

May 3, 2001

Mr. Robert P. Powers, Senior Vice President
Indiana Michigan Power Company
Nuclear Generation Group
500 Circle Drive
Buchanan, MI 49107

SUBJECT: DONALD C. COOK (D. C. COOK), UNIT 2 - LOSS-OF-COOLANT ACCIDENT
(LOCA) ANALYSES-OF-RECORD (TAC NO. MA8959)

Dear Mr. Powers:

By letters dated December 9, 1999, February 2, October 24, and December 20, 2000, the Indiana Michigan Power Company (I&M) submitted reports of changes to the large break and small break LOCA analyses-of-record for D. C. Cook, Unit 2, as required by 10 CFR 50.46. The October 24, 2000, letter, reported updated assessments of analyses-of-record for D. C. Cook, Unit 2, in addition to previously identified analysis errors and changes. The assessments demonstrate conformance with the requirements of 10 CFR 50.46 (a)(3)(ii) and 10 CFR 50.46(b).

The Nuclear Regulatory Commission (NRC) has reviewed the submittals as documented in the enclosed safety evaluation. The NRC finds that the submittals satisfy the requirements of 10 CFR 50.46(a)(3)(ii), and are, therefore, acceptable.

Sincerely,

/RA/

John F. Stang, Sr. Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-316

Enclosure: As stated

cc w/encl: See next page

Donald C. Cook Nuclear Plant, Units 1 and 2

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The Nuclear Regulatory Commission (NRC) has reviewed the submittals as documented in the enclosed safety evaluation. The NRC finds that the submittals satisfy the requirements of 10 CFR 50.46(a)(3)(ii), and are, therefore, acceptable.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO LOSS-OF-COOLANT ACCIDENT (LOCA) ANALYSES OF RECORD

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-316

1.0 INTRODUCTION

In letters dated December 9, 1999, February 2, October 24, and December 20, 2000, the Indiana Michigan Power Company (I&M) submitted reports of changes to the large break (LB) and small break (SB) LOCA analyses-of-record for its Donald C. Cook Nuclear Plant, Unit 2 (D. C. Cook, Unit 2). The December 20, 2000, letter, reported that the licensee had performed an assessment of the D. C. Cook, Unit 2, LBLOCA analyses-of-record to correct errors and changes. The results of the assessment demonstrate conformance with the requirements of 10 CFR 50.46(b). The licensee will clarify any ambiguities with regard to the assessments of effects on peak cladding temperature in its annual 10 CFR 50.46 report to be submitted this upcoming summer 2001. The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittals.

2.0 EVALUATION

NRC staff reviewed both D. C. Cook, Unit 2 LBLOCA and SBLOCA evaluation models, and the results of previously existing LOCA analyses-of-record, re-analyses, and LOCA analysis assessments made by the licensee. The NRC staff reviewed the information provided by the licensee against the requirements of 10 CFR 50.46, 10 CFR Part 50, Appendix A, GDC 35, and 10 CFR Part 50, Appendix K.

2.1 December 9, 1999, Letter

The licensee's December 9, 1999, letter reported the status of D. C. Cook, Unit 2 LBLOCA and SBLOCA licensing-basis analysis methodologies and analyses-of-record. The letter identified errors in the LBLOCA and SBLOCA methodologies. The letter also provided schedules for assessments of analysis-of-record changes for both LBLOCA and SBLOCA analyses, and a re-analysis schedule for SBLOCA analyses-of-record. The December 9, 1999, letter, satisfies the reporting requirement of 10 CFR 50.46(a)(3)(ii), and is acceptable.

ENCLOSURE

2.2 February 2, 2000, Letter

The licensee's February 2, 2000, letter referenced an updated analysis-of-record performed in 1995 for D. C. Cook, Unit 2. The licensee performed the LBLOCA analyses using the ESHAPE version of the approved Westinghouse BASH methodology. The LBLOCA analyses included sensitivity studies to identify the limiting case. The licensee assumed an uprated power level of 3588 Megawatts thermal (Mwt) in the calculations. The licensee discovered errors in a model in the D. C. Cook, Unit 2 LBLOCA methodology which would substantially increase the calculated peak cladding temperature (PCT). The licensee recalculated the limiting case, considering the effects of the errors and the compensating effect of assuming the licensed power of 3411 Mwt. The results conform with the criteria given in 10 CFR 50.46(b). It is not clear from the letter exactly how the recalculation was done. It is also not clear whether the licensee meant for this recalculation to be a new licensing-basis analysis (analysis-of-record) or if the licensee intended for this to be an assessment of the effect of model errors.

The NRC staff has the following comments regarding the ambiguity of the letter in presenting the recalculated LBLOCA results:

- (1) The licensee should have more clearly discussed whether a) the recalculation was performed using the approved methodology; or b) the results calculated with corrected models and the adjusted outputs incorporated into the rest of the methodology. The licensee's discussion referred to the recalculation as both "reanalyses" and "assessments;"
- (2) If the licensee intended that the recalculation of the previous limiting case analysis-of-record be a re-analysis to establish an updated analysis-of-record (1a), the letter should have stated why the licensee concluded that the identification of the worst case is not changed by the methodology error correction;
- (3) If the results were recalculated with imposed inputs from excerpted models that had been corrected (1b), the licensee either should have justified that the methodology was not changed, or called it an assessment.
- (4) If the licensee determined that the recalculation was an assessment, then the licensee should have provided a schedule for re-analysis of LBLOCAs.

The licensee's February 2, 2000, letter, also contained SBLOCA analysis-of-record assessments of PCT effects due to changes and errors. The NRC staff concludes that the assessments did not indicate a need to change the schedule for re-analysis given in the December 9, 1999, letter.

The next D. C. Cook, Unit 2, 10 CFR 50.46 report is forthcoming in the summer of 2001. The NRC staff will review this report to assure that clarifications of the ambiguities discussed above are included.

Despite the ambiguities noted above, the licensee's February 2, 2000, letter, satisfies 10 CFR 50.46(a)(3)(ii) because:

- (a) for LBLOCA, all of the alternatives comply with 10 CFR 50.46(a)(3)(ii),
- (b) for SBLOCA, all of the alternatives, along with the re-analysis schedule, comply with 10 CFR 50.46(a)(3)(ii), and
- (c) the licensee has agreed to provide additional clarification of the ambiguities discussed above and the NRC staff will review the report to assure that all issues have been resolved.

2.3 October 24, 2000, Letter

The licensee's October 24, 2000, letter, provides updated SBLOCA and LBLOCA assessments of changes and errors.

The LBLOCA assessment reported one additional correction. However, the estimated PCT effect of this item is not substantial, and does not affect the ambiguities of the February 2, 2000, letter.

The licensee's October 24, 2000, letter, also contained SBLOCA analysis-of-record assessments of PCT effects due to changes and errors. The NRC staff concludes that the assessments did not indicate a need to change the schedule for re-analysis given in the December 9, 1999, letter.

As stated above regarding the February 2, 2000, letter, the licensee has agreed to provide additional clarification of the ambiguities discussed above and the NRC staff will review the report to assure that all issues have been resolved.

The licensee's October 24, 2000, letter, complies with 10 CFR 50.46(a)(3)(ii), because it does not substantially change the status of the LBLOCA and SBLOCA licensing basis analyses for D. C. Cook, Unit 2.

2.4 December 20, 2000, Letter

The NRC staff considered whether the Westinghouse LOCA methodologies and supplementing processes apply to D. C. Cook, Unit 2. The licensee's December 20, 2000, letter, provides information to justify that the LBLOCA and SBLOCA methodologies used for D. C. Cook, Unit 1 analyses apply to D. C. Cook, Unit 1. The letter states that Indiana and Michigan Power Company and Westinghouse have ongoing processes to ensure that the as-operated plant values for PCT-sensitive parameters are bounded by the values assumed in the LOCA analyses. In other documentation, the licensee had indicated that Indiana and Michigan Power Company and Westinghouse have ongoing processes to determine mixed-core penalties for D. C. Cook, Unit 1. When the NRC staff asked if the same processes are used for D. C. Cook, Unit 2, the licensee confirmed that these same processes are also applied to D. C. Cook, Unit 2. The NRC staff concludes that these ongoing processes supplement the generically approved Westinghouse LOCA models in providing acceptable D. C. Cook, Unit 2 LBLOCA and SBLOCA methodologies.

3.0 CONCLUSION

The NRC staff has reviewed the licensee's submittals. As discussed in Section 2 above, the NRC staff concludes that the 10 CFR 50.46 reports for D. C. Cook, Unit 2, contained in the licensee's letters dated December 9, 1999, February 2, October 24, and December 20, 2000, are acceptable, and satisfy the requirements of 10 CFR 50.46(a)(3)(ii).

Contributor: Frank Orr

Date: May 3, 2001