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Document Title:	Appendix S Emergency Response Plan_VDPC
Description:	<p>The Emergency Response Plan outlines procedures for fire service personnel to ensure safe and effective responses to emergencies at the Project Site, with remote monitoring by the operator and provisions for both operational and construction phases.</p> <p>S.A Map of Site; S.B Emergency Response Map; S.C Incident Report Form; S.D Bomb Threat Report; S.E Bomb Threat Checklist; S.F Chemical/Biological Agent Threat Report; S.G Chemical/Biological Agent Threat Checklist; S.H Safety Data Sheets; S.I Considerations During Construction</p>
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Appendix S

Emergency Response Plan



**VACA DIXON POWER CENTER
PROJECT**

Emergency Response Plan (ERP)

COFFMAN PROJECT NO. 251796

IFP SUBMITTAL

December 19, 2025

Prepared for: Vaca Dixon BESS LLC and Arges BESS LLC

EMERGENCY RESPONSE PLAN

FOR

Vaca Dixon Power Center Project

Vacaville, California

Project Number: 251796

Revision	Date	Description
A	10/24/2025	Issued for Review
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IN THE EVENT OF A FIRE OR THERMAL RUNAWAY, FIRST CALL 911

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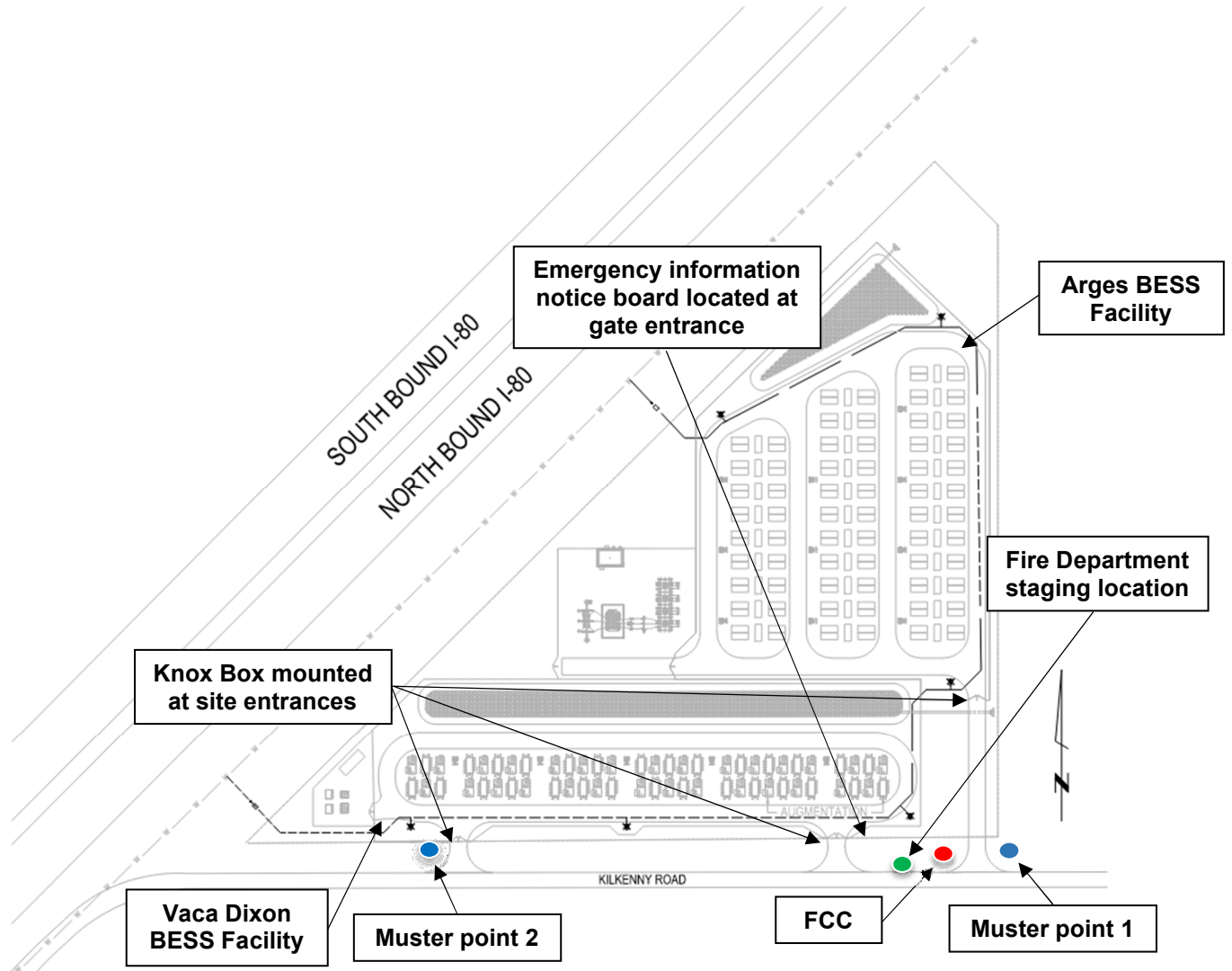
ABBREVIATIONS

AED	Automated External Defibrillator
AHJ	Authorities Having Jurisdiction
BESS	Battery Energy Storage System
BMS	Battery Management System
BOL	Beginning of Life
BOP	Balance of Plant
CFC	California Fire Code
EMS	Energy Management System
EOL	End of Life
ERP	Emergency Response Plan
ESS	Energy Storage System
FACP	Fire Alarm Control Panel
FCC	Fire Command Center
FM	Factory Mutual
LFP	Lithium Iron Phosphate
LPC	Local Plant Controller
MW	Megawatt
MWh	Megawatt-hour
NEC	National Electric Code
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
O&M	Operations & Maintenance
PCS	Power Conversion System
PG&E	Pacific Gas and Electric Company
PPE	Personal Protective Equipment
ROC	Remote Operation Center
SCADA	Supervisory Control and Data Acquisition
SCBA	Self-Contained Breathing Apparatus
SME	Subject Matter Expert
SOC	State of Charge
UPS	Uninterruptible Power Supply

1 QUICK REFERENCE GUIDE

UNMANNED ESS FACILITY WITH REMOTE MONITORING

Staging Map



1. Key Site Information

- Address: Kilkenny Road, City of Vacaville, Solano County, CA, 95377
- Coordinates: 38°23'43.0"N 121°55'15.7"W
- Total Capacity: Vaca Dixon, 57 MW/ 57MWh, Arges, 100 MW/ 400MWh
- Number of Enclosures: Vaca Dixon 29, Arges 100
- Battery Chemistry: Lithium Iron Phosphate (LFP)

2. Abnormal Conditions - Page 18
 - Evacuate the area around the effected equipment
 - Report to the muster point and take head count
3. Emergency Contact List / Procedure – Page 11
 - For ANY emergency, call the Remote Operations Center (ROC) immediately
 - Tracy ROC emergency number: 209-836-9987
 - Tracy ROC responsibilities:
 - Alert Pacific Gas and Electric Company (PG&E) if not already notified
 - Call emergency responders if necessary
 - Call Risen technical support
 - Arrange for on-site personnel if needed
 - Coordinate with Balance of Plant (BOP) provider for emergency response
4. Staging and Approach – Page 17 - 19
 - Stage at least 75 ft away from battery enclosures
 - Contact ROC for site entry consent and updates
 - Enter through the gate with Knox box access
 - Locate the Fire Command Center (FCC) just inside the main entrance
5. Hazard Assessment – Page 18 - 19
 - Check FCC display for enclosures in alarm
 - Assume toxic and flammable gases are present
 - Wear full PPE with SCBA and monitor for gases as required
 - Maintain 75 ft distance as explosive conditions could exist
6. Suppression Tactics – Page 19 - 20
 - Avoid direct suppression unless a life threat exists
 - Use water spray on adjacent structures to prevent spread
 - Apply water with a fog nozzle if deemed safe by the Incident Commander
 - Note: Foams, dry chemicals, and CO₂ are not effective
7. Enclosure Assessment – Page 23
 - Monitor BMS and FACP for internal conditions
 - Air monitor while approaching if approved by Incident Commander
 - Stay 75 ft clear if BMS/FACP is down and there is no ventilation
 - Possible explosive atmosphere even with ventilation
 - Continue monitoring for 24-48 hours post-event
8. Post-Fire Procedures – Page 15
 - Monitor nearby enclosures with detectors and BMS
 - Isolate unstable batteries until safe to decommission follow Risen recommendations
 - Maintain 75 ft exclusion zone after deflagration
 - Watch for toxic/flammable gases, re-ignition, and debris

2 INTRODUCTION

2.1 Purpose

This Emergency Response Plan (ERP) is provided by Coffman Engineers, Inc. (Coffman) for the Vaca Dixon Power Center Project, consisting of the Arges BESS facility and the Vaca Dixon BESS facility, located in the City of Vacaville, California. The following emergency response procedures are provided so that all fire service personnel understand the practices that are to be followed to prepare for and to provide immediate and effective responses to emergencies that may arise at the facility. The Energy Storage System (ESS) conditions will be remotely monitored by the Tracy Remote Operations Center (Operator), and service technicians will be on site periodically to maintain the enclosures. While this document is primarily intended for emergency responses to an operational BESS site, Appendix I has been included for emergency response considerations during the construction phase. The life safety of personnel shall be the highest priority during any event.

2.2 Limitations

This plan does not imply, nor shall readers infer, that implementation of this plan will guarantee a perfect response will be practical or possible. No plan can shield individuals from all events.

Responders will attempt to coordinate the plan and response according to all applicable laws and standards.

Response to emergencies, events, or disasters shall only be undertaken to the level of the responders' training, Personal Protective Equipment (PPE), and resources available. There may be little to no warning to implement operational procedures during specific events.

The success or failure of all emergency plans depends upon effective training, continual (e.g., annual) review of this response plan, and execution of the response. Sites and operators shall comply with applicable codes, standards, and other requirements as appropriate locally, even if those codes, standards, and requirements contradict this plan.

Successful implementation of this plan depends on the timely identification of capabilities, available resources at the time of the incident, and a thorough information exchange between responding organizations and the facility or transporter.

This plan is unique and applicable to this specific site and equipment. It is not to be duplicated or used at any other site regardless of any assumed similarities between sites and equipment.

2.3 Facility Description

The Vaca Dixon Power Center Project, consisting of the Arges BESS facility (100MW/400MWh) and the Vaca Dixon BESS facility (57MW/57MWh), is located on a 10-acre parcel (APN 0133-060-060). The project is located within Solano County, Kilkenny Rd, Vacaville, CA 95377 with coordinates 38°23'46.4"N 121°55'17.3"W.

Project Summary	
Engineering, Procurement and Construction	Power Engineers
Owner	Vaca Dixon BESS LLC and Arges BESS LLC
Utility	Pacific Gas and Electric Company (PG&E)
Vaca Dixon BESS	
BESS Enclosure Type	Enclosure Type IP-55 Resin SYLSU3794U3794KC
Number of ESS Enclosures	21 BOL (29 EOL)
Total Site Footprint	4.25 acres
Capacity	57 MW / 57 MWh
Arges BESS	
BESS Enclosure Type	Enclosure Type IP-55 Resin SYLSU5016U1250KC
Number of ESS Enclosures	100 BOL (129 EOL)
Total Site Footprint	5.75 acres
Capacity	100 MW / 400 MWh

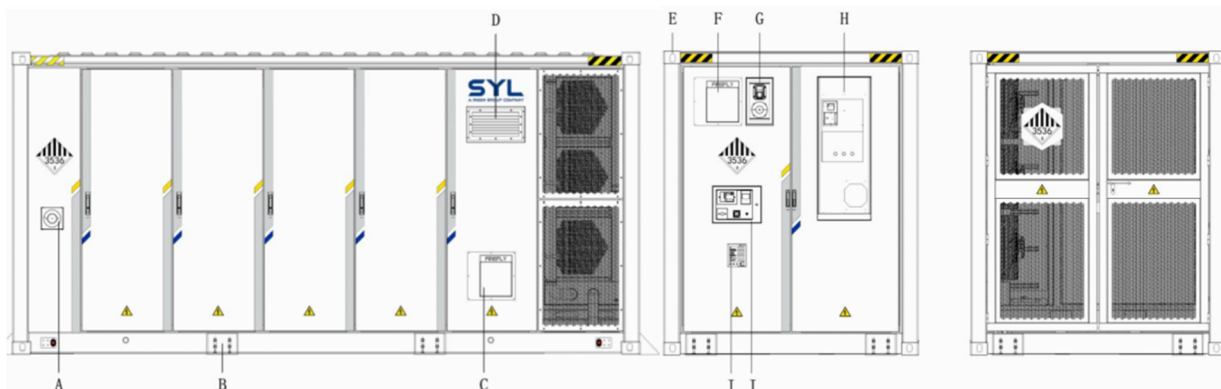


Figure 2.3 – Risen SYLSU3794U3794KC & SYLSU5016U1250KC Overview.

The project will utilize Risen SYLSU3794U3794KC and SYLSU5016U1250KC energy storage system (ESS) enclosures, an on-site project substation, and associated on-site support facilities including inverters, collection lines, fencing, access roads, SCADA, and other ancillary equipment.

Below is a vicinity map (Figure 2.3.1) and a simplified map of the facility (Figure 2.3.2).

A Fire Command Center (FCC) will be provided to monitor both BESS facilities and is located off of Kilkenny Road in between the site access points for both Arges BESS facility and Vaca Dixon BESS facility and near the first responder staging area. It will contain enclosures with power outlets, fire alarm indicator panel, floor and site plans, and printed copies of the ERP, safety data sheets, and any additional information deemed necessary by the Pre-incident planning sessions.

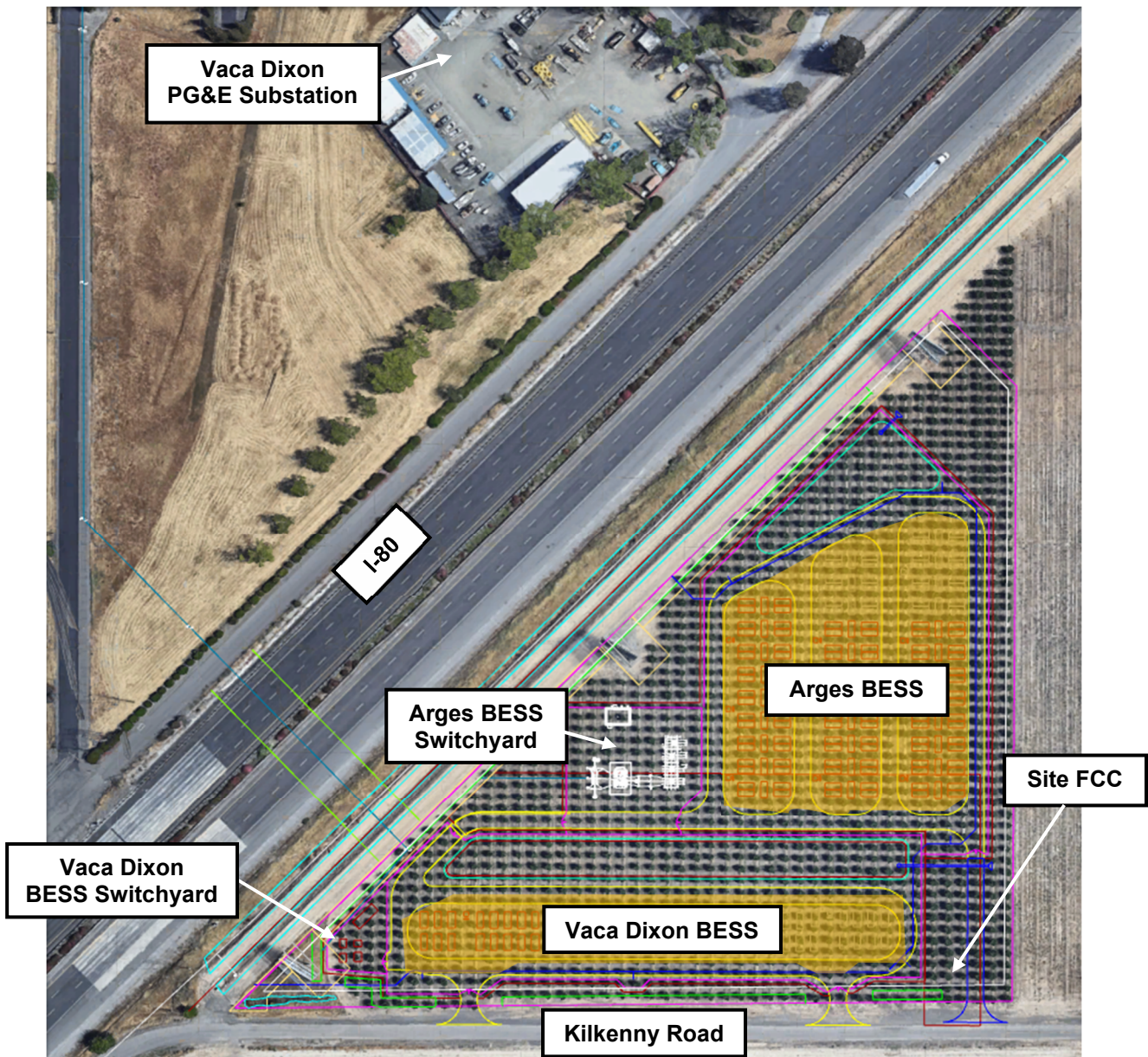


Figure 2.3.1 – Arges and Vaca Dixon Power Center BESS Vicinity Map (North ↑)

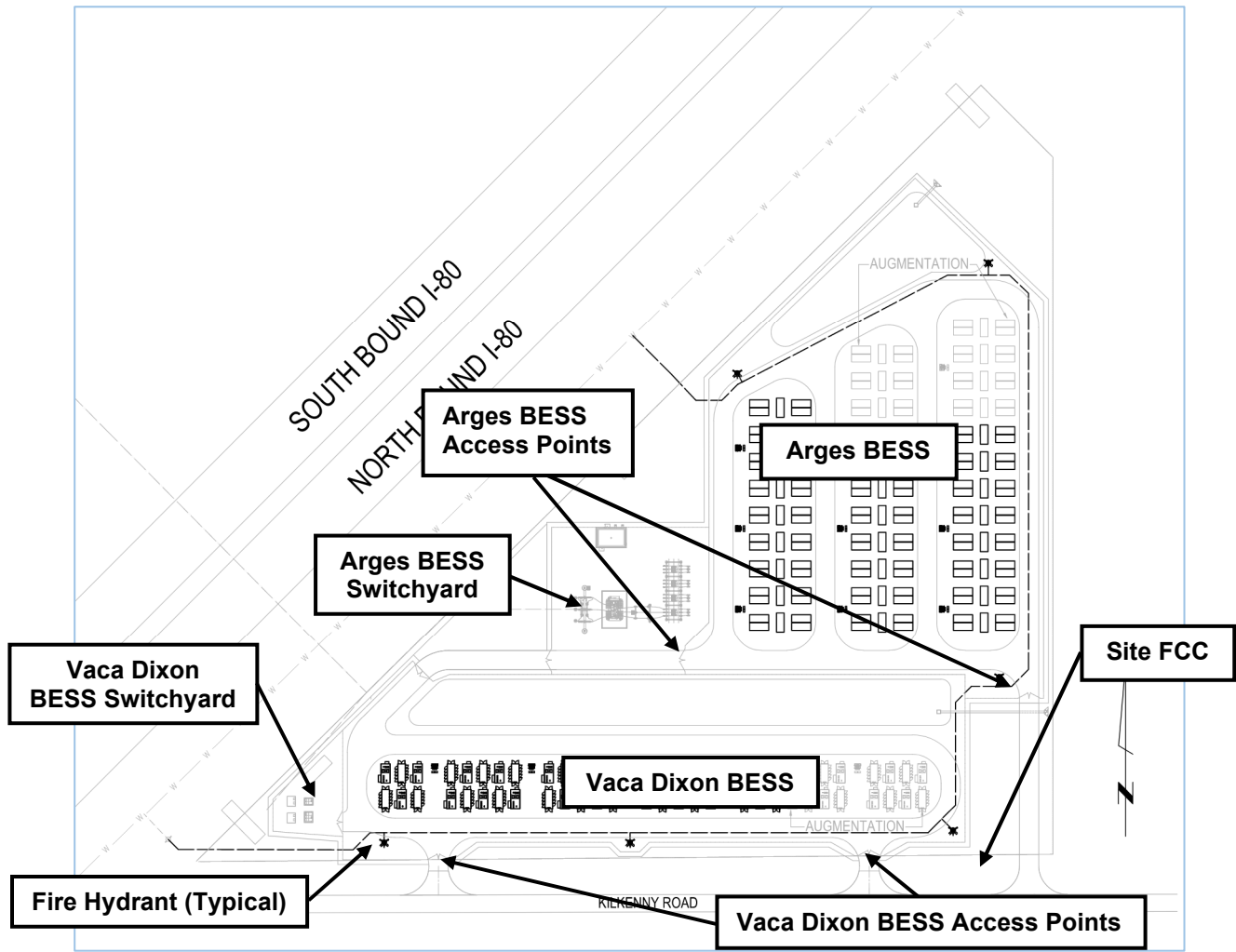


Figure 2.3.2 – Vaca Dixon Power Center BESS Site Layout. (North ↑)

2.4 Plan Review and Revision

A review of this ERP shall be conducted and documented at a minimum on an annual basis. The plan shall be reviewed and amended whenever there is a:

- Change in facility design, construction, operation, or maintenance that affects emergency response planning,
- When outside resources are changed or modified,
- Change in ERP members,
- Updated documentation from Risen,
- Changes in the Solano County Fire Departments response plans.

The plan shall be reviewed and updated to reflect the changes that may affect this ERP when they occur and shall not be delayed until the annual review. This would include, but not be limited to, updating emergency contact information within Section 2.3.

2.5 Applicable Codes and Standards

The Authority Having Jurisdiction (AHJ) for the project is the Vacaville Fire Department. The applicable codes with regards to fire protection and life safety, with local amendments, are listed below.

- CFC, California Fire Code, (2025 Edition), as adopted by the City of Vacaville
- NFPA 72, National Fire Alarm and Signaling Code (2022 Edition)
- NFPA 70, National Electrical Code (NEC) (2020 Edition)
- NFPA 855, Standard for the Installation of Stationary Energy Storage Systems (2023 Edition)
- UL 9540, Standard for Energy Storage Systems and Equipment (2020 Edition)
- UL 9540A, Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems (2019 Edition)

The following standards, not adopted by the CFC, are used as guidance:

- NFPA 855, Standard for the Installation of Stationary Energy Storage Systems (2026 Edition)
- Pre-incident planning per NFPA 1620, Standard for Pre-incident Planning (2020 Edition)

The referenced editions exceed the requirements of the existing guides and standards referenced in the 2022 CFC.

3 EMERGENCY RESPONSE MANAGEMENT

3.1 Overall Organization

Overall responsibility for this ERP lies with the Vaca Dixon Power Center Project Site 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.

3.2 Roles and Responsibilities

Specific management personnel will assume leadership roles for emergency responses. Note that some of these responsibilities may be combined within the duties of single individuals. The following roles and responsibilities are defined herein and are referenced throughout the ERP.

All facility personnel have a responsibility to immediately report emergencies to the Lead Technician on duty or local emergency responder personnel when appropriate. There shall be no delay in reporting emergency events that require the local emergency responders. The Lead Technician will then notify the Emergency Response Coordinator and other key personnel of the situation using the Vaca Dixon Power Center BESS emergency notification telephone list below.

Company Regional Manager: A Company Regional Manager is an individual not directly responsible for the day-to-day operation of the site, nor for the immediate response during or immediately after an emergency, but who does bear responsibility for post-event assessment and broader planning, recovery, and learning from experience. The Regional Manager will typically be responsible for ensuring incident records are maintained. Such a manager shall ensure that O&M Managers are providing safety training and that a safety-based culture is part of core operations across sites.

Emergency Response Contractor: An Emergency Response Contractor is an outside organization or individual who is contracted to undertake certain aspects of emergency response but is not otherwise responsible for the strategic coordination of response, nor is it part of the typical operation of a site. Care shall be taken that such contractors understand the broader picture of site safety and are aware of more comprehensive emergency response protocols (such as, but not limited to, the breadth of topics covered in this plan).

Emergency Response Coordinator: The Emergency Response Coordinator takes control of the emergency and any resources necessary until the emergency has been eliminated and the essential cleanup and restoration operations are complete. This person shall lead the incident reporting. The Emergency Response Coordinator is typically the O&M Manager; in her/his absence, the Lead Technician or other designated person shall assume this role. All personnel on-site shall know who the Emergency Response Coordinator on duty is during their time on site. Remote operators shall likewise know who the Emergency Response Coordinator is for any given shift.

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

The Emergency Response Coordinator is also responsible for seeing that this plan is implemented and will appoint an adequate number of personnel to enforce the plan, ensure everyone is familiar with this plan, and act as a liaison with the local Fire Department(s).

The Emergency Response Coordinator will direct the following activities during an emergency:

1. Oversee the safety of all personnel.
2. Evaluate if operations in the affected area shall be shut down.
3. Take precautions to prevent or limit the spread of fire or explosions.
4. Isolate the affected area and provide directions for radio announcements.
5. Determine the source/cause of the emergency and evaluate the primary and secondary hazards to allow a full-scale, safe response.
6. Ensure that appropriate internal and external notifications are made.
7. Coordinate outside assistance from public or private organizations.
8. Implement other appropriate response provisions as necessary.
9. Determine evacuation routes for workers during an emergency.

The Emergency Response Coordinator shall be accredited in accordance with NFPA 70/70E and the National Electric Safety Code (NESC). If they are not, someone who is (e.g., the O&M Manager) must be present in emergencies to interface with electrical equipment above 50 volts.

Incident Commander: The Incident Commander is the on-scene ranking officer representing the fire department agency with incident jurisdiction. The Incident Commander authorizes incident objectives and strategies that collectively delineate a course of action. Incident Commander role shall not be designated to civilian organizations or owner operators.

O&M Manager: The Operations and Maintenance (O&M) Manager is the individual responsible for the normal operation and upkeep of the energy storage system on a day-to-day basis. This includes standard operating conditions and routine scheduled or responsive maintenance activities.

Lead Technician: A Lead Technician is an on- or off-site individual responsible for the operation of a site from a performance and technical perspective. Such responsibilities may lie with the O&M Manager or with a remote operator.

Site Manager: A Site Manager supervises the personnel for a site. The Site Manager is ultimately responsible for the implementation of the company's written procedures and practices.

Subject Matter Expert (SME): An individual and designated secondary contact with detailed working knowledge of the energy storage system and incident command systems. The Subject Matter Expert (SME) shall have ready access to information on the state of the system, status and meaning of alarms, etc. The SME's contact information must be available to the Emergency Response Coordinator and first responders, as well as others, via information on the emergency information notice board.

3.3 Emergency Contact Information

Contact	Address	Telephone Number
Emergency Fire/Police/Ambulance	N/A	911
Medical Center Kaiser Permanente Vacaville	1 Quality Dr, Vacaville, CA 95688	Non-Emergency 707-624-4000
Gen-Tie Issues Pacific gas and Electric (PG&E)	5221 Quinn Rd, Vacaville, CA 95688	(+1)707-448-2860
I-80 Crossing Issues Caltrans District 4	111 Grand Ave #300, Oakland, CA 94612	(+1)510-286-4444

Emergency Call Centers	Telephone Number
Tracy Remote Operations Center (ROC) – Primary	209-836-9987
Tracy Remote Operations Center (ROC) – Secondary	209-836-1605
Tracy Remote Operations Center (ROC) – Manager	225-382-4421
Risen Energy Technical Support	+86 400-101-8585

Emergency Services & Contractors	Telephone Number
California Governor's Office of Emergency Services (Cal OES)	916-845-8200
UC Davis Firefighters Burn Institute in Sacramento	916-734-7010
U.S. Pipeline & Hazardous Material Safety Administration help line	1-800-467-4922

3.4 ERP Summary Tactical Actions

The following summary actions are provided for storage and during operation:

- In case of an abnormal condition including:
 - Suspicious odor observed near the equipment,
 - Smoke or fire emanating from the equipment,
 - Severe physical impact to the equipment,
 - An operational condition that is not consistent with normal operation.
- DO NOT APPROACH the ESS enclosure if an abnormal condition is suspected.
- Contact Risen Site Personnel or Risen Customer Support and describe the situation.
- The following immediate actions are recommended:
 - EVACUATE THE AREA AROUND THE EQUIPMENT
 - Notify the appropriate personnel which could include Site Operator, Risen, First Responders, Police, or the Utility.
 - Follow the Risen recommendations for shutting down or isolating the equipment.
 - Follow the instructions of Risen.
- DO NOT APPROACH THE ENCLOSURE UNTIL AHJ PROVIDES AN ALL CLEAR.
- Maintain the recommended minimum approach distances during the event:
 - First Responders and Firefighters – 75 feet is recommended in NFPA 855. Final determination to be made during the event, based on established field conditions.

3.5 Pre-Incident Planning

Pre-planning for emergencies is a crucial element of this plan. The following steps shall be taken in planning for emergencies at the site:

- The fire department and other first responders must receive a copy of this plan and participate in an on-site familiarization meeting.
- All emergency responder access points to the facility shall be identified.
- An emergency response information notice board must be maintained at a location readily visible and accessible to all personnel, identified in Appendix A, and contain key contacts for emergencies, a list of personnel certified in First Aid/CPR, and other notices as outlined in this document or as deemed appropriate by the Emergency Response Coordinator. Provision shall be made for non-English speaking workers on site.
- All road exits shall be established and posted on the emergency information notice board.
- An evacuation muster point diagram must be documented and posted on the emergency information notice board.
- Logs of on-site personnel for tracking headcounts during emergencies shall be maintained.
- All enclosures and property surrounded by fencing must be marked by signage that identifies specific hazards, as required by code.
- Site personnel must receive instruction to keep exits from the site clear.
- Safe approach distances must be established for equipment's different failure modes,

personnel must be trained in these distances, and such information must be communicated in writing to first responders during drills and other emergency response informational meetings. A safe distance of 75 feet from an enclosure is required wherever explosive conditions may be present, as further discussed in section 4.1.6 below.

- Safety Data Sheets provided by manufacturers shall, where relevant, be provided to first responders.
- Audible and visual (e.g., flashing lights) alarm systems shall be established that reflect specific on-site hazard analyses. Personnel shall be trained on the significance of different alarms and the corresponding actions. Descriptions of each alarm and corresponding actions shall be clearly posted on an emergency information notice board (location marked on the map in Appendix A).
- Complete periodic on-site training programs to identify emergency risks and protocols to follow in an emergency event.
- Review of OSHA requirements contained in 29 CFR 1910.38

3.6 Emergency Routes & Procedures

A Vaca Dixon Power Center site evacuation sheet shall be posted and employees shall be trained to know the exit location and be familiar with the muster point posted in the area indicated on the site map (Appendix B).

Depending upon the degree of emergency, weather, and site conditions, roadways, as designated on the site map (Appendix B), will be used for routes of evacuation.

In the event of an evacuation, all personnel will meet at the designated muster point, as shown in Appendix B, for further information. If the primary muster point is inaccessible or hazardous, personnel shall establish a secondary muster point and announce its location via radios and telephones as available and inform the emergency coordinator (if not present) by radio or phone. Employees shall then immediately contact their supervisor for further instructions.

When notified to evacuate, site personnel shall do so in a calm and orderly fashion, keeping the following instructions in mind:

- Walk, don't run. Help others who need assistance as long as doing so does not put you at greater risk.
- Stay upwind, upstream, and uphill whenever possible.
- Watch for other traffic and equipment on access roads and roadways.
- Be aware of ice/snow and loose gravel conditions.
- Drive safely.

Any person with a disability (mobility, hearing, sight, etc.) who requires assistance to evacuate is responsible for prearranging with someone in their immediate work area to assist them in the event of an emergency. Anyone knowing of a person with a disability or injury who was not able to evacuate will report this fact immediately to their supervisor. 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 shall account for all personnel. This accountability information shall be communicated to the emergency responders immediately upon their arrival. When a person 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

Responder access points shall be kept unobstructed so first responders will be able to continue their operations when responding to emergencies within the site.

3.7 Communications

Timely and efficient communications are essential to deal with an emergency response situation. The Emergency Response Coordinator is the central point of contact for all involved in an emergency response, including first responders and Subject Matter Experts (SMEs). The following processes shall be observed during emergency communications:

- Employees using radios/phones shall yield to individuals who are the most directly involved in an emergency response activity, i.e., emergency response takes priority over all other communication on the company network.
- Emergency transmissions shall be clearly announced using signal words such as 'urgent' or 'mayday.' These signal words give priority to the radio transmitter to proceed with their message.
- If emergency radio/phone communications are interrupted or unclear, employees shall proceed to the muster point identified in Appendix B.
- All hand-held radios/phones shall be recharged daily with backup batteries ready 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. If a radio is not working properly, then the employee shall notify the lead technician and make arrangements for some other form of communication while working. Radios that are not working properly shall be placed out of service and labeled appropriately so they will not be used by another employee.
- Provision shall be made for non-English speaking workers on site.

3.8 Personal Protective Equipment

Full firefighter protective gear shall be worn in any response to a fire or explosion event or if there is any indication that a fire or thermal runaway may be present. This shall include but not be limited to proper turnout gear (coat, pants, boots, and gloves), helmet, fire hood, and a Self-Contained Breathing Apparatus (SCBA). All NFPA compliant PPE equipment shall be worn in accordance with local fire department policy.

3.9 Emergency Response Operations

Any firefighting or rescue operations shall be performed by trained professionals upon their arrival. An Incident Commander shall be identified, and they will coordinate smoke and fire

boundaries as well as Hot, Warm, and Cold zones for the scene as required. No employee is required or permitted to place themselves in harm's way in order to facilitate extinguishment, evacuation, or rescue.

3.10 Post Emergency Fire Department Procedures

The Incident Commander, in consultation with the O&M Manager, SME, and fire department, shall make the final determination regarding when the scene is safe for release. The Incident Commander shall decide when it is appropriate to remove the fire and smoke scene boundaries and safety zones. In some circumstances, the scene may need to be safeguarded for investigators to examine the event's failures. If the event was caused by a criminal act, the O&M manager should be guided by law enforcement for direction.

3.11 Post-Emergency Incident Reporting Procedures

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

The Emergency Response Coordinator shall compile all documentation and perform a post-emergency investigation. Immediate performance of this activity will aid in determining the exact circumstances and cause of the incident. Issues to be resolved include:

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

4 FIRE OR THERMAL RUNAWAY INCIDENTS

4.1 Conditions Associated with Lithium-Ion Battery Storage

Electrical, vehicle, or other fires not directly involving Lithium-ion batteries shall be managed and controlled using typical firefighting and response efforts. In addition, efforts shall be made to limit fire and heat impacts to the battery storage enclosures.

Lithium-ion battery storage systems present a unique challenge for firefighters.

A battery energy storage system does not have a single point of disconnect. Disconnects will de-energize select parts of the system; however, batteries will remain energized. Stranded electrical energy in fire-damaged storage batteries and other ESS has the potential for reignition long after initial extinguishment.

Proper response to electrochemical ESS thermal runaway is automated within the enclosure, but additional site actions may be required for control or for other fires and may include the following procedures and steps:

- System isolation and shutdown
- Hazard confinement
- Fire suppression

The following hazards may be encountered when fighting fires in lithium-ion battery energy storage systems:

- Electrical enclosures and batteries may not allow water intrusion from the high-pressure stream of a fire hose.
- Shock hazard due to direct contact with energized components.
- Smoke and toxic gases
- Thermal runaway
- Explosion hazard

While the site fire alarm system utilizes an offsite 24/7 monitoring station that will alert the fire department in case of emergency, the exact conditions of each monitoring point on the fire alarm system will only be viewable at the Fire Command Center (FCC) located off of Kilkenny Road at the southeast portion of the facility near the entrances points to both battery energy storage facilities. This will allow the responding fire department to know which enclosure (s) is/are in alarm.

4.1.1 Thermal Runaway

Fires in electrochemical ESS are often a result of a process called thermal runaway, which results in a dynamic temperature increase. Initial signs of thermal runaway include pressure increase at the cell level, temperature increase, and off-gassing. As the process continues, additional signs might include vent gas ignition, exploding cells, projectile release, heat propagation, and flame propagation. As the failure cascades, responders shall also be prepared for toxic and potentially explosive gas release. Responders shall treat them as highly dangerous and use their entire suite of PPE and breathing apparatus when responding.

Thermal runaway can be detected by monitoring temperature and gas levels in and around a battery. The Battery Management System (BMS) monitors battery cell temperature, voltage, current, and dry contact switching value in real time but is external to the fire alarm system. Sensors within the battery enclosures monitor the batteries for high temperatures, smoke, and for toxic and flammable off-gassing. The activation of the gas, smoke, or heat sensors indicates the high probability of a thermal runaway. It sends an alarm signal to the associated FACP and subsequently to the site FCC and the remote monitoring center. Each FACP has a display that will show alarms from its local ESS group. The FCC display will show alarms from the entire site.

Rescue personnel shall keep their distance unless actively rescuing a person if batteries are in a thermal runaway condition.

The ESS enclosures are under the control of a site Energy Management System (EMS) or Local Plant Controller (LPC), which in turn communicates with an off-site fleet controller, SCADA operations center, or other third-party dispatch and monitoring entity. The ESS enclosure alarms will be forwarded to the remote operations, and remote operations or staff personnel on the site can shut down the ESS enclosure(s) remotely if determined necessary.

Note that a system shutdown will not de-energize the battery bank or guarantee that a fault or thermal runaway event has been stopped. Responders and staff shall not approach the ESS enclosure or attempt to open the ESS enclosure until deemed safe.

On-site personnel witnessing an emergency shall not assume that automated alarms have reached the Local Plant Controller or Emergency Management System or that such alarms have been passed on to remote operations. Such personnel are advised to call 911 and contact remote operations directly, in addition to other key stakeholders described herein.

4.1.2 Non-Firefighter Response to Fire Event

In the event of a pre-alarm incipient stage (beginning, small) fire where audible and visual alarms may not be activated, employees shall notify adjacent individuals of this situation and exit the area. Signs of a fire may include:

- Acrid burning smell – sweets smells (e.g., Juicyfruit) or solvent smells (e.g., nail polish have been commonly reported)
- Excessively hot access door handles or outer surfaces
- Unusual sounds indicating electrical arcing or combusting materials – (e.g., hissing and popping)
- Smoke emanating from the battery enclosure
- Other abnormal events

In the event of a more significant fire that has triggered audible or visual fire alarms, employees shall still notify adjacent individuals of this situation and exit the area.

Contractors, maintenance staff, or visitors shall immediately exit the area upon notification of an emergency condition and proceed to the designated muster point. Only employees trained in the use of fire extinguishers or other manual fire suppression systems shall attempt to use them. Employees are not expected or authorized to respond to fires beyond the incipient stage. The

fire department shall be immediately notified by dialing 911 when any unintended fire has taken place. Site management shall also be immediately notified of any emergency.

For a fire, uncontrolled heating, or off-gassing event occurring related to a Battery Enclosure:

1. Evacuate the ESS enclosure area immediately
2. Call 911
 - a. Site Name: Vaca Dixon Power Center BESS
 - b. Address: Kilkenny Road, City of Vacaville, Solano County, CA, 95377 with coordinates 38°23'43.0"N 121°55'15.7"W
3. Make sure the immediate area of the fire is clear of personnel.
4. 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, issue a communication throughout the facility to attempt to locate the person(s) missing.
5. Contact the O&M Manager and Emergency Response Coordinator immediately.
6. Remove obstructions that might impede response to the scene.
7. Station available personnel at road intersections to stop traffic flow into the fire scene.
8. Proceed to the designated muster point for a headcount. If on-site, the Emergency Response Coordinator will do the headcount and relay information/instructions.
9. If encountering heavy smoke, stay low and breathe through a handkerchief or other fabric. Move away from the area.
10. Assist anyone needing help leaving the area so long as doing so does not put the assister at additional risk.
11. Do not leave the designated muster point until advised to do so. If risk requires evacuation of the muster point, a secondary muster point must be established, and that fact must be announced via radios and alarms as available. The secondary muster point shall be outside the property boundary and at least 75 ft away from ESS enclosures.
12. The Emergency Response Coordinator will issue an "all clear" only when the fire department informs them that it is safe to do so.
13. The ESS enclosure is not to be accessed until the O&M Manager or designated Emergency Response Coordinator gives authorization.

The ESS enclosures are under the control of a site Emergency Management System (EMS) or Local Plant Controller (LPC), which in turn communicates with an offsite fleet controller, SCADA operations center, or other third-party dispatch and monitoring entity. The ESS enclosure alarms will be forwarded to the remote operations and remote operations, or staff personnel on the site, can shut down the ESS enclosure(s) remotely if determined necessary. Note that a system shutdown will not de-energize the battery bank or guarantee that a fault or thermal runaway event has been stopped. Nobody shall approach the ESS enclosure or attempt to open the ESS enclosure until deemed safe.

On-site personnel witnessing an emergency shall not assume that automated alarms have reached the Local Plant Controller or Emergency Management System or that such alarms have been passed on to remote operations. Such personnel, in addition to other critical

stakeholders described herein, are advised to call 911 and contact remote operations directly.

4.1.3 Firefighter Response to Fire Event

Considerations for firefighter response:

1. Address: Kilkenny Road, City of Vacaville, Solano County, CA, 95377 with coordinates 38°23'43.0"N 121°55'15.7"W
2. There is a Knox box located at all site entrance points off of Kilkenny Road.
3. Make operator contact for consent to enter site and updated information regarding the current situation. If the operator gives consent to enter site, follow BESS firefighting training procedures.
4. An approved Incident Command Station (ICC) and Fire Alarm Panel are provided off of Kilkenny Road at the southeast portion of the facility near site entrance points for both BESS facilities.
5. Information on which enclosures(s) is/are in alarm may be found on the Incident Command Station (ICC).
6. Recommended staging location is at least 75-ft away from the nearest battery enclosure. See section 3.4.
7. An underground water supply loop is provided for the fire hydrants located throughout the BESS Yard and is directly connected to the municipal supply for fire department use.
8. Toxic and flammable gases may be present but not be detected. Assume they are present. Wear PPE including a self-contained breathing apparatus and monitor the site for toxic and flammable gases.
9. Follow Section 4.1.4 for Recommended Suppression.
10. The Emergency Response Coordinator will issue an "all clear" only when the fire department informs them that it is safe to do so.
11. The ESS enclosure is not to be accessed until the O&M Manager or designated Emergency Response Coordinator gives authorization.

4.1.4 Recommended Suppression

In the absence of a justified reason to enter the site or pass the minimum approach distance (i.e. entrapment of personnel), it is advised that first responders and emergency personnel DO NOT TAKE DIRECT ACTION to suppress the fire, enter the ESS enclosure, or enter the site.

A manual fire alarm activation is provided at the FCC at the main entrance.

If deemed appropriate and safe to do so by the Incident Commander, water can be applied to the Risen ESS enclosure exterior and adjacent structures to prevent fire spread. Fire hydrants are located throughout the BESS Yards.

Water spray has been deemed safe as an agent for use on high-voltage systems and should only be applied by trained professionals.

The possibility of current leakage back to the nozzle, and ultimately the fire fighter, is insignificant based on testing data published in the Fire Protection Research Foundation report “Best Practices for Emergency Response to Incidents Involving Electric Vehicles Battery Hazards: A Report on Full-Scale Testing Results.”

The following methods identified in the report are not recommended:

- Fire-fighting foams are not considered to be effective for these chemistries (lithium-ion batteries) because they lack the ability to cool sufficiently and can conduct electricity.
- Fire-fighting dry chemical powders will not cool the thermal runaway event / battery components.
- Carbon dioxide and inert gas suppressing agents will also eliminate visible flame but will likely not provide sufficient cooling to interrupt the thermal runaway process.

In accordance with Section 1.4 of this document, this section shall be reviewed annually and updated appropriately as fire protection technology changes.

4.1.5 Risen ESS Enclosure Fire Protection System Summary

The ESS enclosures located at Vaca Dixon Power Center BESS site **will** have the following characteristics:

- Thermal runaway management
- Mechanical ventilation system
- Automatic fire detection system
- Gas detection systems
- Clean agent (Novec 1230 or FM-200) fire suppression (Vaca Dixon BESS site only)
- Aerosol canister fire extinguishing system (Arges BESS site only)
- Interior fire sprinkler system with FDC on ESS enclosure (Factory installed, but not used)

The ESS enclosures located at Vaca Dixon Power Center BESS site **will not** have the following characteristics:

- Dry chemical fire suppression

4.1.6 Explosion Control

The Risen lithium-Ion batteries may release detectable levels of flammable gases such as Hydrogen (H₂) and other hydrocarbons in the event of thermal runaway, fire or when exposed to high temperatures. In the event that flammable gases are detected, the enclosure exhaust ventilation system is designed to exhaust the gases. An alarm signal will be transmitted to the main fire alarm panel identifying the enclosure and that flammable gas has been detected. The exhaust ventilation system will continue after detected gas concentrations within the enclosure have been reduced until manually reset.

A minimum of seventy-five feet (75') should be maintained between individuals and the incident enclosure whenever explosive conditions may be present as indicated by the enclosure and site fire alarm control panels. Staging of personnel and equipment shall be on the angles of the enclosure to stay out of the blast pressure wave as much as possible, as well as the blast radius of any doors or other potential projectiles.

Only attempt to extinguish fire if imminent threat to life safety exists. Lithium batteries off-gas when heated or when subjected to electrical or physical damage. These gases can accumulate inside the enclosure at levels well above the Lower Explosive Limit (LEL). Extreme caution shall be taken prior to any attempts to open any compartments or access panels on the system as the introduction of fresh air may bring atmospheric condition back into the explosion range and result in an explosion if a fire or another ignition source is present.

Gas monitoring must be continuously conducted at all times near the Fire Command Center to warn of potential atmospheric risks.

4.1.7 Toxic Gas Release

The Risen lithium-Ion batteries may release detectable levels of toxic gases including carbon monoxide (CO), carbon dioxide, hydrogen, methane, ethylene, and small traces of other gases in the event of fire or high temperatures. The Site Controller monitors the module and cell temperatures and will provide an alert through the SCADA system prior to the thermal runaway. This alert will be transmitted to the EMS, and Local Plant Controller.

Personnel shall remain clear of the enclosure and at no point approach during an off-gassing event unless there is imminent threat to life safety at which only properly trained and equipped personnel may approach. This approach shall be with full firefighter protective gear to include self-contained breathing apparatus (SCBA). Entry in this situation shall be at the sole discretion of the Incident Commander.

The pressure relief vents are located at the top front of the cabinet. Any approach to the front of the cabinet may pose a potential risk of exposure to the byproducts of combustion. Chemicals released from the batteries during a fire or explosion will be in a gaseous form and primarily pose an explosion hazard. However, as water is used in extinguishing flames, these gases can become acids which may cause skin irritation.

The thermal management system utilizes an ethylene glycol coolant and R134a refrigerant for the HVAC system. These chemicals have the potential to leak in an event. R134a can become combustible in air with strong ignition sources. Under certain circumstances these chemicals

can pose a health risk in sufficient quantities. Refer to the Safety Data Sheets provided by Risen for more information on the coolant and refrigerant.

4.1.8 Assessing when it is safe to approach or open the enclosure.

Batteries remain energized even if all the contacts, breakers, and switches have been opened. Toxic or flammable gas may be present inside the enclosure. Visual observation of the exterior may not provide any information on the conditions within. The Incident Commander, with support from First Responders and Operations Manager, shall remotely monitor data and information from the battery management system (BMS) and the Fire Alarm Panel to assess the conditions internal to the enclosure.

If the Site Controller and fire alarm panel are reporting, the following information should be available:

1. Alarm status of smoke detectors and heat detectors
2. Gas Alarm
3. BMS can provide internal temperature and location information if thermal runaway has occurred as well as elevated temperature information for cells that may be at risk of entering thermal runaway

If the exhaust ventilation system is operational and exhausts gases from the enclosure, it is unlikely that flammable gas concentrations within the enclosure are above the LEL, based on a credible event.

Under certain conditions the thermal management system may continue to operate. If the conditions inside the enclosure have caused the thermal management system and BMS to cease reporting to the Site Controller, then extreme caution shall be utilized including maintaining a safe distance and **NOT** opening the enclosure. It is recommended that first responders stay clear of the enclosure and allow the enclosure to burn itself out.

Defensive firefighting is recommended only to prevent spread to nearby enclosures or equipment if the Incident Commander determines this is a possibility. Allow the battery packs to cool down while maintaining contact with the Equipment Manufacturer. This may take up to 48 hours or longer based on the severity of the incident. Monitor the SCADA telemetry and ESS enclosure with a thermal imaging camera.

Monitoring for the presence of smoke (which precedes or coincides with thermal runaway) and remote monitoring of the exterior temperature of the enclosure may provide information about the risk of fire or explosion. Maintaining a safe distance, air monitoring and a fire watch for 48 hours after temperatures drop and no smoke has been observed may be required to ensure it is safe to approach or open the enclosure. If the fire department or any other highly trained personnel has deemed the enclosures safe to open, then they may do so as long as they are confident that no risk to life exists.

When the ESS enclosures are finally opened to vent the area out, the enclosure doors shall remain open until the decommission phase. Stranded energy in ESS still poses a risk that can continue to exist for hours, days, and even weeks following an emergency event of a damage battery. Reference Decommissioning/Stranded Energy Plan for more information.

The fire department can deem the ESS thermal runaway event safe, to turn back over to the owner, once the following criteria are met:

1. Visible smoke and gas concentrations have shown to be actively decreasing
2. Toxic gas levels are within PAC-2 measured 25 feet away from the ESS event
 - a. Carbon Monoxide - 83 ppm
3. Surface temperatures of all the ESS modules within the enclosure are around 200°F
4. Final determination will be based on municipal Fire Department policies

5 MEDICAL EMERGENCY

5.1 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 phone by any available site personnel. The caller must state to the dispatch that they are at the Vaca Dixon Power Center BESS facility. A second notification will be made to the O&M Building to inform others of the situation.

Employees with first aid/CPR training are identified on the emergency information notice board, 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 by appropriate signage and indicated on the map in Appendix A. All employees shall designate a personal emergency contact, which shall be kept on file.

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-threatening, call 911.
2. Notify Operations and Safety Managers.
3. Provide name, exact location, number of injured persons, and a brief description of the incident.
4. On-site personnel shall meet emergency medical responders at the site entrance and direct them to the location of the incident.
5. Do not leave or move the injured unless directed to by Safety Managers or emergency medical responders.
6. Administer first aid if necessary.
7. The site manager shall inform the employee's personal emergency contact.
8. Document incidents and keep them on file.

Note that emergency response procedures are ultimately the responsibility of the Incident Commander.

5.1.1 Attending an Incident

When attending an incident, the following procedures apply:

1. Clear a path to the injured person for Operations and Safety Managers and assign personnel to assist with signaling emergency medical responders to the location of the incident.
2. Identify the location of the Project Site entrance nearest to the incident and notify emergency medical responders.
3. Operations and Safety Managers shall meet emergency medical responders at the site entrance.

4. Direct and accompany emergency medical responders to the location of the incident.
5. Follow all directions of emergency medical responders.
6. Contact management personnel and subcontractors.
7. Document incidents and keep them on file.

5.1.2 Medical Facilities

The nearest medical facility and emergency room to the project site is Kaiser Permanente Vacaville Medical Center at 1 Quality Dr, Vacaville, CA 95688. Directions from the site entrance:

1. Take Kilkenny Rd to Leisure Town Rd
 - 1.6 miles (4 minutes)
2. Turn right onto Leisure Town Rd
 - 0.5 miles (2 minutes)
3. Continue on Quality Dr to the destination
 - 0.2 miles (2 minutes)

5.2 Non-Emergency Safety Procedures

5.2.1 Notification of Minor Incident

In the event a safety incident occurs where emergency response is not required (first aid treatment, near miss, etc.), work is to be stopped immediately and reported to the Emergency Response Coordinator and Lead Technician. Risk will be reassessed, adequate controls implemented, and the situation made safe before resuming the task. The event will be documented and kept on file.

5.2.2 Heat Related Illnesses

When the temperature exceeds 95 degrees Fahrenheit (35 degrees Celsius) or is expected to be so during the course of a shift or work project, the O&M Manager will hold short staff meetings to review the weather report; reinforce heat illness prevention with all workers; and provide reminders to drink water frequently, to be on the lookout for signs and symptoms of heat illness, and inform them that shade can be made available upon request.

Employees shall have free access to potable drinking water provided and located as close as practicable to the areas where employees are working. Where drinking water is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift. Employers may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour. The frequent drinking of water shall be encouraged.

Heat-Related Illness	Signs	Actions
Heat Stroke	<ul style="list-style-type: none"> • High body temperature (103°F or higher) • Hot, red, dry, or damp skin • Fast, strong pulse • Headache • Dizziness • Nausea • Confusion • Losing consciousness (passing out) 	<ul style="list-style-type: none"> • Call 911 right away. Heat stroke is a medical emergency • Move the person to a cooler place • Help lower the person's temperature with cool clothes or a cool bath • Do not give the person anything to drink
Heat Exhaustion	<ul style="list-style-type: none"> • Heavy sweating • Cold, pale, and clammy skin • Fast, weak pulse • Nausea or vomiting • Muscle cramps • Tiredness or weakness • Dizziness • Headache • Fainting (passing out) 	<ul style="list-style-type: none"> • Move to a cool place • Loosen your clothes • Put cool, wet clothes on your body or take a cool bath • Sip water • Get medical help right away if: • You are throwing up • Your symptoms get worse • Your symptoms last longer than 1 hour
Heat Cramps	<ul style="list-style-type: none"> • Heavy sweating during intense exercise • Muscle pain or spasms 	<ul style="list-style-type: none"> • Stop physical activity and move to a cool place • Drink water or a sports drink • Wait for cramps to go away before you do any more physical activity • Get medical help right away if: • Cramps last longer than 1 hour • You're on a low-sodium diet • You have heart problems
Sunburn	<ul style="list-style-type: none"> • Painful, red, and warm skin • Blisters on the skin 	<ul style="list-style-type: none"> • Stay out of the sun until your sunburn heals • Put cool clothes on sunburned areas or take a cool bath • Put moisturizing lotion on sunburned areas • Do not break blisters
Heat Rash	<ul style="list-style-type: none"> • Red clusters of small blisters that look like pimples on the skin (usually on the neck, chest, groin, or in elbow creases) 	<ul style="list-style-type: none"> • Stay in a cool, dry place • Keep the rash dry • Use powder (like baby powder) to soothe the rash

6 SECURITY INCIDENTS

Security incidents at an ESS facility can potentially compromise the safety systems and lead to hazardous conditions. In line with CFC Section 1207.4.9, the ESS installation is equipped with security measures to prevent unauthorized access. Any security breach should be treated as a potential safety risk to the ESS.

6.1 Bomb Threat

6.1.1 Response Plan

The purpose of this plan is to give direction to all site personnel in the event the Vaca Dixon Power Center BESS site is a target of an actual or threatened bomb assault/attack.

Anyone receiving a bomb threat shall:

1. Treat the caller with courtesy and respect. Complete the Bomb Threat Report (Appendix D). Use this sheet as a reference while talking with the caller making the threat.
2. Attempt to obtain as much information as possible. See the "Bomb Threat Checklist" (Appendix E).
3. Immediately notify the Vaca Dixon Power Center BESS site Emergency Coordinator by phone. Stop all radio transmissions from this point on until cleared by the Emergency Coordinator or other competent authority. Radio transmissions can activate electronic detonating or timing devices.

The Emergency Response Coordinator will immediately notify 911. The Emergency Response Coordinator shall:

1. Evaluate the threat and determine the appropriate course of action to take.
2. Notify law enforcement and ambulance.
3. Evacuate the facility as necessary.
4. Coordinate evacuation of any part of the surrounding community with local authorities as needed.
5. Coordinate the search of the site with the proper authorities.

6.1.2 Suspicious Items

If any suspicious item(s) are found, they are not to be touched. Barrier tape will be used to mark the area where the suspicious item(s) are by extending a continuous line of tape beginning immediately in front of the suspicious item(s) and extending to just outside the room exit. This will help guide local authorities to the suspicious item.

The Emergency Response Coordinator will be responsible for communicating the "All Clear" message once the threat has passed or is no longer present.

6.2 Chemical/Biological Agent Threat

The procedures described previously for a bomb threat shall be used for a chemical or biological agent threat.

Any person who is exhibiting signs and symptoms from a chemical or biological agent shall be isolated from other workers and be prepared for transport by emergency medical services.

6.3 Sabotage or Vandalism

Anyone detecting any act or threat of any act of sabotage or vandalism will immediately notify the Emergency Response Coordinator. The Emergency Response Coordinator will evaluate the situation and decide what actions to take. The following options shall be considered and implemented:

1. Notification of 911.
2. Corrective action as required, providing that no person will risk injury.
3. Evacuation of the facility.

6.4 Active Shooter

In an active shooter situation, employees shall:

1. Quickly determine what actions to take to protect life: Options include run, hide, and fight (described in the Ready.gov site). Use best judgment based on the specific circumstances of the incident. Getting away from the shooter(s) is the top priority. Call 911 when in a safe location and warn/prevent individuals from entering an area where an active shooter may be if possible.
2. When encountering responding police, remain calm and follow all instructions from the officers. Officers may shout commands and push individuals to the ground for their safety as well as their own. When law enforcement personnel arrive at the scene, personnel shall be aware of the following:
 - Follow all official instructions from the police
 - Remain calm, think, and resist the urge to panic
 - Immediately raise hands and spread fingers
 - Keep hands visible at all times
 - Put down any items
 - Avoid making sudden or quick movements toward officers
 - Do not point, scream, or yell
 - Do not ask for help from the officers when evacuating
 - Proceed in the direction advised by the officers
 - Provide all relevant information to police

7 ENVIRONMENTAL HAZARDS

7.1 Flooding and Flash Floods

Flash flooding is a result of heavy localized rainfall, such as that from slow-moving, intense thunderstorms. Flash floods often result from small creeks and streams overflowing during heavy rain. These floods often become raging torrents of water that rip through riverbeds and canyons, sweeping everything with them. Flash flooding can occur within 30 minutes to 6 hours of a heavy rain event. In hilly terrain, flash floods can strike with little to no advanced warning. Distant rain may be channeled into gullies and ravines, causing flash flooding in minutes. In the event of a flash flood, the following procedures shall apply:

1. During Periods of Thunderstorms:
 - Always remain alert to heavy rains in your immediate area or upstream from your location. It does not have to be raining at your location for flash flooding to occur.
 - Avoid all topographic depressions that may act as a channel or receptacle for flood water.
 - If you are in a vehicle and are positioned in a dry stream or riverbed, move the vehicle to high ground or abandon the vehicle and seek high ground. If you are already in the stream of water, stay with the vehicle and get on top of the roof.
 - Wait for the flood waters to subside before moving from the area.
 - Be aware of possible lightning.
2. Once the Flashflood has Stopped:
 - Report to the management of the designated area.
 - Attend to any injured, but do not move them unless they are in an unsafe area. Moving them may cause further injury.
 - Management will contact those who are outside by radio.
 - Call 911 to report any injuries, fires, or to receive any other emergency aid.
 - The designated on-site Incident Commander will contact those who are outside by radio or phone.
3. After all are Accounted For:
 - Management will evaluate the extent of the damage and decide whether or not to evacuate the site.
 - Check water and electrical lines, buildings, transformers, containers, inverters, etc. for damage.
 - Do not approach downed power lines. Call local utility PG&E to notify.
 - The Incident Commander will contact senior management and provide a status report.

7.2 High Winds and Dust Storms

Upon the issuance of high wind warnings:

- Take cover in a safe location. Lie down alongside walls.
- If inside, stay inside. If outside, find a secure object that you can attach yourself to. Seek cover alongside building foundations or in trenches. Cover your head and face with your arms, and keep your legs tightly together.
- Remain in place until the high winds subside to a safe speed. Move only when it is safe to do so. Call for help if you cannot move,

- Report to management or muster area for roll call.
- If any person is missing, a search will be made to determine their location and condition only if it is safe to do so.
- Attend to any injuries, but do not move unless they are in an unsafe area.
- Call 911 for emergency assistance.

7.3 Earthquakes

Earthquakes may strike with little to no warning. Earthquakes may result in a lack of basic necessities and loss of life, road and bridge damage, and collapse of buildings or destabilization of the base of buildings. Be aware that some earthquakes may be foreshocks and precursors to a more significant subsequent earthquake. Many earthquakes are also accompanied by aftershocks after the main event has occurred.

1. Earthquake Preparedness:
 - All employees must be trained in the earthquake procedure and evacuation plan.
 - The escape routes must be posted if required by the Emergency Response Coordinator.
 - Safety meetings and drills on earthquake preparedness must be held at least annually.
2. At the Onset of an Earthquake:
 - Drop to the ground, cover your head, and hold on to a sturdy object if available.
 - If outside, quickly find an area clear of possible falling objects.
 - Remain in a safe area until all movement has stopped.
3. When the Earthquake has stopped:
 - Report to the safest, closest designated area
 - Attend to any injured persons. Only move them if they are in an unsafe area. Moving them may cause further injury.
 - The designated on-site Incident Commander will contact those who are outside by radio or phone.
 - Be aware that there may be aftershocks that may be large enough to do additional damage to structures that were weakened during the original quake.
4. After all are Accounted For:
 - Management will evaluate the extent of the damage and decide whether or not to evacuate the site.
 - Check water and electrical lines, buildings, transformers, containers, inverters, etc. for damage.
 - Do not approach downed power lines. Call APS to notify.
 - Visually inspect battery equipment and fire alarm equipment for damage.
 - Call the monitoring station and ensure all readings are normal.
 - The Incident Commander will contact senior management and provide a status report.

7.4 Lightning

In the event of an approaching lightning storm within 30 miles of the site, the following procedures will apply.

1. Notify the O&M Manager and all on-site employees.
2. Stop work safely and head to staging and laydown yards in vehicles.
3. Remain at staging and laydown yards and get updates on weather conditions.

At the Onset of Lightning:

1. If you are inside, stay inside. Avoid contact with any conductive objects. Stay clear of electrical power sources. Stay off of landlines.
2. If you are outside, get inside a vehicle if available. If no shelter is available, get on the ground.
3. If you are caught in an open area, act quickly to find adequate shelter. The most important action is to remove yourself from danger. Crouching or getting low to the ground can reduce your chances of being struck but does not remove you from danger.
4. If you are caught outside with no safe shelter nearby, the following actions may reduce your risk:
 - Immediately get off elevated areas such as hills, mountain ridges, or peaks.
 - Never lie flat on the ground. Crouch down in a ball-like position with your head tucked and hands over your ears so that you are down low with minimal contact with the ground.
 - Never shelter under an isolated tree.
 - Never use a cliff or rocky overhang for shelter.
 - Immediately get out of and away from any body of water.
 - Stay away from objects that conduct electricity (barbed wire fences, power lines, etc.)

APPENDICES

Appendix A
MAP OF SITE

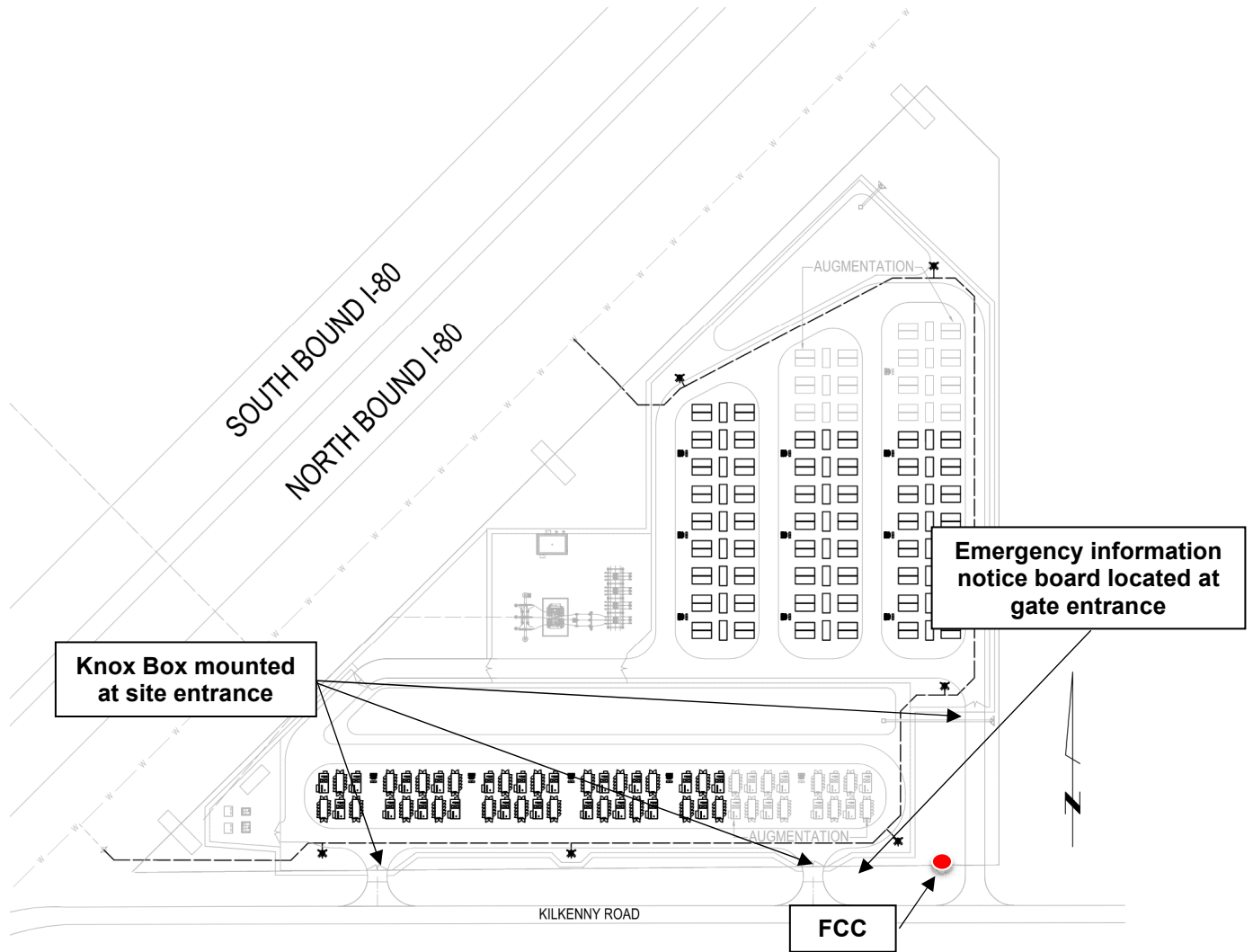


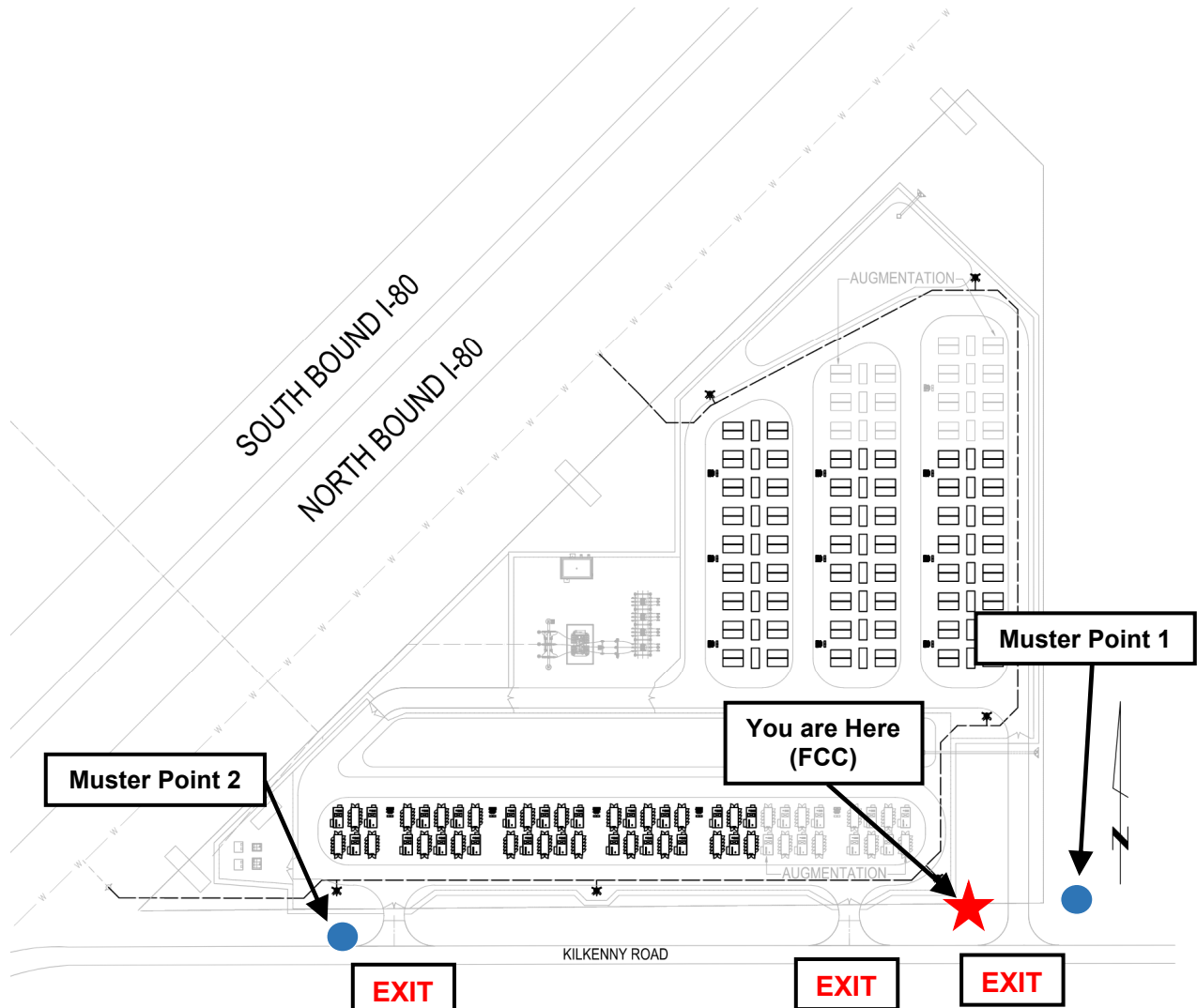
Figure A – Vaca Dixon Power Center Site Map (North ↑)

Appendix B
EMERGENCY RESPONSE MAP

Emergency Response Map

Site Name: Vaca Dixon Power Center Battery Energy Storage System
Site Address: Kilkenny Road, City of Vacaville, CA 95377

Fire/Police/Ambulance: 911
Tracy ROC Emergency Number: 209-836-9987
Cal OES: 916-845-8200



Emergency Response Plan Located within the Fire Command Center Cabinet

Personnel shall stay at the muster point until the fire department arrives

Figure B – Proposed Emergency Response Map (North ↑)

Appendix C
INCIDENT REPORT FORM

HAZARDOUS MATERIALS INCIDENT REPORT

INITIAL CONTACT INFORMATION

(Check one): REPORTED/ACTUAL INCIDENT DRILL/EXERCISE

1. Date/Time of Notification: _____ Report received by: _____
2. Reported by (name & phone number or radio call signs): _____

3. Company/agency and position (if applicable): _____
4. Incident address/descriptive location: _____

5. Agencies at the scene: _____

6. Known damage/casualties (do not provide names over unsecured communications): _____

CHEMICAL INFORMATION

7. Nature of emergency: (check all that apply)
 Leak Explosion Spill Fire Derailment Other
Description: _____

8. Name of material(s) released/placard number(s): _____
9. Release of materials:
 Has ended Is continuing. Estimated release rate & duration: _____
10. Estimated amount of material which has been released: _____
11. Estimated amount of material which may be released: _____

12. Media into which the release occurred: _____ air _____ ground _____
water
13. Plume characteristics:
- a. Direction (Compass direction of plume): _____ c. Color: _____
- b. Height of plume: _____ d. Odor: _____
14. Characteristics of material (color, smell, liquid, gaseous, solid, etc) _____
15. Present status of material (solid, liquid, and gas): _____
16. Apparently responsible party or parties: _____

ENVIRONMENTAL CONDITIONS

17. Current weather conditions at incident site:
- Wind From: _____ Wind Speed (mph): _____ Temperature (F): _____
- Humidity (%): _____ Precipitation: _____ Visibility: _____
18. Forecast: _____
19. Terrain conditions: _____

HAZARD INFORMATION
(From ERP, MSDS, CHEMTREC, or facility)

20. Potential hazards: _____

21. Potential health effects: _____

22. Safety recommendations: _____

23. Recommended evacuation distance: _____

IMPACT DATA

24. Estimated areas/ populations at risk: _____

25. Special facilities at risk: _____

26. Other facilities with HAZMAT in area of incident: _____

PROTECTIVE ACTION DECISIONS

27. Tools used for formulating protective actions
- _____ a. Recommendations by facility operator/responsible party
 - _____ b. *Emergency Response Plan*
 - _____ c. Material Safety Data Sheet
 - _____ d. Recommendations by CHEMTREC
 - _____ e. Results of incident modeling (CAMEO or similar software)
 - _____ f. Other: _____

28. Protective action recommendations:
- ___ Evacuation ___ Shelter-In-Place ___ Combination ___ No Action
- ___ Other _____

Time	Actions Implemented

29. Evacuation Routes Recommended: _____

EXTERNAL NOTIFICATIONS

30. Notification made to:
- _____ National Response Center (Federal Spill Reporting) 1-800-424-8802
 - _____ CHEMTREC (Hazardous Materials Information) 1-800-424-9300
 - _____ State Emergency Response Commission
 - _____ SERC written follow-up forms
31. Other Information: _____

Source: Washington State Emergency Response Commission. Local Emergency Planning Committee (LEPC) Hazardous Materials Emergency Response Plan TEMPLATE. September 2011. <http://www.ecy.wa.gov/epcra>

Appendix D
BOMB THREAT REPORT

***** KEEP CALLER ON THE LINE AS LONG AS POSSIBLE! *****

Exact words of caller:

Questions to ask the caller:

1. When is the bomb going to explode? _____
2. Where is the bomb right now? _____
3. What kind of bomb is it? _____
4. What does the bomb look like? _____
5. Why did you set the bomb? _____
6. Where are you calling from? _____
7. What is your name? _____

Try to determine the following

IDENTITY: • male • female • adult • juvenile (age? _____)

VOICE: • loud • high-pitched • deep • raspy • pleasant

 • disguised • broken Other: _____

ACCENT: • local • not local • foreign • regional _____

RACE: • Caucasian • Black • Hispanic • Asian

Other: _____

SPEECH: • educated • average • illiterate • obscene

Other: _____

MANNER: • calm • angry • rational • irrational • coherent

 • incoherent • deliberate • self-righteous • laughing • intoxicated

BACKGROUND NOISES:

- office machines • factory machines • bedlam • trains • quiet
- voices • mixed sounds • airplanes • music • traffic
- party Other: _____

If the voice is familiar to you, who did it sound like? _____

Additional Information: _____

Date ___/___/___ Time: ___:___ a.m./p.m.

Received by: ___

Appendix E
BOMB THREAT CHECKLIST

Mail Threat:

- _____1. Handle documents as little as possible to preserve fingerprints.
- _____2. Hand deliver immediately to O&M Manager.

Phone Threat:

- _____1. Complete Bomb Threat Form.
- _____2. Deliver completed form to O&M Manager.
- _____3. Notify Supervisor immediately.

O&M Manager:

- _____1. Gather all information regarding threat.
- _____2. Decide upon course of action.
- _____3. Coordinate searches with proper authorities.

Suspicious Objects:

- _____1. DO NOT TOUCH OR ATTEMPT TO MOVE!
- _____2. Notify Police—911.

Evacuation:

- _____1. Announce over public address system, give location where to assemble. Do not use the radio.
- _____2. Enlist volunteers to remain and shut down site.

Re-entry:

- _____1. Determined based on:
 - _____a. "All-clear" given by bomb disposal unit.
 - _____b. O&M Manager's judgment that danger is passed.
- _____2. Full report prepared.

Appendix F
CHEMICAL/BIOLOGICAL AGENT THREAT REPORT

<u>SPEECH:</u>	• educated	• average	• illiterate	• obscene	
	Other: _____				
<u>MANNER:</u>	• calm	• angry	• rational	• irrational	• coherent
	• incoherent	• deliberate	• self-righteous	• laughing	• intoxicated
<u>BACKGROUND NOISES:</u>					
	• office machines	• factory machines	• bedlam	• trains	• quiet
	• voices	• mixed sounds	• airplanes	• music	• traffic
	• party	Other: _____			
If the voice is familiar to you, who did it sound like? _____					
Additional Information: _____					

Date ___/___/___ Time: ___:___ a.m./p.m. Received by: ___					

Appendix G
CHEMICAL/BIOLOGICAL AGENT THREAT CHECKLIST

Mail Threat:

- _____ 1. Handle documents as little as possible to preserve fingerprints.
- _____ 2. Hand-deliver immediately to O&M Manager.

Telephone Threat:

- _____ 1. Complete the Chemical/Biological Threat Report form.
- _____ 2. Deliver completed form to O&M Manager immediately.

O&M Manager:

- _____ 1. Gather all information regarding threat.
- _____ 2. Decide upon course of action.

Searches:

- _____ 1. Comprehensive—To be conducted by trained law enforcement personnel only.

Suspicious Objects:

- _____ 1. Do not touch or attempt to move.
- _____ 2. Notify police.

Evacuation:

- _____ 1. **Make a site-wide announcement and give location where to assemble.**
- _____ 2. **Enlist volunteers to remain and shut down site.**

Re-entry:

- _____ 1. **Determined based on:**
 - _____ a. **“All-Clear” given by competent authority.**
 - _____ b. **O&M Manager’s judgment that danger has passed.**
- _____ 2. **Full report prepared.**

Appendix H
SAFETY DATA SHEETS

Solstice® 513A**10668670**

Version 1.3

Revision Date 04/05/2023

Print Date 07/06/2023

SECTION 1. IDENTIFICATION

Product name : Solstice® 513A

Number : 000000022892

Product Use Description : Refrigerant

Manufacturer or supplier's details : Honeywell International Inc.
115 Tabor Road
Morris Plains, NJ 07950-2546

For more information call : 800-522-8001
+1-973-455-6300(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : Medical: 1-800-498-5701 or +1-303-389-1414
: Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887
:
: (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : Liquefied gas

Color : clear colourless

Odor : slight ether-like

Classification of the substance or mixture

Classification of the substance or mixture : Gases under pressure, Liquefied gas
Simple Asphyxiant

GHS Label elements, including precautionary statements

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Symbol(s)

:



Signal word

: Warning

Hazard statements

: Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

: **Storage:**
Protect from sunlight. Store in a well-ventilated place.Hazards not otherwise
classified: May cause cardiac arrhythmia.
May cause frostbite.
May cause eye and skin irritation.**Carcinogenicity**

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature

: Mixture

Chemical name	CAS-No.	Concentration
2,3,3,3-Tetrafluoroprop-1-ene	754-12-1	56.00 %
1,1,1,2-Tetrafluoroethane	811-97-2	44.00 %

SECTION 4. FIRST AID MEASURES

Inhalation

: Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do

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not give drugs from adrenaline-ephedrine group.

Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.

Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

Indication of immediate medical attention and special treatment needed, if necessary : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frost-bitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : The product is not flammable.
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards during firefighting : Contents under pressure.
This product is not flammable at ambient temperatures and atmospheric pressure.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
Container may rupture on heating.
Cool closed containers exposed to fire with water spray.
Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by

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reducing oxygen available for breathing.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen halides
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO₂)
Carbonyl halides

Special protective equipment for firefighters : In the event of fire and/or explosion do not breathe fumes. Wear self-contained breathing apparatus and protective suit. No unprotected exposed skin areas.

Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is $\geq 19.5\%$.

Environmental precautions : Prevent further leakage or spillage if safe to do so. The product evaporates readily.

Methods and materials for containment and cleaning up : Ventilate the area.

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SECTION 7. HANDLING AND STORAGE**Handling**

Precautions for safe handling : Handle with care.
Avoid inhalation of vapour or mist.
Do not get in eyes, on skin, or on clothing.
Wear personal protective equipment.
Use only in well-ventilated areas.
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Follow all standard safety precautions for handling and use of compressed gas cylinders.
Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use.
Always replace cap after use.

Advice on protection against fire and explosion : The product is not flammable.
Can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Conditions for safe storage, including any incompatibilities : Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Storage rooms must be properly ventilated.
Ensure adequate ventilation, especially in confined areas.
Protect cylinders from physical damage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Do not breathe vapour.
Avoid contact with skin, eyes and clothing.

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- Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities.
- Eye protection : Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes
- Hand protection : Leather gloves
In case of contact through splashing:
Protective gloves
Neoprene gloves
Polyvinyl alcohol or nitrile- butyl-rubber gloves
- Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).
Wear cold insulating gloves/ face shield/ eye protection.
- Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
Wear a positive-pressure supplied-air respirator.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Ensure adequate ventilation, especially in confined areas.
Avoid contact with skin, eyes and clothing.
Remove and wash contaminated clothing before re-use.
Keep working clothes separately.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
2,3,3,3-Tetrafluoroprop-1-ene	754-12-1	TWA : Time weighted average	(500 ppm)	2009	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide, as amended

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2,3,3,3-Tetrafluoroprop-1-ene	754-12-1	TWA : Time weighted average	(500 ppm)	03 15 2010	Honeywell:Limit established by Honeywell International Inc.
2,3,3,3-Tetrafluoroprop-1-ene	754-12-1	STEL : Short term exposure limit	(1,500 ppm)	03 15 2010	Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluoroethane	811-97-2	TWA : Time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluoroethane	811-97-2	TWA : Time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide, as amended

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: Liquefied gas
Color	: clear colourless
Odor	: slight ether-like
Odor threshold	: Note: No data available
pH	: Note: Not applicable
Melting point/range	: Note: No data available
Boiling point/boiling range	: -29.2 °C

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Flash point	: Note: Not applicable
Flammability	: The product is not flammable.
Lower explosion limit	: Note: None
Upper explosion limit	: Note: None
Vapor pressure	: 0.637 MPa at 21.1 °C(70.0 °F)
Vapor density	: 3.83 Note: (Air = 1.0)
Density	: 1.15 g/cm ³ at 21.1 °C
Water solubility	: Note: No data available
Partition coefficient: n-octanol/water	: Note: No data available
Ignition temperature	: Note: No data available
Auto-ignition temperature	: > 750 °C
Decomposition temperature	: > 250 °C Note: To avoid thermal decomposition, do not overheat.
Viscosity, dynamic	: Note: No data available
Viscosity, kinematic	: Note: No data available

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SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Hazardous polymerisation does not occur.
Conditions to avoid	: Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials	: Potassium Calcium Powdered metals Finely divided aluminium Finely divided magnesium Zinc
Hazardous decomposition products	: Halogenated compounds Hydrogen fluoride Carbonyl halides Carbon oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity 2,3,3,3-Tetrafluoroprop-1-ene	: LC50: > 400000 ppm Exposure time: 4 h Species: Rat Method: OECD Test Guideline 403
1,1,1,2-Tetrafluoroethane	: LC50: > 500000 ppm Exposure time: 4 h Species: Rat

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Skin irritation	: Note: Not applicable study technically not feasible
Eye irritation	: Note: Not applicable study technically not feasible
Sensitisation 2,3,3,3-Tetrafluoroprop-1-ene	: Dermal Note: Not applicable, as this product is a gas. study technically not feasible
1,1,1,2-Tetrafluoroethane	: Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observed effect level 75 000 ppm
Repeated dose toxicity 2,3,3,3-Tetrafluoroprop-1-ene	: Species: Rat Application Route: Inhalation Exposure time: (2 Weeks) No-observed-effect level: 50000 ppm Method: OECD Test Guideline 412 Species: Rat Application Route: Inhalation Exposure time: (4 Weeks) NOAEL (No observed adverse effect level): 50000 ppm Method: OECD Test Guideline 412 Species: Rat Application Route: Inhalation Exposure time: (13 Weeks) NOAEL (No observed adverse effect level): 50000 ppm Method: OECD Test Guideline 413 Species: Rabbit, male Application Route: Inhalation Exposure time: (28 d) No-observed-effect level: 500 ppm Method: OECD Test Guideline 412 There are no observed toxicological effects, which result in

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classification as a specific target organ toxicant.

Species: Rabbit, female
 Application Route: Inhalation
 Exposure time: (28 d)
 No-observed-effect level: 1000 ppm
 Method: OECD Test Guideline 412
 There are no observed toxicological effects, which result in classification as a specific target organ toxicant.

Species: Mini-pig
 Application Route: Inhalation
 Exposure time: (28 d)
 NOAEL (No observed adverse effect level): 10000 ppm
 highest exposure tested

1,1,1,2-Tetrafluoroethane : Species: Rat
 NOEL: 40000 ppm

Genotoxicity in vitro
 2,3,3,3-Tetrafluoroprop-1-ene : Test Method: Ames test
 Result: 20% and higher, positive in TA 100 and e. coli WP2 uvrA, negative in TA98, TA100, and TA1535.
 Method: OECD Test Guideline 471

1,1,1,2-Tetrafluoroethane : Note: In vitro tests did not show mutagenic effects
 : Test Method: Chromosome aberration test in vitro
 Cell type: Human lymphocytes
 Result: negative
 Method: OECD Test Guideline 473
 Note: Dose 760,000 ppm

Genotoxicity in vivo
 2,3,3,3-Tetrafluoroprop-1-ene : Species: Mouse
 Cell type: Micronucleus
 Dose: up to 200,000 ppm (4 hour)
 Method: OECD Test Guideline 474
 Result: negative

: Test Method: Unscheduled DNA synthesis
 Dose: up to 50,000 ppm (4 weeks)

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Method: OECD Test Guideline 486

Result: negative

: Species: Rat
Cell type: Micronucleus
Dose: up to 50,000 ppm (4 weeks)
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity

2,3,3,3-Tetrafluoroprop-1-ene

: Species: Rat
Note: Not classified as a human carcinogen. Substance not expected to be a carcinogen based on available data.

Further information

: Note: Rapid evaporation of the liquid may cause frostbite. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity to fish

2,3,3,3-Tetrafluoroprop-1-ene

: LC50: > 197 mg/l
Exposure time: 96 h
Species: Cyprinus carpio (Carp)
Method: OECD Test Guideline 203
Note: No demonstrable toxic effect in saturated solution.

Toxicity to daphnia and other aquatic invertebrates

2,3,3,3-Tetrafluoroprop-1-ene

: EC50: > 83 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 202

Toxicity to algae

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2,3,3,3-Tetrafluoroprop-1-ene : EC50: > 100 mg/l
Species: Scenedesmus capricornutum (fresh water algae)
Method: OECD Test Guideline 201

Bioaccumulation
2,3,3,3-Tetrafluoroprop-1-ene : Note: Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

Biodegradability
2,3,3,3-Tetrafluoroprop-1-ene : Result: Not readily biodegradable.
Method: OECD Test Guideline 301F

Further information on ecology**Ecotoxicology Assessment**

Results of PBT assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT)., This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Additional ecological information : Accumulation in aquatic organisms is unlikely.
This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.
This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere.
To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14. TRANSPORT INFORMATION

DOT UN/ID No. : UN 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.

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	Class	(R-1234yf, 1,1,1,2-Tetrafluoroethane)
	Packing group	2.2
	Hazard Labels	2.2

IATA	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (R-1234yf, 1,1,1,2-Tetrafluoroethane)
	Class	: 2.2
	Hazard Labels	: 2.2
	Packing instruction (cargo aircraft)	: 200
	Packing instruction (passenger aircraft)	: 200

IMDG	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (R-1234yf, 1,1,1,2-TETRAFLUOROETHANE)
	Class	: 2.2
	Hazard Labels	: 2.2
	EmS Number	: F-C, S-V
	Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION**Inventories**

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Inventory of Industrial Chemicals (AIIC), as amended : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

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Korea. Existing Chemicals Inventory (KECI)	:	On the inventory, or in compliance with the inventory
Philippines. Inventory of Chemicals and Chemical Substances (PICCS)	:	Not in compliance with the inventory
China. Inventory of Existing Chemical Substances (IECSC)	:	On the inventory, or in compliance with the inventory, or has been registered as new substance
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	:	Not in compliance with the inventory
Taiwan Chemical Substance Inventory (TCSI)	:	On the inventory, or in compliance with the inventory
TSCA 12B	:	US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
		2,3,3,3-Tetrafluoroprop-1-ene 754-12-1

National regulatory information

US. Toxic Substances Control Act (TSCA) Section 5(a)(2) Final Significant New Use Rules (SNURs) (40 CFR 721, Subpt E)	:	Issued.
	:	2,3,3,3-Tetrafluoroprop-1-ene 754-12-1

SARA 302 Components : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards : Sudden Release of Pressure Hazard
Acute Health Hazard

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California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16. OTHER INFORMATION

	HMIS III	NFPA
Health hazard	: 1	2
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 05/08/2018

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group

Design Report of Safety Data Sheet

(SDS)

Sample Name:

FIRE EXTINGUISHERS (WITH
COMPRESSED OR LIQUEFIED GAS)

Type/Model:

Entrust Unit:

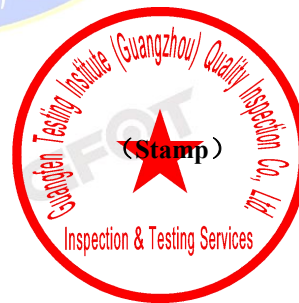
WANZHEN FIRE TECHNOLOGY (GUANGDO
NG) CO.,LTD

Audited by:

DAVE

Edited by:

NICOK



Unit: Guangfen Testing Institute (Guangzhou) Quality Inspection Co., Ltd. (GFQT)

Add: Room 101, 1st Floor, Building 2, Jinke Industrial Park, No. 1 Xinji Avenue, Nancun Town, Panyu District, Guangzhou

Tel: 020-66624679

Web: www.gflad.com

SAFETY DATA SHEET
FIRE EXTINGUISHERS (WITH COMPRESSED OR LIQUEFIED GAS)
***According to GHS (Tenth Revised Edition)**

SDS

Section 1 Identification of the chemical and supplier
◆ Product identifier

Product Name	FIRE EXTINGUISHERS (WITH COMPRESSED OR LIQUEFIED GAS)
Product Model	-
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable

◆ Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Fire extinguishing agent
Uses advised against	Please consult the manufacturer.

◆ Details of the supplier of the Safety Data Sheet


Applicant Name	Wanzhen Fire Technology (Guangdong) Co.,Ltd
Applicant Address	Room 116, huichuang space, TCL culture industrial park, no.69, Guangpu west road, Huangpu district,Guangzhou, Guangdong, China
Applicant Telephone	+86-20-29866567
Applicant Fax	-
Applicant E-mail	tsd@wanzn.com
Supplier Name	SIEX 2001 S.L.
Supplier Address	C/Merindad de Montija nº6, Burgos, 09001 Burgos (Spain)
Supplier Telephone	-
Supplier Fax	-
Supplier E-mail	-

◆ Emergency phone number

Emergency phone number	+86-20-29866567
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Section 2 Hazards identification
Hazard class and label elements of the product according to GHS(the nine revised edition)
◆ Hazard classification according to GHS

Gases under pressure	Compressed gas
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Hazardous to the aquatic environment, long-term (Chronic)		Category 3
♦ GHS Label elements		
Hazard pictograms		
Signal word	Warning	
♦ Hazard statements		
H280	Contains gas under pressure; may explode if heated	
H412	Harmful to aquatic life with long lasting effects.	
♦ Precautionary statements		
▲ Prevention		
P273	Avoid release to the environment.	
▲ Response		
P301 + P317	IF SWALLOWED: Get medical help.	
▲ Storage		
P410+P403	Protect from sunlight. Store in a well ventilated place.	
▲ Disposal		
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.	
♦ Hazard description		
▲ Physical and chemical hazards		
Physical and chemical hazards	It contains high-pressure compressed gas, which may crack and explode in case of heat.	
▲ Health hazards		
Inhaled	Harmful to health or cause respiratory discomfort.	
Ingestion	Abdominal Pain, Vomiting	
Skin Contact	Frostbite possible.	
Eye	Redness, pain, tears.	
▲ Environmental hazards		
Environmental hazards	Please refer to 12th chapter of SDS.	
Section 3 Composition/information on ingredients		

♦ Substance / mixture			
<input type="checkbox"/> Substance		<input checked="" type="checkbox"/> mixture	
Component	Cas No.	EC No.	Concentration (weight percent, %)
1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentane	756-13-8	231-545-4	70-100
Nitrogen	7727-37-9	231-545-4	2.5-10
Section 4 First aid measures			
♦ Description of first aid measures			
General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.		
Eye contact	Check and remove any contact lenses, occasionally lifting the upper and lower eyelids, and immediately flush the eyes with water until the residue clears. Provide a convenient eyewash device and a quick and safe shower without rubbing your eyes. If irritation symptoms occur or persist, consult an ophthalmologist.		
Skin contact	Remove contaminated clothing and shoes. Wash it off with mild soap and plenty of water. Seek medical attention if irritation symptoms occur or continue to develop. If you have frostbite, seek medical attention.		
Ingestion	Rinse mouth with water. If the material has been swallowed and the person is conscious, drink a small amount of water. Water can be dangerous if the person is feeling unwell and vomiting. Do not induce vomiting unless instructed by a medical professional. If vomiting occurs, the head should be kept low so that vomiting cannot enter the lungs. If adverse health effects persist or are severe, seek medical attention and do not orally feed any food to the unconscious person.		
Inhalation	Get out of the scene quickly to fresh air, keep the airway open. Rest where you breathe comfortably. If breathing is difficult, oxygen should be given by trained personnel. If symptoms persist or seriously affect health, seek immediate medical attention.		
Protecting of first-aiders	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.		
♦ Most important symptoms/effects, acute and delayed			
1	The most important known symptoms and effects are as described in Parts 2 and/or 11.		
♦ Indication of any immediate medical attention and special treatment needed			

1	Treat symptomatically.
2	Symptoms may be delayed.
Section 5 Firefighting measures	
♦	Extinguishing media
	Not applicable
♦	Specific hazards arising from the substance or mixture
1	May expansion or decompose explosively when heated or involved in fire.
♦	Special protective equipment and precautions for fire-fighters
1	As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Section 6 Accidental release measures	
♦	Personal precautions, protective equipment and emergency procedures
1	Do not take any action involving any personal risk or without proper training.
2	Entry of unnecessary and unprotected persons is strictly prohibited.
3	Do not touch or cross spilled material to avoid slipping.
4	Avoid inhalation of vapors/gases.
5	Ensure adequate ventilation. Wear proper breathing apparatus when ventilation is poor.
6	Emergency personnel will be equipped with appropriate personal protective equipment (PPE) (see Section 8).
♦	Environmental precautions
1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.
♦	Methods and materials for containment and cleaning up
	Small leakage: if there is no danger, stop the leakage and remove the container from the leakage area. If possible, proper ventilation should be used to diffuse and prevent accumulation.
	Large leakage: if there is no danger, stop the leakage and remove the container from the leakage area. Approaching the leak from upwind, spray the liquid nitrogen to accelerate evaporation, but do not make the water gun to the liquid nitrogen. If possible, the residual or leaked gas will be sent to the washing tower or the fume hood connected to the tower by an exhaust fan. Air leakage containers should be properly handled, repaired, tested before use. Containment and collection of leaking liquids with non-combustible absorbers such as sand, earth, vermiculite, diatomite.
1	leak from upwind, spray the liquid nitrogen to accelerate evaporation, but do not make the water gun to the liquid nitrogen. If possible, the residual or leaked gas will be sent to the washing tower or the fume hood connected to the tower by an exhaust fan. Air leakage containers should be properly handled, repaired, tested before use. Containment and collection of leaking liquids with non-combustible absorbers such as sand, earth, vermiculite, diatomite.
2	Contaminated adsorbents can be just as hazardous as spilled products.
3	Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

Section 7 Handling and storage

◆ Precautions for safe handling

- 1 Wear appropriate personal protective equipment (see Part 8)
- 2 Eating, drinking and smoking are prohibited where materials are handled, stored and processed.
- 3 Workers should wash their hands and faces before eating or smoking. Avoid contact with eyes and inhalation of gas.
- 4 Provide suitable exhaust equipment. Operate in a well-ventilated place.
- 5 Observe good hygiene procedures and practices.
- 6 Handling should be light, to prevent damage to the packaging and containers.
- 7 General fire protection measures. Keep away from heat sources, open flames and hot surfaces.
- 8 Clean thoroughly after operation.
- 9 Individuals with a history of skin allergies should not be employed in any work related to this product.
- 10 Equipped with corresponding varieties and quantities of fire equipment and leakage emergency treatment equipment.

◆ Conditions for safe storage, including any incompatibilities

- 1 Store in accordance with local regulations. Store in a dry, cool and well-ventilated place. Keep container tightly sealed until use.
- 2 Avoid direct sunlight. Keep away from high temperatures and open flames, from incompatible materials (see Section 10), food and feed.
- 3 Equipped with corresponding varieties and quantities of fire equipment and leakage emergency treatment equipment.
- 4 Keep away from children and pets.

Section 8 Exposure controls/personal protection

◆ Control parameters

▲ Occupational Exposure limit values

No information available

▲ Biological limit values


No information available

▲ Monitoring methods

- 1 EN 14042 Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
- 2 GBZ/T 160.1~GBZ/T 160.81-2004 Determination of toxic substances in workplace air (Series standard)


▲ Engineering controls

- 1 Ensure adequate ventilation, especially in confined areas.

2	Ensure that eyewash stations and safety showers are close to the workstation location.
3	Set up emergency evacuation channels and necessary risk relief areas.
4	Operate in accordance with good industrial hygiene and safety regulations.
▲	Personal protection equipment
General requirement	
Eye protection	Wear safety glasses when there is potential eye contact.
Hand protection	Use protective gloves. Check whether the protective gloves are normal before each use Choosing the right glove depends not only on the material, but also on the quality of the material, which varies from manufacturer to manufacturer.
Respiratory protection	If the concentration of vapor/gas exceeds the occupational exposure limit or symptoms such as irritation occur, use a full-cover multifunctional respirator.
Skin and body protection	Wear regular work clothes and boots.
Section 9 Physical and chemical properties	
◆	Physical and chemical properties
Appearance	Red barrels contain colorless liquids and gases
Odor	Odorless
pH	No information available/Not applicable
Melting point/freezing point(°C)	-108
Initial boiling point and boiling range(°C)	49
Flash point(Closed cup,°C)	No information available/Not applicable
Evaporation rate	No information available/Not applicable
Flammability	Not flammable
Upper/lower explosive limits[%(v/v)]	No information available/Not applicable
Vapor pressure(KPa)	No information available/Not applicable
Vapor density(Air = 1)	No information available/Not applicable
Relative density(Water= 1)	No information available/Not applicable
Solubility(mg/L)	not soluble in water
n-octanol/water partition coefficient:	No information available/Not applicable
Auto-ignition temperature(°C)	No information available/Not applicable

Decomposition temperature(°C)	No information available/Not applicable		
Viscosity(mm2/s)	No information available/Not applicable		
Particle characteristics	No information available/Not applicable		
Explosive properties	Not explosive		
Oxidizing properties	Not oxidizing		
Section 10 Stability and reactivity			
♦ Stability and reactivity			
Reactivity	Stable under proper operation and storage conditions.		
Chemical stability	The substance is chemically stable.		
Conditions to avoid	Incompatible material, mechanical impact, direct sunlight, high temperature and flame.		
Incompatible materials	Strong oxidizing agent.		
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.		
Section 11 Toxicological information			
♦ Acute toxicity	No information Available		
♦ Carcinogenicity			
	Component	IARC	NTP
	1,1,1,2,2,4,5,5-nonafluoro-4-(trifluoro methyl)-3-pentanone	Not Listed	Not Listed
	Nitrogen	Not Listed	Not Listed
♦ Others			
Skin corrosion/irritation	Based on available data, the classification criteria are not met		
Serious eye damage/irritation	Based on available data, the classification criteria are not met		
Skin sensitization	Based on available data, the classification criteria are not met		
Respiratory sensitization	Based on available data, the classification criteria are not met		
Reproductive toxicity	Based on available data, the classification criteria are not met		
STOT-single exposure	Based on available data, the classification criteria are not met		
STOT-repeated exposure	Based on available data, the classification criteria are not met		
Aspiration hazard	Based on available data, the classification criteria are not met		
Germ cell mutagenicity	Based on available data, the classification criteria are not met		

Reproductivetoxicity(additional)	Based on available data, the classification criteria are not met
Section 12 Ecological information	
♦ Acute aquatic toxicity	Based on available data, the classification criteria are not met
♦ Chronic aquatic toxicity	Harmful to aquatic life with long lasting effects (Category 3)
♦ Persistence and degradability	No information available
♦ Bioaccumulative potential	No information available
♦ Mobility in soil	No information available
♦ Results of PBT and vPvB assessment	
Component	Results of PBT and vPvB assessment (according to (EC) No 1907/2006)
1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone	not PBT/vPvB
Nitrogen	not PBT/vPvB
Section 13 Disposal considerations	
Waste chemicals	Refer to state, local, and national regulations for proper handling. Avoid or reduce waste production whenever possible. It is recommended to transfer to a suitable container and arrange for collection and disposal by a professional waste disposal company.
Contaminated packaging	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
Disposal recommendations	Refer to section waste chemicals and contaminated packaging.
Section 14 Transport information	
♦ Transport rules	According to IATA DGR 64 rd Edition for transportation, IMO International Maritime Dangerous Goods Code (Amendment 40-20), European Agreement Concerning the International Carriage of Dangerous Goods by Road. The products are subject to IATA DGR, IMDG and ADR/RID.
♦ Label(s) required	

Transporting Label									
♦ Road transport (UN-ADR)									
UN Number		UN1044							
UN Proper shipping Name		Fire extinguisher containing compressed or liquefied gas							
Transport hazard class		2.2							
Transport subsidiary hazard class		None							
Packing group		Not applicable							
Special provisions for transportation		225 594							
♦ (ICAO-IATA/DGR)									
UN Number		UN1044							
UN Proper shipping Name		Fire extinguisher containing compressed or liquefied gas							
Transport hazard class		2.2							
Transport subsidiary hazard class		None							
Packing group		225 594							
Special provisions for transportation		A19							
♦ (IMDG-CODE)									
UN Number		UN1044							
UN Proper shipping Name		Fire extinguisher containing compressed or liquefied gas							
Transport hazard class		2.2							
Transport subsidiary hazard class		None							
Packing group		225 594							
Special provisions for transportation		A19							
Marine pollutant(Yes/No)		No							
Section 15 Regulatory information									
♦ International list of chemicals									
CAS No.	EC Inventory	TSCA	DSL	IECSC	NZIoC	PICCS	KECI	AICS	ENCS
756-13-8	×	√	√	√	√	×	√	√	√
7727-37-9	√	√	√	√	√	√	√	√	×

【EC inventory】 European Inventory of Existing Commercial Chemical Substances
【TSCA】 United States Toxic Substances Control Act Inventory
【DSL】 Canadian Domestic Substances List
【IECSC】 China Inventory of Existing Chemical Substances
【NZIoC】 New Zealand Inventory of Chemicals
【PICCS】 Philippines Inventory of Chemicals and Chemical Substances
【KECI】 Existing and Evaluated Chemical Substances
【AICS】 Australia Inventory of Chemical Substances (AIICS)
【ENCS】 Japan Inventory of Existing & New Chemical Substances

Note :

"√" Indicates that the substance included in the regulations

"×" That no data or included in the regulations

Section 16 Additional Information

Information on revision

Creation Date	2024/01/01
Revision Date	2024/01/02 (Explanation: This report is valid until the implementation of the eleventh revised version of the United Nations GHS.)
Reason for revision	-

References

- [1] IPCS:The International Chemical Safety Cards (ICSC) ,website: <http://www.ilo.org/dyn/icsc/showcard.home>.
- [2] IARC, website: <http://www.iarc.fr/>.
- [3] OECD: The Global Portal to Information on Chemical Substances, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en.
- [4] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>.
- [5] NLM:ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.
- [6] EPA: Integrated Risk Information System, website: <http://cfpub.epa.gov/iris/>.
- [7] U.S. Department of Transportation:ERG, website: <http://www.phmsa.dot.gov/hazmat/library/erg>.
- [8] Germany GESTIS-database on hazard substance, website: <http://gestis-en.itrust.de/>.

Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG	International Maritime Dangerous Goods
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	ICAO-International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists

LC ₅₀	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD ₅₀	Lethal Dose 50%	NTP	National Toxicology Program
EC ₅₀	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
ECX	Effective Concentration X%	vPvB	vPvB -High very Persistent, High very Bioaccumulative
P _{ow}	Partition coefficient Octanol:Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor (BCF)	RPE	Respiratory Protective Equipment
BCF			
ED	Endocrine disruptors	-	-

◆ **Disclaimer**

This Safety Data Sheet (SDS) The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user' s reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product, This report may not be published as an advertisement without the approval of the GFQT. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is illegal and the offender may be prosecuted to the fullest extent of the law.In case of any different meanings from the language used in the report, the Chinese version is applicable.

HUBEI JIANDUN FIRE TECHNOLOGY CO.,LTD

Safety Data Sheet

Product Name:CONDENSED AEROSOL FIRE EXTINGUISHING SYSTEM UNIT

SDS No.SHIS24100466

Prepared according to the United Nations "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS" (Tenth revised edition)



SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier	
Product Name	CONDENSED AEROSOL FIRE EXTINGUISHING SYSTEM UNIT
Product Model	QRR0.75G-U01
Relevant identified uses of the substance or mixture and uses advised against	
Relevant identified uses	Extinguishing Class A, Class B, Class C fires
Uses advised against	Please consult manufacturer.
Details of the supplier of the Safety Data Sheet	
Name of the company	HUBEI JIANDUN FIRE TECHNOLOGY CO.,LTD
Address of the company	No.199 Huaxi Road,Biological Industrial Park,China(Hubei)Free Trade Zone Yichang Area,Yichang City,Hubei Province,China
Post code	443000
E-mail address	development@jad119.com
Telephone number	+86-717-6741877
Emergency phone number	+86-15872583131

SECTION 2: Hazards identification

Classification of the substance or mixture	
Not classified	
Label elements	
Hazard pictograms	/
Signal word	/
Hazard statements	

/
Precautionary statements
/
Response
/
Storage
/
Disposal
/
Other hazards which do not result in classification (e.g. "dust explosion hazard") or are not covered by the GHS.
If the device is activated, it may be exposed to aerosol extinguishing agents. May cause temporary, very mild mucous membrane irritation.

SECTION 3: Composition/information on ingredients

The product is a hot aerosol fire extinguishing device, which consists of aerosol generator and thermal initiator.		
Aerosol generator:		
() Substances		
() Mixtures		
Component	Cas No.	EC No.
Potassium nitrate	7757-79-1	231-818-8
Melamine	108-78-1	203-615-4
PHENOL-FORMALDEHYDE RESIN	9003-35-4	500-005-2

SECTION 4: First aid measures

Description of first aid measures	
General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
Eye contact	Aerosol-generating compounds in the contents of the device eye contact, open eyes nitrile rinse with water, skin contact change clothes and shoes, wash with soap and water. Aerosol fire extinguishing agent eye contact move to fresh air and rinse with water, skin contact change clothes and shoes, wash with soap and water, inhalation move to fresh air.
Skin contact	Aerosol-generating compounds in the contents of the device eye contact, open eyes nitrile rinse with water, skin contact change clothes and shoes, wash with soap and

	water. Aerosol fire extinguishing agent eye contact move to fresh air and rinse with water, skin contact change clothes and shoes, wash with soap and water, inhalation move to fresh air.
Ingestion	Not applicable.
Inhalation	Move immediately from the exposed area to fresh air, give oxygen if breathing is difficult, and seek medical attention immediately. If you feel unwell, seek medical attention immediately.
Protecting of first-aids	Make sure first responders understand the hazard characteristics of the product and take self-protection measures to protect themselves and prevent the spread of contamination.
Most important symptoms and effects, both acute and delayed	
No information available	
Indication of any immediate medical attention and special treatment needed	
1	Treat symptomatically.
2	Symptoms may be delayed.

SECTION 5: Firefighting measures

Extinguishing media	
Suitable extinguishing media	Select fire suppression measures according to the surrounding conditions.
Unsuitable extinguishing media	No information available.
Specific hazards arising from the substance or mixture	
1	Fire can produce irritating gases.
Advice for firefighters	
1	When extinguishing a fire, wear a breathing mask and full body protective clothing.
2	Extinguish fires at a safe distance and with adequate protection.
3	Prevent firefighting water from contaminating surface and groundwater systems.
4	In the event of a fire, evacuate the area and notify the emergency services point. Water can be used as an additional extinguishing agent.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures	
1	Immediately isolate the appropriate distance in all directions as the leak area. Isolation of dangerous

	places, no relevant personnel and not wearing protective equipment to enter and exit.
2	Quickly evacuate personnel to a safe area, away from the spill area and in an upwind direction.
3	Wear personal protective equipment, such as respirator /N95 mask, protective glasses, etc.
4	Ensure adequate ventilation. Stay out of the lowlands.
5	Use personal protective equipment. Avoid inhalation of steam, smoke, gas or dust.
Environmental precautions	
Avoid discharge to the surrounding environment.	
Methods and materials for containment and cleaning up	
1	Maintain ventilation during aerosol fire extinguishing agent spills until the aerosol has been down for a period of time to clean up spray release residue.
2	Attachments or collections shall be stored in suitable airtight containers and disposed of in accordance with relevant local laws and regulations.

SECTION 7: Handling and storage

Precautions for handling	
1	Keep away from heat sources, sparks, open flames, and hot surfaces.
2	Wear appropriate personal protective equipment.
3	Strong mechanical impact and throwing are strictly prohibited.
Conditions for safe storage, including any incompatibilities	
1	Store in a dry, cool and well-ventilated place at a low temperature.

SECTION 8: Exposure controls/personal protection

Control parameters	
Occupational Exposure limit values	
No relevant provisions	
Biological limit values	
No relevant provisions	
Monitoring methods	
1	EN 14042 Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
2	GBZ/T 300.1~GBZ/T 300.160-2017; GBZ/T 300.161~GBZ/T 300.164-2018 Determination of toxic substances in workplace air (Series standard) .
Exposure controls	
Appropriate engineering controls	
1	Strengthen ventilation and keep the concentration in the air below the occupational exposure limit.

2	Set up automatic alarm devices and accident ventilation facilities.
3	Ensure that eyewash stations and safety showers are close to the workstation location.
4	Use explosion-proof electrical/ventilating/lighting/equipment. The power system must meet the explosion-proof requirements of the hazardous area.
5	Set up emergency exit and necessary risk-elimination area.
6	Set up cordon, warning signs and warning instructions in Chinese, and set up a communication alarm system.
Individual protection measures, such as personal protective equipment (PPE)	
Formulate good occupational hygiene regulations, and personal protective equipment should be used in conjunction with other control measures, such as engineering controls, ventilation, and isolation. Personal protective equipment (PPE) is selected according to GB39800.1-2020.	
Eye protection	Wear safety glasses with side shields.
Skin and body protection	Wear suitable protective clothing, gloves and eye/face protection. Impervious clothing. Boots.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. Respirator with a particle filter.
Other protection requirements	Choose appropriately according to the working environment and the risks involved.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties	
Physical state	Solid
Colour	Red
Odor	No information available
Melting point/freezing point	No information available
Initial boiling point/boiling range	No information available
Flammability	Non flammable
Lower and upper explosion limit/flammability limit	No information available
Flash point	Not applicable
Auto-ignition temperature	350°C
Decomposition temperature	No information available
pH	Not applicable
Kinematic viscosity	Not applicable
Solubility	Not applicable
n-octanol/water partition coefficient	Not applicable

Vapor pressure	Not applicable
Density/relative density (water = 1)	No information available
Relative vapour density (air=1)	Not applicable
Particle characteristics	Not applicable
Other information	
No information available	

SECTION 10: Stability and reactivity

Reactivity	Contact with incompatible substances can cause decomposition or other chemical reactions.
Chemical stability	It is stable under correct conditions of use and storage. The chemical agents and thermal initiators in this device are stable below 105°C
Possibility of hazardous reactions	It is stable under correct conditions of use and storage.
Conditions to avoid	Avoid fire, power, vibration and high temperatures.
Incompatible materials	No information available
Hazardous decomposition products	Combustion products potentially contain very small amounts of harmful carbon monoxide and nitrogen oxides

SECTION 11: Toxicological information

Acute toxicity	No information available
Skin corrosion/irritation	No information available
Serious eye damage/irritation	No information available
Respiratory sensitization	No information available
Skin sensitization	No information available
Germ cell mutagenicity	No information available
Carcinogenicity	No information available
Reproductive toxicity	No information available
Specific target organ toxicity – Repeated exposure-single exposure	No information available
Specific target organ toxicity – Repeated exposure-repeated exposure	No information available
Aspiration hazard	No information available
Information on other hazards	
After the hot gas aerosol fire extinguishing device is sprayed, the aerosol will quickly fill the entire protected	

space. The concentration of aerosol is high, and the visibility in space is low. Therefore, if the contact with high concentration of aerosol components for a long time after spraying, the human body may have an uncomfortable reaction, and the human body should be properly protected.

Potassium nitrate: Acute oral toxicity (LD50):901 mg/kg(live rabbit)750 mg/kg(rat)

Melamine: Toxic dose LD50:3248 mg/kg(oral, rats)

SECTION 12: Ecological information


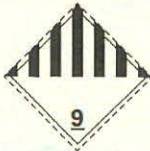
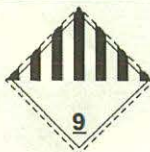

Toxicity
No information available
Persistence and degradability
No information available
Bioaccumulative potential
No information available
Mobility in soil
No information available
Results of PBT and vPvB assessment
No information available
Endocrine disrupting properties
No information available
Other adverse effects
No information available


SECTION 13: Disposal considerations

Waste treatment methods	
Waste chemicals	Before disposal should refer to the relevant national and local laws and regulation.
Contaminated packaging	There may still be residue hazards after the packaging is emptied. It should be kept away from heat and fire sources and returned to the supplier for recycling if possible.
Disposal recommendations	Refer to relevant requirements of Waste chemicals and Contaminated packaging.

SECTION 14: Transport information

UN RTDG	
UN number	UN3559
UN proper shipping name	FIRE SUPPRESSANT DISPERSING DEVICES

Transport hazard class	9
Shipping label	
Packing group	-
IMO-IMDG CODE	
UN number	UN3559
proper shipping name	FIRE SUPPRESSANT DISPERSING DEVICES
Transport hazard class	9
Shipping label	
Packing group	-
IATA-DGR	
UN number	UN3559
proper shipping name	FIRE SUPPRESSANT DISPERSING DEVICES
Transport hazard class	9
Shipping label	
Packing group	-
UN-ADR	
UN number	UN3559
proper shipping name	FIRE SUPPRESSANT DISPERSING DEVICES
Transport hazard class	9
Shipping label	
Packing group	-
COTIF-RID	
UN number	UN3559
proper shipping name	FIRE SUPPRESSANT DISPERSING DEVICES
Transport hazard class	9

Shipping label	
Packing group	-
Environmental hazards	
According to IMDG-CODE, is it a Marine pollutant	No
Special precautions for users	
No information available.	
Maritime transport in bulk according to IMO instruments	
Not applicable.	

SECTION 15: Regulatory information

The following laws and regulations have made corresponding provisions on the safe use, storage, transportation, handling, classification and marking of chemicals:

1. "The Work Safety Law of the People's Republic of China";
2. "Law of the People's Republic of China on the Prevention and Control of Occupational Diseases";
3. "Environmental Protection Law of the People's Republic of China";
4. Import and Export Commodity Inspection Law of the People's Republic of China;
5. Regulations on the Safe Management of Dangerous Chemicals (State Council Decree No. 591);
6. "Regulations on Safety Production License" (State Council Decree No. 397);
7. "Import and Export Commodity Inspection Law of the People's Republic of China Implementation Regulations";
8. Measures for the Safe Management of Road Transportation of Dangerous Goods (Ministry of Transportation Decree No. 29 of 2019).

Users are advised to comply with local regulations governing this chemical.

Other management information

"Montreal Protocol" (Annex A, B, C, E): Not included

Rotterdam Convention (Annex III Chemicals subject to the prior informed consent procedure): Not listed

"Stockholm Convention on Persistent Organic Pollutants" (Appendix A, B, C): not included

SECTION 16: Other information

Information on revision

Creation Date: 2024/12/16

version: 1.0

Creation Company: HUBEI JIANDUN FIRE TECHNOLOGY CO.,LTD

Reason for revision: -

Reference

- [1] United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS, Tenth Revision)
- [2] United Nations Model Regulations for Recommendations on the Transport of Dangerous Goods (23rd Revised Edition)
- [3] International Maritime Dangerous Goods Code (IMDG Code, 41-22)
- [4] IATA Dangerous Goods Code (IATA DGR, 65th edition)
- [5] United Nations European Convention on the International Carriage of Dangerous Goods by Road (ADR, 2023)
- [6] international chemical safety program: international chemical safety CARDS (ICSC), website:
<http://www.ilo.org/dyn/icsc/showcard.home>.
- [7] International Agency for Research on Cancer, <http://www.iarc.fr/>.
- [8] OECD Global Chemicals Information Platform, Website:
http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en.
- [9] the European chemicals agency, ECHA website: <https://echa.europa.eu/home>.
- [10] American medical library: chemicals database, website:
<http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.
- [11] the United States environmental protection agency (epa) : integrated risk information system, web site:
<http://cfpub.epa.gov/iris/>.
- [12] the U.S. department of transportation: emergency response guidelines, website:
<http://www.phmsa.dot.gov/hazmat/library/erg>.
- [13] the CAMEO chemicals database, web site: <http://cameochemicals.noaa.gov/search/simple>.
- [14] GESTIS, Germany - Hazardous Substances Database, <http://gestis-en.itrust.de/>.
- [15] (Japan) national institute of technology and evaluation, website:
<https://www.nite.go.jp/chem/english/ghs/08-mhlw-0319e.html>.

Abbreviations and acronyms

CAS –Chemical Abstracts Service

EC NO–European Inventory Existing commercial Chemical Substances

PC-STEL- permissible concentration-short term exposure limit

PC-TWA - permissible concentration-time weighted average

NTP-National Toxicology Program

IARC - International Agency for Research on Cancer

LC₅₀ - Lethal Concentration 50%LD₅₀ - Lethal Dose 50%

EC_x - Concentration that produces x% response

EC₅₀ - Effective Concentration 50%

NOEC -No Observed Effect Concentration

ErC₅₀-Expressed as a decrease in growth rate EC₅₀

PBT - Persistent, Bioaccumulative, Toxic

vPvB - very Persistent, very Bioaccumulative

BCF - Bioconcentration factor (BCF)

Log Kow-Octanol/Water Partition Coefficient

CMR-Carcinogens, mutagens or substances toxic to reproduction

RAHC-The Remote Area Health Corps

UN-The United Nations

IATA-International Air Transport Association

OECD-Organization for Economic Co-operation and Development

ACGIH-American Conference of Governmental Industrial Hygienists

IMDG-International Maritime Dangerous Goods

DGR-Dangerous Goods Regulations

ADR-Agreement Concerning the International Carriage of Dangerous Goods by Road

IMSBC CODE-International Maritime Solid Bulk Cargoes Code

Disclaimer

This Safety Data Sheet (SDS) was prepared according to UN GHS (Tenth revised edition). The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

Appendix I
CONSIDERATIONS DURING CONSTRUCTION

ROLES AND RESPONSIBILITIES DURING CONSTRUCTION

During construction the key change from the ERP is that the General Contractor will be the Emergency Response Coordinator. The Emergency Response Coordinator takes control of the emergency and any resources necessary until the emergency has been eliminated and the necessary cleanup and/or restoration are complete. This person shall lead the incident reporting. All personnel on site shall know who the Emergency Response Coordinator on-duty is during their time on site. Remote operators shall likewise know who the Emergency Response Coordinator is for any given shift.

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

The Emergency Response Coordinator is also 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).

GENERAL CONTRACTOR EMERGENCY ACTION PLAN

The General Contractor shall prepare an emergency action plan per OSHA standard 1926.35. This plan should address the following items:

- Types and locations of hazardous materials (refer to Safety Data Sheets)
- Potentially dangerous operations or conditions
- Chemical storage sites
- Remote job sites
- Workplace communication systems
- Employee work shifts
- Means of egress
- Evacuation routes and means to maintain routes in all ground and weather conditions
- Fixed and portable fire extinguishing systems
- Employee alarm systems
- Protection of visitors and members of the public
- Adverse weather conditions

BESS STORAGE RECOMMENDATIONS

During the process of construction and commissioning, any BESS enclosures that are to be stored between arrival and installation shall be stored following the guidance of NFPA 855 – Standard for the Installation of Stationary Energy Storage Systems – 2023 Edition as stated in the following subsections.

It is important to note that the following storage guidance from NFPA 855 is intended for batteries. The BESS enclosures that will be on-site are not batteries themselves but contain battery cells within. The enclosures have gone through full-scale UL 9540A testing as operational units. However, in the construction phase of the project, the enclosures are not yet operational and there are safety features of each enclosure that may not yet be activated including smoke, heat and gas detection and exhaust ventilation. For these reasons, Coffman recommends these enclosures be regarded as batteries while on-site but not operational for Section 4 of this document, following the methodology of NFPA 855 - 2023 Edition - Chapter 14 - Storage of Used or Off-Specification Batteries.

No temporary buildings or transportation containers will be used for this site. Information below on such arrangements is used to further guide construction management crews if any storage configurations change on-site.

The placement of an ESS enclosure in its final location is not considered storage if commissioning and safety features are operational within 3-months of setting.

Per NFPA 241 § 5.3.3, any non-storage temporary structures used during the construction process shall be equipped with a minimum of one fire extinguisher suitable for all classes of fires that are expected inside the structure. The extinguisher(s) shall be located so that travel distance to an extinguisher does not exceed 50 ft within the structure.

Outdoor Storage Locations

The planned storage arrangement for this project is directly outside so the storage areas or “piles” shall comply with the following:

1. Be limited to 200 ft² in area and separated from other piles by 10 ft.
2. Be separated by a minimum 20 ft from:
 - a. Lot lines
 - b. Public ways
 - c. Buildings
 - d. Other storage
 - e. Hazardous materials
 - f. Other exposure hazards
3. Be permitted to have a 3 ft clearance from exposures where a 3-hour freestanding fire barrier, suitable for exterior use, and extending 15 ft above and extending 15 ft beyond the physical boundary of the pile is provided to protect the exposure.

Indoor Storage Locations

While it is not anticipated that any batteries or ESS will be stored inside during construction and commissioning, the following information is provided for reference should this change.

If stored in a **room or space**, the room or space shall:

1. Be classified as an industrial high-hazard occupancy.
2. Be separated from the remainder of the building areas by fire barriers with a 3-hour fire resistance rating and with horizontal assemblies with a 3-hour fire resistance rating constructed in accordance with the local building code.
3. Be provided with a fire alarm system activated by a radiant-energy detection system with occupant notification installed in accordance with NFPA 72 – National Fire Alarm Code.
4. Be provided with an automatic sprinkler system designed and installed in accordance with NFPA 13 – Standard for the Installation of Sprinkler Systems.
5. Be equipped with an explosion protection system in accordance with NFPA 68 or 69.

These fire incident detection and mitigation measures shall be documented in a Fire Incident Prevention and Mitigation Plan to be provided to the AHJ for review and approval.

Storage Precautions

In accordance with the Risen transportation and storage guidelines, should the ESS enclosures or battery cells require storage for extended periods of time, the following is advised:

1. Long-term storage of batteries is not recommended and causes irreversible capacity loss. After 12 months of storage at the recommended temperature (less than or equal to 95°F) the typical irreversible capacity loss is 3 to 6 percent.
2. Recommended battery storage ambient humidity of less than 60%.
3. Recommended battery stored between 30%-50% State-of-Charge (SOC). During storage, all external power-consuming devices must be disconnected. Perform regular inspections. Maintain detailed inspection records and promptly address any abnormal conditions.
4. Store in a dry, clean, and well-ventilated warehouse to prevent dust and moisture ingress and ensure no short circuits.
5. Avoid contact with corrosive organic solvents or gases to prevent battery corrosion and rust.
6. Avoid direct sunlight.
7. During storage, if any questions arise, contact the after-sales service for consultation and handling at +86 400-101-8585, or essmkt@risenstorage.com
8. Storage facilities should be compliant with the appropriate local fire code requirements.

DAMAGE TO BESS EQUIPMENT DURING CONSTRUCTION

Battery Cells

Should a battery cell be damaged during handling, storage, or transportation reference section 4.1.8 of the ERP for assessing if it is safe to approach the enclosure.

Fire Alarm / BMS Systems

Any ESS enclosure that has a non-functional Fire Alarm or Battery Management System (BMS) shall be shut down immediately.

Note that a system shutdown will result in electrical isolation of the battery strings and cessation of battery charging or discharging. A system shutdown will not de-energize the battery bank, nor will it guarantee that a fault or thermal runaway vent has stopped. Do not open the ESS enclosure until deemed safe to do so by an individual qualified to direct such decision.

COMMISSIONING

Prior to starting any commissioning, the commissioning plan, documentation requirements, and design verification checklist shall be finalized by all interested parties. In addition to Risen procedures, the following site considerations shall be implemented:

Fire Command Center (FCC)

The overall site Fire Command Center (FCC) shall be operational prior to commissioning of individual ESS fire alarm panels. Individual ESS enclosure fire alarm systems shall be operational prior to energization of that ESS enclosure. See Appendix A for location.

Fire Water Access

The on-site fire hydrants shall be operational prior to commissioning. The ESS enclosures were tested in accordance with UL 9540A without the use of water and demonstrated that unit-to-unit propagation does not occur. See Figure 2.3.2 for fire hydrant locations.

Fire Access Roads

For any ESS being commissioned, the fire access road to the equipment shall be clear with an unobstructed width of at least 20-ft and unobstructed vertical clearance of not less than 13'-6", so that responding fire department equipment can access the location of the ESS. See Appendix A for location.