U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/86011(DRS); 50-316/86011(DRS)

Docket Nos. 50-315; 50-316 Licenses No. DPR-58; DPR-74

Licensee: American Electric Power Service Corporation
Indiana and Michigan Electric Company
1 Riverside Plaza
Columbus, OH 43216

Facility Name: D. C. Cook Nuclear Plant, Units 1 and 2

Inspection At: D. C. Cook Site, Bridgman, MI

Inspection Conducted: March 3-13, 1986

Inspector: P. R. Wohld 3/31/86
Date

Approved By: M. P. Phillips, Chief
Operational Programs Section 3/31/86
Date

Inspection Summary

Inspection on March 3-13, 1986 (Reports No. 315/86011(DRS); 316/86011(DRS))
Areas Inspected: Routine, announced inspection of licensee actions on previous inspection findings; inservice test program for pumps and valves; and motor-operated valve setup, maintenance, and testing.
Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

*A. A. Blind, Assistant Plant Manager
*B. A. Svensson, Assistant Plant Manager
*J. D. Allard, Maintenance Superintendent
*K. R. Baker, Operations Superintendent
*P. A. Barrett, Lead Compliance Engineer
*J. G. Feinstein, Manager, Nuclear Safety and Licensing
*C. A. Freer, Quality Control/ISI Assistant Supervisor
*M. L. Horvath, AEPSC, Quality Assurance Supervisor
*R. T. Huerter, AEPSC, Quality Assurance Auditor
*J. A. Kobyra, Mechanical Engineering Project Engineer
*M. Marrocco, Manager, Piping and Valve Section
*J. Moline, Maintenance
*R. L. Otte, Quality Control/ISI Supervisor
*T. K. Postlewait, Technical Engineering/Performance Section Head
*C. A. Ross, Engineering Staff
*J. F. Stietzel, Quality Control Superintendent
*S. G. Williams, Engineer, Nuclear Safety and Licensing
*K. R. Worthington, AEPSC, Quality Assurance Auditor

*Denotes those attending the exit interview held on March 13, 1986.

Additional plant technical and administrative personnel were contacted during the course of the inspection.

2. Action on Previous Inspection Findings

a. (Closed) Unresolved Item (315/84013-03(DRS); 316/84015-03(DRS)): Response time testing of the turbine-driven auxiliary feedwater pump per technical specification requirements. Pump response time testing is now included in the surveillance test program with the total response time, per technical specification requirement, evaluated in test procedure 12 THP 4030 STP.205A for a 60 second limit. This item is considered closed.

b. (Open) Open Item (315/84013-04(DRS); 316/84015-04(DRS)): Turbine-driven auxiliary feedwater pump response test on loss of nonsafety-related control air. The licensee has written a loss of air test procedure, 12-OHP SP.040, for both units and has satisfactorily tested the Unit 1 pump turbine. Unit 2 will be tested prior to restart from the current outage. Periodic test considerations are pending a final decision on whether or not the governors will be replaced every other refueling cycle. Replacement will require a loss of air test, per Woodward Governor recommendations, and would satisfy the concern for periodic loss of air testing. This item remains open pending further licensee evaluation and decision on periodic preventive maintenance for the turbine governor.

c. (Closed) Open Item (315/84013-05(DRS); 316/84015-05(DRS)): Auxiliary feedwater pump suction pressure trips. Since the inspector raised questions in this area in 1984, the plant staff has experienced problems with inadvertent tripping, apparently due to a combination of problems including equipment malfunction in the suction pressure trip sensing lines and oscillations in the suction line pressure. (This has been reported by LER 85-058-01.) A review of suction pressure oscillations indicates a resonant phenomena, at approximately one or two Hertz, that appears to be amplifying small perturbations in the turbine-driven auxiliary feedwater pump control.

The licensee has defeated the suction pressure trips for all pumps, pending final engineering evaluation of the problem, and is depending on control room operators to trip and protect auxiliary feedwater pumps in the event that a valid low pressure alarm is received. The inspector expressed concern about the short response time that may be necessary for pump protection. The licensee indicated that final corrective action will be expedited to address the problem. Since NRC review of corrective action under the LER is pending, this open item is unnecessary and is, therefore, considered closed.

d. (Closed) Unresolved Item (315/84013-07(DRS); 316/84015-07(DRS)): Valve strokes not physically verified at the valves in Unit 1 have already been addressed; procedure 1-OHP 4030.STP.034, Local Valve Position Verification Test, will be used for Unit 1 valves in the future; the Unit 2 procedure is in the final approval stage and will be used to verify Unit 2 valves prior to startup from the current outage. Since the licensee has initiated the appropriate corrective action, and because this activity is inspected as part of periodic NRC inspection activities, this open item is considered closed.

e. (Closed) Open Item (315/84013-08(DRS); 316/84015-08(DRS)): Valve exercise prior to stroke timing. The licensee has identified corrective action to address this item and is recording first stroke times in the IST program; hence, this item is considered closed.

f. (Closed) Open Item (315/84013-09(DRS); 316-84015-09(DRS)): Post maintenance valve stroke time verification. The licensee has initiated a number of changes that address this item, including the development of technical data books that will provide the necessary information to determine valve stroke acceptability. The necessary evaluations to declare valve operability under the plant technical specifications are being made; hence, this item is considered closed.

(Closed) Open Item (315/85021-01(DRS); 316/85021-01(DRS)): Valve leak rate trending per ASME Code requirements. The licensee is implementing a program to evaluate valve leak rates in accordance with the requirements of IWV-3420f and IWV-3420g of Section XI. The program will be fully effective after the start of the second ten year program beginning July 1, 1986. Because the licensee's commitment in this area is fully satisfactory, and because it will be subject to routine inspection in the future, the item is considered closed.

3. Inservice Testing of Pumps and Valves

The inspector reviewed the safety evaluation report on the first ten year IST program recently issued by NRC and verified that outstanding issues identified were addressed in correspondence to Mr. H. R. Denton, Director, Office of NRR, dated October 15, 1985 (Letter No. AEP:NRC:0730H). The inspector also noted that the second ten-year program was submitted to NRC. This second interval begins for both units on July 1, 1986. Because of the transition between programs, changes in the implementation process, and the detailed inspection in this area in 1984; a detailed program inspection was not done at this time.

While reviewing the items discussed in Paragraph 2 and discussing the IST program with licensee personnel, the inspector noted a positive management involvement in the program and a professional attitude by the staff that has resulted in significant program improvements in areas of "good practice" as well as regulatory compliance.

4. Motor-Operated Valve Setup, Maintenance, and Testing

A special inspection was conducted of the licensee's programs for setup, maintenance, and testing of motor-operated valves. Inspection findings were as follows:

a. Design Control (10 CFR 50, Appendix B, Criterion III)

The control of motor-operated torque and geared limit switches needs improvement as evident from the following (part of which the licensee is already pursuing in response to IE Bulletin 85-03):

(1) Only very general guidance for Limitorque valve operator geared limit switch settings is provided on valve schematic drawings. More specific guidance with the normal design controls is needed for field use to assure that the valves will operate per the design intent.

(2) Maintenance procedures do not adequately specify the setting of geared limit switches so that their design functions are met. The bypass switch setting instructions do not assure the proper bypass of the open torque switch on valve opening, and instructions for the open limit switch are likely to result in undesirable valve steam backseating.

(3) It appears that preoperational testing done on some valves may be invalidated by subsequent maintenance procedure use that can result in less conservative switch settings than that shown acceptable during preoperational testing.

(4) There are a number of torque switches that were set at a low value and required a special safety evaluation to justify on Unit 1. Unit 2 will be looked at prior to startup from the current outage. This should not have been necessary with a properly controlled torque switch setting program.

The licensee has already begun an assessment of problems related to Limitorque, torque, and geared limit switch problems in order to respond to IE Bulletin 85-03. Hence, the above items will be reviewed later for proper resolution. Pending the licensee's additional consideration of these items, response to the bulletin, and subsequent corrective actions; this is considered an unresolved item (315/86011-01(DRS); 316/86011-01(DRS)).

b. Test Control (10 CFR 50, Appendix B, Criterion XI)

Testing subsequent to torque or geared limit switch setting is not specified to assure that valve operator settings are proper and adequate for operation under design basis conditions.

Maintenance procedures were reviewed for post maintenance test requirements. No testing or test criteria were identified within the maintenance procedures or other plant procedures that appeared adequate to reasonably assure valve post maintenance operability under design basis conditions.

The licensee currently depends on valve stroke timing per Section XI of the ASME Code for surveillance testing; however, while meeting specific ASME requirements in this area, there are serious weaknesses in the test techniques and stroke time criteria currently applied. The stroke timing is not normally done at design differential pressures, and test techniques are not adequate to allow an extrapolation of test data to account for the difference between actual test and design basis conditions. Also, stroke time increase limits allowed by the Code are not seen in actual practice prior to total valve failure to stroke.

The inspector suggested some testing ideas to the maintenance department which is also in the process of evaluating certain test capabilities available, including the Motor-Operated Valve Analysis and Test System (MOVATS). Any testing selected should be such that a good overall program is achieved in balance with all valve program activities, including surveillance testing, periodic inspection, preventive maintenance, and post maintenance testing.

Overall, it appears that the licensee's programs for testing motor-operated valves do not meet the intent of Criterion XI, Test Control, in Appendix B of 10 CFR 50, which states, "A test program shall be established to assure that all testing required to demonstrate that . . . components will perform satisfactorily in service is identified and performed. . . The test program shall include operational tests during nuclear power plant operation." Resolution of this item is pending further consideration by the licensee and evaluation by the inspector. This is an unresolved item (315/86011-02(DRS); 316/86011-02(DRS)).

c. Valve Inspection

Three, eight-inch safety injection valves in Unit 2 were made available for inspection by the inspector. The following were noted:

(1) All three valves had a marginally acceptable setting of the limit switches that perform the open torque switch bypass function. The bypass is set so that it opens on the open stroke just as the valve disc is breaking away from the seat.

(2) One valve had no evidence of grease on the valve stem threads, showed signs of improper wear of the stem nut against the valve stem threads, and was difficult to move with the handwheel (particularly in comparison with the other two valves).

(3) The torque switch setting values observed were higher than the licensee's list of field settings on one valve, lower on another, and matched on the third, indicating that the list is not a reliable indicator of field settings.

(4) A number of spare wires were found in each limit switch compartment which had loose ends wrapped in ordinary electrical tape. The tape was coming loose in some cases, exposing bare wire ends.

(5) A flexible conduit for wiring to one motor operator was found partially flattened at its connection to the operator case.

(6) Some of the geared limit switch mounting block screws required tightening, according to the maintenance procedure, to take up a minor amount of looseness observed in several of the mounting blocks.

(7) The valves were not checked for backseating, because the licensee's procedure for setting open limit switches is written to allow backseating. (This is addressed further in Subparagraph 4.e.(1)).

The licensee is addressing all items noted on these valves; however, the items found indicate the value of a simple visual inspection and manual handwheel operation as a means of assessing valve physical conditions. The licensee currently has no periodic inspection or preventive maintenance requirement in the valve program other than the ASME Code, Section XI requirement for physically verifying valve stroking once every two years. The inspector suggested that this physical stroke observation be expanded to also provide a more in-depth inspection of the valves while personnel are already available at the valve for the stroke observation. (The procedure written by Operations already incorporates some desirable inspection activities. It could be expanded, however, in light of the above, to cover such items as handwheel operation, switch compartment inspection, etc.).

It is difficult to specify what might be required in the category of periodic valve inspection without also considering other activities including preventive maintenance, and surveillance testing. Because the licensee is considering many aspects of its valve programs, and because of this pending nature of IE Bulletin 85-03, the area of periodic valve inspection and preventive maintenance is considered an open item pending further licensee consideration and subsequent inspection activities by NRC pursuant to closing out the bulletin (315/86011-03(DRS); 316/86011-03(DRS)).

d. Valve Operability Assurance After Valve Repacking or Valve Packing Tightening

The licensee currently depends primarily on ASME Section XI stroke timing (done normally at zero differential pressure conditions) for valve operability assurance after packing maintenance activities. While the stroke time may be a good indicator in this case for air-operated valves, motor operator stroke times vary only slightly for large load changes. The concern is that for either repacking or simple packing tightening, the potential increase in thrust requirements for the valve stem may go up to an unacceptably high level such that there is not enough margin left in the torque switch to handle higher load conditions when there is a differential pressure across the valve.

This is a specific example of a concern for adequate post maintenance testing discussed in Paragraph 4.b. In this case, increased control on the packing tightening might be considered to reduce the depth of post maintenance testing that appears needed, or a measure of handwheel torque required to move the valve in mid-stroke might be used to determine that excessive stem thrust loads are not present. Resolution of the above will be considered an open item pending further evaluation by the licensee and subsequent review by the inspector (315/86011-04(DRS); 316/86011-04(DRS)).

e. Field Instructions and Procedures (10 CFR 50, Appendix B, Criterion V)

The inspector reviewed the following D. C. Cook maintenance procedures and discussed the associated comment with the licensee's staff:

(1) 12MHP5021.001.037, Revision 1, Maintenance Procedure for Rotor and Torque Limit Switches on Limitorque Motor-Operated Valves Steps 7.1.5-7.1.9: Setting of the open limit switch, as instructed, will not prevent coastdown of the valve operator motor from hardseating the valve stem into the backseat. Also, testing is not specified in the procedure that will check for inadvertent backseating after operation with the motor operator.

Step 7.1.12 does not adequately address setting of the open torque switch bypass contact rotor to assure that the torque switch is bypassed through initial unseating of the valve.

Steps 7.2.2-7.2.5: A caution may be needed here, depending on the type of torque switches used in the plant, to assure that torque switches whose apparent setpoint is changed in the "torqued" condition are set and read in the relaxed position.

Steps 7.2.7:

(a) This step allows setting one torque switch differently from the other (contrary to the note in Step 3.6 which indicates that both torque switches should be set identically). If different settings are to be allowed, a caution and torque switch diagram should be added to the procedure to prevent confusion between the "open" and "closed" labels for the torque switch contacts and the setting screws used for torque switch setting.

(b) If "additional torque" is needed, as indicated in this step, when the valve is being stroked under less than design differential pressure conditions, the valve and/or the recommended setting should be considered suspect and corrective action taken.

(2) 12MHP5021.001.006, Revision 2, Maintenance Repair Procedure for Limitorque Valve Operators 6.0 Lubrication: The grease indicated, Mobilux EP-1, is not the type of grease currently being used; hence, the procedure is in error and should have already been changed. Also, the type of grease used in the limit switch gearbox, Mobile 28, is not specified.

Procedural details are inadequate for motor operator disassembly and reassembly; unless the valve mechanics doing the work are adequately trained. The licensee is developing a formal training program for INPO approval. Some additional review is needed when the training program is implemented to assure a match between procedural detail and training depth.

9.0 Acceptance Criteria: Post maintenance testing and acceptance criteria are inadequately specified. The licensee indicated that this is specified through the Job Order System; however, there is no standard retest procedure at this point. Items to consider would include motor meggering, motor rotation check, motor current during valve stroking, stoke distance measuring, position lights vs. valve stem position, functional test, stroke time, quality control checks, etc. (This is also part of the unresolved item in Paragraph 4.b which relates, in part, to post maintenance testing.)

(3) 12MHP4030STP.025, Revision 1, Maintenance Surveillance Test Procedure for Channel Calibration of Pressurizer PORV Block Valves. This procedure is specific to the three PORV block valves and has questionable instructions on setting the torque and limit switches similar to that commented on above for

12MHP5021.001.037, Revision 1, Maintenance Procedure for Rotor and Torque Limit Switches on Limitorque Motor-Operated Valves. It should be revised in light of the same comments on that procedure.

The above comments on the three procedures constitute an open item pending further consideration of the comments by the licensee and procedural revision, as necessary (315/84011-05(DRS); 316/84011-05(DRS)).

5. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 4.c, 4.d, and 4.e.

6. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 4.a and 4.b.

7. Exit Interview

The inspector met with licensee representatives (denoted in Section 1) on March 13, 1986, to discuss the scope and findings of the inspection. The licensee acknowledged the statements made by the inspector with respect to items discussed in the report. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.