September 4, 1997

Mr. Richard R. Grigg
Chief Nuclear Officer
Wisconsin Electric Power Company
231 West Michigan Street, Room P379
Milwaukee, WI 53201

SUBJECT: POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS RE: INCREASE FUEL ENRICHMENT FOR SPENT FUEL POOL STORAGE (TAC NOS. M97837 AND M97838)

Dear Mr. Grigg:

The Commission has issued the enclosed Amendment Nos.179 and183to Facility Operating License Nos. DPR-24 and DPR-27 for the Point Beach Nuclear Plant (PBNP), Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated January 24, 1997 (TSCR-193), as supplemented on May 15 and August 5, 1997.

These amendments revise TS 15.5.4, "Fuel Storage," to increase fuel assembly enrichment limits to 5.0 weight percent U-235 while maintaining K_{eff} in the storage pools (spent fuel pool and new fuel storage racks) less than 0.95. Fuel assemblies with enrichments greater than 4.6 weight percent U-235 will incorporate integral fuel burnable absorbers.

A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Orig. signed by
Linda L. Gundrum, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosures:
1. Amendment No179to DPR-24
2. Amendment No183to DPR-27
3. Safety Evaluation

cc w/encls: See next page

DISTRIBUTION: See attached page

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DATE	8/8 /97		8/8 /97		8/12 /97		8/14/97		9/2 /97	

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

September 4, 1997

Mr. Richard R. Grigg
Chief Nuclear Officer
Wisconsin Electric Power Company
231 West Michigan Street, Room P379
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cc w/encls: See next page

cc:

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DATED: September 4, 1997

AMENDMENT NO.179TO FACILITY OPERATING LICENSE NO. DPR-24 - POINT BEACH UNIT 1
AMENDMENT NO.183TO FACILITY OPERATING LICENSE NO. DPR-27 - POINT BEACH UNIT 2

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

WISCONSIN ELECTRIC POWER COMPANY

DOCKET NO. 50-266

POINT BEACH NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 179
License No. DPR-24

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

   A. The application for amendment by Wisconsin Electric Power Company (the licensee) dated January 24, 1997, as supplemented on May 15 and August 5, 1997, 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 3.B of Facility Operating License No. DPR-24 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No.179, are hereby incorporated in the license. The licensee shall operate the facility in accordance with Technical Specifications.

3. This license amendment is effective immediately upon issuance. The Technical Specifications are to be implemented within 45 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Linda L. Gundrum

Linda L. Gundrum, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of issuance: September 4, 1997

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

WISCONSIN ELECTRIC POWER COMPANY

DOCKET NO. 50-301

POINT BEACH NUCLEAR PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 183
License No. DPR-27

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

   A. The application for amendment by Wisconsin Electric Power Company (the licensee) dated January 24, 1997, as supplemented on May 15 and August 5, 1997, 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 3.B of Facility Operating License No. DPR-27 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No.183, are hereby incorporated in the license. The licensee shall operate the facility in accordance with Technical Specifications.

3. This license amendment is effective immediately upon issuance. The Technical Specifications are to be implemented within 45 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Linda L. Gundrum

Linda L. Gundrum, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of issuance: September 4, 1997

ATTACHMENT TO LICENSE AMENDMENT NOS. 179 AND 183

TO FACILITY OPERATING LICENSE NOS. DPR-24 AND DPR-27

DOCKET NOS. 50-266 AND 50-301

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE	INSERT
15.5.4-1	15.5.4-1
-	15.5.4-2

15.5.4 FUEL STORAGE

Applicability

Applies to the capacity and storage arrays of new and spent fuel.

Objective

To define those aspects of fuel storage relating to prevention of criticality in fuel storage areas.

Specification

1. The new fuel storage and spent fuel pool structures are designed to withstand the anticipated earthquake loadings as Class I structures. The spent fuel pool has a stainless steel liner to ensure against loss of water.

2. The new and spent fuel storage racks are designed so that it is impossible to store assemblies in other than the prescribed storage locations. The fuel is stored vertically in an array with sufficient center-to-center distance between assemblies to assure $K_{eff} < 0.95$ with the storage pool filled with unborated water and with the fuel loading in the assemblies limited to 5.0 w/o U-235, with or without axial blanket loadings. Each assembly with a fuel loading greater than 4.6 w/o U-235 must contain Integral Fuel Burnable Absorber (IFBA) rods in accordance with Figure 15.5.4-1 or have a reference infinite multiplication factor, K_{∞}, less than or equal to 1.49364, which includes a 1% ΔK reactivity bias. An inspection area shall allow rotation of fuel assemblies for visual inspection, but shall not be used for storage.

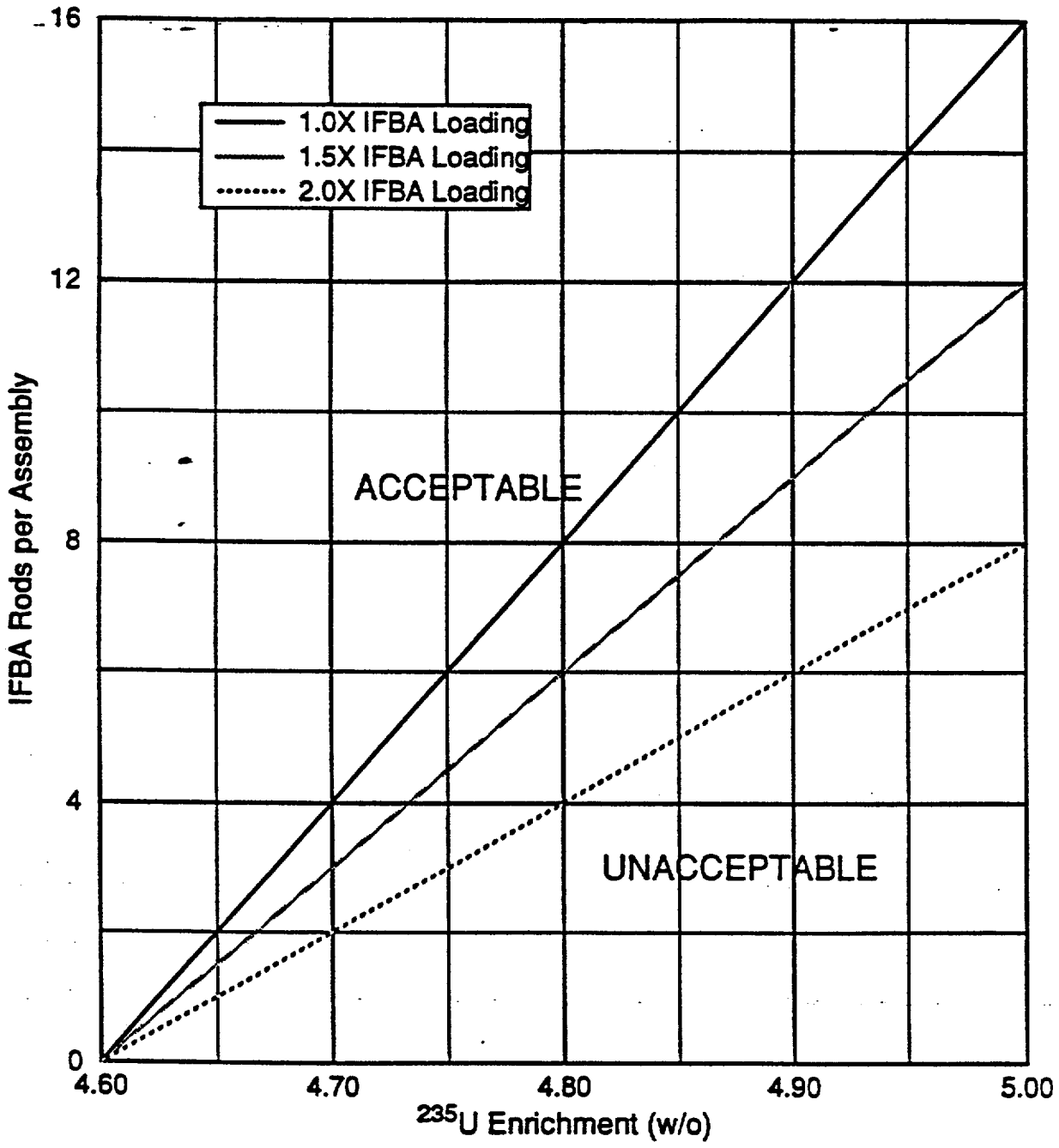
3. The spent fuel storage pool shall be filled with borated water at a concentration of at least 1800 ppm boron whenever there are spent fuel assemblies in the storage pool.

4. Except for the two storage locations adjacent to the designated slot for the spent fuel storage rack neutron absorbing material surveillance specimen irradiation, spent fuel assembly storage locations immediately adjacent to the spent fuel pool perimeter or divider walls shall not be occupied by fuel assemblies which have been subcritical for less than one year.

Unit 1 - Amendment ~~35,77,86,117,126~~, 179
Unit 2 - Amendment ~~41,81,90,120,130~~, 183

Figure 15.5.4-1

Fuel Assembly IFBA Requirements



Note: 1.0X, 1.5X, and 2.0X IFBA rods have nominal poison material loadings of 1.67, 2.50, and 3.34 milligrams B-10 per inch, respectively.

Unit 1 - Amendment 179

Unit 2 - Amendment 183

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 179 AND 183 TO

FACILITY OPERATING LICENSE NOS. DPR-24 AND DPR-27

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-266 AND 50-301

1.0 INTRODUCTION

By letter dated January 24, 1997, as supplemented on May 15 and August 5, 1997, the Wisconsin Electric Power Company (the licensee) requested amendments to the Technical Specifications (TS) appended to Facility Operating Licenses Nos. DPR-24 and DPR-27 for the Point Beach Nuclear Plant (PBNP), Unit Nos. 1 and 2. The proposed amendments would revise TS 15.5.4, "Fuel Storage," to increase fuel assembly enrichment limits to 5.0 weight percent (w/o) Uranium-235 (U-235) while maintaining K_{eff} in the storage pools (spent fuel pool and new fuel storage racks) less than 0.95.

The August 5, 1997, supplement provided clarifying information within the scope of the original application and did not change the staff's initial proposed no significant hazards considerations determination.

2.0 EVALUATION

The current NRC limitation on maximum U-235 enrichment is 5.0 w/o. However, the previous NRC-accepted analysis for the new fuel storage racks assumed Westinghouse 14x14 Optimized Fuel Assembly (OFA) fuel at an enrichment of 5.5 w/o U-235 with no neutron absorbers. The proposed changes would allow for the storage of fuel with an enrichment not to exceed a nominal 5.0 w/o U-235 in the new (fresh) and spent fuel storage racks. The licensee plans to use integral fuel burnable absorbers (IFBAs) in fuel assemblies with enrichments greater than 4.6 w/o U-235. Therefore, the previous analysis remains bounding for the proposed changes.

The analysis of the reactivity effects of fuel storage in the PBNP spent fuel storage racks was performed with the three-dimensional multi-group Monte Carlo computer code, KENO-5a, using neutron cross sections generated by the NITAWL code package from the 227 energy group library. Since the KENO-5a code package does not have depletion capability, burnup analyses were performed with the two-dimensional transport theory code, PHOENIX-P. PHOENIX-P was also used to determine the reactivity effects of material and manufacturing tolerances. These codes are widely used for the analysis of fuel rack reactivity and have been benchmarked against results from numerous critical experiments. The NRC has found these codes

acceptable and capable of predicting the reactivity of pressurized water reactor spent fuel storage racks containing assemblies with maximum fuel rod enrichments of 5.0 w/o U-235 with a high degree of confidence and concludes that they are also acceptable for the PBNP storage rack analyses.

The storage racks in the spent fuel pool contain stainless steel storage cells with a center-to-center spacing of 9.938 inches. Each cell contains two 8-inch wide and 0.10-inch thick Boraflex panels. The spent fuel racks are normally fully flooded by water borated to at least 1800 parts per million (ppm), as required by TS 15.5.4.3. However, to meet the criterion stated in Section 9.1.2 of the NRC Standard Review Plan (SRP), k_{eff} must not exceed 0.95 with the racks fully loaded with fuel of the highest anticipated reactivity and flooded with unborated water. The maximum calculated reactivity must include a margin for uncertainties in reactivity calculations and in manufacturing tolerances such that the true k_{eff} will not exceed 0.95 at a 95/95 probability/confidence level.

The PBNP spent fuel storage racks were evaluated for Westinghouse 14x14 OFA and standard (STD) fuel assemblies nominally enriched to 4.6 w/o U-235 and moderated by pure water at a temperature of 68 °F. For the nominal storage cell design, uncertainties due to tolerances in fuel enrichment and density, storage cell inner diameter and pitch, and Boraflex absorber width and thickness were accounted for, as well as asymmetric fuel positioning. These uncertainties were determined at the 95/95 probability/confidence level. In addition, calculational and methodology biases and uncertainties due to benchmarking, a bias to account for B-10 self-shielding in the Boraflex, and a bias to account for the effect of the normal range of pool water temperatures (50 °F to 180 °F) on neutron cross sections were included. The staff concludes that these biases and uncertainties are appropriately conservative and acceptable.

Although no measurable shrinkage or gap formation was detected during the blackness testing of PBNP Boraflex panels conducted in September 1996, all Boraflex absorber panels were modeled with 4% width shrinkage. In addition, all Boraflex panels were also modeled with 4% length shrinkage, which was assumed to occur either uniformly (end shrinkage) or nonuniformly (a single 4-inch gap distributed randomly along the axial position). In response to NRC Generic Letter 96-04 on Boraflex degradation, the licensee stated that the silica levels in the PBNP pool do not indicate significant dissolution of the Boraflex and, therefore, thinning was not assumed. Based on the results of the blackness testing, on the low pool silica levels, and on upper bound values recommended by Electric Power Research Institute (EPRI), the staff agrees that these assumptions bound the current measured data and future development of additional shrinkage and gaps. Therefore, the staff concludes that the effect of Boraflex degradation has been adequately included in the PBNP criticality analysis.

The resulting k_{eff} was 0.94876. This meets the 0.95 acceptance criterion and is, therefore, acceptable.

To allow the storage of fuel assemblies with nominal enrichments greater than 4.6 w/o U-235, the licensee used the concept of reactivity equivalencing. In this technique, which has been previously approved by the NRC, credit is taken for the reactivity decrease due to the IFBA material coated on the outside of the uranium dioxide pellet. Based on these calculations, the reactivity of the fuel rack array containing fuel assemblies enriched to 5.0 w/o U-235 with each containing 16 IFBA rods, was found to be equivalent to the rack reactivity with 4.6 w/o fuel with

no IFBA rods. The calculation assumed the standard IFBA patterns used by Westinghouse with the minimum standard loading of 1.675 milligram per inch of Boron-10 per rod. Since the worth of individual IFBA rods can change depending on position within the fuel assembly, additional margin was included in the IFBA requirement to account for this. In addition, the IFBA requirements also include a 10% margin on the total number of IFBA rods for 5.0 w/o enriched assemblies to account for calculational uncertainties. The staff concludes that the IFBA requirement calculations contain sufficient conservatism to account for manufacturing and calculational uncertainties.

As an alternative method for determining the acceptability of fuel storage in the spent fuel pool racks, the infinite multiplication factor, k_∞, of a 4.6 w/o U-235 Westinghouse 14x14 OFA fuel assembly in the PBNP core geometry was determined to be 1.49364. Therefore, fuel with a reference k_∞ no greater than 1.49364 can be stored in the spent fuel pool and meet the 0.95 rack reactivity acceptance criterion.

Most abnormal storage conditions will not result in an increase in the k_{eff} of the racks. However, it is possible to postulate events, such as placing a fresh fuel assembly of the highest possible enrichment in the middle of the space between the rack module and the concrete wall of the spent fuel pool or pool temperatures decreasing below 50 °F (cooldown event), which could lead to an increase in reactivity. However, for such events, credit may be taken for the presence of a minimum of 1800 ppm of boron in the pool water required by TS 15.5.4.3, since the staff does not require the assumption of two unlikely, independent, concurrent events to ensure protection against a criticality accident (double contingency principle). In fact, the reduction in k_{eff} caused by only 700 ppm of boron is sufficient to mitigate the worst postulated accident in the pool. Therefore, the staff criterion of k_{eff} no greater than 0.95 for any postulated accident is met.

Based on the staff's evaluation, the following proposed TS changes were found to be acceptable:

> TS 15.5.4 would replace the existing enrichment limits while maintaining the original k_{eff} limits.
>
> The new TS would allow storage of both Westinghouse 14x14 STD and OFA fuel assemblies with enrichments up to 5.0 w/o U-235.
>
> The TS would require that assemblies with enrichments greater than 4.6 w/o U-235 incorporate IFBAs, as shown in proposed TS Figure 15.5.4-1, or have a reference k_∞ less than or equal to 1.49364.

In conclusion, based on the staff's review described above, the staff finds the criticality aspects of the proposed enrichment increase to the PBNP new and spent fuel pool storage racks are acceptable and meet the requirements of PBNP General Design Criterion (GDC) 66 and Title 10, *Code of Federal Regulations*, Part 50, Appendix A, GDC 62 for the prevention of criticality in fuel storage and handling.

Although the above-mentioned fuel is acceptable for storage in the PBNP fuel storage racks, evaluations of reload core designs (using any enrichment) will, of course, be performed on a cycle-by-cycle basis as part of the reload safety evaluation process. Each reload design is

evaluated to confirm that the cycle core design adheres to the limits that exist in the accident analyses and TS to ensure that reactor operation is acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact has been prepared and published in the *Federal Register* on August 13, 1997 (62 FR 43364).

Accordingly, based upon the environmental assessment, the Commission has determined that the proposed action will not have a significant effect on the quality of the human environment.

5.0 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.

Principal Contributor: L. Kopp

Date: September 4, 1997