

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/91026(DRP)

Docket No. 50-461

License No. NPF-62

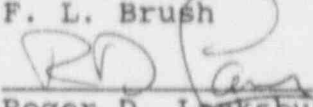
Licensee: Illinois Power Company
500 South 27th Street
Decatur, IL 62525

Facility Name: Clinton Power Station

Inspection At: Clinton Site, Clinton, Illinois

Inspection Conducted: December 31, 1991 - February 3, 1992

Inspectors: P. G. Brochman
F. L. Brush

Approved By: 
Roger D. Lanksbury, Chief
Reactor Projects Section 3B

2/7/92
Date

Inspection Summary

Inspection from December 31, 1991 - February 3, 1992 (Report No. 50-461/91026(DRP))

Areas Inspected: Routine, unannounced safety inspection by the resident inspectors of licensee actions on: previous inspection findings, event follow-up, operational safety, radiological controls, maintenance/surveillance, emergency preparedness, licensee event reports, and 10 CFR Part 21 reports.

Results: Of the eight areas inspected, no violations or deviations were identified. One inspection follow-up item concerning discrepancies in meteorological tower data was identified (paragraph 6.b).

The following is a summary of the licensee's performance during this inspection period:

Plant Operations

- An electrical fault in the "B" phase of the main generator output transformer caused a turbine trip and reactor scram. The operators responded well to the event.

Maintenance/Surveillance

- Replacement of the failed main power transformer went very well and no problems were observed.

- The licensee identified several problems with the timing of the scram discharge volume's vent and drain valves. These included incorrectly set air operators and locked valves that were not completely secure.

Emergency Preparedness

- The licensee determined that some data from the site meteorological tower was inaccurate. This inaccurate data had the potential to result in nonconservative protective action recommendations. (IFI 461/91026-01(DRSS))

Safety Assessment and Quality Verification

- No concerns were identified with the reviewed licensee event reports.
- The licensee's evaluation of a 10 CFR Part 21 report on Automatic Switch Company (ASCO) solenoid valves was reviewed and no impact on plant equipment was noted.

DETAILS

1. Persons Contacted

Illinois Power Company (IP)

- *J. Perry, Vice President
- *J. Cook, Manager - Clinton Power Station
- *J. Miller, Manager - Nuclear Station Engineering Department (NSED)
- *R. Wyatt, Manager - Quality Assurance
- *F. Spangenberg, III, Manager - Licensing and Safety
- *R. Morgenstern, Manager - Scheduling and Outage Management
- *J. Palchak, Manager - Nuclear Planning and Support
- D. Miller, Director - Plant Radiation Protection
- *P. Yocum, Director - Plant Operations
- *S. Rasor, Director - Plant Maintenance
- *R. Phares, Director - Licensing
- *K. Moore, Director - Plant Technical
- *W. Bousquet, Director - Plant Support Services
- *C. Elsasser, Director - Planning & Scheduling
- *S. Hall, Director - Nuclear Program Assessment
- *J. Sipek, Supervisor - Regulatory Interface
- *J. O'Brien, Supervisor - Independent Safety Engineering Group

The inspector also contacted and interviewed other licensee and contractor personnel during the course of this inspection.

- * Denoted those present during the exit interview on February 3, 1992.

2. Action on Previous Inspection Findings (92702)

- a. (Closed) Open Item (461/90017-04 (DRSS)): Questions with the testing rate for random fitness for duty tests. The inspectors noted that the licensee's rate of testing was 50% behind that needed to achieve the nominal rate required by 10 CFR 26.24(a)(2). The inspectors reviewed the licensee's summary report for 1991 and verified, on an annualized basis, that the licensee had exceeded the goal of testing 100% of the work force. The weekly average of the site population was 1600 persons. A total of 1792 persons were tested (112% of goal) in 1991.
- b. (Closed) Generic Letter (461/89013-GL): Service water system problems. This item is being administratively closed per Region III management in the Region III Outstanding Item List (OIL), to avoid duplication of effort. This item is presently tracked in the NRC Safety Issues Management System (SIMS) and closure of this generic letter will be documented by the NRC staff.

- c. (Closed) Generic Letter (451/91006-GL): Adequacy of safety-related DC power supplies. This item is being administratively closed per Region III management in the Region III OIL, to avoid duplication of effort. This item is presently tracked in the NRC SIMS tracking system and closure of this generic letter will be documented by the NRC staff.
- d. (Closed) Generic Letter (461/91011-GL): Limiting Conditions for Operation (LCOs) for Class 1E vital instrument buses. This item is being administratively closed per Region III management in the Region III OIL, to avoid duplication of effort. This item is presently tracked in the NRC SIMS tracking system and closure of this generic letter will be documented by the NRC staff.

No violations or deviations were identified.

3. Plant Operations

The unit began the report period operating at 100% power. An automatic reactor scram occurred at 2:17 a.m. (CST) on January 4, 1992, due to an electrical fault in the "B" phase of the main generator output transformers (see paragraph 3.a). The "B" phase transformer was replaced and the unit was restarted at 11:29 a.m. on January 15, 1992. The generator was synchronized to the grid at 7:24 a.m. on January 16, 1992, and the plant operated at power levels up to 96% for the rest of the report period.

a. Onsite Event Follow-up (93702)

The inspectors performed onsite follow-up activities for an event which occurred during January 1992. This follow-up included reviews of operating logs, procedures, deviation reports, licensee event reports (where available), and interviews with licensee personnel. For the event, the inspectors developed a chronology; reviewed the functioning of safety systems required by plant conditions; and reviewed licensee actions to verify consistency with procedures, license conditions, and the nature of the event. Additionally, the inspectors verified that the licensee's investigation had identified the root causes of equipment malfunctions and/or personnel errors and that the licensee had taken appropriate corrective actions prior to restarting the unit. Details of the event and the licensee's corrective actions developed through inspector follow-up is provided below:

(1) Main Transformer Failure Resulting In a Reactor Scram

At 2:17 a.m. on January 4, 1992, with the plant at 99 percent power, an electrical fault occurred in the "B" phase of the main generator output transformers. There was a separate transformer for each of the three phases. This fault caused a pressure spike in the transformer which initiated a sudden pressure trip. The sudden pressure trip caused an automatic generator trip and turbine trip, and resulting reactor scram. Additionally, the fire protection deluge system for the "B" and "C" phase transformers actuated. All systems functioned as required with the exception of a scram discharge volume (SDV) drain valve which did not automatically open after the scram signal was reset. The valve was manually opened to drain the SDV and then re-closed. The plant was restarted at 11:29 a.m. on January 15, 1992, after the maintenance activities described in paragraphs 5.a and 5.b were performed.

b. Operational Safety (71707)

The inspectors observed control room operation, reviewed applicable logs, and conducted discussions with control room operators during December 1991 and during January and February 1992. During these discussions and observations, the inspectors ascertained that the operators were alert, cognizant of plant conditions, attentive to changes in those conditions, and that they took prompt action when appropriate. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified the proper return to service of affected components. Tours of the circulating water screen house and the auxiliary, containment, control, diesel, fuel handling, rad-waste, and turbine buildings were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, and excessive vibrations, and to verify that maintenance requests had been initiated for equipment in need of maintenance.

The inspectors verified by observation and direct interviews that the physical security plan was being implemented in accordance with the station security plan.

The inspectors observed plant housekeeping and cleanliness conditions and verified implementation of radiation protection controls. The inspectors also witnessed portions of the radioactive waste system control associated with rad-waste shipments and barreling.

The observed facility operations were verified to be in accordance with the requirements established under Technical Specifications, Title 10 of the Code of Federal Regulations, and administrative procedures.

(1) Unit Derating Due To Problems With Moisture Separator Reheaters

For several months, the licensee had problems with the high load and low load steam admission valves to the reheater portion of moisture separator reheaters (MSRs). This caused the unit to be derated up to 4% (approximately 40 MWe) to minimize thermal stresses on the low pressure turbines. During the forced outage to replace the "B" main transformer, the licensee also replaced the high load valve to the "B" MSR. Two days after restarting the unit, the valve failed again. The licensee intended to leave the reheaters isolated until the March 1992 refueling outage. Changes to the design of the MSR's steam admission system were being evaluated by the licensee's engineering staff. The unit remained derated 4% at the end of the report period.

No violations or deviations were identified.

4. Radiological Controls

The licensee informed the resident inspectors that the evaluation period in the transition to "Panasonic" thermoluminescent dosimeters (TLD) had been completed. The licensee had previously used TLDs which were manufactured by Eberline and were required to be shipped offsite to be read. The licensee developed the capability of reading the new Panasonic TLDs onsite. The new TLDs were also capable of measuring poly-energetic neutron exposures, rather than requiring a separate dosimeter. As of February 1, 1992, the licensee was only using the Panasonic TLDs. This topic will be reviewed further by regional specialist inspectors in a subsequent report.

No violations or deviations were identified.

5. Maintenance/Surveillance (61726 & 62703)

Station maintenance and surveillance activities of both safety-related and nonsafety-related systems and components listed below were observed or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards, and in conformance with Technical Specifications.

Maintenance Work Request Number and Component:

D10238 - Main Power Transformer, Mechanical Maintenance
D26247 - Main Power Transformer, Electrical Maintenance
D17326 - Main Power Transformer, Electrical Maintenance
D17319 - Scram Discharge Volume Vent and Drain Valves

The following items were considered during this review: the limiting conditions for operation were met while affected components or systems were removed from and restored to service; approvals were obtained prior to initiating work or testing; quality control records were maintained; parts and materials used were properly certified; radiological and fire prevention controls were accomplished in accordance with approved procedures; maintenance and testing were accomplished by qualified personnel; test instrumentation was within its calibration interval; functional testing and/or calibrations were performed prior to returning components or systems to service; test results conformed with Technical Specifications and procedural requirements and were reviewed by personnel other than the individual directing the test; any deficiencies identified during the testing were properly documented, reviewed, and resolved by appropriate management personnel; work requests were reviewed to determine the status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which may affect system performance.

a. Transformer Repair

The main generator "B" phase output transformer failed due to an internal fault and was replaced with an onsite spare. The inspectors observed various maintenance activities, paying particular attention to the use of cranes in the vicinity of overhead power lines. The inspectors noted that proper safety precautions were followed during the replacement effort.

Tests were also performed on the "A" and "C" phase transformers and isolated phase bus ducting to determine if they had been damaged. These tests included high-potential (hi-pot), oil analysis, and meggering. The generator output disconnect links were removed and the three transformers were energized by back feeding power from the switchyard as part of the post maintenance testing. There were no problems found with any the transformers.

The "B" transformer fire suppression deluge system was removed to facilitate the transformer replacement. It was aligned and tested after reinstallation to ensure the spray patterns were correct.

The licensee initiated an investigation of the cause(s) of the transformer failure and initiated efforts to repair the damaged transformer or obtain a replacement. These efforts were estimated to take six months to one year.

The licensee's overall performance during this evolution was very good. The inspectors had no concerns resulting from this effort.

b. Repair of Scram Discharge Volume (SDV) Vent and Drain Valves

Following the scram on January 4, 1992, reactor operators noted that valves 1C11-F010 and 1C11-F011 (see figure 1) did not automatically open when the scram was reset. Valve 1C11-F010 was found open, but the valve position indication open limit switch was not made up. When the limit switch was tapped, it repositioned. Valve 1C11-F011 was found closed. Valve 1C11-F011 was manually opened to drain the SDV. The scram was subsequently reset.

The licensee reviewed the maintenance history of the system and determined that valves 1C11-F009 and 1C11-F182 were rebuilt in January 1991. The closing time for valves 1C11-F010, F011, F180, and F181 was successfully verified every three months. However, the opening time was not part of the acceptance criteria. On May 2, 1991, licensee personnel noted that the opening time of F011 was 17 minutes. A work request was initiated and scheduled for refueling outage 3 (March 1992).

Maintenance personnel's trouble shooting of this event identified several problems:

- The 1C11-F009 and 1C11-F182 valves were leaking air. A small piece of foreign matter (believed to be solder) was found between the back seat and the disk of valve 1C11-F009;
- The actuation pressure of valve 1C11-F010 was found set too low, at 6 to 30 psi (i.e., lift off seat at 6 psi and fully back seated at 30 psi), rather than 18.5 to 60 psi;
- The actuating pressure for valve 1C11-F011 was found set at 20 to 62 psi;
- Valve 1C11-F180 was found to have a bent stem and galling was observed on the disk and stem. The actuating pressure was found set at 8 to 25 psi, rather than 3 to 15 psi; and

- Valve 1C11-F159A was found throttled closed further than required. The method of locking the valve was ineffective because the valve hand wheel could be moved with the locking device in place.

The failure of valves F010 and F011 to open at the same time was caused by the combination of air leaking by the back seat of valve F009, the lower set pressure of valve F010, and the reduction in air flow from valve F159A. As little as 1/8 of a turn significantly affected the amount of air valve F159A passed. These factors allowed valve F010 to open while valve F011 remained closed.

Corrective actions taken included: rebuilding valves F009, F180, and F182; resetting the actuating pressure of valves F010 and F011; developing a new means of locking valves F159A and F159B and providing positive indication of these needle valve's position; and revising the quarterly procedure to record the opening and closing times, to detect degradation. Based on these corrective actions, the inspectors have no further concerns on this issue.

c. Hydraulic Fluid Spill into the Suppression Pool

On January 7, 1992, approximately 5 to 20 gallons of "Fyrquel" hydraulic fluid sprayed into the containment suppression pool. An O-ring on a solenoid valve in the "B" reactor recirculation flow control valve (FCV) high pressure hydraulic power unit (HPU) failed. The licensee immediately terminated all system operations that involved taking a suction on the suppression pool in order to confine the Fyrquel. The licensee determined that the bolts on the cover plate over the O-ring had not been properly torqued down by the manufacturer. This solenoid valve had been installed in December 1991 after the "B" FCV failed to lock up on demand (see inspection report 50-461/91023). An investigation by the licensee determined that Fyrquel could damage the fuel if it entered the reactor. The suppression pool was cleaned using a surface skimmer and divers to vacuum the bottom. Water chemistry analysis after the cleanup determined that the Fyrquel concentration in the suppression pool was below the detectable level of approximately 50 parts per billion. There was also no Fyrquel detected in the various systems that take water from the suppression pool.

The licensee initiated a review to determine if there are any other alternative fluids which can be used in the HPUs. The licensee was also reviewing any other

possible impacts that Fyrquel might have on plant systems. The inspectors will review the licensee's evaluation.

No violations or deviations were identified.

6. Emergency Preparedness

a. Loss of Offsite Response Capability (71707)

At 12:50 p.m. on January 15, 1992, the shift supervisor was notified that due to blizzard conditions, the DeWitt County sheriff had closed the roads surrounding the site. The licensee notified the NRC Operations Center of a loss of offsite response capability as required by 10 CFR 50.72(b)(1)(v). At 5:21 p.m. the licensee was notified that the roads had been reopened. This information was conveyed to the NRC. The inspectors have reviewed this event and concluded that the licensee's notifications were appropriate.

b. Discrepancies In Meteorological Tower Data May Result In Nonconservative Protective Action Recommendations

On November 19, 1991, during a meeting between the licensee's emergency preparedness staff and the Illinois Department of Nuclear Safety (IDNS), IDNS mentioned that they were observing discrepancies in the meteorological tower data. The licensee started an investigation and on January 9, 1992, initially concluded that the 10 meter temperature monitor was reading incorrectly when the sun was shining on it. The difference between the temperature readings at the 10 meter and 150 meter elevations would be used in a calculation in the determination of protective action recommendations (PARs) made by the licensee during an emergency. The PARs would be provided to the state government to assist in determining sheltering or evacuation protective actions during an emergency. The inaccurate 10 meter temperature could result in incorrect and possibly nonconservative PARs being made to the state government.

The licensee documented this problem in condition report 1-91-01-006. The licensee's investigation was in progress at the end of the inspection period. Interim guidance was provided to emergency response facility personnel responsible for dose projections and PARs. Resolution of this issue will be tracked as an inspection follow-up item (IFI) (461/91026-01(DRSS)).

No violations or deviations were identified. One inspection follow-up item was identified.

7. Safety Assessment/Quality Verification

a. Licensee Event Report (LER) Follow-up (90712 & 92700)

Through direct observation, discussions with licensee personnel, and review of records, the following LERs were reviewed to determine that the reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications.

<u>LER No.</u>	<u>Title</u>
461/89035	Selection of a wrong channel during a drywell pressure channel functional test resulted in the isolation of the drywell and containment instrument air system.
461/89030	Low water level resulted in a reactor protection system actuation due to placing a partially drained residual heat removal system into shutdown cooling.

b. Review Of 10 CFR Part 21 Notice On Automatic Switch Company (ASCO) Solenoid Valves

The inspectors reviewed the licensee's evaluation of a 10 CFR Part 21 notice which was issued by the General Electric Company (GE) on dual solenoid valves (Model NP 8323) manufactured by the ASCO company. These particular valves were used on the main steam line isolation valves (MSIV). The 10 CFR Part 21 notice identified an estimated decrease in service life of the solenoid valves from 5 years to 18 months. This was due to thermal aging causing an increase in internal leakage.

The licensee determined that the 10 CFR Part 21 Notice was not applicable because they had purchased these solenoid valves directly from ASCO rather than through GE. ASCO had performed the qualification tests under more rigorous conditions and had calculated a longer service life. The inspectors verified that the time, temperature, and radiation profiles contained in the ASCO testing were harsher than the post-accident conditions postulated for Clinton.

The calculated service life of these valves was 40 years. This assumed that selected components (elastomers) would be replaced at more frequent intervals. The service life of the most limiting component was 3.08 years. The licensee replaced the complete valve assemblies every three years because the rebuild kits were no longer available. The inspectors have no further concerns in this area.

No violations or deviations were identified.

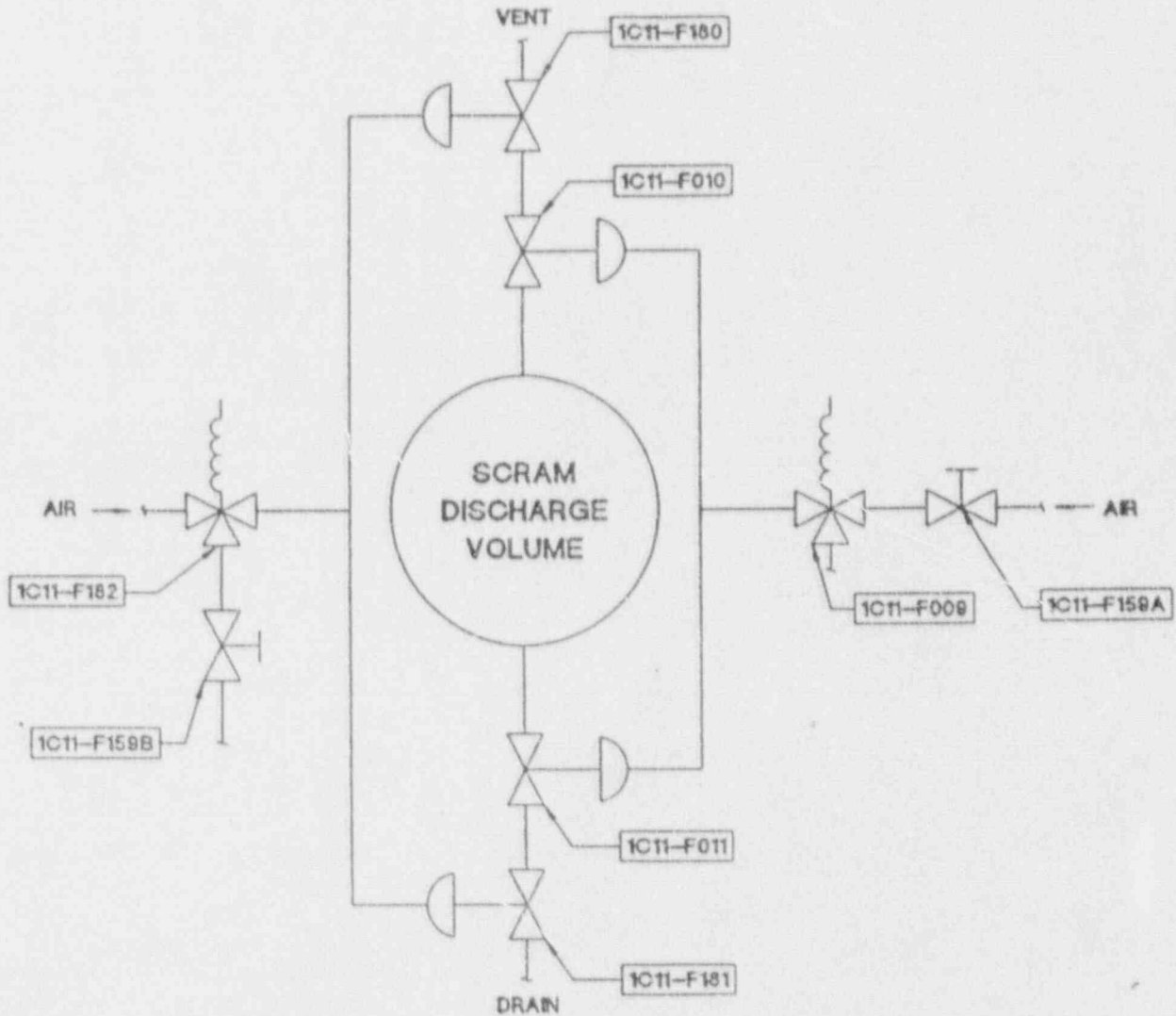
8. Inspection Follow-up Items

Inspection Follow-up Items (IFI) 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. An IFI disclosed during the inspection is discussed in paragraph 6.b.

9. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection on February 3, 1992. The inspectors summarized the purpose and scope of the inspection and the findings. The inspectors 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 or processes as proprietary.

Figure 1



During normal system operation, valves F010 and F011 close first and open second. Valves F180 and F181 close second and open first. Valves F159A and F159B were adjusted to control the timing between these valves.