Pacific Gas and Electric Company®

Barry S. Allen
Site Vice President

Diablo Canyon Power Plant
Mail Code 104/6
P. O. Box 56
Avila Beach, CA 93424

805.545.4888
Internal: 691.4888
Fax: 805.545.6445

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PG&E Letter DCL-13-011

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.4

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Pacific Gas and Electric Company's Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)

References:

1. NRC Order Number EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012

2. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,'" Revision 0, dated August 29, 2012

Dear Commissioners and Staff:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference 1 to Pacific Gas and Electric Company (PG&E). Reference 1 is immediately effective and directs PG&E to have a reliable indication of the water level in associated spent fuel pools (SFPs). Specific requirements are outlined in Reference 1, Attachment 2.

By PG&E Letter DCL-12-028, dated March 28, 2012, PG&E consented to Reference 1 and did not request a hearing. Based on information available at that time, PG&E had not identified any circumstances of the type described in Sections IV.B.1 and IV.B.2 of Reference 1 requiring relief. In addition, PG&E had not identified any impediments to compliance with Reference 1 within two refueling cycles after submittal of the integrated plan, or December 31, 2016, whichever came first.

By PG&E Letter DCL-12-106, dated October 25, 2012, PG&E confirmed that it had received Reference 2 as required by Reference 1, Section IV.C2.

Reference 1, Section IV.C.1.a, states that all holders of operating licenses issued under Part 50 shall by February 28, 2013, submit to the Commission for review an overall integrated plan including a description of how compliance with the requirements described in Reference 1, Attachment 2 will be achieved.

Enclosure 1 of this letter provides PG&E's overall SFP integrated plan for the Diablo Canyon Power Plant, which includes a description of how compliance with the requirements described in Reference 1, Attachment 2 will be achieved.

PG&E is making a regulatory commitment (as defined by NEI 99-04) in the Enclosure 2 of this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Mr. Terence L. Grebel at (805) 545-4160.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 27, 2013.

Sincerely,

Barry S. Allen
Site Vice President

crlb/SAPN 50465912
Enclosures
cc: Diablo Distribution
cc:/enc: Eric E. Bowman, NRC, NRR/DPR/PGCB
Elmo E. Collins, NRC Region IV
Thomas R. Hipschman, NRC, Senior Resident Inspector
Jessica A. Kratchman, NRC, NRR/JLD/PMB
Eric J. Leeds, NRC Director, Office of Nuclear Reactor Regulation
Eileen M. Mckenna, NRC, NRO/DSRA/BPTS
James T. Polickoski, NRR Project Manager

Reliable Spent Fuel Pool Instrumentation Overall Integrated Plan
Diablo Canyon Power Plant, Units 1 and 2

Introduction

The Nuclear Regulatory Commission (NRC) issued Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," (Reference 1) dated March 12, 2012. Reference 1 requires licensees to have a reliable indication of the water level in associated spent fuel pools (SFPs) capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the SFP operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. Reference 1 also requires submission of an overall integrated plan that provides a description of how the requirements of the order will be achieved.

Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,'" (Reference 2) provides an approach for complying with Reference 1. NRC Interim Staff Guidance (ISG) JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," (Reference 3) considers that the methodologies and guidance in conformance with the guidelines provided in Reference 2, subject to the clarifications and exceptions specific to Reference 2, Section 3.4, Qualification, are an acceptable means of meeting the requirements of Reference 1.

This overall integrated plan applies to Diablo Canyon Power Plant (DCPP) Units 1 and 2 and provides the approach for complying with Reference 1. Pacific Gas and Electric Company (PG&E) will fully comply with the guidance in Reference 2 and Reference 3 in implementing reliable SFP instrumentation for the DCPP site, as documented in the Reliable Spent Fuel Pool Instrumentation Overall Integrated Plan and subsequent regulatory correspondence. Consistent with the requirements of Reference 1 and the guidance in Reference 2, 6-month reports will delineate progress made, any proposed changes in compliance methods, updates to the schedule, and if needed, requests for relief and basis.

Schedule

Installation of reliable SFP level instrumentation will be completed prior to startup from the second refueling outage per Unit, after submittal of this plan, or December 31, 2016, whichever occurs first, consistent with PG&E Letter DCL-12-028, "Answer to March 12, 2012, Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated March 28, 2012 (Reference 4).

The following milestone schedule is provided. The dates are planning dates and are subject to change as design and implementation details are developed. Any changes to the following milestones will be reflected in the subsequent 6-month status reports.

Milestone	Unit 1	Unit 2
Commence engineering and design	03/31/13	03/31/13
Complete design	03/31/14	03/31/14
Receipt of SFP instruments	12/31/14	12/31/14
Complete SFP instrumentation procedures and training	10/29/15	05/31/16
SFP instruments operational	10/29/15	05/31/16

Identification of SFP Water Levels

Key SFP water levels:

(1) **Level adequate to support operation of the normal SFP cooling system:** Indicated level on either the primary or backup instrument channel of 23 feet (ft)-9 inches (in.) above the top of the spent fuel storage racks, plus the accuracy of the SFP level instrument channel, which is to be determined. This aligns with the normal SFP level as described in the DCPP Updated Final Safety Analysis Report (UFSAR) (Reference 5), Section 9.1.2.3.2, and provides adequate margin to maintain SFP cooling pump suction.

(2) **Level adequate to provide substantial radiation shielding for a person standing on the SFP operating deck**: Indicated level on either the primary or backup instrument channel of greater than 10 ft above the top of the spent fuel storage racks based on Reference 2 and Reference 3, plus the accuracy of the SFP level instrument channel, which is to be determined. This monitoring level ensures there is an adequate water level to provide substantial radiation shielding for a person standing on the SFP operating deck.

(3) **Level where fuel remains covered**: Indicated level on either the primary or backup instrument channel of greater than 1 ft above the top of the spent fuel storage racks plus the accuracy of the SFP level instrument channel, which is to be determined. This monitoring level assures that there is adequate water level above the spent fuel seated in the rack.

Instruments

The design of the instruments will be consistent with the guidelines of Reference 2 and Reference 3 as discussed below.

Primary and Backup Instrument Channels:

The DCPP SFP instrumentation system (SFPIS) will utilize fixed primary and backup guided wave radar (GWR) sensors. The GWR technology meets the requirements of Reference 1 and Reference 3 by providing the capability to reliably monitor the SFP water level under adverse environmental conditions.

GWR technology uses the principle of time domain reflectometry to detect the SFP water level. A microwave signal is sent down the cable probe sensor, and when it reaches the water, it is reflected back to the sensor electronics. This is due to the difference between the dielectric constants of air and water. Using the total signal travel time, the sensor electronics embedded firmware computes the level of the water in the SFP. The probe, which is located in the SFP, is separated from the sensor electronics and connected by an interconnecting cable that is routed into an adjacent room or building. By placing the sensor electronics outside of the SFP area, it is not subject to the harsh environment resulting from the boiling or loss of water in the SFP during a postulated loss-of-inventory event that creates high humidity, steam, and/or radiation.

The primary and backup instrument channels will provide continuous level indication from 12 in. above the top of the spent fuel storage racks at elevation 114 ft-11 in. (Reference 5) to the high SFP level at elevation 139 ft (PG&E Letter DCL-86-019, "Spent Fuel Pool Reracking – Additional Information", dated January 28, 1986 (Reference 6).

Reliability

Reliability of the primary and backup instrument channels will be assured by conformance with the guidelines of Reference 2, Section 3.4, Qualification and Section 4.3, Testing and Calibration, and Reference 3.

Instrument Channel Design Criteria:

Instrument channel design criteria will meet the guidelines of Reference 2 and Reference 3.

The primary and backup measurement systems will consist of a flexible stainless-steel sensor cable probe, suspended in the SFP from a bracket attached to the operating deck or to a raised curb at the side of the pool. The cable probe will extend from slightly above the high pool level elevation to less than 1 ft above the top of the spent fuel storage racks. The sensor electronics will be mounted in an adjacent room or building, to prevent instrument exposure to radiation and high temperatures that could result from a postulated loss-of-water inventory in the pool.

A 4 to 20-milliampere (mA) signal from the sensor electronics module is connected to a mounted, seismically-qualified power supply panel. The panel contains a 24-volt (V)

direct current (dc) (Vdc) uninterruptible power supply (UPS) and batteries for continued system operation during a loss of alternating current (ac) power for a minimum of 72 hours, in which time an alternate external source of power can be supplied. A bulkhead connector and transfer switch is externally accessible for the connection of an alternate power source. The interface between the sensor electronics and the mounted panel is a twisted, shielded pair cable.

The interface between the indicator and the sensor electronics and power supply panel is by cable. The indicator is located in one of the accessible locations in the vicinity of the control room.

Arrangement

The primary and backup instrument sensing components will be separated consistent with the guidelines of Reference 2 and Reference 3. Design of the mounting bracket will allow the fuel-handling machine to pass over the bracket without interference.

A SFP walkdown identified preliminary locations for the primary and backup level sensing components. As shown in Figure 1, the preliminary location of the primary and backup instrument sensing components for Unit 1 is at the south and north ends of the Unit 1 SFP, respectively. As shown in Figure 1, the preliminary location of the primary and backup instrument sensing components for Unit 2 is at the north and south ends of the Unit 2 SFP, respectively. The design for installation will include physical separation of the two sensors, separate extension cables from the electronics to the sensors, routing all cables in separate conduit/trays, separate UPS power supplied from different ac sources, and seismically-qualified mounting with physical separation of both the level sensing electronics and indications.

The final location of the primary and backup system mounting brackets will be determined during the design phase with consideration of power availability and separation requirements to protect against missiles.

The level sensing electronics for the primary system will be located in the shared auxiliary building. The level sensing electronics for the backup system will be located in the shared fuel handling building, compliant with Reference 2 and Reference 3 for separation and accessibility.

The primary system indicator will be located in the vicinity of the control room. The backup system indicator will be located in an accessible location. The locations will allow for reading of the indicators following an event.

Mounting

The mounting of both the primary and backup system will be installed to maintain its integrity during and following a design-basis seismic event. All locations will be reviewed for seismic interactions.

Qualification

Reliability of both instrument channels will be demonstrated via an appropriate combination of design, analyses, operating experience, and/or testing of channel components for the following sets of parameters:

(1) conditions in the area of instrument channel component used for all instrument components;

(2) effects of shock and vibration on instrument channel components used during and following any applicable event for installed components; and

(3) seismic effects on instrument channel components used during and following a potential seismic event for only installed components.

The normal operational, event, and post-event conditions for temperature, humidity, and radiation, will be addressed for no fewer than 7 days post-event or until offsite resources can be deployed by the mitigating strategies resulting from NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (Reference 7). Examples of post-event (beyond-design-basis) conditions to be considered are:

(1) radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water level 3 (Section III, Item 3) as described in Reference 1,

(2) temperatures of 212°F and 100 percent relative humidity environment,

(3) boiling water and/or steam environment,

(4) a concentrated borated water environment,

(5) impact of FLEX mitigating strategies.

The instrument channel reliability will be demonstrated by an appropriate combination of design, analyses, operating experience, and/or testing of channel components for the effects of shock and vibration. Demonstration of shock and vibration adequacy will be consistent with the guidelines in Reference 2 and Reference 3.

Demonstration of seismic adequacy will be achieved using one or more of the following methods:

(1) demonstration of seismic motion consistent with that of existing design basis loads at the installed location;

(2) substantial history of operational reliability in environments with significant vibration, such as for portable hand-held devices or transportation applications. Such a vibration design envelope shall be inclusive of the effects of seismic motion imparted to the components proposed at the location of the proposed installation;

(3) adequacy of seismic design and installation is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations" (Reference 8), or a substantially similar industrial standard;

(4) demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges); or

(5) seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

Independence

The backup instrument system will be redundant to and independent of the primary instrument system.

Independence of the two systems includes location, mounting, power sources, power and signal wiring, and indications, to prevent any failure of one system from affecting the other system.

Power Supplies

An ac source will be selected for each system's 24-Vdc UPS, with power cables routed separately through existing or new tray/conduit and penetrations.

Both channels will be powered by independent batteries following a loss-of-ac power. The minimum battery life will be 72 hours. The 72-hour battery life is a sufficient amount of time for an alternate source of power to be provided by the plant-specific procedures to address Reference 7. Each channel will include an externally accessible bulkhead connector and transfer switch for connection of an alternate power source.

Accuracy

Instrument channels will be designed such that they will maintain their specified accuracy without recalibration following a power interruption or change in power source.

The accuracy will be within the resolution requirements of Reference 2, Figure 1.

The instrument accuracy will be sufficient to allow personnel using plant procedures to determine when the water level reaches levels 1, 2, and 3 without conflicting or ambiguous indication.

Testing

Instrument channel design will provide for routine testing and calibration consistent with Reference 2 and Reference 3.

Display

The primary system indicator will be located in the vicinity of the control room. The backup system indicator will be located in an accessible location. The locations will allow for reading of the indicators following an event. The display will provide continuous indication of the SFP water level and will be consistent with the guidelines of Reference 2 and Reference 3.

Instrument Channel Program Criteria

Instrument channel program criteria will be consistent with the guidelines of Reference 2 and Reference 3.

Training:

The Systematic Approach to Training will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. Training will be completed prior to placing the instrumentation in service.

Procedures:

Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation, and abnormal response issues associated with the new SFP instrumentation.

FLEX support guidelines will address a strategy to ensure the SFP water makeup is initiated at an appropriate time consistent with implementation of NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0" (Reference 9).

Testing and Calibration:

Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup SFP level instrument channels to maintain the instrument channels at the design accuracy. Testing and calibration of the instrumentation will be consistent with vendor recommendations and any other documented basis.

Need for Relief and Basis

PG&E is not requesting relief from the requirements of Reference 1 or the guidance in Reference 3 at this time.

Consistent with the requirements of Reference 1 and the guidance in Reference 2, the 6-month reports will delineate progress made, any proposed changes in the compliance methods, updates to the schedule, and if needed, requests for relief and their bases.

References

(1) NRC Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," March 12, 2012

(2) NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,'" Revision 1, August 2012

(3) NRC JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0," August 29, 2012

(4) PG&E Letter DCL-12-028, "Answer to March 12, 2012, Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," March 28, 2012

(5) Diablo Canyon Power Plant Updated Final Safety Analysis Report, Revision 20

(6) PG&E Letter DCL-86-019, "Spent Fuel Pool Reracking – Additional Information," January 28, 1986

(7) NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis- External Events," March 12, 2012

(8) IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"

(9) NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, August 2012

Figure

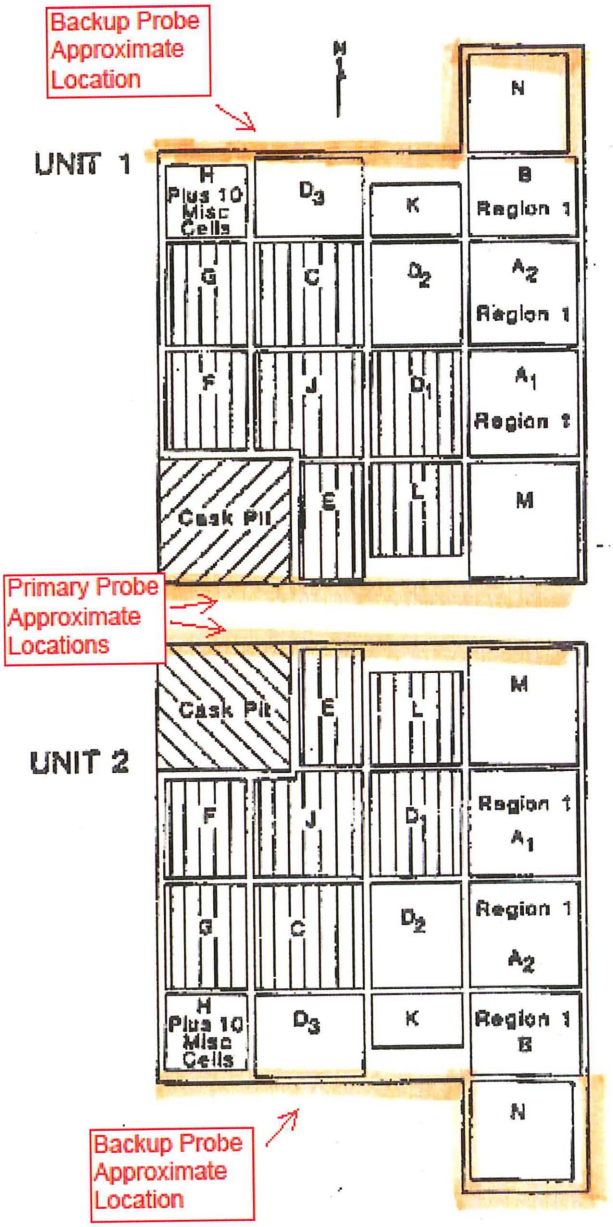

Figure 1

Preliminary Probe Locations for Diablo Canyon Power Plant, Units 1 and 2

Open Items

None

Regulatory Commitments

PG&E is making the following regulatory commitment (as defined by NEI 99-04) in this submittal:

Commitments	Due Date
PG&E will fully comply with the guidance in JLD-ISG-2012-03 and NEI 12-02 in implementing Reliable Spent Fuel Pool Instrumentation for the DCPP site, as documented in the Reliable Spent Fuel Pool Instrumentation Integrated Plan and subsequent regulatory correspondence.	5/31/16