

April 3, 2006

Mr. Mano K. Nazar  
Senior Vice President and  
Chief Nuclear Officer  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNIT 2 (DCCNP-2) - RELIEF  
REQUEST REL-PP6 REGARDING THE WEST ESSENTIAL SERVICE WATER  
PUMP TEST FREQUENCY (TAC NO. MD0248)

Dear Mr. Nazar:

By letter dated March 10, 2006, Indiana Michigan Power Company (IMPC) submitted Inservice Testing Relief Request REL-PP6 for its third 10-year inservice testing (IST) program interval at DCCNP-2. Specifically, this proposed alternative would allow IMPC to test the DCCNP-2 west Essential Service Water pump on a nominal 3-month frequency, in lieu of the double frequency specified by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), OM-6, paragraph 6.1, and would allow IMPC to monitor the pump weekly via a predictive maintenance vibration monitoring program when the pump is in service operating at normal flow. This submittal superseded a previous submittal dated March 3, 2006.

The Nuclear Regulatory Commission (NRC) staff has completed its review of Relief Request REL-PP6. Details of the NRC staff's review are set forth in the enclosed safety evaluation. Accordingly, Relief Request REL-PP6 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on the NRC staff's determination that compliance with the specified ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Because of the proposed combination of testing and monitoring, the licensee's proposed alternative provides reasonable assurance of the operational readiness of the pump. This alternative is authorized from the date of the most recent IST program test (January 23, 2006) for a period of 92 days plus the 25 percent allowance permitted by Technical Specifications. If you have any questions, please call the Project Manager, Mr. Peter Tam at 301-415-1451.

Sincerely,

/RA/

L. Raghavan, Branch Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-316

Enclosure: As stated

cc w/encl: See next page

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\*SE transmitted by memo of 3/16/06.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM RELIEF REQUEST REL-PP6

DONALD C. COOK NUCLEAR PLANT, UNIT 2 (DCCNP-2)

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-316

1.0 INTRODUCTION

By letter dated March 10, 2006 (Agencywide Document Access and Management System (ADAMS) Accession No. ML060880278), Indiana Michigan Power Company (the licensee) proposed an alternative under Relief Request REL-PP6 for the third 10-year inservice testing (IST) program interval at DCCNP-2. The licensee requested relief from certain inservice test requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, which references the ASME Code, Operations and Maintenance (OM) Standard, Part 6 (OM-6), for IST of pumps. The licensee's March 10, 2006, submittal supersedes the licensee's March 3, 2006 (ADAMS Accession No. ML060740406) submittal. The Nuclear Regulatory Commission (NRC) staff reviewed the licensee's March 10, 2006, submittal, and has recorded results of its review in the following sections.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* at Section 50.55a (10 CFR 50.55a) requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) program intervals in accordance with the specified ASME Code incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the NRC staff pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 50.55a(f)(4)(iv), IST of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used, provided that all related requirements of the respective editions and addenda are met. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the NRC staff to approve alternatives and to grant relief from ASME Code requirements upon

ENCLOSURE

making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to Code requirements that are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

The DCCNP-1 third 10-year IST interval commenced July 1, 1996. The program was, therefore, developed in accordance with the 1989 Edition of the ASME Code, Section XI. The 1989 ASME Code, Section XI, references OM Standards, Part 1 (OM-1), Part 6 (OM-6), and Part 10 (OM-10) for its IST requirements. The licensee requested relief from the requirements of OM-6, which requires that the frequency of pump testing be doubled if deviations fall within the alert range.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Pump Relief Request REL-PP6

##### 3.1.1 Code Requirements

The licensee requested relief from OM-6, Paragraph 6.1, which requires that the frequency of testing be doubled if deviations fall within the alert range.

##### 3.1.2 Licensee's Basis for Requesting Relief

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested the subject relief to preclude the risk of a unit transient or shutdown due to temperature changes on the DCCNP-2 reactor coolant pump seal resulting from a full-flow test of the DCCNP-2 west essential service water (ESW) pump.

DCCNP-2 has a licensing basis minimum leak-off flow rate for the reactor coolant pump (RCP) seals. This minimum flow is based on ensuring seal injection as well as preventing the unanalyzed condition of two-phase flow in the downstream leak-off piping. Until January 20, 2006, the seal leak-off flow rate for RCP 1 was stable and above the minimum limits, although slightly lower than the rate for the other three pumps. On January 20, 2006, the RCP 1 seal leak-off flow rate exhibited a period of instability. Initial analysis indicated that the instability was initiated by a series of injection water pressure and temperature changes caused by multiple charging pump starts and stops. As a result of this occurrence, the licensee initiated actions to keep the seal leak-off flow rate stable, and provided contingency actions that might be taken if the instability recurred. The actions to maintain the seal leak-off flow rate stable have proven to be effective at normal ESW system flow rates. However, the licensee's procedures instruct operators to shut down the reactor if instabilities result in a sustained low seal leak-off flow.

On February 21, 2006, a containment isolation valve surveillance test resulted in changes to non-ESW flow to air coolers in the vicinity of RCP 1. Although not expected, the resultant fluctuations in air temperature apparently caused a recurrence of instability in leak-off flow. Based on investigation of this occurrence, the licensee concluded that there is a significant dependence and sensitivity between temperature changes and the onset of seal leak-off flow instabilities.

The licensee evaluated upcoming plant evolutions to identify activities affecting any parameter that could impact the RCP 1 seal. These evolutions included the increased frequency IST vibration measurement of the west ESW pump, which is currently in alert status. The IST measurements are taken at elevated ESW flows (full flow reference conditions), which result in decreased component cooling water temperatures, thereby reducing the RCP 1 seal water injection temperature. Since the west ESW pump is in an alert status, the ASME Code requires that the pump be tested at twice the normal 3-month frequency. The west ESW pump surveillance is required to be performed by March 21, 2006. The DCCNP-2 refueling outage is scheduled to start March 25, 2006, at which time the licensee intends to correct the seal leak-off instability condition. Approval of the proposed alternative will preclude the risk of a unit transient or shutdown due to seal injection water temperature changes resulting from the increased frequency IST program test.

The current Unit 2 west ESW pump bowl assembly, including the rotating element, was installed in October 2004, and a new set of vibration reference values were established. Following establishment of the new reference values, temporary changes were made to the configuration of the forebay from which the ESW system takes suction. During these changes, pump vibration readings taken at 4 of the 5 measurement locations, while the pump was at normal operating flow, were observed to be above the IST alert limit. The IST limits are based on full-flow conditions. The pump was placed on an increased frequency IST program testing schedule. Subsequent to the bowl assembly replacement, the IST-required vibration readings for one location have fluctuated around the alert limit (0.152 in/sec) with no increasing or decreasing trend evident. The highest reading at the location was 0.195 in/sec (for reference, the Action limit is 0.366 in/sec).

In addition to IST-required testing, the west ESW pump vibration has been monitored weekly via a predictive maintenance monitoring program since October 2004, when the elevated vibration levels were noted. The weekly monitoring is performed when the pump is in service, operating at normal flow. The weekly monitoring includes trending of overall vibration levels, spectral analysis, and time waveform analysis. In addition, underwater accelerometer vibration data from accelerometers installed on the ESW pump bowls is collected and analyzed. The licensee stated that the weekly monitoring has shown no adverse trends.

### 3.1.3 Licensee's Proposed Alternative Testing

The licensee proposed that the west ESW pump be tested at the 3-month testing frequency specified by OM-6, paragraph 5.1, in lieu of the double frequency specified by OM-6, paragraph 6.1. For the duration of the proposed alternative, the west ESW pump will be monitored weekly, via a predictive maintenance vibration monitoring program, when the pump is in service operating at normal flow. The proposed alternative will apply to the west ESW pump from the date of the most recent IST program test (January 23, 2006) for a period of 92 days plus the 25 percent allowance permitted by Technical Specifications.

### 3.1.4 NRC Staff Evaluation of Relief Request REL-PP6

OM-6, Paragraph 6.1, requires that the frequency of testing be doubled if deviations fall within the alert range. Subsequent to bowl assembly replacement, the west ESW pump had vibration readings that exceeded the alert range value of 0.152 in/sec and was placed in an increased

testing frequency regimen. The highest vibration reading obtained was 0.195 in/sec and an increasing or decreasing trend in vibration levels is not evident based on trending data.

To perform the Code-required test, the ESW flow is required to be increased to the full-flow reference value, which would result in decreased component cooling water temperature, and a decrease in the RCP 1 seal water injection temperature. Such a decreased seal water injection temperature could result in RCP 1 seal instability and a resultant unit transient or shutdown.

The licensee's proposed alternative is to test the west ESW pump on a nominal 3-month frequency with a 25 percent allowance permitted by Technical Specifications, and monitor the pump weekly, via a predictive maintenance vibration monitoring program when the pump is in service operating at normal flow. This combination of testing and monitoring provides reasonable assurance of the operational readiness of the west ESW pump.

Requiring the licensee to meet the Code-required increased pump testing frequency (as a consequence of west ESW pump vibration levels in the alert range) could cause seal instability. The licensee's proposed alternative testing frequency and weekly monitoring will assure the pump's operational readiness. Therefore, the NRC staff finds that requiring Code compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The DCCNP-2 refueling outage is scheduled to start March 25, 2006, at which time the licensee intends to correct the seal leak-off instability condition. Therefore, the licensee's proposed alternative will apply to the west ESW pump from the date of the most recent IST program test (January 23, 2006) for a period of 92 days plus the 25 percent allowance permitted by Technical Specifications.

### 3.1.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specified Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Specifically, this alternative allows the licensee to test the DCCNP-2 west ESW pump on a nominal 3-month frequency, in lieu of the double frequency specified by OM-6, paragraph 6.1, and monitor the pump weekly via a predictive maintenance vibration monitoring program when the pump is in service operating at normal flow. Because of the proposed combination of testing and monitoring, the licensee's proposed alternative provides reasonable assurance of the operational readiness of the pump. This alternative is authorized\* from the date of the most recent IST program test (January 23, 2006) for a period of 92 days plus the 25 percent allowance permitted by Technical Specifications.

Principal Contributor: W. Poertner

Date: April 3, 2006

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\*This authorization had been verbally conveyed to the licensee on March 17, 2006, per the guidance in Office of Nuclear Reactor Regulation Office Instruction LIC-102, Rev. 1, "Relief Request" and documented in an e-mail, P. Tam to the licensee, dated March 17, 2006 (ADAMS Accession No. ML060760281).



Donald C. Cook Nuclear Plant, Units 1 and 2

cc:

Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
2443 Warrenville Road, Suite 210  
Lisle, IL 60532-4352

Attorney General  
Department of Attorney General  
525 West Ottawa Street  
Lansing, MI 48913

Township Supervisor  
Lake Township Hall  
P.O. Box 818  
Bridgman, MI 49106

U.S. Nuclear Regulatory Commission  
Resident Inspector's Office  
7700 Red Arrow Highway  
Stevensville, MI 49127

James M. Petro, Jr., Esquire  
Indiana Michigan Power Company  
One Cook Place  
Bridgman, MI 49106

Mayor, City of Bridgman  
P.O. Box 366  
Bridgman, MI 49106

Special Assistant to the Governor  
Room 1 - State Capitol  
Lansing, MI 48909

Mr. John A. Zwolinski  
Safety Assurance Director  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106

Michigan Department of Environmental  
Quality  
Waste and Hazardous Materials Div.  
Hazardous Waste & Radiological  
Protection Section  
Nuclear Facilities Unit  
Constitution Hall, Lower-Level North  
525 West Allegan Street  
P. O. Box 30241  
Lansing, MI 48909-7741

Lawrence J. Weber, Plant Manager  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106

Mr. Joseph N. Jensen, Site Vice President  
Indiana Michigan Power Company  
Nuclear Generation Group  
One Cook Place  
Bridgman, MI 49106