

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/94004(DRP)

Docket No. 50-461

License No. NPF-62

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

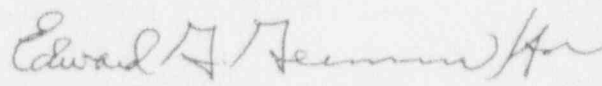
Facility Name: Clinton Power Station

Inspection At: Clinton Site, Clinton, Illinois

Inspection Conducted: February 23 - April 4, 1994

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


Brent Clayton, Chief
Reactor Projects Branch 1

4/22/94
Date

Inspection Summary

Inspection from February 23 through April 4, 1994, (Report No. 50-461/94004(DRP))

Areas Inspected: Routine, unannounced safety inspection by the resident and headquarters inspectors of licensee actions on plant operations, maintenance, engineering, and plant support.

Results: Of the four areas inspected, no violations or deviations were identified in three areas; one non-cited violation was identified for failure to maintain Division II equipment operable with the Division I diesel generator out-of-service (paragraph 3.2).

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EXECUTIVE SUMMARY

Operations

- The plant was on line the entire report period and operated at power levels up to 100 percent.
- Operator knowledge of reactor recirculation pump seal pressure limitations was weak.

Maintenance

- Declining performance in the maintenance area was observed over the last several months. Several personnel errors have occurred. However, none have led to a safety significant event.
- A flow transmitter on the main steamline isolation valve - leakage control system (MSIV-LCS) was not properly returned to service. (NCV)
- Programs for controlling valve packing adjustments in air and motor operated valves appeared to be very advantageous. The licensee has several initiatives underway to improve the maintenance program.

Engineering

- The quality of a licensee technical specification amendment request was weak.
- Analysis of potential vortexing and air entrainment in the RCIC and HPCS suction piping was thorough.
- Analysis of industry events was thorough. Actions taken on MSIVs has yielded improved leak rate performance.

Plant Support

- Housekeeping conditions in the security computer room and UPS room were substandard. Wood untreated with fire retardant was stored in a room with a fire suppression system.
- Fire protection conditions declined in some areas partly because appropriate personnel did not have access to those areas.

DETAILS

1.0 Persons Contacted

Illinois Power Company (IP)

- *J. Perry, Senior Vice President
- J. Cook, Vice President and Manager of Clinton Power Station (CPS)
- *J. Miller, Manager - Nuclear Station Engineering Department (NSED)
- *R. Wyatt, Manager - Quality Assurance
- *D. Thompson, Manager - Training
- *J. Palchak, Manager - Nuclear Planning and Support
- F. Spangenberg, III, Nuclear Strategic Change leader
- *R. Phares, Director - Licensing
- *L. Everman, Director - Radiation Protection
- *P. Yocum, Director - Plant Operations
- *W. Clark, Director - Plant Maintenance
- K. Moore, Director - Plant Technical
- *W. Bousquet, Director - Plant Support Services
- *C. Elsasser, Director - Planning & Scheduling
- R. Kerestes, Director - Nuclear Safety and Analysis
- D. Korneman, Director - Systems and Reliability, NSED
- *J. Langley, Director - Design and Analysis, NSED
- *J. Sipek Supervisor - Regulatory Interface

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

* Denotes those present during the exit interview on April 4, 1994.

2.0 Plant Operations

The unit was on line the entire report period and operated at power levels up to 100 percent.

2.1 Licensed Operator Knowledge of Limiting Parameters

The inspectors asked two operating crews if they knew of any procedural limits on the operation of the reactor recirculation (RR) pumps, during the period when the #2 seal pressure on the "A" RR pump was degrading. All but one of the licensed operators queried were unfamiliar with the 810 psig limit on #2 seal pressure. The inspectors had previously identified a concern on operator familiarity with action limits on #2 seal pressure for the RR pumps in June 1992 (Inspection Report 461/92012, paragraph 3.b(5)).

On February 26, 1994, the #2 seal inlet pressure indicator for the A RR pump began increasing intermittently. Increasing pressure in the #2 seal can indicate that the #1 seal is failing. The operating crew was clearly aware of this equipment degradation. On February 28 and March 1, 1994, the inspectors asked two operating crews if they were aware of any procedural limitations that would direct the pump be shut

down if the #2 seal pressure increased above a specific value. With exception of one operator, the responses revealed they were not familiar with this limit.

Management's response to the previous concern was to provide guidance in CPS Procedure 3302.01, Table 1 and Step 8.1.14. Training was also conducted on this procedure last fall prior to startup from the refueling outage. The inspectors discussed this issue with operations management. Operations management did not understand this lack of knowledge and initiated an investigation. The inspectors noted that the location of the information in CPS 3302.01 was weak from a human factors standpoint. The information was provided in the system startup section of the procedure and no cross reference was provided in the abnormal operations section. In addition, the wording used in the table did not correspond to the terminology used by the operators or displayed on the 680 panel's computer monitors. The inspectors will review the licensee's resolution of this issue during a future inspection.

2.2 Core Stability Procedure Changes (37700)

The licensee revised the reactor recirculating pump procedures to address concerns with operating near the reactor core's power-to-flow instability region, during reactor startup and shutdown. The inspectors reviewed the changes and did not have any concerns.

The issue of reactor core power-to-flow instabilities has been of increasing concern to the NRC. The inspectors performed this independent inspection to review the licensee's actions to date. The inspectors attended the facility review group (FRG) meeting that approved the changes, reviewed the safety evaluations, and discussed the changes with the responsible engineer. The safety evaluations were thorough, discussions during the FRG were open, and overall, the process exhibited a good safety focus. The inspectors determined that the licensee's performance in this matter was excellent.

2.3 Operational Safety (71707)

The inspectors observed control room operation, reviewed applicable logs, and conducted discussions with control room operators. During these discussions and observations, the operators were alert, cognizant of plant conditions, attentive to changes in those conditions, and 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 auxiliary, containment, control, diesel, fuel handling, rad-waste, and turbine buildings were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, excessive vibrations, and to verify that

maintenance requests had been initiated for equipment in need of maintenance. The inspectors verified implementation of radiation protection controls and physical security plan.

No violations or deviations were identified.

3.0 Maintenance

3.1 Declining Trend in Maintenance Performance

Since the startup from the last refueling on December 10, 1993, a declining trend in the performance of maintenance activities has emerged. There were at least six events in this period which involved personnel errors, lack of attention to detail, poor communications, or complacency. None of these events led to a plant transient; however, when taken collectively, this issue was safety significant. Licensee management was aware of the problem and has discussed it with the inspectors and with maintenance personnel.

The following is a synopsis of the events:

- On November 19, 1993, the low pressure core spray (LPCS) injection valve (1E21-F005) was manually stroked off its shut seat by maintenance personnel to adjust the packing. Approximately one half-hour later, the reactor operator noticed a 14 inch increase in reactor vessel water level - from the LPCS keep fill pump. There was no impact on refueling operations from this event.
- On December 11, 1993, the pressure transmitter from the "A" feedwater flow venturi was found isolated. The licensee could not establish a cause, but believed that the transmitter had not been properly returned to service following calibration. There was no impact upon the plant as the condition was discovered while the plant was at low power.
- On January 15, 1994, maintenance personnel lifted the wrong lead during a surveillance and caused a reactor water cleanup system isolation. This was caused by inattention to detail by maintenance personnel.
- On February 1, 1994, a pressure transmitter in the "A" MSIV leakage control system was found isolated. The licensee could not establish a cause, but believed that the transmitter had not been properly returned to service following calibration. This event is discussed further in paragraph 3.2.
- On March 22, 1994, a maintenance technician used an incorrect section of a procedure to return a reactor water level transmitter to service. This caused a severe hydraulic transient on the "A" division of reactor vessel water level instruments and resulted in trips in the "A" reactor protection system (RPS) division and the feedwater level control division. Only one RPS division tripped, so

the coincidence logic for a reactor scram was not met. Fortuitously, the feedwater level control system was selected to the "B" channel; this event would likely have caused a reactor scram if the system was selected to the "A" channel.

- On March 25, 1994, the reactor core isolation cooling (RCIC) turbine was inadvertently started when maintenance personnel relaxed the spring pack and allowed the valve stem to move, while they were removing test equipment from the steam admission valve. The turbine ran for 16 minutes unnoticed. The cause was poor work coordination and communications between maintenance, operations, and engineering.

3.2 Action on Previous Inspection Findings (92701)

(Closed) Unresolved Item (461/94002-01(DRP)): Main Steamline Isolation Valve Leakage Control System (MSIV-LCS) flow transmitter found out-of-service. The MSIV-LCS is used in a post-accident environment. This transmitter provided indication to the control room operators. With it not working, the reactor operators might secure the system in the belief it was not working correctly. The "B" train of the main steam isolation valve leakage control system and the Division I emergency diesel were inoperable at the same time.

Technical Specification 3.8.1.1.e states, in part, that with diesel generator 1A or 1B ... inoperable, ... verify within 2 hours that all required systems, subsystems, trains, components and devices that depend of the remaining OPERABLE diesel generator as a source of power are also operable; otherwise be in at least HOT SHUTDOWN within the next 12 hours.... The licensee believed the transmitter was inoperable from November 19, 1993 to February 9, 1994. This transmitter was in the "B" division of the MSIV-LCS. On February 3, 1994, the "A" division diesel generator was taken out-of-service. This was a violation of TS 3.8.1.1.e; however, since the licensee discovered the violation and took appropriate corrective actions it is not being cited because the criteria specified in Section VII.B.2 of the "General Statement of Policy and Procedures for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C.) were satisfied.

The licensee's corrective actions included: briefing the maintenance technicians on valve manipulations, in accordance with Maintenance Procedure CPS 8801.12 "Local Mounted Instrument Valve Operation and Venting." Additionally, the instrument valves were labeled. The inspectors have reviewed the licensee's corrective actions and had no further concerns. This issue is considered closed.

3.3 Discussions on the MOV and AOV Valve Packing Program

The inspectors explored licensee initiatives to resolve valve packing leaks. The licensee was using *Chesterton*™ live load packing and *Liberty Technologies* Packing 'nForcer™ to obtain better information on the adjustment of valve packing. The desired results of these initiatives were better packing consolidation, less packing leakage, and a better

understanding of valve stem loads. If the licensee can use this technology to validate analytical limits of stem friction forces, the need to perform thrust verification testing on some motor operated valves (MOV) or air operated valves (AOV), after they are repacked, is reduced or eliminated. The licensee believes that eliminating unnecessary thrust verification testing will reduce equipment unavailability and personnel radiation exposure.

The licensee also discussed the use of the *Fisher FlowScanner™* to verify the thrust and friction forces of AOVs. The licensee has had numerous problems with AOVs leaking by the seat or not performing correctly. The inspectors concluded these initiatives could potentially result in significant improvements in the performance and availability of MOVs and AOVs and in avoiding personnel radiation exposure.

3.4 Discussions on Maintenance Program Initiatives

The inspectors had discussions with the licensee on its initiatives to improve maintenance performance, plant material condition, and communications. Licensee performance in the maintenance area has been on a generally improving trend, with an occasional problem. Performance indicators have improved with corrective maintenance and PMT failure rates both going down. Leaks and control room deficiencies have also decreased.

The maintenance department has introduced several initiatives to reduce backlogs, improve communications, oversight of contractors, training of contractors in licensee expectations, and supervisory oversight. Overall the inspectors concluded that the initiatives should provide continued improvement in the maintenance function and some of the initiatives have already borne fruit. Further management attention is needed to address the declining trend in maintenance personnel errors.

3.5 Observations Of Work Activities (61726 & 62703)

The inspectors observed maintenance and surveillance activities of both safety related and non-safety related systems and components listed below. These activities were reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes or standards, and in conformance with technical specifications.

<u>Document</u>	<u>Activity</u>
D25792	RCIC Transmitter Calibration and Zero Shift Check
D35010	VOTES™ testing of valve 1HG009B
D55820	Troubleshooting of IRM "H"

No deviations were identified. One non-cited violation was identified.

4.0. Engineering

4.1 Quality of License Amendment Submittal

The quality of a licensee request to amend the technical specifications, on an emergency basis, was weak. The licensee's request contained technical inaccuracies and did not contain an adequate technical basis to support the NRC's approval of the request. After further discussions between the licensee and the NRR staff, the licensee supplemented its amendment request with additional information. The NRC subsequently issued the amendment.

By letter dated February 25, 1994, the licensee requested immediate staff action to process an emergency change to Technical Specification 3/4.4.3.1, "Reactor Coolant System Leakage - Leakage Detection Systems." The existing specification would allow operation for only 30 days with the drywell floor drain sump flow monitoring instrumentation inoperable. Due to inaccessibility of the instrumentation during power operation, the licensee requested permission to continue plant operation, with the inoperable instrumentation, until the first time that the plant was brought to COLD SHUTDOWN after March 15, 1994.

Technical inaccuracies included the frequency of performing maintenance on the drywell fission product monitor and the radiation levels in the sump area when the plant was in HOT SHUTDOWN. Also, the package did not provide an adequate technical basis for the need to go to COLD SHUTDOWN as opposed to HOT SHUTDOWN. The combination of the technical inaccuracies and inadequate technical basis resulted in an inadequate justification for granting the requested amendment. Therefore, the licensee was required to submit supplemental information. The NRC subsequently approved the request.

The NRC recognized that this request was generated by emergent conditions at the facility, and that the licensee had to prepare this package on an abbreviated schedule. Regardless of the time constraints for developing license submittals such as this one, the NRC expected licensee submittals to be accurate and of high technical quality.

4.2 Evaluation of Vortexing in the RCIC Storage Tank

The inspectors reviewed an NSED evaluation of the likelihood of air entrainment, due to vortexing, in the suction of the reactor core isolation cooling (RCIC) and high pressure core spray (HPCS) pumps. The licensee identified that the calculations on RCIC storage tank's minimum water level did not include the effects of vortexing. The licensee's new calculation determined that the minimum tank water level should be raised; however, by using some of the excess margin in the level transmitter's setpoint calculation, the actual setpoint did not need to be changed.

During the performance of a licensee safety system functional assessment (SSFA) on the RCIC and low pressure core spray (LPCS) systems, the SSFA determined that calculations on RCIC tank minimum level did not consider the effect of vortexing, as required by the General Electric design specification. A pump sucking from a free surface (tank at atmospheric pressure) can create a vortex at entrance to the suction piping. If the water level dropped too low, the vortex could suck air into the suction. This entrained air could cause the pump to become air bound and fail.

The inspectors reviewed the licensee's calculation (IP-M-0384, Rev. 0) and concluded that it was very thorough. The licensee calculated a void fraction (VF) for the RCIC and HPCS pumps' suctions and concluded that a VF of less than 2% would be maintained. A 2% VF was used, based on industry and NRC guidance. However, the licensee determined that the minimum tank level should be raised from 739.896 feet to 740.03 feet MSL. The RCIC tank level transmitter's setpoint was not changed. The inspector did identify one concern. The HPCS calculation used a design flow rate of 5010 gpm rather than a worst case flow rate of 5500 gpm. The calculation was reperformed, with no change in the outcome. The inspectors concluded that the SSFA's identification of this problem was excellent and that the licensee's evaluation and calculation was good. The inspectors had no further concerns on this issue.

4.3 Review of Industry Events (90700)

4.3.1 Review of Information Notice 94-08

The licensee's engineering department (NSED) presented actions taken to address an NRC Information Notice (IN) 94-08 on inoperable main steam isolation valves (MSIV) and failures of surveillance testing. The licensee had begun a review (EWR #93-00220) in May 1993, in response to a letter from the vendor. The concern related to the valve sticking open due to wear on the guide ribs.

The inspectors considered NSED's review to be thorough and proactive. The licensee believed that the actions taken will address the issues contained in the IN.

- The maintenance department had developed the ability to measure and machine the guide ribs to a high degree of accuracy. The licensee's procedure for machining the MSIVs required more dimensional information at more locations, than the vendor recommendations. This has achieved higher accuracy on the guide ribs' concentricity and parallelism. The higher machining accuracy has resulted in more reliable operation and lower leakage rates.

- The licensee performs a full stroke test on each MSIV quarterly. This test verified that both the A and B solenoids were not stuck. It also demonstrated that the valve will close past the 90% open limit switch. Based on this testing methodology, the licensee has decided not to relocate the third limit switch on the MSIV's from 90% open to 85% open.

The inspectors agreed that the licensee's actions clearly demonstrated the operability of the valves. The inspectors did suggest that if the licensee should increase the time interval between full stroke test, that it should reconsider moving the third limit switch to provide clear indication that the valve's main poppet was moving. Based on this review, this issue is considered closed.

4.3.2 Review of Information Notice 89-77, Supplement 1

The inspectors reviewed the licensee's response to Information Notice (IN) 89-77, Supplement 1, "Debris in Containment Emergency Sumps and Incorrect Screen Configurations." The inspectors concluded that the licensee adequately reviewed the IN for applicability.

As requested by Edward G. Greenman's memorandum of February 10, 1994, the inspectors reviewed the licensee's response to this IN. The IN discussed problems with the containment sump at a PWR facility. The licensee determined that the design of the suppression pool system was not susceptible to the problems identified in the IN. Additionally, the licensee intended to clean the suppression pool during the April 15, 1994, outage (PO-6). The inspectors had no further concerns on this matter.

4.4 Action on Previous Inspection Findings (92701)

(Closed) Inspection Follow-up Item (461/94002-02(DRP)): Questions on the interactions between the RR pumps' CB-4 and CB-5 circuit breakers. The licensee had identified that removal of the 125 Vdc control power from the CB-4 breaker would cause the CB-5 breaker to automatically trip. The inspectors asked for additional information on this design and any relationship to the RR pump tripping event in the summer of 1993.

The licensee's evaluation of this issue was good. The licensee determined there was no similarity between last year's event and this issue, because last year's issue involved deenergization and reenergization of a 120 Vac instrument bus versus the deenergization of 120 Vdc control power. The licensee verified that the CB-5 breaker will trip if the control power to either the CB-3 or CB-4 breakers is lost. This was not a deliberate design intention, but was an inherent feature. The CB-5 breaker needs to receive a signal from CB-3 or CB-4, if they open, so that CB-5 can open and cause the control system to close the low speed RR breakers. The method used to provide this signal was such

that deenergization of the breakers' control power indicated the same as the breaker opening. The licensee also verified that optical isolators were used between the 1E CB-3 and CB-4 breakers and the non-1E CB-5 breaker.

Based on this information, the inspectors have no further concerns on this issue. It is considered closed.

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

The inspectors reviewed the following LERs to verify that reportability requirements were met, immediate corrective actions were completed, and long term corrective actions were defined and tracked. Verification of licensee corrective actions included reviewing procedure changes, interviewing personnel, inspecting equipment, and observing field conditions. The following LERs are considered closed:

<u>LER</u>	<u>Title</u>
93007	Reactor Scram Due to the Loss of Condenser Vacuum
94002	MSIV-LCS system inoperable due to valved out transmitter

The inspectors reviewed the licensee's corrective actions for LER 93007. They included procedure changes and training during operator requalification classes. The licensee's corrective actions for LER 94002 are discussed in paragraph 3.2.

5.0 Plant Support

5.1 Housekeeping (71707)

Tours of the circulating water screen house and auxiliary, containment, control, diesel, fuel handling, rad-waste, and turbine buildings were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, housekeeping, and cleanliness conditions.

On March 22, 1994, the inspector identified substandard housekeeping and material conditions during a tour of the security computer room. A temporary wooden stand was stored in the room and was constructed out of 2x4s which had not been treated with fire retardant chemicals. This room has a fire suppression system installed. An unlabeled circuit board was lying on top of a computer unit. The circuit board was not protected and was lying on a sheet of paper, which itself was obstructing the ventilation holes on top of a unit. Pieces of old tie-wraps and scraps of paper were in the corners of the room. The louvers outside of the inlet filters for the air conditioning units were covered in greasy dirt. Magnetic tape reels were not stored vertically, but were stored horizontally, with papers and books piled on top of them. Spare window air conditioning units and a flammable elephant trunk were stored in the room.

There did not appear to be adequate provisions for permanent electrical power outlets for the computer auxiliaries such as monitors and printers. Cords for power strips were plugged into the few permanent outlets and then run through the overhead or taped to the floor using combustible tape. Some of the computer units (except one) in the room had permanent spray shields mounted above them, since water pipes ran through the room. This unshielded unit also had its end panel removed, further exposing the internals to possible water intrusion. The inspectors discussed this issue with plant management and the room was cleaned up and unnecessary equipment removed.

Over a 4 week period, the inspectors observed a procedure lying on the floor of the condensate pump room, inside of a contamination zone. The procedure was not moved during this period. Additionally, after 1 week, it was joined by a pile of used anti-contamination clothing. On April 1, the inspectors observed that the anti-contamination clothing had been picked up, but the procedure was still lying in the same location.

On April 4, 1994, the inspectors identified trash and debris in the security UPS room. However, housekeeping and material condition in the security battery room and 120 Vac distribution panel were good.

Overall, the inspectors have observed improvements in plant housekeeping. The licensee has recently implemented a program to assign an individual responsibility for a specific space and provide them time each week to clean up the room. However, these problems indicated a continuing need for management attention, as well as presence in all areas of the plant. The inspectors also noted that the security computer room did not have a specific individual responsible for its cleanliness and that many management personnel did not have access to this security zone.

No violations or deviations were identified.

5.2 Fire Protection (71707)

After finding the non-treated wood in the security computer room, the inspectors discussed this issue with the fire protection supervisor. He confirmed that this was contrary to the licensee's policy, but was not a violation of procedure CPS 1893.03, section 8.2.2, "Control of Combustible Material," as the security computer room was not a safety related area.

The fire protection supervisor also indicated that an interior door in the room should have been closed, to ensure proper concentrations of the Halon fire suppression system. He also indicted that the fire protection personnel had not routinely inspected this area, as they did not have unescorted access to it. Also there were other areas in the plant to which they did not have access. The inspectors discussed with

station management the importance of fire protection personnel having appropriate access to plant areas to ensure fire protection standards are properly maintained.

5.3 Security Battery (71707)

During a tour of the security battery room, the inspectors observed that the cells from the large lead acid battery were not restrained in any way from the effects of an earthquake. This battery provides an uninterruptible power source (UPS) to the security system. This battery did not have the level of restraints which are installed on the non-safety related E and F division batteries. The inspector discussed this comment with the licensee. No requirements existed for seismic restraints on security batteries. The inspectors also observed that the housekeeping and material condition in the battery room were good.

No violations or deviations were identified.

6.0 Non-Cited Violation

The NRC uses the Notice of Violation to formally document failure to meet a legally binding requirement. However, because the NRC wants to encourage and support licensee's initiatives for self-identification and correction of problems, the NRC will not issue a Notice of Violation if the requirements set forth in 10 CFR Part 2, Appendix C, are met. A violation of regulatory requirements identified during the inspection, for which a Notice of Violation will not be issued, is discussed in paragraph 3.2.

7.0 Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1.0 at the conclusion of the inspection on April 4, 1994. 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.