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November 5, 2001 C1101-05

Docket Nos: 50-315
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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
ADDITIONAL INFORMATION CONCERNING RESPONSE TO NUCLEAR REGULATORY COMMISSION (NRC) BULLETIN 2001-01: CIRCUMFERENTIAL CRACKING OF REACTOR PRESSURE VESSEL HEAD PENETRATION NOZZLES
(TAC numbers MB2624 and MB2625)

References:
1) Letter from J. F. Stang (NRC) to R.P. Powers "Donald C. Cook Nuclear Plant, Units 1 and 2 – Telephone Conference summary Re: Response to Nuclear Regulatory Commission (NRC) Bulletin 2001-01, Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (TAC Nos. MB2624 and MB2625)", dated October 17, 2001.

2) Letter from M. W. Rencheck (I&M) to 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.

3) Letter from E. E. Fitzpatrick (I&M) to NRC Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, Generic Letter 97-01, 'Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations,' 120 Day Response," AEP:NRC:1218C, dated August 1, 1997.

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This letter provides new and relevant information, as discussed in Reference 1, concerning Indiana Michigan Power Company's (I&M's) response to NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles."

Specifically, the additional information provides further justification for operating Donald C. Cook Nuclear Plant (CNP) Unit 2, after December 31, 2001. The information includes three different evaluations. First, a probabilistic risk assessment was performed to determine changes in plant risk associated with operation beyond December 31, 2001. As discussed in previous public meetings, I&M has completed the development of a new probabilistic risk assessment tool. This tool has recently been reviewed through the Westinghouse Owners Group (WOG) certification initiative. Second, a deterministic approach evaluated the time for a through-the-wall crack to propagate to a critical circumferential size. Third, an assessment of Unit 2 operation since the original response (Reference 2) was performed to determine the amount of time spent in cold shutdown, as crack growth would not have occurred during this condition. CNP Unit 2 is the only I&M unit that has experienced Vessel Head Penetration (VHP) cracking. The next CNP Unit 2 refueling outage (RFO) is scheduled for January 19, 2002. This is nineteen days following the December 31, 2001, date referenced in the information request. Plant operation during this period does not adversely impact the safe operation of CNP Unit 2. This conclusion is based on the results of the probabilistic, deterministic, and recent operational history evaluations. The following briefly summarizes each of these considerations:

1) A CNP-specific probabilistic safety analysis has been performed by Westinghouse Electric Corporation (Westinghouse) to provide the impact on core damage frequency of an additional 30 days of operation past December 31, 2001 (Attachments 1 and 2). The I&M summary of this analysis is included as Attachment 3. The results of this analysis, based solely on continued operation for the 30-day period, is an incremental core damage probability (ICDP) of 3.4E-07 and an incremental large early release probability of 1.76E-08. These are well below the guideline values stated in NUMARC 93-01 ("Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants") for temporary plant configurations not requiring any special risk management considerations. This provides confidence that the risk associated with operation of CNP Unit 2 through January 19, 2002, is acceptable.

   In addition to these results, the risk impact of shutting down CNP Unit 2 nineteen days earlier than is currently planned is considered. This assessment takes RFO planning, preparation, and execution into account

when evaluating plant shutdown conditions. The recently completed shutdown probabilistic safety assessment model was used to investigate this situation. This assessment concluded that the ICDP of an additional day at cold shutdown (Mode 5) is approximately 6.1E-8. Consequently, the risk associated with VHP cracking is completely offset if an additional 6 days in Mode 5 occurs as a result of a sudden change in the RFO schedule. These considerations provide additional support for operating CNP Unit 2 until its planned RFO.

2) Westinghouse has prepared and issued Revision 4 to WCAP-14118, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: D.C. Cook Units 1 and 2," (Attachment 4). This is a Westinghouse proprietary report. As such, an affidavit for withholding from public disclosure is provided in Attachment 5. WCAP-15753, the non-proprietary version of this report, is included as Attachment 6. The I&M summary of this analysis is included as Attachment 7. WCAP-14118 is unique to CNP and specifically addresses axial, circumferential, and lack-of-fusion flaws. The conservative time estimate for a circumferential flaw growing to a critical flaw size is at least 38 effective full power years (EFPY). CNP Unit 2 presently has accumulated less than 15 EFPY. Therefore, even if a through-wall crack had developed for CNP Unit 2 early in its plant life, the model predicts a substantial amount of operating time before the development of any potential safety significant issue would occur.

3) Since the issuance of I&M's initial response to NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles" (Reference 2), CNP Unit 2 has been in Mode 5 for 29 days. Mode 5 conditions do not cause the initiation or growth of a flaw. Thus, continuous operation of Unit 2 until January 29, 2002, equates to the EFPY that would have accumulated for continuous operation from September 4, 2001, to December 31, 2001. The condition of the VHP nozzles would be similar to what would exist if Unit 2 had operated continuously until December 31, 2001.

I&M has been an industry leader in the conservative management and evaluation of VHP integrity and will continue with the appropriate testing, repair, monitoring, and analysis. Prior inspections, including both visual and eddy current examinations, have been completed at CNP Unit 2. This information, as discussed in Reference 3, was provided in response to Generic Letter 97-01, "Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations," dated April 1, 1997. The combination of previous

inspection information and the assessment and evaluations provided herein establish reasonable assurance that continued operation of CNP Unit 2 until its scheduled RFO, January 19, 2002, is acceptable.

During the RFO, I&M will visually inspect all accessible penetrations under the insulation on top of the head, and use non-destructive techniques to examine selected penetrations from below the head. This will include examinations of all control rod drive and thermocouple penetration J-groove welds since these have not been subjected to previous examinations. Additional examinations will be done to selected penetration inside diameter surfaces including, as a minimum, the most susceptible locations.

Attachment 1 contains a Westinghouse, CNP-specific, Risk Analysis "An Estimation of Plant Risk Due to Reactor Vessel Head Penetration Cracks for D. C. Cook Unit 2".

Attachment 2 contains a Westinghouse document, "STD-01-0047, Progress Report on EPRI MRP 82/182 Project, 'Reactor Vessel Head Penetration Data Analysis and Risk Assessment (revision 2): Non-Proprietary Version.'"

Attachment 3 contains an I&M summary of the Westinghouse analysis contained in Attachments 1 and 2.

Attachment 4 is Revision 4 to WCAP-14118, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: D. C. Cook Units 1 and 2."

Attachment 5 is a Westinghouse affidavit for withholding Attachment 4 from public disclosure.

Attachment 6 is WCAP-15753, the non-proprietary version of WCAP-14118, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: D. C. Cook Units 1 and 2."

Attachment 7 contains an I&M summary of the Westinghouse WCAP-14118.

There are no new commitments contained in this document.

Should you have any questions, please contact Mr. Ronald W. Gaston, Manager of Regulatory Affairs, at (616) 697-5020.

Sincerely,

M. W. Rencheck
Vice President Nuclear Engineering

/pae

Attachments

c: J. E. Dyer
MDEQ – DW & RPD, w/o attachment
NRC Resident Inspector
R. Whale, w/o attachment

AFFIRMATION

I, Michael W. Rencheck, 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

M. W. Rencheck
Vice President Nuclear Engineering

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 5th DAY OF November, 2001

Notary Public

My Commission Expires 11-5-2004

PATRICIA A. EDDIE
NOTARY PUBLIC-BERRIEN COUNTY, MI
MY COMMISSION EXPIRES
NOVEMBER 5, 2004

bc: G. P. Arent/W. C. Mammoser, w/o attachments
P. B. Cowan, w/o attachments
S. A. Greenlee, w/o attachments
S. B. Haggerty, w/o attachments
J. T. Hawley, w/o attachments
D. W. Jenkins, w/o attachments
J. B. Kingseed/T. R. Satyan-Sharma, w/o attachments
M. W. Rencheck, w/o attachments
E. M. Ridgell, w/o attachments
J. F. Stang, Jr., - NRC Washington, DC
T. R. Stephens, w/o attachments

ATTACHMENT 1 TO C1101-05

WESTINGHOUSE ELECTRIC CORPORATION
"AN ESTIMATION OF PLANT RISK DUE TO REACTOR VESSEL
HEAD PENETRATION CRACKS FOR D. C. COOK UNIT 2"