



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

November 15, 2016

Mr. Edward D. Halpin, Senior Vice President
Generation and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56, Mail Code 104/6
Avila Beach, CA 93424

**SUBJECT: DIABLO CANYON POWER PLANT - NRC TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000275/2016008 AND 05000323/2016008**

Dear Mr. Halpin:

On October 20, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Diablo Canyon Power Plant, Units 1 and 2, and discussed the results of this inspection with Mr. J. Nimick, Senior Director, Nuclear Services, and other members of your staff. The results of this inspection are documented in the enclosed report.

No NRC-identified or self-revealing findings were identified during this inspection. However, the team documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the violation, 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 the Diablo Canyon Power Plant.

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

E. Halpin

- 2 -

Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Gregory E. Werner, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-275 and 50-323
License Nos. DPR-80 and DPR-82

Enclosure:
Inspection Report No. 05000275/2016008 and
05000323/2016008, w/Attachment:
Supplemental Information

cc w/enclosure: Electronic Distribution

E. Halpin

- 2 -

Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Gregory E. Werner, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-275 and 50-323
License Nos. DPR-80 and DPR-82

Enclosure:
Inspection Report No. 05000275/2016008 and
05000323/2016008, w/Attachment:
Supplemental Information

cc w/enclosure: Electronic Distribution

Distribution:
See next page

ADAMS ACCESSION NUMBER: ML16321A443

<input checked="" type="checkbox"/> SUNSI Review By: SMA		ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		Keyword: NRC-002
OFFICE	SRI:EB2	SRI:EB2	SRI:EB2	RI:EB2	PE:IPAT	SRA:PSB2	C:EB2	
NAME	SAIferink	SGraves	JMateychick	SMakor	EUrube	DLoveless	GWerner	
SIGNATURE	/RA/	/RA/	/RA/	e-mail	/RA/	/RA/	/RA/	
DATE	11/1/16	11/14/16	11/2/16	11/1/16	11/3/16	11/4/16	11/14/16	
OFFICE	C:PBA	C:EB2						
NAME	JGroom	GWerner						
SIGNATURE	/RA/	/RA/						
DATE	11/15/16	11/15/16						

OFFICIAL RECORD COPY

Letter to Edward D. Halpin from Gregory E. Werner, dated November 15, 2016

SUBJECT: DIABLO CANYON POWER PLANT - NRC TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000275/2016008 AND 05000323/2016008

Electronic distribution by RIV:

Regional Administrator (Kriss.Kennedy@nrc.gov)
Deputy Regional Administrator (Scott.Morris@nrc.gov)
DRP Director (Troy.Pruett@nrc.gov)
DRP Deputy Director (Ryan.Lantz@nrc.gov)
DRS Director (Anton.Vegel@nrc.gov)
DRS Deputy Director (Jeff.Clark@nrc.gov)
Senior Resident Inspector (Christopher.Newport@nrc.gov)
Resident Inspector (John.Reynoso@nrc.gov)
Administrative Assistant (Madeleine.Arel-Davis@nrc.gov)
Branch Chief, DRP/A (Jeremy.Groom@nrc.gov)
Senior Project Engineer, DRP/A (Ryan.Alexander@nrc.gov)
Project Engineer, DRP/A (Mathew.Kirk@nrc.gov)
Public Affairs Officer (Victor.Dricks@nrc.gov)
Project Manager (Balwant.Singal@nrc.gov)
Team Leader, DRS/IPAT (Thomas.Hipschman@nrc.gov)
RITS Coordinator (Marisa.Herrera@nrc.gov)
ACES (R4Enforcement.Resource@nrc.gov)
Regional Counsel (Karla.Fuller@nrc.gov)
Project Engineer, DRS/IPAT (Eduardo.Uribe@nrc.gov)
Senior Congressional Affairs Officer (Jenny.Weil@nrc.gov)
RIV Congressional Affairs Officer (Angel.Moreno@nrc.gov)
RIV/ETA: OEDO (Jeremy.Bowen@nrc.gov)

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Dockets: 05000275 and 05000323

Licenses: DPR-80 and DPR-82

Report Nos.: 05000275/2016008 and 05000323/2016008

Licensee: Pacific Gas and Electric Company

Facility: Diablo Canyon Power Plant, Units 1 and 2

Location: 7 ½ miles NW of Avila Beach
Avila Beach, CA

Dates: October 3 to October 20, 2016

Team Leader: S. Alferink, Reactor Inspector, Engineering Branch 2

Team: S. Graves, Senior Reactor Inspector, Engineering Branch 2
J. Mateychick, Senior Reactor Inspector, Engineering Branch 2
S. Makor, Reactor Inspector, Engineering Branch 2
E. Uribe, Project Engineer, Inspection Program and Assessment Team
D. Loveless, Senior Reactor Analyst, Plant Support Branch 2

Accompanying Personnel: B. Metzger, Fire Protection Engineer, Office of Nuclear Reactor
Regulation, Division of Risk Assessment, Fire Protection Branch

Approved By: Gregory E. Werner, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

IR 05000275/2016008 and 05000323/2016008; 10/03/2016 – 10/20/2016; Diablo Canyon Power Plant; Triennial Fire Protection Team Inspection.

The report covers a two-week triennial fire protection team inspection by specialist inspectors from Region IV. One licensee-identified finding, which was a non-cited violation, was documented. The significance of inspection findings is indicated by their color (i.e., Green, White, Yellow, or Red) and determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated August 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

None

B. Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by the team. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and the corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (71111.05XT)

This report presents the results of a triennial fire protection team inspection conducted at the Diablo Canyon Power Plant in accordance with NRC Inspection Procedure 71111.05XT, "Fire Protection - NFPA 805 (Triennial)," dated January 31, 2013. The team reviewed the licensee's fire protection program against the requirements of National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48(c). The NFPA 805 standard establishes a comprehensive set of requirements for fire protection programs at nuclear power plants. The standard incorporates both deterministic and risk-informed, performance-based concepts. The inspection team evaluated the implementation of the approved fire protection program in selected risk-significant areas with an emphasis on the procedures, equipment, fire barriers, and systems that ensure the plant can achieve and maintain a safe and stable condition.

Inspection Procedure 71111.05XT requires the selection of three to five fire areas and one or more mitigating strategies for review. The team used the fire hazards analysis section of the Diablo Canyon Power Plant NFPA 805 fire probabilistic risk assessment to select the following five risk-significant fire areas (inspection samples) for review:

Fire Area	Description	Category
3-CC	Containment Penetration Rooms (All Elevations)	Performance-Based
6-B-1	Battery, Inverter, and Switchgear Room (Bus F)	Performance-Based
6-B-2	Battery, Inverter, and Switchgear Room (Bus G)	Performance-Based
6-B-3	Battery, Inverter, and Switchgear Room (Bus H)	Performance-Based
7B	Cable Spreading Room	Primary Control Station

The team evaluated the licensee's fire protection program using the applicable requirements, which included the plant Technical Specifications, Operating License Conditions 2.C.(4) and 2.C.(5), NRC safety evaluations, 10 CFR 50.48, and NFPA 805. The team also reviewed related documents that included the Final Safety Analysis Report (FSAR), Section 9.5.1; the nuclear safety capability assessment; and the fire safety analysis. Specific documents reviewed by the team are listed in the attachment.

Five fire area inspection samples and one mitigating strategy sample were completed.

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the nuclear safety capability assessment, piping and instrumentation diagrams, and fire response procedures to verify that a safe shutdown success path, free of fire damage, would be available to meet the nuclear safety goals, objectives, and performance criteria in the event of a fire under any plant operational mode or configuration.

The team reviewed applicable sections of the fire response procedures for the selected fire areas and their associated fire scenarios to verify that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe and stable plant conditions.

The team performed a walkdown of the procedure to verify that recovery actions credited to achieve the nuclear safety performance criteria were feasible. The team evaluated the feasibility of the recovery actions against the criteria established in the licensee's fire protection program as approved in the safety evaluation report. Specifically, the team verified that licensee personnel credited for procedure implementation had procedures available, were trained on implementation, and were available in the event a fire occurred. The team also verified that the operators could reasonably be expected to perform the recovery actions within the time required to maintain plant parameters within specified limits.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe the material condition and configuration of the installed fire area boundaries (including walls, fire doors, and fire dampers) and verify that the electrical raceway fire barriers were appropriate for the fire hazards in the area. The team compared the installed configurations to the approved construction details, supporting fire tests, and applicable license commitments.

The team reviewed installation, repair, and qualification records for a sample of penetrations and openings to verify the fill material possessed an appropriate fire rating and that the installation met the engineering design. The team also reviewed similar records for the rated fire wraps to ensure the material possessed an appropriate fire rating and that the installation met the engineering design.

The team also reviewed completed surveillance and maintenance records for selected fire dampers, fire doors, and fire barrier seals to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

b. Findings

No findings were identified.

.03 Active Fire Protection

a. Inspection Scope

The team reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected fire areas. The team verified the automatic detection systems and the manual and automatic suppression systems were installed, tested, and maintained in accordance with the National Fire Protection Association code of record or approved deviations and that each suppression system was appropriate for the hazards in the selected fire areas.

The team performed a walkdown of accessible portions of the detection and suppression systems in the selected fire areas and the major system support equipment in other areas (e.g., fire pumps, carbon dioxide supply systems, and hose stations) to assess the material condition, design, and operational lineup, operational availability, and operational effectiveness of these systems and components.

The team reviewed flow and pressure tests for electric fire pumps 0-1 and 0-2 and the raw water reservoir to verify that the pumps and gravity-fed water supply systems met their design requirements. The team also reviewed the suppression system functional tests to verify that the system capability met the design requirements.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed pre-fire plans and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify the success path necessary to achieve and maintain the nuclear safety performance criteria and to facilitate suppression of a fire that could impact the ability to achieve and maintain safe and stable plant conditions. In addition, the team inspected fire brigade equipment to determine operational readiness for fire fighting.

The team observed an unannounced fire drill and subsequent drill critique on October 19, 2016, using the guidance contained in Inspection Procedure 71111.05AQ, "Fire Protection Annual/Quarterly," dated September 30, 2010. The team observed fire brigade members fight a simulated fire in the Unit 2 12kV switchgear room (Fire Area 20). The team verified that the licensee identified problems, openly discussed them in a self-critical manner at the drill debrief, and identified appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate firefighting techniques; (4) sufficient firefighting equipment was brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

b. Findings

A licensee-identified non-cited violation in this inspection area is documented in Section 4OA7 of this report.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The team performed a plant walkdown and reviewed documents to verify that one success path necessary to achieve and maintain the nuclear safety performance criteria would be maintained free of fire damage by a single fire. Specifically, the team verified:

- A fire in one of the selected fire areas would not indirectly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage the success path necessary to achieve and maintain the nuclear safety performance criteria.
- A fire in one of the selected fire areas that may result in the use of a manually activated fire suppression system would not indirectly cause damage to the success path necessary to achieve and maintain the nuclear safety performance criteria.
- The inadvertent actuation of an automatic or manual fire suppression system or the rupture of a fire suppression system would not indirectly cause damage to the success path necessary to achieve and maintain the nuclear safety performance criteria.
- Adequate drainage was provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.05 Shutdown from a Primary Control Station

a. Inspection Scope

Review of Methodology

The team reviewed the nuclear safety capability assessment, procedures, piping and instrumentation drawings, electrical drawings, and other supporting documents to verify that the licensee can achieve and maintain safe and stable plant conditions from the primary control station in the event a fire required evacuation of the control room.

The team verified that the nuclear safety capability assessment properly identified the components and systems necessary to meet the nuclear safety performance criteria for the fire area selected. Specifically, the team determined the adequacy of the systems selected to meet the criteria for reactivity control, inventory and pressure control, decay

heat removal, vital auxiliaries, and process monitoring. For the primary control station, which was analyzed using a performance-based approach, the team verified that the analysis included a consideration of all the necessary cables and equipment associated with operation and control of both alternating current (ac) and direct current (dc) power supplies.

The team verified that the transfer of command and control from the control room to the primary control station would be unaffected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for shutdown control circuits).

Review of Operational Implementation

The team verified that the training program for licensed and non-licensed operators included the procedures for achieving and maintaining safe and stable plant conditions, including any necessary recovery actions. The team also verified that sufficient personnel required to achieve and maintain safe and stable plant conditions were properly trained and were available at all times among the normal on-site staff, exclusive of the fire brigade.

The team performed a timed walkdown of the procedure for shutdown from outside of the control room on Unit 2 with licensed and non-licensed operators to determine the adequacy of the procedure. The team verified that the recovery actions taken were feasible and that operators could reasonably be expected to implement the procedure within the applicable time requirements to achieve the nuclear safety performance criteria. The team evaluated the feasibility of the recovery actions using the criteria established in the licensee's approved fire protection program.

The team also verified that the licensee conducted periodic operational tests of the transfer and isolation capability and instrumentation and control functions used for transferring control from the main control room to the primary control station and other locations where recovery actions would be performed. The team verified that the tests were adequate to prove the functionality of the primary control stations' capability to meet performance criteria and achieve and maintain safe and stable plant conditions.

b. Findings

No findings were identified.

.06 Circuit Analysis

a. Inspection Scope

The team reviewed the nuclear safety capability assessment to verify that the licensee identified the circuits required for nuclear safety functions and protected these circuits in accordance with the deterministic approach or provided an appropriate level of protection based on the results of an analysis using an acceptable risk-informed, performance-based approach. The team verified, on a sample basis, that the licensee properly identified circuits that may impact the nuclear safety performance criteria. The team verified that these circuits were either adequately protected from the potentially adverse effects of fire damage or were analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not affect the capability to

meet the nuclear safety performance criteria. The team verified that the licensee's analyses considered potential spurious operations due to fire-induced cable faults.

The team focused on cables from the following components:

- AFW-2-LCV-110-DT, steam generator 2-1 auxiliary feedwater supply
- CCW-2-FCV-356-DO, reactor coolant pump barrier component cooling water return valve
- CVCS-2-8108, charging line isolation motor-operated valve
- E-2-PY23-AV, vital instrument alternating current distribution panel

For the sample of components selected, the team reviewed process and instrumentation drawings and electrical elementary and block diagrams, and the team identified power, control, and instrument cables necessary to support their operation. In addition, the team reviewed cable routing information to verify that fire protection features were in place as needed to satisfy the separation requirements specified in the fire protection license basis.

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The team inspected the designated emergency communication radios and storage locations and reviewed the procedure for shutdown from outside of the control room to verify that portable radio communications and fixed emergency communications systems were available, operable, and adequate for the performance of designated activities. The team verified the capability of the communication systems to support the operators in the conduct and coordination of their required actions. The team also verified that the design and location of communications equipment such as repeaters and transmitters would not cause a loss of communications during a fire. The team discussed system design, testing, and maintenance with the system engineer.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The team reviewed the emergency lighting provided, both in fixed and portable form, along access and egress routes and at control stations, plant parameter monitoring locations, and recovery action locations. The team verified that the emergency lighting

was adequate for operators to perform the required recovery actions during a walkdown of the procedure for shutdown from outside of the control room. Specifically, the team verified:

- The battery power supplies had a capacity sufficient to support recovery actions necessary to meet the nuclear safety performance criteria.
- The illumination was sufficient for operators to perform the required recovery actions for a shutdown from outside the control room.
- The operability testing and maintenance of the emergency lighting followed licensee procedures and accepted industry practice.
- The emergency lighting batteries were maintained consistent with the manufacturer's recommendations.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team determined that the licensee did not credit cold shutdown repairs to meet the nuclear safety performance criteria. The team reviewed the nuclear safety capability assessment and interviewed licensee personnel and determined that the licensee does not require transitioning to cold shutdown to achieve a safe and stable plant condition.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified that compensatory measures were implemented for out-of-service, degraded, or inoperable fire protection and success path equipment, systems, or features (e.g., detection and suppression systems and equipment; passive fire barriers; or pumps, valves, or electrical devices providing nuclear safety functions or capabilities for meeting performance criteria) necessary to achieve and maintain safe and stable plant conditions. The team also verified that the short-term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

The licensee identified multiple variations from deterministic requirements during the development of the risk-informed, performance-based fire protection program which required plant modifications to resolve. License Conditions 2.C.(5) and 2.C.(4),

“Fire Protection,” for Units 1 and 2, respectively, discuss the transition period. The license conditions require these modifications to be completed by the end of refueling outages 1R20 (April/May 2017) for Unit 1 and 2R20 (February/March 2018) for Unit 2.

The license conditions require the licensee to maintain appropriate compensatory measures in place until completion of the modifications. The licensee’s compensatory measures consisted of hourly fire watches and the continued use of the post-fire safe shutdown procedures developed under the previous deterministic fire protection program. The team reviewed the compensatory measures and found the compensatory measures to be adequate.

b. Findings

No findings were identified.

.11 Radiological Release

a. Inspection Scope

The team verified that the licensee provided reasonable assurance that a fire would not result in a radiological release that adversely affects the public, plant personnel, or the environment. The team also verified that the licensee determined that any radiation release to any unrestricted area resulting from fire suppression activities (but not involving fuel damage) was as low as reasonably achievable and would not exceed applicable 10 CFR Part 20 limits. The team verified that the licensee analyzed the radioactive release on a fire area basis. The team walked down the selected fire zones and verified that the pre-fire plan tactics and instructions were consistent with the potential radiological conditions identified in the analyses.

b. Findings

No findings were identified.

.12 Non-Power Operations

a. Inspection Scope

The plant did not enter an outage during the inspection. However, the team verified that the licensee performed the following activities:

- Defined higher risk evolutions that are performed during outages.
- Defined the key safety functions required to maintain the plant in a safe and stable condition during non-power operational modes.
- Performed the nuclear safety capability assessment during non-power operations and defined specific pinch points where one or more key safety functions could be lost.

- Established additional fire protection defense-in-depth actions to be taken during higher risk evolutions in the locations of the pinch points where key safety functions could be lost.

b. Findings

No findings were identified.

.13 Monitoring Program

a. Inspection Scope

The team verified that the licensee had developed a draft monitoring program to ensure that the availability and reliability of the fire protection systems, structures, and components credited in the performance-based analyses are maintained and to assess the performance of the fire protection program in meeting the nuclear safety performance criteria.

The team noted that the licensee was in the transition period and was not required to have a monitoring program fully implemented until April 14, 2017. The team verified that the draft monitoring program ensured the assumptions in the engineering analyses remained valid with the possible exception of the condition described in the draft Frequently Asked Question 10-0059. The licensee stated that they intended to address the conclusions of this frequently asked question prior to full program implementation. The team determined that the licensee had not yet developed established levels of availability, reliability, and performance in accordance with its license condition.

b. Findings

No findings were identified.

.14 Plant Change Evaluation

a. Inspection Scope

The team reviewed the one plant change evaluation that the licensee had performed under the NFPA 805 program to verify that, where performance-based methods were applied, the methods adequately represented plant design and conditions in the fire area were performed by qualified people, were acceptable for the application, and met the requirements of the fire protection license condition for self-approved changes to the fire protection program.

The team reviewed the following change:

- DDP-1000025244-000-00, "Incipient Detection"

b. Findings

No findings were identified.

.15 Alternative Mitigation Strategy Inspection Activities

a. Inspection Scope

The team reviewed the licensee's implementation of guidance and strategies intended to maintain or restore core, containment, and spent fuel pool cooling capabilities under the circumstances associated with the potential loss of large areas of the plant due to explosions or fire as required by 10 CFR 50.54(hh)(2).

The team verified that the licensee implemented and maintained adequate procedures, maintained and tested equipment necessary to properly implement the strategies, and ensured station personnel were knowledgeable and capable of implementing the procedures. The team performed a visual inspection of portable equipment used to implement the strategy to ensure the availability and material readiness of the equipment, including the adequacy of portable pump trailer hitch attachments, and verified the availability of on-site vehicles capable of towing the portable pump. The team assessed the off-site ability to obtain fuel for the portable pump and foam used for fire fighting efforts. The strategy and procedure selected for this inspection sample included:

- Extensive Damage Mitigation Guideline EDG-12, "Start Diesel Generator Without DC Power"

b. Findings

No findings were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team selected a sample of condition reports associated with the licensee's fire protection program to verify that the licensee had an appropriate threshold for identifying deficiencies. The team reviewed the corrective actions proposed and implemented to verify that they were effective in correcting identified deficiencies. The team evaluated the quality of recent engineering evaluations through a review of condition reports, calculations, and other documents during the inspection.

b. Findings

No findings were identified.

4OA5 Other Activities

The team reviewed corrective actions and training associated with Notification NN 50687017 written for site fire department activities related to fire protection program equipment maintenance and testing. The team did not identify any significant issues with licensee corrective actions or training in this area.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented the inspection results to Mr. J. Nimick, Senior Director, Nuclear Services, and other members of the licensee staff at an exit meeting on October 20, 2016. The licensee acknowledged the finding presented.

The team verified that no proprietary information was retained by the team or documented in this report.

4OA7 Licensee-Identified Violations

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance and met the NRC Enforcement Policy criteria for being dispositioned as a non-cited violation.

- License Conditions 2.C.(5) for Unit 1 and 2.C.(4) for Unit 2 state, in part, that the licensee shall implement and maintain all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment request, dated June 26, 2013, and as approved in the safety evaluation, dated April 14, 2016. Section 3.2.3 of Attachment A of the license amendment request states, in part:

Procedures shall be established for implementation of the fire protection program. In addition to procedures that could be required by other sections of the standard, the procedures to accomplish the following shall be established: Inspection, testing, and maintenance for fire protection systems and features credited by the fire protection program.

Equipment Control Guideline 18.1, "Fire Suppression Systems/Fire Suppression Water Systems," provided the requirements to demonstrate the operability of the fire suppression water system. Equipment Control Guideline Surveillance Requirement 18.1.10 required the licensee to perform a flow test of the fire suppression water system in accordance with Chapter 5, Section 11, of the Fire Protection Handbook, 14th Edition. Chapter 5, Section 11, of the Fire Protection Handbook, 14th Edition, stated, in part, that tests should be conducted in such a way that the available flow and pressure at high value or hazardous areas can be determined readily.

Contrary to the above, prior to October 20, 2016, the licensee failed to implement all provisions of the approved fire protection program. Specifically, during the flow tests, the licensee failed to establish surveillance test procedures that measured pressure

values for one of the three fire suppression water subsystems using the methodology in Chapter 5, Section 11 of the Fire Protection Handbook, 14th Edition.

The performance deficiency was more than minor because it was associated with the protection against external factors (fire) attribute of the Mitigating Systems Cornerstone and adversely affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was screened in accordance with Inspection Manual Chapter 0609, Appendix F, dated September 20, 2013. The finding was determined to be of very low safety significance (Green) in Task 1.4.7, "Fire Water Supply," Question A. Although the licensee did not measure and record fire main pressure, they did measure flow and it was greater than 50 percent of the required capacity. The finding was entered into the licensee's corrective action program as Notifications NN 50853684 and NN 50863322.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

A. Arsene, Engineer, Fire Protection Engineering
A. Chitwood, Shift Manager, Operations
D. Ensminger, Chief, Fire Department
L. Fusco, Manager, Engineering
J. Gregerson, Engineer, Fire Protection Engineering
D. Hampshire, Supervisor, Fire Protection Engineering
H. Hamzehee, Manager, Regulatory Services
A. Heffner, NRC Interface, Regulatory Services
D. Hromyak, Engineer, Fire Protection Engineering
K. Johnston, Director, Operations
S. Maze, Beyond Design Basis Owner, Emergency Services
M. McCoy, NRC Interface, Regulatory Services
J. Morris, Supervisor Compliance, Regulatory Services
J. Nimick, Senior Director, Nuclear Services
M. Penner, Assistant Chief, Fire Department
M. Shepard, Senior Engineer, PRA
B. Waggener, Engineer, Fire Protection Engineering
T. Wernet, Assistant Chief, Fire Department
B. Wong, Engineer, Fire Protection Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Calculations

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
134A-DC-T	Associated Circuit Analysis – Fire Protection	2
134-DC	Cable Data Worksheet, Auxiliary Feedwater Pump 2-3	October 12, 2007
333-DC	Fuse Selection Criteria	0
335-DC	Emergency Lightning and Communication	12
9000041846	NFPA 805 Monitoring Program – Scoping Evaluation	Draft
9000041847	NFPA 805 Monitoring Program – Quantitative Screening Calculation	Draft
9000041848	NFPA 805 Monitoring Program – Risk Target Value Determination	Draft
CF3.ID4 Att. 4	Nuclear Safety Capability Assessment	1
F.3.5	Probabilistic Risk Assessment, Development of Fire-Induced Risk Model	3
F.3.11b	Main Control Room Fire Modeling	3
M-1023	Cable Spreading CO ₂ Retention Time Verification Calculation	0
M-1176	NFPA 805 Radioactive Release Review	0
M-1177	Nuclear Safety Capability Assessment	1
M-657	Document the Change in Inspection Requirements for Fire Barriers	1
M-670	Penetration Seals	0
M-997	Fire Barrier Penetration Seals – Qualification of Designs	12

Condition Reports (Notifications)

50035799	50035806	50294777	50541581
50035804	50035807	50356411	50541606
50035805	50035808	50401036	50687017

50701039	50874259	50874554*	50875682*
50774214	50874454*	50874555*	50875683*
50826030*	50874458*	50874561*	50875684*
50853684	50874459*	50874562*	50875685*
50862125	50874530*	50874728*	50875686*
50863322*	50874531*	50874861*	50875688*
50873080	50874534*	50874862*	50875689*
50874060*	50874538*	50875312*	50875700*
50874061*	50874539*	50875452	50875701*
50874151	50874551*	50875509*	50875702*
50874157*	50874552*	50875594*	50875703*

*Issued as a result of inspection activities.

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
102010, Sheet 3	Residual Heat Removal System	52
106718, Sheet 11	Yard Loop	173
106718, Sheet 13	Containment Structure Unit 1	20
106718, Sheet 14	Containment Structure Unit 2	24
106718, Sheet 17	Containment Structure Unit 2	146
106718, Sheet 2	Yard Loop	173
108001, Sheet 1	Piping Schematic Legend	12
108001, Sheet 2	Piping Schematic Legend	12
108001, Sheet 3	Piping Schematic Legend	11
108003, Sheet 1	Feedwater System	52
108003, Sheet 2	Feedwater System	7
108003, Sheet 3	Feedwater System	81
108003, Sheet 4	Feedwater System	67
108004, Sheet 3	Turbine Steam Supply System	86
108004, Sheet 5	Turbine Steam Supply System	101
108004, Sheet 7	Turbine Steam Supply System	92

Drawings

108008, Sheet 1	Chemical & Volume Control System	85
108008, Sheet 3	Chemical & Volume Control System	105
108008, Sheet 4	Chemical & Volume Control System	86
108008, Sheet 4	Chemical & Volume Control System	111
108009, Sheet 1	Safety Injection System	46
108009, Sheet 4	Safety Injection System	77
108009, Sheet 5	Safety Injection System	63
108012, Sheet 3	Containment Spray System	27
108014, Sheet 1	Component Cooling Water System	51
108014, Sheet 5	Component Cooling Water System	49
108014, Sheet 7	Component Cooling Water System	36
108018, Sheet 2	Yard Loop	45
108018, Sheet 3	Unit 1 Fuel Handling Building – Fire Water Pumps	20
108018, Sheet 4	Turbine Building Unit 2 Wet & Deluge Automatic Fire Sprinkler System	40
108018, Sheet 4A	Turbine Building Unit 2 Wet & Deluge Automatic Fire Sprinkler System	31
108018, Sheet 5	Unit Two Fuel Handling Building	28
108018, Sheet 6	Carbon Dioxide Fire Protection System Hazard Spray System	37
108018, Sheet 6A	Carbon Dioxide Fire Protection System Hosereels	35
108018, Sheet 7	Containment Structure	40
109803	Steam Generator 1 Auxiliary Feedwater Supply LC-86	0
109803	Steam Generator 4 Auxiliary Feedwater Supply LC-89	0
109803	Steam Generator 3 Auxiliary Feedwater Supply Functional Loop Diagram	2

Drawings

109803	Steam Generator 4 Auxiliary Feedwater Supply LC-89 Functional Loop Diagram	2
109808	Functional Loop Diagram – Charging to Regenerative Heat Exchanger	3
109808	Functional Loop Diagram – Charging Header Flow Control FCV-128	5
109809, Sheet 3	Charging to Regenerative HX Functional Loop Diagram	3
109809, Sheet 19	Charging Header Flow Control FCV-128	5
111906	Auxiliary Building Elev. 128', 154' & 164'	6
111906	Auxiliary Building Elev. 115', Unit 2	9
111906	Auxiliary Building Elev. 115', Unit 1 and 2	10
111906	Auxiliary Building Elev. 100'	7
111906	Auxiliary Building Elev. 85	8
111906, Sheet 21	Fire Protection Drawing, Auxiliary Building Elev. 115'	10
111906, Sheet 25	Fire Protection Drawing, Auxiliary Building Elev. 128', 154', & 164'	6
4008751	Electrical Schematic Diagram Charging Pump No. 23	9
4010037	Schematic Diagram 120V Nuclear Instrument AC System	0
437510	Electrical Diagram of Connections Hot Shutdown Control Panel	14
437518	Electrical Single Line Diagram for Station Auxiliaries	41
438145, Sheet 1	Firewater System Power Block Perimeter	38
438147, Sheet 1	Firewater System Profile	16
438149, Sheet 1	Fire Water System Profile	16
441220	Electrical Single Line Diagram for Station Auxiliaries	29
441220, Sheet 1	Single Line Diagram For Station Auxiliaries	29

Drawings

441237, Sheet 1	Single Line Meter and Relay Diagram 480 Volt System Bus Section 2F	37
441238, Sheet 1	Single Line Meter and Relay Diagram 480 Volt System Bus Section 2G	54
441239, Sheet 1	Single Line Meter and Relay Diagram 480 Volt System Bus Section 2H	48
441240, Sheet 1	Single Line Meter and Relay Diagram 125V D.C. System	46
441301	LCV 110 Steam Gen. 21 Aux Feedwater Supply	0
441301	LCV 110 Steam Gen. 21 Aux Feedwater Supply	19
441302	Electrical Schematic Diagram Auxiliary Feedwater Pump	21
441324	Schematic Diagram CVCS Motor Operated Valves	New
441325	Schematic Diagram Component Cooling System Motor Operated valves	10
445290	Electrical Single Line Meter and Relay Diagram 120V Instrument AC System	17
500662	Electrical Conduit Layout Plan Below Elevation 140'-0" Area "H"	45
502689	Diagram of Connections Below Elev. 112'-0" Area FE & FW	13
502941	Cable Tray and Conduit Layout Plan Below El. 115'-0" Area GE & GW	3
509603	Electrical Conduit Layout Plan at Elev. 127'-4" Area "H"	22
516943	Electrical Conduit Layout Plan Below El. 140'-0" Area "H"	34
RA-13	Radiological Control Area (RC), Elevation 85 foot	8
RA-15	Radiological Control Area (RC), Elevation 85 foot	7
RA-17	Radiological Control Area (RC), Elevation 85 foot	9
TB-14	Turbine Building, Elevation 85 foot	10

Engineering Evaluations (FHARE)

<u>Number</u>	<u>Title</u>	<u>Revision</u>
12	Winch Cable Penetrations for Post-LOCA Sampling Room Shield Wall	2
13	Unique Blockout Penetration Seal Through Barrier Between the Unit-2 Turbine /Containment Penetration Areas	3
26	Non-Rated Barriers	3
80	Fire Dampers Installed at Variance with Manufacturer's Instructions	3
91	Non-Rated Barrier Between Fire Area/Zone 3BB (3CC) and 3-P-2 (3-V-2)	0
95	Justification of Excessive Gaps on Fire Doors	0
97	Containment Electrical Penetrations	0
100	Block Walls Structurally Modified with Columns, Beams and Steel Plates	0
104	Fireproofing on Structural Steel for Block Walls	1

Fire Impairments

1-TS-15-0437 2-TS-14-0251

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	2013 Fire Protection Audit	August 8, 2013
	Fire Protection System Health Report – Unit 1, First Quarter	March 31, 2016
	Fire Protection System Health Report – Unit 1, Second Quarter	June 30, 2016
	Fire Protection Program Health Report – Unit 2, Second Quarter	August 8, 2016

Miscellaneous Documents

	Fire Protection System Health Report – Unit 2, First Quarter	March 31, 2016
	Letter from California Department of Forestry and Fire Protection - 2016 Operating Plan for On-Site Fire and Rescue Response at Diablo Canyon Nuclear Power Plant	June 2, 2016
030010-RPT-01	NFPA 805 Monitoring Program Phase 2: Qualitative Review Results	Draft
10083-J-JPG	Specification for Furnishing and Delivering Manual/Auto Station for Diablo Canyon Power Plant Unit 1 & 2	January 10, 2011
Design Criteria Memorandum S-18	Fire Protection System	22
Design Criteria Memorandum T-13	Appendix R Fire Protection	7A
FAQ 07-0030	Establishing Recovery Actions	5
Final Safety Analysis Update, Appendix 9.5A	Fire Hazards Analysis	22
Lesson No. R151C4	Penetration Seal/HELB	0A
NRC Letter ML16035A441	Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance With 10 CFR 50.48(c) (CAC Nos. MF2333 AND MF2334)	April 14, 2016
Operations Policy A-48	Operations Watchstander and Supervisor Expectations	March 10, 2016
P1890-002-004	Diablo Canyon Power Plant Fire Protection Code Conformance Review	1
PG&E Letter DCL-13-065	License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 Edition)	June 26, 2013
R2044-001-3CC85	Detailed Fire Modeling Report – Fire Compartment 3-CC-85	2

Miscellaneous Documents

R2165-007-001	NFPA 805 Risk Informed Performance Based Fire Risk Evaluations	2
R2165-043-001	NFPA 805 Effects of Fire Suppression Activities Review	2
Ross 2171A89132	Single Solenoid Pilot Valve Installation and Maintenance Manual	N/A

Modifications

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1000024816	Design to Re-route Circuits 230D, 230D3, 230D4, and 230D5 out of Fire Area 5-B-4 to Ensure FCV-95 is Unaffected at the Control Room due to a Fire in Fire Area 5-B-4	0
1000024939	Replacement Vital 480V MCC Cubicles and Circuit Breakers in Bus 2G	1
1000025004	Unit 2 NFPA 805 Hot Shutdown Panel Modifications	0
1000025194	Establish a New Maintenance Modification Drawing (MMD) which is Essentially an "On-the-Shelf" Design Change which can be Used on As-Needed Basis	0
1000025261	Replace Circuit G12H14 Wire E12 Using a Spare Wire from Circuit GSP29 Located in Cubicle SHG11	0
2000001367	Unit 2 NFPA 805 Hot Shutdown Panel (HSDP) Upgrade	0
2000001368	NFPA 805 Hot Shutdown Panel Upgrade	0

Plant Change Evaluations

DDP 1000025244

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
AR PK10-10	Annunciator Response Fire Detected	7A
AWP E-028	PRA Model Maintenance and Upgrades	2

Procedures

CP M-10	Fire Protection of Safe Shutdown Equipment	37
CP M-10 (Unit 2)	Fire Protection of Safe Shutdown Equipment	35
CP M-6	Fire	35
EDDG-05	Fuse Control Program	0
EDMG EDG-12	Start Diesel Generator Without DC Power	1
EDMG EDG-14	EDMG Equipment Annual Inventory	3
MA1.DC54	Conduct of Maintenance	11
MP E-41.1A	Maintenance of Westinghouse DB-50 480V Circuit Breakers	35
MP E-62.2A	Maintenance of General Electric 12kV Power-VAC Circuit Breakers	13
MP E-62.5A	Maintenance of Cutler Hammer 12kV AM-VR Vacuum Circuit Breakers	7
MP E-63.6A	Maintenance of SF6 4kV Circuit Breakers	24A
MP E-64.1A	Molded Case Circuit Breaker Testing	42
MP E-64.5A	Maintenance of ABB, ITE-Type K-3000 Circuit Breakers	8
MP E-64.6A	Maintenance of ABB K-Line Circuit Breakers	42
MP E-64.6C	Post Overhaul Inspection of ABB K-Line Circuit Breakers	0
MP E-67.5A	Testing and Maintenance of Battery Operated Lights Inside Power Block	35
OM8.ID2	Fire System Impairment	19
OM8.ID4	Control of Flammable and Combustible Materials	25
OM8.ID5	Fire Protection Program Administration	0
OM8.ID6	Fire Protection Change Evaluation	0A
OM8.ID17	NFPA 805 Fire Protection Monitoring Program	Draft
OP A-4A:I	Pressurizer – Make Available	25
OP AP-8A (Unit 2)	Control Room Inaccessibility – Establishing Hot	31

Procedures

	Standby	
OP C-2:II	Main Steam and Steam Dump System – Local Operation of Steam Dumps	9
OP K-2C	Fire Protection Network Operation	43
PMT 08.38	Hot Shutdown Panel (HSDP) NFPA 805 Modifications Functional Tests	0
STP M-63C	Fire Water System Functional Test of the Fuel Handling and Radwaste Buildings	4
STP M-63E	Fire Water System Yard Loop Flush	7
STP M-69A	Monthly Fire Extinguisher Station Inspection Inside the Protected Area	51
STP M-70B	Inspection and Testing of Fire Dampers	18
STP M-70D	Inspection of Fire Barriers, Rated Enclosures, Credited Cable Tray Fire Stops, and Equipment Hatches	17
STP M-70D	Inspection of Fire Barriers, Rated Enclosures, Credited Cable Tray Fire Stops, and Equipment Hatches	18
STP M-71	Firewater System Flow Test	9
STP P-AFW-23	Routine Surveillance Test of Motor-Driven Auxiliary Feedwater Pump 2-3	19
STP P-CCP-23	Routine Surveillance Test of Centrifugal Charging Pump 2-3	5A
STP P-FPP-A01	Fire Pump 0-1 Performance Test	5
STP P-FPP-A01	Fire Pump 0-1 Performance Test	6
STP P-FPP-A02	Fire Pump 0-2 Performance Test	6
STP P-FPP-A02	Fire Pump 0-2 Performance Test	7
STP P-FPP-A03	Fire Pump 0-3 Performance Test	12
STP P-FPP-A04	Fire Pump 0-4 Performance Test	13
STP P-FPP-A04	Fire Pump 0-4 Performance Test	14

Procedures

STP P-FPP-B01	Fire Pump 0-1 Routine Surveillance	12
STP P-FPP-B02	Fire Pump 0-2 Routine Surveillance	13
STP P-FPP-B03	Fire Pump 0-3 Routine Surveillance	9A
STP P-FPP-B04	Fire Pump 0-4 Routine Surveillance	8A
STP V-2U3D	Exercising SG No. 3 AFW Supply Valves LCV-108 and LCV-115	10
STP V-2U4D	Exercising SG No. 4 AFW Supply Valves LCV-109 and LCV-113	10
TQ1.DC12	Fire Brigade and Emergency Response Training	14

RiskMan Probabilistic Risk Assessment Sequences

ZXU2RNCI Sequence 1	ZXU2RNCI Sequence 7	ZXU2RNCI Sequence 13
ZXU2RNCI Sequence 2	ZXU2RNCI Sequence 8	ZXU2RNCI Sequence 14
ZXU2RNCI Sequence 3	ZXU2RNCI Sequence 9	ZXU2RNCI Sequence 15
ZXU2RNCI Sequence 4	ZXU2RNCI Sequence 10	ZXU2RNCI Sequence 16
ZXU2RNCI Sequence 5	ZXU2RNCI Sequence 11	
ZXU2RNCI Sequence 6	ZXU2RNCI Sequence 12	

Vendor Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
NUS-A228MA	AMS826 Operation & Maintenance Manual	4

Work Orders

64062002	64102233	64123928	64152191
64066747	64105328	64131502	64152372
64096685	64108872	64132473	64152382
64096686	64109461	64137386	
64099553	64110352	64152013	
64101178	64123318	64152028	