June 17, 2003

Mr. A. Christopher Bakken III, Senior Vice President
and Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
500 Circle Drive
Buchanan, MI 49107

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNIT 2 - RELAXATION OF THE REQUIREMENTS OF ORDER (EA-03-009) REGARDING REACTOR PRESSURE VESSEL HEAD INSPECTIONS (TAC NO. MB9543)

Dear Mr. Bakken:

The U. S. Nuclear Regulatory Commission (NRC) has approved, upon good cause shown and subject to the conditions specified below, the Indiana Michigan Power Company's (the licensee's) request for relaxation of a specific requirement of Order EA-03-009 for the Donald C. Cook Nuclear Plant (D. C. Cook), Unit 2. The Order requires inspections of the reactor pressure vessel (RPV) and associated penetration nozzles at pressurized-water reactors. This relaxation is in response to the licensee's letter dated June 12, 2003.

Pursuant to the procedure specified in Section IV., paragraph F. of the Order, the licensee requested relaxations from the requirement specified in Section IV., paragraph C., item (1)(b), to perform either ultrasonic testing (UT) of each RPV head penetration nozzle or a wetted surface examination using eddy current testing (ET) or dye penetrant testing (PT) of each head penetration nozzle. The licensee requested relaxation from the Order to allow either UT or a wetted surface examination using ET or PT to inspect all but two of the RPV head penetration nozzles. Specifically for penetrations 73 and 75, the licensee requests relaxation from the Order to allow a combination of UT, ET, and PT to inspect those two nozzles. This relaxation allows the licensee to perform either UT or a wetted surface examination using ET or PT to inspect all but two of the RPV head penetration nozzles. For penetrations 73 and 75, this relaxation allows a combination of UT, ET, and PT to inspect the nozzles.

The NRC staff has reviewed and evaluated the information provided by the licensee in support of the request for relaxation and found that the licensee has demonstrated good cause for the requested relaxation. The licensee has demonstrated that the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to Section IV. of the Order, and Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3), the NRC staff approves, for one operating cycle commencing with startup from the spring 2003 refueling outage (U2C14), the licensee's request for relaxation and authorizes the proposed alternatives to Section IV., paragraph C., item (1)(b) of the Order with respect to UT and wetted surface examination testing which cannot be completed as specified in the Order.

The details of the NRC staff's review are contained in the enclosed safety evaluation. Please contact Mr. John Stang at (301) 415-1345 with any questions regarding this approval.

Sincerely,

/RA by LRaghavan for/

William H. Ruland, Director
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-316

Enclosure: Safety Evaluation

cc w/encl: See next page

The details of the NRC staff's review are contained in the enclosed safety evaluation. Please contact Mr. John Stang at (301) 415-1345 with any questions regarding this approval.

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cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ORDER (EA-03-009) RELAXATION REQUEST, EXAMINATION COVERAGE

FOR REACTOR PRESSURE VESSEL HEAD PENETRATION NOZZLES

DONALD C. COOK NUCLEAR PLANT, UNIT 2

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-316

1.0 INTRODUCTION

The Nuclear Regulatory Commission (NRC) issued Order EA-03-009, dated February 11, 2003, requiring specific examinations of the reactor pressure vessel (RPV) head and vessel head penetration (VHP) nozzles of all pressurized-water reactor plants. Section IV., paragraph F., of the Order states that requests for relaxation of the Order associated with specific penetration nozzles will be evaluated by the NRC staff using the procedure for evaluating proposed alternatives to the American Society of Mechanical Engineers Code in accordance with 10 CFR 50.55a(a)(3). Section IV., paragraph F., of the Order states that a request for relaxation regarding inspection of specific nozzles shall address the following criteria: (1) the proposed alternative(s) for inspection of specific nozzles will provide an acceptable level of quality and safety, or (2) compliance with this Order for specific nozzles would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

For the Donald C. Cook Nuclear Plant, Unit 2, and similar plants determined to have a high susceptibility to primary water stress-corrosion cracking (PWSCC), in accordance with Section IV., paragraphs A. and B. of the Order, the following inspections are required to be performed every refueling outage in accordance with Section IV., paragraph C., item (1) of the Order:

a. Bare metal visual examination of 100 percent of the RPV head surface (including 360° around each RPV head penetration nozzle), AND

b. Either:

    i. Ultrasonic testing (UT) of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone, OR

    ii. Eddy current testing (ET) or dye penetrant testing (PT) of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld.

Footnote 3 in Section IV., paragraph C., item (1) of the Order provides specific criteria for examination of repaired VHP nozzles.

By letter dated June 12, 2003, the Indiana Michigan Power Company (the licensee) requested relaxation to implement alternatives to the requirements of Section IV., paragraph C., item (1)(b), for the D. C. Cook Unit 2 VHP nozzles.

2.0 ORDER EA-03-009 RELAXATION REQUEST FOR PROPOSED ALTERNATIVE INSPECTION FOR RPV HEAD NOZZLES

2.1 Order Requirements for which Relaxation is Requested

Section IV., paragraph C., item (1)(b) of the Order requires, in part, that the following inspections be performed during every refueling outage for high susceptibility plants similar to D. C. Cook Unit 2:

> Either:
>
> (i) UT of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone, OR
>
> (ii) ET or PT of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld.

The licensee has requested relaxation of the requirements of Section IV., paragraph C., item (1)(b), of the Order as follows:

> Relaxation from the Order to allow either/or UT or a wetted surface examination using ET or PT to inspect all but two of the RPV head penetration nozzles. Specifically for Penetrations 73 and 75, the licensee requests relaxation from the Order, to allow a combination of UT/ET/PT to inspect those two nozzles.

2.2 Licensee's Proposed Alternative

In lieu of requiring inspections to be performed as prescribed in Section IV., paragraph C., item (1)(b) of the Order, the licensee proposed the following alternative:

IV.C(1)(b) For each penetration perform either:

(i) Ultrasonic testing of the RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone;

(ii) Eddy current testing or dye penetrant testing of the wetted surface of the J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld; OR

(iii) Equivalent combination of (i) and (ii) to obtain sufficient data to assess the acceptability of the penetration nozzle base material and J-groove weld.

2.3 Licensee's Basis for Relaxation

The licensee's submittal dated June 12, 2003, indicates that the proposed alternative is submitted under Criterion (1) of Section IV., paragraph F., of the Order, which states:

> *The proposed alternative(s) for inspection of specific nozzles will provide an acceptable level of quality and safety...*

The licensee stated that due to the design of some of the RPV head penetration nozzles (nine nozzles have thermal sleeves installed in them), complete inspections of each RPV head penetration nozzle using one inspection method identified in Section IV., paragraph C., item (1)(b) of the Order cannot be achieved.

The licensee provided this proposed relaxation request since all of the RPV head penetration nozzles are not being inspected by the same method during the current scheduled refueling outage. This relaxation would allow the licensee to inspect nine nozzles using ET; one nozzle using a combination of UT, ET, and PT; one nozzle using a combination of PT and UT; and the remaining nozzles using UT. The licensee stated that this relaxation would not change the criteria of the inspection requirements identified in Section IV., paragraph C., item (1)(b) of the Order for the nozzles being inspected. All of the RPV nozzles would receive an inspection by an approved method described in the Order.

The licensee stated that ET would be performed on nine nozzles (numbers one to nine) located on the inner-most rows of the RPV head. These nozzles have centering tabs with thermal sleeves installed which prevents UT inspections because of the configuration of the UT transducers. The licensee stated that ET is the only inspection method that can be used to examine from 2 inches above the J-groove weld down to the top of the chamfer near the bottom of the nozzle. The licensee stated that penetration 73 had a minimum distance from the J-groove weld to the threaded area of approximately 0.36 inches. To achieve complete inspection coverage, the licensee performed in addition to the UT examination, an ET examination on the inside diameter surface down to the top of the chamfer, and a PT examination was performed on the threaded surface of the outside diameter down to the bottom of the threads. Penetration 73 is in the next-to-the-outermost row of the RPV head. The licensee performed a UT examination on penetration 75 in accordance with the Order, except for a small area which had previously been weld-repaired.

The licensee stated that it was unable to accurately inspect this area with the UT method. The licensee performed a PT examination on this weld repaired area. The remaining nozzles were inspected using the UT method.

The licensee stated that all the inspections identified above were performed in accordance with Section IV., paragraph C., item (1)(b) of the Order. Therefore, based upon the above information, the licensee believes that the proposed alternative inspection (i.e., the use of a combination of previously approved and accepted inspection methods of the type described in Section IV., paragraph C., items (1)(b)(i) and (1)(b)(ii) of the Order) is sufficient to detect PWSCC and will provide an acceptable level of quality and safety since the proposed examinations covers each RPV head penetration nozzle.

2.4 EVALUATION

The NRC staff's review of this relaxation request is based on Criterion (1) of Section IV., paragraph F. of the Order.

The licensee's proposed alternative is to use the examination techniques identified in Section IV., paragraph C., item (1)(b)(i) or item (1)(b)(ii) of the Order or combination thereof. The exclusive use of either the UT or ET/PT inspection techniques for the RPV nozzles in accordance with the Order cannot be done because of the limitations imposed by the configurations of the RPV head nozzles at D. C. Cook Unit 2. The licensee has proposed to use inspection techniques that are identified in the Order. The NRC staff has reviewed the licensee's proposed combination of inspection techniques and finds that the proposed inspection of the RPV nozzles will be sufficient to detect PWSCC phenomena and provide assurance of structural integrity.

The proposed alternative is acceptable because each RPV head nozzle penetration will be inspected by a method identified in Order EA-03-009, and will provide assurance of structural integrity. Therefore, the proposed alternative will provide an acceptable level of quality and safety.

3.0 CONCLUSION

The NRC staff concludes that the licensee's proposed alternative to allow the use of, or a combination of, examination methods on the RPV head nozzle penetrations in accordance with Section IV., paragraph C., items (1)(b)(i) and (1)(b)(ii) of the Order is sufficient to reliably detect PWSCC and provides reasonable assurance of the structural integrity of the RPV head. Thus, the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to Section IV., paragraph F., of Order EA-03-009, the licensee has demonstrated good cause for the proposed relaxation of the Order, and the NRC staff authorizes the proposed relaxation and alternative inspection of the RPV head nozzle penetrations at D. C. Cook Unit 2 for the spring 2003 outage.

Principal Contributors: E. Reichelt
A. Hiser

Date: June 17, 2003