PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

May 13, 2024

Jose Zambrano
Director, Asset Management
American Kings Solar Facility
15671 25th Ave Lemoore CA 93245

SUBJECT: Generation Audit of American Kings Solar (American Kings) - Audit Number GA2024-04AKS

Dear Mr. Zambrano:

On behalf of the Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission (CPUC), Samuel Mandell and Christopher Villalobos of ESRB staff conducted a generation audit of American Kings from February 26 through February 29, 2024.

During the audit, ESRB observed plant operations, inspected equipment, reviewed data, interviewed plant staff, and identified potential violations of General Order (GO) 167-B. A copy of the audit findings itemizing the violations is attached. Please advise me by email no later than June 14, 2024 by providing an electronic copy of all corrective actions and preventive measures taken and/or planned to be taken to resolve the violations.

Your response should include a Corrective Action Plan with a description and completion date of each action and measure completed. For any violations not corrected, please provide the projected completion dates to correct the violations and achieve full compliance with GO 167-B.

Please submit your response to Samuel Mandell at Samuel.Mandell@cpuc.ca.gov . Please note that although American Kings has been given 30 days to respond, it has a continuing obligation to comply with all applicable GO 167-B requirements; therefore, the response period does not alter this continuing duty.

The CPUC intends to publish the audit report of American Kings on the CPUC website. If you wish to make a claim of confidentiality covering any of the information in the report, you may submit a confidentiality request pursuant to Section 15.4 of GO 167-B, using the heading “General Order 167-B Confidentiality Claim" along with such redactions. Per GO 167-B Rule 15.4, the confidentiality claim should be for specific items and provide its corresponding justification, as opposed to a blanket confidentiality claim on the entire audit report. The request and redacted version of the audit report should be sent to Samuel Mandell with a copy to me and the GO 167 inbox GO167@cpuc.ca.gov by June 14, 2024

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Please note that ESRB will also post American Kings' audit report response on the CPUC website. If there is any information in your response that you would like us to consider as confidential, we request that in addition to your confidential response, you provide us with a redacted version of your audit response that can be posted on the CPUC website.

Thank you for your courtesy and cooperation throughout the audit process. If you have any questions concerning this audit, please contact Samuel Mandell at Samuel.Mandell@cpuc.ca.gov or (916) 928-2279.

Sincerely,

Banu Acimis, P.E.
Program and Project Supervisor
Electric Safety and Reliability Branch
Safety and Enforcement Division
California Public Utilities Commission

Attachment: CPUC Generation Audit Findings

Cc: Lee Palmer, Director, Safety and Enforcement Division, CPUC
Nika Kjensli, Program Manager, ESRB, SED, CPUC
Rickey Tse, Program and Project Supervisor, ESRB, SED, CPUC
Nathan Sarina, Senior Utilities Engineer- Supervisor, ESRB, SED, CPUC
Samuel Mandell, Utilities Engineer, ESRB, SED, CPUC
Christopher Villalobos, Utilities Engineer, ESRB, SED, CPUC

CPUC AUDIT FINDINGS OF

AMERICAN KINGS SOLAR

FEBRUARY 26 – FEBRUARY 29, 2024

I. Findings

Finding 1: The flammable storage cabinet outside of the Operation & Maintenance (O&M) does not properly store and identify the hazards of the stored materials.

General Order (GO) 167-B, Appendix D, Maintenance Standard (MS) 1 Safety states:

> *"The protection of life and limb for the work force is paramount. The company behavior ensures that individuals at all levels of the organization consider safety as the overriding priority. This is manifested in decisions and actions based on this priority. The work environment, and the policies and procedures foster such a safety culture, and the attitudes and behaviors of individuals are consistent with the policies and procedures."*

GO 167-B, Appendix E, Operation Standard (OS) 1 Safety states:

> *"The protection of life and limb for the work force is paramount. GAOs have a comprehensive safety program in place at each site. The company behavior ensures that personnel at all levels of the organization consider safety as the overriding priority. This is manifested in decisions and actions based on this priority. The work environment and the policies and procedures foster such a safety culture, and the attitudes and behaviors of personnel are consistent with the policies and procedures."*

GO 167-B, Appendix E, OS 13 Routine Inspections states:

> *"Routine inspections by plant personnel ensure that all areas and critical parameters of plant operations are continually monitored, equipment is operating normally, and that routine maintenance is being performed. Results of data collection and monitoring of parameters during routine inspections are utilized to identify and resolve problems, to improve plant operations, and to identify the need for maintenance. All personnel are trained in the routine inspections procedures relevant to their responsibilities. Among other things, the GAO creates, maintains, and implements routine inspections by:*
> *A. Identifying systems and components critical to system operation (such as those identified in the guidelines to Standard 28).*
>
> *B. Establishing procedures for routine inspections that define critical parameters of these systems, describe how those parameters are monitored, and delineate what action is taken when parameters meet alert or action levels.*
>
> *C. Training personnel to conduct routine inspections.*
>
> *D. Monitoring routine inspections."*

GO 167-B, Appendix E, OS 20 Preparedness for On-Site and Off-Site Emergencies states**:**

> *"The GAO plans for, prepares for, and responds to reasonably anticipated emergencies on and off the plant site, primarily to protect plant personnel and the public, and secondarily to minimize damage to maintain the reliability and availability of the plant. Among other things, the GAO:*
> *A. Plans for the continuity of management and communications during emergencies, both within and outside the plant,*
> *B. Trains personnel in the emergency plan periodically, and*
> *C. Ensures provision of emergency information and materials to personnel."*

National Fire Protection Association (NFPA) 704 Standard System for the Identification of the Hazards of Materials for Emergency Response; Section 4.2.3.3 states in part:

> *"Where more than one chemical is present in a building or specific area, professional judgment shall be exercised to indicate ratings using the following methods:*
>
> *(1) Composite Method. Where many chemicals are present a single sign shall summarize the maximum rating s contributed by the materials in each category and the special hazard category for the building and/or the area.*
> *(2) Individual Method. Where only a few chemicals are present or where only a few chemicals are of concern to emergency responders (taking into account factors including physical form, hazard rating and quantity), individual signs shall be displayed. The chemical name shall be displayed below each sign.*
> *(3) Composite-Individual Combined Method. A single sign shall be used to summarize the ratings via the compose method for building or other area containing numerous chemicals. Signs based on the individual method shall be used for rooms or smaller area withing the building containing small numbers of chemicals."*

NFPA 1, Uniform Fire Code, **Section 66.9.4.3** states in part:

> *"(2) Doors shall be well fitted, self-closing and equipped with a self-latching device"*

At American Kings Solar ("the Plant") hazardous material is stored outside of the O&M building in a flammable storage cabinet. All hazardous materials stored in the flammable cabinet have corresponding Safety Data Sheets (SDS), easily accessible to the Plant staff and contractors. Located on the outside of the flammable cabinet is an NFPA hazard diamond used to communicate the presence of hazardous materials and their potential effects. The NFPA hazard diamond at American Kings Solar, seen in Figure 1, shows potential hazard ratings of; Health-1, Fire-3, Instability-0. The Plant violated NFPA 704 because the maximum potential hazard of all materials stored are not accurately shown on the NFPA hazard diamond. The purpose of NFPA hazard diamond is for efficient recognition of the potential hazard of all stored chemicals in an emergency. Klear HD Degreaser cleaner was stored in the cabinet which has a health hazard rating of two (2). The NFPA hazard icon, shown in Figure 1, does not exhibit the maximum potential hazard of the stored materials.

Plant staff should update the NFPA diamond, verifying all chemicals stored on-site have the appropriate hazard indication, including but not limited to the material presented in Finding 1. When new chemicals are introduced to the Plant and stored in the cabinet, the existing NFPA diamond should be reviewed and if necessary, updated. The accuracy of the NFPA hazard diamond is critical for the day-to-day safety of Plant staff and for the use of emergency responders to help determine the appropriate response in the case of an emergency.

Additionally, upon inspection, when the flammable storage cabinet was opened, ESRB discovered the cabinet was not equipped with a self-closing and self-latching door. Figure 2 shows the cabinet door ajar. NFPA 1, section 66.9.4.3 requires a self-closing and latching door when flammable material is stored.

Figure 1 Flammable Storage Cabinet with NFPA Hazard Diamond

Figure 2 Flammable Storage Door Ajar

<u>Finding 2: American Kings physical security needs to be improved.</u>

GO 167-B, Appendix E, OS 8 Plant Status and Configuration

> *"Station activities are effectively managed so plant status and configuration are maintained to support safe, reliable and efficient operation."*

GO 167-B, Appendix E, OS 21 Security

> *"To ensure safe and continued operations, each GAO provides a prudent level of security for the plant, its personnel, operating information and communications, stepping up security measures when necessary."*

Throughout ESRB's audit, the front access gate to the facility was kept unlocked and open during normal business hours. At the Plant, there is no secondary gate leading to the solar array, so when the main gate is open, any person could enter the facility without the staff's knowledge,

which is a safety risk. The Plant staff confirmed it is the standard practice to leave the gate unlocked and open while technicians are on-site. Additionally, the site does not have security cameras. Although cameras are not required, the insurance report completed by Renewable Consulting Group recommended adding cameras in key areas to enhance security due to the ease of access to the site and the equipment. The site should increase security by locking the gate after staff has entered or exited the facility, and should consider installing cameras as recommended by the insurance report, Data Request Item #13.

Finding 3: The hardcopy of the Lock Out Tag Out Procedure in the O&M building was not updated with the 2023 version.

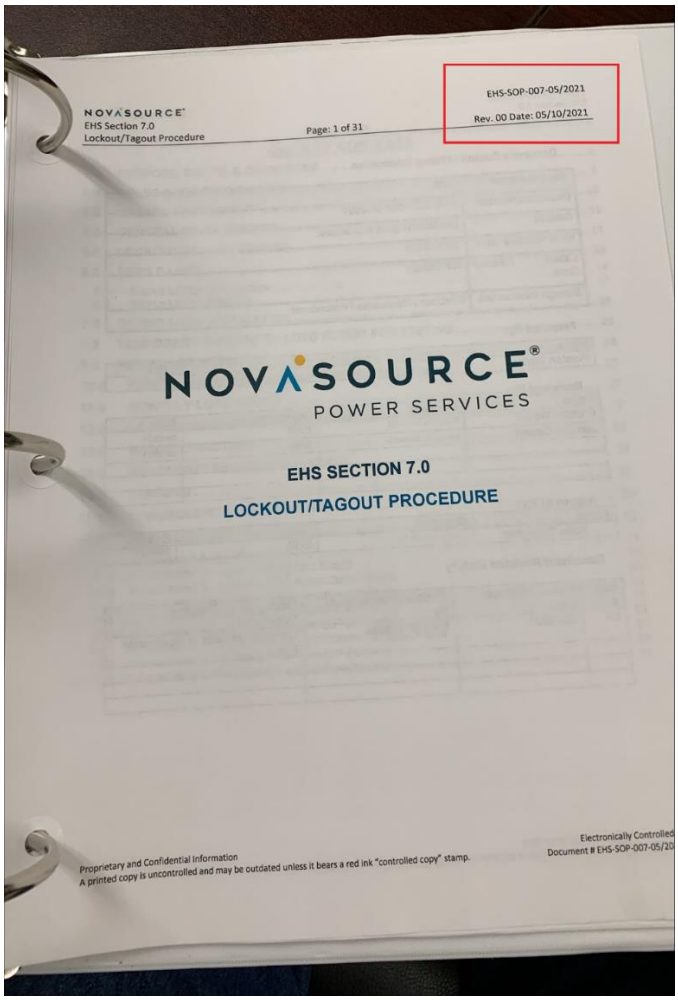
GO 167-B, Appendix D, MS 8 Maintenance Procedures and Documentation states:

> *"Maintenance procedures and documents are clear and technically accurate, provide appropriate direction, and are used to support safe and reliable plant operation. Procedures must be current to the actual methods being employed to accomplish the task and are comprehensive to ensure reliable energy delivery to the transmission grid."*

GO 167-B, Appendix E, OS 14 Clearances states in part:

> *"The GAO prepares and maintains a clearance procedure. The clearance procedure contains requirements for removing a component from service and/or placing a component back into service."*

The Plant staff maintains a Lockout Tagout (LOTO) Procedure and provided ESRB with three electronic annual revisions of the procedure, with the newest version released on 12/12/2023. ESRB staff reviewed the physical copy of the LOTO procedure on site and found it was not updated to the most up to date version of the LOTO procedure. The version found on site was a version from 05/10/2021 as shown in Figure 3. Data Request item #14, *LOTO procedure*, shows the newest revision was released on 12/12/2023. Keeping an up-to-date version of procedures on-site allows personnel to review the current and correct LOTO procedure, which helps maintain staff safety and adherence to the proper procedures. Plant Staff should update the LOTO Procedure on-site to the newest version and maintain a practice of updating the physical copy with each annual review of the LOTO procedure.



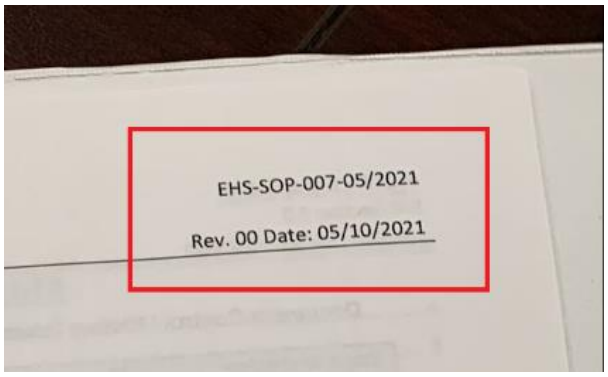


Figure 3 Old Version of LOTO Procedure

Finding 4: The Plant must continuously maintain and replace deteriorated danger and hazard signage.

GO 167-B, Appendix D, MS 1: Safety states:

> *"The protection of life and limb for the work force is paramount. The company behavior ensures that individuals at all levels of the organization consider safety as the overriding priority. This is manifested in decisions and actions based on this priority. The work environment, and the policies and procedures foster such a safety culture, and the attitudes and behaviors of individuals are consistent with the policies and procedures."*

GO 167-B, Appendix E, OS 1 Safety states:

> *"The protection of life and limb for the work force is paramount. GAOs have a comprehensive safety program in place at each site. The company behavior ensures that personnel at all levels of the organization consider safety as the overriding priority. This is manifested in decisions and actions based on this priority. The work environment and the policies and procedures foster such a safety culture, and the attitudes and behaviors of personnel are consistent with the policies and procedures."*

GO 167-B, Appendix D, MS 4: Problem Resolution and Continuing Improvement states**:**

> *"The company values and fosters an environment of continuous improvement and timely and effective problem resolution."*

GO 167-B, Appendix D, MS 11: Plant Status and Configuration states:

> *"Station activities are effectively managed so plant status and configuration are maintained to support safe, reliable and efficient operation."*

At the time of the audit, ESRB inspected the solar arrays, inverters, and combiner boxes. All combiner boxes at the facility have a sticker indicating "Danger Arc Flash." Throughout the facility there are several faded and illegible signs, assumed to be due to sun exposure or other environmental conditions. Examples of deteriorated signage at the Plant are shown in Figure 4, however the extent of the occurrence is not limited to combiner boxes shown. Maintaining signage indicating danger or safety hazards is critical for the safety of day-to-day operations, site visitors, and contractors. The Plant must maintain signage and perform routine inspections to identify and replace deteriorated or missing signage immediately after the issue is identified.

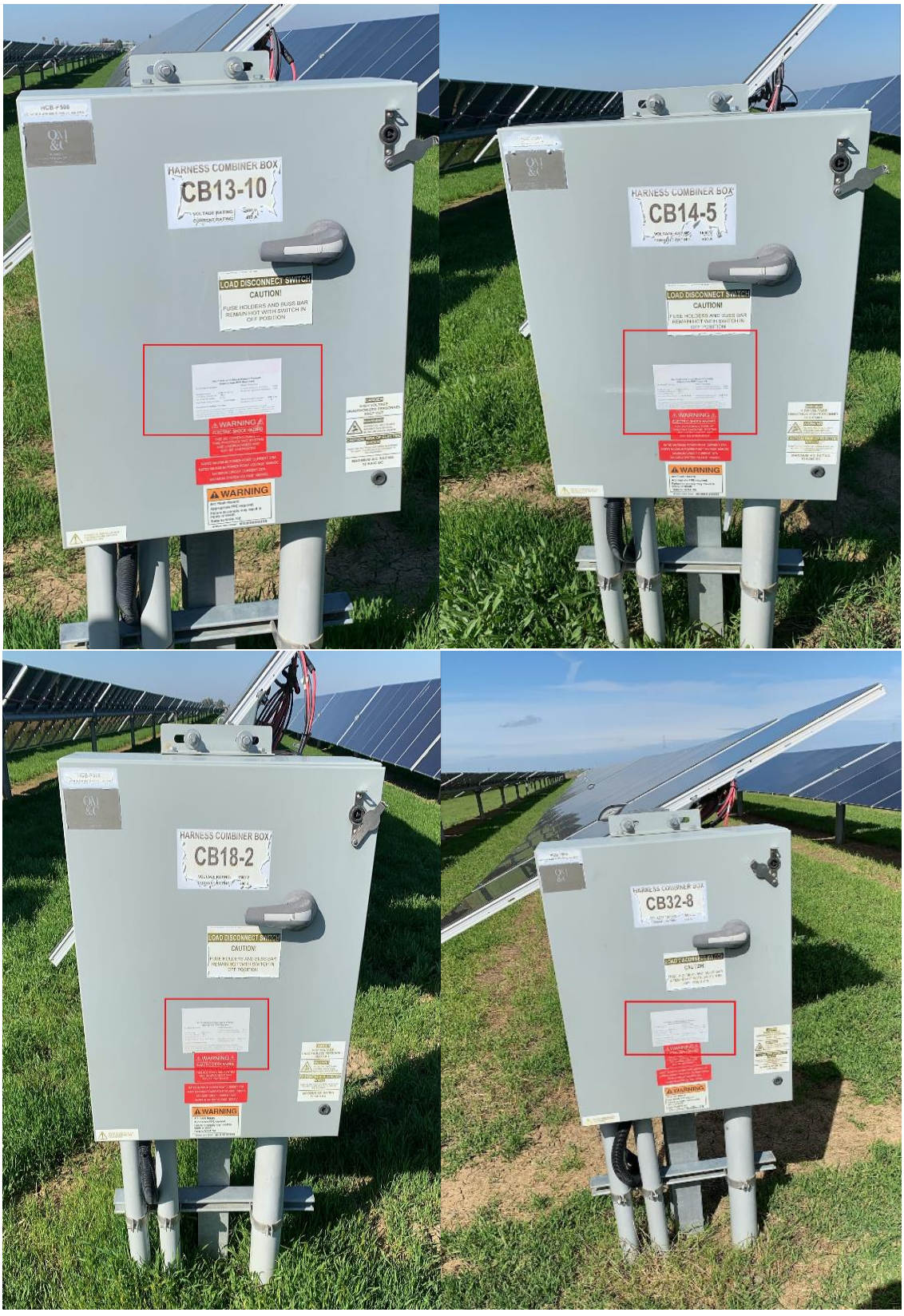


Figure 4 Combiner Box Deteriorated Danger Labels

Finding 5: Various cable inspections and corrective maintenance in the solar array areas need improvement.

GO 167-B, Appendix D, MS 4 Problem Resolution and Continuing Improvement states:

> *The company values and fosters an environment of continuous improvement and timely and effective problem resolution.*

GO 167-B, Appendix D, MS 9 Conduct of Maintenance states:

> *Maintenance is conducted in an effective and efficient manner so equipment performance and materiel condition effectively support reliable plant operation.*

GO 167-B, Appendix D, MS 11 Plant Status and Configuration states:

> *Station activities are effectively managed so plant status and configuration are maintained to support reliable and efficient operation.*

GO 167-B, Appendix E, OS 13 Routine Inspections states in part**:**

> *Routine inspections by plant personnel ensure that all areas and critical parameters of plant operations are continually monitored, equipment is operating normally, and that routine maintenance is being performed.*

At the time of ESRB's audit of the Plant, there were several cables and ground connections that were disconnected or broken. Examples and descriptions of the damaged cables can be seen in Figures 5, 6 and 7. The cables disconnected or broken are seen on grounds, ethernet cables, and communication with the inverters. Completing corrective maintenance on cables is critical to the safe and reliable operation of the facility. Plant staff attributed the disconnected cables in the solar fields to the recent vegetation control work, which brought sheep into the area. The sheep often brush up against equipment and move quickly which can cause cables to disconnect. It is a reasonable assumption that the sheep can be the cause of the disconnected cables. The staff should complete routine inspections following vegetation control to ensure the Plant remains in proper condition following sheep being in the area. The routine inspections should be an ongoing effort, with added emphasis following livestock roaming in the area.

Figure 5 Broken connection on inverter communication device

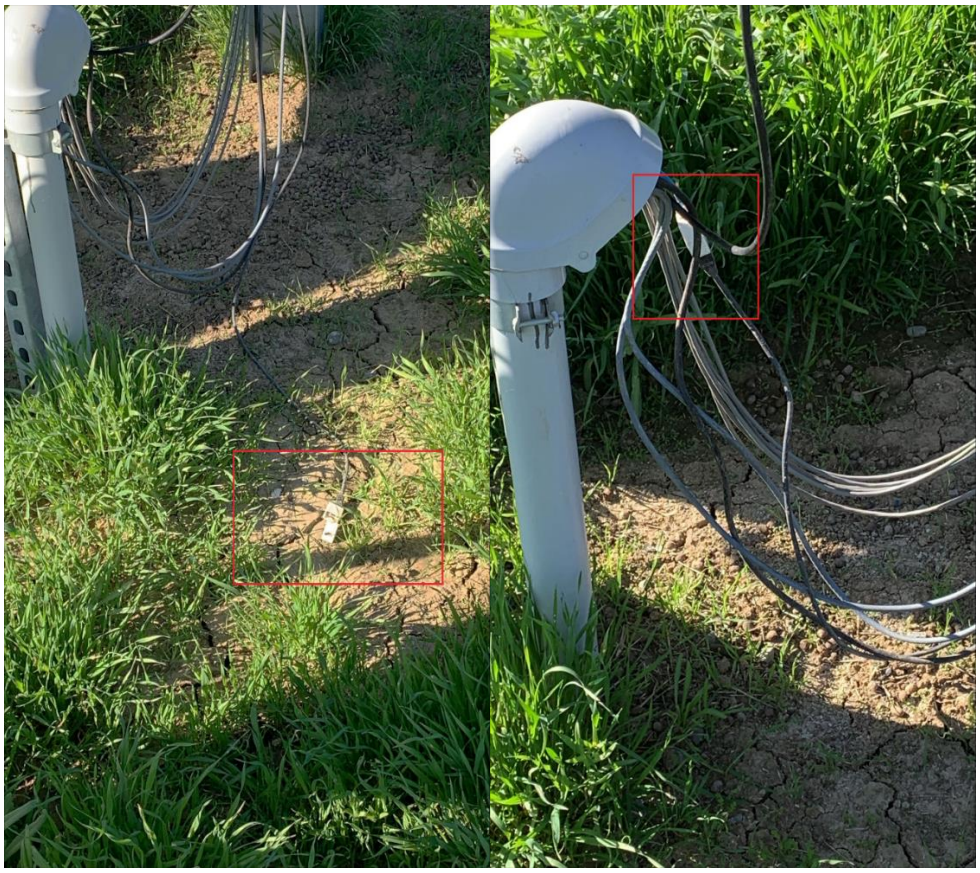


Figure 6 Heliostat Unconnected Ethernet (Left) Corrected (Right)

Figure 7 Unconnected Ground

Finding 6: Several inverter control panel covers and pins are broken.

GO 167-B, Appendix D, MS 4 Problem Resolution and Continuing Improvement states:

> *"The company values and fosters an environment of continuous improvement and timely and effective problem resolution."*

GO 167-B, Appendix D, MS 9 Conduct of Maintenance states:

> *"Maintenance is conducted in an effective and efficient manner so equipment performance and materiel condition effectively support reliable plant operation."*

GO 167-B, Appendix D, MS 11 Plant Status and Configuration states:

> *"Station activities are effectively managed so plant status and configuration are maintained to support reliable and efficient operation."*

GO 167-B, Appendix E, OS 13 Routine Inspections states in part:

> *"Routine inspections by plant personnel ensure that all areas and critical parameters of plant operations are continually monitored, equipment is operating normally, and that routine maintenance is being performed."*

Inverters at the facility have a control panel which is protected with a plastic covering. At several of the inverters, the pins holding the cover were broken, resulting in the control panel being exposed and vulnerable. With animals present in the vicinity, including sheep and dogs, the inverter control panel is vulnerable to incidental operation. The exposed control panels are also subjected to environmental concerns. The broken covers or pins were seen on inverters number 21 and 34. The Plant should include the control panel covers as a part of their routine inspections for the inverters and correct issues promptly after they are identified.

Figure 8 Inverter 21(Left) and Inverter 34(Right) Cover Ajar with broken Pin

Finding 7: An active bird nest was found in the switchyard.

GO 167-B, Appendix D, MS 9 Conduct of Maintenance states:

> *"Maintenance is conducted in an effective and efficient manner so equipment performance and materiel condition effectively support reliable plant operation."*

GO 167-B, Appendix E, OS 8 Plant Status and Configuration:

> *"Station activities are effectively managed so plant status and configuration are maintained to support safe, reliable and efficient operation."*

ESRB discovered an active bird's nest within the fenced perimeter of the switchyard. Birds and birds' nests pose several risks to Plant operations. Birds' nests are composed of debris that could contain flammable or conductive material, all of which needs to be mitigated in the switchyard. An active birds nest also brings the risk of birds flying near operating equipment that can result in bridging between phase-to-ground or phase-to-phase caused by the wingspan of the bird when flying. The possible effects of bridging due to animal presence can range from brief occurrences to extensive power interruptions. Additionally, the presence of an active bird's nest introduces the possibility of attracting predatory animals. The nest should be removed from the switchyard when deemed appropriate by the Plant, and preventative measures should be taken to prevent future nests from being made.

Figure 9 Bird's Nest in Switchyard

Finding 8: During inspection of Conex storage containers, empty boxes and waste material were stored inside.

GO 167-B, Appendix D, MS 9 Conduct of Maintenance states:

> *"Maintenance is conducted in an effective and efficient manner so equipment performance and materiel condition effectively support reliable plant operation."*

GO 167-B, Appendix D, MS 11 Plant Status and Configuration:

> *"Station activities are effectively managed so plant status and configuration are maintained to support reliable and efficient operation."*

At the Plant, there are several Conex containers in the O&M yard that are used for the storage of equipment like spare inverters. Plant staff needs access to the interior of the Conex container for Plant operations. Upon inspection of the containers, trash in the form of cardboard and packaging materials were stored in the unit. The waste material stored in the storage unit can be seen in

Figure 10 on the left. The Plant staff corrected the issue and removed the waste during the audit. The area showing removed waste can be seen in Figure 10 on the right.

Figure 10 Storage Container

Finding 9: The Plant lacks sufficient upkeep of Work Order status tracking, completion, and closeout.

GO 167-B, Appendix D, MS 3 Maintenance Management and Leadership states:

> *"Maintenance managers establish high standards of performance and align the maintenance organization to effectively implement and control maintenance activities."*

GO 167-B, Appendix D, MS 4 Problem Resolution and Continuing Improvement states:

> *"The company values and fosters an environment of continuous improvement and timely and effective problem resolution."*

GO 167-B, Appendix D, MS 10 Work Management states:

> *"Work is identified and selected based on value to maintaining reliable plant operation. Work is planned, scheduled, coordinated, controlled, and supported with resources for safe, timely, and effective completion."*

ESRB reviewed the open and backlogged work orders (WO) the Plant provided to the ESRB audit team in Data Request Item #31, "*Salesforce Open WO.*" In the document, there were 160 open and backlogged work orders. The status of the work orders was listed as, scheduled, ready to schedule, rescheduled, pending material/equipment, pending warranty provider, pending customer response, and pending subcontractor response. The items range in date from 04/03/2023 to 01/29/2024. Many of the scheduled work orders have a scheduled start and completion dates that have passed, and the status of the work orders has not been updated. Keeping the work order statuses up to date and organized is critical to sustaining optimal maintenance and operations practices. The Plant should have timely and effective closeout of work orders. If work orders cannot be closed out, or need to be rescheduled, the status of the work order should be updated in the work order management system. For open items dependent on customers, subcontractors, warranties, or parts/equipment, the issues should be followed-up with the entity causing the delay and statuses updated regularly.

The Plant staff stated that the Plant has used several different work management systems since operations began, and the migration of systems has posed difficulties in work order tracking. The Plant should review historical work order management system records and update the work orders that are currently open to ensure all transferred work orders have been addressed and completed.

II. Observations

Observation 1: The speed limit is not posted on the main gate into the O&M yard.

When entering the main gate to the facility, ESRB noted that there is no posted speed limit for driver. Posting the speed limit is important for the safety of Plant staff as well as contractors, visitors etc. as well as the safety of the equipment since the vehicles drive in the field in close proximity to the solar panels and inverters. Solar panels and other equipment should be protected from dust and other pollutants that may cause ineffective solar irradiation penetration and/or efficiency. The Plant should consider hanging a sign to make the speed limit known upon entering.

Figure 11 Main Gate with no Speed Limit Sign

III. List of Documents Reviewed

Category	Reference #	CPUC-Requested Documents
Safety	1	Orientation Program for Visitors and Contractors**
	2	Evacuation Procedure
	3	Evacuation Map and Plant Layout
	4	Evacuation Drill Report & Critique (last 3 years)
	5	Hazmat Handling Procedure
	6	MSDS for All Hazardous Chemicals
	7	Injury & Illness Prevention Plan (IIPP) (last 3 years)
	8	OSHA Form 300 (Injury Log) in last 4 years
	9	OSHA Form 301 (Incident Report) in last 4 years
	10	List of all CPUC Reportable Incidents (last 5 years)
	11	Root Cause Analysis of all Reportable Incidents (if any)
	12	Fire Protection System Inspection Record (last 3 years)
	13	Insurance Report / Loss Prevention / Risk Survey (last 3 years)
	14	Lockout / Tagout Procedure (last 3 revisions, if applicable)
	15	Arc flash Analysis
	16	Confined Space Entry Procedure
	17	Plant Physical Security and Cyber Security Procedures and Records
Training	18	Safety Training Records*
	19	Skill-related Training Records*
	20	Certifications for Welders, Forklift & Crane Operators*
	21	Hazmat Training and Record*
Contractor	22	Latest list of Qualified Contractors*
	23	Contractor Selection / Qualification Procedure

	24	Contractor Certification Records
	25	Contractor Safety Program Procedure and Training Records
Regulatory	26	Water Permit (if applicable)
	27	Spill Prevention Control Plan (SPCC) (if applicable)
	28	CalARP Risk Management Plan (RMP)
O&M	29	Daily Round Sheets / Checklists
	30	Logbook**
	31	List of Open/Backlogged Work Orders*
	32	List of Closed/Retired Work Orders (last 3 years)*
	33	Work Order Management Procedure (last 3 revisions, if applicable)
	34	Computerized Maintenance Management System (Demonstration On-site)**
	35	All Root Cause Analyses (if any)
	36	Maintenance & Inspection Procedures, or Related Documents (last 3 revisions, if applicable)
	37	SCADA system (Demonstration On-site)**
	38	Maintenance and Inspection Records for Solar Inverters
	39	Maintenance and Inspection Records for Solar Trackers
	40	Maintenance and Inspection Records for Solar Arrays/Collectors/Solar Field
	41	Maintenance and Inspection Records for Mounting System
	42	Maintenance and Inspection Records for Switchgear/breaker/relays
	43	Maintenance and Inspection Records for Electrical System
	44	Maintenance and Inspection Records for Main Transformer(s)
	45	Maintenance and Inspection Records for Switchyard & Transmission Equipment
	46	Maintenance and Inspection Records for other equipment
Documents	47	P&IDs*

	48	Vendor Manuals*
	49	Solar Farm Equipment Design Data
	50	Procedure Compliance Policy
Spare Parts	51	Spare Parts Inventory List
	52	Shelf-life Assessment Report
Management	53	Organizational Chart
Instrumentation	54	Instrument Calibration Procedures and Records
Test Equipment	55	Measuring & Testing Equipment List
	56	Test Equipment Calibration Procedures and Records
Internal Audit	57	Internal Audit Procedures and all Records

* Provide data in a searchable format such as a searchable PDF, Word Document, Excel Spreadsheet, etc.

** These items may be provided on-site by the first day of the audit.