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

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Docket No.: 50-305
License No.: DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
RECENTLY IRRADIATED FUEL SUPPLEMENTAL INFORMATION RE: LICENSE
AMENDMENT REQUEST 210, "TECHNICAL SPECIFICATION MODIFICATIONS
REGARDING CONTROL ROOM ENVELOPE HABITABILITY"

Pursuant to 10 CFR 50.90, on September 14, 2007, Dominion Energy Kewaunee, Inc. (DEK) requested an amendment to Facility Operating License Number DPR-43 for Kewaunee Power Station (KPS) (reference 1). This license amendment request (LAR) 210 would revise the Operating License by modifying the KPS Technical Specifications (TS) to adopt technical specification task force (TSTF) traveler TSTF-448-A, Revision 3, "Control Room Habitability," consistent with the KPS plant design. DEK also proposed additional changes including:

- Applicable changes from TSTF-51-A, Revision 2, "Revise Containment Requirements During Handling of Irradiated Fuel and Core Operations;"
- Applicable changes from TSTF-287-A, Revision 5, "Ventilation System Envelope Allowed Outage Time;"
- Inclusion of Control Room Ventilation Radiation Monitor R-23; and
- Other changes from NUREG 1431, "Standard Technical Specification-Westinghouse Plants."

The availability of TSTF-448-A was approved and announced in the Federal Register on January 17, 2007 (72FR2022), as part of the consolidated line item improvement process (CLIIP). The proposed amendment would incorporate TSTF-448-A and align the KPS TS with NUREG 1431, Revision 3.

LAR 210 also included proposed changes to adopt applicable portions of TSTF-51-A, including the term "recently irradiated fuel." In reference 1, DEK proposed to add restrictions on the movement of recently irradiated fuel. These proposed restrictions are tied to the operability of the control room post-accident recirculation system and the control room envelope boundary.

The term "recently irradiated fuel" is defined in standard technical specifications as fuel that has occupied part of a critical reactor core within the previous [x] days (reference 2). The number of days is determined by analysis demonstrating that after sufficient radioactive decay has occurred (x days), doses resulting from the associated accident remain below the allowable limits without crediting the associated TS structure, system, or component.

KPS analysis has demonstrated that after 100 hours of decay, acceptable Site Boundary and Low Population Zone dose results are obtained for a fuel handling accident. However, on the date LAR 210 was submitted, DEK had not yet performed an analysis to demonstrate the appropriate value for "x days." Therefore, in LAR 210, DEK proposed to define "recently irradiated fuel" as all fuel that has occupied part of a critical reactor until analysis determines an appropriate value for "x days."

DEK has completed an analysis demonstrating that after 300 hours of radioactive decay has occurred, doses to control room occupants resulting from a fuel handling accident will remain below allowable limits without crediting the control room envelope boundary or the control room post-accident recirculation system. Therefore, DEK intends to modify the TS basis to define "recently irradiated fuel" as fuel that has occupied part of the critical reactor in the previous 300 hours, and is hereby supplementing Kewaunee LAR 210 to include this new information.

The attachment to this letter contains summary information from the analysis DEK performed to define "recently irradiated fuel." Upon approval of LAR 210, DEK intends to replace the phrase "[x] days" in the proposed KPS TS 3.12 Bases with "300 hours." In addition, DEK intends to delete the phrase in the proposed KPS 3.12.a Bases that states, "Until analysis is performed to determine a specific time, the term recently is defined as all irradiated fuel assemblies."

The additional information provided in this letter does not affect the conclusions of the Significant Hazards Consideration discussion in DEK's original submittal (reference 1).

A copy of this submittal has been provided to the State of Wisconsin in accordance with 10 CFR 50.91(b).

Attachment:

Analysis Summary of Decay Time Defining Recently Irradiated Fuel

Commitments made by this letter: None

References:

1. Letter from Gerald T. Bischof (DEK) to Document Control Desk (NRC), "License Amendment Request 210, Technical Specification Modifications Regarding Control Room Envelope Habitability," dated September 14, 2007 (ADAMS Accession No. ML072620144).
2. NUREG 1431, "Standard Technical Specifications - Westinghouse Plants," Revision 3, Volume 2.

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ATTACHMENT

**RECENTLY IRRADIATED FUEL SUPPLEMENTAL INFORMATION RE: LICENSE
AMENDMENT REQUEST 210, "TECHNICAL SPECIFICATION MODIFICATIONS
REGARDING CONTROL ROOM ENVELOPE HABITABILITY"**

ANALYSIS SUMMARY OF DECAY TIME DEFINING RECENTLY IRRADIATED FUEL

**KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.**

Kewaunee Power Station Analysis Summary of Decay Time Defining Recently Irradiated Fuel

Overview

Dominion Energy Kewaunee, Inc. (DEK) has supplemented the Kewaunee Power Station control room radiological analysis for the Fuel Handling Accident. The purpose of this supplement was to determine the decay time required to ensure the dose to control room occupants from a fuel handling accident (FHA) remains below 10 CFR 50.67 limits, assuming no credit for the control room envelope boundary (CREB) or the control room post-accident recirculation (CRPAR) system. This decay time will be used to define the term "recently irradiated fuel" in the TS Bases for TS 3.12.a, 3.12.d, 3.12.e, and 3.12.f.

This analysis demonstrates that acceptable radiological dose consequences for the control room operators are achieved without crediting the control room envelope boundary (CREB), CRPAR system operation, or control room isolation, provided the irradiated fuel assemblies have decayed for at least 300 hours. This calculation is applicable to the current plant design at its current rated power level of 1772 MWth.

Background

The following radiological accidents are the design basis accidents (DBAs) for the Kewaunee Power Station (KPS):

- Main steam line break (MSLB)
- Locked reactor coolant pump (RCP) rotor
- Rod ejection (RE)
- Steam generator tube rupture (SGTR)
- Large-break loss-of-coolant accident (LBLOCA)
- Waste gas decay tank (GDT) rupture
- Volume control tank (VCT) rupture
- Fuel-handling accident (FHA)

Alternate Source Term (AST) analytical methods and assumptions outlined in Regulatory Guide 1.183 were approved for KPS in license amendment 166 (reference 1). The radiological accident analyses performed for the KPS stretch power uprate followed the approved methodology from the AST license amendment. The radiological accident analyses for the stretch power uprate were approved as part of the stretch power uprate license amendment 172 (reference 2).

Tracer gas in-leakage tests were performed in December 2004 by NUCON International Inc. The amount of air in-leakage into the control room emergency zone (CREZ) was evaluated using the concentration decay method under isolated conditions. This test was based on ASTM E 741 and conducted to ensure compliance with the NRC Generic Letter 2003-01.

Two concentration decay tests were performed to determine total unfiltered in-leakage, one with CRPAR Train A operating, and one with CRPAR Train B operating. The following results were obtained for total unfiltered in-leakage (UFI) to the three rooms contained in the control room envelope.

Table 1		
Control Room Emergency Zone Inleakage Test Results		
Date of Test	Train Tested	Total Inleakage
December 14, 2004	CRPAR Train A	409 ± 29 cfm
December 15, 2004	CRPAR Train B	447 ± 51 cfm

The test results showed that the CREZ UFI was greater than that assumed in the radiological accident analysis (RAA) approved in license amendment 172. As an interim measure, administrative restrictions were placed on other RAA input assumptions to ensure the CREZ remained operable. The resolution to this non-conforming condition was to permanently incorporate the increase in assumed CREZ UFI into the RAA. The increase in the assumed control room UFI was determined to be a facility change that caused an increase in the dose consequences of the approved RAA. Therefore, license amendment request (LAR) 211 (reference 3) was submitted for approval as required by 10 CFR 50.59 (c)(2), and supplemented in January 2007 (reference 4). In March of 2007, the NRC approved KPS LAR 211 as KPS license amendment 190 (reference 5).

During the development of the license amendment request adopting TSTF-448-A (LAR 210), a question arose concerning the definition of "recently irradiated fuel." NUREG 1431, "Standard Technical Specification - Westinghouse Plants, item 3.7.10, "Control Room Emergency Filtration System (CREFS)^(*)," applicability states, in part, "During movement of [recently] irradiated fuel assemblies." The NUREG 1431 Basis for LCO 3.7.10, "CREFS," applicability section states in part:

During movement of [recently] irradiated fuel assemblies, the CREFS must be OPERABLE to cope with the release from a fuel handling accident [involving handling recently irradiated fuel]. [The CREFS is only required to be

^(*) The Control Room Emergency Filtration System (CREFS) in standard technical specifications is similar to the control room post-accident recirculation (CRPAR) system at Kewaunee.

OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days), due to radioactive decay.]

The KPS accident analysis has demonstrated that after 100 hours of decay, acceptable Site Boundary and Low Population Zone results are obtained for a fuel handling accident. In LAR 210, DEK stated that KPS had not performed an analysis (where the CREZ boundary and CRPAR system were not credited) to determine a value for "x days," consistent with the definition for "recently" used in the improved standard technical specifications. Therefore, in LAR 210, DEK proposed to define recently irradiated fuel as all fuel that has occupied part of a critical reactor until analysis determines an appropriate value for "x days".

DEK has completed an analysis demonstrating that, after 300 hours of radioactive decay has occurred, doses to control room occupants resulting from a fuel handling accident will remain below allowable limits without crediting the CREZ boundary or the CRPAR system. Therefore, DEK intends to modify the TS basis to define "recently irradiated fuel" as fuel that has occupied part of the critical reactor in the previous 300 hours, and is hereby supplementing Kewaunee LAR 210 to include this new information.

Upon approval of LAR 210, DEK intends to replace the phrase "[x] days" in the proposed KPS TS 3.12 Bases with "300 hours." In addition, DEK intends to delete the phrase in the proposed KPS 3.12.a Bases, which states, "Until analysis is performed to determine a specific time, the term recently is defined as all irradiated fuel assemblies."

Computer Code

DEK used RADTRAD-NAI to perform the analysis. This computer code, "RADTRAD: Simplified Model for RADionuclide Transport and Removal And Dose Estimation," is the same code used by DEK to perform the radiological consequence calculations for the FHA AST radiological consequence analysis approved by the NRC in KPS license amendment 190 (reference 5). RADTRAD-NAI also has been used and approved at other Dominion plants, such as Millstone 2 and 3 and North Anna.

Acceptance Criteria

The acceptance criterion for the KPS analysis is provided in 10 CFR 50.67. 10 CFR 50.67 states that, for a fuel handling accident, the acceptance criterion for control room dose is 5 rem total effective dose equivalent (TEDE) for the duration of the accident.

Inputs and Assumptions

All assumptions listed in the analysis accepted in reference 5 were used, except for the following changes.

1. In all cases, control room post-accident recirculation was assumed to be off.
2. For the no control room isolation case, the flow rate into and out of the control room was either the maximum ventilation flow rate of 2750 cfm or the minimum ventilation flow rate of 1620 cfm.
3. For the control room isolation case, the flow rate into and out of the control room was 2750 cfm prior to isolation and 1500 cfm^(†) after isolation at 1 minute.

For this analysis, it was assumed that the control room post-accident recirculation system does not operate. This assumption results in higher doses and relates to the purpose of the analysis to find the time after shutdown that fuel movement may occur without the CRPAR being operable

Results and Conclusions

Table 2 provides the limiting dose results to the control room occupants after 300 hours of decay for the FHA. The results meet the acceptance criteria in all cases, demonstrating that the control room does not need to be isolated and the CRPAR system is not required to be operable to meet the dose acceptance criteria, provided a decay time of at least 300 hours has occurred.

If the control room is isolated after the fuel handling accident, dose results are slightly increased but acceptable.

Table 2 Control Room Dose Results (rem TEDE)		
Conditions	Results	Acceptance Criteria
No isolation; 2750 cfm	4.22	5.0
No isolation; 1620 cfm	4.21	5.0
Isolation	4.35	5.0

^(†) Although the CREZ UFI assumption of 1500 cfm exceeds the UFI results from Table 1, this is the same as the value assumed in the KPS fuel handling accident analysis (reference 3).

References

1. Letter from John Lamb (NRC) to Tom Coutu (NMC), "Kewaunee Nuclear Power Plant - Issuance of Amendment Regarding Implementation of Alternate Source Term (TAC NO. MB4596)," dated March 17, 2003 (ADAMS Accession No. ML030210062).
2. Letter from John G. Lamb (NRC) to Thomas Coutu (NMC), "Kewaunee Nuclear Power Plant - Issuance of Amendment Regarding Stretch Power Uprate (TAC NO. MB9031)," dated February 27, 2004 (ADAMS Accession No. ML040430633).
3. Letter from Leslie N. Hartz (DEK) to Document Control Desk (NRC), "License Amendment Request 211, Radiological Accident Analysis and Associated Technical Specifications Change," dated January 30, 2006 (ADAMS Accession No. ML060540217).
4. Letter from Gerald T. Bischof (DEK) to Document Control Desk (NRC), "Response to Request for Additional Information Regarding License Amendment Request 211, Radiological Accident Analysis and Associated Technical Specifications Change," dated January 23, 2007 (ADAMS Accession No. ML070240543).
5. Letter from Robert F. Kuntz (NRC) to David A. Christian (DEK), "Kewaunee Power Station - Issuance of Amendment Re: Radiological Accident Analysis and Associated Technical Specifications Change (TAC NO. MC9715)," dated March 8, 2007 (ADAMS Accession No. ML070430020).