UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 3, 2013

Mr. Edward D. Halpin
Senior Vice President 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, UNIT NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING OVERALL INTEGRATED PLAN FOR RELIABLE SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051) (TAC NOS. MF0963 AND MF0964)

Dear Mr. Halpin:

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A500), Pacific Gas and Electric Company (PG&E, the licensee) submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for Diablo Canyon Power Plant (DCPP), Units 1 and 2. The U.S. Nuclear Regulatory Commission (NRC) staff endorsed 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'," Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307), with exceptions, as documented in Interim Staff Guidance (ISG) JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

The NRC staff reviewed the information provided by the licensee and determined that additional information is needed to complete its review as documented in the Enclosure to this letter. The draft request for additional information (RAI) was transmitted to Mr. Philippe Soenen of your staff via e-mail on June 20, 2013. Mr. Soenen confirmed that an RAI clarification telephone call was not needed and agreed to provide the response as requested. PG&E is requested to provide its RAI response by July 22, 2013. If any part of the requested information is not available by July 22, 2013, please provide a date by which the information will be provided.

If you have any questions regarding this matter, I may be reached at 301-415-5430 or via email at james.policKoski@nrc.gov.

Sincerely,

for

James T. Polickoski, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

OVERALL INTEGRATED PLAN RESPONSE IN TO

ORDER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A500), Pacific Gas and Electric Company (PG&E, the licensee) submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for Diablo Canyon Power Plant (DCPP), Units 1 and 2. The U.S. Nuclear Regulatory Commission (NRC) staff endorsed 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'," Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307), with exceptions, as documented in Interim Staff Guidance (ISG) JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

The NRC staff reviewed the February 27, 2013, response by the licensee and determined that the following request for additional information (RAI) is needed to complete its technical review. If any part of this information is not available within the specified response period for this RAI, please provide the date this information will be submitted.

2.0 LEVELS OF REQUIRED MONITORING

The OIP states, in part, that

> 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.

RAI-1

Please provide the following:

a) The specific elevations within the plant SFP corresponding to the three levels described in the guidance provided in NEI 12-02, Revision 1. For level 1, please specify how the identified elevation represents the HIGHER of the two points described in the NEI 12-02 guidance for this level.

b) A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of the instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Please indicate on this sketch the datum values representing Level 1, Level 2, and Level 3 as well as the top of the fuel racks. Indicate on this sketch the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level with respect to the Level 1, Level 2, and Level 3 datum points.

3.0 INSTRUMENTATION AND DESIGN FEATURES

3.1 Arrangement

The OIP states, in part, that

> 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.

RAI-2

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area depicting the SFP inside dimensions; the planned locations/placement of the primary and back-up SFP level sensors; and the proposed routing of the cables that will extend from the sensors toward the location of the local electronics cabinets and read-out/display devices in the main control room or alternate accessible location.

3.2 Mounting

The OIP states, in part, that

> 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.

RAI-3

Please provide the following:

a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Please describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Please indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections.

c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.

3.3 Qualification

The OIP states, in part, that

> 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 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.

RAI-4

Please provide the following:

a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under Beyond-Design-Basis (BDB) ambient temperature, humidity, shock, vibration, and radiation conditions.

b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to Ii) the level sensor mounted in the SFP area; and (ii) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.

c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment such that following a seismic event the instrument will maintain its required accuracy.

3.4 Independence

The OIP states, in part, that

> 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.

RAI-5

Please provide the following:

a) A description of how the two channels of the proposed level measurement system in each pool meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.

b) Further information describing the design and installation of each level measurement system, consisting of level sensor electronics, cabling, and readout devices. Please address how independence of these components of the primary and back-up channels is achieved through the application of independent power sources, physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

3.5 Power Supplies

The OIP states, in part, that

> An ac [AC, alternating current] source will be selected for each system's 24-Vdc [volts, DC, direct current] UPS [uninterruptible power supply], 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.

RAI-6

Please provide the following:

a) A description of the electrical AC power sources and capacities for the primary and backup channels.

b) If the level measurement channels are to be powered through a battery system (either directly or through an UPS), please provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the BDB event for the minimum duration needed, consistent with the plant mitigation strategies for BDB external events (Order EA-12-049).

3.6 Accuracy

The OIP states, in part, that

> 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.

RAI-7

Please provide the following:

a) An estimate of the expected instrument channel accuracy performance (e.g., in percentage of span) under both i) normal SFP level conditions (approximately Level 1 or higher) and ii) at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.

b) A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag operators and technicians that the channel requires adjustment to within the normal condition design accuracy.

3.7 Testing

The OIP states, in part, that

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

RAI-8

Please provide the following:

a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.

b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other and against any other permanently-installed SFP level instrumentation.

c) A description of how calibration tests and functional checks will be performed and the frequency at which they will be conducted. Please discuss how these surveillances will be incorporated into the plant surveillance program.

d) A description of what preventative maintenance tasks are required to be performed during normal operation and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.

3.8 Display

The OIP states, in part, that

> 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.

RAI-9

Please provide the following:

a) The specific location for the primary and backup instrument channel displays.

b) Since both the primary and backup display locations are not in the main control room, please provide justification for prompt accessibility to displays including primary and alternate route evaluation; habitability at display location(s);

continual resource availability for personnel responsible to promptly read displays; and provisions for communications with decision makers for the various SFP drain down scenarios and external events.

c) The reasons justifying why the locations selected will enable the information from these instruments to be considered "promptly accessible." Include consideration of various drain-down scenarios.

4.0 PROGRAM FEATURES

4.1 Procedures

The OIP states, in part, that

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

RAI-10

Please provide the following:

a) A list of the operating (both normal and abnormal response) procedures, calibration/test procedures, maintenance procedures, and inspection procedures that will be developed for use of the SFP instrumentation in a manner that addresses the order requirements.

b) A brief description of the specific technical objectives to be achieved within each procedure. If your plan incorporates the use of portable spent fuel level monitoring components, please include a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components when needed.

4.2 Testing and Calibration

The OIP states, in part, that

> 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.

RAI-11

Please provide the following:

a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed, and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Please include a description of your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.

b) Please describe how the guidance in NEI 12-02, Section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.

c) A description of the compensatory actions to be taken in the event that one of the instrument channels cannot be restored to functional status within 90 days.

If you have any questions regarding this matter, I may be reached at 301-415-5430 or via email at james.policksoki@nrc.gov.

Sincerely,

/ra/ (JSebrosky for)

James T. Policksoki, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
As stated

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