U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/95013(DRP)

FACILITY
Clinton Power Station

License No. NPF-62

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

DATES
September 26 through November 9, 1995

INSPECTORS

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11/27/95
Date

AREAS INSPECTED

A routine, unannounced inspection of operations, engineering, maintenance, and plant support was performed. Safety assessment and quality verification activities were routinely evaluated. Follow-up inspection was performed for non-routine events and for certain previously identified items. Temporary Instruction TI 2515/128 was closed based on the results of this inspection.

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Executive Summary

Operations

- The licensee demonstrated a lack of sensitivity to the importance of containment when they planned actions which would have allowed the breaching of primary containment integrity while in Mode 1.

- Equipment deficiencies resulted in an overflow of the fuel pool filter demineralizer sludge tank. Resolution of the tank's level indication system had been planned. Due to the tank's low radiological risk and infrequent use, when compared to several other tanks requiring work, the tank modifications were not scheduled until September 1996.

- The drywell floor drain sump weir box flow indication was declared inoperable due to a recurring problem with the system. The licensee was considering performing additional actions during the next refueling outage (October 1996) in an attempt to prevent further system fouling and improve system operability. The alternate flow indication system performed well.

Maintenance

- Good performance was noted during the Division II emergency diesel generator (EDG) outage; however, deficiencies identified during the conduct of hot work were a concern.

- Inspection and repair of the SS-13 solid state trip device circuit boards was excellent.

Engineering

- The identification of, and response to, degraded solid state trip devices was excellent.

- Evaluations performed to support the reactor vessel water level instrumentation modification were technically sound and incorporated a good safety focus.

Plant Support

- Quick and appropriate actions were taken by fire protection personnel in response to hot work concerns during the EDG outage.

- Declining radiation worker practices were identified related to the control of radiological boundaries and frisking techniques. After informing radiation protection of the concerns, additional examples were identified.

- Performance during the emergency preparedness exercise was excellent. Facilities were well managed and staffing was ample in all areas. In addition, the licensee's evaluation and critique of the exercise was also excellent.

Safety Assessment/Quality Verification

- Risk significance was appropriately considered in: 1) prioritizing radioactive waste sludge tank work; 2) the rapid engineering response to degraded circuit boards in the solid state trip devices for circuit breakers; and 3) the modification to reactor vessel water level instrumentation. However, sensitivity to the importance of containment integrity was weak when plans were approved to breach containment rather than rigorously examining safer alternatives.

- Licensee management reviews of some 1994 occurrences varied in quality; however, corrective actions appropriately addressed the root causes of the occurrences.

Summary of Open Items
Inspection Follow-up Items: identified in Section 1.4
Non-cited Violations: identified in Sections 1.5 and 5.2.1

DETAILS

1.0 OPERATIONS

NRC Inspection Procedure 71707 was used in the performance of an inspection of ongoing plant operations. Degraded equipment and operator workarounds led to another overflow of a radwaste sludge tank. This event was less significant than previous events and corrective actions for the radwaste tanks were based on safety significance. The drywell floor drain weir box also experienced recurring operational problems which were expected by the licensee. Additional actions to resolve the erratic weir box indications were being considered as part of the scope for the next refueling outage. Poor understanding of the intent of technical specifications, and a lack of sensitivity to the importance of containment, was observed during a proposed breach of containment integrity. No violations were idertified.

1.1 Workaround Resulted in Overflow of Fuel Pool Filter Demineralizer Sludge Tank

On October 21, 1995, the fuel pool filter demineralizer sludge tank (1WX02T) and its respective sump overflowed. Approximately 10 gallons of water flowed out of the sump but was contained within the berm. Upon discovery, operators took prompt and effective actions to terminate the overflow.

A review of the event determined that the overflow was the result of the operators having to work around several equipment deficiencies. Leakage from the fuel pool cooling and cleanup system (FC) had been present since 1992. Although the licensee performed extensive troubleshooting efforts to resolve the FC leakage issues, the leakage continued. Prior to the overflow, the licensee was unaware that the FC leakage was flowing into the demineralizer sludge tank which raised the tank's level. The in-leakage into the tank could not be monitored due to faulty level instrumentation which had been unreliable since initial operation. In addition, the tank's hi-hi level alarm was disabled in June 1988 due to being a nuisance alarm. While the licensee had an inventory tracking system in place to monitor tank level prior to the event, the system was only able to account for known inventory transfers into the tank.

The safety significance of this event was minimal; however, the event was an additional example where degraded equipment led to the overflow of a radioactive sludge tank. Previous tank overflows were discussed in Inspection Report 95011. Following the previous events, the licensee developed an action plan to replace all of the radioactive waste tank level indicators based upon risk significance and frequency of tank use. Due to the low risk significance and the infrequent utilization of the 1WX02T tank, the modification to 1WX02T was the last to be scheduled. Completion was expected in September 1996. In light of this event, the licensee re-evaluated the prioritization system used to determine the level indication modification schedule. No changes were incorporated. The inspectors will continue to monitor the licensee's actions in this area.

1.2 Recurring Drywell Floor Drain Sump Weir Box Degradation

During September 1995, the drywell floor drain sump weir box (used to monitor unidentified leakage) was declared inoperable due to erratic readings in the control room. The weir box was flushed during forced outage 95-04 (also in September) and readings returned to normal. This was considered only a temporary fix to the system and the licensee expected continued problems. During this inspection period, the weir box was again declared inoperable although it was still able to provide trending information. A recently installed modification used to supplement the weir box indications performed well; however, the weir box provided more timely information. The licensee was considering performing a thorough cleaning of the floor drain system during refueling outage-6 (scheduled for October 1996) in an attempt to prevent further system fouling.

1.3 Lack of Sensitivity Concerning Primary Containment Integrity

The licensee liberally interpretated the technical specification to provide operational convenience when it developed plans to move equipment into the containment while in Mode 1. The plan would have defeated the containment personnel hatch interlocks and breached containment integrity. Through conference calls with the NRC, the intent of the technical specification was communicated. The licensee re-evaluated other methods for moving the equipment into the containment and the following day was able to pass the equipment through the hatch while maintaining one door shut at all times. The lack of concern over maintaining containment integrity while in Mode 1 and the poor review of alternative methods for moving the equipment demonstrated a poor sensitivity to primary containment integrity. In addition, the questionable use of Probabilistic Risk Assessment (PRA) to justify such an action and management's acceptance of the planned course of action were significant concerns.

After noon on November 6, 1995, the licensee informed the NRC of its plan to defeat the containment personnel hatch door interlock the next morning (allowing both doors to be open at the same time) to move three equipment cabinets into the containment. The licensee claimed that one cabinet was too long to pass through the hatch while maintaining one door always closed. The evolution was to take between 15 and 30 minutes.

The licensee assumed that the technical specification (3.6.1.2 Note 1) allowing both doors to be open for a short period of time could be extended to support the equipment move. However, the intent of the technical specification was only to allow entry and exit in performance of repairs to an inoperable door. The bases further explains the preferred method would be to access the inoperable door through the other containment personnel hatch. On November 10, the NRC confirmed that the intent of TS 3.6.1.2 was to repair inoperable doors. In this case the licensee had intended to make the personnel hatch inoperable for operational convenience. The licensee directed their personnel to pursue alternative methods to move the equipment into the containment without opening both doors.

The following day all three cabinets were moved through the equipment hatch in less than ten minutes without having both doors open concurrently. The only action needed to accommodate the long cabinet was to remove a hand wheel from a door operator, which was located inside the hatch. The door could still be operated by personnel outside (from either side of the hatch) and the interlock between the doors was maintained. The simplicity with which the equipment move was accomplished demonstrated that the licensee had placed little emphasis on maintaining containment integrity and was more concerned with operational convenience when the job was originally planned.

1.4 Failure to Restore Computer Point Resulted in Non-Conservative Calculation of Reactor Power

On November 7, 1995, the licensee made a 24-hour notification as required by section 2.G of the facility's operating license. Following restoration of the reactor water cleanup system from a maintenance outage, the reactor was operated above the license thermal limit by 2 MW_t (less than 0.1 percent reactor power) for several hours. All details concerning the issue were not available at the end of the inspection period. This is an inspection followup item (95013-01 DRP) which will be dispositioned in the next routine report.

1.5 Follow-up on Non-Routine Events

NRC Inspection Procedures 90712 and 92700 were used to perform a review of written reports of non-routine events. For items which are "closed" on the basis of this inspection, the Inspection Procedures were satisfied in regard to verification of appropriate licensee corrective and preventive actions.

(Closed) LER (461/95006): "Lack of Appropriate Post Maintenance Testing Due to Personnel Errors Results in Inoperable Reactor Recirculation Flow Control Valve (FCV)." On July 31, 1995, with the plant in Mode 1, the servo and relief valves were replaced on both subloops of the B reactor recirculation (RR) hydraulic power unit. Although post maintenance testing was performed following the replacement, the testing failed to meet the intent of technical specification (TS) surveillance requirement (SR) 3.4.2.2 which requires that the average rate of FCV movement be less than or equal to 11 percent of full stroke per second in accordance with chapter 15 of the Final Safety Analysis Report.

A subsequent review by the licensee determined that although SR 3.4.2.2 was still part of the current licensing basis, the SR was no longer needed due to a modification during the fifth refueling outage

(April 95) which removed the single failure potential for simultaneous movement of both RR FCVs. The licensee was in the process of submitting a TS revision such that the SR would more closely reflect current plant design. Additional corrective actions were implemented to prevent recurrence and operability concerns were resolved in a timely manner.

The safety significance of this event was minimal. The personnel error associated with this event, which resulted in performing the valve replacements while in Mode 1, was an additional example of recurring personnel error concerns as described in IR 95012, 95009 and 95008. The failure to have a recirculation loop FCV operable in each operating recirculation loop while in Mode 1 is a violation of TS 3.4.2. However, this licensee identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII of the NRC Enforcement Policy.

(Closed) LER (461/95007): "Inattention to Detail During Surveillance Testing and Process Radiation Monitor Restoration Results in Entering the Startup Mode Without Required Average Power Range Monitor Testing Being Completed and a Control Room Ventilation Subsystem Being Inoperable." This issue was discussed in Sections 1.2 and 4.2 of Inspection Report 95012 and resulted in a violation of NRC requirements.

No violations or deviations were identified.

2.0 MAINTENANCE

NRC Inspection Procedures 62703 and 61726 were used to perform an inspection of maintenance and testing activities. Hot work deficiencies were noted during the Division II emergency diesel generator (EDG) outage. Conversely, solder repairs to the SS-13 solid state trip devices were excellent.

2.1 Hot Work Weaknesses Identified During Division II EDG Outage

During the week of October 16, the Division II EDG was taken out-of-service for a system outage. Work performed during the outage included the replacement of the circulating oil piping with swagelock piping and fittings and the calibration of the EDG's protective and time delay relays.

Performance during the EDG outage was good although deficiencies identified during the conduct of hot work were a concern. Specifically, maintenance personnel failed to identify additional combustibles in the area prior to cutting piping with a grinding wheel. When the presence of combustible materials was brought to the attention of the maintenance supervisor, specific materials were promptly removed; however, additional inspections of the area were not performed until requested by fire protection personnel. All combustible materials were then removed from the area or covered with fire protective blankets and work commenced as scheduled. Further concerns were noted when some maintenance personnel believed that they were not required to stop work involving combustible materials while in a hot work area. The licensee was taking actions to address these concerns at the conclusion of the inspection.

Although the safety significance of this event was minimal, previous concerns regarding the conduct of hot work were documented in Inspection Report 95009. A review of each event determined that although both involved maintenance personnel, the situations surrounding each event varied significantly. The inspectors consider this issue to be a weakness in implementing hot work controls and will continue to monitor the licensee's performance in this area.

2.2 Repair of SS-13 Solid State Trip Devices was Excellent

Electrical technicians performance during the inspection and repair of the SS-13 solid state trip device circuit boards was excellent. The technicians were well informed concerning what were acceptable solder joints and referenced photographic examples to support their conclusions. Some deficiencies were not clearly identified without the use of a high intensity light and magnifying glass. In one case a circumferential crack was identified which was nearly undetectable; however, when a connector was pressed down, the solder joint separated essentially creating an open circuit. Upon releasing the pressure the solder joint returned to its near undetectable condition. The tedious inspection and repair process was well controlled and documented.

2.3 Follow-up on Non-Routine Events

(Closed) LER 94001: "Unexpected Automatic Isolation of Reactor Core Isolation Cooling (RCIC) System During Channel Calibration Surveillance Due to Lifting Wrong Thermocouple Leads." On January 15, 1994, technicians inadvertently pulled the wrong thermocouple leads while performing a channel calibration surveillance. The error resulted in isolation of the RCIC turbine steam supply containment isolation valves. When the valves closed, the RCIC turbine tripped from the standby mode. The RCIC system was immediately declared inoperable but was returned to service approximately 30 minutes later. The licensee's corrective actions to this event included counseling the technicians on self-checking practices and improving the labeling of various control room leads. The corrective measures were acceptable.

No violations or deviations were identified.

3.0 ENGINEERING

NRC Inspection Procedure 37550 was used to perform an onsite inspection of the engineering function. Actions taken in response to degraded solid state trip devices were aggressive. In addition, the actions taken to address NRC Bulletin 93-03 were thorough and demonstrated a good safety focus.

3.1 Excellent Identification and Response to Degraded Circuit Breakers

On October 6, 1995, the licensee issued an interim 10 CFR 21 report due to three recent failures of Asea Brown Boveri ITE Gould Type SS-13 Solid State Trip Devices. These breakers failed to close upon demand. The vendor had not completed a root cause analysis to date, although the licensee gathered other failure information from the vendor and began inspecting the circuit cards in the solid state trip devices for potential soldering problems.

The licensee aggressively pursued inspection of the safety related units and noted soldering deficiencies on nearly every circuit board. The deficiencies included inadequate solder fill at the joints, pin holes in the joints, cold solder joints, and circumferential cracking of the solder between the electrical lead and the foil of the circuit card. Some of the deficiencies could not have contributed to the recent failures; however, the licensee repaired all identified problems.

In addition to the SS-13 trip devices, the licensee suspected that SS-14 trip devices, used in bus isolations, would have the same deficiencies. Based on the greatest risk, the SS-13 safety related units were repaired and the licensee was finalizing a schedule for inspecting the SS-14 safety related units. Some of the safety related SS-14 units will not be accessible until the sixth refueling outage scheduled in the fall of 1996. Scheduling for the non-safety related SS-13 and SS-14 units was in the planning stage.

Engineering performance was excellent in identifying and responding to the breaker failures. The number of breaker failures was not unusual if the failures had occurred over the entire service time of the breakers; however, the licensee identified an adverse trend and responded promptly. Although the defective solder joints were not found to be the root cause of the failures, the inspections were effective actions the licensee could take while waiting for the vendor's evaluation. Once deficiencies were identified, the licensee pursued prompt repairs with a focus on working the highest risk breakers first.

3.2 Evaluation of Modifications to Reactor Vessel Water Level Instrumentation (TI 2515/128):

The inspectors reviewed the licensee's reactor vessel water level modifications which were installed in response to NRC Bulletin 93-03, "Resolution of the Issues Related to Reactor Vessel Water Level Instrumentation in BWRs." The modifications were properly installed and tested. The safety evaluations associated with the modifications were thorough and technically sound.

The licensee installed a keep-fill modification in the Divisions I and II reactor water level instrumentation using the control rod drive (CRD) system as a source of water. Divisions III and IV were not modified with a keep-fill system but the fuel zone transmitters were modified to change the reference leg from the steam condensing chamber to the narrow range variable leg of their respective divisions. This change assured that the fuel zone reference legs would remain filled with water that has a low concentration of dissolved gasses. Prior to installation, the licensee's approach was reviewed by the Office of Nuclear Reactor Regulation and found to be acceptable (documented in a letter from the NRC to the licensee dated February 8, 1994).

The inspectors considered the licensee's use of probabilistic risk assessment (PRA) techniques in evaluating the design alternatives to be a strength. Specifically, the licensee used PRA techniques to illustrate the safety gain that was achievable with a diverse design (only providing a keep-fill system for two of the divisions versus four). The use of PRA in this manner demonstrated a good safety focus.

The licensee utilized two diversely designed check valves (in series) as the safety/non-safety interface for the backfill systems. This was considered to be a strength in the design of the systems. Since the backfill systems tapped into the CRD system downstream of the containment isolation valves, only a single check valve was necessary as a barrier between the safety and non-safety related portions of the systems. However, the licensee recognized that a single failure of a check valve (in a single check valve design) could render one channel of level indication inoperable in the event that the CRD system lost charging pressure. The use of double check valves in this application demonstrated a good safety focus and increased the reliability of the level instrumentation systems.

No violations or deviations were identified.

4.0 PLANT SUPPORT

NRC Inspection Procedures 71750 and 83750 were used to perform an inspection of Plant Support activities. Fire protection (FP) personnel responded quickly to the hot work concerns described in Section 2.1 by ensuring equipment and personnel safety during hot work. FP staff planned to implement new procedural requirements to improve hot work performance. Performance and evaluation of the emergency preparedness exercise was considered excellent. Conversely, the inspectors identified a number of radiation boundary control and frisking concerns which signified a performance decline in the area of radiation worker practices.

4.1 Good Response by Fire Protection Personnel to Hot Work Concerns

Concerns related to the conduct of hot work were identified during the inspection period. Upon notification of the FP staff, personnel responded promptly to ensure proper resolution of the deficient conditions. Good actions by the FP supervisor resulted in additional training for both the FP and maintenance staff prior to resuming EDG work. In addition, the hot work procedure was reviewed to ensure that the concerns identified during the EDG outage were adequately addressed.

The inspectors considered the actions taken by FP personnel to be effective.

4.2 Poor Habits Noted in Radiation Worker Practices

Throughout the inspection period the inspectors noted examples of poor radiation worker practices. Specifically, an operator performed a whole body frisk in less than 45 seconds (with a hand frisker) prior to entering the control room. Several examples of excessively fast hand frisking of items leaving the RCA were also observed. In addition, several contamination zones were found with improperly controlled hoses, electrical cords, plastic and laundry bags crossing over the radiological boundary. After informing radiation protection, several additional problems with contaminated radiological boundaries were observed. These issues represent a declining trend in performance, which the inspectors will continue to monitor.

4.3 Excellent Performance During Emergency Preparedness Exercise

On October 4, 1995, the licensee conducted a utility-only Emergency Preparedness Exercise. The inspector observed activities in the simulator, technical support center (TSC), operations support center (OSC), and the emergency operations facility (EOF). Overall performance in each facility was excellent.

In the simulator, operators identified and classified events promptly and made timely notifications. The shift supervisor exercised good command and control and sought his staff's feedback concerning potential problems and suggestions in controlling the event.

The TSC was well staffed and activated 25 minutes after the Alert was announced. Congestion and noise levels were kept to a minimum and the TSC director conducted frequent and informative briefs. Good teamwork was observed in mitigating the event. However, the suggestion by the simulator crew to restore containment cooling as a priority went unheeded. This resulted in containment temperatures nearly reaching the design limit. Cooling was restored before the limit was reached.

The OSC was activated in 29 minutes. Staffing was ample in all areas of expertise which resulted in no need to prioritize work activities. The OSC was properly equipped to perform its function including effective emergency lighting which was required as part of the exercise scenario. Command and control of activities was excellent as was monitoring the location, task, and exposures of in-plant teams.

The EOF assumed command authority 52 minutes after notification began for the Site Area Emergency. The facility was in excellent condition and amply staffed. Noise levels were kept to a minimum and participant enthusiasm was excellent.

The controllers allowed the exercise to continue past the planned exercise termination time based on higher than expected containment temperatures. By extending the exercise, the licensee took advantage of a valuable training opportunity to reinforce both the importance of good communications and of considering all suggestions for mitigating an event.

The licensee did an excellent job of evaluating and critiquing the exercise. Minor problems were identified in both the exercise simulation and some actions taken by personnel in decision making and communication.

No violations or deviations were identified.

5.0 SAFETY ASSESSMENT/QUALITY VERIFICATION

5.1 Current Operational Issues

The licensee's creditable use of risk significance in plant activities was demonstrated several times. While the radioactive waste sludge tank overflow (Section 1.1) was partially due to low priority assigned to a level indication modification for the tank, the risk prioritization was appropriate and resulted in a spill of low significance. The rapid response by engineering to degraded circuit boards in solid state trip devices for circuit breakers was also risk based (Section 3.1). The licensee identified the safety significance, took actions to inspect potential root cause contributors instead of waiting for the vendor to conclude their investigation, and upon identifying poor solder connections, scheduled repairs based on risk. In addition, the modification to reactor vessel water level instrumentation (Section 3.2) also demonstrated good use of risk considerations when designing the modification. However, a liberal interpretation of technical specifications, and a lack of sensitivity to the function of containment, was used to approve a proposed breach of containment integrity (Section 1.3).

The Nuclear Assurance department demonstrated good sensitivity to recurring events by quickly realizing the importance of the recent radwaste sludge tank overflow while performing their audits of the control room logs. This sensitivity was not evident in the operations department, as the issue was not raised to line management during the weekend. Management was informed late Monday following a review of logs by a shift supervisor not assigned to normal operations.

5.2 Thorough Review and Actions For Procedural Adherence Issues

Review of several occurrences indicated inconsistent and unclear expectations regarding maintenance and quality verification procedural adherence issues that did not appear to be properly supported or emphasized at the first line supervisor level. Licensee management conducted several investigations of these occurrences which varied in quality, but which in aggregate were thorough with corrective actions appropriately addressing root causes. These occurrences, discussed in more detail in Section 5.2.1 of this report, included:

- A parts verification form for a component cooling water relief valve was signed off on March 3, 1994, without the corresponding work having been completed. (Condition report 1-94-11-043)

- Usage of a maintenance work request (MWR) discrepancy list to incorrectly deviate from a maintenance procedure involving the reactor core isolation cooling (RCIC) turbine steam supply bypass valve which occurred on September 13, 1994. (Condition report 1-94-11-044)

- Inconsistencies in QV verification methodology of relay testing.

- A disagreement on whether certain procedural steps had to be performed during installation of a solenoid valve occurred on December 28, 1994. (These steps were ultimately performed.)

- A deviation from procedure occurred while meggering diesel generator exciter armature and generator field leads on January 18, 1995. (Condition report 1-95-01-029)

Safety consequence of each individual incident with respect to the equipment was minimal. However, the broader, related issues discussed further in section 5.2.2 were of greater safety concern. (These incidents were representative of other examples identified through subsequent licensee investigations and other processes.) In addition, these problems caused personnel friction, resulting in unpleasant confrontations among QV inspectors and between QV inspectors and maintenance personnel.

5.2.1 Reviews of Specific Occurrences

Parts Verification Form

A parts verification form was signed off by QV personnel on March 3, 1994, without the corresponding work having been completed. MWR D51037 involved refurbishment of a safety related relief valve removed from the component cooling water system. The QV inspector verified that four parts were present and correct for installation but did not observe actual installation. The QV inspector however signed off portions of the parts form for verification of installation. Nuclear Assurance Procedure (NAP)-510.04, Revision 9, governing use of this form, required the following regarding this sign-off:

"Verify installation of the replacement parts. Ensure the parts are installed, per the applicable work document, in the specified Equipment Identification Number."

Installation did not occur later on that day because an additional part was needed. The improper QV sign-off was discovered by another QV inspector who was called to witness the recommended work on September 26, 1994.

QV supervision regarded the cause of the improper sign-off as an incorrect interpretation versus an intentional disregard of the procedural requirement. The QV inspector, apparently wanting to improve the efficiency and "value added" of QV activities, had more liberal interpretations. However, this particular QV inspector appeared to be the only one in the department that had this interpretation. The QV supervisor was surprised at the interpretation, as he indicated these types of expectations was previously discussed in the department. On the other hand, the QV inspector, not wanting to do an actual installation verification, could have just marked the form NV for "Not Verified" in accordance with the licensee's program. The procedure was subsequently clarified and QV personnel were trained on the revised procedure. Broader issues involved in this error and corresponding corrective actions are discussed in Section 5.2.2 of this report.

Failure to perform the verification in accordance with NAP-510.04 was a violation of 10 CFR 50, Appendix B, Criterion V. Safety significance was minimal since the parts were later installed and properly verified before the valve was actually used. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII of the NRC Enforcement Policy.

MWR Discrepancy List

An MWR discrepancy list was utilized to incorrectly deviate from a maintenance procedure on September 13, 1994. This action was incorrectly accepted by a QV inspector involved in the repair activity. MWR D57390 involved disassembly, testing, and reworking the reactor core isolation cooling (RCIC) turbine steam supply bypass valve in accordance with CPS 8120.03, Revision 10. During the work, the disc/wedge to seat clearance specified in the procedure could not be met. The vendor manual indicated that the clearances may not always be met and if the valve was used in severe conditions then the vendor should be consulted for recommended clearances. A discrepancy list entry was made, the vendor was contacted to provide the new clearances, and the work was completed. However, a temporary procedure change (TPC) was not processed until after the work was completed, contrary to the requirements of CPS 1005.07, Revision 18, Step 8.1.2. Concerns regarding this work were first raised by another QV inspector with this specific aspect being documented in the Human Performance Evaluation System (HPES) investigation. Additional examples were later identified by QV personnel (Condition report 1-95-02-043) and in the licensee's subsequent investigations, indicating improper utilization of discrepancy lists to deviate from procedure was a wider problem. Corrective actions are described in Section 5.2.2 of this report.

Failure to follow CPS 8120.03 and CPS 1005.07 by proceeding with the valve work prior to processing a TPC was a violation of 10 CFR 50, Appendix B, Criterion V. The safety significance was minimal since the work performed was subsequently reflected in an approved TPC. This licensee-identified and corrected violation is being treated as a

Non-Cited Violation, consistent with Section VII of the NRC Enforcement Policy.

Relay Testing Verification

Inconsistencies in QV verification methodology of relay testing existed and caused friction between QV inspectors. One QV inspector felt it sufficient to review computer records which recorded the results of the calibration checks, rather than observing the data gathering itself. Corresponding relay calibration procedures such as CPS 8501.18, Revision 0 and its data sheet were somewhat confusing, but could realistically be interpreted as either method being acceptable. Procedures were later revised to more clearly indicate this.

Solenoid Valve Installation

A confrontation between a QV inspector and maintenance personnel occurred on December 28, 1994, regarding whether certain procedural steps had to be performed during maintenance work. MWR D30727 involved replacement of a solenoid on the air operator for a service air valve in accordance with CPS 8492.02 and engineering change notice (ECN) 27293. The procedure required verification that no grafoil tape existed inside the valve, application of grease to the housing cover threads, and torquing of the cover to a specified tolerance. However, these steps were not realistically necessary for new solenoid valves, as was the case here. Maintenance personnel wanted to skip these steps but the QV inspector refused to sign off the documentation unless maintenance performed the steps or a TPC was processed. The steps were performed, thus preventing a procedural violation. The TPC option was not utilized due to the additional time required to verify the new solenoid valve documentation. The procedure was later revised to provide additional flexibility.

Diesel Generator Meggering

A deviation from procedure occurred while meggering diesel generator exciter armature and generator field leads on January 18, 1995. Preventive maintenance task PEMHPM003 required meggering the Division 3 diesel generator and exciter windings in accordance with CPS 8507.02, Section 8.4. Step 8.4.3.10 of this procedure required six exciter armature leads to be de-terminated, prior to the test, to protect diodes that could be damaged by the megger test. (A caution prior to the step explained the reason.) In lieu of de-terminating the leads, maintenance personnel placed jumpers around the diodes (apparently so they wouldn't have to determine through engineering if a torque was required for the nylock nuts.) A TPC was not processed to allow for the alternate method, contrary to the requirements of CPS 1005.07, Revision 18, Step 8.1.2. The procedure deviation was identified by a QV inspector. The corrective actions are described in Section 5.2.2 of this report.

Failure to follow CPS 8507.02 and CPS 1005.07, by placing the jumpers in lieu of de-terminating the leads, without processing a TPC was a violation of 10 CFR 50, Appendix B, Criterion V. Safety significance was minimal since placing the jumpers was technically equivalent and allowed by CPS 8507.01 for the same test on Divisions 1 and 2 diesel generators. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII of the NRC Enforcement Policy.

5.2.2 Licensee Investigations and Corrective Action Quality

Special investigations were conducted at various times addressing broader aspects of the occurrences given above. These included a HPES investigation (dated December 6, 1994) of the first two items above, a broader investigation (dated March 6, 1995) of work involving a QV inspector connected to the first item (and to a lesser extent the third item), and another investigation (dated March 23, 1995) of the later two items (and to a lesser extent the first three items.) In addition, condition reports were generated for several of these incidents and other similar incidents or document discrepancies identified during these investigations. Although earlier reviews and actions were lacking in some respects, the latter ones were much improved.

Initial QV supervisory actions regarding the parts verification form issue, although not ignoring the basic concern, could have been more thorough and lacked conflict resolution skills. Specifically:

- Initial actions were based on assuming the QV inspector misinterpreted the requirements versus intentionally ignoring them. Despite some evidence that might have indicated the latter, QV supervision did not appear to have heavily considered the possibility. As a result, other checks of the individual's past work were not initially done.

- Assigning a lead QV inspector to review the issue was appropriate, as was adding a clarifying note to the parts form. (The note was not inaccurate or misleading and was clearly dated for the time it was added to the form.) Based on acceptance of the QV inspector's motives, assigning him to revise the procedure was not inappropriate. Involving an individual who made an error in the corrective action process is a common practice and can be an effective retraining tool. However, this appeared to be incorrectly perceived by some and the reason for this action was not well explained by QV supervision.

- After ensuring the expectations for verifying parts form sign-offs were understood, QV supervision allowed the QV inspector to continue in that function without attempting to verify the QV inspector was complying with the expectations.

- As part of the HPES investigation into the MWR discrepancy list item, condition reports were generated to address incorrect use of an MWR discrepancy list and failing to comply with administrative requirements for the parts form. Left strictly to QV supervision, these actions may not otherwise have been initiated. In addition, more broad scope issues (discussed below) raised in the HPES investigation, may not have been examined as thoroughly.

- A September 19, 1994, teamwork report issued by QV management, addressing the MWR discrepancy list issue, was poorly worded and could have been construed, depending on the individual's outlook, to discourage questioning of QV inspectors' improper actions. However, it could also be construed, as QV supervision indicated the intent that individuals should not be defensive when questioned about their performance. Even after an individual expressed concern to licensee management regarding the meaning, there was no attempt to clarify the intent with other plant personnel.

The licensee's HPES investigation, although much improved from QV supervision's response (as indicated above), could also have been more thorough. (This investigation was conducted after an individual expressed dissatisfaction with initial supervisory actions to senior plant management.) The HPES report addressed broader scope problems including the ability to properly manage change within the QV department, possible adverse effects of the organization downsizing effort, and inconsistent ways of doing business causing disorganization and discontent. However, it still did not heavily consider whether the first item involved intentional ignoring of administrative requirements. In addition, it was not clear that plant management adequately addressed the broader concerns until after further incidents occurred.

The subsequent investigations were extremely thorough resulting in broad scope actions to address larger issues. These were initiated after increased scrutiny regarding the first item and further incidents. A summary of the activities and conclusions reached by the licensee in these latter investigations included:

- A review of other work by the QV inspector involved in the first item and related interviews was conducted. A substantial number of activities were reviewed identifying several anomalies and generating several corrective action documents. The licensee concluded none involved safety significant hardware items. The licensee's investigation determined that the QV inspector's intent in regard to the first item was inconclusive.

- The approach to certain administrative requirements was inconsistent within the QV organization, which caused frustration among craft personnel.

Several recommendations were generated which were addressed further in an internal memo dated April 26, 1995, from the Manager, Nuclear Assessment to the Director, Licensing. Actions resulting from these recommendations included maintenance management meeting with craft personnel to reinforce expectations in the areas of procedure adherence, proper approach to revisions of procedures, having a professional and respectful relationship with QV personnel in resolving conflicts, and in the proper use of discrepancy lists. These expectations were also reinforced directly on an individual basis with certain involved maintenance personnel. QV management also discussed these topics with QV personnel. In addition, expectations regarding proper control of process changes (including new interpretations) were discussed with QV personnel. A follow-up assessment was completed on July 31, 1995, and concluded that maintenance and QV personnel were working together and the relationship was respectful and professional.

Other actions were also being pursued. A new procedure, CPS 1005.15, on procedure use and adherence was drafted and a corresponding lesson plan was being finalized to more clearly define related expectations. This was awaiting approval of some quality assurance program changes prior to implementation. Changes to administrative procedures to streamline and reduce paperwork related to discrepancy lists were also being pursued. Expected by the end of 1995, these changes would hopefully make the processes less cumbersome and more apt to be correctly followed. Likewise, changes in processing of procedure deviations and temporary procedure deviations were being developed with implementation also expected by the end of 1995.

Interviews with QV and maintenance personnel indicated that the situations surrounding these occurrences had considerably improved with no recent confrontations. The improper use of discrepancy lists to deviate from the procedure was also much improved, although less obvious deviations, for example some involving engineering evaluations, may still be a problem. However, licensee management was continuing improvement efforts by actively seeking and identifying examples and re-enforcing expectations. The long term effectiveness of these efforts will be evaluated in routine NRC inspections.

6.0 PERSONS CONTACTED AND MANAGEMENT MEETINGS

The inspectors contacted various licensee operations, maintenance, engineering, and plant support personnel throughout the inspection period. Senior personnel are listed below.

At the conclusion of the inspection on November 9, 1995, the inspectors met with licensee representatives (denoted by*) and summarized the scope and findings of the inspection activities. The licensee did not identify any of the documents or processes reviewed by the inspectors as proprietary.

J. Cook, Vice President
*R. Morgenstern, Manager - Clinton Power Station
J. Miller, Manager - Nuclear Station Engineering Department
R. Wyatt, Manager - Nuclear Assessment
D. Thompson, Assistant Manager - Nuclear Assessment
*J. Palchak, Manager - Nuclear Support Services
*L. Everman, Director - Radiation Protection
*P. Yocum, Director - Nuclear Assessment

W. Clark, Director - Plant Maintenance
K. Moore, Director - Plant Operations
*A. Mueller, Director - Plant Support Services
*C. Elsasser, Director - Planning & Scheduling
*R. Phares, Director - Licensing
R. Kerestes, Director - Nuclear Safety and Analysis
*D. Korneman, Director - Plant Engineering
*J. Langley, Director - Engineering Projects
*M. Stickney, Supervisor - Regulatory Interface
*W. Bousquet, Director - Maintenance & Technical Training
*D. Zemel, Resident - Illinois Department Nuclear Safety