September 25, 2002

Mr. Gregory M. Rueger
Senior Vice President, Generation and
Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
P. O. Box 3
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENT RE: CREDIT FOR SOLUBLE BORON IN THE SPENT FUEL POOL CRITICALITY ANALYSIS (TAC NOS. MB2982 AND MB2984)

Dear Mr. Rueger:

The Commission has issued the enclosed Amendment No. 154 to Facility Operating License No. DPR-80 and Amendment No. 154 to Facility Operating License No. DPR-82 for the Diablo Canyon Nuclear Power Plant (DCPP), Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated September 13, 2001, as supplemented by letter dated February 27, 2002.

The amendments revise Technical Specification (TS) 3.7.16.1 to allow the use of credit for soluble boron in the spent fuel pool (SFP) criticality analysis. The amendments also increase the frequency of Surveillance Requirement 3.7.16.1 from 31 days to 7 days to verify the SFP boron concentration is within limits.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,

/RA/
Brian Benney, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-275
and 50-323

Enclosures:
1. Amendment No. 154 to DPR-80
2. Amendment No. 154 to DPR-82
3. Safety Evaluation

cc w/encls: See next page

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PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 154
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Pacific Gas and Electric Company (the licensee) dated September 13, 2001, as supplemented by letter dated February 27, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-80 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 154, hereby incorporated in the license. Pacific Gas and Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/
Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 25, 2002

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-323

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 154
License No. DPR-82

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Pacific Gas and Electric Company (the licensee) dated September 13, 2001, as supplemented by letter dated February 27, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-82 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 154, are hereby incorporated in the license. Pacific Gas and Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/
Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 25, 2002

ATTACHMENT TO

LICENSE AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-82

DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
Page 3 of 4	Page 3 of 4
3.7-27	3.7-27
3.7-28	3.7-28
3.7-29	3.7-29
3.7-30	3.7-30
3.7-31	3.7-31
3.7-32	3.7-32
4.0-1	4.0-1
4.0-2	4.0-2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-82

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By application dated September 13, 2001, as supplemented by letter dated February 27, 2002, Pacific Gas and Electric Company (PG&E or the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License Nos. DPR-80 and DPR-82) for the Diablo Canyon Nuclear Power Plant, Units 1 and 2. The proposed changes would revise the Diablo Canyon spent fuel pool criticality analysis. The licensee's new analysis credits soluble boron to control reactivity with the intent of replacing the checkerboard configuration established in response to Generic Letter (GL) 96-04, "Boraflex Degradation in Spent Fuel Pool (SFP) Storage Racks," dated June 26, 1996. Approval of the request also results in a change of the licensing basis, which required maintaining a 5 percent subcriticality margin under all conditions. The licensee stated that this approval and licensing basis change would allow them to maintain full core offload capability. The new analysis methodology was stated to be analogous to WCAP-14416-NP-A, "Westinghouse Spent Fuel Rack Criticality Analysis Methodology," except that it accounts for the axial burnup bias nonconservatisms identified after WCAP-14416-NP-A was approved. This departure from an approved methodology results in a new analysis methodology.

The February 27, 2002, supplemental letter provided additional clarifying information, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on October 31, 2001 (66 FR 55020).

GL 96-04 was issued because of concerns related to gamma radiation-induced Boraflex degradation. In response to this GL, PG&E administratively modified the arrangement of fuel stored in the spent fuel pool into a checkerboard configuration within the region of the pool employing storage racks containing Boraflex panels thus reducing the storage capacity of each pool by 145 assemblies. This license amendment request eliminates the need to credit Boraflex for maintaining a subcritical condition within that region and eliminates the storing of fuel assemblies in a checkerboard configuration, thereby allowing the use of the 145 cells that were previously blocked and returning the pools to their authorized capacity.

The following technical specifications (TS) will be changed as a result of approval of the new criticality analysis: TS 3.7.16, "Spent Fuel Pool Boron Concentration"; TS 3.7.17, "Spent Fuel Assembly Storage - Region 1/Region 2"; and TS 4.3, "Fuel Storage." The boron concentration surveillance frequency of TS 3.7.16 changes from 31 days to 7 days. The TS 3.7.17 changes reflect a transition from a two region pool to a single region pool and the new parameters of interest from the new criticality analysis. The new TS 4.3 reflects 10 CFR 50.68 criticality accident requirements and new parameters from the new criticality analysis.

2.0 BACKGROUND

In the past, several utilities encountered Boraflex degradation. The NRC staff did not consider this a safety issue since pressurized water reactor (PWR) plant criticality analyses did not credit the considerable concentrations of soluble boron that were present in the spent fuel pool. The Boraflex degradation was not expected to result in impingement on the required 5 percent subcriticality margin. However, in 1996, the NRC published GL 96-04, which required plants to assess the capability of Boraflex to maintain the 5 percent subcriticality margin, and to submit a plan to the NRC describing proposed actions if the subcriticality margin could not be maintained due to future Boraflex degradation. PG&E's action in response to GL 96-04 was to administratively implement a checkerboard configuration in Region 1, which contained the deteriorating Boraflex. This form of controlling reactivity is effective but reduces the pool capacity. The new criticality analysis submitted credits soluble boron to control pool reactivity in a single region pool environment in order to regain the capacity lost due to configuration controls previously instituted. The Boraflex panels are not credited in the analysis.

This safety evaluation (SE) evaluates potential dilution pathways from plant systems that could decrease the concentration of soluble boron in the spent fuel pool sufficiently to challenge the design basis subcriticality requirements. This SE also reviews an increase in the frequency of Surveillance Requirement (SR) 3.7.16.1, which verifies that the spent fuel pool boron concentration is within limits. The frequency of the SR is proposed to increase from 31 days to 7 days.

3.0 EVALUATION

Section 9.1.2.3, "Safety Evaluation" of Revision 13 to the Diablo Canyon Final Safety Analysis Report (FSAR) Update, establishes the licensing basis to maintain a 5 percent subcriticality margin in the spent fuel pool under all conditions. Approval of this request changes that licensing basis. With the new licensing basis, the spent fuel pool k_{eff} must be less than unity including all biases and uncertainties at a 95 percent probability/95 percent confidence level (95/95 level) assuming no soluble boron. An addition of 806 ppm soluble boron is credited to regain the 5 percent subcriticality margin. The spent fuel pool soluble boron concentration is maintained at greater than or equal to 2000 parts per million (ppm) in accordance with TS Limiting Condition for Operation (LCO) 3.7.16. This is more than sufficient concentration to maintain the 5 percent subcriticality margin.

The licensee provided a Westinghouse spent fuel pool criticality analysis in Enclosure 5 of their September 13, 2001, submittal. General Design Criterion (GDC) 62 requires prevention of criticality in fuel handling and storage by physical systems or processes, preferably by use of geometrically safe configurations. The aim of the criticality analysis is to discontinue the checkerboard configuration control by replacing it with the physical process of neutron attenuation by a strong neutron absorber, B-10 in soluble boron instead of B-10 in a fixed panel. This process is regulated by 10 CFR 50.68, which specifies criticality accident requirements and specifically states requirements when crediting soluble boron in the spent fuel pool. Section 50.68(b)(4) requires a k_{eff} less than or equal to 0.95 in the presence of borated water, and k_{eff} less than 1.0 in the absence of boron, both with a 95 percent probability/95 percent confidence. The staff evaluated the licensee's criticality analysis against the 10 CFR 50.68 acceptance criteria. The analysis resolves criticality issues of degraded Boraflex of concern in GL 96-04 by not crediting the negative reactivity associated with degraded Boraflex panels.

The review procedures of Standard Review Plan (SRP) Section 9.1.2, "Spent Fuel Storage" guides the staff to consider spacing and strong fixed neutron absorbers (i.e., Boraflex) sufficient to maintain k_{eff} less than or equal to 0.95 in the absence of soluble boron. However, 10 CFR 50.68 takes precedence. As mentioned above, the spent fuel storage dilution accident acceptance criterion is k_{eff} less than 1.0. Therefore, the criticality analysis and changes to the technical specifications reflect implementation of this requirement. The first step of the criticality analysis was to determine a configuration to meet the dilution accident acceptance criterion of k_{eff} less than 1.0.

The normal condition acceptance criterion was k_{eff} less than 0.95 assuming no soluble boron, under the assumptions of the April 14, 1978 letter from Brian K. Grimes, NRC, to all power reactor licensees that provided the position guidance. The current 10 CFR 50.68 dilution accident acceptance criterion results in the dropped assembly accident condition acceptance criteria being more restrictive than the normal conditions. In other words, the current regulation targets a k_{eff} of less than 1.0 assuming no soluble boron, thereby transforming the normal condition k_{eff} to less than 1.0. This normal condition acceptance criterion transformation was remedied by the staff's "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants," dated August 19, 1998, to allow soluble boron credit under normal conditions to maintain k_{eff} less than 0.95. The analysis then is aimed at determining the incremental soluble boron concentration needed to maintain k_{eff} less than or equal to 0.95 and to mitigate a non-dilution accident with an acceptance criterion of k_{eff} less than 0.95 and to account for calculational uncertainties.

The first step in the Diablo Canyon methodology for implementing soluble boron credit is to determine a configuration that would maintain the spent fuel pool k_{eff} less than 1.0 when flooded with unborated water, including uncertainties at a 95/95 level. The soluble boron concentration needed to drop k_{eff} down to 0.95 under normal conditions was then computed. Finally, the amount of soluble boron needed to offset the worst accident reactivity insertion was computed. The conclusion of the analysis was that 806 ppm was needed to maintain the subcriticality margin. The details of that analysis follow.

Westinghouse performed the criticality analysis with SCALE-PC, which includes the CSAS25 control module which includes BONAMI, NITAWL-II and KENO-Va and employs the 44 Group ENDF/B-V cross section library. SCALE-PC was validated against 30 critical experiments. The critical experiments included 19 from the Babcock and Wilcox experiments carried out in support of the close proximity storage of power reactor fuel and 11 experiments from the Pacific Northwest Laboratory (PNL) experimental program. The calculations adequately reproduced the data. The same code and cross sections were used for the statistical analysis and for the calculations. The DIT code was used to generate a set of isotopic concentrations. It has been benchmarked against Combustion Engineering (CE) PWR cores and against other PWR lattice codes, such as CASMO, with very good agreement. The benchmarking (validation) supports the use of these codes for this application.

Westinghouse performed calculations of an infinite array of fresh and burned assemblies in a 2x2 checkerboard configuration to determine the allowable burnup/enrichment curve and the tolerance and uncertainty Δk_{eff} units. Seven cases of varying enrichment and burnup were run and the resulting enrichment versus burnup storage curve was plotted in Figure 4.1-1 of the licensee's September 13, 2001 submittal. Westinghouse used a full spent fuel pool model to determine the soluble boron worth that was calculated with 0, 100, 200, and 300 ppm of soluble boron and tabulated in Table 3.6-1. This table was generated to be used to determine the soluble boron needed to bring the normal condition k_{eff} down from 1.0 to 0.95, and to offset uncertainties.

The bounding 17x17 fuel assembly designs chosen were the Westinghouse standard fuel assembly for burned fuel and the Westinghouse optimized fuel assembly for fresh fuel. A 5 percent enriched fresh fuel assembly with 16 integral fuel bundle absorbers (IFBA) loaded with 1.5 mg/in each was shown by analysis to be of lower reactivity than 4.9 percent enriched with no IFBA loading. Fuel assemblies enriched to greater than 4.9 percent must have a minimum of 16 IFBA rods. Therefore, the staff finds the Westinghouse analysis performed with 4.9 percent enriched fuel for the fresh fuel model to be acceptable.

Capturing end effects necessarily requires a non-uniform axial burnup distribution. This distribution was demonstrated to be effectively described by four axial zones, three of which are small zones at the top of the fuel rod. The most limiting burnup profile was taken from DOE/RW-0472, Rev.1, "Topical Report on Actinide-Only Burnup Credit for PWR Spent Fuel Packages." An 18-zone model was chosen as the most limiting of 3169 axial burnup profiles calculated based on core-follow calculations and in-core measurement data compiled in a database by Yankee Atomic. The 18-zone model was reduced to 4- and 7-zone models. A comparison of the 4-zone and 7-zone models shows that the 4-zone model results in matching the k_{eff} of the 7-zone model within 2σ. The analyses showed that the 18-zone model did not provide additional accuracy since more than 95 percent of fissions occurred in the top 18 inches of the fuel assembly where the axial bias is more important. The 4-zone model is representative of a fuel assembly burnup profile and expected accuracy and is therefore acceptable.

Westinghouse used the DIT code to generate isotopic concentrations for each segment of the axial profile. The DIT isotopic concentrations were equivalenced to a reduced set of isotopes for KENO material composition inputs. This equivalencing was performed by explicitly representing the U-235, U-236, U-238, Pu-239, Pu-240, Pu-241, O-16, and equilibrium Sm-149 at shutdown. The rest of the fission product inventory was represented by an equivalent B-10 concentration. This representation was achieved by varying the B-10 concentration in the KENO calculation until the KENO k_{eff} matched the DIT calculated value to within 0.0006 $\Delta k_{eff.}$ Calculations were performed for 3 percent, 4 percent, and 5 percent enriched fuel with burnup up to 65 GWD/MTU. The DIT code bias was accounted for in the uncertainty analysis. This representation is acceptable since the reduced set of isotopes represented in the KENO material composition reproduces the DIT k_{eff} within 0.0006 and since the DIT code has been validated and the uncertainty is accounted for.

The licensee provided a summary of tolerances and uncertainties for the zero soluble boron condition, which were calculated with the infinite array. These uncertainties were factored into the final soluble boron determination through assigning appropriate Δk_{eff} units for each factor and equating that to an equivalent soluble boron concentration needed to offset those uncertainties. The tolerances and uncertainties accounted for include a methodology bias based on the critical experiments, a reactivity bias due to pool conditions, the 95/95 confidence level methods variance, the 95/95 confidence level calculational uncertainty, fuel rod manufacturing tolerance, storage rack fabrication tolerance, fuel assembly enrichment uncertainty, and pellet density uncertainty, burnup uncertainty, fuel temperature uncertainty, and tolerance for fuel assembly cell positioning. The pool soluble boron concentration needed to maintain the 5 percent subcriticality margin included the Δk_{eff} units computed from these uncertainty calculations.

Reactivity equivalencing methodology uncertainty is the fuel assembly reactivity uncertainty and the fuel assembly burnup uncertainty. The fuel assembly reactivity uncertainty is the depletion uncertainty and was taken to be 0.005 Δk_{eff} per 30 GWD/MTU. The analysis maximum burnup was 52550 MWD/MTU, which results in 0.008758 Δk_{eff} units for fuel assembly reactivity uncertainty. The fuel assembly burnup uncertainty was taken as 5 percent of the analysis maximum burnup which is 2627.5 MWD/MTU, which results in a Δk_{eff} of 0.00389. The sum of these is 0.01265 Δk_{eff} units, resulting in 56 ppm interpolated from Table 3.6-1 on page 51 of Enclosure 5 of the licensee's September 13, 2001, submittal.

The submittal described how a Δk_{eff} was calculated for methodology bias and reactivity bias for a spent fuel pool temperature variation from 50°F to 212°F. The staff independently calculated the KENO bias based on the equation on page 12 of the licensee's September 13, 2001, submittal and agrees that the value is 0.00259 based on the summaries of calculational results for the critical experiments tabulated in Tables 1.4-1 and 1.4-2. The staff confirmed that the approach to determine the mean calculational bias and the mean calculational variance is appropriate for this validation.

The potential accident events, such as misplacement of fresh fuel, and the dropped fuel assembly, were analyzed to determine the increase in the k_{eff} value of the spent fuel pool. The worst case scenario analyzed is the positioning of two fresh fuel assemblies in adjacent cells. This accident was modeled using the full spent fuel pool model with 0, 400 and 600 ppm of soluble boron to determine the Δk_{eff} of the misplacement condition as compared to no misplacement, as well as the soluble boron worth under those conditions. The accident calculation showed that the misplacement accident resulted in a positive reactivity insertion of 0.09760 Δk_{eff} units, offset by 512 ppm of soluble boron, which was determined by linear interpolation. Other mishandling events, such as the misplacement of a fresh fuel assembly in place of a burned fuel assembly, were also analyzed to determine their k_{eff} value.

Based on the review of the results of all the analyses conducted, and accounting for all the uncertainties in the calculations, a boron concentration of 806 ppm was determined to be sufficient to maintain the spent fuel pool at a k_{eff} of less than or equal to 0.95, with a 95/95 confidence level. PG&E's current TS value of 2,000 ppm minimum is more than sufficient to cover any accident scenario, including the boron concentration requirement of 56 ppm associated with reactivity equivalencing. The TS value of 2000 ppm will conservatively maintain the spent fuel pool storage rack k_{eff} less than or equal to 0.95 when fuel is stored in accordance with the configurations evaluated in the criticality analysis.

The licensee conservatively calculated the spent fuel pool water volume to be 379,000 gallons. Of this volume, 347,000 gallons of unborated water, also conservatively calculated, would be required to dilute this volume from 2000 ppm to 806 ppm. The licensee evaluated potential dilution paths, based on flow rate, to determine the time required to reach 806 ppm. The dilution sources considered in the analysis are: chemical and volume control system (CVCS) holdup tanks, primary water makeup system, makeup water system, liquid radwaste system, component cooling water (CCW) system, equipment drain systems, fire protection system, and spent fuel pool demineralizer. Of these sources, the CVCS holdup tanks, the liquid radwaste system, and the CCW systems are eliminated from further analysis because they do not contain more than 347,000 gallons. The licensee reported that dilution from seismic events or random pipe breaks is bounded by the analysis below for 170 gallons per minute (gpm) flow into the pool from the primary water makeup system. They discounted the equipment drain system because backflow through the system is not considered credible. The spent fuel pool demineralizer is eliminated because it cannot provide sufficient dilution. Therefore, three sources provide a credible dilution path. These are the primary water makeup system, makeup water system, and the fire protection system.

Primary Water Makeup System

The contents of the primary water storage tank can be transferred to the spent fuel pool via the primary water pumps directly or indirectly:

The direct path is through the spent fuel pool demineralizer resin flushing connection with the manual isolation valve left open. This path can provide 170 gpm. The licensee determined that it would take 2 hours to increase the spent fuel pool level from the low to high alarm setpoints, and 34 hours to provide the 347,000 gallons required to dilute the pool from 2000 to 806 ppm soluble boron. This affords the licensee over 30 hours to mitigate the event. The staff verified the time to dilution through independent calculation.

The indirect path is via spillage from a local tool washing station near the spent fuel pool. The primary water pumps supply the tool washing station. It could provide a flow rate of 50 gpm. If the hose at this station were left spilling into the pool and unattended, it would take 6.4 hours to increase the spent fuel pool level from the low to high alarm setpoints, and nominally 5 days to provide the 347,000 gallons to dilute the pool from 2000 to 806 ppm boron. The staff verified the time to dilution through independent calculation. This affords the licensee over 4-1/2 days to mitigate the event.

Makeup Water System

There are two potential paths from this system:

One path is from the rental water treatment unit. The flow rate from this system is 494 gpm. If flow from this unit were left aligned to the spent fuel pool, the licensee's analysis indicates that it would take 37 minutes to increase the spent fuel pool level from the low to high alarm setpoints, and nominally 12 hours to provide the 347,000 gallons required to dilute the pool from 2000 to 806 ppm soluble boron. The staff independently calculated a value of 11.7 hours to dilute the pool. This affords the licensee 11 hours to mitigate the event from receipt of the spent fuel pool high level alarm.

The other makeup water path is from the condensate storage tank or the fire water transfer tank, via the makeup water transfer pumps to the spent fuel pool, and can provide approximately 320 gpm. If the path were established and left unattended, it would take 1 hour to increase the spent fuel pool level from the low to high alarm setpopints, and 18 hours to provide the 347,000 gallons to dilute the pool from 2000 to 806 ppm boron. The staff verified the time to dilution through independent calculation. This affords the licensee 17 hours to mitigate the event.

Fire Protection System

The fire protection system draws from a firewater transfer tank. A potential indirect path exists from the fire water pump to the spent fuel pool via spillage from the fire hose station outside the spent fuel pool area and can provide approximately 125 gpm. If the hose was left unattended, it would take 2.5 hours to increase the spent fuel pool level from the low to high alarm setpoints, and nominally 2 days to provide the 347,000 gallons required to dilute the pool from 2000 to 806 ppm boron. The staff verified the time to dilution through independent calculation. This affords the licensee a little under 2 days to mitigate the event.

Of the above three potential dilution sources, the fire protection system is capable of providing non-borated water to the spent fuel pool during a loss of offsite power. This could provide 125 gpm to the spent fuel pool as described above. A loss of offsite power would affect the licensee's ability to respond to a dilution event because the spent fuel pool level instrumentation is not powered from vital power supplies. However, this event would be identifiable by plant personnel making rounds in the spent fuel pool room every 12 hours and therefore would afford the licensee about 1-1/2 days to mitigate the event. The licensee indicated that the refueling water purification pump is not powered from a safeguards supply and would not be available to deliver borated water from the refueling water storage tank (RWST). However, at a water level above approximately 50 percent, the RWST can be gravity-fed to the spent fuel pool through the refueling water purification pumps to provide a borated water source. Also, manual addition of dry boric acid to the pool could be used if it became necessary to increase the spent fuel pool boron concentration during a loss of offsite power.

Conclusion

The staff considers the above calculated response times, based on knowledge of required time response for operator actions, to be adequate to respond to and mitigate the events described. A typical required operator response time to terminate a flood due to pipe break outside containment, for example, is one-half hour based on the criteria in ANSI/ANS 58.8-1984, "Time Response Design Criteria for Nuclear Safety Related Operator Actions."

The staff has reviewed the license amendment request submitted by the licensee. The changes proposed for TS 3.7.16, 3.7.17 and 4.3, as a result of the revised criticality analysis, will ensure adequate design margin with respect to criticality. The staff finds these changes to the Technical Specifications for PG&E to be acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change a surveillance requirement. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (66 FR 55020). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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