

October 11, 2001

Mr. Mark Reddemann  
Site Vice President  
Kewaunee and Point Beach Nuclear Plants  
Nuclear Management Company, LLC  
6610 Nuclear Road  
Two Rivers, WI 54241

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT - CORRECTION TO ISSUANCE OF  
AMENDMENT 158 (TAC NO. MB2047)

Dear Mr. Reddemann:

On September 20, 2001, the U.S. Nuclear Regulatory Commission issued Amendment No. 158 to Facility Operating License No. DPR-43 for the Kewaunee Nuclear Power Plant. The amendment approved changes to Technical Specification (TS) 4.2 to revise the Surveillance Requirements and Bases for TS 4.2.b, "Steam Generator Tubes," to account for changes associated with the replacement of the original steam generators. Specifically, the proposed changes deleted inspection requirements associated with steam generator tube sleeving and repair limits and revised the phrasing of text within the TS to enhance clarity.

Due to an administrative error, the safety evaluation contains two errors in the Background section and one error in the Evaluation section. The two errors contained in the Background section are in the third paragraph: Alloy 600 should be replaced with Alloy 690. The error in the Evaluation section is located in the fourth paragraph, second sentence: "...steam generators use tubing with a diameter and wall thickness that is different from the original steam generator tubing." The sentence should be corrected with the following: "...steam generators use tubing with Alloy 690 that is different from the original steam generator tubing."

The corrected safety evaluation is enclosed. We apologize for any inconvenience this may have caused.

Sincerely,

*/RA/*

John G. Lamb, Project Manager, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosure: Safety Evaluation

cc: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATING TO AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE NO. DPR-43  
NUCLEAR MANAGEMENT COMPANY, LLC  
KEWAUNEE NUCLEAR POWER PLANT  
DOCKET NO. 50-305

## 1.0 INTRODUCTION

By application dated May 25, 2001, as supplemented August 17, 2001, the Nuclear Management Company, LLC (NMC or the licensee) requested an amendment to the technical specifications (TSs) for the Kewaunee Nuclear Power Plant (KNPP). The proposed amendment would revise the surveillance requirements and Bases for TS 4.2.b, "Steam Generator Tubes," to account for changes associated with replacement of the original steam generators. Specifically, the proposed changes would delete inspection requirements associated with steam generator tube sleeving and repair limits and revise the phrasing of text within the TS to enhance clarity.

The supplemental information contained clarifying information and did not change the initial no significant hazards consideration determination and did not expand the scope of the original *Federal Register* notice.

## 2.0 BACKGROUND

KNPP currently uses two Westinghouse model 51 recirculating steam generators with mill-annealed Inconel Alloy 600 tubing that is rolled along part of the tube sheet. The current steam generator tubes are made of mill-annealed Inconel Alloy 600 and the tube support plates are made of carbon steel. Use of these materials contributed, in part, to the existing steam generator tube degradation. As degradation occurred, the licensee amended KNPP TS with various tube repair criteria which the Nuclear Regulatory Commission (NRC) staff subsequently reviewed and approved.

The licensee is scheduled to replace the KNPP steam generators during an upcoming refueling outage in the fall of 2001. The replacement steam generators are Westinghouse model 54F. The replacement steam generators incorporate a number of design and material improvements. These improvements include (1) the material selection of the tubing; (2) tube support design; and (3) material treatment for the straight leg and U-bend sections.

The replacement steam generators contain tubes fabricated from thermally treated Inconel Alloy 690 tube material as well as stainless steel tube support plates and anti-vibration bars. The thermally treated Alloy 690 tubing material is more resistant to stress corrosion cracking

than mill-annealed Alloy 600 tubing material. The stainless steel tube support plates are resistant to magnetite formation and would not be expected to exhibit the tube denting experienced in steam generators with carbon steel tube support plates. Licensees that have used these materials in their replacement steam generators have reported significantly less tube degradation.

### 3.0 EVALUATION

In January 2001, the licensee performed preservice examination of the replacement steam generator tubes after the steam generators had arrived at the plant site. The licensee inspected the full length of each tube in each steam generator using bobbin coil probes. All bobbin indications were examined by rotating pancake (+point) coil probes. The indications included bulges, bending machine geometry, dings, free span differentials, and manufacturing burnish marks. These indications were caused by the tube manufacturing or tube installation process. The licensee did not plug or repair any tubes as a result of the preservice examination.

The licensee has scheduled the first inservice inspection of the replacement steam generators in the spring of 2003. The licensee will examine every tube full length using bobbin coil probes. Any bobbin indications will be re-examined by the rotating pancake coil probes. The licensee will perform a degradation assessment in 2002 that will consider industry experience with similar replacement steam generators. The result of this assessment will determine the final scope of rotating pancake coil examination in the 2003 inspection. The licensee stated that it has no intent to take exception to Electric Power Research Institute Steam Generator Examination Guidelines during inservice inspection of the replacement steam generators. The NRC staff finds that the scope of licensee's preservice and inservice inspections follows the generally accepted industry practice and the TS and, therefore, is acceptable.

The licensee has proposed changing TS 4.2.b.4, "Plugging Limit Criteria," to delete requirements for and associated references to steam generator tube repair by sleeving and the plugging limit of tubes previously repaired by sleeving. Further, the licensee proposed the deletion of Table 4.2-3, "Steam Generator Repaired Tube Inspection," in its entirety and the deletion of the reference to this table. Also, TS 4.2.b.2 will be modified to delete the requirement to select a sample of installed sleeves for inspection.

The current surveillance requirements detail the approved sleeve designs and installation requirements described in Westinghouse and ABB Combustion Engineering topical reports. The licensee states that the referenced reports are no longer appropriate since the replacement steam generators use tubing with Alloy 690 that is different from the original steam generator tubing. Further, the replacement steam generators incorporate metallurgy and fabrication technology that has proven to be very resistant to corrosion related degradation and a sleeving repair is not expected to be required. Thus, the current sleeving requirements are not needed for the replacement steam generators. The NRC staff finds deletion of these requirements acceptable.

The tube plugging limit in TS 4.2.b.4 is derived from calculations that include certain replacement steam generator parameters. The licensee recalculated a structural limit in accordance with Regulatory Guide 1.121. The licensee confirms that a larger structural limit for allowable defect depth bounds the current limit in TS shown in Westinghouse report, WCAP-

15325, "Regulatory Guide 1.121 Analysis for Kewaunee Replacement Steam Generators." The current 50 percent plugging limit for the tubing, therefore, is conservative and will remain in the TS. However, the reference document in the TS bases will be changed from WCAP-7832 "Evaluation of Steam Generator Tube, Tube Sheet, and Divider Plate Under Combined LOCA Plus SSE Conditions" to WCAP-15325.

In addition, the licensee has proposed to change the definitions in TS 4.2.b to delete references on alternate tube repair criteria, such as laser weld repairs, F\* distance, F\* tubes, EF\* distance, and EF\* tubes. The NRC staff finds the deletion of these references acceptable because these repairs would not be valid for the replacement steam generators. Several definitions in this section are rephrased for clarification. The clarifying changes are minor and do not change the technical meaning or basis of the items. Therefore, the NRC staff finds these changes acceptable.

The NRC staff has reviewed the proposed changes to TS Bases Section B4.2.b and finds them consistent with the other changes discussed above. Therefore, the NRC staff has no objection to these changes.

#### 4.0 STATE CONSULTATION

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

#### 5.0 ENVIRONMENTAL CONSIDERATION

This 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 staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (66 FR 31711). Accordingly, this 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 this amendment.

#### 6.0 CONCLUSION

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

Principal Contributor: J. Tsao

Date: September 20, 2001