



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 238 TO FACILITY OPERATING LICENSE NO. DPR-58

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-315

1.0 INTRODUCTION

By application dated August 17, 1999, the Indiana Michigan Power Company (IM, or the licensee) requested an amendment to the Technical Specifications (TSs) for the Donald C. Cook Nuclear Plant (D.C. Cook), Unit 1. The proposed amendment would remove the voltage-based repair criteria, F\* repair criteria, and sleeving methodologies from the Unit 1 TSs and clarify the Bases sections accordingly. The changes are proposed due to the planned replacement of the Unit 1 steam generators (SGs) during the current outage.

2.0 EVALUATION

2.1 Background

IM plans to replace the Unit 1 SGs during the current outage prior to Unit 1 restart. The current surveillance requirements for sample selection, inspection frequency, acceptance criteria, repair methods, and required reports were specifically developed for application to the degraded Westinghouse Model 51 SGs (OSGs) installed in Unit 1. These requirements were developed, in part, to permit tubes to remain in service that were experiencing various tube degradation mechanisms. After replacement of the OSGs, the current voltage-based repair criteria, F\* repair criteria, and sleeving methods will no longer be applicable due to material and design changes incorporated into the replacement steam generators (RSGs), which were manufactured by Babcock and Wilcox.

The analyses performed to support application of the voltage-based and F\* repair criteria were specifically based on the OSGs. Following replacement of the OSGs, these analyses will not apply to the RSGs. In addition, the currently approved Westinghouse mechanical, Westinghouse laser-welded, and Combustion Engineering leak-tight welded sleeving processes will no longer be applicable to Unit 1. These sleeving processes were developed specifically for Westinghouse SG materials and design and are, therefore, not applicable to the Babcock and Wilcox RSGs.

IM proposes to revise TS 3/4.4.5, TS Bases 3/4.4.5, TS Bases 3/4.4.6.2, and TS Bases 3/4.4.8. These revisions would remove the TS Unit 1 modifications made to address the various SG tube degradation mechanisms that have occurred on the Unit 1 OSGs. Incorporation of these proposed changes will return the Unit 1 TSs to the original licensing bases, except for the operational leakage limits, which are consistent with NUREG-0452, Rev. 4, "Standard Technical Specifications for Westinghouse Pressurized Water Reactors," and the Unit 2 TSs.

## 2.2 Evaluation of Proposed Changes

The proposed TS revisions reflect the significant design differences between the OSGs and the RSGs. The SG tube repair criteria and the associated surveillance and reporting requirements are identified as interim plugging criteria. These repair criteria were required to address a form of SG tube degradation in the OSG known as outer diameter stress corrosion cracking (ODSCC). For Unit 1 operation after SG replacement, the voltage-based and F\* requirements will no longer be applicable due to the design differences between the OSGs and the RSGs. In addition, the sleeving methodologies referenced in the Unit 1 TSs are specific to the Westinghouse Model 51 SGs and have not been analyzed or approved for use by the NRC for use with the RSGs. The removal of the interim plugging criteria and the associated surveillance and reporting requirements required no independent staff analysis since the RSGs do not have the same type of SG tube support structures as the OSGs, and, therefore, the SG tube repair criteria for the ODSCC flaws that occurred in the OSGs are not applicable to the RSGs. Accordingly, the RSGs will not be subject to the relatively large end-of-cycle SG tube leakage that could occur under postulated accident conditions. Similarly, the proposed removal of the SG tube alternate repair criteria for flaws occurring within the OSG tubesheets (i.e., the F\* repair criteria) and the proposed removal of the sleeving methodologies also required no independent staff analysis for the same reason. The various SG tube repair criteria and the associated surveillance and reporting requirements are not required to ensure the safe operation of the RSGs due to the significant design differences between the OSGs and the RSGs.

The TS acceptance limits will be based on through-wall criteria that require tubes to be plugged when imperfections exceed the plugging limit of 40 percent of the nominal tube wall thickness. The proposed program for periodic inservice inspection of the RSGs monitors the integrity of the SG tubing to provide reasonable assurance that there is sufficient time to take proper and timely corrective action if any tube degradation is present. The proposed program is consistent with NUREG-0452 and was the basis for the original TSs issued for Unit 1. The purpose of the TS plugging limit, in conjunction with surveillance and maintenance programs, is to provide reasonable assurance that the SG tubes accepted for continued service will retain adequate structural and leakage integrity during normal, transient, and postulated accident conditions. Although D.C. Cook is not a General Design Criteria (GDC) plant, IM has determined that the RSG design is consistent with GDC 14, 15, 30, 31, and 32 of 10 CFR Part 50, Appendix A. Compatibility with these GDCs supports the application of TS acceptance limits based on through-wall criteria.

The licensee proposes to revise TS Surveillance Requirement (TSSR) 4.4.5.2, "Steam Generator Tube Sample and Selection," to remove reference to previous defects or imperfections repaired by sleeving and to revise TSSR 4.4.5.2.b.1 and TSSR 4.4.5.2 to remove reference to sleeving. The licensee proposes to delete TSSRs 4.4.5.2.b.4, 4.4.5.2.c, 4.4.5.2.e, and 4.4.5.2.f, and to renumber TSSR 4.4.5.2.d. These proposed changes reflect the removal

of sleeving methodologies and repair criteria applicable to the OSGs that are not applicable to the RSGs, and are acceptable.

The licensee proposes to revise TSSR 4.4.5.3, "Inspection Frequencies," to add a requirement for SG inservice inspection after 6 effective full power months but within 24 calendar months after SG replacement. The revision is acceptable in that it applies a requirement on the inspection frequency of the first inservice inspection of the RSGs which is identical to that of the OSGs.

The licensee proposes several changes to TSSR 4.4.5.4, "Acceptance Criteria." The licensee proposes to change TSSR 4.4.5.4.a items 1, 2, 3, 6, 7, and 8 to remove references to sleeving and to change TSSR 4.4.5.4.a items 5 and 6 to remove references to repair limits. The licensee proposes to revise TSSR 4.4.5.4.a.5 to define a defect in terms of the plugging limit, to revise TSSR 4.4.5.4.a.6 to remove discussion of the applicability of F\* tubes and sleeves, and to revise TSSR 4.4.5.4.a.8 to remove reference to the interim plugging limit. The licensee proposes to delete TSSR 4.4.5.4.a items 9, 10, 11, 12, and 13, and TSSR 4.4.5.4.c. The licensee proposes to revise TSSR 4.4.5.4.b to remove reference to sleeves and repair limits. These proposed changes reflect the removal of sleeving methodologies and repair criteria applicable to the OSGs that are not applicable to the RSGs, and are acceptable.

The licensee proposes several changes to TSSR 4.4.5.5, "Reports." The licensee proposes to revise TSSR 4.4.5.5.a, TSSR 4.4.5.5.b.1, and TSSR 4.4.5.5.b.3 to remove references to sleeving, and to delete TSSR 4.4.5.5.d. These required reports are not applicable to the RSGs since the RSGs are not subject to the same forms of SG tube degradation in the tubesheet area that have occurred in the OSG; therefore, the changes are acceptable.

The licensee proposes to revise TS Table 4.4-2 to remove references to sleeving. These proposed changes reflect the removal of sleeving methodologies applicable to the OSGs that are not applicable to the RSGs, and are acceptable.

The licensee proposes to revise TS Bases 3/4.4.5, "Steam Generators Tube Integrity," to remove references to repair of defective tubes, repair limits, and sleeving, and to remove details on voltage-based repair limits and approved methodologies for sleeving. These proposed changes reflect the removal of sleeving methodologies and repair criteria applicable to the OSGs that are not applicable to the RSGs, and are acceptable.

The licensee proposes to revise TS Bases 3/4.4.6.2, "Operational Leakage," to remove references to crack growth and expected primary-to-secondary leakage during a main steamline break accident. Under the interim plugging criteria, a leak rate of 8.4 gpm was determined to be the upper limit for primary-to-secondary leakage in a faulted SG. This leakage, combined with the maximum of 150 gpd allowed leakage from each nonfaulted SG, was determined to limit the offsite dose to 10 percent of the 10 CFR Part 100 limits. Following replacement of the SGs, the leakage is limited to 150 gpd from each SG. The 150 gpd limit provides for leakage detection and plant shutdown in the event of an unexpected tube leak and minimizes the potential for excessive leakage or tube burst in the event of main steamline break or loss-of-coolant accident conditions, and therefore, is acceptable.

The licensee proposes to revise TS Bases 3/4.4.8, "Specific Activity," to remove the discussion of offsite dose following a main steamline break with a primary-to-secondary leak rate of 120 gpm. The discussion was added to TS Bases 3/4.4.5 and 3/4.4.8 by Amendment No. 166, dated July 29, 1992. Subsequently, Amendment No. 178, dated March 15, 1994, imposed a limit of 12.6 gpm (later revised to 8.4 gpm) SG leakage for the main steamline break accident analysis to limit offsite doses to 10 percent of the 10 CFR Part 100 limits. Amendment No. 178 removed the reference to the 120 gpm evaluation from Bases 3/4.4.5, but inadvertently did not revise Bases 3/4.4.8. Since the discussion regarding the 120 gpm SG leak rate does not apply to the RSGs, the revision is acceptable.

### 3.0 STATE CONSULTATION

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

### 4.0 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 or changes a surveillance requirement. The 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 (64 FR 54375). 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.

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

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