

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/94006(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: April 5 - May 16, 1994

Inspectors: P. G. Brochman  
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Approved By:

  
H. Brent Clayton, Chief  
Reactor Projects Branch 1

JUN 10 1994

Date

Inspection Summary

Inspection from April 5 through May 16, 1994, (Report No. 50-461/94006(DRP))

Areas Inspected: Routine, unannounced safety inspection by the resident 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 two areas; one violation was identified in paragraph 2.4, failure to maintain minimal control room staffing; one non-cited violation was identified in paragraph 4.1, failure to maintain feedwater isolation valves in conformance with their design requirements; and one violation was identified in paragraph 4.3, failure to promptly correct a condition adverse to quality.

## Executive Summary

### Operations

- On April 15, 1994, reactor power rose to a maximum value of approximately 109.7% due to a failed reactor recirculation flow control valve. This is discussed in inspection report 461/94009.
- The plant shut down on April 16, 1994 for a ten day outage to replace the "A" reactor recirculation (RR) pump seal.
- Control room staffing was below the minimum Technical Specification level. (VIO 461/94006-01(DRP))
- On April 12, 1994, power was reduced due to high lake level. The licensee's response was very good and exhibited a good safety focus.

### Maintenance

- The root cause analysis for Inspection Followup Item 461/93022-01, reactor scram caused by an arc during fuse replacement, was insufficient. The inspectors returned the closure package to the licensee.
- All aspects of the maintenance effort during the RR pump seal replacement went very well.

### Engineering

- Indicated Division III diesel generator starting air pressure was above the air start motor design pressure. This issue was identified in 1992 and corrective action was not effective in resolving it. (VIO 461/94006-02(DRS))
- In February 1994, the licensee received an emergency technical specification change due to an inoperable drywell floor drain sump flow monitoring instrument. During the planned outage, the instrument was repaired as required in the change.
- Installation of the main feedwater check valves (1B21F032A & B) was not in conformance with their design requirements. (NCV)

### Plant Support

- Radiological controls during the RR pump seal replacement were very good.

## DETAILS

### 1.0 Persons Contacted

#### Illinois Power Company (IP)

- \*J. Cook, Vice President - Illinois Power Company
- \*R. Morgenstern, Manager - 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 May 16, 1994.

### 2.0 Operations

The unit shut down on April 16, 1994, for a ten day planned outage. The unit was on line the remainder of the report period and operated at power levels up to 100 percent.

### 2.1 Onsite Event Follow-up (93702)

The inspectors performed onsite follow-up activities for an event which occurred during April 1994. An overview of the event is provided below:

A reactivity excursion occurred due to equipment failure. Reactor power peaked at approximately 109.8%. Power was initially at 100%. During their response to the event, weaknesses in the operating crew's coordination and communications were noted. No increase in radiation levels or reactor coolant activity were detected.

At 11:15 a.m. on April 15, 1994, the "A" reactor recirculation flow control valve (FCV) failed fully open. The FCV moved as the reactor operators (RO) were restarting the HPU. The HPU had tripped due to high hydraulic fluid temperature. The operators stabilized the plant and returned the FCV to its original position of 57% open, 100% power. The

transient lasted 75 seconds. This event and the licensee's corrective actions are discussed further in inspection report 461/94009 (DRP).

## 2.2 Power Reduction Due to High Lake Water Level

At 5:30 p.m. on April 12, 1994, due to heavy rains, the level in Clinton lake reached 696 feet MSL. Normal water level was approximately 691 feet. The licensee's off-normal procedure required that a controlled shutdown be commenced. At 6:15 p.m., power was reduced at the rate of 10 MWe per hour. The power reduction was small for the following reasons. Earlier in the day the lake level was increasing at approximately 3 inches per hour. By the time the level reached 696 feet, the increase was less than 1 inch per hour. Since the rain had stopped early that morning, the licensee did not feel the level would reach 697 feet which would have required a rapid plant shutdown. Additionally, as a precautionary measure, the licensee placed sandbags around the circulating water pumps and other equipment at the lake screen house.

At 9:00 p.m., the water level peaked at 696 feet 2 inches and at 10:00 p.m. it began to decrease. At 3:00 a.m. on April 13, 1994, the level decreased below the 696 foot elevation. Since this weather forecast did not predict additional rain and the water level continued to decrease, the plant was returned to 100% power. The inspectors followed the licensee's actions and reviewed their decisions during the event. Personnel response was excellent and exhibited a good safety focus. The inspectors have no concerns in this matter.

## 2.3 Control Room Staffing Was Below Minimum Levels

At 3:54 a.m. on April 13, 1994, due to an illness, the line assistant shift supervisor (LASS) left the control room for approximately 3 minutes. The plant was in Operational Condition (OC) 1. Due to high lake levels (see paragraph 2.2), the operations shift supervisor (SS) and staff assistant shift supervisor (SASS) had left the control room to tour the lake screenhouse. Neither the LASS nor the reactor operators promptly informed the SS of the LASS's absence which reduced the control room below the minimum staffing level.

Technical Specification (TS) 6.2.2.b states, in part, "... while the unit is in OPERATIONAL CONDITION 1, 2 or 3 at least one licensed Senior Operator shall be in the control room." The failure to maintain minimum control room staffing while in OC 1 was a violation of TS 6.2.2.b. (461/94006-01(DRP)).

Licensee corrective actions included discussing the incident with the LASS and stressing the importance of maintaining compliance with TS requirements. Additionally, the licensee stated that the event will be discussed with the other licensed operators.

## 2.4 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.

One violation was identified. No deviations were identified.

## 3.0 Maintenance

### 3.1 Action on Previous Inspection Findings

(Open) Inspection Follow-up Item (461/93022-01(DRP)): Reactor scram caused by an electric arc during fuse replacement. During a review of the licensee's closure package, the inspectors noted that the root cause of the scram was determined; however, the cause of the fuse arcing over and any generic implications were not addressed. The inspectors considered the licensee's root cause determination to be insufficient and returned the package to the licensee. This item will remain open.

### 3.2 Reactor Recirculation Pump's Seal Replacement

The inspectors observed maintenance activities associated with replacing the "A" reactor recirculation pump seal. Overall, the effort went very well. There was good coordination between the maintenance and radiation protection departments. All personnel were aggressive in keeping their dose as low as possible. Maintenance personnel were rigorous in maintaining foreign material exclusion as well as a safe work area. Tools and parts were stored neatly. The use of mockups and training contributed to the overall success of the effort. The inspectors have no concerns in this area.

### 3.3 Termination Questionnaires

The inspector identified a concern with the process for completing termination questionnaires. During the last refueling outage, these questionnaires were completed by contractor personnel when they were leaving the site. This was a voluntary program that the licensee initiated to allow personnel to identify safety concerns. The inspector discussed this program with nuclear assessment, maintenance department,

and contractor management personnel. Their expectation was that this questionnaire would be confidential; however, guidance to this effect had not been provided to first line supervisors responsible for implementing the program. Given the intended purpose of the questionnaire and to avoid any potential chilling effect, the inspector concluded that further guidance from nuclear assessment and site management for site and contractor supervisors was necessary. Based on this information, this concern is considered closed.

### 3.4 Observations Of Work Activities (61726 & 62703)

The inspectors observed maintenance and surveillance activities of both safety-related and nonsafety-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>
D57897	Reactor Recirc Pump Seal Replacement
D56022	Drywell Floor Drain Sump Flow

No violations or deviations were identified.

### 4.0 Engineering

#### 4.1 Actions on Previous Inspection Findings

4.1.1 (Closed) Unresolved Item (461/93022-03(DRP)): Were the 1B21F032 valves in conformance with design requirements? In October 1993, the licensee identified that the feedwater outboard containment isolation valves (F032A & B) leaked excessively. The licensee believed the excessive leakage was due to improperly installed air actuators. The inspector reviewed this and several other concerns.

The air actuator linkage was not properly installed for both the F032A and F032B valves.

This concern was substantiated. The design of the valve requires that the actuator shall fully seat the disk when there is no feedwater flow and a loss of coolant accident signal is present. The keyway for F032A was misaligned by 90°. This did not prevent the disk from closing, but would not force it closed. Valve F032B was correctly aligned on its keyway; however, interference on the actuator linkage prevented the actuator from providing any force on the last 5° disk of travel. The licensee modified the actuator linkages to ensure they force the disks into their seats. This concern is considered closed.

The disks for the F032 valves were found to be laterally misaligned by 0.020 inches. The design limit is 0.004 inches. The air actuator does not have enough force to drive the disk sideways, if it is laterally misaligned. A laterally misaligned disk will not pass a local leak rate test (LLRT).

This concern was substantiated. Even after the actuator linkage was realigned, it did not have sufficient force to drive the disk sideways. The licensee determined that given the size of the split shaft and the looseness of the keyways on the valve disk, no actuator could produce torque adequate to move the disk latterly.

The licensee's position was that the force of gravity, from the falling disk, and the reverse flow would be sufficient to cause the disk to center into the seat. The seat shape is conical and lifting the disk a few inches and dropping it were sufficient to center the disk. The forces would be present in an accident. However, they would not be present when the valves were set up for a LLRT. Consequently, the licensee concluded that test conditions for a LLRT were not representative of accident conditions and that the failure to pass a LLRT did not indicate the valves would fail in an accident. After the disks were centered, the valves easily passed LLRTs. This indicated the seating surfaces were in excellent condition. Based on this information, this concern is considered closed. The licensee has also developed a contingency modification for the next refueling outage, should the problems of lateral misalignment continue and cause further problems.

The compression spring on the air actuator was not adjusted to provide the proper closing force.

This concern was not substantiated. Analysis of the angle of rotation of the shaft versus the length of the spring stroke indicated that the spring does not provide any force for driving the disk into the seat. The spring only provides a force to get the disk moving into the flow stream.

Were engineering personnel fully aware of the problems with the valves and were sketches and reports included in the work package.

This concern was not substantiated. The inspector discussed the problems with the F032 valves' performance with the cognizant engineers, who was fully aware of the problems with the valves. The inspector also reviewed the work requests and there was adequate information contained in them to describe the problems with the F032 valves.

The air supply to the F032 valves was not properly tagged out to support maintenance.



This concern was partially substantiated. The inspector reviewed the tagouts for the work request (93-0973) and noted that an additional valve was tagged shut (1IA881B) after the tagout was hung. A review of the applicable drawing M05-1040, Sheet 22, revision R, showed that valve 1IA1039 was an isolation for the air supply to the F032B valve. Valve 1IA881B was upstream of valve 1IA1039. Further review identified that the valve list showed valve 1IA1039 as being deleted per FECN 24033, dated 8/25/88. However, M05-1040, sheet 22 was not included in the list of applicable drawings to be updated by the FECN. There was no equipment history to indicate that valve 1IA1039 was removed. The inspector believed the valve was abandoned in place, in the open position, rather than being removed.

Consequently, the ability of valve 1IA1039 to shut and function as an isolation boundary was potentially suspect. The operators use of 1IA1039 was reasonable, based on the drawing. If valve 1IA881B was added as a isolation valve when 1IA1039 leaked by, that was also appropriate. The inspector discussed this issue with licensee management for updating of the plant drawings. Based on this review the inspectors have no further concerns on this issue.

The design of the 1B21F032 valves requires that an air actuator be used to assist the disk to a fully closed position. This requirement is contained in design specification K-2866A, Data Sheet A0205, Item 3. Title 10 of the *Code of Federal Regulations*, Part 50, Appendix B, Criterion III, requires that measures shall be established to ensure that applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions. The failure to maintain the F032 valves in conformance with specification K-2866A was a violation of Criterion III; 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.

- 4.1.2 (Closed) Violation (461/92005-02(DRS)): Failure to correct Division III Emergency Diesel Generator (EDG) safety related process and instrumentation tubing restraint design deficiencies first identified in 1985. The inspector reviewed Condition Report (CR) 1-92-03-058 issued on March 20, 1992, responding to NRC concerns regarding EDG tubing supports, and had no adverse comments. The CR was closed on May 15, 1992. The inspector also reviewed the Safety Significance Evaluation for the CR, and concurred with the facts stated in the evaluation and the disposition of the concerns. All the load carrying plastic ty-raps were replaced by metal restraints with vibration dampers. The inspector also reviewed modification package No. DG-063, including Sargent and Lundy Engineers (S&L) Engineering Change Notice (ECN) No. 9768, and had no adverse comments. The inspector selectively verified that as-built documents met S&L ECN design criteria. The inspector's walkdown and measurements of tubing supports and whip restraints for the Division III EDG on May 3, 1994, concluded that the workmanship was good, and that



span distances were in accordance with design criteria. The item was considered closed.

#### 4.2 Drywell Floor Drain Sump Flow Monitoring Instrument

On February 25, 1994, due to an inoperable drywell floor drain sump flow monitoring instrument, the licensee requested an emergency change to Technical Specification 3/4.4.3.1, "Reactor Coolant System Leakage - Leakage Detection System". The change was granted with the condition that the instrument would be repaired during the next cold shutdown. This issue was discussed in inspection report 461/94004, paragraph 4.1.

During the planned outage in April 1994, the licensee determined that the instrument was coated with crust of "lime-like" substance and its housing was corroded. Following chemical decontamination work during the fourth refueling outage, the reactor recirculation piping was drained to the floor drain sump. The licensee believed the substance was deposited on the probe at that time. The corrosion on the housing was due to the normally high humidity in the area during reactor operation.

The licensee replaced the instrument, removed the corrosion from instrument housing and housing lid, and grounded the housing lid. Following the corrective maintenance, the instrument performed satisfactorily. The inspectors reviewed the licensee's corrective actions and have no further concerns in this matter.

#### 4.3 Division III EDG Air Start System Pressure

During an NRC inspection conducted in March through June 1992, the inspector observed an over-pressure condition on the Division III EDG air start system (NRC Inspection Report No. 50-461/92005(DRS)). At that time, a program did not exist to monitor and regulate the air start pressure; however, a maintenance task was developed during the inspection. The Maintenance Order (MO)5-1035 required the regulators to be set at 200 psig or less, since the maximum design pressure for the air start motor was 200 psig.

During the NRC inspection conducted on May 3, 1994, the gauge readings for the two air trains upstream of the air start motors were found at 206 and 210 psig. In responding to the inspector's questions, the System Engineer stated that the justification for operation of the system at over-pressure conditions was as follows:

- The system was scheduled for service every two years, and pressure regulator adjustment was planned for the following week.
- The last pressure check with a calibrated air pressure gauge in July 1992 showed the air pressure (psig) in the two EDG air start trains to be 194 and 200.75, instead of the gauge readings of 204 and 208 respectively.

- To-date, there had not been any EDG air start system abnormalities observed during the monthly surveillance tests conducted subsequent to March 1992, the date the NRC first expressed a concern with the over-pressurization of the air start system.

This issue was of concern from several perspectives. First, the System Engineer did not maintain a system to track air pressure subsequent to the identification of indicated air pressure exceeding system design; nor did the system engineer report this problem to design engineering for the evaluation of long term or cumulative damage to the air start motor caused by routine monthly surveillance testing. Secondly, the System Engineer failed to recognize that there are other potential design and operational considerations, such as tubing system seismic restraint qualifications, that could render the EDG and the air start system inoperable. The justification for acceptance of this condition was based solely on the passing of the EDG monthly surveillance tests. The inspector concluded that the original identification of a condition adverse to quality in May 1992 that was not corrected in May 1994 constituted a corrective action violation for not meeting the requirements of 10 CFR 50, Appendix B, Criterion XVI. (461/94006-02)

#### 4.4 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>
93004	Failure of the Division I SX Pump to Automatically Restart.
93005	Feedwater Check valves incapable of fully seating

For LER 93004, the inspectors reviewed the licensee's corrective actions which included modifying the breaker logic for the division I and II SX pumps and then successfully completing the required surveillance procedure. The licensee also reviewed other safety-related breakers that receive LOCA and undervoltage signals and determined they are not susceptible to similar problems. The inspectors have no further concerns with this issue.

For LER 93005, see paragraph 4.1.

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

## 5.0 Plant Support

### 5.1 Flooding Limits Plant Access

At 3:50 a.m. on April 12, 1994, due to flooding of local roads caused by heavy rainfall, the licensee determined that its onsite emergency response facilities could not be activated, if needed. The NRC was notified as required by 10 CFR 50.72. The backup Emergency Operations Facility (EOF) in Decatur was not affected. At 10:26 a.m., the licensee notified the NRC that the roads were passable. The notifications were timely and appropriate. The inspectors have no further concerns.

### 5.2 Radiation Protection

The inspectors observed the radiological controls during the reactor recirculation pump seal replacement. All personnel were aggressive in limiting the dose received as a result of the work. The inspectors received excellent briefings prior to entering the drywell. The inspectors noted an improvement in performance since the fourth refueling outage.

### 5.4 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.

The inspectors performed a drywell closeout inspection following the planned outage. There were a few items in the drywell basement as well as a sheen of oily substance underneath a reactor recirculation pump. The debris was not of sufficient size or quantity to block the emergency core coolant system pumps' suction strainers. The oily substance was *FYRQUEL*<sup>™</sup>, the hydraulic fluid in the RR FCV actuators. In 1993 there was a leak from a RR FCV and fluid has continued to leach out of the paint. During the outage, the licensee vacuumed the suppression pool floor. There was a significant decrease in the amount of material deposited on the floor.

The inspectors noted an overall improvement in this area.

No violations or deviations were identified.

## 6.0 Management Changes

Mr. Steve Perry, Senior Vice President, left Illinois Power to accept a position with Commonwealth Edison Company. John Cook, Plant Manager and Vice President, has been named as site vice president. Roger Morgenstern was named as the Plant Manager. These changes were effective in April 1994.

## 7.0 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 4.1.

## 8.0 Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection on May 16, 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 identify any such documents or processes as proprietary.