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Data Request Response #2

Corby Battery Energy Storage System Project (24-OPT-05)

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Acronyms and Abbreviations

Applicant	North Bay Interconnect, LLC and Corby Energy Storage, LLC
Application	Opt-in Application
BESS	battery energy storage system
BMP	best management practice
BMS	battery management system
CAAQS	California Ambient Air Quality Standard
CAES	Compressed Air Energy Storage
CATL	Contemporary Amperex Technology Co. Limited
CEC	California Energy Commission
CFC	California Fire Code
CFD	computational fluid dynamics
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CRHR	California Register of Historical Resources
CSP	Concentrating Solar Power
DFPD	Dixon Fire Protection District
DOE	U.S. Department of Energy
DUSD	Dixon Unified School District
EAP	Emergency Action Plan
EMS	emergency medical services
ERIS	Environmental Risk Information Services
ERP	Emergency Response Plan
ESA	Environmental Site Assessment
FMEA	Failure Mode and Effects Analysis
FPP	Fire Protection and Prevention Plan
FRA	Fire Risk Alliance, LLC
gen-tie	generation tie
GWP	global warming potential
Heben	Nanjing Heben M&E Equipment Technology Co., Ltd
HMA	Hazard Mitigation Analysis

HMBP	Hazardous Materials Business Plan
HV	high voltage
IDLH	Immediately Dangerous to Life or Health
IFC	International Fire Code
IIPP	Illness and Injury Prevention Plan
kWh	kilowatt-hour
LCOS	levelized cost of storage
LFP	lithium iron phosphate
MW	megawatt
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standard
NERC	North American Electric Reliability Corporation
NFPA	National Fire Protection Association
NO_2	nitrogen dioxide
NRHP	National Register of Historic Places
O&M	operations and maintenance
PG&E	Pacific Gas and Electric
PHAST	Process Hazard Analysis Software Tools
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PPE	personal protective equipment
Prohibitions	Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses
Project	Corby Battery Energy Storage System Project
RMP	Risk Management Plan
RTE	round-trip efficiency
SAP	Sampling and Analysis Plan
SDS	Safety Data Sheet
SIL	Significant Impact Level
SL	screening level
SMP	Soil Management Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure

SWPPP	Stormwater Pollution Prevention Plan
TDM	Transportation Demand Management
TES	thermal energy storage
TMS	thermal management system
UL	Underwriters Laboratories
USEPA	U.S. Environmental Protection Agency
Wh	watt-hour
YSAQMD	Yolo Solano Air Quality Management District

1.0 INTRODUCTION

This Data Request Response #2 to North Bay Interconnect, LLC and Corby Energy Storage, LLC's (Applicant)[1] Opt-in Application (Application) for the Corby Battery Energy Storage System Project (Project) (24-OPT-05), responds to comments that California Energy Commission (CEC) Staff have made as a result of their data adequacy review of the Application, as documented in their Determination of Incomplete Application and Request for Information letter dated December 9, 2024. The intention of this supplement is to provide all additional information necessary for Staff to find that the Application contains adequate data to begin an Opt-in Renewables site certification proceeding under California Code of Regulations, Title 20, Section 1877, and Public Resources Code, Section 25545, for the technical areas included in the submittal.

Table 1-1 provides a summary of the technical areas requiring additional information to be deemed complete and indicates which of these are addressed in this Data Request Response #2. For each technical area included, the responses are complete and address all identified deficiencies.

Table 1-1. Completeness Review Status

Technical Area	Previously Addressed in Data Request Response #1	Addressed in Data Request Response #2
Incomplete		
Mandatory Opt-in Requirements	X	
Air Quality		X
Alternatives		X
Biological Resources	X	
Cultura and Tribal Cultural Resources		X
Geologic Hazards	X	
Greenhouse Gas Emissions		X
Hazardous Materials Handling		X
Land Use	X	
Paleontological Resources	X	
Project Description	X	
Reliability		X
Socioeconomics		X
Traffic and Transportation		X
Transmission System Safety and Nuisance	X	
Transmission System Design	X	
Visual Resources	X	
Waste Management		X
Water Resources	X	
Wildfire		X

[1] North Bay Interconnect, LLC and Corby Energy Storage, LLC are both wholly-owned subsidiaries of NextEra Energy Resources. North Bay Interconnect, LLC will own and operate the interconnection facilities for the Project; and Corby Energy Storage, LLC will own and operate the BESS components of the Project.

Technical Area	Previously Addressed in Data Request Response #1	Addressed in Data Request Response #2
Worker Safety and Fire Protection		X
Complete		
Efficiency, Energy, and Energy Resources	NA	
Executive Summary		
Facility Design		
Noise and Vibration		
Public Health		
Soils		

The format for this supplement follows the order of Staff's completeness review and provides additional information and responses to CEC information requests for several disciplines. Only sections for which CEC Staff posed requests or questions related to data adequacy are addressed.

Each data request is followed by the Applicant's response to the information requested. All figures referenced in responses are provided following the set of responses for the technical discipline. If the response requires additional appended material, it is included in numbered appendices at the end of the document.

Separate from this Data Request Response #2 document, the Applicant previously filed a Project Description Update, which presents Project updates and analyzes the potential environmental impacts resulting from these updates relative to the analysis included in the Application. A Project Description Update Addendum will be concurrently filed with this Data Request Response #2 to present updated environmental review for Air Quality, Energy, Greenhouse Gas Emissions, and Transportation, which were not previously provided with the Project Description Update.

2.0 AIR QUALITY

2.1 Data Request DR AQ-1

DR AQ-1. Please provide an ambient air quality impacts analysis of all criteria pollutants including NO_2, SO_2, CO, PM10, and PM2.5 using AERMOD or AERSCREEN (the screening version of AERMOD) during construction and operation and demonstrate whether the project impacts would comply with all state and federal AAQS.

Response: An updated Air Quality and Greenhouse Gas Technical Report has been prepared and filed separately, providing a detailed updated analysis addressing the Project description updates and Data Requests. Ambient air quality impacts analyses for criteria pollutants were performed using AERMOD. Predicted impacts for construction for 8-hour carbon monoxide (CO) and sulfur dioxide (SO_2) are less than the Significant Impact Levels (SILs), indicating that no further air quality modeling is required for these pollutants. AERMOD predicted concentrations for 1-hour CO, nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns ($PM_{2.5}$) are summed with the ambient monitored background concentrations, resulting in total construction impacts below the California and National Ambient Air Quality Standards (CAAQS and NAAQS). Predicted impacts for operation are less than the SILs for all pollutants. Results are summarized in Tables 11 and 12 of the Air Quality and Greenhouse Gas Technical Report. Detailed modeling results and ambient background concentrations are provided in Appendix B of the report.

2.2 Data Request DR AQ-2

DR AQ-2. Please provide explanation regarding whether a cumulative air quality impacts modeling analysis is needed based on the updated air quality modeling results. If cumulative air quality impacts modeling is needed, please submit a modeling analysis for assessing the cumulative air quality impacts of the project during its standard operational phase.

Response: As stated in DR AQ-1, AERMOD predicted impacts for NO_2, PM_{10}, $PM_{2.5}$, CO, and SO_2 during both construction and operation of the Project will comply with all state and federal AAQS. The Yolo-Solano Air Quality Management District (YSAQMD) *Handbook for Assessing and Mitigating Air Quality Impacts*[2] states that any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative impact. For CO, impacts are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects (i.e., background concentration) will exceed the CAAQS. Although YSAQMD does not provide guidance for pollutants other than CO, the same criteria for significance is used for the purpose of this analysis to determine that cumulative air quality modeling analysis is not needed.

3.0 ALTERNATIVES

3.1 Data Request DR ALT-1

DR ALT-1. Please supplement the alternatives analysis in Section 5.0 with the following information:

a. **Site Alternatives**

- Provide estimated lengths of gen-tie routes required to connect to each alternative site (i.e., Site 1 and Site 2).
- Illustrate locations of gen-tie routes for each alternative site (i.e., Site 1 and Site 2) in Figure 5-1.

b. **Technology Alternatives.** Section 5.5 does not provide the assumptions used to prepare the Technology Alternative Comparison in Table 5-4. While this table indicates if a technology presents an advantage or disadvantage over the proposed project, there are no data or assumptions provided in Section 5.5 to support the comparison in Table 5-4 or to support the Preferred Technology Alternative conclusions presented in Section 5.5.5. Staff requires the following data to prepare an evaluation of the comparative engineering, economic, and environmental merits of the alternatives per Appendix B (f) (2):

- For each alternative technology, provide assumptions for the facility reliability and round-trip efficiency to allow staff to compare these assumptions with the project description information provided in Section 2.5.2 (Facility Reliability) and Section 2.5.3 (Efficiency).

[2] YSAQMD (Yolo Solano Air Quality Management District). 2007. Handbook for Assessing and Mitigating Air Quality Impacts. Available online at: https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf

- For each alternative technology, provide assumptions for the cost criterion used in Table 5-4 to allow staff to compare these assumptions with the projected cost of the proposed project.
- For each alternative technology, provide assumptions for the environmental impact criterion used in Table 5-4 to allow staff to compare these assumptions with the environmental impacts of the proposed project.

Response:

a. Site Alternatives

Figure 5-1 from the Application has been revised and is included herein as Figure 3-1. This revised figure includes the conceptual generation tie (gen-tie) routes required to connect to each alternative site. The conceptual gen-tie routes have estimated distances as shown below.

- Alternate Site 1 Eastern Gen-Tie Route – 1.22 miles
- Alternate Site 1 Western Gen-Tie Route – 2.04 miles
- Alternate Site 2 Eastern Gen-Tie Route – 3.48 miles
- Alternate Site 2 Western Gen-Tie Route – 4.28 miles

b. Technology Alternatives

The following text describes alternative technologies and their advantages and disadvantages to address the data request. Facility reliability is addressed through a combination of efficiency, response time, and energy storage duration for each technology. Assumptions made with regard to the energy density, efficiency, response times, storage durations, cost, and potential environmental impacts are included below. Table 5-4 in the Application incorrectly notes that energy density for supercapacitors is similar to that of battery energy storage systems; instead, supercapacitors have lower energy density than battery energy storage systems and this would be a disadvantage for a supercapacitor. This text has been updated and is discussed in the relevant section below.

Compressed Air Energy Storage

Compressed Air Energy Storage (CAES) is a technology that stores energy by compressing air during periods of low energy demand and releasing it to generate electricity during peak demand. The compressed air is typically stored in underground caverns, such as salt domes or depleted natural gas fields, which provide the necessary geological formations to contain the pressurized air. The compression process involves using electricity to power compressors, allowing the air to be stored efficiently in a compressed state. When energy is needed, the compressed air is released, heated, and expanded through a turbine to generate electricity.

However, the feasibility of CAES systems is often constrained by geological requirements, as suitable underground formations are not universally available. Additionally, the larger footprint required for both the storage facilities and the associated infrastructure can limit implementation in certain locations. For instance, in the context of the Project, geological constraints and space limitations would render CAES technology an infeasible alternative, as the necessary site size for effective operation exceeds what is available and, importantly, suitable geology is not present.

Energy Density: In order to meet the 300-megawatt (MW) objective of the Project, a CAES system would require a substantially larger footprint than the Project. CAES requires a larger physical space to drive a turbine and generate electricity back to the grid. For example, an Application for Certification was filed with the CEC in 2021 for the Pecho Energy Storage Center located in San Luis Obispo County. While the application for this CAES facility was subsequently withdrawn, the facility was proposed to operate at 400 MW and occupy an aboveground area of 80-acres (CEC 2025).[3] This facility was proposed to be nearly twice as large as the Project site (excluding the underground compressed air storage cavern) and would have delivered only 133 percent of the proposed Project's capacity. Therefore, a CAES system is less energy dense than the proposed battery energy storage system (BESS) facility based on this example.

Efficiency: According to the U.S. Department of Energy (DOE), one of the challenges with CAES technology includes the need for heat during the expansion process, which requires additional energy such as that from the combustion of natural gas, hydrogen, electric heating with power from onsite, or nearby renewables (DOE 2023a).[4] The DOE also notes that another challenge with CAES systems is lower round-trip efficiency (RTE). The theoretical upper limit of RTE for CAES is defined by thermodynamics, while what is achievable is determined from the combination of each of the individual steps. For example, if the compressor and expander each operate at an efficiency of 80 percent, then the process efficiency cannot be greater than 64 percent (80 percent x 80 percent) (DOE 2023a). According to the DOE, the base RTE of CAES systems is 52 percent (DOE 2023a). The DOE also notes that lithium iron phosphate (LFP) battery systems, one type of lithium-ion batteries, have a base RTE of 85 percent (DOE 2023b)[5] (which aligns with the estimated Project RTE of 84.6 percent). Accordingly, a CAES system is less efficient than the proposed BESS facility.

Response Time: The DOE also notes that CAES systems have a longer response time (DOE 2023a). While batteries have a very rapid response time (typically within a second), CAES systems may take up to 30 seconds to respond (Storelectric 2025).[6] Therefore, a CAES system would have a lower response time than the proposed BESS facility.

Storage Duration: With suitable geologic conditions, CAES systems are able to store large amounts of energy for extended periods of time beyond the capabilities of battery storage, but they require suitable geologic conditions for air storage, which presents additional challenges. These systems have the potential to store energy for several days to weeks (Yu et al. 2019),[7] compared to lithium-ion BESS

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[3] CEC. 2025. Pecho Energy Storage Center. Available online at: https://www.energy.ca.gov/powerplant/caes/pecho-energy-storage-center (accessed April 22, 2025).

[4] DOE. 2023a. Technology Strategy Assessment: Findings from Storage Innovations 2030 Compressed Air Energy Storage. July. Available online at: https://www.energy.gov/sites/default/files/2023-07/Technology%20Strategy%20Assessment%20-%20Compressed%20Air%20Energy%20Storage_0.pdf (accessed April 22, 2025)

[5] DOE. 2023a. Technology Strategy Assessment: Findings from Storage Innovations 2030 Lithium-Ion Batteries. July. Available online at: https://www.energy.gov/sites/default/files/2023-09/2_Technology%20Strategy%20Assessment%20-%202%20Lithium-ion_508.pdf (accessed April 22, 2025)

[6] Storelectric. 2025. CAES or Batteries in the Energy Transition? Available online at: https://storelectric.com/caes-or-batteries-in-the-energy-transition/#:~:text=Cycles%2C%20Ancillary%20Services-,Response%20Time,and%20therefore%20consuming%20little%20power (accessed April 22, 2025)

[7] Yu, Q., Wang, Q., Tan, X., Fang, G., Meng, J. 2019. A Review of Compressed-Air Energy Storage. Journal of Sustainable Energy 11(4): 042702. https://doi.org/10.1063/1.5095969 (accessed April 22, 2025)

facilities which are better suited for quick discharge and charge cycles and have a storage duration that is generally up to several days (Nykvist and Nilsson 2015).[8] Therefore, a CAES system could have a greater storage duration than the proposed BESS facility if suitable geological conditions are present.

Cost: Because CAES systems have the potential for greater storage duration, the cost of energy stored may be less than for a battery storage system during operation. However, the DOE also notes that another challenge of this technology includes high upfront capital costs (DOE 2023a). In addition to requiring a larger footprint, suitable geology that allows for underground storage volume (such as in salt caverns) is needed to contain the compressed air. According to the DOE, the levelized cost of storage (LCOS) for CAES systems ranges from $0.15/kilowatt-hour (kWh) to $0.60/kWh (DOE 2023a). The LCOS for LFP battery systems, one type of lithium-ion batteries, is $0.143/kWh (DOE 2023b). Therefore, a CAES system would be more costly than the proposed BESS facility.

Potential Environmental Impacts: A major potential environmental impact for CAES systems is the large physical footprint required for CAES facilities, which can lead to land use changes and habitat disruption, as illustrated by the proposed 80-acre footprint for the Pecho Energy Storage Center (CEC 2025). Additionally, the geological constraints necessary for effective CAES operation can limit site selection and may pose risks such as groundwater impacts if unsuitable locations are chosen. The reliance on heat during the expansion process often necessitates additional energy inputs, potentially increasing carbon emissions if fossil fuels are used (DOE 2023a).

Moreover, CAES systems exhibit an RTE of around 52 percent, indicating that a significant portion of the energy input is lost during conversion, which raises further environmental concerns (DOE 2023a). Therefore, a CAES system at the proposed Project site would have greater potential environmental impacts than the proposed BESS facility.

Thermal Energy Storage

Thermal energy storage (TES) is a technology that captures and stores thermal energy for later use, providing a flexible solution for energy management. TES systems can store excess heat generated during periods of low demand and release it during peak demand. One of the most common forms of TES involves the use of molten salt as a storage medium, particularly in Concentrating Solar Power (CSP) plants, where solar energy is harnessed to heat the molten salt, which can then be stored and converted back to electricity when needed (DOE 2023c).[9] However, the deployment of TES systems often requires significant physical space and a consistent heat source, which can limit their practicality in certain locations.

TES technology would not be a feasible alternative for the Project as there is no suitable consistent heat source in the vicinity of Vaca-Dixon Substation, and the proposed BESS facility does not have enough space for a TES system.

[8] Nykvist, B., and M. Nilsson. 2015. Rapidly falling costs of battery packs for electric vehicles. *Nature Climate Change* 5(4): 328–332.

[9] DOE. 2023c. Technology Strategy Assessment: Findings from Storage Innovations 2030; Thermal Energy Storage. Available online at: https://www.energy.gov/sites/default/files/2023-09/9_Technology%20Strategy%20Assessment%20-%20%239%20Thermal%20Energy%20Storage_508.pdf (accessed April 22, 2025)

Energy Density: According to the DOE, high temperature TES systems have been historically deployed using molten salt as the energy storage medium with CSP facilities. In the United States, there are two molten salt CSP + TES deployments: (1) Solana Generating Station with a power capacity of 280 MW and 6 hours of storage, and (2) Crescent Dunes with a power capacity of 100 MW and 10 hours of storage (DOE 2023c). The Solana Generating Station covers approximately 1,920 acres in Arizona, which is primarily due to the solar power component of this facility. While the TES system is integrated throughout this facility, the TES is inherently tied to the solar component as the CSP directly heats the molten salt TES system. TES systems have also been deployed at smaller scales for building heating with heat pump equipment (electric input); however, utility scale TES systems require a larger footprint with a substantial heating source to achieve a similar capacity as the proposed Project. Therefore, a TES system is less energy dense than the proposed BESS facility.

Efficiency: Due to the nature of heat dissipation, TES systems can experience energy losses that reduce their overall efficiency. According to the DOE, a molten salt storage with steam turbine has an RTE of 44 percent (DOE 2023c). As noted previously, battery storage systems have a higher RTE with LFP battery systems, having an RTE of 85 percent (DOE 2023b). Accordingly, a TES system is less efficient than the proposed BESS facility.

Response Time: TES systems have slower response times as heat energy needs to be transferred to a working medium and converted into electricity. Therefore, a TES system would have a lower response time than the proposed BESS facility.

Storage Duration: Similar to CAES, TES systems are able to store large amounts of energy for extended periods beyond the capabilities of battery storage. Energy storage duration for TES systems can last from hours to weeks (DOE 2025).[10] However, TES systems can experience energy losses due to the nature of heat dissipation, as previously described, and these systems require a more constant heat source. Therefore, while less efficient, a TES system would have a greater storage duration than the proposed BESS facility.

Cost: A TES system would cost more than the proposed BESS system because it is less energy dense and therefore would require a greater footprint than the proposed site. Additionally, a TES system requires a heat source (such as a CSP), and no suitable sources are located within the vicinity of the Vaca-Dixon Substation. A much longer gen-tie line would also be required to interconnect a TES system to Vaca-Dixon Substation due to this constraint. According to the DOE, the LCOS of TES systems is $0.134/kWh while the LCOS of LFP battery systems is $0.143/kWh (DOE 2023a, 2023b). Although the LCOS for TES systems is lower, a TES system would be more costly than the proposed BESS facility in this region due to the need for a larger footprint, a heat source, and a much longer gen-tie line.

Potential Environmental Impacts: Due to the larger required footprint, a TES system is assumed to have greater temporary construction impacts than a similar capacity BESS facility. In addition, at the proposed Project location, a TES system would require a much longer gen-tie line to connect to a suitable heat source. This would greatly increase any potential environmental impacts. Therefore,

[10] DOE. 2025. Thermal Energy Storage. Available online at: https://www.energy.gov/eere/buildings/thermal-energy-storage (accessed April 22, 2025)

while TES systems in general are able to store large amounts of energy for periods that are beyond the capabilities of battery storage systems, it is assumed that this type of system would result in greater construction and operational environmental impact than the proposed Project.

Supercapacitors

Supercapacitor energy storage systems are devices engineered to store and release electrical energy with remarkable speed, making them ideal for applications that demand quick bursts of power. Unlike conventional batteries, supercapacitors store energy through electrostatic charge rather than chemical reactions, which allows for rapid charge and discharge cycles. This characteristic enables supercapacitors to excel in critical applications, such as providing ride-through power for essential infrastructure and enhancing power quality in renewable energy systems (DOE 2023d; Liu et al. 2023).[11] While supercapacitors have been widely adopted in various commercial applications, they typically exhibit lower energy density compared to batteries, making them less suitable for long-term energy storage. Their higher self-discharge rates and associated energy losses further limit their efficiency for prolonged storage solutions (Zhang et al. 2022).[12]

Due to their limited energy density, passive discharge rate, and lower efficiency compared to batteries, supercapacitors are not a feasible alternative technology for the proposed Project.

Energy Density: Supercapacitors have a lower energy density than batteries. Lithium-ion batteries typically have energy densities ranging from 150 to 250 watt-hours (Wh)/kg, while supercapacitors generally have an energy density of 5 to 10 Wh/kg (IEA 2022). Supercapacitors have been integrated into many types of commercial uses and can be used in standalone applications or as part of a hybrid energy storage system. For example, supercapacitors are sometimes used to provide ride-through power in critical infrastructure that is typically backed by large generators, which often take more than 15 seconds to start up (DOE 2023d). They have also been used in bulk power systems to regulate power factor and transmission capabilities by injecting or absorbing reactive power. They are used in renewable systems integration for improving the power quality of fluctuating renewable generation. However, to the knowledge of the Applicant, a standalone supercapacitor energy storage system has not yet been deployed on a utility scale.

Efficiency: Due to higher self-discharge rate and other losses, supercapacitors have a lower energy efficiency and are overall less suitable for long-term energy storage when compared to the proposed BESS facility. According to the DOE, a supercapacitor passively discharges from 100 percent to 50 percent in a month compared with only 5 percent for a lithium-ion battery (DOE 2023d). Consequently, this technology is best suited to applications where frequent charge-discharge cycles

[11] DOE. 2023d. Technology Strategy Assessment: Findings from Storage Innovations 2030; Supercapacitors. Available online at: https://www.energy.gov/sites/default/files/2024-02/10_Technology%20Strategy%20Assessment%20-%20%2310%20Supercapacitors_508_rev.pdf (accessed April 24, 2025).
Liu, J., Wang, Y., & Chen, X. (2023). Advancements in Supercapacitor Technologies: Applications and Future Directions. *Journal of Energy Storage*.
[12] Zhang, L., F. Huang, and Q. Li. 2022. The Role of Supercapacitors in Energy Systems: An Overview. *Renewable and Sustainable Energy Reviews*.

or rapid energy delivery are required, or when coupled with another type of energy system for stability. Therefore, batteries are more efficient than supercapacitors (Gonzalez et al. 2023).[13]

Response Time: Based on their design, supercapacitors have a greater ability to rapidly store and release electrical energy and generally have a longer life cycle relative to batteries. Therefore, supercapacitors would have an advantage over the proposed BESS system for frequent charge-discharge cycles and therefore have a greater response time than BESS systems.

Storage Duration: As described above, a supercapacitor passively discharges from 100 percent to 50 percent in a month compared with only 5 percent for a lithium-ion battery (DOE 2023d). As a result, this technology is best suited to applications where frequent charge-discharge cycles or rapid energy delivery is required, or for when they are coupled with another type of energy system for stability. Therefore, batteries have a greater storage duration than supercapacitors.

Cost: According to the DOE, the high capital cost and low energy density of supercapacitors make the unit cost of energy stored ($/kWh) more expensive than alternatives such as batteries (DOE 2023d). Their attributes make them attractive for uses in which frequent small charges/discharges are required (e.g., ensuring power quality or providing frequency regulation). Their attributes and cost make them less attractive for long-duration energy storage, which favors technologies with low self-discharge that cost less per unit of energy stored. According to the DOE, the LCOS of supercapacitors is $0.443/kWh while the LCOS of LFP battery systems is $0.143/kWh (DOE 2023d, DOE 2023b). Therefore, a supercapacitor system would be more costly than the proposed BESS facility.

Potential Environmental Impacts: Although BESS systems and supercapacitors exhibit significant differences, they are fairly similar from an environmental impact standpoint. Both types of facilities would involve the installation of significant electrical equipment, and it is assumed that supercapacitors would be coupled with another typer of energy storage system, such as a BESS. Therefore, environmental impacts are assumed to be similar between these two technologies.

<u>Hydrogen Storage</u>

Hydrogen serves as a versatile energy carrier that can be generated from various sources, including renewable energy. Once produced, hydrogen gas is compressed and stored in high-pressure tanks or underground facilities, such as salt caverns, or it can be stored in a liquefied form, depending on the chosen storage method. This flexibility enables hydrogen to contribute to balancing intermittent renewable energy generation and providing long-duration energy storage (IEA 2023).

However, despite its potential advantages, hydrogen storage systems encounter several challenges. These include lower energy density compared to battery energy systems, increased space needs, efficiency losses during conversion processes, and slower response times. Furthermore, the costs associated with hydrogen storage can be higher than those of battery systems, particularly when factoring in the infrastructure necessary for safe and effective storage (Hydrogen Council 2022). Therefore, hydrogen storage is not a feasible alternative technology for the proposed Project.

[13] Gonzalez, A., R. Smith, and M. Patel. 2023. Comparative Efficiency of Energy Storage Technologies. *Journal of Energy Storage*.

Energy Density: Hydrogen systems have a lower energy density than battery systems. Lithium-ion batteries typically have energy densities ranging from 150 to 250 Wh/kg (IEA 2022). In contrast, hydrogen, when stored in compressed gas form, has an energy density of approximately 33.6 kWh/kg. Regardless of the storage method, hydrogen can only be compressed to a certain extent and battery systems can hold more energy in a smaller space than hydrogen tanks.

In terms of space constraints, aboveground hydrogen storage systems require significantly more space compared to the proposed BESS facility. For example, a hydrogen storage tank capable of holding a comparable amount of energy to a 1 megawatt-hour (MWh) battery system can occupy several hundred square meters, while a 1 MWh battery system might occupy around 100 square meters (Hydrogen Council 2022; Zhang et al. 2022). Therefore, hydrogen storage systems are less energy dense than the proposed BESS facility and would require more space than a BESS facility that has the same MWh capacity.

Efficiency: For hydrogen storage systems, when energy is needed, hydrogen is recombined with oxygen to produce electricity (and water as a byproduct). The process of electrolysis and later conversion of hydrogen back into electricity results in energy losses and lowers overall efficiency compared to battery storage systems. According to the DOE, the RTE for a hydrogen energy storage system is 31 percent based on a system with 73 percent electrolyzer efficiency and 51 percent fuel cell efficiency (DOE 2023e).[14] As previously mentioned, the DOE also notes that LFP battery systems, one type of lithium-ion batteries, have a RTE of 85 percent (DOE 2023b). Therefore, hydrogen storage systems are less efficient than the proposed BESS facility.

Response Time: Hydrogen storage systems have slower charging and response times than battery energy systems due to the conversion processes required, which make them less suitable for peak demand response. The multistep process of electrolysis and later conversion of hydrogen back into electricity requires more time than discharging battery systems back into the grid. Each of these steps introduces delays, resulting in a significantly slower response time compared to a battery energy system (DOE 2023e). Battery energy systems can respond and discharge power within milliseconds. Accordingly, a hydrogen storage system would have a lower response time than the proposed BESS facility.

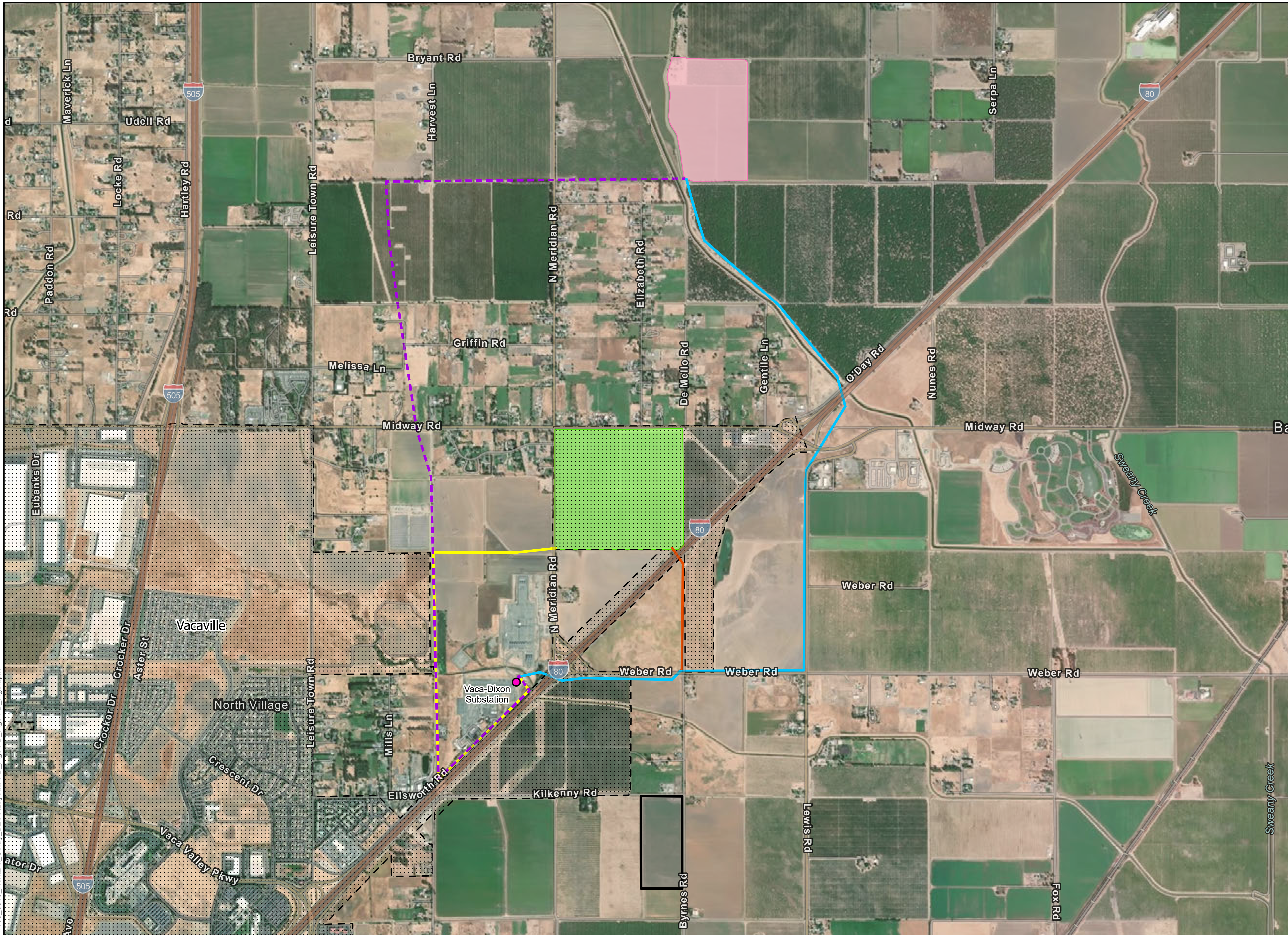
Storage Duration: Hydrogen systems are able to store large amounts of energy for extended periods beyond the capabilities of battery storage. Hydrogen storage is stable under the right conditions and can be contained for long periods of time in either gaseous or liquid form (IEA 2022). While the overall efficiency is lower than batteries due to the losses associated with the conversion process of hydrogen back into electricity, the storage of hydrogen itself is stable and allows for a greater storage duration than battery storage systems.

Cost: According to the DOE, the LCOS for hydrogen storage is $0.24/kWh for tank storage and $0.13/kWh for cavern storage (DOE 2023e). As discussed previously, the LCOS for LFP battery systems

[14] DOE. 2023e. Technology Strategy Assessment. Findings from Storage Innovations 2030: Bidirectional Hydrogen Storage. July. Available online at: https://www.energy.gov/sites/default/files/2023-09/11_Technology%20Strategy%20Assessment%20-%20%2311%20Bidirectional%20Hydrogen%20Storage_508.pdf (accessed April 23, 2025).

is $0.143/kWh (DOE 2023b). While cavern storage is assessed to be less costly per kWh than battery systems, the geological conditions in the Project region are not suitable for cavern storage. Therefore, when comparing the proposed BESS facility with an aboveground hydrogen tank storage system, hydrogen storage is more costly than the proposed BESS facility.

Potential Environmental Impacts: Hydrogen storage systems present several environmental impacts and safety risks associated with their production, storage, and distribution. The highly reactive nature of hydrogen poses significant safety challenges, as leaks can lead to explosive mixtures with air, necessitating stringent safety protocols (DOE 2023e; IEA 2023). In addition, hydrogen storage systems are less energy dense than the proposed BESS facility and would require more space than a BESS facility that has the same MWh capacity, which would therefore result in a larger environmental impact.



NextEra Energy
Corby Battery Energy Storage System Project

Figure 3-1 Alternative Site Locations (replaces Figure 5-1 in Application)

Solano County, CA

Point of Interconnection
City of Vacaville Boundary

Proposed Features

Preferred Project Site

Alternative Sites

Alternative Site 1
Alternative Site 2

Alternative Routes

Alternate Site 1 Eastern Gen-Tie Route Option
Alternate Site 1 Western Gen-Tie Route Option
Alternate Site 2 Eastern Gen-Tie Route Option
Alternate Site 2 Western Gen-Tie Route Option

TETRA TECH

NOT FOR CONSTRUCTION

Reference Map

1:24,000 NAD 1983 StatePlane California II FIPS 0402 Feet

0 0.25 0.5 Miles

Source: ESRI, USDA NAIP, US CENSUS, BTS

Z:\Projects\1109_0319_NextEra_Corby_BESS\Layouts\PD_Figs\PD_Figs.aprx

4.0 CULTURAL AND TRIBAL CULTURAL RESOURCES

4.1 Data Request DR CUL/TRI-1

DR CUL/TRI-1. The ethnographic setting in Confidential Appendix 4.5-A and Section 4.5 does not focus on Patwin ethnography within a 5-mile radius of the project as required by Appendix B (g) (2) (A). For instance, the 1978 work by Johnson, referenced in the discussion of Patwin ethnography, identifies the village of Ululato, shown in Figure 1. This village is located within a 5-mile radius from the project site. At a minimum, please consult Johnson (1978), Kroeber (1932, 1976), and Hoover et al. (2002) to ensure that the Patwin setting focuses near the project vicinity. Please update Confidential Appendix 4.5-A and Section 4.5 to include this discussion, following the requirements in Appendix B (g) (2) (A) and please provide references cited for these citations.

Response: An updated ethnographic setting including a discussion of Patwin ethnography is provided in Section 5.3 of Confidential Appendix 4-A. Citations for requested references are included.

4.2 Data Request DR CUL/TRI-2

DR CUL/TRI-2. Identify the individuals responsible for the records searches and whether they meet the Secretary of the Interior’s (SOI) professional standards for cultural resource professionals or were working under the direction of an SOI-qualified individual. Please provide this information in accordance with Appendix B (g) (2) (B).

Response: The requested information is provided in Section 6.1 and Appendix B, Qualifications, of Confidential Appendix 4-A. From Appendix B: “report was completed under the direction of Christine Miller Cruiess, Senior Architectural Historian, and Steven Pappas, Senior Archaeologist. Both meet the Secretary of the Interior’s Standards for their fields.”

4.3 Data Request DR CUL/TRI-3

DR CUL/TRI-3. The record search results are provided in Subsection 4.5.3.1 of the application and in Confidential Appendix 4.5-A, but copies of the reports and associated site records are not included in a confidential cultural resource filings provided with the application. Please provide copies of all reports and site records, in accordance with Appendix B (g) (2) (B).

Response: The requested information is provided in Appendix C of Confidential Appendix 4-A.

4.4 Data Request DR CUL/TRI-4

DR CUL/TRI-4. Please describe efforts to identify cultural and historic architectural resources listed or recognized by a city, county, or local historical and archaeological societies or museums. Please provide this information in accordance with Appendix B (g) (2) (B). Please list, in a table or text format, the name of each entity contacted, the date of consultation, and the information received.

Response: As summarized in Section 6.6 of Confidential Appendix 4-A and updated below, ICF conducted outreach to historical societies and museums. Initial outreach emails were sent to local historical societies and other related organizations on January 24, 2025. ICF followed up with those organizations via email on February 6, 2025.

In addition, ICF went to the Vacaville Heritage Council and the Solano County Historical Society[15] to conduct in-person research on January 30, 2025. During that visit, ICF's Senior Architectural Historian, Christine Miller Cruiess, spoke with Doug Rodgers, President, Vacaville Heritage Council. Mr. Rodgers explained that the property at 5310 Kilkenny Road was constructed by George Sharpe and shared an artifact proving that association. The artifact from the property was provided by the current owners, Michael and Linda Geller, and was a portion of interior lumber from the house that had "Geo. Sharpe" written on it in graphite or chalk. Mr. Rodgers explained his theory that the writing was tantamount to a packing slip for the lumber delivery rather than a signature.

Mr. Rodgers noted that the Gellers were working to have 5310 Kilkenny Road identified as a historical resource, although he did not note if they intended to try listing it as a local resource, in the California Register of Historical Resources (CRHR), or on the National Register of Historic Places (NRHP).

Mr. Rodgers stated that the Vacaville Heritage Council and the Solano County Historical Society both oppose the Project and expressed concerns that the Project would impact the property at 5310 Kilkenny Road. Mr. Rodgers also shared his organization's position against the Project.

The information collected from ICF's outreach efforts, as detailed above and in Table 4-1, was considered in the CRHR evaluation of 5310 Kilkenny Road, as summarized below.

Based on the assessment in Confidential Appendix 4-A, ICF has recommended 5310 Kilkenny Road ineligible for listing in the CRHR/NRHP. Additionally, 5310 Kilkenny Road is not listed on a local register of historical resources pursuant to Public Resources Code Section 5020.1(k).

ICF's evaluation considered the feedback from the outreach and the in-person research. While the property is historic-aged and important to people within the community, the property lacks significance under all CRHR/NRHP criteria, as explained in the Confidential Appendix 4-A Section 7.2.2.8, *5310 Kilkenny Road*.

The results of ICF's outreach are summarized in Table 4-1; email responses received are provided in Appendix 4-B. ICF also reviewed the Solano County General Plan and Solano County GIS data. No additional historical resources were identified.

[15] The Vacaville Heritage Council and the Solano County Historical Society operate out of the same location and have overlapping members and board members.

Table 4-1. Summary of Historical Society Outreach

Name of Organization	Contact Information	Type and Dates(s) of Outreach	Response Date	Response Summary
Solano County Historical Society	P.O. Box 3009 Fairfield, CA 94533 solanohistory@gmail.com 707-447-0518	Email January 24, 2025, and February 6, 2025	March 19, 2025	*March 19, 2025:* Elissa DeCaro, President, replied via email: • The Queen Anne–style Kilkenny Ranch Home was built by George Sharpe in 1900 for Catherine Kilkenny and is considered a significant historical property by the historical society. • The ranch property has been restored, preserved, and protected by the current owner. • The Ranch Parcel contains the largest private collection of oak trees and wildlife habitat and is on Class A agricultural soil. • The Vacaville Heritage Council is in the process of assisting the current owners of the Kilkenny Ranch by documenting the historical status of the home. • Concerns: consider the project dangerous and it would cause a substantial adverse change to the historic environmental integrity of the site. Solano County Historical Society opposes the Project.
Solano County Genealogical Society	610 East Main Street, 2nd Floor Vacaville, CA 95688 scgs@scgsca.org 707-446-6869 https://www.scgsca.org/contact.php	Email January 24, 2025, and February 6, 2025	None	No response received.
Vacaville Heritage Council	618 East Main Street Vacaville, CA 95688 vacavilleheritagecouncil@gmail.com 707-447-0518 https://www.vacavilleheritagecouncil.org/contact- us/	Email January 24, 2025, and February 6, 2025	January 30, 2025, and March 19, 2025	*January 30, 2025:* Christine Miller Cruiess, ICF Architectural Historian, met with Doug Rodgers, President of the Vacaville Heritage Society. • Mr. Rodgers explained that the property at 5310 Kilkenny Road was constructed by George Sharpe. • Mr. Rodgers had a piece of lumber from the home that was marked in chalk or pencil with “Geo. Sharpe” and indicated it was from the property at 5310 Kilkenny Road and given to the Vacaville Heritage Council by the current property owners, Michael and Linda Geller. Mr. Rodgers indicated that the stamp was equal to a packing slip and signature for the lumber, and proof that George Sharpe’s involvement with the construction of the home. • Mr. Rodgers noted that the Gellers were working to have 5310 Kilkenny Road identified as a historical resource, although he did not note if that meant listing it in a local resource list, the

<table>
<tr><th>Name of Organization</th><th>Contact Information</th><th>Type and Dates(s) of Outreach</th><th>Response Date</th><th>Response Summary</th></tr>
<tr><td></td><td></td><td></td><td></td><td>California Register of Historical Resources (CRHR), or the National Register of Historic Places (NRHP).

March 19, 2025:
Elissa DeCaro, Historian, Treasurer, replied via email [same person as President of the Solano County Historical Society]:
There is a significant historical property in the immediate project area.
Property identified as the Kilkenny Ranch Home.
Kilkenny Ranch Home is a Queen Anne style built by George Sharpe in 1900 for Catherine Kilkenny.
The Ranch Parcel contains the largest private collection of oak trees and wildlife habitat and is on Class A agricultural soil.
The Vacaville Heritage Council is in the process of assisting the current owners of the Kilkenny Ranch by documenting the historical status of the home.
Concerns: consider the Project ill-conceived and has the potential to cause a substantial adverse change to the historic environmental integrity of the irreplaceable area.</td></tr>
<tr><td>Vacaville Museum</td><td>213 Buck Avenue
Vacaville, CA 95688
info@vacavillemuseum.org
https://vacavillemuseum.org/contact-us/</td><td>Email January 24, 2025, and February 6, 2025</td><td>February 14, 2025</td><td>February 14, 2025:
Reply stated the organization will review the Project and asked when comments are due. ICF replied by end of day February 19.</td></tr>
</table>

4.5 Data Request DR CUL/TRI-5

DR CUL/TRI-5. The following in-text references appear in Confidential Appendix 4.5-A but are missing from the References section (Chapter 9) of Appendix 4.5-A. Please add these references to Chapter 9 of Confidential Appendix 4.5-A:

- Adams 2012
- American Farmland Trust 2024
- BLM 2023
- Howe 2002
- USGS 1917, 1941, and 1943
- Vacaville Heritage Council c. 1878

Response: References in Chapter 9 of Confidential Appendix 4.5-A were updated to include Adams 2012, BLM 2023, Howe 2002, USGS 1917, and USGA 1941 (see Confidential Appendix 4-A). A different source was used for American Farmland Trust 2024. Vacaville Heritage Council c. 1878 was deleted from the document. USGS 1943 was stated as not being cited in the document and therefore not included. While the citation is not within the text of the document, USGS 1943 does appear on page 2 of the site form for the Vaca-Peabody 230 kV Transmission Line in Appendix E.

4.6 Data Request DR CUL/TRI-6

DR CUL/TRI-6. Please provide a list or table identifying properties less than 45+ years old in the Project Area and/or within the 0.5-mile built environment buffer, in a revised Appendix 4.5-A. The goal being to characterize these properties "whatever their age", as specified in Appendix B (g) (2) (C), within the Project Area and the 0.5-mile built environment study area as appropriate by name, address, and/or parcel. Also, please provide the name of and a statement that a qualified architectural historian (Secretary of the Interior's standards for professional architectural historians), has made the determination that these built environment features less than 45 years in age do not qualify as being of exceptional importance in accordance with National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) guidelines.

Response: A list of properties built after 1980 is provided in Appendix F of Confidential Appendix 4-A. Section 6.5 (p.6-6) of Confidential Appendix 4-A states that "Secretary of Interior's Standards -(SOI) Qualified ICF architectural historians conducted a desktop survey to identify properties for field survey and CRHR evaluation." It also states that architectural historians reviewed historic aerial photographs to determine if resources were older than 45 years. Although no names are provided in Section 6.5 for SOI staff, they are provided in Appendix B, Qualifications, of Confidential Appendix 4-A.

4.7 Data Request DR CUL/TRI-7

DR CUL/TRI-7. Appendix 4.5-A and Section 4.5 of the Application evaluate a number of built environment resources using more or less the same statement, leading to a recommendation of ineligibility. Desktop research conducted by ICF staff indicates that the above statements do not include significant historical data available online (BLM GLO records, ancestry.com, historicnewspapers.com, etc.), regarding significant individuals and/or events in relation to the history and development of Solano County agriculture and/or specific properties in the Project Area and/or within the 0.5-mile built environment buffer. For example, preliminary research conducted by CEC staff indicates that the Queen Anne residence located at 5310 Kilkenny Road was built in 1896 (Realtor websites – Zillow and Trulia) and not in 1937 as recorded by ICF based on Solano County Property Information data. Also, that this residence was built on a property historically owned by Anthony Kilkenny (who is not mentioned in Section 4.5 or Confidential Appendix 4.5-A of the application), subsequently owned by Catherine Kilkenny, who was noted as a pioneer Solano County settler. This data suggests that the historic Kilkenny Ranch Complex located at 5310 Kilkenny Road might have important associations in accordance with NRHP/CRHR Criterion A/1 (early example of Solano County agricultural development beginning in 1870s), or with NRHP/CRHR Criterion B/2 (Kilkenny family), and/or with NRHP/CRHR Criterion C/3 (largely intact example of Queen Anne style nineteenth century ranch complex). Similar data exists for other properties. Please conduct additional historical research as necessary to re-evaluate all previously identified and evaluated built environment features identified in Table 8-1 in Appendix 4.5-A and Section 4.5 and revise Appendix 4.5-A and Section 4.5 accordingly.

Response: ICF conducted additional onsite permit research, field survey, and repository research, and developed historic contexts to aid in evaluating eligibility of built environment resources. Resources were updated with additional research from Solano County Assessor/Recorder's Office, Department of Resource Management, the Solano County Historical Society, and the Vacaville Heritage Council. Additional research did not identify properties eligible for listing in the CRHR. Updated resource descriptions and evaluations are included in Section 7.2 and Appendix E of Confidential Appendix 4-A.

4.8 Data Request DR CUL/TRI-8

DR CUL/TRI-8. Preliminary research conducted by CEC staff suggests that numerous built environment features, primarily linear features, were not identified in Confidential Appendix 4.5-A. CEC staff, using historic maps and aerials, and Solano County parcel maps and records of survey and other online databases, have identified the following 45+ year old built environment linear features that were not identified in Appendix 4.5-A within the 0.5-mile built environment study area or within the project site. Please confirm these findings with additional desktop research and/or historic architectural survey. If confirmed, these features need to be added to Confidential Appendix 4.5-A, recorded on the appropriate Department of Parks and Recreation (DPR) 523 forms, and evaluated for significance under the California Environmental Quality Act (CEQA). The linear features include, but are not limited to the following:

- Roads and Highways
    - Kilkenny Road – County Road No. 393
    - Byrnes Road – County Road No. 122
    - Weber Road – County Road No. 162
    - N. Meridian Road – County Road No. 105
    - Interstate 80/U.S. Route 40 – Bisects Project Area

- Canals, Ditches, Laterals, Flood Control Channels
  - Kilkenny Canal – North side of Kilkenny Road and East of Kilkenny-Byrnes Road Intersection
  - Gibson Canyon Creek Flood Control (FC) Channel – Improved by Solano County Flood Control and Irrigation District
  - Solano Irrigation District Canal – Running along east side of I-80
  - Numerous Laterals – Solano Irrigation District

Note: The above noted features appear to be 45+ years in age. In addition, the canals, ditches, laterals, and FC channels may be components of a larger district of features under the jurisdiction of the Solano County Flood Control and Irrigation District.

Response: ICF completed a desktop review to confirm additional linear resources in the Study Area, developed historic contexts for evaluating the linear resources, and completed CRHR evaluations for each property. As part of the response, ICF assessed the following irrigation channels and laterals: Solano Irrigation District Lateral 4-C; Solano Irrigation District Lateral 4-D; Irrigation Channel along N. Meridian Road; Irrigation Channel west of Vaca-Dixon Substation; Irrigation Channel at Mills Lane; and Irrigation Channel east of Byrnes Road. None of the linear resources were significant under any CRHR criteria, either individually or as district contributors. No linear resources were recommended eligible for listing in the CRHR. Revisions are included in Section 7.2 and Appendix E of Confidential Appendix 4-A.

4.9 Data Request DR CUL/TRI-9

DR CUL/TRI-9. While resumes were provided in Appendix 4.5-1, there is no narrative description of who was responsible for what task. Please provide the names and qualifications of the cultural resources specialists who contributed to and were responsible for literature searches and preparation of the technical report in accordance with Appendix B (g) (2) (C) (v).

Response: A narrative description of personnel qualifications, responsibilities, and contributions is included in Appendix B of Confidential Appendix 4-A.

5.0 GREENHOUSE GAS EMISSIONS

5.1 Data Request DR GHG-1

DR GHG-1. Please demonstrate how the use of R-134a would comply with the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses. If not, please propose an alternative refrigerant, and provide updated greenhouse gas emission estimates associated with the newly proposed refrigerant.

Response: The Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning and Other End-Uses[16] (Prohibitions) prohibits the sale or installation of

[16] California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 on Climate Change, Article 4, Subarticle 5, Section 95374

refrigerants exceeding defined global warming potential (GWP) levels based on specific defined uses. Table 3 of Section 95374(c) in the regulation addresses chillers used for industrial process refrigeration, which would be applicable to the chiller units within the BESS enclosure thermal management system (TMS) equipment. Refrigerants with a GWP 750 or greater are prohibited as of January 1, 2024, in new chillers designed for chilled fluid level leaving the chiller at temperatures greater than 35 degrees Fahrenheit. The chilled fluid temperature in the TMS chillers will be above 35 degrees Fahrenheit and R-134a has a GWP of 1,300[17]; therefore, its use would be prohibited. The Applicant coordinated with the proposed technology vendor to determine compliant refrigerant options. Based on input from CATL, the proposed EnerC+ BESS units can be procured with R-513a refrigerant systems. R-513a has a GWP of 573 and is therefore compliant with the Prohibitions. Updated greenhouse gas emission estimates including the use of R-513a have been prepared and incorporated into an updated Air Quality and Greenhouse Gas Technical Report, which will be filed under separate cover.

5.2 Data Request DR GHG-2

DR GHG-2. Please provide a copy of the spreadsheet file of the emissions calculations shown in Table 4.8-4 with live, embedded calculations.

Response: An updated spreadsheet file including live, embedded calculations for the estimated indirect operational greenhouse gas emissions will be provided under separate cover. A PDF version of the worksheet is provided in Appendix 5-A.

5.3 Data Request DR GHG-3

DR GHG-3. Please include assumptions that account for the degradation of round-trip efficiency over the project lifetime in the calculation of indirect GHG emissions.

Response: As noted in this Data Request, battery performance will degrade over time, gradually decreasing the round-trip efficiency. Additionally, battery augmentation will be performed periodically to offset battery degradation and maintain Project performance commitments, increasing auxiliary loads. The Project will initially include a total of 384 battery enclosures. Current augmentation plans require a total of 423 enclosures by year 15, which is the midpoint of the Project's life cycle and therefore representative for estimating Project emissions.[18] The indirect GHG emissions calculations provided in Appendix 5-A include estimated transmission and charging cycle losses and auxiliary loads for both the beginning (year 1) and midpoint of the Project life (year 15). The indirect GHG emissions analysis in the updated Air Quality and Greenhouse Gas Technical Report (filed under separate cover) is based on the year 15 calculations to account for degradation and to be representative of the overall Project lifecycle.

[17] 40 CFR Part 98
[18] The Application presented a conservative full buildout scenario of 544 BESS enclosures; however, this quantity exceeds requirements to maintain Project performance. The Applicant currently has commercial commitments to provide 300 MW and 1,200 MWh of energy storage for the initial 15 years of the Project's operating life. Commercial commitments for years 16 through 30 are currently undefined. Therefore, augmentation through year 15 (mid-point) is used to represent the average number of enclosures over the Project life.

6.0 HAZARDOUS MATERIALS HANDLING

6.1 Data Request DR HAZ-1

DR HAZ-1. Please provide an updated Phase I ESA that covers the offsite components, including the gen-tie line and associated structures, and areas of anticipated ground disturbance that are not within the Corby BESS footprint.

Response: Based on consultation with CEC Staff, a regulatory database search was conducted for the Project gen-tie corridor rather than a full Phase I Environmental Site Assessment (ESA), as Appendix B (g)(12)(a) only requires a Phase I ESA for "the proposed power plant site." CEC Staff confirmed via email on February 4, 2025, that a search for any potential regulatory cases would suffice. Accordingly, an Environmental Risk Information Services (ERIS) Database Report was procured for the proposed gen-tie corridor. A review of this report was conducted and is included, along with the ERIS Database Report, herein as Appendix 6-A. The ERIS report records associated with two properties potentially associated with the gen-tie corridor, as discussed below.

The Pacific Gas and Electric (PG&E) Vaca-Dixon substation was listed in multiple databases for records associated with hazardous materials use, storage, and disposal. No records of hazardous substance releases were identified. The gen-tie corridor overlaps with a portion of the PG&E Vaca-Dixon substation property; however, the gen-tie corridor portion of the substation property is undeveloped and does not include hazardous materials storage or use areas. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.

The Solano County Certified Unified Agency database included a record for an "agricultural site" owned by Gurmail Singh but lacked a specific location or any detailed information. Gurmail Singh is the former property owner of the Corby BESS Project site and currently owns the parcel immediately west of the Project site over which a small portion of the gen-tie corridor crosses. The database record is likely related to permitted agrichemical application activities. The Corby BESS Project site and gen-tie corridor are known to have historic agricultural uses and will be evaluated for potential residual agricultural chemicals in accordance with proposed Project Design Measure **PD HAZ-03**.

With the potential exception of an "agricultural site" database listing associated with a property owned by Gurmail Singh, the report revealed no onsite environmental conditions within the Project gen-tie corridor footprint, nor did it reveal any offsite environmental conditions with the potential to affect the Project gen-tie corridor.

6.2 Data Request DR HAZ-2

DR HAZ-2. Please clarify if the terminology "enclosures used to store hazardous materials" refers to the battery enclosures, storage enclosures for other hazardous materials, or both types of enclosures. Additionally, please specify how often the hazardous material enclosures would be inspected for leaks.

Response: In the analysis for Impact 4.9-1 in Section 4.9, *Hazards and Hazardous Materials*, of the Application, it was noted that hazardous materials used for operations will either be stored offsite at a regional operations and maintenance (O&M) facility or stored onsite in accordance with the manufacturers' specifications and consistent with applicable regulatory requirements, including dedicated storage areas with secondary containment to prevent accidental release. To provide clarification, with the exception of materials contained within operating equipment (listed in Table 4.9-1 of the Application), no hazardous materials will be stored onsite. Any hazardous materials used during O&M activities such as grease, lubricants, paints, solvents, adhesives, or herbicides will be transported to the Project site as needed but will be stored at a regional O&M facility.

All hazardous materials that will be stored onsite during Project operation will be contained within the Project components. The only enclosures used to store hazardous materials will be the BESS enclosures containing sealed battery cells and thermal management systems. Visual inspections of the exterior of each enclosure will be performed monthly, and the interior of each enclosure will be inspected semi-annually (summer and winter seasonal inspections). A detailed inspection of each enclosure will be conducted annually, per the manufacturer-recommended inspection protocol and frequency. Oil- or gas-containing equipment including transformers and high-voltage (HV) breakers, will be inspected for leaks monthly by O&M staff.

6.3 Data Request DR HAZ-3

DR HAZ-3. Please update Tables 4.9-1 and 4.9-2 with information for hazardous materials that could be stored onsite during project operation in areas other than the BESS enclosures.

Response: Tables 4.9-1 and 4.9-2 of the Application contain lists of hazardous materials that will be stored onsite during Project operation. Aside from those stored within the sealed battery cells, the other hazardous materials listed in these tables will be stored within the other Project components, including insulating oil within the transformers, sulfur hexafluoride within the HV breakers, and R134a and ethylene glycol within the BESS enclosures. The remaining hazardous materials listed in these tables will be stored within sealed battery cells. These hazardous materials are part of the Project components, rather than materials that are stored onsite for use by O&M staff.

Additionally, as discussed above under the response for Data Request DR HAZ-2, other hazardous materials used during operation will be stored offsite at a regional O&M facility and transported to the Project site as needed during regular site inspections and minor repairs. Accordingly, Tables 4.9-1 and 4.9-2 of the Application already include information for hazardous materials that will be stored onsite during Project operation, and no revisions or additions are necessary with regard to the list of materials. However, these tables have been revised in response to DR HAZ-7 to account for Project augmentation.

6.4 Data Request DR HAZ-4

DR HAZ-4. Please update Tables 4.9-1 and 4.9-2 to include the anticipated hazardous materials that would be stored and used during project construction.

Response: Tables 6-1 and 6-2 provide a list of hazardous materials that will be stored onsite and used during Project construction, supplementing Tables 4.9-1 and 4.9-2 in the Application. An update to Table 4.9-2 for Project operations, including augmentation phasing, is provided in response to DR HAZ-7.

Table 6-1. Use and Storage of Hazardous Materials During Construction

Chemical	Use	Quantity	Storage Location	State	Type of Storage
Gasoline	Construction Equipment	50 gallons	Within the temporary construction laydown area.	Liquid	Temporary stationary tanks with secondary containment
Diesel	Construction Equipment	1,300 gallons	Within the temporary construction laydown area.	Liquid	Temporary stationary tanks with secondary containment
Lubricants	Construction Equipment	50 gallons	Within the temporary construction laydown area.	Liquid	Temporary stationary tanks with secondary containment

Table 6-2. Toxicity, Reactivity, and Flammability of Hazardous Materials Onsite During Construction

Hazardous Materials	CAS Number	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability
Gasoline	8006-61-9	A clear, colorless to amber-colored liquid with a petroleum odor	Skin, eye, and respiratory irritant. Exposure can cause drowsiness and dizziness. May be fatal if swallowed and enters airways. May be carcinogenic.	Stable at normal conditions. Incompatible with strong oxidizing agents.	Flammable
Diesel	68476-34-6	A straw yellow to dark colored liquid with a petroleum odor.	Skin, eye, and respiratory irritant. May be fatal if swallowed and enters airways. May be carcinogenic.	Stable at normal conditions. Incompatible with strong oxidizing agents.	Flammable
Lubricants	74869-22-0	A viscous and odorless liquid, generally brown to black color.	Skin, eye, and respiratory irritant. Exposure can cause drowsiness and dizziness. May cause nausea if ingested. May be carcinogenic.	Non-reactive. Incompatible with strong acids, strong bases, strong oxidizing agents.	Flammable

6.5 Data Request DR HAZ-5

DR HAZ-5. Please update discussions related to hazardous materials used in construction. This includes section 4.9.2.1, heading Hazardous Material Use and Disposal (page 4.9-4), section 4.9.3.4, Impact 4.9-1 and Impact 4.9-2, to include the revised Table 4.9-1 and 4.9-2 information.

Response: As discussed in Application Section 4.9.2.1, heading *Hazardous Material Use and Disposa*l, of Section 4.9, *Hazards and Hazardous Materials,* the Project will use minimal hazardous materials during construction. The hazardous materials used during construction will include gasoline, diesel, and lubricants, as provided in Table 6-1 and Table 6-2 above. These hazardous materials will be stored in temporary stationary tanks or hazardous materials cabinets with secondary containment and will be located within the temporary construction laydown area. Construction equipment fuel storage will include approximately 1,300 gallons of diesel fuel, 50 gallons of gasoline, and 50 gallons of lubricants. These hazardous materials will be utilized to power and maintain construction equipment. All gasoline, diesel, and lubricants brought to the Project site for construction will be transported in compliance with all applicable requirements of the California Department of Transportation, California Highway Patrol, and California Department of Motor Vehicles. Any unused hazardous materials will be removed by the construction contractor once construction is complete or the materials are no longer needed. Any hazardous waste generated during construction will be removed from the site by a registered hazardous waste transporter and disposed of at an appropriate waste handling facility. Hazardous waste treatment, storage, and disposal facilities that may receive hazardous waste generated by the Project are discussed in Section 4.19, *Utilities and Service Systems*, of the Application.

The Project will have a comprehensive Spill Prevention, Control, and Countermeasure (SPCC) Plan for construction, in accordance with applicable federal, state, and local regulations. The preparation and implementation of a SPCC Plan, which will describe proper handling, storage, transport, and disposal techniques and methods to be used to avoid spills and minimize impacts in the event of a spill, will reduce impacts related to the routine transport, use, or disposal of hazardous materials to a less than significant level (Impact 4.9-1). Additionally, these materials will be stored and handled in a manner to prevent accidental release, i.e., consistent with the hazardous materials handling best management practices (BMPs) and other measures contained within the required Stormwater Pollution Prevention Plan (SWPPP) and Hazardous Materials Business Plan (HMBP), which will require them to be stored within secured aboveground containers with secondary containment (Impact 4.9-2). Ultimately, the transport, use, and disposal of gasoline, diesel, and lubricants needed to power and maintain construction equipment will not create a significant hazard to the public or the environment, and proper storage of such materials in aboveground containers with secondary containment will reduce the risk of accidental release of these materials into the environment. Impacts related to the use of gasoline, diesel, and lubricants during construction will be less than significant.

6.6 Data Request DR HAZ-6

DR HAZ-6. Please provide a discussion of refueling practices during construction. How often would the construction diesel fuel storage tank be refilled and what measures would be taken to prevent leaks and spills during refueling? Would vehicle and equipment maintenance occur onsite and, if so, what measures would be taken to prevent leaks/spills?

Response: During construction, equipment refueling will occur daily. Construction workers will use drip trays under the fueling nozzle to prevent spillage during refueling. Additionally, the fuel tanks will have secondary containment via double-walled tanks or spill trays within which the fuel tanks will sit. These secondary containment measures will be sized to hold the entire amount within the fuel tank.

The construction diesel fuel storage tank will be refilled as needed, which is anticipated to be approximately weekly. The fuel delivery vendor or construction contractor will implement fuel delivery BMPs including inspection of fuel tank, hoses, nozzles, and valves; grounding and bonding of the equipment; use of spill containment trays or sheeting beneath fuel transfer activities; and/or overflow protection measures such as sight glass, gauges, and automatic shutoff valves.

Finally, spill kits will be maintained onsite in the event that a spill occurs outside of the spill trays. The construction contractor will perform training for all construction workers to educate workers on the proper methods for refueling and spill cleanup.

As required by Project Design Measure **PD HAZ-02**, an SPCC Plan will also be developed and implemented prior to receiving oil-containing products onsite in excess of SPCC threshold quantities (1,320 gallons) during construction and operation. Fuel delivery and refueling BMPs will be further defined in the construction SPCC Plan.

6.7 Data Request DR HAZ-7

DR HAZ-7. Please clarify if the volume/quantity of hazardous materials that is related to the BESS enclosures and batteries is related to the initial installation of 384 BESS enclosures or after the final augmentation and full build out of 544 BESS enclosures. Please provide quantities/volumes for all hazardous materials used and stored during project operation at: the initial stage of 384 BESS enclosures, at each subsequent augmentation stage, and at the final build out stage of 544 BESS enclosures. Update Table 4.9-1 with the associated quantities as described above for all hazardous materials used and stored during project operation.

Response: The quantities provided in Table 4.9-1 of the Application reflected a conservative full buildout scenario (544 BESS enclosures) to present the maximum potential onsite hazardous materials quantities during the life of the Project. A revised version of this table, included below as , provides the quantities of hazardous materials that will be stored onsite at full buildout (544 BESS enclosures), initial buildout (384 BESS enclosures), and after each of three planned augmentation events described below.

The Applicant currently has commercial commitments to provide 300 MW and 1,200 MWh of energy storage for the initial 15 years of the Project's operating life. Commercial commitments for years 16 through 30 are currently undefined. The initial buildout of 384 enclosures will provide sufficient overbuild to provide the nameplate energy storage capacity for 6 years. It is expected that a first augmentation of 12 enclosures (48.88 MWh) will occur in year 6, a second augmentation of 13 enclosures (52.95 MWh) will occur in year 9, and a third augmentation of 14 enclosures (57.02 MWh) will occur in year 12 to achieve commercial commitments through year 15. Future augmentation activities beyond year 15 will depend on future commercial commitments.

As discussed above under Data Request DR HAZ-2, all hazardous materials that will be stored onsite during Project operation will be contained within the Project components, including the battery cells, transformers, HV breakers, and BESS enclosures. At each stage of augmentation, only the hazardous materials associated with the battery cells and BESS enclosures will increase, as these are the only components with hazardous materials that will be added during augmentation. No additional transformers or HV breakers will be added to the Project site during augmentation. As such, the quantities of hazardous materials for these components (including mineral oil and sulfur hexafluoride) will remain constant throughout the life of the Project. For all other hazardous materials associated with the battery cells and BESS enclosures, the quantities of these chemicals were factored based on the conservative full buildout quantities, initial buildout, and the increase in BESS enclosures at each stage of planned augmentation for the first 15 years of the Project's lifespan.

Table 6-3. Use and Storage of Hazardous Materials *During Operation* (replaces Table 4.9-1 in Application)

Chemical	Use	Quantity *(544 Encl. - Full Buildout)*	Quantity *(384 Encl. - Initial Buildout)*	Quantity *(396 Encl. - Year 6)*	Quantity *(408 Encl. - Year 9)*	Quantity *(421 Encl. - Year 12)*	Storage Location	State	Type of Storage
Lithium iron phosphate	Battery	3,423,000 kg	2,416,235 kg	2,491,749 kg	2,573,550 kg	2,661,639 kg	Within sealed battery cells [28% by wt]	Solid	Continuously onsite
Graphite	Battery	1,991,000 kg	1,405,412 kg	1,449,334 kg	1,496,914 kg	1,548,152 kg	Within sealed battery cells [16% by wt]	Solid	Continuously onsite
Copper	Battery	1,369,000 kg	966,353 kg	996,554 kg	1,029,270 kg	1,064,500 kg	Within sealed battery cells [11% by wt]	Solid	Continuously onsite
Dimethyl Carbonate	Battery electrolyte	934,000 kg	659,294 kg	679,899 kg	702,219 kg	726,255 kg	Within sealed battery cells [8% by wt]	Liquid	Continuously onsite
Ethylene Carbonate	Battery electrolyte	934,000 kg	659,294 kg	679,899 kg	702,219 kg	726,255 kg	Within sealed battery cells [8% by wt]	Liquid	Continuously onsite
Diethyl Carbonate	Battery electrolyte	934,000 kg	659,294 kg	679,899 kg	702,219 kg	726,255 kg	Within sealed battery cells [8% by wt]	Liquid	Continuously onsite
Ethyl Methyl Carbonate	Battery electrolyte	934,000 kg	659,294 kg	679,899 kg	702,219 kg	726,255 kg	Within sealed battery cells [8% by wt]	Liquid	Continuously onsite
Aluminum	Battery	498,000 kg	351,529 kg	362,516 kg	374,417 kg	387,232 kg	Within sealed battery cells [4% by wt]	Solid	Continuously onsite
Lithium hexafluoro-phosphate solution	Battery electrolyte	311,000 kg	219,529 kg	226,390 kg	233,822 kg	241,826 kg	Within sealed battery cells [3% by wt]	Liquid	Continuously onsite
Carboxymethyl-cellulose Sodium	Battery	311,000 kg	219,529 kg	226,390 kg	233,822 kg	241,826 kg	Within sealed battery cells [3% by wt]	Solid	Continuously onsite
Polyvinylidene Fluoride	Battery	311,000 kb	219,529 kg	226,390 kg	233,822 kg	241,826 kg	Within sealed battery cells [3% by wt]	Solid	Continuously onsite
Carbon	Battery	124,000 kg	87,529 kg	90,265 kg	93,228 kg	96,419 kg	Within sealed battery cells [1% by wt]	Solid	Continuously onsite
Mineral oil	Insulating oil	44,907 gal	44,907 gal	44,907 gal	44,907 gal	44,907 gal	Within transformers	Liquid	Continuously onsite
Sulfur hexafluoride	Circuit breakers	227 kg	227 kg	227 kg	227 kg	227 kg	Within HV breakers	Gas	Continuously onsite

Chemical	Use	Quantity *(544 Encl. - Full Buildout)*	Quantity *(384 Encl. - Initial Buildout)*	Quantity *(396 Encl. - Year 6)*	Quantity *(408 Encl. - Year 9)*	Quantity *(421 Encl. - Year 12)*	Storage Location	State	Type of Storage
R-513a	Refrigerant	4,950 kg	3,494 kg	3,603 kg	3,722 kg	3,849 kg	BESS enclosures	Liquid	Continuously onsite
Ethylene glycol	Coolant	10,880 kg	7,680 kg	7,920 kg	8,180 kg	8,460 kg	BESS enclosures	Liquid	Continuously onsite

Notes:
gal – gallon
kg – kilogram
wt – weight

6.8 Data Request DR HAZ-8

DR HAZ-8. Proposed project design mitigation measures PD HAZ-01 and PD HAZ-02, require implementation of a HMBP and a SPCC, respectively. However, both of these mitigation measures are lacking in significant detail (they are each only one sentence long). Please provide additional detail for each proposed mitigation measure that includes at a minimum how and when each would be applied during construction and operation, an outline of the information that would be included in each plan, including any standard language regarding spill control and cleanup, and how preparation and implementation of the plans shall be confirmed.

Response: Additional details about Project Design Measures **PD HAZ-01** and **PD HAZ-02** are detailed below, including information that will be included in each plan, preparation and implementation timing, and plan enforcement. In addition to being proposed Project Design Measures, both the HMBP and SPCC Plan are prescribed regulatory requirements applicable to the Project and will be implemented in accordance with these defined regulatory programs, as summarized below.

Hazardous Materials Business Plan

The construction and operations HMBPs will include an inventory of all hazardous materials stored onsite during construction, including all hazardous materials used during construction as listed in Table 6-1 and all hazardous materials used during operation as listed in Table 6-3 above. The HMBPs will be prepared in accordance with California Health and Safety Code, Chapter 6.95, Article 1 and California Code of Regulations, Title 19, Chapter 1. The locations, types, and quantities of these materials, as listed in the above tables, as well as Project ownership/operator contact information, will be included in each HMBP. Contact information for local and state agencies will also be provided in accordance with State law, including for local emergency response, the California Emergency Management Agency, the American Canyon District Office of the California Occupational Safety and Health Administration, the Solano County Department of Resource Management Environmental Health Services Division, the Solano County Office of Emergency Services, Dixon Fire Protection District, and City of Vacaville Fire Department. The HMBPs will also include emergency procedures established to address potential hazards associated with the use of hazardous materials. Topics covered in the emergency response procedures will include prevention (i.e., safety, storage, and containment procedures), mitigation (i.e., actions to be taken to stop a release, contain a release, or to reduce problems associated with a release), abatement (i.e., the process of stopping a release, cleaning up, and disposing of released materials), evacuation procedures, post-earthquake inspection procedures, and waste management procedures. The HMBPs will also include an inspection checklist to be used by employees during construction and operations activities. Finally, the HMBPs will include an Employee Training Plan to educate employees on the contents and procedures of the HMBPs, including type and location of equipment that can or will be used for response to hazardous materials incidents (i.e., fire extinguishers, first-aid kits, and other personal protective equipment [PPE]). Employee training will be implemented initially for all new workers and employees and on then annually. The Project will also submit annual reports through the California Environmental Reporting System in accordance with California Assembly Bill 2286. These reports will include chemical inventory data, emergency response plans and procedures, employee training programs, and site diagrams.

As outlined in Project Design Measure **PD HAZ-01** in Section 4.9, *Hazards and Hazardous Materials*, of the Application, the HMBP will be developed and implemented prior to receiving hazardous materials onsite in excess of reportable quantities during construction and operation. The construction HMBP will be drafted once the Project is fully designed and a construction contractor has been selected. The operations HMBP will be prepared prior to commercial operation. CEC Staff will have the opportunity to review the draft HMBPs prior to finalization and implementation. The Applicant anticipates the CEC will enforce all Project Design Measures as Conditions of Certification, whereby CEC review and approval will be required for compliance with **PD HAZ-01** prior to hazardous materials being received onsite in excess of reportable quantities during both construction and operation.

Spill Prevention, Control, and Countermeasure Plan

The SPCC Plans for construction and operation will be prepared in accordance with the requirements of California Health and Safety Code Chapter 6.67, Aboveground Storage of Petroleum, and the U.S. Environmental Protection Agency (USEPA) Title 40 Code of Federal Regulations (CFR) Part 112. According to the Aboveground Petroleum Storage Act Program, a tank facility is subject to SPCC regulations if the aboveground tank facility has an aggregate storage capacity of 1,320 gallons or more of petroleum in aboveground storage containers or tanks with a shell capacity equal to or greater than 55 gallons (OSFM 2025[19]). The SPCC Plans will describe the procedures, methods, equipment, and other requirements that are used to prevent the discharge of oil from storage vessels and oil-containing equipment at the Project site. Workers and first responders to any fire, rescue, or emergency medical services (EMS) emergency will be informed of what petroleum products are on the Project site and what precautions to take to avoid exposure such as flammability, explosivity, and toxicity of these products. During construction, the construction SPCC Plan will be maintained and lay out the proper procedures to prevent any discharge of petroleum products and control the discharge if that were to occur at the Project site such as the temporary construction laydown area. During operation, the operations SPCC Plan will be prepared and maintained to prevent or control any discharge from oil-containing equipment including electrical transformers within the onsite substation and BESS array. The SPCC Plans will include general facility information, including the areas where petroleum products will be stored, administration of responsibility to implement the plan, oil storage inventory data, spill reporting procedures and responses for minor and major discharge incidents.

6.9 Data Request DR HAZ-9

DR HAZ-9. Please clarify if an RMP will be prepared for the project and if so, provide additional detail about preparation and implementation of the RMP.

Response: A Risk Management Plan (RMP) is not required. The Project will not handle, treat, store, or dispose of listed hazardous materials at a quantity greater than the threshold quantity requiring an RMP. Table 4.9-7 in the Application incorrectly noted that an RMP will be prepared under the discussion for Health and Safety Code, Section 25531 through 25543.4. However, this was in error and

[19] OSFM (Office of the State Fire Marshal). 2025. Aboveground Petroleum Storage Act. Available online at: https://osfm.fire.ca.gov/what-we-do/pipeline-safety-and-cupa/certified-unified-program-agency/aboveground-petroleum-storage-act

no RMP will be prepared as it is not required based on the types and quantities of hazardous materials identified in Table 6-1 for Project construction, included above under Data Request DR HAZ-5, and in Table 6-3 for Project operation, included above under Data Request DR HAZ-7.

6.10 Data Request DR HAZ-10

DR HAZ-10. Please provide a discussion about explosion risk and how the deflagration prevention and control system would work to prevent explosions.

Response: Explosion risk and prevention are addressed in Appendix 6-B, Fire Protection Assessment for NFPA 69 Compliance in a Battery Energy Storage System. This appendix provides a summary and analysis for the BESS, model "EnerC+," designed by Contemporary Amperex Technology Co. Limited (CATL) with fire protection systems designed by Nanjing Heben M&E Equipment Technology Co., Ltd (Heben). The primary goal of the analysis was to determine if the explosion control measures in place are in conformance with the applicable requirements of National Fire Protection Association (NFPA) standards 855 and 69. The BESS uses the explosion mitigation strategy of combustible concentration reduction via exhausting the interior contents upon detection of flammable gases at a pre-determined threshold. The gas detection system includes two hydrogen sensors per BESS enclosure to provide redundancy. These sensors provide early warning of a thermal runaway condition.

A computational fluid dynamics (CFD) model was utilized to demonstrate the system design successfully reduces the concentration of combustible gases in the container to less than 25 percent of the lower flammability limit of the gas mixture. The CFD modeling analysis conservatively assumes three modules will go into thermal runaway concurrently. The thermal runaway gas data used in the CFD model is based on gas types and volumes from actual fire test data via Underwriters Laboratories (UL) 9540A, *Standard for Test Method for Evaluating Thermal Runaway Propagation in Battery Energy Storage Systems.*

Based upon the analysis conducted in Appendix 6-B, the model "EnerC+" BESS meets the explosion control system requirements of NFPA standards 855 and 69.

6.11 Data Request DR HAZ-11

DR HAZ-11. Please provide a record of conversion for the discussion with the DFPD about the BESS technology and fire strategy for the Project on October 11, 2024. Also provide copies of any correspondence with the DFPD regarding the Project.

Response: With regard to the October 11, 2024, meeting between the Applicant and Dixon Fire Protection District (DFPD), the Applicant presented a brief PowerPoint presentation about the proposed BESS technology and its fire safety design elements. This presentation is included herein as Appendix 6-C. The Applicant also shared the Fire Protection System Schematic with DFPD during this meeting, which was previously included as Appendix 2-D of the Application. The Applicant, with these supporting materials, elaborated on the recommendation not to include a fire suppression system for the BESS. As discussed with DFPD, direct contact with water can exacerbate a thermal event. At the time of this meeting, an onsite water tank was not proposed for these reasons. However, as discussed in the Project Description Updated filed in April 2025, a 24,000-gallon onsite water tank is now proposed for to be used as a backup water supply resource for DFPD for local fire suppression needs.

While fire suppression is still not recommended for direct use on the BESS equipment, the water source could be used by first responders to fight wildfires or for fire events on other nearby properties or to maintain a defensible space around the Project at their discretion. This Project element is being proposed as a benefit to the local community to help address fire suppression needs whether or not related to the Corby BESS facility. Finally, additional correspondence with DFPD since the October 11, 2024, meeting is included herein as Appendix 6-D. The Applicant made repeated attempts between December 2024 and February 2025 via phone and email to request a meeting with DFPD to discuss fire suppression and solicit input; no substantive responses were received.

7.0 RELIABILITY

7.1 Data Request DR RELI-1

DR RELI-1. Please provide the annual equivalent availability factor and annual and lifetime capacity factors for the BESS project.

Response: The anticipated availability factor for the Project is 96 percent based on commercial commitments. The Project is expected to be online continuously, except for limited planned outages associated with infrequent battery enclosure augmentation activity or unplanned outages associated with equipment malfunction and required maintenance. While lifetime capacity factor is typically not applied to energy storage projects as it is with generation, based on the availability factor of 96 percent and assuming one operating cycle per day including a 4-hour discharge, the expected capacity factor would be 16 percent:

4 hrs discharge per day / 24 hours per day X 96% = 16%

8.0 SOCIOECONOMICS

8.1 Data Request DR SOCIO-1

DR SOCIO-1. Provide the **projected** unemployment rate of the region affected by the construction and operation of the project, or if this data is unavailable provide an explanation.

Response: To the best of our knowledge, projected unemployment rates are not prepared by the State of California and are not available for the affected region. We consulted with the California Open Data Team who confirmed that this appears to be the case and provided this link to the unemployment-related datasets that are available: https://data.ca.gov/dataset?q=unemployment&sort=score+desc%2C+metadata_modified+desc

8.2 Data Request DR SOCIO-2

DR SOCIO-2. Provide the availability of skilled workers by occupation for operation of the project. Acknowledging that the applicant expects that the facility will not require on-site operations workers on a daily or weekly basis, operations phase workers will still be required periodically. Please provide an estimate of the **occupational type** and number of operations workers required for the following:

1. the expected major maintenance inspection occurring annually for approximately one week, and

2. the expected battery augmentation process occurring every two to three years for approximately three months.

Response: The estimated number of operations workers by occupational type are as follows:

1. The annual major maintenance inspection will require approximately 20 personnel for approximately one week. This workforce is anticipated to include maintenance supervisors (2), engineers (2), electricians (2), and operations and maintenance technicians (14).
2. The expected battery augmentation process will involve a crew of approximately 20 additional workers onsite for approximately 3 months to install and connect additional batteries. This workforce is anticipated to include project managers/support (4), construction laborers (8), electricians (6), and equipment operators (2).

Table 8-1 provides an overview of recent and projected employment in Solano County for the operation-related trades that will be employed on the Project during the above periods. As indicated in the table, there is a large supply of workers in these occupations in the region.

Table 8-1. Short-Term Operations Workforce by Trade in Solano County, 2022 and 2032

SOC[1/]	Occupational Title	2022	2032	Projected Change	
				Net Change	Percent Change
17-2071	Electrical Engineers	200	210	10	5%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	1,240	1,360	120	10%
47-2061	Construction Laborers	1,710	1,860	150	9%
47-2073	Operating Engineers and Other Construction Equipment Operators	470	520	50	11%
47-2111	Electricians	760	840	80	11%
49-1000	Supervisors of Installation, Maintenance, and Repair Workers	670	700	30	4%
49-9099	Installation, Maintenance, and Repair Workers, All Other	280	300	20	7%

Notes:
SOC – Standard Occupational Classification system codes
1/ These are the federal SOC system categories that correspond with the trades required for annual major maintenance inspections and periodic battery augmentation.
Sources: CEDD 2025[20]

8.3 Data Request DR SOCIO-3

DR SOCIO-3. Provide the capacities, service standards, response times, and **existing** and **expected** use levels of fire protection services, law enforcement, emergency response, medical facilities, school districts, parks and recreation facilities, and libraries.

Response:

Fire Protection

The Dixon Fire Department consists of 21 career and 3 volunteer/reserve personnel working a 48/96-hour rotation schedule. In 2023, the Dixon Fire Department responded to a total of 2,970 calls for

[20] CEDD (California Employment Development Department). 2025. Long-Term Occupational Employment Projections - Vallejo-Fairfield Metropolitan Statistical Area. March. Available online at: https://labormarketinfo.edd.ca.gov/data/employment-projections.html

service. Of those, 1,857 calls were related to rescue and EMS, while 57 calls pertained to hazardous conditions. As referenced in Application Section 4.15.2.1, *Fire Protection*, response times from Dixon Fire Department Station 81 range between 12 and 14 minutes (Sbozil and Shafer 2024).[21] The estimated response time from Station 81 to the Project site is approximately 13 minutes.

The Vacaville Fire Department consists of 63 firefighter/firefighter paramedics, 18 engineers/paramedics, 18 captains, and 3 battalion chiefs, with a minimum daily shift staffing of 22 personnel (City of Vacaville 2025[22]). In 2023, the department responded to 13,010 incidents, 9,635 being medical emergencies resulting in 8,150 patient ambulance transfers and 101 hazardous condition responses, including natural gas calls. The average response times for the department include about 1 minute to be enroute once notified of an emergency, approximately 6 minutes to arrive at the scene once called for service, and approximately 28 minutes of commitment time (Vacaville Fire Department 2023[23]). The estimated response time for the nearest Vacaville Fire Department station, Station 73, to get to the Project site is approximately 8 minutes.

The existing use levels of fire protection services correlate with on-duty personnel and volume of emergency calls responded to by the Dixon Fire Department and Vacaville Fire Department. It is anticipated that the expected use levels of fire protection services will not vary from the existing use levels as the Project will not increase the local population that will in turn increase the demand for fire protection services. Therefore, the capacity and resources of the fire departments are expected to adequately meet the ongoing needs of the community without the necessity for additional personnel or enhancements in fire protection service.

Law Enforcement

Solano County Sheriff's Office is a law enforcement agency of about 170 sworn deputies who oversee the county jail and patrol unincorporated areas of the county (Vallejo Sun 2025[24]). Estimated law enforcement response times are based on approximate travel times from the Solano County Sheriff's Office located at 530 Union Ave #100 in the city of Fairfield to the Project site, which is approximately 23 minutes. However, depending on where police units are stationed at the time the emergency call was placed, law enforcement response times vary. Capacities and service standard information was not available and therefore cannot be analyzed.

It is anticipated that the expected use levels of law enforcement will remain the same as the existing use levels because the Project will not increase population or demand for police services. Therefore, the capacity and resources of the Solano County Sheriff's Office are expected to adequately meet the ongoing needs of the community without the necessity for additional personnel or enhancements in law enforcement services.

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[21] Sbozil, Bill, and Randy Shafer. 2024. Email Communication between Bill Sbozil, Fire Marshal for Dixon Fire Department, and Randy Shafer, Deputy Fire Chief for Dixon Fire Department, and Hannah Marquez, Tetra Tech. August 8, 2024.
[22] City of Vacaville. 2025. About Vacaville Fire Department: Operations. Available online at: https://www.cityofvacaville.gov/government/fire-department/about-vfd/operations
[23] Vacaville Fire Department. 2023. 2023 Annual Report. Available online at: https://indd.adobe.com/view/d031d80e-f147-49e6-a360-04321637d60c
[24] Vallejo Sun. 2025. Solana County Sheriff's Office. Available online at: https://www.vallejosun.com/tag/solano-county-sheriffs-office/

Emergency Response

The Solano County Emergency Communication Center is made up of 20 dispatchers who work various shifts, including weekends and holidays, to provide 24-hour coverage for four law enforcement and seven fire agencies. The Emergency Communication Center operates with a minimum of three dispatchers on duty and is the first point of contact between the public and first responders (Solano County 2025[25]).

The Solano County Emergency Communication Center does not have capacity, service standards, response times, or existing use levels data available. Estimated time for ambulance emergency response will be the same response time for fire protection, as Dixon Fire and Vacaville Fire both provide emergency services. As the Project will not increase population, the expected use levels of the Solano County Emergency Communication Center will remain the same as the existing use levels. Therefore, the capacity and the resources of the Solano County Emergency Communication Center and first responders are expected to adequately meet the ongoing needs of the community without the necessity for additional emergency response support.

Medical Facilities

Kaiser Permanente Vacaville Medical Center provides health care services to approximately 136,232 members and is a licensed 140-bed Joint Commission-accredited acute care hospital (Kaiser Permanente 2017[26]). The estimated travel time from the Project site to Kaiser Permanente Vacaville Medical Center is approximately 6 minutes, and less than 5 minutes for medical services. Data for existing use levels of Kaiser Permanente Vacaville Medical Center is not available; however, it is anticipated that that the expected use levels of medical facilities will not vary from the existing use levels because the Project will not increase population or demand of medical facilities or services. Therefore, Kaiser Permanente Vacaville Medical Center will be able to continue to adequately meet the ongoing needs of the community without requiring additional personnel or enhancements of medical facilities.

School Districts

There is no available information on the Dixon Unified School District (DUSD) regarding the overall capacity of the school district. Table 4.15-1 within Section 4.15.2.4 of the Application lists the local enrollment for the years 2021 through 2024; however, the capacity of students that the district can enroll is unknown. Existing use levels of the school district can also be reflected by the enrollment data provided in Table 4.15-1. As the Project will not increase population, the expected use levels of the school district will not vary from the existing use levels. Therefore, the DUSD will continue to meet the needs of the community without the needing additional personnel or enhancements of local schools.

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[25] Solano County. 2025. Emergency Communication Center. Sheriff's Office. Available online at: https://www.solanocounty.com/depts/sheriff/emergency_communications_center/default.asp

[26] Kaiser Permanente. 2017. Measuring Care Quality in our Hospitals. Kaiser Foundation Hospital, Northern California Region Vacaville. May. Available online at: https://healthy.kaiserpermanente.org/content/dam/kporg/final/documents/reports/quality-safety-reports/ncal/measuring-care-quality-vacaville-ncal-en.pdf

Parks and Recreation Facilities

Corderos Park is the nearest local park, located approximately 1.45 miles west from the Project site. Nearby regional parks include Lake Solano County Park and Campground located approximately 8.7 miles northwest of the Project site and Lagoon Valley Park is located approximately 6.8 miles southwest of the Project site. There is a lack of comprehensive data regarding the existing levels of use for parks and recreational facilities in Solano County and the city of Vacaville. However, as the Project will not induce population change, the expected levels of use for parks and recreational facilities will be the same as the existing levels of use.

Libraries

The Vacaville Cultural Center Library is approximately 3.7 miles southwest of the Project site. The library is currently undergoing renovations to expand the capacity and services of the Vacaville Cultural Center Library. The new renovations include a 3,600-square-foot addition consisting of a meeting room and a multipurpose room, a new outdoor programing area for children and teens, complete renovation of the interior and exterior to update the look and feel of the library while allowing the facility to host a wider array of services with improved acoustic separation, and a complete upgrade of mechanical, electrical, and structural systems improving the efficiency and safety of the facility. The renovation and expansion of the library is expected to take 15 months to complete from August 2024 to approximately November 2025. To accommodate library materials, services, and programs while the Vacaville Cultural Center Library renovations are underway, the Town Square Library will expand its hours temporarily until the renovations are complete (Solano County Library 2025[27]). There is a lack of comprehensive data regarding the existing levels of use for the Vacaville Cultural Center Library as well as other libraries in Solano County and the city of Vacaville. However, as the Project will not induce population change, the expected levels of use for libraries will be the same as the existing levels of use.

8.4 Data Request DR SOCIO-4

DR SOCIO-4. Provide a quantitative estimate of applicable school impact fees, or if this data is unavailable provide an explanation.

Response: According to the DUSD Business Services website, a School District Fee Form is provided in the Building Inspection Division packet at the time when a building permit application is filed with the County. As of June 17, 2024, DUSD levies fees of $5.17 per square foot for new residential construction and additions and $0.84 per square foot for commercial and industrial developments. DUSD does not charge developer fees on square footage of 499 square feet or less.[28] Considering that the Project is not a residential, commercial, or industrial development, and will not result in the development of new building square footage, no school impact fees will apply to the Project.

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[27] Solano County Library. 2025. Vacaville Cultural Center Library Renovation and Expansion. Available online at: https://solanolibrary.com/hours-and-locations/vacaville-cultural-center-library/vcc-remodel/

[28] https://drive.google.com/file/d/1HrSE8vgvwr-sBNAEgM3uFFO8-bsavo5W/view

8.5 Data Request DR SOCIO-5

DR SOCIO-5. Provide the estimated payroll for the following:

1. the 20 personnel required for the annual major maintenance inspection, and
2. the 20 personnel required for the battery augmentation work.

Response: The estimated payroll totals for the annual major maintenance inspection and periodic battery augmentation are as follows:

1. The annual major maintenance inspection will require approximately 20 workers for approximately one week. The total estimated payroll for this one-week period is $39,000. This total includes wages and benefits.
2. The expected battery augmentation process will involve a crew of approximately 20 workers onsite for approximately 3 months to install and connect additional batteries. The total estimated payroll, including wages and benefits, for this 3-month period is $821,500.

Estimated wages are based on the median hourly wages for the affected occupations in Solano County. The affected occupations are identified by SOC system code and discussed further in response to DR SOCIO-2, above.[29] Median wage estimates are from the first quarter of 2024. Benefits are estimated using the applicable national ratio of benefits to wages from the U.S. Bureau of Labor Statistics. Data are from December 2024.[30]

8.6 Data Request DR SOCIO-6

DR SOCIO-6. Provide a quantitative estimate of sales taxes during an operational year of the project, or if this data is unavailable, please provide an explanation.

Response: The Project will generate an estimated $3,700 in sales and use tax during an operational year, with an estimated $700 of this total paid to Solano County (see Table 4.14-14 in Section 4.14, Population/Housing of the Application).

8.7 Data Request DR SOCIO-7

DR SOCIO-7. Provide tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each for both Population/Housing and Public Services.

Response:

Tables identifying laws, regulations, ordinances, and standards; adopted local, regional, state, and federal land use plans; and leases applicable to the proposed Project, including a discussion of the applicability of and conformance with each, are provided below for both Population/Housing (Table

[29] CEDD (California Employment Development Department). 2025. Long-Term Occupational Employment Projections - Vallejo-Fairfield Metropolitan Statistical Area. March. Available online at: https://labormarketinfo.edd.ca.gov/data/employment-projections.html
[30] U.S. Bureau of Labor Statistics. 2025. Employer Costs for Employee Compensation – December 2024. News Release USDL-25-0335. Available online at: https://www.bls.gov/news.release/pdf/ecec.pdf

8-2) and Public Services (Table 8-3). As noted in the Application Sections 4.14.8 and 4.15.8, no permits are required pertaining to Population/Housing or Public Services.

Table 8-2. Laws, Ordinances, Regulations, and Standards (LORS) for Population and Housing

LORS	Requirements/Applicability	Administering Agency	Project Conformance
Federal			
No federal statutes, regulations, plans, or policies govern population and housing-related considerations on the Project site.			
State			
No state statutes, regulations, plans, or policies govern population and housing-related considerations on the Project site.			
Local			
Solano County General Plan	The Solano County General Plan serves as a framework to fulfill the community's vision for the county. The Housing Element of this plan was developed to create a comprehensive strategy for addressing the housing needs in unincorporated Solano County.	Solano County Department of Resource Management	The Project will comply with the goals, policies, and implementation measures of the of the County General Plan Housing Element, including Objectives H and I, and Policies G.1 and H.2 as related to housing. The Project will not interfere with the County's ability to preserve the rural character of its residential communities. Impacts to housing are further discussed in Sections 4.14.3.1, *Housing Impacts*, and 4.14.3.5, CEQA Impact 4.14-1 of the Application. The Project will not interfere with the environmental quality of residential areas as it will not require any new housing units and will not induce population of the County directly or indirectly. Refer also to Section 4.11, *Land Use and Planning*, of the Application for a consistency analysis with applicable County General Plan goals, policies, and implementation measures.
City of Vacaville General Plan	The City of Vacaville General Plan outlines the goals, policies and actions necessary to guide the City's growth and development in the coming years. The Housing Element of this plan focuses on establishing goals and policies that promote safe and adequate housing for both current and future residents of the City, catering to all income levels.	City of Vacaville Department of Community Development; City of Vacaville Department of Housing and Community Services	The Project will comply with the goals, policies, and actions of the Housing Element of the City General Plan, including Goals HE.1 and HE.2, and Policies HE.1 – GP 1, HE.1 – GP 7, HE.2 – GP 2, and HE.2 – GP 5 as related to housing, which is described further in Sections 14.3.1 and 4.14.3.5 of the Application. The Project will not require the construction of new housing development or increase

LORS	Requirements/Applicability	Administering Agency	Project Conformance
			the population of the City directly or indirectly. Refer to Section 4.14.3.5, CEQA Impact Analysis Impact 4.14-1 and Impact 4.14-2. Refer also to Section 4.11, *Land Use and Planning*, of the Application for a consistency analysis with applicable City General Plan goals, policies, and actions.

Table 8-3. Laws, Ordinances, Regulations, and Standards (LORS) for Public Services

LORS	Requirements/Applicability	Administering Agency	Project Conformance
Federal			
No federal statutes, regulations, plans, or policies relevant to public			.
State			
Quimby Act (California Government Code Section 66477)	Requires a city or county to adopt standards for recreational facilities in its general plan recreation element if it is to adopt a parkland dedication/fee ordinance.	Solano County Department of Resource Management	The Solano County General Plan Parks and Recreation Element does not contain any requirements applicable to the Project. Therefore, the Applicant is not required to adopt a parkland dedication or pay recreational fees.
State School Funding (California Education Code Section 17620)	Allows school districts to levy a fee against any construction within the boundaries of the district for the purpose of funding constructing or reconstructing school facilities.	California Department of Education	As previously stated for Data Request DR SOCIO-4, the Applicant will receive the School District fee form as part of the building permit application. The County Building Inspection Department determines how much the developer fee rate will be by the square footage of the space. The Commercial/Industrial DUSD Developer Fee rate for the 2024-2025 year is $0.84 per sq. ft. The Applicant will pay these development fees required by the County and school district as stated in Section 4.15.2.4 and 4.15.3.1 CEQA Impact Analysis (iii) of the Application.
Local			
Solano County General Plan	Comprehensive long-range plan to guide the County's physical development.	Solano County Department of Resource Management	The Project will comply with the goals, policies, and implementation measures of the County General Plan, including Goal PF.G-3, Policy HS.P-39 and Implementation Measure HS.I-35 as related to fire protection. This is further explained in Section 4.15.3.1 CEQA Impact Analysis (i) of the Application that

LORS	Requirements/Applicability	Administering Agency	Project Conformance
			the Project's construction and operation will not significantly impact local fire protection service ratios, response times, or other performance objectives. The Project design will be constructed in compliance with all applicable federal, state, and local worker safety and protection codes to minimize the risk of fire occurrence. The Project will also comply with Policy PF.P-41 and Implementation Measure PF.I-42 as related to police protection. This is discussed further in Section 4.15.3 CEQA Impact Analysis (ii) of the Application that the Project will implement security features such as a 6-foot-tall chain link fence with barbed wire along the perimeter of the Project site as well as motion-controlled security lighting. Refer also to Section 4.11, *Land Use and Planning*, of the Application for a consistency analysis with applicable County General Plan goals, policies, and implementation measures as related to public services.
City of Vacaville General Plan	Guides future conservation, enhancement and development in the city.	City of Vacaville Department of Community Development	The Project will comply with the goals, policies, and actions of the Public Facilities and Services chapter of the City General Plan, including Goal PUB-1 and Policy Pub-P1.4 as related to fire protection. This is further explained in Section 4.15.3.1 CEQA Impact Analysis (i) of the Application that the Project's construction and operation will not significantly impact local fire protection service ratios, response times, or other performance objectives. The Project design will be constructed in compliance with all applicable federal, state, and local worker safety and protection codes to minimize the risk of fire occurrence. The Project will also comply with Goal PUB-2 and Policy Pub-P2.4 of the Public Facilities and Services chapter of the City General Plan as related to police protection. This is discussed further in Section 4.15.3 CEQA Impact Analysis (ii) of the Application that the Project will implement security features such as a 6-foot-tall chain link fence with barbed wire along the perimeter of

LORS	Requirements/Applicability	Administering Agency	Project Conformance
			the Project site as well as motion-controlled security lighting. Refer also to Section 4.11, *Land Use and Planning*, of the Application for a consistency analysis with applicable City General Plan goals, policies, and actions as related to public services.

9.0 TRAFFIC AND TRANSPORTATION

9.1 Data Request DR TRANS-1

DR TRANS-1. Provide a Transportation Demand Management plan with recommended strategies and timeframes to reduce the number of trips during construction. Supply any documentation supporting the expected trip reduction.

Response: As a component of the Traffic Management Plan proposed in Project Design Measure TRANS-01, the Applicant will implement a Transportation Demand Management (TDM) measures to reduce automobile travel and traffic impacts associated with the Project construction. As discussed in the Application, the location of the site limits the opportunity to improve how efficiently workers reach the site. TDM measures that will be effective and practical for the Project include the following:

- Provide a transportation coordinator who can match workers for carpooling,
- Encourage carpooling among the construction workforce,
- Consider staggered start and end times for construction workers, and
- Explore the feasibility of providing vanpool service from select locations within the City of Vacaville and surrounding communities.

As discussed in the Application, the Project's worker vehicular trip generation analysis is based on workforce data provided by the Project Applicant. To account for the implementation of the proposed Traffic Management Plan, including TDM measures including those listed above, a vehicle occupancy rate of 1.10 was applied to all worker trip generation estimates. We believe that Staff does not need the plan in order to find the Project will not result in significant impacts and will comply with laws, ordinances, regulations, and standards. To achieve these findings, the Staff can and should rely on proposed Project Design Measure **PD TRANS-01** and the performance standards outlined in this response.

9.2 Data Request DR TRANS-2

DR TRANS-2. Provide a listing of any existing features on the study area roads that may affect public safety. State how they affect safety and possible ways to mitigate the hazards. If there are no existing features creating hazards, that should be stated.

Response: There are no existing features on the study area roadways that would affect public safety or create a traffic hazard.

10.0 WASTE MANAGEMENT

10.1 Data Request DR WASTE-1

DR WASTE-1. Please provide a more detailed description of the types and volumes of hazardous waste that would be generated by project construction and operation, how the hazardous waste would be managed, where it would be stored onsite, and how long it would be stored onsite before being transferred offsite by a permitted hazardous waste transporter.

Response: As discussed above under the response for DR HAZ-5, hazardous materials used and stored onsite during construction of the Project are included in Table 6-1. During Project construction, hazardous materials used and stored onsite will include gasoline, diesel, and lubricants. These hazardous materials will be stored in temporary stationary tanks with secondary containment and will be located within the temporary construction laydown area. These hazardous materials will be used to power and maintain construction equipment. Management of hazardous materials during construction will be addressed in the SPCC Plan and HMBP, as further described above in the response for DR HAZ-8. The majority of these hazardous materials will be consumed onsite during Project construction and will not result in waste generation. Any unused hazardous materials will be removed by the construction contractor once construction is complete or the materials are no longer needed. Hazardous waste generation is not anticipated during construction. In the event that hazardous materials become unusable, or any hazardous waste is generated from hazardous materials cleanup, the hazardous waste will be removed from the site by a registered hazardous waste transporter and disposed of at an appropriate waste handling facility based on the characteristics of the waste.

As discussed above under the response for DR HAZ-7, hazardous materials used and stored onsite during operation of the Project are included in Table 6-2. All hazardous materials that will be stored onsite during Project operation will be contained within the Project components. These materials will not be used by O&M staff. Rather, they will be contained within the sealed battery cells, transformers, HV breakers, and BESS enclosures. As these materials will be sealed within Project components, they will not result in hazardous waste generation.

In the analysis for Impact 4.9-1 in Section 4.9, *Hazards and Hazardous Materials*, of the Application, it was also noted that hazardous materials used for operations will include grease, lubricants, paints, solvents, and adhesives; these items will be stored at a regional O&M facility and transported to the Project site as needed. Additionally, these materials to be used by O&M staff are consumables and are not expected to result in hazardous waste generation. However, should hazardous waste be generated from these consumable materials, such waste will be collected in a 90-day hazardous waste storage area at a regional operations and maintenance facility and will be disposed of by a licensed hazardous waste disposal service.

Finally, as discussed in Section 4.19, *Utilities and Service Systems*, of the Application, used lithium-ion batteries are most likely considered hazardous waste by the USEPA. The USEPA recommends that businesses consider managing lithium-ion batteries under the federal "universal waste" regulations in

Title 40 CFR Part 273.[31] During Project operation, the facility will require battery augmentation to maintain Project capacity; batteries will be added but not replaced during this planned activity. However, lithium-ion battery cells may occasionally be replaced due to defects or loss of efficiencies. In such cases, these batteries will be managed in accordance with the "universal waste" regulations in 40 CFR Part 273, as recommended by the USEPA.

11.0 WILDFIRE

11.1 Data Request DR WILDFIRE-1

DR WILDFIRE-1. Would general onsite O&M activities, as described above occur more frequently than once per year? If so, how frequently would standard onsite O&M activities occur? How often and what types of O&M activities would occur for the offsite project facilities such as the gen-tie?

Response: Routine O&M activities will occur approximately weekly, including routine inspections and minor maintenance activities. Activities may include TMS repairs, operational adjustments, and other corrective maintenance. The gen-tie will be inspected annually, with any required vegetation management performed on an annual cycle.

11.2 Data Request DR WILDFIRE-2

DR WILDFIRE-2. Please provide a discussion of combustible vegetation to control for fire protection/wildfire reduction for both on- and offsite project components for both construction and operation of the project, including anticipated locations of combustible vegetation control, limited vegetation heights, and combustible vegetation clearance buffers.

Response: As discussed in Section 4.20, *Wildfire,* of the Application, all battery components for the BESS will be installed on concrete pads. The fenced BESS yard, onsite substation, and access roads will be surfaced with crushed rock. O&M activities will include spot removal of any vegetation growth within the BESS and onsite substation areas as needed. As such, no combustible vegetation will be present within these areas.

For Project site areas outside of the BESS and onsite substation fence lines, O&M staff will inspect areas adjacent to the facility and gen-tie line to monitor vegetation management needs. All combustible vegetation will be mechanically cleared to a minimum of 30 feet around the fenced BESS yard and onsite substation to maintain defensible space.

Additionally, vegetation management will occur along the gen-tie corridor and around the associated transmission towers in accordance with the North American Electric Reliability Corporation (NERC) transmission vegetation management standards and California Fire Code (CFC) requirements. All combustible vegetation will be mechanically cleared to a minimum of 10 feet around electric poles to maintain defensible space. Additionally, vegetation will not be allowed to encroach within 10 feet of conductors under any condition (accounting for maximum sag and horizontal wind sway).

[31] https://www.epa.gov/recycle/used-lithium-ion-batteries#businesses

11.3 Data Request DR WILDFIRE-3

DR WILDFIRE-3. Please identify which access roads would be used or serve as firebreaks for each of the major project components, including the BESS array, project Substation, and gen-tie line. What is the width of the access roads that would serve as firebreaks for the project?

Response: Crushed rock site surfacing will provide a minimum 10-foot firebreak between the perimeter fences and all equipment within the BESS yard and Project substation, meeting the vegetation control requirements of CFC Section 12-7.5.17. Access roads will add to these fire breaks along the northern, eastern, and southern perimeter of the BESS array. Although no access road is proposed along the western site boundary, the proposed crushed rock surfacing meets the CFC defensible space requirement. In addition to the crushed rock fire breaks, vegetation clearing will be performed outside of the BESS and Project substation fence lines (30-foot width) and along the gen-tie corridor as described above in response to DR WILDFIRE-2.

11.4 Data Request DR WILDFIRE-4

DR WILDFIRE-4. Please provide a discussion of fire protection measures that would be required by the County for the project site and along the gen-tie line.

Response: Solano County Ordinance No. 22-01 adopted the 2022 CFC with various modifications, deletions, and additions necessary because of the local climatic, geological, and topographical conditions of the County. Most of the modifications and additions adopted by the County do not apply to the Project as they are either procedural in nature or applicable to other types of development (i.e., residential). However, the following modifications apply to the Project:

- **Section 22-01(I): Minimum turning radius**. CFC Section 503.2.4 is amended as follows: A fire department access road shall have a minimum standard turning radius of 28 feet inside and a 52-foot outside diameter.
- **Section 22-01(L): Type of water supply**. CFC Section 507.2 is amended as follows: A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains, or other fixed systems capable of providing the required fire flow based on Appendix B.

As shown on the updated Site Plan included in Appendix 2-A of the Project Description Update, Project access roads have been designed to meet the minimum turning radius requirements adopted by the County.

CFC Appendix B is a procedure for determining fire-flow requirements for buildings. Per Section 101.1, *Scope*, the appendix does not apply to structures other than buildings. Therefore, this provision does not apply to the Project.

Accordingly, the Project will comply with the fire protection measures required by the County through compliance with the 2022 CFC and with the applicable County modifications and additions to the 2022 CFC adopted in Solano County Ordinance No. 22-01.

Similarly, the City of Vacaville adopted the 2022 CFC in Section 15.20.271.010 of the City's Municipal Code. Section 15.20.271.040 of the City's Municipal Code includes amendments to the 2022 CFC adopted by the City. Most of the amendments adopted by the City do not apply to the Project, and specifically to the portion of the gen-tie line located within the City's jurisdiction, as they are either procedural in nature or applicable to other types of development (i.e., residential). However, the following amendments apply to the Project:

- **Section 15.20.271.040(F): Abatement of Waste Material, Weeds, and Dry Grass**. Accumulation of combustible materials. It shall be unlawful to accumulate or allow to accumulate or exist on any property any combustible waste matter, rubbish, weeds, dry grass, or other matter that creates a public nuisance, poses a threat to life, safety, or property, or creates a fire hazard. The Fire Chief may order or cause the abatement of such hazard or nuisance in the manner specified in Section 112 and 112.4.1.2 of this code.
- **Section 15.20.271.040(G): Abatement of Weeds and Other Vegetation.**
    - c) For properties in excess of five acres.
        1. There shall be not less than a thirty-foot (30') wide firebreak around the perimeter and a thirty-foot (30') wide firebreak at the center of the property.
        2. There shall be not less than one hundred feet (100') of clearance around all structures and other improvements.
        4. Tree branches located within one hundred feet (100') of a structure or improvement shall be removed or pruned to be not less than six feet (6') from the ground. Bushes and shrubs in this area shall also be maintained to prevent fire spread, as determined by the Fire Chief.

The portion of the Project's gen-tie line located within the City's jurisdiction is within existing almond orchards, which will be removed prior to gen-tie line construction, along with the existing almond orchards within the gen-tie laydown area. In addition to compliance with transmission vegetation management standards established by NERC as discussed in Section 4.20, *Wildfire*, of the Application, the Project will also comply with the City's firebreak and abatement standards for weeds, dry grass, and other vegetation through ongoing O&M activities, where O&M staff will actively manage vegetation during routine inspections of the Project site and gen-tie line. Additionally, the Project's gen-tie line will include firebreaks along the corridor as needed to meet the requirements, including perimeter firebreaks and vegetation clearance around the gen-tie poles, as applicable based on consultation with the City.[32] No trees will be located on the gen-tie corridor; the nearest orchard trees on adjacent parcels within the City Vacaville will be located a minimum of 70 feet from overhead gen-tie structures.

The Project will comply with the 2022 CFC and with the applicable City amendments to the 2022 CFC adopted in Section 15.20.271.040 of the City's Municipal Code.

[32] The Applicant has attempted to contact the City of Vacaville Planning Department and City of Vacaville Fire Department via telephone to clarify the applicability of Section 15.20.271.010 of the municipal code for gen-tie facilities. As of the date of this submittal, response is pending.

11.5 Data Request DR WILDFIRE-5

DR WILDFIRE-5. Please provide an updated Fire Response Template that includes response steps/information for BESS structures that do not contain fire suppression systems and that cannot be entered.

Response: The BESS Fire Response Template provided in the Application was an example for reference; a Project-specific procedure will be prepared as a component of the operations Emergency Action Plan (EAP) (proposed Project Design Measure **PD HAZ-05**) discussed in the response to Data Request DR WS-13. In general, response procedures will require facility and emergency response personnel to allow the BESS to burn and consume itself, while being monitored from a safe distance by first responders. In practical application, during a thermal runaway incident, it is neither safe nor standard procedure for first responders to approach a burning BESS unit. This approach is recommended to ensure the safety of emergency personnel and is supported by established safety protocols. Moreover, since filing of the Application, a Hazard Mitigation Analysis (HMA) was prepared for the Project by Fire and Risk Alliance, LLC (FRA) included herein as Appendix 11-A. As discussed in the HMA, FRA recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed BESS enclosure to ensure they are not momentarily exposed to dangerous conditions during a thermal event. A minimum approach distance will be defined in the EAP.

11.6 Data Request DR WILDFIRE-6

DR WILDFIRE-6. Please provide a discussion of the components of the fire detection system and how they will work. Is the identified fire detection system confined to the BESS enclosures? Is there a fire detection system for other components of the BESS facility and along the gen-tie line? If so, please provide a description of any fire detection systems for these project components?

Response: As discussed in response to Data Request DR WILDFIRE-5, an HMA was prepared for the Project by FRA, included herein as Appendix 11-A. FRA conducted an installation level code review and an HMA in accordance with the requirements of the 2022 edition of the CFC, which is based on the 2021 edition of the International Fire Code (IFC), with local amendments. The analysis evaluated the CATL EnerC+ BESS and is intended to be used as a tool for a Fire Code Official or an Authority Having Jurisdiction to assist in their review of the proposed Project. The HMA includes a review of the Project site plan and the EnerC+ system including its construction, design, fire safety features, listings, certifications, UL 9540A fire test data, and Failure Mode and Effects Analysis (FMEA).

The EnerC+ container is provided with fire and gas detection. The fire and gas detection system includes three photoelectric smoke detectors (two in the battery compartment and one in the electrical compartment), two heat detectors in the battery compartment, and two hydrogen gas detectors in the battery compartment, as shown in Figure 7 of Appendix 11-A. The fire and gas detection system are connected to a fire alarm control panel. Any alarm condition from the fire alarm control panel is communicated to the full site network's Energy Storage Management System/Programmable Logic Controller. The Programmable Logic Controller is certified to IEC/EN 61131-2 and electrical safety standards IEC/EN/UL/CSA 61010-2-201. The site controller then transmits signals and alarms to the NextEra Remote Operation Control Center, which is staffed 24/7/365. The Remote Operation Control Center is located in a CAT 5 building with backup power redundancy. For local notification, as detailed in Figure 5 of Appendix 11-A, an audible/visible appliance is installed on the exterior of the electrical compartment on each EnerC+ container. No fire detection system is proposed for the other components of the BESS facility, Project substation[33], or gen-tie line, nor is it required by any code or standard. Please refer to Appendix 11-A for additional information on the Project's fire detection system.

12.0 WORKER SAFETY AND FIRE PROTECTION

12.1 Data Request DR WS-1

DR WS-1. Please provide site diagrams illustrating the placement and distribution of the 544 proposed BESS units across the parcel.

Response: Please refer to Appendix 12-A, *Electrical Equipment Site Plan*, which includes a site diagram showing the 544 proposed BESS units. As shown, BESS units will be constructed in pairs, with 9-inch spacing between units in each pair (back to back), 14-foot, 4.875-inch spacing between pairs (front to front), and 9-foot, 10.2-inch spacing between pairs (end to end). BESS unit spacing is in accordance with the manufacturer's specifications, as shown on Figure 5-1 of Appendix 12-B, *EnerC+ Battery Container Operating Instruction and Maintenance Manual*.

Additionally, the CATL EnerC+ with proposed paired configuration has been subjected to a large scale burn test (see Appendix 12-C). During this test, a fire was initiated in a single BESS unit (full enclosure) using electrical resistance heaters and subsequently a lit road flare caused all racks within the enclosure to burn completely without the use of any suppression. This created an unrealistic full enclosure fire event to demonstrate the lack of propagation between BESS enclosures based on a highly conservative thermal event scenario (as further discussed below in Sections 12.2 and 12.7, UL 9540A testing demonstrates that thermal runaway in one cell may propagate to adjacent cells, but does not propagate between modules or racks). During the large-scale burn test, no thermal runaway propagation to adjacent units (enclosures) was observed. Temperature data indicated that while high external temperatures were seen at the target (adjacent) units, internal temperature increases in target units were moderated by the enclosure envelope and insulation, at no time did target unit battery cell temperatures exceed 75 percent of the thermal runaway temperature, and no components of the target units caught fire, apart from paint and door seals.

12.2 Data Request DR WS-2

DR WS-2. Please provide discussion describing how the applicant arrived at conclusions for fire protection for the project. Please also provide descriptions of all significant assumptions, methodologies, and computational methods used in arriving at those conclusions.

Response: Please refer to Appendix 11-A, *Hazard Mitigation Analysis,* and Appendix 12-D, *Plume Analysis.* As described under the response for DR WILDFIRE-6 above, FRA conducted an installation-level code review and an HMA in accordance with the requirements of the 2022 CFC. The analysis evaluated the CATL EnerC+ lithium-ion BESS, which will be used for the proposed Project. The HMA is intended to be used as a tool for a Fire Code Official or an Authority Having Jurisdiction to assist in

[33] Smoke detection is included in the Project substation control enclosure per CFC requirements.

their review of the proposed Project, and it includes a review of the Project's site plan and the EnerC+ system including its construction, design, fire safety features, listings, certifications, UL 9540A fire test data, and FMEA. Based on a review of the EnerC+ system, the Project's site plan, and the UL 9540A testing, the proposed BESS facility design will meet the CFC installation level requirements for an outdoor BESS when it is installed in accordance with the manufacturer's instructions, its listing, the approved drawings, and the CFC. Please refer to Appendix 11-A for the detailed HMA.

Additionally, as discussed in Appendix 12-D, FRA performed a plume analysis to evaluate the plume dynamics from a release of battery vent gas due to a propagating thermal runaway event from the CATL EnerC+ BESS. The plume analysis considers consequence extents for potential pre-combustion[34] battery vent gas release scenarios up to the full enclosure level. Scenarios for pre-combustion releases included the four-cell UL 9540A module level test-based release, and additional hypothetical release scenarios including a full-volume module level release, a full-volume release from a rack of eight modules, and a full-volume release from an entire BESS enclosure of five racks (40-modules). Process Hazard Analysis Software Tools (PHAST) consequence modeling methodology was used, and the following four scenarios and associated sub-scenarios were modeled in PHAST:

1. <u>Scenario 1</u>: UL 9540A Based Scenario (four-cells venting under thermal runaway)
    - Propagation rate of four cells per 20.4 minutes from UL 9540A module test for all cells (40 liters/min)
    - 10-minute release duration
    - Instantaneous release
2. <u>Scenario 2</u>: Single Module Release (104 cells)
    - Propagation simultaneously through each cell at a rate of four cells per 20.4 minutes from UL 9540A module test for all cells (280.63 1/min for 75.6 min)
    - 10-minute release duration
3. <u>Scenario 3</u>: 1-Rack Release (8 modules [832 cells])
    - Propagation simultaneously through each module at a rate of four cells per 20.4 minutes from UL 9540A module test for all cells (2,245.08 1/min for 75.6 min)
    - 10-minute release duration
4. <u>Scenario 4</u>: 1-Container Release (5 racks [40 modules {4,160 cells}])
    - Propagation simultaneously through each module at a rate of four cells per 20.4 minutes from UL 9540A module test for all cells (11,229.36 1/min for 75.6 min)
    - 10-minute release duration

For all the above listed scenarios, all individual gas components of the battery vent gas mixture defined in the UL 9540A cell level testing were included in the consequence analysis. Modeling accounted for all toxic components with established Immediately Dangerous to Life or Health (IDLH)

[34] As further described in Section 12.7, UL 9540A thermal runaway testing did not result in fires within the BESS components.

values within the battery vent gas mixture and were individually tracked in dispersion calculations such that the centerline concentration for each component was documented over the duration of the release. The default PHAST averaging time for IDLH calculations is 30-minutes, as it is the minimum exposure duration needed to meet the IDLH exposure requirements. PHAST calculates downwind concentration extents and cloud widths for each tracked toxic component within the battery vent gas mixture which, depending on gas composition, may include some or all of the following: CO, carbon dioxide (CO_2), toluene, benzene, xylene, hydrogen fluoride, hydron bromide, hydrogen chloride, and other trace components.

With the exception of CO and CO_2, model inputs for all other toxic components within the battery vent gas mixture fell below the PHAST required minimum component concentration (i.e., below individual IDLH concentrations) for dispersion calculations to be performed. Trace toxic components all fell below concentrations measurable beyond the immediate release location. Accordingly, CO and CO_2 were evaluated for IDLH extents. Upon initial review of intermediate modeling results, it became clear that the extent of the CO_2 IDLH cloud (40,000 parts per million) did not extend measurably beyond the release location. As such, the vapor cloud was modeled as a mixture according to the component concentrations listed in the UL 9540A reports for pre-combustion and associated gas properties, and CO was tracked as an individual component of the release mixture to determine the maximum extent of IDLH concentrations (1,200 parts per million CO) within the cloud.

It should be noted that although Scenario 4 (5-rack, 40-module full container release) was included in this analysis for defining the worst-case bounding scenario of a pre-combustion release from all cells within all modules of all racks in a container, it is not a feasible release scenario as the UL 9540A reports show no direct thermal runaway propagation between modules. Additionally, there are no single failures identified in the FMEA, documented in the available BESS failure literature, or reported in anecdotal incident case reports that show or support a mechanism of failure that would cause thermal runaway to occur in 104-cells within a single module simultaneously, let alone within all 4,160-cells for the 40-module CATL EnerC+ container. As such, there is no existing test data or established failure mechanism in the UL 9540A reports that document all 104 cells within a module or 4,160-cells within a container initiating thermal runaway from a single failure. Rather, thermal runaway propagation from cell-to-cell and module-to-module would remain a direct component of battery vent gas release timing, release conditions, and associated consequences for all potential single failures initiating thermal runaway and battery gas venting in the CATL EnerC+ BESS.

Additionally, a theoretical upper-bounding release condition scenario assumed a 10-minute duration in the analysis only as a comparison tool to frame the UL 9540A test data-based analysis results against the theoretical upper-bounding venting condition, achieved by assuming thermal runaway and venting are initiated simultaneously for the all cells within an entire BESS over a 10-minute duration for all module/rack/container level scenarios. These upper-bounding theoretical worst-case release sub-scenarios were only included to provide an understanding of the hypothetical peak impact associated with a condensed release and are not representative of the consequences to be expected from any propagating non-flaming thermal runaway event.

The analysis of results for all modeled scenarios show that there are no significant hazards that extend beyond the nearest property boundary for either the flammable or toxic portions of the dispersed cloud. The maximum extent of impact from the one-half lower flammability limit (LFL) vapor cloud was 24.4 feet for the UL 9540A based propagation duration release from a full BESS enclosure. For the battery vent gas release for the full BESS enclosure thermal runaway is release scenario, the component with the largest IDLH footprint and required potential exposure duration (30-minutes) is CO. The largest CO IDLH extent with a duration greater than 30-minutes was 63.3 feet, less than the distance from the BESS nearest to a property boundary of approximately 148 feet. Please refer to Appendix 12-D for detailed information on the plume analysis.

12.3 Data Request DR WS-3

DR WS-3. Please provide an evaluation along with additional discussion of the potential impacts of a BESS fire at the site that includes air dispersion modeling of BESS fire emissions of gases identified in the UL9450A test.

Response: Please refer to the response to Data Request DR WS-2 above, as well as new Appendices 11-A, *Hazard Mitigation Analysis,* and 12-D, *Plume Analysis.* As discussed above for DR WS-2, for all the scenarios modeled in the Plume Analysis, all individual gas components of the battery vent gas mixture defined in the UL 9540A cell level testing were included in the consequence analysis.

12.4 Data Request DR WS-4

DR WS-4. Please provide, at a minimum, a 30 percent design for the battery storage systems. This should include dimensioned plan and elevation views, required enclosure spacing, built-in safety features, and details of backup power systems (as referenced in Section 2.3.6.2).

Response: Please refer to Appendix 12-A, *Electrical Equipment Site Plan*, which shows enclosure spacing as discussed in the response to Data Request DR WS-1 above. BESS array site plan and elevation drawings are provided in Appendix 12-E (BESS elevation drawings also provided as Figure 2-2 in the Application, and the updated site plan drawing was provided with the recent Project Description Update. These drawings are also provided again herein for convenience).

Built-in safety features are documented in the HMA and the CATL EnerC+ O&M Manual (Appendix 12-B). Note that the optional aerosol and water spray fire extinguishing systems presented in the CATL EnerC+ O&M manual are not proposed for the Project. For non-walk-in container systems, fire suppression is not required per CFC and NFPA 855 and is not necessary based on UL9540a propagation testing (see Section 12.7 below). Fire suppression for BESS is not currently recommended as best practice by industry.

External backup power supply will be provided to the BESS containers in accordance with NFPA 855 and NFPA 72; however, this design detail has not yet been developed.

12.5 Data Request DR WS-5

DR WS-5. Please provide a description of each training course. Ensure that the training adequately covers the risks associated with the project. This can be in a table format using short phrases or a sentence or two.

Response: A brief description of each training course if provided in Table 12-1.

Table 12-1. Construction and Operation Safety Training Programs

Training Course	Target Employees	Training Description
Injury and Illness Prevention Plan	All	Training for the Injury and Illness Prevention Plan will include topics such as hazard recognition, safe work practices, emergency response procedures, accident reporting, specific job hazards tailored to job functions or tasks, ongoing refresher training to keep safety knowledge current, and open communication regarding safety concerns. Employees will be trained on the topics of the Project's Injury and Illness Prevention Plan during onboarding.
Fire Protection and Prevention Plan	All	Training for the Fire Protection and Prevention Plan involves basic fire safety awareness, identification of fire hazards, equipment specifications such as fire extinguishers, emergency evacuation protocol, and reporting fires and emergencies. Employees will be trained on the topics of the Project's Fire Protection and Prevention Plan during onboarding.
Personal Protective Equipment Program	All	Training for the Personal Protective Equipment Program involves the proper use and care of personal protective equipment (PPE), when PPE is necessary, what type of PPE is required, and limitations of PPE. Employees will be trained on the topics of the Personal Protective Equipment Program during onboarding.
Emergency Action Plan	All	Training for the Emergency Action Plan involves understanding the procedures of various emergencies such as fire, severe weather, pandemic, etc., roles and responsibilities employees undertake during an emergency, evacuation routes and meeting locations, communication protocols, and use of emergency equipment such as first aid kits and emergency alarms. Employees will be trained on the topics of the Project's Emergency Action Plan during onboarding.
Heavy Equipment Safety Program	Employees working on, near, or with heavy equipment.	Training for the Heavy Equipment Safety Program involves understanding the safety protocols for operating heavy equipment such as vehicle/fleet safety visual inspections, the PPE required for operating heavy equipment, and the specific vehicle and equipment requirements. Employees working on, hear, or with heavy equipment will be trained on the topics of the Project's Heavy Equipment Safety Program during onboarding.
Forklift Operator Training	Employees working on, near, or with forklifts. Operators must be certified.	The Forklift Operator Training involves learning the procedures for pre-operation inspections, safe operating techniques, understanding load limits and proper load placement, and the PPE required for operating a forklift. Forklift operators will be trained on the topics of the Project's Forklift Operator Training during onboarding.
Trenching and Excavation Safety Program (Use of Excavation Permits per Cal-OSHA)	Employees involved with the conduct of trenching or excavation.	The Trenching and Excavation Safety Program training will cover topics such as trench inspection protocols, PPE requirements, safe work practices, hazard identification and assessment, and emergency response protocols. Employees involved with trenching or excavation will be trained on topics of the Project's Trenching and Excavation Safety Program during onboarding.
100% Fall Protection Program	Employees required to use fall protection.	The 100% Fall Protection Program training will cover topics such as identifying fall hazards, the proper use of fall protection systems and equipment, safe work practices and emergency procedures in case a fall will occur on site. Employees required to use fall protection will be trained on topics of the Project's 100% Fall Protection Program during onboarding.
Scaffolding Safety Program	Employees required to erect or use scaffolding.	The Scaffolding Safety Program training will cover topics such as proper use of the scaffold, safety protocols while handling of materials on the scaffold, and hazard identification and minimization with various types of scaffolds. Employees required to erect or use scaffolding will be trained on topics of the Project's Scaffolding Safety Program during onboarding.

Training Course	Target Employees	Training Description
Hoisting and Rigging Safety Program	Employees responsible for the oversight or conduct of hoisting and rigging.	The Hoisting and Rigging Safety Program training will cover topics such as hazard identification associated with hoisting and rigging, familiarization with various hoisting and rigging equipment, proper rigging practices, signal person responsibilities, PPE required for hoisting and rigging, and emergency protocols. Employees responsible for the oversight or conduct hoisting and rigging will be trained on topics of the Project's Hoisting and Rigging Safety Program during onboarding.
Crane Safety Program	Employees supervising or performing crane operations.	The Crane Safety Program training will cover topics such as familiarization of different crane types and components, hazard identification association with crane operations, load handling, signal person responsibilities, safe operating procedures, PPE required for crane operations, and emergency protocols. Employees supervising or performing crane operations will be trained on topics of the Project's Crane Safety Program during onboarding.
Flammable and Combustible Liquid Storage and Handling	Employees responsible for the handling and storage of flammable or combustible liquids or gases.	The Flammable and Combustible Liquid Storage and Handling training will cover topics such as types of flammable and combustible liquid, hazard identification associated with storing and handling flammable and combustible liquid, safe storage and handling practices and procedures, emergency protocols, and spill prevention and response procedures. Employees responsible for handling and storing flammable or combustible liquids or gases will be trained on topics of the Project's Flammable and Combustible Liquid Storage and Handling during onboarding.
Hot Work Permits	Employees performing hot work.	Hot Work Permit training will cover topics such as hazard identification associated with hot work, how to get a hot work permit, fire prevention measures, PPE required for hot work, emergency protocols, and safe work practices. Employees performing hot work will be trained on topics of the Project's Hot Work Permits during onboarding.
Hazardous Energy Control (Lockout/Tagout)	Employees performing lockout/tagout.	Hazardous Energy Control (Lockout/Tagout) training will cover topics such as lockout/tagout procedures, energy control procedures for specific equipment, emergency protocol. Employees performing lockout/tagout will be trained on topics of the Project's hazardous energy control protocols during onboarding.
Electrical Safety	Employees required to work on electrical systems and equipment.	Electrical Safety training will cover topics such as hazard identification, safe work practices, PPE required while working with electrical systems, equipment safety while using electrical tools, and emergency protocols. Employees working on electrical systems and equipment will be trained on the Project's electrical safety procedures during onboarding.
Permit Required Confined Space Entry	Employees required to supervise or perform confined space entry.	Confined Space Entry training will cover topics such as hazard identification, the confined space entry permit process, pre-entry and entry procedures, PPE required when entering confined spaces, rescue plans and procedures, and roles and responsibilities of entrants, attendants and supervisors. Employees supervising or performing confined space entry will be trained on the Project's confined space entry protocols during onboarding.
Hand and Portable Power Tool Safety	All	Hand and Portable Power Tool safety will cover topics such as hazard identification, safe work practices, PPE required while operating certain hand and power tools, and first aid and emergency protocols. All employees will be trained on the Project's hand and portable power tool safety procedures during onboarding.
Housekeeping Policy and Program	All	Housekeeping Policy and Program training will cover topics such as roles and responsibilities of employees in maintaining good housekeeping on the Project site, daily and specialized cleaning tasks, hazard identification associated with poor housekeeping, safe cleaning procedures and first aid and emergency protocols. All

Training Course	Target Employees	Training Description
		employees will be trained on the Project's Housekeeping Policy and Program during onboarding.
Hearing Conservation	All	Hearing Conservation training will cover topics such as understanding Noise-Induced Hearing Loss (NIHL), permissible noise level exposure, noise monitoring and audiometric testing procedures, PPE to prevent NIHL, safe work practices such as noise reduction strategies, and first aid and emergency procedures. All employees will be trained on the Project's hearing conservation protocols during onboarding.
Safe Lifting Program	All	Safe Lifting Program training will cover topics such as understanding hazard identification, risks associated with manual lifting, safe lifting techniques, proper use of lifting equipment, ergonomic adjustments to minimize strain, and emergency protocols. All employees will be trained on the Project's Safe Lifting Program during onboarding.
Safe Driving Program	All	Safe Driving Program training will cover topics such as hazard identification while driving, defensive driving techniques and situational awareness, handling adverse conditions wile driving, and emergency procedures. All employees will be trained on the Project's Safe Driving Program during onboarding.
Hazardous Substance Program (Hazard Communication)	All	Hazardous Substance Program (Hazard Communication) training will cover topics such as hazard identification, how to read and interpret Safety Data Sheets (SDS), safe handling and storage practices, PPE required for certain hazardous substances, and emergency protocols. All employees will be trained on the Project's Hazardous Substance Program during onboarding.
Respiratory Protection Program	All employees required to wear respiratory protection.	Respiratory Protection Program training will cover topics such as hazard identification (such as airborne hazards), types and proper uses of respirators, and emergency protocols in case of respiratory protection failure or exposure to hazardous substances. Employees required to wear respiratory protection will be trained on the Project's Respiratory Protection Program during onboarding.
HAZWOPER/First Responder	Employees working around waste.	HAZWOPER/First Responder training will cover topics such as hazard identification, fall protection, site safety planning, first aid and emergency protocols, and PPE requirements. Employees who will work around hazardous waste or hazardous materials release cleanup will be trained on the Project's HAZWOPER/First Responder protocols during onboarding.

Cal-OSHA – California Occupational Safety and Health Administration; HAZWOPER – Hazardous Waste Operation Emergency Response

12.6 Data Request DR WS-6

DR WS-6. Please provide a description of the proposed fuel management and handling during both the construction and operations (if applicable), including details on fuel delivery and distribution methods and systems, containment systems, and fire prevention measures to be implemented (e.g., static electricity mitigation, etc.).

Response: As described in the responses to Data Requests DR HAZ-5 and DR HAZ-6 above, the hazardous materials used during construction will include gasoline, diesel, and lubricants. These hazardous materials will be stored in temporary stationary tanks with secondary containment and will be located within the temporary construction laydown area. During construction, equipment refueling may occur daily. Construction workers will use drip trays under the fueling nozzle to prevent spillage during refueling. Equipment will be bonded and grounded to prevent static electricity buildup and discharge. Additionally, the fuel tanks will have secondary containment spill trays within which the fuel tanks will sit. These secondary containment spill trays will be sized to hold the entire amount of the fuel tank should a failure result in release of a full tank. Finally, spill kits will be maintained onsite in the event that a spill occurs outside of the spill trays. The construction contractor will perform training for all construction workers to educate workers on the proper methods for refueling and spill cleanup.

During operation, equipment fueling activity will be limited to major maintenance activities such as battery augmentation/installation. The procedures described above for construction will be implemented for any fueling during O&M activities.

As required by Project Design Measure **PD HAZ-02**, an SPCC Plan will also be developed and implemented prior to receiving hazardous materials (including fuel) onsite in excess of reportable quantities during construction and operation.

12.7 Data Request DR WS-7

DR WS-7. Please clarify the specific batteries proposed for the project and provide the complete UL 9540A testing results and the UL 9540 Certificate of Compliance. Please also include information regarding the electrolyte(s) and associated Safety Data Sheets (SDS) for these materials.

Response: The proposed CATL battery cell, module, and unit model numbers are provided in Table 12-2 to clarify the model numbers associated with the proposed CATL EnerC+ BESS. UL 9540A test reports for the cell, module, and unit levels and the UL 9549 Certificate of Compliance for the Unit Model Number C02306P05L01 that will be used for the Project are provided in Appendix 12-F. The SDS for CATL battery unit Model C02306P05L01 including electrolyte composition is provided in Appendix 12-G.

Table 12-2. Battery Component Model Numbers

Component	Model Number
Cell	CBDD0
Module	M02306P05L01
Unit	C02306P05L01

Section 6.0 of the HMA provided in Appendix 11-A includes a detailed analysis of the cell, module, and unit-level UL 9540A test reports. In summary, the module and unit-level testing demonstrated that thermal runaway within a cell could propagate into adjacent cells within a module, but did not spread between modules or units. No evidence of flaming, flying debris, or deflagrations were observed during the testing.

12.8 Data Request DR WS-8

DR WS-8. Please provide a comprehensive description of the BMS, including how it manages adverse conditions such as those described in application Section 2.3.6. Additionally, please provide the UL 1973 Certificate for the BMS.

Response: Please refer to Sections 2.4.4 and 7.1 of the HMA provided in Appendix 11-A for additional information regarding the battery management system (BMS) safety functions.

The UL 1973 Certificate for the BMS is provided in Appendix 12-H.

12.9 Data Request DR WS-9

DR WS-9. Please expand the narrative of how each of the hazards listed in Table 4.9-4 is addressed by the protective measures.

Response: A discussion of how each of the hazards listed in Table 4.9-4 of the Application is addressed by the protective measures is provided in Table 12-3.

Table 12-3. Battery Energy Storage System Hazards Addressed by Protection Measures

Protection Measure/ Hazards	Protective Measures
Thermal Runaway	As detailed in Appendix 11-A, *Hazard Mitigation Analysis,* the battery management system (BMS) is a protective feature for thermal runaway. The BMS has layers of protection that work autonomously to identify abnormal cell conditions and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the California Fire Code (CFC) permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973. In addition to the BMS, the EnerC+ is also equipped with a thermal management system (TMS), fire detection and notification system, and explosion control system all pre-assembled within a single container. The TMS compartment houses the liquid cooling (water-glycol mixture) TMS for the battery modules. The TMS maintains the battery modules at an optimum operating temperature, and consists of a compressor, heater, fan, and pump. Refer to Appendix 11-A for additional information, including Section 2.4.5, *Electrical Fault Protection Devices,* Section 2.4.6, *Fire and Gas Detection,* and Section 2.4.8, *Explosion Control.*
Stranded Energy	Stranded energy hazards (energy remaining in a damaged cell after efforts to safely discharge the stored energy) will be mitigated through warning signage, emergency response procedures, and liming access to battery energy storage system (BESS) enclosures to authorized, trained personnel.
Toxic and Flammable Gases	As detailed in Appendix 12-D, *Plume Analysis,* the analysis of results for all pre-combustion battery vent gas release scenarios show that there are no significant hazards that extend beyond the nearest property boundary for both the flammable and toxic portions of the dispersed cloud. Additionally, as discussed in Appendix 11-A, *Hazard Mitigation Analysis,* FRA also recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed EnerC+ to ensure they are not momentarily exposed to dangerous conditions during a thermal event. The Plume Analysis provides recommended minimum approach distances for toxic and flammable gas releases. Overall, there would be no significant risk to persons or property beyond the Project site boundary.
Mechanical Abuse	Batteries will be delivered to the Project site in California Department of Transportation (DOT)-certified vehicles and in compliance with all applicable requirements of the DOT, California Highway Patrol, and California Department of Motor Vehicles. Lithium-ion batteries are classified as a Class 9 hazardous material, and therefore must meet DOT Hazardous Material Regulations (49 Code of Federal Regulations [CFR] 171-180). In addition, under UN3536, "Lithium batteries installed in cargo transport units" (United Nations 2019), the batteries must be securely attached to the interior structure of the cargo unit (e.g., Conex-type shipping container), the batteries must pass UN38.3 tests that prevent overcharge and over discharge between batteries, and no additional hazardous cargo is allowed that is not directly related to the transport of the batteries. Compliance with existing regulations for the transportation of hazardous materials will prevent mechanical abuse from occurring while Project components are brought to the site. Once batteries and other Project components arrive onsite, they will be handled in accordance with the manufacturer's specifications for installation requirements to prevent mechanical abuse during construction. During operation, the BESS array and substation will be fenced off to prevent mechanical abuse from vandalism.
Thermal Abuse	Thermal abuse can occur due to overheated batteries and can lead to thermal runaway. As previously discussed, the BMS is a protective feature for thermal runaway. The BMS has layers of protection that work autonomously to identify abnormal cell conditions and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the

Protection Measure/ Hazards	Protective Measures
	CFC permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973. Refer to Appendix 11-A for additional information.
Electrical Abuse	Electrical abuse can occur when batteries are over-charged or over-discharged. The BMS monitors, tracks, and manages conditions which may lead to electrical abuse. The BMS can identify possible risks to the battery system by monitoring battery cell temperature, voltage, current, and dry contact switching value in real-time. The BMS function is intended to prevent the risk of thermal runaway by preventing the risks of overcharge, over-discharge, over-temperature, and overcurrent. It provides thermal runaway risk protection by safely disconnecting the batteries in case of fault conditions. In the occurrence of an abnormal event, the BMS prevents the affected module from charging or discharging.
Environmental Hazards	Environmental hazards include external conditions that may affect the Project and Project site, such as seismic hazards, rodent damage to wiring, extreme heat or cold, flooding, and wildfire. Risks associated with seismic hazards, flooding, and wildfire were addressed in the Application. For example, BESS enclosures will be seismically anchored, and the Project site is not located in either a 100-year floodplain or very high fire hazard severity zone. Refer to Sections 4.7, Geology and Soils, 4.10, Hydrology and Water Quality, and 4.20, Wildfire, of the Application. Risks associated with extreme heat or cold were addressed in the engineering of the Project components. For example, the TMS maintains the battery modules at an optimum operating temperature and is part of the pre-assembled container. Risks associated with pests are managed through ongoing O&M activities including regular site inspections.

12.10 Data Request DR WS-10

DR WS-10. Please describe the specific emergency response and fire protection measures available to emergency responders at the project site. Additionally, describe a fire water loop, hydrant locations, source of water, flow of at least 2500 gpm, the duration of the flow, and if an on-site water tank would be needed and provide a scaled drawing with these fire protection components. Also describe the location of the second access gate through the BESS fence line and please describe how emergency responders would access this emergency entrance.

Response: The Applicant has proposed specific emergency response and fire protection measures in the form of proposed Conditions of Certification, which have been filed separately.[35]

A fire water loop and hydrants are not proposed because the battery system is designed and tested to ensure propagation will not occur and the use of pressurized water within the BESS array increases the risk of electrical shorts and thermal runaway. <u>Additionally, there is no public water system to support the installation of a fire water loop or hydrants</u>. The Applicant has proposed a 24,000-gallon onsite water tank to be used as a backup water supply resource for the DFPD for local fire suppression needs. While fire suppression is not recommended for direct use on the BESS equipment, the water source could be used by first responders to fight wildfires or to maintain a defensible space around the perimeter of the facility to prevent spread of fire outside of the facility in the unlikely event of propagation outside of a BESS container. Additional information and drawings of the tank were provided in the Project Description Update filed on April 2, 2025.

A second access road and gate into the BESS yard have been proposed, as described in the Project Description Update and depicted in Appendix 12-E. Knox Box access has not been proposed because active firefighting within the BESS array is not recommended. The Applicant’s emergency response

[35] North Bay Interconnect, LLC and Corby Energy Storage, LLC Proposed Revisions to Conditions of Certification WORKER SAFETY- 7, 8 and 9 Proposed by CEC Staff in the Darden Clean Energy Project Staff Assessment.

plans for BESS facilities advise allowing the BESS to burn and consume itself in the case of an unanticipated thermal runaway event, while being monitored from a safe distance by first responders. This approach is recommended to ensure the safety of emergency personnel and is supported by established safety protocols.

12.11 Data Request DR WS-11

DR WS-11. Please provide separate IIPP and PPE Program details for both the construction and operation phases of the project, including phase-specific topics.

Response: The construction phase Injury and Illness Prevention Plan (IIPP) will be prepared by the construction contractor prior to construction and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure HAZ-04. While contractor IIPP organization may vary, the construction IIPP and associated plans will include the following elements at a minimum, specific to the construction-phase workplace hazards:

- Project Safety Organization and Expectations
- Responsibilities and Lines of Authority
- Subcontractor and Supplier Safety
- Identifying and Evaluating Workplace Hazards
- Worker Training
- Communications
- Safety and Health Inspections
- Record Keeping
- Incident Reporting
- Correcting Unsafe Conditions
- Accident Investigation
- Medical Support
- Personal Protective Equipment
- Safety Plans, Programs, and Procedures, including the following construction-specific items:
    - Traffic Control Plan
    - Slips, Trips, and Fall Hazards
    - Fall Protection
    - Heat Stress
    - Hazard Communication Program
    - Flammable and Combustible Liquids

    - Emergency Response Plans
    - Spill Plan
    - Noise Control Program
    - Hand Tool and Power Tool Procedures
    - Stairway and Ladder Procedures
    - Trenching and Excavation Plan
    - Motor Vehicles and Mechanical Equipment Plan
    - Mobile Crane Lifting Operations
    - Electrical Equipment
    - Electrical Transmission Line Work
    - Confined Space Plan
    - Lock Out/Tag Out Plan
    - Adverse Weather
    - Job Hazard Analysis

The operations phase IIPP will be prepared by the Applicant prior to operations and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-05**. The operations IIPP and associated plans will include the following elements at a minimum, specific to the operations phase workplace hazards:

- Program Implementation and Responsibilities
- Employee Participation and Communication
- Health and Safety Committee
- Employee Training
- Reporting and Recordkeeping
- Accident Investigation
- Hazard Identification and Correction
- Hazard Control Procedures, including the following:
    - Confined Space Program
    - Contractor Safety
    - Electrical Safety
    - Bloodborne Pathogens
    - Hazard Communication Program

    - Hearing Conservation Program
    - Fall Protection
    - Hazardous Energy Control
    - Hazardous Materials Spill Response
    - Heat Stress
    - Respiratory Protection
- Personal Protective Equipment
- First Aid and Emergency Procedures
- Program Evaluation

The construction phase PPE Program will be prepared by the construction contractor prior to construction and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-04**. The construction PPE Program will include the following elements at a minimum, specific to the construction phase workplace hazards:

- General Requirements
- Hazard Assessment
    - Site Entry
    - Working with Hazardous Materials
    - Working Around Heavy Equipment
    - Falling Objects
    - Work Near Vehicle Traffic
    - Electrical Hazards
    - Working at Heights
    - Welding
- PPE Specifications
    - Protective Footwear
    - Head Protection
    - Eye Protection
    - Hearing Protection
    - Hand Protection
    - Clothing Requirements
    - Chemical Resistant Gloves

    - Fall Protection Equipment

The operations-phase PPE Program will be prepared by the Applicant prior to operations and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-05**. The operations PPE Program will include the following elements at a minimum, specific to the operations phase workplace hazards:

- General Requirements
- Specific PPE Requirements
    - Protective Footwear
    - Head Protection
    - Hand Protection
    - Eye and Face Protection
    - Hearing Protection
    - Fall Prevention & Protection
    - Body Protection
    - Respiratory Protection
- Training Requirements

12.12 Data Request DR WS-12

DR WS-12. Please provide separate Fire Protection and Prevention Plan details for the construction and operation phases, including phase-specific topics.

Response:

The construction-phase Fire Protection and Prevention Plan (FPP) will be prepared by the construction contractor prior to construction and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-04**. The construction FPP will include the following elements at a minimum, specific to the construction-phase potential fire hazards:

- Purpose
- Responsibilities
- General Requirements
- Fire Protection
    - Portable Fire Extinguishers
    - Fire Watch and Fire Extinguisher Training
    - Fire Extinguisher Inspections
- Flammable and Combustible Liquids

  - Indoor Storage
  - Outdoor Storage
  - Fire Control
  - Flammable Liquid Use Areas
- Power-Operated Equipment and Welding Operations
  - Power-Operated Tools and Equipment
  - Welding and Cutting Operations
  - Hot Work Permits
- Fire Prevention
  - Housekeeping
  - Smoking
  - Service and Refueling Areas

The operations-phase FPP will be prepared by the Applicant prior to operations and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-05**. The operations FPP will include the following elements at a minimum, specific to the operations phase potential fire hazards:

- General Requirements
- Life Safety
- Housekeeping
- Smoking
- Flammable Liquids
- Hot Work and Compressed Cylinders/Gas
- Portable Fire Extinguishers
- Detection Systems
- Employee Alarm System
- Annual Emergency Fire Drill
- Training

12.13 Data Request DR WS-13

DR WS-13. Please provide separate EAP and ERP details for the construction and operation phases, including phase specific topics.

Response: Details pertaining to the construction and operations EAP requirements and contents are provided below. The construction and operations EAPs will each include emergency response procedures, addressing Emergency Response Plan (ERP) requirements of California Health and Safety Code Section 25505 and Senate Bill 38.

The construction phase EAP will be prepared by the construction contractor prior to construction and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-04**. The EAP may be a standalone document or a component of a comprehensive site-specific safety plan, depending on the construction contractor's health and safety documentation format. The construction EAP will include the following elements at a minimum, specific to the construction phase potential emergencies:

- Pre-Emergency Planning
- Emergency Equipment and Supplies
- Evacuation Procedures
- Emergency Medical Treatment
- Inclement Weather
- Emergency Notifications
- Emergency Preparedness Training

The operations-phase EAP will be prepared by the Applicant prior to operations and will be submitted to CEC for review and approval, in accordance with proposed Project Design Measure **PD HAZ-05**. The operations EAP will include the following elements at a minimum, specific to the operations-phase potential emergencies:

- Purpose and Scope
- References and Commitments
    - Regulatory References
    - Severe Weather Guidelines
    - Fire Protection Plan Procedure
    - Safety Signs, Barriers, and Equipment Tags
    - Health and Safety Inspections
    - Personal Protective Equipment
    - Electric Shock
    - Corporate Security
    - BESS First Responder Orientation
    - BESS Fire Off Normal Response
    - Wildfire Mitigation Plan
- Records

- Procedure
  - Statement of Compliance
  - Designation of Facility Emergency Coordinators
  - Training
  - Facility Location Information for Outside Emergency Responders
  - Fire Responder Information
  - General Emergency Procedure
  - Emergency Action Plan Annual Drills
- Specific Event Procedures
  - Natural Disaster /Severe Weather Event
  - Fire Response Event
  - Physical Security Event
  - Cyber Security Event
  - Capacity/Transmission Event
  - Environmental Event
  - Pandemic Event
  - Site Evacuation Procedure
  - Designated Egress Routes & Muster Areas for Evacuations
  - Personnel Injuries and Serious Health Conditions

12.14 Data Request DR WS-14

DR WS-14. Please provide the language for Project Design Measures PD **HYD-04** and PD **HYD-05** (or where they can be found in the documents submitted) or clarify if these are met to be PD **HAZ-04** and PD **HAZ-05**.

Response: As previously communicated to CEC Staff informally; there are no Project Design Measures **PD HYD-04** and **PD HYD-05**. This was an error in the Application and this reference was intended to be for Project Design Measures **PD HAZ-04** and **PD HAZ-05**.

12.15 Data Request DR WS-15

DR WS-15. Please provide a more comprehensive list of LORS, including a discussion of their applicability and conformance. Include specific section references where compliance with each law or standard is addressed during both the construction and operation phases of the facility and in particular provide the details enumerated in CFC section 1207 and NFPA 855.

Response: Tables 12-4 and 12-5 provide additional detail regarding Hazardous Materials and Worker Health and Safety laws, ordinances, regulations, and standards applicability and conformance during both construction and operations.

Table 12-4. Laws, Ordinances, Regulations, and Standards for Hazards and Hazardous Materials (Replaces Table 4.9-7 in Application)

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
Federal			
Section 302, Emergency Planning and Community Right-to-Know Act (EPCRA) (Pub. L. 99–499, 42 United States Code [U.S.C.] 11022) Hazardous Chemical Reporting: Community Right-To-Know (40 Code of Federal Regulations [CFR] 370)	Requires one-time notification if extremely hazardous substances are stored in excess of threshold planning quantities (TPQs).	Solano County Department of Resource Management, Environmental Health Services Division (DRM EHS)	**As discussed in Section 4.9.3.1 Hazard Analysis page 4.9-14 of the Application, extremely hazardous substances will not be used or stored onsite.** A Hazardous Materials Business Plan (HMBP) will be prepared for submittal to Solano County DRM EHS **to assure that all hazardous materials will be handled and stored properly for Construction and Operations.**
Section 304, EPCRA (Pub. L. 99–499, 42 U.S.C. 11002) Emergency Planning and Notification (40 CFR 355)	Requires notification when there is a release of hazardous material in excess of its reportable quantity (RQ).	Solano County DRM EHS	**As discussed in CEQA Impact 4.9-2 page 4.9-21 of the Application**, an HMBP will be prepared to describe notification and reporting procedures **as part of the hazardous materials release response plan. The HMBP will be applied for both construction and operations.**
Section 311, EPCRA (Pub. L. 99–499, 42 U.S.C. 11021) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires that material safety data sheets (MSDS) for all hazardous materials or a list of all hazardous materials be submitted to the State or Tribal Emergency Response Commission (SERC), Local or Tribal Emergency Planning Commission (LEPC), and Solano County DRM.	Solano County DRM EHS	The **construction and operations** HMBPs will include a list of hazardous materials for submission to agencies.
Section 313, EPCRA (Pub. L. 99–499, 42 U.S.C. 11023) Toxic Chemical Release Reporting: Community Right-To-Know (40 CFR 372)	Requires annual reporting of releases of hazardous materials.	Solano County DRM EHS	The **construction and operations** HMBPs will describe reporting procedures.
Section 112, Clean Air Act (CAA) Amendments (Pub. L. 101–549, 42 U.S.C. 7412) Chemical Accident Prevention Provisions (40 CFR 68)	Requires facilities that store a listed hazardous material at a quantity greater than the threshold quantity (TQ) to develop a Risk Management Plan (RMP).	Solano County DRM EHS	**As discussed in Section 4.9.2.1 Risk Management Plan page 4.9-8 of the Application**, the Project will not store listed hazardous materials during **construction or operations**; therefore, an RMP will not be required.
Section 311, CWA (Pub. L. 92–500, 33 USC 1251 et seq.) Oil Pollution Prevention (40 CFR 112)	Requires preparation of an SPCC Plan if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will store petroleum products in excess of 1,320 gallons.	SWRCB	**As discussed in CEQA Impact 4.9-1 pages 4.9-18 and 4.9-20 of the Application,** an SPCC Plan will be prepared **and implemented prior to storing petroleum products onsite in excess of 1,320 gallons during construction and operations.**

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
29 U.S.C. § 651, 29 CFR § 1910 et seq. and § 1926 et seq.	Contains requirements for equipment used to store and handle hazardous materials and addresses requirements for equipment necessary to protect workers in emergencies.	U.S. Environmental Protection Agency (Region IX) and Federal Occupational Safety and Health Administration (OSHA)	**As discussed in CEQA Impact 4.9-1 pages 4.9-18 and 4.9-19,** the Project will meet requirements for equipment used to store and handle hazardous materials necessary to protect workers for construction and operations.
49 CFR Parts 172, 173, and 179	Provides standards for labels, placards, and markings on hazardous waste shipments by truck (Part 172) and standards for packaging hazardous wastes (Part 173 and 179)	California Highway Patrol, California Department of Motor Vehicles, and U.S. Department of Transportation	Standards for labels, placards, and markings on hazardous waste shipments are the responsibility of the transporters.
State			
Health and Safety Code, Section 25500 et seq. (HMBP)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities.	California Occupational Safety and Health Administration (Cal-OSHA)	**As stated in CEQA Impact 4.9-1 page 4.9-19 and CEQA Impact 4.9-2 page 4.9-21 of the Application,** an HMBP will be prepared for submittal to the Solano County DRM EHS**. The construction and operations HMBPs will ensure that all handling, storage, and disposal of hazardous materials will be conducted in accordance with proven practices to minimize exposure to workers or the public.**
8 California Code of Regulations (CCR) § 339, § 3200 et seq., 5139 et seq., and 5160 et seq.	Address the control of hazardous substances.	Solano County DRM EHS	**As stated in CEQA Impact 4.9-1 page 4.9-18 of the Application,** the HMBP **as well as the SPCC Plan will describe the proper handling, storage, transport, and disposal techniques and methods for controlling hazardous materials and prevent spills for both construction and operation**
Health and Safety Code, Section 25531 through 25543.4 (CalARP)	Requires registration with local Certified Unified Program Agency (CUPA) or lead agency and preparation of an RMP if regulated substances are handled or stored in excess of TPQs.	Solano County DRM EHS	**Not Applicable. The Project will not handle, treat, store, or dispose of more than the threshold quantity of any of the listed regulated materials.**
California Fire Code, Article 89, and others	Includes provisions for storage and handling of hazardous materials, and requirements for combustible and flammable liquids.	Dixon Fire Protection District (DFPD)	**As stated in section 4.9.3.2 Health and Safety Program page 4.9-15 of the Application,** the Project will meet requirements for the storage and handling of hazardous materials (Article 80), flammable and combustible liquids (Article 79), and for obtaining permits (Article 4) **through implementing the Fire Protection and Prevention Plan**.
California Fire Code, Chapter 12	Includes requirements for vehicle impact protection, location, spacing between batteries, egress, security, seismic and structural design, and fire suppression systems. Chapter 12 also sets maximum allowable battery	DFPD	**As stated in section 4.9.3.1 Hazard Design Protection Measures page 4.9-11 of the Application,** the Project will meet design and fire suppression requirements for electrical energy storage systems as set forth in Chapter 12 of the California Fire Code.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
	quantities and specific battery type requirements for various battery technologies.		
Senate Bill 38	Adds safety requirements for battery energy storage projects to the California Public Utilities Code. Requires BESS facilities to have an emergency response and emergency action plan, which includes established response procedures for equipment malfunction or failure, procedures that provide for the safety of surrounding residents, neighboring properties, and first responders, and established notification and communication procedures between the BESS facility and local emergency management agencies.	Solano County DRM EHS and DFPD	**As stated in section 4.9.3.1 Safety Standard Compliance page 4.9-11 of the Application,** the Project will develop an emergency response and emergency action plan in accordance with SB 38 requirements.
Local			
Solano County General Plan	Provides guidance for siting and management of facilities that store, collect, treat, dispose, or transfer hazardous waste and hazardous materials.	Solano County DRM and DFPD	The Project will comply with the applicable goals, policies, and implementation measures of the Public Health and Safety Element of the County General Plan, including Policies **HS.P-31 and HS.P-39** and Implementation Measures **HS.I-17** and **HS.I-19** as related to fire safety, and Policies **HS.P-49** through **HS.P-54** as related to hazardous waste and materials. **As stated in CEQA Impact 4.9-7 page 4.9-24 of the Application, fire safety systems will be consistent with California Fire Code requirements and manufacturer's specifications. Refer also to Section 4.20, *Wildfire*, of the Application.** **Additionally, as stated in CEQA Impacts 4.9-1 and 4.9-2 of the Application, the Project will minimize risks associated with transporting, storing, and using hazardous materials, and disposing of hazardous waste through preparation and implementation of a SWPPP, HMBP, and SPCC.** Refer also to Section 4.11, *Land Use and Planning*, of this application for a consistency analysis with applicable County General Plan goals, policies, and implementation measures as related to hazards and hazardous materials.
Solano County Multi-Jurisdictional Hazard Mitigation Plan	Provides guidance for natural and human-caused hazard planning and mitigation.	Solano County DRM	**As stated in CEQA Impact 4.9-6 page 4.9-23**, an HMBP will be prepared for submittal to the Solano County DRM EHS, and the Project's **construction or operation** would not impair the County's ability to implement the MJHMP.
City of Vacaville General Plan	Provides guidance for siting and management of facilities that store, collect, treat, dispose, or transfer hazardous waste and hazardous materials.	City of Vacaville Utilities Administration Department	The Project will comply with the goals, policies, and actions of the Safety Element of the City General Plan, including Policies SAF-P5.2, SAF-P5.4, SAF-P5.7, and Action SAF-5.2 as related to fire safety, and Policy SAF-P6.6 as related to hazardous materials. **As stated in CEQA Impact 4.9-7 of the Application, all fire safety**

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
			systems will be consistent with local zoning and fire department requirements, as well as comply with federal, state and local worker safety and fire protection codes and regulations. As stated in CEQA Impact 4.9-1, the Project will properly transport all hazardous materials, such as transporting the lithium-ion batteries via DOT-certified vehicles.
Travis Air Force Base Land Use Compatibility Plan (AFB LUCP)	Regulates land use and safety hazards within the Travis AFB Airport Influence Area	Solano County Airport Land Use Commission	**As described in CEQA Impact 4.9-5 page 4.9-23 of the Application,** the Project site is located within Zone D of the Travis AFB LUCP and would comply with compatibility factors and development conditions of this zone, including limiting the development of structures to below 200 feet.

1/ LORS – laws, ordinances, regulations, and standard
2/ Added detail is provided in **bold text**.

Table 12-5. Laws, Ordinances, Regulations, and Standards for Worker Health and Safety (Replaces Table 4.9-8 in Application)

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
Federal			
Title 29 Code of Federal Regulations (CFR) Part 1910	Contains the minimum occupational safety and health standards for general industry in the United States	Occupational Health and Safety Administration (OSHA)	**As described in Health and Safety Programs 4.9.3.2, pages 4.9-14 through 4.9-16 of the Application, health and safety programs will be designed and implemented to adhere to all applicable regulations.** The Project will meet federal employee health and safety standards for general industry.
Title 29 CFR Part 1926	Contains the minimum occupational safety and health standards for the construction industry in the United States	OSHA	**As described in Health and Safety Programs 4.9.3.2, pages 4.9-14 through 4.9-16 of the Application, health and safety programs will be designed and implemented to adhere to all applicable regulations.** The Project will meet federal employee health and safety standards for the construction industry.
42 United States Code (U.S.C.) § 9601 et seq.; 40 CFR Part 302	Prescribes notification requirements for any release of a reportable quantity of hazardous substance, and notification of potential injured parties in connection with any release	National Response Center and U.S. Environmental Protection Agency, Region IX	**As described in Mitigation Measures 4.9.5 page 4.9-27 of the Application, project design features will be implemented prior to any reportable quantities of hazardous substances.** Prescribes requirements for notification of any specific release of hazardous substance, notification of potential injured parties, and demonstration of financial responsibility. In the event of a specified release, the Project will follow all specified requirements.
49 CFR Parts 172, 173, and 179	Provides standards for labels, placards, and markings on hazardous waste shipments by truck (Part 172) and standards for packaging hazardous materials (Part 173) and tank cars (Part 179)	California Highway Patrol	The Project will meet standards for labels, placards, and markings on hazardous waste shipments and standards for packaging hazardous materials **by using qualified vendors and transporters who will be responsible for complying with applicable transportation regulations**.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
State			
California Occupational Safety and Health Act, 1970	Establishes minimum safety and health standards for construction and general industry operations in California	California Occupational Health and Safety Administration (Cal-OSHA)	**As described in Health and Safety Programs 4.9.3.2, pages 4.9-14 through 4.9-16 of the Application, health and safety programs will be designed and implemented to adhere to all applicable regulations.** The Project will meet safety and health standards for construction and general industry operations.
8 California Code of Regulations (CCR) 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act	Cal-OSHA	**As discussed in CEQA Impact Analysis 4.9.3.4 page 4.9-17 of the Application, the project will not involve the routine transport or disposal of hazardous materials.** The Project will meet requirements for hazardous chemicals.
8 CCR 1509	Addresses requirements for construction, accident, and prevention plans	Cal-OSHA	**As discussed in Mitigation Measures 4.9-5, page 4.9-28 of the Application, the Applicant will prepare and submit a Project Construction Health and Safety Program as well as a Construction Site Security Plan containing requirements for construction, accident, and prevention plans.** The Project will meet requirements for construction, accident, and prevention plans.
8 CCR 1509, et seq., and 1684, et seq.	Addresses construction hazards, including head, hand, and foot injuries, and noise and electrical shock	Cal-OSHA	**As described in Health and Safety Programs in Section 4.9.3.2, page 4.9-14 and 4.9-15 of the Application, an Injury and Illness Prevention Plan and a Personal Protective Equipment Program will be implemented to address construction hazards.** Project will meet standards for construction hazards.
8 CCR 1528, et seq., and 3380, et seq.	Requirements for personal protective equipment (PPE)	Cal-OSHA	**As described in Health and Safety Programs in Section 4.9.3.2, page 4.9-15 of the Application, a Personal Protective Equipment Program will be implemented that addresses PPE requirements.** The Project will meet requirements for PPE.
8 CCR 1597, et seq., and 1590, et seq.	Requirements addressing the hazards associated with traffic accidents and earth moving	Cal-OSHA	**As described in Safety Training Programs in Section 4.9.3.3, pages 4.9-16 through 4.9-17 of the Application, safety training associated with earth moving vehicles and traffic accidents will be required.** The Project will meet requirements for hazards associated with traffic accidents and earth moving.
8 CCR 1604, et seq.	Requirements for construction hoist equipment	Cal-OSHA	**As described in Safety Training Programs in Section 4.9.3.3, page 4.9-16 of the Application, a Hoisting and Rigging Safety Program will be implemented to for construction hoist equipment safety.** The Project will meet requirements for construction hoist equipment.
8 CCR 1620, et seq., and 1723, et seq.	Addresses miscellaneous hazards	Cal-OSHA	**As described in Hazardous Materials Use and Disposal in Section 4.9.2.1, page 4.9-5 of the Application, miscellaneous hazards will be stored offsite or stored onsite at in accordance with the manufacturers' specifications.** The Project will meet standards for miscellaneous hazards.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
8 CCR 1709, et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations	Cal-OSHA	**As described in Hazard Design Protection Measures in Section 4.9.3.1, page 4.9-13 of the Application, Project components will be constructed of steel reinforcing.** The Project will meet requirements for steel reinforcing, concrete pouring, and structural steel erection operations.
8 CCR 1920, et seq.	Requirements for fire protection systems	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Fire Protection and Prevention Plan will be implemented to protect from fire hazards.** The Project will meet requirements for fire protection systems.
8 CCR 2300, et seq., and 2320, et seq.	Requirements for addressing low-voltage electrical hazards	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, an electrical safety training course will be required for all employees that work on electrical systems and equipment**. The Project will meet requirements for low-voltage electrical hazards.
8 CCR 2395, et seq.	Addresses electrical installation requirements	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, an electrical safety training course will be required for all employees that work on electrical systems and equipment.** The Project will meet requirements for electrical installation.
8 CCR 2700, et seq.	Addresses high-voltage electrical hazards	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, an electrical safety training course will be required for all employees that work on electrical systems and equipment**. The Project will meet requirements for high-voltage electrical hazards.
8 CCR 3200, et seq., and 5139, et seq.	Requirements for control of hazardous substances	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, a Hazardous Substance Training Program will be required for all employees.** The Project will meet requirements for hazardous substances.
8 CCR 3203, et seq.	Requirements for operational accident prevention programs	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, pages 4.9-14 through 4.9-16 of the Application, the construction safety and health program will transition into an operations-oriented program.**
8 CCR 3270, et seq., and 3209, et seq.	Requirements for evacuation plans and procedures	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-16 of the Application**, the Project will incorporate evacuation plans as part of the Emergency Action Plan and will meet requirements for evacuation plans and procedures.
8 CCR 3301, et seq.	Requirements for addressing miscellaneous hazards, including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle-loading dock operations	Cal-OSHA	**As described in Section 4.9.2.1, Hazardous Materials Use and Disposal, page 4.9-5 of the Application, miscellaneous hazardous materials will be stored offsite or stored onsite at in accordance with the manufacturers' specifications.** The Project will meet requirements for miscellaneous hazards.
8 CCR 3360, et seq.	Addresses requirements for sanitary conditions	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, an Injury and Illness Prevention Plan (IIPP) and**

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
			PPE Program will be implemented that addresses requirements for sanitary conditions.
8 CCR 3395, et seq., and 3396, et seq.	**Requirements for addressing heat illness in both indoor and outdoor workplaces.**	**Cal-OSHA**	**Project will meet requirements for hazards associated with heat illness by implementing construction and operations IIPPs.**
8 CCR 3511, et seq., and 3555, et seq.	Requirements for addressing hazards associated with stationary engines; compressors; and portable, pneumatic, and electrically powered tools	Cal-OSHA	**As discussed in Section 4.9.3.3, Safety Training Programs, pages 4.9-16 through 4.9-17 of the Application, trainings in portable/tool safety and stationary engine safety will be required.** The Project will meet requirements for hazards associated with stationary engines; compressors; and portable, pneumatic, and electrically powered tools.
8 CCR 3649, et seq., and 3700, et seq.	Requirements for addressing hazards associated with field vehicles	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, a Safe Driving Program is required for all employees.** The Project will meet requirements for hazards associated with field vehicles.
8 CCR 3940, et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, Hot Work Permits will be required for employees performing activities** associated with power transmission, compressed air, and gas equipment.
8 CCR 5109, et seq.	Requirements for addressing construction accident and prevention programs	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-14 of the Application, implementation of an IIPP will address construction accident and prevention.** The Project will meet requirements for construction accident and prevention programs.
8 CCR 5110, et seq.	Requirements for the implementation of an ergonomics program	Cal-OSHA	The Project will meet requirements for ergonomics programs **through implementation of the construction and operations IIPP**.
8 CCR 5139, et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding, and spray-coating	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, Hot Work Permits will be required for employees performing cutting/welding.** Project will meet requirements for welding, sandblasting, grinding, and spray-coating.
8 CCR 5141, et seq.	**Requirements for addressing Valley Fever and harmful respiratory exposure.**	**Cal-OSHA**	**Project will meet requirements for preventing respiratory illness such as Valley Fever by implementing construction and operations health and safety programs, respiratory protection programs, and fugitive dust control best management practices.**
8 CCR 5141.1, et seq.	**Requirements for addressing injury or illness due to wildfire smoke exposure**	**Cal-OSHA**	**Project will meet requirements for protection from wildfire smoke by implementing construction and operations health and safety programs and respiratory protection programs.**
8 CCR 5150, et seq.	Requirements for confined space entry	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, permits for confined space entry are required for relevant employees**. The Project will meet requirements for confined space entry.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
8 CCR 5155, et seq.	Requirements for use of respirators and for controlling employee exposure to airborne contaminants	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, the Respiratory Protection Program will be implemented for all employees.** The Project will meet requirements for use of respirators and exposure to airborne contaminants.
8 CCR 5160, et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, Hot Work Permits will be required for employees performing hot work.** The Project will meet requirements for hot, flammable, poisonous, corrosive, and irritant substances.
8 CCR 5184, et seq.	Requirements for storage battery systems	Cal-OSHA	**As described in Section 4.9.3.1, Hazard Analysis, page 4.9-11 of the Application, requirements for storage battery systems are detailed.** The Project will meet requirements for storage battery systems.
8 CCR 5185, et seq.	Requirements for changing and charging storage batteries	Cal-OSHA	**As described in Section 4.9.3.1, Hazard Analysis, page 4.9-13 of the Application, requirements for changing and charging storage batteries are discussed.** Project will meet requirements for changing and charging storage batteries.
8 CCR 5192, et seq.	Requirements for conducting emergency response operations	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-16 of the Application, an Emergency Action Plan will be implemented for conducting emergency response operations.** The Project will meet requirements for conducting emergency response operations.
8 CCR 5193, et seq.	Requirements for controlling employee exposure to bloodborne pathogens associated with exposure to raw sewage water and body fluids associated with First Aid/CPR duties	Cal-OSHA	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Personal Protective Equipment Program will be implemented to address bloodborne pathogens, and exposure to raw sewage and fluids associated with First Aid/CPR duties.** The Project will meet requirements for controlling employee exposure to bloodborne pathogens associated with exposure to raw sewage water and body fluids associated with First Aid/CPR duties.
8 CCR 5194, et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, the Respiratory Protection Program will be implemented for all employees**. The Project will meet requirements for exposure to dusts, fumes, mists, vapors, and gases.
8 CCR 5405, et seq.; 5426, et seq.; 5465, et seq.; 5500, et seq.; 5521, et seq.; 5545, et seq.; 5554, et seq.; 5565, et seq.; 5583, et seq.; and 5606, et seq.	Requirements for flammable liquids, gases, and vapors	Cal-OSHA	**As described in Section 4.9.3.3, Safety Training Programs, page 4.9-17 of the Application, a Flammable and Combustible Liquid Storage and Handling training will be required for employees responsible for handling combustible liquids or gases**. The Project will meet requirements for flammable liquids, gases, and vapors.
8 CCR 6150, et seq.; 6151, et seq.; 6165, et seq.; 6170, et seq.; and 6175, et seq.	Fire protection requirements	Cal-OSHA	**As described in Section 4.9.3.1, Hazard Analysis, page 4.9-11 of the Application, the Project will include a fire protection design to prevent against fire hazards**. The Project will meet fire protection requirements.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
Title 24, Part 3, California Electrical Code	The Cal-OSHA electrical safety regulations incorporate the requirements of the Uniform Electrical Code located in Title 24, Part 3	Cal-OSHA	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees**. The Project will meet requirements for electrical safety regulations.
Health and Safety Code Section 25531, et seq.	Requires that every new or modified facility that handles, treats, stores, or disposes of more than the threshold quantity of any of the listed regulated materials prepare and maintain a Risk Management Plan (RMP).	Cal-OSHA	**As described in Section 4.9.2.1, Hazards and Hazardous Materials, page 4.9-8 of the Application, a Risk Management Plan is not required because the identified types and quantities of hazardous materials are not applicable**. The Project will not handle, treat, store, or dispose of more than the threshold quantity of any of the listed regulated materials.
Health and Safety Code Sections 25500 through 25541	Requires the preparation of a Hazardous Material Business Plan (HMBP) that details emergency response plans for a hazardous materials emergency at the facility	Cal-OSHA	**As described in Section 4.9.8.1, Hazards and Hazardous Materials, page 4.9-37 of the Application, an HBMP will be developed.** The Project will prepare an HMBP that details emergency response plans for hazardous materials emergencies.
Local			
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies	Solano County Department of Resource Management, Environmental Health Services Division (DRM EHS)	**As described in CEQA Impact Analysis 4.9.3.4, page 4.9-23 of the Application, the Project will coordinate with the County to ensure temporary road closure will not impair emergency response or evacuation in the area.** The Project will provide response agencies with necessary information to address emergencies.
Emergency Response Plan	Allows response agency to integrate Project emergency response activities into any response actions	Solano County DRM EHS	**As described in CEQA Impact Analysis 4.9.3.4, page 4.9-23 of the Application, the Project will not interfere with any adopted emergency response plan.** The Project will prepare an Emergency Response Plan and provide to response agency.
Business Plan	Provides response agency with overview of Project purpose and operations	Solano County DRM EHS	**As described in Section 4.9.8.1, Hazards and Hazardous Materials, page 4.9-37 of the Application, the** Project will provide response agency with an HMBP containing an overview of the Project.
RMP (Certified Unified Program Agency [CUPA], administered by the County)	Provides response agency with detailed review of risks and hazards located at the Project and mitigation implemented to control risks or hazards	Solano County DRM EHS	**As described in Section 4.9.2.1, Hazards and Hazardous Materials, page 4.9-8 of the Application, the Project will not be required to develop a Risk Management Plan because it will not result in the threshold quantities of any listed regulated materials.** The Project will not handle, treat, store, or dispose of more than the threshold quantity of any of the listed regulated materials.
Industrial Codes and Standards			
National Fire Protection Association (NFPA)	Prescribes minimum requirements necessary to establish a reasonable level of fire safety and property protection from the hazards created by fire and explosion.	Dixon Fire Protection District (DFPD)	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Fire Protection and Prevention Plan will be implemented that covers fire safety and property protection**. The Project will meet minimum requirements necessary to establish a reasonable

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
			level of fire safety and property protection from the hazards created by fire and explosion.
NFPA 1	Fire Prevention Code	DFPD	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Fire Protection and Prevention Plan will be implemented that addresses the NFPA 1 Fire Prevention Code**. The Project will meet Fire Prevention Code requirements.
NFPA 10	Portable Fire Extinguishers	DFPD	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Fire Protection and Prevention Plan will be implemented that addresses the NFPA 10 for portable fire extinguishers.** The Project will maintain fire extinguishers.
NFPA 30	Flammable and Combustible Liquids Code	DFPD	**As described in Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, a Fire Protection and Prevention Plan will be implemented that addresses the NFPA 30 Flammable and Combustible Liquids Code**. The Project will meet applicable code requirements for flammable and combustible liquids onsite during construction.
NFPA 68	Explosion Venting	DFPD	**As described in Section 4.9.2, *Affected Environment,* page 4.9-8 of the Application, fire explosion control will be achieved through the Fire Prevention and Protection Program**. The Project will meet applicable requirements for explosion venting.
NFPA 69	Explosion Preventing	DFPD	**As described in Section 4.9.2, *Affected Environment*, page 4.9-8 of the Application, fire explosion control will be achieved through the Fire Prevention and Protection Program**. The Project will meet applicable requirements for explosion prevention.
NFPA 70	National Electric Code	DFPD	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees**. The Project will meet applicable requirements of the National Electric Code.
NFPA 70B	Electrical Equipment Maintenance	DFPD	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees.** The Project will meet applicable requirements for electrical equipment maintenance.
NFPA 70E	Electrical Safety Requirements for Employee Workplaces	DFPD	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17, and Section 4.9.3.2, Health and Safety Programs, page 4.9-15 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees. The Personal Protective Equipment Program will also address protection from electric shocks**. The Project will meet applicable electrical safety requirements for employee workplaces.

LORS[1/]	Requirements/Applicability	Administering Agency	Project Conformance[2/]
NFPA 72	National Fire Alarm Code	DFPD	**As described in Section 4.9.3, *Environmental Analysis*, page 4.9-12 of the Application, the Project will include fire mitigation measures including fire detection systems and alarms.** The Project will meet applicable requirements of the National Fire Alarm Code.
NFPA 75	Protection of Electronic Computer/Data Processing Equipment	DFPD	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees. This includes training for electrical equipment.** The Project will meet applicable protection requirements for electronic computer/data processing equipment.
NFPA 78	Lighting Protection Systems	DFPD	The Project will meet applicable requirements for lighting protection systems.
NFPA 90A	Installation of Air Conditioning and Ventilating Systems	DFPD	**As described in Section 2.3.6, *Fire Protection*, pages 2-11 through 2-12 of the Application,** the Project will include installation of BESS thermal management systems, gas detection, and ventilation and will meet applicable requirements.
NFPA 496	Purged and Pressurized Enclosures for Electrical Equipment	DFPD	**As described in Section 4.9.2.2, Worker Health and Safety, page 4.9-17 of the Application, electrical safety regulations will be incorporated into the electrical safety training for all relevant employees. This includes training for electrical equipment.** The Project will meet applicable requirements for purged and pressurized enclosures for electrical equipment.
NFPA 497	Flammable and Combustible Liquids Classification	DFPD	**As described in Section 4.9.2, *Affected Environment*, page 4.9-8 of the Application, fire explosion control and classification will be achieved through the Fire Prevention and Protection Program**. The Project will meet applicable requirements for flammable and combustible liquids classification.
NFPA 855	Standard for the Installation of Stationary Energy Storage Systems	DFPD	**As described in Section 4.9.3, *Environmental Analysis*, page 4.9-13 of the Application, the Project will implement system spacing for the installation of Stationary Energy Storage Systems.** Project design incorporates fire protection and safety requirements.

1/ LORS – laws, ordinances, regulations, and standard
2/ Added detail is provided in **bold text**.

12.16 Data Request DR WS-16

DR WS-16. Please include the following standards in the Construction Safety and Health Plan and Operations Safety and Health Plan and add these additional regulations to Table 4.9-8:

- Title 8 Cal Code Regs section 5141 Valley Fever
- Title 8 Cal Code Regs section 3395 and 3396 Heat Illness Prevention

- Title 8 Cal Code Regs section 5144.1 Protection from Wildfire Smoke.

Response: Valley Fever, heat illness prevention, and protection from wildfire smoke and the associated standards have been added to Table 12-5 above and will be addressed in the construction and operations health and safety programs prepared in accordance with proposed Project Design Measures **PD HAZ-04** and **PD HAZ-05**.

12.17 Data Request DR WS-17

DR WS-17. Please provide additional details regarding Applicant's proposed project design mitigation measure HAZ-03, including a Sampling and Analysis Plan (SAP) for the site and the Gen-Tie line route which includes the proposed locations of soil sampling and justification for those locations, sampling depths, analytical methods, and analytes to be assessed during the investigation. Please also provide a discussion of the worker safety and health measures that would be followed at the PG&E Vaca-Dixon Substation.

Response: A SAP is provided in Appendix 12-I. Sample borings are proposed throughout the Project site and gen-tie corridor to collect and analyze surface soil samples for organochlorine pesticides and arsenic based on Department of Toxic Substances Control guidance for sampling agricultural properties.

Based on historical topographic maps provided within the Phase I ESA (Appendix 4.9-A of the Application), the PG&E Vaca-Dixon Substation was constructed prior to 1953 and therefore the portion of the gen-tie corridor north of Interstate 80 has not been in agricultural production for at least 70 years. Therefore, sampling and analysis for residual agricultural chemicals is not warranted or proposed at the gen-tie structure locations on the Vaca-Dixon substation property. PG&E will follow their standard practices for worker health and safety and soil management during construction of the Project elements on the Vaca-Dixon Substation parcel.

APPENDIX 4-A: CULTURAL RESOURCES INVENTORY REPORT (REPLACES APPENDIX 4.5-A IN APPLICATION)

This Appendix is filed under a request for confidential designation

APPENDIX 4-B: HISTORICAL SOCIETY RESPONSES

From:	Vacaville Heritage Council
To:	Severn, Josh
Cc:	Doug Rodgers; Brian Irwin; mgneca@sbcglobal.net; mgneca@gmail.com
Subject:	Re: FW: Re: Corby Battery Energy Storage System Project, Solano County, CA
Date:	Wednesday, March 19, 2025 7:13:46 AM
Attachments:	image001.jpg

Hi Josh,

Thank you for your inquiry. There is a significant historical property in the immediate project area identified as the Kilkenny Ranch Home. It is a Queen Anne home built by master builder George Sharp for Catherine Kilkenny in 1900. The ranch property has been restored and preserved by its current owner. The parcel also hosts the largest private collection of oak trees and is a recognized wildlife habitat. The proposed project area sits on Class A, agricultural soil.

We are in the process of assisting the Kilkenny Ranch Home property owner with documenting the historical status of their home.

We have grave concerns regarding this ill-conceived project. It has every potential for causing Substantial Adverse Change to the historic and environmental integrity of the irreplaceable area. One need only look at the battery facility in Moss Landing to see the very real consequences. This project should not be approved nor allowed.

Respectfully,
Elissa DeCaro
Historian | Treasurer, Vacaville Heritage Council
President, Solano County Historical Society

On Thu, Feb 6, 2025 at 11:56 AM Severn, Josh <Josh.Severn@icf.com> wrote:

> Good afternoon.
>
> I am following up on the outreach email sent 01/24/2025.
>
> Let me know if you have any additional questions or information.
>
> Thank you for your time.
>
> Best,
>
> **JOSHUA SEVERN, Architectural Historian**
>
> **980 9th Street, Suite 1200, Sacramento, CA, 95814, USA**
>
> icf.com | LinkedIn

*** I honor and respect boundaries around personal time, well-being, caretaking, and rest. Prioritize joy, not email, when and where you can. If you receive messages from me during a time that you're engaged in any of the above, please protect your time. Wait to respond until you're next working..***

From: Severn, Josh
Sent: Friday, January 24, 2025 11:07 AM
To: vacavilleheritagecouncil@gmail.com
Subject: Re: Corby Battery Energy Storage System Project, Solano County, CA

Hello.

My name is Joshua Severn, architectural historian with ICF. We are supporting cultural resources technical studies for a proposed battery storage project in Solano County and are conducting outreach to local historical societies and organizations.

Please see the attached outreach letter and map showing the proposed project location.

Thank you for your time.

JOSHUA SEVERN (he/him/his), Architectural Historian

980 9th Street, Suite 1200, Sacramento, CA, 95814, USA

icf.com | LinkedIn

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--

From: The Solano County Historical Society
To: Severn, Josh
Subject: Re: Corby Battery Energy Storage System Project, Solano County, CA
Date: Wednesday, March 19, 2025 8:34:51 AM
Attachments: image001.jpg
image001.jpg
Corby_2025_OutreachMaps.pdf
OuteachLetter_2025_SolanoCoHistSoc.pdf

Hi Josh,

As conveyed in the email from the Vacaville Heritage Council, the proposed project is adjacent to a significant historical property identified as the Kilkenny Ranch Home. The Queen Anne home was built by master builder George Sharpe (note correct spelling) for Catherine Kilkenny in 1900. Catherine owned many more parcels in the area to the substation.

The ranch property has been restored, preserved, and protected by its current owner. The parcel also hosts the largest private collection of oak trees and is a recognized wildlife habitat. The proposed project area is on Class A, agricultural soil and food/income producing orchards.

The Vacaville Heritage Council is in the process of assisting the Kilkenny Ranch Home property owner with documenting the historical status of their home.

We share the grave concerns regarding this dangerous project; and agree it would cause Substantial Adverse Change to the historic and environmental integrity of site. The catastrophic environment impacts caused by the battery facility in Moss Landing support our concern. We adamantly oppose this project.

Respectfully,
Elissa DeCaro
President, Solano County Historical Society

Sent from my iPhone

> On Feb 6, 2025, at 11:55 AM, Severn, Josh <Josh.Severn@icf.com> wrote:
>
> Good afternoon.
>
> I am following up on the outreach email sent 01/24/2025.
>
> Let me know if you have any additional questions or information.
>
> Thank you for your time.
>
> Best,

JOSHUA SEVERN, Architectural Historian

980 9th Street, Suite 1200, Sacramento, CA, 95814, USA

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From: Severn, Josh
Sent: Friday, January 24, 2025 11:00 AM
To: solanohistory@gmail.com
Subject: Re: Corby Battery Energy Storage System Project, Solano County, CA

Hello.

My name is Joshua Severn, architectural historian with ICF. We are supporting cultural resources technical studies for a proposed battery storage project in Solano County and are conducting outreach to local historical societies and organizations.

Please see the attached outreach letter and map showing the proposed project location.

Thank you for your time.

JOSHUA SEVERN (he/him/his), Architectural Historian

980 9th Street, Suite 1200, Sacramento, CA, 95814, USA

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From:	Vacaville Museum
To:	Severn, Josh
Cc:	Clara Dawson
Subject:	RE: Re: Corby Battery Energy Storage System Project, Solano County, CA
Date:	Friday, February 14, 2025 10:30:39 AM
Attachments:	image001.jpg OuteachLetter_2025_VacavilleMuseum.pdf Corby_2025_OutreachMaps.pdf

Hi Josh,

Thanks for reaching out. Our team is still working on the review. When would you need a response by?

Vacaville Museum Staff
213 Buck Ave, Vacaville CA, 95688
p: (707) 447-4513 **|** w: https://vacavillemuseum.org/

From: Severn, Josh <Josh.Severn@icf.com>
Sent: Thursday, February 6, 2025 11:57 AM
To: Vacaville Museum <info@vacavillemuseum.org>
Subject: FW: Re: Corby Battery Energy Storage System Project, Solano County, CA

Good afternoon.

I am following up on the outreach email sent 01/24/2025.

Let me know if you have any additional questions or information.

Thank you for your time.

Best,

JOSHUA SEVERN, Architectural Historian
980 9th Street, Suite 1200, Sacramento, CA, 95814, USA
icf.com | LinkedIn

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From: Severn, Josh
Sent: Friday, January 24, 2025 11:10 AM
To: info@vacavillemuseum.org

Subject: Re: Corby Battery Energy Storage System Project, Solano County, CA

Hello.

My name is Joshua Severn, architectural historian with ICF. We are supporting cultural resources technical studies for a proposed battery storage project in Solano County and are conducting outreach to local historical societies and organizations.

Please see the attached outreach letter and map showing the proposed project location.

Thank you for your time.

JOSHUA SEVERN (he/him/his), Architectural Historian

980 9th Street, Suite 1200, Sacramento, CA, 95814, USA

icf.com | LinkedIn

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APPENDIX 5-A: INDIRECT GREENHOUSE GAS EMISSION CALCULATIONS

Corby BESS AFC - Indirect GHG Emissions

Transmission and Charging Cycle Losses		Year 1	Year 15
Energy discharged per cycle	**MWh**	1,200	1,200
Grid energy required per full charge cycle	**MWh**	1,343	1,404
Energy loss per full charge cycle	**MWh**	143	204
Assumed annual charge/discharge cycles	**Cycles/year**	365	365
Total annual BESS charging losses	**MWh/year**	52,053	74,424

[1] Estimated by the project. This represents transmission and cycle losses only, not aux loads.

Auxiliary Loads		Year 1	Year 15
BESS cooling power demand (per enclosure)	**kW**	20	20
BESS Enclosures[2]	**#**	384	423
Total Auxiliary Load	**MW**	7.68	8.46
Assumed annual operating hours	**Hours/year**	2,920	2,920
Operating Efficiency	**%**	95.0%	95.0%
Total annual BESS Aux Load Consumption	**MWh/year**	23,606	26,003

[2]Year 15 enclosure quantity based on current augmentation schedule.

Round Trip Efficiency		Year 1	Year 15
Total loss/yr (transmission, cycle, auxiliary load)	**MWh/year**	75,659	100,427
Total grid power/yr for BESS charging	**MWh/year**	490,053	512,424
Overall RTE:	**%**	84.6%	80.4%

Indirect GHG Emissions Calcs

	GHG emission factor (lb/Mwh)			
	CO2	**CH4**	**N2O**	**CO2e**
CalEEMod Electric Utility GHG Emission Factors[3]	203.983	0.033	0.004	206.000

[3] Emission factors are for the Pacific Gas & Electric Company, which serves Solano County.

	Year 1 - GHG emissions (metric tons)			
	CO2	**CH4**	**N2O**	**CO2e**
Indirect GHG emissions due to charging losses	4,816	0.78	0.09	4,864
Indirect GHG emissions due to Auxiliary loads	2,184	0.35	0.04	2,206
Total indirect GHG emissions for BESS operation	7,000	1.13	0.14	7,070
Global Warming Equivalence Factor	1	25	298	
Equivalent CO2e Emissions	7,000	28.31	40.91	7,070

	Year 15 - GHG emissions (metric tons)			
	CO2	**CH4**	**N2O**	**CO2e**
Indirect GHG emissions due to charging losses	6,886	1.11	0.14	6,954
Indirect GHG emissions due to Auxiliary loads	2,406	0.39	0.05	2,430
Total indirect GHG emissions for BESS operation	9,292	1.50	0.18	9,384
Global Warming Equivalence Factor	1	25	298	
Equivalent CO2e Emissions	9,292	37.58	54.30	9,384

APPENDIX 6-A: ERIS DATABASE REPORT REVIEW

TETRA TECH

Memo

To: Corby Energy Storage, LLC

From: Dashiell Geyer and Jay Neuhaus (Tetra Tech, Inc.)

Cc: Doug Urry (Tetra Tech, Inc.)

Date: May 9, 2025

Subject: Database Review for the Gen-Tie Corridor, Corby Battery Energy Storage System Project, DR Haz-1 Database Review

Tetra Tech, Inc. (Tetra Tech) prepared this Database Review technical memo summarizing the findings of the Environmental Risk Information Services (ERIS) Database Report, dated February 13, 2025, for properties consisting of what is identified herein as the Corby Battery Energy Storage System (BESS) Project generation tie line (gen-tie) corridor. The gen-tie corridor is located in the city of Vacaville and unincorporated areas of Solano County, California, and is associated with five parcels identified by the Solano County Accessor as Accessor Parcel Numbers (APNs) 0133-060-010, 0133-060-020, 0141-030-080, 0141-010-030, and 0133-060-070. This Database Review technical memo was prepared for Corby Energy Storage, LLC. The conditions and findings discovered in this report are dependent on the ERIS database report.

1.0 ERIS DATABASE REPORT REVIEW

A database records report for the Corby BESS gen-tie corridor and surrounding areas (also known as a "radius report") was generated by ERIS based upon database listings found in several environmental databases. The ERIS database report is provided as **Attachment A**.

Federal, state, and local records were reviewed to assess whether the Corby BESS Project gen-tie corridor or facilities within the approximate minimum search distance have experienced significant unauthorized releases of hazardous substances or other events with potentially adverse environmental effects. Tetra Tech contracted with ERIS to perform a database search of the Corby BESS Project gen-tie corridor. ERIS identified 19 regulatory database listings associated with 6 facilities at locations surrounding, but not within, the gen-tie corridor. These listings are indicative of hazardous materials use/activity at the facilities and were evaluated to assess whether they potentially represent sources of current or former releases of hazardous substances and/or petroleum products with the potential to migrate to the Corby gen-tie corridor. Based on distance, regulatory status, and/or estimated direction of groundwater flow, the regulatory database listings did not indicate a significant release of hazardous substances or events with potentially adverse environmental effects to the gen-tie corridor. Table 1 provides a list of the database sources and whether facilities were identified for each database. The 19 listings (from 6 facilities) are noted in bold.

Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500, Irvine, CA 92614
Tel +1.949.809.5000 | tetratech.com

Table 1. Databases Searched and Number of Facilities Identified

Database Acronym	Database Definition	Number of Facilities
Federal Records from Standard Sources		
NPL	National Priority List	0
PROPOSED NPL	Proposed National Priority List Sites	0
DELETED NPL	National Priority List Deletions	0
SEMS	Superfund Enterprise Management System	0
ODI	Open Dump Inventory	0
SEMS-ARCHIVE	Superfund Enterprise Management System Archive	0
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System	0
IODI	Open Dump Inventory on Indian Lands	0
CERCLIS NFRAP	CERCLIS - No Further Remedial Action Planned	0
CERCLIS LIENS	CERCLIS Liens	0
RCRA CORRACTS	Resource Conservation and Recovery Act - Corrective Action Report	0
RCRA-TSD	RCRA – Treatment, Storage, and Disposal	0
RCRA-LQG	RCRA – Large Quantity Generators	2
RCRA-SQC	RCRA – Small Quantity Generators	0
RCRA-VSQG	RCRA – Very Small Quantity Generators	0
RCRA NON-GEN	**RCRA** – Non-Generators	1
RCRA CONTROLS	RCRA – Sites with Controls	0
FED ENG	Federal Engineering Controls-ECs	0
FED INST	Federal Institutional Controls- ICs:	0
LUCIS	Land Use Control Information System	0
NPL IC	Institutional Control Boundaries at NPL sites	0
ERNS 1982 TO 1986	Emergency Response Notification System	0
ERNS 1987 TO 1989	Emergency Response Notification System	0
ERNS	Emergency Response Notification System	0
FED BROWNFIELDS	The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database	0
FEMA UST	Federal Emergency Management Agency Underground Storage Tank Listing	0
FRP	Facility Response Plan	0
DELISTED FRP	Delisted Facility Response Plans	0
HIST GAS STATIONS	Historical Gas Station	0
REFN	Petroleum Refineries	0
BULK TERMINAL	Petroleum Product and Crude Oil Rail Terminals	0
SEMS LIENS	Superfund Enterprise Management System Liens	0
SUPERFUND ROD	Superfund Decision Documents	0
DOE FUSRAP	Formerly Utilized Sites Remedial Action Program	0
State, Tribal, and Local Records from Standard Sources		
RESPONSE	State Response Sites	0
ENVIROSTOR	EnviroStor Database	1
DELISTED ENVS	Delisted State Response Sites	0

Database Acronym	Database Definition	Number of Facilities
SWF/LF	Solid Waste Information System	0
SWRCB SWF	Solid Waste Disposal Sites with Waste Constituents Above Hazardous Waste Levels	0
WMUD	Waste Management Unit Database	0
HWP	EnviroStor Hazardous Waste Facilities	0
SWAT	Sites Listed in the Solid Waste Assessment Test (SWAT) Program Report	0
C&D DEBRIS RECY	Construction and Demolition Debris Recyclers	0
RECYCLING	Recycling Centers	0
PROCESSORS	Listing of Certified Processors	0
CONTAINER RECY	Listing of Certified Dropoff, Collection, and Community Service Programs	0
LDS	Land Disposal Sites	1
LUST	Leaking Underground Fuel Tank Reports	0
DELISTED LST	Delisted Leaking Storage Tanks	0
UST	Permitted Underground Storage Tank (UST) in GeoTracker	0
UST CLOSURE	Proposed Closure of Underground Storage Tank Cases	0
HHSS	Historical Hazardous Substance Storage Information Database	1
UST SWEEPS	Statewide Environmental Evaluation and Planning System	0
AST	Aboveground Storage Tanks	0
AST SWRCB	SWRCB Historical Aboveground Storage Tanks	0
TANK OIL GAS	Oil and Gas Facility Tanks	0
DELISTED TNK	Delisted Storage Tanks	1
CERS TANK	California Environmental Reporting System (CERS) Tanks	2
DELISTED CTNK	Delisted California Environmental Reporting System (CERS) Tanks	0
HIST TANK	Historical Hazardous Substance Storage Container Information - Facility Summary	1
LUR	Site Mitigation and Brownfields Reuse Program Facility Sites with Land Use Restrictions	0
CALSITES	CALSITES Database	0
HLUR	Hazardous Waste Management Program Facility Sites with Deed / Land Use Restrictions	0
DEED	Deed Restrictions and Land Use Restrictions	0
VCP	Voluntary Cleanup Program	0
CLEANUP SITES	GeoTracker Cleanup Program Sites	0
DELISTED CLEANUP	Delisted Cleanup Program Sites	0
DELISTED COUNTY	Delisted County Records	0
INDIAN LUST	Leaking Underground Storage Tanks on Tribal/Indian Lands	0
NDIAN UST	Underground Storage Tanks on Tribal/Indian Lands	0
DELISTED INDIAN LST	Delisted Tribal Leaking Storage Tanks	0
DELISTED INDIAN UST	Delisted Tribal Underground Storage Tanks	0
CUPA SOLANO	Solano County - CUPA List	3
LOP SOLANO	Solano County - LOP Sites List	0
UST SOLANO	Solano County - UST List	1

Database Acronym	Database Definition	Number of Facilities
Additional Environmental Federal, State, Tribal, and Local Records		
FINDS/FRS	Facility Registry Service/Facility Index	0
TRIS	Toxics Release Inventory (TRI) Program	0
PFAS NPL	PFOA/PFOS Contaminated Sites	0
PFAS FED SITES	Federal Agency Locations with Known or Suspected PFAS Detections	0
PFAS SSEHRI	SSEHRI PFAS Contamination Sites	0
ERNS PFAS	National Response Center PFAS Spills	0
PFAS NPDES	PFAS NPDES Discharge Monitoring	0
PFAS TRI	Perfluorinated Alkyl Substances (PFAS) from Toxic Release Inventory	0
PFAS WATER	Perfluorinated Alkyl Substances (PFAS) Water Quality	0
PFAS TSCA	PFAS TSCA Manufacture and Import Facilities	0
PFAS E-MANIFEST	PFAS Waste Transfers from RCRA e-Manifest	0
PFAS IND	PFAS Industry Sectors	0
HMIRS	Hazardous Materials Information Reporting System	0
NCDL	National Clandestine Drug Labs	0
TSCA	Toxic Substances Control Act	0
HIST TSCA	Hist TSCA	0
FTTS ADMIN	FTTS Administrative Case Listing	0
FTTS INSP	FTTS Inspection Case Listing	0
PRP	Potentially Responsible Parties List	0
SCRD DRYCLEANER	State Coalition for Remediation of Drycleaners Listing	0
ICIS	Integrated Compliance Information System	0
FED DRYCLEANERS	Drycleaner Facilities	0
DELISTED FED DRY	Delisted Drycleaner Facilities	0
FUDS	Formerly Used Defense Sites	0
FUDS MRS	FUDS Munitions Response Sites	0
FORMER NIKE	Former Military Nike Missile Sites	0
PIPELINE INCIDENT	PHMSA Pipeline Safety Flagged Incidents	0
MLTS	Material Licensing Tracking System	0
HIST MLTS	Historic Material Licensing Tracking System (MLTS) sites	0
MINES	Mines Master Index File	0
SMCRA	Surface Mining Control and Reclamation Act Sites	0
MRDS	Mineral Resource Data System	0
LM SITES	DOE Legacy Management Sites	0
ALT FUELS	Alternative Fueling Stations	0
CONSENT DECREES	Superfunds Consent Decrees	0
AFS	Air Facility System	0
SSTS	Registered Pesticide Establishments	0
PCBT	Polychlorinated Biphenyl (PCB) Transformers	0
PCB	Polychlorinated Biphenyl (PCB) Notifiers	0
PFAS SAMPLING	PFAS Sampling Locations	0
DRYCLEANERS	Dry Cleaning Facilities	0

Database Acronym	Database Definition	Number of Facilities
DELISTED DRYCLEANERS	Delisted Drycleaners	0
DRYC GRANT	Non-Toxic Dry Cleaning Incentive Program	0
PFAS GT CLEANUPS	PFAS GeoTracker Cleanup Sites	0
PFAS GW	PFOA/PFOS Groundwater	0
PFAS INVEST	PFAS Investigations	0
HWSS CLEANUP	Hazardous Waste and Substances Site List - Site Cleanup	0
TOXIC PITS	Toxic Pit Cleanup Act Sites	0
DTSC HWF	List of Hazardous Waste Facilities Subject to Corrective Action	0
INSP COMP ENF	EnviroStor Inspection, Compliance, and Enforcement	0
SCH	School Property Evaluation Program Sites	1
CHMIRS	California Hazardous Material Incident Report System	0
HIST CHMIRS	Historical California Hazardous Material Incident Report System	0
HAZNET	Handlers from Hazardous Waste Manifest Data	0
HAZ GEN	Generators from Hazardous Waste Manifest Data	0
HAZ TSD	TSDF from Hazardous Waste Manifest Data	0
HIST MANIFEST	Historical Hazardous Waste Manifest Data	0
HW TRANSPORT	DTSC Registered Hazardous Waste Transporters	0
WASTE TIRE	Registered Waste Tire Haulers	0
MEDICAL WASTE	California Medical Waste Management Program Facility List	0
HIST CORTESE	Historical Cortese List	0
CDO/CAO	Cease and Desist Orders and Cleanup and Abatement Orders	0
CERS HAZ	California Environmental Reporting System (CERS) Hazardous Waste Sites	0
DELISTED HAZ	Delisted Environmental Reporting System (CERS) Hazardous Waste Sites	1
GEOTRACKER	Sites in GeoTracker	0
MINE	Mines Listing	0
LIEN	Recorded Environmental Cleanup Liens	0
WASTE DISCHG	Waste Discharge Requirements	0
EMISSIONS	Toxic Pollutant Emissions Facilities	3
CDL	Clandestine Drug Lab Sites	0

The databases searched have been developed and are updated by federal, state, and local agencies. While these databases are reliable and comprehensive, there have been cases where the data presented are out of date and no longer reflective of actual facility conditions. The Government Records Searched/Data Currency Tracking section of the ERIS Database Report provided in **Attachment A** identifies when each database was updated.

2.0 CORBY GEN-TIE CORRIDOR DATABASE LISTINGS

The Corby gen-tie corridor was not identified in any environmental databases.

3.0 SURROUNDING PROPERTY DATABASE LISTINGS

The six surrounding facilities identified in the ERIS report listings are discussed in **Table 2**.

Table 2. Surrounding Property Database Listings

Item	Description
Facility Name	PG&E Vaca-Dixon Substation
Databases	Delisted TNK, CUPA Solano, HHSS, UST Solano, CERS Tank, Emissions, Hist Tank, RCRA LQG
Address	5221 Quinn Road, Vacaville CA 95688
Distance (feet)	912
Direction	West-Northwest
Elevation	Higher
Summary	The site is listed in the Delisted Storage Tank database containing a list of storage tank sites that were removed by the State Water Resources Control Board (SWRCB). This site is listed in the Certified Unified Program Agency (CUPA) program for the county of Solano. The site is listed in the Historical Hazardous Substance Storage Information Database containing information collected in the 1980s from facilities that stored hazardous substances. The site is listed in the Solano County – Underground Storage Tanks List of registered underground storage tanks (USTs) in the County of Solano made available by the Solano County Environmental Health Services Division. The site is also listed in the California Environmental Protection Agency (CalEPA) regulated site portal which falls under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs. This site is listed as a Toxic Pollutant Emissions Facility, which is a list of criteria toxic pollutant emissions data for facilities in California made available by the CalEPA – Air Resources Board (ARB). The information contained within the listings associated with the Pacific Gas and Electric (PG&E) Vaca-Dixon substation is associated with hazardous materials use, storage, and disposal. No records of hazardous substance releases were included. The gen-tie corridor overlaps with a portion of the PG&E Vaca-Dixon substation property; however, the gen-tie corridor portion of the substation property is undeveloped and does not include hazardous materials storage or use areas. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.
Facility Name	Vacaville Aero Service
Databases	CUPA Solano
Address	5419 Weber Road, Vacaville, CA 95687
Distance (feet)	1169
Direction	Northeast
Elevation	Lower
Summary	This site is listed in the CUPA program for the county of Solano. Based on review of this database listing, there is no evidence of hazardous material release to the environment. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.
Facility Name	CalPeak Power-Vaca Dixon, LLC
Databases	CUPA Solano, Emissions, RCRA Non Gen, CERS Tank
Address	5157 Quinn Road, Vacaville, CA 94588
Distance (feet)	1281
Direction	West-Northwest
Elevation	Higher
Summary	This site is listed in the CUPA program for the county of Solano. The site was also listed in the Toxic Pollutant Emissions database where a list of criteria and toxic pollutant emissions data for facilities in California made available by the CalEPA ARB. The site is listed as a Resource Conservation and Recovery Act (RCRA) Non-Generator, in the U.S. Environmental Protection Agency (EPA) comprehensive information system. The site is also listed in the CalEPA regulated site portal, which falls under the Aboveground Petroleum Storage and

Item	Description
	Underground Storage Tank regulatory programs. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.
Facility Name	West Coast Railroad
Databases	Delisted HAZ
Address	5119 Quinn Road, Vacaville CA 95688
Distance (feet)	2305
Direction	West-Southwest
Elevation	Higher
Summary	This site is listed in Delisted Environmental Reporting System (CERS) Hazardous Waste Sites database. The database contains a list of sites that were removed from CalEPA in the following regulatory programs: Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator. No additional information is provided. Based on the lack of information provided by the database and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.
Facility Name	Gibson Canyon Creek WWTP
Databases	LDS
Address	7050 Leisure Town Road, Vacaville CA 95688
Distance (feet)	2379
Direction	West-Northwest
Elevation	Higher
Summary	This site is listed in the State Water Resources Control Board (SWRCB) data management system GeoTracker as a Land Disposal Site. The Land Disposal program regulates waste discharge to land for treatment, storage and disposal in waste management units. Waste management units include waste piles, surface impoundments and landfills. Based on records available on GeoTracker, ongoing groundwater extraction and monitoring is being performed due to elevated salinity levels. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.
Facility Name	North Village Elementary
Databases	SCH, ENVIROSTOR
Address	Vaca Valley/Leisure Town Road, Vacaville, CA 95688
Distance (feet)	4692
Direction	West
Elevation	Higher
Summary	This site is registered with the Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup (SPEC) division. SPEC is responsible for assessing, investigating, and cleaning up proposed school sites. The division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy the new school. The site is also listed in the EnviroStor Data Management System made available by the DTSC, which includes Corrective Action sites, Tiered Permit sites, Historical sites, and Evaluation/Investigation sites. In 2002, a Phase I Environmental Site Assessment (ESA) was performed at the 11-acre property to identify if there were any impacts due to historical agricultural use at the property. The Phase I ESA concluded that no further action was required. Based on the nature of the database records and location of the facility, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.

Based on the nature of the database records and locations of the six facilities summarized in Table 2, there is no evidence of hazardous substance releases to the environment with the potential to affect the Corby BESS gen-tie corridor.

4.0 UNPLOTTABLE REPORT SUMMARY

Unplottable sites are facilities with incomplete or insufficient address information that may be located in the vicinity of the Corby BESS Project gen-tie corridor. Based on the limited information provided by the ERIS database report (**Attachment A**) for the unplottable facilities, two of the listings, CalPeak Power and Gurmail Singh, are near the Corby BESS gen-tie corridor and are discussed below. The other two unplottable listings do not appear to be relevant to the gen-tie corridor based on the location and incident information provided.

CalPeak Power was identified as a facility list in the Aboveground Storage Tank (AST) database, where an estimated 7,800-gallon AST was present on Quinn Road. This record is associated with the CalPeak Power-Vaca Dixon, LLC facility listed in Table 2 and does not provide additional substantive information relative to the Corby BESS gen-tie corridor.

Gurmail Singh is the former property owner of the Corby BESS Project site and currently owns the parcel immediately west of the Project site over which a small portion of the gen-tie corridor crosses. The facility was listed in the Solano County Certified Unified Agency (CUPA) list likely related to permitted agrichemical application activities. The Corby BESS Project site and gen-tie corridor are known to have historic agricultural uses and will be evaluated for potential residual agricultural chemicals per proposed Project Design Measure PD HAZ-03.

5.0 FINDINGS AND CONCLUSIONS

Tetra Tech has prepared this Database Review Report utilizing ASTM E1527-21 as a guide, but the report does not fully comply with the standard. With the exception of the “agricultural site” listing associated with a property owned by Gurmail Singh (which is already being addressed through Project Design Measure PD HAZ-03), this report has revealed no onsite environmental conditions at the Corby gen-tie corridor, nor has it revealed offsite environmental conditions with the potential to affect the Corby gen-tie corridor.

Written by:
Dashiell Geyer
Project Geologist
March 28, 2025

Reviewed by:
Jay Neuhaus, PG
Senior Geologist
May 8, 2025

ATTACHMENT A: ERIS DATABASE REPORT

DATABASE REPORT

Project Property:	*NextEra Energy Corby BESS Gen-tie* *n/a* *Vacaville CA*
Project No:	*194-1109-0319*
Report Type:	*Database Report*
Order No:	*25021100935*
Requested by:	*Tetra Tech, Inc.*
Date Completed:	*February 13, 2025*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:		*NextEra Energy Corby BESS Gen-tie* *n/a Vacaville CA*
Project No:		*194-1109-0319*
Coordinates:		
	Latitude:	*38.39803634*
	Longitude:	*-121.91593487*
	UTM Northing:	*4,250,535.75*
	UTM Easting:	*594,662.59*
	UTM Zone:	*UTM Zone 10S*
Elevation:		*83 FT*

Order Information:

Order No:	*25021100935*
Date Requested:	*February 11, 2025*
Requested by:	*Tetra Tech, Inc.*
Report Type:	*Database Report*

Historicals/Products:

Aerial Photographs	*Historical Aerials (with Project Boundaries)*
ERIS Xplorer	*ERIS Xplorer*
Excel Add-On	*Excel Add-On*
Fire Insurance Maps	*US Fire Insurance Maps*
Physical Setting Report (PSR)	*Physical Setting Report (PSR)*
Topographic Map	*Topographic Maps*
Vapor Screening Tool	*Vapor Screening Tool*

Executive Summary: Report Summary

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
Standard Environmental Records								
Federal								
NPL	Y	1	0	0	0	0	0	0
PROPOSED NPL	Y	1	0	0	0	0	0	0
DELETED NPL	Y	0.5	0	0	0	0	-	0
SEMS	Y	0.5	0	0	0	0	-	0
ODI	Y	0.5	0	0	0	0	-	0
SEMS ARCHIVE	Y	0.5	0	0	0	0	-	0
CERCLIS	Y	0.5	0	0	0	0	-	0
IODI	Y	0.5	0	0	0	0	-	0
CERCLIS NFRAP	Y	0.5	0	0	0	0	-	0
CERCLIS LIENS	Y	PO	0	-	-	-	-	0
RCRA CORRACTS	Y	1	0	0	0	0	0	0
RCRA TSD	Y	0.5	0	0	0	0	-	0
RCRA LQG	Y	0.25	0	0	**2**	-	-	**2**
RCRA SQG	Y	0.25	0	0	0	-	-	0
RCRA VSQG	Y	0.25	0	0	0	-	-	0
RCRA NON GEN	Y	0.25	0	0	**1**	-	-	**1**
RCRA CONTROLS	Y	0.5	0	0	0	0	-	0
FED ENG	Y	0.5	0	0	0	0	-	0
FED INST	Y	0.5	0	0	0	0	-	0
LUCIS	Y	0.5	0	0	0	0	-	0
NPL IC	Y	0.5	0	0	0	0	-	0
ERNS 1982 TO 1986	Y	PO	0	-	-	-	-	0
ERNS 1987 TO 1989	Y	PO	0	-	-	-	-	0
ERNS	Y	PO	0	-	-	-	-	0
FED BROWNFIELDS	Y	0.5	0	0	0	0	-	0
FEMA UST	Y	0.25	0	0	0	-	-	0
FRP	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
DELISTED FRP	Y	0.25	0	0	0	-	-	0
HIST GAS STATIONS	Y	0.25	0	0	0	-	-	0
REFN	Y	0.25	0	0	0	-	-	0
BULK TERMINAL	Y	0.25	0	0	0	-	-	0
SEMS LIEN	Y	PO	0	-	-	-	-	0
SUPERFUND ROD	Y	1	0	0	0	0	0	0
DOE FUSRAP	Y	1	0	0	0	0	0	0
State								
RESPONSE	Y	1	0	0	0	0	0	0
ENVIROSTOR	Y	1	0	0	0	0	**1**	**1**
DELISTED ENVS	Y	1	0	0	0	0	0	0
SWF/LF	Y	0.5	0	0	0	0	-	0
SWRCB SWF	Y	0.5	0	0	0	0	-	0
WMUD	Y	0.5	0	0	0	0	-	0
HWP	Y	1	0	0	0	0	0	0
SWAT	Y	0.5	0	0	0	0	-	0
C&D DEBRIS RECY	Y	0.5	0	0	0	0	-	0
RECYCLING	Y	0.5	0	0	0	0	-	0
PROCESSORS	Y	0.5	0	0	0	0	-	0
CONTAINER RECY	Y	0.5	0	0	0	0	-	0
LDS	Y	0.5	0	0	0	**1**	-	**1**
LUST	Y	0.5	0	0	0	0	-	0
DELISTED LST	Y	0.5	0	0	0	0	-	0
UST	Y	0.25	0	0	0	-	-	0
UST CLOSURE	Y	0.5	0	0	0	0	-	0
HHSS	Y	0.25	0	0	**1**	-	-	**1**
UST SWEEPS	Y	0.25	0	0	0	-	-	0
AST	Y	0.25	0	0	0	-	-	0
AST SWRCB	Y	0.25	0	0	0	-	-	0
TANK OIL GAS	Y	0.25	0	0	0	-	-	0
DELISTED TNK	Y	0.25	0	0	**1**	-	-	**1**
CERS TANK	Y	0.25	0	0	**2**	-	-	**2**
DELISTED CTNK	Y	0.25	0	0	0	-	-	0
HIST TANK	Y	0.25	0	0	**1**	-	-	**1**

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
LUR	Y	0.5	0	0	0	0	-	0
CALSITES	Y	0.5	0	0	0	0	-	0
HLUR	Y	0.5	0	0	0	0	-	0
DEED	Y	0.5	0	0	0	0	-	0
VCP	Y	0.5	0	0	0	0	-	0
CLEANUP SITES	Y	0.5	0	0	0	0	-	0
DELISTED CLEANUP	Y	0.5	0	0	0	0	-	0
DELISTED COUNTY	Y	0.25	0	0	0	-	-	0
Tribal								
INDIAN LUST	Y	0.5	0	0	0	0	-	0
INDIAN UST	Y	0.25	0	0	0	-	-	0
DELISTED INDIAN LST	Y	0.5	0	0	0	0	-	0
DELISTED INDIAN UST	Y	0.25	0	0	0	-	-	0
County								
LOP SOLANO	Y	0.5	0	0	0	0	-	0
UST SOLANO	Y	0.25	0	0	**1**	-	-	**1**
CUPA SOLANO	Y	0.25	0	0	**3**	-	-	**3**

Additional Environmental Records

Federal

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
PFAS GHG	Y	0.5	0	0	0	0	-	0
OSC RESPONSE	Y	0.125	0	0	-	-	-	0
FINDS/FRS	Y	PO	0	-	-	-	-	0
TRIS	Y	PO	0	-	-	-	-	0
PFAS NPL	Y	0.5	0	0	0	0	-	0
PFAS FED SITES	Y	0.5	0	0	0	0	-	0
PFAS SSEHRI	Y	0.5	0	0	0	0	-	0
PFAS ERNS	Y	0.5	0	0	0	0	-	0
PFAS NPDES	Y	0.5	0	0	0	0	-	0
PFAS TRI	Y	0.5	0	0	0	0	-	0
PFAS WATER	Y	0.5	0	0	0	0	-	0
PFAS TSCA	Y	0.5	0	0	0	0	-	0
PFAS E-MANIFEST	Y	0.5	0	0	0	0	-	0
PFAS IND	Y	0.5	0	0	0	0	-	0
HMIRS	Y	0.125	0	0	-	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
NCDL	Y	0.125	0	0	-	-	-	0
TSCA	Y	0.125	0	0	-	-	-	0
HIST TSCA	Y	0.125	0	0	-	-	-	0
FTTS ADMIN	Y	PO	0	-	-	-	-	0
FTTS INSP	Y	PO	0	-	-	-	-	0
PRP	Y	PO	0	-	-	-	-	0
SCRD DRYCLEANER	Y	0.5	0	0	0	0	-	0
ICIS	Y	PO	0	-	-	-	-	0
FED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED FED DRY	Y	0.25	0	0	0	-	-	0
FUDS	Y	1	0	0	0	0	0	0
FUDS MRS	Y	1	0	0	0	0	0	0
FORMER NIKE	Y	1	0	0	0	0	0	0
PIPELINE INCIDENT	Y	PO	0	-	-	-	-	0
MLTS	Y	PO	0	-	-	-	-	0
HIST MLTS	Y	PO	0	-	-	-	-	0
MINES	Y	0.25	0	0	0	-	-	0
SMCRA	Y	1	0	0	0	0	0	0
MRDS	Y	1	0	0	0	0	0	0
LM SITES	Y	1	0	0	0	0	0	0
ALT FUELS	Y	0.25	0	0	0	-	-	0
CONSENT DECREES	Y	0.25	0	0	0	-	-	0
AFS	Y	PO	0	-	-	-	-	0
SSTS	Y	0.25	0	0	0	-	-	0
PCBT	Y	0.5	0	0	0	0	-	0
PCB	Y	0.5	0	0	0	0	-	0
POWER PLANTS	Y	0.125	0	0	-	-	-	0
State								
PFAS SAMPLING	Y	0.5	0	0	0	0	-	0
DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DRYC GRANT	Y	0.25	0	0	0	-	-	0
PFAS GT CLEANUPS	Y	0.5	0	0	0	0	-	0
PFAS GW	Y	0.5	0	0	0	0	-	0
PFAS INVEST	Y	0.5	0	0	0	0	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
HWSS CLEANUP	Y	0.5	0	0	0	0	-	0
TOXIC PITS	Y	1	0	0	0	0	0	0
DTSC HWF	Y	0.5	0	0	0	0	-	0
INSP COMP ENF	Y	1	0	0	0	0	0	0
SCH	Y	1	0	0	0	0	**1**	**1**
CHMIRS	Y	PO	0	-	-	-	-	0
HIST CHMIRS	Y	PO	0	-	-	-	-	0
HAZNET	Y	PO	0	-	-	-	-	0
HAZ GEN	Y	PO	0	-	-	-	-	0
HAZ TSD	Y	0.5	0	0	0	0	-	0
HIST MANIFEST	Y	PO	0	-	-	-	-	0
HW TRANSPORT	Y	0.125	0	0	-	-	-	0
WASTE TIRE	Y	PO	0	-	-	-	-	0
MEDICAL WASTE	Y	0.25	0	0	0	-	-	0
HIST CORTESE	Y	0.5	0	0	0	0	-	0
CDO/CAO	Y	0.5	0	0	0	0	-	0
CERS HAZ	Y	0.125	0	0	-	-	-	0
DELISTED HAZ	Y	0.5	0	0	0	**1**	-	**1**
GEOTRACKER	Y	0.125	0	0	-	-	-	0
MINE	Y	1	0	0	0	0	0	0
LIEN	Y	PO	0	-	-	-	-	0
WASTE DISCHG	Y	0.25	0	0	0	-	-	0
EMISSIONS	Y	0.25	0	0	**3**	-	-	**3**
CDL	Y	0.125	0	0	-	-	-	0
Tribal	***No Tribal additional environmental record sources available for this State.***							
County								
	Total:		0	0	15	2	2	19

**** PO – Property Only***
**** 'Property and adjoining properties' database search radii are set at 0.25 miles.***

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number

No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
1	DELISTED TNK	PG&E DIXON SUBSTATION	5221 QUINN RD VACAVILLE CA 95688	WNW	0.17 / 912.28	1	21
1	CUPA SOLANO	PG&E VACA DIXON SUBSTATION 707-452-1963	5221 QUINN RD VACAVILLE CA 95688 CA	WNW	0.17 / 912.28	1	21
1	HHSS	VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1	21
1	UST SOLANO	PG&E VACA DIXON SUBSTATION 707-452-1963	5221 QUINN RD VACAVILLE CA 95688 CA ***Site No:*** 80072	WNW	0.17 / 912.28	1	21
1	CERS TANK	PG&E: Vaca Dixon Substation	5221 QUINN RD VACAVILLE CA 95688 ***Site ID:*** 399518	WNW	0.17 / 912.28	1	22
1	EMISSIONS	PACIFIC GAS & ELECTRIC COMPANY	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1	24
1	EMISSIONS	PACIFIC GAS AND ELECTRIC COMPANY	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1	29
1	HIST TANK	VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA	WNW	0.17 / 912.28	1	30
1	RCRA LQG	PG&E VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA 95688-9453 ***EPA Handler ID | Recycler Activity?:*** CAD981398795 | NO	WNW	0.17 / 912.28	1	30
1	RCRA LQG	PG&E VACA DIXON SUBSTATION	5221 QUINN RD VACAVILLE CA 95688 ***EPA Handler ID | Recycler Activity?:*** CAR000377093 | NO	WNW	0.17 / 912.28	1	38
2	CUPA SOLANO	VACAVILLE AERO SERVICE 707-447-4500	5419 WEBER RD VACAVILLE CA 95687 CA	NE	0.22 / 1,169.11	-2	39
3	CUPA SOLANO	CALPEAK POWER-VACA DIXON, LLC 619-229-3770	5157 QUINN RD VACAVILLE CA 94588	WNW	0.24 / 1,280.94	2	39

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
			CA				
3	EMISSIONS	CALPEAK POWER - VACA DIXON, LLC	5157 QUINN ROAD VACAVILLE CA 95688	WNW	0.24 / 1,280.94	2	40
3	RCRA NON GEN	CALPEAK POWER-VACA DIXON LLC	5157 QUINN RD VACAVILLE CA 95688-9452	WNW	0.24 / 1,280.94	2	45
			EPA Handler ID | Recycler Activity?: CAL000233781 | NO				
3	CERS TANK	CalPeak Power - Vaca Dixon	5157 QUINN RD VACAVILLE CA 95688	WNW	0.24 / 1,280.94	2	47
			Site ID: 102334				
4	DELISTED HAZ	West Coast Railroad	5119 QUINN RD VACAVILLE CA 95688	WSW	0.44 / 2,305.13	5	52
5	LDS	GIBSON CANYON CREEK WWTP	7050 Leisure Town Road VACAVILLE CA 95688	WNW	0.45 / 2,378.57	6	52
6	SCH	NORTH VILLAGE ELEMENTARY	VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688	W	0.89 / 4,692.14	10	61
			Estor/EPA ID | Cleanup Status: 48020003 | NO ACTION REQUIRED AS OF 6/13/2002				
6	ENVIROSTOR	NORTH VILLAGE ELEMENTARY	VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688	W	0.89 / 4,692.14	10	62
			Estor/EPA ID | Cleanup Status: 48020003 | NO ACTION REQUIRED AS OF 6/13/2002				

Executive Summary: Summary by Data Source

Standard

Federal

RCRA LQG - RCRA Generator List

A search of the RCRA LQG database, dated Oct 21, 2024 has found that there are 2 RCRA LQG site(s) within approximately 0.25miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PG&E VACA DIXON SUBSTATION	5221 QUINN RD VACAVILLE CA 95688	WNW	0.17 / 912.28	1
	EPA Handler ID | Recycler Activity?: *CAR000377093 | NO*			
PG&E VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA 95688-9453	WNW	0.17 / 912.28	1
	EPA Handler ID | Recycler Activity?: *CAD981398795 | NO*			

RCRA NON GEN - RCRA Non-Generators

A search of the RCRA NON GEN database, dated Oct 21, 2024 has found that there are 1 RCRA NON GEN site(s) within approximately 0.25miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
CALPEAK POWER-VACA DIXON LLC	5157 QUINN RD VACAVILLE CA 95688-9452	WNW	0.24 / 1,280.94	3
	EPA Handler ID | Recycler Activity?: *CAL000233781 | NO*			

State

ENVIROSTOR - EnviroStor Database

A search of the ENVIROSTOR database, dated Sep 25, 2024 has found that there are 1 ENVIROSTOR site(s) within approximately 1.00miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
NORTH VILLAGE ELEMENTARY	VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688	W	0.89 / 4,692.14	6
	Estor/EPA ID | Cleanup Status: *48020003 | NO ACTION REQUIRED AS OF 6/13/2002*			

LDS - Land Disposal Sites

A search of the LDS database, dated Sep 25, 2024 has found that there are 1 LDS site(s) within approximately 0.50miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
GIBSON CANYON CREEK WWTP	7050 Leisure Town Road VACAVILLE CA 95688	WNW	0.45 / 2,378.57	5

HHSS - Historical Hazardous Substance Storage Information Database

A search of the HHSS database, dated Aug 27, 2015 has found that there are 1 HHSS site(s) within approximately 0.25miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1

DELISTED TNK - Delisted Storage Tanks

A search of the DELISTED TNK database, dated Nov 14, 2024 has found that there are 1 DELISTED TNK site(s) within approximately 0.25miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PG&E DIXON SUBSTATION	5221 QUINN RD VACAVILLE CA 95688	WNW	0.17 / 912.28	1

CERS TANK - California Environmental Reporting System (CERS) Tanks

A search of the CERS TANK database, dated Oct 28, 2024 has found that there are 2 CERS TANK site(s) within approximately 0.25 miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PG&E: Vaca Dixon Substation	5221 QUINN RD VACAVILLE CA 95688 ***Site ID**: 399518*	WNW	0.17 / 912.28	1
CalPeak Power - Vaca Dixon	5157 QUINN RD VACAVILLE CA 95688 ***Site ID**: 102334*	WNW	0.24 / 1,280.94	3

HIST TANK - Historical Hazardous Substance Storage Container Information - Facility Summary

A search of the HIST TANK database, dated May 27, 1988 has found that there are 1 HIST TANK site(s) within approximately 0.25 miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
VACA-DIXON SUBSTATION	5221 QUINN ROAD VACAVILLE CA	WNW	0.17 / 912.28	1

County

UST SOLANO - Solano County - Underground Storage Tanks List

A search of the UST SOLANO database, dated Oct 26, 2021 has found that there are 1 UST SOLANO site(s) within approximately 0.25 miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PG&E VACA DIXON SUBSTATION 707-452-1963	5221 QUINN RD VACAVILLE CA 95688 CA ***Site No***: *80072*	WNW	0.17 / 912.28	1

CUPA SOLANO - Solano County - CUPA List

A search of the CUPA SOLANO database, dated Dec 3, 2020 has found that there are 3 CUPA SOLANO site(s) within approximately 0.25miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PG&E VACA DIXON SUBSTATION 707-452-1963	5221 QUINN RD VACAVILLE CA 95688 CA	WNW	0.17 / 912.28	1
CALPEAK POWER-VACA DIXON, LLC 619-229-3770	5157 QUINN RD VACAVILLE CA 94588 CA	WNW	0.24 / 1,280.94	3

Lower Elevation	Address	Direction	Distance (mi/ft)	Map Key
VACAVILLE AERO SERVICE 707-447-4500	5419 WEBER RD VACAVILLE CA 95687 CA	NE	0.22 / 1,169.11	2

Non Standard

State

SCH - School Property Evaluation Program Sites

A search of the SCH database, dated Sep 25, 2024 has found that there are 1 SCH site(s) within approximately 1.00miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
NORTH VILLAGE ELEMENTARY	VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688 ***Estor/EPA ID | Cleanup Status***: *48020003 | NO ACTION REQUIRED AS OF 6/13/2002*	W	0.89 / 4,692.14	6

DELISTED HAZ - Delisted Environmental Reporting System (CERS) Hazardous Waste Sites

A search of the DELISTED HAZ database, dated Nov 29, 2018 has found that there are 1 DELISTED HAZ site(s) within approximately 0.50miles of the project property.

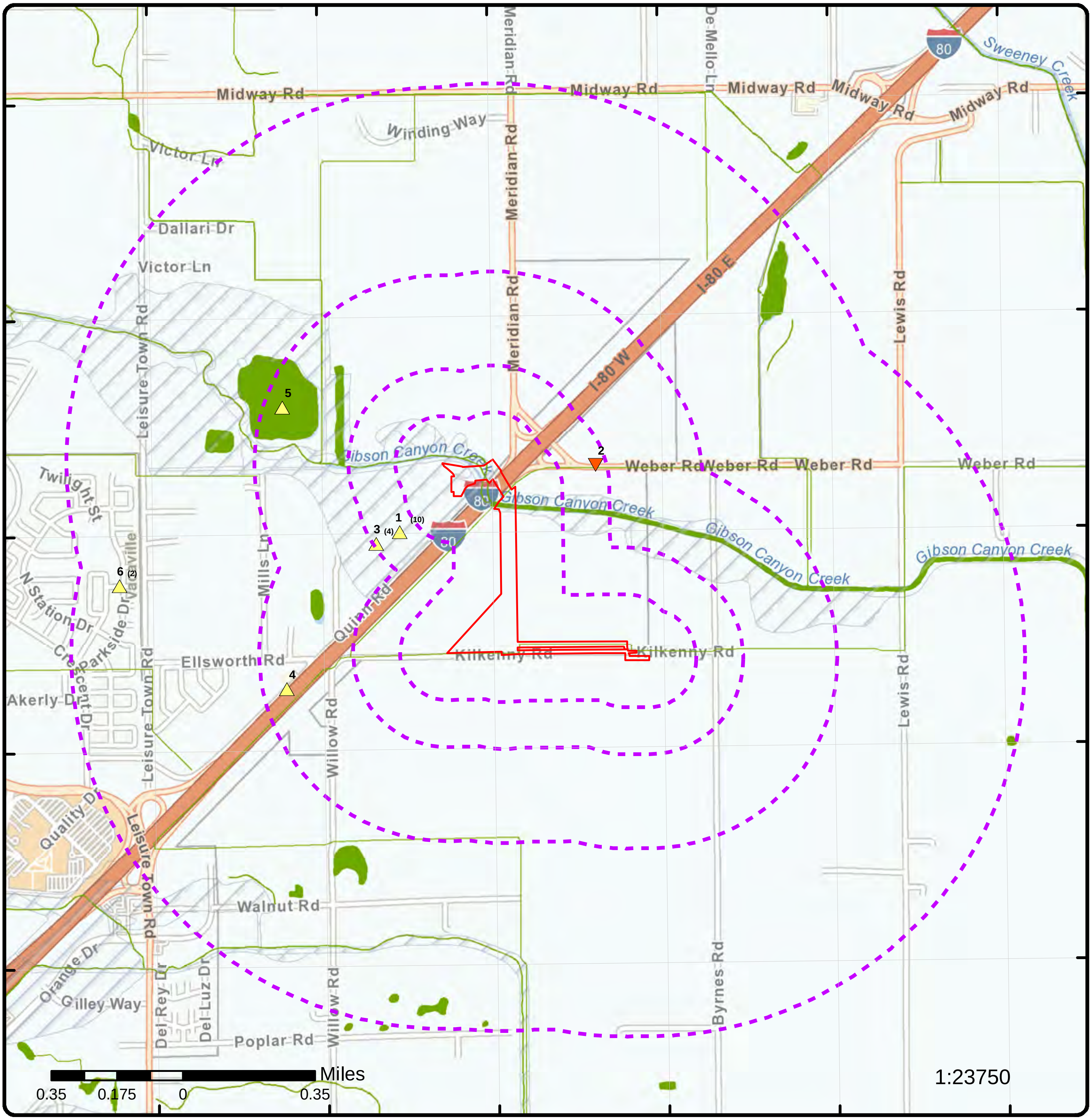
Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
West Coast Railroad	5119 QUINN RD VACAVILLE CA 95688	WSW	0.44 / 2,305.13	4

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key

EMISSIONS - Toxic Pollutant Emissions Facilities

A search of the EMISSIONS database, dated Dec 31, 2021 has found that there are 3 EMISSIONS site(s) within approximately 0.25 miles of the project property.

Equal/Higher Elevation	Address	Direction	Distance (mi/ft)	Map Key
PACIFIC GAS AND ELECTRIC COMPANY	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1
PACIFIC GAS & ELECTRIC COMPANY	5221 QUINN ROAD VACAVILLE CA 95688	WNW	0.17 / 912.28	1
CALPEAK POWER - VACA DIXON, LLC	5157 QUINN ROAD VACAVILLE CA 95688	WNW	0.24 / 1,280.94	3



Map: 1.0 Mile Radius

Order Number: 25021100935

Address: n/a, Vacaville, CA

Project Property

Buffer Outline

- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- Areas with Higher Elevation
- Areas with Same Elevation
- Areas with Lower Elevation
- Areas with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major & Minor Arterial
- Traffic Circle; Ramp
- Local Road
- Rail
- State
- Country
- National Wetland
- Indian Reserve Land
- 100 Year Flood Zone
- 500 Year Flood Zone
- FWS Special Designation Areas
- National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium

Map: 0.5 Mile Radius

Order Number: 25021100935

Address: n/a, Vacaville, CA

Project Property

Buffer Outline

Sites with Higher Elevation

Sites with Same Elevation

Sites with Lower Elevation

Sites with Unknown Elevation

Areas with Higher Elevation

Areas with Same Elevation

Areas with Lower Elevation

Areas with Unknown Elevation

Freeways; Highways

Traffic Circle; Ramp

Major & Minor Arterial

Traffic Circle; Ramp

Local Road

Rail

State

Country

National Wetland

Indian Reserve Land

100 Year Flood Zone

500 Year Flood Zone

FWS Special Designation Areas

National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium

Map: 0.25 Mile Radius

Order Number: 25021100935

Address: n/a, Vacaville, CA

Project Property

Buffer Outline

Sites with Higher Elevation

Sites with Same Elevation

Sites with Lower Elevation

Sites with Unknown Elevation

Areas with Higher Elevation

Areas with Same Elevation

Areas with Lower Elevation

Areas with Unknown Elevation

Freeways; Highways

Traffic Circle; Ramp

Major & Minor Arterial

Traffic Circle; Ramp

Local Road

Rail

State

Country

National Wetland

Indian Reserve Land

100 Year Flood Zone

500 Year Flood Zone

FWS Special Designation Areas

National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium

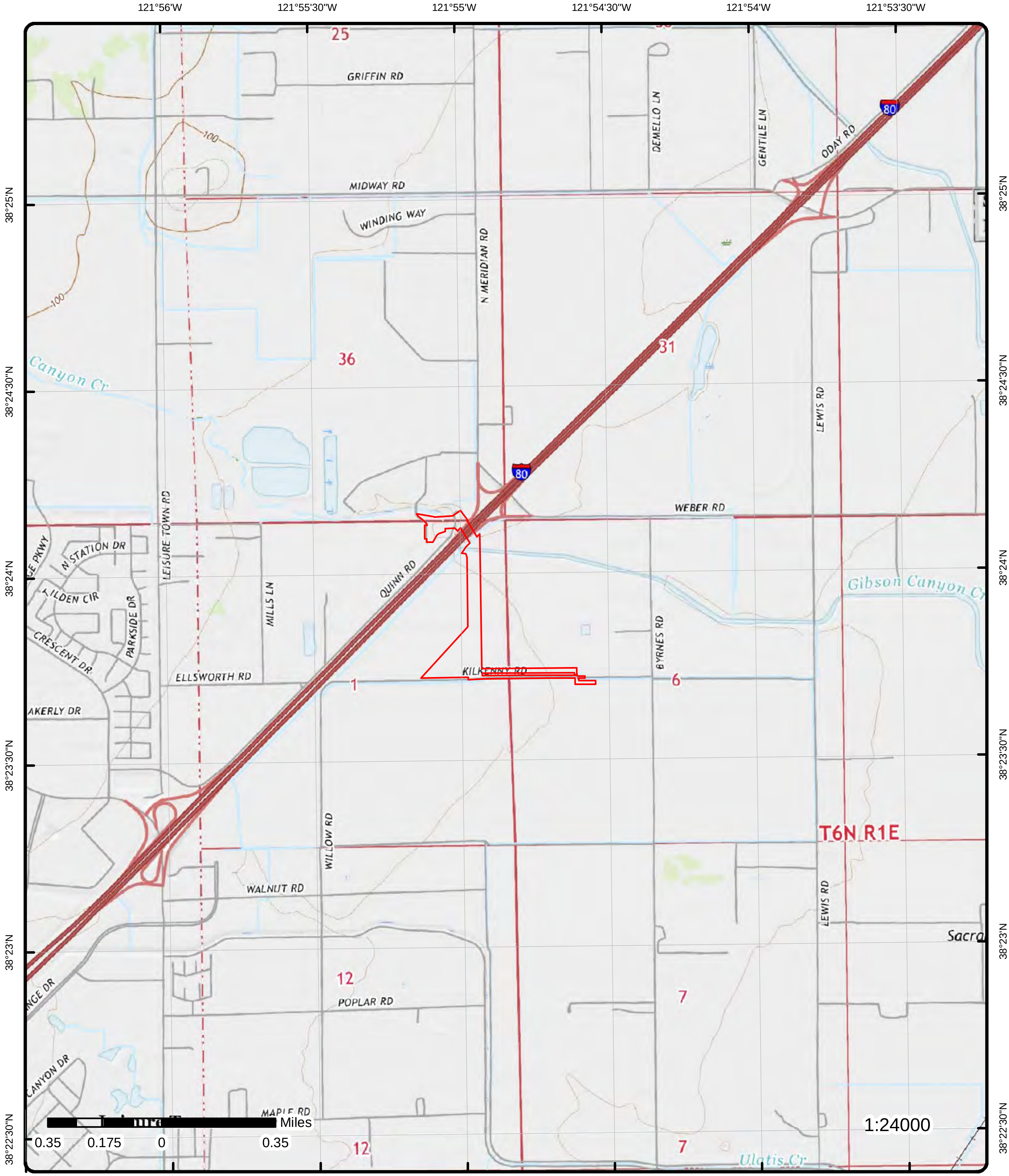
Aerial **Year: 2023**

Order Number: 25021100935

Address: n/a, Vacaville, CA

© ERIS Information Inc.

Source: ESRI World Imagery



Topographic Map

Year: 2022

Order Number: 25021100935

Address: n/a, CA

Quadrangle(s): Dixon CA, Allendale CA, Elmira CA

Source: USGS Topographic Map

Detail Report

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	1 of10	WNW	0.17 / 912.28	83.99 / 1	PG&E DIXON SUBSTATION 5221 QUINN RD VACAVILLE CA 95688	DELISTED TNK

Delisted Underground Storage Tanks

Facility ID: 80072
CERS ID:
Original Source: UST
Record Date: 17-OCT-2021
CalEnviroScrn 4 Pct :
County: Solano
Latitude: 38.39814433
Longitude: -121.92373
Permitting Agency: SOLANO COUNTY
Site Facility Type: PERMITTED UNDERGROUND STORAGE TANK (UST)
Note: Information related to facilities can be searched on Geo Tracker Website: https://geotracker.waterboards.ca.gov/search
Source:

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	2 of10	WNW	0.17 / 912.28	83.99 / 1	PG&E VACA DIXON SUBSTATION 707-452-1963 5221 QUINN RD VACAVILLE CA 95688 CA	CUPA SOLANO

Site No: 80072
Program: 21M
Freq: 1

Detail Information

Inv No: 1
Status Desc: ACTIVE
Permit Expiration: 12/31/20
Inventory Type Desc: 20 - 49 Personnel, SUBMITTAL TO CERS DUE (164)
Last Service Dt: 01/22/13
Last Service: LETTER/REPORT REVIEW
Call Back:
Inspector: Dubois, Tristan
Supervisor / District: SUP-DIST NO 3031

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	3 of10	WNW	0.17 / 912.28	83.99 / 1	VACA-DIXON SUBSTATION 5221 QUINN ROAD VACAVILLE CA 95688	HHSS

County: Solano
Tank Details Microfiche: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002133b.pdf

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	4 of10	WNW	0.17 / 912.28	83.99 / 1	PG&E VACA DIXON SUBSTATION 707-452-1963 5221 QUINN RD VACAVILLE CA 95688 CA	UST SOLANO

Site No: 80072

Detail Information

Site No / Status: 80072 I
Status Desc: Inactive
Program / Inv No: 23U 2
Program: 23U
Inv No: 2
Inventory Type Desc: Permanent Closure (192)
Last Service / Freq: 02/09/07 1
Last Service Date: 02/09/07
Freq: 1
Call Back:
Inspector: Dubois, Tristan
Supervisor/District: SUP-DIST NO 3031
Last Service / Permit Expire: ROUTINE - INITIAL (INVENTORIED) 03/31/95
Last Service: ROUTINE - INITIAL (INVENTORIED)
Permit Expiration: 03/31/95
Site Nm / Supervisor / District: PG&E VACA DIXON SUBSTATION 707-452-1963 SUP-DIST NO 3031
Address / Inspector: 5221 QUINN RD VACAVILLE CA 95688 Dubois, Tristan

Detail Information

Site No / Status: 80072 I
Status Desc: Inactive
Program / Inv No: 23U 1
Program: 23U
Inv No: 1
Inventory Type Desc: Permanent Closure (192)
Last Service / Freq: 06/27/07 1
Last Service Date: 06/27/07
Freq: 1
Call Back:
Inspector: Dubois, Tristan
Supervisor/District: SUP-DIST NO 3031
Last Service / Permit Expire: LETTER/REPORT REVIEW 03/31/95
Last Service: LETTER/REPORT REVIEW
Permit Expiration: 03/31/95
Site Nm / Supervisor / District: PG&E VACA DIXON SUBSTATION 707-452-1963 SUP-DIST NO 3031
Address / Inspector: 5221 QUINN RD VACAVILLE CA 95688 Dubois, Tristan

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	5 of10	WNW	0.17 / 912.28	83.99 / 1	PG&E: Vaca Dixon Substation 5221 QUINN RD VACAVILLE CA 95688	CERS TANK

Site ID: 399518
Latitude: 38.395585
Longitude: -121.924936

Regulated Programs

EI ID: 10148479
EI Description: Aboveground Petroleum Storage

EI ID: 10148479
EI Description: Hazardous Waste Generator

EI ID: 10148479
EI Description: RCRA LQ HW Generator

EI ID: 10148479
EI Description: Chemical Storage Facilities

Evaluations

Eval Date: 11/16/2021
Violations Found: No
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HW
Eval Source: CERS
Eval Notes:

Observed no violations; Note: data in [EVAL Notes] field for some records is truncated from the source.

Eval Date: 11/16/2021
Violations Found: No
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HMRRP
Eval Source: CERS
Eval Notes:

Affiliations

Affil Type Desc: Operator
Entity Name: Pacific Gas and Electric Company
Entity Title:
Address:
City:
State:
Country:
Zip Code:
Phone: (707) 452-1963

Affil Type Desc: Identification Signer
Entity Name: Larry Jeffris
Entity Title: Senior Manager
Address:
City:
State:
Country:
Zip Code:
Phone:

Affil Type Desc: Legal Owner
Entity Name: Pacific Gas and Electric Company
Entity Title:
Address: PO Box 7640
City: San Francisco
State: CA
Country: United States
Zip Code: 94120
Phone: (415) 973-7000

Affil Type Desc: Facility Mailing Address
Entity Name: Mailing Address
Entity Title:
Address: PO Box 7640
City: San Francisco
State: CA
Country:
Zip Code: 94120
Phone:

Affil Type Desc: Document Preparer
Entity Name: Kevin Risley
Entity Title:
Address:
City:
State:
Country:
Zip Code:
Phone:

Affil Type Desc: Parent Corporation
Entity Name: PG&E
Entity Title:
Address:
City:
State:

Country:
Zip Code:
Phone:

Affil Type Desc:	CUPA District
Entity Name:	Solano County Env Health
Entity Title:	
Address:	675 Texas Street, Suite 5500
City:	Fairfield
State:	CA
Country:	
Zip Code:	94533
Phone:	(707) 784-6765

Affil Type Desc:	Environmental Contact
Entity Name:	Kevin Risley
Entity Title:	
Address:	111 Stony Circle
City:	Santa Rosa
State:	CA
Country:	
Zip Code:	95401
Phone:	

Coordinates

Env Int Type Code:	APSA	**Longitude:**	-121.924940
Program ID:	10148479	**Coord Name:**	
Latitude:	38.395580	**Ref Point Type Desc:**	Center of a facility or station.

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	6 of10	WNW	0.17 / 912.28	83.99 / 1	PACIFIC GAS & ELECTRIC COMPANY 5221 QUINN ROAD VACAVILLE CA 95688	EMISSIONS

2007 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0
CO:	48	**ROGT:**	0
Air Basin:	SV	**COT:**	0
District:	YS	**NOXT:**	.03
COID:	SOL	**SOXT:**	
DISN:	YOLO/SOLANO AQMD	**PMT:**	
CHAPIS:		**PM10T:**	

2007 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2008 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0

CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.03
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2008 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2009 Criteria Data

Facility ID:	5524	***CERR Code:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.03
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2009 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2010 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2011 Criteria Data

Facility ID:	5524	***CERR Code:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.06
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	

CHAPIS:		**PM10T:**	

2011 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2012 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0
CO:	48	**ROGT:**	0
Air Basin:	SV	**COT:**	0
District:	YS	**NOXT:**	.06
COID:	SOL	**SOXT:**	
DISN:	YOLO/SOLANO AQMD	**PMT:**	
CHAPIS:		**PM10T:**	

2012 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2013 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0
CO:	48	**ROGT:**	0
Air Basin:	SV	**COT:**	0
District:	YS	**NOXT:**	.07
COID:	SOL	**SOXT:**	
DISN:	YOLO/SOLANO AQMD	**PMT:**	
CHAPIS:		**PM10T:**	

2013 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2014 Criteria Data

Facility ID:	5524	***CERR Code:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.07
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2014 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2015 Criteria Data

Facility ID:	5524	***CERR Code:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.07
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2015 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2016 Criteria Data

Facility ID:	5524	***CERR CODE:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	0
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2016 Toxic Data

Facility ID:	5524	***TS:***	0
Facility SIC Code:	4931	***HRA:***	
CERR CODE:		***CH Index:***	
COID:	SOL	***AH Index:***	
CO:	48	***Air Basin:***	SV
DISN:	YOLO/SOLANO AQMD	***District:***	YS

CHAPIS:

2017 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0
CO:	48	**ROGT:**	0
Air Basin:	SV	**COT:**	0
District:	YS	**NOXT:**	0
COID:	SOL	**SOXT:**	
DISN:	YOLO-SOLANO AQMD	**PMT:**	
CHAPIS:		**PM10T:**	

2017 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO-SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2018 Criteria Data

Facility ID:	5524	**CERR Code:**	
Facility SIC Code:	4931	**TOGT:**	0
CO:	48	**ROGT:**	0
Air Basin:	SV	**COT:**	0
District:	YS	**NOXT:**	0
COID:	SOL	**SOXT:**	
DISN:	YOLO-SOLANO AQMD	**PMT:**	
CHAPIS:		**PM10T:**	

2018 Toxic Data

Facility ID:	5524	**COID:**	SOL
Facility SIC Code:	4931	**DISN:**	YOLO-SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2019 Criteria Data

CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
Facility ID:	5524	**ROGT:**	0
District:	YS	**COT:**	0
Facility SIC Code:	4931	**NOXT:**	0
CO ID:	SOL	**SOXT:**	0
DISN:	YOLO-SOLANO AQMD		
PM10T:	0		
TOGT:	0		
PMT:	0		

2019 Toxic Data

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB

CO:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Faccility ID:	5524	***CERR Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4931	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2020 Criteria Data

CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
Facility ID:	5524	***ROGT:***	0
District:	YS	***COT:***	0
Facility SIC Code:	4931	***NOXT:***	0
CO ID:	SOL	***SOXT:***	0
DISN:	YOLO-SOLANO AQMD		
TOGT:	0		
PMT:	0		
PM10T:	0		

2020 Toxic Data

CO:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Facility ID:	5524	***CHERR Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4931	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2021 Toxic Data

Co:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Facility ID:	5524	***Cerr Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4931	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2021 Criteria Data

Co:	48	***CHAPIS:***	
Air Basin:	SV	***Cerr Code:***	
Facility ID:	5524	***ROGT:***	0
District:	YS	***COT:***	0
Facility SIC Code:	4931	***NOXT:***	0
CO ID:	SOL	***SOXT:***	0
DISN:	YOLO-SOLANO AQMD		
TOGT:	0		
PMT:	0		
PM10T:	0		

1	*7 of10*	*WNW*	*0.17 / 912.28*	*83.99 / 1*	***PACIFIC GAS AND ELECTRIC COMPANY 5221 QUINN ROAD VACAVILLE CA 95688***	***EMISSIONS***

2006 Criteria Data

Facility ID:	5524	***CERR Code:***	
Facility SIC Code:	4931	***TOGT:***	0
CO:	48	***ROGT:***	0
Air Basin:	SV	***COT:***	0
District:	YS	***NOXT:***	.04
COID:	SOL	***SOXT:***	
DISN:	YOLO/SOLANO AQMD	***PMT:***	
CHAPIS:		***PM10T:***	

2006 Toxic Data

Facility ID:	5524	***COID:***	SOL
Facility SIC Code:	4931	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

1	*8 of10*	*WNW*	*0.17 / 912.28*	*83.99 / 1*	***VACA-DIXON SUBSTATION 5221 QUINN ROAD VACAVILLE CA***	***HIST TANK***

Owner Name:	PACIFIC GAS & ELECT CO	***No of Containers:***	2
Owner Street:	77 BEALE	***County:***	SOLANO
Owner City:	SAN FRANCISCO	***Facility State:***	CA
Owner State:	CA	***Facility Zip:***	95688
Owner Zip:	94106		

1	*9 of10*	*WNW*	*0.17 / 912.28*	*83.99 / 1*	***PG&E VACA-DIXON SUBSTATION 5221 QUINN ROAD VACAVILLE CA 95688-9453***	***RCRA LQG***

EPA Handler ID:	CAD981398795
Gen Status Universe:	Large Quantity Generator
Contact Name:	VERONICA MORA
Contact Address:	BOX 28150 , , OAKLAND , CA, 94604 , US
Contact Phone No and Ext:	925-471-1104
Contact Email:	
Contact Country:	US
County Name:	SOLANO
EPA Region:	09
Land Type:	Private
Receive Date:	20240815
Location Latitude:	38.399254
Location Longitude:	-121.92028
Recycler Activity?:	NO
Recycler Activity Note:	This facility has no indication of Recycling Activity.

Violation/Evaluation Summary

Note:	NO RECORDS: As of Oct 2024, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility (EPA ID).

Handler Summary

Importer Activity:	No

Mixed Waste Generator: No
Transporter Activity: No
Transfer Facility: No
Onsite Burner Exemption: No
Furnace Exemption: No
Underground Injection Activity: No
Commercial TSD: No
Used Oil Transporter: No
Used Oil Transfer Facility: No
Used Oil Processor: No
Used Oil Refiner: No
Used Oil Burner: No
Used Oil Market Burner: No
Used Oil Spec Marketer: No
Recycler Activity: No
Recycler Activity Without Storage: No

<u>Hazardous Waste Handler Details</u>

Sequence No: 1
Receive Date: 19900413
Handler Name: PG&E VACA-DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator
Source Type: Annual/Biennial Report

<u>Hazardous Waste Handler Details</u>

Sequence No: 2
Receive Date: 20080301
Handler Name: VACA-DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator
Source Type: Annual/Biennial Report

<u>Waste Code Details</u>

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

<u>Hazardous Waste Handler Details</u>

Sequence No: 1
Receive Date: 20180228
Handler Name: PACIFIC GAS & ELECTRIC COMPANY
Federal Waste Generator Code: N
Generator Code Description: Not a Generator, Verified

Source Type: Annual/Biennial Report update with Notification

Waste Code Details

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: 281
Waste Code Description: Adhesives

Hazardous Waste Code: 331
Waste Code Description: Off-specification, aged, or surplus organics

Hazardous Waste Code: 343
Waste Code Description: Unspecified organic liquid mixture

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D006
Waste Code Description: CADMIUM

Hazardous Waste Code: D007
Waste Code Description: CHROMIUM

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: D035
Waste Code Description: METHYL ETHYL KETONE

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Code: F005
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Handler Details

Sequence No: 1
Receive Date: 20211221
Handler Name: VACA-DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator
Source Type: Notification

Waste Code Details

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: 281
Waste Code Description: Adhesives

Hazardous Waste Code: 331
Waste Code Description: Off-specification, aged, or surplus organics

Hazardous Waste Code: 343
Waste Code Description: Unspecified organic liquid mixture

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D006
Waste Code Description: CADMIUM

Hazardous Waste Code: D007
Waste Code Description: CHROMIUM

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: D035
Waste Code Description: METHYL ETHYL KETONE

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Code: F005
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

<u>Hazardous Waste Handler Details</u>

Sequence No: 2
Receive Date: 20220228
Handler Name: VACA-DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator
Source Type: Annual/Biennial Report update with Notification

<u>Waste Code Details</u>

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: 281
Waste Code Description: Adhesives

Hazardous Waste Code: 331
Waste Code Description: Off-specification, aged, or surplus organics

Hazardous Waste Code: 343
Waste Code Description: Unspecified organic liquid mixture

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D006
Waste Code Description: CADMIUM

Hazardous Waste Code: D007
Waste Code Description: CHROMIUM

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: D035
Waste Code Description: METHYL ETHYL KETONE

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Code: F005
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

<u>Hazardous Waste Handler Details</u>

Sequence No: 3
Receive Date: 20240227
Handler Name: VACA-DIXON SUBSTATION
Federal Waste Generator Code: 2
Generator Code Description: Small Quantity Generator
Source Type: Annual/Biennial Report update with Notification

<u>Waste Code Details</u>

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: 281
Waste Code Description: Adhesives

Hazardous Waste Code: 331
Waste Code Description: Off-specification, aged, or surplus organics

Hazardous Waste Code: 343
Waste Code Description: Unspecified organic liquid mixture

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D006

Waste Code Description: CADMIUM

Hazardous Waste Code: D007
Waste Code Description: CHROMIUM

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: D035
Waste Code Description: METHYL ETHYL KETONE

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Code: F005
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Handler Details

Sequence No: 2
Receive Date: 20240815
Handler Name: PG&E VACA-DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator
Source Type: Notification

Waste Code Details

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: 281
Waste Code Description: Adhesives

Hazardous Waste Code: 331
Waste Code Description: Off-specification, aged, or surplus organics

Hazardous Waste Code: 343
Waste Code Description: Unspecified organic liquid mixture

Hazardous Waste Code: D001
Waste Code Description: IGNITABLE WASTE

Hazardous Waste Code: D002
Waste Code Description: CORROSIVE WASTE

Hazardous Waste Code: D003
Waste Code Description: REACTIVE WASTE

Hazardous Waste Code: D006
Waste Code Description: CADMIUM

Hazardous Waste Code: D007
Waste Code Description: CHROMIUM

Hazardous Waste Code: D008
Waste Code Description: LEAD

Hazardous Waste Code: D035
Waste Code Description: METHYL ETHYL KETONE

Hazardous Waste Code: F003
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Hazardous Waste Code: F005
Waste Code Description: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Owner/Operator Details

Owner/Operator Ind:	Current Owner	***Street No:***	PG&E-EPA IDS
Type:	Private	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	PG&E-EPA IDS
Dt Became Current:	19060101	***City:***	PO BOX 7640
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Notification	***Zip Code:***	94120

Owner/Operator Ind:	Current Owner	***Street No:***	77
Type:	County	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19060101	***City:***	SAN FRANCISCO
Dt Ended Current:		***State:***	CA
Phone:	209-323-9617	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94105

Owner/Operator Ind:	Current Operator	***Street No:***	77
Type:	Private	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19060101	***City:***	SAN FRANCISCO
Dt Ended Current:		***State:***	CA
Phone:	209-323-9617	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94105

Owner/Operator Ind:	Current Owner	***Street No:***	300
Type:	Other	***Street 1:***	LAKESIDE DRIVE
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	OAKLAND
Dt Ended Current:		***State:***	CA
Phone:	925-471-1104	***Country:***	US
Source Type:	Notification	***Zip Code:***	94612

Owner/Operator Ind:	Current Operator	***Street No:***	77
Type:	Private	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	PO BOX 7640
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94120

Owner/Operator Ind:	Current Owner	***Street No:***	300
Type:	Private	***Street 1:***	LAKESIDE DRIVE

Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	OAKLAND
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94612

Owner/Operator Ind:	Current Operator	***Street No:***	300
Type:	Other	***Street 1:***	LAKESIDE DRIVE
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	OAKLAND
Dt Ended Current:		***State:***	CA
Phone:	925-471-1104	***Country:***	US
Source Type:	Notification	***Zip Code:***	94612

Owner/Operator Ind:	Current Owner	***Street No:***	77
Type:	Private	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	PO BOX 7640
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94120

Owner/Operator Ind:	Current Operator	***Street No:***	PG&E-EPA IDS
Type:	Private	***Street 1:***	BEALE ST
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	PG&E-EPA IDS
Dt Became Current:	19060101	***City:***	PO BOX 7640
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Notification	***Zip Code:***	94120

Owner/Operator Ind:	Current Operator	***Street No:***	300
Type:	Private	***Street 1:***	LAKESIDE DRIVE
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19051010	***City:***	OAKLAND
Dt Ended Current:		***State:***	CA
Phone:	925-597-7321	***Country:***	US
Source Type:	Annual/Biennial Report update with Notification	***Zip Code:***	94612

Owner/Operator Ind:	Current Owner	***Street No:***	
Type:	Private	***Street 1:***	BEALE STREET
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19200101	***City:***	SAN FRANCISCO
Dt Ended Current:		***State:***	CA
Phone:		***Country:***	US
Source Type:	Annual/Biennial Report	***Zip Code:***	94105

Owner/Operator Ind:	Current Operator	***Street No:***	
Type:	Private	***Street 1:***	
Name:	PACIFIC GAS AND ELECTRIC COMPANY	***Street 2:***	
Dt Became Current:	19200101	***City:***	
Dt Ended Current:		***State:***	
Phone:		***Country:***	US
Source Type:	Annual/Biennial Report	***Zip Code:***	

<u>Historical Handler Details</u>

Receive Dt: 20240227
Generator Code Description: Small Quantity Generator
Handler Name: VACA-DIXON SUBSTATION

Receive Dt: 20220228
Generator Code Description: Large Quantity Generator
Handler Name: VACA-DIXON SUBSTATION

Receive Dt: 20211221
Generator Code Description: Large Quantity Generator
Handler Name: VACA-DIXON SUBSTATION

Receive Dt: 20180228
Generator Code Description: Not a Generator, Verified
Handler Name: PACIFIC GAS & ELECTRIC COMPANY

Receive Dt: 20080301
Generator Code Description: Large Quantity Generator
Handler Name: VACA-DIXON SUBSTATION

Receive Dt: 19900413
Generator Code Description: Large Quantity Generator
Handler Name: PG&E VACA-DIXON SUBSTATION

1	*10 of10*	*WNW*	*0.17 / 912.28*	*83.99 / 1*	***PG&E VACA DIXON SUBSTATION 5221 QUINN RD VACAVILLE CA 95688***	**RCRA LQG**

EPA Handler ID: CAR000377093
Gen Status Universe: Large Quantity Generator
Contact Name: VERONICA MORA
Contact Address: PO BOX 28150 , , OAKLAND , CA, 94604 , US
Contact Phone No and Ext: 925-471-1104
Contact Email:
Contact Country: US
County Name: SOLANO
EPA Region: 09
Land Type: Private
Receive Date: 20240813
Location Latitude: 38.39953
Location Longitude: -121.919933
Recycler Activity?: NO
Recycler Activity Note: This facility has no indication of Recycling Activity.

Violation/Evaluation Summary

Note: NO RECORDS: As of Oct 2024, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility (EPA ID).

Handler Summary

Importer Activity: No
Mixed Waste Generator: No
Transporter Activity: No
Transfer Facility: No
Onsite Burner Exemption: No
Furnace Exemption: No
Underground Injection Activity: No
Commercial TSD: No
Used Oil Transporter: No
Used Oil Transfer Facility: No
Used Oil Processor: No
Used Oil Refiner: No
Used Oil Burner: No
Used Oil Market Burner: No
Used Oil Spec Marketer: No
Recycler Activity: No
Recycler Activity Without Storage: No

Hazardous Waste Handler Details

Sequence No: 1
Receive Date: 20240813
Handler Name: PG&E VACA DIXON SUBSTATION
Federal Waste Generator Code: 1
Generator Code Description: Large Quantity Generator

Source Type: Notification

Waste Code Details

Hazardous Waste Code: 181
Waste Code Description: Other inorganic solid waste

Hazardous Waste Code: D003
Waste Code Description: REACTIVE WASTE

Owner/Operator Details

Owner/Operator Ind:	Current Operator	**Street No:**	300
Type:	Other	**Street 1:**	LAKESIDE DRIVE
Name:	PACIFIC GAS AND ELECTRIC COMPANY	**Street 2:**	
Dt Became Current:	19051010	**City:**	OAKLAND
Dt Ended Current:		**State:**	CA
Phone:	925-471-1104	**Country:**	US
Source Type:	Notification	**Zip Code:**	94612

Owner/Operator Ind:	Current Owner	**Street No:**	300
Type:	Other	**Street 1:**	LAKESIDE DRIVE
Name:	PACIFIC GAS AND ELECTRIC COMPANY	**Street 2:**	
Dt Became Current:	19051010	**City:**	OAKLAND
Dt Ended Current:		**State:**	CA
Phone:	925-471-1104	**Country:**	US
Source Type:	Notification	**Zip Code:**	94612

2	1 of1	NE	0.22 / 1,169.11	80.37 / -2	VACAVILLE AERO SERVICE 707-447-4500 5419 WEBER RD VACAVILLE CA 95687 CA	CUPA SOLANO

Site No: 80121
Program: 21M
Freq: 1

Detail Information

Inv No:	1	**Last Service:**	
Status Desc:	INACTIVE	**Call Back:**	
Permit Expiration:		**Inspector:**	Dubois, Tristan
Inventory Type Desc:	1 - 4 Personnel, SUBMITTAL TO CERS DUE (161)	**Supervisor / District:**	SUP-DIST NO 3031
Last Service Dt:			

3	1 of4	WNW	0.24 / 1,280.94	84.94 / 2	CALPEAK POWER-VACA DIXON, LLC 619-229-3770 5157 QUINN RD VACAVILLE CA 94588 CA	CUPA SOLANO

Site No: 80939
Program: 21M
Freq: 1

Detail Information

Inv No:	1	**Last Service:**	Return to Compliance
Status Desc:	ACTIVE	**Call Back:**	
Permit Expiration:	07/31/21	**Inspector:**	Dubois, Tristan
Inventory Type Desc:	<10 Pers > 10,000 Gallons CERS SUBM. DUE	**Supervisor / District:**	SUP-DIST NO 3031

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB

Last Service Dt: (168) 04/09/18

3	2 of4	WNW	0.24 / 1,280.94	84.94 / 2	CALPEAK POWER - VACA DIXON, LLC 5157 QUINN ROAD VACAVILLE CA 95688	EMISSIONS

2007 Criteria Data

Facility ID: 5409
Facility SIC Code: 4911
CO: 48
Air Basin: SV
District: YS
COID: SOL
DISN: YOLO/SOLANO AQMD
CHAPIS:
CERR Code:
TOGT: 1.9693654266958424507658643326039387308 5
ROGT: .18
COT: .41
NOXT: .52
SOXT: .18
PMT: .432595573440643863179074446680080482897 4
PM10T: .43

2007 Toxic Data

Facility ID: 5409
Facility SIC Code: 4911
CO: 48
Air Basin: SV
District: YS
TS:
Health Risk Asmt:
Non-Cancer Chronic Haz Ind:
Non-Cancer Acute Haz Ind:
COID: SOL
DISN: YOLO/SOLANO AQMD
CHAPIS:
CERR Code:

2008 Criteria Data

Facility ID: 5409
Facility SIC Code: 4911
CO: 48
Air Basin: SV
District: YS
COID: SOL
DISN: YOLO/SOLANO AQMD
CHAPIS:
CERR Code:
TOGT: 1.2035010940919037199124726477024070021 9
ROGT: .11
COT: .25
NOXT: .34
SOXT: .11
PMT: .261569416498993963782696177062374245472 8
PM10T: .26

2008 Toxic Data

Facility ID: 5409
Facility SIC Code: 4911
CO: 48
Air Basin: SV
District: YS
TS:
Health Risk Asmt:
Non-Cancer Chronic Haz Ind:
Non-Cancer Acute Haz Ind:
COID: SOL
DISN: YOLO/SOLANO AQMD
CHAPIS:
CERR Code:

2009 Criteria Data

Facility ID:	5409	***CERR Code:***	
Facility SIC Code:	4911	***TOGT:***	2.2975929978118161925601750547045951 86
CO:	48	***ROGT:***	.21
Air Basin:	SV	***COT:***	.08
District:	YS	***NOXT:***	.65
COID:	SOL	***SOXT:***	.2
DISN:	YOLO/SOLANO AQMD	***PMT:***	.482897384305835010060362173038229376 2575
CHAPIS:		***PM10T:***	.48

2009 Toxic Data

Facility ID:	5409	***COID:***	SOL
Facility SIC Code:	4911	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2010 Toxic Data

Facility ID:	5409	***COID:***	SOL
Facility SIC Code:	4911	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2011 Criteria Data

Facility ID:	5409	***CERR Code:***	
Facility SIC Code:	4911	***TOGT:***	.87527352297592997811816192560175054704 6
CO:	48	***ROGT:***	.08
Air Basin:	SV	***COT:***	.04
District:	YS	***NOXT:***	.24
COID:	SOL	***SOXT:***	.08
DISN:	YOLO/SOLANO AQMD	***PMT:***	.18108651911468812877263581488933601609 66
CHAPIS:		***PM10T:***	.18

2011 Toxic Data

Facility ID:	5409	***COID:***	SOL
Facility SIC Code:	4911	***DISN:***	YOLO/SOLANO AQMD
CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2012 Criteria Data

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	1.96936542669584245076586433260393873085
CO:	48	**ROGT:**	.18
Air Basin:	SV	**COT:**	.93
District:	YS	**NOXT:**	.52
COID:	SOL	**SOXT:**	.18
DISN:	YOLO/SOLANO AQMD	**PMT:**	.4124748490945674044265593561368209255533
CHAPIS:		**PM10T:**	.41

<u>***2012 Toxic Data***</u>

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:			
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

<u>***2013 Criteria Data***</u>

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	1.96936542669584245076586433260393873085
CO:	48	**ROGT:**	.18
Air Basin:	SV	**COT:**	.93
District:	YS	**NOXT:**	.52
COID:	SOL	**SOXT:**	.18
DISN:	YOLO/SOLANO AQMD	**PMT:**	.4124748490945674044265593561368209255533
CHAPIS:		**PM10T:**	.41

<u>***2013 Toxic Data***</u>

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

<u>***2014 Criteria Data***</u>

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	2.14822771213748657357679914070891514501
CO:	48	**ROGT:**	.2
Air Basin:	SV	**COT:**	1.03
District:	YS	**NOXT:**	.57
COID:	SOL	**SOXT:**	.19
DISN:	YOLO/SOLANO AQMD	**PMT:**	.4627766599597585513078470824949698189135
CHAPIS:		**PM10T:**	.46

2014 Toxic Data

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2015 Criteria Data

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	2.1482277121374865735767991407089151450 1
CO:	48	**ROGT:**	.2
Air Basin:	SV	**COT:**	1.03
District:	YS	**NOXT:**	.57
COID:	SOL	**SOXT:**	.19
DISN:	YOLO/SOLANO AQMD	**PMT:**	. 462776659959758551307847082494969818913 5
CHAPIS:	N	**PM10T:**	.46

2015 Toxic Data

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO/SOLANO AQMD
CO:	48	**CHAPIS:**	N
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2016 Criteria Data

Facility ID:	5409	**CERR CODE:**	
Facility SIC Code:	4911	**TOGT:**	2.2556390977443609022556390977443609022 6
CO:	48	**ROGT:**	.21
Air Basin:	SV	**COT:**	.42
District:	YS	**NOXT:**	.72
COID:	SOL	**SOXT:**	.21
DISN:	YOLO/SOLANO AQMD	**PMT:**	. 482897384305835010060362173038229376257 5
CHAPIS:		**PM10T:**	.48

2016 Toxic Data

Facility ID:	5409	**TS:**	0
Facility SIC Code:	4911	**HRA:**	
CERR CODE:		**CH Index:**	
COID:	SOL	**AH Index:**	
CO:	48	**Air Basin:**	SV
DISN:	YOLO/SOLANO AQMD	**District:**	YS
CHAPIS:			

2017 Criteria Data

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	1.61117078410311493018259935553168635875
CO:	48	**ROGT:**	.15
Air Basin:	SV	**COT:**	.76
District:	YS	**NOXT:**	.43
COID:	SOL	**SOXT:**	.14
DISN:	YOLO-SOLANO AQMD	**PMT:**	.3420523138832997987927565392354124748491
CHAPIS:		**PM10T:**	.34

2017 Toxic Data

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO-SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2018 Criteria Data

Facility ID:	5409	**CERR Code:**	
Facility SIC Code:	4911	**TOGT:**	1.82599355531686358754027926960257787325
CO:	48	**ROGT:**	.17
Air Basin:	SV	**COT:**	.23
District:	YS	**NOXT:**	.67
COID:	SOL	**SOXT:**	.17
DISN:	YOLO-SOLANO AQMD	**PMT:**	.4024144869215291750503018108651911468813
CHAPIS:		**PM10T:**	.4

2018 Toxic Data

Facility ID:	5409	**COID:**	SOL
Facility SIC Code:	4911	**DISN:**	YOLO-SOLANO AQMD
CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
District:	YS		
TS:	0		
Health Risk Asmt:			
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

2019 Criteria Data

CO:	48	**CHAPIS:**	
Air Basin:	SV	**CERR Code:**	
Facility ID:	5409	**ROGT:**	.12
District:	YS	**COT:**	.23
Facility SIC Code:	4911	**NOXT:**	.52
CO ID:	SOL	**SOXT:**	.12
DISN:	YOLO-SOLANO AQMD		
PM10T:	.29		
TOGT:	1.288936627282491944146079484425349087		
PMT:	.2917505030181086519114688128772635814889		

__*2019 Toxic Data*__

CO:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Faccility ID:	5409	***CERR Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4911	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

__*2020 Criteria Data*__

CO:	48	***CHAPIS:***	
Air Basin:	SV	***CERR Code:***	
Facility ID:	5409	***ROGT:***	.02
District:	YS	***COT:***	.77
Facility SIC Code:	4911	***NOXT:***	1.08
CO ID:	SOL	***SOXT:***	.25
DISN:	YOLO-SOLANO AQMD		
TOGT:	.2148227712137486573576799140708915145005		
PMT:	.6036217303822937625754527162977867203219		
PM10T:	.6		

__*2020 Toxic Data*__

CO:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Facility ID:	5409	***CHERR Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4911	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

__*2021 Toxic Data*__

Co:	48	***DISN:***	YOLO-SOLANO AQMD
Air Basin:	SV	***CHAPIS:***	
Facility ID:	5409	***Cerr Code:***	
District:	YS	***TS:***	0
Facility SIC Code:	4911	***Health Risk Asmt:***	
COID:	SOL		
Non-Cancer Chronic Haz Ind:			
Non-Cancer Acute Haz Ind:			

__*2021 Criteria Data*__

Co:	48	***CHAPIS:***	
Air Basin:	SV	***Cerr Code:***	
Facility ID:	5409	***ROGT:***	.31
District:	YS	***COT:***	1.63
Facility SIC Code:	4911	***NOXT:***	.9
CO ID:	SOL	***SOXT:***	.31
DISN:	YOLO-SOLANO AQMD		
TOGT:	3.329752953813104189044038668098818474 76		
PMT:	.7243460764587525150905432595573440643863		
PM10T:	.72		

3	***3 of4***	***WNW***	***0.24 / 1,280.94***	***84.94 / 2***	***CALPEAK POWER-VACA DIXON LLC***	***RCRA NON GEN***

5157 QUINN RD
VACAVILLE CA 95688-9452

EPA Handler ID:	CAL000233781
Gen Status Universe:	No Report
Contact Name:	MATTHEW LYDON
Contact Address:	9405 ARROWPOINT BLVD , , CHARLOTTE , CA, 28273 ,
Contact Phone No and Ext:	704-672-2799
Contact Email:	MATTLYDON@COGENTRIX.COM
Contact Country:	
County Name:	SOLANO
EPA Region:	09
Land Type:	
Receive Date:	20011114
Location Latitude:	38.399039
Location Longitude:	-121.920552
Recycler Activity?:	NO
Recycler Activity Note:	This facility has no indication of Recycling Activity.

Violation/Evaluation Summary

Note:	NO RECORDS: As of Oct 2024, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility (EPA ID).

Handler Summary

Importer Activity:	No
Mixed Waste Generator:	No
Transporter Activity:	No
Transfer Facility:	No
Onsite Burner Exemption:	No
Furnace Exemption:	No
Underground Injection Activity:	No
Commercial TSD:	No
Used Oil Transporter:	No
Used Oil Transfer Facility:	No
Used Oil Processor:	No
Used Oil Refiner:	No
Used Oil Burner:	No
Used Oil Market Burner:	No
Used Oil Spec Marketer:	No
Recycler Activity:	No
Recycler Activity Without Storage:	No

Hazardous Waste Handler Details

Sequence No:	1
Receive Date:	20011114
Handler Name:	CALPEAK POWER-VACA DIXON LLC
Source Type:	Implementer
Federal Waste Generator Code:	N
Generator Code Description:	Not a Generator, Verified

Owner/Operator Details

Owner/Operator Ind:	Current Operator	***Street No:***	
Type:	Other	***Street 1:***	9405 ARROWPOINT BLVD
Name:	MATTHEW LYDON	***Street 2:***	
Date Became Current:		***City:***	CHARLOTTE
Date Ended Current:		***State:***	CA
Phone:	704-672-2799	***Country:***	
Source Type:	Implementer	***Zip Code:***	28273

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB

Owner/Operator Ind:	Current Owner	**Street No:**	
Type:	Other	**Street 1:**	9405 ARROWPOINT BLVD
Name:	CALPEAK POWER OPERATING SERVICES	**Street 2:**	
Date Became Current:		**City:**	SAN DIEGO
Date Ended Current:		**State:**	CA
Phone:	704-525-3800	**Country:**	
Source Type:	Implementer	**Zip Code:**	92120-0000

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
3	4 of4	WNW	0.24 / 1,280.94	84.94 / 2	CalPeak Power - Vaca Dixon 5157 QUINN RD VACAVILLE CA 95688	CERS TANK

Site ID: 102334
Latitude: 38.399000
Longitude: -121.923900

Regulated Programs

EI ID: 10155497
EI Description: Chemical Storage Facilities

EI ID: 10155497
EI Description: Hazardous Chemical Management

EI ID: 10155497
EI Description: Hazardous Waste Generator

EI ID: 10155497
EI Description: Aboveground Petroleum Storage

Violations

Violation Date:	06/11/2014	**Violation Source:**	CERS
Violation Program:	HMRRP	**Violation Division:**	Solano County Environmental Health

Citation: HSC 6.95 Multiple - California Health and Safety Code, Chapter 6.95, Section(s) Multiple
Violation Notes:

Returned to compliance on 12/30/2014. Label yellow haz mat containers to indicate hazardous material/waste contained

Violation Description:

Business Plan Program - Operations/Maintenance - General

Violations

Violation Date:	06/11/2014	**Violation Source:**	CERS
Violation Program:	CalARP	**Violation Division:**	Solano County Environmental Health

Citation: 19 CCR 4.5 2755.3(a)(b) - California Code of Regulations, Title 19, Chapter 4.5, Section(s) 2755.3(a)(b)
Violation Notes:

Returned to compliance on 12/30/2014. 1. Recommend updating the unloading check list to state verification of transfer hose service life 2. Develop method to ensure that hose connections are leak tight 3. Include breakaway connection cable attachment to check list - ammonia unloading. *Note: Please perform Management of Change procedure for all piping/procedure revisions. Submit work plan for RTC by 7/11/2014

Violation Description:

Failure to prepare written operating procedures that provide clear instructions or steps for safely conducting activities associated with each covered process consistent with the safety information for that process and address the following:
1. Initial startup;
2. Normal operations;
3. Temporary operations;
4. Emergency shutdown and operations;
5. Normal shutdown;
6. Startup following a normal or emergency shutdown or a major change that requires a hazard review;
7. Consequences of deviations and steps required to correct or avoid deviations;

8. Equipment inspections.

Violations

Violation Date: 04/17/2017
Violation Source: CERS
Violation Program: CalARP
Violation Division: Solano County Environmental Health
Citation: 19 CCR 4.5 2755.5(d) - California Code of Regulations, Title 19, Chapter 4.5, Section(s) 2755.5(d)
Violation Notes:

Violation Description:

Failure to perform or cause to be performed inspections and tests on process equipment that:
1. Follow recognized and generally accepted good engineering practices;
2. The frequency of inspections & tests must be consistent with applicable manufacturer's recommendations, industry standards or codes, good engineering practices and prior operating experience).

Violations

Violation Date: 04/17/2017
Violation Source: CERS
Violation Program: CalARP
Violation Division: Solano County Environmental Health
Citation: 19 CCR 4.5 2755.2(a) - California Code of Regulations, Title 19, Chapter 4.5, Section(s) 2755.2(a)
Violation Notes:

Violation Description:

Failure to conduct a review of the hazards associated with the regulated substances, process, and procedures that identifies the following:
1. The hazards associated with the process and regulated substances;
2. Opportunities for equipment malfunctions or human errors that could cause an accidental release;
3. The safeguards used or needed to control the hazards or prevent equipment malfunction or human error;
4. Any steps used or needed to detect or monitor releases.

Violations

Violation Date: 06/11/2014
Violation Source: CERS
Violation Program: HMRRP
Violation Division: Solano County Environmental Health
Citation: HSC 6.95 25510 - California Health and Safety Code, Chapter 6.95, Section(s) 25510
Violation Notes:

Returned to compliance on 12/30/2014. Observed transformer with 5340 gallon capacity on site, but not listed on CERS inventory. Update CERS inventory

Violation Description:

Failure to update hazardous material inventory within 30 days when one of the following occurs:
A 100 percent or more increase in the quantity of a previously disclosed material.
Any handling of a previously undisclosed hazardous materials A change of business address, business ownership, or business name.

Violations

Violation Date: 04/17/2017
Violation Source: CERS
Violation Program: CalARP
Violation Division: Solano County Environmental Health
Citation: 19 CCR 4.5 2755.6(d) - California Code of Regulations, Title 19, Chapter 4.5, Section(s) 2755.6(d)
Violation Notes:

Violation Description:

Failure to:
1. Promptly determine and document an appropriate response to each of the findings of the compliance audit;
2. Enter into an agreement with the AA on a timetable for resolution of these findings. Otherwise these responses shall be completed one and one-half (1.5) years after performing the compliance audit, or the next planned turnaround for items requiring a turnaround (these timelines shall not apply to any compliance audit completed prior to January 1, 2015);
3. Document the actual completion dates when deficiencies were corrected.

Violations

Violation Date:	04/17/2017	***Violation Source:***	CERS
Violation Program:	HMRRP	***Violation Division:***	Solano County Environmental Health
Citation:	HSC 6.95 Multiple - California Health and Safety Code, Chapter 6.95, Section(s) Multiple		
Violation Notes:			

Returned to compliance on 02/13/2018.

Violation Description:

Business Plan Program - Operations/Maintenance - General

Violations

Violation Date:	06/11/2014	***Violation Source:***	CERS
Violation Program:	CalARP	***Violation Division:***	Solano County Environmental Health
Citation:	19 CCR 4.5 2755.2(b) - California Code of Regulations, Title 19, Chapter 4.5, Section(s) 2755.2(b)		
Violation Notes:			

Returned to compliance on 12/30/2014. Last Hazard Review performed 6/8/2011, please contact Solano County CUPA prior to next Hazard Review to discuss method. Submit work plan for RTC by 7/11/2014

Violation Description:

Failure to consult with the AA to decide which hazard review methodology is best suited to determine and evaluate the hazards of the process being analyzed.

Violations

Violation Date:	04/17/2017	***Violation Source:***	CERS
Violation Program:	CalARP	***Violation Division:***	Solano County Environmental Health
Citation:	19 CCR 4.5 Multiple - California Code of Regulations, Title 19, Chapter 4.5, Section(s) Multiple		
Violation Notes:			

Violation Description:

CalARP Program - Training - General

Violations

Violation Date:	06/11/2014	***Violation Source:***	CERS
Violation Program:	HW	***Violation Division:***	Solano County Environmental Health
Citation:	22 CCR 12 66262.34(f) - California Code of Regulations, Title 22, Chapter 12, Section(s) 66262.34(f)		
Violation Notes:			

Returned to compliance on 12/30/2014. Observed unlabeled 5 gallon bucket. Properly label or dispose of

Violation Description:

Failure to properly label hazardous waste accumulation containers with the following requirements: "Hazardous Waste", name and address of the generator, physical and chemical characteristics of the Hazardous Waste, and starting accumulation date.

Evaluations

Eval Date:	04/17/2017
Violations Found:	No
Eval General Type:	Compliance Evaluation Inspection
Eval Type:	Routine done by local agency

Eval Division: Solano County Environmental Health
Eval Program: HW
Eval Source: CERS
Eval Notes:

Eval Date: 08/26/2021
Violations Found: No
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HMRRP
Eval Source: CERS
Eval Notes:

Colby LaPlace on site for CALARP, HMBP, and HazWaste inspections. For HMBP no Violation noted.; Note: data in [EVAL Notes] field for some records is truncated from the source.

Eval Date: 04/17/2017
Violations Found: Yes
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HMRRP
Eval Source: CERS
Eval Notes:

Eval Date: 06/11/2014
Violations Found: Yes
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HMRRP
Eval Source: CERS
Eval Notes:

Eval Date: 04/17/2017
Violations Found: Yes
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: CalARP
Eval Source: CERS
Eval Notes:

Eval Date: 06/11/2014
Violations Found: Yes
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: CalARP
Eval Source: CERS
Eval Notes:

Program Level 2. Non-staffed location monitored continuously from San Diego head office; Note: data in [EVAL Notes] field for some records is truncated from the source.

Eval Date: 06/11/2014
Violations Found: Yes
Eval General Type: Compliance Evaluation Inspection
Eval Type: Routine done by local agency
Eval Division: Solano County Environmental Health
Eval Program: HW
Eval Source: CERS
Eval Notes:

Eval Date:	08/26/2021
Violations Found:	No
Eval General Type:	Compliance Evaluation Inspection
Eval Type:	Routine done by local agency
Eval Division:	Solano County Environmental Health
Eval Program:	HW
Eval Source:	CERS
Eval Notes:	

Inspected on 8/26/2021 by Colby LaPlace. No Violations.; Note: data in [EVAL Notes] field for some records is truncated from the source.

Eval Date:	08/26/2021
Violations Found:	No
Eval General Type:	Compliance Evaluation Inspection
Eval Type:	Routine done by local agency
Eval Division:	Solano County Environmental Health
Eval Program:	CalARP
Eval Source:	CERS
Eval Notes:	

ON SITE INSPECTION; Note: data in [EVAL Notes] field for some records is truncated from the source.

<u>Affiliations</u>

Affil Type Desc:	Legal Owner
Entity Name:	CalPeak Power - Vaca Dixon, LLC
Entity Title:	
Address:	4350 Executive Drive, Suite 320
City:	San Diego
State:	CA
Country:	United States
Zip Code:	92121
Phone:	(619) 229-3770

Affil Type Desc:	Environmental Contact
Entity Name:	Tony Gilmore
Entity Title:	
Address:	4350 Executive Drive, Suite 320
City:	San Diego
State:	CA
Country:	
Zip Code:	92121
Phone:	

Affil Type Desc:	Identification Signer
Entity Name:	Ramiro Gonzalez
Entity Title:	Plant Manager
Address:	
City:	
State:	
Country:	
Zip Code:	
Phone:	

Affil Type Desc:	Parent Corporation
Entity Name:	CalPeak Power, LLC
Entity Title:	
Address:	
City:	
State:	
Country:	
Zip Code:	
Phone:	

Affil Type Desc: Operator
Entity Name: CalPeak Power - Vaca Dixon, LLC
Entity Title:
Address:
City:
State:
Country:
Zip Code:
Phone: (619) 229-3770

Affil Type Desc: Document Preparer
Entity Name: Tony Gilmore
Entity Title:
Address:
City:
State:
Country:
Zip Code:
Phone:

Affil Type Desc: Facility Mailing Address
Entity Name: Mailing Address
Entity Title:
Address: 4350 Executive Drive, Suite 320
City: San Diego
State: CA
Country:
Zip Code: 92121
Phone:

Affil Type Desc: CUPA District
Entity Name: Solano County Env Health
Entity Title:
Address: 675 Texas Street, Suite 5500
City: Fairfield
State: CA
Country:
Zip Code: 94533
Phone: (707) 784-6765

Coordinates

Env Int Type Code: CalARP
Program ID: 10155497
Latitude: 38.400631
Longitude: -121.921288
Coord Name:
Ref Point Type Desc: Unknown

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
4	1 of1	WSW	0.44 / 2,305.13	87.24 / 5	West Coast Railroad 5119 QUINN RD VACAVILLE CA 95688	DELISTED HAZ

Siteid: 170975
Latitude: 38.394372
Longitude: -121.926487
Original Source: CHAZ
Record Date: 30-MAY-2017

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
5	1 of1	WNW	0.45 / 2,378.57	88.47 / 6	GIBSON CANYON CREEK WWTP 7050 Leisure Town Road VACAVILLE CA 95688	LDS

Global ID: L10004421981
Facility ID: L10004421981
Cleanup Status: OPEN
Site Facility Type: LAND DISPOSAL SITE
Address: 7050 Leisure Town Road
RWQCB Region: CENTRAL VALLEY RWQCB (REGION 5S)
Longitude: -121.926926248169
Latitude: 38.4049132269394

City:	VACAVILLE
County:	Solano
State:	CA
Zip:	95688

<u>GeoTracker Sites Data Download – Site Details</u>

RB Case No:	5A48SC00002
Loc Case No:	
Status:	Open
Status Date:	1/1/1965
Begin Date:	
Case Type:	Land Disposal Site
Cal Enviroscreen:	
Qty Released Gallons:	
CUF Case:	
EPA Region:	9
Lead Agency:	CENTRAL VALLEY RWQCB (REGION 5S)
Case Worker:	
Local Agency:	
File Location:	
Potential COC:	
Military DoD Site:	No
Leak Reported Dt:	
No Further Action Dt:	
Potential Media of Concern:	
How Discovered:	
How Discovered Description:	
Stop Method:	
Stop Description:	
Calwater Watershed Name:	Valley Putah-Cache - Elmira (511.10)
DWR GW Subbasin Name:	Sacramento Valley - Solano (5-021.66)
Disadvantaged Community:	
Discharge Cause:	
Coordinate Source:	Google Map Move
Discharge Source:	
Facility Project Sub Type:	Unknown
Calenviroscreen 3 Score:	51-55%
Calenviroscreen 4 Score:	55-60%
Claim No:	
Claim Status:	
Site History:	

<u>GeoTracker Sites Data Download - Reg Activity</u>

Date:	2024-08-30 00:00:00
Action:	Correspondence
Action Type:	RESPONSE
Date:	2024-04-17 00:00:00
Action:	Correspondence
Action Type:	RESPONSE
Date:	2024-03-20 00:00:00
Action:	Staff Letter
Action Type:	ENFORCEMENT
Date:	2021-04-29 00:00:00
Action:	Staff Letter
Action Type:	ENFORCEMENT
Date:	2017-07-11 00:00:00
Action:	Site Visit / Inspection / Sampling
Action Type:	ENFORCEMENT
Date:	2009-12-10 00:00:00

Action:	Waste Discharge Requirements - #R5-2009-0116
Action Type:	ENFORCEMENT
Date:	2009-06-09 00:00:00
Action:	Waste Discharge Requirements
Action Type:	ENFORCEMENT
Date:	2005-07-14 00:00:00
Action:	Staff Letter - #R5-2004-0021
Action Type:	ENFORCEMENT
Date:	2005-06-30 00:00:00
Action:	Corrective Action Plan / Remedial Action Plan
Action Type:	RESPONSE
Date:	2005-06-24 00:00:00
Action:	Cease and Desist Order - #R5-2005-0088
Action Type:	ENFORCEMENT
Date:	2005-02-01 00:00:00
Action:	Other Report / Document
Action Type:	RESPONSE
Date:	2005-02-01 00:00:00
Action:	Post Closure Maintenance Plan
Action Type:	RESPONSE
Date:	2004-11-01 00:00:00
Action:	Site Assessment Report
Action Type:	RESPONSE
Date:	2004-03-01 00:00:00
Action:	Soil and Water Investigation Workplan
Action Type:	RESPONSE
Date:	2004-01-30 00:00:00
Action:	Waste Discharge Requirements - #R5-2004-0021
Action Type:	ENFORCEMENT
Date:	2004-01-30 00:00:00
Action:	Waste Discharge Requirements
Action Type:	ENFORCEMENT
Date:	2000-06-16 00:00:00
Action:	Waste Discharge Requirements - #R5-2000-172
Action Type:	ENFORCEMENT

GeoTracker Sites Data Download - Regulatory Contacts

Contact Type:	Regional Board Caseworker - Primary Caseworker
Contact Name:	JARROD RAMSEY-LEWIS
Organization Name:	CENTRAL VALLEY RWQCB (REGION 5S)
Address:	11020 Sun Center Drive, Suite 200
City:	RANCHO CORDOVA
Email:	jarrod.ramsey-lewis@waterboards.ca.gov
Phone No:	9163145799

GeoTracker Search - Facilities (as of Sep 25, 2024)

Site Facility Name:	GIBSON CANYON CREEK WWTP
Site Facility Type:	LAND DISPOSAL SITE
Cleanup Status:	OPEN
Project Status:	
Potential COC:	NONE SPECIFIED
WDR Place Type:	
Wdr File No:	
Wdr Order No:	

Address: 7050 LEISURE TOWN ROAD
City: VACAVILLE
Zip: 95688
County: SOLANO
Cuf Claim No:
CUF Priority Assig:
CUF Amount Paid:
Designated Beneficial Use: MUN, AGR, IND, PROC
Designated Benefic Use Desc: Municipal and Domestic Supply, Agricultural Supply, Industrial Service Supply, Industrial Process Supply
Project Oversight Agencies:
Report Link: https://geotracker.waterboards.ca.gov/profile_report?global_id=L10004421981
Cleanup Status Detail: OPEN AS OF 1/1/1965
Cleanup History Link: https://geotracker.waterboards.ca.gov/profile_report_include?global_id=L10004421981&tabname=regulatoryhistory
Potential Media of Concern: NONE SPECIFIED
User Defined Beneficial Use:
DWR GW Sub Basin: Sacramento Valley - Solano (5-021.66)
Calwater Watershed Name: Valley Putah-Cache - Elmira (511.10)
Post Closure Site Management:
Future Land Use:
Facility Type: * UNKNOWN
Composting Method:
Gndwater Monitoring Frequen:
Cleanup Oversight Agencies: CENTRAL VALLEY RWQCB (REGION 5S) (LEAD) - CASE #: 5A48SC00002
CASE MANAGER: JARROD RAMSEY-LEWIS
File Location:
Site History:

No site history available

<u>GeoTracker Search - Regulatory Activities (as of Sep 25, 2024)</u>

Action Type: Response Requested - Reports
Action: Monitoring Report - Annually
Action Date:
Received Issue Date:
Doc Link: https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=5847904
Title Description Comment: Annual Groundwater Monitoring Report (July 2014-June 2015)

Action Type: Response Requested - Other
Action: Correspondence
Action Date: 6/15/2024
Received Issue Date:
Doc Link: https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6121940
Title Description Comment: Response to Response to GWE Cessation Request

Action Type: Other Regulatory Actions
Action: Staff Letter
Action Date: 3/20/2024
Received Issue Date: 3/20/2024
Doc Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6575229&temptable=ENFORCEMENT
Title Description Comment: Response to GWE Cessation Request

Action Type: Other Regulatory Actions
Action: Staff Letter
Action Date: 4/29/2021
Received Issue Date: 4/29/2021
Doc Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6467481&temptable=ENFORCEMENT
Title Description Comment: Review of Updated Water Quality Protection Standard

Action Type: Other Regulatory Actions
Action: Site Visit / Inspection / Sampling
Action Date: 7/11/2017
Received Issue Date: 7/11/2017
Doc Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6330306&temptable=ENFORCEMENT

Title Description Comment:	INSPECTION REPORT AND REVIEW OF 2016-2017 ANNUAL MONITORING REPORT
Action Type:	Enforcement/Orders
Action:	Waste Discharge Requirements - #R5-2009-0116
Action Date:	12/10/2009
Received Issue Date:	12/10/2009
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6252437&temptable=ENFORCEMENT
Title Description Comment:	RESCISSION of CDO R5-2005-008 Historic document from RWQCB files
Action Type:	Enforcement/Orders
Action:	Waste Discharge Requirements
Action Date:	6/9/2009
Received Issue Date:	6/9/2009
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6252429&temptable=ENFORCEMENT
Title Description Comment:	Revised MRP Order R5-2004-0021
Action Type:	Other Regulatory Actions
Action:	Staff Letter - #R5-2004-0021
Action Date:	7/14/2005
Received Issue Date:	7/14/2005
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6574009&temptable=ENFORCEMENT
Title Description Comment:	Conditional Approval of Corrective Action Plan
Action Type:	Response Requested - Workplans
Action:	Corrective Action Plan / Remedial Action Plan
Action Date:	*6/30/2005
Received Issue Date:	7/1/2005
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6093303
Title Description Comment:	
Action Type:	Enforcement/Orders
Action:	Cease and Desist Order - #R5-2005-0088
Action Date:	6/24/2005
Received Issue Date:	6/24/2005
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536758&temptable=ENFORCEMENT
Title Description Comment:	Cease and Desist Order R5-2005-0088 Historic -f rom RWQCB files
Action Type:	Response Requested - Reports
Action:	Post Closure Maintenance Plan
Action Date:	2/1/2005
Received Issue Date:	2/1/2005
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6093313
Title Description Comment:	Preliminary Closure Plan
Action Type:	Response Requested - Other
Action:	Other Report / Document
Action Date:	2/1/2005
Received Issue Date:	2/1/2005
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6093355
Title Description Comment:	Engineering Feasibility Study
Action Type:	Response Requested - Reports
Action:	Site Assessment Report
Action Date:	11/1/2004
Received Issue Date:	11/1/2004
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6093311
Title Description Comment:	Site Investigation
Action Type:	Response Requested - Workplans
Action:	Soil and Water Investigation Workplan
Action Date:	3/1/2004
Received Issue Date:	3/1/2004
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents_all?global_id=L10004421981&doc_id=6093310
Title Description Comment:	SITE INVESTIGATION WORK PLAN FOR SOIL SAMPLING AND GROUNDWATER MONITORING

Action Type:	Enforcement/Orders
Action:	Waste Discharge Requirements - #R5-2004-0021
Action Date:	1/30/2004
Received Issue Date:	1/30/2004
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536754&temptable=ENFORCEMENT
Title Description Comment:	WDRs for Closure and Corrective Action

Action Type:	Enforcement/Orders
Action:	Waste Discharge Requirements
Action Date:	1/30/2004
Received Issue Date:	1/30/2004
Doc Link:	
Title Description Comment:	WDRs Order R5-2004-0021

Action Type:	Enforcement/Orders
Action:	Waste Discharge Requirements - #R5-2000-172
Action Date:	6/16/2000
Received Issue Date:	6/16/2000
Doc Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536753&temptable=ENFORCEMENT
Title Description Comment:	WDRs for Discharge to Gibson Canyon Creek (NPDES No. CA0078018)

GeoTracker Search - Documents (as of Sep 25, 2024)

Title:	ANNUAL GROUNDWATER MONITORING REPORT JULY 2023-JULY 2024
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/1218978762/L10004421981.PDF
Type:	OTHER REPORT / DOCUMENT
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Site Documents
Document Date:	7/15/2024*
Size:	10,049 KB

Title:	ANNUAL GROUNDWATER MONITORING REPORT JULY 2021-JUNE 2022
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/3163104474/L10004421981.PDF
Type:	OTHER REPORT / DOCUMENT
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Site Documents
Document Date:	7/13/2022*
Size:	35,805 KB

Title:	REVIEW OF UPDATED WATER QUALITY PROTECTION STANDARD
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6467481
Type:	STAFF LETTER
Submitted:	
Submitted By:	KENNY CROYLE (REGULATOR)
Document Type:	Site Documents
Document Date:	4/29/2021
Size:	

Title:	CORRECTIVE ACTION PLAN / REMEDIAL ACTION PLAN - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6093303
Type:	CORRECTIVE ACTION PLAN / REMEDIAL ACTION PLAN
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	7/1/2005
Size:	

Title:	PRELIMINARY CLOSURE PLAN - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6093313
Type:	POST CLOSURE MAINTENANCE PLAN
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	2/1/2005

Size:	
Title:	SITE INVESTIGATION - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6093311
Type:	SITE ASSESSMENT REPORT
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	11/1/2004
Size:	
Title:	WDRS FOR CLOSURE AND CORRECTIVE ACTION
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536754
Type:	WASTE DISCHARGE REQUIREMENTS
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	1/30/2004
Size:	
Title:	ANNUAL GROUNDWATER REPORT 2017-2018
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/3896255731/L10004421981.PDF
Type:	MONITORING REPORT - ANNUALLY
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Monitoring Reports
Document Date:	7/6/2018*
Size:	26,464 KB
Title:	02-2023 TECH MEMO TO RB
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/5879672586/L10004421981.PDF
Type:	OTHER REPORT / DOCUMENT
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Site Documents
Document Date:	2/17/2023*
Size:	1,148 KB
Title:	2020 WQ PROTECTION STANDARDS UPDATE
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/5405678510/L10004421981.PDF
Type:	OTHER REPORT / DOCUMENT
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Site Documents
Document Date:	9/23/2020
Size:	34,165 KB
Title:	INSPECTION REPORT AND REVIEW OF 2016-2017 ANNUAL MONITORING REPORT
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6330306
Type:	SITE VISIT / INSPECTION / SAMPLING
Submitted:	
Submitted By:	KENNY CROYLE (REGULATOR)
Document Type:	Site Documents
Document Date:	7/11/2017
Size:	
Title:	SITE INVESTIGATION WORK PLAN FOR SOIL SAMPLING AND GROUNDWATER MONITORING - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6093310
Type:	SOIL AND WATER INVESTIGATION WORKPLAN
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	3/1/2004
Size:	
Title:	2024-08 LSCE TECHNICAL MEMO
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/8296812832/L10004421981.PDF
Type:	JOINT TECHNICAL DOCUMENT

Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Site Documents
Document Date: 9/10/2024
Size: 367 KB

Title: RESPONSE TO GWE CESSATION REQUEST
Title Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6575229
Type: STAFF LETTER
Submitted:
Submitted By: JARROD RAMSEY-LEWIS (REGULATOR)
Document Type: Site Documents
Document Date: 3/20/2024
Size:

Title: ANNUAL GROUNDWATER MONITORING REPORT JULY 2015-JUNE 2016
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/5937927484/L10004421981.PDF
Type: MONITORING REPORT - ANNUALLY
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Monitoring Reports
Document Date: 7/14/2016*
Size: 16,974 KB

Title: RESPONSE TO RESPONSE TO GWE CESSATION REQUEST
Title Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6121940
Type: CORRESPONDENCE
Submitted:
Submitted By: JARROD RAMSEY-LEWIS (REGULATOR)
Document Type: Site Documents
Document Date:
Size:

Title: TRANSMITTAL LETTER FOR 2022-2023 ANNUAL REPORT
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/5285691499/L10004421981.PDF
Type: ELECTRONIC REPORTING SUBMITTAL DUE
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Site Documents
Document Date: 7/13/2023*
Size: 242 KB

Title: TRANSMITTAL LETTER FOR 2023-2024 ANNUAL REPORT
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/2505319535/L10004421981.PDF
Type: OTHER REPORT / DOCUMENT
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Site Documents
Document Date: 7/15/2024*
Size: 269 KB

Title: REVISED MRP ORDER R5-2004-0021
Title Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6252429
Type: WASTE DISCHARGE REQUIREMENTS
Submitted:
Submitted By: LIUDMILA COSTISINA (REGULATOR)
Document Type: Site Documents
Document Date: 6/9/2009
Size:

Title: ANNUAL GROUNDWATER MONITORING REPORT JULY 2020-JUNE 2021
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/3177798688/L10004421981.PDF
Type: MONITORING REPORT - ANNUALLY
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Monitoring Reports
Document Date: 7/15/2021*
Size: 36,313 KB

Title:	ANNUAL GROUNDWATER MONITORING REPORT JULY 2019-JUNE 2020
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/2457375586/L10004421981.PDF
Type:	MONITORING REPORT - ANNUALLY
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Monitoring Reports
Document Date:	7/13/2020*
Size:	9,032 KB

Title:	ANNUAL GROUNDWATER MONITORING REPORT (JULY 2014-JUNE 2015) - TO BE REVIEWED - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/regulators/deliverable_documents/5785552799/Gibson%202014%2D15%20GW%20Rpt%5Ffinal%20reduced%2Epdf
Type:	MONITORING REPORT - ANNUALLY
Submitted:	
Submitted By:	LIUDMILA COSTISINA (REGULATOR)
Document Type:	Monitoring Reports
Document Date:	
Size:	15,037 KB

Title:	ANNUAL GROUNDWATER MONITORING REPORT JULY 2016-JUNE 2017
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/9618896722/L10004421981.PDF
Type:	MONITORING REPORT - ANNUALLY
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Monitoring Reports
Document Date:	7/14/2017*
Size:	16,824 KB

Title:	GIBSON EW1 WORK PLAN
Title Link:	https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/1984167933/L10004421981.PDF
Type:	STATUS / PROGRESS REPORTS
Submitted:	
Submitted By:	MINDY BOELE (RP)
Document Type:	Site Documents
Document Date:	7/20/2018*
Size:	481 KB

Title:	RESCISSION OF CDO R5-2005-008
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6252437
Type:	WASTE DISCHARGE REQUIREMENTS
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	12/10/2009
Size:	

Title:	CONDITIONAL APPROVAL OF CORRECTIVE ACTION PLAN
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6574009
Type:	STAFF LETTER
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	7/14/2005
Size:	

Title:	CEASE AND DESIST ORDER R5-2005-0088
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536758
Type:	CEASE AND DESIST ORDER
Submitted:	
Submitted By:	JARROD RAMSEY-LEWIS (REGULATOR)
Document Type:	Site Documents
Document Date:	6/24/2005
Size:	

Title:	ENGINEERING FEASIBILITY STUDY - REGULATOR RESPONSE
Title Link:	https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&document_id=6093355
Type:	OTHER REPORT / DOCUMENT
Submitted:	

Submitted By: JARROD RAMSEY-LEWIS (REGULATOR)
Document Type: Site Documents
Document Date: 2/1/2005
Size:

Title: ANNUAL GROUNDWATER MONITORING REPORT JULY 2018- JUNE 2019
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/8139340341/L10004421981.PDF
Type: MONITORING REPORT - ANNUALLY
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Monitoring Reports
Document Date: 7/12/2019*
Size: 14,712 KB

Title: ANNUAL GROUNDWATER MONITORING REPORT JULY 2022-JUNE 2023
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/3411457717/L10004421981.PDF
Type: NPDES / WDR REPORTS
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Site Documents
Document Date: 7/13/2023*
Size: 35,043 KB

Title: GIBSON CLEAN CLOSURE REPORT WITH ATTACHMENTS
Title Link: https://geotracker.waterboards.ca.gov/esi/uploads/geo_report/2202487409/L10004421981.PDF
Type: OTHER REPORT / DOCUMENT
Submitted:
Submitted By: MINDY BOELE (RP)
Document Type: Site Documents
Document Date: 4/29/2021*
Size: 18,069 KB

Title: WDRS FOR DISCHARGE TO GIBSON CANYON CREEK (NPDES NO. CA0078018)
Title Link: https://geotracker.waterboards.ca.gov/view_documents?global_id=L10004421981&enforcement_id=6536753
Type: WASTE DISCHARGE REQUIREMENTS
Submitted:
Submitted By: JARROD RAMSEY-LEWIS (REGULATOR)
Document Type: Site Documents
Document Date: 6/16/2000
Size:

6	1 of2	W	0.89 / 4,692.14	92.83 / 10	NORTH VILLAGE ELEMENTARY VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688	SCH

Estor/EPA ID: 48020003
Nat Priority List: NO
Census Tract: 6095252904
Permit Renewl Lead:
Project Manager:
Acres: 11 ACRES
Supervisor: MARK MALINOWSKI
County: SOLANO
Latitude: 38.3981
Longitude: -121.935
Site Code: 104272
Cleanup Status: NO ACTION REQUIRED AS OF 6/13/2002
Cleanup Oversight Agencies: DTSC - LEAD AGENCY
Assembly District: 11
Senate District: 03
School District: VACAVILLE UNIFIED SCHOOL DISTRICT
Office: SANTA SUSANA FIELD LABORATORY BRANCH
Public Participatn Spclst:
Special Program:
Funding: SCHOOL DISTRICT
Site Type: SCHOOL
APN: NONE SPECIFIED
Past Use that Caused Contam: AGRICULTURAL - LIVESTOCK
Potential Media Affected: NO MEDIA AFFECTED
Potential Contamin of Concern:

NO CONTAMINANTS FOUND

SITE HISTORY:

The 11-acre parcel of undeveloped land has historically been used for cattle grazing. The Site is disked annually and contains no vegetation.

Status: NO ACTION REQUIRED
Program Type: SCHOOL EVALUATION
CalEnviroScreen Score: 55-60%
Summary Link: https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=48020003

Completed Activities

Title: * Site Visit - Site Inspections/visit
Title Link:
Area Name:
Area Link:
Sub Area:
Sub Area Link:
Document Type: Site Inspections/Visit (Non LUR)
Date Completed: 6/12/2002
Comments:

Title: Phase 1
Title Link: https://www.envirostor.dtsc.ca.gov/public/final_documents2?global_id=48020003&doc_id=6006433
Area Name:
Area Link:
Sub Area:
Sub Area Link:
Document Type: Phase 1
Date Completed: 6/13/2002
Comments:

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
6	2 of2	W	0.89 / 4,692.14	92.83 / 10	NORTH VILLAGE ELEMENTARY VACA VALLEY PARKWAY/LEISURE TOWN ROAD VACAVILLE CA 95688	ENVIROSTOR

Estor/EPA ID: 48020003
Site Code: 104272
Nat Priority List: NO
APN: NONE SPECIFIED
Census Tract: 6095252904
Site Type: SCHOOL
Address Description: VACA VALLEY PARKWAY/LEISURE TOWN ROAD
Office: SANTA SUSANA FIELD LABORATORY BRANCH
Special Program:
Funding: SCHOOL DISTRICT
Assembly District: 11
Senate District: 03
Permit Renewal Lead:
Public Partici Spclst:
Project Manager:
County: SOLANO
Latitude: 38.3981
Longitude: -121.935
Acres: 11 ACRES
Supervisor: MARK MALINOWSKI
Cleanup Status: NO ACTION REQUIRED AS OF 6/13/2002
Cleanup Oversight Agencies: DTSC - LEAD AGENCY
School District: VACAVILLE UNIFIED SCHOOL DISTRICT
Past Use that Caused Contam: AGRICULTURAL - LIVESTOCK
Potential Media Affected: NO MEDIA AFFECTED
Potential Contamin of Concern:

NO CONTAMINANTS FOUND

Site History:

The 11-acre parcel of undeveloped land has historically been used for cattle grazing. The Site is disked annually and contains no vegetation.

Status: NO ACTION REQUIRED
Program Type: SCHOOL EVALUATION
CalEnviroScreen Score: 55-60%
Summary Link: https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=48020003

Completed Activities

Title: Phase 1
Title Link: https://www.envirostor.dtsc.ca.gov/public/final_documents2?global_id=48020003&doc_id=6006433
Area Name:
Area Link:
Sub Area:
Sub Area Link:
Document Type: Phase 1
Date Completed: 6/13/2002
Comments:

Title: * Site Visit - Site Inspections/visit
Title Link:
Area Name:
Area Link:
Sub Area:
Sub Area Link:
Document Type: Site Inspections/Visit (Non LUR)
Date Completed: 6/12/2002
Comments:

Unplottable Summary

Total: 4 Unplottable sites

DB	Company Name/Site Name	Address	City	Zip	ERIS ID
AST	CAL PEAK POWER	QUINN RD	VACAVILLE CA		820214467
CUPA SOLANO	GURMAIL SINGH	KILKENNY VACAVILLE CA 95688	CA		821334659
ERNS		MP: 59 SUBD: MARTINEZ ***NRC Report No:*** 1341608	VACAVILLE CA	95687	902195028
HMIRS		HWY I-80	VACAVILLE CA		818371393

Unplottable Report

Site: ***CAL PEAK POWER***
QUINN RD VACAVILLE CA

AST

Total Capacity(Gal):	7,800	***Owner Name:***	
CUPA:	Solano	***County:***	Solano

Site: ***GURMAIL SINGH***
KILKENNY VACAVILLE CA 95688 CA

CUPA SOLANO

Site No:	804473
Program:	21M
Freq:	1

Detail Information

Inv No:	1	***Last Service:***	CONSULTATION - PHONE/COUNTER
Status Desc:	INACTIVE	***Call Back:***	
Permit Expiration:	* Missing *	***Inspector:***	Dubois, Tristan
Inventory Type Desc:	Agricultural Site, SUBMITTAL TO CERS DUE (122)	***Supervisor / District:***	SUP-DIST NO 3031
Last Service Dt:	02/13/13		

Site:
MP: 59 SUBD: MARTINEZ VACAVILLE CA 95687

ERNS

NRC Report No:	1341608	***Latitude Degrees:***	
Type of Incident:	RAILROAD NON-RELEASE	***Latitude Minutes:***	
Incident Cause:	TRESPASSER	***Latitude Seconds:***	
Incident Date:	7/15/2022 11:35	***Longitude Degrees:***	
Incident Location:	RAILROAD TRACK	***Longitude Minutes:***	
Incident Dtg:	OCCURRED	***Longitude Seconds:***	
Distance from City:		***Lat Quad:***	
Distance Units:		***Long Quad:***	
Direction from City:		***Location Section:***	
Location County:	SOLANO	***Location Township:***	
Potential Flag:	No	***Location Range:***	
Year:	Year 2022 Reports		

Description of Incident: CALLER REPORTED THAT AN UNKNOWN INDIVIDUAL WAS STRUCK BY AN AMTRAK PASSENGER TRAIN AT A RAILROAD TRACK RIGHT OF WAY. THE INCIDENT RESULTED IN A FATALITY OF THE TRESPASSING INDIVIDUAL. LOCAL LAW ENFORCEMENT RESPONDED ON SCENE FOR INVESTIGATION. THERE IS NO RELEASE OF MATERIALS DUE TO THIS INCIDENT.

Calls Information

Date Time Received:	7/15/2022 3:30:00 PM	***Responsible City:***	
Date Time Complete:	7/15/2022 3:38:00 PM	***Responsible State:***	XX
Call Type:	INC	***Responsible Zip:***	
Resp Company:		***Source:***	TELEPHONE
Resp Org Type:	UNKNOWN		

Incident Information

Tank ID:		***Building ID:***	
Tank Regulated:	U	***Location Area ID:***	
Tank Regulated By:		***Location Block ID:***	
Capacity of Tank:		***OCSG No:***	

Capacity Tank Units:	
Description of Tank:	
Actual Amount:	
Actual Amount Units:	
Tank Above Ground:	ABOVE
NPDES:	
NPDES Compliance:	U
Init Contin Rel No:	
Contin Rel Permit:	
Contin Release Type:	
Aircraft ID:	
Aircraft Runway No:	
Aircraft Spot No:	
Aircraft Type:	
Aircraft Model:	
Aircraft Fuel Cap:	
Aircraft Fuel Cap U:	
Aircraft Fuel on Brd:	
Aircraft Fuel OB U:	
Aircraft Hanger:	
Road Mile Marker:	
Power Gen Facility:	U
Generating Capacity:	
Type of Fixed Obj:	
Type of Fuel:	
DOT Crossing No:	
DOT Regulated:	U
Pipeline Type:	
Pipeline Abv Ground:	ABOVE
Pipeline Covered:	U
Exposed Underwater:	N
Railroad Hotline:	
Railroad Milepost:	59
Grade Crossing:	N
Crossing Device Ty:	
Ty Vehicle Involved:	
Device Operational:	Y

OCSP No:	
State Lease No:	
Pier Dock No:	
Berth Slip No:	
Brake Failure:	N
Airbag Deployed:	U
Transport Contain:	U
Location Subdiv:	MARTINEZ
Platform Rig Name:	
Platform Letter:	
Allision:	N
Type of Structure:	
Structure Name:	
Structure Oper:	U
Transit Bus Flag:	
Date Time Norm Serv:	
Serv Disrupt Time:	
Serv Disrupt Units:	
CR Begin Date:	
CR End Date:	
CR Change Date:	
FBI Contact:	
FBI Contact Dt Tm:	
Passenger Handling:	PASSENGERS WILL STAY ON THE AFFECTED TRAIN DURING INVESTIGATION.
Passenger Route:	YES
Passenger Delay:	YES
Sub Part C Test Req:	NO
Conductor Test:	
Engineer Test:	
Trainman Test:	
Yard Foreman Test:	
RCL Operator Test:	
Brakeman Test:	
Train Dispat Test:	
Signalman Test:	
Oth Employee Test:	
Unknown Test:	

Incident Details Information

Release Secured:	U
Release Rate:	
Release Rate Unit:	
Release Rate Rate:	
Est Duration of Rel:	
Desc Remedial Act:	LOCAL LAW ENFORCEMENT IS ON SCENE FOR INVESTIGATION.
Fire Involved:	N
Fire Extinguished:	U
Any Evacuations:	N
No Evacuated:	
Who Evacuated:	
Radius of Evac:	
Any Injuries:	N
No. Injured:	
No. Hospitalized:	
No. Fatalities:	
Any Fatalities:	N
Any Damages:	N
Damage Amount:	
Air Corridor Closed:	N
Air Corridor Desc:	
Air Closure Time:	
Waterway Closed:	N
Waterway Desc:	
Waterway Close Time:	
Road Closed:	N
Road Desc:	
Road Closure Time:	

State Agen Report No:	
State Agen on Scene:	SOLANO COUNTY SHERIFF OFFICE
State Agen Notified:	
Fed Agency Notified:	
Oth Agency Notified:	
Body of Water:	
Tributary of:	
Near River Mile Make:	
Near River Mile Mark:	
Offshore:	No
Weather Conditions:	SUNNY
Air Temperature:	84
Wind Direction:	
Wind Speed:	
Wind Speed Unit:	
Water Supp Contam:	U
Water Temperature:	
Wave Condition:	
Current Speed:	
Current Direction:	
Current Speed Unit:	
EMPL Fatality:	
Pass Fatality:	
Community Impact:	
Passengers Transfer:	NO
Passenger Injuries:	
Employee Injuries:	
Occupant Fatality:	

Road Closure Units:		***Sheen Size:***	
Closure Direction:		***Sheen Size Units:***	
Major Artery:	No	***Sheen Size Length:***	
Track Closed:	Y	***Sheen Size Length U:***	
Track Desc:	2 MAINS	***Sheen Size Width:***	
Track Closure Time:		***Sheen Size Width U:***	
Track Closure Units:		***Sheen Color:***	
Track Close Dir:	ALL	***Dir of Sheen Travel:***	
Media Interest:	NONE	***Sheen Odor Desc:***	
Medium Desc:	RAIL REPORT (N/A)	***Duration Unit:***	
Addl Medium Info:	TRESPASSER	***Additional Info:***	

Site:

HWY I-80 VACAVILLE CA HMIRS

Incident County: SOLANO

HMIR Historical Reports

Report No:	I-1994060868	***Fed DOT Agency Nm:***	
Report Type:	A hazardous material incident	***Fed DOT Report No:***	
Date of Incident:	1994-05-26	***Report Submit Src:***	Paper
Time of Incident:	1500	***Inc Multiple Rows:***	No
Haz Class Code:		***Inc Non US State:***	
Hazardous Class:	8	***Mode Transport:***	Highway
Commodity Short Nm:	ACETIC ACID, GLACIAL OR	***Transport Phase:***	In Transit
Commodity Long Nm:	ACETIC ACID, GLACIAL OR ACETIC ACID SOLUTION, WITH MORE THAN 80 PERCENT ACID, BY MASS	***Incident Occrrnce:***	
Trade Name:	ACTIC ACID	***Mat Ship Approval?:***	No
ID No:	UN2789	***Mat Ship Approv No:***	
Haz Waste Ind:	No	***Undecl Hazmat Ship?:***	No
Haz Waste EPA No:		***Packaging Type:***	Cargo Tank Motor Vehicle (CTMV)
HMIS Tox Inhalation?:	No	***Packing Group:***	
TIH Hazard Zone:		***Carrier Reporter:***	ARROW TRANSPORTATION CO
Qty Released:	0.078125	***CR Street Name:***	10145 NORTH PORTLAND ROAD
Unit of Measure:	Liquid - Gallon	***CR City:***	PORTLAND
What Failed:	102; 141	***CR State:***	OR
What Failed Desc:	Auxiliary Valve; Piping or Fittings	***CR Postal Code:***	97283
How Failed Code:	;	***CR Non US State:***	
How Failed Desc:	;	***CR Fed DOT ID:***	0
Failure Cause Code:	526;	***CR Hazmat Reg ID:***	
Failure Cause Desc:	Loose Closure, Component, or Device;	***CR Country:***	US
Ident. Markings:		***Shipper Name:***	G W C INC
Cont1 Pkging Type:		***Shipper Street Name:***	5540 NW FRONT AVE
Cont1 Const Mat:		***Shipper City:***	PORTLAND
Cont1 Head Type:		***Shipper State:***	OR
Cont1 Pkg Capacity:	6900	***Shipper Postal:***	97210
C1 Capacity UOM:	LGA	***Shipper Non US St:***	
Cont1 Pkg Amt:	0	***Shipper Country:***	US
C1 Pkg Amt UOM:		***Shipper Waybill:***	
Cont1 Pkg No:	1	***Ship Hazmat Reg ID:***	
C1 Pkg NO Failed:	1	***Origin City:***	
Cont1 Pkg Mnfctr:	BRENNER TANK INC	***Origin State:***	
Cont1 Pkg Mnfct Dt:	0-00-00 00:00:00	***Origin Postal:***	
Cont1 Pkg Serial NO:	4345	***Origin Non US St:***	
C1 Pkg Last Test Dt:	1994-05-07 00:00:00	***Origin Country:***	US
C1 Test Const Mat:		***Destination City:***	WASHOUGAL
C1 Pkg Dsign Pres.:	0	***Destination State:***	WASHINGTON
C1 Dsign Press UOM:		***Destination Postal:***	98671
C1 Pkg Shell Thick:	0	***Destination Non US:***	
C1 Shell Thick UOM:		***Destination Country:***	US
C1 Head Thickness:	0	***Cont2 Package Type:***	
C1 Head Thick UOM:		***Cont2 Const Mat:***	
C1 Pkg Srvc Pres.:	0	***Cont2 Pkg Capacity:***	0
C1 Srvc Press UOM:		***Cont2 Capacity UOM:***	
C1 Valve/Device Fail?:	No	***Cont2 Pkg Amount:***	0
C1 Device Type:		***Cont2 Pkg Amt UOM:***	
C1 Device Mnfctr:		***Cont2 Pkg No:***	0

C1 Device Model:	
NRC No:	
RAM Pkg Category:	
RAM Pkg Cert.:	FALSE
RAM Pkg Cert. NBR:	
RAM Nuclide S:	
RAM Transport Index:	
RAM UOM:	
RAM Activity Rpted:	0
RAM UOM Rpted:	
RAM Activity:	0
RAM Activity UOM:	
RAM Mat Safety:	
Spillage Result:	Yes
Fire Result:	No
Explosion Result:	No
Water Sewer Result:	No
Gas Dispersion:	No
Environment Damage:	No
No Release Result:	No
Fire EMS Report:	No
Fire EMS EMS Report:	
Police Report:	No
Police Report No:	
In House Cleanup:	No
Other Cleanup:	No
Damage > 500:	No
Material Loss:	10
Carrier Damage:	0
Property Damage:	0
Response Cost:	0
Remediation Cost:	300
Damage Old Form:	0
Total Damages Amt:	310
Hazmat Fatality:	No
Haz Fatal Employees:	0
Haz Fatal Respndrs:	0
Haz Fatal Gen Public:	0
Tot Hazmat Fatalities:	0
Non Hazmat Fatality:	No
Non Hazmat Fatals:	0
Hazmat Injury:	No
Haz Hospital Empl:	0
Haz Hospital Resp:	0
Haz Hosp Gen Public:	0
Haz Hosp Old Form:	0
Total Haz Hosp Inj:	0
Haz Non Hosp Empl:	0
Haz Non Hosp Resp:	0

Cont2 Pkg No Failed:	0
Haz NonHosp Public:	0
Haz NonHosp Old:	
Tot Haz Non Hosp Inj:	
Total Hazmat Injuries:	0
Evacuation Indicator:	No
Public Evacuated:	0
Employees Evac:	0
Total Evacuated:	0
Total Evacuation Hrs:	0
Major Artery Closed:	No
Mjr Artery Hrs Closed:	0
Material Involved:	No
Estimated Speed:	0
Weather Conditions:	
Vehicle Overturn:	No
Vehicle Left Roadway:	No
Passenger Aircraft:	No
Cargo Baggage:	
Ship Non Transport:	No
Ship Air First Flight:	No
Ship Air Subflight:	No
Ship Init Transport:	No
Ship Phase Transfer:	No
Contact Name:	LORI WYLAM
Contact Title:	CLAIMS MANAGER
Contact Business:	
Contact Street:	
Contact City:	
Contact State:	
Contact Postal:	
Contact Non US St:	
Contact Country:	US
Inc. Report Prepared:	
HMIS Serious Incidnt:	No
HMIS Serious Fatality:	No
HMIS Serious Injury:	No
HMIS Flight Plan:	No
HMIS Serious Evacs:	No
HMIS Major Artery:	No
HMIS Bulk Release:	No
HMIS Marine Pollutnt:	No
HMIS Radioactive:	No
HMIS Gen Pkg Type:	TANK
HMIS Container Code:	MC307
HMIS Container Desc:	Cargo tanks
HMIS Bulk Incident:	Yes
Undeclared Shipment:	No

Description of Events: SPILL HAPPENED WHEN PRODUCT VALVE GASKET HAD FAILED.

Recommend Actions Taken:

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ERIS updates databases as set out in ASTM Standard E1527-13 and E1527-21, Section 8.1.8 Sources of Standard Source Information:

"Government information from nongovernmental sources may be considered current if the source updates the information at least every 90 days, or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public."

Standard Environmental Record Sources

Federal

National Priority List: NPL

The U.S. Environmental Protection Agency (EPA)'s National Priorities List (NPL) includes the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program, based primarily on the score a site receives from EPA's Hazard Ranking System. A site must be on the NPL to receive money from the Superfund Trust Fund for remedial action. This data includes NPL sites represented as polygons, where available, that can be sourced from the EPA NPL Superfund Site Boundaries dataset, refreshed by the Shared Enterprise Geodata and Services (SEGS). These site boundaries represent the footprint of a whole site, the sum of all the Operable Units (OUs) and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. As site investigation and remediation progress, OUs may be added, modified or refined. Data provided by external parties is not independently verified by EPA. This boundary data is made available to the public strictly for informational purposes. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Sep 25, 2024

National Priority List - Proposed: PROPOSED NPL

Sites proposed by the U.S. Environmental Protection Agency (EPA), the state agency, or concerned citizens for addition to the National Priorities List (NPL) due to contamination by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment. Sites represented as polygons, where available, can be sourced from the EPA NPL Superfund Site Boundaries dataset, refreshed by the Shared Enterprise Geodata and Services (SEGS). These site boundaries represent the footprint of a whole site, the sum of all the Operable Units (OUs) and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Data provided by external parties is not independently verified by EPA. This boundary data is made available to the public strictly for informational purposes. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Sep 25, 2024

Deleted NPL: DELETED NPL

Sites deleted from the U.S. Environmental Protection Agency (EPA)'s National Priorities List (NPL). The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Sites represented as polygons, where available, can be sourced from the EPA NPL Superfund Site Boundaries dataset, refreshed by the Shared Enterprise Geodata and Services (SEGS). These site boundaries represent the footprint of a whole site, the sum of all the Operable Units (OUs) and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Data provided by external parties is not independently verified by EPA. This boundary data is made available to the public strictly for informational purposes. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Sep 25, 2024

SEMS List 8R Active Site Inventory: SEMS

The U.S. Environmental Protection Agency's (EPA) Superfund Program has deployed the Superfund Enterprise Management System (SEMS), which integrates multiple legacy systems into a comprehensive tracking and reporting tool. This inventory contains active sites evaluated by the Superfund program that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted. This data includes SEMS sites from the List 8R Active file as well as applicable sites from the EPA's Facility Registry Service map tool.

Government Publication Date: Oct 24, 2024

Inventory of Open Dumps, June 1985: ODI

The Resource Conservation and Recovery Act (RCRA) provides for publication of an inventory of open dumps. The Act defines "open dumps" as facilities which do not comply with EPA's "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR 257).

Government Publication Date: Jun 1985

SEMS List 8R Archive Sites: SEMS ARCHIVE

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System (SEMS) Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. This data includes sites from the List 8R Archived site file.

Government Publication Date: Oct 24, 2024

Comprehensive Environmental Response, Compensation and Liability Information System - CERCLIS: CERCLIS

Superfund is a program administered by the United States Environmental Protection Agency (EPA) to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The EPA administers the Superfund program in cooperation with individual states and tribal governments; this database is made available by the EPA.

Government Publication Date: Oct 25, 2013

EPA Report on the Status of Open Dumps on Indian Lands: IODI

Public Law 103-399, The Indian Lands Open Dump Cleanup Act of 1994, enacted October 22, 1994, identified congressional concerns that solid waste open dump sites located on American Indian or Alaska Native (AI/AN) lands threaten the health and safety of residents of those lands and contiguous areas. The purpose of the Act is to identify the location of open dumps on Indian lands, assess the relative health and environment hazards posed by those sites, and provide financial and technical assistance to Indian tribal governments to close such dumps in compliance with Federal standards and regulations or standards promulgated by Indian Tribal governments or Alaska Native entities.

Government Publication Date: Dec 31, 1998

CERCLIS - No Further Remedial Action Planned: CERCLIS NFRAP

An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. The Archive designation means that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Government Publication Date: Oct 25, 2013

CERCLIS Liens: CERCLIS LIENS

A Federal Superfund lien exists at any property where EPA has incurred Superfund costs to address contamination ("Superfund site") and has provided notice of liability to the property owner. A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. This database is made available by the United States Environmental Protection Agency (EPA). This database was provided by the United States Environmental Protection Agency (EPA). Refer to SEMS LIEN as the current data source for Superfund Liens.

Government Publication Date: Jan 30, 2014

RCRA CORRACTS-Corrective Action: RCRA CORRACTS

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. At these sites, the Corrective Action Program ensures that cleanups occur. EPA and state regulators work with facilities and communities to design remedies based on the contamination, geology, and anticipated use unique to each site.

Government Publication Date: Oct 21, 2024

RCRA non-CORRACTS TSD Facilities: RCRA TSD

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. This database includes Non-Corrective Action sites that have indicated engagement in the treatment, storage, or disposal of hazardous waste which requires a RCRA hazardous waste permit.

Government Publication Date: Oct 21, 2024

RCRA Generator List: RCRA LQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

Government Publication Date: Oct 21, 2024

RCRA Small Quantity Generators List: RCRA SQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.

Government Publication Date: Oct 21, 2024

RCRA Very Small Quantity Generators List: RCRA VSQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Very Small Quantity Generators (VSQG) generate 100 kilograms or less per month of hazardous waste, or one kilogram or less per month of acutely hazardous waste. Additionally, VSQG may not accumulate more than 1,000 kilograms of hazardous waste at any time.

Government Publication Date: Oct 21, 2024

RCRA Non-Generators: RCRA NON GEN

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Non-Generators do not presently generate hazardous waste.

Government Publication Date: Oct 21, 2024

RCRA Sites with Controls: RCRA CONTROLS

List of Resource Conservation and Recovery Act (RCRA) facilities with institutional controls in place. RCRA gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Government Publication Date: Oct 21, 2024

Federal Engineering Controls-ECs: FED ENG

List of Engineering controls (ECs) made availabe by the United States Environmental Protection Agency (EPA). ECs encompass a variety of engineered and constructed physical barriers (e.g., soil capping, sub-surface venting systems, mitigation barriers, fences) to contain and/or prevent exposure to contamination on a property. The EC listing includes remedy component data from Superfund decision documents for applicable sites on the final or deleted on the National Priorities List (NPL); and sites with a Superfund Alternative Approach (SAA) Agreement in place. The only sites included that are not on the NPL; proposed for NPL; or removed from proposed NPL, are those with an SAA Agreement in place.

Government Publication Date: Nov 20, 2024

Federal Institutional Controls- ICs: FED INST

List of Institutional controls (ICs) made available by the United States Environmental Protection Agency (EPA). ICs are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Although it is EPA's expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable, ICs play an important role in site remedies because they reduce exposure to contamination by limiting land or resource use and guide human behavior at a site. The IC listing includes remedy component data from Superfund decision documents for applicable sites on the final or deleted on the National Priorities List (NPL); and sites with a Superfund Alternative Approach (SAA) Agreement in place. The only sites included that are not on the NPL; proposed for NPL; or removed from proposed NPL, are those with an SAA Agreement in place.

Government Publication Date: Nov 20, 2024

Land Use Control Information System: LUCIS

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

Government Publication Date: Sep 1, 2006

Institutional Control Boundaries at NPL sites: NPL IC

These boundaries of Institutional Control areas at sites on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL), or as Proposed or Deleted, are sourced from the EPA NPL Superfund Site Boundaries dataset, refreshed by the Shared Enterprise Geodata and Services (SEGS). The EPA's NPL includes the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Data provided by external parties is not independently verified by EPA. This boundary data is made available to the public strictly for informational purposes.

Government Publication Date: Sep 25, 2024

Emergency Response Notification System: ERNS 1982 TO 1986

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1982-1986

Emergency Response Notification System: ERNS 1987 TO 1989

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1987-1989

Emergency Response Notification System: ERNS

Database of oil and hazardous substances spill reports made available by the United States Coast Guard National Response Center (NRC). The NRC fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. These data contain initial incident data that has not been validated or investigated by a federal/state response agency.

Government Publication Date: Oct 15, 2024

The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database: FED BROWNFIELDS

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands. This data is provided by the United States Environmental Protection Agency (EPA) and includes Brownfield sites from the Cleanups in My Community (CIMC) web application.

Government Publication Date: Feb 7, 2024

FEMA Underground Storage Tank Listing: FEMA UST

The Federal Emergency Management Agency (FEMA) of the Department of Homeland Security maintains a list of FEMA owned underground storage tanks.

Government Publication Date: Dec 31, 2017

Facility Response Plan: FRP

This listing contains facilities that have submitted Facility Response Plans (FRPs) to the U.S. Environmental Protection Agency (EPA). Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit FRPs. Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments. This listing includes FRP facilities from an applicable EPA FOIA file and Homeland Infrastructure Foundation-Level Data (HIFLD) data file.

Government Publication Date: Jan 9, 2024

Delisted Facility Response Plans: DELISTED FRP

Facilities that once appeared in - and have since been removed from - the list of facilities that have submitted Facility Response Plans (FRP) to EPA. Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit Facility Response Plans (FRPs). Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments.

Government Publication Date: Jan 9, 2024

Historical Gas Stations: HIST GAS STATIONS

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

Government Publication Date: Jul 1, 1930

Petroleum Refineries: REFN

This list of petroleum refineries is sourced from the U.S. Energy Information Administration (EIA), Refinery Capacity Report. The listing includes operating and idle petroleum refineries (including new refineries under construction) and refineries shut down during the previous year. The geographic area the report covers is the 50 States, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, and other U.S. possessions. Per the EIA, the facility location data represents the approximate location based on research of publicly available information from sources such as Federal agencies, company websites, and satellite images on public websites.

Government Publication Date: Oct 31, 2024

Petroleum Product and Crude Oil Rail Terminals: BULK TERMINAL

A list of petroleum product and crude oil rail terminals from the U.S. Energy Information Administration (EIA), as well as petroleum terminals sourced from Oak Ridge National Laboratory hosted by the Homeland Infrastructure Foundation-Level Database. Data includes operable bulk petroleum product terminals with a total bulk shell storage capacity of 50,000 barrels or more, and/or the ability to receive volumes from tanker, barge, or pipeline; also rail terminals handling the loading and unloading of crude oil with activity between 2017 and 2018. EIA petroleum product terminal data comes from the EIA-815 Bulk Terminal and Blender Report, which includes working, shell in operation, and shell idle for several major product groupings.

Government Publication Date: Oct 31, 2024

LIEN on Property: SEMS LIEN

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System (SEMS) provides Lien details on applicable properties, such as the Superfund lien on property activity, the lien property information, and the parties associated with the lien.

Government Publication Date: Oct 24, 2024

Superfund Decision Documents: SUPERFUND ROD

This database contains a list of decision documents for Superfund sites. Decision documents serve to provide the reasoning for the choice of (or) changes to a Superfund Site cleanup plan. The decision documents include completed Records of Decision (ROD), ROD Amendments, Explanations of Significant Differences (ESD) for active and archived sites stored in the Superfund Enterprise Management System (SEMS), along with other associated memos and files. This information is maintained and made available by the U.S. Environmental Protection Agency.

Government Publication Date: Oct 24, 2024

Formerly Utilized Sites Remedial Action Program: DOE FUSRAP

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

Government Publication Date: Mar 4, 2017

State

State Response Sites: RESPONSE

A list of identified confirmed release sites where the Department of Toxic Substances Control (DTSC) is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. This database serves a purpose similar to that of the federal NPL, functioning as a state-level counterpart for prioritizing cleanup efforts at hazardous substance release sites.

Government Publication Date: Sep 25, 2024

EnviroStor Database: ENVIROSTOR

The EnviroStor Data Management System is made available by the Department of Toxic Substances Control (DTSC). Includes Corrective Action sites, Tiered Permit sites, Historical Sites and Evaluation/Investigation sites. This database serves a purpose similar to that of the federal Superfund Enterprise Management System (SEMS), functioning as a state-level counterpart for tracking potential hazardous substance release sites.

Government Publication Date: Sep 25, 2024

Delisted State Response Sites: DELISTED ENVS

Sites removed from the list of State Response Sites made available by the EnviroStor Data Management System, Department of Toxic Substances Control (DTSC).

Government Publication Date: Sep 25, 2024

Solid Waste Information System (SWIS): SWF/LF

The Solid Waste Information System (SWIS) database made available by the Department of Resources Recycling and Recovery (CalRecycle) contains information on solid waste facilities, operations, and disposal sites throughout the State of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites.

Government Publication Date: Oct 26, 2024

Solid Waste Disposal Sites with Waste Constituents Above Hazardous Waste Levels: SWRCB SWF

This is a list of solid waste disposal sites identified by California State Water Resources Control Board with waste constituents above hazardous waste levels outside the waste management unit.

Government Publication Date: Sep 20, 2006

Waste Management Unit Database: WMUD

The Waste Management Unit Database System tracks and inventories waste management units. CCR Title 27 contains criteria stating that Waste Management Units are classified according to their ability to contain wastes. Containment shall be determined by geology, hydrology, topography, climatology, and other factors relating to the ability of the Unit to protect water quality. Water Code Section 13273.1 requires that operators submit a water quality solid waste assessment test (SWAT) report to address leak status. The WMUDS was last updated by the State Water Resources control board in 2000.

Government Publication Date: Jan 1, 2000

EnviroStor Hazardous Waste Facilities: HWP

A list of hazardous waste facilities including permitted, post-closure and historical facilities found in the Department of Toxic Substances Control (DTSC) EnviroStor database.

Government Publication Date: Sep 25, 2024

Sites Listed in the Solid Waste Assessment Test (SWAT) Program Report: SWAT

In a 1993 Memorandum of Understanding, the State Water Resources Control Board (SWRCB) agreed to submit a comprehensive report on the Solid Waste Assessment Test (SWAT) Program to the California Integrated Waste Management Board (CIWMB). This report summarizes the work completed to date on the SWAT Program, and addresses both the impacts that leakage from solid waste disposal sites (SWDS) may have upon waters of the State and the actions taken to address such leakage.

Government Publication Date: Dec 31, 1995

Construction and Demolition Debris Recyclers: C&D DEBRIS RECY

This listing of Construction and Demolition Debris Recyclers is maintained by the California Intergrated Waste Management Board-common C&D materials include lumber, drywall, metals, masonry (brick, concrete, etc.), carpet, plastic, pipe, rocks, dirt, paper, cardboard, or green waste related to land development.

Government Publication Date: Jun 20, 2018

Recycling Centers: RECYCLING

This list of Certified Recycling Centers that are operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Jan 2, 2025

Listing of Certified Processors: PROCESSORS

This list of Certified Processors that are operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Jan 2, 2025

Listing of Certified Dropoff, Collection, and Community Service Programs: CONTAINER RECY

This list of Certified Dropoff, Collection, and Community Service Programs (non-buyback) operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Jan 2, 2025

Land Disposal Sites: LDS

Land Disposal Sites in GeoTracker, the State Water Resources Control Board (SWRCB)'s data management system. The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units. Waste management units include waste piles, surface impoundments, and landfills.

Government Publication Date: Sep 25, 2024

Leaking Underground Fuel Tank Reports: LUST

List of Leaking Underground Storage Tanks within the Cleanup Sites data in GeoTracker database. GeoTracker is the State Water Resources Control Board's (SWRCB) data management system for managing sites that impact groundwater, especially those that require groundwater cleanup (Underground Storage Tanks, Department of Defense and Site Cleanup Program) as well as permitted facilities such as operating Underground Storage Tanks. The Leak Prevention Program that overlooks LUST sites is the SWRCB in California's Environmental Protection Agency.

Government Publication Date: Sep 25, 2024

Delisted Leaking Storage Tanks: DELISTED LST

List of Leaking Underground Storage Tanks (LUST) cleanup sites removed from GeoTracker, the State Water Resources Control Board (SWRCB)'s database system, as well as sites removed from the SWRCB's list of UST Case closures.

Government Publication Date: Jan 15, 2025

Permitted Underground Storage Tank (UST) in GeoTracker: UST

List of Permitted Underground Storage Tank (UST) sites made available by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency (EPA).

Government Publication Date: Nov 17, 2024

Proposed Closure of Underground Storage Tank Cases: UST CLOSURE

This listing includes Proposed Closure of Underground Storage Tank (UST) Cases which are being considered for closure by either the State Water Resources Control Board at a Future Board Meeting or the Executive Director that have been posted for a 60-day public comment period, and Closure of UST Cases with Closure Denials and Approved Orders. The lists are provided by the California Water Boards.

Government Publication Date: Oct 26, 2024

Historical Hazardous Substance Storage Information Database: HHSS

The Historical Hazardous Substance Storage database contains information collected in the 1980s from facilities that stored hazardous substances. The information was originally collected on paper forms, was later transferred to microfiche, and recently indexed as a searchable database. When using this database, please be aware that it is based upon self-reported information submitted by facilities which has not been independently verified. It is unlikely that every facility responded to the survey and the database should not be expected to be a complete inventory of all facilities that were operating at that time. This database is maintained by the California State Water Resources Control Board's (SWRCB) Geotracker.

Government Publication Date: Aug 27, 2015

Statewide Environmental Evaluation and Planning System: UST SWEEPS

The Statewide Environmental Evaluation and Planning System (SWEEPS) is a historical listing of active and inactive underground storage tanks made available by the California State Water Resources Control Board (SWRCB).

Government Publication Date: Oct 1, 1994

Aboveground Storage Tanks: AST

A statewide list from 2009 of aboveground storage tanks (ASTs) made available by the Cal FIRE Office of the State Fire Marshal (OSFM). This list is no longer maintained or updated by the Cal FIRE OSFM.

Government Publication Date: Aug 31, 2009

SWRCB Historical Aboveground Storage Tanks: AST SWRCB

A list of aboveground storage tanks made available by the California State Water Resources Control Board (SWRCB). Effective January 1, 2008, the Certified Unified Program Agencies (CUPAs) are vested with the responsibility and authority to implement the Aboveground Petroleum Storage Act (APSA).

Government Publication Date: Dec 1, 2007

Oil and Gas Facility Tanks: TANK OIL GAS

Locations of oil and gas tanks that fall under the jurisdiction of the Geologic Energy Management Division of the California Department of Conservation (CalGEM) (CCR 1760). CalGEM was formerly the Division of Oil, Gas, and Geothermal Resources (DOGGR).

Government Publication Date: Nov 14, 2024

Delisted Storage Tanks: DELISTED TNK

This database contains a list of storage tank sites that were removed by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency (EPA) and the Cal FIRE Office of State Fire Marshal (OSFM).

Government Publication Date: Nov 14, 2024

California Environmental Reporting System (CERS) Tanks: CERS TANK

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs. The CalEPA oversees the statewide implementation of the Unified Program which applies regulatory standards to protect Californians from hazardous waste and materials.

Government Publication Date: Oct 28, 2024

Delisted California Environmental Reporting System (CERS) Tanks: DELISTED CTNK

This database contains a list of Aboveground Petroleum Storage and Underground Storage Tank sites that were removed from in the California Environmental Protection Agency (CalEPA) Regulated Site Portal.

Government Publication Date: Oct 28, 2024

Historical Hazardous Substance Storage Container Information - Facility Summary: HIST TANK

The State Water Resources Control Board maintained the Hazardous Substance Storage Containers listing and inventory in th 1980s. This facility summary lists historic tank sites where the following container types were present: farm motor vehicle fuel tanks; waste tanks; sumps; pits, ponds, lagoons, and others; and all other product tanks. This set, published in May 1988, lists facility and owner information, as well as the number of containers. This data is historic and will not be updated.

Government Publication Date: May 27, 1988

Site Mitigation and Brownfields Reuse Program Facility Sites with Land Use Restrictions: LUR

The Department of Toxic Substances Control (DTSC) Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents land use restrictions that are active. Some sites have multiple land use restrictions.

Government Publication Date: Sep 25, 2024

CALSITES Database: CALSITES

This historical database was maintained by the Department of Toxic Substance Control (DTSC) for more than a decade. CALSITES contains information on Brownfield properties with confirmed or potential hazardous contamination. In 2006, DTSC introduced EnviroStor as the latest Brownfields site database.

Government Publication Date: May 1, 2004

Hazardous Waste Management Program Facility Sites with Deed / Land Use Restrictions: HLUR

The Department of Toxic Substances Control (DTSC) Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Government Publication Date: Feb 18, 2021

Deed Restrictions and Land Use Restrictions: DEED

List of Deed Restrictions, Land Use Restrictions and Covenants in GeoTracker made available by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency. A deed restriction (land use covenant) may be required to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to residual hazardous materials.

Government Publication Date: Jan 15, 2025

Voluntary Cleanup Program: VCP

List of sites in the Voluntary Cleanup Program made available by the Department of Toxic Substances and Control (DTSC). The Voluntary Cleanup Program was designed to respond to lower priority sites. Under the Voluntary Cleanup Program, DTSC enters site-specific agreements with project proponents for DTSC oversight of site assessment, investigation, and/or removal or remediation activities, and the project proponents agree to pay DTSC's reasonable costs for those services.

Government Publication Date: Sep 25, 2024

GeoTracker Cleanup Program Sites: CLEANUP SITES

A list of Cleanup Program sites in the state of California made available by The State Water Resources Control Board (SWRCB) of the California Environmental Protection Agency (EPA). SWRCB tracks leaking underground storage tank cleanups as well as other water board cleanups.

Government Publication Date: Sep 25, 2024

Delisted Cleanup Program Sites: DELISTED CLEANUP

A list of Cleanup Program sites which were once included - and have since been removed from - the list of Cleanup Program Sites in GeoTracker. GeoTracker is the State Water Resource Control Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Government Publication Date: Jan 15, 2025

Delisted County Records: DELISTED COUNTY

Records removed from county or CUPA databases. Records may be removed from the county lists made available by the respective county departments because they are inactive, or because they have been deemed to be below reportable thresholds.

Government Publication Date: Oct 28, 2024

Tribal

Leaking Underground Storage Tanks on Tribal/Indian Lands: INDIAN LUST

This list of leaking underground storage tanks (LUSTs) on Tribal/Indian Lands in Region 9, which includes California, is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: May 7, 2024

Underground Storage Tanks on Tribal/Indian Lands: INDIAN UST

This list of underground storage tanks (USTs) on Tribal/Indian Lands in Region 9, which includes California, is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: May 7, 2024

Delisted Tribal Leaking Storage Tanks: DELISTED INDIAN LST

Leaking Underground Storage Tank (LUST) facilities which once appeared on - and have since been removed from - the Regional Tribal/Indian LUST lists made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Jan 22, 2025

Delisted Tribal Underground Storage Tanks: DELISTED INDIAN UST

Underground Storage Tank (UST) facilities which once appeared on - and have since been removed from - the Regional Tribal/Indian UST lists made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Jan 22, 2025

County

Solano County - Local Oversight Program List: LOP SOLANO

A list of Leaking Underground Storage Tank (LUST) facilities in the Solano County. This list is made available by the Solano County Environmental Health Services. Since April 1993, the State Water Resources Control Board has contracted with the County of Solano to provide regulatory oversight for the cleanup of LUSTs under Local Oversight Program (LOP) contract.

Government Publication Date: Aug 20, 2019

Solano County - Underground Storage Tanks List: UST SOLANO

A list of registered Underground Storage Tanks (USTs) in the County of Solano made available by the Solano County Environmental Health Services Division. There are approximately 190 facilities throughout the county that are subject to the regulatory requirements of the UST program.

Government Publication Date: Oct 26, 2021

Solano County - CUPA List: CUPA SOLANO

A list of facilities associated with various Certified Unified Program Agency (CUPA) programs in the County of Solano. This list is made available by Solano County Environmental Health Division which has been certified by CalEPA to implement the Unified program as a CUPA.

Government Publication Date: Dec 3, 2020

Additional Environmental Record Sources

Federal

PFAS Greenhouse Gas Emissions Data: PFAS GHG

The U.S. Environmental Protection Agency's Greenhouse Gas Reporting Program (GHGRP) collects Greenhouse Gas (GHG) data from large emitting facilities (25,000 metric tons of carbon dioxide equivalent (CO2e) per year), and suppliers of fossil fuels and industrial gases that results in GHG emissions when used. Includes GHG emissions data for facilities that emit or have emitted since 2010 chemicals identified in EPA's CompTox Chemicals Dashboard list of PFAS without explicit structures and list of PFAS structures by DSSTox. PFAS emissions data has been identified for facilities engaged in the following industrial processes: Aluminum Production (GHGRP Subpart F), HCFC-22 Production and HFC-23 Destruction (Subpart O), Electronics Manufacturing (Subpart I), Fluorinated Gas Production (Subpart L), Magnesium Production (Subpart T), Electrical Transmission and Distribution Equipment Use (Subpart DD), and Manufacture of Electric Transmission and Distribution Equipment (Subpart SS). Over time, other industrial processes with required GHGRP reporting may include PFAS emissions data and the list of reportable gases may change over time.

Government Publication Date: Aug 5, 2024

On-Scene Coordinator Response Sites: OSC RESPONSE

This list of On-Scene Coordinator (OSC) Response Sites is provided by the U.S. Environmental Protection Agency (EPA). OSCs are the federal officials responsible for monitoring or directing responses to all oil spills and hazardous substance releases reported to the federal government. OSCs coordinate all federal efforts with, and provide support and information to local, state, and regional response communities. An OSC is an agent of either EPA or the U.S. Coast Guard (USCG), depending on where the incident occurs. EPA's OSCs have primary responsibility for spills and releases to inland areas and waters. USCG OSCs have responsibility for coastal waters and the Great Lakes. In general, an OSC has the following key responsibilities during and after a response: Assessment, Monitoring, Response Assistance, and Evaluation.

Government Publication Date: Apr 4, 2024

Facility Registry Service/Facility Index: FINDS/FRS

The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, and data collected from EPA's Central Data Exchange registrations and data management personnel. This list is made available by the U.S. Environmental Protection Agency (EPA).

Government Publication Date: Aug 1, 2024

Toxics Release Inventory (TRI) Program: TRIS

The U.S. Environmental Protection Agency's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of toxic chemicals from U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment. There are currently 770 individually listed chemicals and 33 chemical categories covered by the TRI Program. Facilities that manufacture, process or otherwise use these chemicals in amounts above established levels must submit annual reporting forms for each chemical. Note that the TRI chemical list does not include all toxic chemicals used in the U.S. One of TRI's primary purposes is to inform communities about toxic chemical releases to the environment. This database includes TRI Reporting Data for calendar years 1987 through 2021 and Preliminary Data for 2022.

Government Publication Date: Sep 20, 2023

PFOA/PFOS Contaminated Sites: PFAS NPL

This list of Superfund Sites with Per- and Polyfluoroalkyl Substances (PFAS) detections is made available by the U.S. Environmental Protection Agency (EPA) in their PFAS Analytic Tools data, previously the list was obtained by EPA FOIA requests. EPA's Office of Land and Emergency Management and EPA Regional Offices maintain what is known about site investigations, contamination, and remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) where PFAS is present in the environment. Limitations: Detections of PFAS at National Priorities List (NPL) sites do not mean that people are at risk from PFAS, are exposed to PFAS, or that the site is the source of the PFAS. The information in the Superfund NPL and Superfund Alternative Agreement (SAA) PFAS detection site list is years old and may not be accurate today. Site information such as site name, site ID, and location has been confirmed for accuracy; however, PFAS-related information such as media sampled, drinking water being above the health advisory, or mitigation efforts has not been verified. For Federal Facilities data, the other Federal agencies (OFA) are the lead agency for their data and provided them to EPA.

Government Publication Date: Dec 17, 2024

<u>Federal Agency Locations with Known or Suspected PFAS Detections:</u> PFAS FED SITES

This list of federal agency locations with known or suspected detections of Per- and Polyfluoroalkyl Substances (PFAS) is made available by the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools data. The EPA outlines that these data are gathered from several federal entities, such as the federal Superfund program, Department of Defense (DOD), National Aeronautics and Space Administration (NASA), Department of Transportation (DOT), and Department of Energy (DOE). The dates this data was extracted for the PFAS Analytic Tools range from 2022 to 2024. Sites on this list do not necessarily reflect the source/s of PFAS contamination and detections do not indicate level of risk or human exposure at the site. Agricultural notifications in this data are limited to DOD sites only. At this time, the EPA is aware that this list is not comprehensive of all Federal agencies.

Government Publication Date: Oct 24, 2024

<u>SSEHRI PFAS Contamination Sites:</u> PFAS SSEHRI

This PFAS Contamination Site Tracker database is compiled by the PFAS Project Lab, part of the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents. Locations for the Known PFAS Contamination Sites are sourced from the PFAS Sites and Community Resources Map by the PFAS-REACH team, credited to PFAS Project Lab, Silent Spring Institute, and PFAS Exchange. Disclaimer: The source conveys the data undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Access the following source link for the most current information: https://pfasproject.com/pfas-sites-and-community-resources/

Government Publication Date: Jun 27, 2024

<u>National Response Center PFAS Spills:</u> PFAS ERNS

This Per- and Poly-Fluoroalkyl Substances (PFAS) Spills dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. The National Response Center (NRC), operated by the U.S. Coast Guard, is the designated federal point of contact for reporting all oil, chemical, and other discharges into the environment, for the United States and its territories. This dataset contains NRC spill information from 1990 to the present that is restricted to records associated with PFAS and PFAS-containing materials. Incidents are filtered to include only records with a "Material Involved" or "Incident Description" related to Aqueous Film Forming Foam (AFFF). The keywords used to filter the data included "AFFF," "Fire Fighting Foam," "Aqueous Film Forming Foam," "Fire Suppressant Foam, "PFAS," "PERFL," "PFOA," "PFOS," and "Genx." Limitations: The data from the NRC website contains initial incident data that has not been validated or investigated by a federal/state response agency. Keyword searches may misidentify some incident reports that do not contain PFAS. This dataset should also not be considered to be exhaustive of all PFAS spills/release incidents.

Government Publication Date: Dec 9, 2024

<u>PFAS NPDES Discharge Monitoring:</u> PFAS NPDES

This list of National Pollutant Discharge Elimination System (NPDES) permitted facilities with required monitoring for Per- and Polyfluoroalkyl (PFAS) Substances is made available via the U.S. Environmental Protection Agency (EPA)'s PFAS Analytic Tools. Any point-source wastewater discharger to waters of the United States must have a NPDES permit, which defines a set of parameters for pollutants and monitoring to ensure that the discharge does not degrade water quality or impair human health. This list includes NPDES permitted facilities associated with permits that monitor for Per- and Polyfluoroalkyl Substances (PFAS), limited to the years 2007 - present. EPA further advises the following regarding these data: currently, fewer than half of states have required PFAS monitoring for at least one of their permittees, and fewer states have established PFAS effluent limits for permittees. For states that may have required monitoring, some reporting and data transfer issues may exist on a state-by-state basis.

Government Publication Date: Dec 16, 2024

<u>Perfluorinated Alkyl Substances (PFAS) from Toxic Release Inventory:</u> PFAS TRI

List of Toxics Release Inventory (TRI) facilities at which the reported chemical is a per- or polyfluoroalkyl (PFAS) substance included in the U.S. Environmental Protection Agency's (EPA) consolidated PFAS Master List of PFAS Substances. Encompasses Toxics Release Inventory records included in the EPA PFAS Analytic Tools. The EPA's TRI database currently tracks information on disposal or releases of 770 individually listed toxic chemicals and 33 chemical categories from thousands of U.S. facilities and details about how facilities manage those chemicals through recycling, energy recovery, and treatment. This listing includes TRI Reporting Data for calendar years 1987 through 2021 and Preliminary Data for 2022.
Government Publication Date: Sep 20, 2023

PFAS Water Quality Portal Sampling Data: PFAS WATER

This Per- and Poly-Fluoroalkyl Substances (PFAS) Environmental Media Sampling Data is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. The Water Quality Portal (WQP), as a cooperative service sponsored by the United States Geological Survey, the EPA, and the National Water Quality Monitoring Council, is part of a modernized repository storing ambient sampling data for all environmental media and tissue samples. A wide range of federal, state, tribal and local governments, academic and non-governmental organizations, and individuals submit project details and sampling results to this public repository. Limitations: EPA did not carry out the sampling or testing of a majority of the data in the WQP PFAS dataset. EPA can only speak to the accuracy and completeness of the data from projects like the National Aquatic Resource Surveys for which EPA is the data owner/organization. Data may exist within the file on Quality Assurance Project Plans (QAPPs) and the approving agency of the QAPP, if a QAPP is entered.
Government Publication Date: Jul 22, 2024

PFAS TSCA Manufacture and Import Facilities: PFAS TSCA

The U.S. Environmental Protection Agency (EPA) issued the Chemical Data Reporting (CDR) Rule under the Toxic Substances Control Act (TSCA) and requires chemical manufacturers and facilities that manufacture or import chemical substances to report data to EPA. This list is specific only to TSCA Manufacture and Import Facilities with reported per- and poly-fluoroalkyl (PFAS) substances. Data file is sourced from EPA's PFAS Analytic Tools TSCA dataset which includes CDR/Inventory Update Reporting data from 1998 up to 2020. Disclaimer: This data file includes production and importation data for chemicals identified in EPA's CompTox Chemicals Dashboard list of PFAS without explicit structures and list of PFAS structures in DSSTox. Note that some regulations have specific chemical structure requirements that define PFAS differently than the lists in EPA's CompTox Chemicals Dashboard. Reporting information on manufactured or imported chemical substance amounts should not be compared between facilities, as some companies claim Chemical Data Reporting Rule data fields for PFAS information as Confidential Business Information.
Government Publication Date: Jan 5, 2023

PFAS Waste Transfers from RCRA e-Manifest : PFAS E-MANIFEST

This Per- and Poly-Fluoroalkyl Substances (PFAS) Waste Transfers dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. Every shipment of hazardous waste in the U.S. must be accompanied by a shipment manifest, which is a critical component of the cradle-to-grave tracking of wastes mandated by the Resource Conservation and Recovery Act (RCRA). According to the EPA, currently no Federal Waste Code exists for any PFAS compounds. To work around the lack of PFAS waste codes in the RCRA database, EPA developed the PFAS Transfers dataset by mining e-Manifest records containing at least one of these common PFAS keywords: • PFAS • PFOA • PFOS • PERFL • AFFF • GENX • GEN-X (plus the Vermont state-specific waste codes). Limitations: Amount or concentration of PFAS being transferred cannot be determined from the manifest information. Keyword searches may misidentify some manifest records that do not contain PFAS. This dataset should also not be considered to be exhaustive of all PFAS waste transfers.
Government Publication Date: Dec 15, 2024

PFAS Industry Sectors: PFAS IND

This Per- and Poly-Fluoroalkyl Substances (PFAS) Industry Sectors dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. The EPA developed the dataset from various sources that show which industries may be handling PFAS including: EPA's Enforcement and Compliance History Online (ECHO) records restricted to potential PFAS-handling industry sectors; ECHO records for Fire Training Sites identified where fire-fighting foam may have been used in training exercises; and 14 CFR Part 139 Airports compiled from historic and current records from the FAA Airport Data and Information Portal. Since July 2006, all certificated Part 139 Airports are required to have fire-fighting foam onsite that meet certain military specifications, which to date have been fluorinated (Aqueous Film Forming Foam). Limitations: Inclusion in this dataset does not indicate that PFAS are being manufactured, processed, used, or released by the facility. Listed facilities potentially handle PFAS based on their industrial profile, but are unconfirmed by the EPA. Keyword searches in ECHO for Fire Training sites may misidentify some facilities and should not be considered to be an exhaustive list of fire training facilities in the U.S.
Government Publication Date: Dec 16, 2024

Hazardous Materials Information Reporting System: HMIRS

The Hazardous Materials Incident Reporting System (HMIRS) database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.
Government Publication Date: May 29, 2024

National Clandestine Drug Labs: NCDL

The U.S. Department of Justice ("the Department"), Drug Enforcement Administration (DEA), provides this data as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy.
Government Publication Date: Nov 30, 2023

Toxic Substances Control Act: TSCA

The U.S. Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule. The CDR enables EPA to collect and publish information on the manufacturing, processing, and use of commercial chemical substances and mixtures (referred to hereafter as chemical substances) on the TSCA Chemical Substance Inventory (TSCA Inventory). This includes current information on chemical substance production volumes, manufacturing sites, and how the chemical substances are used. This information helps the Agency determine whether people or the environment are potentially exposed to reported chemical substances. EPA publishes submitted CDR data that is not Confidential Business Information (CBI). EPA CDR collections occur approximately every four years and reporting requirements change per collection.
Government Publication Date: May 12, 2022

Hist TSCA: HIST TSCA

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.
The 2006 IUR data summary report includes information about chemicals manufactured or imported in quantities of 25,000 pounds or more at a single site during calendar year 2005. In addition to the basic manufacturing information collected in previous reporting cycles, the 2006 cycle is the first time EPA collected information to characterize exposure during manufacturing, processing and use of organic chemicals. The 2006 cycle also is the first time manufacturers of inorganic chemicals were required to report basic manufacturing information.
Government Publication Date: Dec 31, 2006

FTTS Administrative Case Listing: FTTS ADMIN

An administrative case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.
Government Publication Date: Jan 19, 2007

FTTS Inspection Case Listing: FTTS INSP

An inspection case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.
Government Publication Date: Jan 19, 2007

Potentially Responsible Parties List: PRP

Early in the site cleanup process, the U.S. Environmental Protection Agency (EPA) conducts a search to find the Potentially Responsible Parties (PRPs). The EPA looks for evidence to determine liability by matching wastes found at the site with parties that may have contributed wastes to the site. This listing contains PRPs, Noticed Parties, at sites in the EPA's Superfund Enterprise Management System (SEMS).
Government Publication Date: Nov 20, 2024

State Coalition for Remediation of Drycleaners Listing: SCRD DRYCLEANER

The State Coalition for Remediation of Drycleaners (SCRD) was established in 1998, with support from the U.S. Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation. Coalition members are states with mandated programs and funding for drycleaner site remediation. Current members are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin. Since 2017, the SCRD no longer maintains this data, refer to applicable state source data where available.
Government Publication Date: Nov 08, 2017

Integrated Compliance Information System (ICIS): ICIS

The Integrated Compliance Information System (ICIS) database contains integrated enforcement and compliance information across most of U.S. Environmental Protection Agency's (EPA) programs. The vision for ICIS is to replace EPA's independent databases that contain enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions and a subset of the Permit Compliance System (PCS), which supports the National Pollutant Discharge Elimination System (NPDES). This information is maintained by the EPA Headquarters and at the Regional offices. A future release of ICIS will completely replace PCS and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities that support compliance and enforcement programs, including incident tracking, compliance assistance, and compliance monitoring.
Government Publication Date: Apr 13, 2024

Drycleaner Facilities: FED DRYCLEANERS

A list of drycleaner facilities from Enforcement and Compliance History Online (ECHO) data as made available by the U.S. Environmental Protection Agency (EPA), sourced from the ECHO Exporter file. The EPA tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments.

Government Publication Date: May 5, 2024

Delisted Drycleaner Facilities: DELISTED FED DRY

List of sites removed from the list of Drycleaner Facilities (sites in the EPA's Integrated Compliance Information System (ICIS) with NAIC or SIC codes identifying the business as a drycleaner establishment).

Government Publication Date: May 5, 2024

Formerly Used Defense Sites: FUDS

Formerly Used Defense Sites (FUDS) are properties that were formerly owned by, leased to, or otherwise possessed by and under the jurisdiction of the Secretary of Defense prior to October 1986, where the Department of Defense (DOD) is responsible for an environmental restoration. The FUDS Annual Report to Congress (ARC) is published by the U.S. Army Corps of Engineers (USACE). This data is compiled from the USACE's Geospatial FUDS data layers and Homeland Infrastructure Foundation-Level Data (HIFLD) FUDS dataset which applies to the Fiscal Year 2021 FUDS Inventory.

Government Publication Date: May 15, 2023

FUDS Munitions Response Sites: FUDS MRS

Boundaries of Munitions Response Sites (MRS), published with the Formerly Used Defense Sites (FUDS) Annual Report to Congress (ARC) by the U.S. Army Corps of Engineers (USACE). An MRS is a discrete location within a Munitions response area (MRA) that is known to require a munitions response. An MRA means any area on a defense site that is known or suspected to contain unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC). This data is compiled from the USACE's Geospatial MRS data layers and Homeland Infrastructure Foundation-Level Data (HIFLD) MRS dataset.

Government Publication Date: May 15, 2023

Former Military Nike Missile Sites: FORMER NIKE

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline, heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

Government Publication Date: Dec 2, 1984

PHMSA Pipeline Safety Flagged Incidents: PIPELINE INCIDENT

This list of flagged pipeline incidents is made available by the U.S. Department of Transportation (US DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA regulations require incident and accident reports for five different pipeline system types. Accidents reported on hazardous liquid gravity lines (§195.13) and reporting-regulated-only hazardous liquid gathering lines (§195.15) and incidents reported on Type R gas gathering (§192.8(c)) are not included in the flagged incident file data.

Government Publication Date: May 6, 2024

Material Licensing Tracking System (MLTS): MLTS

A list of sites that store radioactive material subject to the Nuclear Regulatory Commission (NRC) licensing requirements. This list is maintained by the NRC. As of September 2016, the NRC no longer releases location information for sites. Site locations were last received in July 2016.

Government Publication Date: May 11, 2021

Historic Material Licensing Tracking System (MLTS) sites: HIST MLTS

A historic list of sites that have inactive licenses and/or removed from the Material Licensing Tracking System (MLTS). In some cases, a site is removed from the MLTS when the state becomes an "Agreement State". An Agreement State is a State that has signed an agreement with the Nuclear Regulatory Commission (NRC) authorizing the State to regulate certain uses of radioactive materials within the State.

Government Publication Date: Jan 31, 2010

Mines Master Index File: MINES

The Master Index File (MIF) is provided by the United States Department of Labor, Mine Safety and Health Administration (MSHA). This file, which was originally created in the 1970's, contained many Mine-IDs that were invalid. MSHA removes invalid IDs from the MIF upon discovery. MSHA applicable data includes the following: all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970; mine addresses for all mines in the database except for Abandoned mines prior to 1998 from MSHA's legacy system (addresses may or may not correspond with the physical location of the mine itself); violations that have been assessed penalties as a result of MSHA inspections beginning on 1/1/2000; and violations issued as a result of MSHA inspections conducted beginning on 1/1/2000.

Government Publication Date: Feb 5, 2024

Surface Mining Control and Reclamation Act Sites: SMCRA

This inventory of land and water impacted by past mining (primarily legacy coal mining operations) is maintained by the U.S. Department of the Interior's Office of Surface Mining Reclamation and Enforcement (OSMRE), as it provides information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). This inventory contains information on the type and extent of Abandoned Mine Land (AML) Problems, as well as information on the cost associated with the reclamation of those problems. The data is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed. Disclaimer: Per the OSMRE, States and tribes who enter their data into e-AMLIS (AML Inventory System) may truncate their latitude and longitude so the precise location of usually dangerous AMLs is not revealed in an effort to protect the public from searching for these AMLs, most of which are on private property. If more precise location information is needed, please contact the applicable state/tribe of interest.

Government Publication Date: May 20, 2024

Mineral Resource Data System: MRDS

The Mineral Resource Data System (MRDS) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps.

Government Publication Date: Mar 15, 2016

DOE Legacy Management Sites: LM SITES

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) currently manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The LM manages sites with diverse regulatory drivers (statutes or programs that direct cleanup and management requirements at DOE sites) or as part of internal DOE or congressionally-recognized programs, such as but not limited to: Formerly Utilized Sites Remedial Action Program (FUSRAP), Uranium Mill Tailings Radiation Control Act (UMTRCA Title I, Tile II), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Decontamination and Decommissioning (D&D), Nuclear Waste Policy Act (NWPA). This site listing includes data exported from the DOE Office of LM's Geospatial Environmental Mapping System (GEMS). GEMS Data disclaimer: The DOE Office of LM makes no representation or warranty, expressed or implied, regarding the use, accuracy, availability, or completeness of the data presented herein.

Government Publication Date: Dec 12, 2023

Alternative Fueling Stations: ALT FUELS

This list of alternative fueling stations is sourced from the Alternative Fuels Data Center (AFDC). The U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy launched the AFDC in 1991 as a repository for alternative fuel vehicle performance data, which provides a wealth of information and data on alternative and renewable fuels, advanced vehicles, fuel-saving strategies, and emerging transportation technologies. The data includes Biodiesel (B20 and above), Compressed Natural Gas (CNG), Electric, Ethanol (E85), Hydrogen, Liquefied Natural Gas (LNG), Propane (LPG), and Renewable Diesel (R20 and above) fuel type locations.

Government Publication Date: Aug 29, 2024

Superfunds Consent Decrees: CONSENT DECREES

This list of Superfund consent decrees is provided by the Department of Justice, Environment & Natural Resources Division (ENRD) through a Freedom of Information Act (FOIA) applicable file. This listing includes Cases filed since 2010 limited to the following: Consent Decrees for CERCLA or Superfund Sites filed and/or as proposed within the ENRD's Case Management System (CMS); and applicable ENRD's Environmental Defense Section (EDS) CERCLA Cases with "Consent" in History Note. CMS may not reflect the latest developments in a case, nor can the agency guarantee the accuracy of the data. ENRD Disclaimer: Congress excluded three discrete categories of law enforcement and national security records from the requirements of the FOIA; response is limited to those records that are subject to the requirements of the FOIA; however, this should not be taken as an indication that excluded records do, or do not, exist.

Government Publication Date: Jun 26, 2024

Air Facility System: AFS

This EPA retired Air Facility System (AFS) dataset contains emissions, compliance, and enforcement data on stationary sources of air pollution. Regulated sources cover a wide spectrum; from large industrial facilities to relatively small operations such as dry cleaners. AFS does not contain data on facilities that are solely asbestos demolition and/or renovation contractors, or landfills. ECHO Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014; the EPA retired this system for Clean Air Act stationary sources and transitioned to ICIS-Air.
Government Publication Date: Oct 17, 2014

Registered Pesticide Establishments: SSTS

This national list of active EPA-registered foreign and domestic pesticide and/or device-producing establishments is based on data from the Section Seven Tracking System (SSTS). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 7 requires that each producing establishment must place its EPA establishment number on the label or immediate container of each pesticide, active ingredient or device produced. An EPA establishment number on a pesticide product label identifies the EPA registered location where the product was produced. The list of establishments is made available by the U.S. Environmental Protection Agency (EPA).
Government Publication Date: Feb 29, 2024

Polychlorinated Biphenyl (PCB) Transformers: PCBT

Locations of Transformers Containing Polychlorinated Biphenyls (PCBs) registered with the United States Environmental Protection Agency. PCB transformer owners must register their transformer(s) with EPA. Although not required, PCB transformer owners who have removed and properly disposed of a registered PCB transformer may notify EPA to have their PCB transformer de-registered. Data made available by EPA.
Government Publication Date: Oct 15, 2019

Polychlorinated Biphenyl (PCB) Notifiers: PCB

Facilities included in the national list of facilities that have notified the United States Environmental Protection Agency (EPA) of Polychlorinated Biphenyl (PCB) activities. Any company or person storing, transporting or disposing of PCBs or conducting PCB research and development must notify the EPA and receive an identification number.
Government Publication Date: May 23, 2024

Power Plants: POWER PLANTS

This list of power plants is provided by the U.S. Energy Information Administration (EIA). The listing includes operable electric generating plants in the United States by energy source, originating from the EIA-860, Annual Electric Generator Report; EIA-860M, Monthly Update to the Annual Electric Generator Report; and EIA-923, Power Plant Operations Report. It includes all operable plants by energy source with a combined nameplate capacity of 1 megawatt or more that are operating, are on standby, or out of service for short- or long-term.
Government Publication Date: Apr 15, 2024

State

PFAS Sampling Locations: PFAS SAMPLING

This data is sourced from the State Water Board's GeoTracker Per- and Polyfluoroalkyl Substances (PFAS) Map tool which contains individual sampling points (i.e., soil boring, groundwater monitoring well, drinking water well for municipal drinking water systems, etc.) or a site location with PFAS analytical data. Includes analytical results that are finalized and submitted electronically by the Responsible Parties via GeoTracker's Electronic Submittal of Information Portal, and after it's accepted by a Regional Water Quality Control Board.
Government Publication Date: Dec 6, 2024

Dry Cleaning Facilities: DRYCLEANERS

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial, linen supply, commercial laundry, dry cleaning and pressing machines - Coin Operated Laundry and Dry Cleaning. This is provided by the Department of Toxic Substance Control.
Government Publication Date: Dec 20, 2021

Delisted Drycleaners: DELISTED DRYCLEANERS

Sites removed from the list of drycleaner related facilities that have EPA ID numbers, made available by the California Department of Toxic Substance Control.
Government Publication Date: Jan 31, 2022

Non-Toxic Dry Cleaning Incentive Program: DRYC GRANT

A list of grant recipients of the Non-Toxic Dry Cleaning Incentive Program made available by the California Air Resources Board (CARB). The program provides grants to eligible dry cleaning businesses to assist them in transitioning away from PERC machines to alternative non-toxic and non-smog forming technologies.
Government Publication Date: Jan 31, 2022

PFAS GeoTracker Cleanup Sites: PFAS GT CLEANUPS

A list of applicable cleanup sites from the State Water Resources Control Board's (SWRCB) GeoTracker data management system where one or more of the potential contaminants of concern are identified in the PFAS Structure List and/or PFAS Chemicals Without Explicit Structure List made available by the United States Environmental Protection Agency (US EPA).

Government Publication Date: Jan 15, 2025

PFOA/PFOS Groundwater: PFAS GW

A list of water wells from the Groundwater Ambient Monitoring and Assessment Program (GAMA) Groundwater Information System with the groundwater chemical perfluorooctanoic acid (PFOA) (NL = 0.014 UG/L) or perfluorooctanoic sulfonate (PFOS) (NL = 0.013 UG/L). The GAMA Groundwater Information System search is made available by California Water Boards.

Government Publication Date: Dec 1, 2024

PFAS Investigations: PFAS INVEST

This list of potential Per- and Polyfluoroalkyl Substance (PFAS) sites is compiled from the California State Water Resources Control Board's (SWRCB) PFAS Investigations Map tool. The SWRCB issued investigative orders, per California Water Code (CWC) Section 13267 and/or 13383, to these sites. Orders were also issued to the public water systems to sample wells in the vicinity of these locations. Military facilities have been identified by the Department of Defense (DOD) as part of their efforts to investigate PFAS per the Defense Environmental Restoration Program (DERP) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The data includes locations for Airports, Chrome Plating Facilities, Landfills, Publicly Owned Treatment Works, Refineries and Bulk Terminals, DOD Facilities, and Monitored Drinking Water Wells being investigated for potential PFAS.

Government Publication Date: Jan 23, 2024

Hazardous Waste and Substances Site List - Site Cleanup: HWSS CLEANUP

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies and developers to comply with the California Environmental Quality Act requirements in providing information about the location of hazardous materials release sites. This list is published by California Department of Toxic Substance Control.

Government Publication Date: Mar 15, 2023

Toxic Pit Cleanup Act Sites: TOXIC PITS

The Toxic Pits Cleanup Act (TPCA) list identifies sites suspected of containing hazardous substances where cleanup has not yet been completed. This list was maintained by the State Water Resources Control Board (SWRCB), is not longer maintained, and updates are not planned.

Government Publication Date: Jul 1, 1995

List of Hazardous Waste Facilities Subject to Corrective Action: DTSC HWF

This is a list of hazardous waste facilities identified in Health and Safety Code (HSC) § 25187.5. These facilities are those where Department of Toxic Substances Control (DTSC) has taken or contracted for corrective action because a facility owner/operator has failed to comply with a date for taking corrective action in an order issued under HSC § 25187, or because DTSC determined that immediate corrective action was necessary to abate an imminent or substantial endangerment.

Government Publication Date: Jul 18, 2016

EnviroStor Inspection, Compliance, and Enforcement: INSP COMP ENF

A list of permitted facilities with inspections and enforcements tracked by the California Department of Toxic Substance Control's (DTSC) EnviroStor data management system.

Government Publication Date: Nov 23, 2023

School Property Evaluation Program Sites: SCH

A list of sites registered with The Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup (SPEC) Division. SPEC is responsible for assessing, investigating and cleaning up proposed school sites. The Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy the new school.

Government Publication Date: Sep 25, 2024

California Hazardous Material Incident Report System (CHMIRS): CHMIRS

A list of reported hazardous material incidents, spills, and releases from the California Hazardous Material Incident Report System (CHMIRS). This listing has been made available by the California Governor's Office of Emergency Services (Cal OES).

Government Publication Date: Oct 21, 2024

Historical California Hazardous Material Incident Report System (CHMIRS): HIST CHMIRS

A list of reported hazardous material incidents, spills, and releases from the California Hazardous Material Incident Report System (CHMIRS) prior to 1993. This list has been made available by the California Office of Emergency Services (OES).

Government Publication Date: Jan 1, 1993

Handlers from Hazardous Waste Manifest Data: HAZNET

A list of handlers not otherwise classified as Treatment, Storage, Disposal facilities (TSDF) or generators from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Oct 24, 2016

Generators from Hazardous Waste Manifest Data: HAZ GEN

List of handlers listed as having generated waste from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Dec 31, 2017

TSDF from Hazardous Waste Manifest Data: HAZ TSD

List of Treatment, Storage, and Disposal Facilities (TSDFs) from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Dec 31, 2017

Historical Hazardous Waste Manifest Data: HIST MANIFEST

A list of historic hazardous waste manifests received by the Department of Toxic Substances Control (DTSC) from year the 1980 to 1992. The volume of manifests is typically 900,000 - 1,000,000 annually, representing approximately 450,000 - 500,000 shipments.

Government Publication Date: Dec 31, 1992

DTSC Registered Hazardous Waste Transporters: HW TRANSPORT

The California Department of Toxic Substances Control (DTSC) maintains this list of Registered Hazardous Waste Transporters.

Government Publication Date: Jan 2, 2025

Registered Waste Tire Haulers: WASTE TIRE

This list of registered waste tire haulers is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Oct 28, 2024

California Medical Waste Management Program Facility List: MEDICAL WASTE

This list of Medical Waste Management Program Facilities is maintained by the California Department of Public Health. The Medical Waste Management Program (MWMP) regulates the generation, handling, storage, treatment, and disposal of medical waste by providing oversight for the implementation of the Medical Waste Management Act (MWMA). The MWMP permits and inspects all medical waste off-site treatment facilities, medical waste transporters, and medical waste transfer stations. This list contains transporters, treatment, and transfer facilities.

Government Publication Date: Sep 5, 2024

Historical Cortese List: HIST CORTESE

List of sites which were once included on the Cortese list. The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies and developers to comply with the California Environmental Quality Act requirements for providing information about the location of hazardous sites.

Government Publication Date: Nov 13, 2008

Cease and Desist Orders and Cleanup and Abatement Orders: CDO/CAO

The California Environment Protection Agency "Cortese List" of active Cease and Desist Orders (CDO) and Cleanup and Abatement Orders (CAO). This list contains many CDOs and CAOs that do NOT concern the discharge of wastes that are hazardous materials. Many of the listed orders concern, as examples, discharges of domestic sewage, food processing wastes, or sediment that do not contain hazardous materials, but the Water Boards' database does not distinguish between these types of orders.

Government Publication Date: Dec 6, 2021

California Environmental Reporting System (CERS) Hazardous Waste Sites: CERS HAZ

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the following regulatory programs: Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, RCRA LQ HW Generator. The CalEPA oversees the statewide implementation of the Unified Program which applies regulatory standards to protect Californians from hazardous waste and materials.

Government Publication Date: Oct 28, 2024

Delisted Environmental Reporting System (CERS) Hazardous Waste Sites: DELISTED HAZ

This database contains a list of sites that were removed from the California Environmental Protection Agency (CalEPA) in the following regulatory programs: Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, RCRA LQ HW Generator.

Government Publication Date: Nov 29, 2018

Sites in GeoTracker: GEOTRACKER

GeoTracker is the State Water Resource Control Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. This is a list of sites in GeoTracker that aren't otherwise categorized as LUST, Land Disposal Sites (LDS), Cleanup Sites, or sites having Waste Discharge Requirements (WDR). This listing includes program types such as Underground Injection Control (UIC), Confined Animal Facilities (CAF), Irrigated Lands Regulatory Program, plans, and non-case information.

Government Publication Date: Sep 25, 2024

Mines Listing: MINE

This list includes mine site locations extracted from the Mines Online database, maintained by the California Department of Conservation. Mines Online (MOL) is an interactive web map designed with GIS features that provide information such as the mine name, mine status, commodity sold, location, and other mine specific data. Please note: Mine location information is provided to assist experts in determining the location of mine operators in accordance with California Civil Code section 1103.4 and reflects information reported by mine operators in annual reports provided under Public Resources Code section 2207. While the Division of Mine Reclamation (DMR) attempts to populate MOL with accurate location information, the DMR cannot guarantee the accuracy of operator reported location information.

Government Publication Date: Oct 3, 2024

Recorded Environmental Cleanup Liens: LIEN

The California Department of Toxic Substance Control (DTSC) maintains this list of liens placed upon real properties. A lien is utilized by the DTSC to obtain reimbursement from responsible parties for costs associated with the remediation of contaminated properties.

Government Publication Date: Dec 18, 2023

Waste Discharge Requirements: WASTE DISCHG

List of sites in California State Water Resources Control Board (SWRCB) Waste Discharge Requirements (WDRs) Program in California, made available by the SWRCB via GeoTracker. The WDR program regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Government Publication Date: Sep 25, 2024

Toxic Pollutant Emissions Facilities: EMISSIONS

A list of criteria and toxic pollutant emissions data for facilities in California made available by the California Environmental Protection Agency - Air Resources Board (ARB). Risk data may be based on previous inventory submittals. The toxics data are submitted to the ARB by the local air districts as requirement of the Air Toxics "Hot Spots" Program.

Government Publication Date: Dec 31, 2021

Clandestine Drug Lab Sites: CDL

The Department of Toxic Substances Control (DTSC) maintains a listing of drug lab sites. DTSC is responsible for removal and disposal of hazardous substances discovered by law enforcement officials while investigating illegal/clandestine drug laboratories.

Government Publication Date: Jan 19, 2021

Tribal

No Tribal additional environmental record sources available for this State.

County

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

APPENDIX 6-B: NFPA 69 COMPLIANCE REPORT

FIRE PROTECTION ASSESSMENT FOR NFPA 69 COMPLIANCE IN A BATTERY ENERGY STORAGE SYSTEM

10/26/2023

Prepared by:

TLB Fire Protection Engineering, Inc.

SIGNATURE PAGE

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Date: 2023.11.16 19:39:17 -08'00'

Revision History

Date	Rev. Number	Description
7/28/2023	0	Initial Document
8/3/2023	1	Minor Updates
8/24/2023	2	Issued Stamped Letter
10/26/2023	3	Updates to Stamped Letter

EXECUTIVE SUMMARY

This document provides a summary and analysis performed by TLBFPE for the battery energy storage system (BESS), model “EnerC+”. The “EnerC+” is designed by Contemporary Amperex Technology Co. Limited (CATL) with fire protection systems designed by Nanjing Heben M&E Equipment Technology Co., Ltd (Heben). The primary goal of the assessment was to determine if the explosion control measures in place are in conformance with the applicable requirements of NFPA 855 (2023 Ed.) *Standard for the Installation of Stationary Energy Storage Systems* and NFPA 69 (2019 Ed.) *Standard on Explosion Prevention Systems*.

The BESS uses the explosion mitigation strategy of combustible concentration reduction via exhausting the interior contents upon detection of flammable gases at a pre-determined threshold. The gas detection system includes two hydrogen sensors. These sensors provide early warning of a thermal runaway condition.

A Computational Fluids Dynamics (CFD) model was utilized to demonstrate the system design successfully reduces the concentration of combustible gases in the container to less than 25 percent of the lower flammability limit of the gas mixture. The CFD model conservatively assumes three modules will go into thermal runaway concurrently. The thermal runaway gas data used in the CFD model is based on gas types and volumes from actual fire test data via UL 9540A *Standard for Test Method for Evaluating Thermal Runaway Propagation in Battery Energy Storage Systems*.

Based upon our review, it is our engineering opinion that according to the information provided, the BESS meets the intent of NFPA 69 and the explosion control requirements of NFPA 855.

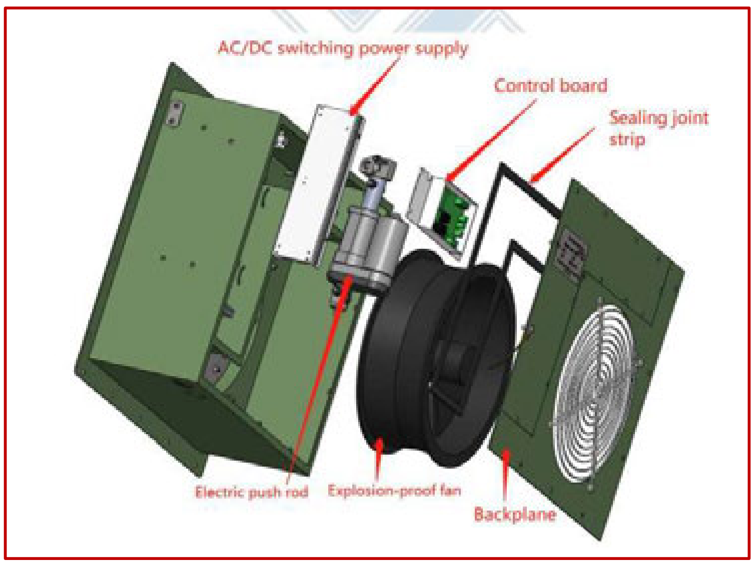
DOCUMENTS REVIEWED

The following documents pertinent to NFPA 69 compliance were reviewed as part of this assessment:

- Computational Fluid Dynamics Report titled "Diffusion Law of Thermal Runaway Gas in the Energy Storage Container – EnerC+_(3leaks real release 820 cfm)_10172023"
- Fire Dynamics Simulator code: "3Leaks-realRelease-820CFM"
- Gas sensor cutsheet and associated Listings for "Honeywell Sensepoint XCL Fixed Gas Detector"
- Explosion proof exhaust fan cutsheet "Nanjing Heben M&E Equipments Technology Co., Ltd." Model TFP03 Explosion proof exhaust fan.
    - 10.16.1107 – ATEX Certification for Explosion Proof Exhaust Fan
- Explosion proof ventilation louver cutsheet "Nanjing Heben M&E Equipments Technology Co., Ltd." Model TFP04 Explosion proof ventilation louver.
    - 10.16.1108 – ATEX Certificate for Explosion-proof ventilation louver
- Drawing C-1: Explosion Prevention System (potter)
- Drawing Set "EnerC+(UL-Potter)" (4 sheets)
- UL 9540A test data supplied by client.

BESS EXPLOSION CONTROL DETAILS

The "EnerC+" explosion control system consists of an explosion proof 820 cfm fan, a make-up air louver, and two hydrogen gas sensors. An exploded view of the exhaust fan is provided for reference:



ENGINEERING ANALYSIS AND DISCUSSION

The explosion control system was reviewed in accordance with the following applicable standards, in addition to current industry best practices, where codes and standards are not in effect. It must be noted that only some portions of the following Standards apply to the reviewed BESS, and as such, have been applied accordingly on this project.

NFPA 69 – *Standard on Explosion Prevention Systems* – 2019 Edition

NFPA 855 – *Standard for the Installation of Energy Storage Systems* – 2023 Edition

Lithium-ion batteries produce flammable gases during thermal runaway events. When flammable gases are produced and accumulate within an enclosure and reach the flammability limits of the gases in the presence of an ignition source, a deflagration or explosion may occur. The intent of an explosion control system, as required by NFPA 855, is to provide a mechanism to mitigate this hazard to an acceptable level of risk.

For the BESS reviewed in this report, the NFPA 69 method of explosion control called "Deflagration Prevention by Combustible Concentration (Chapter 8)" is utilized. Within NFPA 855, Section 9.6.5.6.7 requires that an explosion prevention or control system reduce the flammable gas concentration to less than 25% of the gas mixture or of the individual components. The concentration levels are managed by utilizing a gas detection system within the enclosure to activate an exhaust fan and make up air opening, thereby evacuating flammable gases from the container.

The explosion mitigation design may be validated in a variety of ways, from basic empirical calculations to more advanced and more accurate computational fluid dynamics (CFD) models. In the BESS reviewed herein, the client has chosen to perform a CFD model. The CFD analysis models gas release during thermal runaway using known gas release test data (UL 9540A), the exact container or enclosure dimensions, fan size and location, make up air opening size, location and gas sensor locations and properties, and other pertinent details.

The use of a CFD model provides both a visual and quantitative means to determine if the system design is capable of adequately reducing the combustible concentration in the container.

Based on the CFD model, it is our engineering opinion that the system design successfully reduces the combustible concentration in the container for three modules undergoing thermal runaway.

The concepts reviewed and considered in determining the design adequacy are listed on the following page.

The following items were reviewed and considered during the overall system compliance analysis:

- A detailed peer-review of the client developed CFD code (using the software Fire Dynamics Simulator) was performed to determine if any errors or omissions existed. The author of this Engineering Assessment report has extensive experience in CFD modeling and is qualified to perform this review.
- The gas detection system components are Listed to UL 2075. Although not explicitly required by NFPA 855 or NFPA 69, this provides a higher degree of reliability.
- The BESS container is equipped with both two hydrogen (H_2) detection sensors, providing redundancy in the form of two detectors allowing for spatial distribution within the container.
- Backup power for the gas detection system has a 24-hour duration in standby and 2 hours in alarm, as demonstrated via NFPA 72 compliant battery calculations. This complies with NFPA 855, Section 9.6.5.6.7. Backup power for exhaust fan shall be supplied by public utility.
- The review of the CFD model showed no "dead spots" or areas in which flammable gases might accumulate. The fan and make up air unit are capable of exhausting flammable gases throughout the container in a homogenous manner.
- This analysis included a CFD model of three modules undergoing simultaneous thermal runaway. There is no current industry consensus as to how many cells or modules, simultaneously off-gassing, that a combustible concentration reduction system shall be capable of handling. One cannot say for certain that more than 3 modules would simultaneously vent, however, this is viewed as extremely unlikely. The primary reason is that in a situation where multiple cells vent, for example in an overcharge scenario, it is unlikely that more than 3 modules would fail in the exact same second. This is primarily due to statistical differences in cell voltages at high states of charge (SOC), and these differences make it unlikely that many cells or modules will vent at the exact same moment. This is an important consideration, as the gas release rates during thermal runaway are very "peaky", rapidly increasing and then decreasing. This "peaky" behavior makes it unlikely (though not impossible) that an explosion control system would need to contain more than 3 modules.
- In a thermal runaway event, it is anticipated that some measurements may exceed 25% of the flammability limit in specific locations and for short durations, such as at the gas release location, and along the pathway from gas release to exhaust fan. The explosion reduction system is expected to mitigate these to an acceptable level.
- The CFD modeling demonstrates that the average concentration of hydrogen within the BESS is maintained below 25 percent of the LFL for the duration for the thermal runaway, as seen in Figure 2. Although several discrete points exceed 25 percent of the LFL for a short duration (See Figure 1), and the 2023 Edition of NFPA 855 states the system shall ensure the flammable gas does not exceed 25 percent of the LFL, the intent of the requirement in NFPA 855, Section 9.6.5.6.7 (2) is an 'accumulation of gases exceeding an average of 25 percent of the LFL'. At the time this report has been published, a proposal for the 2026 Edition of NFPA 855, with similar language, has been agreed to in principle by the NFPA 855 technical committee. This reflects industry consensus that a combustible concentration reduction system cannot be expected to reduce the flammable gas

concentration to below 25 percent of the LFL for all discrete locations at all times, and that an average, with the focus on accumulation, is the intent of the requirement.

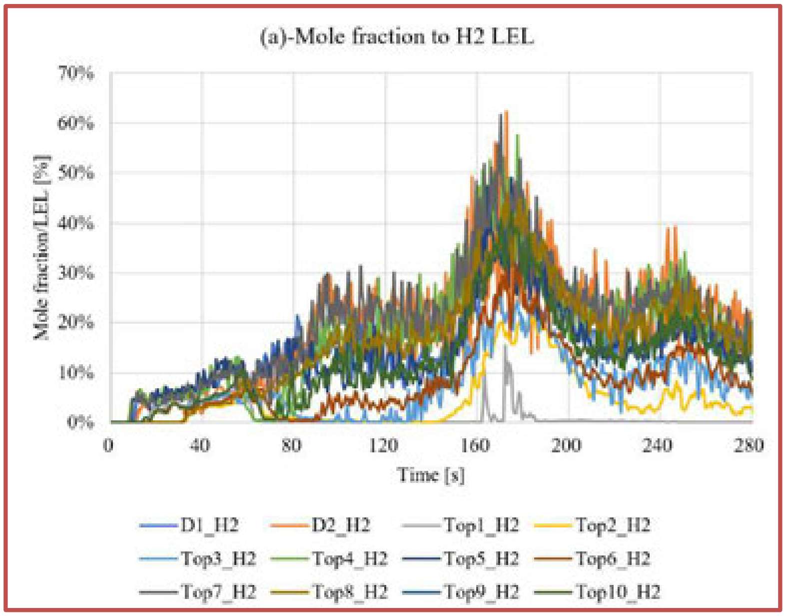


Figure 1

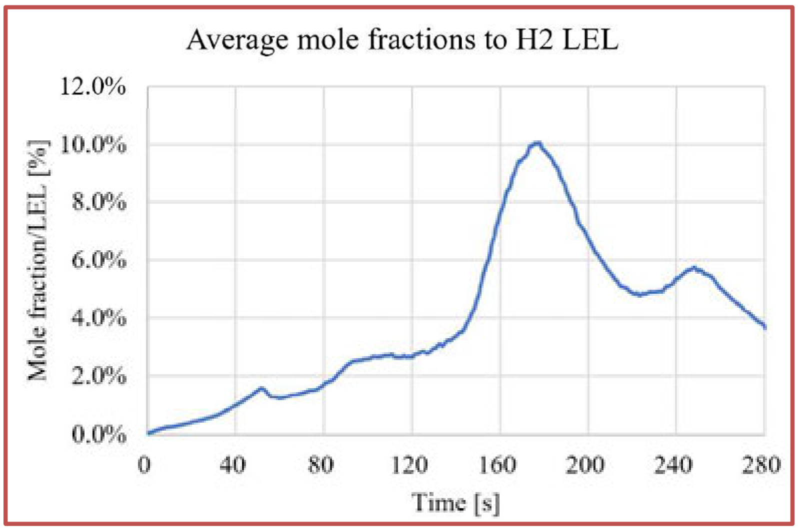


Figure 2

- The system was reviewed against the requirements of Chapter 15 of NFPA 69, Installation, Inspection, and Maintenance of Explosion Prevention Systems, and found to comply with the applicable requirements, specifically, Section 15.5, Electrical Installation. Non-SIL-rated instrumentation is permitted where applying Section 9.3.1(1).
- The exhaust fan complies with the requirements of the 2021 International Mechanical Code, Section 503.2, for fans that may come into contact with flammable vapors.
- The International Mechanical Code requires a minimum of 1 cubic foot per minute / per square foot. This container has an 820-cfm fan, providing airflow over a container area of

(16.1 ft x 7.4 ft [120 ft^2]). This provides a volumetric flow of 6.8 cfm/ft^2 , which greatly exceeds the minimum mechanical code requirements.

ENGINEERING JUDGMENT AND CONCLUSION

The BESS in this project is equipped with an explosion control system consisting of gas detection, an exhaust fan, and a make-up air louver. A CFD model was performed to demonstrate the ability of this system to successfully reduce the concentration of combustibles in the container in accordance with applicable codes and standards, and best practices.

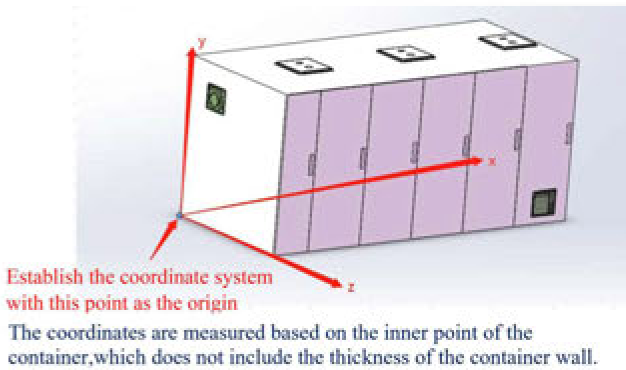
It is our engineering opinion that the explosion control system provided complies with the letter and intent of the applicable requirements of NFPA 69 and NFPA 855. As such, the explosion risk is mitigated to a substantially low and manageable risk.

Attachment 1
Computational Fluid Dynamics Modeling Report

Diffusion Law of Thermal Runaway Gas in the Energy Storage Container

1. Simulation calculation parameters

The structure of the energy storage container and the arrangement of the measurement points are shown in Fig. 1. In the initial state, the container is filled with air at ambient temperature and the pressure is 1atm.



	x/mm	y/mm	z/mm
Detector 1	3323	2413	2130
Detector 2	1329	2413	2130

Fig. 1. The location of the detectors.

The gas release rate curve is obtained from the module level UL9540A report, as shown in Fig. 2.

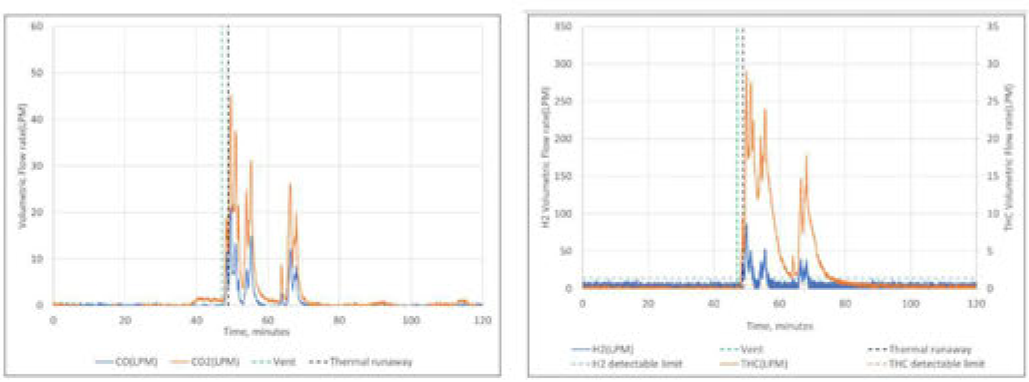


Fig. 2. Measured curve of leaking gas components

The leakage temperature of a single cell T_s=241℃. The gas venting starts at 47.15 min. After thermal runaway of the cell occurs, the components and ratios of the leakage gas are shown in Table 1. The performance curve of the fan is determined based on actual fan testing. The operating curve of the fan startup is shown in Fig. 3.

Time[s]	Air volume (CFM)
0	0
1	121
2	237
3	261
4	458
5	604
6	720
7	826

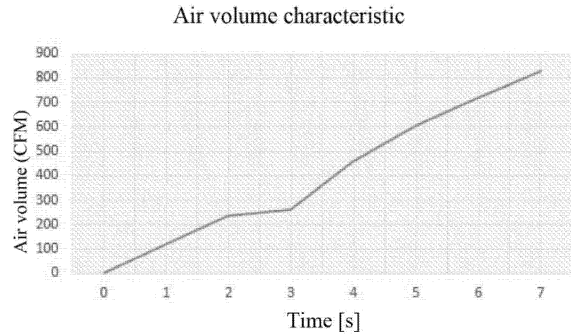


Fig. 3. The operating curve of the fan startup.

2. Thermal runaway leakage model and law of the energy storage container

2.1 Introduction to simulation calculation software

The software used in this report is PyroSim (Thunderhead Engineering PyroSim) which is a GUI for FDS (Fire Dynamics Simulator). FDS is developed by the National Institute of Standards and Technology (NIST) and is specially designed for simulate fire dynamics. PyroSim software jointly executes FDS and Smokeview. Smokeview is a visualization software and visualizes outputs from the FDS simulations [1-4].

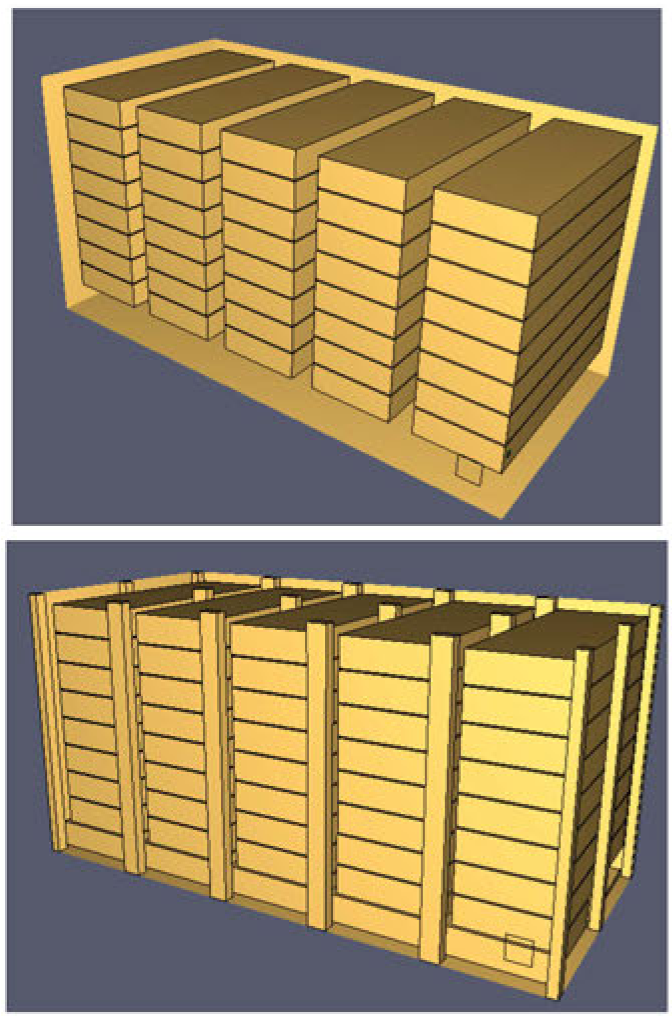
FDS is a computational fluid dynamics software with fluid motion in fire accidents as the main objects, and uses large eddy for fire simulation. The software uses numerical methods to solve the N-S equation for the flow of low Mach number driven by fire buoyancy, focusing on the calculation of smoke and heat transfer processes in fire accident. Because the FDS program is open source, its accuracy has been verified by numerous experiments, so it is widely used in the field of fire science[5-7].

Scholars at home and abroad simulated the motion morphology and concentration changes of thermal runaway gas under different physical models using FDS, and verified the accuracy of the software by comparison according to the test data. Pan Mingyu [8] used FDS software to establish a lithium-ion battery fire model, and conducted numerical simulation studies on the fire of lithium-ion battery packs of electric vehicles. Meanwhile, he analyzed the changes of heat release rate, smoke, visibility, temperature and component concentration during the fire process. The research results show that the fire of lithium-ion battery pack in electric vehicles develops rapidly, and its hazards such as smoke, high temperature, and CO affect the safety of people in the vehicle. Wang Jun [9] simulated thermal runaway, opening of pressure relief valve and the diffusion behavior of released gas in the battery module based on the lithium-iron phosphate battery module, conducted simulation study on them through FDS software, and analyzed the diffusion law of the released gas during thermal runaway of the lithium-iron phosphate battery. The research results show that after the pressure relief valve is opened, the gas of the lithium-iron phosphate battery fills the upper part of the entire battery module box within 8s, and after 30s, the spatial distribution of gas in the module box gradually tends to balance and does not change with time, which is consistent with the measured data. Chen Jiqing [10] established a numerical model of fire combustion of a single lithium battery cell based on fire dynamics theory, simulated the fire combustion process during thermal runaway with FDS, and carried out thermal runaway experiment of this single battery cell. Through comparison with the experimental results, it is found that the model accurately simulated the evolution process of the fire situation from smoking, fire catching, violent combustion and extinguishing when the single battery cell is burning, and the simulated temperature curve revealed the characteristics of fast combustion speed, high flame intensity and concentrated heat burst during thermal runaway of the battery, which verifies the reliability of the model. Xie [11] used FDS to perform numerical simulations of different fire situations in the battery warehouse to determine the optimal state of charge of the battery, shelf spacing and warehouse layout scheme of fire extinguishing facilities. The results show that when batteries in 50% and 100% state of charge are stored in the warehouse, the risk of thermal runaway, fire spread and smoke spread is much higher than that of batteries in zero-charge state. The automatic fire extinguishing sprinkler system has an obvious inhibitory effect on the fire in the warehouse, and the shelf spacing of the warehouse is also an important factor affecting the spread of fire. Cui [12] established a fire FDS model of a single battery cell based on experimental data to study the fire characteristics of the battery pack when it spreads in the warehouse environment. The results show that in the warehouse environment, the lithium-ion battery fire spreads to the upper battery pack preferentially, and spreads to the upper battery pack 19s after the initial thermal runaway of the battery, and the flame propagation of the horizontal battery pack is greatly affected by the distance. The farther the battery pack is from the thermal runaway battery, the later the occurrence time of fire in the battery pack, and the data predicted by the FDS model is close to the test results.

The Pyrosim we used for the simulation is Version 2019.1.0515. The process of using PyroSim simulation includes: establishing model: establishing building model, setting ignition source and vent locations, defining reactions, setting meshes, defining material properties, etc. Operations and solution: Perform calculations according to the set time and parameters. Analysis and processing: process the simulation results, and plot the change curves of component concentration, temperature, etc. by analyzing the spread of smoke and the development of fire.

2.2 Establishment of physical model

The internal dimensions of the energy storage container are 4.92m×2.33m×2.43m, there are five electric cabinets, each cabinet composed of 8 battery racks. The size of the air inlet and outlet is 222mm. It should be noted that the above physical model parameters are all determined based on the actual ESS. To detect the leaking components as quickly as possible, the most unfavorable source of leakage is determined to be the battery pack farthest from the measurement point, and the physical model is shown in Fig. 4.



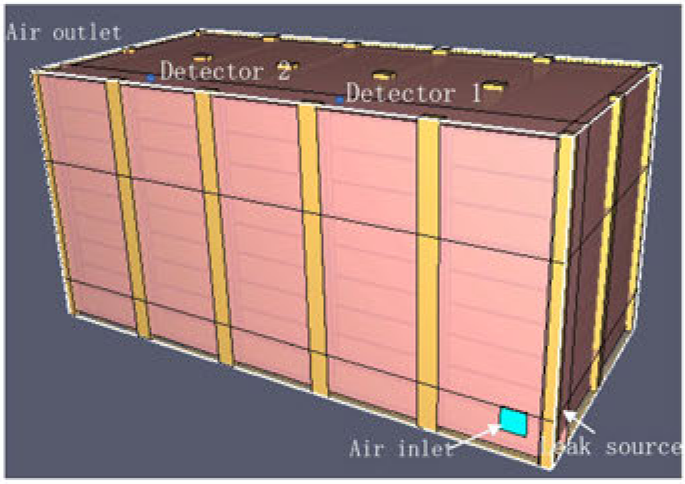


Fig. 4. Simplified model of battery pack and the container.

The basic control equations solved by FDS calculation mainly include:

(1) Continuous equation

$$\frac{\partial \rho}{\partial t} + \nabla \cdot \rho \boldsymbol{u} = 0$$

where ρ is the density; t is time; $\boldsymbol{u}$ is the velocity vector.

(2) Momentum conservation equation

$$\rho\left(\frac{\partial \boldsymbol{u}}{\partial t} + \frac{1}{2}\nabla \cdot |\boldsymbol{u}|^2 - \boldsymbol{u} \times \omega\right) + \nabla p - \rho g = \boldsymbol{f} + \nabla \cdot \tau$$

where f is the vector of external force acting on the fluid; p is pressure; τ is the viscous force tensor; ω is vorticity; g is the gravitational acceleration.

(3) Equation of conservation of components

$$\frac{\partial}{\partial t}(\rho Y_i) + \nabla \cdot (\rho Y_i \boldsymbol{u}) = (\rho D_i \nabla Y_i) + \dot{m}_i'''$$

where i is the ith component; Y_i is the concentration of the ith component; D_i is the diffusion coefficient of the ith component; $\dot{m}_i'''$ is the mass production rate of the ith component.

(4) Energy conservation equation

$$\frac{\partial}{\partial t}(\rho h) + \nabla \cdot (\rho h \boldsymbol{u}) = \frac{\partial p}{\partial t} + \boldsymbol{u} \cdot \nabla p - \nabla q_r + \nabla \cdot (k \nabla T) + \sum_i \nabla \left(h_i \rho h D_i \nabla Y_i\right)$$

where h is the specific enthalpy; q_r is the radiation flux; T is the temperature; k is the thermal conductivity.

(5) State equation

$$p_0 = \rho T R \sum_i (Y_i / M_i) = \rho T R / M$$

where R is the gas constant; M is the molecular mass of the gas mixture.

2.3 Boundary conditions for simulation

The components and ratios of the leaking gas are shown in Table 1.

Table 1 Components of thermal runaway gas

Composition of gas	**Mole percentage (%)**	**Molecular weight**	**Mass percentage x_i**	**Explosion limit concentration range (%V)**	**Minimum ignition energy (mJ)**	**20%LEL**	**40%LEL**
C_2H_6	1	30	1.43%	3.0~15.5	0.25	0.6	1.2
CO_2	26.9	44	56.24%	—	—		
CH_4	7	26	8.65%	5.0~15	0.33	1.0	2.0
C_2H_4	3.3	28	4.39%	2.7~36	0.096	0.54	1.08
H_2	43	2	4.09%	4.0~75.6	0.019	0.8	1.60
CO	14.6	28	19.42%	12.5~74.2	<0.28	2.5	5.0
Rest	4.2	29	5.79%	—	—		

The leaking volume of CO2, CO, H2, and THC can be obtained from Fig. 2. In FDS, we use the mass flux of individual species as the release boundary conditions. The conversion from volumetric leakage to mass flux used in FDS are shown in the following equation:

Mass flux(kg/m^{2}s)=Volumetric leakage(L/min)*Density(kg/m^3)/Leakage area(m^2)

For the volume of fan, we could set a maximum value for the outlet surface (820 CFM), and set a custom ramping time and volume ratio based on Fig. 3.

2.4 Meshing and grid independence verification

The size of the mesh will affect the accuracy of the simulation, the smaller the mesh, the more accurate the results, and the greater the amount of calculation. Therefore, it is necessary to evaluate the meshes of the energy storage container to ensure accuracy and improve efficiency. The initial conditions in the calculation are as follows: ambient temperature T_o=20℃, ambient pressure P=101.25kPa. The meshes have been refined the air areas.

We calculate the mass flux by converting the volume flow rate and density, and then calculate the kg/m2-s based on the leakage source area for input into FDS. The leakage curve used for grid independence verification is shown in Fig. 5. We get the leaking values of H2, CO, CO2, and THC from Fig 2. Note that the value of THC obtained from Fig. 2 includes all the C-H components, like CH4, C2H4, C2H6 etc. According to the component percentage table (Table 1), CH4 take about 51% in the total THC. In our report, the THC means all the C-H components excluding CH4.

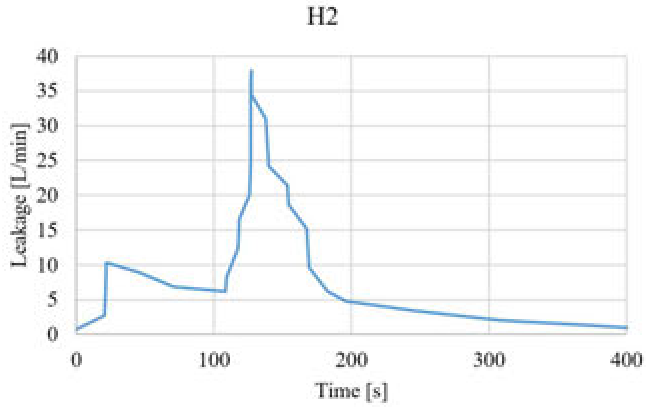


Fig. 5. Curve of actual leakage H_2 component.

The results of changes in H_2 and CO components at detector 1 under different mesh models are shown in Fig. 6. In the plot, "m" represents "million", for instance, 0.6 m means there are 0.6 million girds for the calculation.

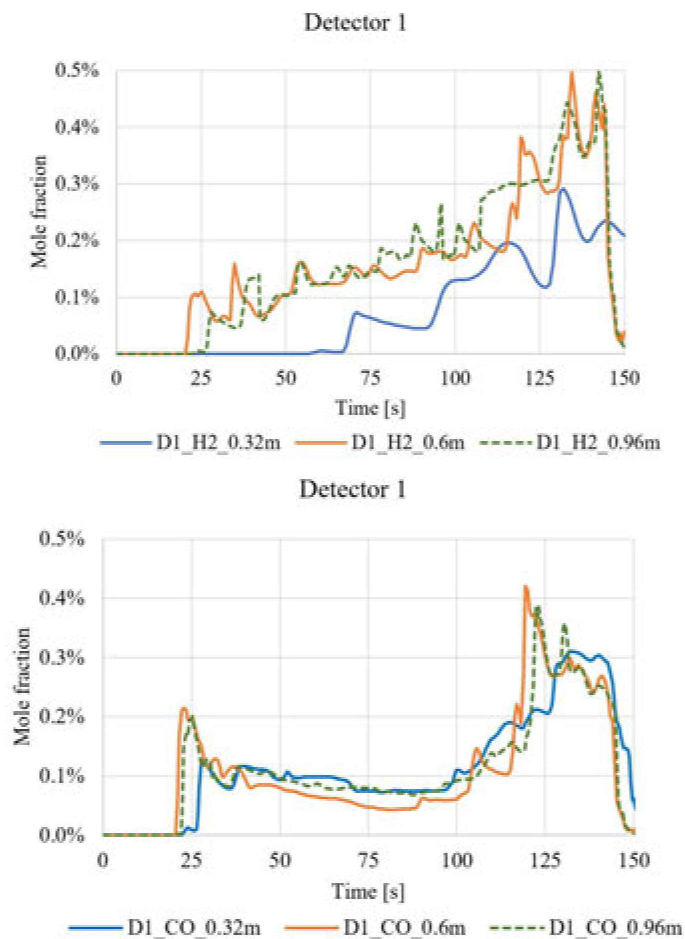


Fig. 6. Changes in gas component parameters under different number of girds.

Table 2 shows the comparison of the calculation results under different numbers of meshes, to balance the calculation accuracy and calculation speed, a meshing model of 0.6 million can be selected for the subsequent models.

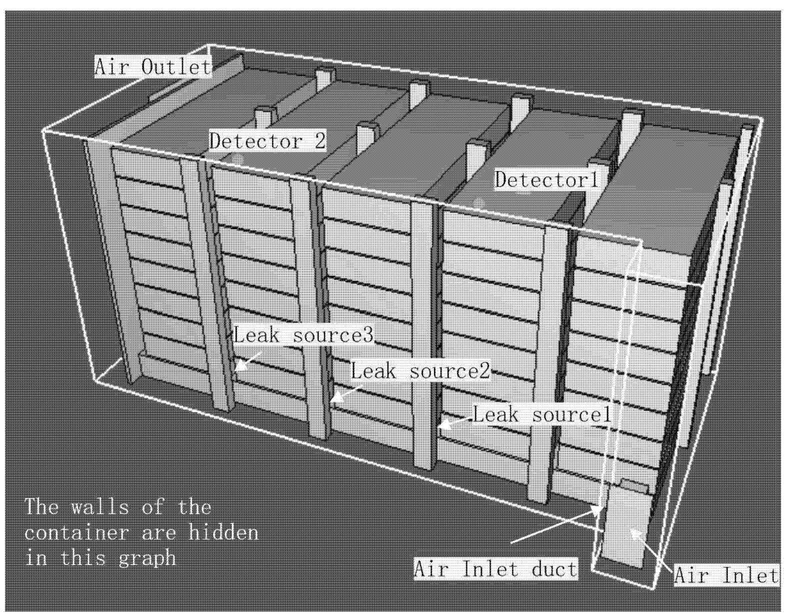
Table 2 The calculation results under different numbers of meshes.

Normal mesh size	50mm*58mm*60mm	47mm*45mm*48mm	33mm*29mm*30mm
Dense mesh size	33mm*30mm*30mm	28mm*25mm*25mm	25mm*22mm*24mm
Total number of meshes	0.32 million	0.6 million	0.96 million
Average H_2 mole fraction within 150 s	0.2039%	0.1555%	0.1626%
Average CO mole fraction within 150 s	0.1118%	0.1079%	0.1115%

2.5 Simulation results and analysis

The initial conditions in the calculation are as follows: ambient temperature T_0=20℃, battery thermal runaway gas temperature T_s=241℃, the leakage starts from 47.15 min, in the simulation we set this time as the 0^{th} second.

For this simulation case, the maximum release rate of H2, CO, CO2, CH4, and THC are used, whose release rates are derived from Fig. 2. The fan would be automatically activated if detector 1 or detector 2 detects 0.4 % of H2 (i.e. 10 % H2 LEL). The inlet and outlet of the storage container are both closed before the startup of the fan. The ventilation volume is 820CFM. The location of the measurement points and leakage sources are shown in the Fig. 7.



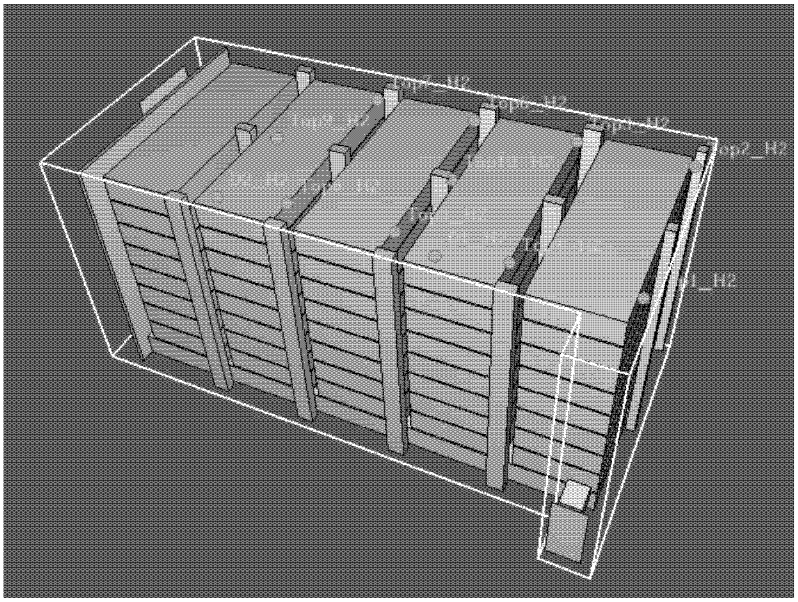
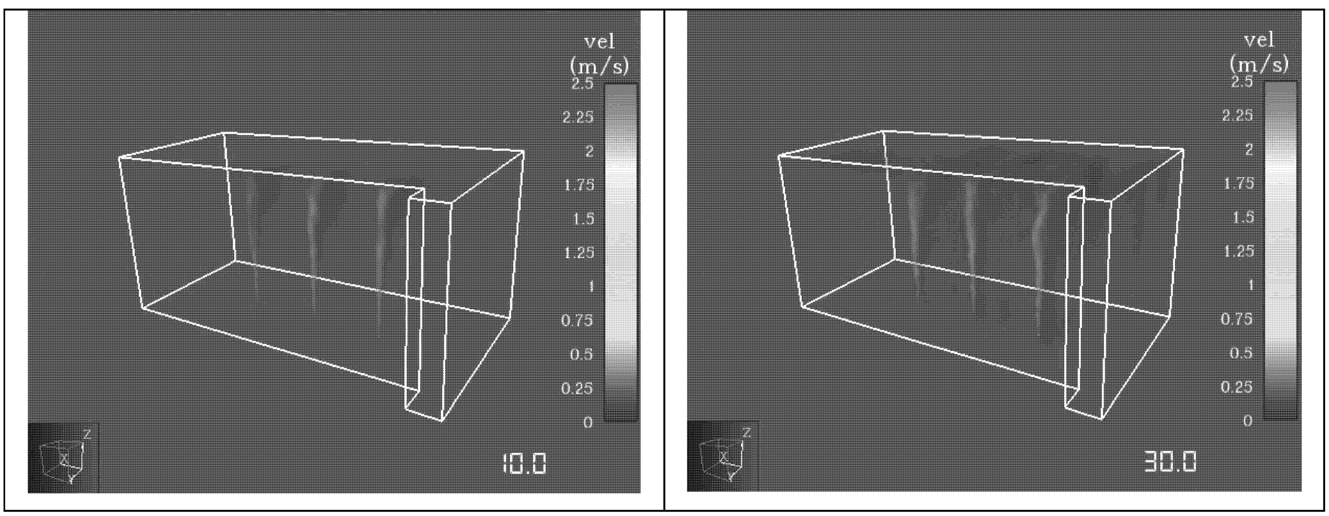


Fig. 7. Location of the measurement points and leakage sources.

After 51 seconds without ventilation, the concentration of H2 at the location of detector reaches 10 % LEL, the fan is thus started at 51th second. After 7 seconds the ventilation volume would reach 820CFM. The velocity contour of this process is shown in Fig. 8.



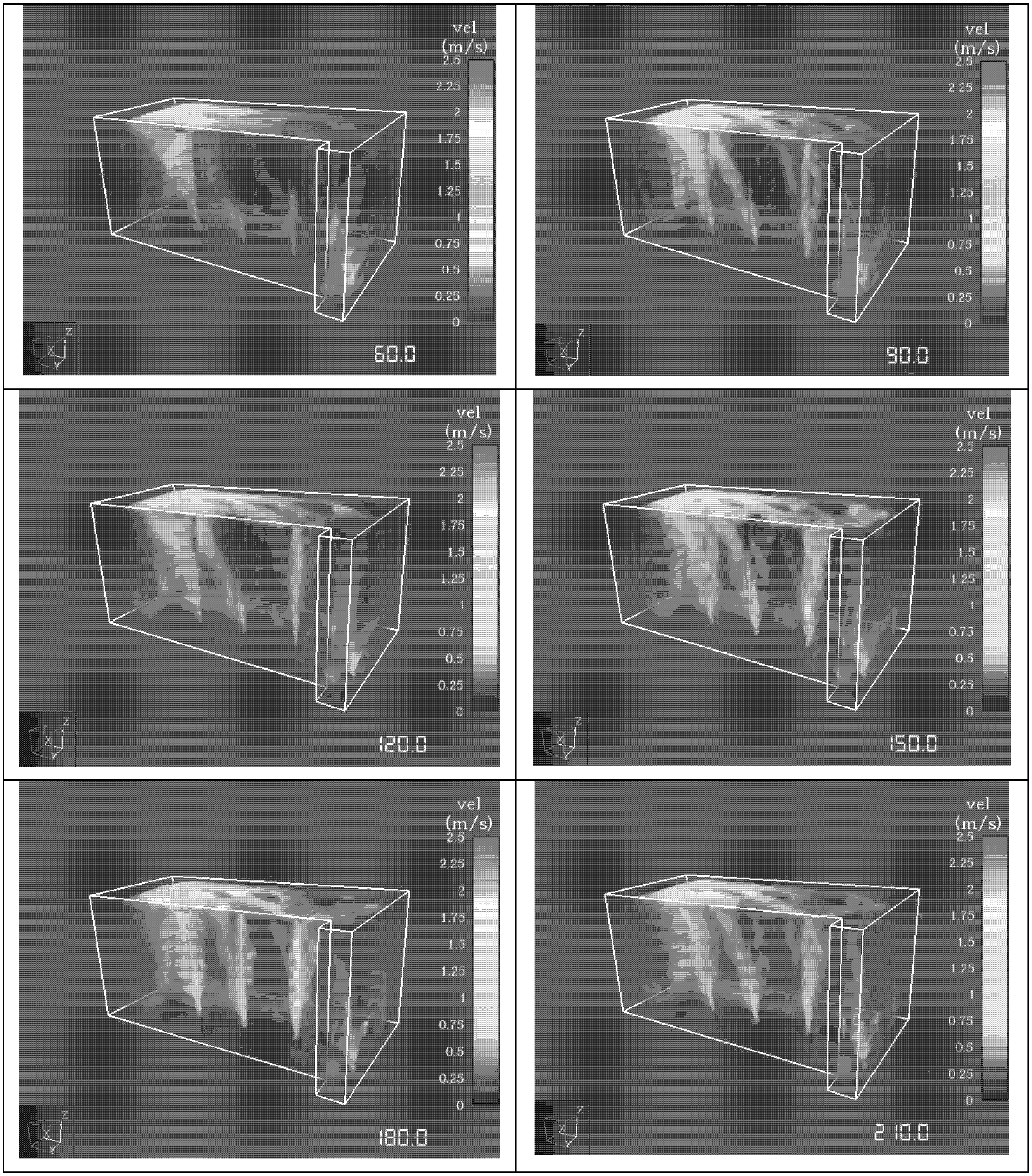
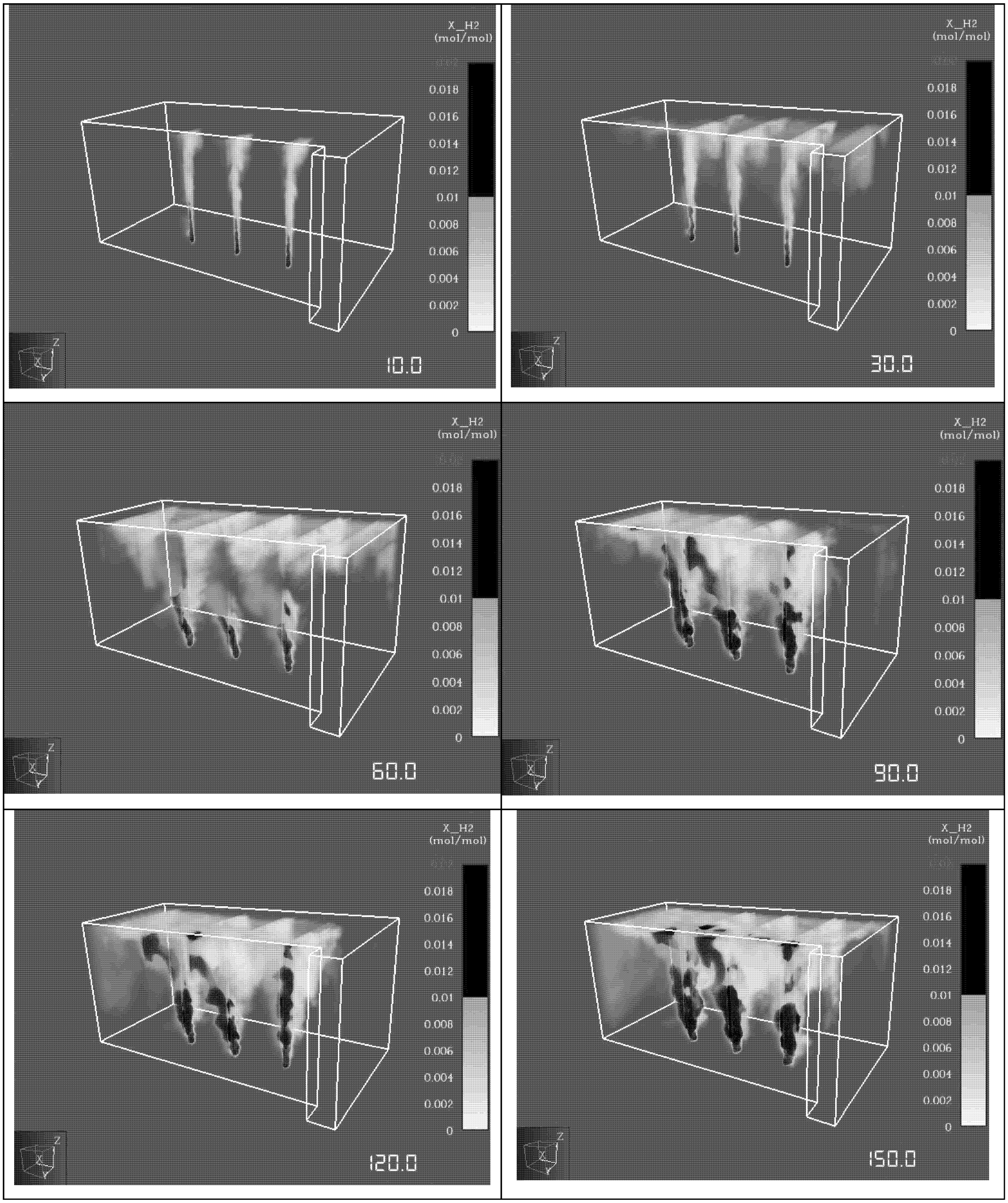


Fig. 8. 3D velocity contour.

The 3D contour of the H_2 component of the process is shown in Fig. 9. The highlighted black color represents the mole concentration of H2 is higher than 1% (25 % of H2 LEL).



X_H2
(mol/mol)
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Z
X
Y
10.0
30.0
60.0
90.0
120.0
150.0

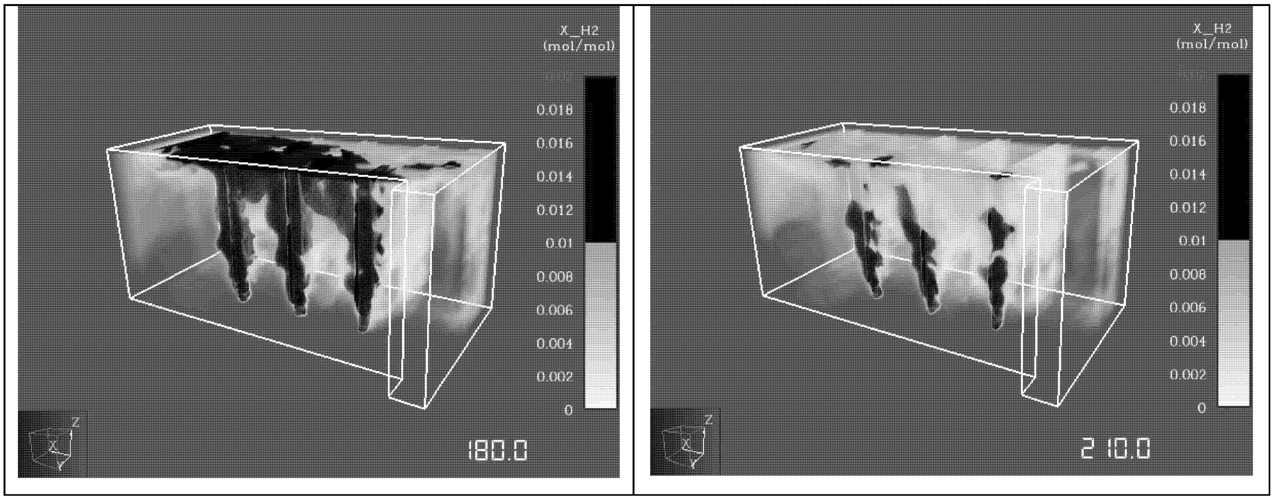
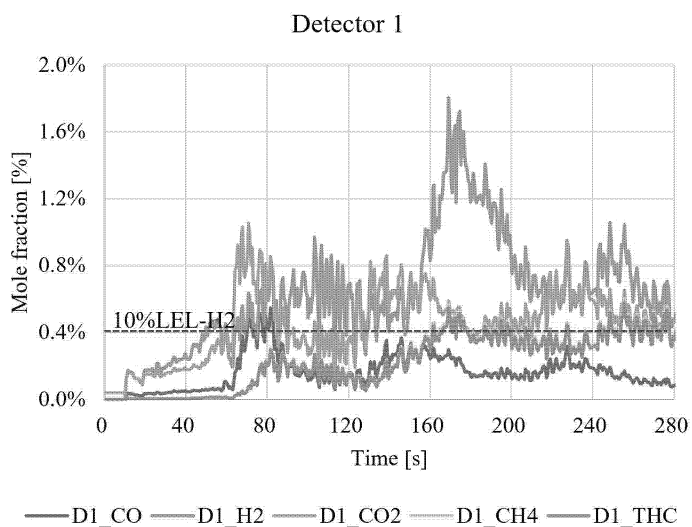


Fig. 9. 3D contours of H_2 component under three module leakage condition.

The component change curves of the unventilated and ventilated stages are shown in Fig. 10. The ventilation starts at 51 seconds. In the following plots, "D" means detector. After the fan is started, the mole fraction of H2 would decrease in a short time, Fig. 10 shows the H2 mole fraction changing curve at detector 1 and 2.



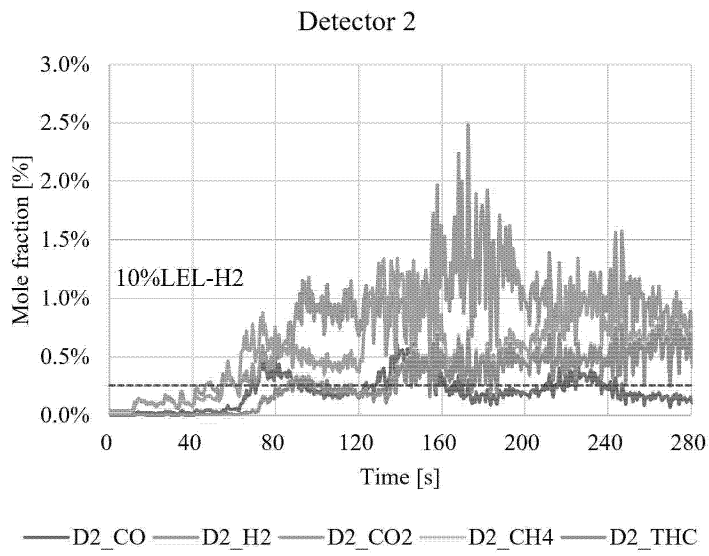


Fig. 10. Component change curves at detectors.

Fig. 11 shows the ratio of H_2 mole fraction to H_2 LEL at locations of detectors 1 and 2. The H2 mole fractions at detectors 1 and 2 are less than 25% LEL during the most part of the ventilation process. The H2 mole fraction at detector 1 and 2 would drop from 25 % LEL to 10% LEL in 10 seconds.

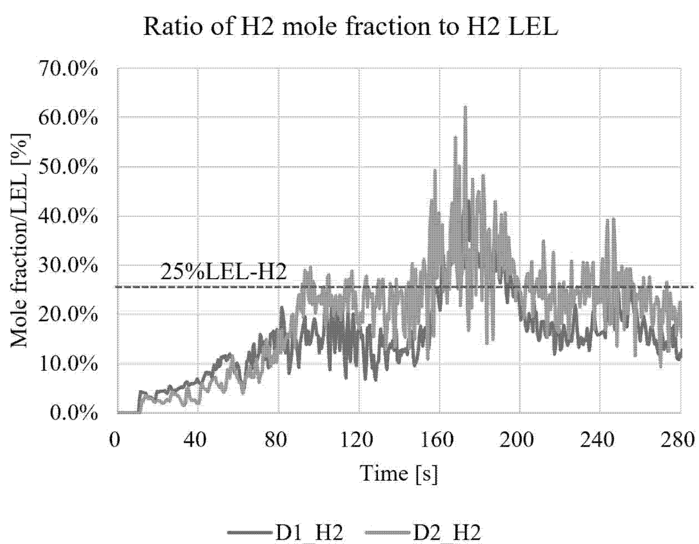
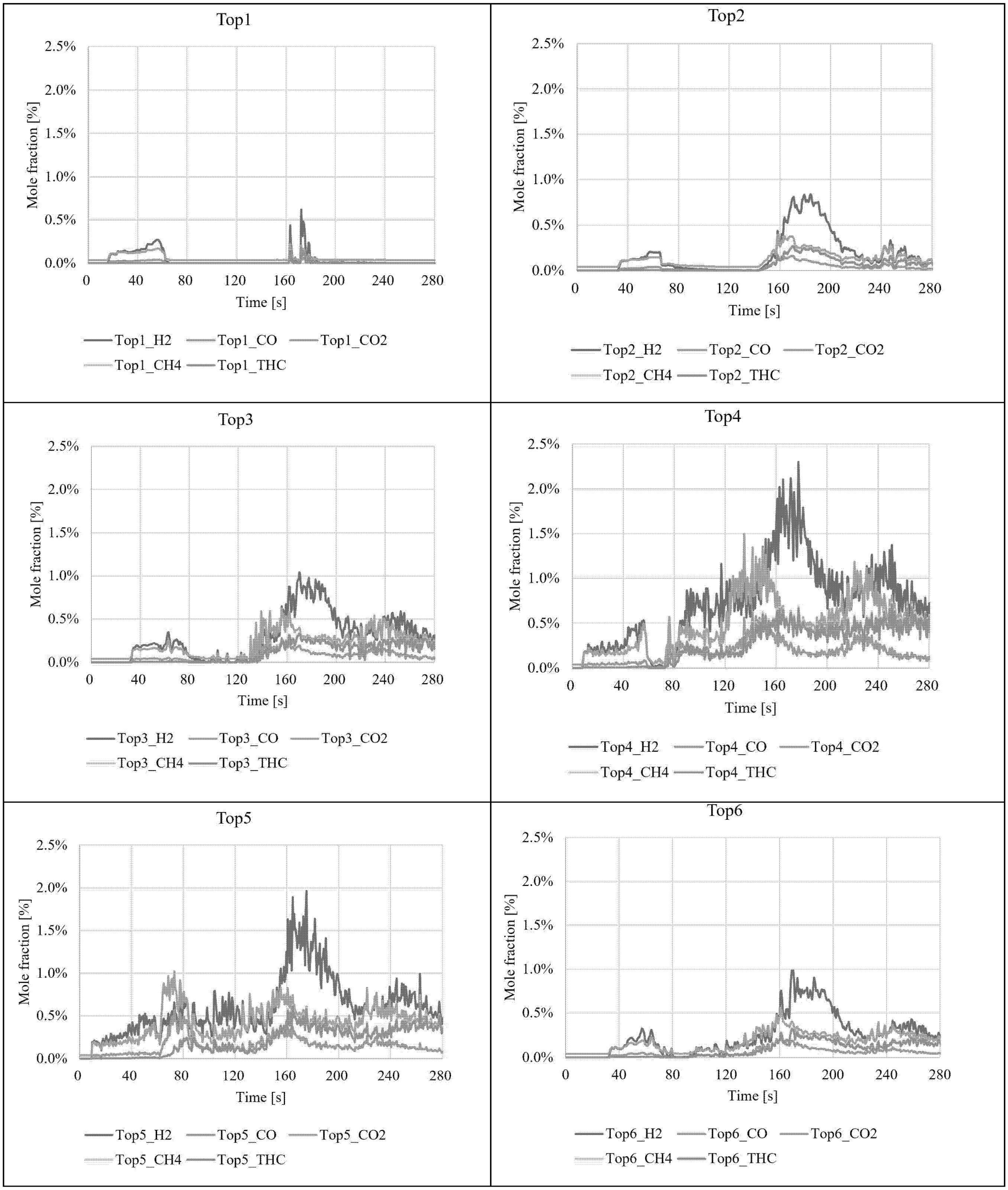


Fig. 11. The ratio of H2 concentration to the LEL.

For three modules leakage, the mole fraction change curves of the components at top measurement points in the entire process are as shown in Fig. 12. Since the measurement point Top 4,5,8 is located directly above the leakage sources, and the leaking gas moves upward due to buoyancy, the H_2 mole fractions of these upper measurement points are the largest. For the other measuring points at the top side, the H2 mole fractions are all lower than 2.0 % for the most of time.


Top1
Mole fraction [%]
Time [s]
Top1_H2
Top1_CO
Top1_CO2
Top1_CH4
Top1_THC
Top2
Top2_H2
Top2_CO
Top2_CO2
Top2_CH4
Top2_THC
Top3
Top3_H2
Top3_CO
Top3_CO2
Top3_CH4
Top3_THC
Top4
Top4_H2
Top4_CO
Top4_CO2
Top4_CH4
Top4_THC
Top5
Top5_H2
Top5_CO
Top5_CO2
Top5_CH4
Top5_THC
Top6
Top6_H2
Top6_CO
Top6_CO2
Top6_CH4
Top6_THC

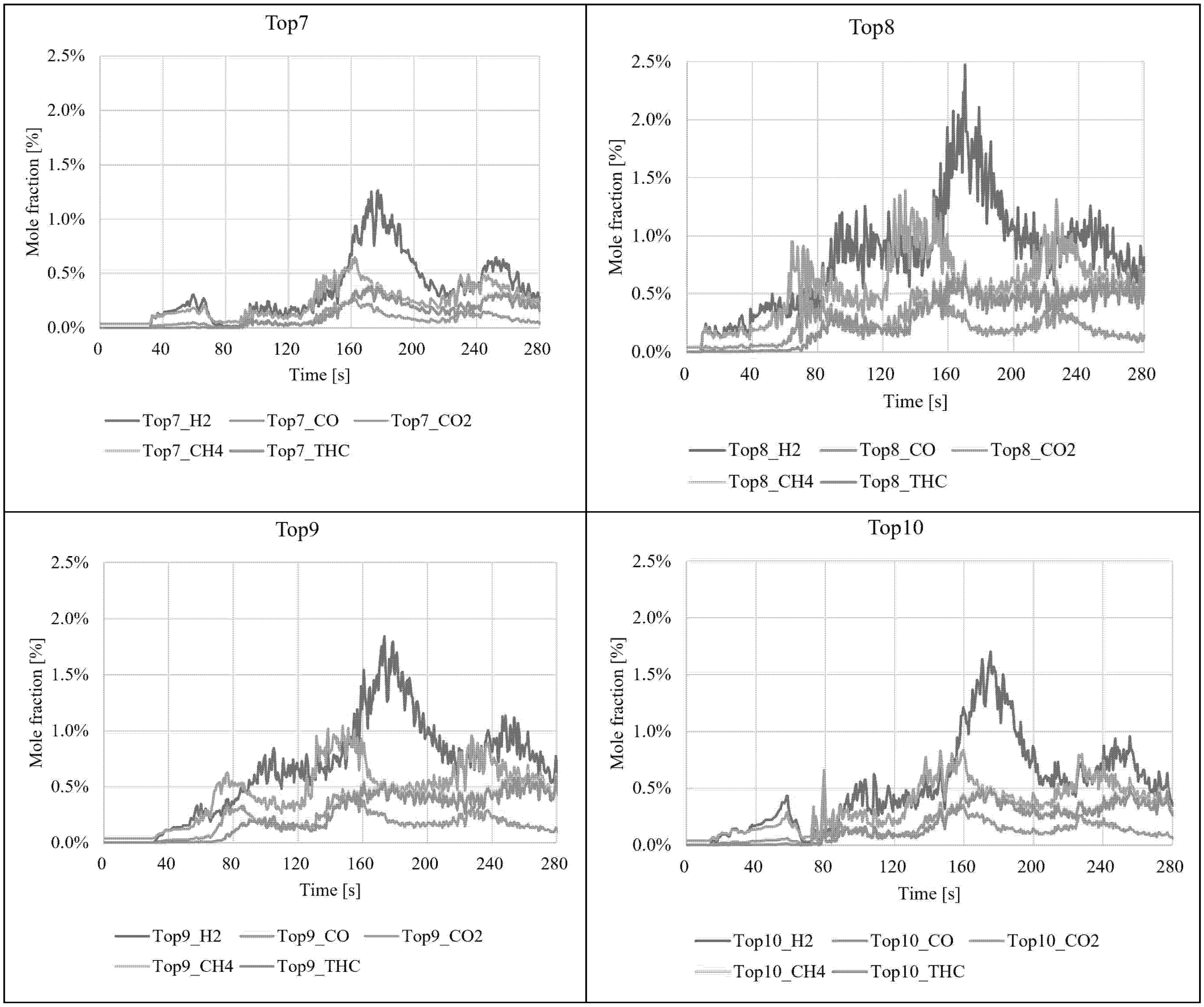
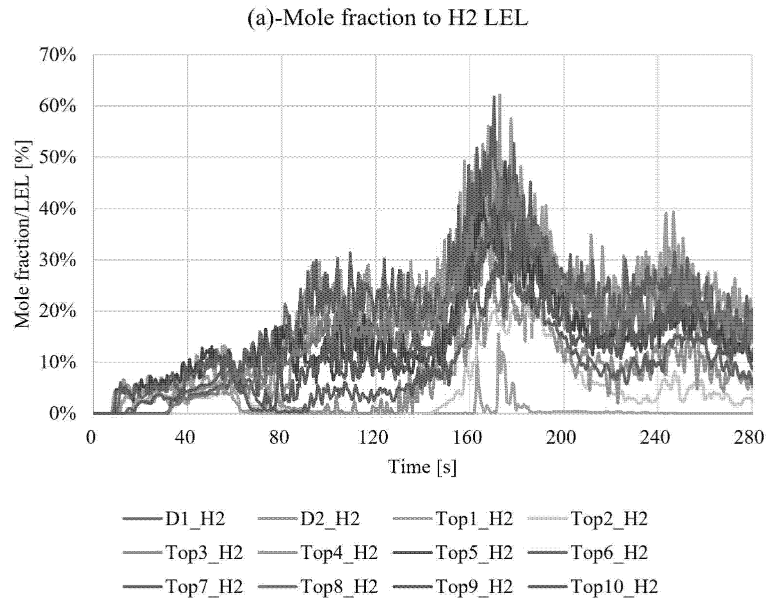
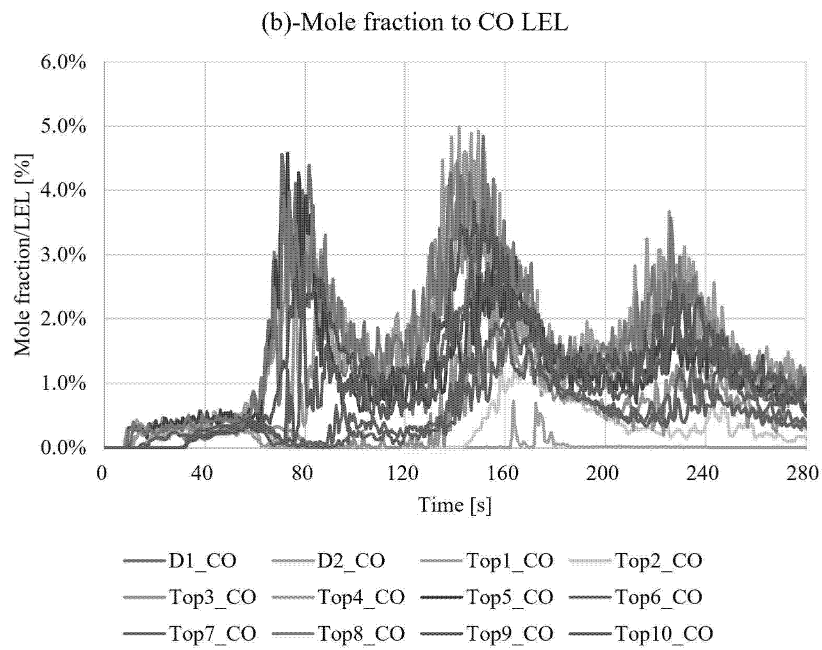


Fig. 12. Mole fraction change curves of components at top measurement points

The ratio of the mole fraction of H_2, CO, CH4, and THC to their LEL (for THC, we are using C2H6 to represent) at the measuring points in the container is shown in Fig. 13. The mole fractions of H2 for Top 4,5,8 are higher than 25 % LEL due to its short distance to the leaking source.


(a)-Mole fraction to H2 LEL
70%
60%
50%
40%
30%
20%
10%
0%
Mole fraction/LEL [%]
0
40
80
120
160
200
240
280
Time [s]
D1_H2
D2_H2
Top1_H2
Top2_H2
Top3_H2
Top4_H2
Top5_H2
Top6_H2
Top7_H2
Top8_H2
Top9_H2
Top10_H2


(b)-Mole fraction to CO LEL
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Mole fraction/LEL [%]
0
40
80
120
160
200
240
280
Time [s]
D1_CO
D2_CO
Top1_CO
Top2_CO
Top3_CO
Top4_CO
Top5_CO
Top6_CO
Top7_CO
Top8_CO
Top9_CO
Top10_CO

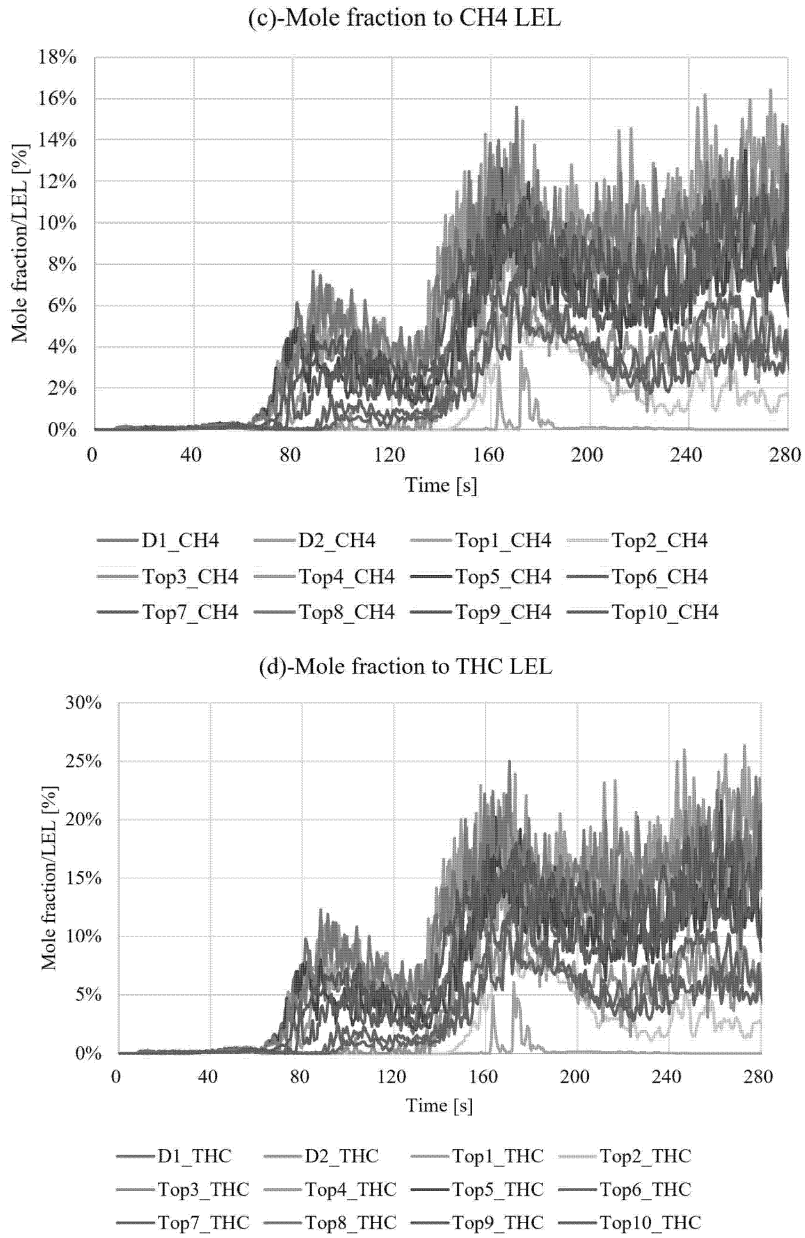
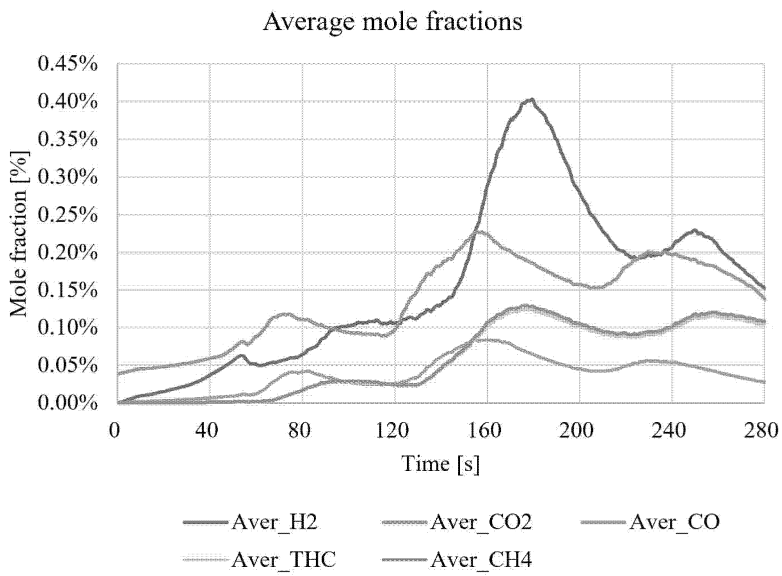
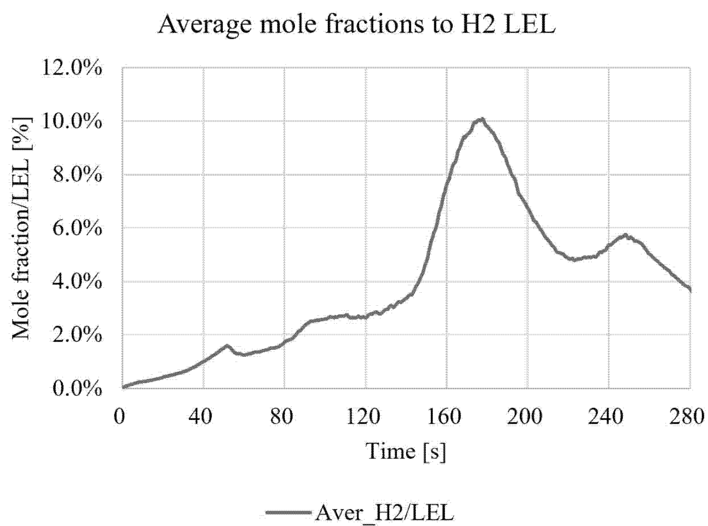
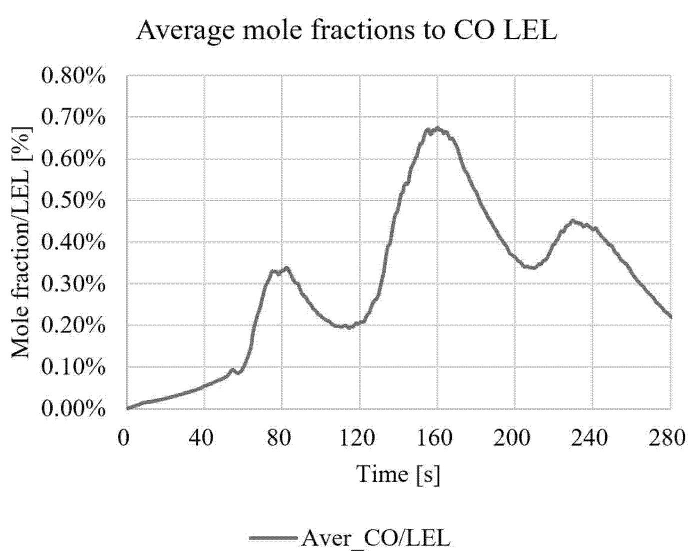


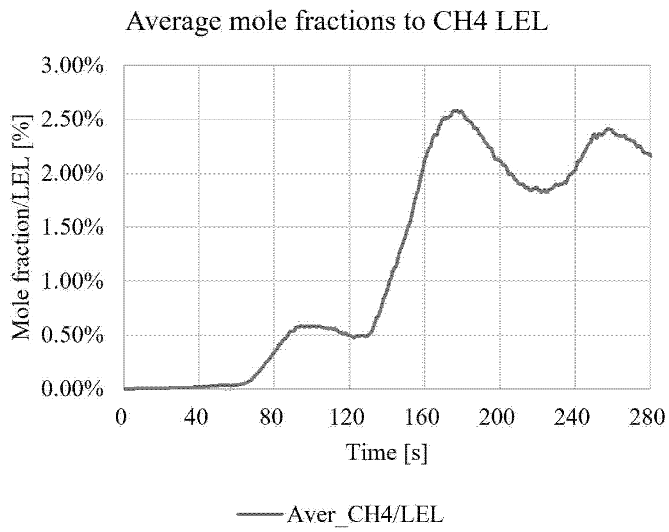
Fig. 13. Ratios of mole fraction of the components at the measuring points to the LEL.

Fig. 14 shows the average mole fraction of each component in the entire energy storage container. Due to the large size of the container and early startup of ventilation process, the average mole fraction of H_2 throughout the process does not exceed 10% of H_2 LEL.


Average mole fractions
0.45%
0.40%
0.35%
0.30%
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
Mole fraction [%]
0
40
80
120
160
200
240
280
Time [s]
Aver_H2
Aver_CO2
Aver_CO
Aver_THC
Aver_CH4


Average mole fractions to H2 LEL
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Mole fraction/LEL [%]
0
40
80
120
160
200
240
280
Time [s]
Aver_H2/LEL


Average mole fractions to CO LEL
0.80%
0.70%
0.60%
0.50%
0.40%
0.30%
0.20%
0.10%
0.00%
Mole fraction/LEL [%]
0
40
80
120
160
200
240
280
Time [s]
Aver_CO/LEL



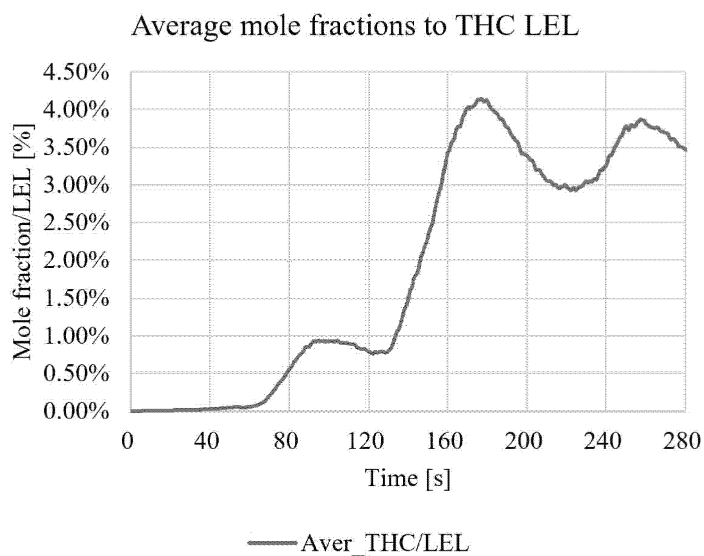


Fig. 14. Average mole fraction of components in the energy storage container.

References

[1] LIU J, LIU M, ZHI H Q, et al. Discussion on basic theory on FDS fire accident simulation and application skills [J]. Safety, 2006(27): 6-9, 13.

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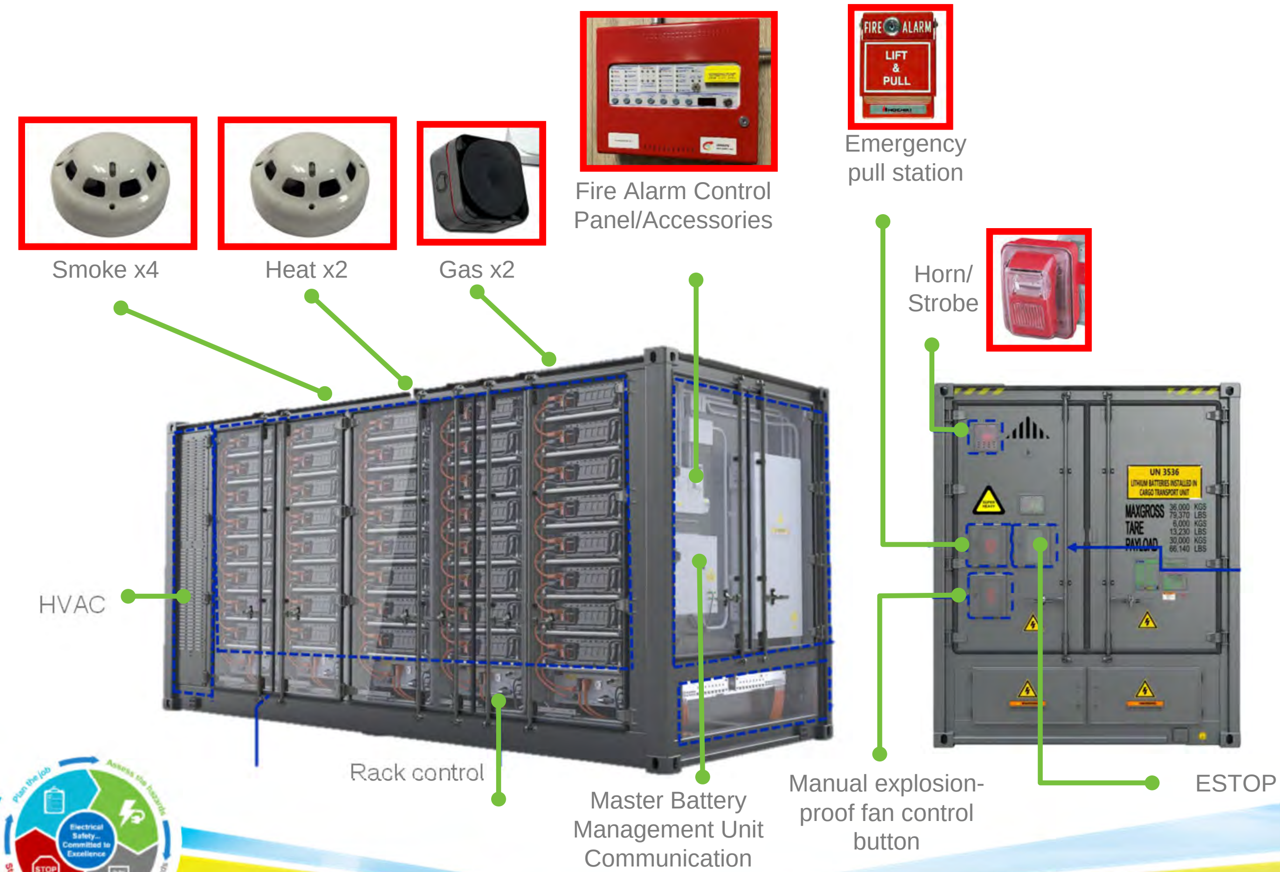
[11] Jun Xie, Jiapeng Li, Jinghong Wang, Juncheng Jiang, Fire protection design of a lithium-ion battery warehouse based on numerical simulation results[J], Journal of Loss Prevention in the Process Industries, 2022(80):104885.

[12] Yilin Cui, et al., Numerical study on the fire and its propagation of large capacity lithium-ion batteries under storage[J], Journal of Thermal Analysis and Calorimetry, 2023(148): 5787–5803.

APPENDIX 6-C: DFPD PRELIMINARY FIRE SAFETY PRESENTATION

CATL EnerC+ BESS Container

The EnerC+ incorporates smoke detection, flammable gas detection, and audible and visual alarming.



- **Fire Detection and Notification**
  - Gas x2
  - Smoke x3
  - Heat x2
  - Fire Panel x1
- **NFPA855 Systems**
  - Smoke detection
  - Thermal runaway prevention
  - NFPA 69 deflagration control
- **UL9540A – Large Scale Fire Testing**
  - Fire involving 1 BESS unit will not propagate to an adjacent BESS unit
- **Exhaust for gas ventilation included in each container**

NEXTera ENERGY RESOURCES

Standard BESS Signage

Emergency Response/Operations Plan

- **Renewable Operations Control Center (ROCC) SHALL:**
  - Contact the appropriate key authorities, agencies, and management
  - Isolate the affected feeder (remote breaker open)
  - Inform local fire department of any known hazards and provide safety datasheets (SDS)
  - Notify fire department of type of fire suppression (if present) and if it has discharged
  - NextEra/FPL shall deploy site cleanup crew after site determined to be free of electrical hazards

- **Local Fire Department SHALL:**
  - ✔ Establish a safe perimeter and monitor the events at the direction of FPL representative
  - ✔ Wear appropriate PPE when approaching a distressed BESS container during an emergency
    Note: NextEra BESS cannot be occupied

- **Local Fire Department shall NOT:**
  - ✘ Use water on any battery containers
  - ✘ Open any battery container doors
  - ✘ Consider the site to be free of electrical hazards until cleared by NextEra/FPL staff

- **Contacts:**
  - Renewable Operations Control Center (ROCC): 561-694-3636 (24/7/365)
    - Primary contact for notification in the event of emergency
  - Energy Resources Control Center (ERCC) : 888-202-6337 (24/7/365)
    - Primary contact for remote isolation of power to the site in the event of an emergency
  - FPL Site Leader/Manager : to be provided prior to construction of BESS

APPENDIX 6-D: DFPD FOLLOW-UP COMMUNICATION

From: Ahn, Stephen
Sent: Thursday, February 6, 2025 2:36 PM
To: Fireplansubmission <Fireplansubmission@bureauveritas.com>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>; Fire Marshal <firemarshal@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan <Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Hi Barbara (and Dixon Fire Department),

I tried calling yesterday to check in on this and left a voicemail. Your timely feedback would be appreciated as this will be finalized soon. If helpful, we can schedule a call next week.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

From: Ahn, Stephen
Sent: Thursday, January 30, 2025 12:45 PM
To: Fireplansubmission <Fireplansubmission@bureauveritas.com>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>; Fire Marshal <firemarshal@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p

<Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan
<Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Dear Dixon Fire Department,

I want to follow up on this email and reiterate our commitment to ensuring the safety of our project in light of the recent incident in Moss Landing, California.

We are aware of the incident and are closely monitoring the situation. While we cannot comment on specific aspects of another company's project, we reaffirm our commitment to maintaining the highest safety standards for our projects.

To that end, we would be happy to meet with you again if you would like to learn more about the safety measures and designs implemented for the Corby project. In the meantime, I would like to share the following facts about us and our project.

To that end, we would be happy to meet with you again if you would like to learn more about the safety measures and designs implemented for the Corby project. In the meantime, I would like to share the following facts about us and our project.

- **Safety Record in California:** Our California fleet currently has 2,096 MW of operating battery energy storage systems with zero incidents to date.
- **Improved Design Safeguards:** Our California projects utilize outdoor containerized battery energy storage systems designed with batteries isolated in racks and individual containers to prevent thermal propagation. These non-walk-in containerized systems allow safe, external access to all components, eliminating the need to enter the containers.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

From: Ahn, Stephen
Sent: Tuesday, January 14, 2025 12:20 PM
To: Fireplansubmission <Fireplansubmission@bureauveritas.com>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan <Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Just to clarify, we are soliciting feedback from the Dixon Fire Department to incorporate into our design. However, the permit/license will be issued by the California Energy Commission rather than Solano County.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

From: Ahn, Stephen
Sent: Tuesday, January 14, 2025 9:54 AM
To: Fireplansubmission <Fireplansubmission@bureauveritas.com>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan <Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Hi Barbara,

Thank you for getting back to us and we will keep an eye out for your formal response. We do not have a permitting number associated with this project, as it is going through the state opt-in process given the moratorium. Let me know if you need any further clarification.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

From: Fireplansubmission <Fireplansubmission@bureauveritas.com>
Sent: Monday, January 13, 2025 8:40 PM
To: Ahn, Stephen <Stephen.Ahn@nexteraenergy.com>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan <Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Good afternoon Stephen,
We are looking into this for you. Could you please provide a permit number? In the meantime you will be receiving an answer in regards to your questions as one of our team members will be reaching out. Thank you for your patience.

Respectfully,

Barbara Tomajic
Project Manager
Work : (916) 514-4511 Cell : (916) 247-4210
BUREAU VERITAS
180 Promenade Circle, Ste. 150
Sacramento, CA 95834
www.bureauveritas.com (or local website)

From: Ahn, Stephen <Stephen.Ahn@nexteraenergy.com>
Sent: Monday, January 13, 2025 10:10 AM
To: Fire Marshal <firemarshal@dixonfireca.gov>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan <Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: RE: Corby - Follow-up and Project Update

Dear Dixon Fire Department,

I hope you enjoyed your well-deserved time off. I am following up on the email I sent during the holidays regarding feedback on the Corby project. We are also happy to schedule a call if that would be helpful for you.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

From: Ahn, Stephen
Sent: Friday, December 27, 2024 9:13 PM
To: Fire Marshal <firemarshal@dixonfireca.gov>; Randy Shafer <rshafer@dixonfireca.gov>; Greg Lewis <glewis@dixonfireca.gov>
Cc: Adams, Josh <josh.adams@nexteraenergy.com>; Elizondo, Adrian <Adrian.Elizondo@nexteraenergy.com>; Benson, Michael p <Michaelp.Benson@nexteraenergy.com>; Omercajic, Nadan

<Nadan.Omercajic@nexteraenergy.com>; Bena, Andrew <Andrew.Bena@nexteraenergy.com>
Subject: Corby - Follow-up and Project Update

Dear Dixon Fire Department,

I hope you are winding down and ready to spend time with your loved ones. I wanted to follow up on our conversation from 10/11 and provide a brief project update. We have submitted our application to the California Energy Commission and are working to have it deemed complete.

In the meantime, I would like to check if you have any questions regarding our recommendation not to include fire suppression, internally or externally, for the battery energy storage system. As discussed, direct contact with water is likely to exacerbate a thermal event. For this reason, we are also not planning to include an on-site water tank. We would appreciate your concurrence or any feedback on this approach.

Additionally, could you provide the standard for fire access roads at the facility? We will ensure adequate measures are taken for proper emergency response, as detailed in our emergency response plan, and would like to incorporate your team's considerations.

Thank you for your time and support. Please feel free to reach out with any questions or comments.

Stephen Ahn | *Project Director*
NextEra Energy Resources
Mobile: +1 713 829 9269

APPENDIX 11-A: HAZARD MITIGATION ANALYSIS

NextEra Corby BESS

Hazard Mitigation Analysis for Outside Ground Mounted Battery Energy Storage Systems: CATL EnerC+ Solano County, California

Report | Rev0 | May 16, 2025

Prepared for:

ORR Protection Systems, Inc.
OPS - Dublin
6761 Sierra Ct Ste A
Dublin CA 94568-2692

Prepared by:

Fire & Risk Alliance, LLC
7640 Standish Place
Rockville, MD 20855

www.fireriskalliance.com

877-961-4118

Date	Revision	Reason for Issue	Developed By	Approved by
May 16, 2025	0	Initial	WB	GM

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EXECUTIVE SUMMARY

Fire and Risk Alliance, LLC (FRA) conducted an installation level code review and a Hazard Mitigation Analysis (HMA) in accordance with the requirements of the 2022 Edition of the California Fire Code (CFC), which is based on the 2021 Edition of the International Fire Code (IFC), with local amendments. The analysis is evaluating the Contemporary Amperex Technology Co., Limited (CATL) EnerC+ Lithium-Ion Battery Energy Storage System (BESS) intended for installation at the Corby BESS facility located at 6865 Byrnes Road in unincorporated Solano County, California. The Corby BESS will have an approximate capacity of 300 megawatts (MW) / 1200 megawatt hours (MWh) utilizing 384 EnerC+ containers with space allocated for future augmentation of 160 additional containers. The EnerC+ is a pre-assembled, non-walk-in (NWI) style lithium-ion BESS container with a capacity of 4,073 kilowatt hours (kWh).

This narrative has been developed by FRA and summarizes our analysis. It is intended to be used as a tool for a Fire Code Official (FCO) or an Authority Having Jurisdiction (AHJ) to assist in their review of the Corby BESS. This analysis includes a review of the Corby BESS site plan and the EnerC+ including its construction, design, fire safety features, listings, certifications, UL 9540A fire test data, and Failure Mode and Effects Analysis (FMEA).

Based on a review of the EnerC+ and the site plan, the Corby BESS site design can meet the CFC installation level requirements for an outdoor BESS when it is installed in accordance with the manufacturer's instructions, its listing, the site plan, and the CFC. However, the following items were identified in this analysis that need to be addressed to ensure compliance:

- A disconnecting means or placards must be provided at the site per CFC §1207.4.1.
- Signage must be provided at the site per CFC §1207.4.8.
- Information related to the inverter listing must be provided per CFC §1207.3.
- The fire code official must approve of angles of approach/departure, grade, and imposed load for the access roads per CFC §503.
- If the AHJ requires one, a key box must be provided at the site per CFC §506.

Once the items noted above are provided, the Corby BESS site design will comply with the CFC requirements.

In addition, the EnerC+ BESS installation at the Corby BESS facility meets the following HMA approval criteria outlined in the CFC §1207.1.4.2, as follows:

1. *Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations [CFC §1207.1.4.2 #1]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within unoccupied ESS rooms. However, it should be noted, the EnerC+ has a number of protection schemes in place to prohibit fire from spreading from one EnerC+ container to another. As demonstrated in UL 9540A unit level testing, thermal runaway was contained to a single module within an EnerC+ container. Although this requirement applies to unoccupied ESS rooms (and not an outdoor installation), the Corby BESS still meets the intent of the requirement by containing a fire event to a single EnerC+ container.

2. *Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate [CFC §1207.1.4.2 #2]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within occupied work centers (or any other room). However, it should be noted, the EnerC+ has numerous internal sensors that are monitored by the battery management system (BMS) that can detect abnormal events and/or failures of the unit. The EnerC+ also includes smoke, heat, and gas detection systems with an audible/visible appliance installed on the exterior of the container to provide local notification. These systems are also monitored remotely, providing off-site notification in the unlikely event of a fire. Although this requirement applies to occupied work centers (and not an outdoor installation), the Corby BESS still meets the intent of the requirement through the internal sensors, fire and gas detection system, the remote monitoring provided, and the local notification appliances installed in each EnerC+ container.

3. *Toxic and highly toxic gases released during fires will not reach concentrations in excess of the Immediately Dangerous to Life or Health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area [CFC §1207.1.4.2 #3]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within a building or adjacent to a means of egress. There are no occupied buildings or public exposures within 100 feet of the nearest EnerC+ container. As such, no toxic or highly toxic gases released during fires or other faulty conditions would reach IDLH levels in buildings or adjacent means of egress. However, it should be noted, gases released during a fire may result in a localized concentration in excess of IDLH levels. Therefore, first responders should wear proper personal protective equipment (PPE) when responding to a Corby BESS fire.

4. *Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL) [CFC §1207.1.4.2 #4]:*

   The Corby BESS meets this requirement. The EnerC+ utilizes listed lithium-ion cells that do not vent toxic gases during normal charging, discharging, or operation. As such, no flammable gases exceeding 25% of their LFL will be released from the Corby BESS during charging, discharging, and normal operation.

5. *Flammable gases released from ESS during fire, overcharging, and other abnormal conditions will be controlled through the use of ventilation of gases, preventing accumulation, or by deflagration venting [CFC §1207.1.4.2 #5]:*

   The Corby BESS meets this requirement. The EnerC+ has an NFPA 69-compliant explosion control system. During a thermal event, the explosion control system activates, ventilating the EnerC+ to keep the gas concentration of the container below its explosive limit. TLB performed a review of the explosion control system and CFD simulations prepared for the EnerC+ and determined the system to be in compliance with NFPA 69. In addition, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL. As such, flammable gases released from ESS during a fire, overcharging, or other abnormal conditions will be controlled through ventilation of gases.

In summary, based on a review of the EnerC+, the site plan, and UL 9540A testing, the Corby BESS meets the HMA approval criteria outlined in the CFC, as described above.

1.0 INTRODUCTION

Fire and Risk Alliance, LLC (FRA) conducted an installation level code review and a Hazard Mitigation Analysis (HMA) in accordance with the requirements of the 2022 Edition of the California Fire Code (CFC), which is based on the 2021 Edition of the International Fire Code (IFC), with local amendments. The analysis is evaluating the Contemporary Amperex Technology Co., Limited (CATL) EnerC+ Lithium-Ion Battery Energy Storage System (BESS) intended for installation at the Corby BESS facility located at 6865 Byrnes Road in unincorporated Solano County, California. The Corby BESS will have an approximate capacity of 300 megawatts (MW) / 1200 megawatt hours (MWh) utilizing 384 EnerC+ containers with space allocated for future augmentation of 160 additional containers. The EnerC+ is a pre-assembled, non-walk-in (NWI) style lithium-ion BESS container with a capacity of 4,073 kilowatt hours (kWh).

This narrative has been developed by FRA and summarizes our analysis. It is intended to be used as a tool for a Fire Code Official (FCO) or an Authority Having Jurisdiction (AHJ) to assist in their review of the Corby BESS. This analysis includes a review of the Corby BESS site plan and the EnerC+ including its construction, design, fire safety features, listings, certifications, UL 9540A fire test data, and Failure Mode and Effects Analysis (FMEA).

1.1 Applicable Codes and Standards

The following codes and standards are applicable to the Corby BESS installation in Solano County, California:

- California Fire Code – 2022 Edition, based on the 2021 Edition of the International Fire Code.
- Solano County Fire Ordinance No. 22-01
- NFPA 69, *Standard on Explosion Prevention Systems* – 2019 Edition.
- NFPA 70, *National Electric Code* – 2020 Edition.
- NFPA 72, *National Fire Alarm and Signaling Code* – 2022 Edition.
- UL 1973, *Batteries for Use in Stationary and Motive Auxiliary Power Applications* – 2022 Edition.
- UL 9540, *Energy Storage Systems and Equipment* – 2020 2nd Edition.
- UL 9540A, *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems* – 2019 4th Edition.

1.2 Reference Materials

The following reference materials were reviewed as part of this analysis:

- Corby BESS Site Plan Rev D Issued for 90%, Dated 2025.05.09.
- CATL EnerC+ Battery Container Operating Instruction and Maintenance Manual, Dated 2024.06.13.
- UL 9540 listing report, Report No. CN23J9GR 001 Dated 2023.11.18.

- CATL EnerC+ UL 9540A Cell Level Fire Test Report (4790838636), UL (Changzhou) Quality Technical Service Co., LTD, Dated 2023.08.24.
- CATL EnerC+ UL 9540A Module Level Fire Test Report (4790931782), UL (Changzhou) Quality Technical Service Co., LTD, Dated 2023.09.13.
- CATL EnerC+ UL 9540A Unit Level Fire Test Report (4790931774), UL (Changzhou) Quality Technical Service Co., LTD, Dated 2023.10.27.
- Fire Protection Assessment for NFPA 69 Compliance in a Battery Energy Storage System, Dated 2023.10.26.
- CATL EnerC+ NFPA 69 Test Report, Dated 2023.12.05.
- EnerC+ Containerized Lithium Ion Battery Storage System (Rechargeable Li-ion Battery System) FMEA Report Dated, 2023.12.18.
- Corby BESS Plume Analysis Rev0, Dated 2025.05.16.

1.3 Report Definitions

Battery Energy Storage System (BESS): Stationary equipment that receives electrical energy and then utilizes batteries to store that energy to supply electrical energy at some future time. The BESS, at a minimum consists of one or more modules, a power conditioning system, battery management system and balance of plant components. [UL 9540A §4.2]

Battery Management System (BMS): A battery control circuit with active and programmable active protection devices that monitors and maintains the cells within their safe operating region; and which prevents overcharge, overcurrent, overtemperature, under-temperature and overdischarge conditions of the cells. [UL 1973 §6.3]

Cell: The basic functional electrochemical unit containing an assembly of electrodes, electrolyte, separators, container, and terminals. It is a source of electrical energy by direct conversion of chemical energy. [UL 9540A §4.3]

Combustible Liquid, Class II: Liquids having a closed cup flash point at or above 100 degrees F, and below 140 degrees F. [e.g., Diesel Fuel] [CFC §202]

Energy Storage Management System (ESMS): An electronic system that protects energy storage systems from operating outside their safe operating parameters and disconnects electrical power to the ESS or places it in a safe condition if potentially hazardous temperatures or other conditions are detected. [CFC §202]

Energy Storage Systems (ESS): One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time. [CFC §202]

Energy Storage System Cabinet: A cabinet containing components of the energy storage system that is included in the UL 9540 listing for the system. Personnel are not able to enter the enclosure other than reaching in to access components for maintenance purposes. [CFC §202]

Flammable Gas: A material which is a gas at 68° F (20° C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68° F (20° C) or less at 14.7 psia (101 kPa)] which:

1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume

with air; or

2. Has a flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit.

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68° F (20° C) in accordance with ASTEM E681. [CFC §202]

Lithium-ion battery: A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with an inorganic salt and can be in a liquid or a gelled polymer form. Lithiated metal oxide is typically a cathode and forms of carbon or graphite typically form the anode. [CFC §202]

Module: A subassembly that is a component of a BESS that consists of a group of cells or electrochemical capacitors connected together either in a series and/or parallel configuration (sometimes referred to as a block) with or without protective devices and monitoring circuitry. [UL 9540A §4.9]

Station Energy Storage System: An energy storage system installed as fixed or stationary electrical equipment in a permanent location. [CFC §202]

Thermal runaway: The incident when an electrochemical cell's temperature increases at an accelerating rate in an uncontrollable fashion sufficient to result in damage to the cell. The thermal runaway progresses when the cell's generation of heat is at a higher rate than the heat it can dissipate. This may lead to fire, explosion and gas and smoke evolution. [UL 9540A §4.11]

Unit: A frame, rack, or enclosure that consists of a functional BESS which includes components and subassemblies such as cells, modules, battery management systems, ventilation devices and other ancillary equipment. [UL 9540A §4.12]

1.4 Acronyms and Abbreviations

Authority Having Jurisdiction	AHJ	Lithium Iron Phosphate	LFP
Battery Energy Storage System	BESS	Lower Flammability Limit	LFL
Battery Management System	BMS	Manual Switch Disconnector	MSD
California Fire Code	CFC	Master Battery Management Unit	MBMU
Cell Sensor Circuit	CSC	Minimum Approach Distance	MAD
Current Sensor Unit	CSU	Maximum Allowable Quantities	MAQ
Electrical Energy Storage	EES	National Fire Protection Association	NFPA
Emergency Response Plan	ERP	Process Hazard Analysis Software Tools	PHAST
Energy Storage System	ESS	Personal Protective Equipment	PPE
Energy Storage Management System	ESMS	Polyphenylene Oxide	PPO
Failure Modes and Effects Analysis	FMEA	Power Conversion System	PCS
Fire Alarm Control Panel	FACP	Programmable Logic Controller	PLC
Fire Protection Engineering	FPE	Remote Operation Control Center	ROCC
Fire & Risk Alliance, LLC	FRA	State of Charge	SOC

Fire Code Official	FCO	Slave Battery Management Unit	SBMU
Hazard Mitigation Analysis	HMA	Surge Protection Device	SPD
Heating, Ventilation, & Air Conditioning	HVAC	Thermal Management System	TMS
Immediately Dangerous to Life or Health	IDLH	Underwriters Laboratory, LLC	UL
Inspection, Testing, and Maintenance	ITM	Uninterruptible Power Supply	UPS
International Electrotechnical Commission	IEC		

1.5 Nomenclature

Ampere-hour	Ah	Megawatt	MW
Cubic Feet Per Minute	CFM	Megawatt-hour	MWh
Degree Celsius	°C	Millimeter	mm
Degree Fahrenheit	°F	Liter	L
feet	ft	Pounds per square inch absolute	psia
inch	in	Parts per million	ppm
kilopascal	kPa	Volt	V
kilowatt-hour	kWh		

2.0 SYSTEM INFORMATION

The EnerC+ is a fully integrated BESS with battery modules, power electronics, control systems, battery management system (BMS), thermal management system (TMS), fire detection and notification system, and explosion control system all pre-assembled within a single container. It is meant for outdoor installations, mounted to the ground.

2.1 Cell

The cell is the smallest anatomy of the battery assembly. The EnerC+ utilizes a lithium iron phosphate (LFP) prismatic cell, as shown in Figure 1. The cells are CATL model CBDD0 and are UL 1973 compliant. Each cell has a nominal capacity of 306-amp hour (Ah), a nominal voltage of 3.2 volts (V), and a nominal energy capacity 0.979 kWh. Each cell measures 8.16 in (207.3 mm) × 6.88 in (174.7 mm) × 2.82 in (71.6 mm). UL (Changzhou) Quality Technical Service Co., LTD (UL) performed UL 9540A cell level testing and issued a report.[1]

Figure 1. EnerC+ Cell

This cell is manufactured for use in the EnerC+ and is intended to be part of the module assembly. Passive safety features include material reliability and manufacturing process. Known hazards of the cell during normal operation consist of either electrical, thermal, or mechanical failures which could result in gas release, flaming electrical fluid, electrical shorting, thermal heating, and/or thermal runaway.

2.2 Module

The battery module is the second smallest level of the BESS anatomy. The EnerC+ module is model M02306P05L01, which is a liquid-cooled enclosure where the top of the enclosure is plastic, and the bottom is aluminum. The module, with a 52S2P cell configuration, has a nominal capacity of 612 Ah, a nominal voltage of 166.4 V, a nominal energy capacity of 101.83 kWh, and

[1] Project # 4790838636.3, UL (Changzhou) Quality Technical Service Co., LTD Dated 2023.08.24

is composed of 104 CATL model CBDD0 LFP cells, as shown in Figure 2. Each module has overall dimensions of 7.33 ft (2,235 mm) × 2.72 ft (830 mm) × 0.82 ft (250 mm). UL performed UL 9540A module level testing and issued a report.[2]

Figure 2. EnerC+ Module

This module is manufactured for use in the EnerC+ and is intended to be part of the unit-level assembly. The module assembly supports safe operation through its material insulation and internal cooling. Passive safety features include material reliability and manufactured assembly process. The module itself does not have any active emergency functions for disconnection from the charging source or discharging stored potential energy. The module also consists of a Cell Sensor Circuit (CSC) that functions as a part of the system BMS. Known hazards of the module during normal operation consist of either electrical, thermal, or mechanical failures which could result in gas release, flaming electrical fluid, electrical shorting, thermal heating, and/or thermal runaway.

2.3 Unit

The unit (or rack) is the third level of BESS anatomy. Each unit holds 8 modules and includes a sub-control box that includes a Slave Battery Management Unit (SBMU), as shown in Figure 3. The EnerC+ unit is model C02306P05L01-R that utilizes an 8S1P module configuration. It has a nominal capacity of 612 Ah, a nominal voltage of 1331.2 V, a nominal energy capacity of 814.69 kWh and has overall dimensions of 8.85 ft (2698 mm) × 3.07 ft (936 mm) × 7.39 ft (2252.5 mm). The unit is manufactured for use in the EnerC+ and is intended to be part of the container-level assembly. UL performed UL 9540A unit level testing and issued a report.[3]

[2] Project # 4790931782, UL (Changzhou) Quality Technical Service Co., LTD Dated 2023.09.13

[3] Project # 4790931774, UL (Changzhou) Quality Technical Service Co., LTD Dated 2023.10.27

Figure 3. BESS Unit Assembly: Photo (Left) and Rendering (Right)

2.4 Container

The container is the final and largest level of the BESS. The EnerC+ container is a rigid metal (steel) enclosure designed to house the batteries, associated controllers, and appurtenances. The container supports the safe operation of the BESS through its exterior rigid housing structure that helps to protect the batteries from mechanical damage and weather conditions. It is 8 ft wide, 9.5 ft tall, and 20 ft long and is intended for outdoor installations, with an IP-55 rating, ground-mounted. The EnerC+ contains a battery compartment, an electrical controls compartment, and a TMS compartment, as shown in Figure 4.

Figure 4. EnerC+ Container Assembly with Doors Closed (Top) and Open (Bottom)

2.4.1 Battery Compartment

The battery compartment is equipped with 5 battery units, as shown in Figure 4. As described above, each unit contains 8 modules, and each module contains 104 LFP cells. In total, the EnerC+ has 4,160 cells with an energy capacity of 4,073 kWh.

2.4.2 Electrical Compartment

The electrical compartment houses the associated controllers, auxiliary electrical components, and the user controls for the EnerC+. It contains controls equipment such as the Master Control Box, cable connection, sub-control box, and a power supply distribution box consisting of a transformer, circuit breaker, an uninterruptible power supply (UPS), and circuit protection. The exterior of the Electrical Compartment also has key safety features and manual controls, an audible/visible notification device, a manual start/stop button for the ventilation system, an emergency pull box, and an emergency stop button to isolate the auxiliary power source, as shown Figure 5.

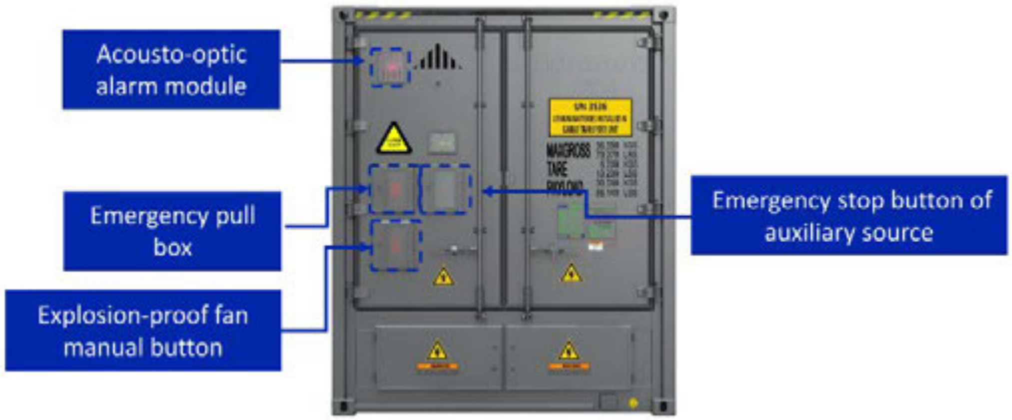


Figure 5. Exterior of the Electrical Compartment

2.4.3 TMS Compartment

The TMS compartment houses the liquid cooling (water-glycol mixture) TMS for the battery modules. The TMS maintains the battery modules at an optimum operating temperature. It consists of a compressor, heater, fan, and pump. The TMS compartment is located on the opposite side of the EnerC+ container from the Electrical Compartment, as shown Figure 6.

Figure 6. TMS Compartment

2.4.4 BMS

The EnerC+ is provided with a BMS that can identify possible risks to the battery system by monitoring battery cell temperature, voltage, current, and dry contact switching value in real-time.

The BMS function is intended to prevent the risk of thermal runaway by preventing the risks of overcharge, over-discharge, over-temperature, and overcurrent. It provides thermal runaway risk protection by safely disconnecting the batteries in case of fault conditions. The BMS can be regarded as three levels:

- Cell Sensor Circuit (CSC) and Current Sensor Unit (CSU)
    - The CSC collects cell data inside the battery module and transmits cell voltage and temperature data to the Slave Battery Management Unit (SBMU). The CSC completes the balance between cells in the battery module according to commands given by the SBMU.
- Slave Battery Management Unit (SBMU)
    - The SBMU receives voltage and temperature data from the CSC and current data from the CSU. The SBMU performs calculations and determines appropriate State of Charge (SOC) corrections, as required. The system also manages pre-charging, charging and discharge of units, and data upload to the Master Battery Management Unit (MBMU).
- Master Battery Management Unit (MBMU) and ETH (communication interface between BESS system and the Energy Management System)
    - Maintains operation and management of the entire battery system. The MBMU receives the data uploaded by the SBMU and controls the system accordingly. The MBMU and ETH are located in the container Master Control Box.

2.4.5 Electrical Fault Protection Devices

The EnerC+ is equipped with a layers of electrical fault protection devices designed to protect the battery cells from abnormal electrical conditions. These include:

High-voltage interlock: This ensures real-time monitoring of the stability of the battery system's high-voltage connection. When any connector is loose, the BMS detects this abnormal condition and sends a fault alarm.

High-voltage relay: Through the high-voltage control relay, the occurrence of arc pulling and relay adhesion can be effectively reduced to ensure the safety of the whole power supply system.

Insulation detection: The BMS carries out real-time insulation detection for the whole container to prevent the risk of electric shock caused by an insulation failure.

Manual Switch Disconnector (MSD): During assembly, maintenance, and transportation the removeable MSD can cut off the high voltage connection to protect personnel from electrical shock injuries.

Internal High Speed DC Fuse: Each battery module contains a high-speed DC fuse. These fuses are one time only use safety devices that can interrupt the flow of an overcurrent in the battery module during an abnormal electrical event.

Surge Protection (Lightning Protection): A surge protection device (SPD) provides overvoltage protection to the EnerC+. The surge protection is designed for the AC system and can prevent an overvoltage to the system, providing protection from lightning strikes.

2.4.6 Fire and Gas Detection

The EnerC+ container is provided with fire and gas detection. The fire and gas detection system includes three photoelectric smoke detectors (two in the battery compartment and one in the electrical compartment), two heat detectors in the battery compartment, and two hydrogen gas detectors in the battery compartment, as shown in Figure 7. The fire and gas detection system are connected to a fire alarm control panel (FACP). Any alarm condition from the FACP is communicated to the full site network's Energy Storage Management System/Programmable Logic Controller (ESMS/PLC). The PLC is certified to IEC/EN 61131-2 and electrical safety standards IEC/EN/UL/CSA 61010-2-201. The site controller then transmits signals and alarms to the NextEra Remote Operation Control Center (ROCC), which is staffed 24/7/365. The ROCC is located in a CAT 5 building with backup power redundancy. It has been reported to FRA that the AHJ has approved the ROCC as a proprietary supervising station, however, FRA has not received confirmation of this approval.

For local notification, as detailed above in Figure 5, an audible/visible appliance is installed on the exterior of the electrical compartment on each EnerC+ container.

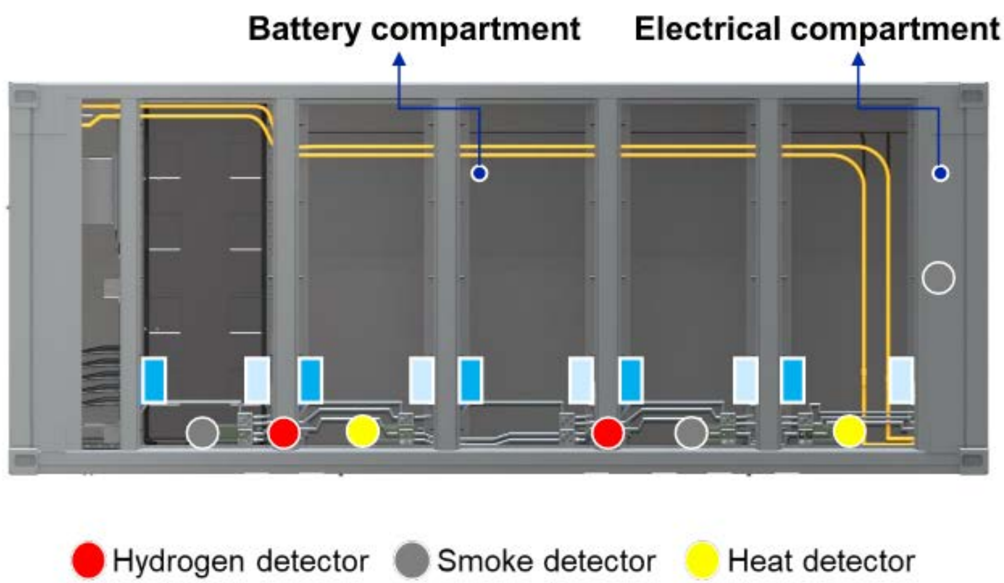


Figure 7. Fire and Gas Detector Locations

2.4.7 Fire Suppression System

The EnerC+ can come equipped with an optional aerosol suppression system or an optional dry sprinkler system. The EnerC+ containers at Corby BESS will not come equipped with a fire suppression system.

2.4.8 Explosion Control

The EnerC+ BESS container has an NFPA 69-compliant explosion control system. The system is a combustible gas concentration reduction system and consists of gas detection, an explosion-proof 820-cubic feet per minute (CFM) exhaust fan, and a make-up air louver, as shown in Figure 8. As briefly described above, the EnerC+ is equipped with two flammable gas detectors calibrated to hydrogen. Upon the detector sensing 10% of the LEL, the explosion control system (exhaust system) activates, ventilating the EnerC+ to keep the gas concentration of the container below 25% LEL. In addition, the BMS receives an alarm, the horn/strobe on the exterior of the container activates, the BMS shuts down the battery system, and the HVAC system shuts down.

TLB Fire Protection Engineering, Inc. (TLB) performed a review of the explosion control system and computational fluid dynamics (CFD) simulations for the EnerC+ and determined the system complies with NFPA 69.[4] Additionally, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL.[5]

Figure 8. Explosion Control System Inlet/Outlets (Top) and Exhaust Fan (Bottom)

[4] Fire Protection Assessment for NFPA 69 Compliance in a Battery Energy Storage System, Dated 2023.10.26

[5] CATL EnerC+ NFPA 69 Test Report, Dated 2023.12.05

3.0 CORBY BESS SITE PLAN

The Corby BESS facility is located on a 37 acre parcel of land at 6865 Byrnes Road in unincorporated Solano County, CA. Based on a review of the site plan, the Corby BESS is anticipated to include 384 EnerC+ containers with space allocated for future augmentation of 160 additional containers, as shown in Figure 9. Other equipment on site will include auxiliary transformers, auxiliary distribution switchboards, inverters, and power conversion system skids. The BESS yard will be surrounded by a perimeter fence with two points of ingress and egress on Byrnes Road. Fire apparatus access roads are provided throughout the BESS yard with a width of 24 feet.

A site substation is located to the north of the BESS yard, surrounded by a separate perimeter fence with a single point of ingress and egress on Byrnes Road. The substation includes three transformers and a site control enclosure. A sound barrier is located on the north end of the site just south of Kilkenny Road. The Corby BESS facility will have an approximate capacity of 300 megawatts (MW) / 1200 megawatt hours (MWh).

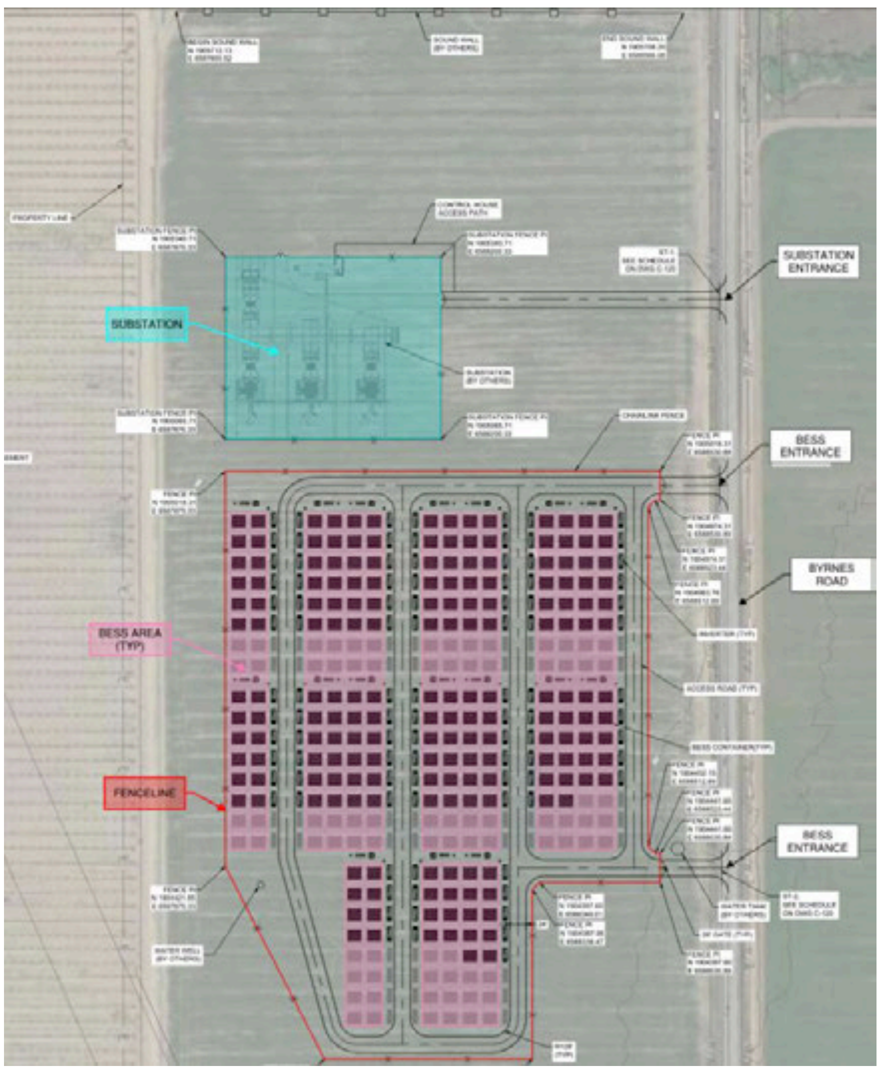


Figure 9. Site Plan

4.0 CORBY BESS SITE CODE ANALYSIS

Solano County, California adopts the 2022 Edition of the CFC, which is based on the 2021 Edition of the IFC. Compliance with CFC §1207, Electrical Energy Storage Systems, is required when a lithium-ion BESS installation has an energy capacity greater than 20 kWh [CFC §1207.1.1 and Table 1207.1.1]. Since the Corby BESS has an energy capacity of 300 MW / 1200 MWh, CFC §1207 requirements apply. Below is a review of the Corby BESS for installation level compliance with the CFC based upon a review of the site plan and the EnerC+. Note, this code analysis applies only to site design elements of the Corby BESS pertaining to fire and life safety. Other aspects of the site design, including the electrical or structural design/installation, are outside the scope of this review. As this is a site design review, elements related to the installation itself are also outside the scope of this analysis. It is assumed that the BESS and its associated equipment, as well as all fire protection systems, will be designed, installed, commissioned, inspected, tested, and maintained as required by the manufacturer(s), CFC, and/or other applicable codes and standards.

4.1 BESS Installation Classifications

The Corby BESS includes 384 EnerC+ containers installed outdoors. The EnerC+ is a NWI style BESS that is unoccupiable, with all internal components accessible via exterior doors. The CFC defines this type of BESS as an Energy Storage System Cabinet, which is an enclosure containing components of the ESS where personnel cannot enter the enclosure other than reaching into access components for maintenance purposes. For outdoor BESS installations, the CFC provides code requirements based on the proximity and location of the BESS equipment from adjacent exposures [CFC §1207.8]. The two outdoor installation classifications are as follows:

- **Remote locations** – BESS located more than 100 ft from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure.
- **Locations near exposures** – BESS locations that do not comply with remote outdoor location requirements.

Based on a review of the site plan, the Corby BESS installation will maintain at least a 100 ft separation distance to lot lines and the nearest exposures not associated with the electrical grid infrastructure. As such, the Corby BESS is classified as a remote, outdoor BESS for this analysis. CFC Tables 1207.6 and 1207.8 list the code requirements pertaining to a remote, outdoor lithium-ion BESS installation. These requirements are summarized below in Table 1 and discussed in detail within the following sections.

Table 1. CFC Remote Outdoor BESS Installation Requirements

Requirement	Compliance Required	CFC Code Reference
General installation requirements	Yes	§1207.4
Clearance to exposures	Yes	§1207.8.3
Fire suppression systems	Yes[a]	§1207.5.5
Maximum allowable quantities	No	§1207.5.2
Maximum enclosure size	Yes	§1207.5.6
Means of egress separation	Yes	§1207.5.8

Requirement	Compliance Required	CFC Code Reference
Size and separation	No	§1207.5.1
Smoke and automatic fire detection	Yes	§1207.5.4
Vegetation control	Yes	§1207.5.7
Technology Specific Protection – Lithium-Ion Batteries		
Explosion control	Yes	§1207.6.3
Thermal runaway	Yes[b]	§1207.6.5
Other CFC Requirements – All Facilities		
Fire apparatus access roads	Yes	§503
Key boxes	Yes	§506
Fire protection water supply	Yes	§507

a. Where approved by the fire code official, fire suppression systems are permitted to be omitted.

b. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.

4.2 All ESS Installations

CFC Table 1207.8 requires compliance with the general requirements outlined in §1207.4. Note, these sections have been written for all ESS installations: indoors, outdoors, stationary, or mobile. Only the fire and life safety general installation requirements applicable to a remote, outdoor, NWI style BESS installation are summarized in the following sections. Requirements unrelated to fire and life safety or pertaining to other types of BESS installations, such as indoor, are not discussed. These include fire-resistance-rated separations [CFC §1207.4.3], seismic and structural design [CFC §1207.4.4], occupied work centers [CFC §1207.4.10], open rack installations [CFC §1207.4.11], and walk-in units [CFC §1207.4.12]. In addition, requirements related to plans, such as commissioning or emergency response, are not discussed, as those items are not related to the site design. See Section 5.0 for a discussion on plans and emergency response.

4.2.1 Electrical Disconnects

CFC §1207.4.1 requires placards or directories to be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with the *California Electrical Code* when the ESS disconnecting means is not within sight of the main electrical service disconnecting means. Based on a review of the EnerC+ and the site plan, the Corby BESS is capable of being installed in compliance with the electrical disconnect requirement. However, no information related to electrical disconnect placards or directories has been provided. To ensure compliance, a disconnecting means or placards must be provided at the site per CFC §1207.4.1.

4.2.2 Working Clearances

CFC §1207.4.2 requires access and working space to be provided and maintained about all electrical equipment in accordance with the *California Electrical Code* and the manufacturer's instructions. The EnerC+ Operating Instruction and Maintenance Manual identifies working clearances of 9.8 ft (3 meters) to the sides and in front of the container. Based on a review of the site plan, the EnerC+ BESS installation maintains clearances of at least these lengths. As such, the Corby BESS site design complies with the CFC working clearances requirement.

4.2.3 Vehicle Impact Protection

CFC §1207.4.5 requires ESS that are subject to impact by a motor vehicle to be provided with vehicle impact protection in accordance with Section 312. Based on a review of the site plan, vehicle impact protection is not being provided at the Corby BESS facility. However, vehicle impact protection is not necessary, as the Corby BESS facility is a secured, outdoor installation that does not have personnel on site each day. In addition, there is no motor vehicle traffic moving through the site other than the occasional maintenance vehicle (re. there are no public roads/ways on the site). Therefore, impact protection is not necessary for the Corby BESS. As such, the Corby BESS site design complies with the CFC vehicle impact protection requirement.

4.2.4 Combustible Storage

CFC §1207.4.6 does not permit combustible materials to be stored in ESS rooms, areas, or walk-in units. The EnerC+ is a NWI style BESS that is unoccupiable, with all internal components accessible via exterior doors. It does not have free open space within the container to store additional combustible materials. As such, the Corby BESS site design complies with the CFC combustible storage requirement.

4.2.5 Toxic and Highly Toxic Gases

CFC §1207.4.7 requires ESS that have the potential to release toxic and highly toxic gas during charging, discharging, and normal use conditions to be provided with a hazardous exhaust system in accordance with Chapter 5 of the *California Mechanical Code*. The EnerC+ utilizes listed lithium-ion cells that do not vent toxic or highly toxic gases (or any gases) during normal charging, discharging, or normal use. As such, the Corby BESS site design complies with the CFC toxic and highly toxic gas release requirement.

4.2.6 Signage

CFC §1207.4.8 requires approved signage to be provided on or adjacent to all entry doors for ESS rooms or areas and on enclosures of ESS cabinets and walk-in units located outdoors. Signs designed to meet both the requirements of this section and the California Electrical Code shall be permitted. The signage shall include the following or equivalent:

1. "ENERGY STORAGE SYSTEM," "BATTERY STORAGE SYSTEM," "CAPACITOR ENERGY STORAGE SYSTEM" or the equivalent.
2. The identification of the electrochemical ESS technology present.
3. "ENERGIZED ELECTRICAL CIRCUITS."
4. Where water-reactive electrochemical ESS are present, the signage shall include "APPLY NO WATER."
5. Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 1207.1.6.1.

Based on a review of the EnerC+ and the site plan, it is capable of being installed in compliance with the signage requirement. However, no information related to signage has been provided. To ensure compliance, signage must be provided at the site per CFC §1207.4.8.

4.2.7 Security of Installations

CFC §1207.4.9 requires rooms, areas, and walk-in units in which electrochemical ESS are located to be secured against unauthorized entry and safeguarded in an approved manner and that security barriers, fences, landscaping, and other enclosures shall not inhibit the required airflow to or exhaust from the ESS and its components. Based on a review of the site plan, a security fence is provided around the perimeter of the Corby BESS. As such, Corby BESS site design complies with the CFC security of installation requirement.

4.2.8 Listings

CFC §1207.3.1 requires ESS to be listed in accordance with UL 9540. The EnerC+ container is listed to UL 9540. As such, the Corby BESS complies with the CFC listings requirement.

CFC §1207.3.2 requires inverters and the Energy Storage Management System (ESMS) to be covered as part of the UL 9540 listing or they must be listed separately. CFC §1207.3.3 requires inverters to be listed and labeled according to UL 1741. Only inverters listed and labeled for utility-interactive system use and identified as interactive are allowed to operate in parallel with the electric utility power system to supply power to common loads. Based on a review of the site plan, inverter information has not been provided. To ensure compliance, information related to the inverter listing must be provided in accordance with CFC §1207.3.

4.2.9 Energy Storage Management System

CFC §1207.3.4 requires ESS to be provided with an approved energy storage management system that monitors and balances cell voltages, currents, and temperatures within the manufacturer's specifications. The EnerC+ is provided with a BMS that monitors battery cell temperatures, voltages, currents, and the switching of each rack. As such, the Corby BESS site design complies with the CFC ESMS requirement.

4.2.10 Enclosures

CFC §1207.3.5 requires enclosures of ESS to be of noncombustible construction. The EnerC+ consists of a noncombustible steel enclosure with an IP-55 ingress rating. As such, the Corby BESS site design complies with the CFC enclosures requirement.

4.3 Remote Outdoor ESS Installations

4.3.1 Clearance to Exposures

CFC §1207.8.3 requires ESS located outdoors to be separated by a minimum of 10 feet from lot lines, public ways, buildings, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards. Based on a review of the site plan, lot lines, public ways, buildings, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with the electrical grid infrastructure are all greater than 10 ft away from the EnerC+ containers. As such, the Corby BESS site design complies with the CFC clearance to exposures requirement.

4.3.2 Fire Suppression Systems

CFC §1207.5.5 requires rooms and areas within buildings and walk-in units containing electrochemical ESS to be protected by an automatic fire suppression system. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within rooms or buildings, meaning the

EnerC+ containers at the Corby BESS do not require fire suppression systems. As such, the Corby BESS site design complies with the CFC fire suppression systems requirement.

4.3.3 Maximum Allowable Quantities

CFC Table 1207.8 does not require remote outdoor BESS installations to meet the maximum allowable quantity requirement of 600 kWh noted in CFC Table 1207.5 for lithium-ion BESS. As such, the Corby BESS site design complies with the CFC maximum allowable quantities requirement.

It should be noted, the Corby BESS will have a capacity of 1,200 MWh, which is greater than the 600-kWh threshold specified in CFC Table 1207.5. However, the CFC also permits the maximum allowable quantity utilized at the Corby BESS based on the development of an HMA and performance of UL 9540A large-scale fire testing [CFC §1207.5.2 #1]. The EnerC+ large-scale fire testing performed in accordance with UL 9540A (see Section 6.0) demonstrated that a fire will not propagate from module-to-module within the EnerC+ or to adjacent EnerC+ racks. In addition, this HMA has been developed for the Corby BESS. As such, although not required for a remote outdoor BESS installation, this HMA and the UL9540A testing support the current design configuration (maximum allowable quantity) for the site.

4.3.4 Maximum Enclosure Size

CFC §1207.5.6 limits outdoor walk-in units housing ESS to a maximum size of 53 ft x 8 ft x 9.5 ft high, not including bolt-on HVAC and related equipment. The EnerC+ BESS is a NWI style BESS that is installed outdoors. As such, the EnerC+ BESS is not required to comply with the maximum enclosure size requirement. However, the EnerC+ BESS still complies with this requirement, as its dimensions are 8 ft x 9.5 ft x 19.9 ft. As such, the Corby BESS meets the CFC maximum enclosure size requirement.

4.3.5 Means of Egress Separation

CFC §1207.5.8 requires ESS located outdoors to be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet. Based on a review of the site plan, no buildings are located within 10 ft of any EnerC+ container. As such, the Corby BESS site design complies with the CFC means of egress separation requirement.

4.3.6 Size and Separation

CFC Table 1207.8 does not require remote outdoor BESS to meet the size and separation requirements of CFC §1207.5.1, which requires electrochemical ESS to be segregated into groups not exceeding 50 kWh and each group to be separated by a minimum of 3 ft from other groups. As such, the Corby BESS site design complies with the CFC size and separation requirement.

It should be noted, the Corby BESS will have larger capacities and smaller separation distances than what is specified in CFC §1207.5.1. However, the CFC permits the size and separation utilized at the Corby BESS based on the UL 9540A large-scale fire testing results [CFC §1207.5.1 #2]. The EnerC+ large-scale fire testing performed in accordance with UL 9540A (see Section 6.0) demonstrated that a fire will not propagate from module-to-module within the EnerC+ or to adjacent EnerC+ racks. As such, although not required for a remote outdoor BESS, the UL9540A testing also supports the current design configuration (size and separation) for the site.

4.3.7 Fire Detection

CFC §1207.5.4 requires an approved automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 to be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where approved to a constantly attended location. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within rooms or buildings, meaning the EnerC+ containers at the Corby BESS do not require fire detection systems. As such, the Corby BESS site design complies with the CFC fire detection requirement.

However, the EnerC+ still meets this requirement. It is equipped with a smoke and heat detection system that is monitored by the NextEra ROCC. In addition, the EnerC+ is equipped with an audible/visual notification appliance located on the exterior of the container. Any alarm state communicated from an EnerC+ BMS is seen at the full site network's ESMS/PLC. The PLC is certified to IEC/EN 61131-2 and electrical safety standards IEC/EN/UL/CSA 61010-2-201. The site controller then transmits signals and alarms to the ROCC, which is staffed 24/7/365. The ROCC is located in a CAT 5 building with backup power redundancy. It has been reported to FRA that the AHJ has approved the ROCC as a proprietary supervising station, however, FRA has not received confirmation of this approval.

One fire alarm control panel (FACP) will be provided to support four EnerC+ containers. The FACP will be installed in the Electrical Compartment of the Master EnerC+ container. The FACP is designed to provide 24 hours of standby power and 2 hours of alarm power for the fire alarm devices in all four of the containers using two 35 Ah batteries. The backup power will provide uninterrupted power during power outages and during the initial moments of a fire event, even if auxiliary power to the EnerC+ has been severed. Maintaining power during this time is critical for the detection and notification (both locally and remotely) of the fire event and for the activation of the NFPA 69 ventilation system to provide site personnel, should anyone be in the area, time to evacuate.

As such, although not required, the Corby BESS site design complies with the CFC fire detection requirement.

4.3.8 Vegetation Control

CFC §1207.5.7 requires areas within 10 feet on each side of outdoor ESS to be cleared of combustible vegetation and other combustible growth. Based on a review of the site plan, no combustible vegetation will be located within 10 ft of the nearest EnerC+. As such, the Corby BESS site design complies with the CFC vegetation control requirement.

4.4 Technology Specific Protection – Lithium-Ion Batteries

CFC §1207.6 requires electrochemical ESS to comply with the requirements as outlined in CFC Table 1207.6. For lithium-ion BESS, that requires compliance with the explosion control requirements of §1207.6.3 and the thermal runaway requirements of §1207.6.5. Note, lithium-ion batteries do not need to meet the exhaust ventilation requirements of §1207.6.1, the spill control and neutralization requirements of §1207.6.2, or the safety cap requirements of §1207.6.4.

4.4.1 Explosion Control

CFC §1207.6.3 requires explosion control to be provided for rooms, areas, or walk-in units containing electrochemical ESS technologies in accordance with Section 911. The explosion control system shall consist of one of the following:

(1) Explosion prevention systems installed and maintained in accordance with NFPA 69.

(2) Deflagration venting installed and maintained in accordance with NFPA 68.

The EnerC+ is equipped with a combustible gas concentration reduction system that complies with NFPA 69. It is designed to maintain the flammable gas concentration inside the EnerC+ container below 25% of the LEL, thereby minimizing the deflagration potential. TLB performed a review of the explosion control system and CFD simulations prepared for the EnerC+ and determined the system to be in compliance with NFPA 69. Additionally, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL. As such, the EnerC+ installation at the Corby BESS complies with the CFC explosion control requirements.

As a critical fire protection system, it is recommended that backup power be provided for the explosion control system. The backup power will provide uninterrupted power during power outages and also during the initial moments of a fire event, even if auxiliary power to the EnerC+ has been severed. Maintaining power during this time is critical for the detection and notification (both locally and remotely) of the fire event and for the activation of the NFPA 69 ventilation system to provide site personnel, should anyone be in the area, time to evacuate. The backup power integral to the EnerC+ does not support the explosion control system. FRA has been informed that backup power will be provided for the explosion control system with a minimum of two hours of operation for four simultaneous containers. While FRA has not verified the provision of backup power for the explosion control system, backup power design will be provided at the site level and is to be verified upon completion of the design.

4.4.2 Thermal Runaway Protection

CFC §1207.6.5 requires thermal runaway protection to be provided for lithium-ion technologies with a listed device or other approved method to prevent, detect, and minimize the impact of thermal runaway. The thermal runaway protection is permitted to be part of the BMS that has been evaluated with the battery as part of the evaluation to UL 1973 [CFC Table 1207.8]. The BMS provided for the EnerC+ was tested and verified during the UL 1973 certification process. As such, the EnerC+ installation at the Corby BESS complies with the CFC thermal runaway requirement.

4.5 All Facilities

CFC §501.1 requires fire service features for buildings, structures, and premises to comply with Chapter 5, Fire Service Features. For remote, outdoor BESS, that includes compliance with the fire apparatus access road requirements of §503, the key box requirements of §506, and the fire protection water supply requirements of §507. Other sections of Chapter 5 would not be applicable to a remote, outdoor BESS facility.

4.5.1 Fire Apparatus Access Road

CFC §503.1.1 requires fire apparatus roads to be provided for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction. At a minimum, the fire apparatus access roads must meet the following:

1. Extend to within 150 feet (45,720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility [CFC §503.1.1].
2. Have an unobstructed width of not less than 20 feet (6,096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4,115 mm) [CFC §503.2.1].
3. Be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities [CFC §503.2.3].
4. Have a turning radius and angles of approach/departure that are approved by the fire code official [CFC §503.2.4 and §503.2.8]. Additionally, the minimum turning radius shall be 28 feet inside and a 52-foot outside diameter [Solano County Fire Ordinance No. 22-01].
5. Dead-end fire apparatus access roads in excess of 150 feet (45,720 mm) in length shall be provided with an approved area for turning around fire apparatus [CFC §503.2.5].
6. The grade of the fire apparatus access road shall be within the limits established by the fire code official based on the fire department's apparatus [CFC §503.2.7]. Additionally, the grade shall not exceed 16% [Solano County Fire Ordinance No. 22-01].

Based on the review of the site plan, the fire apparatus access roads are 24 ft in width, all areas of the BESS facility are within 150 ft of an access road, there are no dead ends, and all roads have an inside turning radius of 28 feet and an outside turning radius of 52 feet. The fire code official must approve of angles of approach/departure, grade, and imposed load for the access roads in order for the Corby BESS site to comply with CFC requirements.

4.5.2 Key Boxes

CFC §506.1 permits the AHJ to require a key box to be installed in an approved location when an area is restricted or where immediate access is necessary for life-saving or fire-fighting purposes. The key box must be of an approved type in accordance with UL 1037 and must contain keys to gain access. Based on a review of the site plan, no key box is being provided at the Corby BESS site. If the AHJ requires one, a key box must be provided.

4.5.3 Fire Protection Water Supply

CFC §507.1 requires an approved water supply capable of supplying the required fire flow for fire protection to be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. Additionally, a water supply shall consist of reservoirs, pressure tanks, elevated tanks, waters mains, or other fixed systems capable of providing the required flow based on Appendix B [Solano County Fire Ordinance No. 22-01]. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official [CFC §507.5.1]. Based on a review of the site plan, a 24,000-gallon onsite water tank is proposed for emergency responders to use to maintain a defensible space around the perimeter of the facility to prevent spread of fire outside of the facility in the unlikely event of propagation outside of a BESS container. The water tank will be located at the south entrance to the BESS facility. It has been reported to FRA that the AHJ has approved this arrangement, however, FRA has not received confirmation of this approval.

Note, typical BESS firefighting response procedures do not require or recommend offensive firefighting tactics to manually suppress a BESS fire. In addition, UL 9540A unit level fire testing (see Section 6.0) demonstrated that a fire will not spread from module-to-module within the EnerC+ container or to adjacent EnerC+ racks. This result was without a fire suppression system installed inside the EnerC+ container and without manual fire suppression via hose lines. As discussed above, while it is not advisable to use manual firefighting techniques at the site, if manual firefighting tactics are used, water is considered the preferred agent to manage lithium-ion battery fires, to suppress nearby combustibles, to cool nearby exposures, and to control smoke. Other fire suppression methods, such as gaseous agents (CO2, Halon), dry chemical suppressants, or foams, are unlikely to be effective. As discussed in Section 4.1, the site is a remote location with BESS located more than 100 ft from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure. Therefore, nearby exposures not associated with the facility that may need cooling would be outside the site fence line.

4.6 BESS Site Design Code Analysis Summary

Based on a review of the EnerC+ and the site plan, the Corby BESS site design meets the CFC installation level requirements for a remote, outdoor, NWI style BESS when it is installed in accordance with the manufacturer's instructions, its listing, the site plan, and the CFC. However, the following items were identified in this analysis that need to be addressed to ensure compliance:

- A disconnecting means or placards must be provided at the site per CFC §1207.4.1.
- Signage must be provided at the site per CFC §1207.4.8.
- Information related to the inverter listing must be provided per CFC §1207.3.
- The fire code official must approve of angles of approach/departure, grade, and imposed load for the access roads per CFC §503.
- If the AHJ requires one, a key box must be provided at the site per CFC §506.

5.0 CORBY BESS PLANS AND TRAINING

The CFC and California Senate Bill 38 (CA SB38) require a number of plans to be developed for a BESS facility. Often times, these documents are developed during construction or after substantial completion of the facility, such that they include site specific details that would not be available prior (such as during the design phase of the project). Below is a description of the plans required for the Corby BESS.

5.1 Commissioning, Operation, Decommissioning, and ITM

CFC §1207.2 requires commissioning, decommissioning, and inspection, testing, and maintenance (ITM) plans for the BESS installations. It states that the operation, inspection, testing, and maintenance are to be followed per the manufacturer's instructions and directions.

A commissioning plan must be developed for the integration of the new BESS equipment into the electrical utility grid. The commissioning documentation captures the commissioning roles and responsibilities, list of equipment, conditions, BESS operation compliance, fire protection feature compliance and operability, etc. [CFC §1207.2.1]. An operation and maintenance manual must be developed and provided to both the Owner, or their authorized agent, and the BESS operator before the BESS is put into operation [CFC §1207.2.2]. A decommissioning plan must be developed to provide the organization, documentation requirements, contingencies, and methods and tools necessary to indicate how the safety systems, ESS, and components will be decommissioned and removed from the site [CFC §1207.2.3]. In addition, all fire protection systems must be designed, installed, commissioned, inspected, tested, and maintained as required by the CFC and their respective NFPA standard [CFC Chapter 9].

Commissioning, operation/maintenance, and decommissioning plans will be developed for the Corby BESS facility. A commissioning guide, operations and maintenance, and a decommissioning guide have been prepared by CATL for the EnerC+. These documents can be used as a guide for the development of site-specific plans. FRA recommends that all commissioning, operations and maintenance, and decommissioning plans be finalized prior to energizing the Corby BESS.

5.2 Emergency Response Plan

CA SB38 requires every BESS facility in California to have an emergency response and emergency action plan. It is anticipated that an Emergency Response Plan (ERP) is being developed by NextEra to address general site organization and management, fire/thermal runaway incidents, and subsequent appropriate efforts to meet CA SB38 requirements. The ERP should also include information and procedures for responding to the site during a thermal event or power outage where the EnerC+ fire safety systems may not be functional, such as the gas detection, fire alarm, and explosion control systems. When responding during these events, FRA recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed EnerC+ to ensure they are not momentarily exposed to dangerous conditions. In addition, FRA recommends that NextEra finalize the ERP prior to energizing the Corby BESS site.

5.3 Emergency Response Training

CA SB38 requires the owner of the BESS or their authorized representative to engage in emergency planning and training emergency responders such that any foreseeable hazards associated with the BESS can be effectively addressed. This typically includes having all personnel responsible for the operation, maintenance, repair, servicing, and response of the ESS to be trained in the procedures included in the ERP.

FRA recommends that all site personnel and emergency response personnel, who could be responsible for responding to a Corby BESS emergency, be trained on the ERP prior to energizing the Corby BESS. In addition, refresher training should be provided as appropriate, typically annually, if requested by the AHJ.

6.0 UL 9540A SUMMARY AND ANALYSIS

UL 9540A is the Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems. The test method evaluates a BESS at all levels of the BESS anatomy: cell, module, unit, and if necessary, the installation level.

Cell level testing is performed first and determines if further testing at the module level is required. Module level testing is required if the following observations are recorded:

- Thermal runaway is induced in the cell; and,
- The composition of vent gases exceeds 25% of the LFL for flammable gases.

Module level testing examines the module design, heat release rate, gas generation, external debris, and flying debris hazards. Unit level testing is required if the following observations are recorded:

- Module design is unable to contain thermal runaway; and,
- Cell vent gas is flammable.

Unit level testing assesses the BESS design of the unit, heat release rate, gas generation and composition, deflagration and flying debris hazards, BESS and wall surface temperatures, heat flux at the target walls, and reignition. Installation level testing is required if the following observations are recorded during unit level testing:

- Flaming is observed outside the initiating BESS unit;
- The surface temperature of the modules in the adjacent BESS unit exceeds the temperature at which cell level gas venting occurred;
- Surface temperatures of wall surfaces increase more than 175ºF (79.4ºC) from ambient; and,
- Explosion hazards are recorded.

UL 9540A cell, module, and unit-level testing was conducted for the EnerC+ and the results of the tests have been summarized herein.

6.1 UL 9540A Cell Level Testing

The UL 9540A cell level tests were conducted in five separate tests, all of which were conducted under similar parameters. All tests were conducted with a single battery cell. Refer to Table 2 for test-specific data and Figure 10 for cell testing configuration. Thermocouple 1 (TC01) was placed between the cell body and heater, TC02 was placed on the cell positive, and TC03 was placed on the cell body and not covered by the film heater.

Table 2. Cell Thermal Runaway Results

	Cell Test 1	Cell Test 2	Cell Test 3	Cell Test 4	Cell Test 5
OCV at start of test, Vdc	3.384	3.374	3.405	3.400	3.379
Average Heating Rate, °C/min	4.5	4.5	4.5	4.5	4.5
Venting Time after the test start (hh:mm:ss)	0:34:55	0:36:44	0:35:46	0:36:00	0:36:24
Venting Temperature, °C	153	153	159	152	166
Thermal Runaway Time after the test start (hh:mm:ss)	0:55:32	0:57:42	0:56:49	0:56:41	0:56:10
Thermal Runaway Temperature, °C	240	243	244	238	247

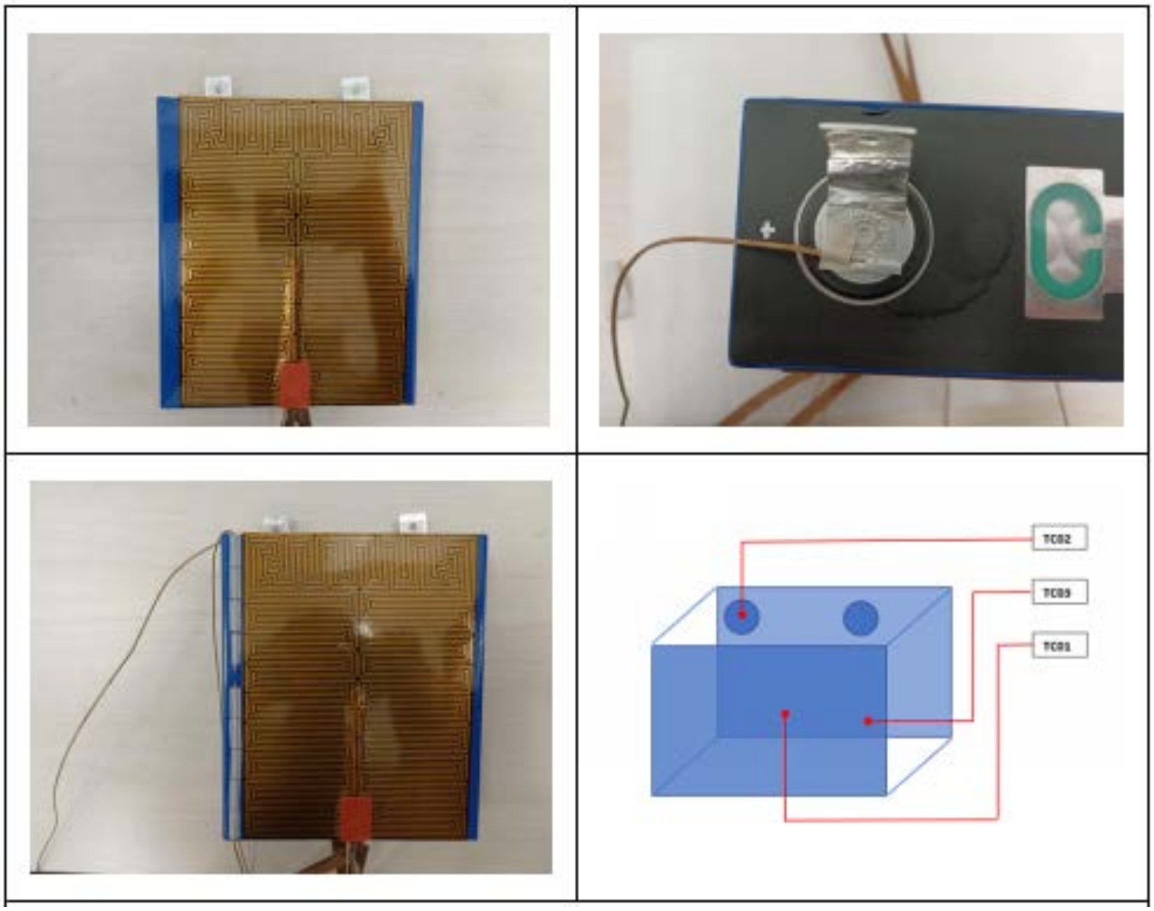


Figure 10. Sample Instrumentation Prior to the Test

Thin film heaters were used to induce thermal runaway in the cells at a heating rate of 4.5°C per minute. The film heaters measure 6 in (152.4 mm) by 8 in (203.2 mm), with two heaters used on the two largest surfaces of the cells. The average cell surface temperature at gas venting was 154°C and the average surface temperature at thermal runaway was 241°C. The gas composition produced during cell test 5 is shown in Table 3. The total gas volume collected during cell test 5 was 204 L.

Table 3. Cell Level Testing Off-Gas Composition

Gas		Measured %
Carbon Monoxide	CO	14.596
Carbon Dioxide	CO_2	26.925
Hydrogen	H_2	43.066
Methane	CH_4	7.051
Acetylene	C_2H_2	0.119
Ethylene	C_2H_4	3.289
Ethane	C_2H_6	1.060
Propylene	C_3H_6	0.686
Propane	C_3H_8	0.260
-	C4 (Total)	0.865
-	C5 (Total)	0.399
-	C6 (Total)	0.148
1-Heptene	C7H14	0.025
Styrene	C8H8	0.013
Benzene	C_6H_6	0.082
Toluene	C_7H_8	0.012
Dimethyl Carbonate	$C_3H_6O_3$	1.304
Ethyl Methyl Carbonate	$C_4H_8O_3$	0.101
Total	-	100

Cell test 5 used the same film heater setup as tests 1 through 4 but was placed into a sealed battery gas composition chamber. The battery gas composition chamber can be seen in Figure 11. Thermal runaway was induced in the cells and the vent gas was determined to be flammable, thus resulting in the need for module level testing.

Figure 11. Sample 5 Instrumented Inside the Gas Test Chamber

6.2 UL 9540A Module Level Testing

The modules utilize a 52S2P cell configuration mounted in an enclosure made of plastic and aluminum alloy. The module test configuration and the location of the heating elements used to initiate thermal runaway in the tests are shown in Figure 12 and Figure 13. Cell 20 was used as the initiating cell. Thermal couple T1-1 was used to maintain the heating rate between 4-7°C and was located on the wide side of cell 20, between the cell and heater. The test demonstrated that thermal runaway propagated into adjacent Cell 19 and Cell 21.

Limited gas analysis data was collected during the test, as shown in Table 4. No external flaming, flying debris, or sparks/electrical arcs were observed during the test and the effects of thermal runaway were contained by the module design. The vent gas was determined to be flammable, thus resulting in the need for unit level testing.

Table 4. Module Test Gas Production

Gas Compound	Gas Type	Pre-Flaming (L)	Flaming (L)	Minimum detectable flow rate (LPM)
Total Hydrocarbons (Propane Equivalent)	Hydrocarbons	260.29	No flaming	0.50
Carbon Dioxide	Carbon Containing	217.03	No flaming	1.82
Carbon Monoxide	Carbon Containing	77.57	No flaming	0.61
Hydrogen	Hydrogen	263.37	No flaming	14.29

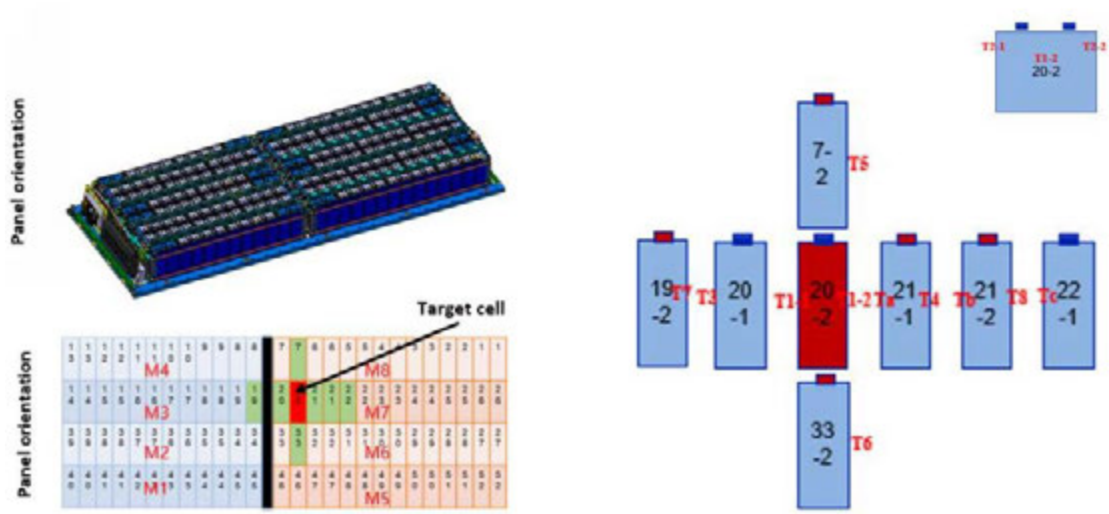


Figure 12. Module Test Initiating Cell Configuration

Figure 13. Module-Level Testing Assembly

6.3 UL 9540A Unit Level Testing

Unit level testing was conducted for the EnerC+ model BESS. The BESS container is equipped with a liquid cooling system; however, this feature was not used or evaluated during the test. A fire suppression system will not be provided for the BESS; therefore, one was not evaluated during the unit level test. The test consisted of three units, with heat flux gauges and thermocouples positioned on target walls and within the simulated means of egress adjacent to the units, as shown in Figure 14.

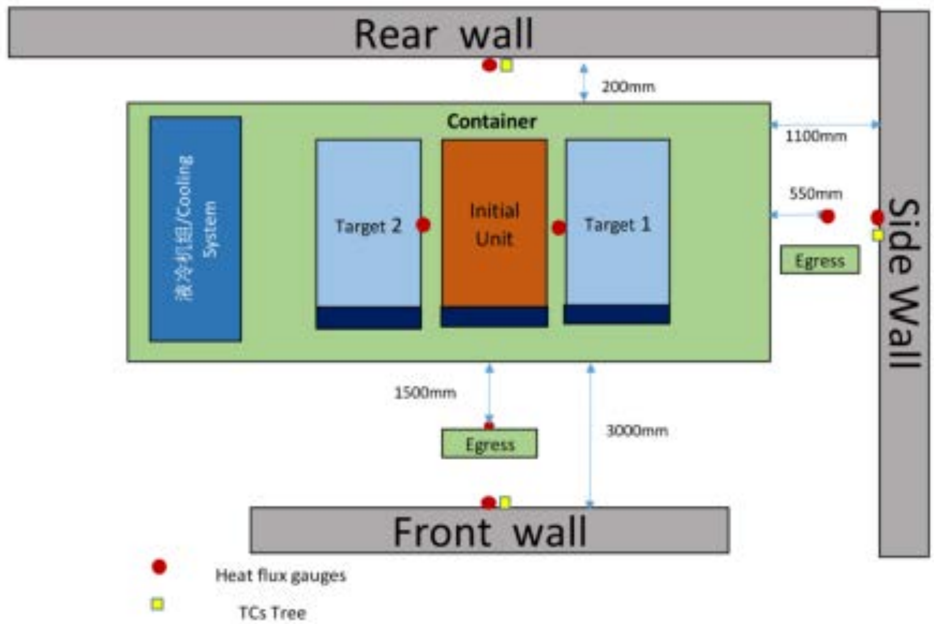


Figure 14. Unit Level Test Configuration

Each unit consisted of eight modules. Modules were fully charged (100% state of charge) before the test and the initiating BESS was at a maximum operating state of charge. Thermal runaway propagation was observed in two or three cells adjacent to the initiating cell, refer to Table 5.

Table 5. Thermal Runaway Propagation Times

Locations (Cell #)	Event	Time
Cell 20-2	Vent	0:41:08
Cell 20-2	Thermal runaway	0:41:48
Cell 20-1	Thermal runaway	0:44:40
Cell 21-1	Thermal runaway	0:46:03
*	Thermal runaway	1:05:26
*Note: Suspect there is another one cell went into thermal runaway, as there is no more TC in the module, cannot determine the cell location, refer to the temperature curve of Cell 21-1, voltage drop of module, gases generation and video, another cell was suspected to be propagated around 65.5 mintues.		

All damage was contained within the BESS initiating unit. The maximum surface temperature (30.5°C) in the adjacent target units did not exceed the cell venting temperature of 154°C, as shown in Table 6. The maximum wall surface temperature (28.3°C) did not exceed 97°C rise above ambient. Refer to Tables 7-9 for temperature measurements at adjacent walls.

Table 6. Maximum Temperature in Target Units

Target Unit 1		Target Unit 2	
Module Location No.	Temperature (°C)	Module Location No.	Temperature (°C)
Module -1	27.2	Module -1	26.9
Module -2	28.8	Module -2	28.1
Module -3	30.5	Module -3	28.7
Module -4	28.5	Module -4	28.0
Module -5	27.5	Module -5	27.7
Module -6	27.3	Module -6	27.2
Module -7	27.3	Module -7	27.0
Module -8	27.8	Module -8	27.5
Note: Temperatures are measured constantly and then averaged every 60-seconds			

Table 7. Maximum Temperatures on the Front Wall

Ambient Temperature: 24.0°C					
UL 9540A performance criteria, Ambient + 97°C: 121.0°C					
Height, mm	Maximum Temperature (°C)	Height, mm	Maximum Temperature (°C)	Height	Maximum Temperature (°C)
152	26.8	1368	27.2	2584	24.7
304	27.0	1520	27.0	2736	27.2
456	27.1	1672	27.0	2888	27.1
608	25.3	1824	27.2	3040	27.2
760	27.3	1976	27.2	3192	27.4
912	27.3	2128	27.4	3344	27.4
1064	27.0	2280	27.4	3496	27.4
1216	27.0	2432	27.2	3648	27.7
Note: Temperatures are measured constantly and then averaged every 60-seconds					

Table 8. Maximum Temperatures on the Side Wall

Ambient Temperature: 24.0°C					
UL 9540A performance criteria, Ambient + 97°C: 121.0°C					
Height, mm	Maximum Temperature (°C)	Height, mm	Maximum Temperature (°C)	Height	Maximum Temperature (°C)
152	24.9	1368	26.8	2584	26.9
304	25.8	1520	26.9	2736	27.0
456	25.5	1672	26.9	2888	27.3
608	26.1	1824	26.8	3040	27.3
760	26.3	1976	26.7	3192	27.0
912	26.6	2128	26.8	3344	27.1
1064	26.7	2280	26.8	3496	27.0
1216	26.5	2432	27.0	3648	27.0
Note: Temperatures are measured constantly and then averaged every 60-seconds					

Table 9. Maximum Temperature of the Rear Wall

Ambient Temperature: 24.0°C					
UL 9540A performance criteria, Ambient + 97°C: 121.0°C					
Height, mm	Maximum Temperature (°C)	Height, mm	Maximum Temperature (°C)	Height	Maximum Temperature (°C)
152	26.7	1368	27.6	2584	27.2
304	27.2	1520	27.4	2736	27.5
456	26.8	1672	27.3	2888	27.5
608	26.9	1824	27.6	3040	27.6
760	27.0	1976	27.2	3192	27.6
912	27.1	2128	27.2	3344	27.5
1064	27.2	2280	28.1	3496	28.3
1216	27.1	2432	26.9	3648	27.7
Note: Temperatures are measured constantly and then averaged every 60-seconds					

Heat flux levels were measured at various locations surrounding the initiating BESS unit to simulate heat exposures to means of egress and at target BESS modules. No attributable heat flux was measured in the means of egress (less than the maximum value of 1.3 kW/m^2 stipulated in the UL 9540A testing criteria) and 0.01 kW/m^2 in the target BESS modules (target unit 2, module number 4).

No explosion (deflagration or detonation) was observed during the test. In addition, there was no evidence of external flaming or flying debris noted at the conclusion of the test. The physical damage was limited to the initiating module. Gas composition and smoke release rate were measured during the test. Table 10 details the gas levels that were measured during the unit testing. A maximum smoke release rate of 0.12 m^2/s was observed.

Table 10. Summary of Battery Gas Volumes

Gas Component	Gas Type	During Pre-flaming (L)	During Flaming (L)	Minimum detectable flow rate(LPM)
Total Hydrocarbons (Propane Equivalent)	Hydrocarbons	111.98	No flaming	4.13
Carbon Dioxide	Carbon Containing	59.54	No flaming	3.08
Carbon Monoxide	Carbon Containing	138.34	No flaming	3.97
Hydrogen	Hydrogen	3.54	No flaming	104.03

6.4 Off-Gassing IDLH and Explosion Hazard Analysis

The cell generated flammable gases during thermal runaway as recorded in the cell level test. The analysis provided in this section of the report is based on the recorded level of the gases from cell #5 of the cell level test as a bounding (worst-case) off-gassing scenario. The UL 9540A unit level test demonstrated that three cells in the initiating module underwent thermal runaway.

The total gases vented from the module have a lower flammability limit (LFL) of 6.12% in the air at the average venting temperature as determined per the testing method outlined in the UL 9540A cell level test. The total gas volume collected from the cell was 7.20 ft^3 (0.204 m^3).

The dimensions of a single BESS container battery compartment are 16.1 ft × 7.64 ft × 7.97 ft with an interior volume of 980 ft^3 (27.8 m^3). The interior free air volume of a single BESS container battery compartment was estimated to be 230 ft^3 (6.51 m^3).

The UL 9540A testing does not consider any ventilation, however, the BESS container is provided with a combustible concentration reduction system.

6.4.1 Hydrogen Explosion Hazard

Hydrogen (H_2) gas has a lower explosive limit of (LEL) of 4% in air. During the cell level test, 43.066% of the total generated gas volume, or 3.10 ft^3 (0.088 m^3), was comprised of H_2 gas. Table 11 provides a summary of the number of cells in the BESS unit that would need to off gas to reach the LEL of H_2.

Table 11. Hydrogen Off-Gassing Volume Needed to Reach LEL

Interior Air Volume (ft^3 / m^3)	Volume of H_2 Required for LEL (ft^3 / m^3)	No. of Cells Required for LEL
230.0 / 6.51	9.20 / 0.26	2.97

The LEL for H_2 gas can be reached by off-gassing from the thermal runaway of three cells. The UL 9540A unit level test demonstrated that 3-4 cells in the initiating module underwent thermal runaway.

6.4.2 Carbon Monoxide Explosion Hazard

Carbon monoxide (CO) has an LEL of 12.5% in air. During the cell level test, 14.596% of the total generated gas volume, or 1.05 ft^3 (0.0297 m^3), was comprised of CO. Table 12 provides a summary of the number of cells in the BESS unit that would need to off gas to reach the LEL of CO.

Table 12. Carbon Monoxide Off-Gassing Volume Needed to Reach LEL

Interior Air Volume (ft^3 / m^3)	The volume of CO Required for LEL (ft^3 / m^3)	No. of Cells Required for LEL
230.0 / 6.51	28.7 / 0.813	27.4

The LEL for CO gas can be reached by off-gassing from the thermal runaway of approximately 28 cells. The UL 9540A unit level test demonstrated that 3-4 cells in the initiating module underwent thermal runaway.

6.4.3 Total Hydrocarbons Explosion Hazard

The cell vent gas has a LFL of 7.24% in the air at the venting temperature. During the cell level test 12.6% of the total generated gas volume, or 0.907 ft^3 (0.0257 m^3), was comprised of hydrocarbons. Table 13 provides a summary of the number of cells in the BESS unit that would need to off gas to reach the LEL of hydrocarbons.

Table 13. Total Hydrocarbon Off-Gassing Volume Needed to Reach LEL

Interior Air Volume (ft^3 / m^3)	Volume of Hydrocarbon Required for LEL (ft^3 / m^3)	No. of Cells Required for LEL
230.0 / 6.51	16.65 / 0.47	18.4

The LEL for total hydrocarbon gas can be reached by off-gassing from the thermal runaway of approximately 19 cells. The UL 9540A unit level test demonstrated that 3-4 cells in the initiating module underwent thermal runaway.

6.4.4 CO IDLH Analysis

The IDLH of CO is listed at 1,200 parts per million. This corresponds to a 0.12% IDLH. A cell generates 1.05 ft^3 (0.0297 m^3) of CO during thermal runaway. Table 14 provides a summary of the number of cells in the BESS unit that would need to off gas to reach the IDLH threshold.

Table 14. Carbon Monoxide Volume Needed to Reach the IDLH Threshold

Interior Air Volume (ft^3 / m^3)	Volume of CO Required for IDLH (ft^3 / m^3)	No. of Cells Required for IDLH
230.0 / 6.51	0.276 / 0.008	0.26

The IDLH for carbon monoxide gas can be reached by off-gassing from the thermal runaway of 1 cell. However, the BESS unit is installed outdoors and is non-occupiable. Meaning it cannot be occupied by personnel or entered by first responders. Therefore, the IDLH hazard is not applicable to this installation. However, FRA recommends that proper PPE be worn by first responders when approaching a distressed EnerC+ container when responding to a BESS emergency.

6.4.5 Explosion Control

The UL 9540A unit test demonstrates that the thermal runaway is limited to the initiating module and module-to-module propagation does not occur. The LEL calculations presented in this section indicated that there is a low margin of safety for reaching the LEL inside the EnerC+ without an additional level of protection as the H_2 LEL may be reached by off-gassing of 3 cells. The UL 9540A unit level test demonstrated that 3-4 cells underwent thermal runaway. To mitigate the risk of explosion, the EnerC+ is provided with an NFPA 69-compliant combustible gas concentration reduction system. TLB performed a review of the system and determined the explosion control design complies with NFPA 69. Additionally, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL.

7.0 PLUME ANALYSIS

FRA performed a plume analysis[6] to evaluate the plume dynamics from the release of battery vent gas due to a propagating thermal runaway event in the EnerC+. The analysis objective was to evaluate the plume dynamics from modeled battery vent gas release scenarios due to a propagating thermal runaway event. This plume analysis was performed using the Process Hazard Analysis Software Tools (PHAST) consequence modeling program to model pre-combustion battery vent gas dispersion and all associated consequences based upon the gas composition and release dynamics described in the UL 9540A cell/module/unit level tests.

The analysis considered consequence extents for potential pre-combustion battery vent gas release scenarios up to the full enclosure level. Scenarios for pre-combustion releases included the four-cell UL 9540A module level test-based release and additional hypothetical release scenarios including a full-volume module level release, a full-volume release from a rack of eight modules, and a full-volume release from an entire BESS enclosure of five racks (40-modules).

Analysis of results for all pre-combustion battery vent gas release scenarios show that there are no significant hazards that extend measurably beyond the nearest occupied property boundary for both the flammable and toxic portions of the dispersed cloud**.**

The distance from the nearest BESS to property boundaries was measured at approximately 148 ft (45.11 m) from the eastern property boundary bordering Byrnes Rd, 870 ft (265.17 m) from the northern property boundary bordering Kilkenny Rd, and 164 ft (50 m) from the western property boundary bordering the farmland property. The south property boundary is not visible in the site layout. The maximum extent of impact from the ½ LFL flammable vapor cloud (3.62%) was 24.41 ft (7.4 m) for the UL 9540A based propagation duration release from a full BESS enclosure. Flash fires were a modeled consequence for all pre-combustion scenarios. The flash fire envelope did not extend beyond the proposed property boundaries for any scenarios.

For non-flaming pre-combustion releases where all battery vent gas is released via thermal runaway conditions alone, the component with the largest IDLH footprint and required potential exposure duration (30-minutes) is carbon monoxide (CO). The largest CO IDLH extent with a duration greater than 30-minutes was 63.32 ft (19.30 m) for Scenario 4.1 (full container release with simultaneous propagation through each module), below the offset distance to the proposed property boundary from the closest BESS. As such, it is recommended that by incorporating a 1.5x safety factor, the minimum approach distance (MAD) for non-flaming release conditions be a minimum of 95 ft (28.95 m).

Note, this is an abbreviated summary of the plume analysis. Refer to the report prepared by FRA for all modeling assumptions, scenarios, and conclusions.

[6] Corby BESS Plume Analysis Rev0, Dated 2025.05.16.

8.0 HAZARD MITIGATION ANALYSIS

To perform an HMA, CFC §1207.1.4.1 requires the use of a failure modes and effects analysis to evaluate the consequences of the following failure modes. Note that only single failure modes shall be considered:

1. A thermal runaway condition in a single ESS rack, module, or unit.
2. Failure of any battery (energy) management system.
3. Failure of any required ventilation or exhaust system.
4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the ESS.
6. Failure of the smoke detection, fire detection, fire suppression, or gas detection system.
7. Required spill neutralization not being provided or failure of a required secondary containment system.

CFC §1207.1.4.2 authorizes the FCO or AHJ to approve the HMA provided that it demonstrates all of the following:

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations [CFC §1207.1.4.2 #1].
2. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate [CFC §1207.1.4.2 #2].
3. Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH levels in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area [CFC §1207.1.4.2 #3].
4. Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL) [CFC §1207.1.4.2 #4].
5. Flammable gases released from ESS during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases, preventing accumulation, or by deflagration venting [CFC §1207.1.4.2 #5].

To perform the HMA in accordance with the CFC, FRA reviewed and analyzed an FMEA developed by CATL for the EnerC+[7]. This analysis is summarized in the following sections.

8.1 FMEA

The severity, frequency, and detectability of the event were assigned a Risk Priority Number (RPN) that is ranked on a 1-10 scale, with 1 indicating a low consequence (severity), low probability of occurrence, or high detectability, and 10 indicating a high consequence event, high probability of occurrence, or low detectability. The three items were ranked to establish a low, medium, and high-risk level.

[7] EnerC+ Containerized Lithium Ion Battery Storage System (Rechargeable Li-ion Battery System) FMEA Report, Dated 2023.12.18

8.1.1 Thermal Runaway

Thermal runaway is when a cell's temperature increases at an accelerating rate in an uncontrollable fashion sufficient to result in damage to the cell. The thermal runaway progresses when the generation of heat is at a higher rate than the rate at which the heat can dissipate. This may lead to venting (off gassing and smoke evolution) or a fire/explosion. The FMEA classifies this failure mode as a low risk. The primary potential cause for thermal runaway is cell over temperature, overcharge, and overdischarge. Other potential causes include manufacturing defects (presence of contaminant), damage during handling, electrical faults, and low temperature charging.

Mitigation features in place include the BMS, which has layers of protection that work autonomously to identify abnormal cell conditions and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the CFC permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973. Further mitigating features include rigorous quality controls in cell manufacturing and the EnerC+ assembly process as well as commissioning tests performed prior to operation. Should thermal runaway occur in one cell, it should be noted that the battery module is designed to contain that failure. As demonstrated in UL 9540A unit level testing, thermal runaway of one cell only propagated to two or three adjacent cells. Thermal runaway was contained within a single module and did not propagate into adjacent modules nor did thermal runaway propagate from the initiating unit into adjacent units. No flaming, flying debris, or deflagrations were observed during the test. These test results demonstrated that in the unlikely event of a cell undergoing thermal runaway, it will not propagate throughout the module and unit.

8.1.2 Failure of BMS

As described in Section 2.4.4, the BMS identifies risks to the battery system by monitoring key cell properties, such as cell temperature, voltage, current and dry contact switching value in real time. If abnormal cell conditions exist, the BMS signals this alarm condition while also working autonomously to limit the power and reduce the voltage of the battery system. The FMEA classifies this failure mode as a low risk. Failure of the BMS may result in overcharge, overheating, or other abnormal battery system and/or cell conditions.

In the occurrence of an abnormal event, the BMS prevents the affected module from charging or discharging. It also incorporates multiple trip setpoints to detect faults and runs data integrity checks of preconfigured values to ensure the battery system is operating within its designed range. However, in the event of a BMS failure, these thermal runaway protections may not be functional. With the exception of an overcharge condition, the failure of the BMS by itself is unlikely to cause a fire unless there is prolonged operation of the EnerC+ in this fault condition and/or additional failures within the battery system subsequently occur. Overcharging is a direct effect of a failure in the BMS software logic that allows continuous operation (i.e., continuous charging) that could lead to cell failure and thermal runaway.

Mitigations in place include the battery module design and construction. Should thermal runaway occur in one cell, as described above, the battery module is designed to contain that failure. As demonstrated in UL 9540A unit level testing, thermal runaway of one cell only propagated to two or three adjacent cells. Thermal runaway was contained within a single module and did not propagate into adjacent modules nor did thermal runaway propagate from the initiating unit into adjacent units. No flaming, flying debris, or deflagrations were observed during the test. These test results demonstrated that in the unlikely event of a BMS failure leading to a cell thermal runaway scenario, it will not propagate throughout the module and unit. Furthermore, the provided fire and gas detection system acts independently of the BMS and provides another layer of detection and notification of abnormal events.

8.1.3 Failure of Ventilation or Exhaust System

As described in Section 2.4.3, the EnerC+ has a TMS that includes a heating and cooling system. The TMS is required to maintain safe operating temperatures for the cells during normal operation. The FMEA identifies several potential failure modes that could lead to a loss of temperature control as a low risk. The primary potential cause identified for this failure mode is insufficient refrigeration power. If excessive temperatures do occur, the risk of thermal runaway or battery degradation may increase.

Mitigation features in place include the BMS, which has layers of protection that work autonomously to identify abnormal cell conditions and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the CFC permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973.

8.1.4 Voltage Surge on Primary Electric Supply

As described in Section 2.4.5, the EnerC+ is equipped with a layers of electrical fault protection devices designed to protect the battery cells from abnormal electrical conditions. These include a high voltage interlock, high voltage relay, insulation detection, MSD, high-speed DC fuses on each module and surge protection through an SPD. The FMEA provided by CATL does not directly address voltage surges on the primary electric supply. The primary potential cause of a voltage surge is indirect lightning strikes. Analyzing the design/function of the SPD, the device is meant to suppress those surges and protect the EnerC+ components from damage. If the SPD were to fail, a voltage surge could damage electrical components/equipment of the EnerC+ and increase the risk of thermal runaway or battery degradation.

Mitigation features in place include the BMS, which has layers of protection that work autonomously to identify abnormal cell conditions/electrical equipment failures and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the CFC permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973.

8.1.5 Short Circuit on the Load Side of the ESS

As described in Section 2.4.5, the EnerC+ is equipped with a layers of electrical fault protection devices designed to protect the battery cells from abnormal electrical conditions. These include a high voltage interlock, high voltage relay, insulation detection, MSD, high-speed DC fuses on each module and surge protection. The FMEA classifies short circuits as low risk. The primary potential cause identified for this failure mode is the fuse failing to break as designed. If excessive temperatures do occur, the risk of thermal runaway or battery degradation may increase.

Mitigation features in place include the BMS, which has layers of protection that work autonomously to identify abnormal cell conditions/electrical equipment failures and react to reduce the likelihood of thermal runaway from occurring. The BMS is considered a reliable means preventing thermal runaway and the CFC permits thermal runaway protection to be part of the BMS that has been evaluated to UL 1973.

8.1.6 Failure of Fire Detection and Suppression System

As described in Section 2.4.6, each EnerC+ container is provided with a fire alarm system that includes three smoke detectors, two gas detectors, and a local visible/audible notification appliance. The FMEA classifies the failure of the fire detection system as low risk. The FMEA did not identify primary potential causes. Potential causes include manufacturing defects in the devices, incorrect installation, a loss of auxiliary power, and/or failure to properly inspect, test, and maintain the system.

Mitigation features in place include redundant smoke and gas detectors, a backup power supply, supervised circuits, the BMS, and proper design, installation, commissioning, and inspection, testing and maintenance. Specifically, the EnerC+ is provided with three smoke detectors and two gas detectors. Should one fail to operate as intended, additional devices within the container are capable of detecting and signaling the FACP. In addition, to address a power loss, the fire alarm and gas detection systems will be equipped with backup batteries sufficiently sized to provide standby and alarm power, as required by NFPA 72. The devices are also on supervised circuits with end of line (EOL) resistors capable of detecting a wiring issue. The EnerC+ also has a number of internal sensors within it that can detect abnormal events through its BMS. The BMS and fire alarm systems are separate from one another. As such, the failure of the fire alarm system does not affect the BMS and in the event that the fire alarm system fails, the BMS would still be operational and capable of detecting and signaling the off-site ROCC of the abnormal condition. Lastly, proper fire alarm system design, installation, commissioning, inspection, testing, and maintenance will ensure the system is operating and functioning as intended.

As described in Section 2.4.7, the EnerC+ is not equipped with a water or aerosol-based fire suppression system. Therefore, failure modes associated with these systems do not apply to Corby BESS.

8.1.7 Failure of Spill Neutralization

As described in the CFC (see Section 4.4), the EnerC+ LFP cells do not require spill control or neutralization.

8.1.8 Failure of Explosion Control System

As described in Section 2.4.8, each EnerC+ container is provided with an NFPA 69-compliant explosion control system. The ventilation system is a critical safety system used to reduce the risk of an explosion or deflagration during a thermal runaway event. The system includes two hydrogen gas detectors, an electric air inlet louver, an electric exhaust louver, and an explosion-proof fan with the associated control module. Upon the hydrogen detector sensing 10% of the LEL, the explosion control system activates, ventilating the EnerC+ to keep the combustible gas concentration of the container below 25% of the LEL. The FMEA classifies the failure of the explosion control system as low risk. The FMEA did not identify primary potential causes. Potential causes include manufacturing defects in the devices, incorrect installation, a loss of auxiliary power, and/or failure to properly inspect, test, and maintain the system.

Mitigation features in place at the container and site level include redundant gas detectors, a backup power supply, the BMS, and proper design, installation, commissioning, and inspection, testing and maintenance. Specifically, the EnerC+ is provided with two gas detectors. Should one fail to operate as intended, additional devices within the container are capable of detecting and signaling the FACP. In addition, to address a power loss, the gas detection systems will be equipped with a

UPS and the ventilation system will be equipped with a site level backup power supply to provide power throughout a thermal event or power outage. The EnerC+ also has a number of internal sensors within it that can detect abnormal events through its BMS. The BMS and explosion control system are separate from one another. As such, the failure of the explosion control system does not affect the BMS. In the event that the explosion control system fails, the BMS would still be operational and capable of detecting and signaling the off-site ROCC of the abnormal condition. Lastly, proper explosion control system design, installation, commissioning, inspection, testing, and maintenance will ensure the system is operating and functioning as intended.

Mitigation features in place for emergency response include an MAD from distressed EnerC+ containers. CFD modeling did not identify a MAD for personnel and first responders from EnerC+ containers. As such, during an emergency/thermal event, FRA recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed EnerC+ container to ensure they are not momentarily exposed to dangerous conditions. In addition, personnel and first responders should not approach the front of the distressed EnerC+ container. Note the front of the EnerC+ container is the side equipped with doors, as shown previously in Figure 4.

8.2 HMA Performance Criteria Approval

CFC §1207.1.4.2 lists the performance criteria required to gain approval of the HMA by the FCO or AHJ. The EnerC+ installation at the Corby BESS meets the criteria for approval, as follows:

1. *Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations [CFC §1207.1.4.2 #1]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within unoccupied ESS rooms. However, it should be noted, the EnerC+ has a number of protection schemes in place to prohibit fire from spreading from one EnerC+ container to another. As demonstrated in UL 9540A unit level testing, thermal runaway was contained to a single module within an EnerC+ container. Although this requirement applies to unoccupied ESS rooms (and not an outdoor installation), the Corby BESS still meets the intent of the requirement by containing a fire event to a single EnerC+ container.

2. *Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate [CFC §1207.1.4.2 #2]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within occupied work centers (or any other room). However, it should be noted, the EnerC+ has numerous internal sensors that are monitored by the battery management system (BMS) that can detect abnormal events and/or failures of the unit. The EnerC+ also includes smoke, heat, and gas detection systems with an audible/visible appliance installed on the exterior of the container to provide local notification. These systems are also monitored remotely, providing off-site notification in the unlikely event of a fire. Although this requirement applies to occupied work centers (and not an outdoor installation), the Corby BESS still meets the intent of the requirement through the internal sensors, fire and gas detection system, the remote monitoring provided, and the local notification appliances installed in each EnerC+ container.

3. *Toxic and highly toxic gases released during fires will not reach concentrations in excess of the Immediately Dangerous to Life or Health (IDLH) level in the building or adjacent*

means of egress routes during the time deemed necessary to evacuate occupants from any affected area [CFC §1207.1.4.2 #3]:

The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within a building or adjacent to a means of egress. There are no occupied buildings or public exposures within 100 feet of the nearest EnerC+ container. As such, no toxic or highly toxic gases released during fires or other faulty conditions would reach IDLH levels in buildings or adjacent means of egress. However, it should be noted, gases released during a fire may result in a localized concentration in excess of IDLH levels. Therefore, first responders should wear proper personal protective equipment (PPE) when responding to a Corby BESS fire.

4. *Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL) [CFC §1207.1.4.2 #4]:*

   The Corby BESS meets this requirement. The EnerC+ utilizes listed lithium-ion cells that do not vent toxic gases during normal charging, discharging, or operation. As such, no flammable gases exceeding 25% of their LFL will be released from the Corby BESS during charging, discharging, and normal operation.

5. *Flammable gases released from ESS during fire, overcharging, and other abnormal conditions will be controlled through the use of ventilation of gases, preventing accumulation, or by deflagration venting [CFC §1207.1.4.2 #5]:*

   The Corby BESS meets this requirement. The EnerC+ has an NFPA 69-compliant explosion control system. During a thermal event, the explosion control system activates, ventilating the EnerC+ to keep the gas concentration of the container below its explosive limit. TLB performed a review of the explosion control system and CFD simulations prepared for the EnerC+ and determined the system to be in compliance with NFPA 69. In addition, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL. As such, flammable gases released from ESS during a fire, overcharging, or other abnormal conditions will be controlled through ventilation of gases.

9.0 RECOMMENDATIONS

Throughout the report, FRA provided several recommendations related to the Corby BESS installation and emergency response to mitigate the hazards of a fire event. These recommendations are based on our review of the available materials, our background, experience, and training, the analyses performed to date described above, common industry best practices for responding to a thermal event involving lithium-ion BESS, as well as from FRA's experience with lithium-ion battery hazards, BESS hazards, and previous BESS fires. These recommendations do not provide opinions or conclusions meant to address specific circumstances or all possible scenarios of an emergency. As with all emergency events, emergency response actions should be evaluated and performed based on real-time fire conditions, observations, and data (i.e., BESS data points, air quality measurements, smoke production, wind direction/speed, fire intensity, proximity of flames to adjacent electrical equipment and structures) during the actual emergency. Below is a summarized list of the recommendations provided throughout the report:

1. **Site Design:** As the site design is finalized, FRA recommends that the following be addressed to ensure compliance with the CFC:
   a. A disconnecting means or placards must be provided at the site per CFC §1207.4.1.
   b. Signage must be provided at the site per CFC §1207.4.8.
   c. Information related to the inverter listing must be provided per CFC §1207.3.
   d. The fire code official must approve of angles of approach/departure, grade, and imposed load for the access roads per CFC §503.
   e. If the AHJ requires one, a key box must be provided at the site per CFC §506.
2. **Plans:** FRA recommends that prior to energizing the Corby BESS, commissioning, decommissioning, operations and maintenance, and emergency response plans be finalized, as required by the CFC.
3. **Emergency Response Training:** FRA recommends that all site personnel and emergency response personnel who could be responsible for responding to a Corby BESS emergency be trained on the ERP before energizing the Corby BESS. Annual refresher training should be provided, as appropriate, if requested by the AHJ.
4. **Fire Protection Systems:** FRA recommends that all fire protection systems (such as the fire alarm system and explosion control system) be designed, installed, commissioned, inspected, tested, and maintained as required by the CFC and their respective NFPA standards.
5. **Minimum Approach Distance (MAD):** When responding to a battery emergency, FRA recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed EnerC+ container, as designated in Corby BESS ERP, to ensure they are not momentarily exposed to dangerous conditions. In addition, site personnel and first responders should not approach the front of distressed EnerC+ containers, and all first responders should wear proper PPE when approaching a distressed EnerC+ container during a battery emergency. Note the front of the EnerC+ container is the side equipped with doors, as shown previously in Figure 4.

10.0 CONCLUSIONS

A BESS site design code review and an HMA was conducted for the proposed EnerC+ installation at the Corby BESS facility. Based on a review of the EnerC+ and the site plan, the Corby BESS site design can meet the CFC installation level requirements for an outdoor BESS when it is installed in accordance with the manufacturer's instructions, its listing, the site plan, and the CFC. However, the following items were identified in this analysis that need to be addressed to ensure compliance:

- A disconnecting means or placards must be provided at the site per CFC §1207.4.1.
- Signage must be provided at the site per CFC §1207.4.8.
- Information related to the inverter listing must be provided per CFC §1207.3.
- The fire code official must approve of angles of approach/departure, grade, and imposed load for the access roads per CFC §503.
- If the AHJ requires one, a key box must be provided at the site per CFC §506.

Once the items noted above are provided, the Corby BESS site design will comply with the CFC requirements.

In addition, the EnerC+ BESS installation at the Corby BESS facility meets the following HMA approval criteria outlined in the CFC §1207.1.4.2, as follows:

1. *Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations [CFC §1207.1.4.2 #1]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within unoccupied ESS rooms. However, it should be noted, the EnerC+ has a number of protection schemes in place to prohibit fire from spreading from one EnerC+ container to another. As demonstrated in UL 9540A unit level testing, thermal runaway was contained to a single module within an EnerC+ container. Although this requirement applies to unoccupied ESS rooms (and not an outdoor installation), the Corby BESS still meets the intent of the requirement by containing a fire event to a single EnerC+ container.

2. *Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate [CFC §1207.1.4.2 #2]:*

   The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within occupied work centers (or any other room). However, it should be noted, the EnerC+ has numerous internal sensors that are monitored by the battery management system (BMS) that can detect abnormal events and/or failures of the unit. The EnerC+ also includes smoke, heat, and gas detection systems with an audible/visible appliance installed on the exterior of the container to provide local notification. These systems are also monitored remotely, providing off-site notification in the unlikely event of a fire. Although this requirement applies to occupied work centers (and not an outdoor installation), the Corby BESS still meets the intent of the requirement through the internal sensors, fire and gas detection system, the remote monitoring provided, and the local notification appliances installed in each EnerC+ container.

3. *Toxic and highly toxic gases released during fires will not reach concentrations in excess of the Immediately Dangerous to Life or Health (IDLH) level in the building or adjacent*

means of egress routes during the time deemed necessary to evacuate occupants from any affected area [CFC §1207.1.4.2 #3]:

The Corby BESS meets this requirement. The EnerC+ is a non-occupiable enclosure that is installed outdoors, not within a building or adjacent to a means of egress. There are no occupied buildings or public exposures within 100 feet of the nearest EnerC+ container. As such, no toxic or highly toxic gases released during fires or other faulty conditions would reach IDLH levels in buildings or adjacent means of egress. However, it should be noted, gases released during a fire may result in a localized concentration in excess of IDLH levels. Therefore, first responders should wear proper personal protective equipment (PPE) when responding to a Corby BESS fire.

4. *Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL) [CFC §1207.1.4.2 #4]:*

   The Corby BESS meets this requirement. The EnerC+ utilizes listed lithium-ion cells that do not vent toxic gases during normal charging, discharging, or operation. As such, no flammable gases exceeding 25% of their LFL will be released from the Corby BESS during charging, discharging, and normal operation.

5. *Flammable gases released from ESS during fire, overcharging, and other abnormal conditions will be controlled through the use of ventilation of gases, preventing accumulation, or by deflagration venting [CFC §1207.1.4.2 #5]:*

   The Corby BESS meets this requirement. The EnerC+ has an NFPA 69-compliant explosion control system. During a thermal event, the explosion control system activates, ventilating the EnerC+ to keep the gas concentration of the container below its explosive limit. TLB performed a review of the explosion control system and CFD simulations prepared for the EnerC+ and determined the system to be in compliance with NFPA 69. In addition, CATL has issued an NFPA 69 test report that demonstrates the ability of the system to maintain a combustible gas concentration below 25% LEL. As such, flammable gases released from ESS during a fire, overcharging, or other abnormal conditions will be controlled through ventilation of gases.

In summary, based on a review of the EnerC+, the site plan, and UL 9540A testing, the Corby BESS meets the HMA approval criteria outlined in the CFC, as described above.

APPENDIX 12-A: ELECTRICAL EQUIPMENT SITE PLAN

ENERGY STORAGE SYSTEM DESCRIPTION	
FACILITY NAMEPLATE	300 MW / 1200 MWh
BESS EQUIPMENT	BOL: 96 PCS SKIDS, 384 BATTERY ENCLOSURES EOL: 136 PCS SKIDS, 544 BATTERY ENCLOSURES

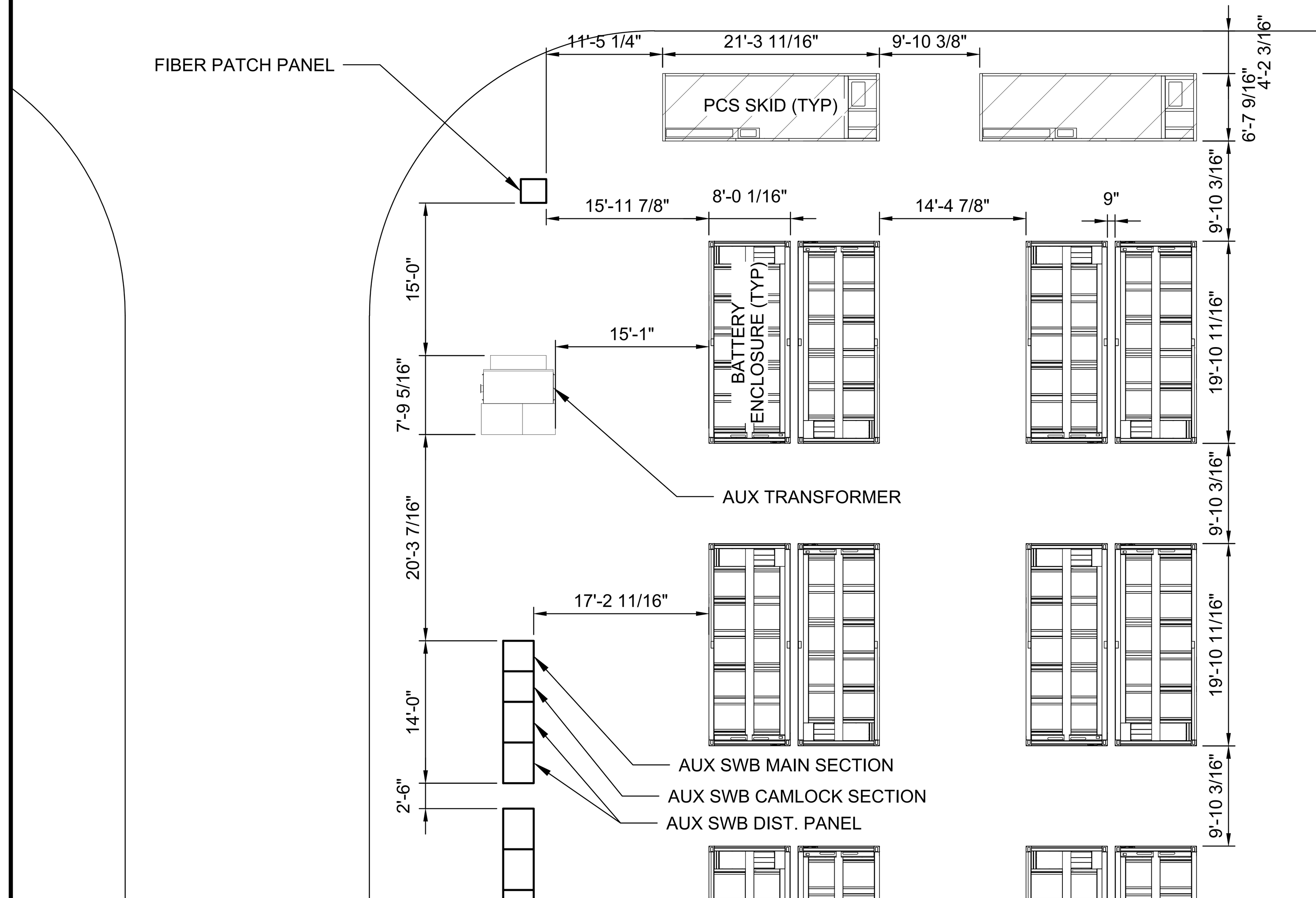
AREA	ACREAGE
PARCEL	37

LEGEND:

- PROPERTY LINE
- FENCE
- SETBACK
- SOUND BARRIER
- GATE

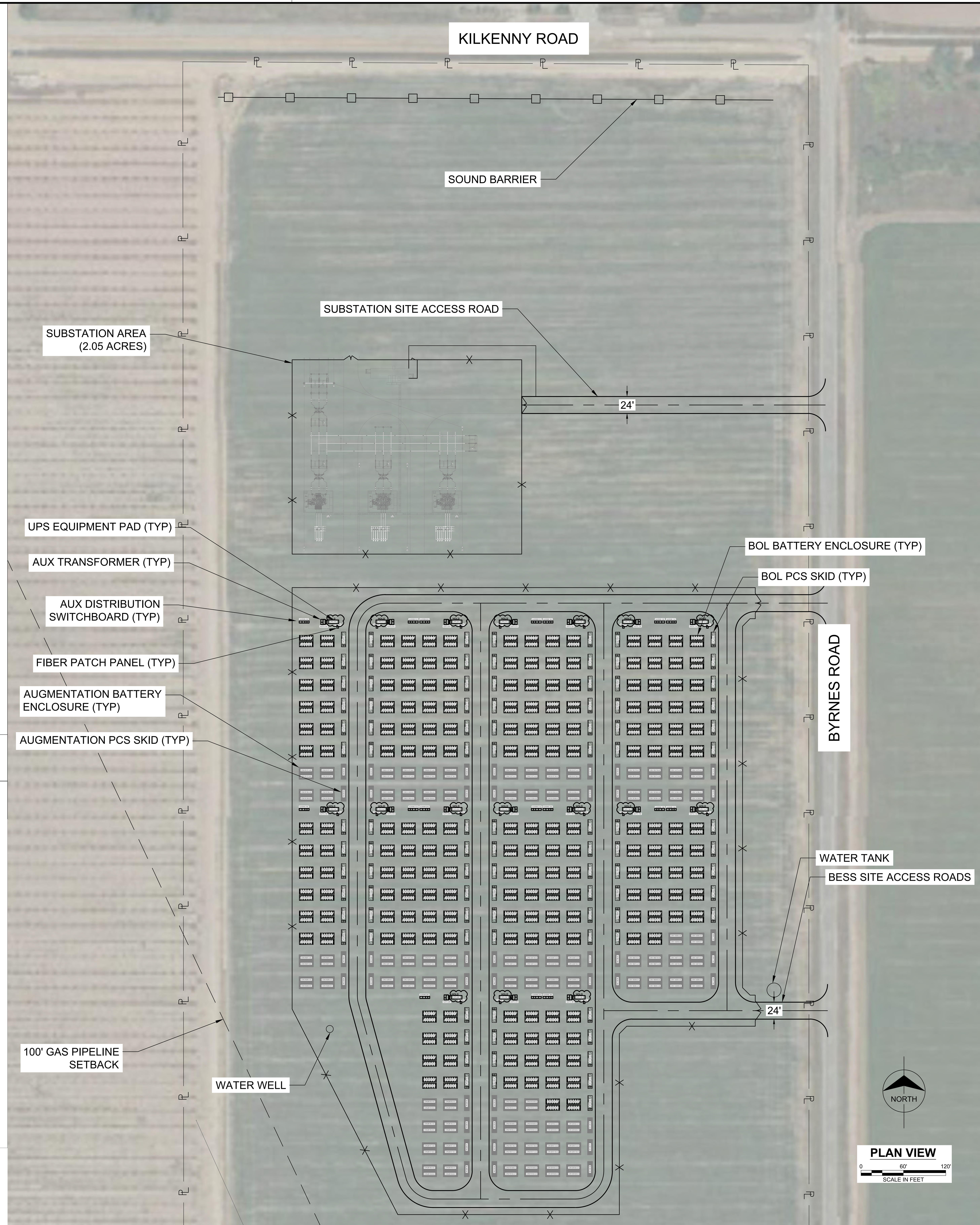
NOTES:

1. SUBSTATION AREA BASED ON PRELIMINARY DRAWING AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN. SUBSTATION FOOTPRINT PROVIDED BY SUBSTATION EOR.
2. SITE DRAINAGE REQUIREMENTS TO BE SHOWN ON CIVIL GRADING PLAN.
3. AUGMENTATION EQUIPMENT WILL NOT BE PRESENT DURING INITIAL SITE DEVELOPMENT.



TYPICAL BESS EQUIPMENT SPACING

0 10' 20'
SCALE IN FEET



PLAN VIEW

0 60' 120'
SCALE IN FEET

REV	DATE	BY	CKD	DESCRIPTION
A	12/21/23	JMF	AMH	ISSUED FOR 30% REVIEW
B	05/03/24	JMF	AMH	ISSUED FOR 60% REVIEW
C	03/05/25	JLT	AMH	ISSUED FOR 60% REVIEW

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS McDONNELL

BURNS & McDONNELL WESTERN ENTERPRISES, INC.
140 S STATE COLLEGE BLVD., SUITE 100
BREA, CA 92821
714-256-1595

date	detailed
OCTOBER 6, 2023	J. FORBES
designed	checked
J. FORBES	A. HINERMAN

CORBY ENERGY STORAGE, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

CORBY BESS PROJECT
6865 BYRNES ROAD
VACAVILLE, CALIFORNIA 95687

CORBY BESS
ELECTRICAL EQUIPMENT
SITE PLAN

project	contract
163851	-

drawing BCR-E-200 – rev. C

sheet of sheets

file BCR-E-200.dwg

APPENDIX 12-B: ENERC+ BATTERY CONTAINER OPERATING INSTRUCTION AND MAINTENANCE MANUAL

EnerC+ Battery Container

Operating Instruction and Maintenance Manual

Revision History

Revision	Chapter	Description	Date
1.0	All	1st revision for release	2022/10/24
1.1	All	1. Arc Flash lavel updated, PPE level is updatd to 2 2. LOTO Procedure updated 3. MSD removed 4. Connector information of master control box updated 5. Remove the CO detector from FSS system 6. FSS control logic updated 7. Auxiliary distribution diagram updated, two options 8. Nameplate Eenergy should be 4073.472kWh 9. Voltage range updated 1040~1500VDC 10. Max. Current updated from 1750A/1 min to 1958.4A/1 minute 11. The max. Auxiliary power is updated from 36.8KW to 37.5KW 12. The weight is updatd from 36.5t to 36t 13. Auxiliary power cable connection (Two options) updated 14. CX. updatd_Switch on Auxiliary Power Supply 15. Batteries are shipped out from CATL at SOC=23% 16. Label introduction added	2023/12/13
1.2	9.1.2	A new caution added: The minimum cell voltage (Static voltage) should not be less than 2.5 V in any case; otherwise, the warranty will be invalid. The minimum cell voltage (Static voltage)should not be less than 2.0 V in any case; otherwise, the battery will be over-discharged and may not be able to be repaired.	2024/02/22
1.3	5.2	Confirm the min clearance of foundation to 50mm	2024/6/13

1 Important Safety Instructions

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

EnerC+ battery container installation and service require knowledge of high voltage electricity and should only be performed by qualified person. CATL assume no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warnings and cautions must be followed when using EnerC+ product.

1.1 Electrically Safe Work Condition

A state in which an electrical conductor or circuit part has been disconnected from BESS energized parts, LOTO procedures must be implemented, the insolation switches in this product must be locked and tagged, the absence of voltage must be tested to verify. If necessary, temporarily grounded for personnel protection.

1.2 Qualified person

One who has demonstrated skills and knowledge related to the BESS construction, operation, installations and has received safety training to identify the hazard and reduce associated risk.

Qualified persons shall be trained and knowledgeable in the operation of battery system, and specific work methods and shall be trained to avoid the electrical hazards that are present. Such persons shall be familiar with the proper use of precautionary techniques and PPE. Training for a qualified person shall include the following:

1. Skills and techniques to avoid a shock hazard:
    a) Between exposed energized surfaces, which might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts.
    b) Between exposed energized surfaces and grounded equipment, other grounded objects, or the earth itself, that might include temporarily insulating or guarding parts to permit the employee to work on exposed energized parts.
2. Method of determining the battery system working boundaries.

1.3 Safety symbol

Below some basic safety symbols and descriptions are applicable to all equipment on the BESS plant.

	DANGER
	When energized, this equipment presents a potential hazard of electric shock, burn or death. Only authorized personnel who are thoroughly familiar with the equipment and adequately trained may install, operate or maintain this equipment. To prevent death, personal injury, or damage to equipment, follow all site safety procedures as indicated by HSE Plan. To minimize hazard of electrical shock, death and burns, approved grounding practices must be strictly followed.

	WARNING
	To prevent personal injury or damage to equipment, personnel shall adhere to site protocol regarding working at heights. To prevent personal injury or equipment damage by equipment malfunction, only adequately trained personnel should modify any programmable machine. Always ensure applicable standards and regulations are followed and only properly certified equipment is used as a critical component of the safety system. Never assume that critical-safety control loop is closed.

	WARNING — Shock Hazard
	Do not come into contact with system connectors or terminals. Do not open the enclosure doors unless appropriate LOTO procedures are followed, PPE and related training as required by local codes and regulations are part of the maintenance plan.

	WARNING — Arc Flash Hazard
	There is an arc flash hazard associated with all electrical equipment. There is an increased risk of arc flash with any equipment modification (e.g., open doors). Serious injuries can occur in arc flash incidents. Appropriate PPE and training as per local codes and regulations is required.

	WARNING — Fire Hazard
	Fire is possible under certain, extreme fault conditions.

	CAUTION
	Indicates a procedure, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment.

The following directives must be followed when working with or near the BESS equipment.

1. Safety parameters and procedures are site-specific, and therefore, must be developed by the customer.
2. Review and refer to all safety warnings contained in this manual before beginning operations. Follow all the safety procedures as prescribed be the supplier manufacturer published safety procedures for each equipment.
3. Establish a clear, permanent, restricted access around the system. Fire extinguishers must be readily available on-site.
4. The system requires a clean, mechanically stable operating environment, free from conductive contaminates, combustibles, moisture, liquids and gases and corrosive substances. The system may be operated only when the ambient temperature is between **-25°C to 55°C**. Do not tap, drill puncture or attach anything to the equipment enclosures. Ensure there is enough clearance on all sides of the enclosures to allow access to the system. Remove watches, jewellery, rings and other metallic objects and always use tools with insulated handles.
5. Follow all applicable Lock Out/Tag Out (LOTO) procedures always. If proper LOTO procedures are not followed, serious injury or death could result. With power applied to the equipment, hazardous voltages will be present on some components. To prevent accidental death or injury, do not touch any components within the enclosure unless specifically directed to do so. To reduce risk of electrical shock, verify that all equipment is properly grounded.
6. Strobes and alarms within the system for evacuation are activated by the FSS system.

	WARNING
	Only authorized, adequately trained Energy Storage personnel with proper Personal Protective Equipment (PPE) can access the system. Do not open the equipment access doors unless qualified person.

1.4 Primary Risks Associated With BESS

The primary risks associated with the BESS system are:

1.4.1 Hazardous Voltage

Hazardous Voltage
• High AC at MV Switchgear, Isolation transformer and Auxiliary Transformer • High AC at PCS input, aux transformer input. • 1500 VDC at PCS output, Battery container.
Consequence
• Electrocution, Fire, Explosion
Avoidance
• Only qualified and authorized person should only be allowed restricted access. • Equipment barriers must remain in place. • PPE must be appropriate for the task and equipment

1.4.2 Arc fault

Arc fault
• When insulation breakdown or accidental contact between high voltage conductors, an arc fault will be happen through the air gap between conductors.
Consequence
• Arc fault creates an electrical explosion. • Light and heat emitted from the explosion is known as **arc flash**. • Pressure wave caused by the tremendous temperatures of the arc flash is known as **arc blast**.
Avoidance
• Only qualified and authorized person should only be allowed restricted access. • Restricted access • Equipment barriers must remain in place • PPE must be appropriate for the task and equipment

1.5 Arc Flash hazard boundary

The US National Fire Protection Association (NFPA) has developed specific approach boundaries designed to protect employees while working on or near energized equipment. These boundaries are:

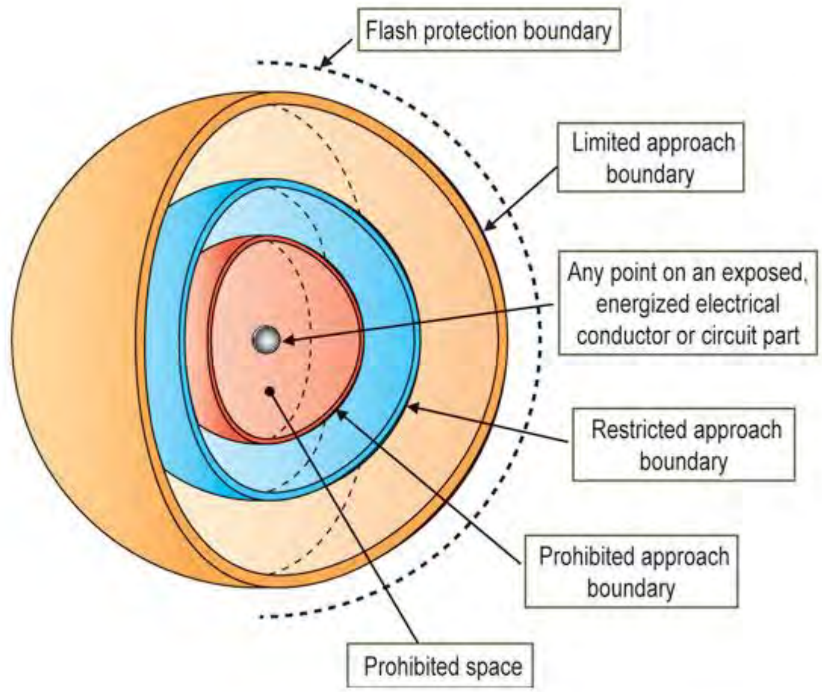


Figure 1-1 Arc Flash Boundaries

- Flash Protection boundary (outer boundary) – this is the furthest established boundary from the energy source. If an arc flash occurred, this boundary is where an employee exposed to a curable second-degree burn. The issue here is the heat generated from a flash that results in burn.
- Limited approach – An approach limit at a distance from an exposed live part where a shock hazard exists.
- Restricted approach – An approach limit at a distance from an exposed live part which there is an increased risk of shock.
- Prohibited approach (inner boundary) – A distance from an exposed part which is considered the same as making contact with the live part.

1.6 Arc Flash label

According to “Maximum Power Method” in NFPA 70E, the estimated DC arc flash incident energy at the maximum power point can be calculated, and then the hazard boundary is defined as following figure.

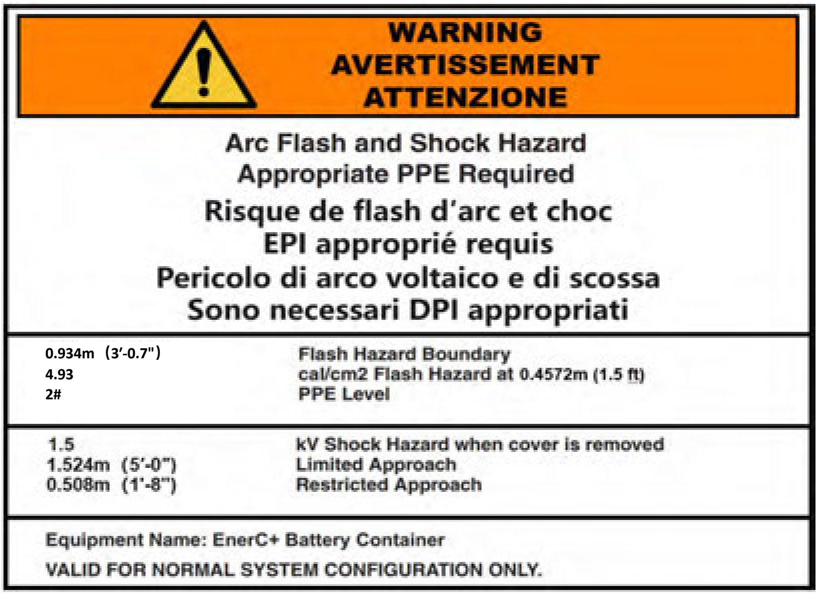


Figure 1-2 Arc Flash Label

1.7 Personal Protective Equipment (PPE)

The PPE is determined by the incident energy which is the temperature produced (in cal/cm²) at a distance (usually eighteen inches) from an arc flash.

PPE requirement for EnerC+ battery container operational precautions is category 2

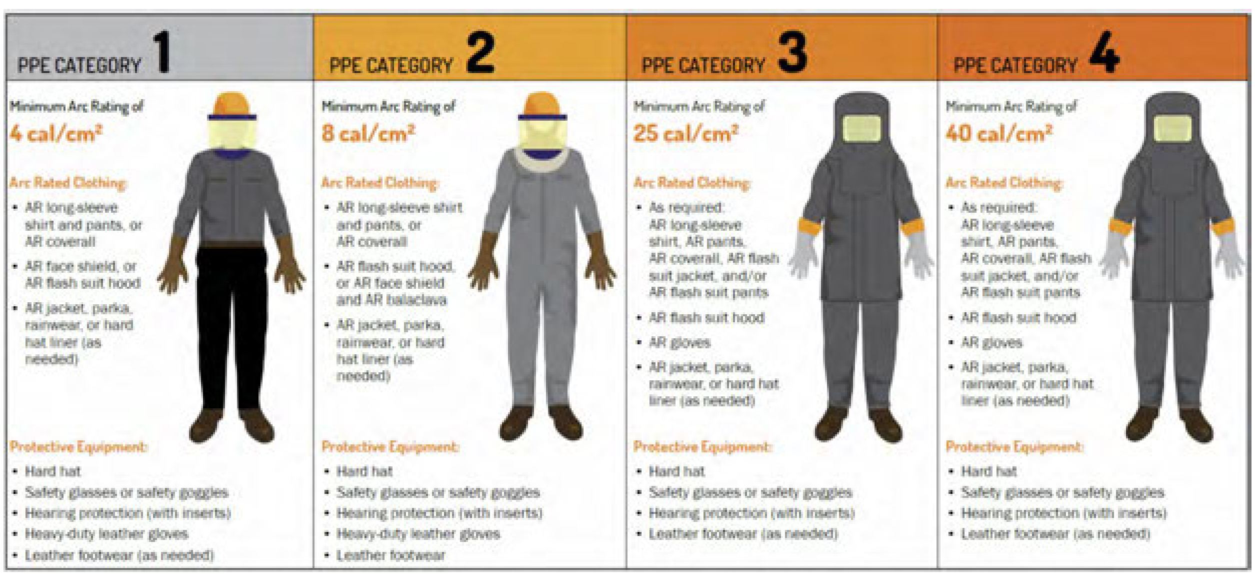


Figure 1-3 PPE Category

1.8 LOTO Procedure

1. The battery container needs to be powered off first. Check the status of PCS and battery containers from EMS, make sure that the circuit breakers/contactors of PCS DC side are all disconnected, and the HV contactors of all racks in the battery containers are disconnected.
2. PPE 2 is required for operator.
3. Turn off the AC circuit breaker QF1, QF2,QF3, QF4 , QF5 and QF8 inside the container distribution box that connect the external auxiliary power. Hang a LOTO warning sign on the door of the distribution box to prevent it from being turned back on.
4. Turn off the on-site AC circuit breaker which supplies the external auxiliary power of the battery containers. Apply a LOTO adapter and LOTO lock and tag to the circuit breaker handle to prevent it from being turned back on.
5. Check, with a multi-meter, that the 230 VAC input connection terminalXT0, XT2, XT5, XT7 and XT8 reads 0 V.
6. Check, with a multi-meter, that the 480 VAC input connection terminal XT1, XT3 and XT4 reads 0 V
7. Check, with a multi-meter, that the 24 VDC input connection terminal XT11 and XT12 reads 0 V.
8. Check, with a multi-meter, that the 1,500 VDC bus bar reads 0 V.
9. Switch off the isolation switch of the rack to “OFF” state. Pull out the LOTO ring of the isolation switch handle and apply LOTO lock and tag to the LOTO ring to prevent it from being turned back on.
10. Install a safety ground clamp from the positive 1,500 VDC bus bar to the ground bar. Use a shotgun stick to make the initial contact between the positive 1,500 VDC bus bar and ground.
11. Install a safety ground clamp from the negative 1,500 VDC bus bar to the ground bar. Use a shotgun stick to make initial contact between the negative 1,500 VDC bus bar and ground.

2 Manual Overview

2.1 Applicable Scope

This manual is applicable to the EnerC+ battery container.

All references to “battery container” in this manual, unless specifically indicated here in, refer to the product series mentioned above.

2.2 General

This manual has been prepared primarily for Battery Energy Storage System (BESS) operators and service personnel and provides three essentials: operation, maintenance and parts information for the BESS. A distribution of text revisions when necessary will be made to all recipients of the Operations and Maintenance manual.

Personnel who practice good operating and maintenance procedures ensure BESS reliability. It is of vital importance that station personnel, trained or untrained in BESS operation, become thoroughly familiar with the information contained in this manual. Prior to BESS operation, a sound program of maintenance should be developed and instituted. Adherence to such a program will result in reduced operating costs, fewer outages, and shorter periods of downtime.

2.3 Manual Updates

An experienced staff from the best information available has compiled the manuals provided for this BESS equipment prior to the time of shipment. Due to your shipping requirements and our desire to meet manual delivery commitments, manuals may be shipped with missing information. All manuals in your hands should be updated as material is received from CATL Company. To assist you in revising and updating your manuals, we offer the following suggestions:

1. Identify those individuals or functions who will be using the sets of manuals.
2. Assign the manuals to each individual or function and number each set.
3. Maintain a log of manual sets and the associated owners.
4. If possible, assign a librarian to ensure all controlled (or numbered) sets of manuals are updated as material is received from CATL. If this is not possible, each owner must keep their set of manuals current.
5. Retain shortage/revision instructions sheet at the front of the appropriate volume. This acts as a log of updates received.

6. Follow instructions for insertion of new material exactly. If the material is not filed properly, it cannot be easily found.
7. Insert shortage/revision material in manuals as soon as received. Some updates are small and can be misplaced.
8. All other manuals left from installations, etc., should be clearly labelled as extras, spares, or not controlled copies.

2.4 Abbreviation

CATL	Contemporary Amperex Technology Limited
BMU	Battery Management Unit
BMS	Battery Management System
BESS	Battery Energy Storage System
EMS	Energy Management System
PCS	Power Conversion System
CSC	Cell Supervision Circuit
CSU	Current Sample Unit
ETH	Ethernet Module
FSS	Fire Suppression System
HV	High Voltage
LV	Low Voltage
LOTO	Lockout/Tagout
MBMU	Master battery management unit
SBMU	Slave Battery Management Unit
IMM	Insulation monitoring Module
CAN	Controller Area Network
ACAN	CAN between BMU and PCS
CCAN	AN between BMU and CSC
SCAN	CAN between BMU and CSU
DCAN	CAN for calibration
BOL	Begin of Life
EOL	End of Life
SOC	State of Charge
SOE	State Of Energy
SOH	State of Health
SOP	State Of Power
TMS	Thermal Management System

Contents

3 Product Introduction

3.1 Product Overview

EnerC+ Battery container is the core unit in the energy storage system and acts as the equipment for storing electrical energy. It can be applied to many applications including renewable energy integration, frequency regulation, and voltage regulation of the grid.

Battery container consists of battery system, battery management system (BMS), fire suppression system (FSS), thermal management system (TMS) and auxiliary distribution system.

Figure 3-1 battery container ---right side overview

Figure 3-2 battery container ---left side overview

The basic units for whole system is list as following:

Table 3-1 Components of battery container

System	Sub Components	Number	Remark
Battery Racks	20 feet Container	1	2896mm(H)*2438mm(W)*6058mm(D)
	Battery Modules	40	With CSC
BMS	Master control box	1	Including IMM,MBMU,ETH, media Conversion Module(optional)
	Sub Control Box	5	Including SBMU, fuse, isolation switch and so on
TMS	Cooling unit	1	Including compressor, pump, fan, heater and others
FSS	Fire Suppression System	1	Including Fire Suppression Control Panel, Smoke detector, Gas detector, Smoke exhaust ventilation system
Auxiliary Power Supply	Distribution box	1	Auxiliary power supply system

3.1.1 Battery rack system overview

The battery system is composed of 5 battery racks in parallel.

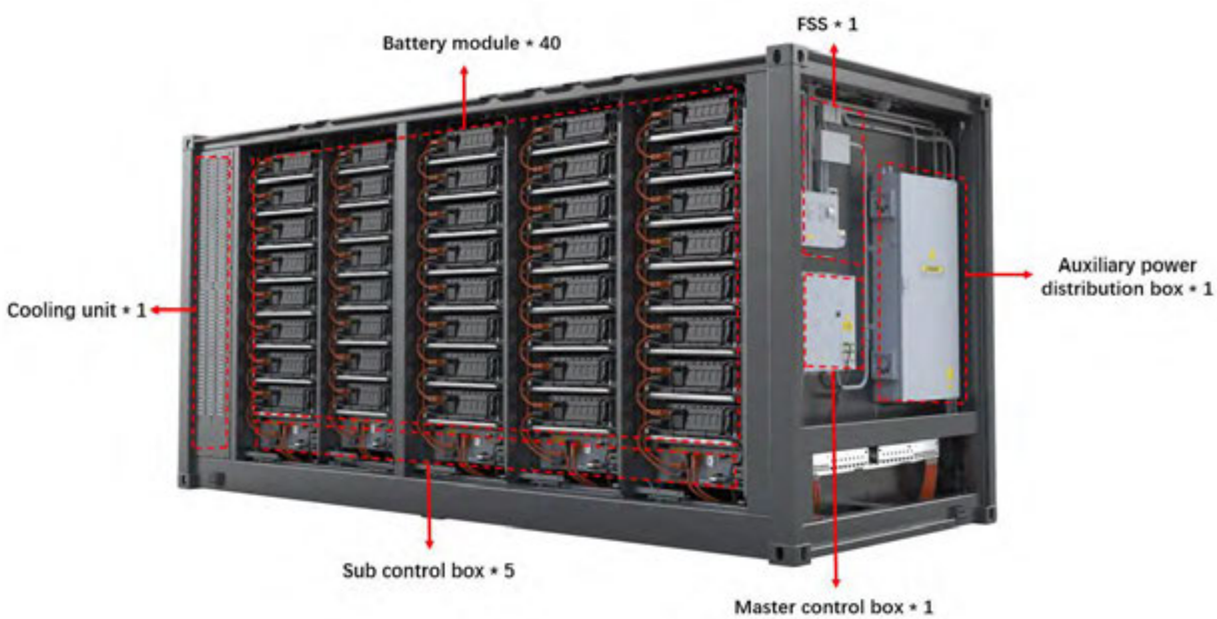


Figure 3-3 EnerC+ liquid-cooled energy storage container overview – inside

The battery system is composed of 5 battery racks in parallel, Each battery rack contains 8 battery modules, each battery modules is composed of 104S(2P52S) battery cells in series connection, so the battery system contains 4160 battery cells.

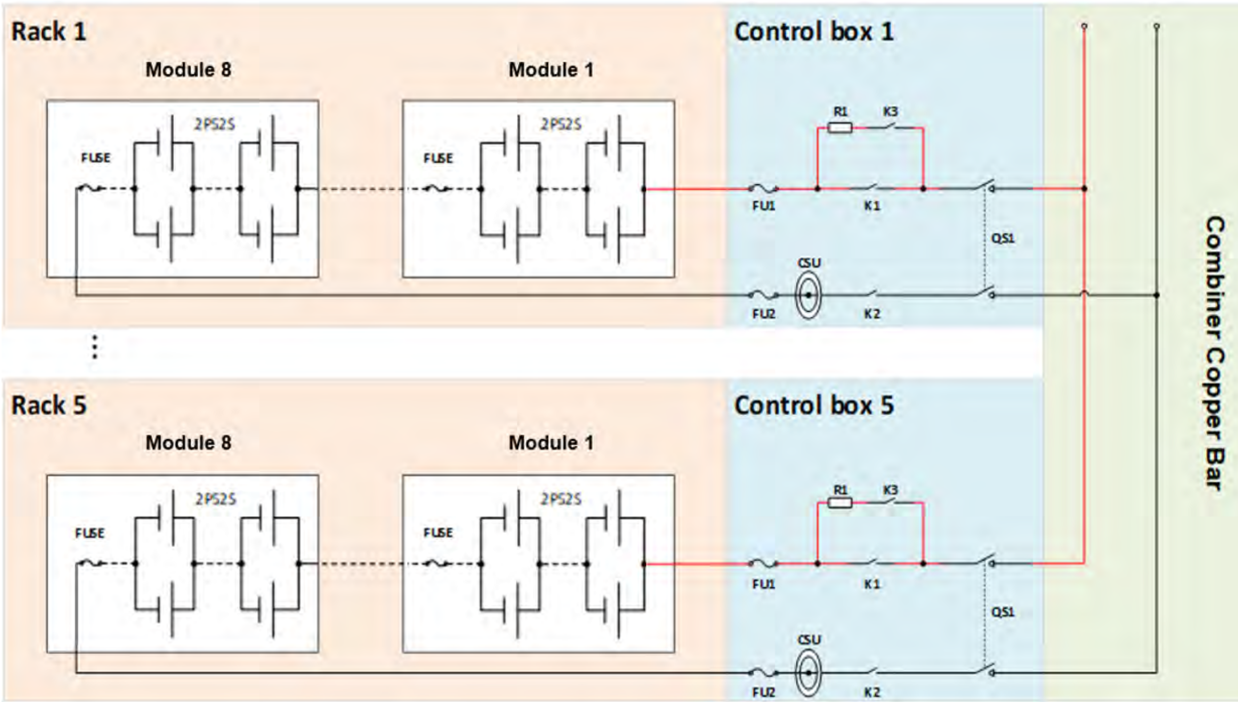


Figure 3-4 Circuit diagram of battery rack

3.1.2 Battery module overview

Total 104 (2P52S) pieces lithium iron cells (306Ah/3.2V) in series connection are used for every battery module. For safety protection, an internal high speed DC fuse is included.

Figure 3-5 battery module ---outside overview

3.1.3 Master Control Box

The MBMU, IMM, ETH, Media Conversion Module are integrated to master control box together.

3.1.3.1 Function description of Master Control Box

Table 3-2 Module function of master control box

Module	Function
MBMU	1. Controlling of system On and Off MBMU detects the condition of system power button to switch state. When receive system power on command from EMS, MBMU can turn itself on from off; When receive system power off command, MBMU can turn itself off to on. 2. Synchronize time ● MBMU synchronizes time via CAN communication. 3. CAN communication ● MBMU contains 3 channels of CAN communication such as MCAN, DCAN and ACAN： 1) MBMB communicates with SBMU, PC monitor via MCAN. 2) MBMU realizes Calibration function via DCAN. 3) MBMU communicates with PCS equipment via ACAN. 4. Environment temperature detection ● MBMU contains 2 temperature detection inputs: range - 40℃~85℃, accuracy ±3℃. 5. RS485 communication ● MBMU contains 2 channels of RS485 which support MODBUS RTU Communication protocol and can be configured with host and slave machine. 6. Address ● MBMU can address CAN and RS485. 7. System status upload ● MBMU can upload system SOC、SOH、SOP and operation status. 8. Contactor driver and auxiliary equipment power supply ● MBMU controls the rack HV relays switch on or off when receiving PCS or EMS command via SBMU.

Module	Function
	● MBMU have 12 high-side outputs, used to drive a power supply relay for external devices or to supply power directly to auxiliary devices. High-side output also has fault diagnosis function. 9. Dry contact detection ● MBMU has 10 dry contactor detections, which used for identify the working states of SPD, UPS, FSS, auxiliary power supply and so on. 10. Insulation status judgment ● MBMU can calculate and determine the current insulation state of the system based on the insulation value provided by the current IMM test board, and send it by means of communication. 11. Relay split and combine instructions ● MBMU can control SBMU to switch on and off the relay of single or all electric cabinets according to control commands from PCS and EMS. 12. Data storage ● MBMU can store operation parameters, historical alarms and other information, and the stored contents can be read and viewed by the ESS upper computer. The storage capacity of MBMU is 8K*8Kb MBMU can scroll to store 100 fault alarm messages. 13. State detection of ventilation fan ● MBMU can detect ventilation fan state detection, fan is open or closed state.
IMM	1. Insulation testing ● Support insulation detection function to measure insulation resistance between HV+ and housing, and between HV- and housing. 2. CAN communication ● It has a CAN communication function to communicate with MBMU
ETH	1. Ethernet communication: ● ETH communicates with PCS and EMS externally via RJ45 interface. Based on TCP/IP, The IP address allocation method can be configured as fixed IP or DHCP according to requirements. Modbus protocol is now supported

Module	Function
	2. Remote update: ● ETH supports to updates the BMS system from a remote client via Ethernet 3. CAN Communication: ● ETH has two CAN interfaces, which receive the status information of THE BMS system through MCAN, and receive and send PCS information through ACAN 4. RS485 Communication: ● ETH has a total of two RS485 interfaces as reservations, which can be expanded according to the actual needs of the hardware function and communicate with external attachments 5. The ETH has an Ethernet interface
Media converter	Convert Ethernet to optical signal

3.1.3.2 Interface description of Master Control Box

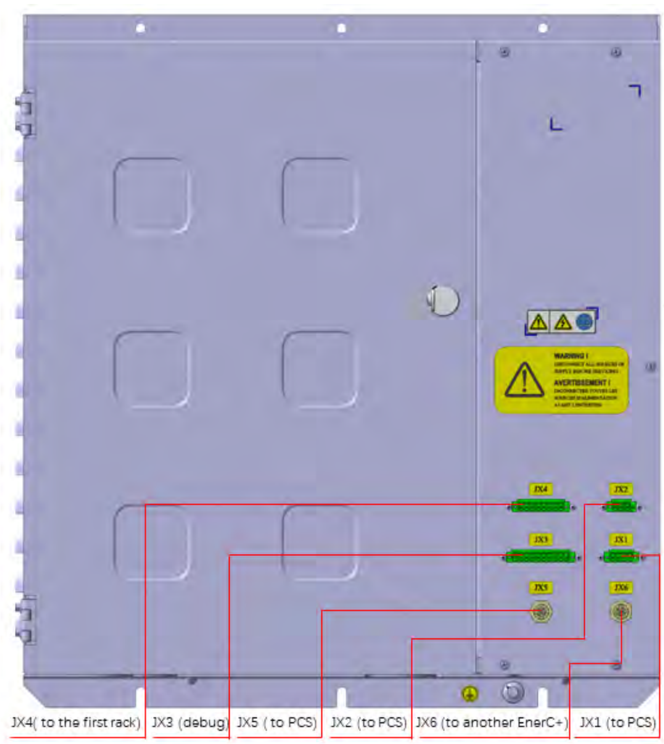


Figure 3-6 Master Control box---Outside view

- JX1: A-CAN BUS. The A-CAN BUS can be connected to PCS.
- JX2: RS485 BUS. The RS485 BUS can be connected to PCS.
- JX3: Debug. It is internal CAN BUS for debug.
- JX4: Is internal communication port.
- JX5: Emergency dry contact. Including emergency dry contact to PCS and emergency dry contact from EMS.
- JX6: M-CAN BUS. M-CAN BUS for parallel containers communication.

The definition for communication terminal JX1, JX2, JX3, JX4, JX5,JX6 see Table 3-3

Table 3-3 connector information of master control box

No.	Connector	Definition	Connector information	Remark
1	JX1-1	A-CAN-H	A-CAN Bus	Communicate with PCS through CAN port
2	JX1-2	A-CAN-L		
3	JX1-3	GND_ACAN		
4	JX1-4	Reserve		
5	JX2-1	RS485A	485 Bus	Communication with PCS through 485 port
6	JX2-2	RS485B		
7	JX2-3	GND		
8	JX3-1	D-CAN-H	Internal CAN bus for debug	Debug
9	JX3-2	D-CAN-L		
10	JX3-3	A-CAN-H		
11	JX3-4	A-CAN-L		
12	JX3-5	M-CAN-H		
13	JX3-6	M-CAN-L		
14	JX3-7…10	Reserve		
15	JX4-1	M-CAN-H	Internal communication. Installed by CATL in factory	Communication between SBMU and MBMU
16	JX4-2	M-CAN-L		
17	JX4-3	SBMU_Code_Out		
18	JX4-4…8	Reserve		
19	JX5-1	E_Stop_to_PCS+	Emergency dry contact	Emergency dry contact to PCS.
20	JX5-2	E_Stop_to_PCS-		

21	JX5-3	E_Stop_to_BMS+		Emergency dry contact to BMS
22	JX5-4	E_Stop_to_BMS-		
23	JX6-1	M-CAN-H	M-CAN bus for parallel containers communication.	M-CAN is used for parallel containers.
24	JX6-2	M-CAN-L		
25	JX6-3	MCAN_GND		
26	JX6-4	Reserve		
27	JX6-5	Canbridge_24V+		
28	JX6-6	Canbridge_24V-		
29	JX6-7&JX6-8	Reserve		

3.1.4 Sub Control box

Sub control box integrate SBMU, HV contactors, precharge circuit, high breaking capacity and high speed DC fuses, which can control battery rack by SBMU and send battery status data to SBMU via CAN bus. Total five sub control boxes are included in one container, which panel diagram is show in Figure 3-7.

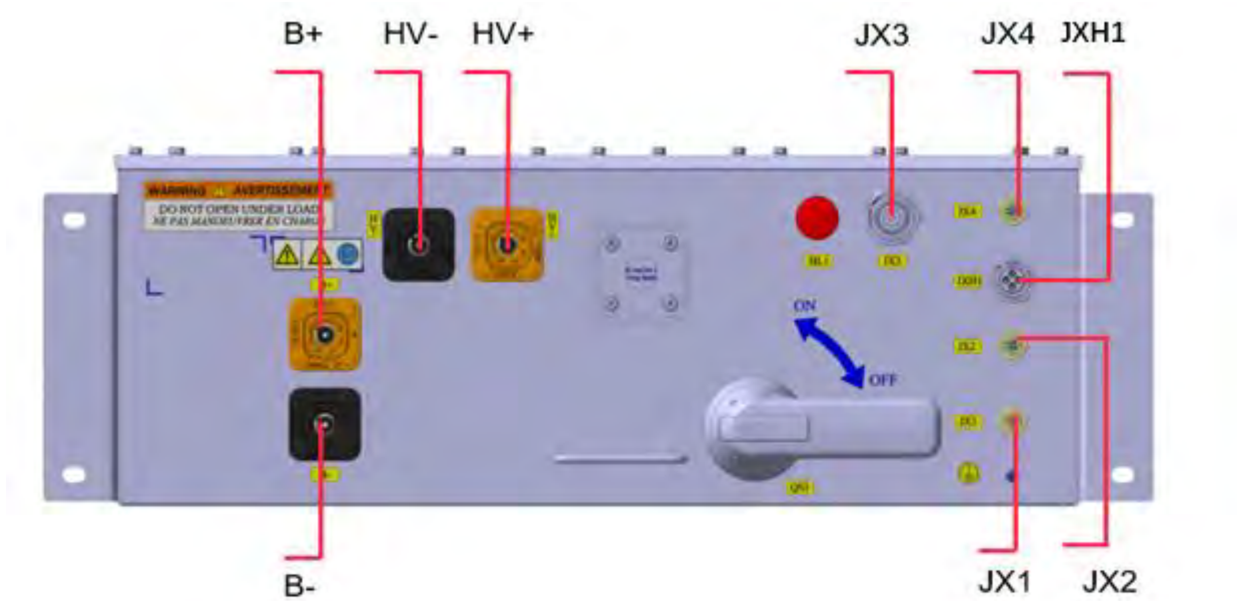


Figure 3-7 Sub Control box

Table 3-4 connector information of Sub control box

No.	Connector	Definition	Connector information	Remark
1	JX1-1	M-CAN-H_OUT	Plug receptacle：PT07A-8-4PX(E)(005) Plug：PT06E-8-4SX(005) Manufacturer: Amphenol	Connect to the next sub control box
2	JX1-2	M-CAN-L_OUT		
3	JX1-3	SBMU _Code _OUT		
4	JX1-4	Reserve		
5	JX2-1	M-CAN-H_IN	Plug receptacle: PT07A-8-4PW(E)(005)	Connect to the previous

6	JX2-2	M-CAN-L_IN	Plug:PT06E-8-4SW(005) Manufacturer: Amphenol	sub control box
7	JX2-3	SBMU _Code _IN		
8	JX2-4	Reserve		
9	JX3	C-CAN	Plug receptacle: PT07A-18-32P(E)(005) Plug: PT06E-18-32S(005) Manufacturer: Amphenol	The physical connection of the 8 electric boxes in the electric cabinet
10	JX4-1	M-CAN-H	Plug receptacle: PT07A-8-4P(E)(005) Plug: PT06E-8-4S(005) Manufacturer: Amphenol	Debug for commissioning
11	JX4-2	M-CAN-L		
12	JX4-3	C-CAN-H		
13	JX4-4	C-CAN-L		
14	JXH1-1	C_Box_24V+_OUT	Plug receptacle：PT07A-14-AAS(RDS)(E)(005) Plug：PT06E-14-AAP(005) Manufacturer: Amphenol	Auxiliary power supply for the next sub control box
15	JXH1-2	C_Box_24V-_OUT		
16	JXH1-3	C_Box_24V+_IN		Auxiliary power supply for the previous sub control box
17	JXH1-4	C_Box_24V-_IN		
18	HV+	Positive output	Plug receptacle：REA4-ZDOD2-A Plug：REA4-WTDO-95-A Manufacturer: Recodeal	Connect to high voltage
19	HV-	Negative output	Plug receptacle：REA4-ZABD2-A Plug：REA4-WTAB-95-A Manufacturer: Recodeal	

Table 3-5 information of switch

No.	Switch	Name of switch	Function
1	QS1	Isolation switch	To switch on and off the output of battery system. (Cannot operate under load)

3.1.5 FSS system overview

As an outdoor non-walk-in battery energy storage system, EnerC + provides a perfect set of fire suppression system solutions with detection, explosion control and fire extinguishing functions. The fire extinguishing control strategy is divided into four levels:

- The first level：alarm warning;
- The second level: Smoke exhaust ventilation system to prevent deflagration;
- Third-level aerosol is released to extinguish the initial fire; (If the customer selects aerosol configuration.)
- The fourth level: water spraying to control the spread of fire.

The fire suppression system is divided into three parts: detection system, exhaust ventilation system. The main components is list as following.

Table 3-6 main components of FSS system

NO.	Category	Product name	Quantity	Configuration	Remark

1	Detection and alarm system	Fire control panel	1	Standard	Receive detector signals and control fire extinguishing system and smoke exhaust ventilation system, in the electrical compartment
2		Hydrogen detector	2	Standard	Detection of hydrogen, in the battery compartment
3		Heat detector	2	Standard	Detection of temperature, in the battery compartment
4		Smoke detector	3	Standard	Detection of smoke particles, two in the battery compartment, and one in the electrical compartment
5		Stop Push button	1	Standard	In the electrical compartment
6		Horn & Strobe	1	Standard	On the electrical compartment door
7	ventilation Fan	ventilation fan	1	Standard	Adjacent thermal management system
8		Inlet and exhaust louver	1	Standard	On the battery compartment door
9		ventilation Fan manual button	1	Standard	On the electrical compartment door
10	Aerosol fire suppression system	Aerosol	7	Optional	In the battery compartment
11		Emergency pull box	1	Standard	On the electrical compartment door
12	Dry pipe system	Nozzle	10	Optional	In the battery compartment
13		Flanged interface	1		Adjacent thermal management system

The information of the interactive interface of FSS is shown in the following Figure 3-8.

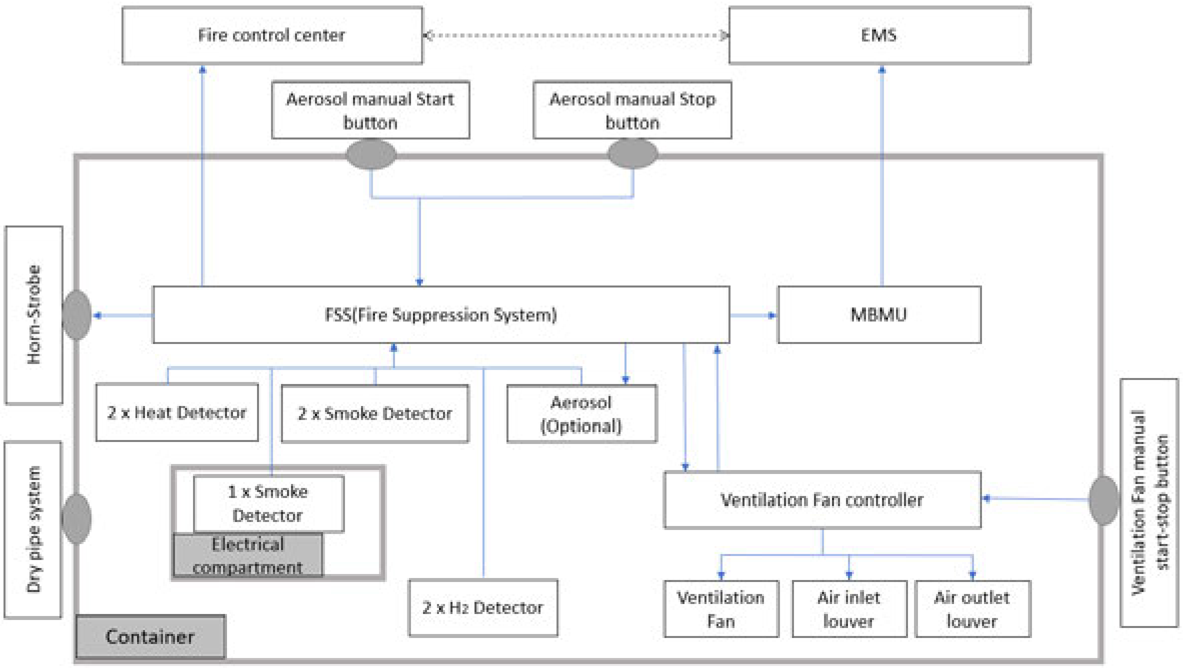


Figure 3-8 The interactive interface of FSS

The detection system has three types of detectors, the number and installation position of which are shown in Table 3-6 and Figure 3-9. All detection signals are received and processed by the fire control panel, and the hydrogen detector can be linked with the exhaust ventilation system .

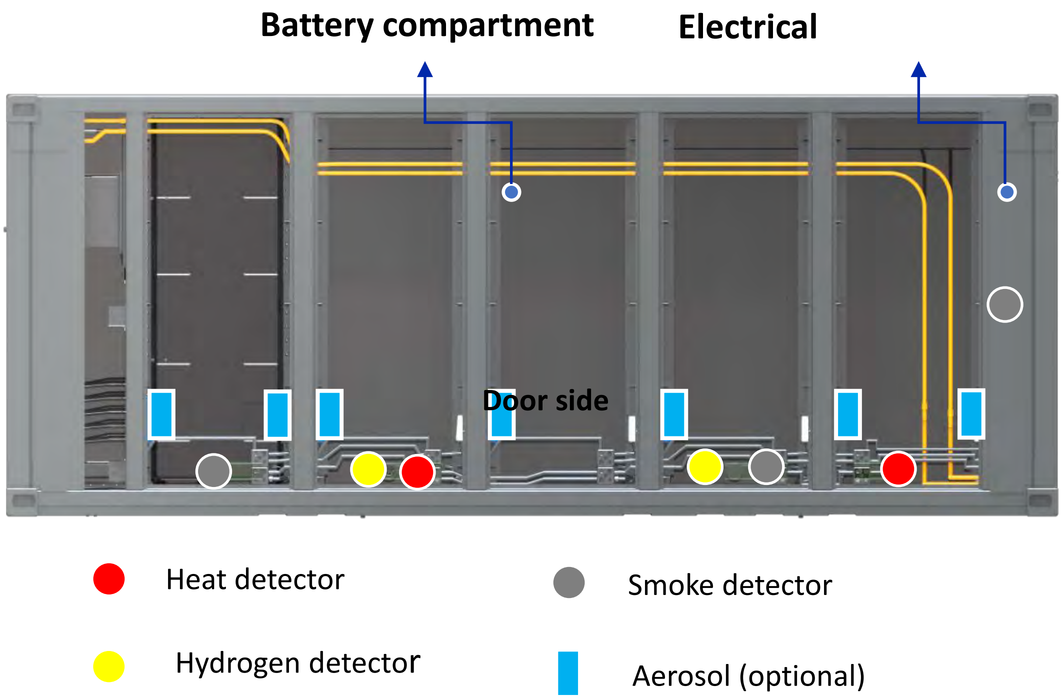


Figure 3-9 Type and location of detectors（Top view）

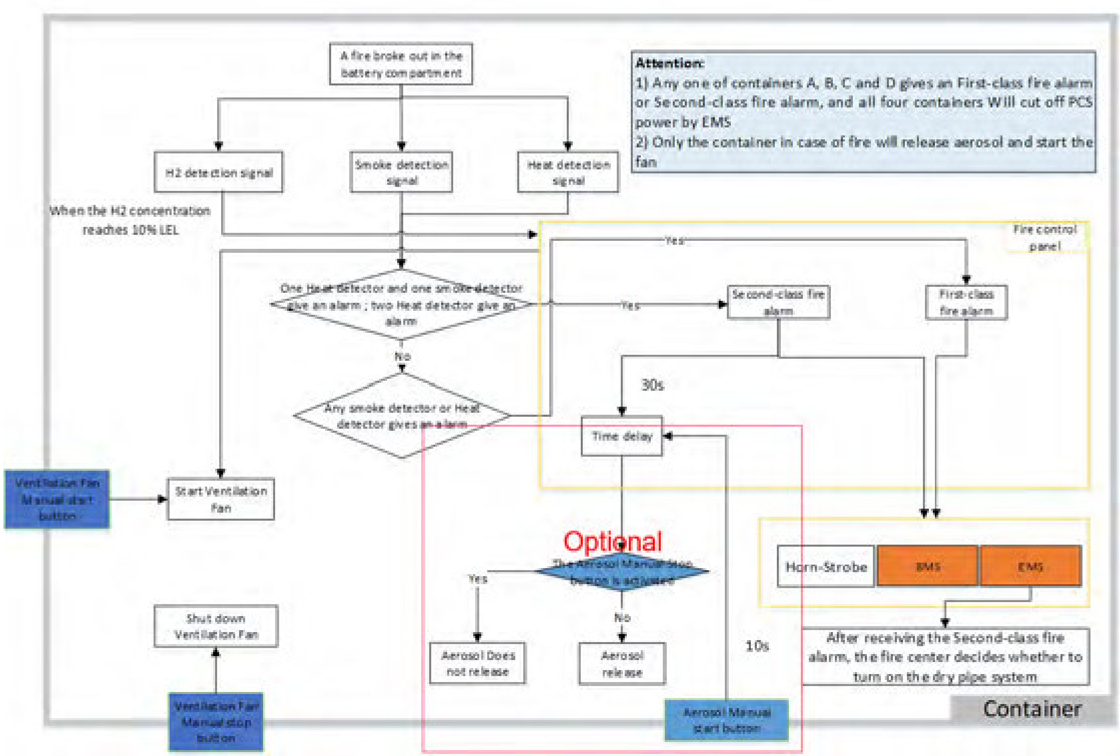


Figure 3-10 FSS control logic overview

3.1.5.1 Smoke exhaust ventilation system

Using Smoke exhaust ventilation system to meet NFPA69 standard. As shown in Figure 3-11.

Figure 3-11 The design of Ventilation Fan

The air inlet electric louver receives the alarm signal sent by the hydrogen detector and opens the electric louver. When the combustible gas concentration falls within the threshold, the air inlet electric louver is automatically closed after receiving the signal. The parameters of the Louver are shown in Table 3-7.

Table 3-7 The paraments of the Inlet

Item	Specification
Rated power	60W
Supply voltage	24V DC

The exhaust receives the alarm signal from the FCP after FCP received the alarm signal sent by H2 detectors, then turns on the explosion-proof fan and discharges the combustible gas in the battery compartment. When the concentration of combustible gas falls within the threshold, the explosion-proof exhaust fan will be automatically turned off after receiving the signal. The parameters of the exhaust port are shown in Table 3-8.

Table 3-8 The paraments of the exhaust port

Item	Specification

Supply voltage	230V AC
Maximum air volume	820CFM

3.1.5.2 Fire extinguishing system

1) Aerosol fire extinguishing system（Optional）

When an initial fire occurs in the battery compartment, a fire alarm signal will occur, and the fire extinguishing system will automatically control the release of aerosol, which can also be triggered manually. The fixed position of aerosol is shown in Figure 3-9.

2) Dry pipe system（Optional）

The dry pipe system can effectively control the spread of fire. As shown in Figure 3-12.

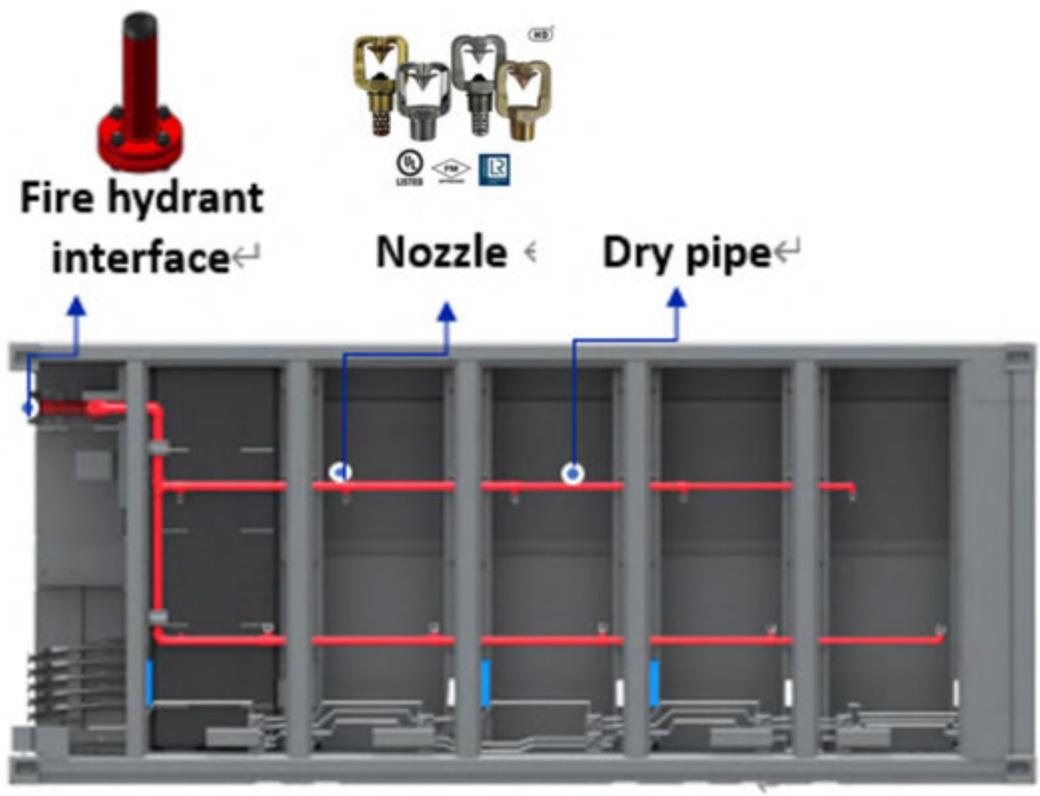


Figure 3-12 The design of dry pipe

The flange is installed at the entrance of the water fire protection system, for the connection between the pipes. The parameters of the flange are shown in Table 3-9.

Table 3-9 The paraments of the flange

Item	**Specification**

Model	DN65
Standard	EN1092-1
Material	ASTM A105
Class	PN 16
Flange type	Slip-on welding Blind
Certificate	PED 4.3 for material

The HD Medium Velocity Water Spray Nozzles are open type (non-automatic) nozzles with rubber plug, designed for directional spray application in fixed fire protection system. The parameters of the nozzle are shown in Table 3-12.

Table 3-10 The paraments of the nozzle

Item	**Specification**
Model	MV-A Brass Material
Type	MV-A
Maximum working pressure	12bar（175 psi）
End connection	NPT 1/2 ''

3.1.5.3 Instruction of UPS for FSS system

In order to keep the FSS system be working normally at least 24 hours standby and 2 hours alarm without external auxiliary power supply, an internal UPS has been included in FSS control panel, and two DC 12V battery have been connected in series. For safety prevent, the battery connection must be disconnected during transportation process.

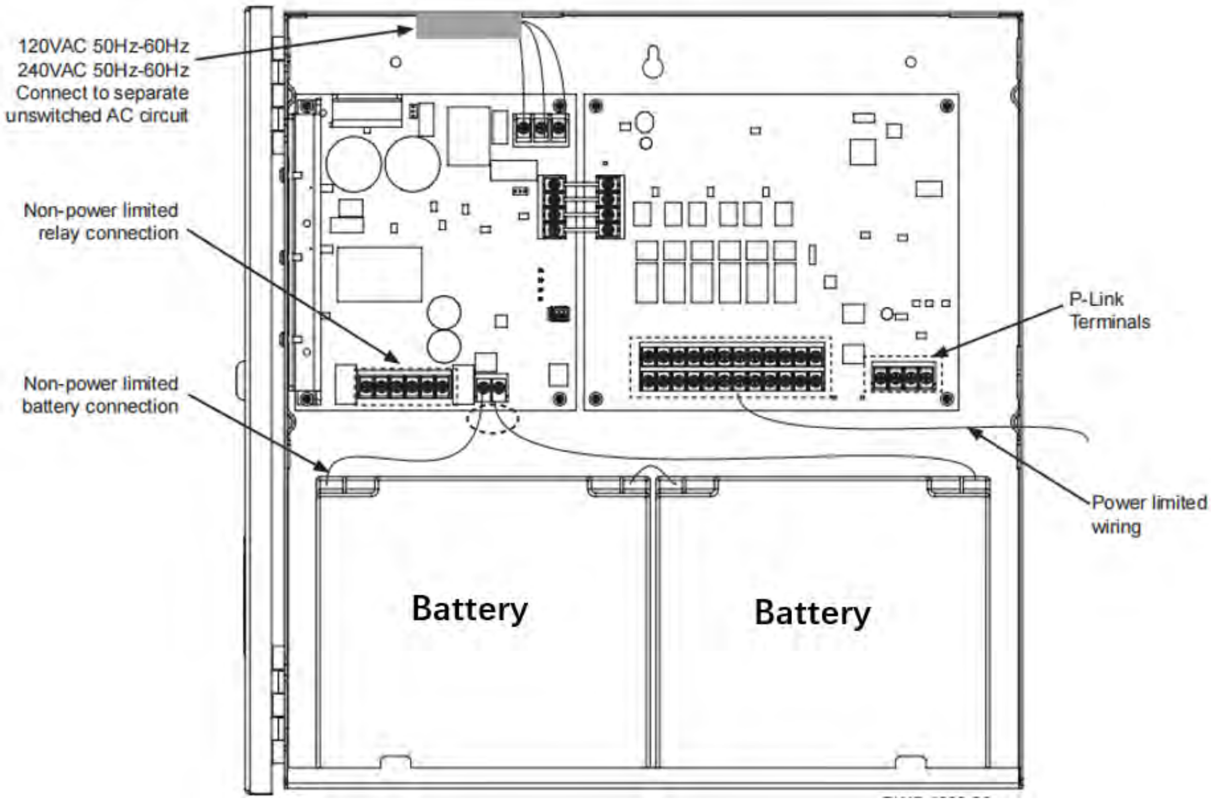


Figure 3-13 The UPS for Fire Control Panel

	CAUTION
⚠	Note that over discharge risk of UPS battery for FSS system operating if long period without auxiliary power. If lost AC auxiliary power 24 hours above, please energize in external backup power to continually enable FSS system , or disconnect the battery connection to stop FSS system operating for prevent over discharge.

3.1.6 TMS system overview

The TMS system is liquid cooling, which main function is to maintain the temperature of the battery system to an allowable operating temperature range. Following is the coolant pipe layout.

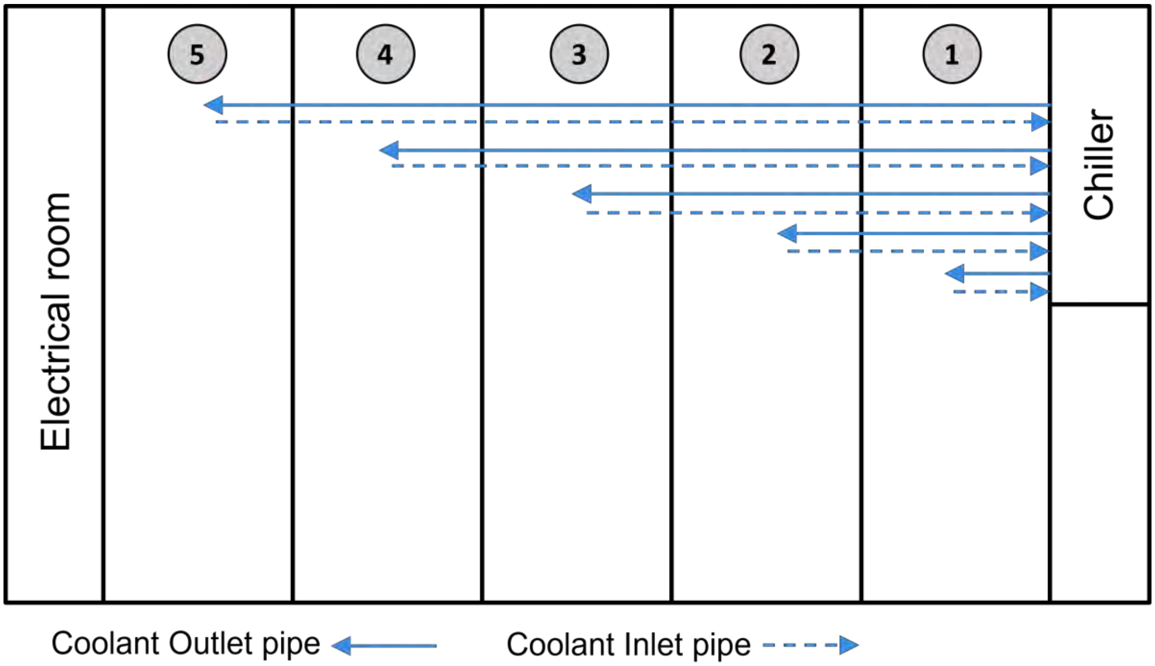


Figure 3-14 Pipe layout of TMS system（Top view）

Table 3-11 Main feature of TMS system

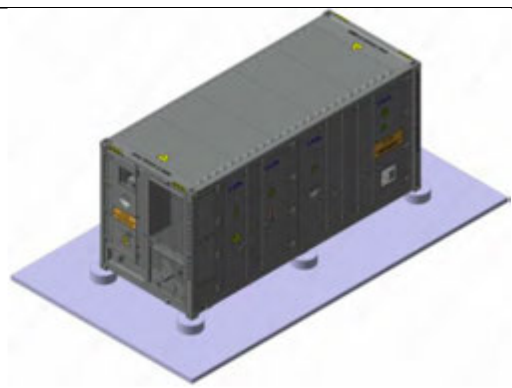
	✓ Coolant: 50% Ethylene glycol+50% DI water ✓ Max. ambient temperature: 55 °C ✓ Power supply: 3AC 380…480V (external) ✓ 40kW Cooling power for 0.5P System ✓ One cooling unit is included for one Container ✓ Cooling power is auto-adjustable according to ambient temperature & discharge/charge status ✓ TMS system components' working status is depend on the target battery cell temperature controlling by BMS. Total there are four operating status for TMS, which can be read by the bit0- bit 1 via register address 0 x 0060

Table 3-12 Status of TMS components

Status	**Cooling** (bit 0 = 0, bit 1=1)	**Heating** (bit 0 = 1, bit 1=0)	**Self-circulation** (bit 0 = 1, bit 1=1)	**Sleeping** (bit 0 = 0, bit 1=0)
Compressor	Run	Stop	Stop	Stop
Pump	Run	Run	Run	Stop

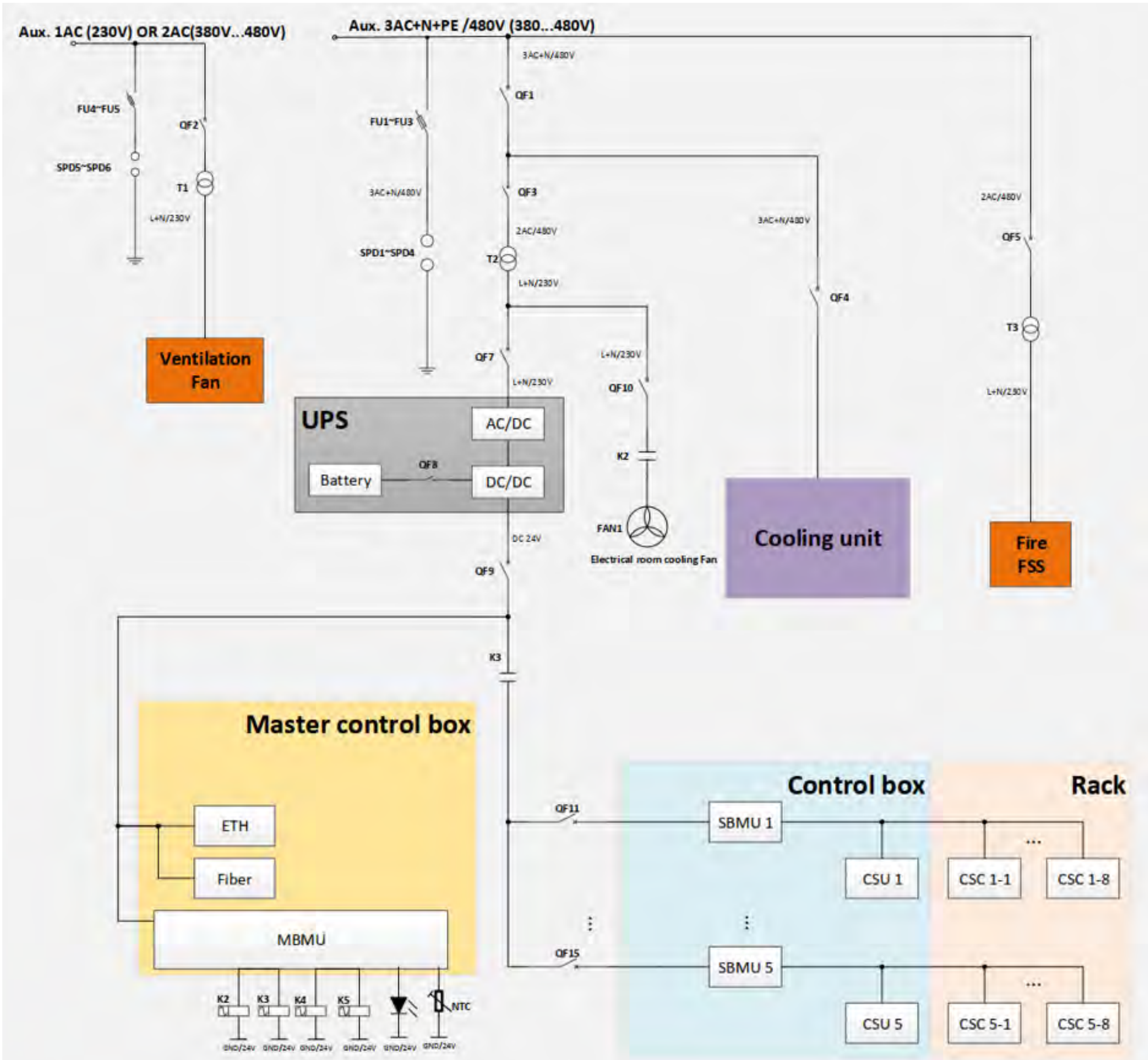
Fan	Run	Stop	Stop	Stop
PTC Heater	Stop	Run	Stop	Stop

Table 3-13 Power Consumption of TMS system

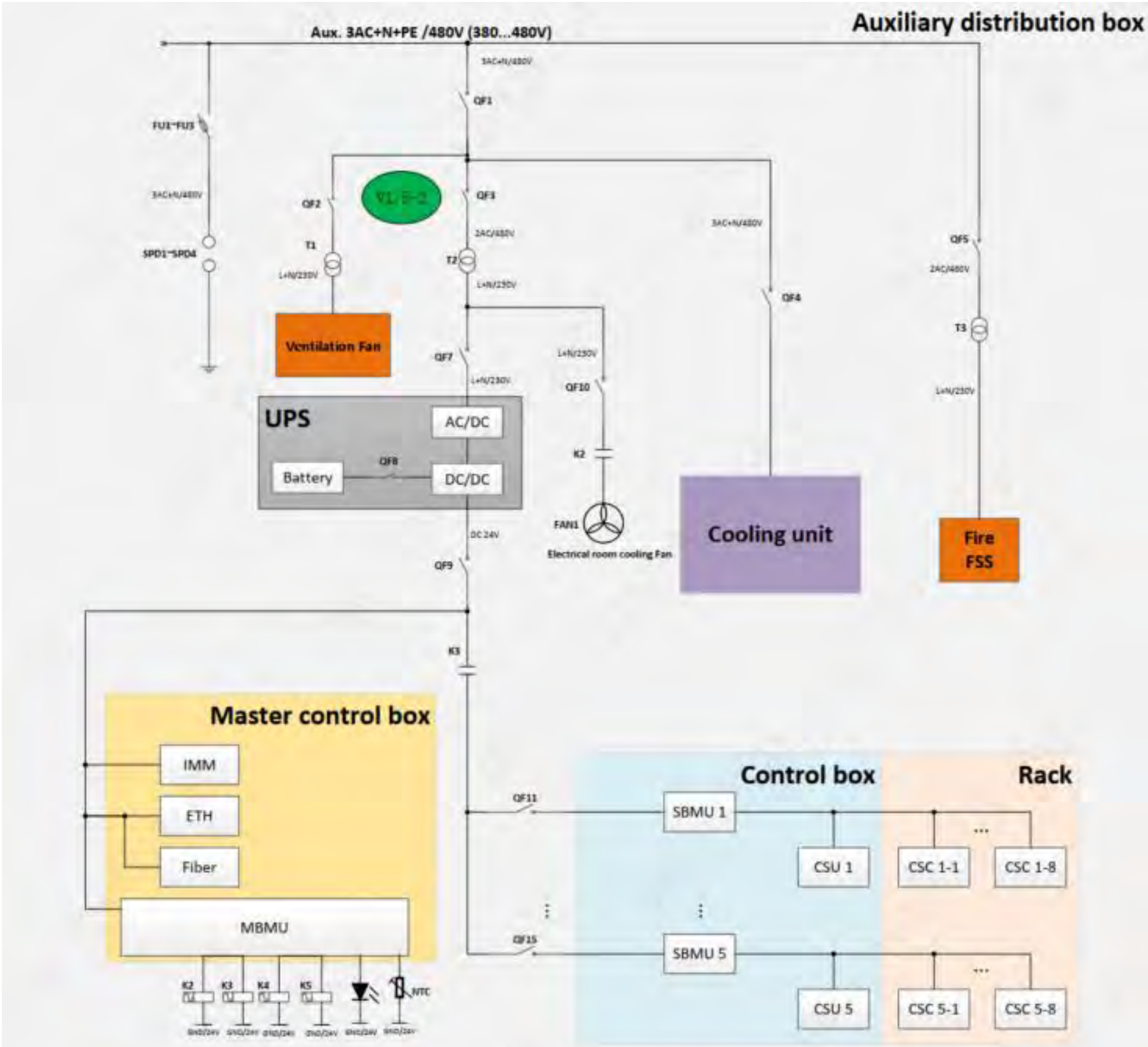
Type of EnerC+	**0.5 P System**
Quantity of Cooling unit	1
Refrigerating Capacity	1 x 40 kW
Maximum Heating Power	17.6 kW
Maximum Cooling Power	27.5 kW
Maximum Cooling current	50.3A
Maximum Heating current	31A
EER	⩾2.76 (18℃ TMS liquid , @35℃ ambient)

3.1.7 Auxiliary distribution box overview

The Auxiliary distribution box is for providing the auxiliary power for whole control system and liquid cooling system.


Aux. 1AC (230V) OR 2AC(380V...480V)
Aux. 3AC+N+PE /480V (380...480V)
FU4~FU5
QF2
SPD5~SPD6
T1
L+N/230V
Ventilation Fan
FU1~FU3
3AC+N/480V
SPD1~SPD4
QF1
QF3
2AC/480V
T2
L+N/230V
QF7
UPS
AC/DC
Battery
QF8
DC/DC
DC 24V
QF9
QF10
K2
FAN1
Electrical room cooling Fan
QF4
Cooling unit
2AC/480V
QF5
T3
Fire FSS
K3
Master control box
ETH
Fiber
MBMU
K4
K5
NTC
Control box
Rack
QF11
SBMU 1
CSU 1
CSC 1-1
CSC 1-8
QF15
SBMU 5
CSU 5
CSC 5-1
CSC 5-8

Option 1



Option 2

Figure 3-15 Single line graph for auxiliary distribution box（Top view）

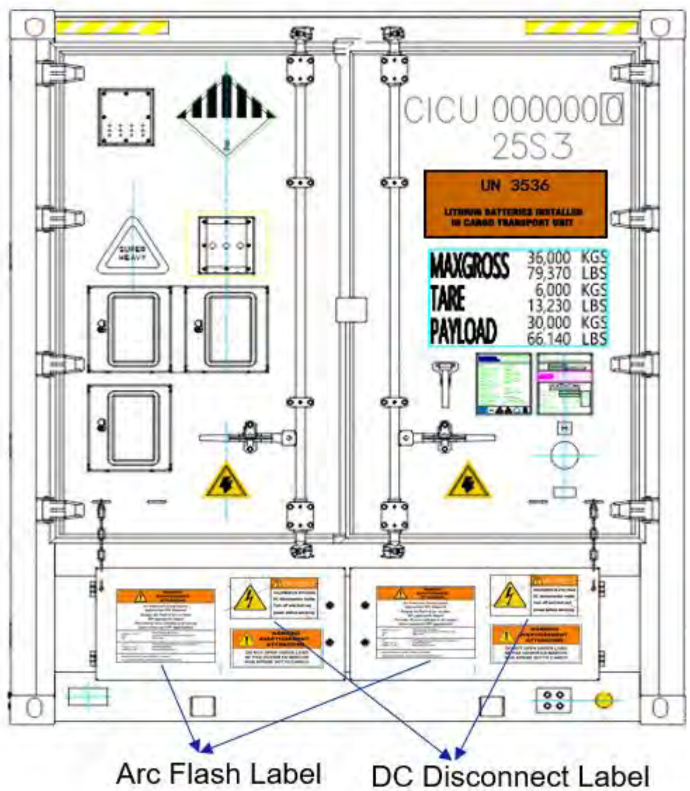
Table 3-14 main feature of distribution box

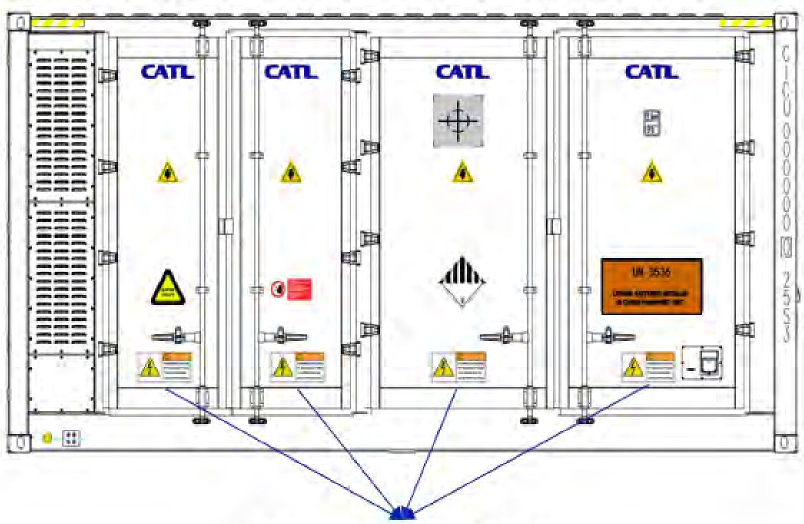
✓ Auxiliary power supply input :z Case 1: 3AC + N+PE 480V(380…480V)±10%, 50/60Hz & 1AC230V(L+N) or 2AC 480V(380…480V)+PE 50/60Hz ; Case 2: 3AC + N+PE 480V(380…480V)±10%. ✓ Include DC24V power supply output & DC24V UPS for BMS system，

- ✓ Include 230V power supply output for Explosion-proof fan,
- ✓ Include 380V power supply output for Chiller system ,
- ✓ Include E-stop circuit,
- ✓ Include circuit protection and power supply on-off control circuit,
- ✓ Include Type II SPD for AC Power supply.

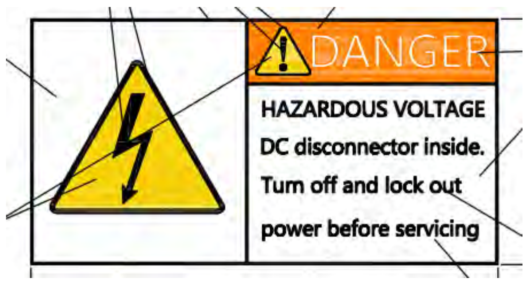
3.1.8 Label introduction

Arch flash label and DC disconnect label shown:





DC Disconnect Label



3.2 Product Specification

EnerC+ liquid-cooled energy storage container				
Product model		**C02306P05L01**		
Product Type		**LFP battery bank**		
NO.	**Item**		**Specification**	**Remark**
1	Configuration		5P2P416S	
2	Rated Energy		4073.472kWh	
3	Rated Voltage		1331.2VDC	
4	Voltage Range		1040~1500VDC	
0.5 P System				
5	Charging Current (0.5 P)	Rated	1530A	
		Maximum	1958.4A/1 minute	
6	Charging Power (0.5P)	Rated	2036.73kW	
7		Rated	1530A	

	Discharging Current (0.5P)	Maximum	1958.4A/1 minute	
8	Discharging Power (0.5P)	Rated	2036.73kW	
9	Auxiliary power supply (0.5P)	Voltage range	Case1:3AC 480V(380…480V)±10%, 50/60Hz 1AC 230(L+N) or 2AC+PE 480(380…480V) ±10% , 50Hz/60Hz Case2: 3AC+N+PE 480V (380…480V) （Optional）	
		Power	Max. 37.5kW	
10	Operating Ambient Temperature	Charge	-25 ℃…+55℃	
		Discharge	-25 ℃…+55 ℃	
11	Environment condition	Storage Temperature	-30 ℃…+60℃	
		Application altitude	≤2000m (No derating)	
12	General Parameters	Size	2896mm(H)*2438mm(W)*6058mm(D)	
		Weight	~36.0t (Metric Ton)	
		IP Level	IP55（Battery Room）	
			IPX5（Electrical Room）	
			IPX5（Cooling unit）	
		Cooling mode	Liquid Cooling	
		Communication agreement	CAN, RS485, TCP/IP	
		Power connection	Cable lug: 8 x M12	
		Communication connection	Fast plug	
		Aux Power connection	Terminal	
		Coolant	50% Ethylene glycol+50% DI water	
13	Fulfill standard	Cell	UN38.3	
			UL1973	
			IEC62619	
			UL9540A	
		Container	UL1973	
			NFPA855	
			UL9540A	
			UL9540	

			IEC 62477	
			IEC 62619	
			IEC 62933-5-2	
			IEC 63056	
			IEC 61000-6-2/ IEC 61000-6-4	

3.3 BMS introduction

3.3.1 BMS system overview

BMS is used in conjunction with the ESS energy storage system, which can monitor the battery voltage, current, temperature, managing energy absorption and release, thermal management, low voltage power supply, high voltage security monitoring, fault diagnosis and management, external communication with PCS and EMS, ensure the stable operation of the energy storage system.

The BMS system is composed of 1 unit of MBMU, 1unit of IMM, 1 unit of ETH, 5 units of SBMUs, 40 units of CSCs.

	CAUTION
	Note that over discharge risk of UPS battery operating if long period without auxiliary power. please recharge the UPS within one week after the auxiliary power supply is cut off. For long-term storage, please recharge the UPS battery every three months.

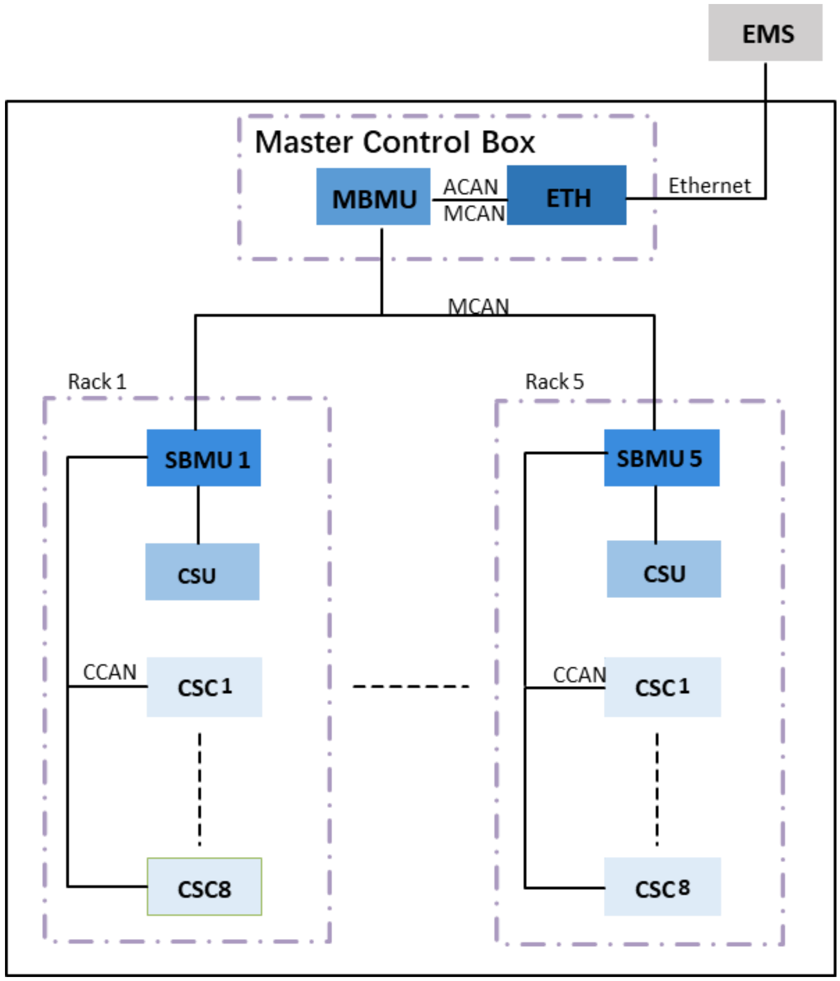


Figure 3-16 Three-level BMS architecture

3.3.2 BMS Power-on and Power-off

BMS has no on/off button. Turn on the power supply of BMS, then BMS will be turned on and run normally; Turn off the power supply to BMS, then BMS will shut down.

3.3.3 Battery Status Monitoring

1. BMS monitors the battery's parameters, including cell voltage, module temperature, battery current and total battery voltage.
2. BMS detects the battery status such as State of Charge (SOC) accurate to within 5%, SOH and the calculation of SOP.
3. BMS functions as a safety management system in such cases as under voltage, over discharge, overvoltage, over-temperature, and overcurrent of the battery. In case of failure, the system will give an alarm to the supervisory equipment, limit the charge and discharge current or

power, and delay the disconnection of all HV relays. This can protect the battery while safeguarding the power systems security.

4. BMS shall provide battery information (incl. data recording and fault information recording) to EMS.

3.3.4 Charging/Discharging Management

1. BMS controls and monitors HV relays, including the contactor's low voltage coils and high-voltage contact (auxiliary contact).
2. BMS has pre-charge control within the parallel connection among racks.
3. BMS works in the management of charge and discharge. It will calculate the charge and discharge power limit according to the existing status of the battery (temperature, SOC) and actual performance of electrical components and then report to EMS which has the function of controlling to these limits;
4. BMS has the function of balance Management to extend the operability of the battery system.

3.3.5 Thermal management

1. BMS has the function of sample collecting of battery cell temperature and chiller operating status.
2. BMS controls the liquid cooled TMS system based on battery cell & coolant’s temperature.

3.3.6 Program Refreshing

BMS can flash programs on site, which supports the flashing of MBMU, SBMU, IMM, CSC and ETH by using the host computer through MCAN.

3.3.7 High Voltage Safety monitoring

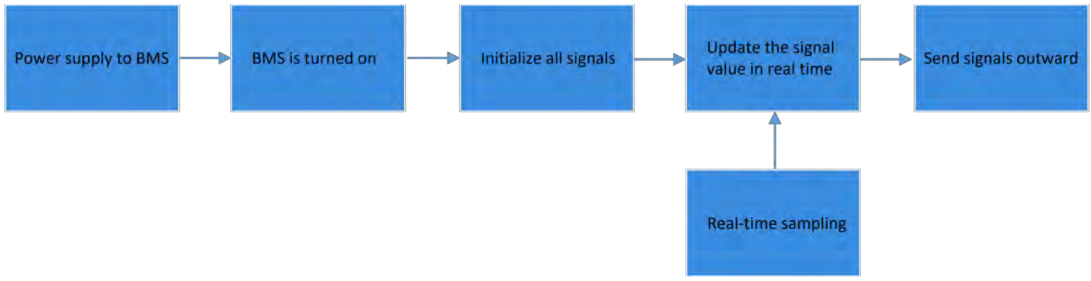
1. BMS has the function of high voltage sampling (collecting data of the main positive voltage)
2. BMS supports the detection of the dry contact of Fuse and switch, as well as the auxiliary contact of the primary loop relay.

3.3.8 Fault Diagnosis Management

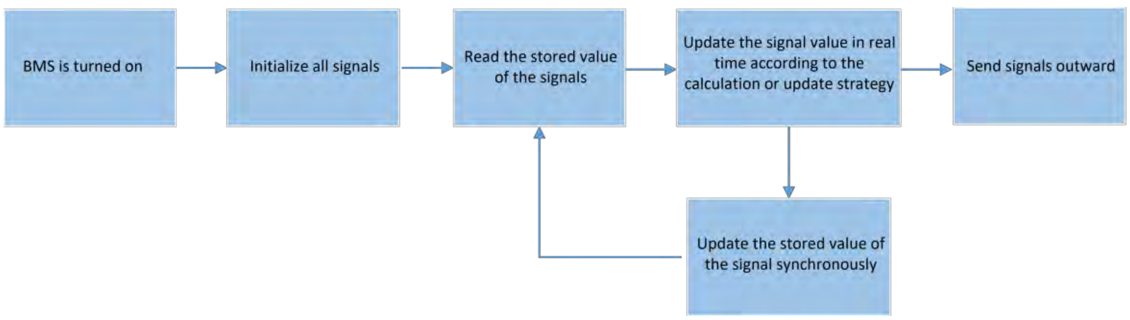
1. BMS stores information such as operational parameters and historical alarms that can be viewed by ESS monitoring tool.
2. BMS enables storage of latest historical alarms.

3.3.9 BMS data recovery function after abnormal power down

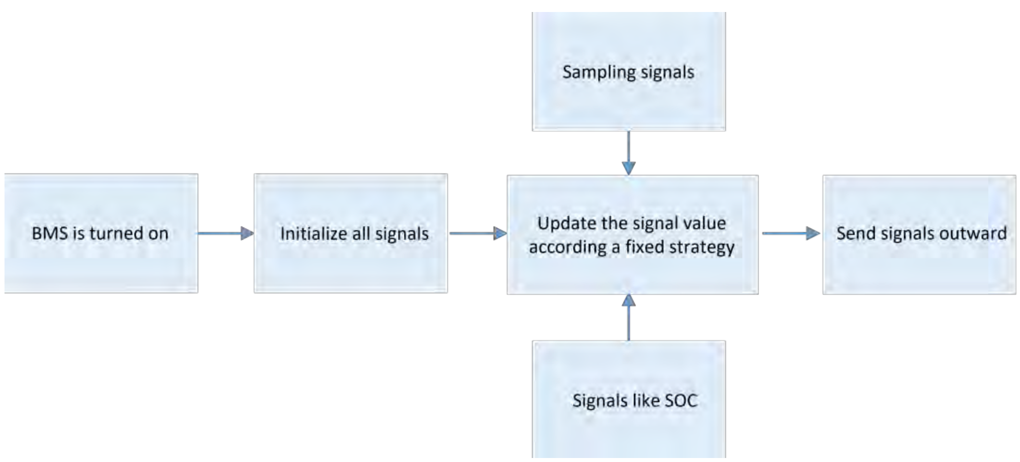
1) Real-time sampling signals, such as voltage, temperature, current, etc., will be initialized first after BMS is turned on. Then the signal value will be updated in real time with the sampling values.



2) Signals that need to be stored, such as SOC, SOH, SOE, etc., will also be initialized when the BMS is turned on. These signals then read the stored value of BMS once. After that, these data will be updated in real time according to their update strategies, and their corresponding stored values will be updated synchronously.



3) Other types of signals are updated by the above two types of signals according to certain logical processing.



3.3.10 BMS system for two container parallel application

If two containers connect with PCS at same DC public connection point, then these two container must adopt following communication architecture.

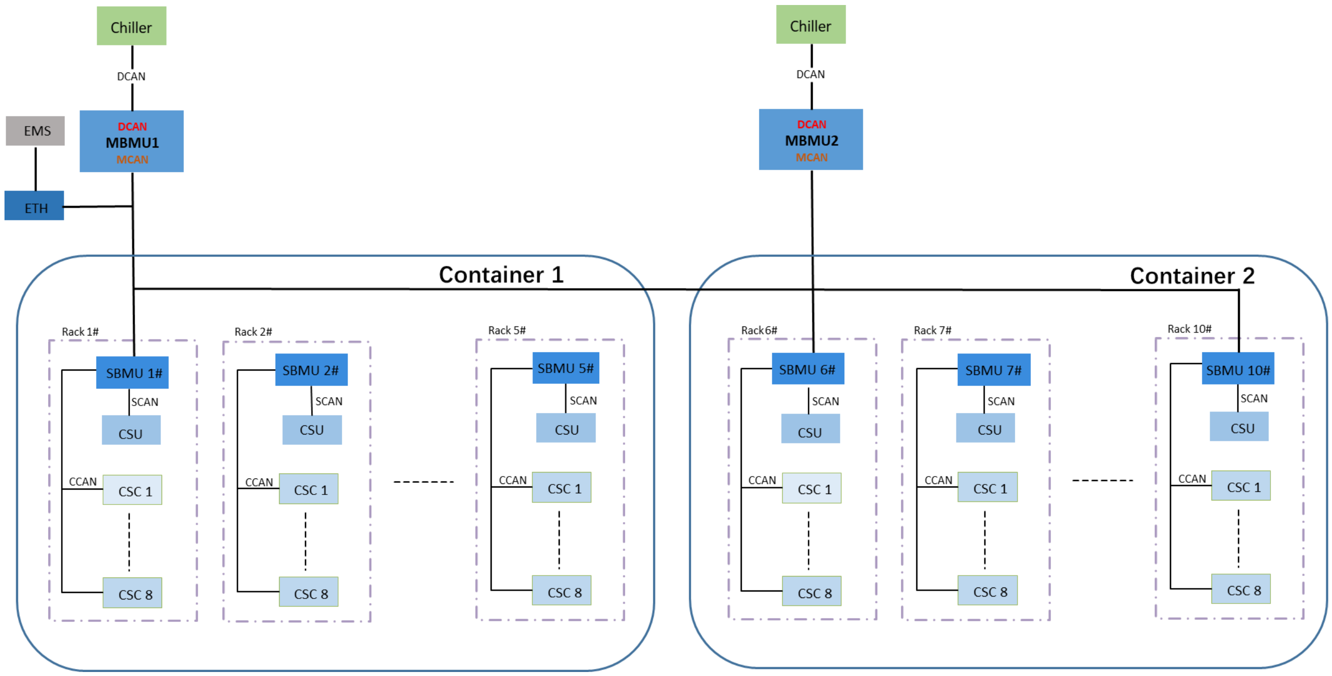


Figure 3-17 Communication circuit for two container parallel application

4 Transportation and Storage

4.1 Transportation process and requirements

Methods of transportation: sea cargo and land carriage.

During loading and unloading, it should be handled with care to prevent throwing, rolling, and heavy pressure; during the transportation, external mechanical impact should be avoided.

- ➢ Battery container transportation requirement for land carriage
  1) Transport scheme for bulky cargo must be evaluated in advance;
  2) The high-speed driving speed of the vehicle (truck) shall not exceed 100 km / hour & domestic legal requirement;
  3) During the driving process, it is forbidden to make sudden braking and sharp turns;
  4) Keep the vehicle in good condition, check the vehicle's carrying status frequently, find and solve the problems in a timely manner;
- ➢ Battery container transportation requirement for sea cargo

  Keep the vehicle in good condition, check the vehicle's carrying status frequently, find and solve the problems in a timely manner.

Requirements for Battery Container Transport

Based on battery features and with the purpose of maximizing the battery performance, the transport and storage of battery container should meet the following requirements:

- Allowable transport temperature: -30~+60℃
- Humidity: ≤95% (no condensation).
- Take appropriate protection measures to keep SOC level at about 30% and ensure that no short circuit happens, or no liquid is allowed into the battery container or soaked in liquids (e.g. water, oil, etc.).

4.2 Hoisting & lifting equipment

Equipment requirement

1) According to the site conditions and mechanical equipment, the selection of good performance of lifting equipment, rigging, shackle calculation selection; Ensure that the crane and rope meet the load-bearing requirements.
2) All kinds of sling, including sling, shackle, etc. should be checked in good condition before entering the site; before formal lifting, it should be reconfirmed that the specifications and quality meet the requirements of this lifting.
3) The lifting point is located at the top of the four terminal corners of the container.
4) When installing or removing a hoisting device, do not drag the container. Otherwise, the container may be damaged.

4.2.1 Container hoisting parameters of single point crane

Table 4-1 single point lifting

Preloaded weight	Cable Length	Cable quantity	Acceleration
< 36.0t(Metric Ton)	＞ 6.3m	4	≤0.5g

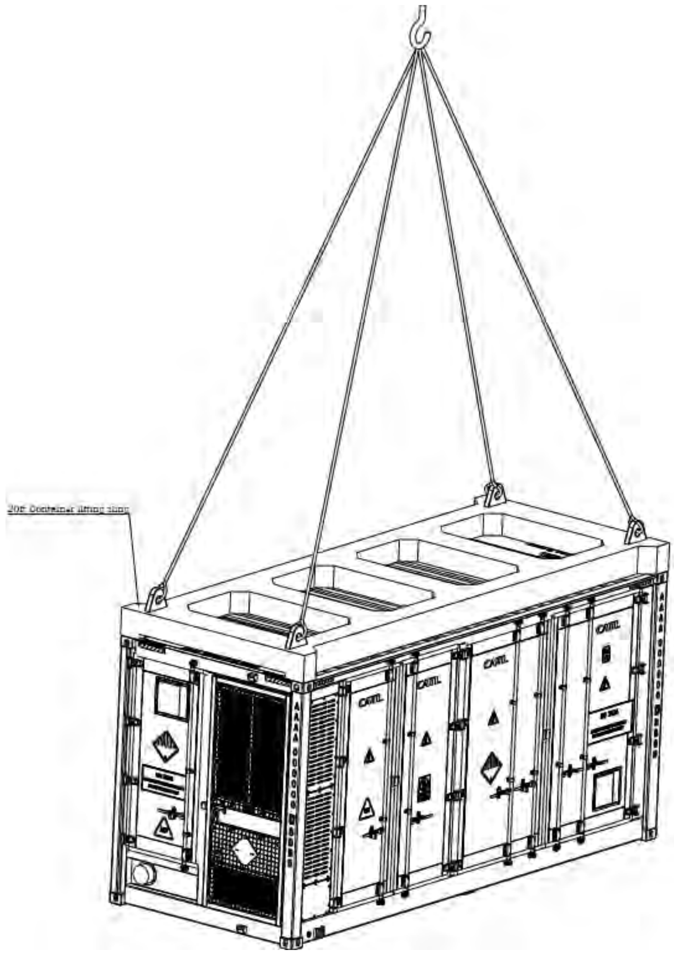


Figure 4-1 Single point lifting

Note：Lifting equipment is provided by customer

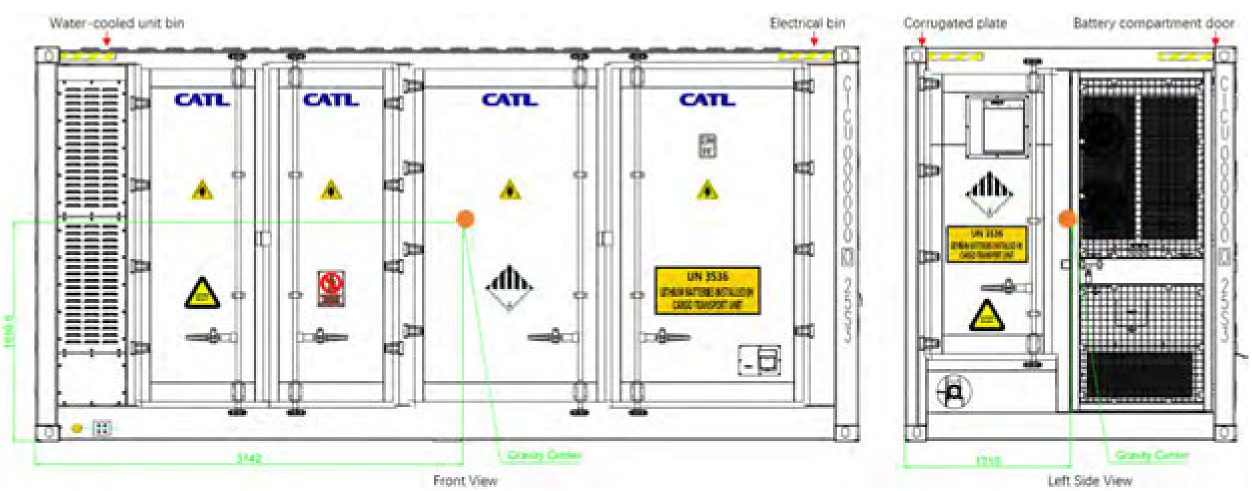


Figure 4-2 Gravity center of the battery container

4.2.2 Container hoisting parameters of four points vertical crane

	CAUTION
	The gravity center of the battery container must be kept stable during lifting process.

Figure 4-3 Top lifting by four points vertical crane

4.2.3 Precautions for hoisting

Hoisting process	Precaution
Before lifting	The lifting capacity and working radius of the crane meet the requirements. If the onsite working conditions do not meet the requirements, seek professional evaluation.
	For outdoor use, you are advised to lift containers when the weather is clear and there is no wind & rain.
	Ensure that the crane and steel cable meet the requirements before hoisting.
	The doors of the container are all closed and locked.
	Ensure the cable connection is safe and reliable.

During lifting	It is strictly forbidden for irrelevant personnel to enter the lifting area, and it is strictly prohibited to stand under the lifting arm.
	Ensure that the crane is in a proper position, not long distance hoisting.
	Keep the container steady, and the diagonal inclination of the container is less than or equal to 5°.
	Hoisting gently, the box body should be slow and steady when falling, to avoid impact on internal equipment.
	When the container is in contact with the base, remove the steel hoisting cable after the base is evenly stressed.
	Containers can be hoisted only after they are secured.

4.2.4 Risk identification for hoisting

	WARNING
	To prevent personal injury or equipment damage, the risk identification must be done before hoisting

1) The crane in the operation of the human body caused by extrusion or impact;
2) The crane hook overloading fracture, lifting when the sling slip out of the hook;
3) Heavy objects fall in the lifting cause striking, heavy objects fall from the air to the ground and rebound wounding;
4) Accidental contact of spreader or sling with conductive slip line;
5) Truck crane working site ground is not smooth, support unstable, weight imbalance, heavy weight exceeds the rated lifting weight caused by crane overturning;
6) Excessive wind, illegal operation caused the crane overturned;
7) People standing under the boom and other dangerous areas;
8) A person standing or sitting on a hook;
9) When lifting, there is no command, there are people staying in the working area, and the spares and heavy objects of the crane in operation swing and strike pedestrians;
10) The crane and other operators do not wear safety helmet and other personal protective equipment;
11) The driver's cab glass is not cleaned, resulting in unclear vision;
12) The driver has poor communication with the commanding personnel, or misunderstands the hoisting signal;
13) The hanging method is not correct, causing heavy objects to fall out from the hook;
14) The sling used exceeds the safety factor;

15) The wire rope jumps out of the pulley groove;

16) Brake crack, friction gasket wear too much.

4.2.5 Measures of hoisting safety

	WARNING
	To prevent personal injury or equipment damage, the safety measure must be followed

1) Strengthen the management of the construction site, set up a warning area on the hoisting site, send full-time safety personnel to supervise and alert, non-operation personnel are strictly prohibited to enter;
2) Carefully do the preparatory work before lifting, according to the requirements of the plan to prepare machinery and heavy lifting rigging. Strictly implement the lifting equipment performance inspection, lifting rigging inspection, pre-lifting detection and lifting procedures to ensure the safe and reliable lifting operation;
3) Detailed technical disclosure shall be made to all personnel participating in the construction operation in advance, so that they must understand the essentials, procedures and requirements of the operation. After the crane enters the site, the crane driver will be introduced to the hoisting scheme in detail, and the unified command signal will be made clear.
4) Crane position operation and walking route should be carried out according to the requirements of the scheme, the outrigger pad must be safe and reliable. Special subgrade box cushion is used under the leg to expand the unit force surface. Crane lifting operation should be smooth, slow action, lifting operation should pay close attention to the settlement of the crane leg;
5) The contact between the site commander and the crane driver should be timely and reliable, and the command signal, flag language and gesture should be clear. If abnormal conditions are found, the commander in chief of the lifting site should be reported in time, so as to take effective measures as soon as possible;
6) When the wind is level 5 or above, it is strictly prohibited to lift in thunder, rain and fog days;
7) Construction personnel entering the hoisting operation site must strictly implement the safety rules and regulations of the site, wear labor protection clothing and safety helmet according to the provisions;
8) Hoisting operation should be unified command, operation personnel should do their duty, closely cooperate, so as to complete the hoisting operation safely and smoothly.

4.3 Requirements for Battery Container Transport

Based on battery features and with the purpose of maximizing the battery performance, the transport and storage of battery container should meet the following requirements:

- Allowable storage temperature: -30~+60℃
- Application altitude: < 2000m;
- Humidity: ≤95% (no condensation).
- Take appropriate protection measures to keep SOC level at about 30% and ensure that no short circuit happens, or no liquid is allowed into the battery container or soaked in liquids (e.g. water, oil, etc.).

4.4 Storage

The battery container should be stored in a place without harmful gases, flammable or explosive products and corrosive chemicals nearby. Keep away from mechanical impact, heavy pressure and strong magnetic field. The distance to heat source should be far away

4.5 Ambient thermal insulation

The battery system must operate within the range of optimum operating temperature, so that the service life of a battery can be extended, and the safety performance of a battery can be improved. The limitation of temperature should completely comply with various definitions in the specification, the installation space of the battery system should be well-ventilated and be designed with the function of thermal insulation.

5 Product Installation

5.1 Site and environment requirements

EnerC+ battery container applies to general outdoor scenarios. In accordance with local laws and regulations, the site selection requirements are as follows:

1 The installation position of the node cannot be in a low-lying area, and the site level is higher than the highest historical water level in the area.

2 The soil condition is good and the ground is solid. No bad geological conditions such as rubber soil and soft soil layer are allowed. The ground that is easy to accumulate water and sink should be avoided.

3 Invest in a well-ventilated place.

4 Keep away from strong vibration, noise sources, and electromagnetic interference areas. Try to avoid places with existing underground facilities.

5 Keep away from places that produce dust, fume, harmful gases, and produce or store corrosive, flammable, and explosive materials. The distance from the airport, landfill, river bank, shore or dam should not be less

than 500m.

6 Choose an open location according to the requirement of Figure 5-1 & Figure 5-2, and ensure that there are no obstacles from the surrounding area.

7 Keep at least 50m away from residential areas to avoid noise pollution.

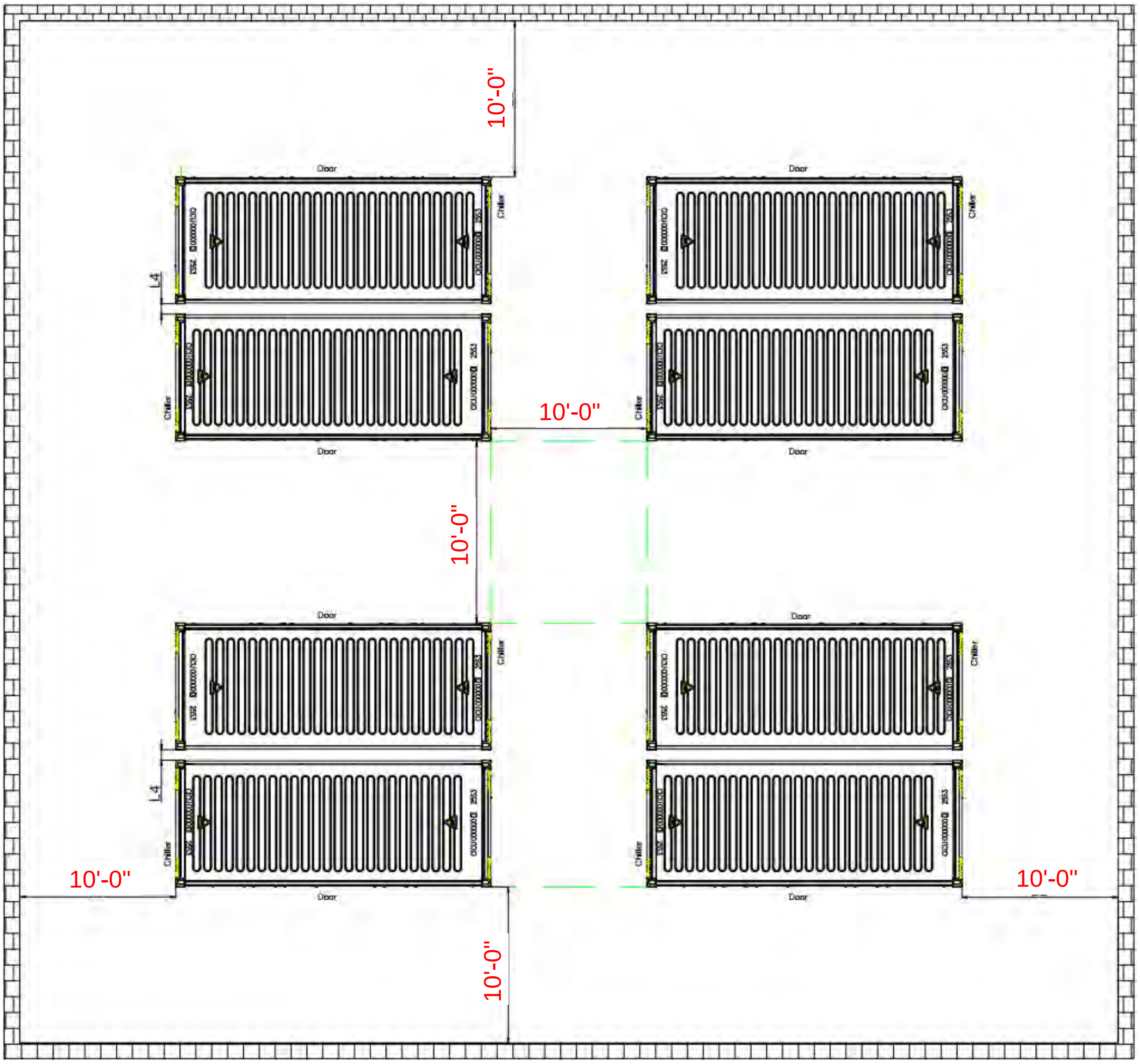


Figure 5-1 Clearance requirement (case 1)

To avoid the hot air interaction for two containers， and to maintain the container， the minimum distance must be followed :

L1 : 3.0m

L2 : 3.0m

L3 : 3.0m（Recommend 3.5m）

L4 : 0.9m（C5 or above），0.20m（C4 or below）

L5 : 3.0m（Recommend 3.5m）

Note that back-to-back two containers have opposite wiring direction and need to control the length of the high-voltage cable to the PCS. The distance here refers to the road width, mainly considering the pass ability of maintenance tools. (Excluding mounting base dimensions)

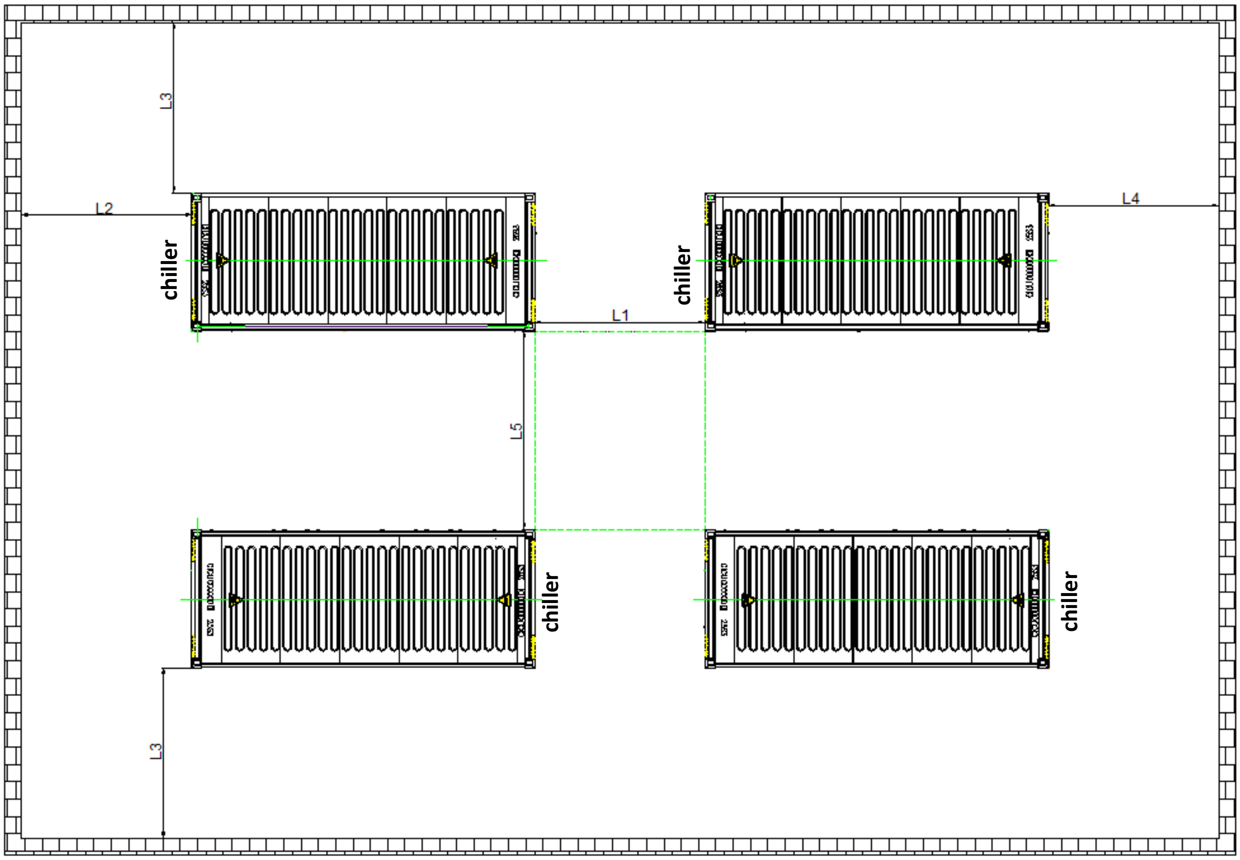


Figure 5-2 Clearance requirement (case 2)

To avoid the hot air interaction for two containers，and to maintain the container， the minimum distance must be followed :

L1 : 3.0m (Recommend 3.5m)

L2 : 3.0m

L3 :3.0m (Recommend 3.5m)

L4: 1.1m (For the distance from the electrical compartment surface to the wall or other containers.)

L5: 3.0m (Recommend 3.5m)

L6: 3.0m (Recommend 3.5m)

Note:Orientation of water cooling unit and door in the drawing. The distance here refers to the road width, mainly considering the pass ability of maintenance tools. (Excluding mounting base dimensions）

5.2 Foundation Requirements

Before installing this container, build the foundation and trench on the selected ground. The requirements for foundation construction are as follows:

1) The size of foundation meets the requirements of container installation and bearing capacity as following shown.

Table 5-1 Installation site requirement

Ground type	Condition requirements	Note
Concrete floor	The ground needs to be able to bear a load of 36.0 Metric Tons	Ground should fulfill: ◆ Level deviation ≤±10mm ◆ Flatness deviation ≤±4mm/2m
Plain land surface		

2) Foundation requirement:

- At least six foundation points need be supported as Figure 5-3.
- Mandatory to fix four corner foundation points as Figure 5-4
- Distance of container bottom fitting points refer to Figure 5-5.
- Diameter for every foundation point 500mm, maximum height is 200mm (at least 50mm for bottom module maintenance)

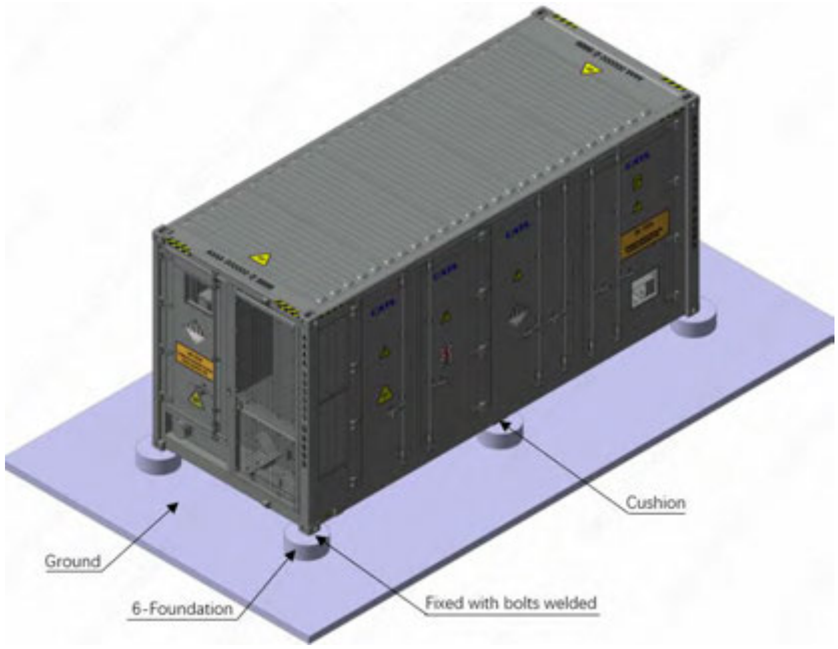


Figure 5-3 installation site overview

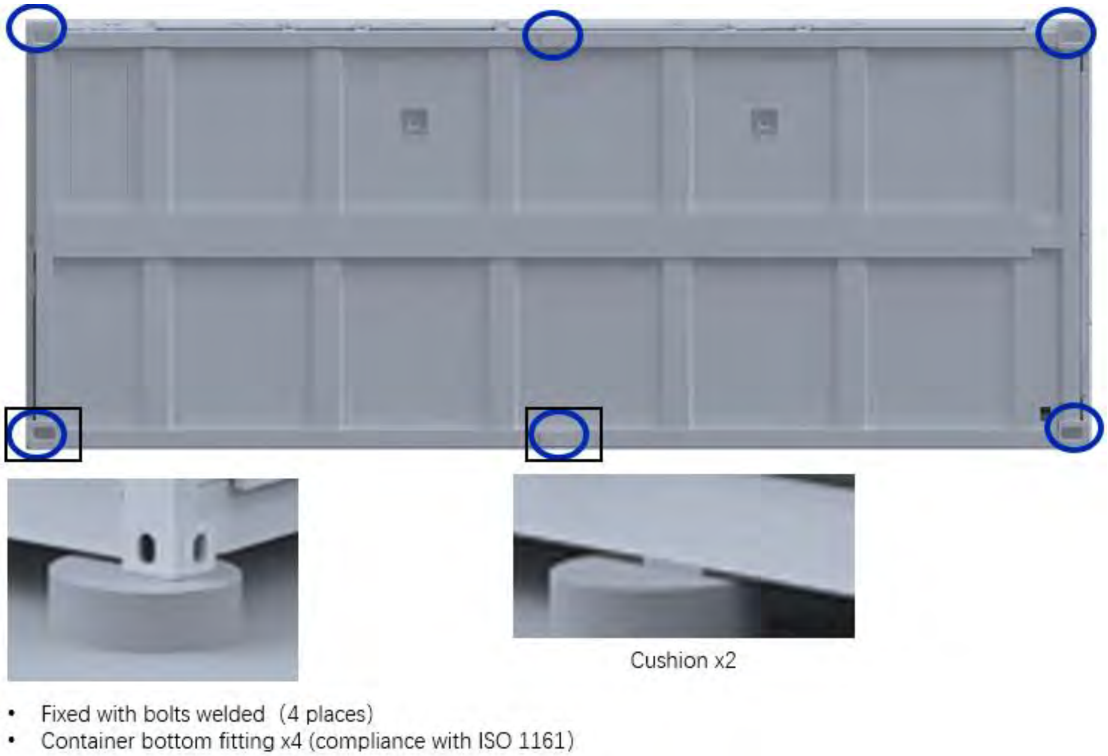


Figure 5-4 Container bottom fitting points

Figure 5-5 Distance of container bottom fitting points

1) Bury the ground grid and reserve a ground bar at the ground position of the container. Connect one end of the ground grid to the embedded ground grid and the other end to the container ground point. When the ground network is embedded, reserve enough length for the ground lug to connect to the ground point on the container.
2) The grounding resistance of the container is less than or equal to 0.1Ω.

3) The container energy storage system uses underside cabling, so the cables need to be buried under the power cabin in advance.

4) The inner diameter of the protective pipe should not be less than 1.5 times the outer diameter (including the protective layer) of the cable.

5) Foundation construction should meet the local historical maximum rainfall drainage requirements. The discharged water shall be treated in accordance with local laws and regulations.

5.3 Installation Procedure

Table 5-2 installation procedure

Step	Procedure
1	Determine the position for installing containers based on the foundation design diagram;
2	Measure the support points of foundation containers fulfill the requirement of chapter 5.2
3	Use a crane to lift containers according to chapter 4.2
4	Adjust the container and level the container using washers to ensure that the support points at the bottom are evenly supported. Note: The washer has been packed with the box and placed at the protective cover of the water pipe in the electrical cabin
5	Open and close all side doors and the electrical cabin doors. There is no lag in operation and no rigid contact between the side door and the cabin body. If there is interference between the door and cabin, washer should be added in the corresponding position
6	Remove the lifting rope and release the crane after the side door and electrical cabin door meet requirements
7	Secure the container.

5.4 Anti-vibration and anti-collision requirement for installation

In the battery container, battery racks are connected in parallel, the management system and a variety of sensing devices are installed. The whole battery system must be installed firmly and reliably without any loosening or shaking. An anti-collision device with sufficient strength must be installed on the periphery of the installation space of battery system so as to ensure that no safety accident (e.g. direct short circuit, overheating and combustion) will be caused by general collision which will not directly harm the battery system and batteries.

5.5 Lock of container

After fixing of the container, it is recommended that the container's side doors and end doors be locked by padlock (as shown in the figure below), to prevent unauthorized access.

Figure 5-6 Lock of battery container

The regular maintenance and inspection of the padlock should be conducted regularly.

5.6 Wiring

5.6.1 Connection Interface

The Battery container has three main connection interfaces: DC power cable connection, AC auxiliary power connection and communication interface

5.6.1.1 DC power cable connection

As Figure 5-7 shown, The DC power cable connection of the battery container is located in the busbar of the electrical room. The positive and negative copper bar provide 8 x double M12 holes for connection.

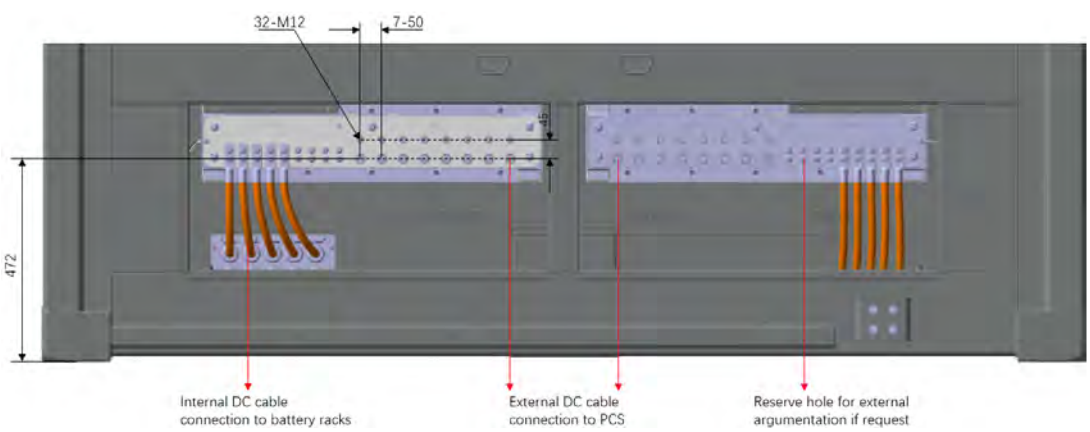


Figure 5-7 DC power cable connection interface

Dual Hole cable lug as Figure 5-8 is recommended to use for external HV cable connection, and the bolt assembly should follow the scheme as Figure 5-9 .

Figure 5-8 External DC power cable lug

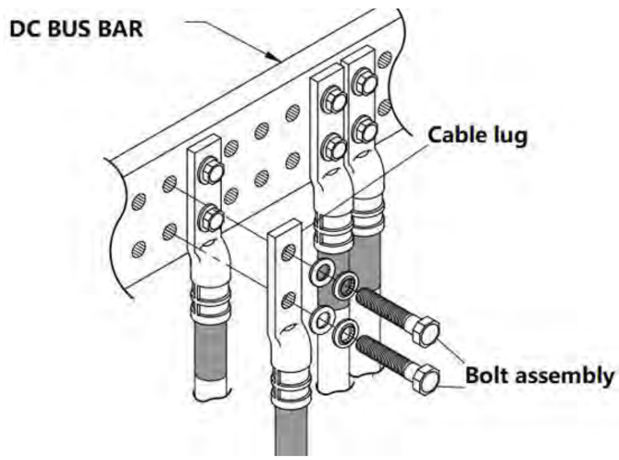


Figure 5-9 External DC power cable connection

Table 5-3 Description of DC power cable connection interface

Pole	Connection	Requirement
HV+	➢ Cable type: Copper ➢ Cable lug :8 *M12, ➢ Cable Max. cross-section: 400mm^2 or 6*AWG 750 ➢ Recommend cable cross-section:6 *150mm2 or 6 *AWG 300 ➢ Screw: M12 * 35 ➢ Torque: 50 N.m	1. The terminal is a double-hole terminal, the center-line distance between the two holes is around 50mm; 2. The connecting cables should meet the following service requirements: rated voltage is 1500V DC and continuous current is 1530A; 3. Route as shown in Figure 5-7 DC power cable connection interface. 4. After the external wiring of the container is completed, it is necessary to fill the gap between the threading opening and the wiring harness with fireproof mud and other materials for sealing. It is
HV-	➢ Cable type: Copper ➢ Cable lug :8 *M12, ➢ Cable Max. cross-section:	

	400mm² or AWG 750 ➢ Recommend cable cross-section:6 x 150mm2 or 6 x AWG 300 ➢ Screw: M12 x 35 ➢ Torque: 50 N.m	required that the filling is uniform, tight and seamless, and the appearance is beautiful.

5.6.1.2 Auxiliary power cable connection

Option1

As Figure 5-11 shown, the auxiliary power cable connection can be accessed at the bottom of electrical room.

Auxiliary power cable connection (3AC 380~480V)

The connection requirements of auxiliary power supply (3AC + N+PE):

1) The 3AC 380V…480V , 50/60 Hz power supply can be connected to the XT1 terminals;
2) Be sure the U/V/W/N/PE (A/B/C/N/PE) terminals connection sequence correctly;
3) Use flexible or hard wires with cold-pressed tube terminals;
4) 25mm² for single wire is recommended.

Auxiliary power cable connection (Ventilation Fan AC230V or 2AC+PE 480V)

The connection requirements of auxiliary power supply (L+N+PE):

1) The AC230V or 2AC+PE 480V 50/60Hz power supply can be connected to the XT0 terminals;
2) Be sure the L/N/PE terminals connection sequence correctly;
3) Use flexible or hard wires with cold-pressed tube terminals;
4) 2.5mm² for single wire is recommended.

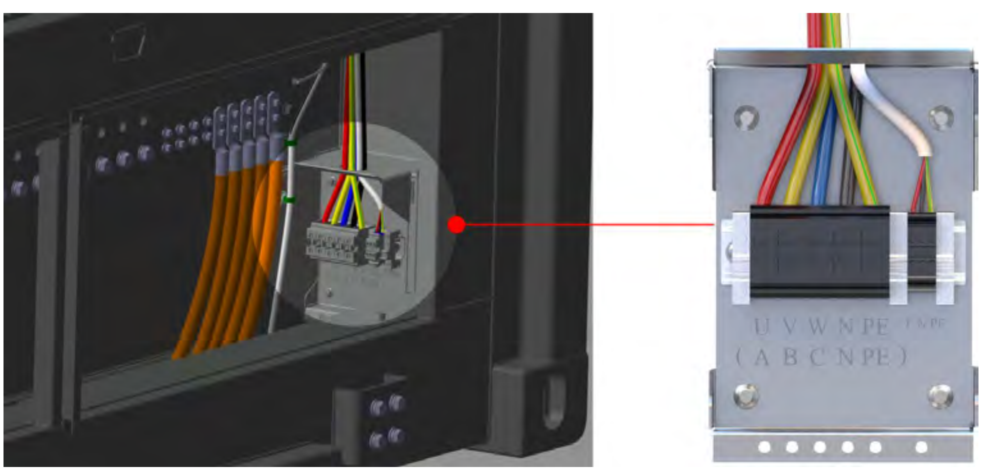


Figure 5-10 AC auxiliary power cable connection interface

Table 5-4 Auxiliary power cable connection interface

<table>
<tr><td>XT1 Terminal</td><td>For 3AC 380~480V</td><td>Power capacity requirement</td><td>Cross-section</td></tr>
<tr><td>XT1-1</td><td>U/A</td><td rowspan="10">Max: 37.5kW</td><td rowspan="5">Type: Copper,
Recommend: 25mm²
Torque：3.2-3.7Nm</td></tr>
<tr><td>XT1-2</td><td>V/B</td></tr>
<tr><td>XT1-3</td><td>W/C</td></tr>
<tr><td>XT1-4</td><td>N</td></tr>
<tr><td>XT1-5</td><td>PE</td></tr>
<tr><td>XT0 Terminal</td><td>For AC230V or 2AC+PE 480V</td><td>Cross-section</td></tr>
<tr><td>XT0-1</td><td>L</td><td rowspan="3">Type: Copper,
Recommend: 2.5mm²
Torque：0.6-0.8Nm</td></tr>
<tr><td>XT0-2</td><td>N</td></tr>
<tr><td>XT0-3</td><td>PE</td></tr>
</table>

Option2（Auxiliary Power：3AC+N+PE）

As Figure 5-11 shown, the auxiliary power cable connection can be accessed at the bottom of electrical room. For option2, the L+N+PE don't need to be powered.

Auxiliary power cable connection (3AC 380~480V)

The connection requirements of auxiliary power supply (3AC + N+PE):

1) The 3AC 380V…480V , 50/60 Hz power supply can be connected to the XT1 terminals;
2) Be sure the U/V/W/N/PE (A/B/C/N/PE) terminals connection sequence correctly;
3) Use flexible or hard wires with cold-pressed tube terminals;
4) 25mm² for single wire is recommended.

Table 5-5 Auxiliary power cable connection interface

<table>
<tr><td>XT1 Terminal</td><td>For 3AC 380~480V</td><td>Power capacity requirement</td><td>Cross-section</td></tr>
<tr><td>XT1-1</td><td>U/A</td><td rowspan="4">Max: 37.5kW</td><td rowspan="4">Type: Copper,</td></tr>
<tr><td>XT1-2</td><td>V/B</td></tr>
<tr><td>XT1-3</td><td>W/C</td></tr>
<tr><td>XT1-4</td><td>N</td></tr>
</table>

XT1-5	PE		Recommend 25mm² Torque：3.2-3.7Nm

5.6.1.3 Grounding connection

As Figure 3-2 and Figure 3-3 shown, there are two grounding connection points for EnerC+ container. The minimum cross-section of earthing conductors must fulfill following requirement.

Figure 5-11 Grounding connection point

Table 5-4 Earthing cable requirement

Cross-section S of line phase conductor	Minimum cross-section of earthing conductors
S ≤ 16 mm^2	≥ S
16 mm^2 < S ≤ 35 mm^2	≥ 16 mm^2
S > 35 mm^2	≥ 0.5 * S
Recommend Earthing cable cross-section for 0.5P system: 3x 150mm^2 or 3 x AWG 300	

Using M12x35 Combination Hexagon bolt. The torque is 50N.m.

The resistance of grounding connection point should be ≤0.1Ω.

5.6.1.4 Communication cable connection

Master control box:

For Optical fiber connection, the Optical fiber conversion module is included in master control box, which can convert TCP/IP to fiber signal, and the single mode ST port is used

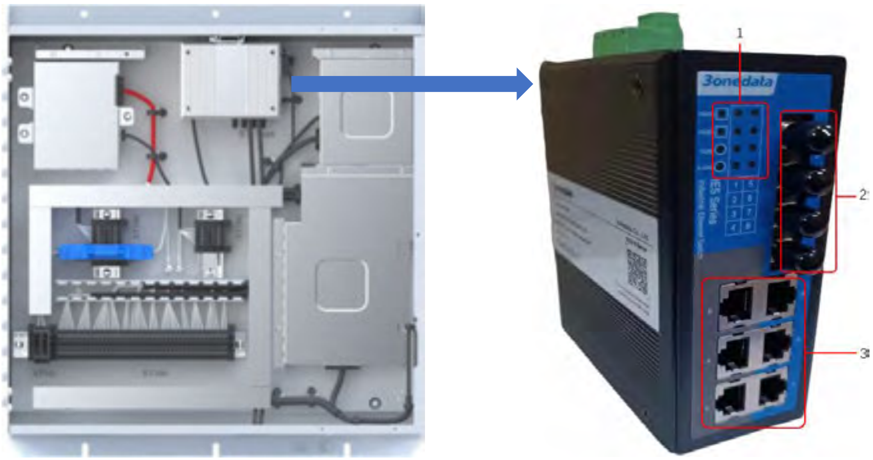


Figure 5-12 Interface of Optical fiber conversion module

Figure 5-13 Type of Fiber Optic Connector: **ST**

Table 5-1 Connector information of Optical fiber conversion module

No.	Item	Connector information
1	Led indicator	Power/Alarm/Working indicator
2	ST port	Two ST (single mode) ports
3	ETH port	Six RJ45 ports.

Figure 5-14 Schematic diagram of optical fiber routing

5.6.1.5 The configuration instructions of the terminal resistance

The configuration instructions of the terminal resistance:

- The MCAN terminal resistors are installed on the ETH and MBMU boards, and the terminal resistors can be accessed by shorting the corresponding ports on the board.
- In the MCAN communication circuit, use one of MBMU or ETH as a communication terminal resistance.
- The SBMU board and IMM board are not equipped with MCAN terminal resistance. Generally, the terminal resistance is configured on the MCAN interface of the electrical cabinet where the last SBMU is located.
- The whole MCAN loop has two 120Ω terminal resistors in parallel, equivalent to 60Ω resistance. Use multi-meter to measure the resistance of any MCAN loop interface.

5.6.2 Wiring quality requirements

1. Inspect whether the polarity of DC cables is correct, nuts are installed properly, and cable signs are correct.
2. Inspect whether the phase sequence of AC cables is correct, wiring terminals are secured properly, and cable signs are correct.
3. Inspect whether the insulation impedance of all racks meet the requirements.

4. Inspect whether the positive and negative poles of DC racks are short-circuited, and terminals U, V, W, N and PE of AC cables are short-circuited.
5. Inspect whether grounding conduction of grounding wires is good.
6. Before power on, check the connection cable of the whole system, and make sure that the cable connection is reliable without aging fracture and insulation damage.
7. Check whether all communication wires and cables and sub connections at the connection end are tight and reliable;

6 CATL Monitor Software

As the LFP battery energy storage running monitor, CATL Real–time Monitoring System can realize following fundamental functions, and the installation process and instruction can refer to follow chapters

1) Data monitoring and recording
2) Rack numbering
3) CSC numbering
4) Rack on-off controlling
5) Fault Alarm checking and analyzing

6.1 Commissioning Tool

For LFP Battery Energy Storage Running Monitor System Installation, following commissioning tools need be installed.

Table 6-1 Commissioning tool

Tool	Description	Overview
ZLGCAN II /ValueCAN4	ZLGCAN tools and ValueCAN4 tools provide connections between CATL BESS and the real time monitoring system (computer). Flashing and configuring are both done by these tools.	
DB9 connector	DB9 connector and rack connectors are used for connection between CAN tools and BESS.	

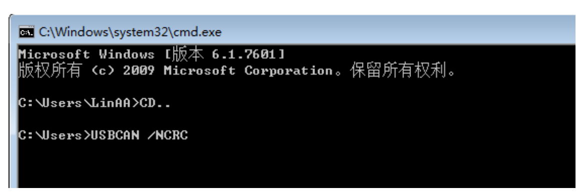
6.2 Commissioning system hardware setup

As the debug interface, JX3 terminal in EnerC+ Master Control box can be used for external commissioning

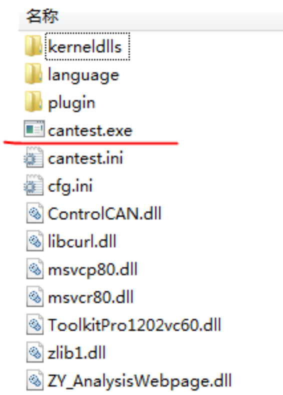
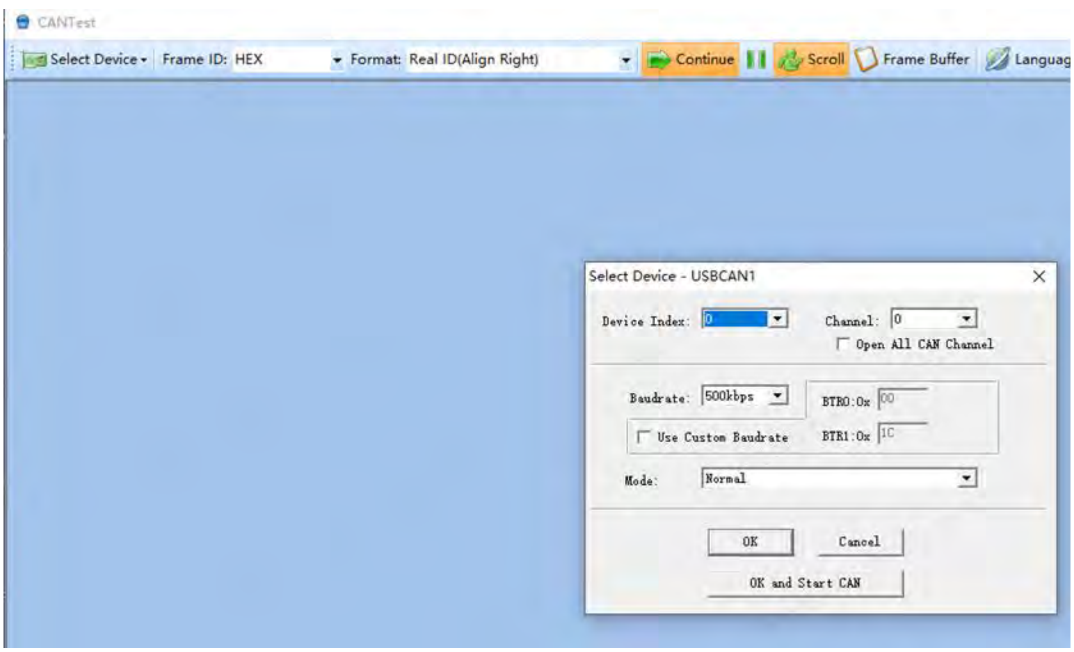
EnerC+ Master Control BOX: JX3 MCAN interface — **ZLGCAN II** — **Commissioning PC**

6.3 Commissioning system software setup

1) ZLGCAN Ⅱ driver installation

Step	Solution 1	Solution 2
1	Extract the diver USBCAN_I_II_2A_drive.rar → 【驱动程序】USBCAN-I_I+_II_II+_2A_I-MINI windows驱动安装 → USBCAN_AllInOne_x86_x64_2.0.0.1.exe	Extract the diver USBCAN_I_II_2A_drive.rar → 【驱动程序】USBCAN-I_I+_II_II+_2A_I-MINI windows驱动安装 → USBCAN_AllInOne_x86_x64_2.0.0.1.exe
2	Install the driver. USBCAN_AllInOne_x86_x64_2.0.0.1.exe	Rename the document as 'USBCAN.exe' and save it to the folder 'user' in Disk C
3	End	Open CMD command in folder 'user' 
4		Input 'USBCAN /NCRC' and press 'enter' to start the installation of the driver. 
5		End

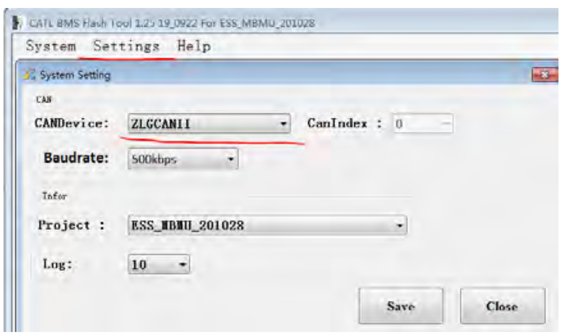
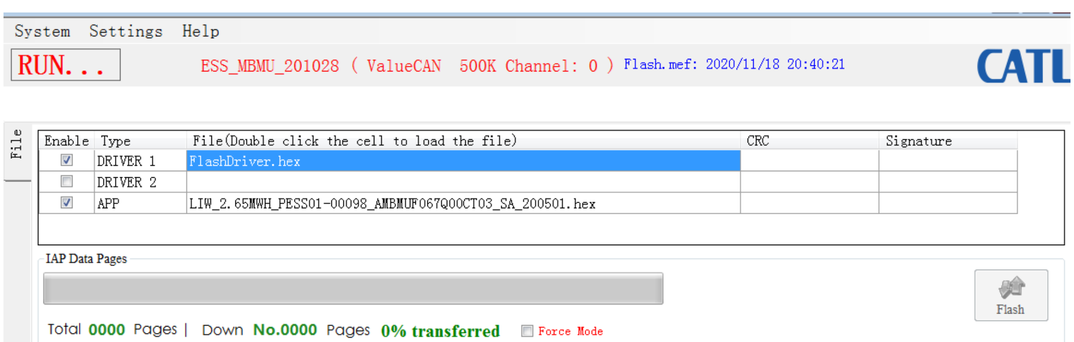
2) CANTEST Usage

Step	Solution
1	Extract CANTEST software in any folder of the computer. 
2	After connecting the ZLG, open CANTEST.EXE. 
3	Choose 500kbps， click ‘ok and start CAN’. 

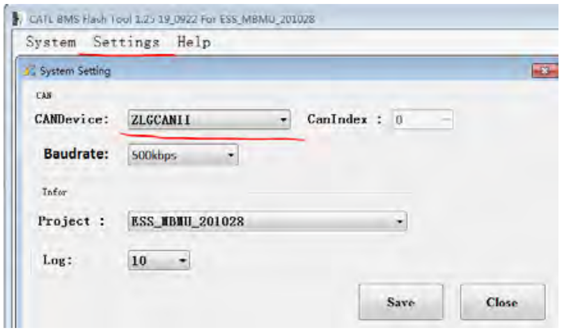
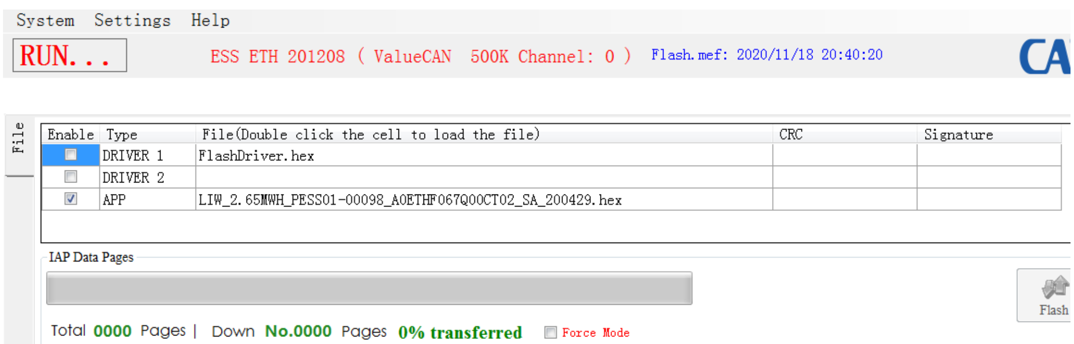
6.4 Software configuration

Switch on aux power supply, if the green indicator of master control box lights up, it means the 24V power supply of MBMU, ETH and fiber conversion module is ok, then, use CANTest software to verify the MCAN log. After getting normal log, start verification and flashing MBMU and ETH software, and then configuring ETH IP according to following steps:

1) MBMU software flashing

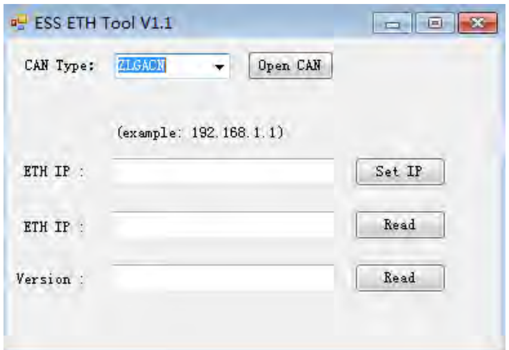
Step	Description
1	Open MBMU/ETH flash tool CATL BMS Flash Tool.exe
2	Select ‘setting’, ‘ZLGCANⅡ’, and click ’save’ 
3	Select driver path in source file configuration \CATL_BMS_Flash_Tool 1.25 For ESS MBMU 201208\Configuration\ESS_MBMU_201028\FlashDriver
4	Select ‘APP path’, and select MBMU hex file (configured project by project) Such as: AMBMUF067Q00CT03_SA_200501.hex 
5	Select ‘system’, click ‘run’.
6	Click ‘flash’ and wait until 100% done.

2) ETH software flashing

<table>
<tr><td>Step</td><td>Description</td></tr>
<tr><td>1</td><td>Open MBMU/ETH flash tool
CATL BMS Flash Tool.exe</td></tr>
<tr><td>2</td><td>Select ‘setting’, ‘ZLGCANⅡ’, and click ‘save’

</td></tr>
<tr><td>3</td><td>Select driver path in source file configuration
\CATL_BMS_Flash_Tool 1.25 For ESS ETH 201208\Configuration\ESS ETH 201208\FlashDriver</td></tr>
<tr><td>e4</td><td>Select ‘APP path’, and select MBMU hex file (configured project by project)
Such as: A0ETHF067Q00CT02_SA_200429.hex

</td></tr>
<tr><td>5</td><td>Select ‘system’, click ‘run’.</td></tr>
<tr><td>6</td><td>Click ‘flash’ and wait until 100% done.</td></tr>
</table>

3) ETH status verification

a) Open ETH IP setting tool, select ZLGCAN, press open CAN, type in the IP address at ETH IP, press set IP, and then it should show ‘successful’ after completion. If failed, please check CAN loop and retry. After ‘successful’ notification appears, Ping IP address and check the connection.



If not able to set IP:

i. Use CANtest to read the log

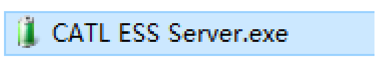
ii. Check ETH power supply and CAN_H/CAN_L loop connection.

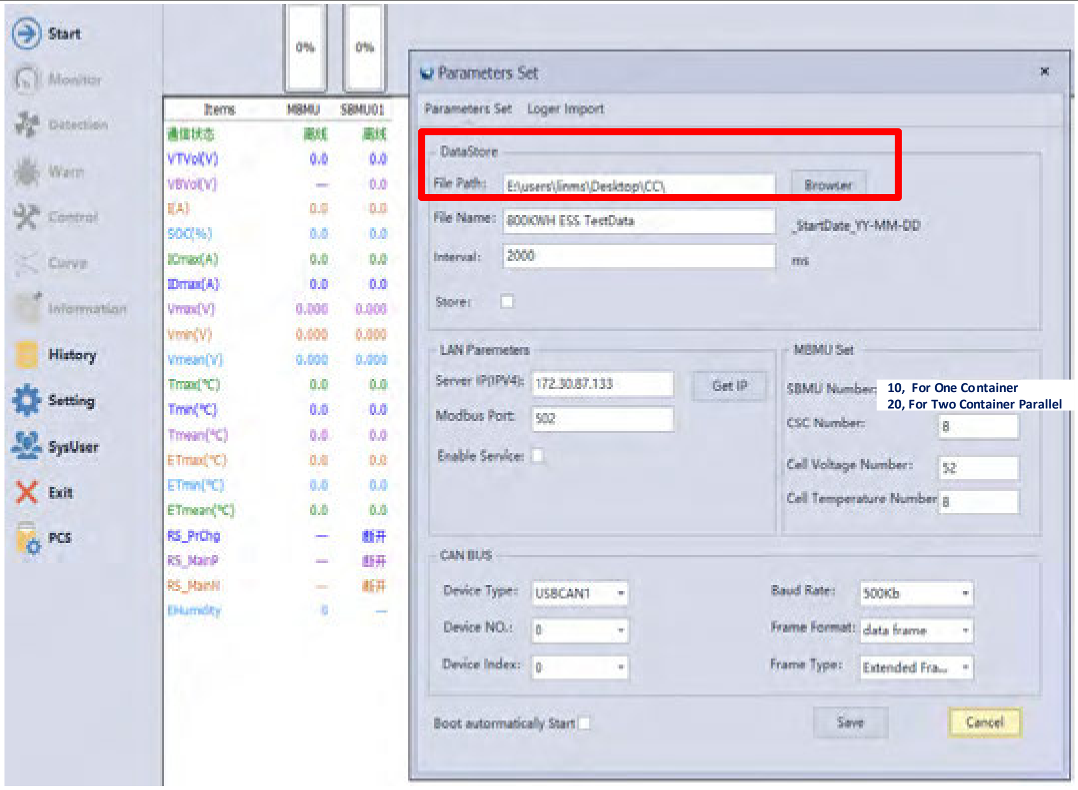
iii. Only turn on the ETH power supply and configure IP.

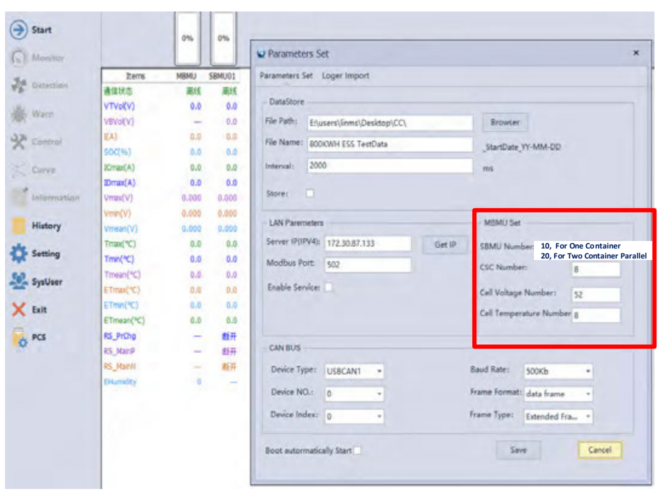
b) After verifying the version, configure IP using setting tools (if the version is wrong, flash the ETH software first.)

6.5 CATL Real–time Monitoring System

Table 6-2 CATL Real–time Monitoring System Overview

Step	Description
1	**CATL Real–time Monitoring System installation** ● After connecting CAN tools to the computer, open the real-time monitoring system 
2	**Data Store file path setting** ● Set up the real-time monitoring system by choosing the data storage place, check the Store option below, after that, all shown data on the monitoring system will be stored on the path.

<table>
<tr>
<td></td>
<td>


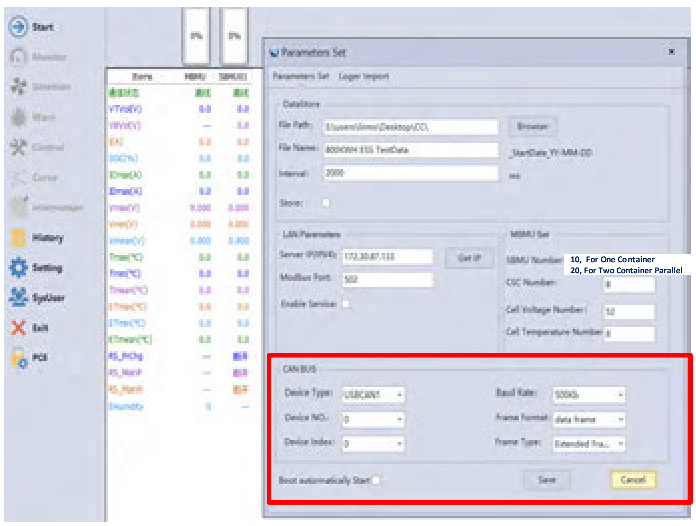
</td>
</tr>
<tr>
<td>3</td>
<td>
MBMU Setting:


- SBMU number: the number of racks on the same CAN circuit, for single container, SBMU number is 5, for two container parallel connection, the number must be updated to 10;
- CSC number: 8, the number of modules in a single rack;
- Cell voltage number: 52, the number of cell in a single module 104 (2P52S);
- Cell temperature number: 16, the number of temperature test points in a single module;
</td>
</tr>
</table>

<table>
<tr>
<td>4</td>
<td>

Interface setting:

- Regarding device type, usually, choose USBCAN1 if using ZLGCAN (ZLGCAN has two interface, CAN1 and CAN2). If using ValueCAN tool, then choose ValueCAN.
- Regarding Baud Rate and data type, leave them as the default value. Click 'save', and the monitoring system will restart automatically. If others Baud Rate setting is required, the definition is according to the type of CAN, the value of ACAN is 250k, CCAN, MCAN, SCAN need chose 500K

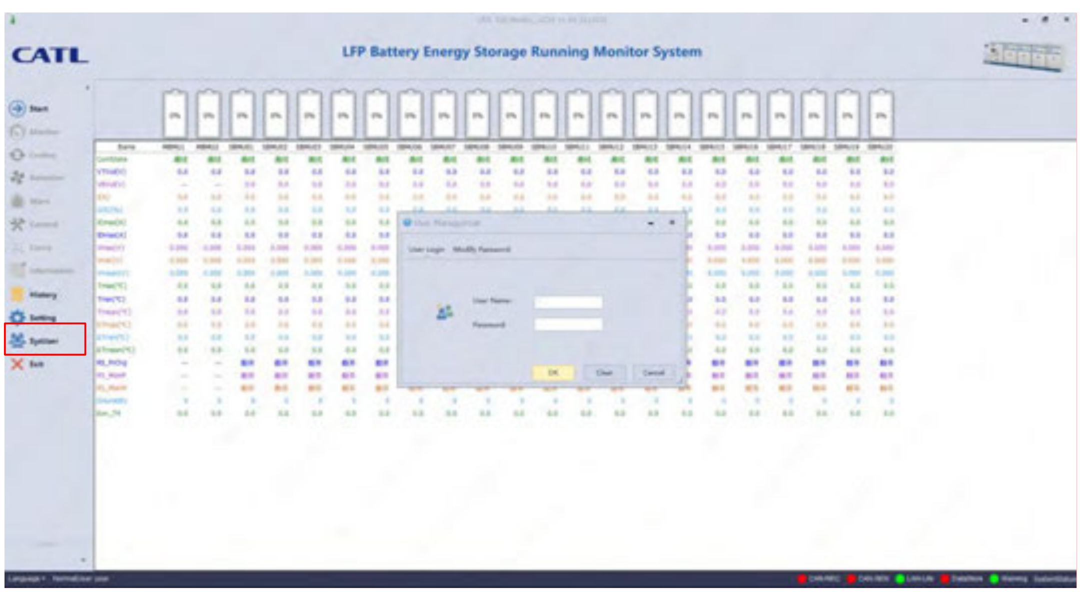


</td>
</tr>
<tr>
<td>5</td>
<td>

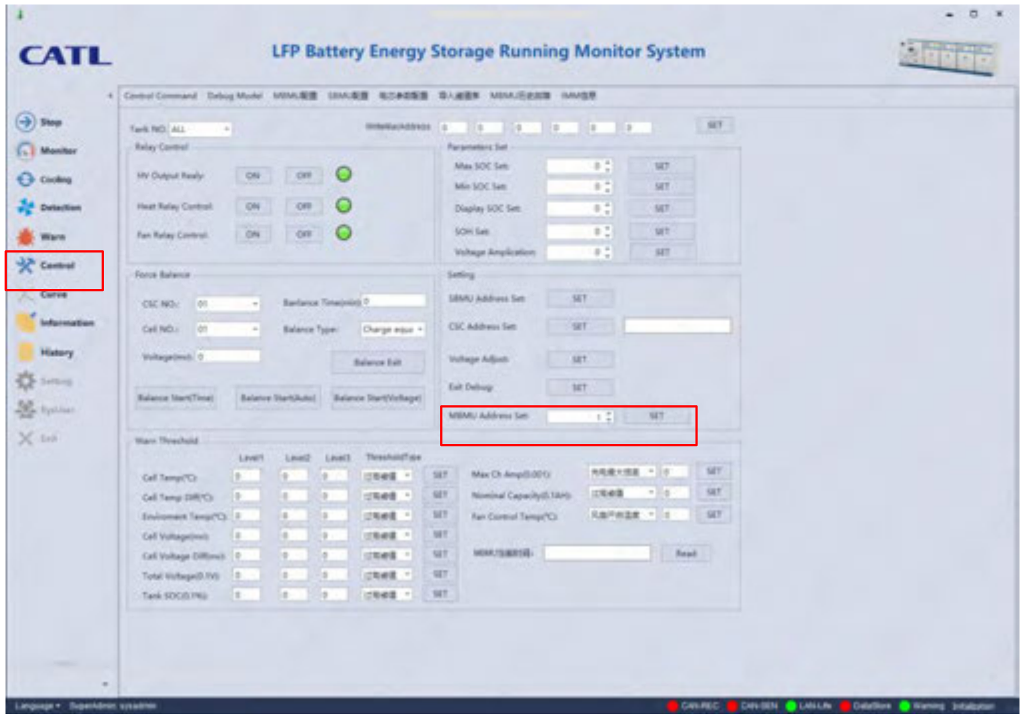
User login interface setting

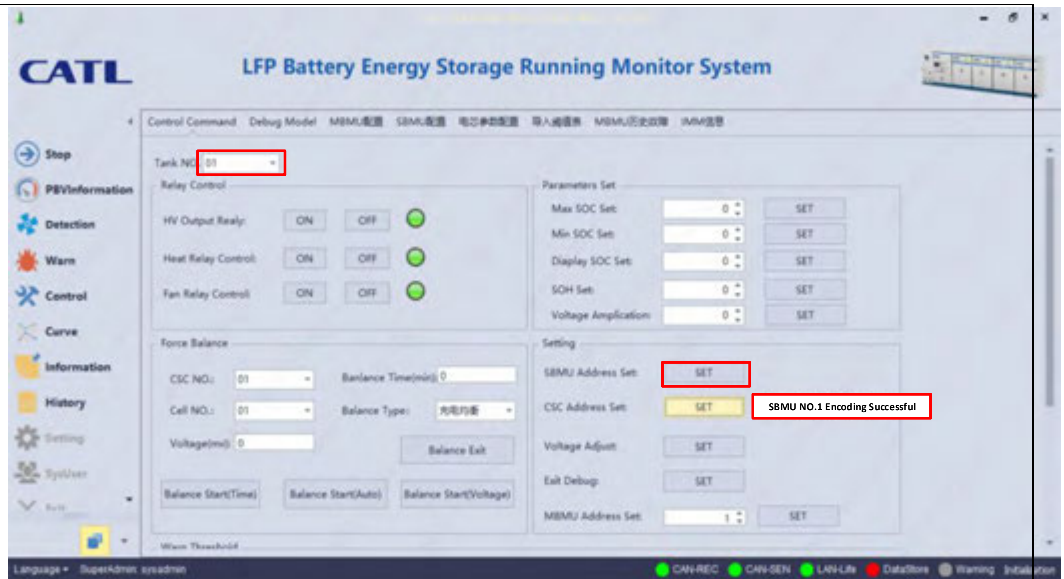
- Click the menu SysUser， the user login interface will pop up.

The User Name is sysadmin, the password is 1234567890111. Then click the OK.

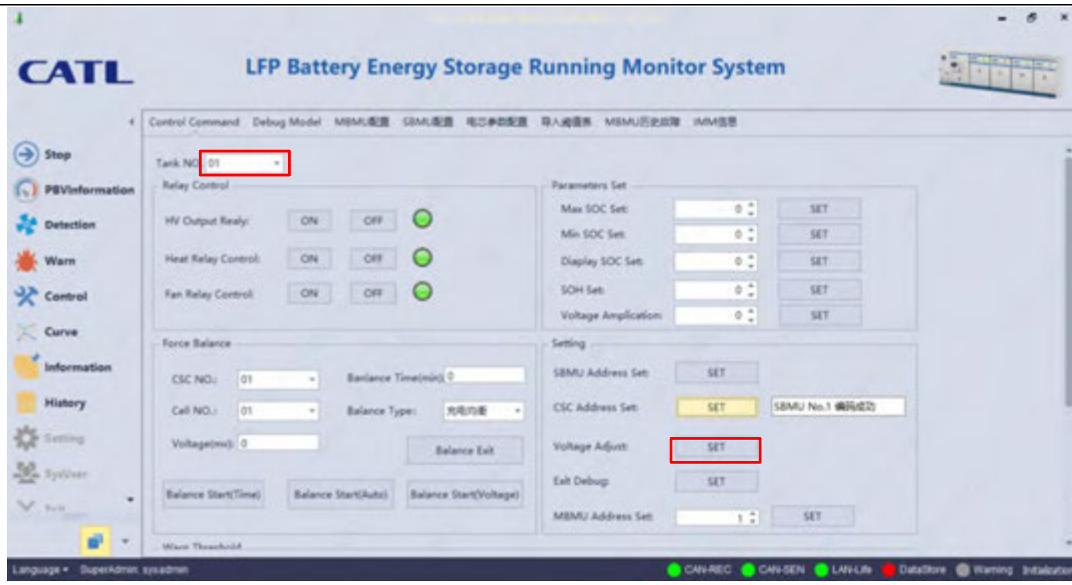
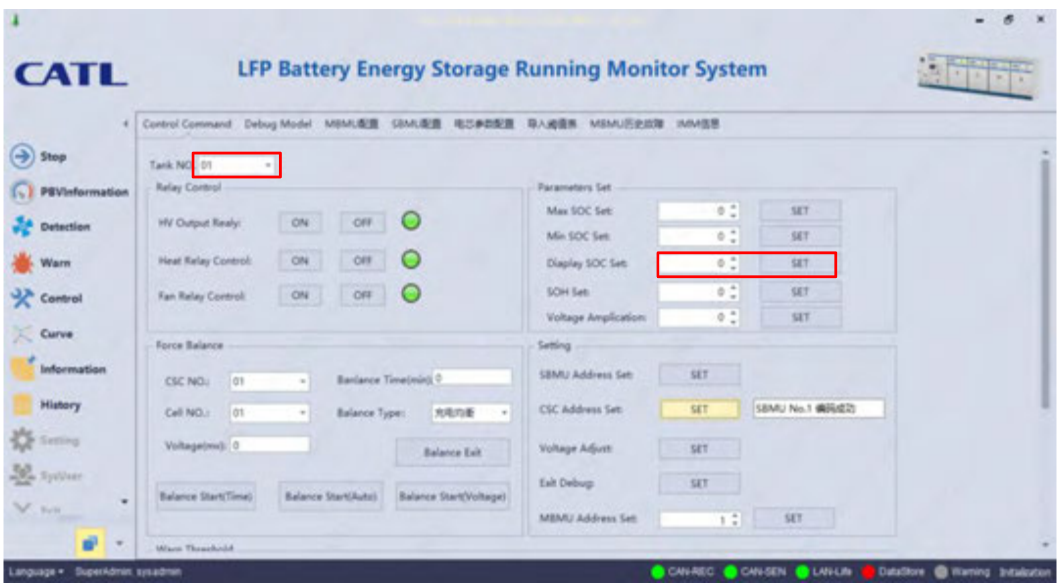


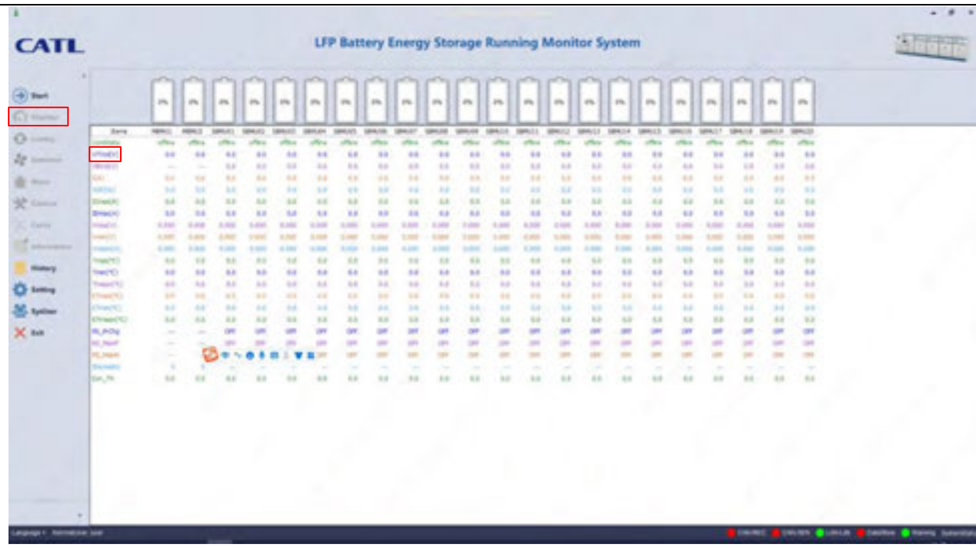
</td>
</tr>
</table>

<table>
<tr><td>6</td><td>MBMU Encoding
● Click the menu ‘Control’, enter encoding interface. When encoding the first MBMU, the MBMU address must be set to ‘1’. If have two container parallel connection, the second MBMU address must be set to ‘2’.
</td></tr>
<tr><td>7</td><td>SBMU&CSC Encoding
● When encoding the first SBMU, set the Tank NO. to “1”, and then click the “SBMU Address Set”, after that, click “CSC address set”. If encoding successful, following message “SBMU No.1 encoding successful” will be got.
● Others SBMU&CSC encoding follow same process</td></tr>
</table>

<table>
<tr><td></td><td>
</td></tr>
<tr><td>8</td><td>Rack on-off controlling
● After confirming that the condition for closing High Voltage relays is fulfilled, click ‘ON’. Then all the racks will be powered on.

</td></tr>
<tr><td>9</td><td>internal voltage calibration
● After closing high voltage relay, BMS will measure system voltage and accumulative voltage of single cell. For limiting these two voltage difference smaller than 2V, the internal voltage calibration need be done.
● Firstly, choose the Tank No. correctly, and then click the ‘set’ in voltage adjust.</td></tr>
</table>

<table>
<tr><td></td><td>
</td></tr>
<tr><td>10</td><td>SOC calibration
● Firstly, choose the Tank No. correctly, and then set the “Display SOC State” to the value you want;

</td></tr>
<tr><td>11</td><td>Operating status Monitor
● Select “monitor”， check if all the batteries are on closed state, and check VTVOL to see if there is voltage data</td></tr>
</table>

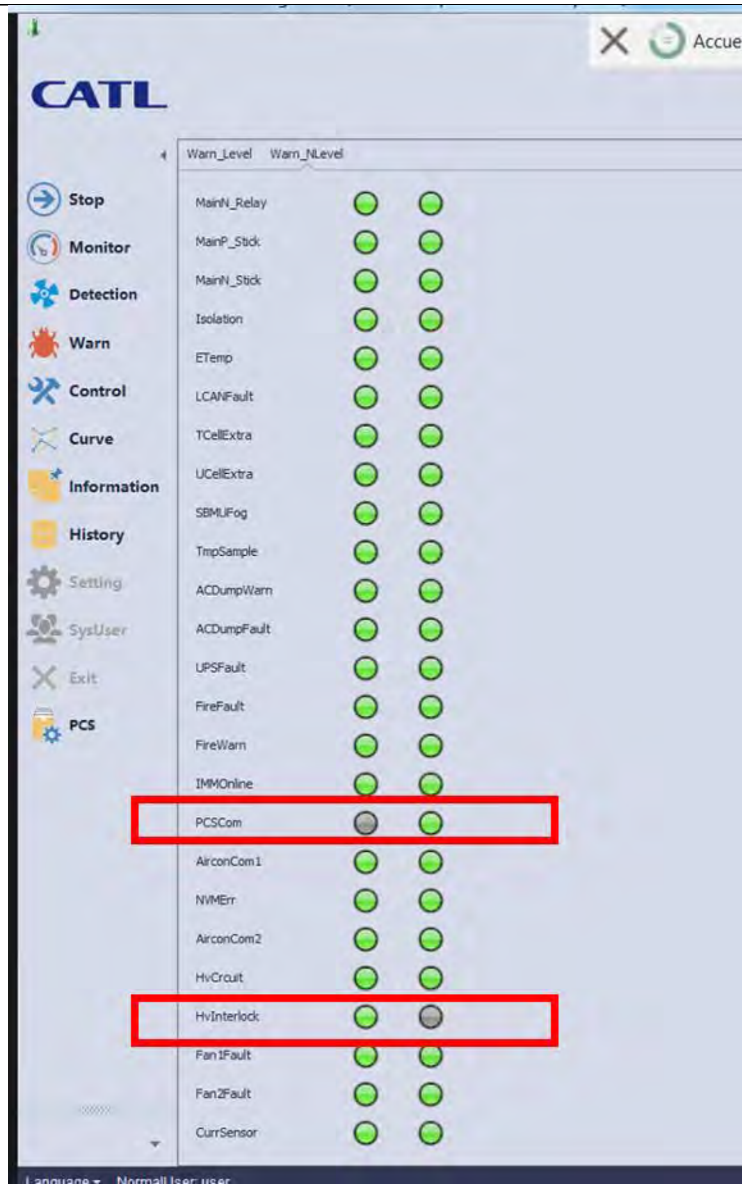


- Check if allowable charging/discharging current appears. If so, it means that the system can charge and discharge normally.

12

Warning status Monitor

- Select ‘warn’. Alarm status can be found here. Based on the alarm status, figure out the corresponding problems and do the analysis.


Accuei
CATL
Warn_Level
Warn_NLevel
Stop
Monitor
Detection
Warn
Control
Curve
Information
History
Setting
SysUser
Exit
PCS
MainN_Relay
MainP_Stick
MainN_Stick
Isolation
ETemp
LCANFault
TCellExtra
UCellExtra
SBMUFog
TmpSample
ACDumpWarn
ACDumpFault
UPSFault
FireFault
FireWarn
IMMOnline
PCSCom
AirconCom1
NVMErr
AirconCom2
HvCrcuit
HvInterlock
Fan1Fault
Fan2Fault
CurrSensor

7 Commissioning flow chart

7.1 Commissioning flow chart

Power On process		Power Off process	
Send power-on command	• EMS self-check, acknowledge system fault, and request BMS to switch on HV.	EMS system inspects	• EMS state active HV power off conditions. • PCS limits the power to 0 within 1s, and then disconnect PCS DC contactor or breaker.
Switch ON HV connection of Rack	• BMS receives switching on HV command. • BMS self-check. • Racks complete pre-charge, switch on HV contactor and disconnect pre-charge circuit.	Send power-off command	• BMS inspect, if BMS detect level 5 fault, then delay power-off 10s.
Rack HV connecting is completed	• BMS sends feedback to the EMS after battery HV connecting is closed.	Disconnect HV	• BMS receives switching off HV command, then disconnect HV contactor of racks.
PCS precharge is completed	• Close PCS pre-charge contactors • Complete the pre-charge progress	OFF status feedback	• BMS sends feedback to the EMS after battery HV connecting is open.
Connecting PCS with Battery System	• Close the main circuit and disconnect the PCS pre-charge circuit. • Request BMS to keep HV holding ON status • Ready for charge & discharge	OFF holding	• Request BMS to keep HV holding OFF status

7.2 System inspection before commissioning

In accordance with the requirements in the system instructions, patrol inspection should be performed for the system and execution and recording should be carried out as per the following table.

Table 7-1 Checklist of system inspection

No	Test item	Description	Result	
1	Appearance Inspection	The appearance of product has no damage and deformation; paint coating has no raise and damage	OK□	NG□
			OK□	NG□
			OK□	NG□
2	Check bolts	Whether bolts get damaged or loosed	OK□	NG□
3	Check HV disconnection	Use the multimeter to test open voltage = 0V;	OK□	NG□
		Use the multimeter to test the resistance	OK□	NG□

		between positive and negative poles is = ∞.		
4	Check LV cable connection	Whether cable connection is correct according to chapter 5.6	OK□	NG□
5	Check AC voltage level of 3AC Auxiliary power supply	Be sure the primary terminals of transformer inside of LV box can match the voltage level 380V…480V of 3AC Auxiliary power supply. Default setting: 3AC 480V.	OK□	NG□

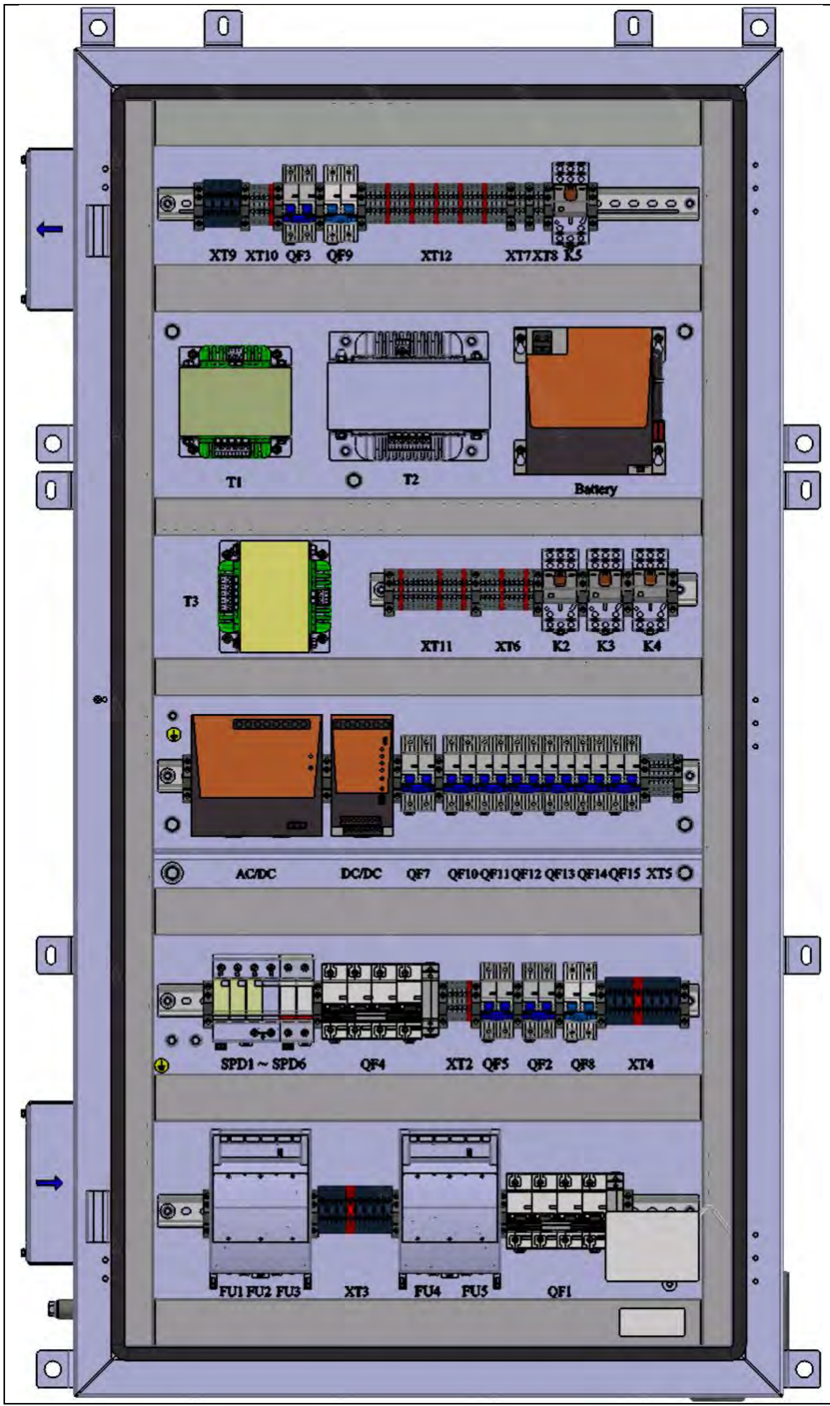
	WARNING
	In the battery system, all power connections must ensure that a sufficient number of protective measures for insulation will be taken, the positive and negative poles of a battery will in no way contact the outer box to lead to leakage of electricity and a short circuit, and the positive and negative poles of the battery system will not be short-circuited in any case; otherwise, a major safety accident and an electric shock might be caused.

7.3 Switch on Auxiliary Power Supply

Connecting 3AC 380…480V Auxiliary power and Power On according to following table, be sure the U/V/W/N/PE terminals connection correctly, then check the green indicator must be light.

Table 7-2 Auxiliary distribution box

Auxiliary distribution box	**Operating**
	1. Switch on the external 3AC 380V~480V auxiliary power supply and AC230V or 2AC 480V UPS power supply. 2. Close the main circuit breaker QF1 in the AC480V power supply. 3. Close the circuit breaker QF5 in the power supply of the Fire system.



4. Close the circuit breaker QF4 in the power supply of the cooling unit system.
5. Close the circuit breaker QF3 & QF7 & QF10.
6. Close the circuit breaker QF8 in the DC 24V power supply.
7. Close the circuit breaker QF2 in the power supply of the Explosion proof.
8. Close the circuit breaker QF9 & QF11 & QF12 & QF13 & QF14& QF15 in the BMS power supply.;
9. Check the indicator of K2 K3 K4 & K5 relay: **Lighting**

Table 7-3 Definition of indication lights

System state	Indicators status for the secondary circuit ●	Indicators status for the primary circuit ●	Alarm indicator light ●
Power OFF	Green light is OFF	Red light is OFF	Yellow light is OFF
Failure	Green light is ON	Red light is OFF	Yellow light is ON
Power ON	Green light is ON	Red light is OFF	Yellow light is OFF
Power up of Primary	Green light is ON	Red light is ON	Yellow light is OFF

Circuit			
Charge/Discharge	Green light is ON	Red light is ON	Yellow light is OFF

7.4 Switch on HV relays of battery control box

Switch on insolation switches of five control box.

Table 7-4 Sub control box overview

Sub control box	**Operating & Status**
	1. Switch on all insolation switches QS1

Switch on HV relays

After the auxiliary power supply is switching on, use the close HV relays command to close the HV relays according to communication protocol. At this moment, the positive and negative output ends of the battery racks will generate about 1040V~1500V DC high voltage. The light combination will correspond to the following state:

Table 7-5 Indicator light: High voltage power supply

System state	Indicator light for the secondary circuit●	Indicator Light for the primary circuit●
High voltage power supply	Green light is on	Red light is on

If the combination of the lights on and off is inconsistent with the above list, it means that the system is not properly powered on. Repeat the steps;

If the system fails to be powered on after repeating the steps for 5 times, if the problem cannot be solved, please contact the manufacturer for system troubleshooting.

7.5 Startup PCS and Precharge DC capacitors

Due to PCS include DC capacitors for filter function, the precharging process is always mandatory, it's recommend that PCS precharging is realized by PCS itself instead of DC battery system.

7.6 Switch on the connection between PCS and Container

For EnerC+ container, high current will be conducted to PCS during charge/discharge process, for line protection and controlling function, a DC breaker with motorized controlling need be used for switching on/off the connection between PCS and EnerC+ container.

After startup PCS and prechaging of DC capacitors, then switch on DC connection.

7.7 EMS send command to PCS to start charge/discharge

7.7.1 Charging of Battery System

When the connection is closed between PCS and EnerC+ container, enable PCS (EMS) working in constant power control model and start charging, the BMS detects the charging current, and the battery system is charged, at this time, the combination of the on and off of each indicator will correspond to the state as Table 7-5

7.7.2 Discharging of Battery System

When the battery system is charged at high voltage, if the battery system detects the discharging current, the battery system will enter the discharging state and the battery system will start discharging. At this moment, the combination of lights on and off will correspond to the state as Table 7-5.

7.8 E-Stop procedure

As Figure 7-1 shown, there is an E-stop button on the door, which is used for power off in case of Emergency.

Figure 7-1 E-stop button

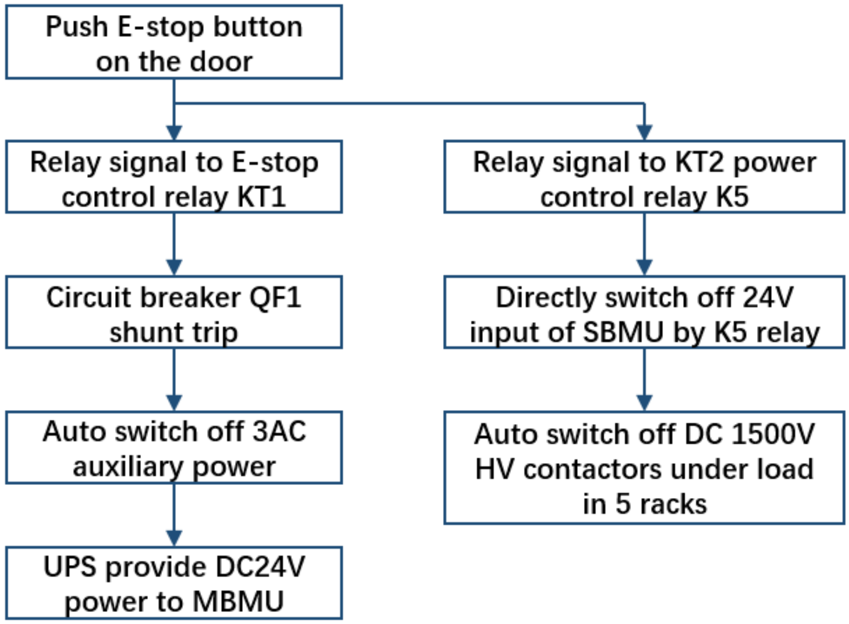


Figure 7-2 E-stop by push button

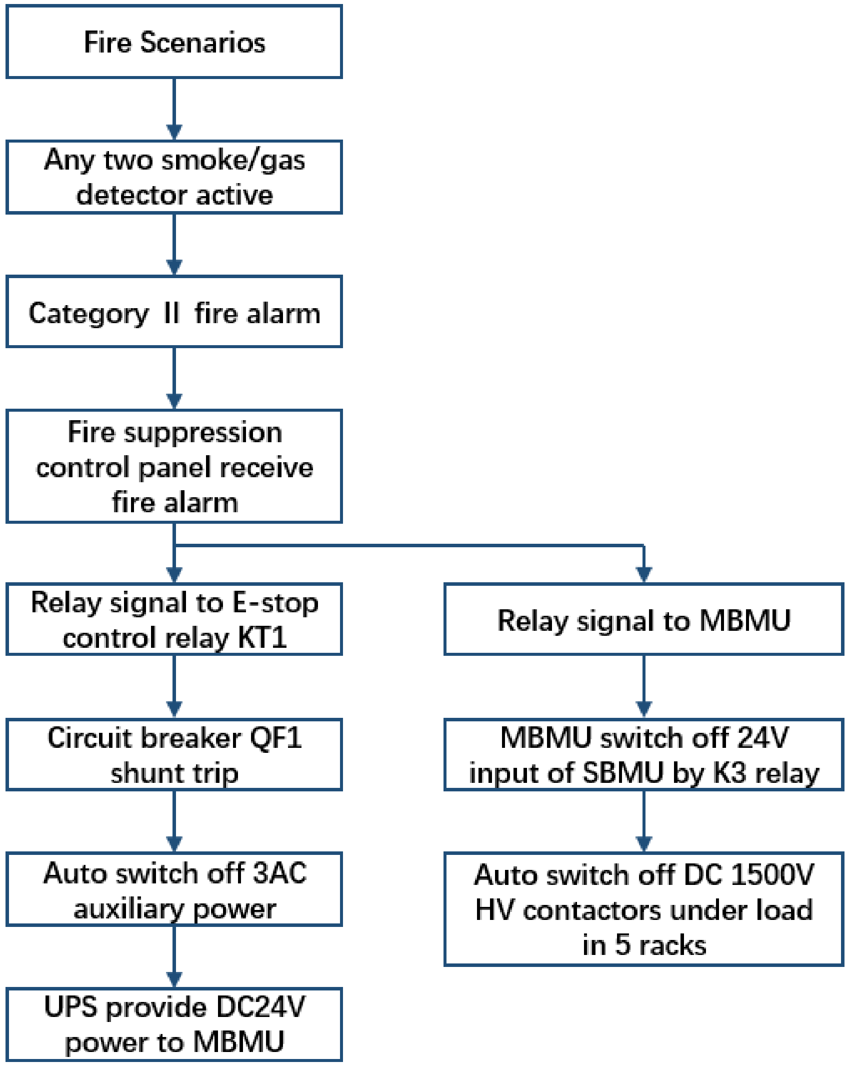


Figure 7-3 E-stop by fire alarm

8 Diagnosis of common abnormal problems

8.1 System status word

The system status can be read by BMS via register address.

Table 8-1 System level fault message

Level	Fault	Register	(Value =0, normal; Value ≠0, abnormal)
MBMU	Single cell overvoltage warning	0x0000	Bit0-Bit2
MBMU	Single cell under voltage warning		Bit3-Bit5
MBMU	Cell extreme over voltage warning		Bit6
MBMU	Cell extreme under voltage warning		Bit7
MBMU	Single cabinet over voltage warning		Bit8-Bit9
MBMU	Single cabinet under voltage warning		Bit10-Bit11
MBMU	Warning for big voltage difference of single cell		Bit12
MBMU	Cell voltage Invalid warning		Bit13
MBMU	Single cell under voltage Report for exchange warning		Bit14
MBMU	Single cell over voltage Report for exchange warning		Bit15
MBMU	Platform Reserved signal	0x0001	Bit0-Bit1
MBMU	Discharge over current warning		Bit2-Bit5
MBMU	Charge over current warning		Bit6-Bit9
MBMU	Current sensor warning		Bit10
MBMU	Platform Reserved signal		Bit11-Bit13
MBMU	Single cell over temperature warning		Bit14-Bit15
MBMU	Single cell over temperature warning	0x0002	Bit0-Bit1
MBMU	Single cell Under temperature warning		Bit2-Bit4
MBMU	Big voltage difference of single cell Warning		Bit5-Bit7
MBMU	SBMU master control box Over temperature warning		Bit8-Bit11
MBMU	SBMU master control box under temperature warning		Bit12-Bit14
MBMU	Single temperature sampling abnormal warning		Bit15
MBMU	Multiple temperature sampling abnormal warning	0x0003	Bit0
MBMU	Platform Reserved signal		Bit1-Bit4
MBMU	Main positive relay drive Short power supply warning		Bit5
MBMU	Main positive relay drive Short Ground warning		Bit6
MBMU	Main negative relay drive Short power supply warning		Bit7
MBMU	Main negative relay drive Short Ground warning		Bit8
MBMU	Pre-charge relay drive Short power supply warning		Bit9
MBMU	Pre-charge relay drive Short Ground warning		Bit10
MBMU	CSC Power Supply Drive Short Power Supply warning		Bit11
MBMU	CSC Power Supply Drive Short Ground warning		Bit12
MBMU	CSC Coded Drive Short Power Supply warning		Bit13
MBMU	Platform Reserved signal		Bit14
MBMU	SBMU Coded Drive Short Power Supply warning		Bit15
MBMU	SBMU Coded Drive Short Ground warning	0x0004	

8.2 Countermeasures of system alarm

If system failure mode is detected, the abnormal status will be divided into 5 level to distinguish the severity of failure, and then the system will automatically switching to a safety operating model according to following definition.

Table 8-2 Treatment measures of failure at different levels

Failure level	Severity degree	Alarm to EMS	BMS failure dry contact	HV Contactor response
CAT 1	Very Low	Report	close	No action
CAT 2	Low	Report	close	No action
CAT 3	Low	Report	close	No action
CAT 4	Medium	Report	close	Outage of failure single rack after 10s
CAT 5	High	Report	close	Outage of failure single rack immediately
CAT 6	High	Report	open	Outage of all battery racks after 10s
CAT 7	Very High	Report	open	Outage of all battery racks immediately

8.3 Countermeasures of abnormal conditions

When enable the battery rack, if it cannot work normally, please check the potential cause according to Table 8-3. At the same time, pay attention to check whether it is caused by external environment, such as temperature, noncompliant humidity or load overload. If the maintenance or replacement of spare parts is involved, the after-sales service procedure should be followed. Meanwhile, the disassembly and installation are not allowed without authorization.

This chapter contains only a few simple failure diagnosis procedures. If the answer to the diagnosis is not very unequivocal, or the information obtained is not enough to settle the problem, please contact the local office or distributor of the CATL.

Table 8-3 List of Failure diagnosis procedures

S/N	Failure or alarm phenomena	Possible cause of failure	Troubleshooting scheme
1	The green indicator light of the battery rack is not on	1. Poor contact of wiring harness	Check indicator light wiring harness
		2. SBMU failure	Replacement of SBMU

S/N	Failure or alarm phenomena	Possible cause of failure	Troubleshooting scheme
		3. Breakdown of indicator	Replacement of indicator light
2	The yellow indicator light of the battery rack is not on	1. Poor contact of wiring harness	Check indicator light wiring harness
		2. SBMU failure	Replacement of SBMU
		3. Breakdown of indicator	Replacement of indicator light
3	The red indicator light of the battery rack is not on	1. Poor contact of wiring harness	Check indicator light wiring harness
		2. SBMU failure	Replacement of SBMU
		3. Breakdown of indicator	Replacement of indicator light
4	Pre-charge relay cannot be closed	1. Poor connection of relay wiring harness	Check wiring harness connection
		2. Relay failure	Replacement of pre-charge relay
		3. SBMU failure	Replacement of SBMU
5	Main positive DC-contactor cannot be closed	1.Poor connection of main positive DC-contactor wiring harness	Check wiring harness connection
		2. Main DC-contactor failure	Replacement of main DC-contactor
		3. SBMU failure	Replacement of SBMU
6	Main negative DC-contactor cannot be closed	1. Poor connection of main negative DC-contactor wiring harness	Check wiring harness connection
		2. Main negative DC-contactor failure	Replacement of main negative DC-contactor
		3. SBMU failure	Replacement of SBMU
7	Adhesion of main positive DC-contactor	1. Damage of main positive DC-contactor	Replacement of main positive DC-contactor
8	Adhesion of main negative DC-contactor	1. Damage of main negative DC-contactor	Replacement of main negative DC-contactor
9	Abnormal power down of CSC	1. Abnormal CSC power supply wiring harness	Check CSC power supply wiring harness
		2. CSC failure	Replacement of CSC
10	Abnormal cell voltage detection	1. Poor connection of voltage detection wiring harness	Check wiring harness connection
		2. CSC failure	Replacement of CSC
11	Abnormal NTC temperature detection	1. Poor connection of temperature detection wiring harness	Check wiring harness connection
		2. Temperature sensor failure	Replacement of

S/N	Failure or alarm phenomena	Possible cause of failure	Troubleshooting scheme
			temperature sensor
		3. CSC failure	Replacement of CSC
12	Abnormal total voltage detection	1. Poor connection of total voltage detection wiring harness	Check wiring harness connection
		2. SBMU failure	Replacement of SBMU
13	Internal communication anomaly	1. Poor connection of internal CAN wires	Check CAN connecting wires by pluck and insertion
14	Anomaly caused by unconfigured system parameters	1. Unconfigured battery system parameters	Configure system parameters
15	Current sensor anomaly	1. Poor connection of 12V power harness wiring	Check wiring harness
		2. Poor connection of SCAN communication wires	Check wiring harness
		3. SBMU power generation anomaly	Replacement of SBMU
16	SBMU automatic shutdown	1. Poor connection of MBMU wake-up signal wires	Check wiring harness
		2. MBMU failure	Replacement of MBMU
17	cell over-voltage alarm	1. Poor equalization	Stop charging and standby equalization
		2. System overcharge	Stop charging
18	cell under-voltage alarm	1. Poor equalization	Stop discharge and standby equalization
		2. System over-discharge	Stop discharge
19	NTC over-temperature alarm	1. Excessive temperature of individual NTC	Check whether the air conditioner is in operation
		Excessive charging-discharge current	Appropriately reduce charging and discharge current
20	NTC under-temperature alarm	1. Lower temperature of individual cores	Check whether the heating function is on (if the equipment cabinet has heating function)
		2. Lower ambient temperature	No charging
21	Charging over-current alarm	1. Excessive current of system charging	Reduce charging power
22	Discharge over-current alarm	1.Excessive current of system discharge	Reduce system load

S/N	Failure or alarm phenomena	Possible cause of failure	Troubleshooting scheme
23	Alarm of higher SOC	1.The system power is full (overcharged)	Stop system charging
24	Alarm of lower SOC	1.The system power is too low (over-discharge)	Stop system discharge
25	Alarm of higher monomer temperature difference	1.Non-uniform heat dissipation of equipment cabinet	Check whether the air conditioner is on
		2. Temperature sensor failure	Replacement of temperature sensor
26	Alarm of higher monomer voltage difference	1.Excessive difference of cell capacity	Battery system can be charged to over 80% SOC, with standby equalization
27	SOC difference alarm	1. The electric quantity difference of different battery racks is too large	—— ——
28	Abnormal alarm of equalization circuit	1. Equalization abnormal CSC board	Replacement of CSC board

8.4 After-sales Service

CATL will provide clients with a full range of technical support and after-sales service. Users can gain services by dialing our service number. Service Number: 86 **400-918-0889**

Please refer to the contract for the free warranty service information.

The following circumstances are not within the scope of our free warranty service:

System damage or failure caused by not following the user manual.

Damage or failure caused by not following the relevant electrical safety specifications for wiring and power supply or caused by poor site environment.

System damage or failure caused by users' private modification.

System damage or failure caused by irresistible natural factors, such as typhoon, earthquake, flood, fire or harsh environment (high temperature, low temperature, high humidity, acid rain, etc.).

After the failure occurs, the user fails to maintain the initial failure state, fails to timely notify the manufacturer and handles without authorization, thus causing it is unable to make a practical fault identification of the failure causes.

9 Product Maintenance

During whole product lifecycle, abnormal operating must be avoid, regular maintenance in Table 8-1 is mandatory to ensure safe and reliable operation and acquire an optimal performance for system.

Table 8-1 Product maintenance category

No.	Components	Checking items	Description	Frequency
1	Container	Coating （*）	Check whether the surface coating of the container is warped, cracked, peeled, rusted, etc.	Annual
2		Label & nameplate	Check whether the labels and nameplates have abnormal phenomena such as falling off, blurring and tilting.	Annual
3		Water traces	Check whether there is obvious water ingress or water ingress in the container.	Semi-Annual
4		Biological invasion	Check whether there are any living things (rodents) in the air conditioner, water-cooled unit compartment, electrical compartment, and battery compartment.	Semi-Annual
5		Battery compartment	Check the dust situation inside the container. If the pollution is particularly serious, it is necessary to find the location from where the dust enters.	Semi-Annual
6		Abnormal odor （*）	Check whether there is a pungent odor or burning paste odor in the container (short cycle inspection does not require opening the container door).	Semi-Annual
7		Battery compartment door	Check whether the battery compartment door limit lever functions normally and whether	Annual

			there is any deformation damage.	
8		Corrosion of parts	Check whether there is corrosion of structural parts, frames, etc. caused by water accumulation inside the container.	Semi-Annual
9		Floor drain	Check whether the floor drain function is normal.	Semi-Annual
10		Abnormal sounds （*）	Check whether there is a crackling sound during system operation (short cycle inspection does not require opening the container door).	Semi-Annual
11		Internal identification	Check whether labels such as master control box, subcontrol box, ditribution box have any abnormal phenomena such as falling off, not being able to see clearly, and cocking.	Annual
12		Door seals	Check whether the sealing strip of each door of the container is dirty, broken, falling off, or not installed in place.	Annual
13		Ambient temperature and humidity	Check whether the ambient temperature and humidity record and check whether the temperature and humidity is within the allowable range.	Semi-Annual
14		Indicator （*）	Check whether the indicators are normal or not.	Semi-Annual
15	Fire suppression system	Gas detector	Check whether the gas detectors are normal or not.	Annual (or refer to local rules)
16		Smoke detector	Check whether the smoke detectors are normal or not.	Annual (or refer to

				local rules)
17		Temperature detector	Check whether the temperature detectors are normal or not.	Annual (or refer to local rules)
18		Smoke&gas trigger	Check whether the alarm function is normal when the smoke and gas detector triggered at the same time.	Annual (or refer to local rules)
19		Temperature&smoke trigger	Check whether the alarm function is normal when the temperature and smoke detector triggered at the same time.	Annual (or refer to local rules)
20		Connectors	Check whether the smoke and temperature sense are installed and tightened, and the wiring harness connection is normal.	Annual (or refer to local rules)
21		Aerosol (optinal)	Check whether the aerosol starting line is damaged, the aerosol is installed firmly, the appearance is damaged, the aerosol reaches the service life.	Annual (or refer to local rules)
22	Chiller	Filter	Check whether the air inlet filter is blocked	Semi-Annual
23		Ventilation hood	Check whether there is dust in the ventilation hood.	Semi-Annual
24		Heating mode function	Check whether the heating mode function is normal.	Semi-Annual
25		Cooling mode function	Check whether the cooling mode function is normal.	Semi-Annual
26		Sleeping mode function	Check whether the sleeping mode function is normal.	Semi-Annual
27		Interface	Check whether there are obvious liquid leakage marks at each interface	Semi-Annual

			position of the unit and water cooling pipe.	
28		Abnormal sounds （*）	Check whether the chiller has abnormal noise during operation (mechanical impact sound/whistle sound).	Semi-Annual
29		Operational status monitoring	1. Check the operation process. Judged by the operation status TMS_RunState in the Cooling interface of the BMS monitor, Cooling is refrigeration, Hot is heating, Cycling is self-circulation, and Stop is shutdown. 2. Check the TMS outlet pressure and return pressure in Cooling interface when the unit is running for 5 minutes without shutdown, and meet the pressure value ≥x bar.	Semi-Annual
30		Fault monitoring	Check the chiller's working condition based on BMS.	Semi-Annual
31		Water pressure and temperature monitoring	The BMS monitor reads the inlet and outlet temperature and water pressure to check whether it is within the normal range.	Semi-Annual
32	High and low voltage wiring harnesses	Harness appearance	Check whether the wiring harness is damaged, ablated or aged.	Semi-Annual
33	High and low voltage connectors	Connector appearance	Check whether the connector is yellowing, blacking or even ablated.	Semi-Annual
34		Connector connection reliability	Shake the connector plug to see if the connector interface is loose.	Semi-Annual

35	Energy storage system	Common-mode voltage troubleshooting--**sopt check , one for each project**	The waveforms of DC-to GND and DC +to GND under five working conditions (standby/shutdown, zero-power floating charge, full-power charge, full-power discharge, standby-to-charge) were collected and analyzed by oscilloscope. PCS terminal AC A-to-ground, B-to-ground waveform.	Annual
36		Equipotential connecting wire	Check whether the equipotential connecting wire of the electric cabinet is complete.	Semi-Annual
37		Equipotential detection	Measure the resistance of the electric box shell to the equipotential site of the electric cabinet.	Semi-Annual
38		Insulation test	Insulation detection with a multimeter.	Semi-Annual
39		BMS monitor inspection	Read voltage difference by BMS monitor.	Semi-Annual
40		Historical data collection	Collect local 6-month operation data for analysis.	Semi-Annual
41		SOH statue analysis	Refer to the collected data, analyze the SOC consistency, historical failure, voltage difference and other information of the battery.	Semi-Annual

"Note:

1.This is a general about CATL preventive maintenance services, for details, please contact CATL service email: S-CustomerCenter@catl.com

2.CATL provide paid preventive maintenance services during warranty period.

3.Service call center：GSS-CustomerCenter@catl.com

3.Maintenance items with asterisks (*）mean that the customer can perform them themselves and will not be counted into the preventive maintenance hours.

4.It is the minimum requirement that an overall annual preventive maintenance shall be carried out to the ESS.

5.It is recommended that ESS preventive maintenance be conducted twice a year, one basic semi-annual inspection and one overall annual checklist.

6.Preventive Maintenance shall be scheduled and carried out as required by CATL ESS User Manuals. Where laws and regulations provide otherwise provisions on the preventive maintenance, such provisions shall prevail.

9.1 Battery System Maintenance

9.1.1 Maintenance instructions for normal operating system

Perform battery maintenance according to following plan on the system every twelve months to prevent battery damage.

1) **Plan 1（This plan is applicable when SOC of the battery system is low）**

- Discharge the battery system to the cut-off condition (the lowest voltage<2.5V), then stop discharging, standing for 1 hour.
- Full charging automatically to the battery system (The highest voltage>3.65V), after charging, standing for 1 hour.
- Discharge the battery system to 30% and stop

2) **Plan 2 （This plan is applicable when SOC of the battery system is high）**

- Full charging automatically to the battery system (The highest voltage>3.65V), after charging, standing for 1 hour.
- Discharge the battery system to the cut-off condition (the lowest voltage<2.5V), then stop discharging, standing for 1 hour.
- Charge the battery system to 30% and stop

	CAUTION
	1. Check to ensure environmental safety, system safety, no alarm, no fault before performing maintenance operations. 2. After the battery maintenance of ESS is completed, it’s suggested to notify CATL after-sales engineer to perform data analysis for free.

9.1.2 Maintenance instructions for long duration idle mode after COD date

- Suggested SOC range of battery storage: 30%~60%.
- If the battery system keep on idle mode more than 90 days, the battery is suggested to have SOC equal or above 50%. 3.1Vdc shall in any case be considered as a minimum voltage level for per cell, in case that this voltage level is reached, battery system must be recharged immediately
- Battery capacity test about 100% SOC charge and 0% SOC discharge must be conducted every 12 months
- When recover the system from idle mode over 90 days to discharge/charge mode, the battery system must perform SOC calibration applying one of the possible methods, including:
  - Static Calibration
  - Dynamic Calibration
  - High Voltage Calibration
- The minimum cell voltage should not be less than **2.0 V** in any case， Otherwise, the battery will over-discharged and may not be repaired.

	CAUTION
	1. The minimum cell voltage (Static voltage) should not be less than 2.5 V in any case; otherwise, the warranty will be invalid. 2. The minimum cell voltage (Static voltage)should not be less than 2.0 V in any case; otherwise, the battery will be over-discharged and may not be able to be repaired.

Spare Batteries are shipped out from CATL at SOC=23%

- The initial maintenance of the spare battery needs to be conducted after 12 months period. Charge the battery to 50% SOC (Equipment used: Pack-level charge and discharge machine)
- After the initial recharge, charge the battery once a year. Charge the battery to 50% SOC. (Equipment used: Pack-level charge and discharge machine)
- The spare parts should be maintained as follows before use.

  First discharge the battery until the minimum cell voltage is 2.5V; evaluate the battery consistency according to the OCV curve table, if the SOC imbalance (that is, the SOC corresponded to average voltage – the SOC corresponded to the lowest cell voltage)> 5%, you need to perform balanced maintenance first. (Equipment used: Pack-level charge and discharge machine、Equalization equipment)

Remark:

Charging duration (h) = (target SOC - current SOC)*nominated capacity (Ah)/machine constant charging current (A)

Discharging duration (h) = (current SOC - target SOC)*nominated capacity (Ah)/machine constant discharging current (A)

9.1.3 Battery system inspection

Conduct an inspection of ESS every 12 months and make inspection record.

9.2 Container enclosure maintenance

	CAUTION
	The enclosure is not allowed to have rust, bend structure during whole product lifecycle

Conduct an inspection of Container every twelve months and make inspection record, if the paint on the surface have following damage scenarios, repaint it according to the following steps.

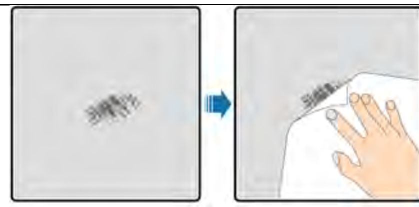
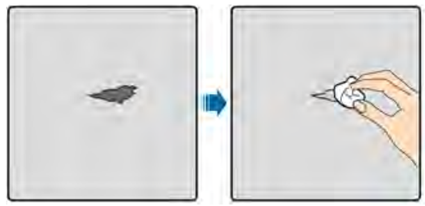
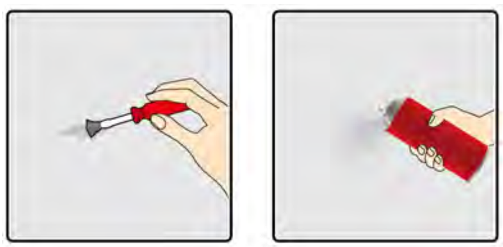
- Shallow scratch (not exposed steel substrate)
- A stain or rust that cannot be wiped
- Deep scratch (damage of primer, exposure of steel substrate)

➢ **Precondition**

- In the outdoor environment without shelter, it is strictly forbidden to repaint in bad weather。
- Prepare the corresponding paint with the same color of the container surface.
- Visually inspect the severity of the surface paint damage of the container, prepare corresponding tools and materials, and evaluate the quantity of materials on site based on the repainting situation.
- Paint that meets requirements has been prepared based on the paint surface color number **RAL7042** of containers.
- The exterior of the container should be intact. If the paint on the surface of the container is damaged or broken, repaint it immediately.
- Tools and Materials: Hand spray paint or paint, brush (for painting a small area), fine sand paper, anhydrous ethanol, cotton cloth, and spray gun

➢ **Procedure**

Step	**Procedure**
1	Gently polish the damaged area with fine sandpaper to remove dirt or rust.

	
2	Moisten the cotton cloth with anhydrous ethanol, wipe the polished area or area to be repaired, remove dirt and dust, and wipe dry with a clean cotton cloth. 
4	According to the damage degree of the paint, evenly apply paint to the damaged coating by using one of the following methods until no damage is visible: 1. A small number of scratches and small area of stains, rust recommended to use hand spray paint or brush paint. 2. A large number of scratches and large areas of stains and rust should be sprayed with a paint spray gun. 
5	Leave the paint on for 30 minutes, and then observe whether the repainting area meets requirements.

	CAUTION
	If the substrate is exposed in the area to be repaired, paint primer until the substrate is not exposed after the paint dries, and then apply middle layer paint and polyurethane topcoat. Use primer or polyurethane top coat of the corresponding color.

	CAUTION

	Note that the paint film should be as thin and even as possible. The paint film should not be droplet shape and the surface should be smooth. If there are different colors on the box body pattern, use adhesive tape and white paper to cover the parts of other colors except the damaged paint before painting, so as to avoid contamination of the parts of other colors during painting repair.

	CAUTION
	The paint patch area should be consistent with the color of the surrounding area, without obvious boundaries, obvious bumps, damage marks, and paint peeling phenomenon. If the user want to spray paint, it’s advised to spray it three times and then check whether it meets the requirements. If not, repeat until the requirements are met.

9.3 Maintenance requirements for Thermal Management System

9.3.1 Instructions of Chiller Maintenance:

- It is strictly forbidden to let the unit work when there is no coolant in the waterway;
- It is strictly forbidden to operate the unit under the condition of soaking in water;
- It is strictly forbidden for personnel to touch the unit while the unit is running;
- It is strictly forbidden to disassemble by non-professionals
- It is strictly forbidden for the unit to be squeezed by heavy objects
- Use a vacuum cleaner to clean the condenser, radiator and air inlet and outlet of the unit every three months (no water);

9.3.2 Instructions of Coolant Maintenance:

Replace the coolant every five years or the coolant is degraded below any of the following levels.

- PH value < 6.5 or PH value > 9.5
- Chloride concentration > 60ppm
- Appearance: turbid coolant with impurities such as precipitated particles or flocculent impurities that are easily seen as shown below:

Turbid coolant:	Normal coolant:

If coolant has not degraded below any of the conditions described above by YAE, existing coolant can be used until the next scheduled inspection (every 5 years).

The coolant element is EC-45, only following approved supplier & type can be used

Table 8-2 Coolant element

Coolant	**Supplier**	**Supplier type**	**Mark**
EC-45	BASF	G30-45	
	SINOPEC	CNSH OEVC-45	
	Lopal Tech	**JSLP L70-45**	**Default type**

	CAUTION
	Mixed coolant from different supplier or type is not allowed, otherwise, the cooling capacity will be lost.

	CAUTION
	Any damage to the relevant parts of the battery compartment caused by using other coolants which are not recommended or approved by CATL is not covered by the warranty.

9.4 Spare parts

The detail spare parts list can be provided order by order, the range of spare parts is pre-defined as following：

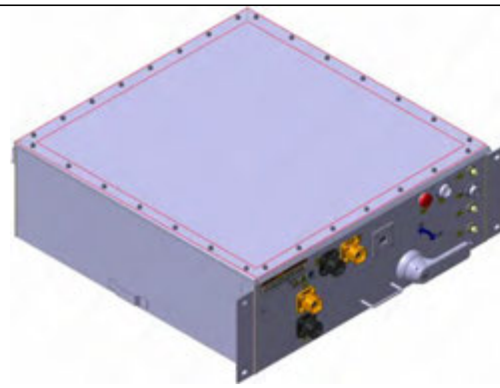
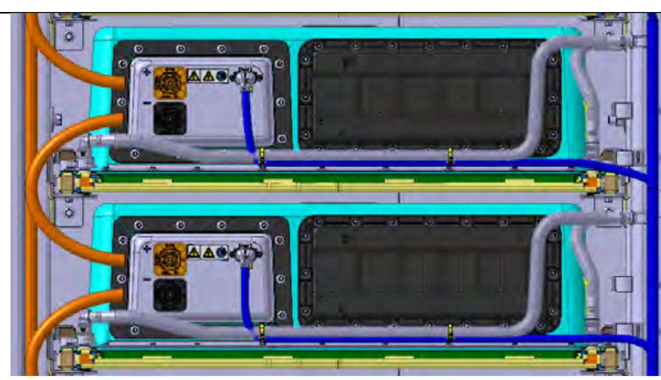
- Master control box and its sub components
- Sub control box and its sub components
- Battery module and CSC module
- Fire Suppression System components

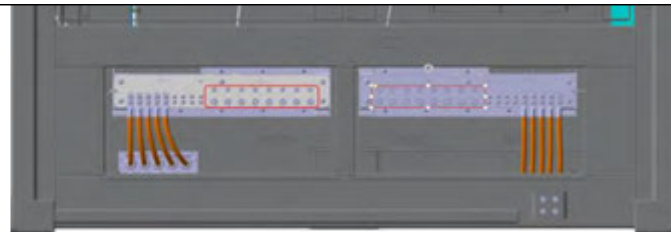
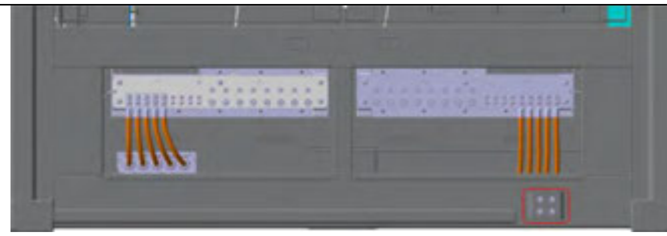
- Thermal Management System components
- LV components of distribution box
- Enclosure

9.5 Fastener type and torque requirement

Any assembly and disassembly maintenance, following fastener type and torque requirement must be followed.

Table 8-3 Fastener type and torque requirement

Module	Screw type	Torque	Fixed point
Sub control box	M6x16, Hexagon bolt with flange	8N.m	
Cover plate of Sub control box	M5x17, Hexagon bolt with flange	5N.m	
Cover Plate of air tightness test in sub control box	M5x17, Hexagon bolt with flange	5N.m	
Battery module	M8x20, Hexagon bolt with flange	25N.m	

Module	Screw type	Torque	Fixed point
HV Connection of DC Combiner	M12x35, Combination Hexagon bolt	50N.m	
Earthing point	M12x35, Combination Hexagon bolt	50N.m	
Cover Plate of Master control box	M4x12, Cross recessed hexagon bolt	2N.m	

10 System Decommissioning & Removal

Contact CATL Service before attempting to decommission or remove a system. CATL equipment is designed for end-of-life management through recycling and materials reclamation, tasks which are normally handled by CATL-qualified partners. CATL Energy Storage can supply a list of qualified partners in your area to help ensure proper disposal of retired equipment.

11 Emergency Plan

After anomalies and accidents occur in battery system, correct and effective treatment measures shall be taken in time to deal with the problems in order to eliminate further damage and enlarged losses. The detail emergency plan can be separated provided.

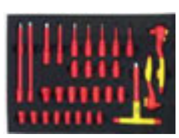
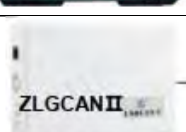
Appendix 1：Inspection Checklist

No.	Inspection Items	Inspection Methods and Criteria	Tools	Type of Inspection	Inspection Results
1	Common-mode voltage check	Collect the DC- to GND and DC+ to GND waveforms under five operating conditions (standby/shutdown, zero-power floating charge, full power charge, full power discharge, and standby to charge) with an oscilloscope for analysis. Refer to the SOP for Common-Mode Voltage Check Oscilloscope for ESS Products	Oscilloscope/isolating probe/multimeter, etc.	First maintenance	
2	Historical data collection	Collect local operating data in the last one month and upload it to the cloud storage; name the folder as assembly PN + collection time.	USB flash drive	First maintenance	
3	Rack tightness check	Visually check whether the sealing strip of the rack door comes off or is damaged	Visual check	Routine inspection	
4	Inspection of the labels and nameplates	Visually check whether the label and the nameplate come off and take photos	Visual check	Routine inspection	
5	Condensate check	Check whether there are traces of condensate and water flow on the inner wall, the top and other visible areas of the container, and take photos if any.	Visual check	Routine inspection	
6	Cabinet body check	Check whether the surface of the electrical cabinet is deformed, rusted, damaged or peeling off	Visual check	Routine inspection	
7	Cabinet insulation test	Test the insulation resistance of the DC terminal with PCS, ≥10MΩ; Test condition: test the insulation under	Insulating meter	In-depth inspection	

		1,500V DC voltage and check whether the stable insulation resistance is ≥20MΩ.			
8	Confirmation of equipotential bonding and grounding of the system	1. Visually check whether the equipotential bonding wire and grounding wire of the system are intact. 2. In the container/cabinet, measure the resistance of the pack housing to the equipotential point of the cabinet, with the value <0.1 Ω as the acceptable one;	Visual check/multimeter	Routine inspection	
9	Fixing bolts of the pack	Check whether the bolts are loose or fall off, and tighten or reinstall them if yes.	Visual check/wrench	Routine inspection	
10	Spill check	Check whether there is any irritating smell in the cabinet	Smelling	Routine inspection	
11	Harness (HV connector/HV harness in the control cabinet)	1. No missing parts, interference, damage or dirt 2. No looseness, with reliable connection and installation 3. No ablation or damages caused by squeezing 4. Consistency of the line markings, without damage or falling off.	Visual check	Routine inspection	
12	Harness (HV connector/HV harness in the control cabinet)	With the system in operation, use a handheld thermal imaging camera to measure the temperature of the first three cabinets of the system and take photos; check whether the temperature rise exceeds 50°C (temperature measured by the thermal imaging camera minus the room temperature);	Thermal images	In-depth inspection	
13	Electrical parts check	Check whether there is any crackle or burning smell during the operation of the system	Visual check/smelling/listening	Routine inspection	
14	Water cooling pipes	Whether the water cooling pipes are damaged	Visual check	Routine inspection	
15	BMS monitor inspection	1. Read the software version 2. Check whether there is any alarm in the system. 3. Check whether the cell voltage difference is ≤300 mV (dynamic, full range) or the cell voltage difference is ≤100 mV (dynamic, 30%-80% SOC) 4. Read the net outlet temperature and	BMS monitor	Routine inspection	

		pressure with the BMS monitor to confirm whether they are within the normal ranges. 5. Check whether the disk space of the IPC is full, and back up the data of the past year.			
16	Historical data collection and analysis	Collect local operating data in the last. Upload the data to the cloud storage if no portable servicer is available; name the folder as assembly PN + collection time. Carry out the local analysis with a portable servicer if it is available.	USB flash drive, portable servicer	In-depth inspection	
17	Capacity testing	By project, perform the capacity testing using the capacity test method provided by SC (capacity test requirements in the acceptance report).	/	In-depth inspection	
18	Ambient environment	1. Ensure the channels/pipes are not blocked2. Check whether the plant and the container leak and check the humidity	Visual check	Routine inspection	
19	Fire protection system	1. Obtain a list of firefighting facilities from the energy storage power station and confirm whether the firefighting facilities are complete 2. Confirm whether there is a third-party fire safety inspection record	Visual check	Routine inspection	
20	Fire protection system	Check whether a third party has performed a professional inspection over the fire protection system and maintained an inspection record.	/	In-depth inspection	
21	UPS power supply	Check whether the UPS indicator and the UPS battery work.	Visual check	Routine inspection	

Appendix 2： Maintenance Tools and Equipment List

Number	Name	Photo	Specification	Recommend Brand
1	Insulated gloves		Insulation grade ≥1500V	Tianjin ShuangAn
2	Insulated shoes		Insulation grade ≥1500V	Shida
3	Protective mask or glasses		S200A-普通型 L ordinary typeL (GB14866-2006)	Honeywell
4	Insulated socket wrench		Insulation grade ≥1500V 09267-20 pieces 12.5MM series VDE Insulating sleeve kit	Shida
5	Auto repair full set of special tools		120+1 pieces 6.3*10*12.5MM series	Shida
6	ZLG		ZLG-USBCAN-II	ZLG

7	ValueCAN4		2Can FD channel 64 bit timestamp accuracy reaches 25 nanoseconds	Intrepid
8	Lifting forklift	TBD	**TBD**	TBD
9	数显扭力扳手 Digital torque wrench		examination range 1.5N.M-30N.M accuracy 4% Recommended model：WE2-030	WIZTANK
10	Multimeter		DC voltage range can reach 1500V Recommended model：HD-160C	Fluke
11	Insulation meter/megge r		Insulation test voltage level 2500V Recommended model： F1535	Fluke
12	Clamp flow meter		DC current range 600A Accuracy 1%+4 Recommended model：Fluke-317	Fluke
13	Portable airtight tester		Detecting pressure： 0～500Kpa Balance time：0～ 999.9s Differential pressure measurement range：-990Pa～ +990Pa testing time：0～ 999.9s Leakage	Gu Heng

			measurement range：0 ~ 999.9mL/h Resolution：1Pa	
14	Pack-level charge and discharge machine		Charge/discharge voltage: 2-260V Charge/discharge current: 0~80A Recommended model:FCF-651CT	Fu Guang
15	Equalization equipment		Balanced constant current：0~5A; Current control accuracy：±0.1A; Current acquisition accuracy：±3mA; 2 channels and 12 channels Recommended model: ACTM-5201	Fu Guang
16	Coolant injection and discharge tool	 	It consists of control panel， air exhaust tool ,coolant injection tool and coolant discharge tool.	Air-internation al Schlemmer