May 29, 2002

Mr. Michael R. Kansler
Senior Vice President and
Chief Operating Officer
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: INDIAN POINT NUCLEAR GENERATING, UNIT NO. 2 - AMENDMENT RE: CREDIT FOR SOLUBLE BORON AND BURNUP IN SPENT FUEL PIT (TAC NO. MB2989)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 227 to Facility Operating License No. DPR-26 for the Indian Point Nuclear Generating Unit No. 2. The amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated September 20, 2001, as supplemented on January 25 and April 29, 2002.

The amendment revises TS 3.8, "Refueling, Fuel Storage and Operations with the Reactor Vessel Head Bolts Less Than Fully Tensioned," TS Table 4.1-2, "Frequencies for Sampling Tests," and TS 5.4, "Fuel Storage," to allow credit for soluble boron in the criticality analysis for the spent fuel pit (SFP). The amendment also incorporates changes to the SFP rack layout by dividing it into sub-regions and specifying requirements for fuel assembly burnup and soluble boron concentration for various loading configurations in these sub-regions.

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

Sincerely,

/RA/

Patrick D. Milano, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-247

Enclosures: 1. Amendment No. 227 to DPR-26
2. Safety Evaluation

cc w/encls: See next page

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Package Number: ML021230413 TS: ML021550533
Accession Number: ML021230367 *See previous concurrence

OFFICE	PDI-1\PM	PDI-1\LA	SPLB\SC*	EMCB\SC*	SRXB\SC*	OGC*	PDI-1\SC
NAME	PMilano	SLittle	SWeerakkody	LLund	FAkstulewicz	RHoefling	RLaufer
DATE	05/22/02	05/22/02	05/13/02	05/13/02	05/14/02	05/21/02	05/22/02

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DATED: May 29, 2002

AMENDMENT NO. 227 TO FACILITY OPERATING LICENSE NO. DPR-26 INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

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ENTERGY NUCLEAR INDIAN POINT 2, LLC

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-247

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 227
License No. DPR-26

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

   A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee) dated September 20, 2001, as supplemented on January 25 and April 29, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and 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-26 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 227, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 29, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 227

FACILITY OPERATING LICENSE NO. DPR-26

DOCKET NO. 50-247

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 Pages	Insert Pages
ix	ix
3.8-4	3.8-4
3.8-5	3.8-5
3.8-6	3.8-6
Figure 3.8-1 (deleted)	Figure 3.8-1
Figure 3.8-2	Figure 3.8-2
Figure 3.8-3	Figure 3.8-3
-----	Figure 3.8-4
-----	Figure 3.8-5
Table 4.1-2 (page 1 of 2)	Table 4.1-2 (page 1 of 2)
5.4-1	5.4-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 227 TO FACILITY OPERATING LICENSE NO. DPR-26

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

DOCKET NO. 50-247

1.0 INTRODUCTION

By letter dated September 20, 2001, as supplemented on January 25 and April 29, 2002, Entergy Nuclear Operations, Inc. (the licensee) submitted a request for changes to the Indian Point Nuclear Generating Unit No. 2 (IP2) Technical Specifications (TSs). The requested changes would revise TS 3.8, "Refueling, Fuel Storage and Operations with the Reactor Vessel Head Bolts Less Than Fully Tensioned," TS Table 4.1-2, "Frequencies for Sampling Tests," and TS 5.4, "Fuel Storage," to allow the credit for soluble boron in the criticality analysis for the spent fuel pit (SFP). The amendment would also incorporate changes to the SFP rack layout by dividing it into sub-regions and specifying requirements for fuel assembly burnup and soluble boron concentration for various loading configurations in these sub-regions. The requested increase in the soluble boron compensates for the reactivity gain due to the degradation of the Boraflex neutron absorber that is integral to the high-density storage racks at IP2. The January 25 and April 29, 2002, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 REGULATORY EVALUATION

General Design Criterion (GDC) 62, "Prevention of criticality in fuel storage and handling," states that "[c]riticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations." The U.S. Nuclear Regulatory Commission (NRC) has established a 5 percent subcriticality margin (k-effective (k_{eff}) $\leq$ 0.95) for nuclear power plant licensees to comply with GDC 62.

Section 50.68, "Criticality accident requirements," of 10 CFR Part 50 states in subpart (b)(4): "If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water."

In Generic Letter (GL) 96-04, "Boraflex Degradation In Spent Fuel Pool Storage Racks," dated June 26, 1996, the NRC staff expressed concerns related to: (1) gamma radiation-induced shrinkage of Boraflex and the potential to develop tears or gaps in the material, and (2) long-term Boraflex performance throughout the intended service life of the racks resulting from gamma irradiation and exposure to the wet pool environment. The NRC staff requested licensees that use Boraflex to assess the ability of Boraflex to maintain a 5 percent subcriticality margin, and to submit a plan describing proposed actions if the 5 percent subcriticality margin could not be maintained by the Boraflex material due to current or projected material degradation.

In License Amendment No. 150 dated April 19, 1990, the NRC authorized an increase to the storage capacity of the IP2 SFP by using high-density storage racks containing Boraflex as a neutron absorber. The criticality analysis supporting License Amendment 150 assumed unborated SFP water. Upon subsequent discovery of degradation to the Boraflex, the licensee implemented a "checkerboard" fuel distribution pattern to conservatively maintain criticality margins. This effectively reduced the capacity of the SFP. Current criticality criteria restricts k_{eff} in the SFP to $\leq$ 0.95 "even if unborated water were used to fill the pit." Thus, in its September 20 application, the licensee requested changes to the TSs, utilizing NRC-approved methodology, to allow credit for soluble boron to maintain $k_{eff} \leq 0.95$. This proposed change will allow the storage capacity of the SFP to return to the levels authorized by Amendment No. 150. It is being proposed as a long-term solution to restore its capacity in light of the Boraflex degradation in the racks.

The staff finds that the licensee identified the applicable regulatory requirements. The regulatory requirements for which the staff based its acceptance are: 10 CFR 50.68 and in particular, 10 CFR 50.68(b).

3.0 TECHNICAL EVALUATION

The staff has reviewed the licensee's regulatory and technical analyses in support of the proposed license amendment which is described in licensee's application dated September 20, 2001, as supplemented on January 25 and April 29, 2002. The detailed evaluation below will support the conclusion 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 amendment will not be inimical to the common defense and security or the health and safety of the public.

3.1 Background

The licensee's proposed amendment is a consequence of the reduced SFP storage capacity due to the implementation of a "checkerboard" fuel distribution pattern at IP2. This short-term corrective action was bounded by a criticality analysis assuming unborated pit water and reduced the number of storage locations in the SFP. This short-term corrective action was necessary to compensate for the onset of thinning and the development of gaps in the Boraflex neutron absorbing material integral to the storage racks. The licensee committed to long-term corrective actions to restore the SFP capacity which has led to its request for additional credit for soluble boron in the SFP. The soluble boron compensates for the reactivity gain due to the degradation of the Boraflex neutron absorber in the high-density storage racks at IP2.

3.2 Proposed TS Changes

In its September 20, 2001, application, the licensee proposed changes to the TSs which will meet the requirements of 10 CFR 50.68 by crediting the use of soluble boron in the SFP. TS 3.8.1.D provides details for the current specified Regions I and II within the storage racks and the categories of the fuel that can be placed in each region. The proposed changes to TS 3.8.D.2 will require a boron concentration sampling on a weekly basis (increased from monthly) and will increase the required minimum soluble boron concentration from 1500 ppm to 2000 ppm.

Each of the two SFP regions will be further subdivided into two sub-regions with limiting conditions for operation for each sub-region as follows:

- Region 1-1 takes no credit for Boraflex and for ^{241}Pu decay and can accommodate unirradiated fuel up to 5.0 w/o ^{235}U assuming a minimum number of Integral Fuel Burnable Absorber (IFBA) rods using a 1 of 2 checkerboard loading pattern with alternate cells left vacant.

- Region 1-2 is assumed to have sustained a 50 percent loss of Boraflex. Region 1-2 can accommodate unirradiated fuel up to 5.0 percent ^{235}U assuming a minimum number of IFBA rods.

- Region 2-1 takes no credit for Boraflex and can accommodate assemblies that have been discharged with a minimum burnup and have cooled for a minimum amount of time.

- Region 2-2 is assumed to have sustained a 30 percent loss of Boraflex. Region 2-2 can accommodate assemblies that have been discharged with a minimum burnup and have cooled for a minimum amount of time.

The specific spent fuel storage rack layouts, limiting fuel burnup vs. initial enrichment, and minimum number of IFBA rods vs. initial enrichment are quantified for each of the specific regions in the TSs.

Additionally, for each region, the licensee proposed a conservative minimum TS requirement for SFP boron concentration of 2000 ppm and increased the frequency for sampling tests of the boron concentration from monthly to weekly. The NRC staff noted that this limit on the boron concentration in the SFP is consistent with other TS requirements, such as the soluble boron concentration for the refueling water storage tank, the accumulators and the reactor refueling water cavity under specified refueling conditions.

3.3 Westinghouse Owners Group (WOG) Topical Report WCAP-14416-P

In a safety evaluation (SE) dated October 25, 1996, the staff accepted WOG Topical Report WCAP-14416-P for referencing in licensing applications where licensee's propose to take credit for soluble boron in spent fuel pool criticality analyses. The staff review and acceptance of WCAP-14416-P focused on the methodology whereby credit could be taken for soluble boron in the SFP to meet NRC-recommended criterion that the spent fuel "rack multiplication factor" (k_{eff}) be less than or equal to 0.95, at a 95-percent probability, 95-percent confidence level. The

NRC required each licensee proposing to use this method for soluble boron credit to identify potential events which could dilute the SFP soluble boron to the concentration required to maintain $k_{eff} \leq 0.95$ and to quantify the time span of these dilution events to show that sufficient time is available to enable detection and mitigation of any dilution event. In its September 20 application, the licensee addressed the approved methodology of Topical Report WCAP-14416-P by identifying the events and quantifying the time available to recognize and mitigate potential boron dilution events at IP2.

3.4 Analytic Methodology

The NRC staff review was limited to the issues associated with the criticality SE presented in Attachment 3, "Criticality Analysis for Soluble Boron and Burnup Credit in the Con Edison Indian Point Unit No. 2 Spent Fuel Storage Racks," of the September 20 application. The staff notes that the license for IP2 was transferred from Consolidated Edison of New York, Inc., to Entergy Nuclear Operations, Inc. on September 6, 2001.

As stated in Section 2.0 of this SE, the regulatory requirements for this amendment request are given in 10 CFR 50.68(b)(4) which states:

> "...If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water."

3.4.1 Estimation of Boraflex Degradation

The key element in the licensee's methodology to show that the regulatory requirements are met is the estimation of the Boraflex degradation with time through the end of calender year 2006.

The licensee based its prediction of the state of degradation of the Boraflex panels in the IP2 SFP through 2006 on the predictions of the computer code RACKLIFE (Refs. 1 and 2), and through periodic, quantitative, in-situ measurements via the BADGER system developed by Northeast Technology Corporation under contract for the Electric Power Research Institute (Ref. 3) .

The Boraflex panel degradation can be divided into three modes, which are characterized by different degradation mechanisms:

1. Uniform dissolution.

2. Shrinkage, including gaps. This results from radiation induced cross-linking of the polymer matrix of Boraflex.

3. Local dissolution. Local non-uniformities in the panel, panel cavity, and cavity inlet/outlet geometry can accentuate dissolution locally.

The RACKLIFE code includes models of the above three degradation mechanisms. It is used to simulate SFP operations at IP2 through the end of 2006 and, thereby, predicts the absorbed dose to and, consequently, the boron carbide (B_4C) loss from the IP2 SFP rack Boraflex panels. Exogenous factors that affect Boraflex degradation include: absorber gamma dose, water temperature, pool water pH, and clean-up and make-up system operation. The RACKLIFE code allows for the input of these factors and models the following phenomena: silica kinetics and pool transport, Boraflex panel absorbed gamma dose, boron carbide loss from Boraflex panels, silica source term, polymerization of silica, panel-cavity-to-pool-volume exchange, and cleanup systems. Calculations based on this information give: time dependent pool silica concentration, individual gamma exposure, and individual panel boron carbide loss. The pool silica level is measured at IP2 as part of the surveillance program and is compared to the values predicted by RACKLIFE. Currently, licensee updates the silica data in the RACKLIFE model on a 1 to 2-month cycle.

The RACKLIFE predictions are based on data of a BADGER test program at IP2 which characterized the state of the IP2 spent fuel racks Boraflex panels at the time of testing (February 2000). The RACKLIFE code is used to identify which panels in the IP2 spent fuel racks have the highest absorbed dose or the highest predicted B_4C loss or both. Measurements are then performed on a spectrum of dose and loss, but with a strong bias toward the “worst” panels. These observed BADGER data are used to develop a probability distribution for random sampling so as to account for the variance observed between RACKLIFE predictions and BADGER observations and the random nature of local effects.

The licensee committed to BADGER testing during the year 2003 to confirm that the assumptions used in the current analysis (based on BADGER testing in February 2000) are still valid (Ref. 4). The NRC staff concludes that the licensee’s methodology for conservatively estimating the level of Boraflex degradation in the IP2 SFP based on RACKLIFE prediction and periodic BADGER measurements is acceptable.

3.4.2 Criticality Calculation

The criticality analysis employs the SCALE code package, and in particular the stochastic Monte Carlo code KENO V.a. (Ref. 5). The KENO code, which has three-dimensional modeling capability, is used when axial effects are important (e.g., axially distributed gaps) or when lateral non-uniformities are present (e.g., checkerboard loading). The deterministic code CASMO-4 is used to compute the reactivity effects due to degraded Boraflex. CASMO-4 is a two-dimensional multi-group transport theory code for fuel assembly burnup analysis such as observed in fuel storage racks. These codes conform with NRC guidance on the regulatory requirements for criticality analysis of fuel storage at light-water reactor power plants (Ref. 6). Moreover, the analytical methods and models used in the reactivity analysis have been benchmarked against experimental data for fuel assemblies similar to those for which the IP2 spent fuel racks are designed and have been found to adequately reproduce the critical values. This experimental data is sufficiently diverse to establish that the method bias and uncertainty will apply to rack conditions that include close proximity storage and strong neutron absorbers.

In Regulatory Information Summary 2001-12 (Ref. 7), the NRC identified a concern that the results reported in NUREG/CR-6683 (Ref. 8) indicate that reactivity equivalencing in the context of high boron concentrations can lead to non-conservative results. In the situation of the licensee’s analysis, this concern only applies to accident conditions, and, in particular, to the calculations involving misplaced bundles and the interface between regions. In these cases, the soluble boron requirements were determined based on the limiting differential boron worth. For each of the fuel rack regions the differential boron worth was computed at various burnups, enrichments and soluble boron concentrations (up to 1500 ppm). The resulting minimum differential boron worth for the pool then takes into account the reduced boron worth due to fission products, the spectral effects of residual Boraflex and increasing soluble boron concentration.

On the basis of the above, the staff concludes that the analysis methods used are acceptable and capable of conservatively predicting the reactivity of the IP2 spent fuel racks with a high degree of confidence.

3.4.2.1 Normal Operating Conditions

Under normal operating conditions the effects of Boraflex degradation are mitigated by taking credit for fuel assembly burnup, the decay of Pu-241, the partial credit for soluble boron in the spent fuel pool water, and IFBA rods in the reload fuel. Without soluble boron, the effective neutron multiplication factor k_{eff} by region is:

Region 1-1	Region 1-2	Region 2-1	Region 2-2
0.98137	0.95006	0.99392	0.99598

These values are less than 1.0, with a 95 percent probability at a 95 percent confidence level, even when the effects of biases, tolerances and uncertainties are included.

The amounts of boron required in each region to achieve a k_{eff} of less than 0.95, with a 95 percent probability at a 95 percent confidence level, even when the effects of biases, tolerances and uncertainties are included are:

Region 1-1	Region 1-2	Region 2-1	Region 2-2
714	786	770	725

These values are well below the proposed TS limit for minimum soluble boron concentration of 2000 ppm.

3.4.2.2 Accident Conditions

The analyses presented by the licensee for abnormal or accident conditions apply the double-contingency principle, wherein credit for soluble boron may be assumed in the evaluation of other than loss of soluble boron accident conditions (Ref. 6). In this regard, the licensee's administrative procedures to assure the presence of soluble boron preclude the possibility of the simultaneous occurrence of 2 independent accident conditions.

The following three categories of abnormal occurrences have been considered:

- Dropped Fuel Assembly or Assembly Alongside Rack
- Misloaded Assembly
- Abnormal Heat Load

The minimum amounts of additional soluble boron required to maintain the effective neutron multiplication factor k_{eff} at less than 0.95, with a 95 percent probability at a 95 percent confidence level, in the event of the worst-case accident are:

Accident Conditions	Region 1-1	Region 1-2	Region 2-1	Region 2-2
Dropped Fuel Assemble or Assembly Alongside Rack	38	38	38	38
Misloaded Assembly	679	0	725	319
Abnormal Heat Load	110	110	60	60
Total with Worst Case Accident	1393	896	1495	1044

Thus, in the event of the worst-case accident, a soluble boron concentration of 1495 ppm would be required to mitigate the effect. The licensee's proposed IP2 TS would require a minimum concentration of 2000 ppm soluble boron and provides sufficient margin in excess of 1495 ppm.

3.4.3 Staff Findings

The NRC staff concludes that the analysis methods used are acceptable and capable of conservatively predicting the reactivity of the IP2 spent fuel racks with a high degree of confidence. In addition, the staff finds that the criticality analyses presented by the licensee to obtain credit for soluble boron in the SFP for storage of fuel assemblies is acceptable and supports the proposed changes to TSs. The proposed minimum soluble boron concentration provides sufficient margin to mitigate the effects of postulated accidents.

3.5 Boron Dilution

3.5.1 Boron Dilution Analysis

As stated above, the licensee determined, through criticality analysis, a minimum acceptable soluble boron concentration which would mitigate a worst-case fuel loading accident. That concentration is 1495 ppm soluble boron required to maintain $k_{eff} \leq 0.95$. For normal conditions the licensee has calculated that a concentration of 786 ppm is required to maintain $k_{eff} \leq 0.95$.

The proposed minimum TS soluble boron concentration is 2000 ppm. This concentration is derived from the licensee's criticality analysis (from a concentration of 1495 ppm with margin added) to maintain $k_{eff} \leq 0.95$ in the SFP for accident conditions. It is noted that the SFP soluble boron concentration must be maintained at a minimum of 2000 ppm to protect against a fuel-handling accident (FHA) (maintain $k_{eff} \leq 0.95$) but an FHA is not assumed concurrent with a dilution event. The approach utilized in the dilution analysis is to evaluate which events, among all dilution events, are capable of adding sufficient unborated water to dilute the SFP from 2000 ppm to 786 ppm. The IP2 SFP water volume is 33,000 cubic feet. The water volume that would dilute the soluble boron concentration from 2000 ppm to 786 ppm was calculated by the licensee to be 230,551 gallons.

The dilution analysis provides quantitative results of the spectrum of plant-specific dilution events to determine that adequate time is available to detect and mitigate all dilution events including the worst-case event. The events were categorized as dilution from sources other than pipe leakage, and dilution as a result of leakage due to pipe failure. The events considered are: (1) dilution from primary water make-up system, (2) SFP heat exchanger tube leak, (3) steam heating and condensate return leakage, (4) fire protection standpipe leakage, (5) city water leakage, (6) primary water pipe leakage, (7) SFP building roof water in-leakage.

Of the events considered, three were identified by the licensee as events that could dilute the SFP (add 230,551 gallons of unborated water) from 2000 ppm to 786 ppm soluble boron. The first of these events is leakage from steam heating and condensate return lines inside the SFP building. The licensee calculated a leak rate of 0.9 gallons per minute (gpm) from this source. At this leak rate it would take 178 days for the pool to dilute from 2000 ppm to 786 ppm boron. This is a large time frame and the change in boron concentration would be detected by the 7-day TS boron sampling.

The second event which is capable of diluting the SFP to 786 ppm is leakage from the 4-inch nominal pipe size fire protection (FP) standpipe at the 95-foot elevation inside the SFP building. This was determined to be the worst-case dilution event. The licensee assumed a moderate-energy piping failure and conservatively calculated a blowdown of 108 gpm from this line, according to criteria provided in NRC Branch Technical Positions SPLB 3-1, "Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," Rev. 2, and MEB 3-1, "Postulated Break and Leakage Locations in Fluid System Piping Outside Containment," Rev. 1. At this leak rate, the SFP would dilute from 2000 to 786 ppm boron in 35.6 hours. This leakage would not be detected by boron sampling at the TS 7-day frequency. This amount of leakage, however, is relatively large and would cause the SFP to overflow in less than 2 hours. The licensee has indicated that this would be readily observable by anyone walking in the vicinity of the SFP, by operators during required rounds which occur every 12 hours, and during normal security rounds which typically occur every couple of hours. This leak would also be detected by the SFP high level alarm which would initiate, at most, after 66 minutes, and by the unusual demand on the FP system (FP pump auto start alarms). The licensee has further indicated that this source would be immediately evident because the location of the FP standpipe is such that the leakage would result in a jet of water in the vicinity of the normal walkway used to inspect the SFP.

The third event considered which could dilute the SFP to 786 ppm soluble boron is a leak of the 3/4-inch city water line inside the SFP building. The licensee conservatively assumed the line has a 1-inch diameter and calculated a maximum leak rate of 50 gpm from this source. At this leak rate the SFP would dilute from 2000 to 786 ppm in 3.2 days. This cannot be assumed to be detected by the required TS 7-day sampling. However, it would overflow the SFP in 4.2 hours and be observable by plant operators on required rounds which occur every 12 hours and by normal security rounds which typically occur every couple of hours. Also, the SFP high level alarm would initiate, at most, after 2.4 hours. As with the FP standpipe, leakage from this pipe would result in a jet of water observable from the walkway used to inspect the SFP.

The staff reviewed the licensee's evaluation of these events and finds the licensee's conclusion acceptable that adequate time is available for detection and mitigation of the events which are capable of diluting the SFP from 2000 ppm to 786 ppm. The other events considered were found either not to be credible or not capable of diluting the SFP to 786 ppm boron.

3.5.2 Staff Findings

Based on our review of the licensee's boron dilution analysis described above, the staff finds the proposed TS changes acceptable because it has been shown that adequate time is available for detection and mitigation of events capable of diluting the SFP from the proposed TS minimum soluble boron concentration of 2000 ppm to the minimum soluble boron concentration required to maintain $k_{eff} \leq 0.95$ (786 ppm) during normal operation. The proposed changes to TS 3.8.D.2 provide for maintaining a minimum soluble boron concentration in the SFP of 2000 ppm and require boron concentration sampling on a weekly basis.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (66 FR 55012). Accordingly, the amendment meets 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 amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

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