U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-315/85027

Docket No. 50-315 License No. DPR-58

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

Facility Name: D. C. Cook Unit 1

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

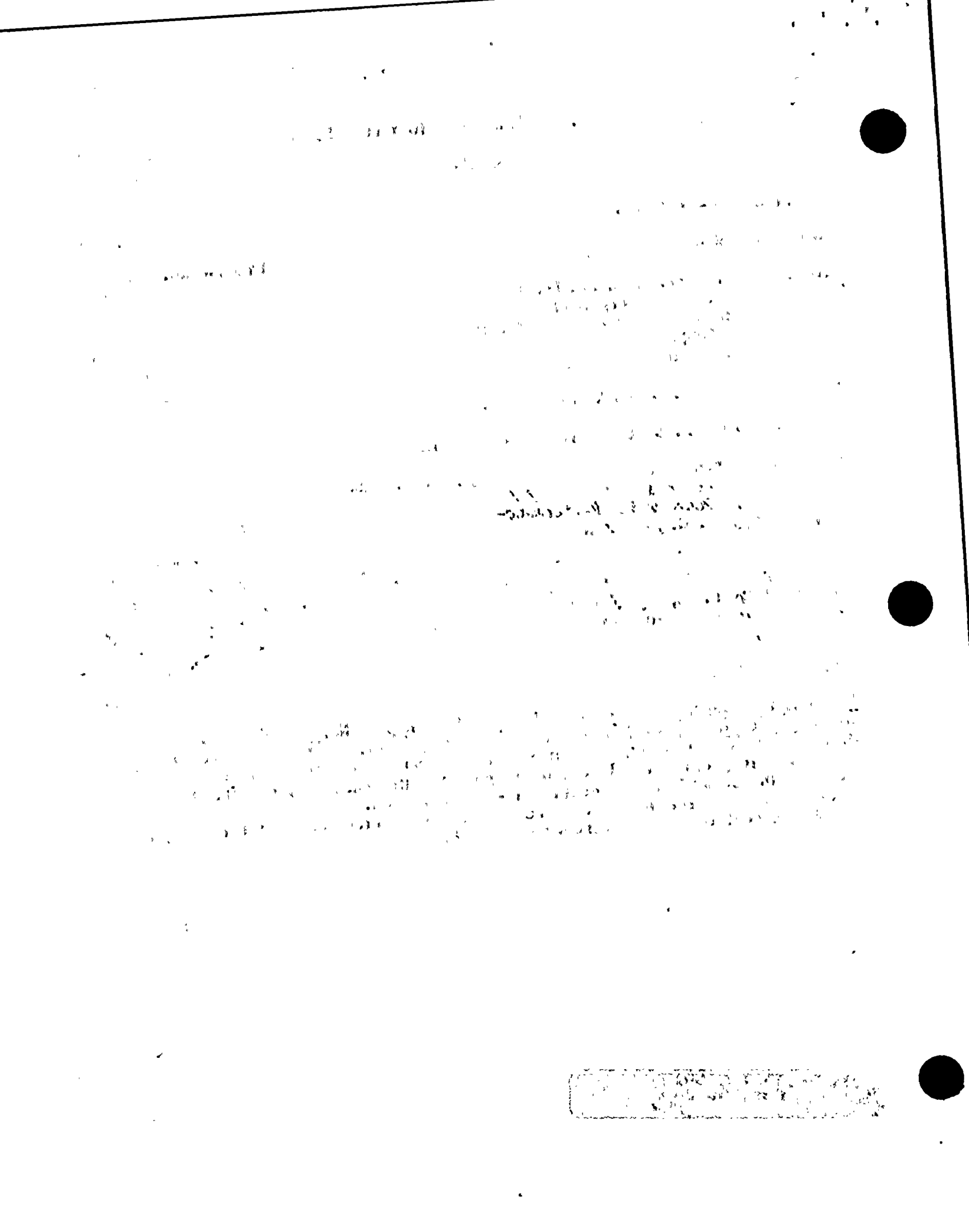
Inspection Conducted: August 27 and September 3, 1985

Inspector: Carl J. Paperiello for W. G. Guldemond — Date: 9/11/85

Approved By: Carl J. Paperiello for L. A. Reyes, Chief, Operations Branch — Date: 9/11/85

Inspection Summary

Inspection on August 27 and September 3, 1985 (Report No. 50-315/85027(DRS)
Areas Inspected: Special announced safety inspection of the events resulting in incorrect system lineups to support a containment integrated leak rate test. The inspection involved four inspector-hours onsite by one inspector and five inspector-hours conducting in-office review.
Results: In the area inspected, one apparent violation was identified regarding failure to control a test boundary - Paragraph 2.



DETAILS

1. Persons Contacted

American Electric Power Service Corporation

*W. G. Smith, Jr., Plant Manager
A. A. Blind, Assistant Plant Manager - Maintenance
+*K. R. Baker, Operations Superintendent
C. E. Murphey, Production Supervisor - Operations
M. A. Baken, Department Assistant, Quality Control
C. A. Ross, Staff Engineer
J. R. Sampson, Production Supervisor - Operations
+P. A. Barrett, Lead Compliance Engineer
J. G. Feinstein, Manager, Nuclear Safety and Licensing
R. F. Kroeger, Manager of Quality Assurance
+D. S. Klimer, Performance Engineer
+R. Czajka, Performance Engineer
M. W. Evarts, Nuclear Safety and Licensing
M. S. Ackerman, Nuclear Safety and Licensing
+T. K. Postelwait, Performance Engineering Supervisor
+L. S. Gibson, Technical Engineering Superintendent

NRC

B. Jorgensen, Senior Resident Inspector
J. Heller, Resident Inspector
C. Wolfsen, Resident Inspector

*Denotes those personnel in attendance at the exit meeting on August 27, 1985.

+Denotes those personnel participating in the meeting held on August 27, 1985 to discuss the licensee's investigation.

2. Containment Integrated Leak Rate Test (CILRT) Boundary Control

On August 18, 1985, during the performance of a CILRT on D. C. Cook Unit 1, a Region III inspector discovered several containment penetrations that were not vented as specified by the test procedure. As discussed in Inspection Report 50-315/85025(DRS), this was immediately brought to the attention of the licensee. In response to this identified problem, the licensee rechecked those portions of the CILRT test boundary outside containment for correct alignment (without verification) and discovered the following discrepancies:

Valve No.	Description	Required Condition	As Found Condition
IPX-6	Safety Injection Accumulator Sample	Open, uncapped	Closed, capped

NPX-106	Hot Leg Sample	Open, uncapped	Closed, capped
NPX-108	Pressurizer Liquid Sample	Open, uncapped	Closed, capped
EPX-10	Hydrogen Sample	Open, uncapped	Closed, capped
GPX-312	Nitrogen Isolation to Accumulator Test	Open, gauge removed	Closed, gauge installed*
GPC-310	Nitrogen Supply to the Reactor Coolant Drain Tank	Open, line vented	Open, line intact*
XPX-100	Control Air Vent	Open, gauge removed	Open, gauge installed*
BD-103-1	Steam Generator	Open	Closed
BD-103-2	Blowdown	Open	Closed
BD-103-3	Isolation	Open	Closed
BD-103-4	Valves	Open	Closed
NS-344	Hydrogen Sample System Supply Valve	Closed	Open
NS-326	Hydrogen Sample Return Vent	Open	Closed
NS-346	Hydrogen Sample	Closed	Open
NPX-110	Pressurizer Steam Space Sample	Open	Closed

a. *These discrepancies were identified initially by the NRC Region III inspector.

As a result of these discrepancies, the following actions were taken and commitments made:

(1) All discrepant boundary conditions were corrected and independently verified with the exception of the steam generator blowdown isolation valves which are not technically boundary valves. This was verified by the inspector who initially discovered the alignment problem.

(2) The CILRT was reperformed. This was witnessed by the inspector who initially discovered the alignment problem.

(3) The licensee committed to check those portions of the test boundary inside containment for correct alignment following the CILRT.

(4) An investigation as to the cause of the problem was initiated.

b. Subsequent to containment depressurization, the following discrepancies were discovered on those portions of the test boundary inside containment:

Valve No.	Description	Required Condition	As Found Condition
SI-164-1	No. 1 Safety Injection Accumulator Vent	Open	Closed
SI-164-4	No. 4 Safety Injection Accumulator Vent	Open	Closed
NPX-300	Nitrogen Supply to the Pressurizer Relief Tank	Open, vent plug removed	Open, plug installed

As a result of these additional discrepancies, the licensee performed a local leak rate test on the penetration associated with NPX-300, took a penalty on the CILRT results, and performed an evaluation which demonstrated that misalignment of the accumulator vent valves did not have a significant impact on the CILRT results. These actions will be discussed further in Inspection Report 50-315/85025(DRS).

c. On August 27, 1985, the inspector had a meeting with those personnel identified in Paragraph 1 of this report to review the results of the licensee's investigation and planned corrective actions. At this meeting the licensee identified three root causes associated with the incorrect test boundary configuration:

(1) The test boundary valve lineup procedure was deficient in that it failed to clearly specify the removal of such components as pipe caps, pipe plugs, and gauges in addition to valve manipulations to ensure that lines were adequately vented as required. This deficiency was compounded by the fact that operations personnel perform valve manipulations and pipe cap removal but do not normally remove pipe plugs or gauges or disconnect mechanical fittings. Thus, not only were certain specific required actions not explicitly identified, responsibility for completing those actions was not clearly identified.

(2) Valve positions were not adequately controlled by tagging or other means following completion of the boundary valve lineup. The following boundary valves were manipulated after the boundary lineup was performed:

(1) EPX-10
(2) BD-103-1, 2, 3, 4
(3) NS-344
(4) NS-326
(5) NS-346

These manipulations were made as part of routine activities not associated with the CILRT without informing either the operations shift supervisor or CILRT personnel.

(3) Personnel error on the part of certain personnel in incorrectly establishing and verifying the CILRT boundary configuration. This causal factor was based on two facts:

(a) No evidence existed that would indicate that the subject portions of the boundary were manipulated following the initial lineup.

(b) The same two individuals, a reactor operator and senior reactor operator, had initialled the CILRT valve lineup sheet for checking and independently verifying the position of all valves subsequently found mispositioned and for which no documentation of post-lineup manipulation existed.

d. As a result of questions asked by the inspector during the meeting, the following information came to light:

(1) Personnel performing the valve lineups received no pre-lineup briefings.

(2) The licensee does not have a procedure or provide formal training on how to perform valve lineups. Thus, consistent guidance on such things as reliance on local and remote position indication or valve stem position is lacking.

(3) Four of the five mispositioned valves outside containment for which no documentation of post-lineup manipulation existed were local chemistry sample points not routinely operated by operations personnel.

(4) The remaining value outside containment found mispositioned, GPX-312, and the two accumulator vent valves inside containment found mispositioned were associated with an ongoing accumulator level transmitter replacement program which was continued up to the start of the CILRT.

(5) Additional controls on containment access were not imposed following completion of the valve lineup. A significant in-containment cleanup effort was conducted after the lineup.

(6) The two operators who were associated with a number of the mispositioned valves steadfastly maintained that they had checked all the valves for which they initialled on the lineup sheets. They admitted that, in hindsight, they had not complied with the literal requirements for time and space separation on independent verification.

(7) Quality Control personnel did not provide extensive coverage of CILRT activities, including valve lineups.

e. Following the August 27, 1985 meeting, the inspector reviewed the licensee's procedures for independent verification and the CILRT to determine what impact those procedures had on this event. The following observations were made.

(1) The independent verification requirements contained in Section 3.8 of PMI-4010 are adequate.

(2) The only Quality Control signature requirements in the CILRT procedure, 1 THP 4030 STP.202, are for removal of fire extinguishers from containment prior to the test and restoration following the test.

(3) Step 4.31 of the CILRT requires that the Chemical Supervisor be informed of all sampling valves which cannot be operated during the test.

(4) The valve lineup sheets contained in the CILRT procedure only specify valve positions. They do not specify pipe plug or cap removal, gauge removal, or line disconnects.

(5) The CILRT procedure does not require tagging boundary valves to prevent inadvertent operation.

f. Based on the above information, the following conclusions were reached by the inspector concerning the CILRT boundary and misconfiguration at D. C. Cook:

(1) As concluded by the licensee, the misconfiguration was primarily the result of two factors:

(a) The licensee failed to establish and maintain control of the CILRT boundary by any viable mechanism such as tagging. This permitted post-lineup boundary manipulation. Further, the requirements of Step 4.31 of the CILRT procedure were not effectively implemented as evidenced by the fact that the chemistry department did manipulate certain sample valves.

(b) The boundary lineup sheets are inadequate in that they do not clearly specify removal of devices necessary to ensure proper venting.

These two conditions appear to be violations of NRC requirements.

While it is certain that personnel error contributed to this event, the information available does not support a clear determination of who made the error(s).

(2) The problem was exacerbated by a failure to effectively communicate to all station personnel that CILRT boundaries had been established and that any boundary manipulated required prior approval.

(3) In addition to the conclusions above, the following weaknesses in licensee performance were noted:

(a) Personnel responsible for performing the CILRT valve lineups were not adequately briefed on their responsibilities.

(b) The extent of Quality Control involvement in test oversight was minimal.

(c) No procedure exists defining how valve position verifications are to be conducted.

It was noted that the licensee aggressively pursued this event and evidenced a strong positive attitude toward safety when deciding to reverify the entire CILRT boundary configuration and re-perform the CILRT upon discovery of lineup problems. Additionally, by the time of the August 27, 1985 meeting, the licensee had already concluded that the CILRT procedure required revision to include more explicit instructions on test boundary lineup and control.

3. Exit Interview

The inspector met with the personnel identified in Paragraph 1 on August 27, 1985 to discuss the findings of this inspection. The licensee acknowledged those findings. On September 3, 1985, the inspector confirmed those findings with the licensee telephonically after reviewing the CILRT and independent verification procedures. The inspector also discussed the likely informational content of the inspection report with regards to documents reviewed by the inspector during the inspection. The licensee did not identify any such documents as proprietary.