



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 EAST LAMAR BOULEVARD  
ARLINGTON, TEXAS 76011-4511

May 05, 2022

Ms. Paula A. Gerfen, Senior Vice President,  
and Chief Nuclear Officer  
Pacific Gas and Electric Company  
P.O. Box 56  
Mail Code 104/6  
Avila Beach, CA 93424

**SUBJECT: DIABLO CANYON POWER PLANT, UNITS 1 AND 2 – INTEGRATED  
INSPECTION REPORT 05000275/2022001 AND 05000323/2022001**

Dear Ms. Gerfen:

On March 31, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Diablo Canyon Power Plant, Units 1 and 2. On April 7, 2022, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

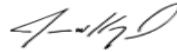
Three findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC Resident Inspector at Diablo Canyon Power Plant, Units 1 and 2.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC Resident Inspector at Diablo Canyon Power Plant, Units 1 and 2.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,



Signed by Kozal, Jason  
on 05/05/22

Jason W. Kozal, Chief  
Projects Branch A  
Division of Operating Reactor Safety

Docket Nos. 05000275 and 05000323  
License Nos. DPR-80 and DPR-82

Enclosure:  
As stated

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DIABLO CANYON POWER PLANT, UNITS 1 AND 2 – INTEGRATED INSPECTION  
 REPORT 05000275/2022001 AND 05000323/2022001 - DATED MAY 05, 2022

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000275 and 05000323

License Numbers: DPR-80 and DPR-82

Report Numbers: 05000275/2022001 and 05000323/2022001

Enterprise Identifier: I-2022-001-0013

Licensee: Pacific Gas and Electric Company

Facility: Diablo Canyon Power Plant, Units 1 and 2

Location: Avila Beach, CA

Inspection Dates: January 1, 2022, to March 31, 2022

Inspectors: A. Athar, Resident Inspector  
N. Day, Acting Senior Resident Inspector  
M. Doyle, Operations Engineer  
J. Drake, Acting Senior Resident Inspector  
N. Hernandez, Acting Senior Resident Inspector

Approved By: Jason W. Kozal, Chief  
Projects Branch A  
Division of Operating Reactor Safety

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Diablo Canyon Power Plant, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### List of Findings and Violations

Failure to Promptly Correct a Condition Adverse to Quality which Resulted in an Inoperable Auxiliary Saltwater Pump			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000275,05000323/2022001-02 Open/Closed	[H.6] - Design Margins	71152A
A self-revealed Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, was identified when the licensee failed to promptly identify and correct a condition adverse to quality. Specifically, excessive moisture and debris on the Unit 1 auxiliary saltwater pump 1-1 caused a ground on the motor that challenged the presumption of operability, and the system was required to be declared inoperable and removed from service for troubleshooting and corrective maintenance.			

Failure to Follow Procedures Results in Inoperable Emergency Diesel Generator			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000323/2022001-01 Open/Closed	[H.5] - Work Management	71153
A self-revealed Green, non-cited violation of Technical Specification 5.4.1.a, was identified for the licensee's failure to implement adequate work instructions for post-maintenance testing of the emergency diesel generator following tuning of the governor. Specifically, following corrective maintenance for governor troubleshooting, the licensee utilized an informal work instruction to perform tuning of the electric governor and failed to ensure that all testing described in Procedure MP E-21.6, "Diesel Generator Electrical Governor and Voltage Regulator Adjustments," Revision 22, was identified and performed, to ensure that the emergency diesel generator 2-3 would be able to perform its specified safety function.			

Inadequate Alarm Response Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000275,05000323/2022001-03 Open/Closed	None (NPP)	71153
The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to establish an adequate procedure for responding to the "FDWTR HTRS LEVEL HI" alarm, as recommended by Section 5 of Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978.			

Specifically, step 2.3.6 of Annunciator Response Procedure AR PK10-16, "FDWTR HTRS LEVEL HI," Revision 8A, directed the control room crew to obtain management advice before taking certain actions to mitigate a feedwater heater tube leak, which could result in undue delay.

**Additional Tracking Items**

None.

## PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On February 23, 2022, Unit 1 reduced power to approximately 50 percent for planned condenser cleaning. Unit 1 returned to rated thermal power on February 25, 2022. On March 6, 2022, Unit 1 entered end-of-fuel-cycle coast-down in preparation for a planned refueling outage. On March 26, 2022, the unit was shut down to enter planned Refueling Outage 23 and remained shut down for the remainder of the inspection period.

Unit 2 operated at or near rated thermal power for the entire inspection period.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk-significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

## REACTOR SAFETY

### 71111.01 - Adverse Weather Protection

#### External Flooding Sample (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated that flood protection barriers, mitigation plans, procedures, and equipment are consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding on March 22, 2022.

#### 71111.04 - Equipment Alignment

##### Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 1 residual heat removal pump 1-2 on January 24, 2022
- (2) Unit 1 emergency diesel generator 1-1 starting air system on February 25, 2022
- (3) Unit 2 residual heat removal pump 2-1 on March 14, 2022
- (4) Unit 1 reactor vessel refueling level indication system on March 28, 2022

#### 71111.05 - Fire Protection

##### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Fire on owner controlled area near 500 kV offsite line on February 2, 2022
- (2) Unit 1 turbine building component cooling water heat exchanger room, 85-foot elevation, on February 16, 2022
- (3) Unit 2 turbine building component cooling water heat exchanger room, 85-foot elevation, on March 15, 2022
- (4) Unit 1 emergency diesel generator 1-1, 1-2, and 1-3 rooms, 85-foot elevation, on March 16, 2022
- (5) Unit 1 turbine building on the 119-foot elevation 4 kV rooms on March 27, 2022

##### Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated the onsite fire brigade training and performance during an unannounced fire drill on January 30, 2022.

#### 71111.06 - Flood Protection Measures

##### Inspection Activities - Internal Flooding (IP Section 03.01) (1 Partial)

- (1) (Partial)  
The inspectors evaluated internal flooding mitigation protections in the Unit 2 emergency diesel generator 2-3 room on March 2, 2022. The inspectors completed inspection procedure Sections 03.01.1 and 03.01.2.

#### 71111.07A - Heat Exchanger/Sink Performance

##### Annual Review (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness and performance of the Unit 1 component cooling water heat exchangers 1-1 and 1-2 thermal performance testing on March 1, 2022.



71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance Requalification Examination Results (IP Section 03.03) (1 Sample)

- (1) The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exam administered on March 29, 2022.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the control room during the Unit 1 shutdown for Refueling Outage 1R23 on March 27, 2022.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator annual exams on February 9, 2022.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (1 Partial)

- (1) (Partial)  
The inspectors evaluated the effectiveness of maintenance to ensure the Unit 2 condensate system remained capable of performing its intended function. The inspectors completed inspection procedure Sections 03.01.1, 03.01.2, and 03.01.4.

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following structure, system, or component remains capable of performing its intended function:

- (1) Emergency diesel generator lube oil storage on January 7, 2022

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 1 emergency diesel generator 1-1 major maintenance outage window on January 12, 2022
- (2) Unit 2 concurrently exercising boration pathway valves on February 15, 2022
- (3) Unit 1 condenser differential pressure emergent trend on February 15, 2022
- (4) Unit 1 emergency diesel generator 1-2 major maintenance outage window on February 24, 2022

### 71111.15 - Operability Determinations and Functionality Assessments

#### Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Unit 1 emergency diesel generator 1-2 lube oil heat exchanger leak on January 25, 2022
- (2) Emergency plan equipment discussed in Notification 51143190 and 51143191 on February 9, 2022
- (3) Operability of concurrent outage of containment fan cooler unit 1-4 and emergency diesel generator 1-2 on February 18, 2022
- (4) Unit 1 residual heat removal valve RHR-1-8072 following discovery of through wall leak on leak-off line RHR-Line-2524 on March 31, 2022

### 71111.18 - Plant Modifications

#### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Installation of a sixth emergency diesel generator on February 17, 2022

### 71111.19 - Post-Maintenance Testing

#### Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post-maintenance testing activities to verify system operability and/or functionality:

- (1) Unit 1 emergency diesel generator 1-1 major maintenance outage window on January 14, 2022
- (2) Unit 2 component cooling water pump 2-3 maintenance outage window on January 18, 2022
- (3) Unit 2 component cooling water heat exchanger 2-1 and auxiliary saltwater pump 2-1 maintenance outage window on January 31, 2022
- (4) Unit 1 control room ventilation maintenance outage window on February 9, 2022
- (5) Unit 1 emergency diesel generator 1-2 major maintenance outage window on February 26, 2022

### 71111.20 - Refueling and Other Outage Activities

#### Refueling/Other Outage Sample (IP Section 03.01) (1 Partial)

- (1) (Partial)  
The inspectors evaluated Refueling Outage 1R23 activities from March 26, 2022, to March 31, 2022. The inspectors completed inspection procedure Sections 3.01.a and 3.01.b..

### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance testing activities to verify system operability and/or functionality:

#### Surveillance Tests (other) (IP Section 03.01) (5 Samples)

- (1) Unit 2 emergency diesel generator 2-2 routine surveillance test on January 20, 2022
- (2) Observation of operator rounds on February 3, 2022
- (3) Unit 1 safety bus G 4 kV under voltage testing per Work Order 64219827 on February 22, 2022
- (4) Unit 1, Work Order 64253229, I-7-P456. A pressurizer power-operated relief valve calibration on February 28, 2022
- (5) Unit 1, 4 kV, bus G non-safety injection auto-transfer test on March 27, 2022

#### Inservice Testing (IP Section 03.01) (1 Sample)

- (1) Unit 1 containment spray pump 1-1 routine surveillance test on January 28, 2022

### 71114.06 - Drill Evaluation

#### Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated a tabletop emergency preparedness drill in the Emergency Operation Facility on January 25, 2022.

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicator submittals listed below:

#### IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

- (1) Unit 1 (January 1, 2021, through December 31, 2021)
- (2) Unit 2 (January 1, 2021, through December 31, 2021)

#### IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (2 Samples)

- (1) Unit 1 (January 1, 2021, through December 31, 2021)
- (2) Unit 2 (January 1, 2021, through December 31, 2021)

#### IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (2 Samples)

- (1) Unit 1 (January 1, 2021, through December 31, 2021)
- (2) Unit 2 (January 1, 2021, through December 31, 2021)

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

The inspectors reviewed the licensee’s implementation of its corrective action program related to the following issues:

- (1) Unit 1 auxiliary saltwater pump 1-1 multiple ground alarms on March 10, 2022. The inspector completed Section 3.0.3. This completes the sample that was partially completed and documented in Integrated Inspection Report 05000275/2021004 and 05000323/2021004 (ADAMS Accession No. ML22024A495).

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (2 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000323/2021-001-00, Diesel Engine Generator (DEG) Declared Inoperable due to Low Frequency Condition Discovery during Routine Surveillance (ADAMS Accession No. ML21263A062). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section 71153.
- (2) LER 05000323/2021-002-00, Unit 2 Manual Reactor Trip Due to Increased Water Level in Feedwater Heater (ADAMS Accession No. ML21348A112). The inspection conclusions associated with this LER are documented under Inspection Results Section 71153.

**INSPECTION RESULTS**

Failure to Promptly Correct a Condition Adverse to Quality which Resulted in an Inoperable Auxiliary Saltwater Pump			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000275,05000323/2022001-02 Open/Closed	[H.6] - Design Margins	71152A
A self-revealed Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, was identified when the licensee failed to promptly identify and correct a condition adverse to quality. Specifically, excessive moisture and debris on the Unit 1 auxiliary saltwater pump 1-1 caused a ground on the motor that challenged the presumption of operability, and the system was required to be declared inoperable and removed from service for troubleshooting and corrective maintenance.			
<u>Description:</u> The auxiliary salt water (ASW) system design includes two safety-related motor driven pumps that draw water from the Pacific Ocean to provide safety-related cooling water for heat removal. The pump motors are housed in an enclosed vault adjacent to the Pacific Ocean that includes forced ventilation through a raised snorkel/intake riser. Through the inherent design of the vault, the ventilation introduces salty air into the environment where the motor is housed on top of the auxiliary saltwater pump.			
During normal operations, Diablo Canyon Power Plant does not need to operate both auxiliary saltwater pumps. In order to perform scheduled work and minimize runtime wear,			

the auxiliary saltwater pumps are swapped between a standby and running pump as appropriate (typically each week). While in the standby (non-running) state, forced air is still provided into the room for appropriate environmental temperatures. To support readiness and long-term reliability, large motors typically have nonsafety-related components. A typical component that supports the readiness in moisture environments is a motor heater. The inspectors note that, although the heater itself is not safety-related, the motor is. In the case of standby operations (nonrunning no heat/drying for moisture removal), excessive moisture builds up that challenges the motor, which is a safety-related component and can affect the reliability and operability of the ASW system.

In September 2019, during routine maintenance, Diablo Canyon identified that the motor heater for ASW pump 1-1 was degraded. In January 2020, the station established a monthly monitoring plan to observe the temperature difference between the stator and the lower bearing; ultimately this monitoring strategy was ineffective due to the relatively long time between evaluations of these parameters. The heater continued to degrade and completely failed July 1, 2021. The degradation of the motor heater allowed elevated levels of contamination and moisture buildup on the Auxiliary Saltwater Pump 1-1 motor windings, which went undetected by the monthly monitoring plan. Over time, the contamination and moisture accumulated enough to cause a ground fault in the Auxiliary Saltwater Pump 1-1 motor.

On July 5, 2021, the scheduled train swap occurred, with a routine start of the ASW pump 1-1. The pump started and ran; however, almost immediately, unexpected main control room ground detection system annunciators alarmed, and the operators were required to secure the running pump due to a detected ground. Operators declared the pump inoperable, and troubleshooting commenced. Insulation performance testing revealed excessive moisture and debris on the pump motor, which spectroscopy confirmed to be sea salt debris. The pump motor was replaced with a spare motor and the licensee performed post-service analysis on the motor that was removed from service. The licensee's analysis determined that if the motor was needed in an accident scenario, the motor ground would have cleared due to self-heating and moisture removal; nonetheless, this issue rendered the system inoperable and unavailable for 75 hours.

Corrective Actions: Diablo Canyon Power Plant replaced the motor with a spare auxiliary saltwater pump motor and declared ASW pump 1-1 operable on July 8, 2021, performed a root cause analysis, revised equipment reliability process procedures to drive management review of risk, created plant computer monitoring points for auxiliary saltwater pump motor heaters, and revised the conduct of engineering and technical evaluation procedures to add specific guidance to improve adverse condition monitoring.

Corrective Action References: Notification 5114756

Performance Assessment:

Performance Deficiency: Diablo Canyon Power Plant Unit 1 failed to promptly identify and correct moisture and debris build up on the Unit 1 ASW pump 1-1 motor internal windings which is a condition adverse to quality. Failing to identify and correct a condition adverse to quality is a performance deficiency that was within the licensee's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating

Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee's failure to promptly identify and correct moisture and debris build up on the Unit 1 ASW pump 1-1 motor internal windings caused 75 hours of unavailability of the ASW pump 1-1.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using Exhibit 2, "Mitigating System Screening Questions," the finding was screened as having very low safety significance (Green) because it was not a design deficiency; did not represent a loss of system function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant nontechnical specification train.

Cross-Cutting Aspect: H.6 - Design Margins: The organization operates and maintains equipment within design margins. Margins are carefully guarded and changed only through a systematic and rigorous process. Special attention is placed on maintaining fission product barriers, defense-in-depth, and safety related equipment. The inspectors noted that Diablo Canyon found degraded current on the auxiliary saltwater pump motor heater in September 2019. However, the licensee failed to replace the motor heater before it failed in July 2021, even when presented with opportunities to replace it during a refuel outage. During this time, the station justified not replacing the heater and failed to maintain plant equipment with appropriate design margin.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion XVI, requires, in part, conditions adverse to quality are promptly identified and corrected.

Contrary to the above, on July 5, 2021, Diablo Canyon Power Plant failed to promptly identify and correct a condition adverse to quality. Specifically, the excessive moisture and debris on the Unit 1 auxiliary saltwater pump 1-1, a condition adverse to quality, caused a ground on the motor that challenged the presumption of operability and required the system to be declared inoperable and removed from service for troubleshooting and corrective maintenance.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Follow Procedures Results in Inoperable Emergency Diesel Generator			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000323/2022001-01 Open/Closed	[H.5] - Work Management	71153
<p>A self-revealed Green, non-cited violation of Technical Specification 5.4.1.a, "Procedures," was identified for the licensee's failure to establish and implement adequate work instructions for post-maintenance testing of the emergency diesel generator (EDG) following tuning of the governor. Specifically, following corrective maintenance for governor troubleshooting, the licensee utilized an informal work instruction to perform tuning of the electric governor and failed to ensure that all testing described in Procedure MP E-21.6, "Diesel Generator Electrical Governor and Voltage Regulator Adjustments," Revision 22, was identified and performed, to ensure that the EDG 2-3 would be able to perform its specified safety function.</p> <p><u>Description:</u> On June 28, 2021, EDG 2-3 was removed from service for governor tuning. EDG 2-3 had been experiencing load and frequency oscillations during its last two surveillances, and the licensee had determined that the governor control system had been impacted by fuel rack resistance changes from previous fuel system maintenance. The personnel scheduled to perform the governor tuning had not previously performed this work. However, only an informal work instruction was prepared to provide guidance for the tuning and post-maintenance testing. Due to the complex nature of the governor tuning work scope, the work order instructions were left vague with detailed actions contained in an informal guidance document. The maintenance work order instructions were to adjust the governor controls "per Engineering direction."</p> <p>Since the document providing direction was an informal work plan, it was not required to be place kept, and place keeping was not performed. Governor tuning maintenance was completed on June 29, 2021; however, a fuel oil leak developed and testing was delayed until the next shift. The maintenance verification testing was scoped, but due to insufficient detail and lack of place keeping, the as-left isochronous (ISOC) frequency set-point on the governor was not verified. EDG 2-3 was declared operable and placed in standby.</p> <p>On July 21, 2021, EDG 2-3 was started on a simulated undervoltage signal for routine monthly surveillance testing per Procedure STP M-9A3. The EDG was started with the mode select switch in the "AUTO" position which indicated the diesel was aligned for dedicated supply to its associated 4 kV vital electrical bus. Upon starting, the as-read steady-state frequency was 58.9 Hz which was outside of the required technical specification acceptance criteria of 59.2 Hz to 60.8 Hz. This resulted in a failed surveillance and the EDG being declared inoperable since June 28, 2021. Engineering determined that the governor as-left ISOC frequency set-point was the problem. The EDG 2-3 ISOC frequency set-point was restored within limits per Procedure MP E-21.6. The EDG 2-3 passed all post-maintenance testing requirements and was declared operable on July 22, 2021, at 10:55 p.m.</p> <p><u>Corrective Actions:</u> The licensee restored the correct governor settings, issued licensee event report (LER) 05000323/2021-001-00, "Emergency Diesel Generator Declared Inoperable due to Low Frequency Condition Discovery during Routine Surveillance," (ADAMS Accession No. ML21263A062), updated Maintenance Procedure MP E-21.6 to include a note about partial procedure use and impacts on ISOC frequency to ensure sufficient maintenance verification testing, and initiated action to provide EDG governor control system training for select system material experts.</p>			

Corrective Action References: Notification 51113496

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to provide adequate work instructions and follow procedures related to tuning and testing the EDG 2-3 governor was a performance deficiency that was reasonably within the licensee's ability to foresee and should have been prevented. Specifically, use of an informal work instruction to perform complex corrective maintenance on the governor resulted in EDG 2-3 being inoperable for greater than the technical specification allowed outage time.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to provide adequate guidance for work on the tuning and post maintenance testing of the governor resulted in EDG 2-3 being inoperable for 25 days.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using Exhibit 2, "Mitigating System Screening Questions," the finding was screened as having very low safety significance (Green) because it was not a design deficiency; did not represent a loss of system and/or train function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant nontechnical specification train. EDG 2-3 maintained its ability to perform its safety function.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the licensee used an informal work instruction rather than developing a formalized procedure/guidance for the operators to complete the complex task of tuning and testing the EDG 2-3 governor.

Enforcement:

Violation: Technical Specification Section 5.4.1.a states, in part, that "written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." NRC Regulatory Guide 1.33, Appendix A, Section 9.a, recommends that maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances.

Contrary to the above, on June 28, 2021, the licensee failed to ensure that maintenance that could affect the performance of safety-related equipment was properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, the licensee utilized an informal work instruction to perform the complex task of tuning and testing the electric governor for EDG 2-3 and failed to complete all required post-maintenance testing required to demonstrate that



structures, systems, and components will perform satisfactorily in service. As a result, EDG 2-3 was inoperable for approximately 25 days.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Inadequate Alarm Response Procedure

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000275,05000323/2022001-03 Open/Closed	None (NPP)	71153

The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to establish an adequate procedure for responding to the "FDWTR HTRS LEVEL HI" alarm, as recommended by Section 5 of Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, step 2.3.6 of Annunciator Response Procedure AR PK10-16, "FDWTR HTRS LEVEL HI," Revision 8A, directed the control room crew to obtain management advice before taking certain actions to mitigate a feedwater heater tube leak, which could result in undue delay.

Description: On October 15, 2021, at 8:49 a.m., the Unit 2 feedwater heaters high level (FDWTR HTRS LEVEL HI) annunciator alarmed in the control room. Based on multiple diverse indications, station personnel verified excessive condensate water on the shell side of feedwater heater 2-5B.

The station entered Annunciator Response Procedure AR PK10-16, "FDWTR HTRS LEVEL HI," Revision 8A, upon receiving the alarm in the control room. Step 2.2.3 of Procedure AR PK 10-16 outlines a methodology to determine whether the high level condition is the result of a level control system malfunction or a feedwater heater tube leak. By 12:26 p.m. that day, operations personnel had completed this step and had determined that there was no malfunction of the level control system, indicating the presence of a tube leak in the feedwater heater 2-5B. At 12:33 p.m., the instrumentation and controls maintenance supervisor had concurred that there was no malfunction of the level control system. Thus, the station had strong evidence at 12:33 p.m. that there was a tube leak in feedwater heater 2-5B.

Step 2.3.6 of Procedure AR PK 10-16 provides instructions in the event that a tube leak has been diagnosed. This step directs the station to "perform either or both of the following, as deemed advisable by plant management after an assessment of event severity:

- Conduct an orderly plant shutdown
- Dispatch an operator to isolate the affected feedwater heater"

This step was entered at 12:33 p.m., and a plant management meeting occurred at 3:00 p.m. to discuss the options listed. The station ultimately decided to dispatch an operator to isolate feedwater heater 2-5B, which first required a downpower to 90 percent due to thermodynamic considerations of taking a feedwater heater out of service. The inspectors noted that the downpower began at 4:09 p.m.—almost 4 hours after the tube leak was initially diagnosed. The downpower was completed at 5:12 p.m., and an operator was then dispatched to isolate feedwater heater 2-5B.

While the operator was attempting to close the condensate outlet isolation valve, the level in the sight glass for feedwater heater 2-5B continued to rise, until it was off-scale (out of sight) high. As required by procedure, the control room crew manually tripped the Unit 2 reactor due to the feedwater heater 2-5B being off-scale high. Immediately following the trip, the crew closed the main steam isolation valves (MSIVs) per Procedure AR PK 10-16. This action also isolated the main feedwater pumps, which are steam-driven.

The inspectors noted that step 2.3.6 of Procedure AR PK 10-16 directs the station to obtain management advice before taking action to mitigate the feedwater heater tube leak. On October 15, the station gathered a senior management meeting to complete this step, before taking action to mitigate the feedwater heater tube leak. After the downpower was completed and an operator was dispatched to isolate the affected feedwater heater, the operator was unable to complete the isolation of feedwater heater 2-5B before the feedwater heater level went off-scale (out of sight) high and the control room crew had to manually trip the reactor.

During the inspection, the licensee provided additional information including timelines describing activities occurring in parallel with plant management meeting preparations, evidence that a plant trip was unavoidable due to the extensive FWH damage in this case, and operating experience suggesting this event progressed significantly more rapidly than past events. Upon review of this information, the inspectors concluded that there was not sufficient basis to conclude the performance deficiency caused the October 15 plant trip and loss of the condenser and feedwater pumps. However, the inspectors concluded that Procedure AR PK 10-16 was inadequate because step 2.3.6 directed control room operators to gain management input before taking action to mitigate the feedwater heater tube leak, which could take the decision-making out of the control room and incur an undue delay.

Corrective Actions: The licensee removed the statement "as deemed advisable by plant management," from step 2.3.6 of Procedure AR PK 10-16, and instead directed the control room operators to take action to mitigate a feedwater heater tube leak as directed by the shift manager.

Corrective Action References: Notifications 51148759 and 51145638

Performance Assessment:

Performance Deficiency: The failure to establish an adequate procedure for responding to the "FDWTR HTRS LEVEL HI" alarm in accordance with the requirements of plant technical specifications was a performance deficiency that was within the licensee's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the undue delay caused by convening a management meeting may lead to a more significant safety concern while implementing this procedure.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using Exhibit 1, "Initiating Events Screening Questions," the finding was screened as having very low safety significance (Green) because it did not cause a reactor trip.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance. Specifically, the latest revision of Annunciator Response Procedure AR PK10-16, "FDWTR HTRS LEVEL HI," Revision 8A, was issued on October 12, 2016, which was outside the 3-year window normally considered to be present performance.

Enforcement:

Violation: Technical Specification 5.4.1.a requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 5, identifies procedures pertaining to alarm conditions as recommended procedures.

Contrary to the above, prior to October 15, 2021, the licensee failed to establish adequate written procedures to respond to the "FDWTR HTRS LEVEL HI" alarm. Specifically, Annunciator Response Procedure AR PK10-16, "FDWTR HTRS LEVEL HI," Revision 8A, Step 2.3.6, directed control room operators to gain management input before taking action to mitigate a feedwater heater tube leak, which could take the decision-making out of the control room and incur an undue delay.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

## **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On April 7, 2022, the inspectors presented the integrated inspection results to Ms. P. Gerfen, Senior Vice President, Generation and Chief Nuclear Officer, and other members of the licensee staff.

**DOCUMENTS REVIEWED Chief Nuclear Officer**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	CP M-16	Severe Weather	20
71111.04	Corrective Action Documents	Notifications	51141818, 51141819, 51141871, 51141890	
71111.04	Procedures	OP A-2:X	RVRLIS Alignments for Refueling Outages	10
71111.04	Procedures	OP B-2:I	RHR System Alignment Verification for Plant Startup	26
71111.05	Corrective Action Documents	Notifications	51142578	
71111.05	Corrective Action Documents	Notifications	51071040, 51094718, 51132042	
71111.05	Drawings	111805-49	Fire Preplan Turbine Building Elevation 85'	3
71111.05	Drawings	11805-54	Fire Preplan Turbine Building Elevation 119'	3
71111.05	Miscellaneous	Generic Safety Plan GPAAHHR and GPAASITE		
71111.05	Procedures		Generic Hot Work Fire Lesson Plan	4
71111.07A	Corrective Action Documents	Notifications	51144881, 51144943, 51144976	
71111.07A	Procedures	PEP M-234	CCW Heat Exchanger Performance Test	21
71111.07A	Work Orders	WO	64187929, 64187939	
71111.11A	Miscellaneous	ARQ results	ARQ Results	03/28/2022
71111.11Q	Procedures	E-0	Reactor Trip or Safety Injection	45D
71111.11Q	Procedures	E-0.1	Reactor Trip Response	43
71111.11Q	Procedures	OP L-4	Normal Operation at Power	103
71111.12	Miscellaneous	PG&E Letter No. DCL 92-036, Docket No. 50-275, OL-DPR-80, Docket No. 50-323, OL-DPR-82	Diablo Canyon Units 1 and 2 License Amendment Request 92-03, Revision of Technical Specifications 3/4.8.1 and 3/4.8.2 Increase Emergency Diesel Generator Fuel Oil Storage Requirements	02/14/1992
71111.12	Miscellaneous	PG&E Letter No. DCL 92-131 Docket No. 50-	Diablo Canyon Units 1 and 2 Response to NRC Questions on License Amendment Request 92-03, Revision of Technical Specifications 3/4.8.1 and 3/4.8.2 Increase	06/05/1992

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		275, OL-DPR-80, Docket No. 50-323, OL-DPR-82	Emergency Diesel Generator Fuel Oil Storage Requirements	
71111.12	Miscellaneous	SISI Manual	Seismically Induced Systems Interaction Manual	13
71111.12	Miscellaneous	STP M-9G Completed Surveillance Results	Diesel Generator 24 Hour Load Test and Hot Restart Test	04/22/2017
71111.12	Miscellaneous	STP M-9G Completed Surveillance Results	Diesel Generator 24 Hour Load Test and Hot Restart Test	04/19/2019
71111.12	Miscellaneous	STP M-9G Completed Surveillance Results	Diesel Generator 24 Hour Load Test and Hot Restart Test for 4-22-2017, 4-19-2019, 5-14-21	05/14/2021
71111.12	Procedures		Behavior Of Loose Equipment In A Seismic Event	06/1985
71111.12	Procedures	STP M-9G	Diesel Generator 24 Hour Load Test and Hot Restart Test	59
71111.13	Corrective Action Documents	Notifications	51139208, 51140737, 51140750, 51140937, 51140954, 51141885	
71111.13	Miscellaneous	Unit 1 Condenser DP Trends	Station Prediction of Condenser DP	02/15/2022
71111.13	Procedures	AD7.ID14	Assessment of Integrated Risk	29
71111.13	Procedures	OM7.ID7	Emerging Issue and Event Investigations	
71111.13	Procedures	OP O-36	Protected Equipment Postings	27
71111.13	Procedures	OP1.DC10	Conduct of Operations	65
71111.13	Procedures	OP1.ID3	Reactivity Management Program	18
71111.13	Procedures	STP V-3E1	Exercising Valve FCV-110A Boric Acid to Blender	22
71111.13	Procedures	STP V-3E2	Exercising Valve FCV-110B Blender to Charging Header	10
71111.15	Corrective Action Documents	Notifications	50985660, 51123152, 51131514, 51135585, 51147276	
71111.15	Drawings	102010-3	Residual Heat Removal System	52
71111.15	Drawings	102028-20	ASME Code Boundary	53
71111.15	Drawings	224757-1	Residual Heat Removal System Suction Loop 4 V-8702	3

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Leak-off & Thermal Expansion	
71111.15	Miscellaneous	9000039632	Emergency Diesel Generator Fuel Oil Storage	0
71111.15	Procedures	EP MT-21	Emergency Kits	19
71111.15	Procedures	MP M-21-HX.2	Diesel Generator Lube Oil Heat Exchanger Maintenance	8
71111.18	Calculations	Calc M-786	Determine Required Diesel Fuel Oil Storage to Meet DCPD Licensing Basis of Operating "Minimum ESF Loads"	6
71111.18	Calculations	Calc M-786	Determine Required Diesel Fuel Oil Storage to Meet DCPD Licensing Basis of Operating "Minimum ESF Loads"	8
71111.18	Engineering Changes	DCN DC2-EM-44405	Install sixth Diesel Engine Generator	1
71111.18	Engineering Changes	DCN DC2-EM-46476	Diesel Engine Generator 2-3	0
71111.18	Engineering Changes	DCP M-44405	Install sixth Diesel Engine Generator	3
71111.19	Corrective Action Documents	Notifications	51140355, 51140689, 51140691, 51140700, 51140702, 51140708, 51140711, 51140724, 51140732, 51140733, 51140734, 51140735, 51140736, 51140738, 51140739, 51140780, 51140784, 51140793, 51140818, 51140856, 51140857, 51140870, 51140882, 51140883, 51141044, 51141058, 51141062, 51141078, 51141379, 51142497, 51142521, 51142533	
71111.19	Work Orders	WO	60130870, 64131387, 64131388, 64132042, 64132052, 64174747, 64213744, 64222825, 64238407	
71111.20	Procedures	OP B-1A	CVCS Borate the RCS to Refuel	3
71111.20	Procedures	OP B-9:l	Primary Sampling - Make System Available	13
71111.20	Procedures	OP L-5	Plant Cooldown from Minimum Load to Cold Shutdown	110
71111.20	Procedures	OP L-6	Cold Shutdown Refueling	88
71111.22	Corrective Action Documents	Notifications	51141538, 51142224, 51147252, 51147253, 51147446	
71111.22	Miscellaneous		U1 Auxiliary Building Round for February 03, 2022, and U2 Turbine Building Rounds for February 04, 2022	
71111.22	Procedures	STP M-13G	4 kV Bus G Non-SI Auto-Transfer Test	61
71111.22	Procedures	STP M-16A	Slave Relay Test of Trains A and B K603 (Safety Injection)	30
71111.22	Procedures	STP M-9A2	Diesel Engine Generator 2-2 Routine Surveillance Test	13

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.22	Procedures	STP P-CSP-11	Routine Surveillance Test of Containment Spray Pump 1-1	21A
71111.22	Procedures	STP V-3I3A	Full Stroke Exercise of Containment Spray Valve CS-9001A	8
71111.22	Work Orders	WO	64172567, 64218102, 64252011, 64252019, 64253229, 64261233	
71114.06	Corrective Action Documents	Notifications	51141937	
71151	Corrective Action Documents	Notifications	51142375	
71152A	Corrective Action Documents	Notification and Causal Evaluation	5114756	
71153	Corrective Action Documents	Notifications	51088141, 51115230, 51117574, 51126031, 51126111, 51133450, 51133724	
71153	Procedures	AD13.ID4	Post Maintenance Testing	37
71153	Procedures	AR PK 10-16	FDWTR HTRS LEVEL HI Annunciator Response Procedure	8A
71153	Procedures	MP M-21.8	Diesel Engine Governor Actuator Maintenance	26
71153	Procedures	MP_E-21.6	Diesel Generator Electrical Governor and Voltage Regulator Adjustments	22
71153	Procedures	MP_E-21.GOV	Emergency Diesel Generator Electrical Governor Maintenance	4
71153	Procedures	OP C-7:IV	Condensate System - Feedwater Heaters Remove from Service	11
71153	Work Orders		60131137, 60136440, 60136888, 60138461, 60138932	