# Appendix O.6

# Preliminary First Responders Guide

# Starlight Solar Project
# Major Use Permit PDS2022-MUP-22-010
# (Preliminary) First Responders Guide (FRG)

20250320-SLS-AW0764-FRG-R0

Issued: 21 May 2025

*AHJ Revision Note: This First Responders Guide (FRG) is provided as a "Basis of Design" information only analysis to support the initial permitting of the Starlight Solar Energy Storage Project in San Diego County California. This FRG was created using a theoretical technology agnostic ESS to characterize the failure modes that could result in fire, shock, explosion, or injury to personnel.*

*The information presented in this FRG is provided only as a technical basis for a fire risk assessment for the development of the required Major Use Permit Hazard Mitigation Analysis. This FRG shall be updated upon determination of the actual energy storage technology for the Starlight Solar Project. This FRG is intended to be considered as "information only".*

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## Revision History

| Revision | Date | Description |
|---|---|---|
| 0 | 21 May 2025 | Release to Client for Dissemination |

## Introduction

Hiller has developed this (Preliminary) Emergency Responders Guide (FRG) to support the development of the appropriate emergency response procedures for Empire II LLC (Empire) containerized Battery Energy Storage System (ESS) Starlight Solar Project system is located in San Diego County, Boulevard CA in proximity of 32.66016162785173, -116.28052568720432 as shown in Figure 1. The Project includes a 100 MW solar facility and a 217.5 MW battery energy storage system (BESS) that would be constructed in two phases. This FRG was developed for Phase 1.

The purpose of this FRG is to familiarize all employees and visitors with all facets of the emergency response to fire incidents at the site, where Battery Energy Storage Systems (BESS) are being installed & commissioned. This includes exits and evacuation, fire extinguisher requirements, response to a fire incident, post fire awareness and site maintenance and housekeeping.

This FRG is intended to provide guidance to employees and visitors with information regarding emergency response to fire incidents at a site where battery energy storage systems (BESS) are installed and commissioned. This information includes data about the technology and the product installed and includes information about the alarm and monitoring systems in place to monitor and ultimately mitigate emergency events.

This FRG also gives guidance on actions personnel should take when an alarm sounds, or an incident occurs. These actions include identifying alarm sights and sounds, evacuating the dangerous area, and who to notify during an emergency event. The importance of site maintenance and proper housekeeping to prevent an emergency is also emphasized.

Facility/customer should have their own ERP, and this document can be used a guidance to include in their existing program.

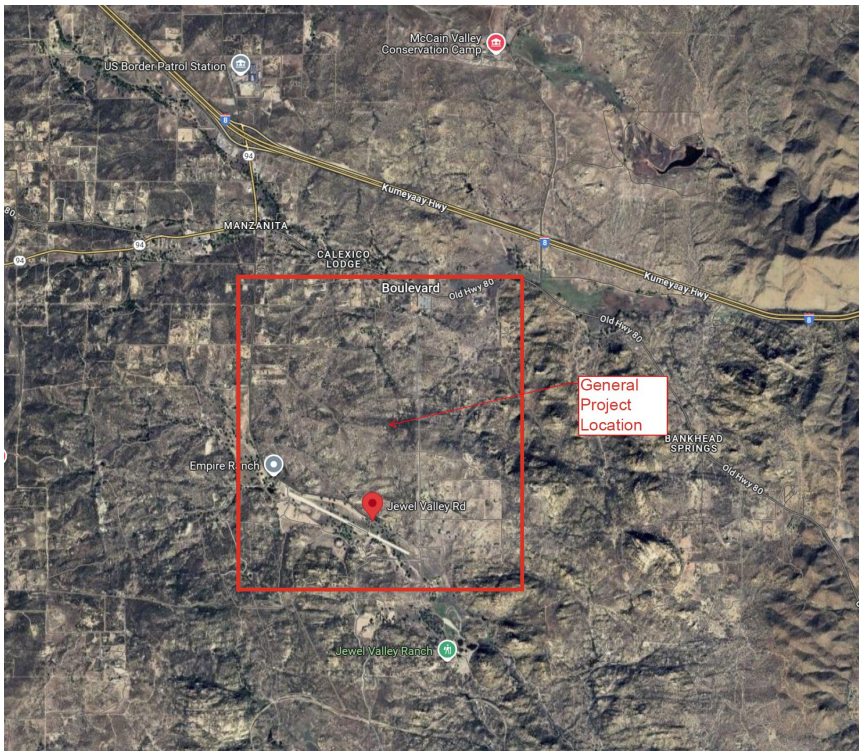



*Figure 1: Starlight Solar Project*

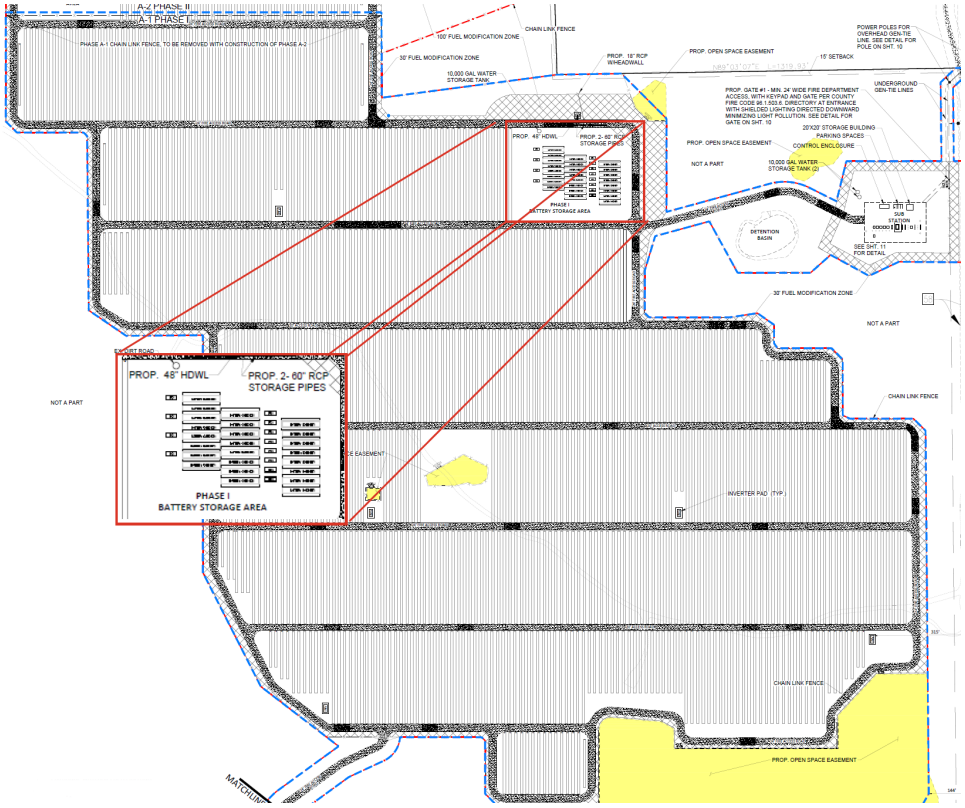



*Figure 2: (ass. Typ.) Starlight Solar Project Plot Plan*

## Purpose

This emergency response guide is provided to assist the San Diego County Operations and Maintenance personnel in establishing an initial understanding of the recommended practices and actions to be followed to be prepared for and to provide immediate and effective responses to emergencies that might arise at the facility. Because the safety of employees is of primary importance, the San Diego Emergency Response Coordinator and each member of the project are committed to providing a safe, healthy work environment and are responsible for ensuring implementation of these procedures.

Rosendin's emphasis on life safety of personnel shall be the highest priority during any event.

This First Responders Guide integrates the recommended processes and principles to present a comprehensive guide from:

- NFPA No.: FPH2008 – *NFPA Fire Protection Handbook* [1]
- 2024 International Fire Code (IFC) [2]
- NFPA 850:2023 - *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations* [3]
- Energy Storage Association, *Energy Storage Corporate Responsibility Initiative Emergency Response Plan* [4]
- Pipeline and Hazardous Material Safety Administration (PHMSA), *2020 Emergency Response Guidebook* [5]
- *Handbook of emergency response to toxic chemical releases: a guide to compliance* [6]
- *The Facility Manager's Emergency Preparedness Handbook* [7]
- *Handbook of Emergency Response: A Human Factors and Systems Engineering Approach* [8]
- FEMA, National Incident Management *System* [9]
- Hiller, Starlight Solar Project *ESS Fire Risk Analysis* [TBA]
- Hiller, Starlight Solar Project *ESS Hazard Mitigation Analysis* [TBA]


Planning for responses to ESS incidents should take into consideration the range of possible conditions and associated hazards as specified Starlight Solar Project Hazard Mitigation Analysis (HMA) [10]. The response should include commonly accepted practices with any hazmat response, including isolating the area to all personnel, confirming location and type of alarm, performing air monitoring, managing ventilation/exhaust, and suppressing fire.

One of the more challenging types of incidents involving the remote location of the Starlight Solar Project BESS Project is the availability of ESS management system operating parameters. This places the responding fire official in the challenging and potentially compromising position of determining what is safe or not with very little information. Integrated energy management systems (EMS) are designed to monitor and manage critical safety parameters of the battery such as cell temperature, voltage, and available current. While this data might prove valuable to responders to best understand the current state of the battery, there is no standard for manufacturers to provide a user interface to access the state of these parameters or a method to interface to monitored alarm systems within the project site.

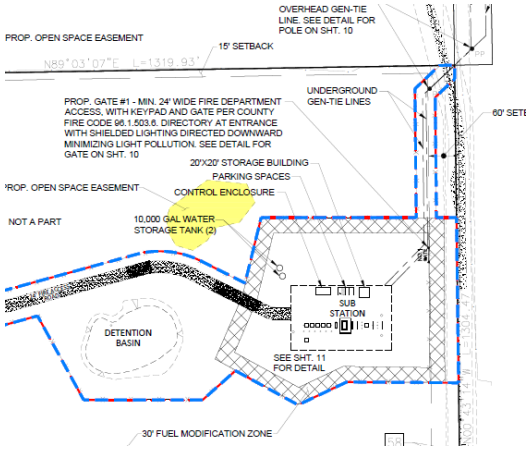



*Figure 3: SDCFD ESS Project Fire Command Center Location*

Any Emergency Operation Procedure (EOP) that is developed for responders should attempt to gather any visible information prior to shutting down the system unless there is clear evidence of imminent danger. Additionally, the response of a qualified and trained individual in ESS should be made available in the event of damage to the installed system.

The Fire Command Center (FCC) is in the Northwest corner of the project site adjacent to the Site Access Gate as shown in Figure 3. The assumed typical corresponding FCC Alarm Input/Output is represented in Figure 4.

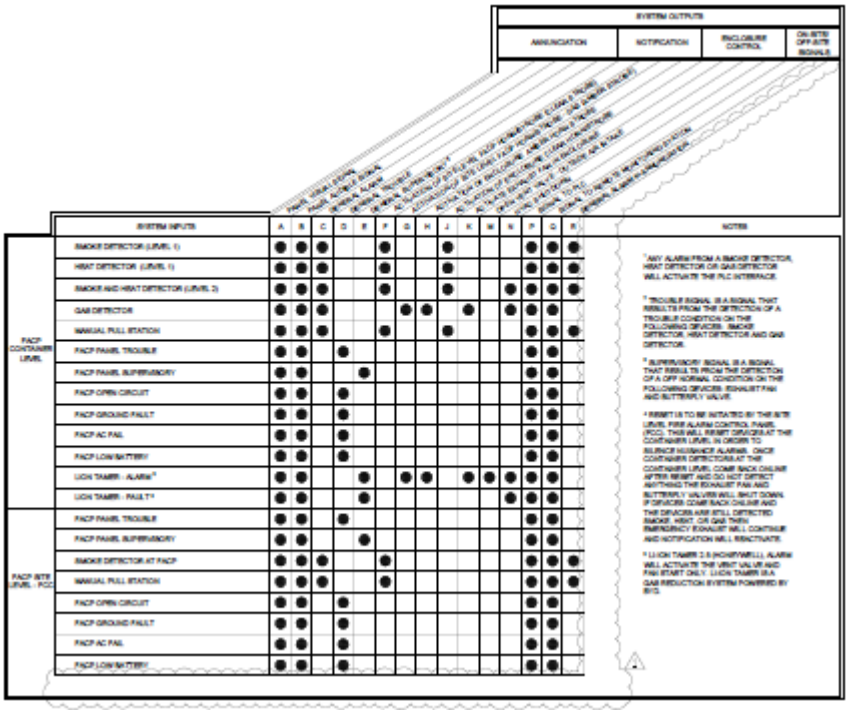


*Figure 4: (ass. Typ.) Fire Control Center Alarm Input/Output Matrix*

## Limitations

This Emergency Response Guide is limited to the recommended response to a fire event associated with the BESS OEM containerized battery energy storage systems for the Starlight Solar Project. This guide should not be interpreted as providing actions to all emergencies. This guide does leverage national and industry information to provide a practical comprehensive series of actions that could be taken in the unlikely event of a fire event.

It is understood the local Authority Having Jurisdiction (AHJ) and Incident Commanders (ICs) will direct Emergency Response Personnel. This guide is intended to provide information to assist AHJs, ICs and other stakeholders in the planning for responding to an unanticipated emergency associated with the BESS.

This Guide is not to be used in lieu of Emergency Response Procedures. Response to emergencies, events or disasters shall only be undertaken to the level of the responders training, Personal Protective Equipment (PPE), and resources available.

Responding to lithium-ion battery fires requires timely identification of the nature of the event, the capabilities of the available resources, time and location of the incident and a thorough exchange of information between Operations and the incident response team.

## Facility Description

The Starlight Solar Project Energy Storage is Starlight Solar located in San Diego County, southeast of Manzanita CA in proximity of 32.66016162785173, -116.28052568720432.

The Starlight Solar Energy Storage Project consists of numerous BESS's distributed throughout the eighty (8) areas for a combined 100 MW solar facility and a 217.5 MW battery energy storage system (BESS) that would be constructed in two phases. The BESS OEM is based on the safe implementation of the $LiFePO_4$ (lithium-Iron-Phosphate, LFP) battery technology developed by Wartsila in Figure 2.

Primary site access via old Highway 80. The parcel falls under State Area Responsibility according to CALFIRE and is categorized as a "high fire hazard area".

Attachment 1 contains maps of the project location. Emergency Management notification information for the project site and external support organizations (police, fire department, medical facilities, etc.) contact information is presented in Attachment 2.

Local Support personnel are available on the site Monday through Friday from 7am to 5pm. The San Diego Project Operations and Site Manager is [TBD].

The Site Manager or their delegate (TBD) is available via cellular phone in case of an emergency at [TBD].

## Emergency Response Plan Review and Revision

It is recommended that a review of all emergency response and operations procedures be reviewed annually for efficacy of information, training, and completeness. A review of the emergency response plans and procedures should be completed or amended whenever there is a change in facility design, construction, operation, or maintenance. This review should also be completed with input from the local Fire Marshall, AHJ, and Fire, Law Enforcement and Medical personnel. Introductions to emergency response policies and procedures should also be reviewed with long-term contractors and/or stakeholders.

## Emergency Response Management

Local or on-site Operations personnel are the primary venue for communicating correct plant conditions. In an emergency the local authorities handle most incidents using the communications systems, dispatch centers, and incident personnel within a single jurisdiction. Larger and more complex incidents, however, may begin with a single jurisdiction, but rapidly expand to multijurisdictional and/or multidisciplinary efforts necessitating outside resources and support. Standard incident command and coordination systems allow the efficient integration of these outside resources and enable assisting personnel from anywhere in the State of California, San Diego County to participate in the incident management structure. In the event there is a State emergency, the Command and Coordination component of California State Emergency Response and Recovery Plan Management Plan describes the systems, principles, and structures that provide a standard, national framework for incident management.

Regardless of the size, complexity, or scope of the incident, effective command and coordination—using flexible and standard processes and systems—helps save lives and stabilize the situation. Incident command and coordination consist of four areas of responsibility:

1. Tactical activities to apply resources on scene.
2. Incident support, typically conducted at EOCs, through operational and strategic coordination, resource acquisition and information gathering, analysis, and sharing.
3. Policy guidance and senior-level decision making; and
4. Outreach and communication with the media and public to keep them informed about the incident.

## Overall Organization

The overall responsibility for the Emergency/Incident Response Plan (ERP) lies with the Starlight Solar Project Emergency Response Coordinator. The Emergency Response Coordinator or their designee is responsible for program implementation, including designating evacuation routes and employee assembly points, coordinating severe weather activities, communicating emergency response procedures to site personnel, contracting with emergency response organizations, and contractor coordination. This guide is provided to assist the ERP with establishing the appropriate response plans and procedures.

Coordinated emergency/incident action planning guides are intended to assist incident management in the response activities. Emergency/Incident action plans (E/IAPs) represent concise, coherent means of capturing and communicating incident objectives, tactics, and assignments for operational and support activities.

It is recommended that every plausible incident should have an action plan; however, not all incidents need written plans. The necessity for written plans depends on incident complexity, command decisions, and legal requirements. Formal E/IAPs are not always developed for the initial operational period of no-notice incidents. However, if an incident is likely to extend beyond one operational period, becomes more complex, or involves multiple jurisdictions and/or agencies, as with the case of recent ESS fire events, preparing a written IAP becomes increasingly important to maintain unity of effort and effective, efficient, and safe operations.

## Roles and Responsibilities

Specific operations management personnel will assume leadership roles for the notification and coordination emergency responses. The Emergency Response Coordinator, Site Manager, and/or Lead Technicians will assist in the implementation of a written plan by knowing and communicating evacuation routes to workers during emergency evacuation and reporting the status of the evacuation to the Fire Department. The Emergency Response Coordinator is responsible for seeing that this plan is implemented and will appoint an adequate number of personnel to enforce the plan, assure everyone is familiar with this plan and act as a liaison with the local Fire Department(s).

All facility personnel have a responsibility to immediately report emergency situations to the Emergency Response Coordinator, Site Manager, and/or Lead Technicians on duty or local emergency responder personnel when appropriate. Delays in notification of Operations should be minimized in the reporting of emergency events that require the San Diego County, CA emergency responders. The Lead Technician will then notify the Emergency Response Coordinator and other key personnel of the situation using the Starlight Solar Project Emergency Notification Telephone List (refer to Attachment 2). In the event of unavailability, plant personnel will refer to the Emergency Notification Telephone list to inform key personnel.

The Emergency Response Coordinator (or designee) shall be responsible for initiating an emergency event notification, including the Regional Manager or the assistant to the regional manager, to initiate corporate awareness and publiccommunications activities in accordance with company structure and policies.

A subject matter expert (SME) shall be contactable at all times by telephone. This person and a designated secondary SME contact should be readily available to firstresponders in case of emergency situations. The SME shall be versed in the battery systems will allow the SME to integrate into the emergency response operations when needed. If this is not practical, a toll-free phone number should be available such that first responders may call at any time, and be given operational data on the system, including its current state of health, system alarm notifications, and advice on how to proceed during an emergency event.

Upon arrival of First Responders and depending on the incident size and complexity, the First Responder Incident Commander may act as the event director to establish support facilities for a variety of purposes and direct their identification and location based on the incident. Typical facilities include the Incident Command Post (ICP), incident base, staging areas, and as necessary establish camps, mass casualty triage areas, points-of-distribution, and emergency shelters.

When an incident occurs within a single jurisdiction and without jurisdictional or functional agency overlap, the appropriate authority designates a single Incident Commander who has overall incident management responsibility. In some cases where incident management crosses jurisdictional and/or functional agency boundaries, the various jurisdictions and organizations may still agree to designate a single Incident Commander.

*"Emergency planning is a continuous process in preparation for future emergencies. It involves a detailed and systematic examination of all aspects of a contemplated emergency"*
- David Cotts, IPMA Fellow

## Preparation and Planning for Emergencies

Pre-planning for emergencies is a crucial element of this plan. The following steps have been provided for consideration when planning for emergency situations at the Starlight Solar Project site:

Effective plans provide a methodology or scheme for responding to any emergency. They are based on well-thought-out assumptions and are not static. They are modified, refined, and updated as a result of new information or as situations change.

The essential characteristics of an emergency/ first responders plan should include the following:

- ***Mission.*** The objective of all planning is to accomplish the mission. The mission should be a clear, concise statement.
- ***Assumptions.*** All plans must be based on factual information or valid assumptions. Any assumption that is made must be as accurate as possible and kept to a minimum.
- ***Resources.*** All resources must be considered and their availability validated. If the facility manager intends to obtain support from a contractor, that should be agreed to in writing and reconfirmed periodically. Community resources must also be coordinated periodically. In-house assets must be inventoried and kept updated; this includes personnel, material, and equipment. Implement mutual aid agreements wherever possible.
- ***Organization.*** Delineation of decision-making authority, responsibilities, and clearly defined relationships is imperative. As stated above, it is best to keep employees doing what they normally do in nonemergency situations to lessen the potential for confusion and redundancy.
- ***Decentralization.*** Facility managers cannot be expected to do everything themselves, therefore, decentralize to the maximum extent possible.
- ***Simplicity.*** The plan should be kept as simple as possible to eliminate confusion and misunderstanding. Use simple, direct language that is easily understood and is not ambiguous.
- ***Flexibility.*** The plan is only that, a plan. This means there must be the element of flexibility to allow for adjustment and corrections based on the site conditions at the time.
- ***Coordinated.*** All elements of the plan fit together, much like a puzzle. This means that every aspect of the plan has been synchronized so that everyone knows his or her role and also what others are doing.

Fire department and other first responders have received a copy of this guide and subsequent plans and have participated in an on-site walk-down and familiarization meeting. All emergency responder access points to the facility shall be identified.

An emergency response information notice board shall be maintained at a posted location and be readily visible and accessible to all on-site personnel and contain key contacts for emergencies, a list of personnelcertified in First Aid/CPR, and other notices as outlined in this document or as deemed appropriate by the Emergency Response Coordinator. Emergency Contact information provided in Attachment 2.

Provision shall be made for non-English speaking workers on site.

All road exits are established and posted on the emergency information notice board.

Evacuation route diagrams have been documented and posted on the emergency information notice board.

All buildings and property surrounded by fencing will be marked by signage that identifies specific hazards (such as the NFPA diamond, and all applicable Danger, Caution, Warning signal words).

Site personnel receive instructions to keep exits from the site or O&M Building clear and to maintain ready access to fire extinguishers by notblocking them with furniture, or any other means.

Safety Data Sheets (SDS) provided by manufacturers shall, where relevant, be provided to first responders.

## Emergency Routes

The Starlight Solar Project Energy Storage Project Evacuation Route(s) shall be posted and orally communicated to sitepersonnel. For planning purposes, it is recommended the existing site access gate with access to Ave 12$^{th}$ East be considered as the primary egress route and staging/assembly area as shown in Figure 5. These procedures shall be discussed at periodic safety meetings in addition to being covered during new employee orientation. Personnel are to know at least two exits whenever possible and be familiar with the evacuation routes posted in the location indicated on the site map (Attachment 1).

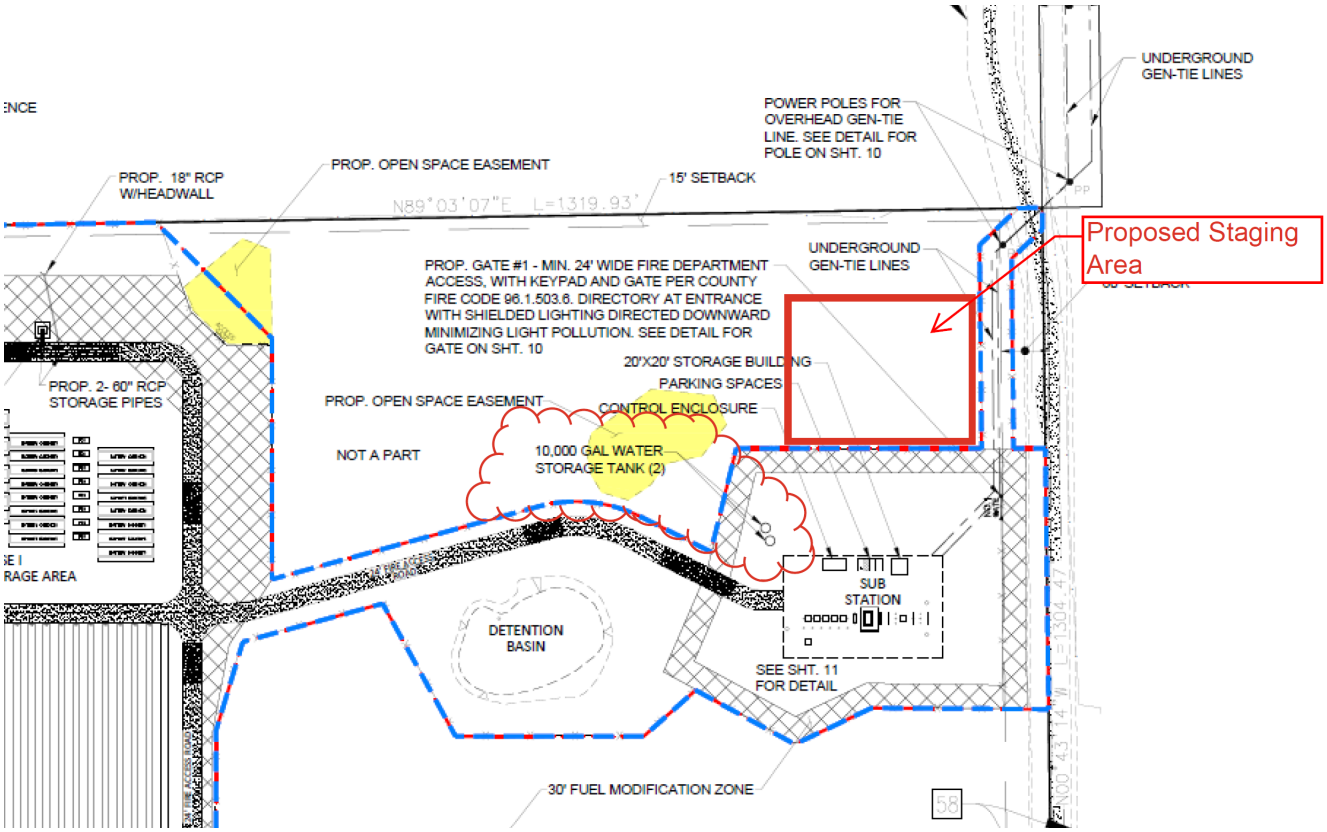



*Figure 5: (Proposed) San Diego Evacuation Route and Staging/Assembly Area*

Depending upon the degree of emergency, weather and/or site conditions, roadways as designated on the site map (Attachment 1) could be used for routes of evacuation. In the event of an evacuation, all personnel will meet at the designated muster/assemble at the main access gate for accountability and further information.

If the main access gate is inaccessible or in the wake of a potentially hazardous toxic plume, personnel shall gather at the secondary access gate located on east side of the ESS Yard and inform the emergency coordinator (if not present) by radio or telephone. The site emergency response coordinator shall inform personnel of a diversion to the secondary access gate by any means possible. If personnel are unable to make it to the designated muster points, they should seek shelter wherever possible and contact their supervisor for further instructions.

Accountability of personnel shall be of the upmost importance and be conducted in a timely manner. Responder access points shall be kept unobstructed at all times so first responders will not be hindered in their operations when responding to emergencies within the site.

## Emergency Communications Management Planning

Responding to an incident or emergent condition requires that personnel rely on flexible communications and information systems to obtain and provide accurate, timely, and relevant information [5, 7, 9, 11]. Establishing and maintaining situational awareness and ensuring accessibility and voice and data interoperability are the principal goals of the Communications and Information Management component. Properly planned, established, and applied communications facilitate information dissemination among command and support elements and cooperating jurisdictions and organizations.

Timely and efficient communications are essential to address the hazards associated with a lithium-ion energy storage emergency situation. The Site Emergency Response Coordinator is the central point of contact for all involved in an emergency response, including for First Responders and Subject Matter Experts (SMEs) [11].

Coordinated communications policy and planning provides the basis for effective communications and information management. Careful planning determines what communications systems and platforms personnel will use, who can use them, what information is essential in different environments, the technical parameters of all equipment and systems, and other relevant considerations. As technologies change and information exchange methods improve, communications management plans and procedures should also evolve.

All stakeholders, including Empire and Starlight Solar Project employees, contractors, and critical infrastructure (grid) owners should be involved in formulating emergency communications management plans and strategies which should be thorough, integrated, and interoperable. Emergency Operations Planners should incorporate sound communication management policies and plans into emergency operations plans and other appropriate plans. Plans should include the following aspects of communications and information management:

- Information needs and potential sources for this information:
- Guidance, standards, and tools to integrate information with partner organizations.
- Procedures, protocols, and networks to release warnings, incident notifications, public communications, and other critical information.
- Mechanisms and protocols for notifying other levels of government and partner organizations.
- Protocols for the effective and efficient use of information management technologies (e.g., computers, networks, and information-sharing mechanisms) to integrate all command, coordination, and support functions; and
- Guidance and mechanisms to ensure that incident messaging is simultaneously accessible to all people, including those who have limited proficiency in English, disabilities, and others who have access and functional needs.

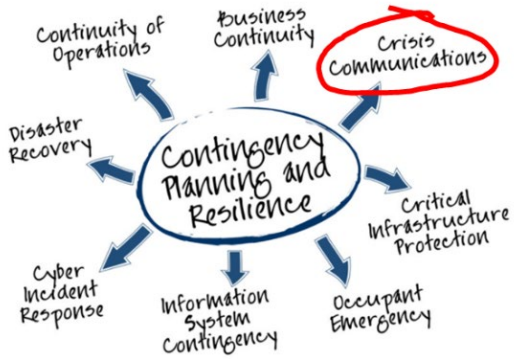
Due to the remote location and size of the San Diego Project, the following processes should be considered as an integral part of the emergency communications management plan:

- Employees using radios/phones shall yield to individuals who are the most directly involved in an emergency response activity, i.e. emergency responsetakes priority over all other communication on the company network.
- Emergency transmissions should be clearly announced using signal words outlined in the Emergency Operations Procedures to establish network prioritization and to signal to others of emergent condition.

- If emergency radio/phone communications are interrupted or unclear, employeesshall proceed to the muster point located at main access gate located on the Northwest corner of the ESS Yard.
- All hand-held radios/phones should be recharged daily with back-up batteriesready for use.
- Radios shall be inspected daily for functionality and a radio check shall be transmitted to confirm that both the transmission and receiving functions work. Ifa radio is not working properly then the employee shall notify the lead technicianand make arrangements for some other form of communication while working.
- Radio's that are not working properly shall be placed out of service and labeledappropriately so they will not be used by another employee.
- Provision shall be made for non-English speaking workers on site.

## Common Terminology

The use of common terminology helps incident personnel from different disciplines, jurisdictions, organizations, and agencies communicate and effectively coordinate activities.




## Plain Language

Using plain language and clear text, not codes, in incident management is a matter of public safety, especially the safety of incident personnel and those affected by the incident. Personnel should use plain language in all communications between organizational elements during an incident, whether oral or written, to help ensure that personnel are disseminating information in a timely and clear manner and that all intended recipients understand. Personnel should avoid using acronyms or jargon unique to an agency, organization, or jurisdiction during incidents that involve multiple jurisdictions or organizations.

## Data Interoperability

An effective emergency communications management plan should establish and apply communications protocols to enable the dissemination of information among management, command, and support elements and cooperating jurisdictions and organizations. Elements of compatible information management include:

- *Data Communication Protocols*: Procedures and protocols for communications (to include voice, data, geospatial information, internet use, and data encryption) to use or share information. This includes structuring and sharing information consistently with the National Information Exchange Model (NIEM).
- *Data Collection Protocols*: Establishing multidisciplinary and/or multijurisdictional procedures and protocols, such as use of the United States National Grid, before an incident allows for standardized data collection and analysis.
- *Encryption or Tactical Language*: When necessary, incident management personnel and their affiliated organizations should have methodology and systems in place to encrypt information to maintain security. Although plain language is appropriate during most incidents, tactical language is occasionally warranted due to the nature of the incident (e.g., during an ongoing terrorist event). In such instances, guidance on the appropriate use of specialized encryption and tactical language should be incorporated in an incident-specific communications plan.

## Emergency Response Personal Protective Equipment (PPE)

The operation, maintenance, and emergency response to a BESS fire event requires knowledge and training in the recognition of the inherent risks. Proper planning for an emergency requires an understanding of the hazards and the associated engineering and administrative controls. When developing the EOPs refer to the Starlight Solar Project BESS Hazard Mitigation Analysis (HMA) for evaluated scenarios upon which a trained Industrial Safety Professional may select the appropriate PPE.

There are different levels of PPE that must be checked and maintained. All personnel who wear levels of protection above and beyond their normal everyday attire must be trained in that PPE. All training of PPE shall be conducted by a competent person and documented. Some PPE have a SCAM (selection, care and maintenance) document that will instruct the end user on thelimitations of the PPE and the proper maintenance of the PPE. Always be aware of individual equipment operational requirements and hazards as well as out of service dates. For example, typical safety PPE may include:

- Safety glasses with side shields (no dark glasses are permitted except those approved for welding or cutting)
- Face shields for cutting & grinding
- Approved safety toe shoes
- Approved hearing protection
- Approved hardhat
- Approved gloves long sleeve shirt and long pants

| DANGER: Risk of Fire and Explosion | |
|---|---|
|   | Fire and Explosive hazards may be present in the event of a battery failure. The Fire Department Personnel should not approach or attempt to enter the Energy Storage System or engage the Emergency Stops (E-Stops).<br><br>Assistance should sought from the System Owner/Operator and any other required SMEs. |

All PPE is required to be worn at all times for the work being conducted. Any PPE that is compromised or no longer considered viable for protection shall be discarded and replaced. Any PPE that comes in contact with hazardous material shall be properly decontaminated and inspected for functionality before being returned to service.

## Safety Training

## General training requirements

Initial training for all site personnel with respect to the contents of this ERP shallbe undertaken upon the start of employment or substantial changes in duties.

Refresher training of the ERP to site personnel shall be conducted at least annually. Documentation of ERP training is to be maintained in site files.

A variety of emergency response drills (such as fire, tornado, bomb threat, etc.as relevant to the site) are to be held by Empire at minimum on a quarterly basis and shall be documented. At least on an annual basis, the San Diego County Fire Department and other emergency response personnel shall be requested to participate and assist with critique of evacuation drills. Table-top exercises are encouraged to familiarize relevant response personnel with procedures for different types of emergencies that could be encountered at thesite.

The site Emergency Response Coordinator and Lead Technicians are trained intheir specific duties upon being assigned these roles or beginning their employment. All building occupants have been instructed in actions to take in case of an emergency through their copies of procedures and training, as needed.

Operator personnel should receive supplier / manufacturer approved training onthe specific characteristics of the energy storage system. Applicable common standards (*e.g.* on electrical safety) should be taken into account.

All personnel who wear levels of protection above and beyond their normal everyday attire must be trained in that PPE. All training of PPE shall be conducted by a competent person and documented.

All hazardous materials incident emergency responders and workers at hazardous materials facilities, transport companies, waste treatment facilities, storage facilities and disposal facilities will be provided training which meets federal and state standards. Such training will be commensurate with their employers or organization Initial and Refresher Training regarding warning systems and alarms shall be conducted at least annually. Documentation of training is to be maintained in site files.

## Warning Systems and Alarms

Audible and visual (e.g., flashing lights) alarm systems should be established that reflectspecific on-site hazard analyses. Personnel should be trained on the significance of different alarms and the corresponding actions as outlined elsewhere in this guide.

Descriptions of each alarm and corresponding actions should be clearly posted on anemergency information notice board (location marked on map in Appendix 1).

Warning systems and alarms should be tested at least every six months or more frequently per manufacturer specifications or code requirements. Tests shall be documented. All site personnel, as well as those offsite who are likely to hear or see analarm, should be made aware of tests so as not to cause undue concern.

## Emergency Response Plan Development


The emergency action planning process and the associated emergency plans are central to managing incidents. The emergency response planning process helps to synchronize multi-stakeholder operations and ensure that they support mission objectives. Emergency response planning is more than producing Emergency Operating Procedures (EOPs) and completing forms—it provides a consistent rhythm and structure to emergency response management.

Operations emergency response personnel managing the incident should develop an EOPs for each operational period. A concise EOP template is essential to guide the initial incident

management decision process and the continuing collective planning activities. The EOP is the vehicle by which leaders on an incident communicate their expectations and provide clear guidance to those managing the incident. The objective of the EOP is to:

- Inform response personnel of the objectives for the operational period, the specific resources that are expected to be available and applied, sequence of actions taken during the operational period to achieve the mission objectives, and to communicate other operational information that could affect the response (e.g., weather, constraints, limitations, etc.).
- Informs partners, stakeholders, Emergency Operations Center (EOC) staff, and regarding the objectives and operational activities planned for the coming operational period(s).
- Identifies individual/organizational work assignments and provides a roadmap of operations during the operational period to help individual/organizational understand how their efforts are integral to the success of the response.
- Demonstrates organizational structure and various operational elements fit into the organization.

## Analyze, Plan, Implement, Evaluate

The goal is to provide a safe, effective, and efficient response to an anticipated emergency situation, while providing continuous support to the organization's mission. To achieve this goal, the facilities department must *analyze* the hazards*, plan* the response*,* practice *implementation, and evaluate* improvement opportunities*.*

- **Analyze:** Analyzing the response is the phase in which the notification takesplace to emergency responders. A series of hazards have been documented in the Hazard Mitigation Assessment that presents the series of analyzed hazards and the associated engineering and administrative controls necessary to mitigate the probability of occurrence and their consequences.
- **Plan:** Planning the response is the phase in which the proper resources and equipment are called to the emergency scene and a plan is developed to mitigatethe emergency.
- **Implement:** Once a plan is developed and the proper resources and equipmentare there, then the Emergency Response Coordinator will make the determination to implement the plan.
- **Evaluate:** Once the plan is implemented, it shall be evaluated for safety and effectiveness. If the plan is not safe or effective, then the process should start over again with **Analyze, Plan, Implement, and Evaluate.**

Only personnel who are properly trained in accordance with 29 CFR Part 1910.120(q)(6) may respond to hazardous chemical releases.

No employee is required or permitted to place himself or herself in harm's way in order to facilitate extinguishment, evacuation, or rescue. All rescue operations will be performed by trained professionals upon their arrival. Rescue operations will only be conducted after a risk-reward analysis is done and proper PPE is used to protect against any adverse hazards that may be encountered.

Incidents where local fire department personnel are involved will be managed under the Incident Commander's plan established by the San Diego County Fire Department. The San Diego County Fire Department Incident Commander will establish the role and responsibilities and will act as the liaison to or for the Emergency Response Coordinator.

## Analyze


The first and most important step of every emergency response requires an assessment of the situation to an appropriate response can be developed. *The key function, however, is to ultimately obtain good, accurate information.* At the initial stage, this may not be possible. If damage is severe, it may be necessary to use qualified members of the team to stabilize the situation and recommend immediate emergency engineered repairs so that rescue operations can be conducted safely. The purpose of damage assessment is to evaluate facilities, buildings, grounds, and utilities to determine whether the organization's mission will be impacted, and safety jeopardized. During emergencies, it may be necessary for the facility manager to activate the damage assessment team to determine damage and recommend the necessary corrective work.

As the emergency situation becomes more stable, the team can efficiently conduct the detailed assessment. Qualified, trained, and experienced personnel should be designated to serve on the team. The team should also have the ability to expand, and contract based on the severity of the damage. A competent, experienced individual should be appointed as the team leader. The team leader is responsible for activating the team when requested to do so. The composition of the team is decided by the team leader and is based on the immediate situation.

Available equipment and resources for use by damage assessment teams must be identified before they are needed. This equipment should be specified in an equipment database and the location of that equipment should always be known. Any cost for the purchase of equipment or material should be tracked, and this information should be provided to the budget and accounting section. In addition to equipment, the facilities organization should also have standing contracts that can be initiated immediately.

When conducting damage assessment equipment and system inventories, general facility information initially can be obtained from several sources, such as:

- Manufacturer's recommendations, which are usually annotated in operational and all internal equipment manuals
- Building construction and renovation specifications of former renovation or new construction contracts, which are kept in the engineering archives
- As-built drawings, which are the final project plans, annotated with changes made in the field
- Preventive and predictive maintenance databases
- Warranty information
- Known deficiencies

*Without entering an immediate hazard area,* the employee who first discovers anemergency should identify the following:

- Is there a fire, spill, explosion, or other incident happening?
- Does medical assistance appear to be needed?
- Who/what is at risk: people, the environment, or property?
- What are the weather and terrain conditions and risks?

The employee will also isolate the area to keep people away from the scene until trained responders arrive, as long

as it is safe to do so. An employee who has not received training in emergency response should take no actions beyond notification, isolation of the area, and personal safety precautions. Any efforts made to rescue people, protect property, or protect the environment must be weighed against the possibility of becoming part of the problem. Attempts to rescue others shall only be attempted with proper PPE, proper training, and in a manner that does not create significant risk to rescuers or others. People at the scene must not contact spilled material or inhale fumes, smoke, or vapors.

## Plan


There are many ways to successfully plan, train, and exercise, but best practices have been observed during numerous incident response exercises and competitions. The following is a generalized approach based on those best practices that have proven effective for a hazardous materials response team. It is not all-inclusive or detailed enough to build a complete program but provides a sound framework to do so.

The main point is to plan to a sufficient level of detail to positively influence the training and exercise program.

1. Initial information gathering.
    a. Take the initial call
    b. Employ a checklist to capture as much relevant information as possible
    c. Provide an initial assessment of the hazards
2. Organizing the team
    a. Gather all personnel present in the office
    b. Assigning team roles
    c. Consider recalling other personnel
3. Initial response team activation
    a. Take an initial response team kit
    b. Know location of/directions to Incident Command Post
    c. Establish safe egress routes
4. Equipment preparation
    a. Use checklist to pull equipment off the shelf and get ready for deployment
    b. Perform calibrations/operations checks
    c. Conduct background measurements
    d. Establish, communicate, and prepare response vehicle and trailer location and equipment contents.
    e. Ensure auxiliary equipment (e.g., generators) are staged, maintained, and ready upon demand.
5. Initial response team arrival
    a. Report to Incident Commander
    b. Obtain critical incident details using a checklist
    c. Begin shaping the remainder of team's response
    d. Establish single point of contact for the Incident Commander
6. Owner Support Personnel Follow-on team arrival/entry
    a. Report to Owner Response Team Chief
    b. Stage equipment/supplies

   c. Receive situation briefing from Owners Response Team Chief
   d. Establish entry objectives and specify associated tasks
   e. Don personal protective equipment
   f. Receive safety briefing
   g. Enter the hot zone only as directed by Incident Commander
   h. Perform tasks to fulfill entry objectives and exit hazard zone upon completion.
7. Follow-on team exit
   a. Decontamination
   b. Doff personal protective equipment
   c. Brief response team chief
8. Post Response Equipment and Supplies Reconstitution
   a. Repack materiel onto trailer/response vehicle
   b. Return materiel to permanent storage location
   c. Plug in batteries to recharge them
   d. Refill self-contained breathing apparatus cylinders
   e. Order replacement supplies
9. Reporting
   a. Complete postexercise/incident summary (PEIS) report within a specified time
   b. Submit the PEIS report to medical readiness
   c. Comply with other local reporting requirements

After all life hazards are no longer a threat, a plan of operation shall be devised for remediation of the event. The plan shall be communicated to all responders and the safety of all responders shall be paramount. A staging area, if needed, shallbe identified for extra personnel and equipment that may be needed to accomplish the plan s objectives. All responders that will enter the hot zone (hazard area) must be made aware of any decontaminated area upon their exit of the hot zone. Trained responders will be called to the scene by the O&M Manager and/or Lead Technicians to begin the process of hazard assessment and to establish objectives and priorities. The hot zone shall be identified, and all non-essential personnel shall not be permitted to enter this area without proper training and permission of the Emergency Response Coordinator.

## Implement

The initial response phase starts with notification, which activates the emergency response system. Anyone who observes or receives information regarding an emergency at Starlight Solar Project should immediately notify available personnel using the approved radio network or their issued cell phones. The Emergency Response Coordinator and/or Lead Technician will ensure 911 is notified. The employees shall be notified of emergencies by cell phone/radio and word of mouth from the Emergency Response Coordinator and/or Lead Technicians. Attachment 2 provides a list of emergency notification information for Site/Project personnel.

If an event has the potential to impact the local community, the Operations personnel on shift will contact local fire/police to make community notifications. The contact list in Attachment 2 also provides notification information for the Company Public Affairs team who will provide guidance for instances involving the media. The Emergency Response Coordinator and/or Lead Technicians will coordinate any media efforts through the San Diego Asset Manager and Company Legal Department.

The incident command post will be set up in a location free of contaminants and located upwind uphill and upstream. The Emergency Response Coordinator or designee shall remain at the incident command post to serve as a liaison

to the Incident Commander designated by emergency responders. Trained responders may enter the "hot zone" only when wearing the appropriate PPE. Personnel entering the hot zone shall be briefed on the plan before entering. All communication devices shall be tested prior to entry into the hot zone. A decontamination corridor shall be established prior to entry into the hot zone. There shall be accountability taken of all personnel entering and leaving the hot zone. A back up team that has the same PPE shall be at the ready in the event of the entry team needs quick assistance. A decontamination team shall be ready to after exiting the location (warm zone). There shall be a doffing station that is set up immediately at the end of the decontamination section that will allow the responders to a safe place to remove their PPE. Only trained responders are authorized to risk exposure to chemicals for purposes of containing or stopping the material release.

The Emergency Response Coordinator or a designee will be responsible for notifying the appropriate regulatory agencies and, if necessary, the EmergencyResponse Contractor or mutual aid groups. Attachment 2 includes a list of emergency contacts and agencies that may be notified in the event of an emergency. The incident will be documented and kept on file.

## Evaluate

During the implementation phase of the emergency, response, action and progress shall be analyzed by the Emergency Response Coordinator constantly.If the plan seems to be ineffective or unsafe the responders shall be removed from the hot zone and the plan shall be revised. The new plan shall be implemented, and that revised plan shall be analyzed for safety effectiveness again.

## Evacuation Procedures

When notified to evacuate, site personnel shall do so in a calm and orderly fashion, keeping the following instructions in mind: ho need assistance as long as doing so does not put you at greater risk. Stay upwind, upstream, and uphill whenever possible. Watch other traffic and equipment on access roads and roadways.Be aware of ice/snow and loose gravel conditions. Drive safely.

Site personnel shall go to the primary designated muster area as identified in Attachment 1 (NW corner of ESS Yard). If employees are unable to make it to the muster area, they should divert to the secondary muster area and immediately contact their supervisor for further instructions.

During evacuation, the Emergency Response Coordinator and/or Lead Technicians should ensure that every person on his/her crew has been notified and that evacuation routes are clear. Any person with a disability (mobility, hearing, sight, etc.) who requires assistance to evacuate is responsible for pre-arranging with someone in their immediate work area to assist them in the event of an emergency. Anyone knowing of a person witha disability or injury who was not able to evacuate will report this fact immediately to theirsupervisor. This information shall be communicated to emergency responders immediately upon their arrival if the disabled person has not been evacuated.

Once an evacuation is complete, the Emergency Response Coordinator or Lead Technician should account for all personnel. This accountability information shall becommunicated to the emergency responders immediately upon their arrival. When aperson is unaccounted for, the following information shall be communicated to the emergency responders:

- Name of the individual
- Disabled or not disabled

- Work location
- Last known location

## Post Emergency Reporting Procedures


Following any emergency described in this plan, and in compliance with facility permitsand other County and/or State requirements, an incident report will be prepared by theEmergency Response Coordinator and transmitted to the appropriate individuals and agencies after review by the Company Regional Manager.

Typically, the Emergency Response Coordinator shall compile all documentation and perform a post-emergency investigation. Performance of this activity should happen as early in the processes as possible as it will aid in determining the exact circumstances and cause of the incident. Issues to be determinedinclude:

- Causes of the incident.
- Effectiveness of the emergency response plan.
- Need for amendments to the response plan.
- Need for additional training programs.

The fire department/Incident Commander will make the final determination regarding when the scene is safe to release the site to staff. In some circumstances the scene may need to be safeguarded by investigators to examine the event failures. If the event was caused by acriminal act, the O&M manager shall be guided by law enforcement for direction. If the facility is not able to reopen due to the event, the Plant Manager will make a determination regarding continuity of operations for the facility in consultation with the Company Regional Manager.

## Fire Incidents

All personnel working on the Starlight Solar Project are to be trained and should know how to prevent and respond to fire emergencies. All on-site personnel shall:

- Complete an on-site training program identifying the fire risks on the Starlight Solar Project.
- Understand the protocol and follow emergency procedures should an event occur.
- Review and report potential fire hazards to the Emergency ResponseCoordinator.

No employee is required or permitted to place himself or herself to facilitate extinguishment, evacuation, or rescue. All rescue operations will beperformed by trained professionals upon their arrival.

## Hazardous Conditions Associated with Energy Storage Systems

The Starlight Solar Project Energy Storage Systems presents a unique challenge for fire fighters. Energy storage systems, unlike a typical electrical or gas utility, do not have a singlepoint of disconnect. Whereas there are disconnects that will de-energize selectparts of the system, batteries will remain energized. The BESS OEM is

equipped with an Emergency Stop Button that de-energizes a portion of the ESS Container, but the Auxiliary Power System will remain energized.

The following hazards may be encountered when fighting fires in energy storage systems:

- Battery Fires
- Failure of Control Systems
- Mechanical Damage leading to Electrical Transients
- Shock or arcing hazard due to the presence of water during suppression activities.
- Related electrical enclosures may not resist water intrusion from the high-pressure stream of a fire hose.
- Batteries damaged in the fire may not resist water intrusion.Damaged conductors may not resist water intrusion.
- Chemical spills.Toxic gases.
- Thermal runaway and explosions.

## Hazard – Battery Fires

Li-ion battery fires are often very intense and difficult to control. They can also be very dangerous to fire fighters and other first responders because, in addition to the immediate fire, explosion and electricity risks, as is with most fire events, the by-products of combustion and may be harmful to human exposure without the use of proper personnel protective equipment (PPE). Firefighters and other first responders shall be trained and knowledgeable about how they react and how to respond to these types of incidents.

## Hazard – Radiated Thermal Energy

[NFPA 551 Fire Risk Analysis and Heat Flux Study to be Accomplished]

The [TBD] team has conducted a series of analysis to quantify the thermal energy hazards associated with a worst-case fire scenario. A portion of this analysis is provided to characterize and summarize the thermal energies associated with a potential fire event.

| WARNING: Extreme Heat | |
|---|---|
|  | Burn Hazard: Potentially Hot Surface and High Radiated Heat when Energy Storage Systems are on fire.<br><br>DO NOT TOUCH |

Figure 6 presents the radiated heat flux as a function of distance from a fully engaged energy storage system. Table 1 presents the physiological effects of thermal radiation and the time of exposure to extreme pain and 2nd degree burns.

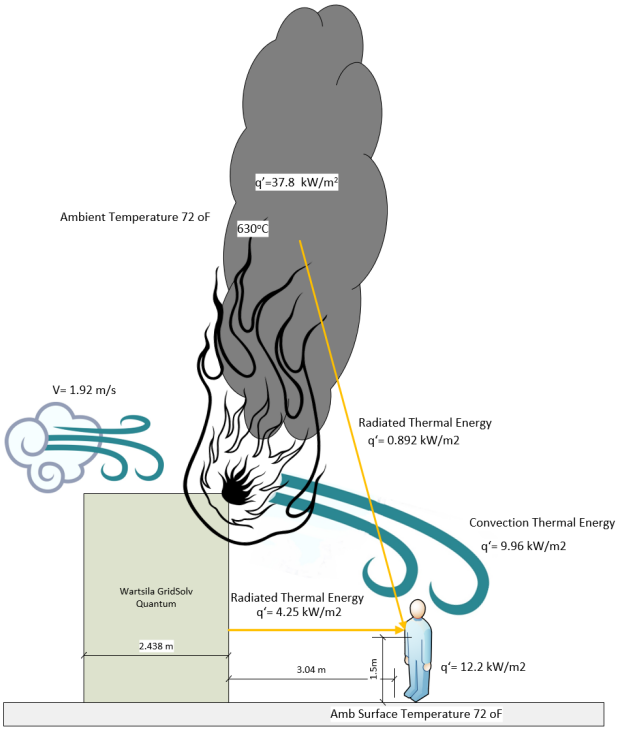



*Figure 6: Maximum Theoretical Momentary Heat Flux Exposure at 3.04 m (10') at a height of 1.5m*

*Table 1: Physiological Effects of Thermal Radiation [12]*

| Time for Physiological Effects (on bare skin) to Occur Following Exposure to Specific Thermal Radiation Levels | | |
|---|---|---|
| Radiation Intensity (kW/m2) | Time for Severe Pain (seconds) | Time for 2nd Degree Burn (seconds) |
| 1 | 115 | 663 |
| 2 | 45 | 187 |
| 3 | 27 | 92 |
| 4 | 18 | 57 |
| 5 | 13 | 40 |
| 6 | 11 | 30 |
| 8 | 7 | 20 |
| 10 | 5 | 14 |
| 12 | 4 | 11 |

## Hazard – Toxic Gas Release

It is well documented that Lithium-ion battery fires generate intense heat and considerable amounts of gas and smoke [13-23]. Although the emission of toxic gases can be a larger threat than heat, the knowledge of such emissions is very limited for large grid-connected energy storage systems. Therefore, the following discussion outlines the findings of research into peer-reviewed publications and government sources to identify the potential toxic gas constituents in a BESS fire.


The New York State Energy Research & Development Authority (NYSERDA) and Consolidated Edison, the New York City Fire Department (FDNY) and the New York City Department of Buildings (NY DOB) DNV-GL were commissioned to address code and training updates required to accommodate deployment of energy storage in New York City. The research by NYSERDA concluded "that all batteries tested emitted toxic fumes, the toxicity is similar to a plastics fire and therefore a precedent exists"[15]. Several different manufacturer batter cells were tested and the typical gases emitted included:

- Carbon monoxide (CO)
- Hydrochloride (HCl)
- Hydrogen Fluoride (HF)
- Hydrogen Cyanide (HCN)

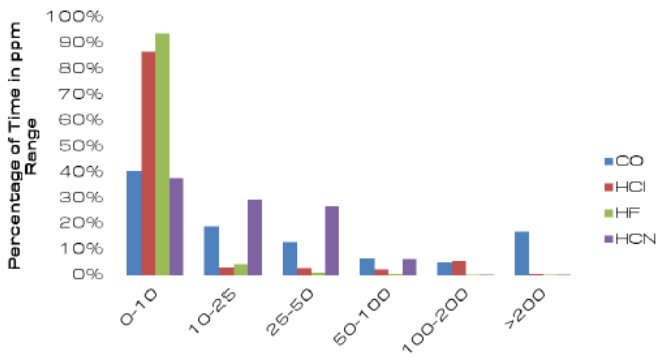



*Figure 7: Representative emissions histogram from a Li-ion battery*

DNV-GL concluded the "average emissions rate of a battery during a fire condition is lower per kilogram of material than a plastics fire"…."However, the peak emissions rate (during thermal runaway of a Li-ion battery, for example) is higher per kilogram of material than a plastics fire. This illustrates that a smoldering Li-ion battery on a per kilogram basis can be treated with the same precautions as something like a sofa, mattress, or office fire in terms of toxicity, but during the most intense moments of the fire (during the 2-3 minutes that cells are igniting exothermically) precautions for toxicity and ventilation should be taken. It should be noted that if Li-ion battery modules are equipped with cascading protections, the cell failure rate may be randomized and staggered. The randomized failure rate limits the toxicity and heat release rate of the fire"[15]. However, few studies have been published that report measurements of released HF amounts from commercial Li-ion battery cells during abuse and HF release during electrolyte fire tests [17, 18, 24].

Larsson et al. studied a broad range of commercial Li-ion battery cells with different chemistry, cell design and size and included large-sized automotive-classed cells, undergoing fire tests. Their objective was to evaluate fluoride gas emissions for a large variety of battery types and for various test setups. Based on their specialized results, they

determined as a function of LIB design, a wide range of amounts of HF, ranging between 20 and 200 mg/Wh of nominal battery energy capacity, were detected from the burning Li-ion batteries [17, 24, 25].

Larsson determined the vented gases can contain evaporated solvents and decomposition products, e.g. CO, CO2, H2, CH4. Besides CO, a large number of different toxic compounds can be released including fluoride gases and most concerningly Hydrogen fluoride (HF). The fluorine in the cells comes from the Li-salt, e.g. LiPF6, but also from electrode binders, e.g. PVdF, electrode materials and coatings, e.g. fluorophosphates and AlF3-coated cathodes, as well as from fluorine containing additives, e.g. flame retardants [24]. $PF_5$, $POF_3$ and HF are of greatest concern but consideration should also be given to the fluorinated phosphoric acids since they will give HF and phosphoric acid when completely reacted with water [18].

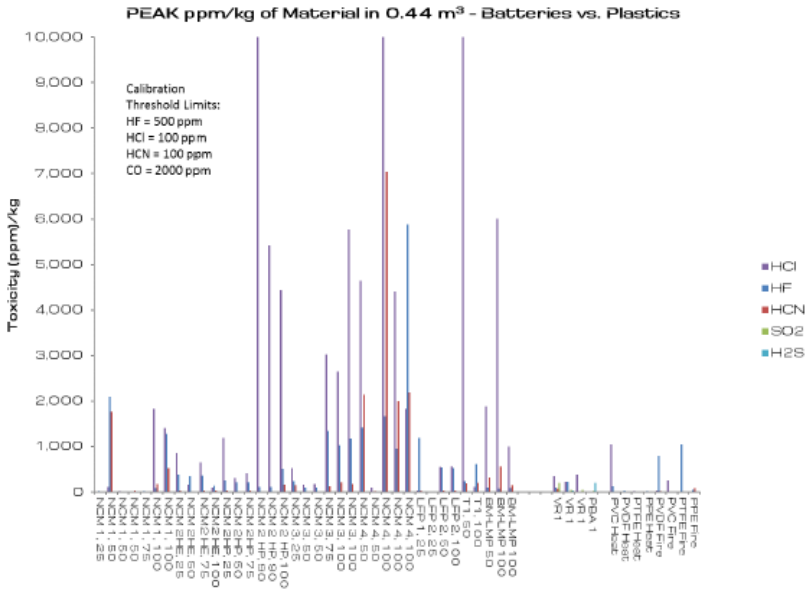



*Figure 8: Peak ppm per kg (in a 0.44 m3 volume) for all batteries tested as compared to plastics [15]*

The National Institute for Occupational Safety and Health (NIOSH) states that HF has a Immediately Dangerous to Life and health (IDLH) value of 30 ppm as shown in Table 2 [26]. No exposure limits are given for Phosphorus pentafluoride ($PF_5$) and Phosphoryl fluoride ($POF_3$), however their chlorine analogues, Phosphorus pentachloride ($PCl_5$) and Phosphoryl chloride ($POCl_3$) have recommended exposure limits (REL) values of 0.1 ppm [26].

As it pertains to the BESS OEM LFP cells, the work performed by the SP Technical Research Institute of Sweden when testing $LiFePO_4$, lithium ion phosphate cells, determined the measured concentrations of HF were "generally quite low but well above the detection limits" [18].

The SP Technical Research Institute of Sweden concluded based on their research "$POF_3$ was detected in all the small scale tests using pure electrolyte. However, no $POF_3$ was detected in the tests on cells. The detection limit for $POF_3$ was 6 ppm. Extrapolating from the small scale tests to the cells tests one ends up at concentrations below 6 ppm, which probably explains why no $POF_3$ was detected in these tests" [18]. "It is an important finding that $POF_3$ is emitted from a battery fire as this will increase the toxicity of the fire effluents. The amount of $POF_3$ is shown to be significant, 5-40 % of the HF emissions on a weight basis.

No PF5 could be detected in any of the tests" [18].

*Table 2: NIOSH Chemical Listing for Hydrogen Fluoride (HF)*

| **Hydrogen fluoride** | **Formula:** HF | **CAS#:** 7664-39-3 | **RTECS#:** MW7875000 | **IDLH:** 30 ppm |
|---|---|---|---|---|
| **Conversion:** 1 ppm = 0.82 mg/m$^3$ | **DOT:** 1052 125 (anhydrous); 1790 157 (solution) | | | |
| **Synonyms/Trade Names:** Anhydrous hydrogen fluoride; Aqueous hydrogen fluoride (i.e., Hydrofluoric acid); HF-A | | | | |
| **Exposure Limits:**<br>**NIOSH REL:** TWA 3 ppm (2.5 mg/m$^3$)<br>C 6 ppm (5 mg/m$^3$) [15-minute]<br>**OSHA PEL†:** TWA 3 ppm | | | **Measurement Methods (see Table 1):**<br>**NIOSH** 3800, 7902, 7903, 7906<br>**OSHA** ID110 | |
| **Physical Description:** Colorless gas or fuming liquid (below 67°F) with a strong, irritating odor. [**Note:** Shipped in cylinders.] | | | | |
| **Chemical & Physical Properties:**<br>**MW:** 20.0<br>**BP:** 67°F<br>**Sol:** Miscible<br>**FI.P:** NA<br>**IP:** 15.98 eV<br>**RGasD:** 0.69<br>**Sp.Gr:** 1.00 (Liquid at 67°F)<br>**VP:** 783 mmHg<br>**FRZ:** -118°F<br>**UEL:** NA<br>**LEL:** NA<br>Nonflammable Gas | **Personal Protection/Sanitation (see Table 2):**<br>**Skin:** Prevent skin contact (liquid)<br>**Eyes:** Prevent eye contact (liquid)<br>**Wash skin:** When contam (liquid)<br>**Remove:** When wet or contam (liquid)<br>**Change:** N.R.<br>**Provide:** Eyewash (liquid)<br>Quick drench (liquid) | | **Respirator Recommendations (see Tables 3 and 4):**<br>**NIOSH/OSHA**<br>**30 ppm:** CcrS*/PaprS*/GmFS/Sa*/ScbaF<br>**§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba<br>**Escape:** GmFS/ScbaE | |
| | **Incompatibilities and Reactivities:** Metals, water or steam<br>[**Note:** Corrosive to metals. Will attack glass and concrete.] | | | |
| **Exposure Routes, Symptoms, Target Organs (see Table 5):**<br>**ER:** Inh, Abs (liquid), Ing (solution), Con<br>**SY:** Irrit eyes, skin, nose, throat; pulm edema; eye, skin burns; rhinitis; bron; bone changes<br>**TO:** Eyes, skin, resp sys, bones | | | **First Aid (see Table 6):**<br>**Eye:** Irr immed (solution/liquid)<br>**Skin:** Water flush immed (solution/liquid)<br>**Breath:** Resp support<br>**Swallow:** Medical attention immed (solution) | |

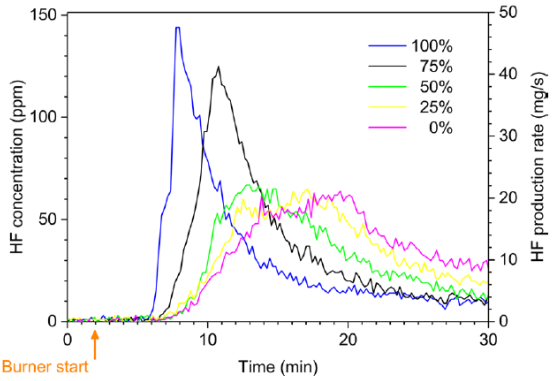



*Figure 9: HF release both as the measured concentrations[17]*

Research has shown that the complex mixture of flammable and toxic gases are emitted from the thermal decomposition of LIB is manufacturer and chemistry dependent. The composite breakdown of particles is a function of the size of the energy source and the inherent design chemistry that can only be estimated based on the research of others. To date, there is no readily identifiable performance data for the batteries used in the BESS OEM applications. Therefore, the following list of potentially flammable and toxic gases is theoretical based on the cited works of [13-23]:

*Table 3: List of Potential Emitted Gases during Thermal Runaway.*

| Gases Measured | Chemical Formula | Gas Type |
|---|---|---|
| Acetylene | C2H2 | Hydrocarbons |
| Ethylene | C2H4 | Hydrocarbons |
| Ethane | C2H6 | Hydrocarbons |
| Methane | CH4 | Hydrocarbons |
| Methanol | CH3OH | Hydrocarbons |
| Formaldehyde | CH2O | Hydrocarbons (Aldehydes) |
| Hydrogen Bromide | HBr | Hydrogen Halides |
| Hydrogen Chloride | HCl | Hydrogen Halides |
| Hydrogen Fluoride | HF | Hydrogen Halides |
| Hydrogen Sulfide | H2S | Sulfur Containing |
| Carbon Dioxide | CO2 | Carbon Containing |
| Carbon Monoxide | CO | Carbon Containing |
| Ammonia | NH3 | Nitrogen Containing |
| Hydrogen Cyanide | HCN | Nitrogen Containing |
| Hydrogen | H2 | - |
| Sulfur Dioxide | SO2 | Sulfur Containing |

It is noted that while the DNV-GL/NYSERDA report lists only 4 emitted gases, NRTL testing of the 280 Ah batteries measured the following emitted gases:

- "Carbon dioxide (CO2)
- Carbon monoxide (CO)
- Methane (CH4)
- Ethylene (C2H4)
- Ethane (C2H6)
- Propene (C3H6)
- Propane (C3H8)
- Hydrogen (H2)"[27]

The Hiller Team included the expertise of Jensen-Hughes in the characterization of the flammable gas emission. Assuming a 4-cell failure, it has been determined the HF plume envelope can be as high as 5 meters and travel a distance of 36 meters. Figures 17 and 18 present the results of the third-party Plume Study of the HF dispersal as a function of distance [28].

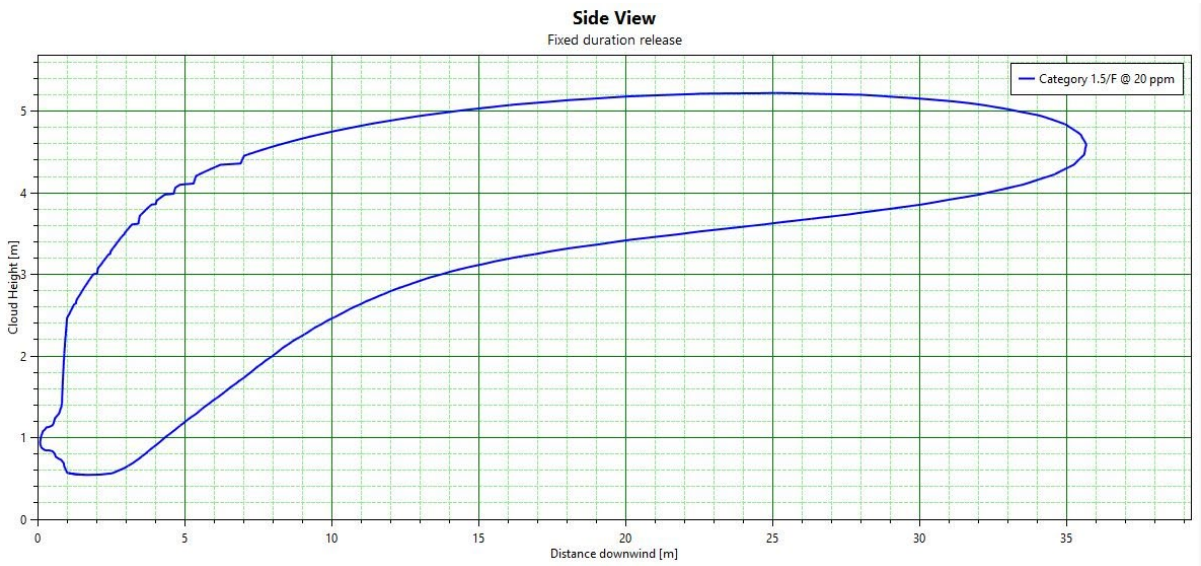



*Figure 10: (typ.) HF Cloud Dispersal Section View*

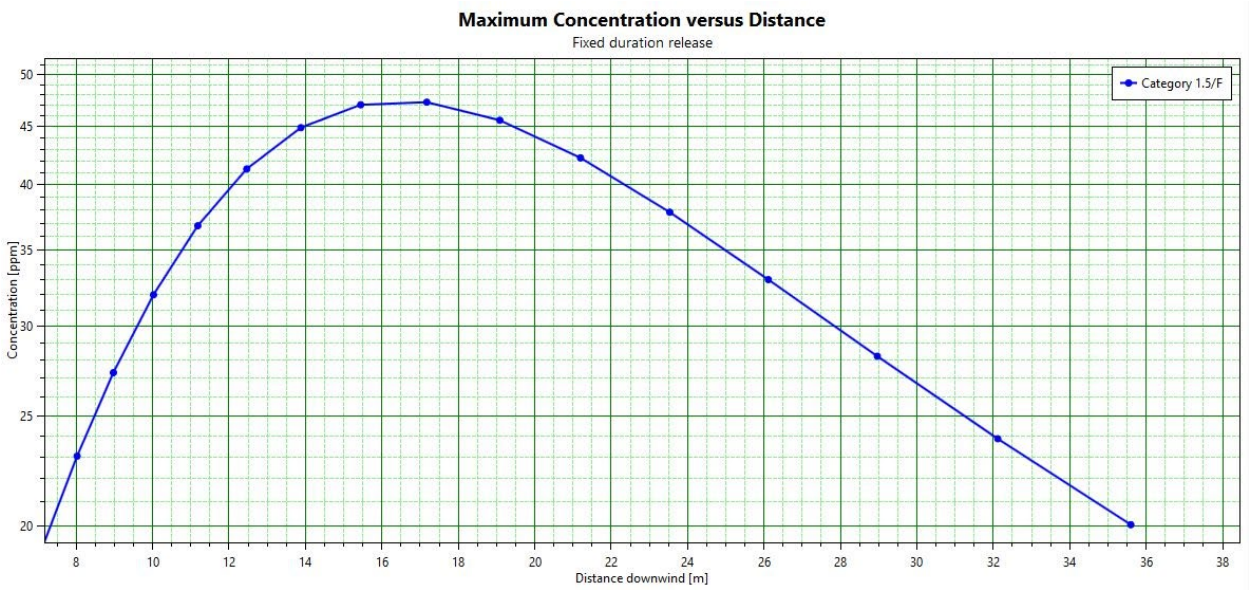



*Figure 11: (typ.) HF Dispersal Concentration as a Function of Distance*

Therefore, it is recommended the Minimum Approach Distances for the BESS OEM be set at a conservative distance of 50 feet when responding to a fire.

### Hazard – Failure of Control Systems

Another issue can be failure of protection and control systems. For example, in a theoretical fire event, the main control system (Energy Storage Management System – ESMS) can lead failure of the Battery Management System (BMS) resulting in overcharging and an inability to monitor the operating environment, such as temperature, current, and cell voltage at cell, module, and rack levels. Caution is recommended when approaching a damaged BESS when the condition of the ESMS or BMS is unknown.

## Hazard – Sensitivity of Li-ion Batteries to Mechanical Damage & Electrical Transients

Contrary to existing conventional battery technology, Li-ion batteries are very sensitive to mechanical damage and electrical surges. This type of damage can result in internal battery short circuits which lead to internal battery heating, battery explosions and fires. The loss of an individual battery can rapidly cascade to surrounding batteries, resulting in a larger scale fire.

## Hazard - Electrical (General)

As an electrical energy storage system, the Starlight Solar Project has inherent electrical risks. Only qualified personnel who are working under an approved work authorization package shall have access to exposed electrical conductors. For First Responders, training and education of a response to energized electrical equipment is required. Some of the known hazards associated with electrical energy storage systems include:

- Overcharge
- Short Circuit
- Overcharge Protection
- Imbalanced Charging
- Temperature
- Dielectric Withstand
- Grouping Continuity
- Failure of Cooling/Thermal Stability System
- Mechanical Damage

| Warning : Electrical Shock Risk | |
|---|---|
|  | Electrical Shock Hazard: Do Not Open or Operate Controls. Use Appropriate PPE and Obtain Authorization from the System Owner/Operator and any other required SMEs. |

## Hazard – Battery Compartment Electrical Energy

The BESS is an integrated system consisting of power converter equipment (PCE) that is electrically connected to each containerized BESS. The PCE controls the conversion to, or from, AC Current and DC Current. The AC side of the PCE can be easily electrically isolated following approved Lock-and-Tag procedures. Similarly, the DC side can also be isolated from the Battery Enclosure itself on a defined location/isolation switch. Refer to the applicable site PCE drawings for exact location of the approved isolation device.

Caution is required as there may be electrical energy within a BESS when the system has been compromised by an incident or fire. Isolation and switching shall only be performed by a trained and competent individual.

## Hazard – Battery Compartment Stored Energy

Under normal operating conditions, with the enclosure doors closed, does not pose electrical hazards. The stack design incorporates safeguards to help ensure that high voltages are contained, and the enclosure is rendered touch safe. The cells are grouped in a tiered subassembly architecture which includes modules (eight cells connected in

series) and packs (three modules connected in series) that have their own metallic enclosures which is bonded per UL 9540 requirements. The stack metal enclosure is also bonded in accordance with bonding requirements in the NFPA 70:2023, the *National Electrical Code* (NEC) and it uses touch-safe connectors. Typically access to internal components of the stack is limited to Empire authorized personnel only [29].

| DANGER: Stranded Energy Risk | |
|---|---|
|  | Removal of Electrical Power to the ESS unit(s) does not de-energize the battery and shock hazard may still be present. Always treat the batteries as Energetic Hazardous Materials, as they may maintain their State of Charge (SOC) long after the removal of power to the overall ESS. |

During maintenance, when the stack doors are open and certain components are serviced, additional precautions are needed due to potential for arc flash/blast. Empire can provide a complete arc flash analysis prepared by a third party that provides an estimate of the incident energy and recommends an appropriate class of personal protective equipment.

The stored battery energy is controlled by the contactor, and when each contactor is open then the Racks are separate, but the stored battery energy within each of the Modules cannot be made safe.

Therefore, there will always be an Arc Flash Thermal Energy Risk and Shock Risk of varying proportions since the batteries will always have residual voltage and current potential.

Anyone working on the Battery Enclosure and encroaching within the Arc Flash Boundary (AFB) is required to wear PPE to meet the incident energy levels as indicated on the Arc Flash label below. Signage shall be posted to warn employees and first responders during live work with minimum PPE.

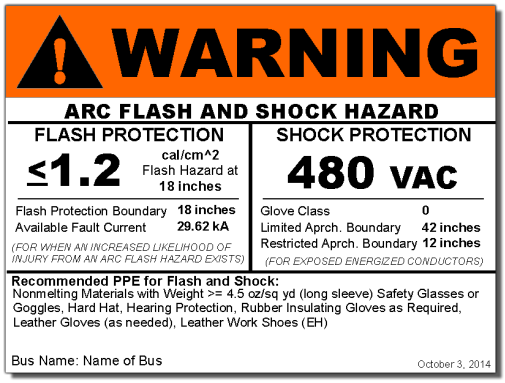



*Figure 12 PPE Warning (typ.)*

Fire responders have their own PPE and shall be made aware, by the person who called them, that they are dealing with Li-ion batteries. First responders shall be made aware through training and upon arrival on scene of incident that full firefighter turnout PPE as well as SCBA is advisable.

## Hazard – Battery Electrolyte (General)

The electrolyte in each Module is a non-aqueous organic solvent, and although the electrolyte is highly flammable,

the internal organic material will burn if the cell is incinerated.

### Hazard – Environmental

As with all fire events, each fire has unique emissions and effluents when suppression is applied. The Starlight Solar Project likewise presents a unique environmental impact when water suppression or evaporative cooling is applied. Caution should be exercised when spraying down the engaged ESS or when evaporative is applied to the adjacent enclosures as the effluents could entrain toxic chemicals that may be harmful to personnel and the environment. Wetting ESS's will create a potential hazard to life and the environment would be created when interaction takes place with the failed batteries, which could produce potentially hazardous chemicals. The primary hazard would be the hydrogen fluoride created. A self-contained breathing apparatus shall be worn at all times along with full personal protective equipment. Efforts should be taken to dike or dam storm drains, water ways or other flow paths of water.

| DANGER: Risk of Fire and Explosion | |
|---|---|
|  <br>  | Fire and Explosive hazards may be present in the event of battery failure. The Fire Department Personnel should not approach or attempt to enter the Energy Storage System or engage the Emergency Stops (E-Stops).<br><br>Assistance should be sought from the System Owner/Operator and any other required SMEs. |

### Fire and Water

Due to the hazards described above, care and consideration should be applied when considering fire suppression by means of water inundation within energy storage systems. But because water as an extinguishing agent is commonplace,the appropriate use of water should be assessed, *i.e.* whether water reacts with the chemistries present or whether it is not an appropriate extinguisher class.

The local fire department should be informed of appropriate fire suppression methods for the energy storage system type as identified by the equipment manufacturer.

If unconventional fire extinguishers are required, local first responders should bealerted and trained on their use, including a familiarization drill. The appropriate and most suitable extinguisher should be recommended based on the specific needs of the site in accordance with guidance from the manufacture. This may include water in some cases, and in all scenarios its use should not be discouraged.

All fire extinguishing equipment, whether automatic or manual, shall be regularly inspected for functionality per the manufacturer's guidance.

### Response to a Fire Incident

In the event of an incipient stage (beginning, small) fire, employees should notify adjacent individuals of this situation

and exit the area. Only employees trained in the use of fire extinguishers or other manual fire suppression systems should attempt to use an extinguisher or system. Employees are not expected or authorized to respond to fires beyond the incipient stage (*i.e.*, fires that are beyond the beginning stage and which cannot be extinguished using a hand-held, portable fire extinguisher). The fire department should be immediately notified by dialing 911 when any type of unintended fire has taken place. Site management shall also be immediately notified of any emergency per the site Emergency Operating Procedures. Table 4 provides a proposed action plan to use when responding to a BESS fire event.

*Table 4: (typ.) Action Plan for Responding to a BESS Fire*

| Step | Action | Checked |
|---|---|---|
| 1. | If a fire is detected by the fire suppression system, the strobes on the battery enclosures will flash and the alarm will be triggered (in case of smoke or fire). | |
| 2. | Follow the site emergency response plan.<br>• Contact control room operator.<br>• Call first responders.<br>• Evacuate & Muster effected Personnel.<br>Note the direction of the wind.<br>○ No one should stand down wind of the BESS system. (Note: Hazardous fumes may be flowing not only fire and smoke)<br>• A safety zone of greater than 50 ft. should be kept from point of fire/smoke incident. This includes FF/FRC and all contractors on site.<br>• When moving from safety boundary toward the engaged BESS the following PPE need to be worn (container doors are closed and prior to opening the doors)<br>○ SCBA<br>○ Bunker Gear | |
| 3. | Designate one person to check the following conditions. Two-man rule should be implemented when responding:<br>• Has anyone been injured because of the fire?<br>• If yes, follow First Aid protocol until First Emergency Responders arrive.<br>• If yes, when First Emergency Responders arrive follow their direction.<br>• Is nearby Equipment at risk from the fire?<br>○ If so, take note, alert Site Manager and Field Forman. | |
| 4. | Stop energy flow to all BESS systems by entering “0” MW firming target on the BESS HMI | |
| 5. | • FD Arrives on site<br>• FD access BESS Fire Panel (either in mimic panel or control house)<br>• FD determines which container has activated FSS<br>• Is there Visible Fire?<br>• Thermal camera scan impacted container, (noted by horn/strobe) or use gas samples/probes<br>• Visit HMI screens to get the temperature details<br>• Heat buildup - Yes | |

| | | |
|---|---|---|
| | • Assume fire<br>• Commence firefighting plan below<br>  • Heat buildup - No<br>  • Actuate manual emergency ventilation (EV) system located on side of BESS<br>  • Observe for at least (4) hrs for temperature change<br>  • Use portable gas detection at ventilation exhaust<br>  • If no change in temp or gas detected<br>  • Open Container for inspection. Ensure to approach the container from 45-degree angle of any door.<br>• Firefighting plan<br>  • E-Stop BESS (All power is interrupted to the containers) *Note: battery racks may still have stranded energy.*<br>  • Confirm energization status of the BESS switchgear.<br>  • Spray container visible signs of fire<br>  • Spray adjacent containers for evaporative cooling<br>  • Continue firefighting until signs of fire are over<br>  • Observe for at minimum 4 hrs<br>  • Use portable gas detector to determine presence of gas in the container exterior to container<br>  • If gas is detected, continue firefighting, do not open doors<br>  • Open container for inspection, when gas is below LEL<br>  • Open container doors at 45-degree angle | |
| 6. | All personnel entering in or around the 50 ft area during the emergency don appropriate SCBA due to potential large volumes of hazardous fumes being released. | |
| 7. | Where possible isolate any electrical supplies to equipment threatened by fire. | |

## Fire External to Battery Container or Enclosure

The following information is provided when making the call for First Responder assistance:

- Call 911 and report the following:
  - Site name: Starlight Solar Project
  - The address of the main entrance: off Highway 80 at coordinates 32.66016162785173, -116.28052568720432.
  - Injuries, if any, and need for ambulance
- Make sure the immediate area of the fire is clear of personnel.
- Account for all employees, contractors, and visitors who were working in the immediate area of the fire. If any personnel are unaccounted for from the immediate fire area, communication shall be made throughout the facility in an attempt to locate the person(s) missing. If the person(s) is equipped with a facility radio, then an emergency transmission shall be communicated in attempt to locate the person(s).
- Contact the Site Manager (if present) and Emergency Response Coordinator (if not the O&M Manager) immediately.

- Remove any obstructions (vehicles, material, etc.) that might impede response to the scene.
- Station available personnel at road intersections to stop traffic flow into the fire scene.
- Evacuate the energy storage system area immediately if the fire warning alarm sounds or fire warning lights illuminate.
- Proceed to the designated muster point for head count.
- If onsite, the designated Emergency Response Coordinator will do a head count and relay any information/instructions.
- If you encounter heavy smoke, stay low and breathe through a handkerchief or other fabric; move away from the area.
- Assist anyone who has trouble leaving the area so long as doing so does not put the assistant at additional risk.
- Attempt to extinguish the fire ONLY if you have had the appropriate training and proper firefighting agent for the type of fire. Refer to the specific safety data sheet.
- Do not leave the designated muster point until advised to do so. If risk (e.g.smoke) requires evacuation of the muster point, the secondary muster point (designated on the map in Attachment 1) will be used and that fact announced via radio and alarms as available.
- The Emergency Response Coordinator will declare all-clear when the fire department informs them that it is safe to do so.
- The energy storage system is not to be accessed until the O&M Manager or designated Emergency Response Coordinator gives authorization.

In the event of a fire incident, the designated operations personnel responsible for the safe shutdown of the plant will open switchgear to ensure the grid side ofthe plant is de-energized and isolate the batteries as best able to (i.e. verify the AC and DC breakers are open in the inverter). The Fire Department needs to understand that some of the equipment (batteries) will remain energized no matter what actions are taken, and the recommended option is containment. Batteries remain energized even if all the contactors, breakers, and switcheshave been opened.

## Post Incident Response

Hazards after a fire should be identified at the time of installation such that recommendations for personal protective equipment (PPE) are available for clean-up crews and hazardous materials (HAZMAT) teams. This may include respirators to protect personnel from toxic gas that continues to be generated from hot cells. Firewater retention and cleanup measures may be required by local regulations. Once the first responders have turned the site back to, Owner Operator appropriate procedures shall be used to direct on-site personnel on procedures for securing the site for safety and pending any investigation as addressed in the Emergency Decommissioning Plan.

In addition to the gas generation risk, cells that remain hot also pose a delayed ignition risk, whereby heat in the cell may transfer to undamaged adjacent cellsor remaining active material and reignite the fire. As such, fire-damaged equipment must remain monitored for a period of 4hrs (minimum) when consultation with Empire and the SME.

Care should be taken to ensure that damaged batteries containing energy have been safely de-energized in accordance with disposal procedures, if possible, before handling and disposal. If unable to completely de-energize batteries involved in a fire, care should be taken with handling or dismantling battery systems involved in fires as they may still contain hazardous energy levels.

## Medical Emergency

### Medical Emergency Response Procedures

If an employee is injured, or an accident has occurred on site and first aid is not enough treatment for the emergency, 911 must be called. The call to 911 can be made by phoneby any available site personnel. The caller must state to the dispatch that they are at the

San Diego employees certified in first aid/cardiopulmonary resuscitation (CPR) may administer aid if they have completed training. Empire regularly ensures employees with first aid/CPR training are identified on the emergency information noticeboard and employees shall be aware of who on staff is so certified. At all times when the site is staffed, at least one first aid certified member of staff shall be present. The location of first aid kits and automated external defibrillators (AEDs), if present, shall be identified byappropriate signage and personnel should be trained where the kits and AED are located.

All employees shall designate a personal emergency contact, which shall be kept on file.

### Serious Injury

The following procedures apply for serious medical injuries such as loss of consciousness, heart attack, bone fractures, neck trauma, or severe burns.

1. If life is threatening, call 911.
2. Notify Operations and/or Safety Managers.
3. Provide name, exact location, number of injured people, and briefdescription of incident.
4. On-site personnel shall meet EMS responders at the site entrance and directthem to location of incident.
5. Do not leave or move the injured unless directed to by Safety Managersor EMS responders.
6. Administer first aid if necessary.

### Attending an Incident

When attending an incident, the following procedures apply:

- Clear a path to the injured person for Operations and/or Safety Managersand assign personnel to assist with signaling EMS responders to the location of the incident.
- Identify the location of Project Site entrance nearest to the incident and notify EMS responders.
- Operations and/or Safety Managers shall meet EMS responders at site entrance.
- Direct and accompany EMS responders to the location of the incident.
- Follow all directions of EMS responders.
- Contact management personnel and/or subcontractors.
- Document incident and keep on file.

### Medical Facilities

The nearest medical facility to the project site is the Sharp Grossmont Hospital, which is approximately 53 miles to the northwest of the project site at 5555 Grossmont Center Dr, La Mesa, CA 91942, phone +16197406000.

Figure 12 depicts the directions from the site entrance:

- North on Ross Ave to Old HWY 80 West
- Continue on Old HWY 80 West to North Ribbonwood Road to Interstate 8 West
- Continue on Interstate 8 West to Exit 14A.

- Northwest on Grossmont Center Drive
- North on Healthcare Drive to hospital entrance.

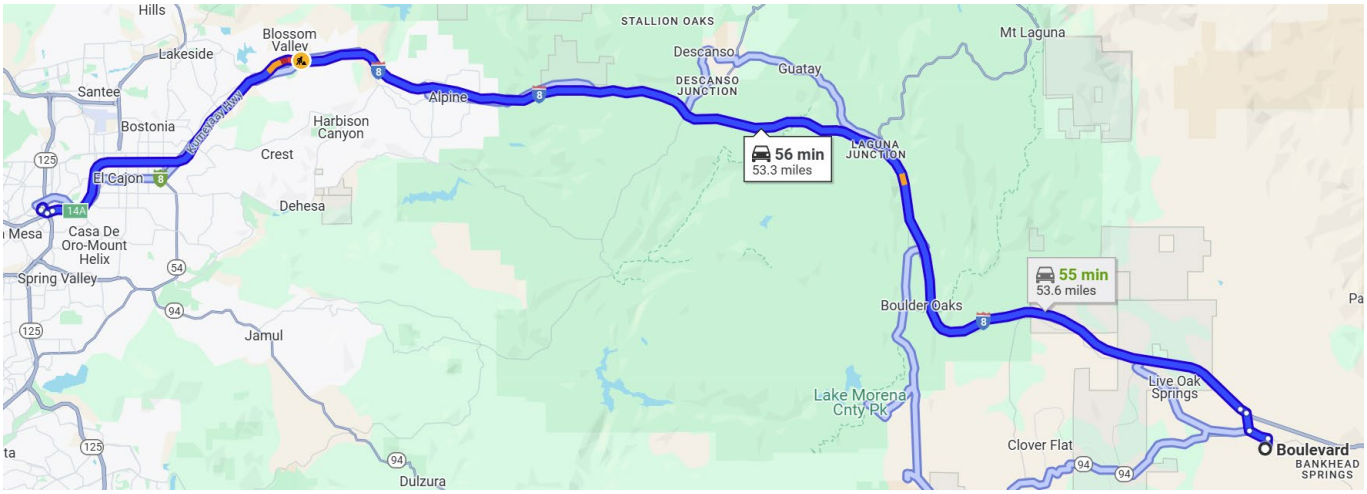



*Figure 13: Directions to Antelope Valley Medical Center*

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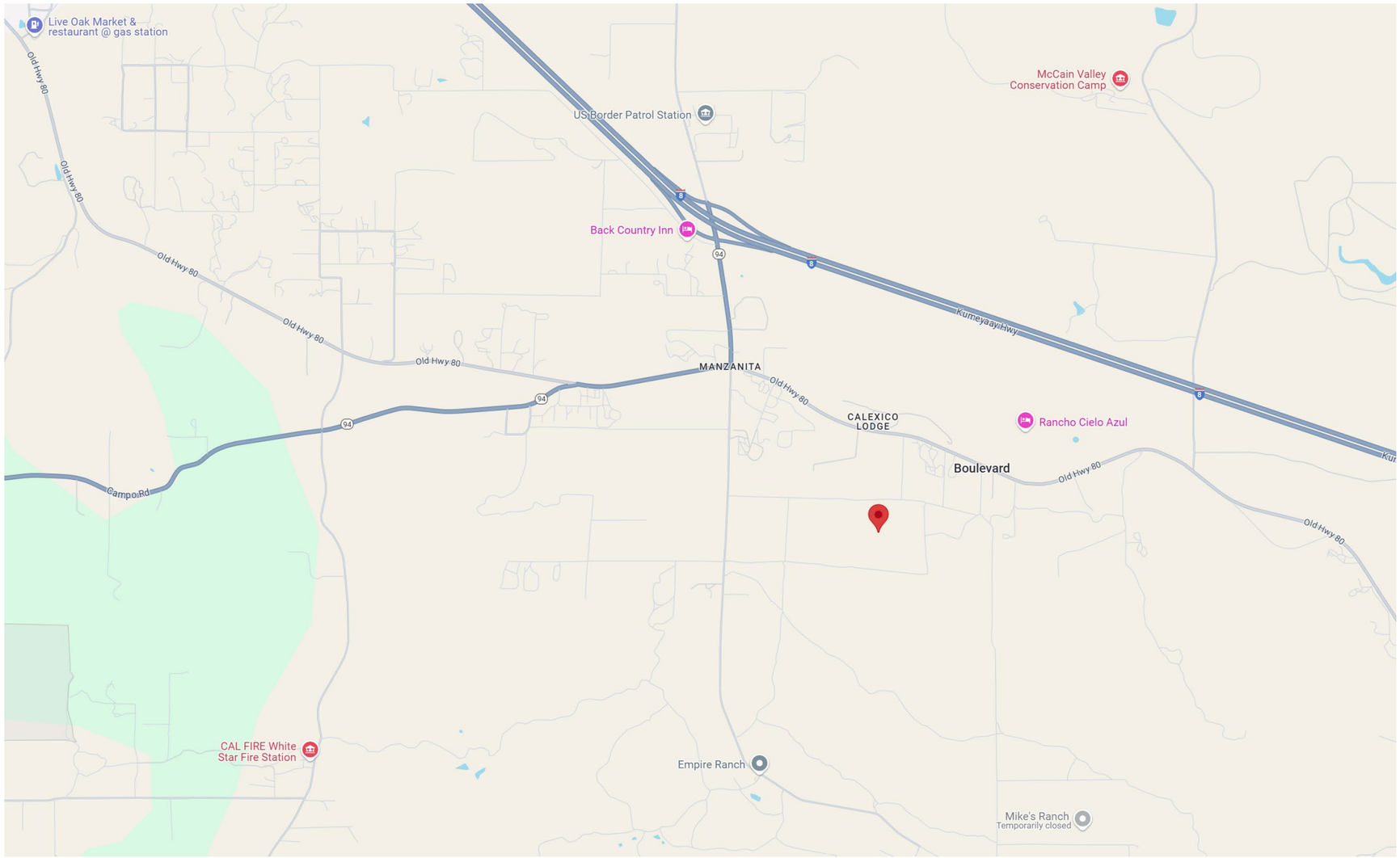
Attachments

Attachment 1: Map of Site

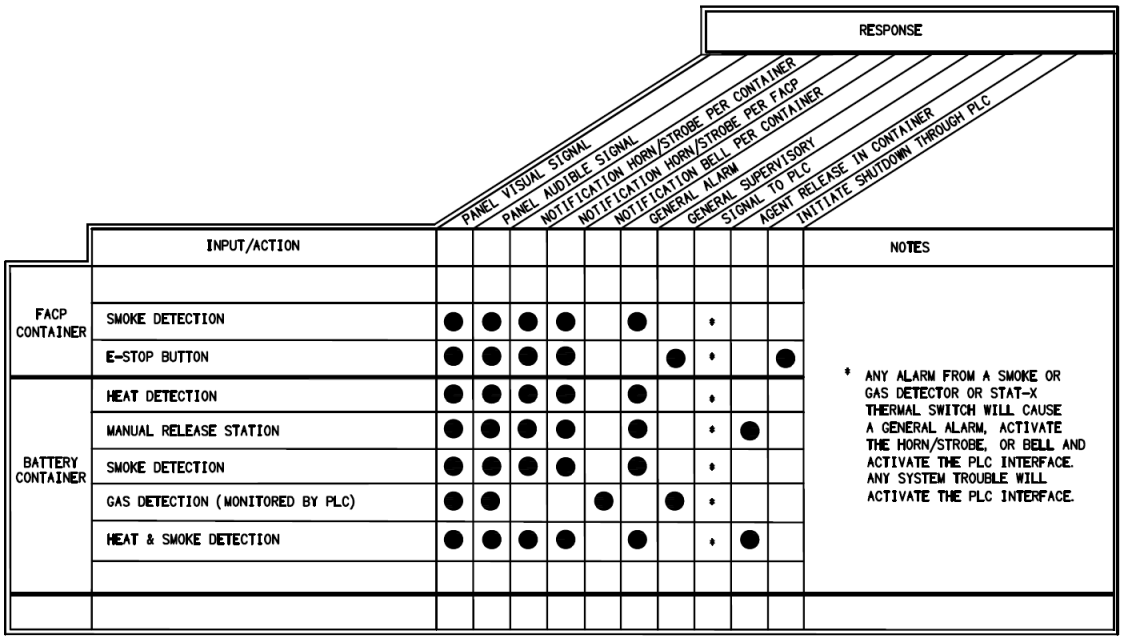


## Attachment 2: Points of Contact

| TITLE | INDIVIDUAL | TELEPHONE NUMBER |
|---|---|---|
| San Diego Fire Authority Boulevard Fire Station #47<br><br>39223 CA-94, Boulevard, CA 91905 | | [TBD] |
| Law Enforcement<br><br>San Diego County Sheriff's Department Jacumba Substation, 39919 CA-94, Boulevard, CA 91905 | | + (619) 766-4585 |
| OFFSITE EMERGENCY ASSISTANCE<br>Fire/Police/Ambulance<br>State Police<br><br>Hospital: Sharp Grossmont Hospital 5555 Grossmont Center Dr, La Mesa, CA 91942 | | 911<br>911<br><br>+16197406000 |
| AGENCY NOTIFICATIONS<br>NRC (24-hour) (Report Oil Spills)<br><br>Cal OES State Warning Center<br><br>Health and Environment | | 1-800-852-7550 |
| Grossman Burn Center<br>7325 Medical Center Dr #200, West Hills, CA 91307 | | +1.818-981-2050 or<br>877-711-BURN (2876) |
| O&M Manager / Emergency Coordinator | [TBD] | [TBD] |

| | | |
|---|---|---|
| Subject Matter Expert<br>Secondary SME Contact | [TBD] | [TBD] |
| Manufacturer Safety Representative | [TBD] | [TBD] |
| Acting Lead Technician | [TBD] | [TBD] |
| Alternate Emergency Contact | [TBD] | [TBD] |
| Company Regional Manager | [TBD] | [TBD] |
| Company Asset Manager | [TBD] | [TBD] |
| Company Control Center | [TBD] | [TBD] |

Attachment 3: Fire Alarm Panel Input/Output Matrix



| | INPUT/ACTION | PANEL VISUAL SIGNAL | PANEL AUDIBLE SIGNAL | NOTIFICATION HORN/STROBE PER CONTAINER | NOTIFICATION HORN/STROBE PER FACP | NOTIFICATION BELL PER CONTAINER | GENERAL ALARM | GENERAL SUPERVISORY | SIGNAL TO PLC | AGENT RELEASE IN CONTAINER | INITIATE SHUTDOWN THROUGH PLC | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RESPONSE | | | | | | | | | | |
| FACP CONTAINER | SMOKE DETECTION | ● | ● | ● | ● | | ● | | * | | | * ANY ALARM FROM A SMOKE OR GAS DETECTOR OR STAT-X THERMAL SWITCH WILL CAUSE A GENERAL ALARM, ACTIVATE THE HORN/STROBE, OR BELL AND ACTIVATE THE PLC INTERFACE. ANY SYSTEM TROUBLE WILL ACTIVATE THE PLC INTERFACE. |
| | E-STOP BUTTON | ● | ● | ● | ● | | | ● | * | | ● | |
| BATTERY CONTAINER | HEAT DETECTION | ● | ● | ● | ● | | ● | | * | | | |
| | MANUAL RELEASE STATION | ● | ● | ● | ● | | ● | | * | ● | | |
| | SMOKE DETECTION | ● | ● | ● | ● | | ● | | * | | | |
| | GAS DETECTION (MONITORED BY PLC) | ● | ● | | | ● | | ● | * | | | |
| | HEAT & SMOKE DETECTION | ● | ● | ● | ● | | ● | | * | ● | | |

**INPUT/OUTPUT MATRIX**

SCALE: NTS

Attachment 4: First Responder Tactical Worksheet


# STARLIGHT SOLAR STORAGE SYSTEM PROJECT FIRE FIGHTING OPERATIONS

The Empire II LLC Starlight Solar Storage Project consists of 8 separate areas containing multiple LPF Energy Storage containers to be installed as shown in Figure 1. Each of the BESS containers is based on the innovative design of the of a TBD BESS OEM, a lithium, iron, phosphate (LiFePO4) battery technology and is separated by 10'

## Starlight Solar Storage Project

Project Address: The Starlight Solar Project located in San Diego County, southeast of Manzanita CA in proximity of 32.66016162785173, -116.28052568720432

The Starlight Solar Project Evacuation Routes shall be posted and orally communicated to site personnel. For planning purposes, it is recommended the existing site access gate with access and is considered as the primary egress route and staging/ assembly area

The nearest medical facility to the project site is the Sharp Grossmont Hospital, which is approximately 53 miles to the northwest of the project site at 5555 Grossmont Center Dr, La Mesa, CA 91942, phone +16197406000. Directions from site entrance: West Old HWY to West Interstate 8 to Exit 14A. West Grossmont Center Drive to Hospital Entrance.

The Fire Command Center is located in the Northwest corner of the project site adjacent to the Site Access Gate as shown in Figure 3.

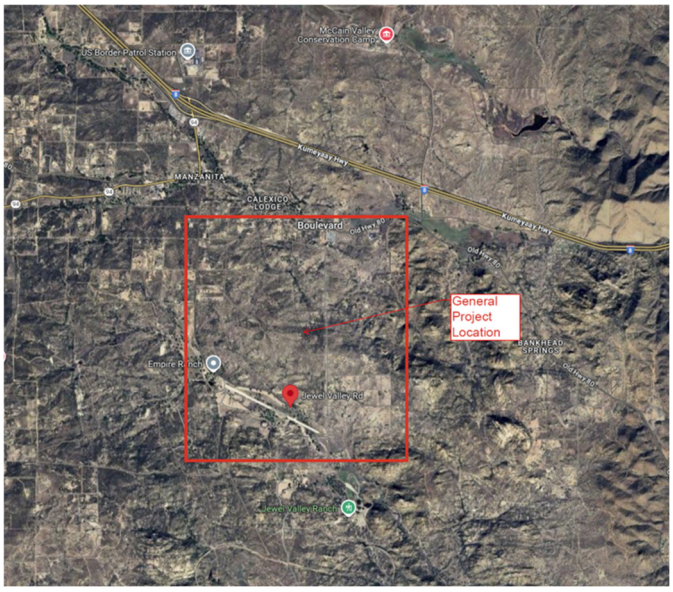



Figure 1: Starlight Solar Project Site

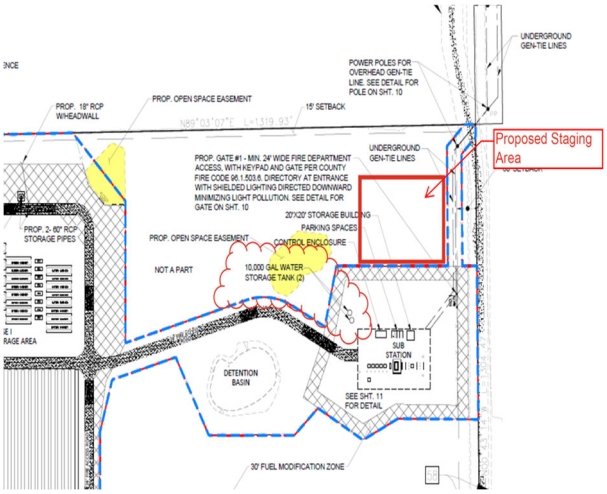



Figure 3: Fire Command Center Location

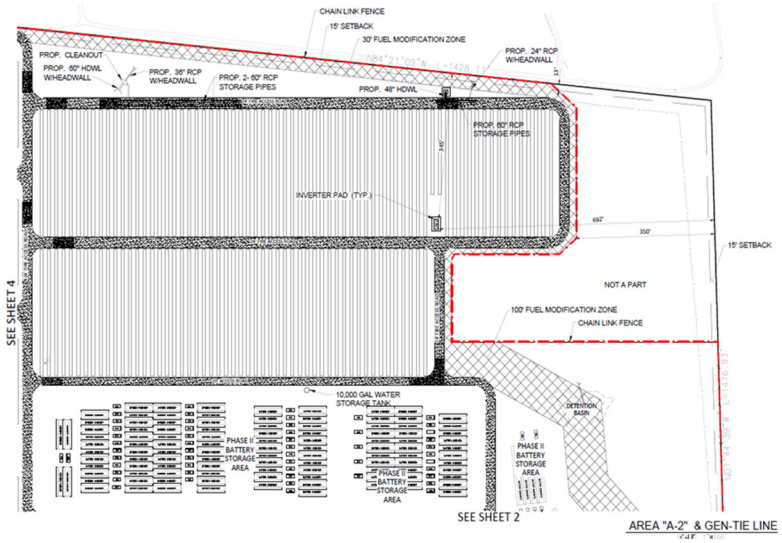



Figure 2: Egress and Staging Area


## Yuma Energy Storage System Project Points of Contacts

| TITLE | INDIVIDUAL | TELEPHONE NUMBER |
|---|---|---|
| San Diego Fire Authority Boulevard Fire Station #47<br>39223 CA-94, Boulevard, CA 91905 | | [TBD] |
| Law Enforcement<br>San Diego County Sheriff's Department Jacumba Substation, 39919 CA-94, Boulevard, CA 91905 | | + (619) 766-4585 |
| OFFSITE EMERGENCY ASSISTANCE<br>Fire/Police/Ambulance State Police<br>Hospital: Sharp Grossmont Hospital 5555 Grossmont Center Dr, La Mesa, CA 91942 | | 911<br>911<br>+16197406000 |
| AGENCY NOTIFICATIONS<br>NRC (24-hour) (Report Oil Spills)<br>Cal OES State Warning Center<br>Health and Environment | | 1-800-852-7550 |
| Grossman Burn Center<br>7325 Medical Center Dr #200,<br>West Hills, CA 91307 | | +1.818-981-2050 or<br>877-711-BURN (2876) |
| O&M Manager / Emergency Co-ordinator | [TBD] | [TBD] |


## Yuma Energy Storage System Project Points of Contacts

| TITLE | INDIVIDUAL | TELEPHONE NUMBER |
|---|---|---|
| Subject Matter Expert<br>Secondary SME Contact | [TBD] | [TBD] |
| Manufacturer Safety Representative | [TBD] | [TBD] |
| Acting Lead Technician | [TBD] | [TBD] |
| Alternate Emergency Contact | [TBD] | [TBD] |
| Company Regional Manager | [TBD] | [TBD] |
| Company Asset Manager | [TBD] | [TBD] |
| Company Control Center | [TBD] | [TBD] |


# STARLIGHT SOLAR STORAGE SYSTEM PROJECT FIRE FIGHTING OPERATIONS

Li-ion battery or ESS fires pose a unique hazard to firefighters. Damaged or ESS's on fire will produce toxic gasses, create explosive environments and always pose an electrocution hazard. The following recommendations should be considered. Refer to Emergency Response Guide 20250320-SLS-AW0764-FRG-R0A

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## Battery Energy Storage System (BESS) Fire Fighting Recommendations

- Consider ESS Fire incidents as a Hazardous Material Incident. When appropriate, suspend activities as a HAZMAT team to develop an Action Plan.
- Establish Command Structure, Command Post and Staging Areas outside of the ESS Yard Access Point
- BESS must always be considered energized. Firefighters should exercise extreme caution when dealing with BESS and all energized electrical equipment.
- Do not make entry into the ESS Yard or approach BESS building, compartment, or enclosure. Opening access doors may introduce fresh air may result in a deflagration or explosion.
- Isolate the area and warn personnel to evacuate the ESS Yard. Recommended initial evacuation distance to a staging area a minimum of 150 to 300 feet. Do not enter the ESS fenced yard area. The exception to this is a savable life/known rescue.
- A failing ESS presents a deflagration and explosive risk. Be aware of explosion potential and off-gassing of hazardous materials. White colored smoke is a good indication of hazardous off-gassing.
- DO NOT ATTEMPT TO EXTINGUISH AN ESS FIRE. DEFENSIVE FIREFIGHTING, water streams are the preferred agent for response to lithium-ion battery fires (lithium-ion is not water reactive).
- DO NOT use class A or B foams. This can trap exothermic gasses. Use water only. Only apply water to exposures. DO NOT attempt to extinguish a container that is on fire.
- If a fire develops, take a defensive stance toward the burning unit and apply water spray on adjacent structures.
- Request Owner/Operators Technical Point of Contact to be present to provide assistance.
- Place fire fighting apparatus within a safe location away from BESS and overhead power lines.
- The Incident Commander will make the ultimate determination regarding hazard mitigation. The hazard mitigation plan should be developed in partnership with the utility representative and/or responsible party.
- If a fire has not developed and only smoke is visible, take a defensive stance toward the system and be prepared to apply water spray on adjacent structures, compartments, and enclosures for evaporative cooling.
- Firefighters must wear full personal protective equipment, including SCBA with facepiece.
- Response crews should allow the battery to burn out. Water should be applied to adjacent battery enclosures and exposures.
- Maintain a safe distance from the unit involved (large commercial systems, at least 150').
- Damaged ESS's will have retained and stranded energy. Inadvertent jarring, mishandling, or movement may introduce accidental short circuits and arc flash hazards.
- When in the area of an ESS that is in alarm maintain a position at a 45- degree angle to the corner of the container.
- Do not have contact with water runoff which may contain hazardous or toxicological chemicals. Burning Lithium Ion batteries could emit Hydrogen Fluoride. Runoff may contain Hydrofluoric acid. ESS sites are graded with a predetermined runoff location. Identify location with SME.