

**PUBLIC UTILITIES COMMISSION**

505 VAN NESS AVENUE  
SAN FRANCISCO, CA 94102-3298



December 8, 2023

Jesse Sanchez  
Wind Site Manager  
11585 Tehachapi Willow Spring Road  
Rosamond, CA 93560

**SUBJECT: Generation Audit of Pacific Wind - Audit Number GA2023-22PW**

Dear Mr. Sanchez:

On behalf of the Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission (CPUC), Stephen Lee, Stephen Hur, and Emmanuel Salas of ESRB staff conducted a generation audit of the Pacific Wind project from October 9 through October 12, 2023.

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 January 10, 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 Stephen Lee at [Stephen.Lee@cpuc.ca.gov](mailto:Stephen.Lee@cpuc.ca.gov). Please note that although Pacific Wind 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 Pacific Wind 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. The request and redacted version of the audit report should be sent to Stephen Lee with a copy to me and the GO 167 inbox [GO167@cpuc.ca.gov](mailto:GO167@cpuc.ca.gov) by January 10, 2024.

Please note that ESRB will also post Pacific Wind's 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.

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Thank you for your courtesy and cooperation throughout the audit process. If you have any questions concerning this audit, please contact Stephen Lee at [Stephen.Lee@cpuc.ca.gov](mailto:Stephen.Lee@cpuc.ca.gov) or (916) 661-2353.

Sincerely,

A handwritten signature in blue ink, appearing to read "Banu Acimis".

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  
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Rickey Tse, Program and Project Supervisor, ESRB, SED, CPUC  
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Emmanuel Salas, Utilities Engineer, ESRB, SED, CPUC

**CPUC AUDIT FINDINGS OF  
PACIFIC WIND  
OCTOBER 9 – OCTOBER 12, 2023**

**I. Findings**

**Finding 1: The National Fire Protection Association (NFPA) 704 Diamonds on the unleaded gasoline tank and propane storage tank area do not match the Safety Data Sheets (SDS).**

**GO 167-B, Appendix D, Maintenance Standard (MS) 1: Safety** states in part:

*“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.”*

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

*“The protection of life and limb for the work force is paramount. GAOs have a comprehensive safety program in place at each site.”*

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

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

The NFPA 704 hazard diamonds on the unleaded gasoline fuel tank and the liquid propane storage area were not consistent with the safety ratings in their respective SDS. These signs help inform employees, contractors, and visitors who may be unfamiliar with the equipment of their inherent dangers and the severity of the hazard that would occur during an emergency response. The Plant must correctly label the following NFPA diamonds according to their SDS:

1. The NFPA 704 diamond on the unleaded gasoline fuel tank is incorrect. According to the Plant’s SDS for unleaded gasoline fuel, the blue health diamond should be 2 and the red flammability diamond should be 4.



**Figure 1:** Incorrect NFPA 704 diamond on the unleaded gasoline storage tank.

- The NFPA 704 diamonds on the liquid propane gas storage areas are incorrect. According to the Plant's SDS for liquid propane gas, the blue health diamond should be 2.



Figure 2: Incorrect NFPA 704 diamonds on the liquid propane gas storage tanks.

**Finding 2: An energized electrical cord is lying in a standing pool of water in the fire pump room.**

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

*“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.”*

**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** states:

*“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 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. 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.”*

The fire water booster pump’s electrical cord is connected to an extension cord that is lying in a pool of standing water in the fire protection room. Having an energized electrical cord in water may cause a fault and render the pump inoperable during emergency firefighting situations. At worst, the standing pool of water may become energized and cause accidental electrocution. The Plant must immediately remove the electrical cord from the pool of water and identify a solution to safely power the pump.



Figure 3: Energized extension cord plug lying in standing water.

**Finding 3: The Plant must address deficiencies with the water level indicators on the fire water tanks and potable water tanks.**

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

*“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.”*

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

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

The water level indicator pipes on the three fire water tanks and one potable water tank have yellowed and are now opaque. This makes verifying the water level in the tanks difficult. Additionally, the water level indicator pipe on the potable water tank is missing its two securing brackets. During the audit, ESRB observed the pipe moving and whipping around in high winds due to the missing brackets. Prolonged stress on the unsecured potable water tank level indicator pipe may cause it to fail prematurely and create a source for leaks. The Plant must re-secure the potable water level indicator and address the opaque level indicators.



**Figure 4:** (Left) Yellowing fire water level indicator pipe. (Right) Unsecured and yellowed potable water level indicator pipe.



Figure 5: The fire water level indicator pipes are yellowed and opaque.

**Finding 4: The Plant is lacking in performing monthly fire extinguisher inspections.**

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

*“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.”*

**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 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.”*

ESRB observed that monthly inspections of fire extinguishers in the substation building were not being conducted as required by EDF Renewable’s Emergency Preparedness and Response Plan (EPRP) Policy Section 6 – Fire Prevention. The EPRP states that all fire protection equipment should be inspected monthly by the site manager or designee. However, during the audit the fire extinguisher inspection record tags were observed to be blank. The Plant must create a plan to ensure that all fire extinguishers in both the substation and administration buildings are being inspected on a monthly basis and that the inspection records tags are being filled out accordingly.



Figure 6: Fire extinguisher in the substation building is missing monthly inspection sign offs.

**Finding 5: The Plant does not have a proper ventilation control for the batteries in the substation battery room.**

**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 E, OS 4: Problem Resolution and Continuing Improvement** states:  
*“The GAO values and fosters an environment of continuous improvement and timely and effective problem resolution.”*

**GO 167-B, Appendix E, OS 8: Plant Status and Configuration** states:  
*“Station activities are effectively managed so plant status and configuration are maintained to support safe, reliable and efficient operation”*

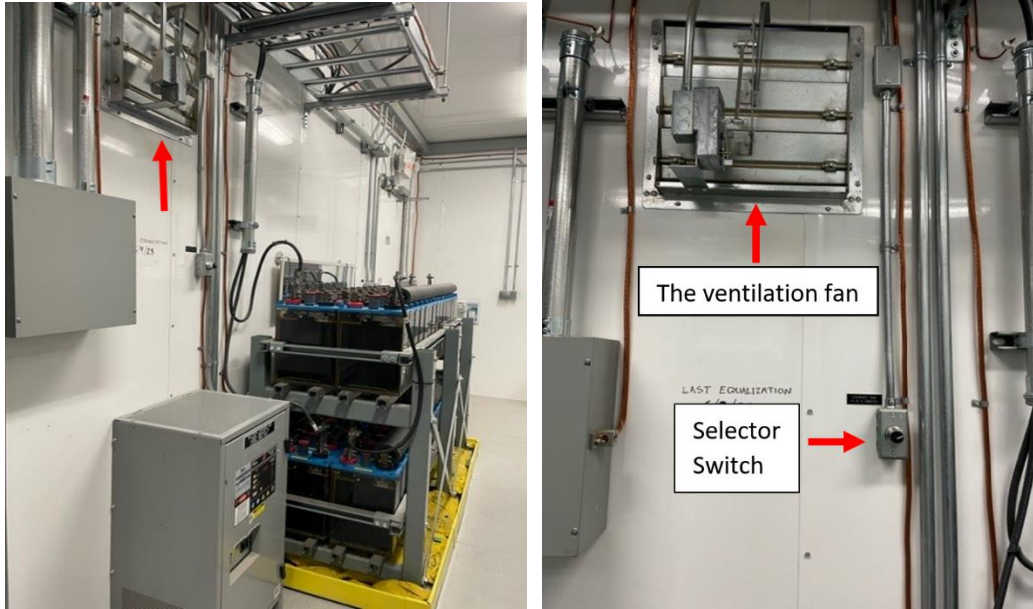
**NFPA 1: Fire Code 2018, Chapter 52, Energy Storage Systems, Code 52.3.2.8, Ventilation** states:

*“Where required...ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:*

- 1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room during the worst-case event of simultaneous "boost" charging of all batteries, in accordance with nationally recognized standards.*
- 2. Mechanical ventilation shall be provided at a rate of not less than 1 ft<sup>3</sup>/min/ft<sup>2</sup> (5.1 L/sec/m<sup>2</sup>) of floor area of the room or cabinet. The ventilation can be either continuous, or activated by a gas detection system...”*

ESRB staff observed that the ventilation control for the batteries in the substation battery room does not comply with safety codes and regulations. NFPA 1 clearly states the requirement of active ventilation systems. The substation battery room is equipped with 60 lead acid battery cells along with relay cabinets. During the audit, ESRB staff observed that the ventilation fan was not running, and no automatic fan control devices were identified on the ventilation system for the battery room. The ventilation fan was turned on manually by Plant staff with a selector switch. Battery room ventilation codes and standards protect workers by limiting the accumulation of hydrogen. Hydrogen release is a normal part of the charging process, but trouble arises when the flammable gas becomes concentrated enough to create an explosion risk which is why compliance of safety standards is vitally important.

The Plant must evaluate the ventilation system of the substation battery room and implement corrective measures to comply with safety codes and regulations. In addition, the Plant must equip notification methods for monitoring high concentration of flammable gas in the battery room since the Plant’s operation and maintenance building is located about 30 minutes away from the substation and is unoccupied after regular working hours.



**Figure 7:** View of the substation batteries and ventilation system. The ventilation system is not equipped with automatic control devices.

**Finding 6: The Plant must address out-of-service equipment on the Generator Step-Up (GSU) Transformer in the substation.**

**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 D, MS 13: Equipment Performance and Materiel Condition** states:

*“Equipment performance and materiel condition support reliable plant operation. This is achieved using a strategy that includes methods to anticipate, prevent, identify, and promptly resolve equipment performance problems and degradation.”*

The Hydran 201Ti dissolved gas analysis (DGA) monitoring system on the substation’s main generator step-up transformer was offline. Continuous DGA monitoring systems can provide basic information on the health and status of oil inside the transformer immediately, rather than waiting for laboratory oil sample results. The offline Hydran monitor was noted in the Plant’s Routine 6-year maintenance that was completed on February 26, 2022, but the monitor was still offline during ESRB’s audit. The Plant must restore this equipment back in service when practical and must continue to conduct regular oil sample lab tests.

Additionally, ESRB identified that one of the radiator fans was out of service. Although the colder winter season is nearing and the Plant may not need to run the GSU with full forced air cooling anytime soon, the Plant must schedule repairs for the broken fan motor to ensure its full availability when forced air convection is required.

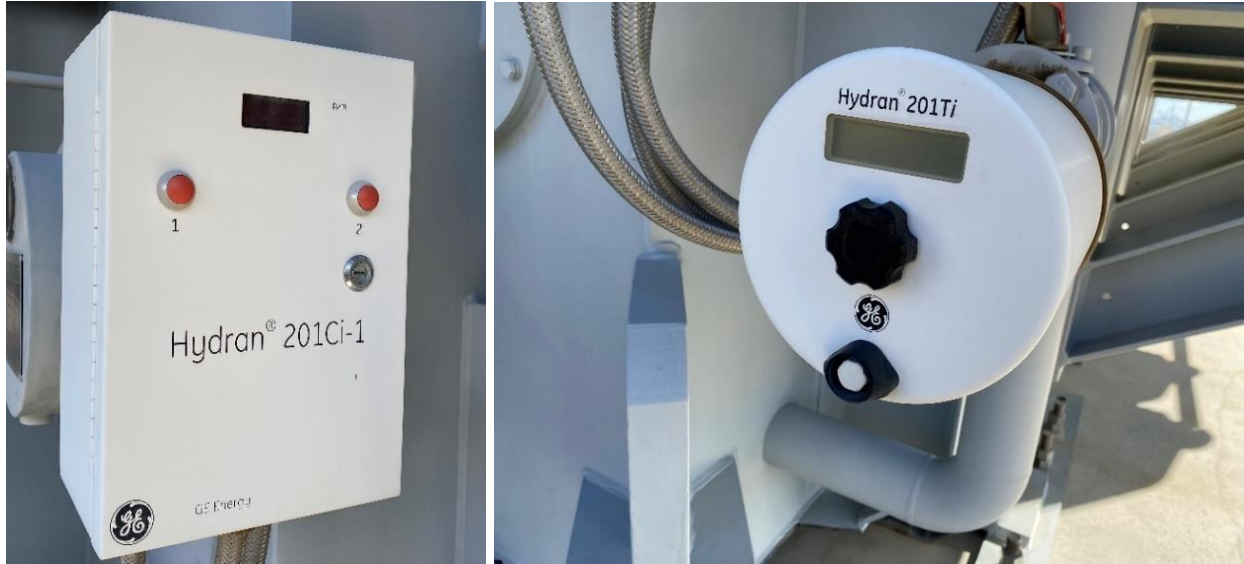


Figure 8: The continuous DGA analyzer was offline.



Figure 9: One GSU fan was not operating during the manual fan test.

**Finding 7: The Plant requires improvements to its monthly substation inspection routines.**

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

*“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.”*

**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 13: Routine Inspection** 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. 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:*

*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.”*

ESRB observed inconsistencies in EDF Renewable’s monthly substation inspection records. It was noted that in the monthly substation inspection checklist, items were overlooked in certain months but not in others. As an example, in the January 23, 2023, substation inspection, the smoke alarm’s functionality was not tested. This omission was also observed in the February 2023 inspection. However, the alarm functionality was tested in the remaining months of 2023 up to October. Similarly, the Valve-regulated Lead-Acid (VLA) batteries were inspected in January but not in February.

The Plant must ensure that no checklist items are missed while conducting monthly inspections of the substation. It is crucial that every item on the substation inspection checklist is inspected and documented accordingly to ensure the reliable and safe performance of the Plant.

**Finding 8: The Plant’s Emergency Action Plan lacks a CPUC Safety-related Incident Reporting Procedure.**

**GO 167-B, Appendix E, OS 2: Organizational Structure and Responsibilities** states:

*“The organization with responsibility and accountability for establishing and implementing an operation strategy to support company objectives for reliable plant operation is clearly defined, communicated, understood and is effectively implemented. Reporting relationships, control of resources, and individual authorities support and are clearly defined and commensurate with responsibilities.”*

Section 10.4, Safety-related Incidents of GO 167-B requires that Generating Asset Owners (GAOs) notify the CPUC within 24 hours of any safety-related incident that has resulted in one of the following:

- death to a person, or
- an injury or illness to a person requiring overnight hospitalization, or
- a report to Cal/OSHA, OSHA, or other regulatory agency, or
- damage to the property of the GAO or another person of more than \$50,000, or
- an incident that has resulted in significant negative media coverage with a circulation or audience of 50,000 or more persons.

During the audit, ESRB identified an incident that occurred in July 2022 due to the catastrophic blade failure on Turbine D21. This incident was not reported to the CPUC. The Plant must report all incidents that meet the CPUC’s GO 167-B incident reporting criteria.

Additionally, Section 2.16 – Injury and Illness Prevention Program (IIPP) in the Plant’s Health, Safety, and Environmental (HSE) Manual refers to an Incident Investigation Procedure, 2331-01. ESRB and the Plant could not locate Procedure 2331-01 and concluded that the procedure may have moved to Section 6.1 – Incident Management in the HSE Manual. The Plant must update the section in the IIPP to reflect the correct name and location of the Incident Investigation Procedure.

**Finding 9: The Plant requires improvements to its documentation and evaluation of annual evacuation drill trainings.**

**GO 167-B, Appendix E, OS 4: Problem Resolution and Continuing Improvement** states:

*“The GAO values and fosters an environment of continuous improvement and timely and effective problem resolution.”*

**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.”

ESRB reviewed the Plant’s 2021, 2022, and 2023 fire evacuation training drills. These drills are documented in the Plant’s Form 100, which has sections for the trainees and evaluators to enter the description of the training and add comments or action items. However, in all these training drill records, these sections were not completed thoroughly and lacked any critiques, feedback, or recommended improvements. The Plant must ensure a complete evaluation and critique is performed for all training drills.

**Finding 10: The Confined Space section in the Plant’s Contractor Orientation presentation require updates.**

**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.”*

The Plant’s Contractor Orientation presentation contains a section on the control of hazards for confined spaces around the Plant. The presentation slide references a list of site-specific confined spaces; however, the list is blank. In the Plant’s HSE Manual, Section 2.5 – Confined Spaces, there is a list of site-specific confined spaces for wind facilities. The Plant must take this list and place it in the Contractor Orientation presentation, so contractors and visitors are aware of the site-specific confined spaces at the Plant.

**Finding 11: The Plant requires improvements to its work order documentation.**

**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 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 17: Equipment History** states:

*“Maintenance standards or procedures clearly define requirements for equipment history for the systems and equipment, including, what information or data to collect, how to record data, and how the data is to be used.”*

**GO 167-B, Appendix E, OS 17: Records of Operation** states:

*“The GAO assures that data, reports and other records reasonably necessary for ensuring proper operation and monitoring of the generating asset are collected by trained personnel and retained for at least five years, and longer if appropriate.”*

ESRB observed that some maintenance work at the Plant lacked documented work orders to verify the performed tasks. For instance, during a 2022 internal audit of turbine unit C-06, it was noted that the top box section of the turbine had a defective fan. During the cross-examination of the documentation with the Plant staff, it was noted that the fan had been replaced without a corresponding work order record. As another example, in the same 2022 internal audit of unit C-06, it was noted that three bus bar bolts were found to be missing from the second platform of the turbine. During the documentation review, the Plant staff showed ESRB email exchanges between the Plant and a vendor coordinating the replacement of the bolts. However, no work order had been created documenting the need for bolt replacements at the unit.

Additionally, the Plant’s documentation forms for all annual padmount transformer maintenance done in February 2022 were not filled out. Although the work orders were closed out in the Plant’s work management system, the actual inspection checklist items were not signed by the inspecting technician and the signature box at the end of the inspection form that confirms if the work had been carried out was not signed by any technicians or supervisors. All operation and maintenance records must be retained for at least five years or longer in accordance with General Order 167-B Operation Standard 17.

The Plant must ensure that all required and completed maintenance work is documented in the form of a work order to ensure that the work is being performed and tracked accordingly. The Plant must also review its processes and practices for data collection and document control to ensure that all corresponding maintenance documentation is completed and transferred correctly to the main file repository. When outstanding maintenance work is not tracked through a work order, the possibility of the work being overlooked increases. Overlooked maintenance can then affect Plant performance and reliability.

**Finding 12: The Plant needs to address backlogged work orders created from January 2018 through July 2023.**

**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.”*

**GO 167-B, Appendix E, OS 16: Participation by Operations Personnel in Work Orders** states in part:

*“Operations personnel identify potential system and equipment problems and initiate work orders necessary to correct system or equipment problems that may inhibit or prevent plant operations. Operations personnel monitor the progress of work orders affecting operations to ensure timely completion and closeout of the work orders, so that the components and systems are returned to service.”*

ESRB identified 252 open work orders from January 1, 2018 through July 31, 2023. According to the Plant’s Maintenance Work Process procedure, the completion of pending repairs should not exceed 180 days of the finding. ESRB identified that 167 of these 252 open work orders were past due. The types of these work orders ranged from, but were not limited to, weekly substation inspections, quarterly blade bearing inspections, 1-year padmount maintenance, and 1-year converter preventative maintenance. The Plant must complete its work orders according to the timeframes in its maintenance procedures to ensure its facilities continue to operate safely, reliably, and efficiently.

**Finding 13: The shortage of parts inventory caused deferred maintenance on wind turbines.**

**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 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.”*

**GO 167-B, Appendix D, MS 12: Spare Parts, Material and Services** states:

*“Correct parts and materials in good condition, are available for maintenance activities to support both forced and planned outages. Procurement of services and materials for outages are performed in time to ensure materials will be available without impact to the schedule. Storage of parts and materials support maintaining quality and shelf life of parts and materials.”*

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

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

ESRB observed numerous scheduled maintenance items were not completed due to the shortage of parts inventory in 2022. The Plant conducted annual inspection and maintenance on all wind turbines in November and December 2022. Due to the parts shortage of hydraulic oil filters and air filters, the majority of wind turbines maintenance was not completed until the next semi-annual maintenance, which was performed in June 2023. The parts order records showed the



parts were ordered on June 2022 but not delivered on or before the scheduled maintenance dates. Scheduled maintenance should be performed according to the manufacturer's guidelines or best industry practice to ensure proper functioning and longevity of the equipment. Manufacturer's guidelines include specific intervals for maintenance activities, such as oil changes, filter replacements, and inspections. By following the manufacturer's recommendations, potential problems can be identified and addressed before they turn into major issues. Adhering to these scheduled maintenance protocols helps prevent potential issues, minimize downtime, and maintain the efficiency and reliability of the equipment. EDF Renewables must evaluate its procurement procedures and processes, inter-departmental coordination, and parts inventory control. This will ensure optimal level of parts inventory is maintained to support the timely completion of scheduled work.

**Finding 14: The Plant must be more proactive in monitoring and mitigating excess levels of combustible dissolved gases in its padmount transformers.**

**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 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 7: Balance of Maintenance Approach** states in part:

*“The maintenance program includes the proper balance of the various approaches to maintenance, e.g., preventive, predictive, or corrective. The approach is adequately documented with consideration of economics and reliability of equipment or components, and their affect on reliable operation of the unit.”*

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

*“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 Plant’s padmount transformer dissolved gas analysis (DGA) results from January 2018 to September 2023 and found that the Plant is allowing excess levels of combustible gases to accumulate in some transformers. For example, transformer TC 8, which corresponds to Turbine D21, was sampled on March 13, 2018; May 21, 2019; July 29, 2020; November 17, 2020; December 21, 2021; and January 7, 2023. In all six samples, the DGA results indicated “EXCESSIVE LEVELS OF HYDROGEN ALONG WITH HYDROCARBONS MAY INDICATE A PARTIAL DISCHARGE CONDITION. CAUTION

SHOULD BE USED DUE TO THE POSSIBLE FLAMMABILITY OF THE GAS SPACE (HEADSPACE)”. Allowing the unmanaged accumulation of combustible gases in the padmount transformers poses safety and reliability risks.

ESRB identified the following transformers that have a history of excess levels of combustible gases that may require servicing. This list may not include all transformers that require servicing:

TC	Turbine
5	D17
8	D21
9	D28
11	D26
12	D25
16	D24
19	D19
21	C09
24	D15
25	D16
30	D07
36	A18
39	D13
45	A16
51	C05
52	C07
53	C04
56	C01
58	B07
60	B05
61	B04
63	B02
66	B11
81	B12

Table 1: ESRB identified a list of transformers with a possible trend of high dissolved gases.

During the audit, the Plant indicated it has plans to service its suspect padmount transformers at the end of 2023 to address the high combustible gases. The Plant must identify all transformers that require servicing. Additionally, the Plant must create preventative maintenance guidelines to define thresholds when transformer oil needs to be serviced.

**Finding 15: The Plant does not comply with its procedure for high voltage equipment switching.**

**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 E, OS 4: Problem Resolution and Continuing Improvement** states:

*“The GAO values and fosters an environment of continuous improvement and timely and effective problem resolution.”*

**GO 167-B, Appendix E, OS 7: Operation Procedures and Documentation** states:

*“Operation procedures exist for critical systems and states of those systems necessary for the operation of the unit including startup, shutdown, normal operation, and reasonably anticipated abnormal and emergency conditions. Operation procedures and documents are clear and technically accurate, provide appropriate direction, and are used to support safe and reliable plant operation. Procedures are 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 12: Operations Conduct** states in part:

*“To ensure safety, and optimize plant availability, the GAO conducts operations systematically, professionally, and in accordance with approved policies and procedures. The GAO takes responsibility for personnel actions, assigns personnel to tasks for which they are trained, and requires personnel to follow plant and operation procedures and instructions while taking responsibility for safety. Among other things:*

- A. All personnel follow approved policies and procedures. Procedures are current, and include a course of action to be employed when an adopted procedure is found to be deficient.”*

**GO 167-B, Appendix E, OS 17: Records of Operation** states:

*“The GAO assures that data, reports and other records reasonably necessary for ensuring proper operation and monitoring of the generating asset are collected by trained personnel and retained for at least five years, and longer if appropriate.”*

Pacific Wind has established and implemented a procedure for Padmount Transformer Cleaning / High Gas Safety / Transformer Switching (Document #: OM-07-2 316) since the year 2011. The procedure requires all affected employees to follow the procedure for switching the high voltage padmount transformer. The procedure specifies completing a “Transformer switching check list” form and “Transformer switching authorization” form prior to performing Padmount Transformer switching. The Plant did not demonstrate compliance with the procedure during Padmount Transformer switching for Turbine A17. No Transformer switching authorization records were identified for the switching event. Mishandled electricity can cause serious injury or fatality. The Plant must address why it is not following the current switching procedure.

Additionally, Plant management must require all employees to comply with the switching procedures to protect workers and assets from the potential of high voltage hazards.

## II. 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)
	8	OSHA Form 300 (Injury Log) in the last 4 years
	9	OSHA Form 301 (Incident Report) in the last 4 years
	10	List of all CPUC Reportable Incidents (last 5 years)
	11	Root Cause Analysis of all Reportable Incidents or Major Equipment Failures
	12	Fire Protection System Test Reports and Inspection Records (last 3 years)
	13	Insurance Report / Loss Prevention / Risk Survey
	14	Lockout / Tagout Procedure, In Plant Clearance Procedures
	15	Arc Flash Analysis
	16	Confined Space Entry Procedure
	17	Plant Physical and Cyber Security Procedures
	18	Work at Height Procedure and Climb Certifications
	19	Emergency Preparedness and Response Plan
Training	20	Safety Training Records
	21	Skill-related Training Records
	22	List of in-house or outside vendors that the Plant utilizes for technicians needing climbing and rescue certification

	23	Certifications for Welders, Forklift & Crane Operators
	24	Hazmat Training and Records
Contractor	25	Latest list of Qualified Contractors
	26	Contractor Selection / Qualification Procedure
	27	Contractor Certification Records
	28	Contractor Monitoring Program
Regulatory	29	Air Permit (if applicable)
	30	Water Permit (if applicable)
	31	Spill Prevention Control Plan (SPCC)
	32	CalARP Risk Management Plan (RMP)
O&M	33	Daily Round Sheets / Checklists
	34	Logbook
	35	List of all Open/Backlogged Work Orders
	36	List of Closed/Retired Work Orders
	37	Work Order Management Procedure
	38	Computerized Maintenance Management System (Demonstration Onsite)
	39	Standard Operating Procedures
	40	Vibration Analysis Reports
	41	Transformer Oil and Turbine Bearing Oil Analysis Reports
	42	Substation inspection records
	43	Test and inspection records of high voltage equipment
	44	Maintenance & Inspection Procedures for wind turbines
	45	Maintenance & Inspection Procedures for generators
	46	Maintenance & Inspection Procedures for transformers
	47	Maintenance & Inspection Procedures for gearboxes
	48	Maintenance & Inspection Procedures for other equipment

	49	Maintenance & Inspection Records for wind turbines
	50	Maintenance & Inspection Records for generators
	51	Maintenance & Inspection Records for transformers
	52	Maintenance & Inspection Records for gearboxes
	53	Maintenance & Inspection Records for other equipment
	54	SCADA System (Demonstration on-site)
Documents	55	P&IDs and Electrical Single-Line Diagrams
	56	Turbine design data
	57	Vendor Manuals
Spare Parts	58	Spare Parts Inventory List
	59	Shelf-life Assessment Report
Management	60	Employee Performance Review Procedures and Verifications
	61	Organizational Chart
Instrumentation	62	Instrument Calibration Procedures and Records
Test Equipment	63	Calibration Procedures and Records
Internal Audit	64	Internal audit reports