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INDIANA MICHIGAN POWER

March 26, 2003

AEP:NRC:3054-04
10 CFR 2.202

Docket Nos: 50-315
50-316

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 1 and Unit 2
REQUEST FOR RELAXATION FROM NUCLEAR REGULATORY COMMISSION ORDER ESTABLISHING INTERIM INSPECTION REQUIREMENTS FOR REACTOR PRESSURE VESSEL HEADS AT PRESSURIZED WATER REACTORS

Reference: 1) Nuclear Regulatory Commission Order EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 11, 2003

2) Letter from J. E. Pollock, Indiana Michigan Power Company, to Secretary, Office of the Secretary of the Commission, U.S. Nuclear Regulatory Commission, "Answer to Nuclear Regulatory Commission Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," AEP:NRC: 3054-03, dated March 3, 2003

This letter transmits two requests for relaxation of requirements contained in a Nuclear Regulatory Commission (NRC) order (Reference 1) establishing interim inspection requirements for reactor pressure vessel (RPV) heads at pressurized water reactors. In Reference 2, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant Unit 1 and Unit 2, consented to the order and identified two requirements from which it intended to request relaxation. Both requirements involve nondestructive examination (ultrasonic, eddy current, and dye penetrant testing) of the penetration nozzles below the J-groove weld that attaches the nozzle to the head and forms part of the reactor

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coolant system pressure boundary. I&M considers that nondestructive examination of certain portions of the nozzles below the J-groove weld is unnecessary because these portions are not involved in the phenomena of concern, leakage through the J-groove weld and circumferential cracking in the nozzle above the J-groove weld.

Section IV.F of the order states that licensees proposing to deviate from requirements contained in the order may request that the Director, NRC Office of Nuclear Reactor Regulation, relax those requirements. Section IV.F further states that requests for relaxation associated with specific nozzles will be evaluated by the NRC staff using its procedure for evaluating proposed alternatives to the American Society of Mechanical Engineers (ASME) Code in accordance with 10 CFR 50.55a(a)(3). In accordance with Section IV.F of the order, I&M is requesting that the Director, Office of Nuclear Reactor Regulation, relax the two requirements described in Attachment 1 and Attachment 2 to this letter. The format of these requests is similar to that published by the Nuclear Energy Institute for proposing alternatives to the ASME Code in accordance with 10 CFR 50.55a(a)(3).

I&M requests approval of the proposed alternatives by April 28, 2003, to support implementation during the next Unit 2 refueling outage. Implementation of the alternative ultrasonic testing proposed in Attachment 1 will include performance of an assessment to determine if leakage has occurred into the nozzle interference fit zone, as required by the order. I&M considers that this assessment may be performed by conducting a bare metal visual leakage examination of the upper RPV head surface, including 360 degrees around each nozzle, in conjunction with evaluating the ultrasonic examination results for evidence of leakage. Although there may be postulated conditions unique to each method in which it would be difficult to identify leakage, I&M considers that the use of both methods will provide a high degree of assurance that leakage into the interference fit zone would be identified.

As noted above, Reference 2 identified two requirements from which I&M intended to request relaxation. In identifying those requirements, I&M stated that the outside surface of each nozzle is threaded at the lower end. This statement was based on information contained in applicable fabrication drawings. However, subsequent inspection of an RPV head similar to those installed at CNP Unit 1 and Unit 2 indicates that only the nozzles that have guide funnels may be threaded. Review of available photographs and video tapes has proved to be inconclusive due to their angle of view and resolution. Therefore, until the underside of the Unit 1 and Unit 2 RPV heads are accessible during the respective refueling outages, it will not be possible to determine whether nozzles that do not have guide funnels are threaded at the bottom end. This is reflected

in the relaxation requests presented in Attachment 1 and Attachment 2 to this letter.

I&M considers that, upon approval by the NRC, the alternatives proposed in Attachment 1 and Attachment 2 will constitute conditions of the order rather than regulatory commitments. Therefore, there are no new commitments identified in this document.

Should you have any questions, please contact Mr. Brian A. McIntyre, Manager of Regulatory Affairs, at (269) 697-5806.

Sincerely,

J. E. Pollock
Site Vice President

JW/rdw

Attachments:

1) Proposed Alternative No. 1 to NRC Order EA-03-009: Alternative to Requirement to Perform Ultrasonic Testing to Bottom of Nozzles
2) Proposed Alternative No. 2 to NRC Order EA-03-009: Alternative to Requirement to Perform Eddy Current or Dye Penetrant Testing of All Wetted Surfaces of Nozzle Base Material

c: Director, Office of Nuclear Reactor Regulation
H. K. Chernoff, NRC Washington DC
K. D. Curry, Ft. Wayne AEP, w/o attachments
J. E. Dyer, NRC Region III
J. T. King, MPSC, w/o attachments
MDEQ - DW & RPD, w/o attachments
NRC Resident Inspector
J. F. Stang, Jr., NRC Washington DC

AFFIRMATION

I, Joseph E. Pollock, being duly sworn, state that I am Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

Indiana Michigan Power Company

J. E. Pollock
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 26th DAY OF March, 2003

Julie Newmiller
Notary Public

My Commission Expires 8-22-2004

JULIE E. NEWMILLER
Notary Public, Berrien County, MI
My Commission Expires Aug 22, 2004

bc: A. C. Bakken III, w/o attachments
G. F. Borlodan/C. R. Lane/K. R. Worthington
M. J. Finissi, w/o attachments
D. J. Garner
J. B. Giessner
D. W. Jenkins, w/o attachments
J. A. Kobyra, w/o attachments
B. A. McIntyre, w/o attachments
J. E. Newmiller
J. E. Pollock, w/o attachments
D. J. Poupard
T. R. Satyan-Sharma
M. K. Scarpello, w/o attachments
C. L. Vanderniet
T. K. Woods

ATTACHMENT 1 TO AEP:NRC:3054-04

PROPOSED ALTERNATIVE NO. 1 TO NRC ORDER EA-03-009:
ALTERNATIVE TO REQUIREMENT TO PERFORM ULTRASONIC TESTING TO BOTTOM OF NOZZLES

NRC Order EA-03-009, Section IV.F, Criterion (1):
Alternative for Inspection of Specific Nozzles Will Provide an Acceptable Level of Quality and Safety

References for this attachment are identified in Section 7.

1. **Components Affected**

   Donald C. Cook Nuclear Plant (CNP) Unit 1 and Unit 2 reactor pressure vessel (RPV) head penetrations (80 and 79 penetrations respectively).

2. **Applicable Document**

   Nuclear Regulatory Commission (NRC) Order EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 11, 2003.

3. **Applicable Requirement**

   NRC Order EA-03-009 requires ultrasonic, eddy current, or dye penetrant testing of RPV head penetration nozzles at various intervals, depending on their susceptibility to primary water stress corrosion cracking. The CNP Unit 1 and Unit 2 RPV heads are currently in the moderate and high susceptibility categories, respectively. The requirements governing ultrasonic testing for RPV heads in the moderate and high susceptibility categories are stated in Sections IV.C(2)(b)(i) and IV.C(1)(b)(i) of the order, respectively. If ultrasonic testing is selected, these sections both require:

   > Ultrasonic testing 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.

   The J-groove weld attaches the nozzle to the underside of the head and forms part of the reactor coolant system pressure boundary.

4. **Reason for Request**

   As described in Section 3 above, NRC Order EA-03-009 requires that ultrasonic testing extend to the bottom of the nozzle. Indiana Michigan Power Company (I&M) is requesting approval of the proposed alternative to obtain requirements that are appropriate to the ultrasonic probes used at CNP, the design of the CNP nozzles, and the phenomena of concern as identified in the order. The proposed alternative is based on the three considerations discussed below.

The first consideration results from the configuration of the ultrasonic transducers in the probes used to examine the nozzles. These probes have separate transducers for sending and receiving the ultrasonic signal. The probes, used for detection of the most significant type of cracks, circumferential cracks, have the two transducers arranged vertically. As documented in Reference 1, Attachment 1, Section 2.5, and Reference 2, Attachment 2, Section 2.5, the probe used for ultrasonic testing of nozzles during the previous Unit 1 and Unit 2 outages was the PCS24. The transducers in the PCS24 probe are nominally 24 millimeters (approximately 0.95 inches) apart. With this configuration, the lower transducer will not contact the inside wall of the nozzle unless the upper transducer is inserted greater than approximately 24 millimeters into the nozzle. Since the scanning process requires that both transducers be in contact with the surface, the probe cannot scan a small portion of the lower end of the nozzle. Based on the geometry involved in the transducer location and nozzle configuration, the portion that cannot be scanned is the portion extending from the bottom of the nozzle upward for a distance of slightly greater than 12 millimeters. I&M intends to continue use of the PCS24 probe since it will provide the best comparison with previous test results. Use of an additional, different type of probe for the sole purpose of scanning that small portion of the nozzle that cannot be scanned by a PCS24 probe would result in increased testing time and expense, and, as described in Section 5 below, would not provide information that is significant to the phenomena of concern.

The second consideration is the effect of threaded surfaces on the ability to read an ultrasonic scan. The outside surface of at least five nozzles is threaded for approximately 3/4 inch at the bottom end. These nozzles have a guide funnel installed on the threads. Other nozzles may also be threaded without having guide funnels installed. Ultrasonic testing of the threaded portions of the nozzle with the PCS24 probe could produce multiple reflections and tip signals, producing scans that are difficult or impossible to read. Use of an additional, different type of probe for the sole purpose of obtaining readable scans of threaded portions of the nozzle would result in increased testing time and expense, and, as described in Section 5 below, would not provide information that is significant to the phenomena of concern.

The third consideration is the elimination of requirements to ultrasonically test portions of the nozzle that are not significant to the phenomena of concern. As described in the order, the phenomena that are of concern are leakage through the J-groove weld, and circumferential cracking in the nozzle above the J-groove weld, which could result in a control rod ejection event. This is appropriately reflected in the requirement (as stated in Section 3 above) that the ultrasonic testing extend to 2 inches above the J-groove weld. I&M considers the 2-inch criterion to also be appropriate for defining the length of nozzle below the J-groove weld to be ultrasonically tested. However, the order requires that ultrasonic testing extend to the bottom of the nozzle. Since nozzles in the center area of the head extend approximately 5 inches below the J-groove weld, the order would require ultrasonically testing significant portions of the nozzle that, as described in Section 5 below, are not relevant to the phenomena of concern.

As documented in Reference 3, the Unit 1 and Unit 2 RPV head penetrations include a single nozzle in each unit used for level indication. The preceding discussions do not apply to that nozzle.

5. Proposed Alternative and Basis for Use

In lieu of requiring that ultrasonic testing of each RPV head penetration nozzle extend to the bottom of the nozzle, I&M proposes that the ultrasonic testing conducted pursuant to Sections IV.C(1)(b)(i) and IV.C(2)(b)(i) of NRC Order EA-03-009 be required to extend to either:

1. The lowest elevation that can be practically inspected with a PCS24 probe.

OR

2. At least two (2) inches below the J-groove weld.

The requirement that ultrasonic testing extend to 2 inches above the J-groove weld would be unaffected. The proposed alternative would not apply to the RPV level indication nozzle.

Both options in this alternative will provide an acceptable level of quality and safety because the only portion of the nozzle involved in the options is the portion below the J-groove weld. Below the J-groove weld, the nozzle is essentially an open-ended tube and the nozzle wall in this portion is not part of the reactor coolant system pressure boundary. Consequently, the portion of the nozzle below the J-groove weld is not involved in the phenomena of concern, leakage through the J-groove weld and circumferential cracking in the nozzle above the J-groove weld. Neither option in this alternative affects ultrasonic testing of the portion of the nozzle involved in the phenomena of concern, the portion involved in the J-groove weld and above. Therefore, the proposed alternative provides an acceptable level of quality and safety.

Additionally, the proposed alternative:

- Reflects the configuration of the PCS24 ultrasonic probe used for past and future testing, and allows use of baseline data previously obtained using that probe.
- Reflects the impracticality of obtaining readable scans of the threaded portion of the nozzle.
- Precludes unnecessary probe changes for the sole purpose of scanning threaded portions of the nozzle or the portion that is not scanned due to the transducer arrangement in the PCS24 probe.
- Provides consistency with the requirement that ultrasonic testing extend to 2 inches above the J-groove weld.
- Provides at least one option that is applicable to all RPV head penetration nozzles regardless of location on the RPV head. In the peripheral areas of the RPV head, the

portion of the nozzles that may be practically inspected with a PCS24 probe may extend less than 2 inches below the lowest part of the J-groove weld, since the surface of the head is significantly inclined from the horizontal in these areas. In such locations, the first option would apply.

6. Duration of Proposed Alternative

The proposed alternative will apply only during the period in which NRC Order EA-03-009 is in effect.

7. References

1. Letter from M. W. Rencheck, I&M, to U. S. NRC Document Control Desk, "Additional Information Requested by Nuclear Regulatory Commission Bulletin 2001-01 (TAC Nos. MB2624 and MB2625)," AEP:NRC:2054, dated March 28, 2002

2. Letter from J. E Pollock, I&M, to U. S. NRC Document Control Desk, "Nuclear Regulatory Commission Bulletin 2001-01 Reactor Pressure Vessel Head Degradation Reactor Coolant Pressure Boundary Integrity," AEP:NRC:2054-03, dated July 3, 2002

3. Letter from M. W. Rencheck, I&M, to U. S. NRC Document Control Desk, "Revised Response to Nuclear Regulatory Commission (NRC) Bulletin 2001-01: Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (TAC Nos. MB2624 and MB2625)," C1001-08, dated October 12, 2001

ATTACHMENT 2 TO AEP:NRC:3054-04

PROPOSED ALTERNATIVE NO. 2 TO NRC ORDER EA-03-009:
ALTERNATIVE TO REQUIREMENT TO PERFORM EDDY CURRENT OR
DYE PENETRANT TESTING OF ALL WETTED SURFACES OF
NOZZLE BASE MATERIAL

**NRC Order EA-03-009, Section IV.F, Criterion (1):
Alternative for Inspection of Specific Nozzles Will Provide an
Acceptable Level of Quality and Safety**

References for this attachment are identified in Section 7.

1. **Components Affected**

   Donald C. Cook Nuclear Plant Unit 1 and Unit 2 reactor pressure vessel (RPV) head penetrations (80 and 79 penetrations respectively).

2. **Applicable Document**

   Nuclear Regulatory Commission (NRC) Order EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 11, 2003.

3. **Applicable Requirement**

   NRC Order EA-03-009 requires ultrasonic, eddy current, or dye penetrant testing of RPV head penetration nozzles at various intervals, depending on their susceptibility to primary water stress corrosion cracking. The CNP Unit 1 and Unit 2 RPV heads are currently in the moderate and high susceptibility categories, respectively. The requirements governing eddy current or dye penetrant testing for RPV heads in the moderate and high susceptibility categories are stated in Sections IV.C(2)(b)(ii) and IV.C(1)(b)(ii) of the order, respectively. If eddy current or dye penetrant testing is selected, these sections both require:

   > Eddy current testing or dye penetrant testing 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 J-groove weld attaches the nozzle to the underside of the head and forms part of the reactor coolant system pressure boundary.

4. **Reason for Request**

   As described in Section 3 above, NRC Order EA-03-009 requires eddy current or dye penetrant testing of all wetted base material surfaces of each nozzle. Indiana Michigan Power Company (I&M) is requesting approval of the proposed alternative so as to obtain

requirements that are appropriate to the design of the CNP nozzles and the phenomena of concern as identified in the order. The proposed alternative is based on the two considerations discussed below.

The first consideration results from the configuration of the outside surface of the bottom end of the nozzles. The outside surface of at least five nozzles is threaded for approximately 3/4 inch at the bottom end. These nozzles have a guide funnel installed on the threads. The funnel is either drilled and pinned, or stitch welded to securely fix it in position. Since there is no seal to prevent reactor coolant from reaching the mating threaded surfaces on the nozzle and funnel, these surfaces must be considered wetted. However, the threaded nozzle surface inside the funnel cannot be accessed for eddy current or dye penetrant testing.

The second consideration is the elimination of requirements to eddy current or dye penetrant test portions of the nozzle that are not significant to the phenomena of concern. As described in the order, the phenomena that are of concern are leakage through the J-groove weld, and circumferential cracking in the nozzle above the J-groove weld, which could result in a control rod ejection event. This is appropriately reflected in the requirement (as stated in Section 3 above) that the eddy current or dye penetrant testing extend to 2 inches above the J-groove weld. I&M considers the 2-inch criterion to also be appropriate for defining the length of nozzle below the J-groove weld to be eddy current or dye penetrant tested. However, the order requires that the eddy current or dye penetrant testing include all wetted surfaces of the nozzle base material. Since nozzles in the center area of the head extend approximately 5 inches below the J-groove weld, the order would require eddy current or dye penetrant testing significant portions of the nozzle that, as described in Section 5 below, are not relevant to the phenomena of concern.

As documented in Reference 1, the Unit 1 and Unit 2 RPV head penetrations include a single nozzle in each unit used for level indication. The preceding discussions do not apply to that nozzle.

5. Proposed Alternative and Basis for Use

In lieu of requiring that all wetted surfaces of the J-groove weld and RPV head penetration nozzle base material be subjected to eddy current or dye penetrant testing, I&M proposes that the eddy current or dye penetrant testing conducted pursuant to Sections IV.C(1)(b)(ii) and IV.C(2)(b)(ii) of NRC Order EA-03-009 be required for all wetted, accessible surfaces of the J-Groove weld and RPV head penetration nozzle base material down to at least 2 inches below the J-groove weld, or down to the bottom end of the nozzle if the nozzle extends less than 2 inches below the J-groove weld. The requirement that eddy current or dye penetrant testing extend to 2 inches above the J-groove weld would be unaffected. The proposed alternative would not apply to the RPV level indication nozzle.

I&M considers that this alternative will provide an acceptable level of quality and safety because the portion of the nozzle below the J-groove weld, which includes threaded portions

at the bottom end, is essentially an open-ended tube, and the nozzle wall in this portion is not part of the reactor coolant system pressure boundary. Consequently, the portion of the nozzle below the J-groove weld is not involved in the phenomena of concern, leakage through the J-groove weld and circumferential cracking in the nozzle above the J-groove weld. The proposed alternative does not affect the requirement to eddy current or dye penetrant test the wetted surface of the J-groove weld or nozzle base material to at least 2 inches above the J-groove weld. Therefore, the proposed alternative does not affect areas involved in the phenomena of concern, and provides an acceptable level of quality and safety.

Additionally, the proposed alternative:

- Reflects the inability to eddy current or dye penetrant test nozzle surfaces inside guide funnels.
- Provides consistency with the requirement that eddy current or dye penetrant testing extend to 2 inches above the nozzle.
- Is applicable to all RPV head penetration nozzles regardless of location on the RPV head. The nozzles having guide funnels are located in the peripheral areas of the RPV head. The accessible portions of these nozzles may extend less than 2 inches below the lowest part of the J-groove weld, since the surface of the head is significantly inclined from the horizontal in these areas. In such locations, the alternative requirement that eddy current or dye penetrant testing is required only for accessible surfaces will apply.

6. Duration of Proposed Alternative

The proposed alternative will apply only during the period in which NRC Order EA-03-009 is in effect.

7. References

1. Letter from M. W. Rencheck, I&M, to U. S. NRC Document Control Desk, "Revised Response to Nuclear Regulatory Commission (NRC) Bulletin 2001-01: Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (TAC Nos. MB2624 and MB2625)," C1001-08, dated October 12, 2001