

INDIANA & MICHIGAN ELECTRIC COMPANY

P. O. BOX 18
BOWLING GREEN STATION
NEW YORK, N. Y. 10004

August 12, 1982
AEP:NRC:0724

Donald C. Cook Nuclear Plant, Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
IE INSPECTION REPORT NOS. 50-315/82-11 (DPRP) and 50-316/82-11 (DPRP)

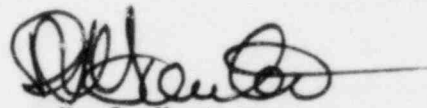
Mr. James G. Keppler, Regional Director
U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

The Attachment to this letter provides our required response to the Notice of Violation contained in the Appendix to IE Inspection Report No. 50-315/82-11 (DPRP) and No. 50-316/82-11 (DPRP).

This document has been prepared following Corporate Procedures which incorporate a reasonable set of controls to insure its accuracy prior to signature by the undersigned.

Very truly yours,


R. S. Hunter
Vice President

/os
cc: John E. Dolan - Columbus
M. P. Alexich
R. W. Jurgensen
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Charnoff
Joe Williams, Jr.
NRC Resident Inspector at Cook Plant - Bridgman

Attachment to AEP:NRC:0724
Donald C. Cook Nuclear Plant, Unit Nos. 1 and 2
Response to Notice of Violation

Item 1 of Appendix (Paraphrased)

Technical Specification 3.7.10 requires that all penetration fire barriers protecting safety related areas in the Plant be functional at all times. With one or more penetration fire barriers non-functional, the Action statement requires that a continuous fire watch on at least one side of the affected penetration be established within one hour.

Contrary to the above, it was observed during the inspection that the access fire doors to Unit 1's Auxiliary Feedwater Pipe Corridor and Unit 2's Turbine Driven Auxiliary Feedwater Pump Room were blocked open with welding cables and were thus made non-functional. A continuous fire watch was not established.

Response to Item 1 of Appendix

In preparation for a weld repair on a drain line from the Turbine Driven Auxiliary Feedwater Pump Turbine, two maintenance mechanics routed a single lead of welding cables through the fire door opening to the Unit 1 Auxiliary Feedwater Pump Room Corridor and through the fire door opening into the Unit 2 Turbine Driven Auxiliary Feedwater Pump Room. The cables would have prevented automatic closure of these normally open doors in the event of a fire. For a brief period, estimated to be between five and ten minutes, the area was left unattended while the mechanics were procuring additional tools. It was during this period that the NRC Resident Inspector observed the temporary condition of this area. The control room was notified and the cables were immediately removed to restore the doors to an operable condition. A Condition Report was initiated, the event was investigated, and a Licensee Event Report (LER) was submitted.

To avoid further noncompliance, Temporary Sheet No. 15 to Plant Manager's Instruction (PMI) No. 2270 ("Fire Protection and Safety Equipment") was forwarded to the maintenance supervisors for review with their respective personnel. This Temporary Sheet lists the circumstances under which a fire door is considered to be non-functional, the actions required when a fire door is rendered non-functional, and the actions to be taken in the event a fire door is discovered to be non-functional. The reviews of this information have been completed. Full compliance was achieved on June 3, 1982 when the cables were removed from the doorways.

Item 2 of Appendix (Paraphrased)

Criterion XVI of Appendix B to 10 CFR 50 requires that measures be established to assure that conditions adverse to quality are promptly identified and corrected. For significant conditions adverse to quality, these measures are required to assure that the cause of the condition is determined and that corrective action is taken to preclude repetition.

Contrary to the above,

- a) A followup review on the "N-List" of Class I components indicated that corrective actions taken were not complete and that the Containment Divider Barrier Seal, a safety related component which had not been included in the "N-List", was procured as non-safety related without Quality Assurance Program benefit, and
- b) Corrective actions to ensure that proper post-maintenance operability verification tests would be performed on the Residual Heat Removal (RHR) system were not timely or adequately implemented.

Response to Item 2a of Appendix

The Containment Divider Barrier Seal has been added to the computerized "N-List" and shall be listed in the next issue of the "N-List" scheduled for publication in September of 1982. In addition, the manufacturer of the seal material, Uniroyal Plastic Products, has been added to the Qualified Suppliers List (QSL).

To avoid further noncompliance, the AEPSC Executive Vice President-Construction and New York Engineering has directed the AEPSC Engineering Divisions to review the "N-List" for completeness and accuracy and to initiate the required actions to make the list an up-to-date document. This review has been initiated and will include a review of all safety-related Request For Change (RFC) packages and QCN procurement documents to verify that items contained in these documents are included in the "N-List". Any items identified during this review as requiring inclusion in the "N-List" shall be added to it in accordance with American Electric Power Service Corporation (AEPSC) General Procedure No. 3.2 entitled "Control and Maintenance of the D. C. Cook Nuclear Plant N-List". The review and subsequent updating of the "N-List" is scheduled to be completed by December 31, 1982, at which time compliance will be achieved.

Response to Item 2b of Appendix

The licensee believes that action was taken in a timely manner in accordance with the plan of action agreed to at the January

13, 1981 Enforcement Conference. However, the licensee also believes that better communication with the NRC on the issue of air/gas entrainment in the Residual Heat Removal (RHR) System should have been maintained to keep the NRC fully advised of the steps being taken to resolve this issue. A chronological listing of pertinent events related to this issue is available at the Plant for review by the NRC Resident Inspector.

The conclusions derived from the test and analysis work performed after the January 13, 1981 Enforcement Conference differ from the preliminary theories discussed at this meeting. During the Enforcement Conference, the problem was thought to have resulted from the inadequate venting of the RHR system following maintenance work. However, the evaluation of the tests performed to determine the source of air in-leakage into the RHR system, the interviews held with the involved Plant maintenance and operations personnel, and the recurrence of this problem in January 1981, when no maintenance work had been performed on the system prior to identification of the problem, lead us to believe that maintenance work performed on the RHR system was not the principal cause of air entrainment during the August, 1980 and January, 1981 events. We believe that these events were the result of inadequate recirculation and/or venting of the system following "half-loop" operations and that the September, 1980 event was a further result of the August event.

The conclusion that the January, 1981 event was the result of "half-loop" operation was demonstrated by the repeated testing performed from late January, 1981 until the start of Unit 2's Refueling Outage in March, 1981. This testing simulated the condition thought to exist during the check valve testing. The system on one side of the RHR Heat Exchanger is drained causing a vacuum to form due to the vertical U-tube construction of the RHR Heat Exchanger and the inlet and outlet piping configuration. During the repeated performance of this testing, the system was placed under a vacuum, refilled by gravity feed from the RWST, and vented of air/gas. During the five times this test was conducted, the venting portion of the test indicated that the amount of air/gas being vented was minimal. Attempts to sample the air/gas during venting were inconclusive due to the small amount of gas vented. After the Unit 2 refueling outage, which ended May 21, 1981, it was apparent that these tests were not indicating the source of air in the RHR system. In early July of 1981, the decision was made, after AEPSC consultation and concurrence, to terminate the special testing agreed to at the January 13, 1981 Enforcement Conference since no new information was being obtained. Confirmation of this decision by AEPSC is contained in S. J. Milioti's August 10, 1981 memo to D. V. Shaller. These results, coupled with the fact that the system was not drained prior to the January, 1981 event, led us to conclude that the air/gas in the system was originating from another source.

The elimination of maintenance and check valve testing as the source of air/gas in the system, as concluded above, led to the consideration that air/gas was entering the RHR system as a result of "half-loop" operation. When the Unit is at "half-loop" and both RHR pumps are in-service, the RHR suction flow can create a vortex at the connection to the RCS loop introducing air/gas into the RHR system. The normal method of operation is to have only one RHR pump in-service when the Unit is at "half-loop". However, when the pumps are being changed over, both pumps may be in-service. This generally does not cause a problem with the pump left in-service since the time span both pumps are on is generally small, and the air entrained in the system is swept back to the loops and vented. The air entrained through the pump being shut down does not get swept back to the loops but migrates to the highest point of the system and forms a bubble. The restart of this pump when on a closed system, as exists during surveillance testing, causes recirculation of this air through the pump. While it is difficult to prevent this from happening, the adverse effect this air may have in the system can be negated by recirculating the RHR loops through the Refueling Water Storage Tank (RWST) whenever the RCS is filled from "half-loop" operation. As an aid in determining the cause of air/gas entrainment in the RHR system and in attempts to establish a data base, Plant personnel were required to complete the applicable sections of a special data sheet whenever system changes were initiated. In addition, interviews with the involved operators were held to determine the methodology used to switch from one RHR pump to another. The interviews verified that the methodology used by most operators resulted in both pumps running at some time during the change-over. There has been additional evidence of air/gas entrainment in the RHR system during subsequent "half-loop" operation. However, no adverse effects on pump operability have been observed following a mode change due to the present procedural guidance employed.

In conclusion, based on the extensive work performed in relation to this issue, it is our judgment that both the August, 1980 and January, 1981 events were the result of "half-loop" operation. It is also our judgment that the September, 1980 event was a result of inadequate system venting in August. The large amount of work performed to analyze this event by Indiana & Michigan Electric Company (I&MECo.) and AEPSC shows the importance that we have given to understanding and correcting this problem.

Corrective Actions Taken and Results Achieved

The analysis and investigative work performed with respect to air/gas entrainment in the RHR system is documented in the chronological listing of pertinent events related to this issue available at the Plant, as indicated above. The analysis work included an evaluation of the potential impact that gas entrapment in the RHR system could have on LOCA mitigating capability. This evaluation concluded that the redundant function provided by the second RHR pump provides more than adequate protection. In addition, the corrective action taken to

prevent returning from "half-loop" operation with air in the RHR system was the inclusion of a step in Procedure Nos. 1-OHP 4021.002.001 (Unit 1) and 2-OHP 4021.002.001 (Unit 2) entitled "Filling and Venting the Reactor Coolant System" which requires the flushing of both RHR trains to the RWST during RCS fill. This requirement was incorporated into Revision 9 of 1-OHP 4021.002.001 (Unit 1) and Revision 3 of 2-OHP 4021.002.001. Both of these revisions were issued on February 18, 1982. Procedure Nos. 1-OHP 4021.008.001 (Unit 1) and 2-OHP 4021.008.001 (Unit 2) entitled "Filling and Venting of the Emergency Core Cooling System" have always required the RHR System to be flushed to the RWST as a final step in filling and venting.

On July 26, 1982, to further insure operability of the system after draining part or all of a RHR loop, Temporary Change Sheets No. 2 and No. 1 to Revision 7 of 1-OHP 4021.017.002 (Unit 1) and to Revision 2 of 2-OHP 4021.017.002 (Unit 2), respectively, were issued and added to these procedures which are entitled "Placing In Service and Operation of the Residual Heat Removal Loop". These Temporary Change Sheets require the RHR system to be flushed to the RWST for a minimum of ten minutes to flush any entrained air to the RWST if the RHR loop has been partially or fully drained. These Procedures also have a precaution against operating both RHR pumps at "half-loop" operation. In addition, a note has been added to Surveillance Test Procedure Nos. 1-OHP 4030.STP.005 (Unit 1) and 2-OHP 4030.STP.005 (Unit 2) entitled "Emergency Core Cooling System Operability Test" which instructs the operator to fill, vent, and flush the system back to the RWST if any part of the system has been drained prior to running the pump for operability.

The above procedural changes will allow the RHR system to be filled, vented, and recirculated to the RWST to remove any entrained air following maintenance and/or "half-loop" operation.

Corrective Actions That Will Be Taken

To further minimize the possibility that the RHR system is not declared operable with air/gas entrained in the system following maintenance work on the system, a revision to the Surveillance Test Procedures of both Units is currently under review which provides a "PRECAUTION" to guard against this. This "PRECAUTION" must be signed-off and requires recirculation of the affected train to the RWST for at least ten minutes whenever maintenance work is performed on the system. This will significantly reduce the possibility of having entrained gas in the system.

Date When Full Compliance Will Be Achieved

We are already in compliance with respect to the procedural changes that have already been implemented, as discussed above. The Surveillance Test Procedures, which are currently being revised to reflect the addition of the "PRECAUTION" statement, are under review and will be in affect by the return of each Unit from their respective 1982 refueling outages.