U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-456/86007(DRP); No. 50-457/86006(DRP)

Docket Nos. 50-456; 50-457 Licenses No. CPPR-132; CPPR-133

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Braidwood Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, IL

Inspection Conducted: February 2 through March 29, 1986

Inspectors: for T. M. Tongue — 4/16/86 Date

M. J. Farber — 4/16/86 Date

W. J. Kropp — 4/16/86 Date

Approved By: R. N. Gardner, Chief
Braidwood Project Section — 4/16/86 Date

Inspection Summary

Inspection on February 2 through March 29, 1986 (Reports No. 50-456/86007(DRP); No. 50-457/86006(DRP))

Areas Inspected: Routine, unannounced safety inspection of licensee action on previous inspection findings; IE bulletin followup; events occurring during the inspection; preoperational testing; integrated hot functional testing; plant tours and independent assessments; receipt, inspection, and storage of new fuel; meetings, training and other activities. The inspection consisted of 372 inspector-hours onsite by three NRC inspectors including 150 inspector-hours onsite during off-shifts.

Results: Concerns were raised related to the potential seriousness of the event when mispositioned valves with improperly applied caution tags were identified during the Unit 1 cold hydrostatic test (Paragraph 7).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

Corporate Personnel

*A. Miosi, Nuclear Licensing Administrator

Braidwood Personnel

*M. J. Wallace, Project Manager
C. W. Schroeder, Station Services Superintendent
D. L. Shamblin, Project Construction Superintendent
*P. L. Barnes, Regulatory Assurance Supervisor
*G. E. Groth, Assistant Construction Superintendent
M. E. Lohmann, Assistant Construction Superintendent
*E. E. Fitzpatrick, Station Manager
L. M. Kline, Regulatory Assurance Group Leader
*C. Tomasnek, Project Startup Superintendent
H. Zimmerman, Project Startup Testing Supervisor
*D. Paquette, Maintenance Assistant Superintendent
*D. O'Brien, Operations Assistant Superintendent
R. Legner, Senior Operating Engineer
G. Masters, Operating Engineer
R. Ungren, Operating Engineer
F. Willaford, Security Administrator
M. Andrews, Station Chemist
R. Lemke, Technical Staff Supervisor
G. Nelson, Assistant Technical Staff Supervisor
R. Acre, Radiation-Chemistry Supervisor
T. Keith, Lead Health Physicist
*T. W. Simpkin, Regulatory Assurance
R. Mertogul, Assistant Technical Staff Supervisor
*T. E. Quaka, Site Quality Assurance Superintendent
*R. Kyrouac, Station Quality Assurance Supervisor
T. Meyer, Station Fire Marshall
*D. Boone, Construction Field Engineer
*G. F. Marcus, Assistant to Manager Quality Assurance
*L. E. Davis, Assistant Superintendent, Technical Services
*D. L. Cecchett, Regulatory Assurance
*A. J. D'Antonio, Regulatory Assurance
*E. Wendorf, Project Field Engineer

NRC Personnel

A. Davis, Region III Deputy Regional Administrator
J. Stevens, NRR Licensing Project Manager

The inspector also talked with and interviewed other licensee employees, including members of the technical and engineering staffs, startup engineers, reactor and auxiliary operators, shift engineers and foremen, electrical, mechanical and instrument personnel, contract security personnel, and construction personnel.

*Denotes those attending one or more exit interviews conducted on February 20, March 6, and March 27, 1986, and informally at various times throughout the inspection period.

2. Licensee Action on Previous Inspection Findings

The inspector reviewed the licensee actions on the following items and the results are as stated:

(Open) Violation 456/84-21-07(DRP); 457/84-20-07(DRP): Failure to implement a Quality Assurance Program to assure the internal cleanliness of mechanical equipment. The inspector conducted a review of the history of this violation including Inspection Reports No. 456/82005; No. 457/82005 where the licensee was cited for failure to properly install safety-related mechanical equipment, and a related Nonconformance Report, NCR 614.

An interim inspection documented in Inspection Reports No. 456/85011; No. 457/85011 indicated that internal cleanliness of systems or the presence of foreign matter in safety-related systems continued to remain a concern. The interim inspection stated that the inspector would evaluate the reflush procedures, the performance of the reflushing crew, the licensee's quality assurance involvement in assuring system cleanliness and that the item would remain open until the licensee completed their corrective actions.

The inspector reviewed the engineering assessment of all systems identified in NCR 614 that had not received visual inspections and were listed for follow up flushes, reflushes, and/or visual inspections of component internals for cleanliness. The inspector interviewed licensee personnel in project startup, members of the flush crew, members of site quality assurance, and employees of Phillips Getschow Company. In addition, the inspector reviewed documents and procedures relative to this issue. The procedures reviewed were:

PSU 200, "Generic System Flushing/Cleaning Procedure"

PSU 206, "Flush Verification Program - Implementation Program"

These procedures were found to be technically accurate and appeared to cover all aspects of the need to assure system cleanliness for systems previously dispositioned as well as future activities.

The inspector then reviewed complete flush packages to verify completeness, accuracy, and that the information was in accordance with the procedures listed above. The flush packages reviewed were:

CFP-AF-10	Auxiliary Feedwater System
CFP-DO-20	Unit 1 and Common Diesel Oil System
CFP-RC-01	Reactor Coolant System
CFP-RC-01 Addendum A	Reactor Coolant System
CFP-RC-(Special)	RC Steam Generator Snubbers
CFP-RHR-10	Residual Heat Removal
CFP-RHR-10A	Residual Heat Removal
CFP-WO-10.1	Control Room Chilled Water

The inspector verified that the flush review packages had received proper review and signatures, including QA involvement, that the proper forms, when required, were in the packages including properly marked up drawings, flush completion final checklists, review forms, system walkdown review forms, instrument lists, flush procedure, data forms, spot check reports, and other information as necessary.

In each case, the inspector found the packages to be acceptable. The inspector also reviewed the licensees action regarding ongoing construction by monitoring several equipment installation requests (EIR) in the field and in the construction office and verified that the mandatory QA hold points were in place and being followed. The inspector noted that the licensee has also placed a notice in the appropriate EIR packages to notify the NRC (Resident Inspector) when systems are ready for closure. This is a courtesy notification for the inspector to have an opportunity to witness the visual inspections conducted by QC/QA personnel. The inspector was able to witness the piping for the Unit 2 Motor-driven Electric Auxiliary Feedwater Pump prior to its piping being assembled.

In summary, the inspector found the licensee's corrective action thus far to be acceptable. This item will remain open pending the completion of the remaining corrective actions.

(Closed) Violation (456/85008-10a(DRS)): Excessive trash and debris in the positive displacement charging pump room. The room was immediately cleaned and the responsible contractor was instructed on the cleanliness requirements for the room. Subsequent inspections have not identified further problems in this room. This item is closed.

(Closed) Violation (456/85008-10b(DRS)): Permanent piping coverings. The licensee implemented a program requiring covers made of wood, metal, plastic, or other durable materials for piping. Inspections conducted subsequent to the scheduled implementation date have not identified any further deficiencies of this type. This item is closed.

(Closed) Violation (456/85008-10c(DRS)): Cleanliness requirements for entry into sealed systems. The licensee immediately implemented the required cleanliness controls for entry into the containment sump and conducted training for test personnel involved in entry into sealed systems. No further deficiencies of this type have been identified. This item is closed.

(Closed) Unresolved Item (456/85027-04(DRP); 456/85027-03(DRP)): Reportability of Nonconformance Report (NCR) 614. The inspector reviewed a copy of the closed NCR package and determined that the corrective action required for closure was identical to that required for the resolution of the corresponding equipment setting issues. The information detailing corrective action contained in the package supported the licensee's position that NCR 614 was emergent from Inspection Report No. 82005 installation of safety-related mechanical equipment issues and was covered by the 10 CFR 50.55(e) No. 82-07, which was filed in response to the Notice of Violation. This item is considered closed.

(Closed) Open Item (456/85027-02(DRP); 457/85027-01(DRP)): Deficiencies in Procedure PM-04, Revision 0, "10 CFR 50.55(e) Determination and Reporting." The inspector reviewed Revision 1 to the procedure which corrected the deficiencies. This item is closed.

(Closed) Unresolved Item (456/85057-04(DRP)): Incorrect valve position during hydrostatic test performance. This item is fully discussed in Paragraph 7.

No violations or deviations were identified.

3. IE Bulletin Followup

Each of the following IE Bulletins was reviewed by the Inspector to determine if: (1) the licensee's written response was submitted within the time limitations stated in the bulletin, (2) the written response included all information required to be reported, (3) the written response included adequate corrective action commitments based on information presented in the bulletin and the licensee's response, (4) licensee management forwarded copies of the written response to the required onsite management representatives, (5) information discussed in the licensee's response was accurate, and (6) the corrective action taken was as described in the response.

(Open) IE Bulletin 456/85-01; 457/85-01 Steam Binding of Auxiliary Feedwater Pumps. By letter, dated February 13, 1986, the licensee provided a description of their action and procedures for the Byron Station. The actions included monitoring fluid temperatures of the

Auxiliary Feedwater (AF) system and, ensuring recognition of the occurrence of steam binding and restoration of the AF system if it occurs. It also described the training of operating personnel on these procedures. The licensee committed to implement the same requirements at Braidwood and will submit a followup report within one year of the bulletin as requested. This bulletin will remain open until that report is received and reviewed.

No violations or deviations were identified.

4. Events Occurring During the Inspection

a. Main Steam Line Water Hammer

On March 25, 1986, during integrated hot functional (IHF) testing, a water hammer event occurred in the Unit 1 "B" main steam line (MSL). This resulted in two MSL pipe supports being damaged and requiring repair, in a nonsafety-related section of the MSL piping. The licensee held up the IHF during repair and evaluation of the event. They developed a description of the event, an action item list related to the event and an associated restart plan.

Through conference calls and meetings between licensee personnel, resident and regional inspectors, Region III management, and NRC headquarters personnel, all questions or concerns were dispositioned. The licensee was requested to document all elements of their action item list and assemble a record package for review by the NRC. This is an open item (456/86007-01(DRP)) pending completion of the inspector's reviews.

b. Radiation Occurrence Report - Survey of Radioactive Materials Upon Receipt

On February 2, 1986, the licensee reported to the Senior Resident Inspector (Operations) that a neutron source was delivered to the site and was not surveyed for neutron exposure upon receipt. However, the licensee did properly conduct surveys for gamma exposure rates and removable contamination. This matter was reviewed by a regional health physicist and is documented in Inspection Reports No. 456/86002; No. 457/86002.

5. Preoperational Testing

During the inspection period, the inspector observed portions of two preoperational tests. The observation included verification that properly approved procedures were available and being followed, that data was properly recorded and within the allowable band specified in the procedure, that out-of-service tags were properly applied as necessary, procedure entries and exits were properly executed, instruments were properly calibrated, deficiencies identified were properly resolved and/or recorded for resolution, and that applicable regulatory requirements were met.

The inspector also reviewed applicable portions of the FSAR and draft Technical Specifications for comparison.

During the inspection, the inspector observed portions of the following tests:

BwPT-DG-10, "Diesel Generators"

BwPT-RY-17, "Pressurizer"

No violations or deviations were identified.

6. Integrated Hot Functional Test (IHF)

On March 9, 1986, the licensee commenced the IHF testing on Unit 1. Through observations of records, witnessing tests, and interviews with licensee personnel, the inspectors evaluated the conduct of the tests, acceptability of results, and performance of personnel. The inspectors observed shift crew personnel and management control, verified that properly approved procedures were available and used, crew requirements were met, test prerequisites were met, proper plant systems were in service, special test equipment was calibrated and in service as needed, crew actions were timely and correct, that deficiencies and test problems were documented, test changes were processed in an approved manner, and data was collected for final analysis by proper personnel. On a sample basis, as-run test results were reviewed to ensure acceptance criteria was met. These inspections were done concurrently with regional inspectors from the Division of Reactor Safety - Test Programs Section (TPS).

The inspectors noted that the licensee had taken extra effort to assure proper access control in the control room and other affected spaces in the plant. In addition, special attention and actions were taken to control the chemistry of water used in the testing.

The inspectors witnessed portions of the following tests:

BwPT-RC-10, "Integrated Hot Functionals"

BwPT-RC-17, "Reactor Coolant Loop Stop Valve Timing, RCP Starting, and Relief Line Flow Verification"

BwPT-MS-17, "Main Steam, Safety-Related"

BwPT-SI-13, "Safety Injection Check Valve Operability and Leakage Test"

BwPT-IT-10, "RTD Cross Calibration"

BwPT-FW-17, "Tempering Flow Test"

BwPT-LM-17, "Reactor Loose Parts Monitor for IHF"

The inspector noted the following with regard to BwPT-SI-13, "Safety Injection Check Valve Operability and Leakage Test:"

a. Five valves have been identified as having leakage greater than the allowed one gallon per minute.

b. While attempting to conduct Section 9.7 of the test the 1750 psig relief valve on the Safety Injection (SI) header was lifted. Since the SI pump discharge pressure at the time should have been no greater than 1600 psig, the source of pressure necessary to lift that relief appears to have been the Reactor Coolant System which was at approximately 1840 psig. This would imply back-leakage through a number of check valves. At the completion of this inspection the licensee had not yet formulated an explanation for the event. Identification of the cause and development of corrective action for this occurrence is an open item (456/86007-02(DRP)) pending inspector review of the licensee's findings.

Early in the inspection period the inspector reviewed the special administrative controls implemented by the licensee for the purpose of controlling the status of components and systems during hot functional testing. The controls appeared programmatically adequate; however, effectiveness of implementation was still unproven. The inspector audited the list of hot functional test support systems against the Component and Position Deviation Binder and the binders containing the working copies of the system valve lineups. Some discrepancies were noted and turned over to the IHF Coordinator for resolution. During the inspection period, as more systems were placed under Operations Department control, additional audits were conducted to better establish the effectiveness of the system. The inspector reviewed lineups for Safety Injection, Residual Heat Removal, and Chemical Volume and Control and compared actual valve and switch positions to those in the lineup and the Component Position/Deviation List. No discrepancies were noted.

At the end of this inspection period, the IHF testing appeared to be handled by well qualified personnel, the licensee stayed close to the planned schedule, and activities in general were conducted in a professional manner.

No violations or deviations were identified.

7. Unit 1 - Reactor Coolant System Hydrostatic Test

The evaluation of the incorrect positioning of safety injection valves which was initially addressed in Inspection Reports No. 456/85057(DRP); No. 457/85053(DRP) was completed during this inspection period. The inspector reviewed the licensee's report of the incident, interviewed engineers and operators, and reviewed related documents.

The inspector determined that the incident was the result of two errors committed by both the test engineer conducting the valve lineup and the operators in the control room.

a. The decision was made to deviate from the valve position required by the test lineup in order to avoid disrupting seal injection flow to the reactor coolant pumps which were in operation at the time. The test engineer did not document on the valve lineup sheet that the safety injection valves were mispositioned. Failure to do this resulted in the master valve lineup being signed off with the valves incorrectly positioned and the test being conducted in violation of the procedure.

b. When the test engineer conducting the lineup was told that the valves would be left closed until just before pressurizing the plant he requested instructions for use of the caution cards which were to be placed on the valves after they were opened. He was directed by the control room operators to hang the tags even though the valves were still closed. Proper execution of the caution card procedure could have prevented the event. It should be noted that the caution cards were not being used to ensure proper valve lineup but to ensure that the lineup was not compromised during the test. As such the error in hanging the caution cards was not the root cause of the event but served to compound the initial error.

10 CFR 50, Appendix B, Criterion V requires that activities affecting quality shall be prescribed by documented instructions of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions. The conduct of a Reactor Coolant System Hydrostatic test is such an activity and the test procedure used was appropriate to the circumstances. However the errors discussed above resulted in failure to adhere to the procedure in such a manner as to impact the acceptability of the test.

NRC Enforcement Policy, 10 CFR 2, Appendix C, Section V. A, provides the option for not issuing a notice of violation if the violation meets all of the following criteria:

a. It was identified by the licensee;

b. It fits in Severity Level IV or V;

c. It was reported, if required;

d. It was or will be corrected, including measures to prevent recurrence, within a reasonable time; and

e. It was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation.

The inspectors' evaluation of the event and the five factors is as follows:

a. The mispositioned valves were identified by the licensee while conducting an inspection of the boundary at approximately 2600 psig.

b. Since no piping was overpressurized or damaged, and the RCS can support additional hydrostatic test cycles the event is considered to fit within Severity Level IV or V (Supplement II).

c. Although there was no requirement to report, the licensee did inform the resident inspector of the event.

d. The licensee's corrective action was comprehensive and timely. The test was repeated and extensive retraining was conducted for those personnel involved.

e. There were no previous violations of this nature.

Since all five factors have been met, a notice of violation will not be issued. This does not diminish the seriousness with which the inspectors view the event since it represents a failure to properly carry out two processes fundamental to the operation of a power plant. This item (456/85057-04(DRP)) is closed.

8. Plant Tours and Independent Assessments

The inspectors conducted routine plant tours during the inspection period to make an independent assessment of equipment conditions, plant conditions, security, fire protection, general personnel safety, housekeeping, and adherence to applicable regulatory requirements. During the tours, the inspector reviewed various logs, daily orders, interviewed personnel, attended shift briefings, and independently determined equipment status. During the shift changes, the inspector observed operator and shift engineer turnovers and panel walkdowns.

The inspector followed up on licensee plans to establish model spaces in the plant as examples of good housekeeping in preparation for operation. On February 26, 1986, the inspectors toured a portion of the model spaces with the station manager to observe the cleaning, painting, and modifications taking place. The project, when carried out through the entire plant, will require a large effort by the licensee and will result in a considerable improvement.

On March 13, 1986, the inspectors conducted a tour with the Project Manager and the Construction Superintendent. The tour was an opportunity to compare philosophies on plant cleanliness with respect to the plant status and point out several areas of specific concern. One of these areas noted was the accumulation of considerable dust on control room panels. This area was identified previously and cleaned; however, follow up cleaning was not apparent. Within several days, the inspectors noted that the panels were being cleaned by construction personnel.

The inspectors noted a general improvement in plant housekeeping during the inspection period. Housekeeping problems identified have not been related to fire hazards, but to protection of equipment, e.g., preventing intrusion of dust and foreign materials into safety-related components and equipment.

The tours with station and project management will be continued in the future.

No violations or deviations were identified.

9. Receipt, Inspection and Storage of New Fuel

During the inspection period, the licensee received the final shipments of new fuel for Unit 1 from Westinghouse Nuclear Fuel Services in Columbia, South Carolina. Upon arrival at the site, the shipments were monitored for radiation and contamination, inspected for damage and stored in the new fuel storage vault and/or the station spent fuel pool.

On a sample basis, the inspectors verified that procedures were approved, available, and followed; the vehicle and containers were properly labeled and placarded; container seals and shock detectors were undisturbed; instruments were properly calibrated; and container numbers, fuel assembly numbers and insert numbers agreed with shipping documents. In addition, the inspectors observed cleanliness and health physics practices.

The inspector verified that controlled access areas and guard force assignments were in accordance with the approved physical security plan and provided adequate protection against theft or sabotage.

No violations or deviations were identified.

10. Meetings, Training and Other Activities

a. American Nuclear Insurers Audit

During the period of February 25-28, 1986, the American Nuclear Insurers (ANI) conducted an audit of the licensee. The licensee relayed a summary of the audit findings to the inspector:

(1) There is a large amount of work to be accomplished prior to fuel load.

(2) No major deficiencies were identified.

(3) The enthusiasm and morale of the station staff is to be commended.

The licensee has committed to let the inspector review the ANI report when it is released. This will be handled in the same manner as INPO reports.

b. Systematic Appraisal of Licensee Performance (SALP)

On March 14, 1986, an NRC-Licensee SALP meeting was held in the Region III office. The period covered was from July 1, 1984 through November 30, 1985 and the findings are documented in Inspection Reports No. 50-456/86001; No. 457/86001.

c. Resident Inspector Seminar

The resident inspectors attended a resident inspector seminar on March 18, 19, and 20, 1986 in Downers Grove, Illinois.

d. Station Visits

On March 27, 1986, Mr. A. B. Davis was at the Braidwood Station for a familiarization tour and informational meetings with the resident inspectors and licensee personnel.

11. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed 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 and 6.

12. Exit Interview

The inspector met with licensee and contractor representatives denoted in Paragraph 1 during and at the conclusion of the inspection on March 27, 1986. The inspector summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.