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| **Docket Number:** | 03-AFC-02C |
| **Project Title:** | Los Esteros Phase II Compliance |
| **TN #:** | 229305 |
| **Document Title:** | Los Esteros Critical Energy Facility Responses to Staff Data Requests Set 2.A1-A6 and Minor Revisions to Proposed Modification |
| **Description:** | N/A |
| **Filer:** | Eric Janssen |
| **Organization:** | Ellison Schneider Harris & Donlan LLP |
| **Submitter Role:** | Applicant Representative |
| **Submission Date:** | 8/9/2019 12:51:23 PM |
| **Docketed Date:** | 8/9/2019 |

**LOS ESTEROS CRITICAL ENERGY FACILITY, LLC**

**717 TEXAS AVENUE**
**SUITE 1000**
**HOUSTON, TX 77002**

August 9, 2019

John Heiser
Compliance Project Manager
Siting, Transmission and
Environmental Protection (STEP Division)
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814
John.Heiser@energy.ca.gov

RE: Los Esteros Critical Energy Facility (03-AFC-02C): Energy Storage Amendment-- Responses to Staff's Data Requests, Set 2, A1 through A6 and Minor Revisions to Proposed Modification

Dear Mr. Heiser:

On behalf of the Los Esteros Critical Energy Facility ("Project"), Los Esteros Critical Energy Facility, LLC ("Project Owner") submits the following responses to California Energy Commission ("Commission") Staff's Data Requests Set 2, A1 through A6. The Project Owner is also submitting minor revisions to the Proposed Modification to incorporate additional areas where the battery energy storage system may be located.

If you have any questions regarding these responses, please contact Barbara McBride at 925-570-0849 or Barbara.McBride@calpine.com.

Sincerely,

/S/

Barbara McBride

## MINOR REVISIONS TO PROJECT DESCRIPTION

Page 2-1 of the Petition for Modification submitted by the Project Owner (TN#: 221243-2) provides the proposed location for the battery energy storage system ("BESS"). To provide additional flexibility in the location of the BESS, the Project Owner proposes to add an additional potential location for either all or some of the BESS components. This additional area is located south of the power distribution center, and is an approximately 150-foot by 150-foot area currently covered with rip rap. The additional potential location is depicted in Attachment A.

## HAZARDOUS MATERIALS MANAGEMENT

**A1. Please provide the volume and composition ranges of the titanium-manganese electrolytes required for 6 MW with up to 18 MWh energy storage capability.**

**RESPONSE:** The titanium-manganese electrolyte volume for 3MW/18MWh would be 1,440 $m^3$ (60 $m^3$ per a tank).

**A2. Please confirm that the 6 MW and 18 MWh are still correct for the energy storage capability of the titanium-manganese flow battery. In addition, please provide an estimate as to how many containers would be required to meet the 6MW/18 MWh.**

**RESPONSE:** The Project Owner proposes installation of a 3MW BESS, with up to 18 MWh of energy storage capability, which would consist of approximately 12 battery containers (20 ft), 24 tank containers (40 ft), one PCS container (40 ft) and one BMS cubicle. The BESS will utilize either titanium manganese flow batteries, lithium ion batteries, or a combination of both. Potential configurations of the titanium-manganese flow BESS are provided as Attachment B.

**A3. Please provide a preliminary drawing showing the configuration of the titanium manganese flow battery installation. Please clearly label the location of the negative and positive electrolyte tanks.**

**RESPONSE:** Please see Attachment B.

**A4. Please explain how secondary containment would be provided for the negative and positive electrolyte tanks, and whether potential mixing of positive and negative electrolytes in a secondary containment would be a problem due to incompatibility.**

**RESPONSE:** The tank container has a two-layer structure in its wall. The internal layer is made up of a rubber tank, which stores the electrolytes, and a stainless steel external layer, which works as a secondary containment. Secondary containment will prevent any spilled electrolyte from leakage to environment. According to the manufacturer, when the electrolytes mix, the only effect is an increase of electrolyte temperature that will not significantly affect the system or result in an electrolyte leak outside of the container. Assuming a complete mix of all electrolytes, the maximum temperature of the mix would be about 65 degrees Celsius. A design concept of the containment structure is provided as Attachment C.

## WORKER SAFETY AND FIRE PROTECTION

**A5. Please provide a written narrative detailing what fire protection, fire alarm and life safety systems would be provided for the titanium-manganese flow battery installation. Please clarify if the fire suppression system would be water, a clean agent, or both.**

**RESPONSE:** There is no combustible material in the proposed flow battery, and the manufacturer typically does not require a fire suppression system in the BESS. The Project Owner anticipates installation of a fire alarm, as described in Data Response A21, and installation of a fire extinguisher near the battery cubicle. If a fire alarm is activated, either water or the fire extinguisher can be used to suppress the fire. In terms of life safety systems, eye wash stations around the battery systems will be installed.

**A6. Please provide any information that shows that the titanium-manganese flow battery would be certified as UL 9540 compliant**.

**RESPONSE:** The batteries are certified to UL-1973 prior to shipment from the manufacturer. Following construction and installation of the BESS, a UL or a UL certified 3rd party will inspect the BESS and certify it as UL 9540 compliant.

**Los Esteros Critical Energy Facility (03-AFC-02C): Energy Storage Amendment**
**Responses to Staff's Data Requests, Set 2, A1 through A6 and**
**Minor Revisions to Proposed Modification**

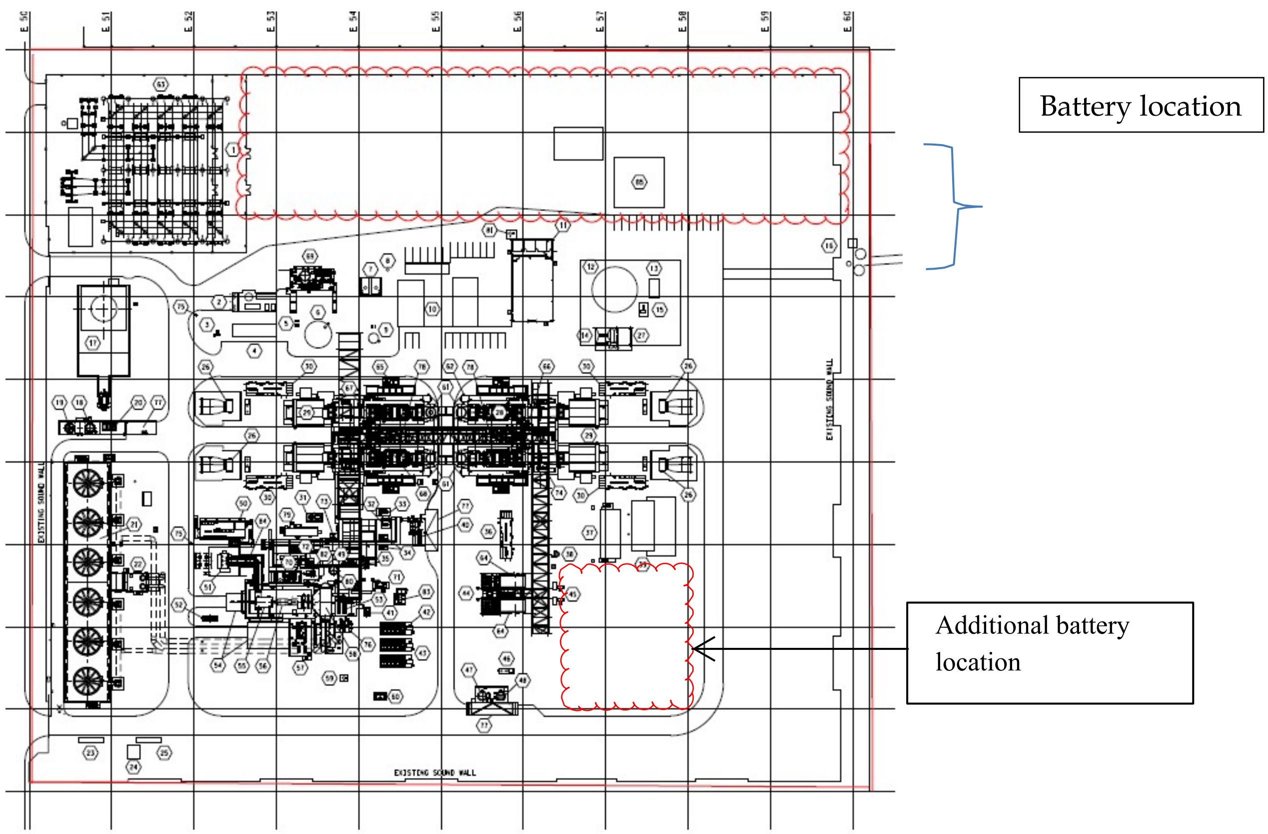
# ATTACHMENT A

**SECTION 2.0**

# Description of Project Modifications

This section includes a description of the proposed project modifications, consistent with CEC Siting Regulations (Title 20, CCR, Section 1769 (a) (1) (A)). The battery installation will be located on the north end of the existing property east of the switchyard inside the fence line. The project map below indicates the area that the batteries will be located. The project includes a three (3) megawatt (MW) battery energy storage system (BESS) ~~an installation of up to 6 MW vanadium flow battery~~, with up to 18 MWh of energy storage capability, ~~and/or an additional installation of up to 6 MW~~ utilizing either titanium-manganese flow batteries, lithium-ion (Li-ion) batteries ~~Battery~~, or a combination of both. ~~with up to 6 MWh of energy storage capability. These energy storage systems are~~ The BESS is comprised of the storage device, the interconnection and the communication system. The system layout will be ~~approximately 167 ft. wide x 112 ft. length and~~ approximately 20 ft. in height. The energy storage system will be located on a concrete foundation with secondary containment. The potential locations for the BESS are depicted below.

In addition, the project will include an interconnection of the battery to the existing 4160V auxiliary bus thru which energy will flow to and from the grid using existing electrical infrastructure and installation of a new and separate revenue meter for monitoring flow battery activity.



**Los Esteros Critical Energy Facility (03-AFC-02C): Energy Storage Amendment**
**Responses to Staff's Data Requests, Set 2, A1 through A6 and**
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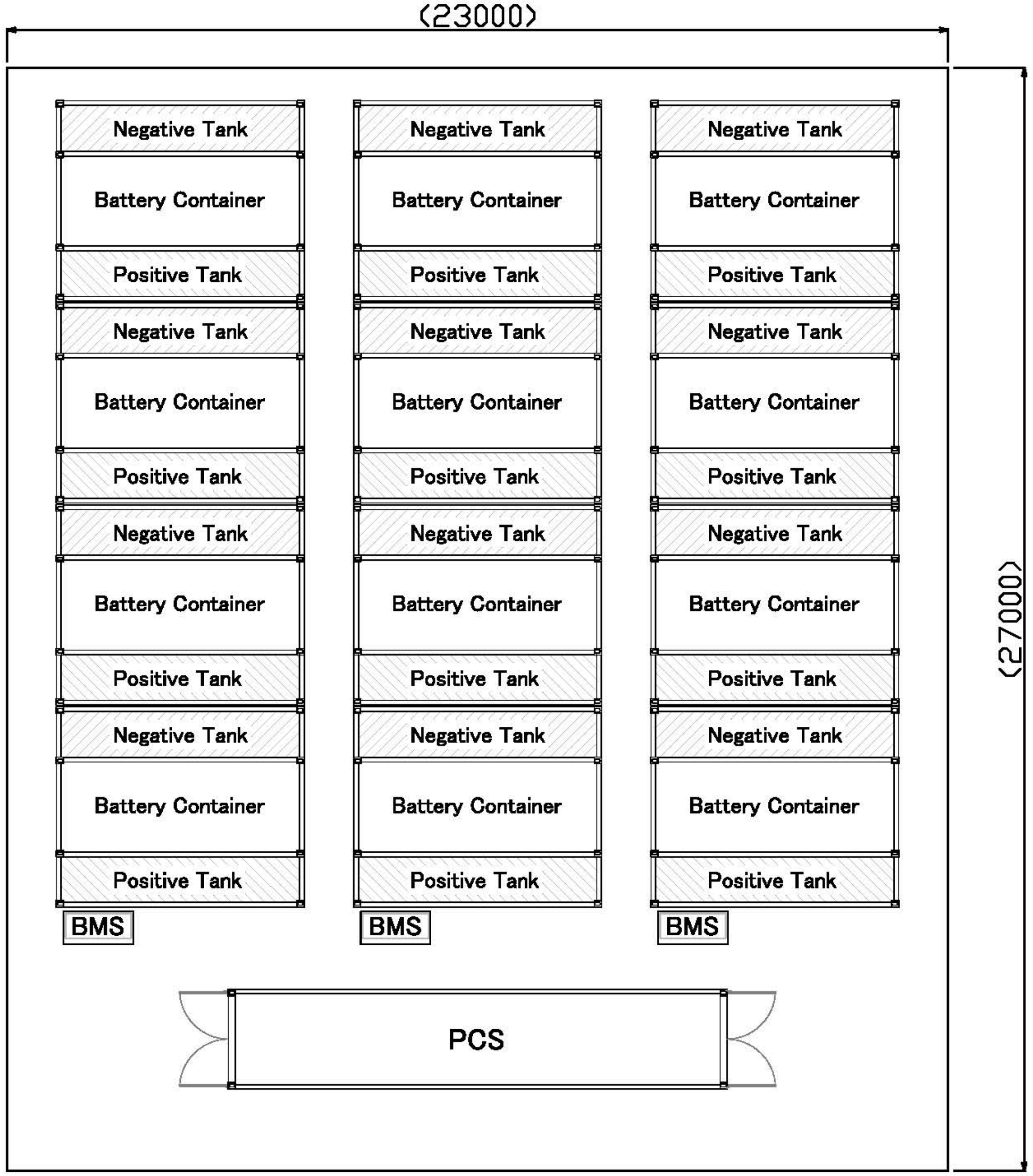
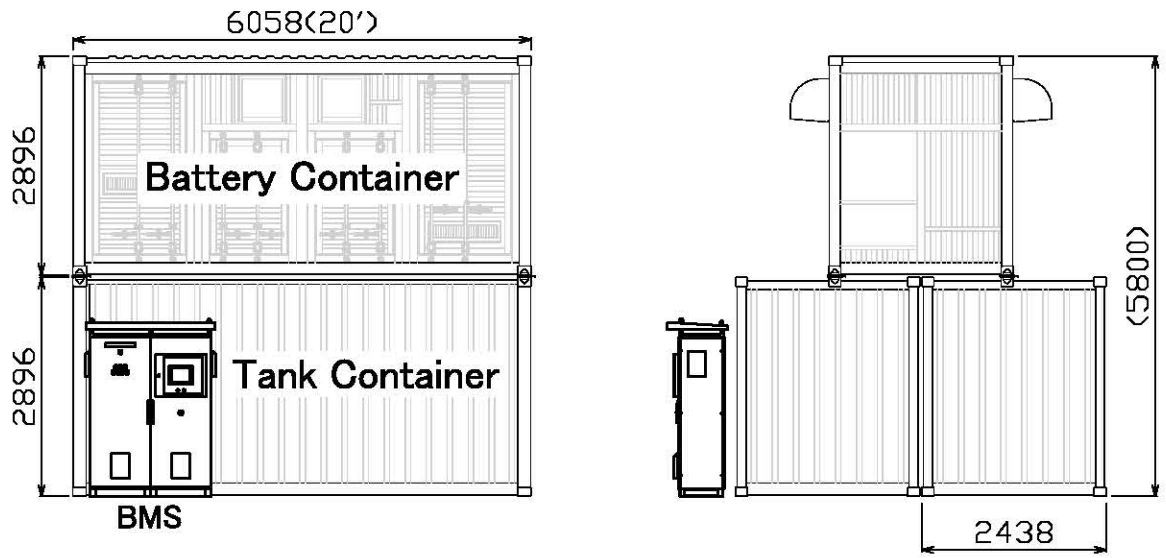
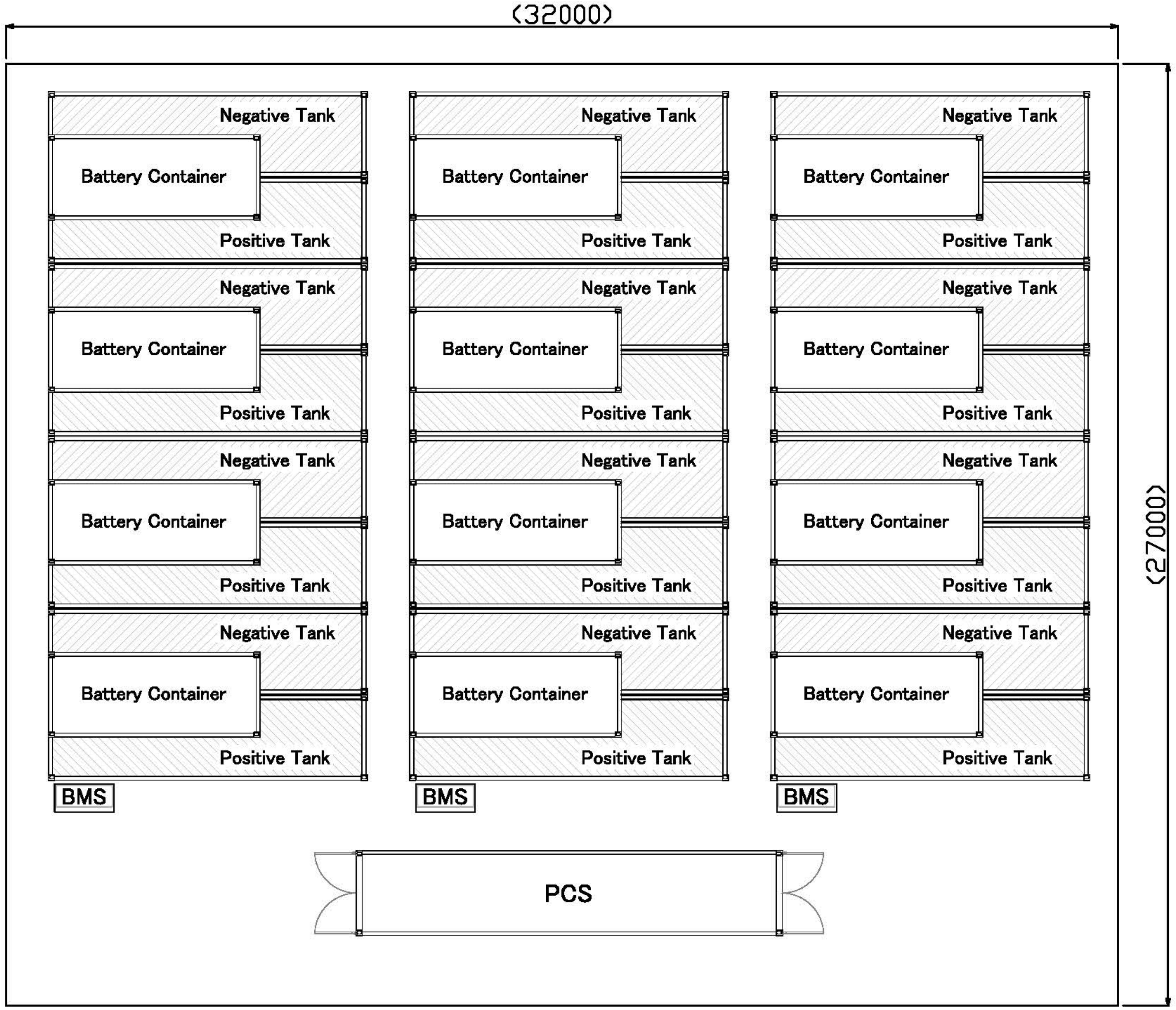
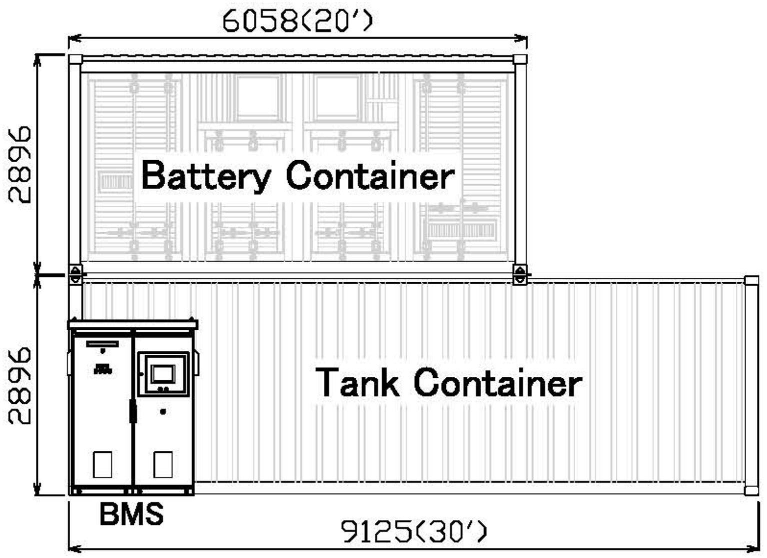
**ATTACHMENT B**

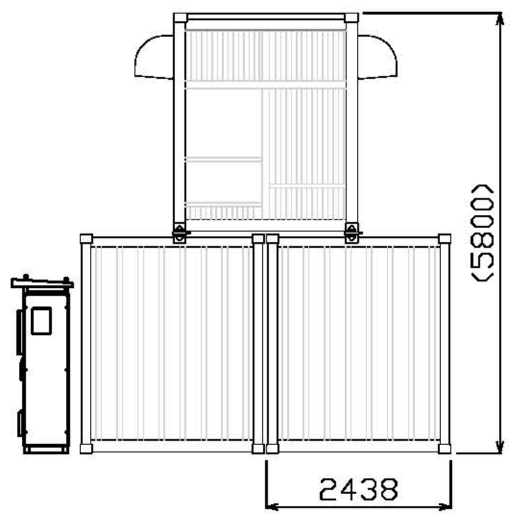



| FLOW BATTERY SYSTEM 3MW × 3h | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CONTRACT NO. : | | | | EQUIPMENT NO. : | | | | |
| DWG TITLE : EQUIPMENT LAYOUT DRAWING | | | | | | | DRAWING NO. | |
| APPROVED | CHECKED | DESIGNED | DRAWN | SHEET 1 | OF | REV | SCALE — | DATE |




| FLOW BATTERY SYSTEM 3MW × 4h | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CONTRACT NO. : | | | | | EQUIPMENT NO. : | | | |
| DWG TITLE : EQUIPMENT LAYOUT DRAWING | | | | | | | DRAWING NO. | |
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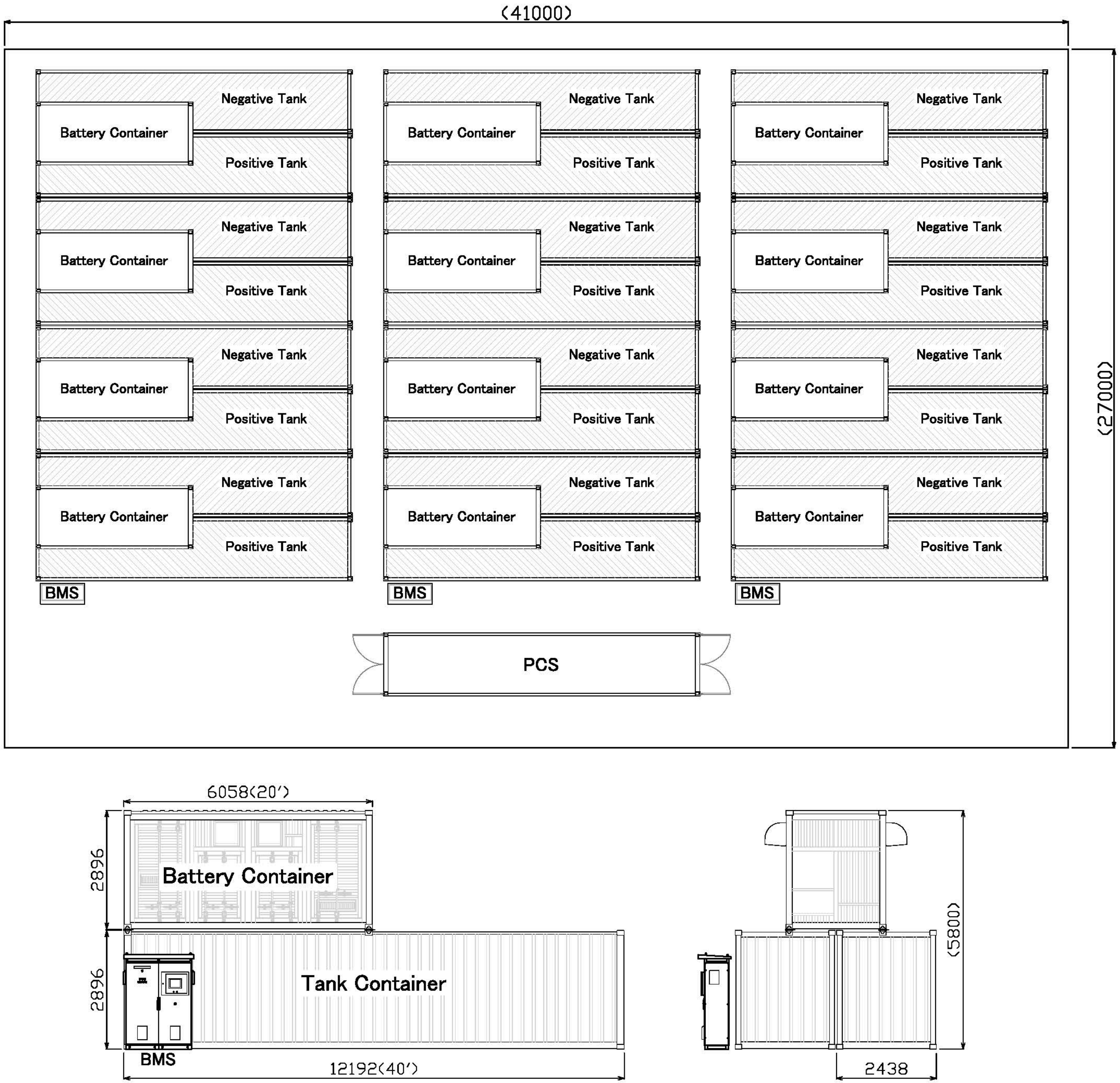


| FLOW BATTERY SYSTEM 3MW × 6h | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CONTRACT NO. : | | | | EQUIPMENT NO. : | | | | |
| DWG TITLE : EQUIPMENT LAYOUT DRAWING | | | | | | | DRAWING NO. | |
| APPROVED | CHECKED | DESIGNED | DRAWN | SHEET 1 | OF | REV | SCALE — | DATE |

**Los Esteros Critical Energy Facility (03-AFC-02C): Energy Storage Amendment Responses to Staff's Data Requests, Set 2, A1 through A6 and Minor Revisions to Proposed Modification**

# ATTACHMENT C

# Design Concepts for Electrolyte Leakage

## 1. Basic Concept

Leakage

↓

Capture leakage within secondary containment or pit in the containers

(*) see next page

↓

Detect leakage by <u>float sensor</u> or <u>insulation monitoring device</u>

- Electrolyte leakage will be detected by mechanical (float sensor) or electrical (insulation monitoring) devices.
- The float sensors will be installed in the each battery and tank container.

↓ Shut-down operation including pumps initiated by BMS

↘ Send an alarm by BMS

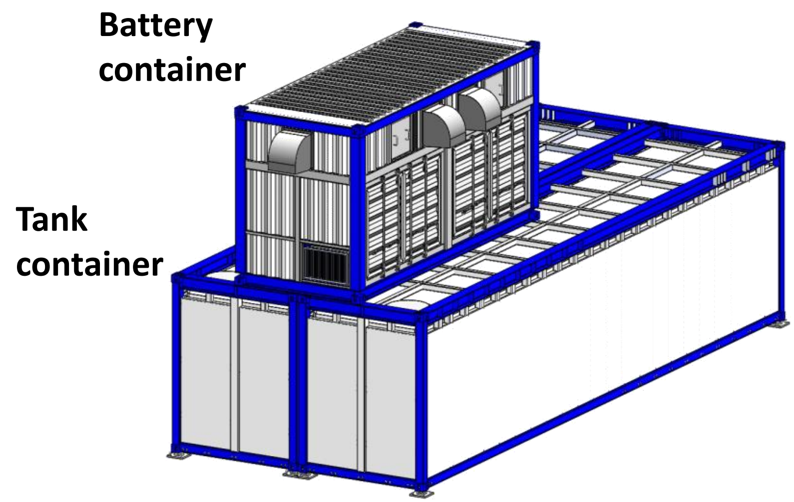


Figure 1. Appearance of battery system

# Design Concepts for Electrolyte Leakage

## 2. Structure

1. The tank container has two layer structure in its wall. From inner, it is made up of i) rubber tank (primary containment, storing electrolyte) and ii) stainless tank (secondary containment). The secondary containment structure prevent spilled electrolyte from leaking to the environment.
2. The battery container also has containment pit that is designed to capture all the volume of electrolyte leaking in the battery container. Upon detecting leakage by sensors, the BMS shutdown the pumps to stop electrolyte circulation from the tank containers so that leakage would not flow over the pits.

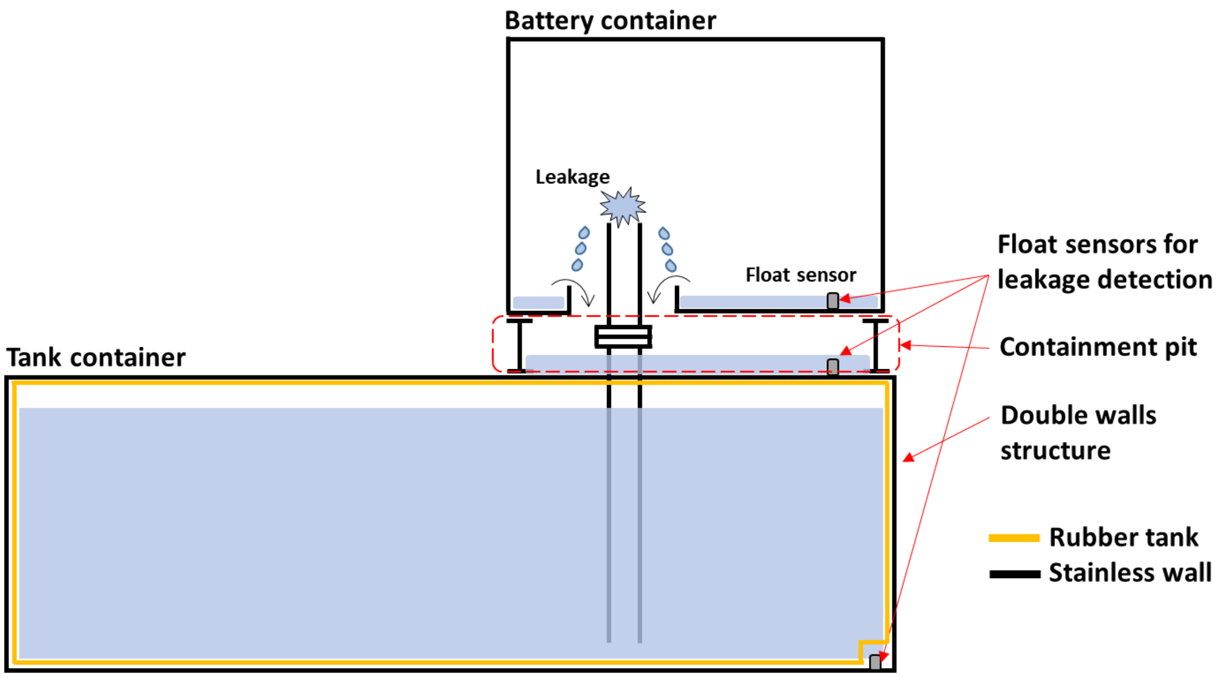


Figure 2. Structure of containerized flow battery system for leakage