Pacific Gas and Electric Company®

Edward D. Halpin
Senior Vice President
Nuclear Generation & Chief Nuclear Officer

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

805.545.4100
E-Mail: E1H8@pge.com

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PG&E Letter DCL-13-052

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

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Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Proposed Path to Closure of Generic Safety Issue-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance"

References 1. NRC Commissioners Staff Requirements Memorandum (SRM)-SECY-10-0113, "Closure Options for Generic Safety Issue [GSI]-191, Assessment of Debris Accumulation on Pressurized Water Reactor [PWR] Sump Performance," December 23, 2010

2. NEI John Butler Letter to NRC William H. Ruland, "GSI-191 – Current Status and Recommended Actions for Closure," May 4, 2012

3. NRC Staff's SECY-12-0093 to the NRC Commissioners "Closure Options for Generic Safety Issue–191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," July 9, 2012

4. NEI John C. Butler Letter to NRC William H. Ruland, "Nuclear Regulatory Commission Review of Generic Safety Issue-191 Nuclear Energy Institute Revised Schedule for Licensee Submittal of Resolution Path," November 15, 2012

5. NRC William H. Ruland Letter to NEI John C Butler "Nuclear Regulatory Commission Review of Generic Safety Issue-191 Nuclear Energy Institute Revised Schedule for Licensee Submittal of Resolution Path," November 21, 2012

6. NRC Commissioners Staff Requirements Memorandum (SRM)-SECY-12-0093, "Closure Options for Generic Safety Issue–191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," December 14, 2012

7. NRC Safety Evaluation of Pressurized-Water Reactor Owners Group (PWROG) submitted Topical Report WCAP-16793, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid," April 8, 2013

Dear Commissioners and Staff:

The Nuclear Regulatory Commission (NRC) Staff has provided guidance to licensees on acceptable paths to closure of Generic Safety Issue (GSI)–191, "Assessment of Debris Accumulation on Pressurized-Water Reactor [PWR] Sump Performance," (References 1, 3, and 6). The Nuclear Energy Institute (NEI) has worked with the Staff to develop the schedule and the content of licensee's submittals on paths to closure (References 2, 4, and 5). Following this guidance, Pacific Gas and Electric (PG&E) Company is submitting, "Diablo Canyon Units 1 and 2, Proposed Path to Closure of Generic Safety Issue-191, 'Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance,'" in the Enclosure to this letter. The proposed path to closure is Option 2, "Risk Informed Approach" of SECY-12-0093 (Reference 6).

The Enclosure includes a summary of margins and conservatisms for completed actions for Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors." The Enclosure also provides a summary of defense-in-depth measures implemented at Diablo Canyon Units 1 and 2. The margins, conservatisms and defense-in-depth measures provide support for the extension of time to completely address GL 2004-02 and GSI-191.

PG&E is making regulatory commitments (as defined by NEI 99-04) in this letter. The commitments are contained in the Attachment of the Enclosure to this letter.

If you have any questions, or require additional information, please contact Tom Baldwin at (805) 545-4720.

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

Executed on May 14, 2013.

Sincerely,

Edward D. Halpin
Senior Vice President and Chief Nuclear Officer

dngd/4955/ 50525804
Enclosure
cc: Diablo Distribution
cc/enc: Thomas R. Hipschman, NRC Senior Resident Inspector
Arthur T. Howell, III, NRC Region IV
Gonzalo L. Perez, California Dept. of Public Health
James T. Polickoski, NRR Project Manager

Diablo Canyon Units 1 and 2
Proposed Path to Closure of Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance"

Option 2: Full Risk-Informed Resolution Path

Introduction

Pacific Gas and Electric Company (PG&E) selected the Full Risk-Informed Resolution Path (Option 2 of SECY-12-0093) for resolution of Generic Safety Issue (GSI)-191. PG&E has determined that performing a risk-informed evaluation of the potential for recirculation sump strainer blockage and in-vessel blockage (South Texas Plant (STP) approach) will resolve GSI-191, as identified in SECY-12-0093, for Diablo Canyon Power Plant (DCPP) Unit 1 and Unit 2.

To support use of this path, and continued operation during the period required to complete the necessary analysis and testing, PG&E has evaluated the design and procedural capabilities that exist to detect and mitigate sump strainer and in-vessel blockage. A description of these detection and mitigation measures and a summary of the existing margins and conservatisms that exist for DCPP Units 1 and 2 are included in this document. This enclosure also provides a summary of defense-in-depth measures implemented at DCPP Units 1 and 2. The margins, conservatisms and defense-in-depth measures provide support for an extension of time to completely address GSI-191 and Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors."

Characterization of Current Containment Fiber Status

In July 2008, PG&E submitted Revision 1 to the Supplemental Response to GL 2004-2 (Reference 2). This Revision 1 to the Supplemental Response represented that Unit 2 was in compliance with the Applicable Regulatory Requirements section of GL 2004-2, with an effective date of April 11, 2008, and that DCPP Unit 1 would be in compliance upon completion of the Unit 1 Fifteenth Refueling Outage (1R15), which was completed in April 2009. The Supplemental Response reported that steam jet impact testing was credited to reduce the zone of influence of three debris sources: Temp-Mat, Calcium Silicate and Pressurizer Heater Cable Insulation. Based on the debris generation and debris transport analysis results reported in the Supplemental Response, PG&E determined that 83.61 pounds of fibrous debris could be transported to the strainers, as documented in References 1 and 2. Based on previously performed strainer bypass testing, the total quantity of fiber calculated to bypass the strainer was 5.37 pounds. PG&E conservatively assumed that the entire amount of fiber bypass reached the reactor fuel. No credit was assumed for a fiber fraction that could recirculate through the containment spray system. Thus the total 5.37 pounds was included in DCPP-specific fuel bottom nozzle testing. This equates to an approximate 12.62 grams of fiber per Fuel Assembly (gr/FA).

The fibrous debris sources considered in these analyses were:

- Temp-Mat
- Cerablanket

- Mineral Wool
- Kaowool (Blanket and Board)
- Pressurizer Heater Cable / Jackets and Flexicone Sleeving
- Latent Debris

At an NRC Public Meeting on December 16, 2009, the Nuclear Regulatory Commission (NRC) mentioned that Westinghouse had discovered an error in the test setup for the steam jet impact testing. In a letter dated April 6, 2010, the NRC concluded that the zone of influence (ZOI) test reports were not valid. Westinghouse indicated that the worst case impact of the jet test setup error could approximately double the spherical volume of a ZOI of a specific tested insulation.

Ultimately, this error has the potential to place DCPP Units 1 and 2 outside the design basis documented in the Supplemental Response to the NRC dated July 10, 2008, (Reference 2). The potential increase in debris loading on the containment sump recirculation strainer could place the strainer outside the tested configuration for strainer head loss. Another concern is that the additional debris may bypass the strainer and enter the emergency core cooling system (ECCS) system.

In September 2011, the Pressurized Water Reactor Owner's Group (PWROG) performed new jet tests on the three DCPP test articles (stainless steel jacketed Temp-Mat insulation, multiple banded Calcium Silicate insulation, and cable tray covers for the pressurizer heater cable insulation). The Temp-Mat passed without any modifications. The tests proved that the Calcium Silicate and the cable tray covers would require the future addition of a jacket/cover to protect exposed seams. Adding double jackets on the calcium silicate piping and double tray covers on the cable tray was estimated to cost approximately 11 million dollars and expose employees to considerable dose. For this reason, PG&E has selected the Full Risk-Informed Resolution Path (Option 2 of SECY-12-0093) for resolution of GSI-191.

Characterization of In-Vessel Effects

In 2008, the results of DCPP site specific fuel bottom nozzle testing were reported in Reference 2 and were witnessed and reported by the NRC in Reference 6. The series of tests determined the head loss across the fuel and bottom nozzle and evaluated the repeatability of results, sensitivity to sequence of debris arrival and variations in flow resistance through the fuel assembly for hot leg and cold leg break flows. The debris quantities represented four different break locations and high and low ratios of fiber to particulate. In addition to the fiber, the other debris constituents included particulate (mica and latent dirt/dust), coatings, calcium silicate, marinite, and chemical effects (sodium aluminum silicate and aluminum oxyhydroxide). The head loss results varied from 11.3 to 24.5 inches of water.

Due to errors discovered in the steam jet test setup and protocol, the increased strainer debris load will adversely impact the results of the strainer fiber bypass and in-vessel effects. The results of DCPP fuel bottom nozzle testing documented in Reference 2 are based on additional debris mitigation measures to double jacket calcium silicate

piping insulation and to protect exposed seams of the pressurizer cable tray covers. Implementing the insulation modifications that were proven in the steam jet retesting program in 2011 would restore the validity of the in-vessel results as reported in Reference 2.

PG&E is participating in the PWROG Project Authorizations to enhance plant-specific in-vessel debris limits for the type of plant design that exists at DCPP Units 1 and 2.

Licensing Basis Commitments

PG&E currently has open Requests for Additional Information (RAIs) from the NRC (References 3 and 4) associated with the closure of GSI-191 and the completion of GL 2004-02 for DCPP Units 1 and 2. The RAIs will remain open until the completion of the programmatic actions that are described in the Resolution Schedule, below.

Resolution Schedule

PG&E will achieve closure of GSI-191 and address GL 2004-02 per the following schedule:

- PG&E will meet with the NRC after submittal of this letter to discuss this proposed resolution path and schedule.
- PG&E will complete measurements for insulation remediation (double jacket calcium silicate piping and installation of additional cable tray cover) by the end of the first refueling outage following January 1, 2013, for Unit 1, which is currently scheduled for a March 4, 2014, completion. PG&E will complete measurements for insulation remediation by the end of the second refueling outage following January 1, 2013, for Unit 2, which is currently scheduled for an October 2014 completion. The Unit 2 measurements are being delayed one outage to allow additional time to determine the insulation replacement scope. With this delay, DCPP will still meet the proposed schedule as outlined in SECY-12-0093.
- PG&E will provide to the NRC by third quarter 2013, a schedule for completion of the risk-informed resolution path activities. This schedule will identify the key testing that will need to be completed to determine the viability of this risk-informed approach. The schedule will include a date for submittal of a licensing action (license amendment request (LAR)). The DCPP LAR will be submitted approximately one year after the issuance of the NRC's safety evaluation (SE) for STP.
- PG&E will complete any necessary insulation replacements or remediation, or other identified plant changes during the next refueling outage, following

issuance of a license amendment (LA) for the risk-informed resolution LAR for DCPP Units 1 and 2.

- Within six months of receipt of the LA for DCPP, PG&E will submit a final updated supplemental response to support closure of GL 2004-02 for DCPP Units 1 and 2.

- If it is determined during the risk-informed process that this option is not viable, PG&E will complete modifications for the deterministic resolution path by the third refueling outage after January 1, 2013, for each Unit.

- PG&E will update the current licensing basis. This update will follow the receipt of the LA that approves the risk-informed resolution approach, and/or the update will follow the completion of any identified removal or modification of insulation debris sources in containment (if required).

Summary of Actions Completed For GL 2004-02

In response to GL 2004-02, PG&E has completed the following actions for DCPP Unit 1 and Unit 2:

PG&E installed a larger sump screen (with approximately 5 times the surface area of the sump screens upgraded in the tenth refueling outages, and 40 times the area of the original screens). The larger sump screens are complex geometry strainers, having a filtering surface area of 3,276 square feet, with nominal 3/32-inch circular openings. The strainers have passed plant-specific head loss testing and vortex testing for the original debris load in Reference 2.

PG&E has implemented other physical improvements that include removal of selected debris sources, encapsulation of selected debris sources, and installation of debris interceptors. Specific improvements include:

- Modification of the reactor cavity door to allow more debris to flow into the reactor cavity inactive sump;

- Addition of 3 approximately 18-inch high perforated plate debris interceptors on doors in the crane wall (to capture reflective metal insulation (RMI) and unqualified coating chips).

- Installation of RMI and stainless steel jacketed Temp-Mat on the replacement steam generators.

- Removal of cable tray fire stops inside the crane wall (inside the pipe break ZOIs).

- Installation of multiple banding on calcium-silicate piping insulation inside the pipe break ZOIs.

- Installation of stainless steel jacketing on Temp-Mat piping insulation inside the pipe break ZOIs.

- Installation of tray covers to protect the pressurizer heater cable insulation in cable trays below the pressurizer.

In addition to the modifications listed above, PG&E has completed the following actions for DCPP Unit 1 and Unit 2:

- performed latent debris sampling and characterization

- completed debris generation and debris transport analyses

- completed ex-vessel downstream effects analysis

- completed net positive suction head analysis

- established programmatic and procedural changes to maintain acceptable configuration and protect the newly established design and licensing basis

Summary of Margins and Conservatisms for Completed Actions For GL 2004-02

The following provides a summary description of the margins and conservatisms associated with the resolution actions taken to date. These margins and conservatisms provide support for the extension of time required to address GL 2004-02 for DCPP, Units 1 and 2.

Margins and Conservatisms in Debris Generation

- Latent Debris
  - Analysis assumes 100 pounds, survey has indicated 60 pounds or less.
- Miscellaneous Debris (tags, tape, lamicoids, cable ties, stickers) Inside the Crane Wall
  - Analysis assumes a sacrificial area of 100 percent of the miscellaneous debris versus 75 percent as allowed in the NEI 04-07 Guidance Report, which results in an additional margin of 17 square feet. Seven square feet 3M foil tape has been removed that results in an additional margin that is not currently credited.
- Qualified Coatings inside the ZOI

  - DCPP uses a 5 diameter ZOI for coatings instead of a 4 diameter ZOI.

- Silicone room-temperature vulcanizing Foam, Vapor Barrier Material, Flexicone Sleeving

  - For conservatism, these materials are assumed to be destroyed in the ZOI as 100 percent small pieces in the range of 1/8 inch by 1/8 inch to 1/2 inch by 1/2 inch, large enough to plug holes on the strainer but small enough to be readily transportable.

- Flexicone Sleeving

  - The fiberglass constituent of the flexicone sleeving would remain bonded to the small pieces of silicon rubber, but was conservatively assumed to be generated as fines.

Margins and Conservatisms in Debris Transport

- Computational Fluid Dynamic Analysis was performed at the start of recirculation with a water level in containment conservatively assumed to be at an initial lower elevation of 93.8 feet. At the end of the injection phase when the refueling water storage tank (RWST) is depleted, flood height is at elevation 94.5 feet.

- Miscellaneous debris (e.g., conduit tape, stickers, labels) outside the ZOI is assumed to fail as intact pieces in debris generation. However, debris transport treats miscellaneous debris conservatively as small pieces that may transport.

- The design bases analysis assumes unqualified coatings outside the ZOI fail at the start of the loss of coolant accident (LOCA). However, the coatings are not expected to fail until 30-60 minutes after the LOCA.

Margins and Conservatisms in Debris Interceptor Testing

- Debris interceptor testing was performed at an equivalent flood depth in containment of elevation 93.8 feet, with velocities of 0.63-0.65 feet per second (fps). At the start of recirculation, flood depth in containment is at elevation 93.6 feet; however, the flood depth increases to 94.5 feet at end of RWST depletion. This increase in water level results in a decrease in velocity to 0.50-0.51 fps and a decrease in debris transport for long-term recirculation.

- Debris interceptor testing was performed with the holes of the perforated plate plugged, thus maximizing the flow velocity and debris transport.

Margins and Conservatisms in Testing of Unqualified Coatings Outside the ZOI

- Analysis and testing used a design basis limit of 51,800 square feet of unqualified coatings, versus the existing inventory of 49,358 square feet.

- Design basis accident testing showed coatings failed as chips 1 to 2 square inches as a minimum with most significantly larger, but DCPP conservatively assumes a 1/8 inch by 1/8 inch to 1/2 inch by 1/2 inch chip size which is large enough to plug holes on the strainer but small enough to be readily transportable.

Margins and Conservatisms in Strainer Head Loss Testing

- Strainer head loss testing was performed at an equivalent flood depth of elevation 93.8 feet in containment with velocities of 0.63-0.65 fps. The start of recirculation is 93.6 feet; however, the containment pool level increases to elevation 94.5 feet at end of RWST depletion. This results in a decrease in velocity to 0.50-0.51 fps (and a decrease in debris transport).

- Strainer head loss testing conservatively assumed the 500 square feet of Original Equipment Manufacturer's (OEM) coatings and 4,000 square feet of Inorganic Zinc (IOZ) primer failed as chips rather than small pieces, because chips will block more strainer surface area.

- During testing, debris settled before reaching the screen. To avoid settling of debris, agitation was used to maintain debris in suspension throughout strainer head loss testing.

- Strainer head loss testing did not credit delayed arrival of chemical precipitates, which increases head loss.

Margins and Conservatisms in Fuel Assembly Head Loss Testing

- The chemical load and particulate load (other than the paint chips representing the unqualified coatings outside the ZOI) were conservatively assumed to bypass the strainer and make it to the fuel.

- Fuel assembly head loss testing conservatively used fuel assembly length up to first grid strap. Using bottom nozzle, P-Grid and one grid strap versus full length fuel assembly with multiple grid straps results in maximized debris bed head loss on bottom nozzle and P-grid.

- Fuel assembly head loss testing conservatively assumed the 500 square feet of OEM coatings and 4000 square feet of IOZ primer failed as particulate, rather than larger chips that would not bypass the screen, which accumulated on the fuel.

Summary of Defense-In-Depth Measures

The following describes the plant specific design features and procedural capabilities that exist for detecting and mitigating a strainer blockage or a fuel blockage condition. These measures provide additional assurance that the health and safety of the public would be maintained. They also provide support for the extension of time required to completely address GL 2004-02 for DCPP Units 1 and 2.

It should be noted that these defense-in-depth (DID) measures are not expected to be needed based on the very low probability of an event that would challenge either the capability of the strainer to provide the necessary flow to the ECCS and containment spray (CS) system, or the very low probability of an event that would result in significant quantities of debris being transported to the reactor vessel that would inhibit the necessary cooling of the fuel.

Defense-In-Depth Measures for Strainer Blockage

DCPP Units 1 and 2 have within their Emergency Operating Procedure (EOP) framework, specific steps for monitoring for indications of sump strainer blockage and actions to be taken if this condition occurs. These actions are described in Reference 2. The actions taken in response to the Bulletin are still in effect at DCPP.

Defense-In-Depth Measures for Fuel (Core) Blockage

Detection of Core Blockage

Multiple methods exist for detection of a core blockage condition as manifested by an inadequate reactor coolant system (RCS) inventory or RCS and core heat removal condition. The primary methods include core exit thermocouples and reactor vessel level monitoring system. This monitoring is initiated early in the event in the EOPs through the Critical Safety Function Status Trees. The Critical Safety Function Status Trees are monitored after completion of diagnosis of the event and every 10 to 20 minutes if plant conditions are not frequently changing. Critical Safety Function Status Tress are monitored continuously when plant conditions are changing frequently and a Red or Magenta path exists.

Emergency response personnel in the Technical Support Center (TSC) or Emergency Operations Facility (EOF) will also maintain oversight of plant status through review of information available in the TSC/EOF. An additional method for detection of a core blockage condition includes monitoring of containment radiation levels by the TSC or EOF staff and/or if an alarm setpoint is reached resulting in an alarm in the control room.

Mitigation of Core Blockage

Upon identification of an inadequate RCS inventory or an inadequate core heat removal condition, the EOPs direct the operators to take actions to restore cooling flow to the RCS including:

- increase residual heat removal (RHR) flow to refill the reactor vessel
- reduce ECCS flow rate to maintain stable pump parameters.
- as necessary, decrease RHR flow to prevent pump damage
- refill the RWST
- provide injection flow from the Volume Control Tank (VCT) if sump blockage is also occurring
- attempt to provide core cooling by steaming through the steam generators
- swap RHR to normal cooldown recirculation lineup if sump blockage is also occurring
- transfer to hot leg recirculation

The operators will also inform the TSC of the condition. The TSC will evaluate the condition and recommend the following actions, as necessary, to the operators to restore core heat removal:

- reduce RCS injection flow rate to meet minimal heat removal requirements
- use the hot leg injection flow path
- backwash of the RHR Sump
- establish alternate injection paths to recover the core. These alternate paths include the following sources; opposite Unit's RWST, VCT, and Boric Acid Storage Tanks
- refill of the RWST from the Primary Water Storage Tank or fire protection water
- restart reactor coolant pumps (RCPs)
- flood containment using the Portable Diesel Fire Pump

The debris load tested for the back flush testing represented the base case limiting debris prior to replacement of the steam generators. The amount of tested debris was significantly greater than the debris load tested for the design basis head loss of Reference 2. The debris load tested during the back flush test represented approximately six times the fibrous debris load and greater than ten times the amount of calcium silicate. Thus the back flush test results remain valid, even with the potential increase in debris due to calcium silicate and cable insulation fiber. The DCPP strainer back flush capability assures that even in the worst possible conditions, DCPP can maintain long-term core cooling.

In addition to the DID measures listed above, PG&E is currently evaluating the recommendations made by Westinghouse in DW-12-013. PG&E will evaluate the recommended changes to the EOP framework and implement any necessary changes, along with the requisite operator training by June 16, 2014.

Conclusion

PG&E expects that the GSI-191 resolution path for DCPP Units 1 and 2 is acceptable, based on the information provided in this document. The execution of the actions identified in this document will result in successful resolution of GSI-191 and closure of GL 2004-02.

References

1. PG&E Letter DCL-08-002, "Supplemental Response to Generic Letter 2004-02, 'Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors,'" dated February 1, 2008.

2. PG&E Letter DCL-08-059, "Supplemental Response to Generic Letter 2004-02, 'Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors (Revision 1),'" dated July 10, 2008.

3. NRC letter to PG&E, "Diablo Canyon Units 1 and 2 – Request for Additional Information Regarding Supplemental Response to Generic Letter 2004-02, 'Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors,'" (TAC Nos. MD4682 and MD4683), dated August 1, 2008.

4. PG&E Letter DCL-08-094, "Response to Request for Additional Information Regarding Supplemental Response to Generic Letter 2004-02, 'Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors,'" dated November 3, 2008.

5. NRC Meeting Summary, Subject: "Summary of January 27, 2010, Meeting with Pacific Gas and Electric Company Regarding Generic Letter 2004-02," (TAC Nos. MC4682 and MC4683), dated February 16, 2010.

6. NRC Trip Report, "Diablo Canyon Bottom Nozzle Testing, Continuum Dynamics Incorporated," dated May 19-21, 2008, (ML-081690224)

List of Regulatory Commitments

Commitment 1

PG&E will meet with the NRC after submittal of this letter to discuss this proposed resolution path and schedule.

Commitment 2

PG&E will complete measurements for insulation remediation (double jacket calcium silicate piping and installation of additional cable tray cover) by the end of the first refueling outage following January 1, 2013 for Unit 1, which is currently scheduled for a March 4, 2014 completion. PG&E will complete measurements for insulation remediation by the end of the second refueling outage following January 1, 2013 for Unit 2, which is currently scheduled for an October 2014 completion.

Commitment 3

PG&E will provide to the NRC by third quarter 2013, a schedule for completion of the risk-informed resolution path activities. This schedule will identify the key testing that will need to be completed to determine the viability of this risk-informed approach. The schedule will include a date for submittal of a licensing action (license amendment request (LAR)). The DCPP LAR will be submitted approximately one year after the issuance of the NRC's safety evaluation (SE) for STP.

Commitment 4

PG&E will complete any necessary insulation replacements or remediation, or other identified plant changes during the next refueling outage, following issuance of an SE for the risk-informed resolution LAR for DCPP Units 1 and 2.

Commitment 5

Within six months of receipt of the SE for DCPP, PG&E will submit a final updated supplemental response to support closure of GL 2004-02 for DCPP Units 1 and 2.

Commitment 6

If it is determined during the risk-informed process that this option is not viable, PG&E will complete modifications for the deterministic resolution path by the third refueling outage after January 1, 2013, for each Unit.

Commitment 7

PG&E will update the current licensing basis. This update will follow the receipt of the NRC SE that approves the risk-informed resolution approach, and/or the update will follow the completion of any identified removal or modification of insulation debris sources in containment (if required).

Commitment 8

PG&E will evaluate the recommended changes to the EOP framework and implement any necessary changes, along with the requisite operator training by June 16, 2014.