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FITZPATRICK,E. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
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SUBJECT: Requests relief from requirements of ASME Section XI Code in order to allow deferral of repair of minor leak that has developed in body of MFW isolation valve FMO-203.Supporting matl encl.

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Indiana Michigan
Power Company
P.O. Box 16631
Columbus, OH 43216

AEP
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AEP:NRC:0969AB

Donald C. Cook Nuclear Plant Unit 2
Docket No. 50-316
License No. DPR-74
ASME SECTION XI RELIEF FOR
FEEDWATER ISOLATION VALVE
2-FMO-203 REPAIR

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

January 5, 1995

Dear Mr. Russell:

The purpose of this letter, submitted pursuant to 10 CFR 50.55a(g)(6)(i), is to request relief from the requirements of the ASME Section XI Code in order to allow deferral of the repair of a minor leak that has developed in the body of main feedwater isolation valve FMO-203. The cause of the leak has been characterized as a pin-hole flaw located just upstream of the upstream seat and in the lower quadrant of the valve body.

At the present time, the leak site surface has been peened and flow from the leak is stopped. As discussed with your staff on January 4, 1995, we believe the nature of the leak is such that no repairs are warranted at this time. It is our plan to continue operating with the valve in its present condition, periodically monitoring the valve for signs of further degradation. As contingencies, we are investigating other options such as:

(1) non-code (interim) repair,

(2) code repair, and

(3) replacement.

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Any proposed non-code type repairs will be submitted to the NRC for approval in accordance with 10 CFR 50.55a(g)(6)(i).

We request that the proposed relief be considered applicable through the end of the next (Cycle 10-11) refueling outage, projected for approximately May 1996.

The attachment to this letter contains justification for the relief request, including the reasons why application of the ASME Section XI requirements regarding repair of the leak is considered impractical.

For the reasons discussed in the attachment to this letter, we believe that granting of relief from ASME Section XI requirements for the repair of valve FMO-203 will not endanger life or property or the common defense and security.

Sincerely,

for E. E. Fitzpatrick
Vice President

eh

Attachment

cc: A. A. Blind
G. Charnoff
J. B. Martin - Region III
NFEM Section Chief
NRC Resident Inspector - Bridgman
J. R. Padgett

ATTACHMENT TO AEP:NRC:0969AB

BACKGROUND INFORMATION AND JUSTIFICATION FOR ASME SECTION XI RELIEF FOR REPAIR OF VALVE 2-FMO-203

This attachment provides background information and justification for relief from the requirements of the ASME Section XI Code. The proposed relief would allow deferral of a code acceptable repair of a minor leak that has developed in the body of main feedwater isolation valve FMO-203.

BACKGROUND

On December 29, 1994, a small pinhole leak was detected at the bottom of the subject valve body, at roughly the 4 to 5 clock position, located on the upstream side of the disc. The steam plume was characterized as an eight inch long wisp. Peening was performed to stop the active leak and informational UT thickness measurements were taken on the as-cast surface. These UT results indicated no substantial loss of wall thickness. (Radiography using readily available radiographic equipment was not an option due to concrete walls limiting the shooting angle and due to the section thickness.)

On December 30, 1994, the as-cast surface was buffed to improve UT entry surface transmission. This substantially improved the signal/noise ratio. Calibration was performed on a step wedge and checked on a flange of known thickness at full system temperature. A one-half inch transducer was used for measurements, which were taken on one-half inch centers for two inch lengths in eight radial directions around the flaw, as well as at a mirror image location on the other side of the valve. These readings showed two to three inch thickness throughout, consistent backwall reflection, and no intermediate indications such as voids. Design minimum wall thickness per ANSI B16.5-68 is 1 3/8 inches, so there is substantial reinforcement in the area of the leak. The vendor was contacted on December 30, 1994. The vendor's service manager was informed of our UT results and preliminary assessment of cause and flaw type. The service manager concurred with the acceptability of continued monitoring of the condition.

During surface preparation for UT the leak path was reopened, resulting in a four to six inch wisp. The leak site surface was repeened and has exhibited no active leakage since that time (December 30, 1994). The condition is currently being periodically monitored.

JUSTIFICATION

1. *VALVE TYPE*

Valve FMO-203 is a normally open, fourteen inch, Class 900 psi Lunkenheimer gate valve with an ASTM type 216 grade WCB cast steel body used for backup feedwater isolation. The valve does not have a flow regulation or control function. It is classified as a non-safety related valve, but is in our IST and Generic Letter 89-10

programs. It is installed in piping designed to non-safety related Seismic Class III criteria.

Grade 216 WCB is a 70 Ksi minimum tensile steel with 22% elongation and is furnished in the annealed or normalized condition. It is readily weldable and is specifically designed for high temperature service. This material is expected to behave in a ductile manner, and rapid propagation or catastrophic failure is extremely unlikely.

2. *FLOW ACCELERATED CORROSION CONSIDERATIONS*

As part of the Cook Nuclear Plant Flow Accelerated Corrosion (FAC) Program, we have conducted ultrasonic wall thickness measurements on over 200 components in the feedwater system. We have removed, measured, and visually inspected several pipe segments, and found no evidence of flow assisted corrosion in this portion of the system. The vendor has reviewed the valve design and confirmed that, based on orientation of this flaw relative to flow and the seat, there should not be any localized eddys or cavitation mechanisms present. Under normal operation this segment of pipe experiences very consistent steady state conditions and is not subject to any upset or transient conditions.

3. *FLAW CHARACTERIZATION AND ORIENTATION*

Our experience at the Cook Nuclear Plant and at fossil plants indicates that this type of pinhole leak is typically due to a gradual link-up over time of casting discontinuities such as sand, porosity or shrink. An internal stress riser or weld discontinuity associated with the seat ring might have served as an initiating site on the ID surface. Our fossil plant experience and the vendor both indicate that while this is not a frequent occurrence, it does happen over time and is not unusual for a commercial quality valve in service for fifteen years. These flaws are typically tight, have no substantial volume, propagate over a tortuous path, and do not have a planar, crack-like morphology. The fact that peening has arrested the leak for several days supports this conclusion.

The orientation of the flaw is such that increased leakage will tend to be directed towards nearby concrete walls and floors, with no intervening equipment. As indicated above, rapid propagation or catastrophic failure is considered extremely unlikely. The vendor has concurred in this conclusion.

4. *REASON WHY APPLICATION OF CODE REQUIREMENTS IS IMPRACTICAL*

Unit 2 of the Cook Nuclear Plant is currently operating at full power. During power operation, the feedwater system is in service, providing flow to the steam generators. There are four main feedwater lines, each providing flow to one steam generator. Since flow is necessary to all steam generators during power operation, it

is not possible to isolate a feedwater line. Performance of a code-acceptable repair would require excavation of the defect, which could not be performed with the feedwater line pressurized. Thus, it would be necessary to remove the unit from power operation in order to perform the repair, which would unnecessarily challenge and thermally cycle the unit, reduce system capacity, and provide minimimal safety benefit. For this reason, we consider a code-type repair to be impractical.

ADDITIONAL EVALUATION

As recommended by the NRC staff during a teleconference on January 4, 1994, we are performing a flaw evaluation using the "Through-Wall Flaw Approach" of Enclosure 1 of Generic Letter 90-05. The results are expected to provide further support for our conclusion that rapid propagation or catastrophic failure is extremely unlikely. This evaluation will be completed by January 9, and the results communicated to the NRC.

COMPENSATORY MEASURES

As discussed above, we are presently monitoring the leak twice per shift. Monitoring of the leak at least once per twelve hour shift will continue throughout the duration of the requested relief.

CONCLUSION

Our evaluation of the condition of the leak in valve FMO-203 has concluded that rapid propagation or catastrophic failure of the flaw is extremely unlikely. Additionally, the orientation of the flaw is such that increased leakage will tend to be directed towards nearby concrete walls and floors, with no intervening equipment. Based on this, we conclude that the requested relief will not endanger life or property or the common defense and security.