

September 28, 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 NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF  
AMENDMENTS (TAC NOS. MB0154 AND MB0155)

Dear Mr. Powers:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 255 to Facility Operating License No. DPR-58 and Amendment No. 238 to Facility Operating License No. DPR-74 for the Donald C. Cook Nuclear Plant, Units 1 and 2. The amendments approve a change to the updated final safety analysis report (UFSAR) in response to your application dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001.

The amendments would approve changes to allow a revision to the current licensing basis, as stated in the UFSAR, to require operator action to mitigate the effects of a loss of seal injection cooling to the reactor coolant pumps.

A copy of our related safety evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

**/RA/**

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

Docket Nos. 50-315 and 50-316

Enclosures: 1. Amendment No. 255 to DPR-58  
2. Amendment No. 238 to DPR-74  
3. Safety Evaluation

cc w/encls: See next page

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PUBLIC	GHill(2)	JStang
PD III-1 Reading	OGC	
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AVegel, RIII	ACRS	
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Accession No. **ML012500180**

\*See previous concurrence

OFFICE	PDIII-1/PM	PDIII-1/LA	SRXB/SC	OGC	PDIII-1/SC
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DATE	9/28/01	9/28/01	9/28/01	9/28/01	9/28/01

OFFICIAL RECORD COPY

Donald C. Cook Nuclear Plant, Units 1 and 2

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INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 255  
License No. DPR-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Indiana Michigan Power Company (the licensee) dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, by Amendment No. 255, Facility Operating License No. DPR-58 is hereby amended to authorize a change to the updated final safety analysis report (UFSAR) to allow operator action to mitigate the effects of a loss of seal injection flow to the reactor coolant pumps, as set forth in the license amendment application dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001, and evaluated in the associated safety evaluation by the Commission's Office of Nuclear Reactor Regulation. The licensee shall update the UFSAR by adding a description of this change, as authorized by this amendment, and in accordance with 10 CFR 50.71(e).
3. This license amendment is effective as of its date of issuance and shall be implemented within 45 days.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA by SBajwa for/***

Claudia M. Craig, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: September 28, 2001

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 238

License No. DPR-74

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Indiana Michigan Power Company (the licensee) dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, by Amendment No. 238, Facility Operating License No. DPR-74 is hereby amended to authorize a change to the updated final safety analysis report (UFSAR) to allow operator action to mitigate the effects of a loss of seal injection flow to the reactor coolant pumps, as set forth in the license amendment application dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001, and evaluated in the associated safety evaluation by the Commission's Office of Nuclear Reactor Regulation. The licensee shall update the UFSAR by adding a description of this change, as authorized by this amendment, and in accordance with 10 CFR 50.71(e).
3. This license amendment is effective as of its date of issuance and shall be implemented within 45 days.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA by SBajwa for/***

Claudia M. Craig, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: September 28, 2001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 255 TO FACILITY OPERATING LICENSE NO. DPR-58  
AND AMENDMENT NO. 238 TO FACILITY OPERATING LICENSE NO. DPR-74  
INDIANA MICHIGAN POWER COMPANY  
DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2  
DOCKET NOS. 50-315 AND 50-316

## 1.0 INTRODUCTION

By application dated September 26, 2000, as supplemented February 1, June 29, and August 10, 2001, Indiana Michigan Power Company (the licensee) requested prior approval of a change to the updated final safety analysis report (UFSAR) to require operator action to mitigate the effects of a loss of seal injection (LOSI) flow to the reactor coolant pumps. The supplements to the September 26, 2000 application, were in response to Nuclear Regulatory Commission (NRC) staff requests for additional information dated December 27, 2000, and March 29, 2001.

The February 1, June 29, and August 10, 2001 supplemental letters did not change the scope of the proposed action and did not change the NRC's preliminary no significant hazards consideration determination.

## 2.0 EVALUATION

In 1997, during an investigation of component cooling water flow rates, the licensee determined that during a LOSI, the reactor coolant pump (RCP) thermal barrier heat exchanger (TBHX) may not be able to maintain the Number 1 seal leak-off temperature below 235 degrees Fahrenheit (F). The higher temperatures of the reactor coolant taking the place of normal reactor coolant pump seal injection, combined with the reduced leak-off flow through the Number 1 seal, could result in the water transforming to steam. Seal performance cannot be predicted with two-phase flow in the downstream piping, and therefore, a two-phase flow condition that is outside the design basis of the plant must be precluded.

In the event of a LOSI flow, reactor coolant system (RCS) water travels along a path up the RCP shaft and through the TBHX to provide a redundant means of cooling and lubrication for the RCP radial bearing and Number 1 seal. This portion of RCS water is called Number 1 seal leak-off flow. Based on vendor design information, the TBHX was believed to provide sufficient cooling of the leak-off flow to maintain the RCP bearing and seal cool and lubricated and to prevent leak-off flow from flashing to steam. Flashing of seal leak-off flow is a concern because



seal performance cannot be predicted when flashing occurs. The TBHX utilizes the cooler water in the component cooling water (CCW) system as a heat sink to reject heat from the hot leak-off flow. The vendor design was believed to permit sustained (essentially indefinite) RCP operation without seal injection over the full range of vendor-recommended seal leak-off flow rates. Therefore, the UFSAR for the D. C. Cook plant states that for a LOSI, manual action of any type is not necessary.

The discovery that the TBHX may not be able to maintain the Number 1 seal leak-off temperature below 235 degrees Fahrenheit (F) invalidated the statement in the D. C. Cook UFSAR that manual action of any type is unnecessary. Operator action will be required to mitigate a LOSI accident.

In order to determine appropriate action in the event of a LOSI flow, the licensee performed detailed thermal analyses of the leak-off flow, including sensitivity studies on parameters that affect the conditions of the leak-off flow. The licensee established the following acceptance criteria to ensure that the RCP bearing and seal continue to be cooled and lubricated: (1) fluid temperature at the RCP bearing must remain below 225 degrees Fahrenheit (F) and (2) RCP leak-off flow must remain subcooled. The licensee developed a thermal analysis model of the flow path for the leak-off flow. The licensee validated the model by several means. The licensee verified the program input parameters (e.g., geometry) through an input review. The licensee verified TBHX performance by comparing runs using the thermal analysis model to hand calculations. The licensee verified the basic equations for heat transfer by comparing leak-off temperature results from the thermal analysis model to heat balance calculations. In addition, the licensee verified the performance of the thermal analysis model under transient (LOSI) conditions by comparing runs using the model to the results of experiments performed by the vendor. The licensee's validation effort confirmed the adequacy of the thermal analysis model. The thermal analysis model was exercised under an array of initial conditions and operating assumptions to determine appropriate action in the event of a LOSI flow.

Based on the analysis, the licensee determined that the following actions were required to offset the reduced cooling capacity of the TBHX and to avoid flashing of the leak-off fluid:

1. Operators should prevent seal leak-off flows during normal operations from decreasing below 1 gpm.
2. If a high seal return line temperature alarm occurs (alarm setpoint is 185 degrees Fahrenheit (F) before seal injection can be restored, the unit will be tripped and the affected RCP(s) secured.
3. Following a LOSI, the unit may remain in hot standby indefinitely, but if a cooldown is performed, the RCS cooldown rate will be limited to 60 degrees Fahrenheit (F)/hr.
4. Following a LOSI, back-pressure in the seal leak-off return line will be controlled to prevent flashing. This is accomplished by maintaining the volume control tank (VCT) pressure sufficiently high to keep the leak-off fluid subcooled. The licensee determined that the VCT pressure will need to be increased to 33 psig within 90 minutes following a LOSI.

5. The CCW inlet temperature to the TBHX will be maintained below 105 degrees Fahrenheit (F).
6. The CCW flow rate to the TBHX will be maintained above 30 gpm.

The staff has reviewed the licensee's analysis. The staff finds that the licensee's analyses were conducted in a manner that conservatively bounds plant operation with respect to important parameters for the LOSI event. The staff further concurs with the licensee's conclusions as described in the February 2001 letter, as supplemented by the June and August 2001 letters, and therefore finds acceptable the licensee's proposed actions, as described above, for responding to a LOSI event. The staff, therefore, finds acceptable the licensee's proposal to modify the D. C. Cook licensing basis, as it is described in the UFSAR, to acknowledge the required actions discussed above.

### 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

These amendments change the requirements 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 amendments involve 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 amendments involve no significant hazards consideration and there has been no public comment on such finding (65 FR 62386). Accordingly, the amendments meet 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 amendments.

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

Principal Contributor: M. Shuaibi

Date: September 28, 2001