DOCKETED	
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Project Title:	Prairie Song Reliability Project
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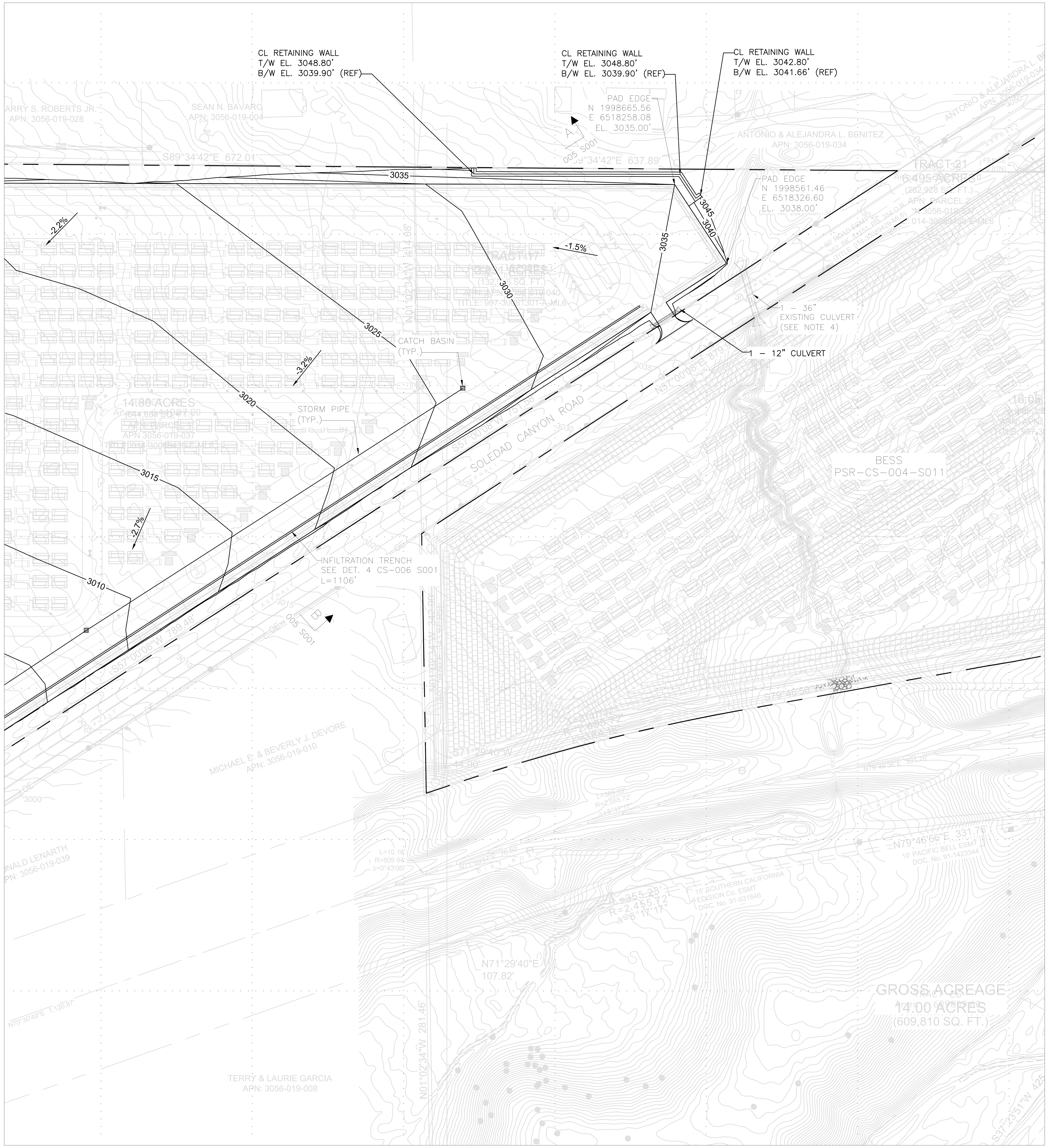
Document Title:	Data Request Response 2_Part 6
Description:	N/A
Filer:	Erin Phillips
Organization:	Dudek
Submitter Role:	Applicant Consultant
Submission Date:	10/15/2025 11:25:37 AM
Docketed Date:	10/15/2025

MATCHLINE PSR-CS-004 S009



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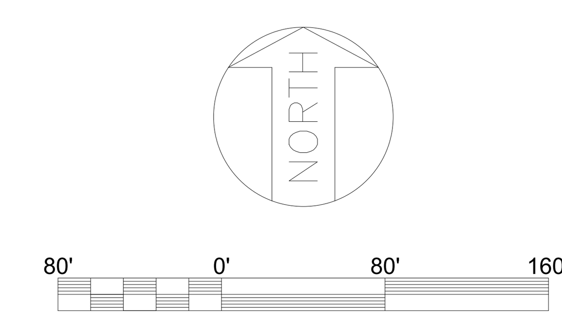
NOT FOR CONSTRUCTION

VICINITY MAP



GRAPHIC SCALE
1" = 80'

NOTES

1. GEOTECHNICAL ENGINEERING REPORT PREPARED BY: TERRACON CONSULTANTS INC., PROJECT NO. LA245085, DATED 05-14-2025.
2. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND SEE DRAWING PSR-CS-002.
3. ESTIMATED QUANTITIES: * SEE NOTES ON DRAWING PSR-CS-004 S009
4. EXISTING CULVERT WILL BE MAINTAINED THROUGHOUT CONSTRUCTION. THE DOWNSTREAM END OF THE CULVERT WILL BE CONNECTED TO A NEW MANHOLE TO PROVIDE CONTINUATION OF STORM WATER CONVEYANCE DOWNSTREAM OF THE BESS FACILITY.

REFERENCE DRAWINGS

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
0A	2/14/2025	ISSUED FOR 30%
0B	3/31/2025	ISSUED FOR PERMIT
0C	5/16/2025	ISSUED FOR PERMIT
0D	8/15/2025	ISSUED FOR PERMIT

ISSUE PURPOSE: ISSUED FOR PERMIT
SPECIFICATION: -
PROJECT NO.: 15474.001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA.

ISSUED FOR PRELIMINARY PURPOSES
JOSHUA BICKETT
P.E. LICENSE #95825

CAD FILE NAME: PSR-CS-004 S010.DWG
PREPARED BY: CAF/JN
REVIEWED BY: JTP
APPROVED BY: --

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SARGENT & LUNDY
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CHICAGO, ILLINOIS 60603-5780

PROJECT
PRAIRIE SONG RELIABILITY PROJECT

DRAWING TITLE
BESS
GRADING AND DRAINAGE PLAN

DRAWING NUMBER	REVISION
PSR-CS-004 S010	0D

SHEET 1 OF 1

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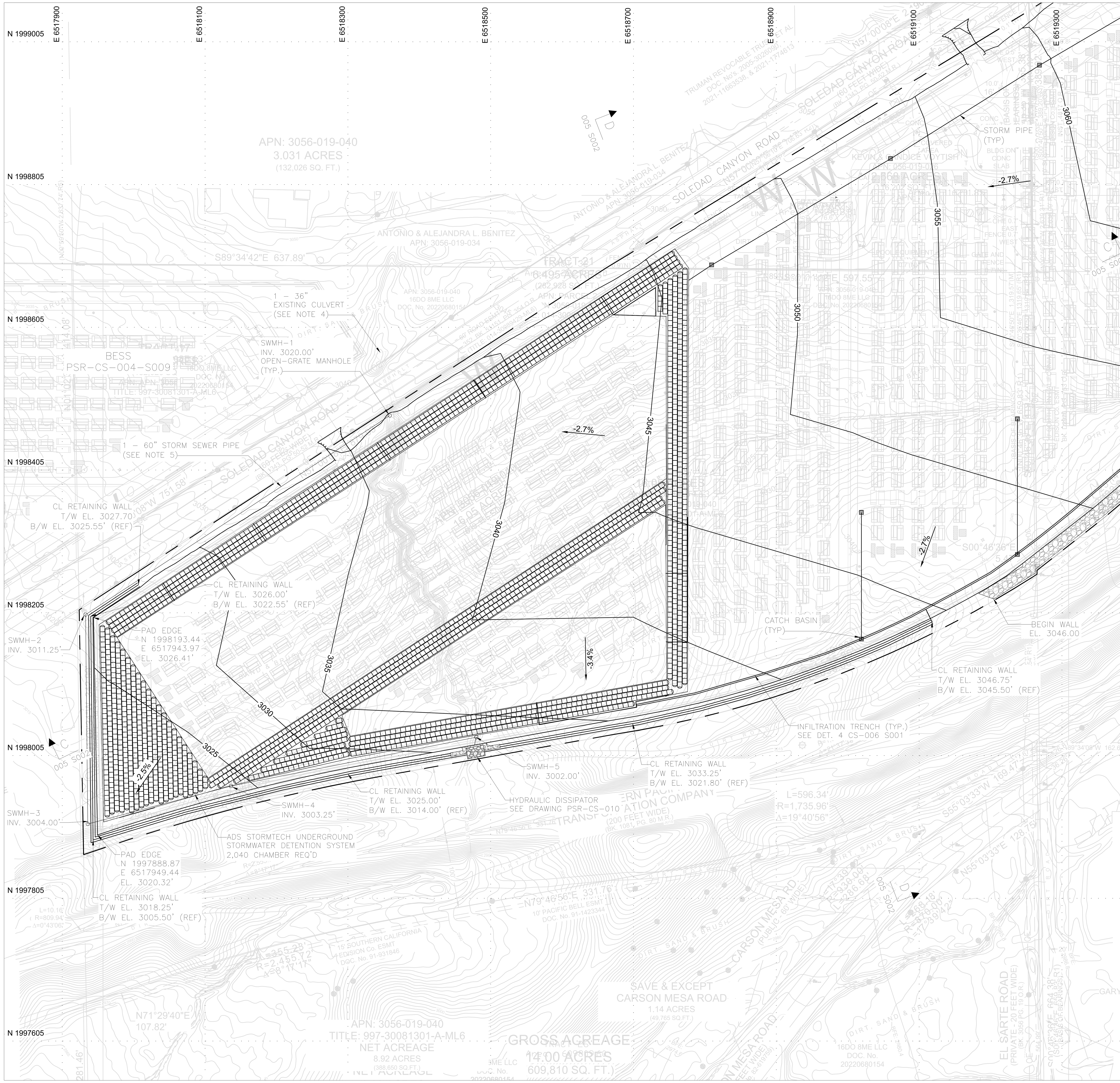

VICINITY MAP

NORTH

GRAPHIC SCALE
1" = 80'

NOTES

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   TERRACON CONSULTANTS INC., PROJECT NO. LA245085, DATED 05-14-2025.
2. FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND SEE DRAWING PSR-CS-002.
3. ESTIMATED QUANTITIES
   CUT: 126,610 CY
   FILL: 468,730 CY
   12" TOPSOIL STRIP: 212,140 SY
   NET: 342,120 CY FILL
4. EXISTING CULVERT WILL BE MAINTAINED THROUGHOUT CONSTRUCTION. THE DOWNSTREAM END OF THE CULVERT WILL BE CONNECTED TO A NEW MANHOLE TO PROVIDE CONTINUATION OF STORM WATER CONVEYANCE DOWNSTREAM OF THE BESS FACILITY.
5. UPSTREAM FLOWS WHICH ARE NORMALLY CONVEYED THROUGH THE EXISTING RAVINE WILL BE COLLECTED AND REROUTED THROUGH THE PIPELINE. STORMWATER WILL DISCHARGE THROUGH A HYDRAULIC ENERGY DISSIPATOR AT THE DOWNSTREAM LOCATION OF THE EXISTING RAVINE.

REFERENCE DRAWINGS

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P.E. LICENSE #95825

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REVIEWED BY: JTP
APPROVED BY: --

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PROJECT
PRAIRIE SONG RELIABILITY PROJECT

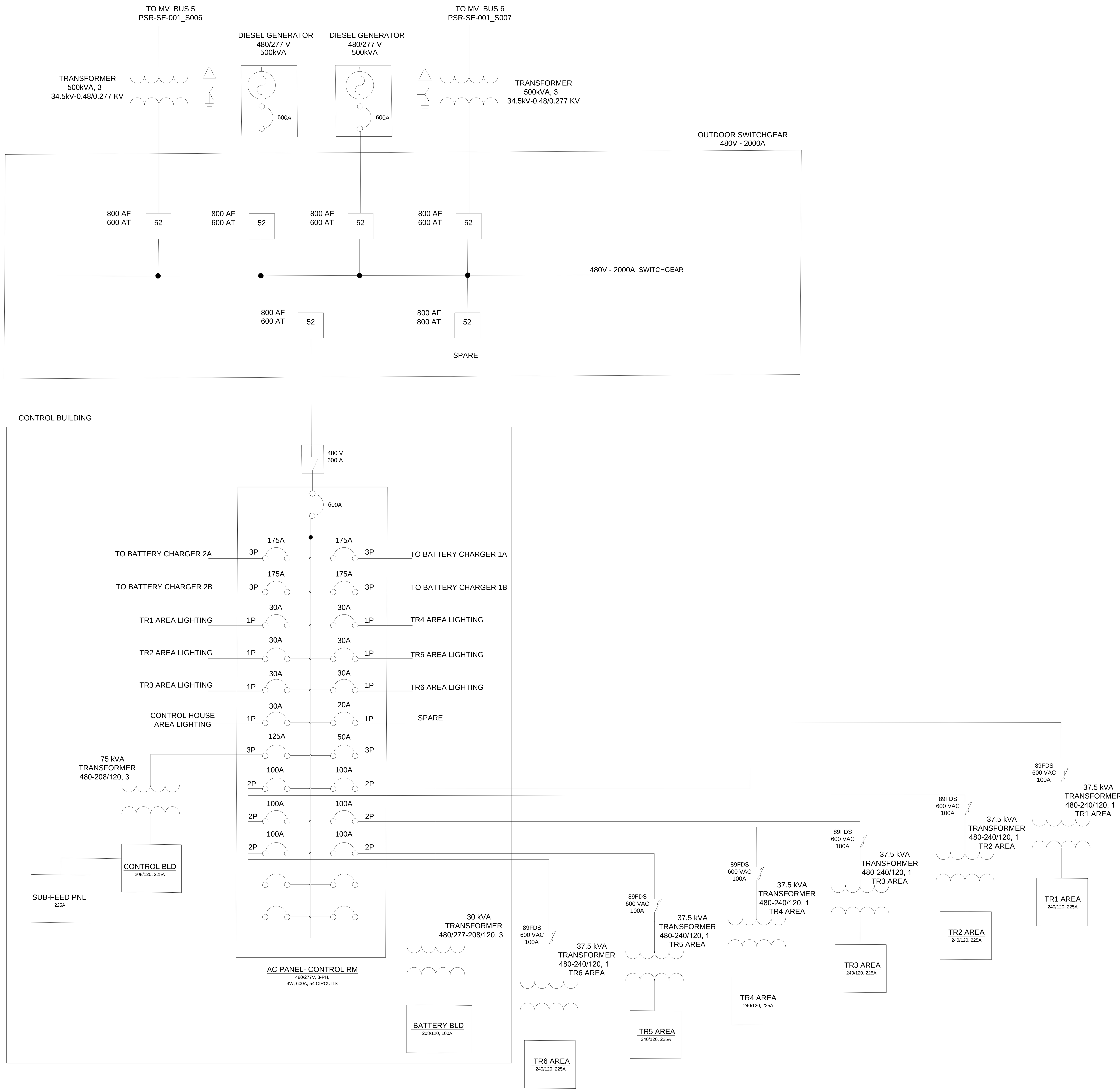
DRAWING TITLE
BESS
GRADING AND DRAINAGE PLAN

DRAWING NUMBER	REVISION
PSR-CS-004 S011	0D

SHEET 1 OF 1

$FILEABBREV$ $TIME$ $DATE$

$PINFO1$
Form GDG-0401-01-09, ANSI (Imperial) MicroStation Border - Size D - 22 x 34
Revision 11A, Revision Date: 04-30-2010



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0B	05/14/2025	ISSUED FOR PERMIT
0C	8/18/2025	ISSUED FOR PERMIT

ISSUE PURPOSE: ISSUED FOR PERMIT
SPECIFICATION: -
PROJECT NO.: 15474.001

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ISSUED FOR PRELIMINARY PURPOSES
GREG MAGSAYSAY
P.E. NO.E17455

CAD FILE NAME: PSR-SE-001_S008.DWG
PREPARED BY: ME
REVIEWED BY: GM
APPROVED BY: GM

Sargent & Lundy

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55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

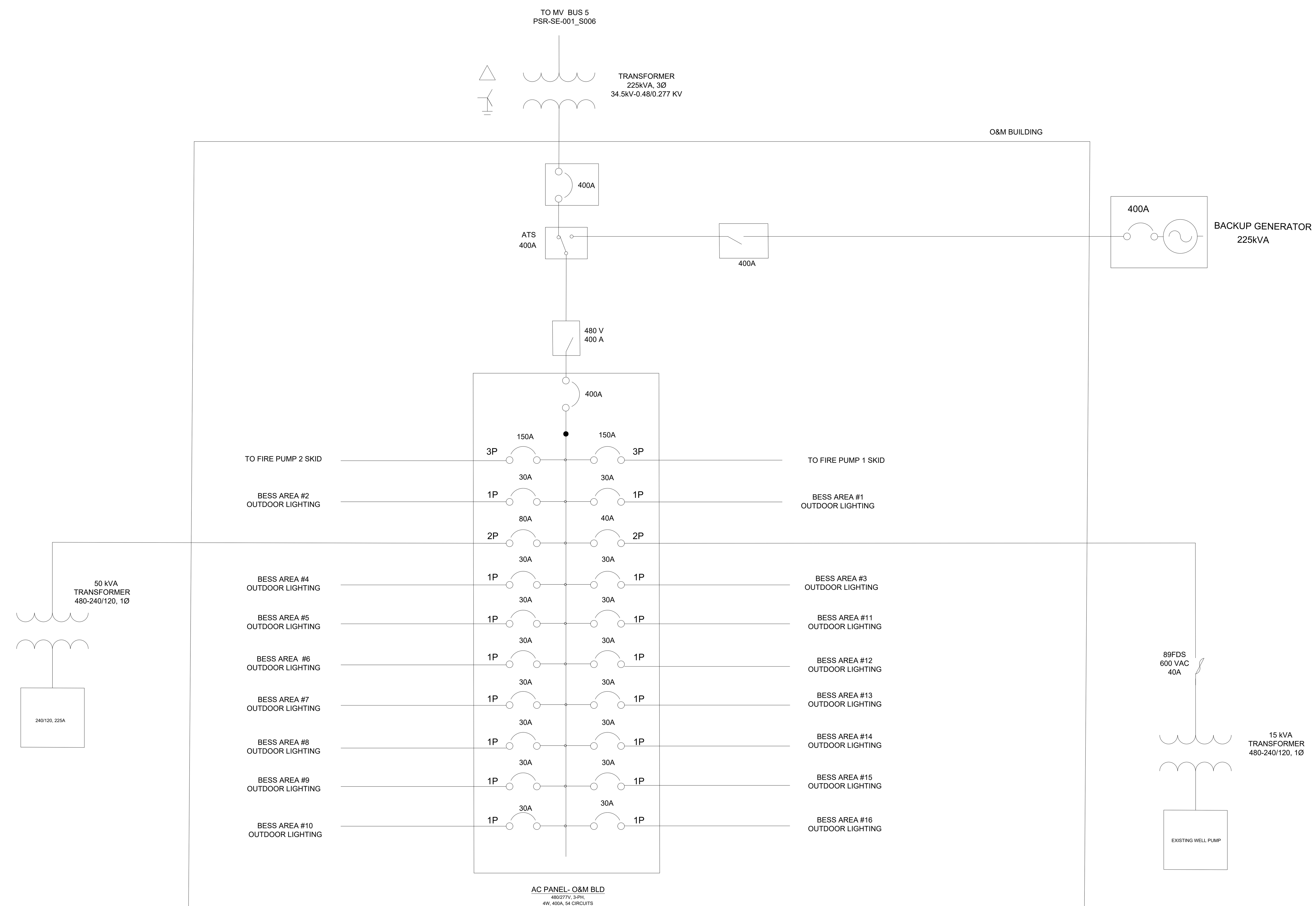
PROJECT

PRAIRIE SONG
RELIABILITY PROJECT

DRAWING TITLE

SINGLE LINE LOW VOLTAGE
CONTROL ROOM

DRAWING NUMBER	REVISION
PSR-SE-001	0C
SHEET 8 OF 9	



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PROJECT

PRAIRIE SONG
RELIABILITY PROJECT

DRAWING TITLE

SINGLE LINE LOW VOLTAGE
O&M BUILDING

DRAWING NUMBER	REVISION
PSR-SE-001	0C

Attachment 29

Materials Safety Data Sheets

Aohong-China

R-32
Material Safety Data Sheet

Part 1. Chemical Product and Company Identification

Data concerning Distributors:

Manufacturer: Shanghai Aohong Chemical Co., Ltd.
Add.: NO.333 HUHUA (E) ROAD JIADING Shanghai, PR of China
Call for more information: +86-021-59972713
Call in case of emergency: +86-021-59972713

Identifications of the substance or the preparation:

PRODUCT NAME: R-32
DISTRIBUTOR: Shanghai Aohong Chemical Co., Ltd.

Part 2. Composition / Information on Ingredients

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Difluoromethane	75-10-5	100

Part 3. Hazards Identification

EMERGENCY OVERVIEW: This product is a flammable, liquefied gas. Contents under pressure. Cylinders may rupture and rocket under fire conditions. Thermal decomposition can produce toxic and corrosive gases. Vapors are heavier than air. May cause asphyxia. Liquid splashes or spray may cause freeze burns (frostbite). High vapor concentrations may cause dizziness or more severe anesthetic effects. Very high exposures can cause potentially fatal abnormal heart rhythm. Read the entire MSDS for a more thorough evaluation of the hazards.

POTENTIAL HEALTH HAZARDS

SKIN: Liquid splashes or spray may cause freeze burns.

SKIN ABSORPTION: This product will probably not be absorbed through human skin.

EYES: Liquid splashes or spray may cause freeze burns.

INHALATION: Exposure to high vapor concentrations can induce anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. Very high exposures can cause abnormal heart rhythm, which is potentially fatal. It can act as an asphyxiate by limiting available oxygen.

INGESTION: Extremely unlikely to occur in use.

OTHER EFFECTS OF OVEREXPOSURE: None Expected.

Part 4. First Aid Measures

SKIN: Immediately wash with plenty of warm water (do not rub). Thaw affected area with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in case of freeze burns. If symptoms (irritation or blistering) develop, get medical attention.

EYES: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Hold eyelids open during flushing. Have eyes examined and treated by medical personnel.

INHALATION: Move victim to fresh air. Keep warm and at rest. If breathing is labored, give oxygen. If only breathing has stopped, give artificial respiration with a pocket mask equipped with a on-way valve to prevent exposure to product or body fluids. If breathing has stopped and there is no pulse, give cardiopulmonary resuscitation (CPR). Get immediate medical attention.

INGESTION: Highly unlikely, but should this occur, freeze burns will result. Do not induce vomiting unless instructed to do so by a physician.

ADVICE TO PHYSICIAN: Symptomatic and supportive therapy, as indicated. Administration of epinephrine or similar sympathomimetic drugs should be with special caution and only in situations of emergency life support as cardiac arrhythmias may result.

Part 5. Fire Fighting Measures

FLAMMABLE PROPERTIES

FLASH POINT:	Not applicable
AUTOIGNITION TEMPERATURE:	Not available
UPPER FLAME LIMIT:	31% (% v/v)
LOWER FLAME LIMIT:	14% (% v/v)

HAZARDOUS REACTIONS:
Reacts with finely divided metals such as aluminum, zinc, magnesium, and alloys containing more the 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

During a fire the product can form toxic and corrosive gases such as hydrogen fluoride.

EXTINGUISHING MEDIA:
Suitable extinguishing medium is dry powder. Allow escaping gas to urn under controlled conditions. Extinguish only if escape of gas can be rapidly stopped as it may form a flammable vapor cloud.

FIRE AND EXPLOSION HAZARDS:
Flammable liquefied gas. Container may burst under intense heat. Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate.

Certain mixtures of HFC-32 and chlorine may be flammable under some conditions.

FIRE FIGHTING PROCEDURES:
Water spray should be used to cool containers.

FIRE FIGHTING PROTECTIVE EQUIPMENT:
Use self-contained breathing apparatus with a full-face piece and special protective clothing.

Part 6. Accidental Release Measures

This product is a flammable, liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Contents under pressure. Ruptured cylinder may rocket or fragment.

Precautions should take into account the severity of the leak or spill.

Move unprotected personnel upwind of leaking container. Remove ignition sources and ventilate the spill area. Use recommended personal protection and shut off the leak, if without risk. If possible, elevate leak position to highest point of container (should leak gas, not liquid). Water should never be put on leak nor should cylinder be immersed. If possible, dike and contain spillage. Prevent liquid from entering sewers sumps, or pit areas since vapor is heavier than air and can create a suffocation atmosphere. Capture material for recycle or destruction if suitable equipment is available.

Notify applicable government authority if release is reportable or could adversely affect the environment.

Part 7. Handling and Storage

HANDLING:
Wear appropriate personal protective equipment. A safety shower and eyewash station should be nearby and ready for use.

This product is a flammable, liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Ensure personnel are trained in handling and storing cylinders. Secure containers at all times. Keep containers closed when not in use.

Ensure there is adequate ventilation or use proper respiratory protection in poorly ventilated or confined areas. Avoid causing and inhaling high concentration or vapor. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practicable.
Prevent liquid or vapor from entering sumps or sewers since vapor is heavier than air and may form suffocating atmospheres.

Do not put mixtures of HFC-32 with air or oxygen under pressure; do not use such mixtures for leak or pressure testing.

Do not heat containers.

Liquid transfers between containers may generate static electricity. Ensure adequate grounding.
Avoid trapping liquid between closed valves or overfilling containers as high pressures can develop with an increase in temperature.

Avoid HFC-32 contact with flames or very hot surfaces.

STORAGE RECOMMENDATIONS:
Keep containers tightly closed, in a cool, well-ventilated place. Keep containers dry. Keep from incompatibles, open flames, hot surfaces, welding operations, and other heat sources.

STORAGE TEMPERATURE:
Store at temperature not exceeding 125 deg. F. (52deg. C).

Part 8. Exposure Controls / Personal Protection

ENGINEERING CONTROLS:
Use ventilation to maintain safe levels. Where appropriate engineering controls are not in place or are inadequate, wear suitable respiratory equipment.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:
Take all precautions to prevent skin contact. Use gloves and protective clothing made of material that has been found by user to be impervious under conditions of use to prevent the skin from becoming frozen for contact with liquid. User should verify impermeability under normal conditions of use prior to general use. Additional protection such as an apron, arm covers, or full body suit may be need depending on conditions of use.

EYE PROTECTION:
Use chemical safety goggles or safety glasses and a face shield when there is potential for eye contact.

RESPIRATORY PROTECTION:
Not normally needed if controls are adequate. If needed, use NIOSH/MSHA approved respirator for organic vapors. For high concentrations and oxygen-deficient atmospheres, use positive pressure air-supplied respirator.

OTHER PROTECTION:
Shower and eye wash station.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Difluoromethane	None	None	*1000 ppm TWA (8hr)

* = Workplace Environmental Exposure Level (AIHA)

Minimize exposure in accordance with good hygiene practice.

Part 9. Physical and chemical properties

APPEARANCE:	Colorless liquefied gas
ODOR:	Faint ethereal odor
SPECIFIC GRAVITY (water = 1.0):	0.98 at 20 deg. C
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	Not applicable
BOILING POINT:	-51.7°C (-61.1°F)
VAPOR PRESSURE (mmHg at 20 deg. C):	10,319
VAPOR DENSITY (air = 1.0):	1.86 at normal boiling point
% VOLATILES:	100

Part 10. Stability and Reactivity

CHEMICAL STABILITY:
Stable under normal conditions.

INCOMPATIBILITIES:
Reacts with finely divided metals such as aluminum, zinc, magnesium, and alloys containing more then 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

HAZARDOUS DECOMPOSITION PRODUCTS:
Hydrogen fluoride by thermal decomposition and hydrolysis.

CONDITIONS TO AVOID:
Keep away from heat, sparks, and flame. Avoid high temperatures.

HAZARDOUS POLYMERIZATION:
Will not occur.

Part 11. Toxicological Information

POSSIBLE HUMAN HEALTH EFFECTS:

Routes of Exposure:
Inhalation, ingestion, eye, and skin contact.

Inhalation: Exposure to high vapor concentrations may cause and abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations can cause anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. It can act as an asphyxiant by limiting available oxygen.

Ingestion: Highly unlikely, but should this occur, freeze burns will result.

Eye Contact: Liquid splashes or spray may cause freeze burns.

Skin Contact: Liquid splashes or spray may cause freeze burns.

Other Effects: None anticipated.

Carcinogenicity:

Ingredient Name	NTP STATUS	ACGIH	IARC STATUS	OSHA LIST

No ingredients listed in this section

ANIMAL DATA:

LC50 4 hr., (rat inhalation) - > 520,000 ppm

Because of its volatility this compound has not been tested for skin or eye irritancy or skin sensitization.

No cardiac sensitization (arrhythmias) occurred in dogs pretreated with epinephrine at 350,000 ppm. In an earlier cardiac sensitization study, a no observed effect level (NOEL) of 200,000 ppm and threshold of 250,000 ppm were established.

No teratogenic effects were seen in rats or rabbits at dose levels up to 50,000 ppm.

No adverse effects were seen at the highest dose level of 50,000 ppm in a 90-day inhalation.

No genotoxicity was observed in a range of in vitro tests or an in vivo mouse micronucleus assay.

Part 12. Ecological Information

PERSISTENCE AND DEGRADATION:

Decomposes comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 4.9 years. Products of decomposition will be highly dispersed and hence will have a very low concentration. It is not considered an ozone-depleting chemical.

EFFECT ON EFFLUENT TREATMENT:

Discharges of the product will enter the atmosphere and will not result in long-term aqueous contamination.

Part 13. Disposal Considerations

DISPOSAL METHOD:

Discarded product is not a hazardous waste under RCRA, 40 CFR 261. However, HFC-32 should be recycled, reclaimed, or destroyed whenever possible.

CONTAINER DISPOSAL:

May contain explosive vapors. Do not distribute, make available, furnish, or reuse container when emptied of the original product. Do not weld or use cutting torch on or near container. Empty container retains product residue. Return containers to supplier.

REFRIGERATION APPLICATION:

Subject to “no venting” regulations of Section 608 of the Clean Air Act during the service or disposal of equipment.

Part 14. Transportation

US DOT HAZARD CLASS: US DOT PROPER SHIPPING NAME: Difluoromethane
US DOT HAZARD CLASS: 2.1
US DOT PACKING GROUP: Not applicable
US DOT ID NUMBER: UN3252

Part 15. Regulation Information

LAWS AND REGULATIONS IN CHINA

NAME:	Regulations on the Control over Safety of Dangerous Chemicals
	Regulations on Safe Use of Chemicals at Workplace
PRESCIBE:	production, storage, transportation, loading and unloading

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS:	Listed on the TSCA inventory
OTHER TSCA ISSUES:	None

Part 16. Miscellaneous

CURRENT ISSUE DATE: February, 2012
PREVIOUS ISSUE DATE: January, 2011

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. We shall not be held liable for any damage resulting from handling or from contact with the above product.

END

Safety Data Sheets (SDSs)

Product Name: Lithium Ion Cell

Commissioner: Sunwoda Mobility Energy Technology Co., Ltd.

CVC Testing Technology Co., Ltd.

Safety Data Sheets (SDSs)

Name of Product	Lithium Ion Cell
Type/Mode	SBP-01-3140 3.2V 314Ah 1005Wh
Commissioned by	Sunwoda Mobility Energy Technology Co., Ltd.
Commissioner address	1-2F, Building A, Sunwoda Industrial Park, No. 18, Tangjia South Road, Gongming Street, Guangming New District, Shenzhen City, Guangdong, P.R. China
Supplier	Deyang Sunwoda New Energy Co.,Ltd
Supplier address	12 South Section, Changping Avenue, North District, Shifang Economic Development Zone, Deyang City, Sichuan, P.R. China
Inspection according to	GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS, Rev.9)
Emergency telephone number	15717098218
Remarks	-
Seal of CVC Date of issue: 2023-09-27	

Approved by: Huang Kun Reviewed by: Zhang Siyao Tested by: Chen Zeyan

Huangkun Zhang siyao ChenZeyan

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Identifier:

Product name: Lithium Ion Cell

Model: SBP-01-3140

Other means of identification:

Synonyms: /

Relevant identified use of Product and uses advised against:

Recommended Use: Energy storage

Uses advised against: Disassemble, Short-circuit, Dispose in fire, Expose to high temperature

Details of the Supplier of the safety data sheet:

Name: Deyang Sunwoda New Energy Co.,Ltd.

Address: 12 South Section, Changping Avenue, North District, Shifang Economic Development Zone, Deyang City, Sichuan, P.R. China

Telephone: 15717098218

Fax: /

Postcode: /

E-mail address: laijunrong@sunwoda-evb.com

Emergency telephone number:

Company Emergency Phone Number: 15717098218

SECTION 2: HAZARDS IDENTIFICATION

Classification:

The watt-hour rate of the product is 1005 Wh, it is belong to the class 9 dangerous goods.

The product is tested according to Section 38.3 of the Manual of Tests and Criteria, the test report number is: RZUN2023-3324

Other information

Caution! Avoid short circuit place in high temperature environment, put into water, or damage the shell.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Mixtures

Description: Chemical power supply based on nonaqueous electrolyte. Composed by positive electrode, negative electrode, diaphragm, electrolyte and shell.

Hazardous ingredients:

Common Chemical Name	Chemical Formula	Mass ratio (%)	CAS No.	EC No.
Lithium iron phosphate	$LiFePO_4$	37	15365-14-7	921-062-3

PVDF	$C_2H_2F_2$	0.8	24937-79-9	607-458-6
Aluminum foil	Al	3	7429-90-5	231-072-3
Copper foil	Cu	6.5	7440-50-8	231-159-6
Carbon Black	C	0.2	1333-86-4	215-609-9
DEC	$C_5H_{10}O_3$	<10	105-58-8	203-311-1
Lithium hexafluorophosphate	$LiPF_6$	<13.5	21324-40-3	244-334-7
EMC	$C_4H_8O_3$	<5	623-53-0	208-760-7
EC	$C_3H_4O_3$	<5	96-49-1	202-510-0
Graphite	C	19	7782-42-5	231-955-3

Note: N/A=Not apply.

SECTION 4: FIRST-AID MEASURES

First aid measures:

Eye Contact: Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.

Skin Contact: Remove contaminated clothing and shoes. Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation: Move to fresh air. If symptoms persist, call a physician.

Ingestion: Do NOT induce vomiting. Drink plenty of water. If symptoms persist, call a physician.

Swallowing: Do not induce vomiting. Get medical attention.

Most Important Symptoms/Effects:

No information available.

Indication of any immediate medical attention and special treatment needed:

Inform physician. Treat symptomatically.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

CO_2, dry chemical powder, wet sand, plenty of water (for cooling).

Unsuitable Extinguishing Media: No information available.

Protective Equipment and Precautions for Firefighters:

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. For example: Wear self-contained respiratory protective device. Wear suitable protective clothing and eye/face protection.

Special hazards arising from the substance or mixture:

Battery may burst and release hazardous decomposition products when exposed to a fire situation. Lithium batteries contain flammable ingredients that may vent, ignite and produce sparks when subjected to high temperature (>150℃), When damaged or abused (e.g. mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in close proximity.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:

Personal Precautions Avoid contact with eyes.

Refer to section 8 for personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

Evacuate personnel to safe areas.

Environmental precautions:

Environmental PrecautionsRefer to protective measures listed in Sections 7 and 8.

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

Methods and material for containment and cleaning up:

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning up Use personal protective equipment. Dam up. Cover liquid spill with sand, earth or other Non-combustible absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling:

Keep away from ignition sources， heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short circuits. Avoid mechanical or electrical abuse.

More than a momentary short circuit will generally reduce the battery service life. Avoid reversing battery polarity within the battery assembly. In case of a battery unintentionally be crushed, rubber gloves must be used to handle all battery components. Avoid contact with eyes, skin. Avoid inhalation. No smoking at working site. Materials to Avoid: Strong oxidizing agents， Corrosives.

Conditions for safe storage, including any incompatibilities:

Store in a cool， well-ventilated area. Keep away from ignition sources， heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short-circuits. Materials to Avoid: Strong oxidizing agents，Corrosives.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls:

Use ventilation equipment if available. Safety shower and eye bath.

Personal Protective Equipment:

Respiratory System: Not necessary under conditions of normal use.

Eyes: Not necessary under conditions of normal use.

Clothing: Wear appropriate protective clothing. ，

Hand: Safety gloves.

Other Protect:

No smoking，drinking and eating at working site. Wash thoroughly after handling.

SECTION 9: Physical and chemical properties

PhysicalState	Form: prismatic
	Color: Blue
	Odour: Odourless
	Odor Threshold: No information available

Change in condition:	
pH, with indication of the concentration	Not determined.
Melting point/freezing point	Not determined.
Initial boiling point and Boiling range:	Not determined.
Flash Point	Not determined.
Flammability (solid, gas)	Not determined.
Upper/lower flammability or explosive limits	Not determined.
Auto-ignition temperature	Product is not self-igniting.
Decomposition temperature	Not determined.
Other Information	No further relevant information available.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Stable under recommended storage and handling conditions (see section 7).
Chemical stability: Stable under normal conditions of use, storage and transport.
Thermal decomposition/conditions to be avoided: No decomposition if used according to specifications.
Possibility of Hazardous Reactions: None under normal processing.
Hazardous Polymerization: Hazardous polymerization does not occur.
Conditions to avoid: Strong heating, fire, Incompatible materials.
Incompatible materials: Strong oxidizing agents. Strong acids.
Hazardous Decomposition Products: Carbon oxides, other irritating and toxic gases.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity: No data available.
Skin corrosion/irritation: No irritant effect.
Serious eye damage/irritation: Cause serious eye irritation.
Respiratory or skin sensitization: No sensitizing effects known.
Specific target organ system toxicity: No information available.
Note: The internal battery materials may cause irritation to eyes and skin.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
Results of PBT and vPvB assessment:
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects: No information available.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods:
Recommendation: Lithium batteries are best disposed of as a non-hazardous waste when fully or mostly discharged. Contact a licensed professional waste disposal service to dispose of large quantities materials.
Other disposal recommendations:
Recommendation: Disposal must be made according to official regulations.

SECTION 14: TRANSPORT INFORMATION

The product had been tested according to the requirements of the UN manual of tests and Criteria, Part III, subsection 38.3 (see section 2)
EmS No: F-A ,S-I
Marine pollutant: No
Environmental hazards: Not applicable.
Special precautions for user: Not applicable.
Hazard Class: Class 9
UN/ID Number: UN3480
Packaging Group: II
Proper Shipping name: Lithium ion batteries (Including lithium ion polymer batteries)

Air transport:

Label for conveyance: Class 9 lithium battery hazard label, Cargo Aircraft Only Label

The goods are complied with the requirements of Section IA of Packing Instruction 965 of 64th DGR Manual of IATA (2023 Edition).

Maritime transport:

Label for conveyance: Class 9 lithium battery hazard label

The goods are complied with the requirements of Packing Instruction P903 of IMDG CODE (Amdt. 40-20) (2020 Edition)

Land transport:

Label for conveyance: Class 9 lithium battery hazard label

The goods are complied with the requirements of Packing Instruction P903 of Agreement concerning the International Carriage of Dangerous Goods by Road (ADR 2023)

SECTION 15: REGULATORY INFORMATION

International Regulation:

GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)

Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations

IATA Dangerous Goods Regulations（DGR）

INTERNATIONAL MARITIME DANGEROUS GOODS CODE（IMDG CODE）

EU Regulation:

Regulation (EU) 2020/878: Revised Requirements for EU Safety Data Sheets

EU regulation (EC) 1272/2008 on "Classification, Labeling and Packaging of Substances and Mixtures" (CLP)

Registration，Evaluation and Authorization of Chemicals（REACH）

Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

US Regulation:

American National Standard for Hazardous Workplace Chemicals – Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation

US DOT， Code of Federal Regulations, Title 49, Transportation, PT. 100-185

SECTION 16: OTHER INFORMATION

This file is only effective to the batteries（SBP-01-3140） provided by commissioner Sunwoda Mobility Energy Technology Co., Ltd.. The commissioner provides the composition information of batteries, and promises its integrity and accuracy. Users should read this file carefully, and use the batteries in correct method. CVC Testing Technology Co., Ltd. (CVC) doesn’t assume responsibility for any damage or loss because of misuse of batteries.

Important

1. The test report is invalid without the official seal of CVC.
2. Nobody is allowed to photocopy or partly photocopy this test report without written permission of CVC.
3. The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
4. The test report is invalid if altered,
5. Objections to the test report must be submitted to CVC within 15 days,
6. This report is valid for the samples provided by commissioner only.

**The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented. **

Address: No.3, Tiantai 1st Road, Kaitai Avenue, Science City, Guangzhou，Guangdong, China.
Tel：020 32293888
FAX：020 32293889
Post Code：510663
E-mail： office@cvc.org.cn
http://www.cvc.org.cn

Attachment 30

Appendix 3.15C - Title 22 Water Quality Sampling

MEMORANDUM

To:	Garrett Lehman, Prairie Song Reliability Project, LLC
From:	Brandon Page, Dudek
CC:	Keith Carwana, Dudek; Erin Phillips, Dudek
Subject:	Title 22 Water Quality Sampling for Prairie Song Reliability Project, Los Angeles County, California
Date:	September 23, 2025
Attachments:	A – Analytical Report

Dudek was contracted by Prairie Song Reliability Project, LLC to complete Title 22 Water Quality sampling of the domestic groundwater well located at 1222 Soledad Canyon Road for the Prairie Song Reliability Project (Project). The Project is located in unincorporated Los Angeles County, south of State Route 14 approximately three miles northeast of the unincorporated community of Acton. On August 22, 2025, Dudek collected a groundwater sample from the well and delivered to Clinical Laboratory of San Bernardino for analysis of the full California Title 22 list of drinking water constituents.

Groundwater Sample Collection and Analysis

The groundwater sample was collected on August 22, 2025, from a spigot located adjacent to the wellhead and prior to any onsite water storage or treatment systems. The well was allowed to pump for approximately 30 minutes to ensure the groundwater sample adequately reflects source (i.e., aquifer) conditions per Title 22 Section 64445. To confirm the well was adequately purged, Dudek also monitored field parameters including pH, electrical conductivity, and temperature utilizing a YSI ProDSS multiparameter water quality meter in accordance with established U.S. Environmental Protection Agency (EPA) methods. Once parameters were deemed stable, the groundwater sample was collected into laboratory-provided containers and placed on ice. Sample containers were preserved in compliance with EPA guidelines for each analytical method. The groundwater sample was delivered to Clinical Laboratory of San Bernadino (California Environmental Laboratory Accreditation Program Certification Number 1088) on August 22, 2025, by laboratory courier following chain-of-custody protocol and analyzed for the full Title 22 analytical suite.

Results

The groundwater sample (Sample ID: 1222SC) was analyzed for the full Title 22 analytical suite including general chemical and physical, microbiological, metals, radiochemistry, volatile and semi-volatile organic compounds, synthetic organic compounds, and asbestos analyses by Clinical Laboratory. Constituents that were detected above laboratory reporting limits were compared against California Title 22 primary maximum contaminant levels (MCLs) for regulated constituents in drinking water and against secondary MCLs related to aesthetic aspects of drinking water (i.e., taste, odor, and appearance). None of the constituents detected in the groundwater sample collected from the domestic well at 1222 Soledad Canyon Road exceeded respective primary or secondary MCLs. The complete analytical laboratory report is presented in Attachment A.

Attachment A

Analytical Laboratory Report

Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

12225C **25H2349-01 (Ground Water)** **Sample Date:** 08/22/25 11:00 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MDL	MCL	Prepared	Analyzed	Batch	Qualifier
Field Analyses										
Temperature (Field)	Field	**20.0**	°C				08/22/25	08/28/25	2534257	
Microbiology Analyses										
Total Coliform	SM 9223	A	P/A				08/22/25	08/23/25	2535002	
E. Coli	SM 9223	A	P/A				08/22/25	08/23/25	2535002	
Plate Count	SM9215B	ND	CFU/ml	1		500	08/22/25	08/24/25	2535020	
General Physical Analyses										
Apparent Color	SM 2120BM	ND	Color Units	3.0		15	08/22/25	08/22/25	2535008	
Odor Threshold	EPA 140.1-M	**1**	TON	1		3	08/22/25	08/22/25	2535008	
Turbidity	EPA 180.1	**0.15**	NTU	0.10	0.030	5	08/22/25	08/22/25	2535008	
General Chemical Analyses										
Alkalinity, Total (as CaCO3)	SM 2320 B	**150**	mg/L	5.0	2.3		08/25/25	08/28/25	2534257	
Bicarbonate (HCO3)	SM 2320 B	**190**	mg/L	5.0			08/25/25	08/28/25	2534257	
Carbonate (CO3)	SM 2320B	ND	mg/L	5.0			08/25/25	08/28/25	2534257	
Chloride (Cl)	EPA 300.0	**88**	mg/L	1.0	0.20	500	08/23/25	08/23/25	2534240	
Langelier Index at Source Tmp	SM 203	**0.40**			-50.00		08/25/25	08/28/25	2534257	
Langelier Index at 60 C	SM 203	**1.00**			-50.00		08/25/25	08/28/25	2534257	
Aggressive Index	SM 203	**12.23**					08/25/25	08/28/25	2534257	
Cyanide (CN)	SM4500CNF	ND	ug/L	100	31	150	08/26/25	08/26/25	2535084	
Specific Conductance (E.C.) at 25°C	SM 2510B	**700**	umho/cm at 25°C	2.0	0.20	1600	08/25/25	08/28/25	2534257	
Fluoride (F)	EPA 300.0	**0.50**	mg/L	0.10	0.026	2	08/23/25	08/23/25	2534240	
Hydroxide (OH)	SM 2320B	ND	mg/L	5.0			08/25/25	08/28/25	2534257	
MBAS	SM 5540C	**0.099**	mg/L LAS, mol wt 342	0.10	0.034	0.5	08/22/25	08/22/25	2534274	J
Nitrate as N (NO3-N)	EPA 300.0	**5.3**	mg/L	0.40	0.061	10	08/23/25	08/23/25	2534240	
Nitrate + Nitrite (as N)	EPA 300.0	**5.3**	mg/L	0.40	0.29	10	08/23/25	08/23/25	2534240	
Nitrite as N (NO2-N)	EPA 300.0	ND	mg/L	0.40	0.17	1	08/23/25	08/23/25	2534240	
Perchlorate (ClO4)	EPA 314.0	**1.9**	ug/L	1.0	0.59	6	09/08/25	09/08/25	2537041	
pH (Lab)	SM 4500HB	**7.8**	pH Units				08/22/25	08/28/25	2534257	
Temp. (C)	SM 4500 HB	**19.0**	°C				08/22/25	08/28/25	2534257	
Sulfate (SO4)	EPA 300.0	**57**	mg/L	0.50	0.14	500	08/23/25	08/23/25	2534240	
Total Filterable Residue/TDS	SM 2540C	**340**	mg/L	5.0	3.1	1000	08/27/25	08/29/25	2535093	
Metals										
Aluminum (Al)	EPA 200.7	ND	ug/L	50	13	200	08/27/25	08/27/25	2535087	

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

12225C **25H2349-01 (Ground Water)** **Sample Date:** 08/22/25 11:00 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MDL	MCL	Prepared	Analyzed	Batch	Qualifier
Metals										
Antimony (Sb)	EPA 200.8	ND	ug/L	6.0	0.78	6	09/11/25	09/11/25	2537189	
Arsenic (As)	EPA 200.8	**0.53**	ug/L	2.0	0.20	10	09/11/25	09/11/25	2537189	J
Barium (Ba)	EPA 200.7	**230**	ug/L	100	12	1000	08/27/25	08/27/25	2535087	
Beryllium (Be)	EPA 200.8	ND	ug/L	1.0	0.27	4	09/11/25	09/11/25	2537189	
Boron (B)	EPA 200.7	**62**	ug/L	100	39		08/27/25	08/27/25	2535087	J
Cadmium (Cd)	EPA 200.8	ND	ug/L	1.0	0.16	5	09/11/25	09/11/25	2537189	
Calcium (Ca)	EPA 200.7	**65**	mg/L	1.0	0.13		08/28/25	08/28/25	2535138	
Chromium (+6)	EPA 218.7	**0.42**	ug/L	0.10	0.050	10	09/03/25	09/03/25	2536128	
Chromium (Total Cr)	EPA 200.8	**0.59**	ug/L	10	0.20	50	09/11/25	09/11/25	2537189	J
Copper (Cu)	EPA 200.7	ND	ug/L	50	6.5	1000	08/27/25	08/27/25	2535087	
Iron (Fe)	EPA 200.7	ND	ug/L	100	14	300	08/27/25	08/27/25	2535087	
Lead (Pb)	EPA 200.8	**0.17**	ug/L	5.0	0.13		09/11/25	09/11/25	2537189	J
Magnesium (Mg)	EPA 200.7	**13**	mg/L	1.0	0.12		08/28/25	08/28/25	2535138	
Manganese (Mn)	EPA 200.7	ND	ug/L	20	0.80	50	08/27/25	08/27/25	2535087	
Mercury (Hg)	EPA 200.8	ND	ug/L	1.0	0.14	2	09/03/25	09/04/25	2536110	
Nickel (Ni)	EPA 200.8	**1.7**	ug/L	10	0.12	100	09/11/25	09/11/25	2537189	J
Potassium (K)	EPA 200.7	**1.6**	mg/L	1.0	0.19		08/28/25	08/28/25	2535138	
Selenium (Se)	EPA 200.8	**8.1**	ug/L	5.0	0.63	50	09/11/25	09/11/25	2537189	
Silver (Ag)	EPA 200.8	ND	ug/L	10	0.14	100	09/11/25	09/11/25	2537189	
Sodium (Na)	EPA 200.7	**49**	mg/L	1.0	0.21		08/28/25	08/28/25	2535138	
Thallium (Tl)	EPA 200.8	ND	ug/L	1.0	0.13	2	09/11/25	09/11/25	2537189	
Vanadium (V)	EPA 200.8	**2.9**	ug/L	3.0	0.15		09/11/25	09/11/25	2537189	J
Zinc (Zn)	EPA 200.7	**230**	ug/L	50	17	5000	08/27/25	08/27/25	2535087	
Calculated Analysis										
Hardness, Total (as CaCO3)	Calculated	**220**	mg/L	6.6			08/28/25	08/28/25	[CALC]	
Total Anions	Calculated	**6.81**	meq/L				08/28/25	08/28/25	[CALC]	
Total Cations	Calculated	**6.49**	meq/L				08/28/25	08/28/25	[CALC]	
% difference	Calculated	**4.8**					08/28/25	08/28/25	[CALC]	
Radiochemistry Analyses										
Gross Alpha	SM 7110C	**3.2**	pCi/L	3.0	1.3	15	09/03/25	09/08/25	2536096	
Gross Alpha Counting Error	SM 7110C	**0.64**	pCi/L				09/03/25	09/08/25	2536096	
Gross Alpha Min Det Activity	SM 7110C	**0.43**	pCi/L				09/03/25	09/08/25	2536096	
Uranium	EPA 200.8	**1.6**	pCi/L	1.0	0.19	20	08/27/25	08/28/25	2535097	

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

12225C | **25H2349-01 (Ground Water)** | **Sample Date:** 08/22/25 11:00 | **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MDL	MCL	Prepared	Analyzed	Batch	Qualifier
Volatile Organic Analyses										
Vinyl Chloride (VC)	EPA 524.2	ND	ug/L	0.50	0.24	0.5	08/28/25	08/28/25	2535145	
Trichlorofluoromethane (FREON 11)	EPA 524.2	ND	ug/L	5.0	1.5	150	08/28/25	08/28/25	2535145	
1,1-Dichloroethylene (1,1-DCE)	EPA 524.2	ND	ug/L	0.50	0.24	6	08/28/25	08/28/25	2535145	
1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 524.2	ND	ug/L	10	0.20	1200	08/28/25	08/28/25	2535145	
Dichloromethane (Methylene Chloride)	EPA 524.2	ND	ug/L	0.50	0.18	5	08/28/25	08/28/25	2535145	
trans-1,2-Dichloroethylene (t-1,2-DCE)	EPA 524.2	ND	ug/L	0.50	0.19	10	08/28/25	08/28/25	2535145	
Methyl tert-Butyl Ether	EPA 524.2	ND	ug/L	3.0	0.33	13	08/28/25	08/28/25	2535145	
1,1-Dichloroethane (1,1-DCA)	EPA 524.2	ND	ug/L	0.50	0.18	5	08/28/25	08/28/25	2535145	
cis-1,2-Dichloroethylene (c-1,2-DCE)	EPA 524.2	ND	ug/L	0.50	0.17	6	08/28/25	08/28/25	2535145	
Chloroform (Trichloromethane)	EPA 524.2	ND	ug/L	1.0	0.25		08/28/25	08/28/25	2535145	
Carbon Tetrachloride	EPA 524.2	ND	ug/L	0.50	0.13	0.5	08/28/25	08/28/25	2535145	
1,1,1-Trichloroethane (1,1,1-TCA)	EPA 524.2	ND	ug/L	0.50	0.11	200	08/28/25	08/28/25	2535145	
Benzene	EPA 524.2	ND	ug/L	0.50	0.081	1	08/28/25	08/28/25	2535145	
1,2-Dichloroethane (1,2-DCA)	EPA 524.2	ND	ug/L	0.50	0.21	0.5	08/28/25	08/28/25	2535145	
Trichloroethylene (TCE)	EPA 524.2	ND	ug/L	0.50	0.098	5	08/28/25	08/28/25	2535145	
1,2-Dichloropropane	EPA 524.2	ND	ug/L	0.50	0.17	5	08/28/25	08/28/25	2535145	
Bromodichloromethane	EPA 524.2	ND	ug/L	1.0	0.33		08/28/25	08/28/25	2535145	
Toluene	EPA 524.2	ND	ug/L	0.50	0.11	150	08/28/25	08/28/25	2535145	
Tetrachloroethylene (PCE)	EPA 524.2	ND	ug/L	0.50	0.15	5	08/28/25	08/28/25	2535145	
1,1,2-Trichloroethane (1,1,2-TCA)	EPA 524.2	ND	ug/L	0.50	0.11	5	08/28/25	08/28/25	2535145	
Dibromochloromethane	EPA 524.2	ND	ug/L	1.0	0.39		08/28/25	08/28/25	2535145	
Monochlorobenzene (Chlorobenzene)	EPA 524.2	ND	ug/L	0.50	0.089	70	08/28/25	08/28/25	2535145	
Ethyl Benzene	EPA 524.2	ND	ug/L	0.50	0.12	300	08/28/25	08/28/25	2535145	
cis-1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50	0.21		08/28/25	08/28/25	2535145	
m,p-Xylene	EPA 524.2	ND	ug/L	0.50	0.26		08/28/25	08/28/25	2535145	
trans-1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50	0.23		08/28/25	08/28/25	2535145	
o-Xylene	EPA 524.2	ND	ug/L	0.50	0.12		08/28/25	08/28/25	2535145	
Styrene	EPA 524.2	ND	ug/L	0.50	0.17	100	08/28/25	08/28/25	2535145	
Bromoform	EPA 524.2	ND	ug/L	1.0	0.48		08/28/25	08/28/25	2535145	
1,1,2,2-Tetrachloroethane	EPA 524.2	ND	ug/L	0.50	0.13		08/28/25	08/28/25	2535145	
1,4-Dichlorobenzene (p-DCB)	EPA 524.2	ND	ug/L	0.50	0.14	5	08/28/25	08/28/25	2535145	
1,2-Dichlorobenzene (o-DCB)	EPA 524.2	ND	ug/L	0.50	0.13	600	08/28/25	08/28/25	2535145	

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

12225C **25H2349-01 (Ground Water)** **Sample Date:** 08/22/25 11:00 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MDL	MCL	Prepared	Analyzed	Batch	Qualifier
Volatile Organic Analyses										
1,2,4-Trichlorobenzene	EPA 524.2	ND	ug/L	0.50	0.35	5	08/28/25	08/28/25	2535145	
Total 1,3-Dichloropropene	EPA 524.2	ND	ug/L	0.50	0.21	0.5	08/28/25	08/28/25	2535145	
Total Trihalomethanes (TTHM)	EPA 524.2	ND	ug/L	1.0	0.25	80	08/28/25	08/28/25	2535145	
Total Xylenes (m,p & o)	EPA 524.2	ND	ug/L	0.50	0.12	1750	08/28/25	08/28/25	2535145	
Surrogate: Bromofluorobenzene	*EPA 524.2*	*81 %*					*08/28/25*	*08/28/25*	*2535145*	
Surrogate: 1,2-Dichlorobenzene-d4	*EPA 524.2*	*84 %*					*08/28/25*	*08/28/25*	*2535145*	
Semi-Volatile Organic Analyses / EPA 504										
Ethylene Dibromide (EDB)	EPA 504.1	ND	ug/L	0.020	0.0041	0.05	08/27/25	08/28/25	2535092	
Dibromochloropropane (DBCP)	EPA 504.1	ND	ug/L	0.010	0.0025	0.2	08/27/25	08/28/25	2535092	
Synthetic Organic Analyses / 1,2,3-TCP										
1,2,3-Trichloropropane	SRL 524M-TCP	ND	ug/L	0.0050	0.0029	0.005	08/26/25	08/26/25	2535047	
Synthetic Organic Analyses										
Endrin	EPA 508.1	ND	ug/L	0.10	0.0089	2	08/28/25	09/07/25	2534078	
Lindane (gamma-BHC)	EPA 508.1	ND	ug/L	0.20	0.0082	0.2	08/28/25	09/07/25	2534078	
Methoxychlor	EPA 508.1	ND	ug/L	10	0.11	30	08/28/25	09/07/25	2534078	
Toxaphene	EPA 508.1	ND	ug/L	1.0	0.55	3	08/28/25	09/07/25	2534078	
Chlordane	EPA 508.1	ND	ug/L	0.10	0.063	0.1	08/28/25	09/07/25	2534078	
Heptachlor	EPA 508.1	ND	ug/L	0.010	0.0084	0.01	08/28/25	09/07/25	2534078	
Heptachlor Epoxide	EPA 508.1	ND	ug/L	0.010	0.0092	0.01	08/28/25	09/07/25	2534078	
Hexachlorobenzene	EPA 508.1	ND	ug/L	0.50	0.0073	1	08/28/25	09/07/25	2534078	
Hexachlorocyclopentadiene	EPA 508.1	ND	ug/L	1.0	0.071	50	08/28/25	09/07/25	2534078	
Polychlorinated Biphenyls (PCBs)	EPA 508.1	ND	ug/L	0.50		0.5	08/28/25	09/07/25	2534078	
Surrogate: 4-4'-Dichlorobiphenyl	*EPA 508.1*	*70 %*					*08/28/25*	*09/07/25*	*2534078*	
Dalapon	EPA 515.4	ND	ug/L	10	5.0	200	09/05/25	09/19/25	2536196	
2,4,5-TP (SILVEX)	EPA 515.4	ND	ug/L	1.0	0.64	50	09/05/25	09/19/25	2536196	
Bentazon (BASAGRAN)	EPA 515.4	ND	ug/L	2.0	0.96	18	09/05/25	09/19/25	2536196	
Picloram	EPA 515.4	ND	ug/L	1.0	0.73	500	09/05/25	09/19/25	2536196	
2,4-D	EPA 515.4	ND	ug/L	10	5.3	70	09/05/25	09/19/25	2536196	
Pentachlorophenol (PCP)	EPA 515.4	ND	ug/L	0.20	0.095	1	09/05/25	09/19/25	2536196	
Dinoseb (DNBP)	EPA 515.4	ND	ug/L	2.0	0.85	7	09/05/25	09/19/25	2536196	
Surrogate: 2,4-Dichlorophenylacetic acid	*EPA 515.4*	*74 %*					*09/05/25*	*09/19/25*	*2536196*	
Alachlor (ALANEX)	EPA 525.2	ND	ug/L	1.0	0.36	2	09/02/25	09/04/25	2536075	

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

12225C **25H2349-01 (Ground Water)** **Sample Date:** 08/22/25 11:00 **Sampler:** Not Listed

Analyte	Method	Result	Units	Rep. Limit	MDL	MCL	Prepared	Analyzed	Batch	Qualifier
Synthetic Organic Analyses										
Atrazine (AATREX)	EPA 525.2	ND	ug/L	0.50	0.11	1	09/02/25	09/04/25	2536075	
Benzo(a)pyrene	EPA 525.2	ND	ug/L	0.10	0.036	0.2	09/02/25	09/04/25	2536075	
Diethylhexylphthalate (DEHP)	EPA 525.2	ND	ug/L	3.0	1.4	4	09/02/25	09/04/25	2536075	
Di(2-ethylhexyl) adipate	EPA 525.2	ND	ug/L	5.0	2.1	400	09/02/25	09/04/25	2536075	
Molinate (ORDRAM)	EPA 525.2	ND	ug/L	2.0	0.62	20	09/02/25	09/04/25	2536075	
Simazine (PRINCEP)	EPA 525.2	ND	ug/L	1.0	0.14	4	09/02/25	09/04/25	2536075	
Thiobencarb (BOLERO)	EPA 525.2	ND	ug/L	1.0	0.30	70	09/02/25	09/04/25	2536075	
Surrogate: 1,3-dimethyl-2-nitrobenzene	*EPA 525.2*	*108 %*					*09/02/25*	*09/04/25*	*2536075*	
Surrogate: Perylene-d12	*EPA 525.2*	*94 %*					*09/02/25*	*09/04/25*	*2536075*	
Surrogate: Triphenylphosphate	*EPA 525.2*	*87 %*					*09/02/25*	*09/04/25*	*2536075*	
Oxamyl (VYDATE)	EPA 531.1	ND	ug/L	20	0.98	50	09/16/25	09/19/25	2538069	
Carbofuran (FURADAN)	EPA 531.1	ND	ug/L	5.0	1.7	18	09/16/25	09/19/25	2538069	
Glyphosate	EPA 547	ND	ug/L	25	17	700	08/26/25	08/26/25	2535057	
Endothall	EPA 548.1	ND	ug/L	45	2.2	100	08/26/25	08/29/25	2535056	
Diquat	EPA 549.2	ND	ug/L	4.0	0.66	20	08/28/25	09/04/25	2535165	
Subcontracted Analyses										
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 1613B	ND	pg/L	5.0	2.5	30	09/03/25	09/15/25	2536091	CERES
Asbestos	EPA 100.2	ND	MFL	0.20		7	09/03/25	09/08/25	2536091	LT

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Physical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535008 Analyst: MK1										
Blank (2535008-BLK1)				Prepared & Analyzed: 08/22/25						
Turbidity	0.050	0.10	NTU							J
LCS (2535008-BS1)				Prepared & Analyzed: 08/22/25						
Turbidity	1.09	0.10	NTU	1.0		109	90-110			

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534240	**Analyst: GE**									
Blank (2534240-BLK1)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	ND	1.0	mg/L							
Fluoride (F)	ND	0.10	"							
Nitrate + Nitrite (as N)	ND	0.40	"							
Nitrate as N (NO3-N)	ND	0.40	"							
Nitrite as N (NO2-N)	ND	0.40	"							
Sulfate (SO4)	ND	0.50	"							
Blank (2534240-BLK2)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	ND	1.0	mg/L							
Fluoride (F)	ND	0.10	"							
Nitrate + Nitrite (as N)	ND	0.40	"							
Nitrate as N (NO3-N)	ND	0.40	"							
Nitrite as N (NO2-N)	ND	0.40	"							
Sulfate (SO4)	ND	0.50	"							
Blank (2534240-BLK3)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	ND	1.0	mg/L							
Fluoride (F)	ND	0.10	"							
Nitrate + Nitrite (as N)	ND	0.40	"							
Nitrate as N (NO3-N)	ND	0.40	"							
Nitrite as N (NO2-N)	ND	0.40	"							
Sulfate (SO4)	ND	0.50	"							
Blank (2534240-BLK4)				Prepared & Analyzed: 08/23/25						
Chloride (Cl)	ND	1.0	mg/L							
Fluoride (F)	ND	0.10	"							
Nitrate + Nitrite (as N)	ND	0.40	"							
Nitrate as N (NO3-N)	ND	0.40	"							
Nitrite as N (NO2-N)	ND	0.40	"							
Sulfate (SO4)	ND	0.50	"							

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534240 **Analyst: GE**										
Blank (2534240-BLK5)				Prepared & Analyzed: 08/23/25						
Chloride (Cl)	ND	1.0	mg/L							
Fluoride (F)	ND	0.10	"							
Nitrate + Nitrite (as N)	ND	0.40	"							
Nitrate as N (NO3-N)	ND	0.40	"							
Nitrite as N (NO2-N)	ND	0.40	"							
Sulfate (SO4)	ND	0.50	"							
LCS (2534240-BS1)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	46.8	1.0	mg/L	50		94	90-110			
Fluoride (F)	1.05	0.10	"	1.0		105	90-110			
Nitrate as N (NO3-N)	5.89	0.40	"	5.7		103	90-110			
Nitrite as N (NO2-N)	1.99	0.40	"	2.0		99	90-110			
Sulfate (SO4)	47.0	0.50	"	50		94	90-110			
LCS (2534240-BS2)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	48.7	1.0	mg/L	50		97	90-110			
Fluoride (F)	1.09	0.10	"	1.0		109	90-110			
Nitrate as N (NO3-N)	6.11	0.40	"	5.7		107	90-110			
Nitrite as N (NO2-N)	1.88	0.40	"	2.0		94	90-110			
Sulfate (SO4)	48.7	0.50	"	50		97	90-110			
LCS (2534240-BS3)				Prepared & Analyzed: 08/22/25						
Chloride (Cl)	48.0	1.0	mg/L	50		96	90-110			
Fluoride (F)	1.07	0.10	"	1.0		107	90-110			
Nitrate as N (NO3-N)	6.04	0.40	"	5.7		106	90-110			
Nitrite as N (NO2-N)	1.88	0.40	"	2.0		94	90-110			
Sulfate (SO4)	48.1	0.50	"	50		96	90-110			

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534240	**Analyst: GE**									
LCS (2534240-BS4)				Prepared & Analyzed: 08/23/25						
Chloride (Cl)	47.0	1.0	mg/L	50		94	90-110			
Fluoride (F)	1.04	0.10	"	1.0		104	90-110			
Nitrate as N (NO3-N)	5.92	0.40	"	5.7		104	90-110			
Nitrite as N (NO2-N)	1.84	0.40	"	2.0		92	90-110			
Sulfate (SO4)	47.2	0.50	"	50		94	90-110			
LCS (2534240-BS5)				Prepared & Analyzed: 08/23/25						
Chloride (Cl)	47.0	1.0	mg/L	50		94	90-110			
Fluoride (F)	1.06	0.10	"	1.0		106	90-110			
Nitrate as N (NO3-N)	5.93	0.40	"	5.7		104	90-110			
Nitrite as N (NO2-N)	1.85	0.40	"	2.0		93	90-110			
Sulfate (SO4)	47.2	0.50	"	50		94	90-110			
Matrix Spike (2534240-MS1)	**Source: 25H2152-03**			Prepared & Analyzed: 08/22/25						
Chloride (Cl)	41.2	1.0	mg/L	25	14.5	107	80-120			
Fluoride (F)	0.912	0.10	"	0.50	0.404	102	80-120			
Nitrate as N (NO3-N)	3.01	0.40	"	2.9	0.124	101	80-120			
Nitrite as N (NO2-N)	1.72	0.40	"	2.0	ND	86	80-120			
Sulfate (SO4)	299	0.50	"	25	275	97	80-120			
Matrix Spike (2534240-MS2)	**Source: 25H2101-01**			Prepared & Analyzed: 08/22/25						
Chloride (Cl)	48.7	1.0	mg/L	25	22.1	106	80-120			
Fluoride (F)	0.905	0.10	"	0.50	0.395	102	80-120			
Nitrate as N (NO3-N)	3.20	0.40	"	2.9	0.344	100	80-120			
Nitrite as N (NO2-N)	1.84	0.40	"	2.0	ND	92	80-120			
Sulfate (SO4)	86.4	0.50	"	25	60.1	105	80-120			
Matrix Spike (2534240-MS3)	**Source: 25H2331-01**			Prepared & Analyzed: 08/22/25						
Chloride (Cl)	37.1	1.0	mg/L	25	12.3	99	80-120			
Fluoride (F)	0.872	0.10	"	0.50	0.359	103	80-120			
Nitrate as N (NO3-N)	7.74	0.40	"	2.9	4.91	99	80-120			
Nitrite as N (NO2-N)	1.97	0.40	"	2.0	ND	98	80-120			
Sulfate (SO4)	40.9	0.50	"	25	16.2	99	80-120			

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534240	**Analyst: GE**									
Matrix Spike (2534240-MS4)		**Source: 25H2346-02**		Prepared & Analyzed: 08/23/25						
Chloride (Cl)	33.6	1.0	mg/L	25	8.82	99	80-120			
Fluoride (F)	0.667	0.10	"	0.50	0.150	103	80-120			
Nitrate as N (NO3-N)	3.40	0.40	"	2.9	0.504	102	80-120			
Nitrite as N (NO2-N)	2.03	0.40	"	2.0	ND	102	80-120			
Sulfate (SO4)	30.9	0.50	"	25	6.79	96	80-120			
Batch 2534257	**Analyst: LV**									
Blank (2534257-BLK1)				Prepared: 08/22/25 Analyzed: 08/28/25						
Alkalinity, Total (as CaCO3)	ND	5.0	mg/L							
Specific Conductance (E.C.) at 25°C	0.78	2.0	umho/cm at 25°C							J
Blank (2534257-BLK2)				Prepared: 08/22/25 Analyzed: 08/28/25						
Alkalinity, Total (as CaCO3)	ND	5.0	mg/L							
Specific Conductance (E.C.) at 25°C	0.76	2.0	umho/cm at 25°C							J
LCS (2534257-BS1)				Prepared: 08/22/25 Analyzed: 08/28/25						
Alkalinity, Total (as CaCO3)	102	5.0	mg/L	100		102	90-110			
pH (Lab)	7.0		pH Units	7.0		101	98-102			
Specific Conductance (E.C.) at 25°C	1010	2.0	umho/cm at 25°C	1000		101	90-110			
LCS (2534257-BS2)				Prepared: 08/22/25 Analyzed: 08/28/25						
Alkalinity, Total (as CaCO3)	104	5.0	mg/L	100		104	90-110			
pH (Lab)	7.1		pH Units	7.0		101	98-102			
Specific Conductance (E.C.) at 25°C	1010	2.0	umho/cm at 25°C	1000		101	90-110			
Duplicate (2534257-DUP1)		**Source: 25H2210-01**		Prepared: 08/22/25 Analyzed: 08/28/25						
Alkalinity, Total (as CaCO3)	194	5.0	mg/L		193			0.4	10	
pH (Lab)	7.8		pH Units		7.8			0.3	10	
Specific Conductance (E.C.) at 25°C	1080	2.0	umho/cm at 25°C		1080			0.09	10	

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534274 **Analyst: CE**										
Blank (2534274-BLK1)				Prepared & Analyzed: 08/22/25						
MBAS	ND	0.10	mg/L LAS, mol wt 342							
Blank (2534274-BLK2)				Prepared & Analyzed: 08/22/25						
MBAS	ND	0.10	mg/L LAS, mol wt 342							
LCS (2534274-BS1)				Prepared & Analyzed: 08/22/25						
MBAS	1.20	0.10	mg/L LAS, mol wt 342	1.2		100	90-110			
LCS Dup (2534274-BSD1)				Prepared & Analyzed: 08/22/25						
MBAS	1.18	0.10	mg/L LAS, mol wt 342	1.2		98	90-110	2	20	
Matrix Spike (2534274-MS1)		**Source: 25H2210-08**		Prepared & Analyzed: 08/22/25						
MBAS	1.50	0.10	mg/L LAS, mol wt 342	1.2	0.116	115	80-120			
Matrix Spike Dup (2534274-MSD1)		**Source: 25H2210-08**		Prepared & Analyzed: 08/22/25						
MBAS	1.50	0.10	mg/L LAS, mol wt 342	1.2	0.116	115	80-120	0.1	20	
Batch 2535084 **Analyst: YG**										
Blank (2535084-BLK1)				Prepared & Analyzed: 08/26/25						
Cyanide (CN)	ND	100	ug/L							
LCS (2535084-BS1)				Prepared & Analyzed: 08/26/25						
Cyanide (CN)	511	100	ug/L	500		102	80-120			
LCS (2535084-BS2)				Prepared & Analyzed: 08/26/25						
Cyanide (CN)	521	100	ug/L	500		104	80-120			

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Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535084 **Analyst: YG**										
Matrix Spike (2535084-MS1)		**Source: 25H2331-01**		Prepared & Analyzed: 08/26/25						
Cyanide (CN)	513	100	ug/L	500	ND	103	80-120			
Matrix Spike Dup (2535084-MSD1)		**Source: 25H2331-01**		Prepared & Analyzed: 08/26/25						
Cyanide (CN)	573	100	ug/L	500	ND	115	80-120	11	20	
Batch 2535093 **Analyst: JM**										
Blank (2535093-BLK1)				Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	ND	5.0	mg/L							
Blank (2535093-BLK2)				Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	ND	5.0	mg/L							
LCS (2535093-BS1)				Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	43.0	5.0	mg/L	50		86	80-120			
LCS (2535093-BS2)				Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	53.0	5.0	mg/L	50		106	80-120			
Duplicate (2535093-DUP1)		**Source: 25H1713-01**		Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	523	5.0	mg/L		489			7	10	
Duplicate (2535093-DUP2)		**Source: 25H2470-01**		Prepared: 08/27/25 Analyzed: 08/29/25						
Total Filterable Residue/TDS	ND	5.0	mg/L		187					
Batch 2537041 **Analyst: MAF**										
Blank (2537041-BLK1)				Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	ND	1.0	ug/L							

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General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537041 **Analyst: MAF**										
Blank (2537041-BLK2)				Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	ND	1.0	ug/L							
Blank (2537041-BLK3)				Prepared: 09/08/25 Analyzed: 09/09/25						
Perchlorate (ClO4)	ND	1.0	ug/L							
LCS (2537041-BS1)				Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	10.6	1.0	ug/L	10		106	90-110			
LCS (2537041-BS2)				Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	10.1	1.0	ug/L	10		101	90-110			
LCS (2537041-BS3)				Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	9.09	1.0	ug/L	10		91	90-110			
LCS (2537041-BS4)				Prepared: 09/08/25 Analyzed: 09/09/25						
Perchlorate (ClO4)	10.5	1.0	ug/L	10		105	90-110			
LCS (2537041-BS5)				Prepared: 09/08/25 Analyzed: 09/09/25						
Perchlorate (ClO4)	9.16	1.0	ug/L	10		92	90-110			
LCS (2537041-BS6)				Prepared: 09/08/25 Analyzed: 09/09/25						
Perchlorate (ClO4)	9.01	1.0	ug/L	10		90	90-110			
LCS (2537041-BS7)				Prepared: 09/08/25 Analyzed: 09/09/25						
Perchlorate (ClO4)	10.2	1.0	ug/L	10		102	90-110			
Matrix Spike (2537041-MS1)	**Source: 25I0335-01**			Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	25.2	1.0	ug/L	25	1.60	95	80-120			

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Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

General Chemical Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537041 **Analyst: MAF**										
Matrix Spike (2537041-MS2)	**Source: 25H2746-01**			Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	24.0	1.0	ug/L	25	ND	96	80-120			
Matrix Spike Dup (2537041-MSD1)	**Source: 25I0335-01**			Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	25.5	1.0	ug/L	25	1.60	96	80-120	1	15	
Matrix Spike Dup (2537041-MSD2)	**Source: 25H2746-01**			Prepared & Analyzed: 09/08/25						
Perchlorate (ClO4)	24.3	1.0	ug/L	25	ND	97	80-120	1	15	

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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087	**Analyst: JG**									
Blank (2535087-BLK1)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Barium (Ba)	ND	100	"							
Boron (B)	ND	100	"							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Zinc (Zn)	ND	50	"							
Blank (2535087-BLK2)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Barium (Ba)	ND	100	"							
Boron (B)	ND	100	"							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Zinc (Zn)	ND	50	"							
Blank (2535087-BLK3)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Barium (Ba)	ND	100	"							
Boron (B)	ND	100	"							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Zinc (Zn)	ND	50	"							
Blank (2535087-BLK4)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Barium (Ba)	ND	100	"							
Boron (B)	ND	100	"							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Zinc (Zn)	ND	50	"							

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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087	**Analyst: JG**									
Blank (2535087-BLK5)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Barium (Ba)	ND	100	"							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Blank (2535087-BLK6)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Blank (2535087-BLK7)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
Blank (2535087-BLK8)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	ND	50	ug/L							
Copper (Cu)	ND	50	"							
Iron (Fe)	ND	100	"							
Manganese (Mn)	ND	20	"							
LCS (2535087-BS1)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2660	50	ug/L	2500		107	85-115			
Barium (Ba)	549	100	"	500		110	85-115			
Boron (B)	2820	100	"	2500		113	85-115			
Copper (Cu)	2790	50	"	2500		111	85-115			
Iron (Fe)	2820	100	"	2500		113	85-115			
Manganese (Mn)	2810	20	"	2500		113	85-115			
Zinc (Zn)	2730	50	"	2500		109	85-115			

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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087 **Analyst: JG**										
LCS (2535087-BS2)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2670	50	ug/L	2500		107	85-115			
Barium (Ba)	564	100	"	500		113	85-115			
Boron (B)	2710	100	"	2500		108	85-115			
Copper (Cu)	2790	50	"	2500		111	85-115			
Iron (Fe)	2830	100	"	2500		113	85-115			
Manganese (Mn)	2800	20	"	2500		112	85-115			
Zinc (Zn)	2800	50	"	2500		112	85-115			
LCS (2535087-BS3)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2660	50	ug/L	2500		106	85-115			
Barium (Ba)	539	100	"	500		108	85-115			
Boron (B)	2840	100	"	2500		114	85-115			
Copper (Cu)	2780	50	"	2500		111	85-115			
Iron (Fe)	2830	100	"	2500		113	85-115			
Manganese (Mn)	2770	20	"	2500		111	85-115			
Zinc (Zn)	2670	50	"	2500		107	85-115			
LCS (2535087-BS4)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2310	50	ug/L	2500		92	85-115			
Barium (Ba)	496	100	"	500		99	85-115			
Boron (B)	2340	100	"	2500		94	85-115			
Copper (Cu)	2420	50	"	2500		97	85-115			
Iron (Fe)	2480	100	"	2500		99	85-115			
Manganese (Mn)	2430	20	"	2500		97	85-115			
Zinc (Zn)	2460	50	"	2500		98	85-115			
LCS (2535087-BS5)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2320	50	ug/L	2500		93	85-115			
Barium (Ba)	492	100	"	500		98	85-115			
Copper (Cu)	2440	50	"	2500		98	85-115			
Iron (Fe)	2520	100	"	2500		101	85-115			
Manganese (Mn)	2440	20	"	2500		98	85-115			

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Metals - Quality Control

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087	**Analyst: JG**									
LCS (2535087-BS6)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2390	50	ug/L	2500		96	85-115			
Copper (Cu)	2490	50	"	2500		100	85-115			
Iron (Fe)	2540	100	"	2500		101	85-115			
Manganese (Mn)	2490	20	"	2500		100	85-115			
LCS (2535087-BS7)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2330	50	ug/L	2500		93	85-115			
Copper (Cu)	2410	50	"	2500		97	85-115			
Iron (Fe)	2450	100	"	2500		98	85-115			
Manganese (Mn)	2410	20	"	2500		96	85-115			
LCS (2535087-BS8)				Prepared & Analyzed: 08/27/25						
Aluminum (Al)	2360	50	ug/L	2500		94	85-115			
Copper (Cu)	2450	50	"	2500		98	85-115			
Iron (Fe)	2520	100	"	2500		101	85-115			
Manganese (Mn)	2460	20	"	2500		98	85-115			
Matrix Spike (2535087-MS1)	**Source: 25H2385-02**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3270	50	ug/L	2500	121	126	70-130			
Barium (Ba)	628	100	"	500	38.6	118	70-130			
Boron (B)	3240	100	"	2500	218	121	70-130			
Copper (Cu)	3110	50	"	2500	47.1	123	70-130			
Iron (Fe)	3130	100	"	2500	240	116	70-130			
Manganese (Mn)	2900	20	"	2500	13.5	115	70-130			
Zinc (Zn)	3050	50	"	2500	86.2	119	70-130			
Matrix Spike (2535087-MS2)	**Source: 25H2210-05**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3200	50	ug/L	2500	ND	128	70-130			
Barium (Ba)	668	100	"	500	92.4	115	70-130			
Boron (B)	3260	100	"	2500	218	122	70-130			
Copper (Cu)	3000	50	"	2500	12.8	119	70-130			
Iron (Fe)	2950	100	"	2500	ND	118	70-130			
Manganese (Mn)	2940	20	"	2500	ND	118	70-130			
Zinc (Zn)	2880	50	"	2500	ND	115	70-130			

Stu Styles
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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087	**Analyst: JG**									
Matrix Spike (2535087-MS3)	**Source: 25H2271-04**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3170	50	ug/L	2500	ND	127	70-130			
Barium (Ba)	616	100	"	500	21.9	119	70-130			
Boron (B)	3270	100	"	2500	238	121	70-130			
Copper (Cu)	3090	50	"	2500	6.63	123	70-130			
Iron (Fe)	3000	100	"	2500	ND	120	70-130			
Manganese (Mn)	2950	20	"	2500	3.31	118	70-130			
Zinc (Zn)	3080	50	"	2500	44.6	121	70-130			
Matrix Spike (2535087-MS4)	**Source: 25H2342-01**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3120	50	ug/L	2500	95.2	121	70-130			
Barium (Ba)	745	100	"	500	173	114	70-130			
Copper (Cu)	2850	50	"	2500	28.3	113	70-130			
Iron (Fe)	33400	100	"	2500	30900	101	70-130			
Manganese (Mn)	4030	20	"	2500	1290	110	70-130			
Matrix Spike (2535087-MS5)	**Source: 25H2606-07**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3150	50	ug/L	2500	ND	126	70-130			
Copper (Cu)	3210	50	"	2500	71.0	126	70-130			
Iron (Fe)	3140	100	"	2500	ND	126	70-130			
Manganese (Mn)	3140	20	"	2500	ND	126	70-130			
Matrix Spike (2535087-MS6)	**Source: 25H2585-04**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3520	50	ug/L	2500	108	137	70-130			QM-01
Copper (Cu)	3220	50	"	2500	10.2	128	70-130			
Iron (Fe)	3160	100	"	2500	ND	126	70-130			
Manganese (Mn)	3160	20	"	2500	1.03	126	70-130			
Matrix Spike (2535087-MS7)	**Source: 25H2530-01**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3230	50	ug/L	2500	ND	129	70-130			
Copper (Cu)	3080	50	"	2500	ND	123	70-130			
Iron (Fe)	3070	100	"	2500	ND	123	70-130			
Manganese (Mn)	3020	20	"	2500	ND	121	70-130			

Stu Styles
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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087 Analyst: JG										
Matrix Spike Dup (2535087-MSD1)	**Source: 25H2385-02**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3150	50	ug/L	2500	121	121	70-130	4	30	
Barium (Ba)	600	100	"	500	38.6	112	70-130	5	30	
Boron (B)	3210	100	"	2500	218	120	70-130	1	30	
Copper (Cu)	3030	50	"	2500	47.1	119	70-130	3	30	
Iron (Fe)	3040	100	"	2500	240	112	70-130	3	30	
Manganese (Mn)	2820	20	"	2500	13.5	112	70-130	3	30	
Zinc (Zn)	2910	50	"	2500	86.2	113	70-130	5	30	
Matrix Spike Dup (2535087-MSD2)	**Source: 25H2210-05**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3170	50	ug/L	2500	ND	127	70-130	0.8	30	
Barium (Ba)	692	100	"	500	92.4	120	70-130	3	30	
Boron (B)	3310	100	"	2500	218	124	70-130	1	30	
Copper (Cu)	3010	50	"	2500	12.8	120	70-130	0.3	30	
Iron (Fe)	2970	100	"	2500	ND	119	70-130	0.4	30	
Manganese (Mn)	2950	20	"	2500	ND	118	70-130	0.2	30	
Zinc (Zn)	2970	50	"	2500	ND	119	70-130	3	30	
Matrix Spike Dup (2535087-MSD3)	**Source: 25H2271-04**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3020	50	ug/L	2500	ND	121	70-130	5	30	
Barium (Ba)	593	100	"	500	21.9	114	70-130	4	30	
Boron (B)	3190	100	"	2500	238	118	70-130	2	30	
Copper (Cu)	2980	50	"	2500	6.63	119	70-130	3	30	
Iron (Fe)	2890	100	"	2500	ND	116	70-130	4	30	
Manganese (Mn)	2840	20	"	2500	3.31	114	70-130	4	30	
Zinc (Zn)	2940	50	"	2500	44.6	116	70-130	5	30	
Matrix Spike Dup (2535087-MSD4)	**Source: 25H2342-01**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3060	50	ug/L	2500	95.2	119	70-130	2	30	
Barium (Ba)	738	100	"	500	173	113	70-130	0.9	30	
Copper (Cu)	2800	50	"	2500	28.3	111	70-130	2	30	
Iron (Fe)	33000	100	"	2500	30900	86	70-130	1	30	
Manganese (Mn)	3980	20	"	2500	1290	107	70-130	1	30	

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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535087	**Analyst: JG**									
Matrix Spike Dup (2535087-MSD5)	**Source: 25H2606-07**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3130	50	ug/L	2500	ND	125	70-130	0.5	30	
Copper (Cu)	3190	50	"	2500	71.0	125	70-130	0.7	30	
Iron (Fe)	3110	100	"	2500	ND	125	70-130	0.9	30	
Manganese (Mn)	3120	20	"	2500	ND	125	70-130	0.7	30	
Matrix Spike Dup (2535087-MSD6)	**Source: 25H2585-04**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3300	50	ug/L	2500	108	128	70-130	6	30	
Copper (Cu)	3050	50	"	2500	10.2	122	70-130	5	30	
Iron (Fe)	3010	100	"	2500	ND	121	70-130	5	30	
Manganese (Mn)	2990	20	"	2500	1.03	120	70-130	5	30	
Matrix Spike Dup (2535087-MSD7)	**Source: 25H2530-01**			Prepared & Analyzed: 08/27/25						
Aluminum (Al)	3140	50	ug/L	2500	ND	126	70-130	3	30	
Copper (Cu)	3010	50	"	2500	ND	121	70-130	2	30	
Iron (Fe)	3000	100	"	2500	ND	120	70-130	2	30	
Manganese (Mn)	2980	20	"	2500	ND	119	70-130	1	30	
Batch 2535138	**Analyst: JG**									
Blank (2535138-BLK1)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							
Blank (2535138-BLK2)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							

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Metadata - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138 **Analyst: JG**										
Blank (2535138-BLK3)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							
Blank (2535138-BLK4)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	0.25	1.0	"							J
Blank (2535138-BLK5)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							
Blank (2535138-BLK6)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							
Blank (2535138-BLK7)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							

Stu Styles
Client Services Manager

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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138	**Analyst: JG**									
Blank (2535138-BLK8)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	ND	1.0	mg/L							
Magnesium (Mg)	ND	1.0	"							
Potassium (K)	ND	1.0	"							
Sodium (Na)	ND	1.0	"							
LCS (2535138-BS1)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.7	1.0	mg/L	25		103	85-115			
Magnesium (Mg)	26.9	1.0	"	25		108	85-115			
Potassium (K)	24.5	1.0	"	25		98	85-115			
Sodium (Na)	48.2	1.0	"	50		96	85-115			
LCS (2535138-BS2)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	26.2	1.0	mg/L	25		105	85-115			
Magnesium (Mg)	27.4	1.0	"	25		109	85-115			
Potassium (K)	24.9	1.0	"	25		100	85-115			
Sodium (Na)	49.8	1.0	"	50		100	85-115			
LCS (2535138-BS3)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	26.1	1.0	mg/L	25		105	85-115			
Magnesium (Mg)	27.2	1.0	"	25		109	85-115			
Potassium (K)	25.2	1.0	"	25		101	85-115			
Sodium (Na)	50.4	1.0	"	50		101	85-115			
LCS (2535138-BS4)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.0	1.0	mg/L	25		100	85-115			
Magnesium (Mg)	25.9	1.0	"	25		104	85-115			
Potassium (K)	24.0	1.0	"	25		96	85-115			
Sodium (Na)	50.5	1.0	"	50		101	85-115			

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138	**Analyst: JG**									
LCS (2535138-BS5)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.8	1.0	mg/L	25		103	85-115			
Magnesium (Mg)	26.7	1.0	"	25		107	85-115			
Potassium (K)	24.8	1.0	"	25		99	85-115			
Sodium (Na)	49.4	1.0	"	50		99	85-115			
LCS (2535138-BS6)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.9	1.0	mg/L	25		104	85-115			
Magnesium (Mg)	26.7	1.0	"	25		107	85-115			
Potassium (K)	25.0	1.0	"	25		100	85-115			
Sodium (Na)	48.6	1.0	"	50		97	85-115			
LCS (2535138-BS7)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.2	1.0	mg/L	25		101	85-115			
Magnesium (Mg)	26.0	1.0	"	25		104	85-115			
Potassium (K)	24.2	1.0	"	25		97	85-115			
Sodium (Na)	48.3	1.0	"	50		97	85-115			
LCS (2535138-BS8)				Prepared & Analyzed: 08/28/25						
Calcium (Ca)	25.0	1.0	mg/L	25		100	85-115			
Magnesium (Mg)	25.7	1.0	"	25		103	85-115			
Potassium (K)	24.3	1.0	"	25		97	85-115			
Sodium (Na)	50.0	1.0	"	50		100	85-115			
Matrix Spike (2535138-MS1)		**Source: 25H2205-03**		Prepared & Analyzed: 08/28/25						
Calcium (Ca)	31.0	1.0	mg/L	25	5.02	104	70-130			
Magnesium (Mg)	27.8	1.0	"	25	0.232	110	70-130			
Potassium (K)	26.5	1.0	"	25	0.348	105	70-130			
Sodium (Na)	122	1.0	"	50	72.4	99	70-130			

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Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138 **Analyst: JG**										
Matrix Spike (2535138-MS2)	**Source: 25H2209-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	89.7	1.0	mg/L	25	65.0	99	70-130			
Magnesium (Mg)	51.7	1.0	"	25	23.1	115	70-130			
Potassium (K)	30.9	1.0	"	25	4.51	105	70-130			
Sodium (Na)	82.9	1.0	"	50	27.8	110	70-130			
Matrix Spike (2535138-MS3)	**Source: 25H2602-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	80.4	1.0	mg/L	25	53.7	107	70-130			
Magnesium (Mg)	35.1	1.0	"	25	7.82	109	70-130			
Potassium (K)	28.6	1.0	"	25	1.56	108	70-130			
Sodium (Na)	96.2	1.0	"	50	43.0	106	70-130			
Matrix Spike (2535138-MS4)	**Source: 25H2352-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	59.5	1.0	mg/L	25	32.8	107	70-130			
Magnesium (Mg)	37.3	1.0	"	25	9.21	112	70-130			
Potassium (K)	28.7	1.0	"	25	1.52	109	70-130			
Sodium (Na)	78.5	1.0	"	50	23.3	110	70-130			
Matrix Spike (2535138-MS5)	**Source: 25H2450-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	84.2	1.0	mg/L	25	59.9	97	70-130			
Magnesium (Mg)	40.4	1.0	"	25	13.6	107	70-130			
Potassium (K)	30.2	1.0	"	25	3.29	107	70-130			
Sodium (Na)	84.6	1.0	"	50	32.0	105	70-130			
Matrix Spike (2535138-MS6)	**Source: 25H2717-04**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	82.9	1.0	mg/L	25	59.9	92	70-130			
Magnesium (Mg)	56.8	1.0	"	25	31.1	103	70-130			
Potassium (K)	27.6	1.0	"	25	1.75	103	70-130			
Sodium (Na)	84.3	1.0	"	50	35.2	98	70-130			

Stu Styles
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138	**Analyst: JG**									
Matrix Spike (2535138-MS7)	**Source: 25H2747-04**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	83.3	1.0	mg/L	25	59.9	94	70-130			
Magnesium (Mg)	58.2	1.0	"	25	32.4	104	70-130			
Potassium (K)	28.1	1.0	"	25	1.76	105	70-130			
Sodium (Na)	89.6	1.0	"	50	35.0	109	70-130			
Matrix Spike Dup (2535138-MSD1)	**Source: 25H2205-03**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	30.7	1.0	mg/L	25	5.02	103	70-130	0.8	30	
Magnesium (Mg)	27.7	1.0	"	25	0.232	110	70-130	0.4	30	
Potassium (K)	26.4	1.0	"	25	0.348	104	70-130	0.4	30	
Sodium (Na)	120	1.0	"	50	72.4	95	70-130	2	30	
Matrix Spike Dup (2535138-MSD2)	**Source: 25H2209-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	87.9	1.0	mg/L	25	65.0	92	70-130	2	30	
Magnesium (Mg)	51.1	1.0	"	25	23.1	112	70-130	1	30	
Potassium (K)	31.4	1.0	"	25	4.51	108	70-130	2	30	
Sodium (Na)	80.3	1.0	"	50	27.8	105	70-130	3	30	
Matrix Spike Dup (2535138-MSD3)	**Source: 25H2602-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	77.1	1.0	mg/L	25	53.7	94	70-130	4	30	
Magnesium (Mg)	35.7	1.0	"	25	7.82	111	70-130	2	30	
Potassium (K)	28.9	1.0	"	25	1.56	109	70-130	0.7	30	
Sodium (Na)	94.5	1.0	"	50	43.0	103	70-130	2	30	
Matrix Spike Dup (2535138-MSD4)	**Source: 25H2352-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	58.5	1.0	mg/L	25	32.8	103	70-130	2	30	
Magnesium (Mg)	36.5	1.0	"	25	9.21	109	70-130	2	30	
Potassium (K)	28.2	1.0	"	25	1.52	107	70-130	2	30	
Sodium (Na)	75.7	1.0	"	50	23.3	105	70-130	4	30	

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535138 **Analyst: JG**										
Matrix Spike Dup (2535138-MSD5)	**Source: 25H2450-01**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	84.1	1.0	mg/L	25	59.9	97	70-130	0.1	30	
Magnesium (Mg)	39.5	1.0	"	25	13.6	104	70-130	2	30	
Potassium (K)	29.4	1.0	"	25	3.29	104	70-130	3	30	
Sodium (Na)	84.5	1.0	"	50	32.0	105	70-130	0.1	30	
Matrix Spike Dup (2535138-MSD6)	**Source: 25H2717-04**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	83.7	1.0	mg/L	25	59.9	95	70-130	1	30	
Magnesium (Mg)	57.0	1.0	"	25	31.1	104	70-130	0.3	30	
Potassium (K)	27.9	1.0	"	25	1.75	104	70-130	1	30	
Sodium (Na)	85.2	1.0	"	50	35.2	100	70-130	1	30	
Matrix Spike Dup (2535138-MSD7)	**Source: 25H2747-04**			Prepared & Analyzed: 08/28/25						
Calcium (Ca)	81.9	1.0	mg/L	25	59.9	88	70-130	2	30	
Magnesium (Mg)	57.3	1.0	"	25	32.4	100	70-130	2	30	
Potassium (K)	27.8	1.0	"	25	1.76	104	70-130	1	30	
Sodium (Na)	86.4	1.0	"	50	35.0	103	70-130	4	30	
Batch 2536110 **Analyst: ZZZ**										
Blank (2536110-BLK1)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							
Blank (2536110-BLK2)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							
Blank (2536110-BLK3)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							

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605 3rd Street	Sub Project:	Received: 08/22/25 15:20
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Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536110	**Analyst: ZZZ**									
Blank (2536110-BLK4)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							
Blank (2536110-BLK5)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							
Blank (2536110-BLK6)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	ND	1.0	ug/L							
LCS (2536110-BS1)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.01	1.0	ug/L	2.0		100	90-110			
LCS (2536110-BS2)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.01	1.0	ug/L	2.0		101	90-110			
LCS (2536110-BS3)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.98	1.0	ug/L	2.0		99	90-110			
LCS (2536110-BS4)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.02	1.0	ug/L	2.0		101	90-110			
LCS (2536110-BS5)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.01	1.0	ug/L	2.0		100	90-110			
LCS (2536110-BS6)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.01	1.0	ug/L	2.0		101	90-110			
LCS (2536110-BS7)				Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.99	1.0	ug/L	2.0		100	90-110			

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Dudek	Project: Water Analysis	Work Order: 25H2349
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536110 Analyst: ZZZ										
Matrix Spike (2536110-MS1)	**Source: 25H2025-05**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.03	1.0	ug/L	2.0	ND	101	70-130			
Matrix Spike (2536110-MS2)	**Source: 25H2331-01**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.97	1.0	ug/L	2.0	ND	99	70-130			
Matrix Spike (2536110-MS3)	**Source: 25H2593-01**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.03	1.0	ug/L	2.0	ND	101	70-130			
Matrix Spike (2536110-MS4)	**Source: 25H1888-05**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.96	1.0	ug/L	2.0	ND	98	70-130			
Matrix Spike Dup (2536110-MSD1)	**Source: 25H2025-05**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.95	1.0	ug/L	2.0	ND	97	70-130	4	20	
Matrix Spike Dup (2536110-MSD2)	**Source: 25H2331-01**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.03	1.0	ug/L	2.0	ND	101	70-130	3	20	
Matrix Spike Dup (2536110-MSD3)	**Source: 25H2593-01**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	2.01	1.0	ug/L	2.0	ND	101	70-130	0.8	20	
Matrix Spike Dup (2536110-MSD4)	**Source: 25H1888-05**			Prepared: 09/03/25 Analyzed: 09/04/25						
Mercury (Hg)	1.99	1.0	ug/L	2.0	ND	100	70-130	1	20	
Batch 2536128 Analyst: JG1										
Blank (2536128-BLK1)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	ND	0.10	ug/L							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536128	**Analyst: JG1**									
Blank (2536128-BLK2)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	ND	0.10	ug/L							
Blank (2536128-BLK3)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	ND	0.10	ug/L							
LCS (2536128-BS1)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	4.76	0.10	ug/L	5.0		95.3	95-105			
LCS (2536128-BS2)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	4.83	0.10	ug/L	5.0		96.7	95-105			
LCS (2536128-BS3)				Prepared & Analyzed: 09/03/25						
Chromium (+6)	5.12	0.10	ug/L	5.0		102	95-105			
Matrix Spike (2536128-MS1)	**Source: 25H2340-01**			Prepared & Analyzed: 09/03/25						
Chromium (+6)	49.4	0.10	ug/L	50	0.0720	98.6	90-110			
Matrix Spike (2536128-MS2)	**Source: 25H2776-01**			Prepared & Analyzed: 09/03/25						
Chromium (+6)	49.3	0.10	ug/L	50	0.0937	98.4	90-110			
Batch 2537189	**Analyst: ZZZ**									
Blank (2537189-BLK1)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	ND	6.0	ug/L							
Arsenic (As)	ND	2.0	"							
Beryllium (Be)	ND	1.0	"							
Cadmium (Cd)	ND	1.0	"							
Chromium (Total Cr)	ND	10	"							
Lead (Pb)	ND	5.0	"							
Nickel (Ni)	ND	10	"							
Selenium (Se)	ND	5.0	"							
Silver (Ag)	ND	10	"							
Thallium (Tl)	ND	1.0	"							
Vanadium (V)	ND	3.0	"							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537189	**Analyst: ZZZ**									
Blank (2537189-BLK2)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	ND	6.0	ug/L							
Arsenic (As)	ND	2.0	"							
Beryllium (Be)	ND	1.0	"							
Cadmium (Cd)	ND	1.0	"							
Chromium (Total Cr)	ND	10	"							
Lead (Pb)	ND	5.0	"							
Nickel (Ni)	ND	10	"							
Selenium (Se)	ND	5.0	"							
Silver (Ag)	ND	10	"							
Thallium (Tl)	ND	1.0	"							
Vanadium (V)	ND	3.0	"							
Blank (2537189-BLK3)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	ND	6.0	ug/L							
Arsenic (As)	ND	2.0	"							
Beryllium (Be)	ND	1.0	"							
Cadmium (Cd)	ND	1.0	"							
Chromium (Total Cr)	ND	10	"							
Lead (Pb)	ND	5.0	"							
Nickel (Ni)	ND	10	"							
Selenium (Se)	ND	5.0	"							
Silver (Ag)	ND	10	"							
Thallium (Tl)	ND	1.0	"							
Vanadium (V)	ND	3.0	"							
LCS (2537189-BS1)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	49.6	6.0	ug/L	50		99	85-115			
Arsenic (As)	48.7	2.0	"	50		97	85-115			
Beryllium (Be)	50.0	1.0	"	50		100	85-115			
Cadmium (Cd)	46.9	1.0	"	50		94	85-115			
Chromium (Total Cr)	49.5	10	"	50		99	85-115			
Lead (Pb)	50.1	5.0	"	50		100	85-115			
Nickel (Ni)	49.1	10	"	50		98	85-115			
Selenium (Se)	47.3	5.0	"	50		95	85-115			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537189	**Analyst: ZZZ**									
LCS (2537189-BS1)				Prepared & Analyzed: 09/11/25						
Silver (Ag)	50.3	10	ug/L	50		101	85-115			
Thallium (Tl)	50.7	1.0	"	50		101	85-115			
Vanadium (V)	48.0	3.0	"	50		96	85-115			
LCS (2537189-BS2)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	49.8	6.0	ug/L	50		100	85-115			
Arsenic (As)	49.8	2.0	"	50		100	85-115			
Beryllium (Be)	49.3	1.0	"	50		99	85-115			
Cadmium (Cd)	46.5	1.0	"	50		93	85-115			
Chromium (Total Cr)	50.7	10	"	50		101	85-115			
Lead (Pb)	51.1	5.0	"	50		102	85-115			
Nickel (Ni)	49.2	10	"	50		98	85-115			
Selenium (Se)	45.4	5.0	"	50		91	85-115			
Silver (Ag)	55.9	10	"	50		112	85-115			
Thallium (Tl)	51.9	1.0	"	50		104	85-115			
Vanadium (V)	47.9	3.0	"	50		96	85-115			
LCS (2537189-BS3)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	52.2	6.0	ug/L	50		104	85-115			
Arsenic (As)	49.9	2.0	"	50		100	85-115			
Beryllium (Be)	48.3	1.0	"	50		97	85-115			
Cadmium (Cd)	46.5	1.0	"	50		93	85-115			
Chromium (Total Cr)	48.0	10	"	50		96	85-115			
Lead (Pb)	49.6	5.0	"	50		99	85-115			
Nickel (Ni)	47.4	10	"	50		95	85-115			
Selenium (Se)	46.4	5.0	"	50		93	85-115			
Silver (Ag)	37.1	10	"	50		74	85-115			QL-04
Thallium (Tl)	50.1	1.0	"	50		100	85-115			
Vanadium (V)	46.3	3.0	"	50		93	85-115			

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537189	**Analyst: ZZZ**									
LCS (2537189-BS4)				Prepared & Analyzed: 09/11/25						
Antimony (Sb)	51.4	6.0	ug/L	50		103	85-115			
Arsenic (As)	49.5	2.0	"	50		99	85-115			
Beryllium (Be)	47.9	1.0	"	50		96	85-115			
Cadmium (Cd)	45.7	1.0	"	50		91	85-115			
Chromium (Total Cr)	47.8	10	"	50		96	85-115			
Lead (Pb)	48.8	5.0	"	50		98	85-115			
Nickel (Ni)	47.0	10	"	50		94	85-115			
Selenium (Se)	47.8	5.0	"	50		96	85-115			
Silver (Ag)	37.3	10	"	50		75	85-115			QL-04
Thallium (Tl)	49.8	1.0	"	50		100	85-115			
Vanadium (V)	46.4	3.0	"	50		93	85-115			
Matrix Spike (2537189-MS1)		**Source: 25I0344-01**		Prepared & Analyzed: 09/11/25						
Antimony (Sb)	49.7	6.0	ug/L	50	ND	99	70-130			
Arsenic (As)	61.8	2.0	"	50	7.25	109	70-130			
Beryllium (Be)	51.9	1.0	"	50	ND	104	70-130			
Cadmium (Cd)	47.0	1.0	"	50	ND	94	70-130			
Chromium (Total Cr)	51.0	10	"	50	ND	102	70-130			
Lead (Pb)	46.9	5.0	"	50	ND	94	70-130			
Nickel (Ni)	48.8	10	"	50	ND	98	70-130			
Selenium (Se)	53.7	5.0	"	50	ND	107	70-130			
Silver (Ag)	43.3	10	"	50	ND	87	70-130			
Thallium (Tl)	48.2	1.0	"	50	ND	96	70-130			
Vanadium (V)	49.7	3.0	"	50	ND	99	70-130			
Matrix Spike (2537189-MS2)		**Source: 25I0323-01**		Prepared & Analyzed: 09/11/25						
Antimony (Sb)	51.7	6.0	ug/L	50	ND	103	70-130			
Arsenic (As)	58.7	2.0	"	50	2.59	112	70-130			
Beryllium (Be)	57.0	1.0	"	50	ND	114	70-130			
Cadmium (Cd)	48.0	1.0	"	50	ND	96	70-130			
Chromium (Total Cr)	60.5	10	"	50	0.521	120	70-130			
Lead (Pb)	47.5	5.0	"	50	0.151	95	70-130			
Nickel (Ni)	69.4	10	"	50	13.2	112	70-130			
Selenium (Se)	57.0	5.0	"	50	1.14	112	70-130			

Stu Styles
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Dudek 605 3rd Street Encinitas CA, 92024	Project: Water Analysis Sub Project: Project Manager: Devin Pritchard-Peterson	Work Order: 25H2349 Received: 08/22/25 15:20 Reported: 09/19/25

Metals - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2537189	**Analyst: ZZZ**									
Matrix Spike (2537189-MS2)	**Source: 25I0323-01**			Prepared & Analyzed: 09/11/25						
Silver (Ag)	49.8	10	ug/L	50	ND	100	70-130			
Thallium (Tl)	48.9	1.0	"	50	ND	98	70-130			
Vanadium (V)	75.6	3.0	"	50	17.0	117	70-130			
Matrix Spike Dup (2537189-MSD1)	**Source: 25I0344-01**			Prepared & Analyzed: 09/11/25						
Antimony (Sb)	50.7	6.0	ug/L	50	ND	101	70-130	2	30	
Arsenic (As)	61.2	2.0	"	50	7.25	108	70-130	0.9	30	
Beryllium (Be)	52.0	1.0	"	50	ND	104	70-130	0.2	30	
Cadmium (Cd)	47.4	1.0	"	50	ND	95	70-130	0.9	30	
Chromium (Total Cr)	49.6	10	"	50	ND	99	70-130	3	30	
Lead (Pb)	47.8	5.0	"	50	ND	96	70-130	2	30	
Nickel (Ni)	52.3	10	"	50	ND	105	70-130	7	30	
Selenium (Se)	54.8	5.0	"	50	ND	110	70-130	2	30	
Silver (Ag)	44.3	10	"	50	ND	89	70-130	2	30	
Thallium (Tl)	48.5	1.0	"	50	ND	97	70-130	0.7	30	
Vanadium (V)	49.0	3.0	"	50	ND	98	70-130	1	30	
Matrix Spike Dup (2537189-MSD2)	**Source: 25I0323-01**			Prepared & Analyzed: 09/11/25						
Antimony (Sb)	52.5	6.0	ug/L	50	ND	105	70-130	2	30	
Arsenic (As)	56.0	2.0	"	50	2.59	107	70-130	5	30	
Beryllium (Be)	56.0	1.0	"	50	ND	112	70-130	2	30	
Cadmium (Cd)	46.9	1.0	"	50	ND	94	70-130	2	30	
Chromium (Total Cr)	58.8	10	"	50	0.521	116	70-130	3	30	
Lead (Pb)	47.4	5.0	"	50	0.151	94	70-130	0.2	30	
Nickel (Ni)	66.9	10	"	50	13.2	107	70-130	4	30	
Selenium (Se)	55.3	5.0	"	50	1.14	108	70-130	3	30	
Silver (Ag)	46.6	10	"	50	ND	93	70-130	6	30	
Thallium (Tl)	48.7	1.0	"	50	ND	97	70-130	0.5	30	
Vanadium (V)	72.7	3.0	"	50	17.0	111	70-130	4	30	

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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Radiochemistry Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535097	**Analyst: ZZZ**									
Blank (2535097-BLK1)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	ND	1.0	pCi/L							
Blank (2535097-BLK2)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	ND	1.0	pCi/L							
Blank (2535097-BLK3)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	ND	1.0	pCi/L							
Blank (2535097-BLK4)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	ND	1.0	pCi/L							
Blank (2535097-BLK5)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	ND	1.0	pCi/L							
LCS (2535097-BS1)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	35.7	1.0	pCi/L	34		105	85-115			
LCS (2535097-BS2)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	36.2	1.0	pCi/L	34		106	85-115			
LCS (2535097-BS3)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	35.0	1.0	pCi/L	34		103	85-115			
LCS (2535097-BS4)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	36.6	1.0	pCi/L	34		108	85-115			
LCS (2535097-BS5)				Prepared: 08/27/25 Analyzed: 08/28/25						
Uranium	36.8	1.0	pCi/L	34		108	85-115			

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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Radiochemistry Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535097	**Analyst: ZZZ**									
LCS (2535097-BS6)				Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	37.1	1.0	pCi/L	34		109	85-115			
Matrix Spike (2535097-MS1)		**Source: 25H2078-03**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	68.2	1.0	pCi/L	34	36.6	94	70-130			
Matrix Spike (2535097-MS2)		**Source: 25H2343-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	53.7	1.0	pCi/L	34	14.2	117	70-130			
Matrix Spike (2535097-MS3)		**Source: 25H2602-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	44.3	1.0	pCi/L	34	4.04	119	70-130			
Matrix Spike (2535097-MS4)		**Source: 25H2342-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	70.8	1.0	pCi/L	34	28.1	126	70-130			
Matrix Spike Dup (2535097-MSD1)		**Source: 25H2078-03**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	68.2	1.0	pCi/L	34	36.6	94	70-130	0.06	30	
Matrix Spike Dup (2535097-MSD2)		**Source: 25H2343-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	54.2	1.0	pCi/L	34	14.2	119	70-130	0.9	30	
Matrix Spike Dup (2535097-MSD3)		**Source: 25H2602-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	44.0	1.0	pCi/L	34	4.04	118	70-130	0.8	30	
Matrix Spike Dup (2535097-MSD4)		**Source: 25H2342-01**		Prepared: 08/27/25	Analyzed: 08/28/25					
Uranium	70.7	1.0	pCi/L	34	28.1	126	70-130	0.04	30	
Batch 2536096	**Analyst: YG**									
Blank (2536096-BLK1)				Prepared: 09/03/25	Analyzed: 09/08/25					
Gross Alpha	1.6	3.0	pCi/L							J
Gross Alpha Counting Error	0.53		"							
Gross Alpha Min Det Activity	0.43		"							

Stu Styles
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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Radiochemistry Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536096		**Analyst: YG**								
LCS (2536096-BS1)				Prepared: 09/03/25 Analyzed: 09/08/25						
Gross Alpha	19.9	3.0	pCi/L	20		100	80-120			
LCS Dup (2536096-BSD1)				Prepared: 09/03/25 Analyzed: 09/08/25						
Gross Alpha	21.9	3.0	pCi/L	20		110	80-120	9	30	
Matrix Spike (2536096-MS1)	**Source: 25H2342-01**			Prepared: 09/03/25 Analyzed: 09/08/25						
Gross Alpha	21.6	3.0	pCi/L	20	8.50	65	70-130			QM-01
Matrix Spike Dup (2536096-MSD1)	**Source: 25H2342-01**			Prepared: 09/03/25 Analyzed: 09/08/25						
Gross Alpha	12.7	3.0	pCi/L	20	8.50	21	70-130	52	50	QM-01

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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Volatile Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535145 **Analyst: LF**										
Blank (2535145-BLK1)				Prepared & Analyzed: 08/28/25						
1,1,1-Trichloroethane (1,1,1-TCA)	ND	0.50	ug/L							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	10	"							
1,1,2-Trichloroethane (1,1,2-TCA)	ND	0.50	"							
1,1-Dichloroethane (1,1-DCA)	ND	0.50	"							
1,1-Dichloroethylene (1,1-DCE)	ND	0.50	"							
1,2,4-Trichlorobenzene	ND	0.50	"							
1,2-Dichlorobenzene (o-DCB)	ND	0.50	"							
1,2-Dichloroethane (1,2-DCA)	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
1,4-Dichlorobenzene (p-DCB)	ND	0.50	"							
Benzene	ND	0.50	"							
Bromodichloromethane	ND	1.0	"							
Bromoform	ND	1.0	"							
Carbon Tetrachloride	ND	0.50	"							
Chloroform (Trichloromethane)	0.26	1.0	"							
cis-1,2-Dichloroethylene (c-1,2-DCE)	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
Dibromochloromethane	ND	1.0	"							
Dichloromethane (Methylene Chloride)	ND	0.50	"							
Ethyl Benzene	ND	0.50	"							
m,p-Xylene	ND	0.50	"							
Methyl tert-Butyl Ether	ND	3.0	"							
Monochlorobenzene (Chlorobenzene)	ND	0.50	"							
o-Xylene	ND	0.50	"							
Styrene	ND	0.50	"							
Tetrachloroethylene (PCE)	ND	0.50	"							
Toluene	ND	0.50	"							
trans-1,2-Dichloroethylene (t-1,2-DCE)	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Trichloroethylene (TCE)	ND	0.50	"							
Trichlorofluoromethane (FREON 11)	ND	5.0	"							
Vinyl Chloride (VC)	ND	0.50	"							

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Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Volatile Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535145 **Analyst: LF**										
Blank (2535145-BLK1)				Prepared & Analyzed: 08/28/25						
Surrogate: 1,2-Dichlorobenzene-d4	*4.1*		*ug/L*	*5.0*		*82*	*70-130*			
Surrogate: Bromofluorobenzene	*4.0*		*"*	*5.0*		*80*	*70-130*			
LCS (2535145-BS1)				Prepared & Analyzed: 08/28/25						
1,1,1-Trichloroethane (1,1,1-TCA)	5.49	0.50	ug/L	5.0		110	70-130			
1,1,2,2-Tetrachloroethane	4.60	0.50	"	5.0		92	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane	5.52	10	"	5.0		110	70-130			J
1,1,2-Trichloroethane (1,1,2-TCA)	5.00	0.50	"	5.0		100	70-130			
1,1-Dichloroethane (1,1-DCA)	5.35	0.50	"	5.0		107	70-130			
1,1-Dichloroethylene (1,1-DCE)	5.12	0.50	"	5.0		102	70-130			
1,2,4-Trichlorobenzene	4.49	0.50	"	5.0		90	70-130			
1,2-Dichlorobenzene (o-DCB)	5.04	0.50	"	5.0		101	70-130			
1,2-Dichloroethane (1,2-DCA)	4.72	0.50	"	5.0		94	70-130			
1,2-Dichloropropane	5.07	0.50	"	5.0		101	70-130			
1,4-Dichlorobenzene (p-DCB)	4.79	0.50	"	5.0		96	70-130			
Benzene	5.24	0.50	"	5.0		105	70-130			
Bromodichloromethane	10.7	1.0	"	10		107	70-130			
Bromoform	11.0	1.0	"	10		110	70-130			
Carbon Tetrachloride	5.53	0.50	"	5.0		111	70-130			
Chloroform (Trichloromethane)	9.71	1.0	"	10		97	70-130			
cis-1,2-Dichloroethylene (c-1,2-DCE)	5.12	0.50	"	5.0		102	70-130			
cis-1,3-Dichloropropene	4.84	0.50	"	5.0		97	70-130			
Dibromochloromethane	11.1	1.0	"	10		111	70-130			
Dichloromethane (Methylene Chloride)	4.48	0.50	"	5.0		90	70-130			
Ethyl Benzene	5.45	0.50	"	5.0		109	70-130			
m,p-Xylene	11.3	0.50	"	10		113	70-130			
Methyl tert-Butyl Ether	4.33	3.0	"	5.0		87	70-130			
Monochlorobenzene (Chlorobenzene)	5.26	0.50	"	5.0		105	70-130			
o-Xylene	5.07	0.50	"	5.0		101	70-130			
Styrene	5.37	0.50	"	5.0		107	70-130			
Tetrachloroethylene (PCE)	5.74	0.50	"	5.0		115	70-130			
Toluene	5.13	0.50	"	5.0		103	70-130			
trans-1,2-Dichloroethylene (t-1,2-DCE)	5.31	0.50	"	5.0		106	70-130			
trans-1,3-Dichloropropene	5.04	0.50	"	5.0		101	70-130			

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Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Volatile Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535145 **Analyst: LF**										
LCS (2535145-BS1)				Prepared & Analyzed: 08/28/25						
Trichloroethylene (TCE)	5.14	0.50	ug/L	5.0		103	70-130			
Trichlorofluoromethane (FREON 11)	4.61	5.0	"	5.0		92	70-130			J
Vinyl Chloride (VC)	4.61	0.50	"	5.0		92	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	*4.8*		*"*	*5.0*		*96*	*70-130*			
Surrogate: Bromofluorobenzene	*4.9*		*"*	*5.0*		*97*	*70-130*			

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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Semi-Volatile Organic Analyses / EPA 504 - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535092 **Analyst: LF**										
Blank (2535092-BLK1)				Prepared: 08/27/25 Analyzed: 08/28/25						
Dibromochloropropane (DBCP)	ND	0.010	ug/L							
Ethylene Dibromide (EDB)	ND	0.020	"							
LCS (2535092-BS1)				Prepared: 08/27/25 Analyzed: 08/28/25						
Dibromochloropropane (DBCP)	0.110	0.010	ug/L	0.10		110	70-130			
Ethylene Dibromide (EDB)	0.0864	0.020	"	0.10		86	70-130			
LCS (2535092-BS2)				Prepared: 08/27/25 Analyzed: 08/28/25						
Dibromochloropropane (DBCP)	0.119	0.010	ug/L	0.10		119	70-130			
Ethylene Dibromide (EDB)	0.103	0.020	"	0.10		103	70-130			
Matrix Spike (2535092-MS1)	**Source: 25H1770-01**			Prepared: 08/27/25 Analyzed: 08/28/25						
Dibromochloropropane (DBCP)	0.112	0.010	ug/L	0.10	ND	112	65-135			
Ethylene Dibromide (EDB)	0.0910	0.020	"	0.10	ND	91	65-135			

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses / 1,2,3-TCP - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535047	**Analyst: LF**									
Blank (2535047-BLK1)				Prepared & Analyzed: 08/26/25						
1,2,3-Trichloropropane	ND	0.0050	ug/L							
LCS (2535047-BS1)				Prepared & Analyzed: 08/26/25						
1,2,3-Trichloropropane	0.00468	0.0050	ug/L	0.0050		94	80-120			J
Duplicate (2535047-DUP1)		**Source: 25H1713-01**		Prepared & Analyzed: 08/26/25						
1,2,3-Trichloropropane	ND	0.0050	ug/L		ND					

Stu Styles
Client Services Manager

Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2534078	**Analyst: JM**									
Blank (2534078-BLK1)				Prepared: 08/19/25 Analyzed: 09/07/25						
Chlordane	ND	0.10	ug/L							
Endrin	ND	0.10	"							
Heptachlor	ND	0.010	"							
Heptachlor Epoxide	ND	0.010	"							
Hexachlorobenzene	ND	0.50	"							
Hexachlorocyclopentadiene	ND	1.0	"							
Lindane (gamma-BHC)	ND	0.20	"							
Methoxychlor	ND	10	"							
Surrogate: 4-4'-Dichlorobiphenyl	*0.59*		*"*	*0.80*		*74*	*70-130*			
LCS (2534078-BS1)				Prepared: 08/19/25 Analyzed: 09/07/25						
Endrin	0.0508	0.10	ug/L	0.040		127	70-130			J
Heptachlor	0.0455	0.010	"	0.040		114	70-130			
Heptachlor Epoxide	0.0314	0.010	"	0.040		79	70-130			
Hexachlorobenzene	0.0290	0.50	"	0.040		72	70-130			J
Hexachlorocyclopentadiene	0.101	1.0	"	0.20		51	58-140			QL-03, J
Lindane (gamma-BHC)	0.0326	0.20	"	0.040		81	70-130			J
Methoxychlor	0.708	10	"	0.40		177	70-130			QL-02, J
Surrogate: 4-4'-Dichlorobiphenyl	*0.60*		*"*	*0.80*		*76*	*70-130*			
Matrix Spike (2534078-MS1)	**Source: 25H1539-01**			Prepared: 08/19/25 Analyzed: 09/07/25						
Endrin	0.0598	0.10	ug/L	0.040	ND	149	65-135			QM-02, J
Heptachlor	0.0283	0.010	"	0.040	ND	71	65-135			
Heptachlor Epoxide	0.0345	0.010	"	0.040	ND	86	65-135			
Hexachlorobenzene	0.0290	0.50	"	0.040	ND	73	65-135			J
Hexachlorocyclopentadiene	0.141	1.0	"	0.20	ND	71	39-135			J
Lindane (gamma-BHC)	0.0379	0.20	"	0.040	ND	95	65-135			J
Methoxychlor	0.692	10	"	0.40	ND	173	65-135			QM-02, J
Surrogate: 4-4'-Dichlorobiphenyl	*0.62*		*"*	*0.80*		*77*	*70-130*			

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535056 **Analyst: DP**										
Blank (2535056-BLK1)				Prepared: 08/26/25 Analyzed: 08/29/25						
Endothall	ND	45	ug/L							
LCS (2535056-BS1)				Prepared: 08/26/25 Analyzed: 08/29/25						
Endothall	41.4	45	ug/L	50		83	80-120			J
Matrix Spike (2535056-MS1)		**Source: 25H2074-01**		Prepared: 08/26/25 Analyzed: 08/29/25						
Endothall	43.8	45	ug/L	50	ND	88	80-120			J
Batch 2535057 **Analyst: JM**										
Blank (2535057-BLK1)				Prepared & Analyzed: 08/26/25						
Glyphosate	ND	25	ug/L							
LCS (2535057-BS1)				Prepared & Analyzed: 08/26/25						
Glyphosate	42.2	25	ug/L	50		84	70-130			
Matrix Spike (2535057-MS1)		**Source: 25H1324-01**		Prepared & Analyzed: 08/26/25						
Glyphosate	38.0	25	ug/L	50	ND	76	65-135			
Matrix Spike (2535057-MS2)		**Source: 25H2499-01**		Prepared & Analyzed: 08/26/25						
Glyphosate	46.6	25	ug/L	50	ND	93	65-135			
Batch 2535165 **Analyst: YG**										
Blank (2535165-BLK1)				Prepared: 08/28/25 Analyzed: 09/04/25						
Diquat	ND	4.0	ug/L							

Stu Styles
Client Services Manager

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2535165 **Analyst: YG**										
LCS (2535165-BS1)				Prepared: 08/28/25 Analyzed: 09/04/25						
Diquat	9.17	4.0	ug/L	10		92	70-130			
Matrix Spike (2535165-MS1)	**Source: 25H2374-01**			Prepared: 08/28/25 Analyzed: 09/04/25						
Diquat	9.97	4.0	ug/L	10	ND	100	70-130			
Batch 2536075 **Analyst: DP**										
Blank (2536075-BLK1)				Prepared: 09/03/25 Analyzed: 09/04/25						
Alachlor (ALANEX)	ND	1.0	ug/L							
Atrazine (AATREX)	ND	0.50	"							
Benzo(a)pyrene	ND	0.10	"							
Di(2-ethylhexyl) adipate	ND	5.0	"							
Diethylhexylphthalate (DEHP)	ND	3.0	"							
Molinate (ORDRAM)	ND	2.0	"							
Simazine (PRINCEP)	ND	1.0	"							
Thiobencarb (BOLERO)	ND	1.0	"							
Surrogate: 1,3-dimethyl-2-nitrobenzene	*5.1*		*"*	*5.0*		*102*	*70-130*			
Surrogate: Perylene-d12	*5.0*		*"*	*5.0*		*100*	*70-130*			
Surrogate: Triphenylphosphate	*5.0*		*"*	*5.0*		*101*	*70-130*			
LCS (2536075-BS1)				Prepared: 09/03/25 Analyzed: 09/04/25						
Alachlor (ALANEX)	6.53	1.0	ug/L	6.0		109	70-130			
Atrazine (AATREX)	3.15	0.50	"	3.0		105	70-130			
Benzo(a)pyrene	0.560	0.10	"	0.60		93	70-130			
Di(2-ethylhexyl) adipate	37.6	5.0	"	30		125	70-130			
Diethylhexylphthalate (DEHP)	22.6	3.0	"	18		126	70-130			
Molinate (ORDRAM)	12.4	2.0	"	12		103	70-130			
Simazine (PRINCEP)	4.48	1.0	"	6.0		75	70-130			
Thiobencarb (BOLERO)	6.13	1.0	"	6.0		102	70-130			
Surrogate: 1,3-dimethyl-2-nitrobenzene	*5.1*		*"*	*5.0*		*103*	*70-130*			
Surrogate: Perylene-d12	*5.1*		*"*	*5.0*		*101*	*70-130*			
Surrogate: Triphenylphosphate	*4.9*		*"*	*5.0*		*98*	*70-130*			

Stu Styles
Client Services Manager

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Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536075	**Analyst: DP**									
Matrix Spike (2536075-MS1)		**Source: 25I0147-01**		Prepared: 09/03/25 Analyzed: 09/04/25						
Alachlor (ALANEX)	6.84	1.0	ug/L	6.0	ND	114	70-130			
Atrazine (AATREX)	3.28	0.50	"	3.0	ND	109	70-130			
Benzo(a)pyrene	0.460	0.10	"	0.60	ND	77	70-130			
Di(2-ethylhexyl) adipate	28.7	5.0	"	30	ND	96	70-130			
Diethylhexylphthalate (DEHP)	17.8	3.0	"	18	ND	99	70-130			
Molinate (ORDRAM)	12.5	2.0	"	12	ND	104	70-130			
Simazine (PRINCEP)	4.84	1.0	"	6.0	ND	81	70-130			
Thiobencarb (BOLERO)	6.23	1.0	"	6.0	ND	104	70-130			
Surrogate: 1,3-dimethyl-2-nitrobenzene	*5.6*		*"*	*5.0*		*112*	*70-130*			
Surrogate: Perylene-d12	*5.2*		*"*	*5.0*		*105*	*70-130*			
Surrogate: Triphenylphosphate	*4.8*		*"*	*5.0*		*96*	*70-130*			
Batch 2536196	**Analyst: JM**									
Blank (2536196-BLK1)				Prepared: 09/05/25 Analyzed: 09/19/25						
2,4,5-TP (SILVEX)	ND	1.0	ug/L							
2,4-D	ND	10	"							
Bentazon (BASAGRAN)	ND	2.0	"							
Dalapon	ND	10	"							
Dinoseb (DNBP)	ND	2.0	"							
Pentachlorophenol (PCP)	ND	0.20	"							
Picloram	ND	1.0	"							
Surrogate: 2,4-Dichlorophenylacetic acid	*71*		*"*	*100*		*71*	*70-130*			
LCS (2536196-BS1)				Prepared: 09/05/25 Analyzed: 09/19/25						
2,4,5-TP (SILVEX)	16.3	1.0	ug/L	20		81	70-130			
2,4-D	187	10	"	200		93	70-130			
Bentazon (BASAGRAN)	40.4	2.0	"	40		101	70-130			
Dalapon	199	10	"	200		100	70-130			
Dinoseb (DNBP)	45.2	2.0	"	40		113	70-130			
Pentachlorophenol (PCP)	4.00	0.20	"	4.0		100	70-130			
Picloram	25.5	1.0	"	20		128	70-130			
Surrogate: 2,4-Dichlorophenylacetic acid	*71*		*"*	*100*		*71*	*70-130*			

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Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2536196	**Analyst: JM**									
Matrix Spike (2536196-MS1)	**Source: 25H2349-01**			Prepared: 09/05/25 Analyzed: 09/19/25						
2,4,5-TP (SILVEX)	14.2	1.0	ug/L	20	ND	71	70-130			
2,4-D	157	10	"	200	ND	79	70-130			
Bentazon (BASAGRAN)	30.0	2.0	"	40	ND	75	70-130			
Dalapon	158	10	"	200	ND	79	70-130			
Dinoseb (DNBP)	31.2	2.0	"	40	ND	78	70-130			
Pentachlorophenol (PCP)	4.25	0.20	"	4.0	ND	106	70-130			
Picloram	15.4	1.0	"	20	ND	77	70-130			
Surrogate: 2,4-Dichlorophenylacetic acid	*71*		*"*	*100*		*71*	*70-130*			
Matrix Spike Dup (2536196-MSD1)	**Source: 25H2349-01**			Prepared: 09/05/25 Analyzed: 09/19/25						
2,4,5-TP (SILVEX)	14.2	1.0	ug/L	20	ND	71	70-130	0.07	30	
2,4-D	161	10	"	200	ND	81	70-130	3	30	
Bentazon (BASAGRAN)	29.5	2.0	"	40	ND	74	70-130	2	30	
Dalapon	152	10	"	200	ND	76	70-130	3	30	
Dinoseb (DNBP)	29.5	2.0	"	40	ND	74	70-130	6	30	
Pentachlorophenol (PCP)	4.48	0.20	"	4.0	ND	112	70-130	5	30	
Picloram	14.2	1.0	"	20	ND	71	70-130	8	30	
Surrogate: 2,4-Dichlorophenylacetic acid	*70*		*"*	*100*		*70*	*70-130*			
Batch 2538069	**Analyst: JM**									
Blank (2538069-BLK1)				Prepared: 09/16/25 Analyzed: 09/19/25						
Carbofuran (FURADAN)	ND	5.0	ug/L							
Oxamyl (VYDATE)	ND	20	"							
LCS (2538069-BS1)				Prepared: 09/16/25 Analyzed: 09/19/25						
Carbofuran (FURADAN)	9.82	5.0	ug/L	10		98	70-130			
Oxamyl (VYDATE)	10.6	20	"	10		106	70-130			J

Stu Styles
Client Services Manager

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Clinical Laboratory of San Bernardino, Inc.

Dudek	Project: Water Analysis	Work Order: 25H2349
605 3rd Street	Sub Project:	Received: 08/22/25 15:20
Encinitas CA, 92024	Project Manager: Devin Pritchard-Peterson	Reported: 09/19/25

Synthetic Organic Analyses - Quality Control

Clinical Laboratory of San Bernardino

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2538069 **Analyst: JM**										
LCS (2538069-BS2)				Prepared: 09/16/25 Analyzed: 09/19/25						
Carbofuran (FURADAN)	10.7	5.0	ug/L	10		107	70-130			
Oxamyl (VYDATE)	11.2	20	"	10		112	70-130			J
Matrix Spike (2538069-MS1)	**Source: 25H2349-01**			Prepared: 09/16/25 Analyzed: 09/19/25						
Carbofuran (FURADAN)	9.69	5.0	ug/L	10	ND	97	65-135			
Oxamyl (VYDATE)	10.3	20	"	10	ND	103	65-135			J
Matrix Spike (2538069-MS2)	**Source: 25I1428-01**			Prepared: 09/16/25 Analyzed: 09/19/25						
Carbofuran (FURADAN)	9.90	5.0	ug/L	10	ND	99	65-135			
Oxamyl (VYDATE)	10.0	20	"	10	ND	100	65-135			J

QM-02	MS and/or MSD recovery was above the method acceptance limit, ND results are valid.
QM-01	MS and/or MSD recovery was outside of method acceptance limits due to probable sample matrix interference.
QL-05	SRM recovery was above the method acceptance limits, ND results are valid.
QL-04	LCS or LCS Dup recovery was outside method acceptance limits. Results are validated by remaining LCS.
QL-03	LCS and/or LCS Dup recovery was outside method acceptance limits. Results are validated by MS and/or MS Dup and CCV recoveries.
QL-02	LCS and/or LCS Dup recovery was above the method acceptance limits, ND results are valid.
LT	Analysis performed at LA Testing, ELAP 2283
J	Detected below the Reporting Limit; reported concentration is estimated; (J-Flag)
CERES	Analysis performed by Ceres Analytical Laboratory, Inc. ELAP # 3046
	pH (Lab) was analyzed ASAP but received and analyzed past the 15 minute hold time.
ND	Analyte NOT DETECTED at or above the MDL; Method Detection Limit

Stu Styles
Client Services Manager

Post Office Box 329 San Bernardino, CA 92402 (909) 825-7693 Fax (909) 825-7696 ELAP Number 1088

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

August 30, 2025 Ceres ID: 19886

Clinical Laboratory of San Bernardino
21881 Barton Road
Grand Terrace, CA 92313

The following report contains the results for the one drinking water sample received on August 26, 2025. This sample was analyzed for 2,3,7,8-TCDD by EPA method 1613. Routine turn-around time was provided for this work.

This work was authorized under your Subcontract Order # 25H2349.

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

Ceres Sample ID:	Sample ID	Date Received	Collection Date	&Time
19886-001	12225C	8/26/2025	8/22/2025	11:00

Section II: Data Summary

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 1613

Quality Assurance Sample Method Blank		
Project ID: 25H2349	**Ceres Sample ID:** 0-3568-MB	**Date Received:** NA
	QC Batch #: 3568	**Date Extracted:** 8/28/2025
	Matrix: Drinking Water	**Date Analyzed:** 8/28/2025
	Sample Size: 1.000 L	

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	ND< 3.82	2.46	5.00		13C-2378-TCDD	67.1	31-137	
					CRS			
					37Cl4-2378-TCDD	78.3	42-164	

EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr Suite 1, El Dorado Hills, CA 95762

EPA Method 1613

Quality Assurance Sample **Ongoing Precision and Recovery**	**Ceres Sample ID:** 0-3568-OPR **QC Batch #:** 3568 **Matrix:** Drinking Water	**Date Received:** NA **Date Extracted:** 8/28/2025 **Date Analyzed:** 8/28/2025
Project ID: 25H2349	**Sample Size:** 1.000 L	

Analyte	Conc. (ng/mL)	Limits (a)	Labeled Standards	% Rec.	Limits (a)
2,3,7,8-TCDD	10.6	7.3-14.6	13C-2378-TCDD	76.0	25-141
			CRS		
			37Cl4-2378-TCDD	84.0	37-158

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 1613

Client Sample ID: 12225C		
Project ID: 25H2349	**Ceres Sample ID:** 19886-001	**Date Received:** 8/26/2025
	QC Batch #: 3568	**Date Extracted:** 8/28/2025
Date Collected: 8/22/2025	**Matrix:** Drinking Water	**Date Analyzed:** 8/28/2025
Time Collected: 11:00	**Sample Size:** 1.023 L	

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	ND < 3.16	2.46	4.89		13C-2378-TCDD	87.8	31-137	
					CRS			
					37Cl4-2378-TCDD	99.5	42-164	

EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit

Analyst: JMH **Reviewed by: BS**

Section VI: Sample Tracking

SUBCONTRACT ORDER

Clinical Laboratory of San Bernardino

25H2349

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Clinical Laboratory of San Bernardino	Ceres Analytical Laboratory, Inc.
21881 Barton Road	4919 Windplay Dr., Ste. 1
Grand Terrace, CA 92313	El Dorado Hills, CA 95762
Phone: 909.825.7693	Phone :(916) 932-5011
Fax: 909.825.7696	Fax:
Project Manager: Stu Styles	

Please email results to Project Manager: Stu Styles

[ ] navarro@clinical-lab.com [X] styles@clinical-lab.com [ ] jhernandez@clinical-lab.com [ ] mendiola@clinical-lab.com

CLIP transfer those samples with PS codes provided	[ ] Yes	[X] No
Water Trax Upload Client: ____________	[ ] Yes	[X] No
GeoTracker Upload Client: ____________	[ ] Yes	[X] No
MDL's / J Flags	[ ] Yes	[X] No
UCMR CDX Upload	[ ] Yes	[X] No
Transfer Files	[ ] Yes	[X] No

Turn Around Time [X] 10 Days [ ] 5 Days [ ] Other __ Days

Subcontract Comments:

Analysis **Comments**

Sample ID: 12225C / 25H2349-01 **Sampled: 08/22/25 11:00 PS Code:**
Ground Water **WTX ID:**

1613 Dioxins TCDD DW

Containers Supplied:

1 L Amber Glass Na Thio EPA 1613 (A) 1 L Amber Glass Na Thio EPA 1613 (B)

Released By	Date / Time	Received By	Date / Time
M CLSB	8-25/1030	HH	8/26/25 11:17

Released By Date / Time Received By Date / Time

Released By Date / Time Received By Date / Time

Samples Received on ( ) Wet Ice ( ) Blue Ice ( ) No Ice Received Temp ________ (F) (C)

Sample Receipt Check List Logged by: HH (initials)

Ceres ID: 19886	Date/Time: 8/26/25 11:17
Client Project ID: 25H2349	Received Temp: 1.2 °C Acceptable: Y / N
Chain of Custody Relinquished by signed?	Y / N
Chain of Custody Received by signed?	Y / N
Custody Seals? Present?	Y / N
Intact?	Y / N
NA:	NA
Unlabeled / Illegible Samples	Y / N
Proper Containers:	Y / N
Preservation Acceptable (Chemical or Temperature)? Drinking Water, Sodium Thiosulfate present? Residual Cl? Aqueous sample pH: 7	Y / N Y / ~~N~~ / NA Y / N / NA NA
List COC discrepancies: HH 8/26/25	
List Damaged Samples: HH 8/26/25	

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*****	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery

LA Testing
520 Mission Street South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order ID: 322517317
Customer ID: 32CLIN51
Customer PO: 25H2349
Project ID:

Attn: Stu Styles
Clinical Laboratory of San Bernardino
PO BOX 329
San Bernardino, CA 92402

Phone: (909) 825-7693
Fax:
Received: 08/25/2025
Analyzed: 09/05/2025

Proj: 25H2349

Test Report: Determination of Asbestos Structures >10µm in Drinking Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm²)	Area Analyzed (mm²)	ASBESTOS Asbestos Types	Fibers Detected	Analytical Sensitivity MFL (million fibers per liter)	Concentration MFL (million fibers per liter)	Confidence Limits MFL (million fibers per liter)
12225C/ 25H2349-01 322517317-0001	8/26/2025 02:20 PM	100	1288	0.0640	None Detected	ND	0.20	<0.20	0.00 - 0.74

Collection Date/Time: *08/22/2025 11:00 AM*

Sample ozonated prior to analysis due to lab receipt time exceeding 48hr method hold time.

Analyst(s)
Sherrie Ahmad (1)

Jerry Drapala Ph.D, Laboratory Manager
or Other Approved Signatory

Any questions please contact Jerry Drapala.

Initial report from: 09/05/2025 21:01:01

OrderID: 322517317

#322517317

SUBCONTRACT ORDER

Clinical Laboratory of San Bernardino

25H2349

SENDING LABORATORY:

Clinical Laboratory of San Bernardino
21881 Barton Road
Grand Terrace, CA 92313
Phone: 909.825.7693
Fax: 909.825.7696
Project Manager: Stu Styles

RECEIVING LABORATORY:

LA Testing
520 Mission Street
South Pasadena, CA 91030
Phone :(323) 254-9960
Fax: (323) 254-9982

Please email results to Project Manager: Stu Styles

[ ] navarro@clinical-lab.com [X] styles@clinical-lab.com [ ] jhernandez@clinical-lab.com [ ] mendiola@clinical-lab.com

CLIP transfer those samples with PS codes provided		[ ] Yes	[X] No
Water Trax Upload Client:	____________	[ ] Yes	[X] No
GeoTracker Upload Client:	____________	[ ] Yes	[X] No
MDL's / J Flags		[ ] Yes	[X] No
UCMR CDX Upload		[ ] Yes	[X] No
Transfer Files		[ ] Yes	[X] No

Turn Around Time [X] 10 Days [ ] 5 Days [ ] Other __ Days

Subcontract Comments:

Analysis **Comments**

Sample ID: 12225C / 25H2349-01 **Sampled: 08/22/25 11:00 PS Code:**
Ground Water **WTX ID:**

Asbestos in Drinking Water EPA 100.2

Containers Supplied:

1 Quart Plastic (W)

Released By	Date / Time	Received By	Date / Time
[signature]	8/25/25	Daisy Betrue (WI)	8/25/25 12:20
Released By	Date / Time	Received By	Date / Time
Released By	Date / Time	Received By	Date / Time

Samples Received on ( ) Wet Ice ( ) Blue Ice ( ) No Ice Received Temp 2.6 (F) (C)

1-1-24

Clinical Lab of San Bernardino, Inc. — Chain of Custody

21881 Barton Road Grand Terrace CA 92313 909 825-7693 / 516-A N 8th St. Lompoc CA 93436 805 737-7300

WO 25+P

25H2349

Client:	Dudek
Address:	605 3rd St.
	Encinitas, CA 92024
Client Contact:	Devin Pritchard-Peterson
Phone No.:	(760) 479-4128
System No.:	
Project:	
Sampled By:	BRANDON PAGE
Comments:	

EMAIL: bpage@dudek.com

Destination Laboratory

[ ] Clinical Grand Terrace / ELAP 1088
[ ] Clinical Lompoc / ELAP 1678
[ ] Other:

Date	Time	Identification	Container ID	Matrix	(Secondary/Inorganic, Radium 226/228)	Unpreserved, 1/2 Gallon	(Green Cap) GP	Unpreserved	Unpreserved			1 Liter Amber (525)	HCl 40mL Amber Vials (VOC's, 123 TCP)	Na2S2O3 40mL Amber Vials (504, 547, 548)	Na2S2O3, 1 Liter Amber (1613)	Na2SO3, 250mL Amber Glass	MCAA, 125mL Amber Glass	Poly	No. of Containers	Secondary Standards/GP, Inorganic Chmicals	P/A, HPC	Corrosivity, Cr (VI)	EPA 504 EDB/DBCP	524.2 VOC's / 524M SRL 1,2,3-TCP	508 Chlorinated Pest PCB	515 Chlorinated Herbicides	525 Semi-Volatile Organics	531 Carbamate Pesticides	547 Glyphosate / 548 Endothall	549 Diquat	1613 Dioxins TCDD DW	Asbestos in Drinking Water EPA 100.2	Gross Alpha/Uranium/Radium 226/228 (if needed)	Turnaround Time (TAT)
8-22-25	1100	1222GC		W	3	1	1	1	1	1	1	3	4	6	2	1	1	1	26	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Field Measurements

CLIP PS Code (if applicable)

Matrix: DW - Drinking Water GW - Ground Water SW - Surface Water W - Water WW - Wastewater SWR - Stormwater Runoff S - Sludge O - Other

TAT: (10) Ten Day (5) Five Day Rush (2) Two Day Rush

Relinquished By (Sign)	Print Name / Company	Date / Time	Received By (Sign)	Print Name / Company
[signature]	BRANDON PAGE / DUDEK	8-22-25 / 12:32	[signature]	[signature]
[signature]	[signature]	8.22 / 12:45		
		1520		

(Lab Use Only)

Condition: [X] On Wet Ice [ ] On Blu Ice [ ] Intact [ ] Custody Seals Samples / COC Checked By: ______

Work Order Logged By: ______

Receipt Comments:

Clinical Lab Receipt Temp.: 1.1 °C

Page __ of __

Attachment 31

Appendix 3.17A - Updated Firefighting Water Supply Analysis

FIRE & RISK
ALLIANCE

~~May 2~~September 29, 2025

[redacted]
Prairie Song Reliability Project LLC
11801 Domain Blvd., Suite 450
Austin, TX 78758

Dear G[redacted]:

Fire & Risk Alliance, LLC (FRA), was contracted by Prairie Song Reliability Project LLC (Client) to perform a firefighting water supply analysis for the Prairie Song Reliability Project Battery Energy Storage System (BESS) proposed for installation in Los Angeles County, California. The proposed Prairie Song Reliability Project site is anticipated to initially include 2,035 SunGrow PowerTitan 2.0 containers. The Prairie Song Reliability Project is currently in the design phase. Currently, a public water supply from the local municipality is not available at the proposed installation location. Therefore, an analysis is required to determine the volume of water necessary to be stored on-site for firefighting operation. The analysis includes calculations on the anticipated fire flow necessary for fire department personnel responding to a fire at the Prairie Song Reliability Project and the associated water tank size necessary to meet that fire flow demand.

APPLICABLE CODES, STANDARDS, TEST METHODS AND REFERENCE MATERIALS

The following codes, standards, and reference materials were reviewed as part of the analysis:

- 2022 California Building Code (CBC)
- 2022 California Fire Code (CFC)
- 2023 Los Angeles County Fire Code (LACFC)
- NFPA 22, Standard for Water Tanks for Private Fire Protection, 2018 Edition (NFPA 22)
- NFPA 24, Standard for the Installation of Private Fire Service Mains and their Appurtenances, 2022 Edition (NFPA 24).
- NFPA 1142, Water Supplies for Suburban and Rural Fire Fighting, 2022 Edition (NFPA 1142).
- Factory Mutual Data Sheet 5-4, Transformers, Interim Revision October 2024 (FMDS 5-4).

ASSUMPTIONS

This analysis is based on the following assumptions:

- The transformers being installed at the Prairie Song Reliability Project have less than 1,000 gallons of mineral oil.
- The Control House Enclosure (CHE) has a height of no greater than 10 feet tall.

PRAIRIE SONG RELIABILITY PROJECT OVERVIEW

The Prairie Song Reliability Project is anticipated to include 2,035 SunGrow PowerTitan 2.0 containers and 517 medium-voltage transformers. The PowerTitan 2.0 containers are not occupiable. Access to the equipment installed inside the BESS is only provided through access doors on the front of the containers. Maintenance and service is performed by reaching into the container from the outside, through these access doors, similar to other electrical equipment cabinets, panels, or a transformer. Therefore, the BESS containers are not defined by the CBC as a building.

In addition to the 2,035 PowerTitan 2.0 containers, the Prairie Song Reliability Project site also includes a substation and a Control House Enclosure, as shown in Figure 1. The CHE is 95 ft long, 27 ft wide, and 10 ft tall. It has a footprint of 2,565 square feet (sf) and an interior volume of no more than 25,650 cubic feet (cf). It houses electrical equipment, electrical connection/junction points, and monitoring equipment for the Prairie Song Reliability Project and does not contain storage or other special hazards. During typical day-to-day operations, it is not normally occupied; however, it can be entered from time to time, as necessary. The CHE is installed within the secured substation area and is approximately 1,000 feet away from the nearest PowerTitan 2.0 container.

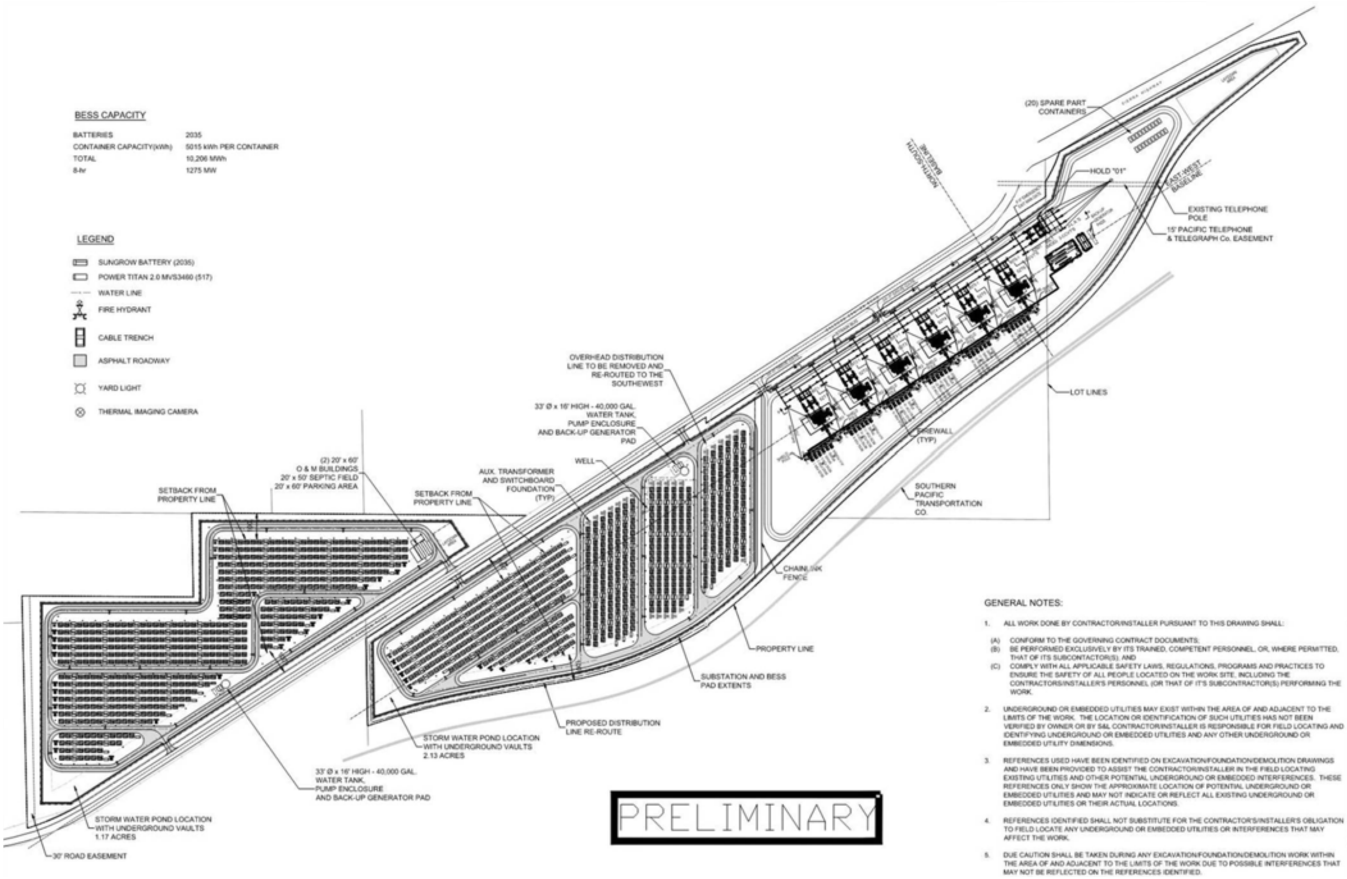


Figure 1 Prairie Song Reliability Project Site Layout

The Prairie Song Reliability Project is proposed to be provided with two 40,000-gallon fire water tanks. The fire water tanks will be NFPA 22 compliant and connected to fire hydrants throughout the site via a dry, underground, NFPA 24 compliant private fire service main. The size of the outlets on the fire hydrants shall be coordinated with the Los Angeles County Fire Department.

CODE REVIEW

When determining the required fire flow for a building, the LACFC does not provide prescriptive approaches. As such, the LACFC, Section 507 Fire Protection Water Supplies, is referenced as it outlines the requirements for fire protection water supplies and fire flow calculations. Fire flow is the flow rate of a water supply that is available for firefighting. This flow rate is typically described in gallons per minute (gpm) and is measured at 20 pounds per square inch (psi) residual pressure. LACFC, Section 507.3 states fire flow requirements for buildings or portions of buildings and facilities must be determined by an approved method or Appendix B.

LACFC, Appendix B Fire Flow Requirements for Buildings, provides a tool for determining fire flow requirements for buildings; however, the Prairie Song Reliability Project installation site does not have access to a municipal water supply. In instances where no municipal water supply is provided, the LACFC, Section B103.3, refers to NFPA 1142. NFPA 1142 specifies guidance for providing water supplies for firefighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist. Therefore, NFPA 1142 can be utilized to determine the minimum water supply required to be on site for the CHE.

The BESS Yard contains the PowerTitan 2.0 containers, transformers, and other auxiliary electrical equipment. As the title of the LACFC Appendix B suggests, the procedure for determining the fire flow applies to buildings, not ~~an~~ electrical equipment (such as the PowerTitan 2.0 containers, transformers, or auxiliary equipment), as stated in LACFC, Section B101.1. The PowerTitan 2.0 container (and the other electrical equipment in the BESS Yard) are not occupiable structures and are not considered as a building. Similarly, NFPA 1142 only provides guidance on calculating fire flow for occupied buildings, not a piece of electrical equipment. Therefore, the prescriptive requirements outlined in the LACFC and NFPA 1142 to determine the fire flow and water supply requirements necessary for the electrical equipment installed within the BESS Yards of the Prairie Song Reliability Project, are not applicable. As such, FRA performed an alternative analysis to determine these values, as permitted by LACFC 507.3, where fire flow requirements can be determined by an "approved method".

WATER SUPPLY ANALYSIS

As described above, the prescriptive method outlined in NFPA 1142 can be utilized to determine the water supply required for the CHE whereas an alternative analysis for the BESS Yard is required. This firefighting water supply analysis for both of these scenarios is outlined below.

CHE Fire

NFPA 1142, Section 4.1.5 classifies the CHE as a structure without exposure hazards given it is not within 50 ft of another structure and is not an Occupancy Hazard Classification Number of 3 or 4. Note, occupancy classifications are described in Chapter 5 of NFPA 1142. Occupancy Hazard Classification Number 3 or 4 are high or severe hazard occupancies such as plastic processing, flammable liquid spraying, warehouses, etc. The CHE is a light hazard occupancy that would be classified with an Occupancy Hazard Classification Number 7. Following the procedure for calculating the water supply required for structures without exposure hazards per NFPA 1142, Section 4.2.1, yields the following equation:

$$WS_{min} = \frac{VS_{tot}}{OHC}(CC) \quad [4.2.1]$$

where:

WS_{min} = minimum water supply in gal (For results in L, multiply by 3.785.)

VS_{tot} = total volume of structure in ft^3 (If volume is measured in m^3, multiply by 35.3.)

OHC = occupancy hazard classification number

CC = construction classification number

Assuming the construction classification number is 1.5 for a Type V building (a conservative classification for the CHE), the required water supply would be 5,497 gallons (25,650 x 1.5 / 7 = 5,497 gallons).

BESS Yard Fire

LACFC, Section 507.1 requires that a water supply must be capable of supplying the required fire flow for fire protection. Therefore, in order to determine the volume of firefighting water that is necessary for the BESS Yard, the fire flow required to respond to a fire event and the duration of the firefighting response, must be determined. To determine the fire flow and duration, FRA reviewed the UL 9540A unit level fire test results of the PowerTitan 2.0 container and typical firefighting tactics/procedures to analyze two scenarios: (1) a fire originating inside the PowerTitan 2.0 container and (2) a fire originating outside of the PowerTitan 2.0 container from nearby site exposures: including a transformer, a vehicle, and/or combustible vegetation.

SunGrow PowerTitan 2.0 Container Fire

The UL 9540A unit level fire test demonstrated that thermal runaway inside a PowerTitan 2.0 container does not propagate beyond the initiating module and is contained within the unit. Temperature measurements of modules adjacent to the initiating module showed that the temperature needed to induce thermal runaway was not reached. The thermal runaway did not propagate to neighboring BESS units and heat flux measurements in front of the initiating unit were below the maximum permitted levels per UL 9540A and did not pose heat exposure risks. These results were achieved without an integral suppression system (aerosol or water based for instance) installed within the PowerTitan 2.0 container nor was external fire suppression (water hose) required. Based on the results of the UL 9540A unit level fire test, a fixed fire suppression system (such as a sprinkler system or water spray system) or offensive fire department efforts are not required to stop a fire originating inside a PowerTitan 2.0 container from spreading to adjacent containers. In addition, the Prairie Song Reliability Project will have a site-specific Emergency

Response Plan (ERP). The ERP will provide firefighting tactics for first responders. Those tactics are anticipated to include recommendations for first responders to approach a PowerTitan 2.0 container fire defensively. The fire crew should maintain a safe distance, outside of the site perimeter fence, and to allow the container to burn itself out. Fire crews could utilize a fog pattern from a single one-and-three-quarter inch handline, typically flowing at 125 gpm, to protect neighboring exposures, or control the path of smoke, if necessary. However, the ERP will not recommend that they actively fight a PowerTitan 2.0 container fire or continuously flow water onto neighboring containers.

As such, a single 1 3/4-inch handline intermittently flowing at 125 gpm is sufficient for a fire department response to a PowerTitan 2.0 fire. The handline can be utilized to cool nearby exposures, control the path of smoke, or extinguish any small vegetation fires at the Prairie Song Reliability Project.

Transformer Exposure Fire

Since the Prairie Song Reliability Project is secured by a perimeter fence and is an outdoor BESS installation, there are only a few potential exposures at the site that could present a risk to a PowerTitan 2.0 container. These exposures, if ignited, could impact the nearby PowerTitan 2.0 containers and present fire spread risk to those units. A review of the drawings and an analysis of other potential hazards associated with Prairie Song Reliability Project maintenance activities yielded two external exposure risks to the PowerTitan 2.0 containers: a transformer fire and a maintenance vehicle fire.

Based on a review of the drawings, the most significant external exposures within the BESS Yard are the transformers. They are typically installed within 4.5 ft of a PowerTitan 2.0 container. Other electrical equipment associated with the substation will be greater than 1,00 ft away from the PowerTitan 2.0 containers and do not pose a serious fire spread risk. As such, a transformer fire is the closest significant fire hazard to the PowerTitan 2.0 containers. A review of FMDS 5-4 provides guidance regarding the fire flow necessary to respond to and suppress a transformer fire. Specifically, Section 2.3.2.3 states:

Where transformers present an exposure to buildings or equipment, provide a hose stream allowance as follows:

A. Adequate for 1-hour hose stream demand of 250 gpm (950L/min) for transformers holding FM Approved liquids or up to 1,000 gal (3.8 m^3) of mineral oil.

B. Adequate for 2-hour hose stream demand of 500 gpm (1,900 L/min) hose stream for greater than 1,000 gal (3.8 m^3) of mineral oil in an individual transformer.

It is assumed all the transformers proposed for installation at the Prairie Song Reliability Project are units with less than 1,000 gallons of mineral oil. As such, per FMDS 5-4, a 250-gpm water delivery rate from a single hose stream for one hour is recommended to suppress a transformer fire. At a delivery rate of 250 gpm for 60 minutes, the necessary water supply to be stored on-site would be 15,000 gallons.

Vehicle Exposure Fire

In addition to a fixed electrical equipment hazard, such as a transformer, transient exposures, such as maintenance vehicles, could also pose an external exposure hazard to the PowerTitan 2.0 containers. The largest exposure risk to a PowerTitan 2.0 container likely involves a vehicle (maintenance vehicle for instance) that is parked within the BESS Yard in close proximity to a PowerTitan 2.0 container. Based on a review of the drawings, a minimum 26-foot-wide vehicle access road will be provided in the BESS Yard. As such, it is possible that a vehicle could be parked within 4 feet in front of or to the side of a PowerTitan 2.0 container. Based on typical firefighting tactics and procedures, first responders would require two 1 3/4-inch handlines flowing at 125 gpm (each) for one hour (at the maximum) to respond to a large commercial vehicle fire. If two handlines are flowing at 125 gpm (each) for 60 minutes, the necessary water supply to be stored on-site would be 15,000 gallons.

WATER SUPPLY CALCULATION

When analyzing the four fire flow scenarios listed above, the BESS Yard external exposures (vehicle exposure fire and the transformer exposure fire) present the largest required water supply of 15,000 gallons, as summarized in Table 1.

Table 1 Summary of Required Firefighting Water Supply

Exposure	Required Water Supply
Transformer	15,000 gallons
Vehicle Fire	15,000 gallons
CHE	5,497 gallons
PowerTitan 2.0 Container	0 gallons (see discussion below)

If the fire originates inside the PowerTitan 2.0 container, the ERP will not recommend offensive firefighting tactics utilizing handlines. Since offensive firefighting tactics will not be required per the ERP, the 40,000 gallons of water provided on site for the other exposure fires can provide up to five hours of continuous water application from a single 1 3/4-inch handline flowing at 125 gpm to cool nearby exposures, control the path of smoke, or extinguish any small vegetation fires. During this initial two-hour duration, a shuttle service can be set up by the fire service, if necessary, to provide additional water to the site. More likely though, a single 1 3/4-inch handline will be used intermittently by the fire service during a PowerTitan 2.0 container fire. Meaning, this volume of water can provide a significantly longer duration of water for cooling nearby exposures, controlling the path of smoke, or extinguishing any small vegetation fires while the shuttle service is set up.

CONCLUSIONS

The fire flows outlined in this report are solely recommendations based on codes, standards, data sheets, and typical firefighting tactics. Any tactics utilized during a fire event are at the discretion of the Los Angeles County Fire Department. Based on our review of the available materials, our background, experience and training, the assumptions listed above, and the analysis performed to date, the following conclusions are submitted within a reasonable degree of scientific and engineering certainty:

1. To ensure a supply of firefighting water is on-site, a ~~5,497~~15,000-gallon water capacity would be required to respond to a transformer, vehicle, or Control House Enclosure fire. However, two 40,000-gallon water tanks are proposed.

2. The 40,000-gallon water supply in each tank would provide an initial water supply for up to five hours for cooling exposures, controlling smoke, or extinguishing small vegetation fires during a PowerTitan 2.0 fire event. During this initial five hours, a shuttle service can be set up by the fire service, to provide additional water to the site if it is required.

3. The water ~~tank~~tanks should be installed in ~~an~~ approved ~~location~~locations.

4. In accordance with LACFC Section 507.2.2, the water ~~tank~~tanks utilized for private fire protection should be installed in accordance with NFPA 22.

5. The fire hydrants should be installed in accordance with LACFC Section 507.5.

Sincerely,

[redacted], P.E.
Senior Fire Protection Engineer
Fire & Risk Alliance

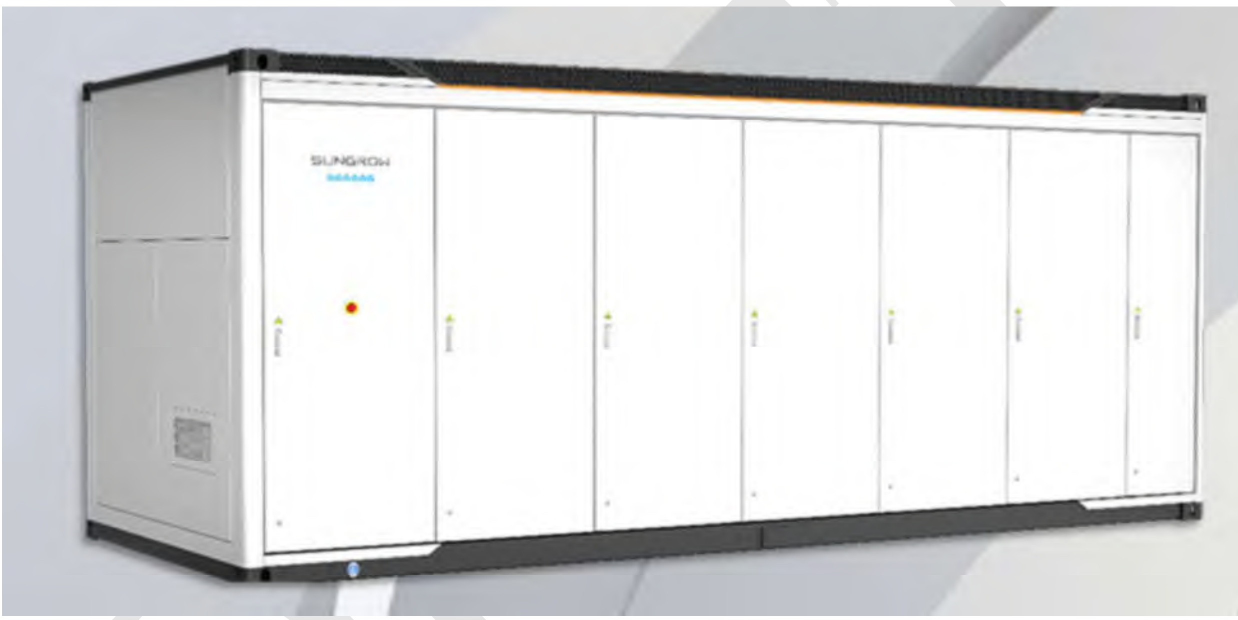
Summary report: Litera Compare for Word 11.12.0.83 Document comparison done on 9/30/2025 10:09:28 AM	
Style name: Default Style	
Intelligent Table Comparison: Active	
Original filename: 780-025 Prairie Song Reliability Project Water Supply Report Rev.0.pdf	
Modified filename: 780-025 Prairie Song Reliability Project Water Supply Report Rev.1.pdf	
Changes:	
Add	11
~~Delete~~	10
~~Move From~~	0
Move To	0
Table Insert	0
~~Table Delete~~	0
Table moves to	0
~~Table moves from~~	0
Embedded Graphics (Visio, ChemDraw, Images etc.)	0
Embedded Excel	0
Format changes	0
Total Changes:	21

Attachment 32

Appendix 3.17B - Hazard Mitigation Analysis

Hazard Mitigation Analysis:
Prairie Song Reliability Project BESS
Battery Energy Storage System
Sungrow Power Titan 2.0
Los Angeles County, CA

Draft Report | Rev.B | September 26, 2025



Prepared for:

Coval Infrastructure
11801 Domain Blvd., Suite 450
Austin, TX 78758

Christian Ng, P.E.
Senior Fire Protection Engineer

Prepared by:

Fire & Risk Alliance, LLC
7620 Standish Place
Rockville, MD 20855

EXECUTIVE SUMMARY

Fire and Risk Alliance, LLC, (FRA) performed a Hazard Mitigation Analysis (HMA) in accordance with the requirements of the Los Angeles County Fire Code (LACFC). This HMA is being used to evaluate the Sungrow Power Titan 2.0 (PT2) lithium-ion Battery Energy Storage System (BESS) intended for installation at the Prairie Song Reliability Project BESS. The Prairie Song Reliability Project BESS will have an approximate capacity of 1,275 megawatts (MW)/10,206 megawatt hours (MWh), utilizing 2,035 PT2s.

This narrative, developed by FRA, 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 Prairie Song Reliability Project BESS. Based on our review of the available materials, our background, experience and training, and the analysis performed to date, the following conclusions are provided for the Prairie Song Reliability Project BESS:

1. The PT2 and the Prairie Song Reliability Project BESS site design can meet the LACFC requirements for an outdoor BESS installation near exposures when it is installed in accordance with the manufacturer's instruction, its listings, the approved drawings, and the LACFC. As the design of the site is being finalized, to ensure compliance, the following must be provided:
    a. The Alternate Means and Methods Request (AMMR) requesting the Prairie Song Reliability Project BESS be exempt from transmitting signals from the energy storage management system to a remote annunciator as required by LACFC §1207.3.4 must be approved by the AHJ.
    b. Signage must be provided per LACFC §1207.4.8.
    c. The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the size and separation requirements of LACFC §1207.5.1 must be approved by the AHJ.
    d. The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the maximum allowable quantity requirements of LACFC §1207.5.2 must be approved by the AHJ.
    e. The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the fire suppression requirements of LACFC §1207.5.5 must be approved by the AHJ.
    f. The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the exhaust ventilation requirements of LACFC Table 1207.6 and §1207.6.1 must be approved by the AHJ.
    g. Fire apparatus access roads must be approved by the AHJ per LACFC §503.
    h. Fire hydrant and water tank design must be approved by the AHJ per LACFC §507.

2. The HMA demonstrates the Prairie Song Reliability Project BESS meets all the HMA performance criteria for approval outlined in LACFC §1207.1.4.2, as follows:
    a. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance rated separations identified in Section 1207.7.4. (LACFC §1207.1.4.2 #1)
    b. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate. (LACFC §1207.1.4.2 #2)
    c. 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. (LACFC §1207.1.4.2 #3)
    d. Flammable gases released from ESS during charging, discharging, and normal operation will not exceed 10 percent of their lower flammability limit (LFL). (LACFC §1207.1.4.2 #4)
    e. 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. (LACFC §1207.1.4.2 #5)

In summary, based on the UL 9540A testing and a review of the drawing set, the Prairie Song Reliability Project BESS can meet the Hazard Mitigation Analysis approval criteria presented in the LACFC upon the inclusion of any listed missing requirements described above.

Note, this executive summary is an abbreviated list of findings. Refer to the main report for details of the analysis.

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LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Fire and Risk Alliance, LLC, performed an HMA for the BESS proposed for installation at the Prairie Song Reliability Project BESS located in Los Angeles County, California. The HMA was performed in accordance with the requirements of the 2023 LACFC, which adopts the 2022 California Fire Code, as well as local amendments to this code. The Prairie Song Reliability Project BESS is anticipated to include 2,035 PT2 cabinets and will have an approximate capacity of 1,275 MW/10,206 MWh. This HMA report has been prepared by FRA and summarizes our analysis. It is intended to be used as a tool for an FCO or an AHJ to assist in their review of the Prairie Song Reliability Project BESS.

1.1 Purpose and Scope

The LACFC requires an HMA to evaluate the consequences associated with the following failure modes and any others deemed necessary by the FCO. Note, only single failure modes must be considered in this analysis (LACFC §1207.1.4.1):

1. 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.
8. Failure of temperature control.

The AHJ or FCO is authorized to approve the HMA provided the analysis demonstrates each of the following (LACFC §1207.1.4.2):

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance rated separations identified in §1207.7.4.
2. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
3. Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
4. Flammable gases released from ESS during charging, discharging, and normal operation will not exceed 10 percent of their LFL.

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.

The framework for this analysis is as follows:

- **Review the PT2 and UL 9540A test data**: FRA reviewed the PT2, its construction, design, fire safety features, listings, and UL 9540A fire test data (see Section 2.0 and 3.0).
- **Review site specifications:** FRA reviewed the proposed Prairie Song Reliability Project BESS site layout and installation including the area surrounding the BESS (see Section 4.0).
- **Prescriptive code compliance review:** The proposed site layout and site response plans/training procedures were reviewed for compliance with the LACFC requirements. Where gaps were identified in the BESS installation and response plans/training procedures, recommendations were provided (see Section 5.0 and 6.0, respectively).
- **Hazard Mitigation Analysis:** The HMA evaluates the BESS failure modes as required by the LACFC. The consequence-based analysis considers product level and site level barriers to prevent failure or reduce the consequences of a failure scenario. Based on the provided barriers, the consequences of a failure event are analyzed. The LACFC details acceptance criteria for which the FCO or AHJ is authorized to approve the HMA provided the consequences of the analysis meet or exceed the criteria (see Section 7.0).
- **Recommendations:** Recommendations are provided throughout the report where gaps exist between the site design and code requirements and where the consequences of failure modes exceed the approval criteria (see Section 8.0).

1.2 Applicable Codes and Standards

The following codes and standards are applicable to the Prairie Song Reliability Project BESS Facility in Los Angeles County, California:

- California Fire Code – 2022 Edition (CFC)
- California Senate Bill 38 (CA SB38)
- Los Angeles County Fire Code – 2023 Edition (LACFC)
- NFPA 68, Standard on Explosion Protection by Deflagration Venting, 2019 Edition (NFPA 68)
- NFPA 69, Standard for Explosion Control Systems, 2019 Edition (NFPA 69)
- UL 1973, Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications, Edition 3, February 25, 2022 (UL 1973)

- UL 9540, Standard for Safety of Energy Storage Systems and Equipment, Edition 3, 2023 (UL 9540)
- UL 9540A, Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, Edition 4, November 12, 2019 (UL 9540A)
- UL 60730-1, Automatic Electrical Controls – Part 1: General Requirements – Edition 5, 2021.
- ASTM E918, Standard Practice for Determining Limits of Flammability of Chemicals at Elevated Temperature and Pressure – 2019 Edition.

1.3 Reference Materials

The following reference materials were reviewed as part of this analysis:

- Drawing packages provided for the Prairie Song Reliability Project BESS (the drawing set)
  - Sargent & Lundy, 30% Site Plans, dated February 24, 2025
- PT2 System Manual – Version 10 Dated November 2023 (Prepared by Sungrow).
- PT2 Operation & Maintenance Instruction Manual – Version 12 Dated November 2024 (Prepared by Sungrow).
- PT2 Fire Suppression System Design Guide (Prepared by Sungrow).
- PT2 DFMEA Dated October 8, 2023 (Prepared by Sungrow).
- PT2 Explosion Vent Panel Technical Specification (Prepared by Chengdu CAIC Electronics Co. Ltd.).
- PT2 NFPA 68 Analysis Report #CN23Y5GB 003 Dated June 7, 2024 (Prepared by TÜV Rheinland).
- PT2 NFPA 69 Analysis Report #CN24QTA6 003 Dated August 1, 2024 (Prepared by TÜV Rheinland).
- UL 1741 Listing Certificate #80177989 for Model SC210HX-US Transformer-Less Standalone Inverter (Prepared by CSA).
- UL 1973 Certificate # CU 72303374 0001 Dated December 11, 2023 (Prepared by TÜV Rheinland).
- UL 9540 Certificate #CU 72404072 0002 Dated February 23, 2024 (Prepared by TÜV Rheinland).
- UL 9540A Cell Level Test Report Project #4790870196 Dated September 18, 2023 (Prepared by UL).

- UL 9540A Module Level Test Report #CN23WZDT 001 Dated December 8, 2023 (Prepared by TÜV Rheinland).
- UL 9540A Unit Level Test Report, #CN23EYFB 001 Dated December 8, 2023 (Prepared by TÜV Rheinland).

1.4 Limitations

At the request of Coval Infrastructure, FRA performed an HMA in accordance with the requirements of the LACFC for the Prairie Song Reliability Project BESS located in Los Angeles County, CA. The scope of services performed during this analysis may not adequately address the needs of other users of this report, and any re-use of this report or its conclusions presented herein are at the sole risk of the user. The opinions and comments formulated during this assessment are based on observations and information available at the time of the analysis, which has been provided to FRA by others. No guarantee or warranty as to future performance of any reviewed condition is expressed or implied.

2.0 PT2 DESCRIPTION

The PT2 is a fully integrated BESS consisting of battery modules, power electronics, control systems, a battery management system, a thermal management system, fire detection and notification system, and explosion control and deflagration venting systems within a single, non-occupiable cabinet. The PT2 has a standardized, modular design that is pre-assembled at the factory and delivered to the site. A PT2 cabinet is approximately 19.9 ft in length, 8 ft deep, 9.5 ft in height, and can weigh up to 94,000 pounds (6.058 m x 2.438 m x 2.896 m and 42,500 kg). Below is a brief description of the PT2, its components, design listing, and fire safety features. For a more detailed discussion of the PT2 components, their location, functionality, and purpose, refer to the PT2 System Manual.

2.1 Cabinet Layout

The PT2 is intended for outdoor installations, ground-mounted to a foundation or base strong enough to support the weight of the equipment and anchor loads (including concrete pads, grade beams, etc.). The PT2 cabinet consists of battery racks, terminal boxes (TB), power conversion systems (PCS), a liquid cooling system (LCS), a battery control panel (BCP), and battery supply panel (BSP). Figure 1 provides an overview of the PT2 layout and internal equipment. There are twelve built in PCS (model SC210-HX-US) for monitoring, energy transfer, and signaling interactions of the battery clusters. The PCS is listed to UL 1741.

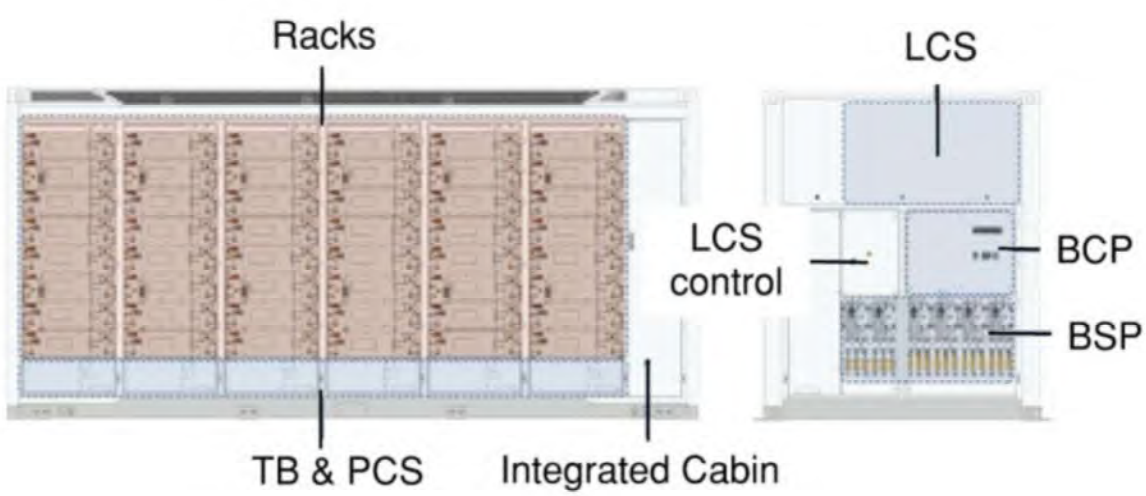

Figure 1. PT2 Internal Components

This modular, cabinet-style approach allows for the system to be easily maintained and serviced from outside the cabinets (i.e., the battery modules and power electronics are serviced through doors located on the front/side of the cabinets) thus eliminating the need for personnel to enter an enclosure, structure, building or cabinet to perform those activities. Since the BESS cabinets do not permit walk-in access, it is classified as a non-walk-in style (NWI) BESS and are not defined as occupied buildings or structures per the LACFC.

2.2 PT2 Cells, Modules, Racks/Clusters

The PT2 utilizes lithium iron phosphate (LFP) battery cells manufactured by China Aviation Lithium Battery Group Co., Ltd., (CALB), nominally rated 3.2 volts (V) and 314 ampere hours (Ah). The PT2 module is manufactured by Sungrow and includes 104 CALB L173F314 battery cells connected in series. The module is nominally rated 332.8 V and 314 Ah. Figure 2 provides an image of a representative battery cell and module for the PT2.

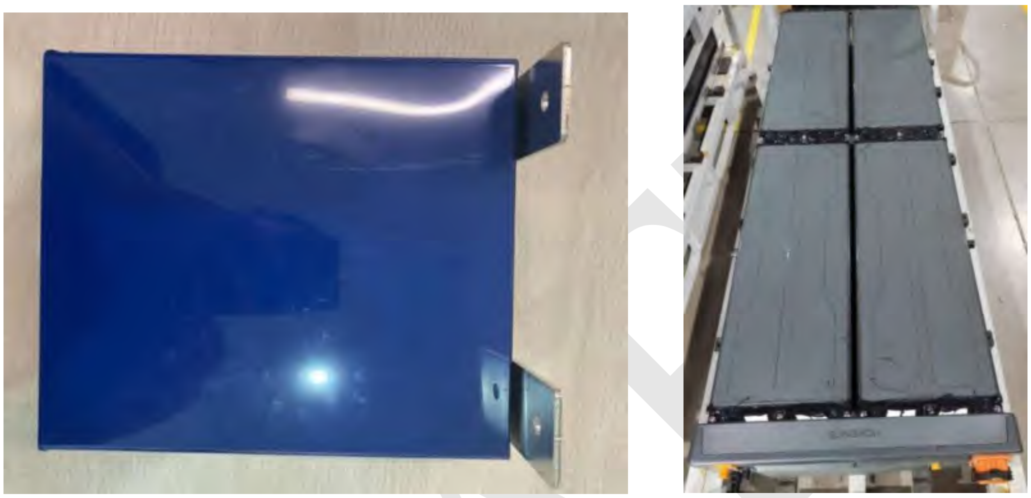

Figure 2. PT2 Cell (left) and Module (right)

The battery modules are connected in series to form battery clusters (Sungrow terminology). Four modules are provided in a cluster to support the eight-hour duration system, as shown in Figure 3.

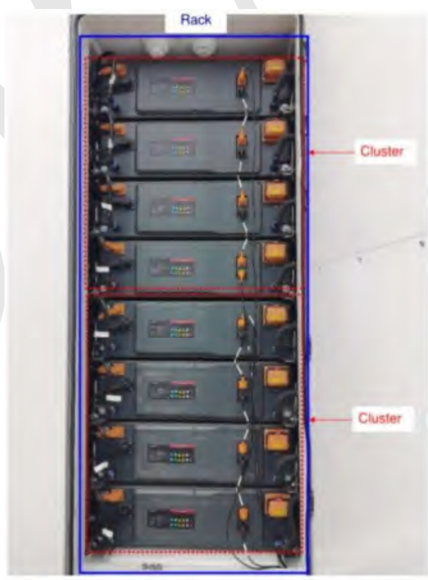

Figure 3. Rack and Cluster Depiction

Sungrow manufactures multiple battery clusters with various battery cluster stacking methods to support varying capacity parameters. An example cluster stacking arrangement representative of the Prairie Song Reliability Project BESS is provided in Figure 4. Note, "PACK" in the figure refers to a module. Refer to the System Manual for a full description of cluster parameters and stacking arrangements.

Figure 4. Example Cluster Stacking Arrangement

2.3 Liquid Cooling System

The PT2 is equipped with a water/glycol liquid cooling system (LCS) that uses liquid-cooled intelligent temperature controls to manage the temperature of battery modules and PCS equipment. The LCS consists of a liquid cooling unit, disturbing fan, top cooling fan, and control unit. The coolant flows through a closed loop piping system from the cooling unit to the battery modules and PCS.

2.4 Ventilation System

The PT2 is equipped with a ventilation system which intakes air from the front top of the cabinet (blue) and exhausts air from the top (red), as shown in Figure 5. The ventilation system is designed to maintain ambient temperatures of the equipment within the design operating ranges.

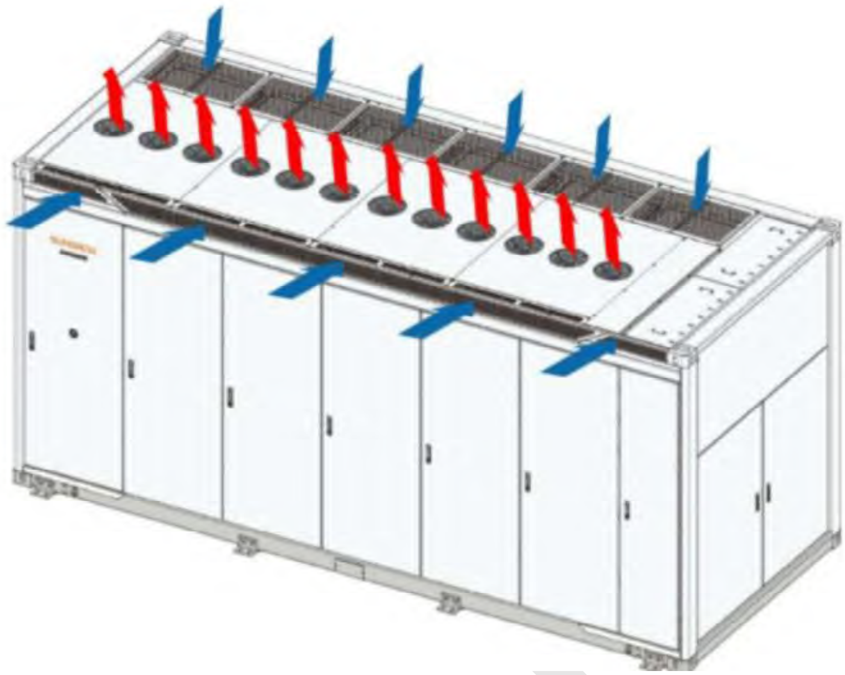

Figure 5. PT2 Ventilation System Design

2.5 Battery Management Unit

The PT2 has an integrated battery management unit (BMU) that tracks the performance, voltage, current, and state of charge (SOC) of the cells (among many other datapoints). The BMU is a layered system, where each battery module has its own BMU which monitors cell performance and communicates information to the battery system controller (BSC). The BSC is provided at the cabinet level and collects node signals from the BMU and fire protection system and relays the signals to the local controller or emergency management system (EMS) for shutdown protection of the battery system. The BMS functional safety was evaluated according to UL 60730-1 Annex H by TÜV Rheinland. An example BMS architecture is illustrated in Figure 6.

Furthermore, the PT2 installation is provided with a smart controller cabinet (SCC) that is integrated into the medium voltage system (skid). The SCC provides the following functions:

- Monitors PCS and battery system information.
- Monitors state of liquid cooling system, fire suppression system, and other external nodes.
- Manages system state such as running, fault, and alarm.
- Controls battery balance management of energy storage system.
- Provides data acquisition and control interface of energy storage system to EMS.
- Provides ESS auxiliary power supply and explosion control system power.

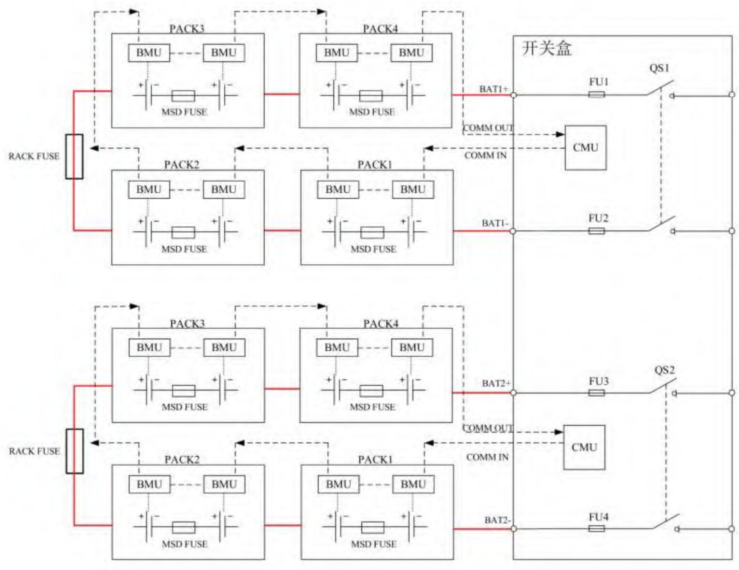

Figure 6. PT2 Example BMS Architecture

2.6 Electrical Fault Protection Devices

The PT2 has several passive and active safety control mechanisms installed within the battery module circuit and distribution circuit that would be available to interrupt a fault current. At a high level, these electrical fault protection features include:

- Internal fuse protection.
- Surge protection.
- Shunt trips.

2.7 Fire Protection Features

The PT2 is equipped with a number of fire protection features as outlined in the Fire Suppression System (FSS) guide provided by Sungrow. An overview of the key FSS components is shown in Figure 7.

2.7.1 Fire Detection

The PT2 is provided with an internal fire detection system which consists of smoke, heat, and gas detectors. The gas detectors are provided for installations which include the emergency ventilation system described in Section 2.7.3. If any abnormality is detected, the signal is sent through the BSC external terminal to the local controller for alarm signaling, control of the battery system shutdown, and control of the battery system for corresponding logic control, as shown in Figure 8 and Figure 9. In the event of fire or gas detection activation, the exterior of the PT2 cabinet is equipped with a local sounder beacon to notify any personnel, should they be present, to evacuate the area.

The fire detection devices will be monitored by the Prairie Song Reliability Project BESS master fire alarm control panel that will transmit all signals to a remote supervising station.

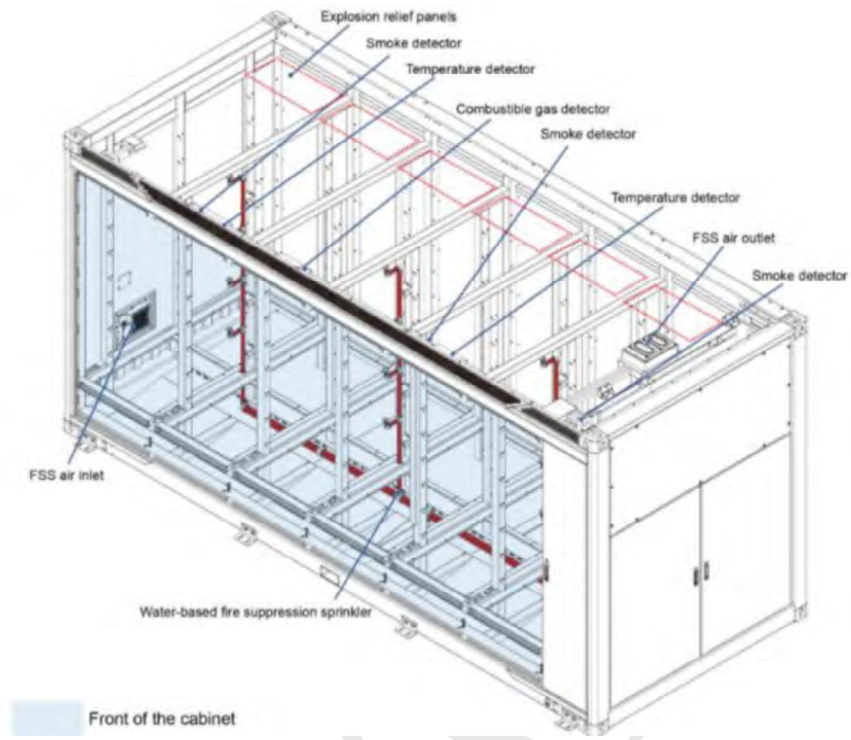

Figure 7. PT2 FSS Features Overview

2.7.2 Optional Fire Suppression

The PT2 can be installed with an optional water-based fire suppression system. The cabinet comes prefabricated with sprinkler pipe and twelve upright nozzles which can be automatically or manually supplied. The PT2 cabinets at the Prairie Song Reliability Project BESS will not be equipped with this system and no fire suppression system will be provided within the cabinet.

2.7.3 Explosion Control

The PT2 includes an explosion control system which consists of six deflagration vents (referred to in the System Manual as explosion relief plates) located on the roof of the cabinet which operate at 0.01 megapascals (Mpa). The system is designed in accordance with the guidelines of NFPA 68. The control logic for the explosion relief system is shown in Figure 8.

Note, NFPA 68 requires vent plates/panels to be secured to the container such that they do not become projectiles during a deflagration event. According to the PT2 Explosion Vent Panel Technical Specification, the vents are connected to the PT2 through 28 M10 bolts. When the internal pressure exceeds the set operating pressure of the vents, three pre-processed weakening grooves release the vent to open and allow the internal pressure to be released.

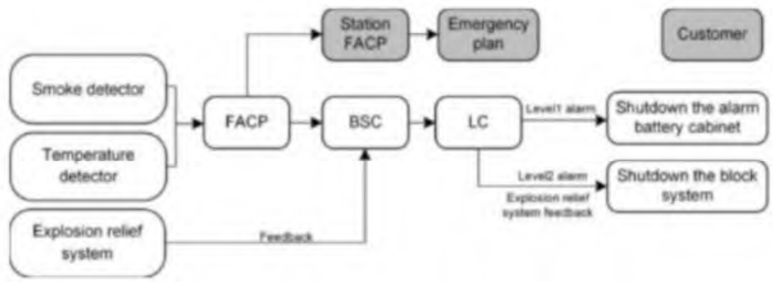

Figure 8. Control Logic of Explosion Relief System

The PT2 is also equipped with an emergency ventilation system as shown in Figure 7. The explosion control system is designed based on the principal of combustible concentration reduction in accordance with NFPA 69. The emergency ventilation system includes an explosion proof fan for exhaust (indicated as FSS air outlet in Figure 7) and make-up air louvers (indicated as FSS air inlet in Figure 7). The control logic for the emergency ventilation system is shown in Figure 9.

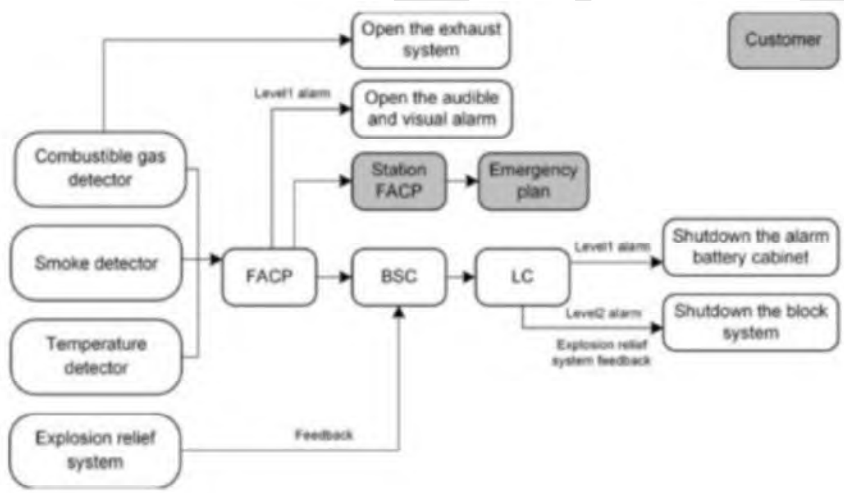

Figure 9. Control Logic of Emergency Ventilation System

Note, as reported in the TÜV reports and in Sungrow's PT2 system materials, the deflagration venting system and the combustible gas reduction system were designed in accordance with NFPA 68 and NFPA 69, respectively. TÜV performed CFD modeling simulations for each of these systems. A detailed compliance review of these systems and their third-party CFD models was not part of this analysis.

2.8 Clearances

The PT2 is provided with a series of passive fire protection schemes (barriers) to reduce the likelihood of thermal runaway from spreading from module-to-module and reduce the likelihood of a fire from spreading unit-to-unit. Included in the passive protection schemes is proper system clearance. The PT2 can be installed side-to-side with a clearance distance of 5 ft (1,500 mm) and back-to-back with a clearance distance of 5.9 inches (150 mm). A minimum of 11.5 feet (3,500 mm) clearance must be provided in front of PT2 cabinets.

2.9 Plans and Emergency Response

A system manual and operations and maintenance manual (O&M) has been prepared by Sungrow. It is expected that Sungrow will provide product level manuals that can be utilized by site owners/operators to develop their own site-specific documents, such as commissioning plans and decommissioning plans.

2.10 PT2 Product Listings

The PT2 and its subcomponents are certified or listed to multiple national and international product design standards. These certifications and listings apply to the cells, battery modules, inverters, power electronics, control systems, integration between the BESS and the grid, as well as the BESS as a whole. The standards highlighted in Table 1 pertain to the lithium-ion cells, the battery modules and the PT2 at the cabinet level.

Table 1. PT2 Product Listings

Listing Standard		Description
Cell Level	UL 1973	This certification standard is applicable to batteries and battery systems utilized for energy storage. The standard evaluates the battery system's ability to safely withstand simulated abuse conditions. For example, the standard subjects module-level stationary batteries to an internal fire exposure test to force a thermal runaway in one cell to ensure it does not explode, propagate fire to neighboring cells, or propagate to the rest of the modular battery system. UL 1973 applies to stationary BESS applications, such as photovoltaic installations and wind turbine energy storage systems (ESS), as well as other specialized ESS, such as light electric rail (LER) operations.
Cabinet Level	UL 9540	This standard covers ESS (including lithium-ion BESS) for stationary indoor and outdoor installations and establishes the system-level certification for ESS and their associated equipment.
	UL 9540A	The test methodology evaluates the fire characteristics and thermal runaway fire propagation of a BESS (including lithium-ion BESS). The test method provides a means to evaluate thermal runaway and fire propagation at the cell level, module level, and unit level. The data generated from the test method can be used to determine the fire and explosion protection required for a BESS installation based on fire test data. This test is specifically referenced by the IFC and NFPA 855 to demonstrate the functionality of the BESS fire protection features during large-scale fire testing.
PCS	UL 1741	This safety standard applies to inverters, converters, and interconnection system equipment used with distributed energy resources, ensuring safe and reliable operation in renewable energy systems.

3.0 PT2 UL 9540A TESTING

UL 9540A provides a method to evaluate thermal runaway and fire propagation of a lithium-ion BESS at the cell level, module level, unit level, and installation level. The data generated from the test method can be used to determine the fire and explosion protection systems/features required for a BESS installation. This includes, but is not limited to, thermal runaway characteristics of the cell; cell thermal runaway gas composition; the fire propagation potential from cell to cell, module to module, and unit to unit; products of combustion; heat release rate; smoke release rate; and performance of fire protection systems.

Initially, cells are tested to determine if further testing is required. Module level testing is required if the following observations are recorded during cell level testing:

- Thermal runaway is induced in the cell; and,
- The cell vent gas is flammable in air when tested in accordance with ASTM E918.

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 during module level testing:

- 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;
- 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 (97ºC) from ambient; and,
- Explosion hazards are observed.

Installation level testing assesses the effectiveness of fire protection systems installed as mitigation methods for the BESS in its intended installation configuration.

A summary of the cell, module, and unit-level test results for the PT2 are provided below.

3.1 UL 9540A Cell Level Summary

Cell-level testing was conducted at CCIC-CSA International Certification Co., Ltd. Kunshan Branch in September of 2023. Testing was performed on five model L173F314, 3.2 V, 314 Ah, LFP cells manufactured by CALB for use in the PT2. Each cell was charged to 100% SOC prior to testing. Thermal runaway was initiated via film strip heaters installed on both of the wide side surfaces of each cell, meaning two heaters were installed on each cell, as shown in Figure 10. The heaters were programmed to increase the temperature of the cell's surface by approximately 5°C per minute until the cell vented and went into thermal runaway. Cell 5 was placed within a gas test chamber and the products released during testing were collected and analyzed.

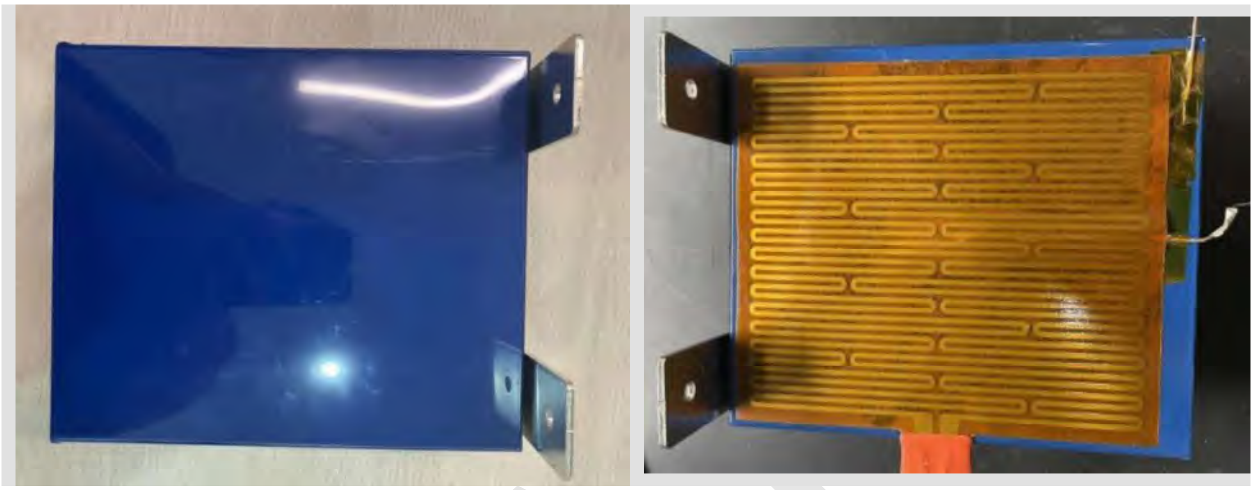

Figure 10. UL 9540A Test Cell (left) and Installed Film Strip Heater (right)

3.1.1 Key Takeaways and Results

Key takeaways from the tests include:

- The average cell vent and thermal runaway temperature was determined to be 140.5°C (285°F) and 210.6°C (411°F), respectively, as listed in Table 2.
- 192 liters of cell vent gases were released.
- The cell vent gas mixture is flammable and has an LFL of 6.2% at ambient temperature and LFL of 5.6% at the venting temperature.
- The cell vent gases were predominantly (approximately 96%) Carbon Monoxide (CO), Carbon Dioxide (CO_2), Hydrogen (H_2), Methane (CH_4), and Ethylene (C_2H_4), as listed in Table 3.
- No evidence of fire was observed during thermal runaway for any of the cell tests.

Table 2. UL 9540A Cell Level Testing: Key Flammability Characteristics

Flammability Property	Value
Average cell surface temperature at gas venting	140.5°C
Average cell surface temperature at thermal runaway	210.6°C
Cell vent gas volume released	192 L
LFL, % volume in air at the ambient temperature	6.2%
LFL, % volume in air at the venting temperature	5.6%
Burning Velocity (Su)	63.8 cm/s

Flammability Property	Value
Maximum pressure (Pmax)	100.4 psig

Table 3. UL 9540A Cell Level Testing: Cell Vent Gas Composition (Excluding O_2 and N_2)

Gas Name	Chemical Structure	% Measured
Carbon Monoxide	CO	13.924
Carbon Dioxide	CO_2	27.237
Hydrogen	H_2	44.925
Methane	CH_4	6.421
Ethane	C_2H_6	0.996
Ethylene	C_2H_4	3.827
Propane	C_3H_8	0.322
Propylene	C_3H_6	1.227
Isobutane	C_4H_{10}	0.013
Acetylene	C_2H_2	0.339
Butane	C_4H_{10}	0.091
Isobutene	C_4H_8	0.085
Transbutene	C_4H_8	0.322
n-Butene	C_4H_8	0.140
Isopentane	C_5H_{12}	0.007
Pentane	C_5H_{12}	0.110
2-methyl-1, 3-butadiene	C_5H_8	0.014
Total	-	100

3.1.2 Performance Criteria

UL 9540A, Section 7.7 outlines the performance criteria for the cell level test. If all these conditions are met, further testing (such as module, unit, or installation level tests) is not required. The acceptable performance criteria during the UL 9540A cell level test are as follows:

1. Thermal runaway cannot be induced in the cell.
2. The cell vent gas does not present a flammability hazard when mixed with any volume of air, at both ambient and vent temperatures.

Given the cell went into thermal runaway and vented flammable gases, UL 9540A module level testing was required.

3.2 UL 9540A Module Level Summary

Module level testing was conducted at a TÜV Rheinland (Shanghai) (TÜV) laboratory during a testing period from November to December of 2023. Testing was performed on a 332.8 V, 314 Ah, PT2 module (model P1044AL-AHA), manufactured by Sungrow, as shown in Figure 11. Each pack consists of 104 CALB model L173F314 LFP cells that were charged to 100% SOC prior to testing. During the test, the PT2 pack is not connected to the BMS or LCS; i.e., they are not actively operating to prevent thermal runaway in a cell or to prohibit the propagation of thermal runaway from cell to cell. Thermal runaway was initiated via film strip heaters installed on both of the wide side surfaces of one cell, similar to the cell level test (see Figure 10). The heaters were programmed to increase the temperature of the cell's surface by 4-7°C per minute until the cells vented and went into thermal runaway. The pack was placed under an instrumented hood and the vent gas was collected for analysis. Thermal runaway propagated from the initiating cell (cell 3) to adjacent cells (cells 1, 2, 4, and 5).

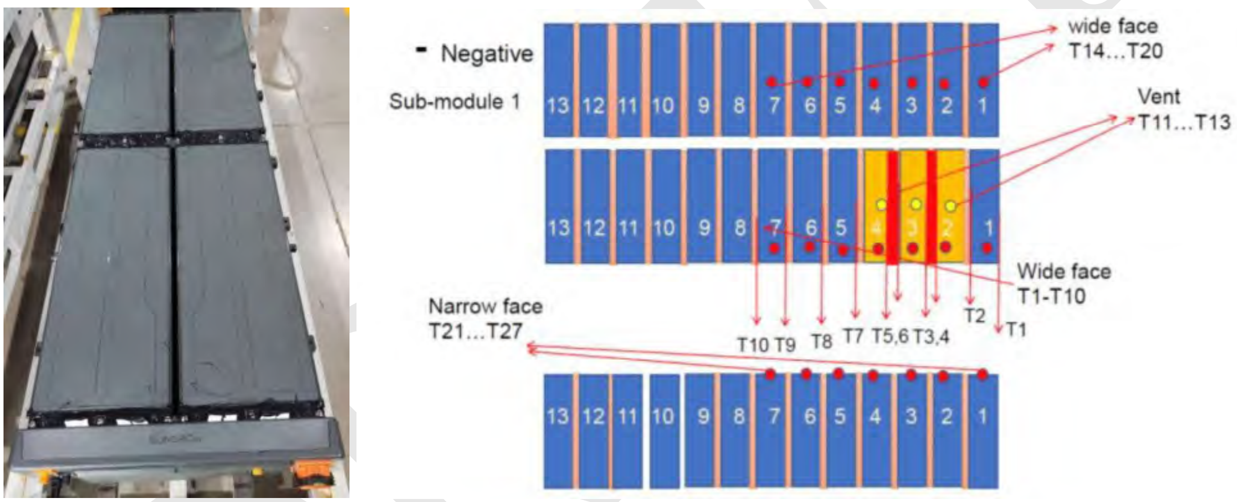

Figure 11. UL 9540A Module Level Test Heater Locations

3.2.1 Key Takeaways and Results

The heating of a single cell resulted in cell-to-cell propagation to four adjacent cells in the PT2 pack. Key takeaways from the UL 9540A module level test include:

- Thermal runaway propagated from the initiating cell (3) to two adjacent cells on each side (cells 1, 2, 4, and 5) resulting in a total of five cells undergoing thermal runaway.
- Audible pops and white smoke were observed during the test.
- No flying debris or explosive discharge of gases were observed.
- No sparks, electrical arcs, or other electrical events were observed during the test.
- No external flaming was observed.
- The peak chemical heat release rate was 27.26 kW.
- The measured peak smoke release rate was 6.785 m^2/s.

- Vent gases were collected, as listed in Table 4. Note, FTIR is the designation for Fourier Transform Infrared Spectroscopy and FID is the designation for Flame Ionization Detector.

Table 4. UL 9540A Module Level Testing: Total Gas Release

Gas Name	Chemical Structure	Total Volume of Gas (L)	Detection Method
Carbon Monoxide	CO	170.2	FTIR
Carbon Dioxide	CO_2	382.3	FTIR
Hydrogen	H_2	970.2	Palladium Nickel Sensor
Methane	CH_4	86.1	FTIR
Ethylene	C_2H_4	66.52	FTIR
Ethane	C_2H_6	16.14	FTIR
Propylene	C_3H_6	261.2	FTIR
Propane	C_3H_8	47.45	FTIR
Total Hydrocarbons	(Methane Equivalent)	973.2	FID

3.2.2 Performance Criteria

UL 9540A, Section 8.4 outlines the performance criteria for the module level test. If all these conditions are met, further testing (such as unit or installation level tests) is not required. The acceptable performance criteria during the UL 9540A module level test are as follows:

1. Thermal runaway is contained by module design.
2. Cell vent gas is nonflammable as determined by the cell level test.

Given the cell vent gases are flammable (as summarized previously) and thermal runaway was not contained by the module design, UL 9540A unit level testing was required.

3.3 UL 9540A Unit Level Summary

Unit level testing was conducted at a TÜV Rheinland (Shanghai) laboratory in November of 2023. Testing was performed on a single PT2 open rack (referred to within the UL 9540A test report as unit) without an enclosure in accordance with the UL 9540A test method for an indoor, non-residential ground mounted installation. Testing was performed on a single PT2 open air rack, not within the PT2 enclosure. As stated in Section 3.3 of the UL 9540A unit level test report, the test was performed in accordance with the UL 9540A test method for an indoor, non-residential ground mounted installation. NFPA 855 §9.1.5 states that fire and explosion testing must be conducted on a representative ESS in accordance with UL 9540A, that the representative units tested must match the intended installation configuration and that the testing must include an evaluation of deflagration mitigation measures when designed into the ESS cabinets. Therefore, by testing the units in this configuration, the PT2 units were not tested as intended by NFPA 855 for explosion hazards.

The PT2 test sample consisted of one open air rack representative of two ‘units,’ where each unit is comprised of four PT2 packs/modules (model P1044AL-AHA) as shown in Figure 12. The tested configuration is intended to be representative of the battery unit models R0417BL-AHAA, R0417BL-AHDA, R0417BL-AHAS, R0417BL-AHCS, R0417BL-AHAT, and R0417BL-AHCT and which utilize four PT2 modules (model P1044AL-AHA) and have a capacity and voltage of 314 Ah and 1331.2V, respectively, as well as the battery unit models R0835BL-AHCA, R0835BL-AHAS, and R0835-BL-AHCS which consist of eight PT2 modules (model P1044AL-AHA) and have a total capacity and voltage of 628 Ah and 1331.2 V, respectively. TÜV witnessed and reported on one UL 9540A unit level fire test (i.e., the test and report apply to all models indicated).

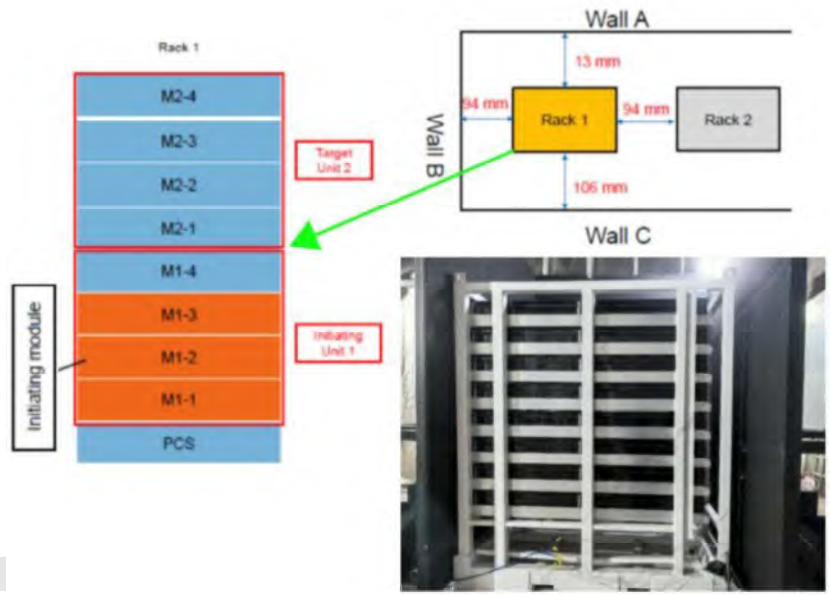

Figure 12. UL 9540A Unit Level Test Configuration

The batteries were tested at 100% SOC. During the test, the BMS and LCS were disabled; i.e., they are not actively operating to prevent thermal runaway in a cell or to prohibit the propagation of thermal runaway from cell-to-cell, or module-to-module.

The initiating battery module was chosen to be the second battery module from the bottom of the rack, as shown in Figure 12. This location was deemed to be the worst-case, given there are battery packs directly above and below it. Within the module itself, thermal runaway was initiated via film strip heaters installed on both of the wide side surfaces of one cell, similar to the cell and module level tests (see Figure 10). Cells 2, 3, and 4 were chosen as the initiating cells. This resulted in the simultaneous heating of three cells. The heaters were programed to provide a heating rate of 4-7°C per minute, as specified by UL 9540A.

One target rack (composed of two target units) was installed 94 mm to the side of initiating rack 2, as shown in Figure 12. Additionally, instrumented walls (5/8” gypsum, painted black) were installed 13 mm/106 mm from the front of the front/rear of the rack and 94 mm to the side of the rack as shown in Figure 12. Thermocouples and heat flux gauges were placed on the wall sections collinear with the center line of initiating rack 1. The test setup was placed under an instrumented hood and the vent gas was collected for analysis.

3.3.1 Key Takeaways and Results

After the test, analysis of the data and a visual inspection of the initiating PT2 pack yielded the following observations:

- Over the duration of the test, five cells went into thermal runaway: the three that were forcibly heated and two additional cells. This demonstrated that cell to cell propagation occurred during the test, as is required by UL 9540A.
- No other signs of distress were observed in the initiating unit. Thermal runaway did not propagate beyond the five cells within initiating module, nor did it spread to the adjacent modules above or below.
- The battery modules within the target PT2 rack installed 3.7 in (94 mm) to the side of the initiating rack were unaffected.
- No flying debris or explosive discharge of gases were observed during the test.
- No sparks, electrical arcs, or other electrical events were observed during the test.
- No external flaming was observed.
- The peak chemical heat release rate was 82.04 kW.
- The measured peak smoke release rate was 2.63 m^2/s.
- The total measured hydrocarbons released was 989.9 L as shown in Table 5.
- Maximum temperatures in the target BESS did not exceed 35.9°C which is less than the average cell venting temperature of 140.5°C determined in the cell level test.
- Maximum temperatures measured on instrumented wall A and wall B were 27.8°C and 33.7°C, respectively, which is less than a 97°C rise above ambient.

Table 5. UL 9540A Unit Level Testing: Total Gas Release

Gas Name	Chemical Structure	Total Volume of gas (L)	Detection Method
Carbon Monoxide	CO	176.2	FTIR
Carbon Dioxide	CO_2	383.7	FTIR
Hydrogen	H_2	939.9	Palladium Nickel Sensor
Methane	CH_4	143.1	FTIR
Ethylene	C_2H_4	73.26	FTIR
Ethane	C_2H_6	13.61	FTIR
Propylene	C_3H_6	278.2	FTIR

Gas Name	Chemical Structure	Total Volume of gas (L)	Detection Method
Propane	C_3H_8	55.63	FTIR
Total Hydrocarbons	(Methane Equivalent)	989.9	FID

3.3.2 Performance Criteria

UL 9540A, Section 9.8 outlines the performance criteria for the unit level test. If all these conditions are met, further testing (such as installation level tests) is not required. The acceptable performance criteria during the UL 9540A unit level test are as follows:

1. Flaming outside of the initiating BESS unit is not observed;
2. Surface temperatures of modules within the target BESS units adjacent to the initiating BESS unit do not exceed the temperature at which thermally initiated cell venting occurs, as determined in the cell level test;
3. For BESS units intended for installation in locations with combustible construction, surface temperature measurements on wall surfaces do not exceed 97°C (175°F) or temperature rise above ambient per UL 9540A §9.2.15;
4. Explosion hazards are not observed, including deflagration, detonation or accumulation (to within the flammability limits in an amount that can cause a deflagration) of battery vent gases; and
5. Heat flux in the center of the accessible means of egress shall not exceed 1.3 kW/m^2.

These test results meet all five of UL 9540A's performance criteria for indoor ground mounted BESS units. The unit level test demonstrated that the simultaneous failure of three cells within the same battery module did not lead to flaming combustion nor to a propagating thermal runaway event throughout the PT2 initiating rack. However, as described above, the units were not tested in the end use configuration inside the PT2 cabinet meant for outdoor, ground mounted installations. Therefore, the evaluation of explosion hazards within the enclosed cabinet was not completed based on this test.

4.0 PRAIRIE SONG RELIABILITY PROJECT BESS SITE

The Prairie Song Reliability Project BESS is proposed for installation in Santa Clarita, CA within Los Angeles County. An aerial view of the site is shown in Figure 13.

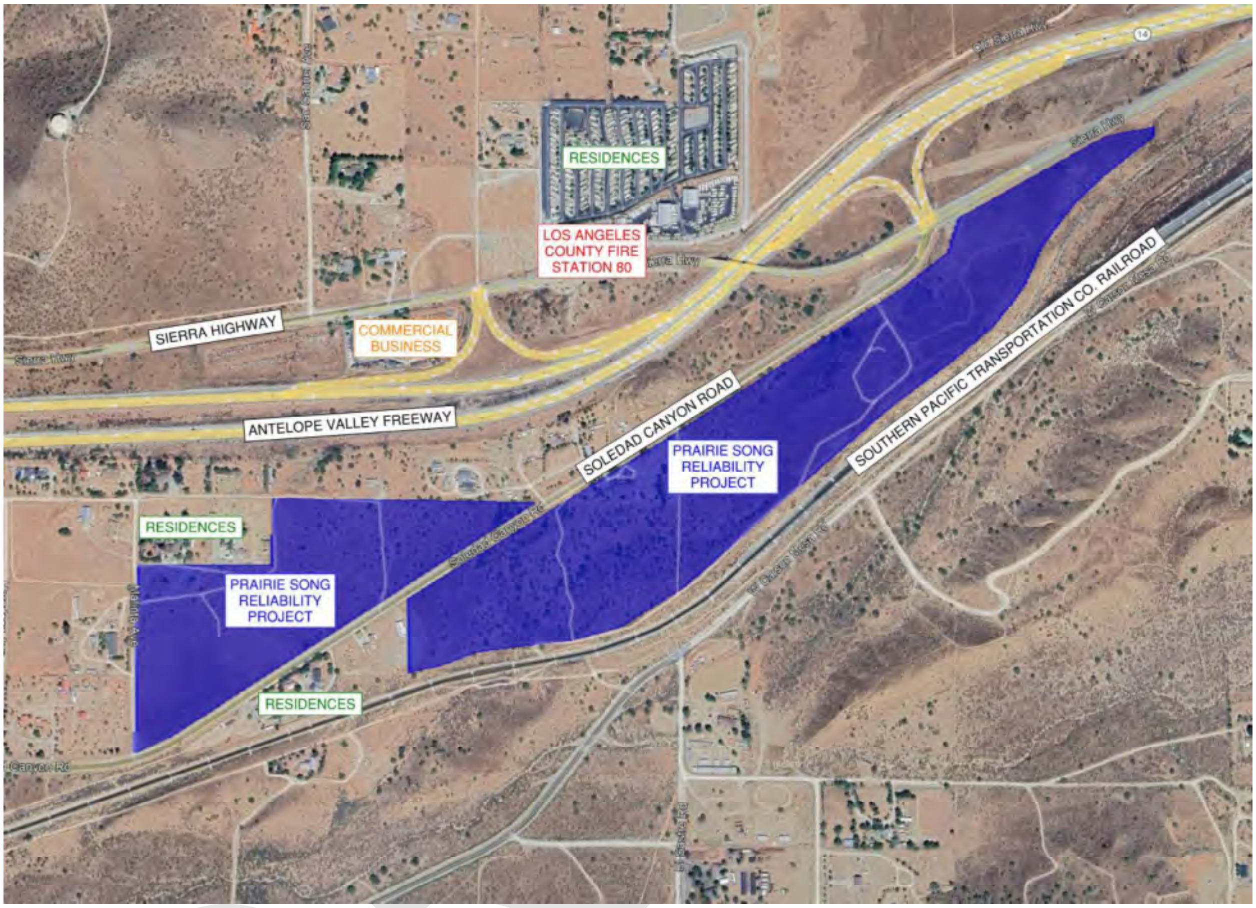

Figure 13. Aerial Map

4.1 Site Level Fire Safety Features

Based on a review of the drawing set, the Prairie Song Reliability Project BESS will include 2,035 PT2s with a capacity of 1,275 MW/10,206 MWh. The site will also include 120 MV transformers and a BESS substation to support the PT2s, as shown in Figure 14.

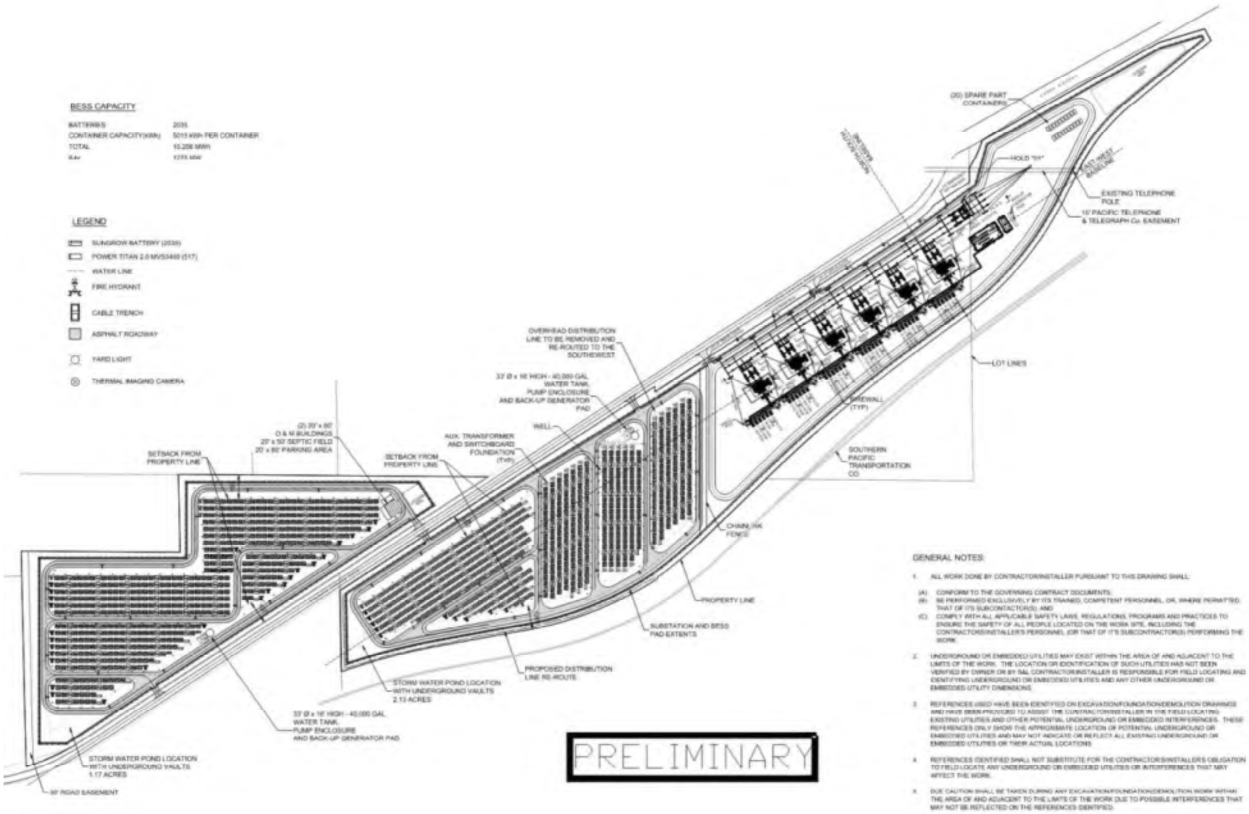

Figure 14. BESS Yard Site Plan

As shown in the drawing set and the PT2 product documentation, the Prairie Song Reliability Project BESS will have a number of site-level fire safety systems and features, described in the following sections.

4.1.1 BESS Monitoring and Emergency Notification

The Prairie Song Reliability Project BESS will be remotely monitored by a Remote Operations Center (ROC). If an abnormal signal is received at the ROC, they will contact the operation and maintenance (O&M) management organization and the responsible service personnel (O&M service personnel). If necessary, such as the abnormal condition leading to a thermal event, the O&M service personnel responding to the signal will then notify first responders.

In addition, the internal fire detection devices within the PT2 are monitored by a master fire alarm control panel that transmits all signals to a remote supervising station.

4.1.2 Periodic Maintenance

The Prairie Song Reliability Project BESS will be periodically inspected and serviced by trained O&M service personnel in accordance with Sungrow's documentation and guidance.

4.1.3 BESS Security

A solid wall will be installed around the perimeter of the Prairie Song Reliability Project BESS to prohibit access to the PT2s. The secured area around the BESS yard at the Prairie Song Reliability

Project BESS will include two 26-ft wide vehicle/equipment access gates on the fire apparatus access road located along Soledad Canyon Road.

4.1.4 Fire Department Access

Los Angeles County Fire Department Station 80 is the closest fire department to the Prairie Song Reliability Project BESS and is approximately 1,000 feet away. The access roads to the site are along Soledad Canyon Road, from which the fire department would turn directly to the site entrance. From there, the site fire apparatus access road on site has the following design features:

- Unobstructed width of 26 ft and unobstructed vertical clearance.
- Turning radii of no less than 32 ft and no dead-ends.
- Grade not exceeding 15%.
- Constructed of material to provide all-weather driving capabilities.

4.1.5 Emergency Water

Firefighting water will be provided via fire hydrants located within the BESS yard satisfying LACFC §507. The fire hydrants will be fed by two (2) 40,000-gallon fire water tanks.

Note, based on the UL 9540A unit level fire testing, manual fire suppression (hose lines) is not required to suppress a PT2 fire. However, if manual firefighting tactics are used, water is considered the preferred agent for managing lithium-ion battery fires, suppressing nearby combustibles, cooling nearby exposures, and controlling smoke. Other fire suppression methods, such as gaseous agents (CO2, Halon), dry chemical suppressants, or foams, are unlikely to be effective.

4.1.6 Fire Alarm and Notification System

Each PT2 cabinet is equipped with internal smoke, heat, and gas detection devices. The internal fire detection devices will activate the individual cabinet notification appliance upon an alarm signal. A master fire alarm control panel will monitor the fire detection devices and is monitored by a remote supervising station in accordance with NFPA 72 and the LACFC. Remote annunciators will be located the BESS yard entrances along Soledad Canyon Road.

Visible and audible annunciation of alarm signals received from the fire detection devices will be provided in the form of pole mounted horns and beacons located around the perimeter of the facility.

4.1.7 Emergency Stop

An emergency stop (E-Stop) push button is provided on the front of each PT2 cabinet. This E-Stop can be used for maintenance purposes or during an emergency to isolate the PT2 cabinets from connected energy sources. Note, a site wide E-Stop should never be initiated without first coordinating with the Owner/Operator and the Utility.

4.2 Permanent BESS or Electrical Grid Exposures

The Prairie Song Reliability Project BESS and its associated equipment are intended to operate 24 hours a day, 365 days a year. The Prairie Song Reliability Project BESS will include 2,035 PT2s and 517 MV transformers. The site will also include fire hydrants, fire water tanks, a BESS substation, and auxiliary electrical equipment. As described in the drawing set, the clearance distances to permanent electrical exposures associated with the Prairie Song Reliability Project BESS and/or electrical grid are summarized in Table 6.

Table 6. Distance to Permanent Exposures Associated with the BESS or Electrical Grid

Exposure	Distance
BESS Transformer	~ 4 ft
O&M Building	~ 30 ft
BESS Substation	~ 200 ft
Substation Control Enclosure	~ 1,450 ft

4.3 Permanent Public Exposure Hazards

All permanently installed public exposures (lot lines, public ways, buildings, stored combustible materials, hazardous materials, high-piled stock, and exposure hazards not associated with electrical grid infrastructure) are at least 10 ft from the closest PT2. As described in the drawing set and aerial map, clearance distances to public exposures are summarized in Table 7.

Table 7. Distance to Permanent Public Exposures

Exposure	Distance
Property Line	~ 100 ft
Soledad Canyon Road	~ 110 ft
Southern Pacific Transportation Co. Railroad	~ 160 ft
Nearest Residences	~ 160 ft
Antelope Valley Freeway	~ 450 ft

5.0 BESS SITE DESIGN CODE ANALYSIS

Los Angeles County adopts and locally amends the 2023 LACFC, which largely enforces the same requirements as the 2022 Edition of the CFC. Compliance with LACFC §1207 is required when a lithium-ion BESS installation has an energy capacity greater than 20 kWh (LACFC Table 1207.1.1). Since the Prairie Song Reliability Project BESS has an energy capacity of 1,275 MW/10,206 MWh, LACFC §1207 requirements apply. Below is a review of the Prairie Song Reliability Project BESS site design for compliance with the LACFC.

Note, this code analysis applies only to site design elements of the Prairie Song Reliability Project BESS pertaining to fire and life safety. Other aspects of the site design, including the electrical or structural design, 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, including all fire protection systems, will be installed, commissioned, inspected, tested, and maintained as required by the manufacturer(s), the LACFC, and/or other applicable codes and standards.

5.1 Outdoor BESS Classifications

The Prairie Song Reliability Project BESS includes 2,035 PT2s installed outdoors. The PT2 is a NWI style BESS that is unoccupiable with all internal components accessible via exterior doors. For outdoor BESS installations, the LACFC provides code requirements based on the proximity and location of the BESS equipment from adjacent exposures (LACFC §1207.8). The two outdoor installation classifications are as follows:

- **Remote outdoor installations –** BESS located more than 100 ft from buildings, lot lines that can be built upon, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure.
- **Installations near exposures –** BESS locations that do not comply with remote outdoor location requirements.

Based on the drawing set, there is less than a 100 ft separation distance between the PT2s and the nearest exposures not associated with the electrical grid infrastructure. As such, the Prairie Song Reliability Project BESS is classified as an outdoor installation near exposures for this analysis. LACFC Tables 1207.6 and 1207.8 list the code requirements pertaining to outdoor lithium-ion BESS installations. These requirements are summarized below in Table 8 and are discussed in detail within the following sections. Other LACFC requirements that apply to all facilities regulated by the LACFC, BESS or otherwise, include fire apparatus access roads (LACFC §503), key boxes (LACFC §506), and fire protection water supplies (LACFC §507).

Table 8. LACFC Outdoor Installation Near Exposures BESS Requirements

Requirement	Compliance Required	LACFC Code Reference
All ESS installations	Yes	§1207.4
Size and separation	Yes	§1207.5.1
Maximum allowable quantities	Yes	§1207.5.2
Smoke and automatic fire detection	Yes	§1207.5.4
Fire suppression systems	Yes	§1207.5.5
Maximum enclosure size	Yes	§1207.5.6
Vegetation control	Yes	§1207.5.7
Means of egress separation	Yes	§1207.5.8
Clearance to exposures	Yes	§1207.8.3
Technology-Specific Protection – Lithium-ion Batteries		
Exhaust ventilation	Yes	§1207.6.1
Explosion control	Yes	§1207.6.3
Thermal runaway	Yes	§1207.6.5
Other LACFC Requirements – All Facilities		
Fire apparatus access roads	Yes	§503
Key boxes	Yes	§506
Fire protection water supply	Yes	§507

5.2 All ESS Installations

LACFC §1207.4 applies to all ESS installations: indoors, outdoors, stationary, or mobile. Only the fire and life safety general installation requirements applicable to an 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 (LACFC §1207.4.3), seismic and structural design (LACFC §1207.4.4), occupied work centers (LACFC §1207.4.10), open rack installations (LACFC §1207.4.11), and walk-in units (LACFC §1207.4.12).

5.2.1 Equipment Listing

LACFC §1207.3.1 requires ESS to be listed in accordance with UL 9540. The PT2 is listed to UL 9540, as described in Section 2.10. As such, the Prairie Song Reliability Project BESS complies with the LACFC equipment listing requirement.

5.2.2 Energy Storage Management System

LACFC §1207.3.4 requires an approved energy storage management system that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications. The system shall disconnect electrical connections to the ESS or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected. The system shall transmit a trouble signal to an approved location and to an approved annunciator panel if potentially hazardous temperatures or other conditions such as short circuits, over voltage, or under voltage are detected.

The PT2 is provided with a BMU and LCS as described in Sections 2.3 and 2.5, as required by LACFC §1207.3.4. However, these signals are not transmitted to an annunciator panel at the Prairie Song Reliability Project BESS site as the data received in the BMU and LCS cannot be transmitted to the fire alarm system for display at a remote annunciator. The remote annunciator will display fire alarm signals such as the gas detection signals within the PT2. As such, an AMMR application will be submitted for the Prairie Song Reliability Project BESS requesting a variance from the default requirements of LACFC §1207.3.4 and §1207.3.4.1.

5.2.3 Enclosures

LACFC §1207.3.5 requires ESS enclosures to be noncombustible. The PT2 is a noncombustible container. As such, the Prairie Song Reliability Project BESS complies with the LACFC enclosures requirement.

5.2.4 Electrical Disconnect

LACFC §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 drawing set, the main electrical service disconnecting means remains to be confirmed by the client. There will be a BESS disconnect at a location to be determined. If this disconnect is not within sight of the main electrical service disconnecting means, placards or directories indicating the location of the BESS disconnect must be installed at the location of the main electrical service disconnecting means in order to be compliant with LACFC electrical disconnect requirements.

5.2.5 Working Clearances

LACFC §1207.4.2 requires access and working space to be provided and maintained for all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with the California Electrical Code and the manufacturer's instructions. Based on a review of the drawing set and the PT2 installation manual, working clearances in accordance with the manufacturer's instructions (11.5 feet in front of the PT2s) are provided at the Prairie Song Reliability Project BESS. As such, the Prairie Song Reliability Project BESS site design complies with the LACFC working clearance requirement.

5.2.6 Vehicle Impact Protection

LACFC §1207.4.5 requires ESS to be located or protected to prevent physical damage, including impact by a motor vehicle. Based on a review of the drawing set, vehicle impact protection is not being provided at the Prairie Song Reliability Project BESS. However, this is not necessary as the Prairie Song Reliability Project BESS is a secured installation that will only have trained O&M personnel on site. Additionally, there are no public roads/ways on the site, so there will not be regular motor vehicle traffic moving through the site. Thus, vehicle impact protection is not necessary for the Prairie Song Reliability Project BESS. As such, the Prairie Song Reliability Project BESS site design complies with the LACFC vehicle impact protection requirement.

5.2.7 Combustible Storage

LACFC §1207.4.6 does not permit combustible materials to be stored in ESS rooms, cabinets, enclosures, areas, or walk-in units, nor does it permit combustible materials to be stored within 3 ft of ESS. The PT2 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 cabinet to store additional combustible materials, and there are no combustible materials stored within 3 ft of the PT2s. Thus, the Prairie Song Reliability Project BESS complies with the LACFC combustible storage requirement.

5.2.8 Toxic and Highly Toxic Gases

LACFC §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 PT2 utilizes listed lithium-ion cells that do not vent toxic or highly toxic gases (or any gases) during charging, discharging, or normal use conditions. Therefore, no hazardous exhaust system is required for the PT2. As such, the Prairie Song Reliability Project BESS site design complies with the LACFC toxic and highly toxic gas requirement.

5.2.9 Signage

LACFC §1207.4.8 requires approved signs 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, on rooftops, or in open parking garages. Signs designed to meet both the requirements of this section and California Electrical Code are permitted. The signage must 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 LACFC §1207.1.6.1.

A permanent plaque or directory denoting the location of all electric power source disconnecting means on or in the premises shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all energy sources capable of being interconnected.

Signage will be provided at the Prairie Song Reliability Project BESS; however, the drawing set does not currently include the complete information per LACFC §1207.4.8. Thus, the Prairie Song Reliability Project BESS is capable of being installed in accordance with the LACFC signage requirements upon demonstration of the intent to furnish signage on the exterior of the PT2 identifying the equipment and associated risks and signage denoting the location of all electric power source disconnecting means.

5.2.10 Security of Installations

LACFC §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. Security barriers, fences, landscaping, and other enclosures shall not inhibit the required airflow to, or exhaust from, the electrochemical ESS and its components. As described in Section 4.1.3, the Prairie Song Reliability Project BESS will be surrounded by a solid wall with two gates to prohibit access to the PT2s. This wall shall not prohibit the required airflow to the PT2s. Thus, the Prairie Song Reliability Project BESS complies with the LACFC security of installation requirement.

5.3 Outdoor ESS Installations Near Exposures

5.3.1 Size and Separation

LACFC §1207.5.1 requires BESS to be segregated into groups not exceeding 50 kWh and each group to be separated by a minimum of 3 ft from other groups. The Prairie Song Reliability Project BESS will have larger capacities and smaller separation distances than what is specified in LACFC §1207.5.1. However, the LACFC permits the size and separation utilized at the Prairie Song Reliability Project BESS based on the UL 9540A large-scale fire testing results (LACFC §1207.5.1 Exception 2). The PT2 large-scale fire testing was performed in accordance with UL 9540A (see Section 3.3) which demonstrated that a fire will not propagate from module-to-module within the PT2 or to adjacent PT2s. As such, the UL 9540A testing supports the current design configuration (size and separation) for the site. Additionally, an AMMR application will be submitted for the Prairie Song Reliability Project BESS requesting a variance from the default requirements of LACFC §1207.5.1.

5.3.2 Maximum Allowable Quantities

The Prairie Song Reliability Project BESS will have a capacity of 10,206 MWh, which is greater than the 600-kWh threshold specified in LACFC Table 1207.5. However, this is permitted by the LACFC upon AHJ approval based on the development of an HMA and performance of UL 9540A large-scale fire testing (LACFC §1207.5.2 Exception 1). The results of the UL 9540A unit level fire test (see Section 3.3) demonstrated that fire did not propagate from module-to-module within the PT2 or to adjacent PT2s and this HMA has been developed for the Prairie Song Reliability Project BESS. As such, this HMA and the UL 9540A testing support the current design configuration (maximum allowable quantities) for the site. Additionally, an AMMR application will be submitted for the Prairie Song Reliability Project BESS requesting a variance from the default requirements of LACFC §1207.5.2.

5.3.3 Fire Detection Systems

LACFC §1207.5.4 requires an approved smoke or radiant energy-sensing fire detection system to be installed in rooms, indoor areas, and walk-in units containing BESS. Alarm and supervisory signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, and to an approved annunciator panel. The PT2 is provided with internal smoke, heat, and gas detection devices satisfying the requirements of LACFC §1207.5.4. The fire detectors will be monitored by a FACP that reports signals to an NFPA 72 compliant central station. Additionally, all signals from the FACP will be displayed at the remote annunciator at a location to be determined.

LACFC §1207.5.4.1 requires visible annunciation be provided on cabinet exteriors or in other approved locations to indicate that potentially hazardous conditions associated with the ESS exist. The Prairie Song Reliability Project BESS site will be provided with exterior, pole mounted horns and beacons located around the perimeter of the facility. The horns and beacons will actuate upon an alarm signal from the internal gas detectors to satisfy the requirements of LACFC §1207.5.4.1.

5.3.4 Fire Suppression Systems

LACFC §1207.5.5 requires an automatic fire suppression system to be installed in rooms and areas within buildings and walk-in units containing ESS. The PT2 is a NWI style BESS that is unoccupiable with all internal components accessible via exterior doors. It is not being installed within a room or building. Therefore, the PT2 installation at the Prairie Song Reliability Project BESS does not require fire suppression systems. As such, the Prairie Song Reliability Project BESS complies with the LACFC fire suppression system requirement. Additionally, an AMMR application will be submitted for the Prairie Song Reliability Project BESS requesting a variance from the default requirements of LACFC §1207.5.5.

5.3.5 Maximum Enclosure Size

LACFC §1207.5.6 requires that walk-in units not exceed 53 ft × 8 ft × 9.5 ft. It does not require NWI containers to meet the maximum enclosure size requirements. The PT2 is a NWI unit; thus, this requirement does not apply. Nonetheless, the Prairie Song Reliability Project BESS meets the intent of this requirement as the PT2 has dimensions of 19.9 ft × 8 ft × 9.5 ft, which are less than those specified by LACFC §1207.5.6.

5.3.6 Vegetation Control

LACFC §1207.5.7 requires areas within 10 ft on each side of new and existing outdoor ESS to be cleared of combustible vegetation and other growth. Combustible vegetation and other combustible growth will be cleared around the PT2 cabinets such that none are within 10 feet. Additionally, a solid wall will be provided around the site and act as a barrier against external vegetation. As such, the Prairie Song Reliability Project BESS complies with the LACFC vegetation control requirement.

5.3.7 Means of Egress Separation

LACFC §1207.5.8 requires ESS located outdoors to be separated from any means of egress as required by the FCO, but in no case less than 10 ft. Based on a review of the drawing set, there are no buildings or occupiable structures within 10 ft of the PT2s. As such, the Prairie Song Reliability Project BESS complies with the LACFC means of egress separation requirement.

5.3.8 Clearance to Exposures

LACFC §1207.8.3 requires ESS located outdoors to be separated by a minimum of 10 ft from the following exposures: lot lines, public ways, buildings, stored combustible materials, hazardous materials, high-piled stock, other exposure hazards, and vegetation. Note, "other exposure hazards" applies to hazards not associated with the electrical grid infrastructure. Based on a review of the drawing set, exposures are at least 10 ft away from the nearest PT2 (see Section 4.3). As such, the Prairie Song Reliability Project BESS complies with the LACFC clearance to exposures requirement.

5.4 Technology-Specific Protection

LACFC §1207.6 requires electrochemical ESS to comply with the requirements as outlined in LACFC Table 1207.6. For lithium-ion batteries, this requires compliance with the exhaust ventilation requirements of LACFC §1207.6.1, explosion control requirements of LACFC §1207.6.3, and the thermal runaway requirements of LACFC §1207.6.5.

Note, lithium-ion batteries do not need to meet the spill control and neutralization requirements of LACFC §1207.6.2 or the safety cap requirements of LACFC §1207.6.4. Lithium-ion batteries, because of their chemistry and architecture, do not require spill neutralization or secondary containment. Unlike other battery types, such as lead acid, there is no free-flowing liquid inside the cells that requires neutralization or containment.

5.4.1 Exhaust Ventilation

The amendment to LACFC §1207.6.1 requires exhaust ventilation complying with the California Mechanical Code.

The PT2 is not provided with an exhaust ventilation system as lithium-ion ESS do not discharge flammable gases during charging, discharging, and normal operations. Therefore, the CFC and NFPA 855 do not require exhaust ventilation of lithium-ion ESS for this reason. Additionally, an AMMR application will be submitted for the Prairie Song Reliability Project BESS requesting a variance from the default requirements of LACFC Table 1207.6 and §1207.6.1.

5.4.2 Explosion Control

LACFC §1207.6.3 requires explosion control complying with §911 to be provided for rooms, areas, or ESS walk-in units containing electrochemical ESS technologies. §911 requires explosion (deflagration) venting systems designed in accordance with NFPA 68 or explosion (deflagration) prevention systems design in accordance with NFPA 69.

The PT2 is equipped with a deflagration venting system designed in accordance with NFPA 68 and a combustible gas reduction concentration explosion control system that is designed in accordance with NFPA 69 as reported in the TÜV reports and in Sungrow's PT2 system materials. TÜV performed CFD modeling simulations for each of these systems. Detailed compliance review of these systems and their third-party CFD models was not part of this analysis.

According to TÜV, for the gas release scenarios, cabinet design, and ventilation system characteristics similar to the design basis outlined in the TÜV modeling report, the ventilation system and deflagration vents can mitigate the risk of deflagration and overpressure. However, the TÜV modeling did not evaluate other gas release scenarios, did not validate the theoretical exhaust fan model against the actual exhaust fan performance, and did not evaluate the differences between the modeled cabinet geometry and the actual cabinet geometry for the PT2. If the gas release scenario differs from the design basis (such as a larger release of cell vent gas or smaller free air volume within the PT2), the exhaust fan may fail to perform as modeled. In addition, if the cabinet interior geometry varies from the design basis, the deflagration may not be addressed with the provided systems.

As a critical fire protection system, it is recommended that backup power be provided for the explosion control system. Per information provided by Sungrow, the PT2 is equipped with an uninterruptible power supply (UPS) that can supply backup power to the gas detection and explosion control system. The project design will provide additional backup power for emergency systems by connecting each PT2 to the same emergency power sources and backup generator that will serve the control house and fire water system. The additional backup power source will be fed from each medium voltage transformer to an auxiliary power input on each PT2. 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 PT2 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.

5.4.3 Thermal Runaway

LACFC §1207.6.5 requires thermal runaway protection for lithium-ion BESS. The protection can be provided 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 (LACFC Table 1207.6 note e). The PT2 is equipped with a BMS that was tested and verified to UL 1973. As such, the Prairie Song Reliability Project BESS complies with the LACFC thermal runaway requirements.

5.5 All Facilities

LACFC §501.1 requires facilities regulated by the LACFC to comply with Chapter 5, Fire Service Features. For outdoor BESS, that requires, or could require, 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 an outdoor BESS facility.

5.5.1 Fire Department Access

LACFC §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 in accordance with LACFC §503. At a minimum, the fire apparatus access roads must meet the following:

1. Extend to within 150 feet 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. (LACFC §503.1.1)
2. Have an unobstructed width of not less than 26 feet, exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance to the sky. (LACFC §503.2.1)
3. Be designed and maintained to support the imposed loads of fire apparatus weighing at least 75,000 pounds and shall be surfaced so as to provide all-weather driving capabilities. (LACFC §503.2.3)
4. Have a turning radius and angles of approach and departure that are approved by the fire code official. (LACFC §503.2.4 and §503.2.8)
5. Dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus. (LACFC §503.2.5)
6. The grade of the fire apparatus access road shall not exceed 15 percent. (LACFC §503.2.7).

Based on a review of the drawing set, the all-weather access roads at the Prairie Song Reliability Project BESS have an unobstructed width of 26 ft, all PT2s are within 150 ft of the access road, and no dead-end access roads are present on site. However, the FCO must approve of turning radii, angles of approach/departure, grade, and imposed load for the access roads. Upon this approval, the Prairie Song Reliability Project BESS is capable of compliance with the LACFC fire apparatus access road requirements.

5.5.2 Key Boxes

LACFC §506.1 permits the AHJ to require a key box to be installed in an approved location when an area is restricted. The key box must be of an approved type in accordance with UL 1037 and must contain keys to gain access, as required by the AHJ. Key boxes will be provided at both entrances of the Prairie Song Reliability Project BESS site entrance to satisfy LACFC §506.

5.5.3 Water Supply

LACFC §507 requires an approved water supply capable of supplying the required water 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. On-site firefighting water will be provided via fire hydrants installed within the Prairie Song Reliability Project BESS yard. The fire hydrants will be connected to two (2) 40,000-gallon fire water tanks. As such, the Prairie Song Reliability Project BESS satisfies the LACFC §507 water supply requirement pending the AHJ approval of the fire hydrant and water tank design.

Note, typical BESS firefighting response procedures do not require or recommend offensive firefighting tactics to manually suppress a BESS fire. If manual firefighting tactics are used, water is considered the preferred agent for managing lithium-ion battery fires, suppressing nearby combustibles, cooling nearby exposures, and controlling smoke. Other fire suppression methods, such as gaseous agents (CO_2, Halon), dry chemical suppressants, or foams, are unlikely to be effective.

5.6 Prairie Song Reliability Project BESS Site Design Code Analysis Summary

Based on a review of the PT2 and the drawing set, the Prairie Song Reliability Project BESS site design can meet the LACFC installation level requirements for outdoor, NWI style BESS when it is installed in accordance with the manufacturer's instructions, its listing, the approved drawings, and the LACFC. Several items were identified in this analysis that still need confirmation to ensure compliance. These include:

- The AMMR requesting the Prairie Song Reliability Project BESS be exempt from transmitting signals from the energy storage management system to a remote annunciator as required by LACFC §1207.3.4 must be approved by the AHJ.
- Signage must be provided per LACFC §1207.4.8.

- The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the size and separation requirements of LACFC §1207.5.1 must be approved by the AHJ.
- The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the maximum allowable quantity requirements of LACFC §1207.5.2 must be approved by the AHJ.
- The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the fire suppression requirements of LACFC §1207.5.5 must be approved by the AHJ.
- The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the exhaust ventilation requirements of LACFC Table 1207.6 and §1207.6.1 must be approved by the AHJ.
- Fire apparatus access roads must be approved by the AHJ per LACFC §503.
- Fire hydrant and water tank design must be approved by the AHJ per LACFC §507.

6.0 BESS PLANS AND TRAINING

The LACFC and California Senate Bill 38 (CA SB38) require several plans to be developed for a BESS site. Often, 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).

6.1 Commissioning, Operation, Decommissioning, and ITM

The LACFC requires commissioning, decommissioning, and inspection, testing, and maintenance (ITM) plans for all BESS installations. It states that the operation, inspection, testing, and maintenance must follow the manufacturer's instructions.

A commissioning plan must be developed for the integration of the new BESS equipment into the electrical utility grid. The commissioning documentation is to capture the commissioning roles and responsibilities, list of equipment, conditions, BESS operation compliance, fire protection feature compliance, and operability (LACFC §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 (LACFC §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 (LACFC §1207.2.3). In addition, all fire protection systems must be designed, installed, commissioned, inspected, tested, and maintained as required by the LACFC and their respective NFPA standard (LACFC Chapter 9).

Commissioning, O&M, and decommissioning plans are to be developed for the Prairie Song Reliability Project BESS facility. FRA recommends that all plans required by the LACFC for the Prairie Song Reliability Project BESS, including commissioning, O&M, and decommissioning plans be finalized prior to energizing the BESS installation.

6.2 Emergency Response Plan

CA SB38 requires every BESS facility in California to have an emergency response and emergency action plan.

An ERP will be developed by FRA for the Prairie Song Reliability Project BESS to address general site organization and management, fire/thermal runaway incidents, and subsequent appropriate efforts to meet CA SB38 requirements. FRA recommends that prior to energizing the Prairie Song Reliability Project BESS, the ERP should be finalized with the local fire department(s) that may respond to an emergency at the Prairie Song Reliability Project BESS, as required by CA SB38.

6.3 Emergency Response Training

CA SB38 requires the owner of the BESS or their authorized representative to engage in emergency planning and training of emergency responders such that any foreseeable hazards associated with the on-site systems can be effectively addressed.

FRA recommends that all site personnel and emergency response personnel who could be responsible for responding to a Prairie Song Reliability Project BESS emergency be trained on the ERP prior to energizing the Prairie Song Reliability Project BESS. In addition, refresher training should be provided as appropriate, typically annually, as required by the AHJ.

7.0 HAZARD MITIGATION ANALYSIS

This HMA is being prepared following the guidance by LACFC §1207.1.4. The HMA evaluates the fire safety features of the PT2, the findings of the UL 9540A cell, module, and unit level tests, and the site level fire safety features of the Prairie Song Reliability Project BESS.

Based on the product level and site level safety features, the fire and life safety consequences associated with typical BESS failure modes can be evaluated to determine the impact to site personnel, the general public, and adjacent exposures.

Per LACFC §1207.1.4.1, the consequences of the following failure modes must be evaluated in an HMA:

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.
8. Failure of temperature control.

The consequences of each of these failure modes for the PT2 are discussed in detail below. Per LACFC §1207.1.4.2, the FCO or AHJ is authorized to approve the HMA provided that it demonstrates each of the following:

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.
2. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
3. Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
4. Flammable gases released from ESS during charging, discharging and normal operation will not exceed 10 percent of their lower LFL.
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.

Only single failure modes must be evaluated. The consequences of each failure mode are evaluated in Sections 7.1 through 7.8 of this report.

7.1 Thermal Runaway Condition

7.1.1 Description

Thermal runaway is a condition in which a self-heating chemical reaction occurs within a battery cell. This occurs when the battery cell generates heat faster than the battery cell is able to dissipate heat. Thermal runaway can be caused by physical damage (e.g. puncture, crushing), electrical malfunctions (e.g. overcharging), exposure to elevated ambient temperatures (e.g. adjacent cells in thermal runaway with elevated temperatures), manufacturing defects, and other internal conditions which may develop inside of aging battery cells (e.g. dendrites).

Thermal runaway typically results in an overpressure event within the battery cell due to internal heat generation inside the casing causing battery gases to be ejected from the cell through the pressure relief valve. Depending on the conditions, thermal runaway may be limited to the initiating cell(s) or thermal runaway may propagate to adjacent cells. Thermal runaway propagation typically occurs through conductive and convective heating or physical damage of adjacent cells due to swelling of the initiating cell. Conductive heating is the primary mode of heat transfer to adjacent cells for a non-flaming event and convective heating is the primary mode of heat transfer to adjacent cells for a flaming event.

Based on the cell level and module level testing, the PT2 cells generate toxic and flammable gases. Depending on the conditions of release, flammable gases released during a thermal runaway event may present an explosion or fire hazard. An explosion hazard exists when sufficient flammable gases are released in the absence of an ignition source and build-up within the container. A fire hazard exists when the flammable gases are released in the presence of an ignition source or self-ignite. It should be noted, the fire hazard and explosion hazard are not mutually exclusive, and both may exist at different time periods throughout a propagating thermal runaway event. In addition, toxic gases present a health exposure hazard to site personnel and first responders located in the vicinity of a BESS failure.

7.1.2 Barriers

Passive and active mitigation strategies are provided to prevent batteries from entering thermal runaway and cool adjacent batteries to prevent thermal runaway propagation. The following barriers are provided in the PT2:

- The cells and modules utilized in the PT2 are certified to UL 1973, as described in Section 2.10. The standard evaluates the battery system's ability to safely withstand simulated abuse conditions. For example, the standard subjects module-level stationary batteries to an internal fire exposure test to force a thermal runaway in one cell to ensure it does not explode, propagate fire to neighboring cells, or propagate to the rest of the modular battery system.

- The PT2 is equipped with a BMU which monitors cell health and shuts down power to modules/cabinets with cells operating outside of their operating conditions, as described in Section 2.5.
- The PT2 is equipped with an LCS which automatically activates to provide cooling and prevent batteries from overheating and escalating to a thermal runaway event, as described in Section 2.3. Additionally, the LCS cools adjacent batteries in a thermal runaway scenario to prevent thermal runaway propagation.
- The PT2 is equipped with a series of electrical fault protection devices, as described in Section 2.6.
- The PT2 will be regularly maintained to ensure it is operating within its specific parameters and to verify the batteries are in good working condition, as described in Section 4.1.2.

7.1.3 Consequences

The consequences of thermal runaway can vary widely depending on the gas release scenario and level of confinement; however, the primary consequences of thermal runaway can be grouped into the following hazard categories: fire and radiant heat, deflagrations and explosions, and toxic gases.

7.1.3.1 Fire & Radiant Heat Exposure Hazard

Radiant heat exposure can be a consequence of a lithium-ion battery thermal runaway event and subsequent fire. UL 9540A module and unit level testing demonstrated that thermal runaway did not propagate throughout the entire module and that measured heat fluxes along the instrumented walls were below the acceptable levels permitted by the test standard. This was achieved even with the open rack configuration of the testing setup. For the PT2, the modules/racks are enclosed in a 19.9 ft noncombustible cabinet that is not occupiable. Therefore, fire and radiant heat exposure is limited to individuals standing outside, in the open ambient air, in proximity to the PT2 cabinet during a failure/fire event. To further mitigate this hazard, the PT2 is equipped with a fire detection and notification (both locally and remotely) system. These systems can detect and notify local site personnel, should anyone be in the area, of a thermal event so that they can evacuate to a safe location before a fire within the PT2 can extend out of the cabinet and impact site personnel. Additional mitigation measures include emergency response procedures and training that will advise site personnel and first responders to stand at a safe distance, upwind from a distressed PT2.

Note, large-scale fire testing (LSFT) and/or CFD fire modeling results have not been provided. As such, defined minimum approach distances (MAD) for first responders cannot be outlined. In addition, in a worst case, fully involved PT2 cabinet fire, the risk of cabinet-to-cabinet fire propagation cannot be evaluated. Additional information is required in order to evaluate this scenario.

7.1.3.2 Deflagration & Explosion Hazard

A deflagration can be a consequence of a lithium-ion battery thermal runaway event. UL 9540A cell and module level test results indicate that flammable gases, predominately hydrogen and hydrocarbons, are released from the battery modules. Note, there were no observations of deflagration, projectiles, flying debris, detonation, or other explosive discharge of gases during the UL 9540A unit level test; however, this test was performed in an open rack scenario, not inside the enclosed cabinet, as required by NFPA 855. To mitigate the deflagration hazard within the PT2, the cabinet is equipped with an explosion control system that actively ventilates combustible vent gas and is also equipped with deflagration vents on the top of the cabinet (as described in Section 2.7.3). TÜV performed CFD modeling simulations for each of these systems. Detailed compliance review of these systems and their third-party CFD models was not part of this analysis. The design reports state the active ventilation system and deflagration panel design assume a maximum failure of five battery cells based on the UL 9540A unit level test results. If the actual gas release scenario differs from the design basis, such as a larger gas release volume, shorter gas release duration, or smaller free air volume, different conditions are expected (i.e., potential for cabinet failure).

To mitigate the hazards associated with a more severe scenario or should the explosion control systems fail, the PT2 is equipped with a fire detection and notification (both locally and remotely) system. These systems can detect and notify local site personnel, should anyone be in the area, of a thermal event so that they can evacuate to a safe location. Additional mitigation measures include emergency response procedures and training that will advise site personnel and first responders to stand at a safe distance, upwind from a distressed PT2.

7.1.3.3 Toxic Gas Hazard

A release of toxic gases can be a consequence of a lithium-ion battery thermal runaway event. UL 9540A cell and module level test results indicate that toxic gases are released from the battery modules (see Table 3 and Table 4). This data provides guidance on the types of gases individuals and first responders may encounter when evacuating from the site or responding to an outdoor PT2 fire. The nonflammable gases detected are similar to gases first responders would encounter in a typical Class A structure fire and do not contain any unique, or atypical, gases beyond what you would find in the combustion of modern combustible materials, such as plastics. However, the PT2 is not occupiable; therefore, toxic or highly toxic gas exposure is limited to individuals standing outside, in the open ambient air, in proximity to the PT2 cabinet during a failure/fire event. FRA conducted a plume analysis for the PT2 installation at the Prairie Song Reliability Project and the results are as follows:

Table 9. Results for Flammable and Toxic Extents for Release Scenarios (m)

Scenario	Duration	100% LFL	50% LFL	CO IDLH
1 (UL 9540A 5-cell)	1.1 (30-min)	0.38	0.64	1.66
	1.2 (Instantaneous*)	1.14	1.57	2.8
2 (1-module)	124.8-min	0.71	1.44	5.73
3 (1-Rack)	124.8-min	1.9	3.35	7.85
4 (Enclosure [6-rack])	124.8-min	4.34	7.64	17.69

**Instantaneous release was modeled for 5-cell volumes only. Module and enclosure level releases exceed the interior volume space of the BESS*

Scenario 4 was conducted as a sensitivity analysis as it includes an entire PT2 enclosure with 6 racks. This approach is used to determine the MAD for emergency response personnel based solely on potential toxic exposure and is governed by the component with the largest IDLH footprint. For non-flaming pre-combustion releases where all battery vent gas is released via venting during thermal runaway conditions alone, the component with the largest IDLH footprint and required potential exposure duration (30-minutes) is CO. The extent of the CO IDLH cloud was ~17.69 meters (58 feet) for the entire enclosure release scenario with a 124.8-minute duration release. As such, it is recommended that by incorporating a 1.5x safety factor, the MAD for non-flaming release conditions be a minimum of 26.5 meters (87 feet). It should be noted that the recommended MAD with the safety factor does not extend beyond the property line for any PT2 at the Prairie Song Reliability Project. Refer to the plume analysis report for the Prairie Song Reliability Project for a detailed analysis on all the scenarios modeled.

Note, the plume analysis does not consider other toxic gases sometimes associated with lithium-ion batteries, such as HF, HCl, and HCN as measurements were not performed during the UL 9540A testing. Therefore, in the absence of data, FRA recommends that monitoring of these gases in addition to CO and CO_2 should be performed during a battery emergency.

During a fire event involving a BESS, the battery cells and plastics encasing them could experience thermal decay contributing to the fuel load, heat release rate, and producing trace toxic components. These could include the release of hydrogen fluoride (HF) gas upon thermal degradation/decomposition. Additionally, thermal decomposition of freon from the HVAC system and wire insulation can be other potential contributing sources of HF. Other potential sources of acid gases include hydrogen cyanide (HCN) from the incomplete combustion of nitrogen-containing materials (such as wool, silk, cotton, paper, and plastics) and hydrogen chloride (HCl) gas from pyrolysis of chlorinated plastics, particularly polyvinyl chloride (PVC), and other chlorine-containing materials. Note, these hazards are not exclusive to battery fires. As the modern built environment has expanded the use of plastic goods and materials to a wide variety of household products, HF, HCl, HCN and other products of combustion are also found as a result of common modern day house fires.

To mitigate this hazard, the PT2 is equipped with a fire detection and notification (both locally and remotely) system. These systems can detect and notify local site personnel, should anyone be in the area, of a thermal event so that they can evacuate to a safe location before toxic gases can impact site personnel. Additional mitigation measures include emergency response procedures and training that will advise site personnel and first responders to stand at a safe distance, upwind from a distressed PT2, to wear appropriate PPE, and to monitor the air for toxic gases, as they would during any fire event.

7.2 Failure of Any Battery (Energy) Management System

7.2.1 Description

The PT2 is equipped with a BMS. The BMS tracks the performance, voltage, current, and state of charge (SOC) of the cells to ensure they are operating within manufacturer specifications. Per LACFC §1207.3.4 the BMS is required to disconnect electrical connections to the ESS if potentially hazardous conditions occur. Additionally, the BMS sends an alarm to the ROC and can initiate other controls based on the hazard detected. Consequences due to BMS failure are evaluated in this section.

7.2.2 Barriers

The following barriers are provided to prevent BMS failure and minimize the consequences of BMS failure:

- The BMS is certified as part of the battery module to UL 1973, as described in Section 2.10.
- The BMS is monitored by the ROC.
- Electrical fault protection is provided as described in Section 2.6.
- The BMS will be regularly maintained to ensure it is operating within its specific parameters, as described in Section 4.1.2.

7.2.3 Consequences

Failure of the BMS will prevent active monitoring of battery cell conditions. The BMS can be configured to be monitored by the Owner's operating center such that a failure will be quickly detected and remediated reducing the duration a PT2 is operating with deficient safety features. It should be noted, BMS failure alone will not cause battery failure. In a worst-case scenario, a BMS failure in conjunction with a secondary failure condition (such as over voltage, excess temperature, etc.) may result in a thermal runaway event. Barriers and consequences of thermal runaway are provided in Sections 7.1.2 and 7.1.3 of this report.

7.3 Failure of Any Required Ventilation System

7.3.1 Description

A failure scenario involving any required ventilation or exhaust may expose the batteries to elevated operating temperatures. Depending on the resulting ambient temperature, ventilation failure may cause batteries to be exposed to temperatures outside of the manufacturer recommended operating conditions or temperatures at which the cell fails. The PT2 is not provided with a normal operating exhaust system, however, it is provided with an LCS and ventilation system (liquid and air-cooled systems), as described in Sections 2.3 and 2.5. The LCS cools battery cells and maintains battery operating temperatures within the recommended range. This failure scenario evaluates the consequences associated with a failure of the LCS.

7.3.2 Barriers

The PT2 is equipped with the following barriers to prevent ventilation system failure and reduce the consequences of a failure event:

- The LCS is monitored by the ROC.
- The LCS and ventilation system will be regularly maintained to ensure it is operating within its specific parameters, as described in Section 4.1.2.

7.3.3 Consequences

Failure of the cooling system may expose batteries to ambient temperatures. The average peak ambient temperature in Santa Clarita, CA is approximately 94ºF and occurs in August. The peak temperature is less than the cell venting temperature; therefore, failure of the cooling system is not anticipated to lead to a thermal runaway event. The LCS can be monitored by the Owner's operating center such that a failure will be quickly detected and remediated, reducing the duration a PT2 is operating with deficient safety features. In a worst-case scenario, batteries operating at elevated temperatures for extended periods of time may degrade and have a higher likelihood of failure over time, possibly leading to thermal runaway. Barriers and consequences of thermal runaway are provided in Sections 7.1.2 and 7.1.3 of this report.

7.4 Voltage Surges on the Primary Electric Supply

7.4.1 Description

A voltage surge on the primary electric supply to the BESS may expose batteries to excessive voltage. This failure scenario evaluates the consequences due to a voltage surge on the primary electric supply.

7.4.2 Barriers

The following barriers are provided to minimize the consequences of a voltage surge on the primary electric supply:

- Electrical fault protection is provided as described in Section 2.6.
- Battery health is monitored by the BMS and automatically shuts down power upon over voltage conditions.
- The electrical components of the PT2 are monitored by the ROC.

7.4.3 Consequences

In the event of a voltage surge, the electrical fault protection will automatically stop electricity flow in the affected electrical circuit. The BMS provides redundancy and will also cut power to the affected cells and send a signal to the operating center such that a failure will be quickly detected and remediated, reducing the duration a PT2 is operating with a damaged electrical component/equipment. In a worst-case scenario, voltage surges may lead to a thermal runaway event, the barriers and consequences of thermal runaway are provided in Sections 7.1.2 and 7.1.3 of this report.

7.5 Short Circuits on the Load Side of the BESS

7.5.1 Description

A short circuit on the load side of the BESS may result in an increased current traveling through the battery circuit. Electrical currents outside of the recommended operating range may damage batteries and lead to a thermal runaway event.

7.5.2 Barriers

The following barriers are provided to minimize the consequences of a short circuit event:

- Electrical fault protection is provided as described in Section 2.6.
- Battery health is monitored by the BMS and automatically shuts down power upon over voltage conditions.
- The electrical components of the PT2 are monitored by the ROC.

7.5.3 Consequences

In a short circuit condition, the electrical fault protection will automatically stop current in the affected electrical circuit. The BMS provides redundancy and will also cut power to the affected cells and send a signal to the operating center such that a failure will be quickly detected and remediated, reducing the duration a PT2 is operating with a damaged electrical component/equipment. In a worst-case scenario, short circuits may lead to a thermal runaway event, the barriers and consequences of thermal runaway are provided in Sections 7.1.2 and 7.1.3 of this report.

7.6 Failure of a Fire Protection System

7.6.1 Description

A failure of a fire protection system can include a smoke detection, fire detection, gas detection system, fire suppression, or explosion control system. The PT2 is equipped with all of these features. Therefore, this failure scenario evaluates the consequences associated with failure of each of these features.

7.6.2 Barriers

The following barriers are provided to minimize the consequences of a failure of a fire protection system:

- Backup power supply for the gas detection and explosion control system.
- Backup power supply for the fire alarm system.
- The explosion control systems should be installed and commissioned in accordance with NFPA 68 and NFPA 69. In addition, regular inspection, testing, and maintenance should be performed in accordance with these standards.
- The fire alarm system should be installed in accordance with NFPA 72. In addition, regular inspection, testing, and maintenance should be performed in accordance with NFPA 72.
- Equipment monitored by supervising station monitoring service and Owner's operating center.
- Procedures in place if power is lost: O&M personnel will be notified to remediate the issue.
- Deflagration vent panels in the event of explosion control ventilation system failure.

7.6.3 Consequences

Failure of the detection systems may result in the inability of the system to detect fire conditions within the PT2 and initiate the explosion control system via the gas detection. However, the PT2 is equipped with a BMS which tracks the performance, voltage, current, and SOC of the cells to ensure they are operating within manufacturer specifications. In addition, failure of the explosion control ventilation system is mitigated by the presence of passive deflagration vents on the top of the PT2 cabinet.

7.7 Failure to Provide Spill Neutralization or Secondary Containment

7.7.1 Description

Lithium-ion batteries, because of their chemistry and architecture, do not require spill neutralization or secondary containment. Unlike other battery types, such as lead acid, there is no free-flowing liquid inside the cells that requires neutralization or containment. This distinction is also made in LACFC Table 1207.6 where lithium-ion BESS is not required to provide spill neutralization and secondary containment.

7.7.2 Barriers

No barriers – failure mode is not applicable to the PT2.

7.7.3 Consequences

No consequences – failure mode is not applicable to the PT2.

7.8 Failure of Temperature Control

7.8.1 Description

The PT2 is equipped with an LCS. The LCS provides a suitable operating temperature for the PT2. A failure of the LCS may expose the batteries to elevated operating temperatures. Depending on the resulting ambient temperature, temperature control failure may cause batteries to be exposed to temperatures outside of the manufacturer recommended operating conditions or temperatures at which the cell fails.

7.8.2 Barriers

The PT2 is equipped with the following barriers to prevent LCS failure and reduce the consequences of a failure event:

- The LCS is monitored by the ROC.
- The LCS will be regularly maintained to ensure it is operating within its specific parameters, as described in Section 4.1.2.

7.8.3 Consequences

Failure of the cooling system may expose batteries to ambient temperatures. The average peak ambient temperature in Santa Clarita, CA is approximately 94ºF and occurs in August. The peak temperature is less than the cell venting temperature; therefore, failure of the cooling system is not anticipated to lead to a thermal runaway event. The LCS can be monitored by the Owner's operating center such that a failure will be quickly detected and remediated, reducing the duration a PT2 is operating with deficient safety features. In a worst-case scenario, batteries operating at elevated temperatures for extended periods of time may degrade and have a higher likelihood of failure over time, possibly leading to thermal runaway. Barriers and consequences of thermal runaway are provided in Sections 7.1.2 and 7.1.3 of this report.

7.9 HMA Analysis Approval

Based on the analysis above, the Prairie Song Reliability Project BESS meets all of the HMA approval criteria for FCO or AHJ approval per LACFC §1207.1.4.2 as it has demonstrated that:

1. *Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance rated separations identified in Section 1207.7.4 (LACFC §1207.1.4.2 #1):*

   The Prairie Song Reliability Project BESS meets this requirement. The PT2 is installed outdoors, not within an unoccupied BESS room or area. However, it should be noted, the PT2 design includes a series of passive fire protection schemes (barriers) to protect it from spreading a fire from one PT2 to another. As demonstrated in UL 9540A unit-level fire testing, a nearly simultaneous failure of six cells did not result in thermal runaway propagating throughout the battery module or to adjacent PT2s. In addition, large-scale fire testing and fire modeling demonstrated a fire will not propagate from one PT2 to adjacent PT2s under the tested conditions. Although this requirement applies to BESS rooms or areas (and not an outdoor installation), the Prairie Song Reliability Project BESS still meets the intent of the requirement by containing a fire event to a single PT2.

2. *Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate (LACFC §1207.1.4.2 #2):*

   The Prairie Song Reliability Project BESS meets this requirement. The PT2 is installed outdoors, not within an occupied work center (or any other room). However, the PT2 has a number of internal sensors within it that can detect an abnormal overheating event, such as a fire. These sensors are monitored by the BMS and are relayed to the ROC. The ROC can then inform O&M service personnel who, if necessary, can notify the fire department if there is a thermal event. Although this requirement applies to occupied work centers (and not an outdoor installation), the Prairie Song Reliability Project BESS still meets the intent of the requirement through the internal gas detectors and sensors provided within the PT2.

3. *Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area (LACFC §1207.1.4.2 #3):*

   The Prairie Song Reliability Project BESS meets this requirement. The PT2 is installed outdoors, not within a building or adjacent to any means of egress. The nearest building is the O&M building which is 30 feet from a PT2. This distance is greater than the 10-foot clearance distance required by the LACFC from the BESS to adjacent buildings and/or means of egress. However, it should be noted, toxic gas concentrations measured during UL 9540A module-level fire testing (where the products of combustion were collected within a hood) are well below the IDLH value for each gas. Given the Prairie Song Reliability Project BESS is installed outdoors, where any gas release would be diluted by the entrainment of outside air, these gases, at the quantities measured during UL 9540A module level fire testing, would not be expected to have an adverse effect on individuals during the time deemed necessary to evacuate from the area (i.e., approximately 30 seconds to walk 100 ft away/evacuate from the vicinity of a burning PT2 based on the average (unimpeded) walking speed of 3.3 meters per second for able bodied maintenance personnel). Nor would these gases, at the quantities measured during UL 9540A module level fire testing, be expected to have an adverse effect on emergency response personnel, who are wearing appropriate PPE while responding to an PT2 fire. Although this requirement applies to a building or to an installation that is immediately adjacent to a means of egress route, the Prairie Song Reliability Project BESS still meets the intent of the requirement (i.e., do not produce toxic or highly toxic gases above the IDLH during an PT2 fire event during the time deemed necessary to evacuate from the area).

4. *Flammable gases released from ESS during charging, discharging, and normal operation will not exceed 10 percent of their LFL (LACFC §1207.1.4.2 #4):*

The Prairie Song Reliability Project BESS meets this requirement. The PT2 utilizes listed lithium-ion cells that are hermetically sealed and do not vent during charging, discharging or normal operation. Unlike other battery types, no flammable gases are released during normal operation of the lithium-ion batteries. As such, no flammable gases exceeding 10 percent of their LFL will be released from the Prairie Song Reliability Project 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 the gases, preventing accumulation, or by deflagration venting (LACFC §1207.1.4.2 #5):*

   The Prairie Song Reliability Project BESS can meet these approval criteria. The PT2 is equipped with an active ventilation (explosion control) system provided via an exhaust fan and inlet louver and deflagration venting via six deflagration panels located on the roof of the cabinet. TÜV performed CFD modeling simulations for each of these systems. Detailed compliance review of these systems and their third-party CFD models were not part of this analysis.

   According to TÜV, for the gas release scenarios, cabinet design, and ventilation system characteristics similar to the design basis outlined in the TÜV modeling report, the ventilation system and deflagration vents can mitigate the risk of deflagration and overpressure. The TÜV modeling did not evaluate other gas release scenarios, did not validate the theoretical exhaust fan model against the actual exhaust fan performance, and did not evaluate the differences between the modeled cabinet geometry and the actual cabinet geometry for the PT2. If the gas release scenario differs from the design basis (such as a larger release of cell vent gas or smaller free air volume within the PT2), the exhaust fan may fail to perform as modeled. In addition, if the cabinet interior geometry varies from the design basis, the deflagration may not be addressed with the provided systems.

   These risks to life safety can be mitigated by the fire detection/notification system and emergency response procedures. During a Prairie Song Reliability Project BESS emergency, the Prairie Song Reliability Project BESS ERP will instruct all site personnel and first responders to stand at a safe distance, upwind from a distressed PT2. This distance should be based on local conditions on the day of the fire such that they are not momentarily exposed to gases, heat, flames, overpressures, or projectiles. As such, the consequences of an explosion scenario outside of the deflagration relief panel design basis are reduced based on the training provided, location of the installation, and coordination/training with the local fire department.

8.0 RECOMMENDATIONS

Throughout the report, FRA provided several recommendations related to the Prairie Song Reliability Project 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, lithium-ion battery 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 and observations (i.e., 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 design of the site is finalized, FRA recommends the following:
   a. Signage must be provided per LACFC §1207.4.8.
   b. Fire apparatus access roads must be approved by the AHJ per LACFC §503.
   c. Fire hydrant and water tank design must be approved by the AHJ per LACFC §507.
2. **BESS Plans:** FRA recommends that commissioning, operations and maintenance, decommissioning and an ERP be prepared and finalized for the Prairie Song Reliability Project BESS prior to energizing the BESS installation, as required by the LACFC.
3. **Emergency Response Training:** FRA recommends that all site personnel and emergency response personnel, who could be responsible for responding to a Prairie Song Reliability Project BESS emergency, be trained on the ERP prior to energizing the Prairie Song Reliability Project BESS. Refresher training should be provided as appropriate, typically annually, as required by the AHJ.
4. **Fire Protection Systems:** FRA recommends that all fire protection systems be designed, installed, commissioned, and periodically inspected, tested, and maintained as required by the LACFC and their respective NFPA standards.
5. **Minimum Approach Distance:** When responding to a battery emergency, FRA recommends that all site personnel and first responders remain at a safe distance, upwind from a distressed PT2 cabinet to ensure they are not momentarily exposed to dangerous conditions (including fire and radiant heat, deflagrations, and/or toxic gases). In addition, site personnel and first responders should not approach the front of distressed PT2 cabinets, all first responders should wear proper PPE, and monitoring of possible toxic gases around the site should be performed during a battery emergency

9.0 CONCLUSIONS

Based on our review of the available materials, our background, experience and training, and the analysis performed to date described above, the following conclusions are submitted for the Prairie Song Reliability Project BESS:

1. The PT2 and the Prairie Song Reliability Project BESS site design can meet the LACFC requirements for an outdoor BESS installation near exposures when it is installed in accordance with the PT2 manufacturer recommendations, its listing, the approved drawings, and the LACFC. As the design of the site is being finalized, to ensure compliance, the following must be provided:
    a. The AMMR requesting the Prairie Song Reliability Project BESS be exempt from transmitting signals from the energy storage management system to a remote annunciator as required by LACFC §1207.3.4 must be approved by the AHJ.
    b. Signage must be provided per LACFC §1207.4.8.
    c. The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the size and separation requirements of LACFC §1207.5.1 must be approved by the AHJ.
    d. The AMMR requesting the Prairie Song Reliability Project BESS be permitted to exceed the maximum allowable quantity requirements of LACFC §1207.5.2 must be approved by the AHJ.
    e. The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the fire suppression requirements of LACFC §1207.5.5 must be approved by the AHJ.
    f. The AMMR requesting the Prairie Song Reliability Project BESS be exempt from the exhaust ventilation requirements of LACFC Table 1207.6 and §1207.6.1 must be approved by the AHJ.
    g. Fire apparatus access roads must be approved by the AHJ per LACFC §503.
    h. Fire hydrant and water tank design must be approved by the AHJ per LACFC §507.
2. The HMA demonstrates the Prairie Song Reliability Project BESS meets all the HMA performance criteria for approval outlined in LACFC §1207.1.4.2, as follows:
    a. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance rated separations identified in Section 1207.7.4. (LACFC §1207.1.4.2 #1)
    b. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate. (LACFC §1207.1.4.2 #2)
    c. Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the

time deemed necessary to evacuate occupants from any affected area. (LACFC §1207.1.4.2 #3)

d. Flammable gases released from ESS during charging, discharging, and normal operation will not exceed 10 percent of their LFL. (LACFC §1207.1.4.2 #4)

e. 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. (LACFC §1207.1.4.2 #5)

In summary, based on the UL 9540A testing and a review of the drawing set, the Prairie Song Reliability Project BESS can meet the Hazard Mitigation Analysis approval criteria presented in the LACFC upon the inclusion of any listed missing requirements, as described above.