



Point Beach Nuclear Plant
6610 Nuclear Rd., Two Rivers, WI 54241

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NPL 97-0256

10 CFR 70.5
10 CFR 70.14
10 CFR 70.24

June 7, 1997

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC. 20555

Attention: Director, Office of Nuclear Material Safety & Safeguards

Ladies/Gentlemen:

DOCKETS 50-266 AND 50-301
REQUEST FOR EXEMPTION FROM 10 CFR 70.24
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Pursuant to 10 CFR 70.14(a) and 10 CFR 70.24(d), Wisconsin Electric Power Company (WEPCO) requests an exemption from the requirements of 10 CFR 70.24, "Criticality Accident Requirements," for areas designated for new (unirradiated) fuel handling and storage at Point Beach Nuclear Plant Units 1 and 2 (PBNP). Such an exemption would relieve WEPCO from the requirement of having a criticality alarm system (as described in the regulation) in these areas. Because of the inherent features associated with handling and storage of unirradiated fuel, WEPCO has determined that granting the requested exemption will not endanger public life or property or the common defense and security and is otherwise in the public interest.

The attachment to this letter contains the basis for this request, which is similar to that previously approved as part of the 10 CFR Part 70 license issued during plant construction. It has been brought to our attention that the prior exemptions may not have been incorporated, except by general reference, into the Part 50 operating license for either Point Beach unit. However, the PBNP design for the new fuel storage and handling area includes two area radiation monitors which provide both local and control room alarms. 10 CFR 70.24(a)(2) requires, "a monitoring system capable of detecting a criticality which generates radiation levels of 300 rems per hour one foot from the source of the radiation. The monitoring devices in the system shall have a preset alarm point of not less than 5 millirems per hour (in order to avoid false alarms) nor more than 20 millirems per hour." The as-built system was found acceptable by the NRC during initial plant licensing, and subsequently as a result of post-TMI modifications, and is consistent with the design and licensing bases described in the Facility Safety Analysis Report (FSAR) for each unit.

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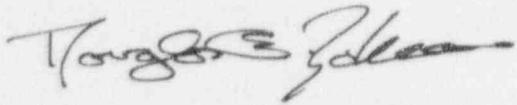
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Please contact us if there are any questions about this submittal.

Sincerely,

A handwritten signature in black ink, appearing to read "Douglas F. Johnson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Douglas F. Johnson

Manager,
Regulatory Services & Licensing

faf/lam

Attachment

cc: Regional Administrator, Region III, USNRC
NRC Resident Inspector

Introduction

Pursuant to 10 CFR 70.14(a) and 10 CFR 70.24(d), Wisconsin Electric Power Company (WEPCO) requests an exemption from the requirements of 10 CFR 70.24, "Criticality Accident Requirements," for areas designated for new (unirradiated) fuel handling and storage at Point Beach Nuclear Plant, Units 1 and 2 (PBNP). Such an exemption would relieve WEPCO from the requirement of having a criticality alarm system (as described in the regulation) in these areas. Because of the inherent features associated with the storage and inspection of unirradiated fuel, WEPCO has determined that granting the requested exemption will not endanger public life or property or the common defense and security and is otherwise in the public interest.

Background

Special Nuclear Material License SNM-1155 (Docket 70-1208) dated October 9, 1969, was issued for the storage of plutonium and uranium enriched in the U-235 isotope. SNM-1155 was issued in response to the WEPCO applications dated July 17 and August 26, 1969. The expiration date for our special nuclear materials license, SNM-1155, was to occur on October 31, 1970, or upon conversion of construction permit CPPR-32 to an operating license, whichever is earlier. In addition, the licenses stated, "The licensees are exempt from the requirements of 70.24, 10 CFR 70, to the extent that this section applies to the material being stored under authority of this license."

Facility Operating License DPR-24, issued on October 5, 1970, states, "The Commission has inspected the facility and has determined that it has been constructed in accordance with the application, as amended, and the provisions of Provisional Construction Permit No. CPPR-32 as amended." It further states, "The facility operating license was issued as proposed except for the revisions of subparagraphs 2.B and 2.C of the conditions and requirements to reflect (a) authorization of receipt, possession, and storage, of 75 milligrams of uranium 239 and 120 milligrams of neptunium 237 as contained in sealed dosimeters, previously licensed by Amendment No. 1 to special nuclear material License No. SNM-1155, and (b) additional byproduct material licensed by Amendment No. 4 to byproduct material license No. 48-13334-01."

On November 16, 1971, the NRC issued Facility Operating License DPR-27 for Unit 2. As in the case of Unit 1, "The Commission's regulatory staff has inspected the facility and has determined that, for fuel loading and subcritical testing, the facility has been constructed in accordance with the application, as amended, and the provisions of Provisional Construction Permit No. CPPR-47. As part of the issuance of this facility operating license, the limits of source and byproduct materials were modified from the initial values stipulated for Unit 1."

On December 16, 1974, Mr. George Lear of the NRC sent a letter to WEPCO requesting that WEPCO apply for the more generalized license provision for the possession of special nuclear, byproduct and source materials. The letter requested licensees to provide proposed amendments to the conditions of existing facility operating licenses which relate to the receipt, possession and use of byproduct, source and special nuclear materials; (2) proposed Technical Specification changes which provide for leakage testing and the related surveillance and reporting requirements for miscellaneous radioactive material sources; and (3) FSAR revisions to include information described in Regulatory Guide 1.70.3, "Additional Information, Radioactive Materials Safety for Nuclear Power Plants," of February, 1974.

In response to this letter, by letters dated September 8, 1975, and January 20, 1976, WEPCO submitted a Technical Specification change request, and additional information to supplement an NRC letter dated December 19, 1975, on this subject.

On March 17, 1976, the Commission granted Amendment 15 to DPR-24 and Amendment 20 to DPR-27 for Units 1 and 2, respectively. Item 1.F of each facility operating license amendment states, "The receipt, possession and use of the byproduct, source and special nuclear materials as authorized by this license, as amended, will be in accordance with the Commission's regulations in parts 30, 40 and 70, including Sections 30.33, 40.32, 70.23, and 70.31. It further states that the original licenses are amended in paragraphs 2, 2.A, 2.B, 2.C, and 2.D are replaced in their entirety as follows:

- A. Pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," to possess, use, and operate the facility at the designated location on the Point Beach site in accordance with the procedures and limitations set forth in this license;
- B. Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Facility Description and Safety Analysis Report, as supplemented and amended as of March 17, 1976.
- C. Pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instruction and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- D. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;
- E. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess such byproduct and special nuclear materials as may be produced by the operation of the facility, but not to separate such materials retained within the fuel cladding.

In the safety evaluation which supported this license amendment, the NRC stated that:

1. The proposed license amendment complies with the NRC December 16, 1974, guidance on the subject.
2. The proposed license amendment assures that the amount and type of reactor fuel which can be received, used and possessed is limited by the onsite fuel storage capacity and the requirements for reactor operation which have been approved previously by the NRC staff and which are described in the FSAR as of this date.
3. The proposed amendments provide reasonable assurance that byproduct, source and special nuclear material will be stored, used, and accounted for in a manner which meets the applicable radiation protection provisions of 10 CFR Parts 20, 30, 40 and 70.

The safety evaluation also states, "The licensee's radiation protection program, as supplemented by the FFDSAR revisions and the proposed Technical Specifications additions, has been evaluated. We have concluded that the incorporation of flexible yet controlled licensing provisions for the receipt, possession, and use of byproduct, source and special nuclear material into the Facility Operating Licenses for Point Beach Nuclear Plant Units 1 and 2 is acceptable."

An exemption from 10 CFR 70.24 requirements for areas designated for new fuel storage at each PBNP unit was previously approved as part of the Part 70 license issued during plant construction. The specific Part 70 license expired upon conversion of the unit construction permit to a commercial operating license, which was issued pursuant to 10 CFR 50.57. The operating license for each PBNP unit requires the receipt, possession, and use of source, byproduct, and special nuclear material, as authorized by the license, to be in accordance with the Commission's regulations in 10 CFR Parts 30, 40, and 70. Amendments 15 and 20 to DPR-24 and DPR-27, respectively, further license PBNP to "receive, possess, and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report." Neither Part 50 operating license, however, explicitly describes the previously approved exemption from Part 70.24 for new reactor fuel which was the authority for WEPCO to not include a criticality accident monitoring system in the primary auxiliary building new fuel storage and handling area during design and construction of PBNP.

In response to an August 31, 1987, letter to the NRC dealing with exemption from criticality monitoring requirements of 10 CFR 70.24 for Browns Ferry Units 1, 2, and 3, and incorporation of the exemption into the Part 50 operating licenses for these units, the NRC stated, "The staff considers that the previously issued exemptions are still in effect even though the specific provisions of the Part 70 licenses were not incorporated into the Part 50 license." Further, "Section 2.B(2) of the Units 1, 2, and 3 licenses states that TVA is authorized to receive, possess and use special nuclear material as reactor fuel in accordance with Part 70. In view of this provision, the previously issued exemptions should not be considered to have expired and you are hereby advised that the staff does not consider a further exemption necessary." During recent telephone conversations between WEPCO and the NRC, it was learned that the NRC no longer supports the position stated in the letter to TVA, and that the previously approved exemptions for WEPCO may no longer be in effect.

10 CFR 70.24(a)(2) requires a monitoring system capable of detecting a criticality which generates radiation levels of 300 rems per hour one foot away from the source of radiation. We have performed calculations which show that our spent fuel pool low range monitor, RE-105, is capable of detecting the level of radiation specified in 10 CFR 70.24(a)(2). The normal high alarm setpoint for this monitor is 10 mr per hour, which also meets the requirement of 10 CFR 70.24(a)(2).

The spent fuel pool high range monitor, RE135, was added to our monitoring system in response to TMI action plan requirements for post-accident monitoring. RE-135 is also capable of detecting a criticality, but has a normal alarm setpoint of 100 mr per hour. We have proceduralized the installation of an additional local monitor (e.g., a Victoreen area monitor package) prior to placement of fuel in the new fuel storage vault. The alarm setpoint for this monitor will be established at ≥ 5 mr per hour, but < 20 mr per hour as required by 10 CFR 70.24(a)(2). Use of these monitors is consistent with the design and licensing basis described in the FSAR for PBNP Units 1 and 2.

Bases for Exemption from 10 CFR 70.24 as it applies to New Fuel Storage and Handling Areas at Point Beach Nuclear Plant, Units 1 and 2

The new fuel storage area, also known as the new fuel vault, is a dry pit used for storing unirradiated new reactor fuel or new fuel inserts. It is located at the west end of the primary auxiliary building adjacent to the spent fuel storage pool on the El. 66' floor. It serves both units. The new fuel storage area serves no safe shutdown function nor any emergency function.

The vault is rectangular in plan with a wood subfloor system on steel beams which supports the vertical load of the new fuel storage racks. The racks consist of upper and lower structural steel gridworks and guides through which the fuel assemblies are inserted in a vertical position. Center-to-center spacing of the fuel assemblies in the new fuel storage racks is 20" to maintain $K_{eff} < 0.95$. The new fuel storage racks originally had a K_{eff} limit of 0.90, which reflected the use of lower enrichment fuels at the time. The latest calculations analyzed K_{eff} in the vault for flooded states, elevated temperatures, mist conditions with water densities from 3 to 80%, a fuel assembly off-center in a unit cell, fuel with natural or enriched uranium ends, and for maximum pellet density. Westinghouse optimized fuel assemblies with an enrichment of 5.5 weight-percent U-235 was used as the example fuel assembly in the criticality calculation. The maximum value of K_{∞} , including all biases and uncertainties, was determined to be 0.9221.

Side walls of the pit provide lateral support for the new fuel storage racks. The new fuel storage area consists of 84 locations, of which 82 are available for new fuel storage. New fuel assemblies received by the plant can be stored in the new fuel storage area or spent fuel pool until needed for refueling. New fuel assemblies stored in the new fuel storage area are stored in a dry environment.

In support of Amendments 126 and 130 to Facility Operating Licenses DPR-24 and DPR-27, respectively, WEPCO provided a safety evaluation and criticality safety analysis of the new fuel storage vault with 5.5 weight-percent (U-235) enriched 14x14 fuel assemblies to the NRC for review. The staff concluded that appropriate acceptance criteria for subcriticality were met to support 5.5 weight-percent fuel to be stored in the new fuel storage racks for various degrees of neutron moderation, including the case of full flooding with nonborated water and the limiting case of optimum moderation

The geometric spacing and the maximum allowed quantities or form of special nuclear material periodically stored in the new fuel racks have not been changed, and the assumptions and conclusions of the referenced analysis remain valid. In addition, administrative controls provide assurance that new fuel is stored in a dry environment which provides further assurance that a potential for criticality does not exist.

Finally, our current Technical Specifications only allow fuel enriched to 4.75 weight-percent U-235 to be stored in the new fuel storage vault and spent fuel pool. On January 24, 1997, we submitted Technical Specification Change Request #193 to increase our allowed enrichment to 5.00 weight-percent U-235 for our spent fuel pool. The analysis of the new fuel vault at 5.5 weight-percent is still bounding.

Shipping Containers, Fuel Handling, and Storage

New reactor fuel is received only in approved shipping containers. While in the container, the unirradiated fuel is precluded from criticality events due to shipping container construction, number of assemblies per container, and storage configuration. The fuel assemblies are frequently shipped in polyethylene dust wrappers. To preclude any potential neutron moderation that could result from the wrappers filling with water, procedural controls assure that these wrappers are removed from each fuel assembly following unloading from the shipping container and prior to storage.

Handling of reactor fuel assemblies, including removal from the shipping container for receipt inspection and storage in the primary auxiliary building is permitted only by the use of approved written procedures.

These procedures are designed to process (unload, inspect, and store) only one fuel assembly at a time. In addition, use of current primary auxiliary building equipment precludes more than one new fuel assembly which is not in an acceptable (designed) fuel assembly location, e.g., the new fuel rack, new fuel elevator, or spent fuel storage pool, from being outside its shipping container strongback/restraint at any given time.

Emergency Planning Considerations

10 CFR 70.24(3) requires that emergency procedures be established for areas where licensed special nuclear material is handled, used or stored to ensure that all personnel withdraw to an area of safety upon the sounding of the alarm. At PBNP:

1. AOP-8C, "Fuel Handling Accident in the Primary Auxiliary Building," contains guidance for actions to be taken in the event of a new fuel handling accident. The provisions of this procedure include guidance for conducting a limited plant evacuation in the event of a high radiation alarm being received. The revision to the procedure was validated via a walk-through at the new fuel vault/spent fuel pool area in the primary auxiliary building

Prior to reload of the Unit 2 Cycle 23 core, operators received training on the revision to this procedure that addresses a new fuel handling accident. The training included a review of plant actual fuel handling operating experience problems that have occurred; revisions to RMSASRB RE-105 (see below); implementation of emergency response to a new fuel criticality event; and familiarization with the requirements of 10 CFR 70.24.

2. RP-2A, "Receipt of New Fuel Assemblies," RP-2B, "Damaged New Fuel Assembly and Insert Visual Inspection," and RP-2C, "New Fuel and Fuel Insert Inspection," contain guidance for the opening and handling/inspection of new fuel from the new fuel deck on El. 66' of the primary auxiliary building. This ensure that installed criticality monitoring devices are able to detect an accidental criticality. Additionally, since there is only one crane available to handle new fuel assemblies, and only one new fuel assembly handling tool, these physical constraints over the handling of new fuel help to ensure that only one new fuel assembly is handled at a time. These physical constraints are also incorporated into our procedures.
3. RMSASRB Channel Information Sheets for RE-105 and RE-135 list the new fuel vault as a possible cause of a high alarm. If the high alarm appears to be due to a new fuel vault problem or a fuel handling accident, the operator is directed to AOP-8C. The first step of AOP-8C initiates a limited plant evacuation of the primary auxiliary building in accordance with EPIP 6.1, "Limited Plant Evacuation." General employee training at PBNP covers responses to local radiation monitor alarms, as well as the proper response to a limited plant evacuation.

RE-105 and RE-135 are tested monthly in accordance with Technical Specification Table 15.4.1-1 "Minimum Frequencies for Checks, Calibrations, and Tests of Instrument Channels."

To provide additional backup capability, RMSASRB Channel Information Sheets for RE-105 and RE-135 instruct the operators to have Health Physics install a Victoreen area monitoring package in the vicinity of RE-105 in the case of a failure alarm for either monitor. The Victoreen area monitoring package is checked weekly.

USNRC Regulatory Guide (RG) 8.12, Criticality Alarm Systems

This guide was issued to describe a system acceptable to the NRC staff for meeting the Commission's requirements for a criticality accident alarm system. The regulatory position taken by the staff, in part, states:

"The guidance on criticality accident alarm systems contained in ANSI/ANS-8.3-1986, 'Criticality Accident Alarm System' is generally acceptable to the NRC staff, subject to the following limitations:

1. Section 70.24 of 10 CFR Part 70 requires alarm coverage 'in each area in which such licensed special nuclear material is handled, used, or stored ...,' whereas paragraph 4.2.1 of the standard states that the need for criticality alarms must be evaluated for such areas. If such an evaluation does not determine that a potential for criticality exists, as for example where the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality, such as in some storage spaces for unirradiated nuclear power plant fuel, it is appropriate to request an exemption from Section 70.24."

The preceding discussions for the new (unirradiated) fuel storage areas for PBNP Units 1 and 2 show that criticality is precluded in these areas. Therefore, an exemption from Section 70.24 will be consistent with staff position C.1 of RG 8.12, and is appropriate.

Impact on Public Life or Property, or the Common Defense or Security

Accidental criticality is precluded by the design of the new fuel storage racks, in conjunction with Technical Specifications which limit the U-235 enrichment to 4.75 weight-percent or 5.0 weight-percent in our pending license amendment and require the fuel to be stored in a dry environment, and is further assured by plant administrative controls related to the handling of new reactor fuel. Thus, the absence of criticality accident monitoring systems in the new fuel handling and storage areas of PBNP Units 1 and 2 does not pose an undue risk to public health and safety nor endanger life or property. Moreover, a criticality accident monitoring system is not related to the loss or diversion (safeguarding) of special nuclear material or the availability of special nuclear material for defense needs. Therefore, exemption from 10 CFR 70.24 does not endanger the common defense or security.

Conclusion

During construction, WEPCO received an exemption from 10 CFR 70.24 as part of the special nuclear materials (Part 70) license for Unit 1. With the exemption, there was no need for criticality accident monitoring of the new fuel storage and handling areas as described in the regulation, and area radiation monitors, each consisting of only one gamma-sensitive detector with local and remote alarms, were installed in these areas. This design was found acceptable by the NRC and is consistent with the PBNP FSAR.

Since issuance of the operating license and expiration of the Part 70 license for each unit, there have been no changes in the type of use, storage facilities, or handling methods for special nuclear material that have

created new conditions for which compliance with 10 CFR 70.24 in the new fuel handling and storage areas would be necessary. The maximum allowed fuel enrichment has been increased from the time when the Part 70.24 exemptions were previously granted, but the results of criticality analyses accounting for the higher enrichment (5.5 weight-percent U-235) have been docketed for both units and show that an acceptable subcritical margin of unirradiated fuel in the new fuel storage racks is assured under the most reactive conditions.

We have determined that the proposed exemption does not involve a significant hazards consideration, authorize a significant change in the types or total amounts of any effluent release, or result in any significant increase in individual or cumulative occupational and non-occupational exposures. Therefore, we conclude that the proposed exemption meets the requirements of 10 CFR 51.22(c)(9) and (10) and that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared.

The requested exemption is authorized by law, and WEPCO believes that the criteria delineated in 10 CFR 70.14(a) and 10 CFR 70.24(d) for granting such an exemption is satisfied for PBNP Units 1 and 2.