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REGION III

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Report No: 50-254/96017(DRP), 50-265/96017(DRP)

Licensee: Commonwealth Edison Company (ComEd)

Facility: Quad Cities Nuclear Power Station, Units 1 and 2

Location: 22710 206th Avenue North
Cordova, IL 61242

Dates: October 27 - December 6, 1996

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EXECUTIVE SUMMARY

Quad Cities Nuclear Power Station, Units 1 & 2
NRC Inspection Report 50-254/96017(DRP), 50-265/96017(DRP)

This inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection.

Operations

- The inspectors determined that winterizing preparations had improved over last year. However, certain equipment, including the auxiliary boiler, were not ready for the onset of cold weather. This was a repeat finding from last year. In addition, the inspectors determined that the lack of special precautions or corrective actions for the low temperature alarms was a weakness in the annunciator response procedures (Section O1.2).

- The shift engineer took a conservative approach in the conduct of switchyard work to repair the backup battery power supply for switchyard breakers (Section O1.4).

- The inspectors concluded that Operations and Engineering had failed fully to evaluate the effect a degraded check valve would have had on the low pressure coolant injection system during an accident. Operations had not initially characterized the degraded check valve as a significant operator workaround (Section O1.5).

- The inspectors concluded that the work effort on the circulating water traveling screens was necessary, but not well coordinated from a risk perspective. As a result, one of the two supplies to all safety-related cooling water was unavailable for over a month with both units operating at full power (Section O2.1).

Maintenance

- The preparation, communications, and the general performance of the high pressure coolant injection (HPCI) surveillance test were acceptable. Shift management allowed operators to continue the high pressure coolant injection (HPCI) surveillance without documenting problems arising in the procedure and without documenting a clarification of a step in the procedure. Weaknesses in planning and schedule adherence led to an extended surveillance period for HPCI (for an administratively increased surveillance). (Section M1.1).

- The licensee identified that incorrect bolt material was installed in the 1C and 2C residual heat removal service water (RHRSW) pumps due to inadequate control of vendor processes. A violation was issued for failure to ensure correct materials were used in safety-related equipment. The use of the incorrect bolt material resulted in a non-cited violation for the 2C RHRSW pump being inoperable in excess of

Technical Specification (TS) limits. The licensee's failure to report a condition prohibited by TS resulted in a violation of 10 CFR 50.73. Other examples involving inadequate control of vendor processes and materials were also identified by the licensee (Section M2.1).

- During overhaul and modification of the 2D RHRSW pump, the licensee identified and corrected a number of problems including deficiencies in vendor supplied parts. Final test results indicated that the overhaul effort was successful (Section M2.2).

- Various material equipment deficiencies resulted in increased personnel radiation exposure and impacted plant operations (Section M2.3).

Engineering

- The licensee identified that the control room emergency ventilation system was inoperable. Post modification and surveillance testing failed to ensure the system met requirements specified in the updated final safety analysis report (UFSAR). The licensee had not performed a required 10 CFR 50.59 evaluation. These three issues were being considered Apparent Violations (Section E2.1).

- The inspectors identified a violation for failure to incorporate Technical Specification requirements into station surveillance procedures (Section E3.1).

- The inspectors identified weaknesses in the licensee's approach for determining control room operability for post accident conditions (Section E3.2).

Plant Support

- The inspectors noted additional radiation exposures were received in an effort either to repair deficient material condition issues or to continue operating the unit with the deficient material condition (Section R1.1).

Report Details

Summary of Plant Status

Unit 1 operated at or near full power throughout the inspection period, with the exception of the first full week in November. On November 1, load was dropped to approximately 500 MWe to repair the level control valve for the "B" steam packing exhauster. The load was further dropped to approximately 340 MWe due to a seal leak on the 1A reactor feedwater pump. The unit was returned to full power on November 7 and continued to operate at or near full power through the remainder of the inspection period.

Unit 2 started the period by increasing to full power following repairs to the main turbine bypass valve control system. Problems with the moisture separator drain tank level control valves, followed by continued main turbine bypass valve control system problems, caused the unit to be taken off-line on October 27. The unit was brought back on-line on October 30, and held at 200 MWe for testing of the main turbine control systems. On November 1, the unit was taken to full power. On December 2, operators reduced Unit 2 power to 200 MWe to repair a packing leak on a reactor water cleanup valve. The unit operated at or near full power the remainder of the inspection period.

I. Operations

O1 Conduct of Operations[1]

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations.

During the inspection period, several events occurred which required prompt notification of the NRC pursuant to 10 CFR 50.72. The events and dates are listed below.

October 27	Operators reduced Unit 1 power due to reactor feed pump ventilation fan return damper failing closed.
October 27	Operators tripped Unit 2 main turbine due to problems with moisture separator drain tank level control valves. Foreign material caused two valves to stick open.
October 28	Emergency Notification System (ENS) call. Safety train of control room ventilation system declared inoperable due to

[1]Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.

inability to maintain sufficient positive pressure in the control room.

November 1	Operators reduced Unit 1 power due to problems with "B" gland steam condenser level control valve air operator.
November 24	Control room emergency filtration system declared inoperable since operators were not assured that a surveillance test was performed correctly. Subsequent testing verified system operability.
November 26	Operators declared the shared standby diesel generator inoperable to Unit 2 due to a relay problem.
December 2	Operators reduced Unit 2 power to less than 15 percent power due to problems with reactor water cleanup isolation valve packing leak.

O1.2 Winterizing Checklist (71714)

a. Inspection Scope

The inspectors observed performance of scheduled cold weather preparation activities including use of Quad Cities Operating Procedure (QCOP) 0010-01, "Winterizing Checklist."

b. Observations and Findings

The inspectors reviewed the licensee's progress of completing the checklist throughout the period and found that a majority of items were completed prior to the expected date of October 30. A notable exception to the licensee's expectations was that the heating boilers were not available for use by the first cold spell of the season or by October 30.

The inspectors identified several periods when supply air low temperature annunciators (panel 912-5, B1 through B5) were lit in the control room for the reactor building, the turbine building, and the radwaste building. The annunciator response procedures for these alarms guided the operators to check for valid indication and take corrective action as necessary. There were no specific actions identified in the procedures.

The inspectors questioned operators as to the special precautions being taken during the time when low intake temperature alarms were annunciated. The operators indicated that only normal rounds were being performed and that maintenance actions to repair the boilers were underway. The inspectors noted that the potential for colder than normal equipment temperatures existed during this time, especially in the vicinity of supply air duct outlets, but found no unacceptable conditions during building inspections.

c. Conclusions

The inspectors determined that use of the winterization checklist had improved from the previous year. However, the licensee still failed to place the auxiliary boiler and other items on the checklist in service before the arrival of cold weather. This was a repeat problem from 1995. In addition, the inspectors determined that the lack of special precautions or corrective actions for the low temperature alarms was a weakness in the annunciator response procedures.

O1.3 Conservative Operations Control of Work Activities

The inspectors attended a meeting conducted by the shift engineer to address switchyard work that had the potential to remove backup battery power for the switchyard breaker trip circuits. The shift engineer directed that the engineers perform a 10 CFR 50.59 safety evaluation to address a design condition that would be controlled by temporary alteration. The meeting was concise, and resulted in all parties knowing their roles and actions. There was good inter-departmental communication. Shift management's conservative approach was demonstrated in the pursuit of a safe and effective corrective action for a problem that could have adversely affected the units.

O1.4 Unit 2 Low Pressure Coolant Injection (LPCI) System Inoperable Due to Loss of Discharge Header Pressure

a. Inspection Scope (71707)

The inspectors responded to a licensee report on November 12 in which the LPCI system was declared inoperable after losing keep fill pressure on the common discharge header from the residual heat removal (RHR) pumps. The inspectors interviewed licensed operators and the system engineer, and reviewed the system configuration and previously completed surveillance tests.

b. Observations and Findings

The licensee had started the "2D" RHR pump in order to verify proper breaker operation after maintenance. After stopping the pump, the discharge check valve (2-1001-67D) failed to fully reseat. This failure allowed water in the discharge header to drain back to the torus through the normally open pump suction valve. Since the discharge header was common to all four RHR pumps, the entire LPCI system was affected. Under normal conditions, the keep fill system maintained pressure in the discharge header for both LPCI and the core spray system. However, the keep fill system could not maintain the discharge header pressure with the discharge check valve stuck open.

The licensee entered a 7-day shutdown limiting condition for operation (LCO) according to Technical Specification (TS) 3.5.A.2 when the Unit 2 LPCI system was declared inoperable. Operators shut the suction valve for the "2D" RHR pump which allowed the keep fill system to repressurize the discharge header. Operators then filled and vented the system in accordance with the operating procedure. The "2C" RHR pump was started to reseat the discharge check valve on the "2D" pump. Once the "2C" RHR pump stopped, header pressure remained constant; and operators determined that the "2D" pump discharge check had reseated. The LPCI system was then determined to be operable and the LCO was exited.

Operators generated problem identification form (PIF) 96-3196 that referenced a previous similar event and mentioned a caution card on the control switch for the "2D" RHR pump. The inspectors found that the caution card on the control panel was dated July 3, 1996, and referenced an action request from May 21, 1996. The inspectors reviewed the previous event and found it was similar to the current event, except the unit was in cold shutdown. The system engineer told the inspectors that this check valve had been replaced during the 1995 Unit 2 refueling outage and that he had been aware of the leak since May 1996 when the RHR system was operating in the shutdown cooling mode.

The inspectors viewed the degraded condition of the check valve as a significant operator work around since failure of the valve to seat could affect the LPCI function during an accident. However, the inspectors found that this work around was not documented on the operator work around list and that no specific information or instructions had been given to operators regarding this potential failure mode. Although the caution card existed on the control switch for the pump, inspectors determined that some control room operators did not recognize the impact of the condition on accident response, and some were not even aware of the degraded condition.

The licensee agreed that the degraded check valve met the criteria for an operator work around. At the end of the inspection period, the licensee had ordered a new valve and was evaluating whether to perform the maintenance on-line or during the upcoming refueling outage. In addition, Operations issued a standing order with special instructions to operators regarding this valve.

c. Conclusion

The inspectors concluded that Operations and Engineering had failed to fully evaluate the impact the degraded check valve would have had on LPCI during accident. Even after the second instance of a check valve failing to reseat, the licensee was slow to consider this a significant operator work around. The inspectors found the licensee's plans for future replacement of the valve and the issuance of the standing order to operators to be acceptable corrective actions and compensatory measures for this degraded condition.

O2 Operational Status of Facilities and Equipment

O2.1 Circulating Water Bay Conditions

a. Inspection Scope (71707)

The inspectors observed maintenance activities on the Unit 1 circulating water bay to assess the licensee's evaluation of risk significant activities.

b. Observations and Findings

Poor Risk Perspective and Prioritization

The inspectors observed maintenance activities associated with repairs on the 1A circulating water pump and motor, and the 1A and 1B traveling screens. Repairs to the traveling screens required the 1A circulating water bay to be dewatered. This was accomplished by placing stop logs upstream of the 1A and 1B traveling screens and at the Unit 1 water supply to the safety-related cooling water bay at the crib house, and pumping the water out of the 1A bay. The safety-related cooling water bay was the suction source for all trains of emergency diesel generator cooling water (EDGCW), residual heat removal service water (RHRSW) for both units, and one of two diesel fire pumps for both units.

The inspectors determined that the repairs to the circulating water system were necessary and appeared to be aimed at correcting long standing problems identified with the traveling screens. However, the limited risk considerations given to this work were troubling. Dewatering the 1A bay left only one supply of water to the safety-related water bay (through the 2E and 2F traveling screens and the fixed screen from the 2C circulating water bay). Normally there were two sources of water to this safety-related water bay, from the ultimate heat sink (UHS) through the 1A and the 2C circulating water bays. The second supply to the safety-related water bay was unavailable since October 28, 1996.

The inspectors asked what processes were used to evaluate the risk priorities of performing work which required circulating water bay 1A to be drained with both units at 100 percent power, instead of with one or both units shut down. The licensee indicated that the risk priorities of various plant conditions were not considered, and that the work was always scheduled for on-line maintenance. The inspectors found that the work requests had been generated in 1995, and since that time both units had been shut down simultaneously for several months. Additionally, the inspectors found that the process described in Quad Cities Administrative Procedure (QCAP) 2200-07 "Probabilistic Risk Assessment of On-Line Maintenance Activities" was used, but was not detailed enough to model items such as the circulating water bay supply to RHRSW in the station probabilistic risk assessment driven operational safety predictor program.

The inspectors had previously identified opportunities for better planning of on-line shared diesel generator work that could have been performed during the sam dual unit outage period (see Inspection Report (IR) 50-254/265-96014). Licensee management indicated the potential weaknesses in scheduling risk significant work would be evaluated.

Lead Unit Planners reviewed the risk significance of circulating water bay dewatering efforts. However, only the risk effects of making a circulating water and service water pump inoperable were considered. The loss of redundancy to the RHRSW water supply from the UHS was not modeled in the operational safety predictor or considered by planners or operations supervision. Since the work was not considered risk significant, planners scheduled the work only on day shift for about the first 2 weeks of the job. Later, a limited sized evening shift crew was added. At times, all crews were pulled away to work on other emergent work for 1 to 2 day periods.

Poor Understanding and Control of Licensing Basis

The inspectors were concerned that the licensee modified an UHS flowpath of water to safety-related cooling components without performing an evaluation for the modification. Technical Specification requirement 3.8.A specified that during plant operation at power, two independent subsystems of RHRSW be available with an operable flow path capable of taking suction from the UHS. On November 24, the inspectors questioned the licensee about the operability of the RHRSW subsystems when only one path from the UHS to the safety-related water bay was available, and it was common to all trains. Operations management indicated that the safety-related water bay was considered part of the UHS, and there was no restriction to operations with only one pathway.

The inspectors determined that the updated final safety analysis report (UFSAR) description of the UHS and of RHRSW was not detailed enough to determine the boundary of the UHS and what flow requirements were needed for intake into the safety-related water bay. The inspectors pointed out that the licensee had used stop logs to modify the safety-related water bay without evaluating the potential impact. For example, the licensee had not initially considered if the flow capacity of the single fixed screen was sufficient, and had not considered the risk impact of the loss of the redundant water supply. The inspectors also questioned the ability of the stop logs to maintain an acceptable water level at all times during a seismic event. The licensee was evaluating the design requirements for the UHS at the close of the period. The inspector's planned assessment of the licensee's evaluation of the design requirements of the UHS and review of scheduling of risk significant activities is considered an **Unresolved Item (50-254/265-96017-01)**.

c. Conclusions

The inspectors concluded that the work effort on the circulating water traveling screens was necessary, but was not well coordinated from a risk perspective. As a result, one of two supplies to all safety-related cooling water was unavailable for over a month with both units operating at full power. In addition, the design basis for the supplies to safety-related cooling water were not well known or considered when stop logs isolated one of the pathways for safety-related cooling water from the UHS.

O8 Miscellaneous Operations Issues (92700)

O8.1 <u>(Closed) Unresolved Item (50-254/265-94004-23)</u>: Reactor Vessel Temperatures Not Recorded During Cooldown. The Diagnostic Evaluation Team (DET) noted that the licensee previously identified operators failed to verify reactor vessel temperature limits during unit cooldown as required by TS 3.6. This was addressed in licensee event report (LER) 50-254-92011 and LER 50-265-92010. These LERs were previously reviewed and closed. The inspectors noted the licensee adequately verified temperature limits during unit heat ups and cool downs.

The DET also identified the licensee had no procedural requirements to log or monitor inoperability of instruments to ensure compliance with TS during surveillance testing. The licensee subsequently established procedural controls in this area. The inspectors noted the licensee continued to implement these administrative controls while complying with TS LCOs for equipment unavailability during surveillance testing. This item is closed.

O8.2 <u>(Closed) Licensee Event Report (LER) 50-254/94011</u>: Control Rod L-11 Failed to Scram During Rod Time Testing. A maintenance activity during the Unit 1 1994 refueling outage installed a pipe plug into a solenoid valve exhaust port during maintenance testing but the plug was not removed until detected by operators during rod testing. The licensee attributed this event to maintenance workers failing to adhere to procedures. The licensee trained maintenance personnel on temporary alterations and maintenance on hydraulic control units. The licensee changed procedures and performed rod testing during the primary plant hydrostatic test in lieu of testing rods during startup from a refuel outage. The inspectors reviewed the changed procedures and verified compliance with TS. Maintenance craft procedure adherence has been enhanced by the station requirement to sign each line item of a procedure. Some sequencing and procedure adherence problems have continued, to a lesser extent, and will be addressed on an individual basis. This event resulted in a Level III Violation and Civil Penalty. See inspection reports 50-254/94017 and 94027 for additional information. This item is closed.

O8.3 <u>(Closed) Violation 50-254/265-94017-01</u>: Violation of Procedure Adherence, Test Control, and Corrective Actions Associated with Failure of a Control Rod to Scram During Testing. This violation was the same event described in Section O8.2 above. Corrective actions for the procedural adherence violation were described above. Licensee actions for test control and corrective action violations included counseling of appropriate nuclear engineering personnel. The licensee hired an experienced nuclear engineer to provide oversight of nuclear engineering issues. Corrective actions taken by the licensee to address delayed start of rod motion included replacement of scram solenoid pilot valve diaphragms with models less prone to the phenomena. The licensee also reinforced the use of the nuclear tracking system to ensure documented problems were tracked to resolution. The inspectors reviewed the licensee's corrective actions. This item is closed.

II. Maintenance

M1 Conduct of Maintenance (62707)

M1.1 High Pressure Coolant Injection (HPCI) System Surveillance Test

a. Inspection Scope

The inspectors observed performance of scheduled activities including a monthly surveillance test run of Unit 2 HPCI system Quad Cities Operating Surveillance (QCOS) 2300-5, "Quarterly HPCI Pump Operability Test."

b. Observations and Findings

Operations stopped at one point to make a procedure field change when the normal pressure indication listed in the procedure was not available due to maintenance. However, the inspectors identified one instance where operators could not properly verify the requirements of the procedure. Step H.31.b. required operators to verify turbine speed increased to approximately 3900 rpm. When the turbine speed reached only 3100 rpm, operators appropriately notified the system engineer. The system engineer informed the operating crew that this was acceptable performance for the present system condition, and to continue the test. The inspectors identified that the system engineer was not aware of the origin of the test requirement or why previous crews had not had trouble meeting the requirement. The system engineer felt confident that the 3900 rpm requirement was related to the high speed stop setting of the HPCI motor speed changer circuitry and was not a critical parameter.

The inspectors reviewed the completed procedure and identified that operators had not documented the inability to meet the 3900 rpm requirement, and that no procedure change was made, even though the actual rpm during the test was about 20 percent lower than required. The system engineer indicated that the rpm seen could be considered approximately equal to that required by the procedure. Based on the magnitude of the speed difference, the inspectors believed that documentation of the speed difference would clarify the step during future testing. The surveillance results indicated that all TS requirements for rated flow were met.

The inspectors noted that the next performance of the surveillance was scheduled for November 28; however, the test was not performed until December 7. The licensee had postponed the test due to Thanksgiving holiday work schedule conflicts. Although this test was only required to be performed quarterly by TS, the licensee scheduled it monthly because previous performance problems had reduced confidence in the system. The licensee sought to improve performance through increased testing and troubleshooting.

c. Conclusions

The inspectors noted that the preparation, communications, and the general performance of the surveillance test were acceptable. An opportunity to document problems and clarify the meaning of steps in the procedure was missed. Shift management allowed operators to continue the HPCI surveillance without documenting problems arising in the procedure and without documenting a clarification for the step for lower than expected rpm. Weaknesses in planning and schedule adherence led to an extended surveillance period for HPCI.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Use of Incorrect Bolt Material in RHRSW Low Pressure (LP) Pumps (IP 92700)

a. Inspection Scope

The inspectors investigated the licensee's use of incorrect bolts in the RHRSW LP Pumps.

b. Observations and Findings

Incorrect Bolt Material on 1C and 2C RHRSW LP Pumps

On May 3, 1996, the RHRSW pump vendor notified ComEd (Ref: 073-61152/503284XX348/XX275) that the part number for the bolts used in the RHRSW LP pumps was not current. The recommendation from Ingersoll-Dresser Pump Co. was to change the bolt material from SAE Grade 8 to A193-75 Class 2 Grade B8. The vendor certified that the recommended parts had not affected the form, fit, or function of the original parts, when in fact, the substitution bolts had a lower yield strength limit than the original Grade 8 material. On May 24, 1996, ComEd's Corporate Materials Engineering Group performed an evaluation, M-1996-0454-0, agreeing with the vendor's incorrect substitution recommendation (PIF 96-3039).

On October 25, 1996, during assembly of a spare RHRSW LP Pump, Mechanical Maintenance Department (MMD) workers were torquing the pump casing flange bolts. One bolt broke and several others showed signs of stretching. The licensee stopped the work and began an investigation of the cause of the failures (PIF 96-3025). The licensee inspected all LP pump casing bolts and discovered that lower yield strength A193-75 Class 2 Grade B8 bolt material had been installed in the 1C RHRSW LP Pump (PIF 96-3029) on October 8, 1996, and in the 2C RHRSW LP Pump (PIF 96-3030) in July 1996. A torque value of 375 ft/lbs, applying to the original "high yield strength" limit for the SAE Grade 8 bolts, was used to assemble the pump casings. Consequently, the yield strength limit for all of the LP pump casing bolts on the 1C and 2C RHRSW LP Pumps was exceeded during assembly.

The licensee's corrective actions included validating (through the vendor) that the high yield strength SAE Grade 8 bolt material or equivalent was the correct replacement. The torque value was verified to be correct at 375 ft/lbs lubricated with N5000 Antiseize for the SAE Grade 8 bolts. Additionally, the vendor recommended a "one-time-use-only," for the high yield strength SAE Grade 8 bolts. Following replacement of the incorrect LP pump casing bolts with the correct bolts, the 1C pump was tested and declared operable on October 27, 1996, and the 2C pump was declared operable on October 28, 1996. The licensee was assessing the condition of other RHRSW LP pumps using the correct SAE Grade 8 bolts which have been torqued more than once. Past practice allowed reuse of the bolts.

Appendix B of 10 CFR Part 50, Criterion III, "Design Control," requires that measures shall be established for the selection and review for suitability of application of parts that are essential to the safety-related functions of the structures, systems and components. The licensee's failure to assure that the correct application of bolt material was used in the safety-related RHRSW LP pumps was a **Violation (50-254/265-96017-02)** of 10 CFR Part 50, Appendix B, Criteria III.

The licensee took good corrective actions at the station level following the discovery of a broken bolt. However, this condition appeared to be similar to other problems related to the control and issuance of safety-related parts. While the short term corrective actions were aggressive, long term actions which included both station and corporate actions, have not been demonstrated. Based on this lack of comprehensive corrective action to prevent recurrence, the NRC chose not to exercise the discretion outlined in Section VII.B.1 of the Enforcement Policy.

2C RHRSW Pump Inoperable in Excess of TS LCO

Technical Specifications 3.5.B.2 required that with one RHRSW pump inoperable, continued reactor operation is permissible only during the succeeding 30 days provided that all other active components of the containment cooling mode of the RHR system are operable. Technical Specifications 3.5.B.5 stated that: "If the requirements of 3.5.B cannot be met, an orderly shutdown shall be initiated, and the reactor shall be in a cold shutdown condition within 24 hours." The 1C and 2C RHRSW pumps were declared inoperable on October 26, 1996, when the licensee recognized the potential impact of the installation of incorrect bolt material that was discovered late on October 25, 1996. It was established that the correct bolt material for use in the LP pumps was the original SAE GRADE 8 material. The 2C RHRSW Pump was inoperable from July 12, 1996, when incorrect bolts were installed in the LP pump casing, until October 28, 1996. The 1C RHRSW Pump was inoperable from the period following October 8, 1996, when incorrect bolts were installed in the LP pump casing, until October 27, 1996.

Unit 2 was started on August 15, 1996, and the incorrect bolt condition was discovered on October 25, 1996. Unit 2 was operated past the

30 days allowed by TS. This licensee-identified and corrected violation is being treated as a **Non-cited Violation 50-254/265-96017-03** consistent with Section VII.B.1 of the NRC Enforcement Policy.

Failure to Report a Condition Prohibited by TS

The 10 CFR 50.73 Section (a)(2)(B), "License Event Report System," required the licensee to report any condition prohibited by the plant's TS within 30 days after the discovery of the event. However, the licensee failed to report by November 24, 1996, in accordance with 10 CFR 50.73, operation of Unit 2 in a condition prohibited by plant TS 3.5.B.2 and 3.5.B.5 following discovery of the incorrect bolts on October 25, 1996, which is a **Violation (50-254/265-96017-04)** of 10 CFR 50.73.

Other Problems Identified During RHRSW LP Pump Maintenance

On October 26, 1996, due to a separate incorrect recommendation from the vendor (PIF 96-3043), a single incorrect bolt was found to have been installed on the 2A RHRSW LP Pump. A substitute bolt material, A193 Grade B7, was installed. This material has a yield strength between the correct SAE Grade 8 material and that of the lower yield A193-75 Class 2 Grade B8 material. This single bolt was replaced.

Another PIF (96-3253) was written to address two spare bearing housings for the RHRSW LP Pumps that did not have all of the bolt holes tapped. There were dimensional problems with two new LP pump shafts drawn from stores for future rebuilds (PIF 96-3000). Several other problems involving inadequate control of vendor supplied materials for LP pumps are described in section M2.2 below.

During overhaul of the 1C RHRSW Pump in the previous inspection period (NRC Inspection Report 50-254/265-96014), the LP pump casing flanges were found not to have met a critical dimension and the pump failed the post maintenance leak test. In response, the licensee's Site Quality Verification Department has initiated a "stop work" to the vendor in order to identify the root cause and take effective corrective actions for the relatively high number of quality control issues from one vendor. The licensee initiated a 10 CFR Part 21 internal and/or external report to address the generic and potential industry implications of the materials issues.

c. Conclusions

The licensee had not assured adequate quality assurance measures for control of some vendor materials and processes. This resulted in incorrect bolt material being installed in the 1C and 2C RHRSW LP pumps, rendering the pumps inoperable. A separate incorrect bolt recommendation resulted in the installation of one incorrect bolt in the 2A RHRSW LP pump.

The licensee's response to the broken bolt while rebuilding the spare pump in the shop was appropriate. Stopping the job and performing timely inspections of all the other pumps demonstrated that MMD workers were alert to conditions adverse to quality. The licensee's identification and timely correction of the incorrect bolt material was an adequate immediate response. While the short term corrective actions were aggressive, long term actions which include both station and corporate actions, have not been demonstrated.

The inspectors will continue to monitor the licensee's performance in determining the root cause of inadequate quality assurance of materials and processes supplied by a vendors.

M2.2 Observation of MMD Work Activities for Overhaul of the 2D RHRSW Pump

a. Inspection Scope

The inspectors observed the MMD during portions of the overhaul of the 2D RHRSW Pump. This was the seventh of eight pump overhauls to perform modifications (cutwater modification) to improve the overall pump performance characteristics and increase reliability.

b. Observations and Findings

The inspectors noted that spare components and tools were staged in an orderly fashion. Foreign material exclusion (FME) barriers were appropriately placed and FME practices were adhered to. Job supervision was adequate and workers coordinated the tasks with each other. A number of issues described below were identified during the overhaul effort.

Erosion of Flange

Excessive erosion was found at the 2D RHRSW LP pump discharge flange. The cause of the erosion was determined to be a weld dam used to initially construct the pipe. The weld dam allowed excess turbulence at the discharge flange, resulting in accelerated erosion. The repair consisted of building up the eroded area inside the pipe and machining the added material to form a smooth surface (ER 9606131). The pump engineer stated that the condition had not been detected during ultrasonic testing. The eroded condition had been noted on one or more of the other RHRSW pumps during overhaul, but was not as advanced as on the 2D pump.

Bearing Housing

One of the bearing housings for the 2D RHRSW high pressure (HP) pump was dimensionally incorrect (PIF 96-3203). These housings, although supplied as new, had a thick paint-like coating on the inner surface. Some of this coating had flaked off and was lose in places, such that it posed a potential for introducing foreign material into the bearings during operation. The licensee replaced the faulty housings.

Rework

Maintenance workers initially positioned the 2D RHRSW HP pump seal housings 180 degrees out of the correct orientation. This was attributed to a performance error on the part of the MMD worker who failed to check the proper orientation prior to assembly. Following the licensee's evaluation of the PIF, an additional work instruction was added to the work package, specifying the orientation of the seal housings to minimize the potential for recurrence. The licensee initially indicated that the orientation of the seal housing was within the skill of the craft.

The second issue arose during post maintenance testing (PMT) of the pump when minor leakage occurred at the HP pump outboard seal. Engineering recommended that the HP pump be re-worked. The cause of the leak was found to be an improperly seated "O" ring in the pump seal assembly. The licensee determined that this was due to imprecise dimensional specifications on the threaded portion of the shaft as it was delivered by the vendor. Maintenance Engineering recommended dimensional adjustments to the shaft assembly to eliminate the potential for the interference between the "O" ring and the threaded portion of the pump shaft. Resultant changes were implemented into the work instructions for future reference.

c. Conclusions

Weaknesses were identified in quality assurance of vendor supplied components. The licensee's work procedure was inadequate for the skill level of the workers as indicated by the incorrect installation of the 2D RHRSW HP Pump seal housings. In spite of a number of problems which the licensee resolved, the work was successfully completed and the pump was returned to service within the original schedule. Test data indicated that the pump performance had improved significantly over the prior-to-overhaul condition. The efficiency of the overhaul process was improved, in part, due to using many of the same personnel for each overhaul job. The knowledge and skill level of the alignment and vibration team has increased with the experience on the RHRSW pumps. Some lessons learned from previous RHRSW pump overhaul efforts were effectively implemented.

M2.3 Material Condition of the Facility

a. Inspection Scope (71707, 62707)

The inspectors reviewed operator logs, PIFs, interviewed operations and maintenance personnel, and observed activities in progress.

b. Observations and Findings

Reactor Water Clean Up (RWCU) System Problems - Unit 1

Maintenance personnel, troubleshooting a pump low flow condition, discovered an installed orifice in the discharge nozzle of the 1A RWCU pump. A modification performed in 1986 (M04-1-85-065) was supposed to have removed the orifice. In the work package implementing M04-1-85-065, workers documented the orifice could not be located, and reassembled the discharge piping without removing the orifice. As corrective actions, the licensee removed the orifice from the 1A RWCU pump, and wrote a work request to remove the orifice from the 2B RWCU pump.

After removing the orifice from the 1A RWCU pump, old weld deficiencies on the pump delayed the return to service. Concurrent with work performed on the 1A pump, the 1B RWCU pump was removed from service due to high vibrations.

Delay in planned maintenance of the 1A pump coupled with an emergent material condition concern with the 1B pump resulted in operating Unit 1 without a functioning RWCU system. The licensee classified this as a maintenance rule functional failure. Workers repaired the 1B RWCU pump within 3 days and returned the RWCU system to service.

Removing the RWCU system from service was not desirable since some chemistry parameters can be adversely affected. The length of time the RWCU system was removed from service did not result in any chemistry parameters exceeding TS limits.

RWCU System Problems - Unit 2

In late October, operators detected a packing leak on the Unit 2 RWCU containment outboard isolation valve (2-1201-5). Subsequent cycling of the valve and tightening of valve packing reduced the leakage to acceptable levels. However, on December 1, operators noted steam emitting from the 2-1201-5 valve packing.

Seat leakage of the RWCU containment inboard isolation valve (2-1201-2) coupled with the packing leak on 2-1201-5 resulted in a degraded condition of the RWCU system. In order to perform repairs at power, operators reduced Unit 2 power and removed RWCU from service. The valve packing leak was temporarily corrected and Unit 2 returned to full power operations. Action requests were written to address both material condition issues for the upcoming outage. The RWCU system was out of service for about 37 hours and TS limits of chemistry parameters were not exceeding .

Gland Seal Condenser Level Control Valve (LCV) Problems

On November 1, operators received control room alarms indicating a failure of the "B" gland steam condenser LCV (1-5404B). The operators reduced Unit 1 power and placed the "A" (1-5404A) LCV in service. Workers replaced a ripped diaphragm in the "B" LCV air operator and identified that both LCV controllers had problems maintaining the proper level in the condenser. Also, the drain header from the "A" gland seal condenser was found to have been plugged.

Workers repaired the controller and returned the "B" LCV to service. The "A" LCV remained out of service until an inspection of the drain header could be performed. However, on November 27, operators received control room alarms indicating additional problems with the "B" LCV. Workers identified the "B" LCV air operator had broken hold down bolts. This resulted in the air operator being displaced from the valve yoke and caused the LCV to close. Workers replaced the broken bolts.

The failures of the Unit 1 gland steam condenser LCVs, although not safety significant, required operators attention to be diverted from monitoring the unit. This condition had the potential to spread contamination from the main turbine seals. On several occasions, operators were required to take manual control of the gland seal condenser level. The local control station was in the feedwater heater bay: an area of elevated radiation dose.

Foreign Material Found in Feedwater Heater System - Unit 2

On November 26, control room operators received feedwater heater drain level alarms indicating problems with the system LCVs during an increase in Unit 2 power. Operators discovered two air operated valves (AO2-3508C and AO2-3509A) were stuck open. Operators removed Unit 2 main turbine from service to allow inspection of all six feedwater heater drain LCVs.

The inspection identified that foreign material caused the two valves to stick open. Foreign material was found in a third LCV. The foreign material was believed to have originated from decaying grid work inside moisture separator drain tanks upstream of the LCVs.

To effect repairs, the licensee was required to remove the unit from operation affecting operational performance of the unit and some increased dose to the workers.

c. Conclusions

During the inspection period, the licensee experienced numerous equipment performance problems. The licensee was still evaluating the causes of the above equipment failures.

The equipment mentioned above was not classified as safety-related. However, poor equipment performance necessitated operator intervention prior to further equipment degradation. Additionally, the degraded equipment performance caused increased personnel radiation exposure to repair and/or restore the affected equipment, re-directed maintenance resources, delayed the start of scheduled maintenance activities, and impacted the operation of the units.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Violation (50-254/265-96011-04): Three Examples of Workers Not Properly Executing Work. The inspectors reviewed the licensee's corrective actions for the personnel errors leading to this violation. This item is closed.

M8.2 (Closed) Violation (50-254/265-96002-08): Improper Storage of Emergency Diesel Generator Air Start Motors. The cause of the improper storage of the air start motors was that the motors were not effectively coded to have planned maintenance (PM) performed on them. This PM would have assured storage in a moisture-free environment to prevent moisture buildup. In response to the NOV, the licensee performed an expanded scope inspection of safety-related spare parts that were coded for PM activities to be performed while in stores. Of over 400 items screened, the licensee identified approximately 35 items which were not coded properly for a PM action. There were no cases in the sample inspected in which installation of faulty parts occurred, or failures of safety-related equipment due to spare parts PM deficiencies. The licensee identified and corrected the PM deficiencies and another administrative weakness whereby the PM code was inappropriately applied to discontinued or redesignated items. The inspectors determined the corrective action was adequate. This item is closed.

III. Engineering

E2 Engineering Support of Facilities and Equipment (IP 37551)

E2.1 Control Room Emergency Ventilation System (CREVS)Inoperable and Outside of the Design Basis as Described in the UFSAR.

a. Inspection Scope (IP 37551)

The inspectors reviewed the CREVS inoperability which was reported to the NRC on October 28, 1996, via the ENS phone line. The inspectors used the TS, the UFSAR, the licensee's operability assessment, various regulatory guides, the standard review plan on control room habitability, and completed surveillance tests in the review. In addition, the inspectors interviewed system engineers and licensee management and attended plant on-site review committee (PORC) meetings on the subject. The inspectors also observed portions of the maintenance and surveillance activities during repair and restoration of the system to an operable status.

b. Observations and Findings

On October 8, 1996, the licensee initiated PIF 96-2892 to document an issue found at Dresden for review at Quad Cities. The issue concerned TS surveillance requirement 4.8.D.5.c which required that once every 18 months, verification that the control room positive pressure was maintained at greater than or equal to 1/8 inch water gauge relative to adjacent areas during system operation at a flow rate less than or equal to 2000 scfm. This particular surveillance requirement was new as of September 24, 1996, when new TS for Quad Cities were implemented. At the time of implementation, all new TS requirements for surveillance were required to be current and completed.

After taking differential pressure measurements supplemental to the measurements of the current surveillance procedure, the licensee identified that the surveillance procedure was inadequate because the control room differential pressure with respect to all adjacent areas was not measured. Engineers found that the required 1/8 inch positive pressure in the control room was not met with respect to the cable spreading room. The licensee identified eight additional adjacent areas that needed to be included in the surveillance. On October 28, 1996, the CREVS was declared inoperable, reported the condition to the NRC, and entered the 7-day Limiting Condition for Operation. The inspectors determined that the system had been inoperable since at least the implementation of the new TS on September 24, 1996, since the as-found condition was not in conformance with the TS and the required test had not been performed prior to November 3, 1996. The inspectors concluded that this was an **Apparent Violation** of TS 3.8.D.1, since the system was inoperable for a period greater than allowed by the 7-day LCO while both units were in Mode 1.

The licensee identified a discrepancy between the requirements of the TS surveillance and the UFSAR description. Technical Specification 4.8.D.5.c required verification of the differential pressure between the control room and adjacent areas, while the UFSAR (Section 6.4) stated that the control room emergency zone should be maintained at a 1/8 inch positive pressure. The control room emergency zone was defined in the UFSAR as the main control room, cable spreading room, auxiliary electric equipment room, and the train "B" heating, ventilation, and air conditioning (HVAC) equipment room. Differential pressure measurements taken between the control room emergency zone and the adjacent areas revealed that some areas were at a negative pressure and that some areas, while positive, could not meet 1/8 inch design basis.

The inspectors reviewed the original design modification that installed the CREVS and determined that testing for Modification M04-1/2-82-02 completed on April 16,1985, had not measured differential pressure between the control room emergency zone and adjacent areas and therefore failed to ensure UFSAR Section 6.4.4.1 criteria were met. The inspectors concluded that both the modification test and subsequent surveillance tests of the CREVS were inadequate to ensure that the system would perform its design basis function as described in the UFSAR. The inspectors consider this an **Apparent Violation** of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control."

The UFSAR stated that the purpose of maintaining positive pressure in the control room emergency zone was to minimize the transfer of toxic or radioactive gases into the control room (Section 6.4.2.4). Chapter 15 of the UFSAR described the control room dose calculation which assumed the in-leakage into the control room emergency zone was 259.3 standard cubic feet per minute (scfm).

The licensee sealed the CREVS ductwork and plugged leakage pathways into the control room emergency zone. A final set of differential pressure readings concluded that while the control room had been restored to 1/8 inch positive pressure with respect to all adjacent areas, other sections of the control room emergency zone remained at a negative pressure.

In addition to the repairs, the licensee performed a control room dose calculation to determine how much in-leakage into the control room emergency zone would result in failure to meet General Design Criteria (GDC) 19 of 10 CFR Part 50, Appendix A which sets limits for the radiation dose operators can receive during an accident. Concurrently, the licensee performed a test to measure the in-leakage. The measured in-leakage was 275 plus or minus 99 scfm, an amount greater than that assumed in the UFSAR.

The licensee performed a new control room dose calculation (NUS calculation number 6200.001-M-04) using the measured in-leakage. The calculation methodology was different from that described in the UFSAR Section 15.6.5. It used dose conversion factors from International Committee on Radiation Protection (ICRP) 30, took credit for suppression pool scrubbing of iodine (Standard Review Plan (SRP) 6.5.5), and used a different secondary containment effluent leakage rate (4 volumes per day). The combined effect of these differences resulted in a lower calculated dose to the thyroid (12.5 rem) for control room personnel when compared to the UFSAR calculation (29.4 rem).

The licensee used the results of the new control room dose calculation and the completed control room differential pressure surveillance test as the basis to declare the CREVS operable and exit the LCO on November 3, 1996. The written operability assessment declared the system fully operable and not degraded. Corrective actions described in LER 50-254/96-022, dated November 25, 1996, included a revision of the control room habitability study and new submittal to the NRC but had not included plans to restore the plant to the original design basis as described in the UFSAR.

The inspectors concluded that several discrepancies continued to exist between the UFSAR and plant conditions after the licensee determined that the CREVS was operable on November 3. On November 27, 1996, the licensee informed the inspectors that as of November 26, the licensee planned to restore the system to its original design basis, while pursuing an update to the control room habitability study. At the end of the inspection period, the licensee developed a schedule for restoring the CREVS to its design bases.

From November 3, when the CREVS was declared operable, to November 26, the licensee did not plan to restore the CREVS to correct the identified UFSAR discrepancies. This *de facto* change in the facility was subject to 50.59 review. Failure to perform this required evaluation was an **Apparent Violation** of 10 CFR 50.59, "Changes, Tests, and Experiments."

c. Conclusion

The inspectors concluded that the licensee had failed to ensure that testing associated with the CREVS was adequate to verify that the system could perform as described in the UFSAR. The licensee's actions after identifying this inadequacy appeared to be technically adequate to ensure operability of the system in that radiation exposure to control room operators would not have exceeded GDC 19 limits. However, the licensee had not properly implemented the procedures required by the regulations for evaluating changes to the design basis.

E2.2 Engineering Review of Post Modification Testing Reveals Deficiencies

a. Inspection Scope

The inspectors reviewed the circumstances surrounding the licensee's failure to adequately test equipment after design modification. The inspectors reviewed PIFs and licensee reports, interviewed engineers and engineering management, and attended several PORC meetings.

b. Observations and Findings

In November 1996, the licensee identified an issue regarding improper closure of a review of modifications conducted in 1993. In response to a violation cited by the NRC in inspection report 50-254/265-93012, the licensee committed to review a sample of old modifications for appropriate post modification testing. That review of 31 modifications was completed in October 1993 but produced 6 operability concerns and numerous other issues. The review questioned whether the operability concerns were properly closed and if the scope had been expanded.

The licensee formed a team to review the issue. Three PIFs (96-3199, 96-3612, 96-3229) were generated which identified modifications that had testing deficiencies. The licensee wrote and performed tests to address the deficiencies. In addition, the licensee expanded the scope of the review of old modifications.

The inspectors planned to inspect the results of the licensee's review after the completion of the additional scope. This is considered to be **Inspector Followup Item (50-254/265-96017-05(DRS))**.

c. <u>Conclusion</u>

The inspectors noted that the licensee's response to the issue was prompt and appeared to be comprehensive. The inspectors will review the licensee's corrective actions to the identified deficiencies upon completion.

E3 Engineering Procedures and Documentation

E3.1 <u>Technical Specification Review</u>

a. <u>Inspection Scope (37551)</u>

The inspectors compared the licensee's surveillance procedures to Section 4.8.D of TS to determine if all TS surveillance requirements for the CREVS were implemented into procedures.

b. <u>Observations and Findings</u>

In answering the inspectors' questions concerning testing performed to meet the requirements of TS 4.8.D, the licensee informed the inspectors that a procedure was not in place to meet requirement TS 4.8.D.4. Quad Cities Technical Staff procedure (QCTS) 440-03, "Control Room Emergency Filtration System (CREFS) Removal of Charcoal Adsorber Test Canister," Revision 3, had not adequately addressed the TS. Specifically, TS 4.8.D.4 required the licensee to remove a sample of charcoal adsorber for testing after CREFS exceeded 720-hours operating time.

However, the licensee had not tracked the operating hours of the CREFS and was not readily able to determine the CREFS operating history. The licensee documented this condition on PIF 96-3413 and were attempting to determine the operating time of CREFS using operating logs. The licensee confirmed the 720-hour operating history was not exceeded.

c. <u>Conclusions</u>

The inspectors identified a failure to incorporate TS requirements into applicable surveillance procedures which is a **Violation (50-254/265-96017-06)** of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control."

E3.2 <u>Control Room Emergency Ventilation System Operability Determination</u>

a. <u>Inspection Scope (37551)</u>

The inspectors reviewed the licensee's operability evaluation for the CREVS, including portions of the control room habitability study calculation. The inspectors also reviewed licensee documentation used for testing in-leakage into the control room emergency zone, operating procedures and applicable regulatory guides. The inspectors also reviewed Section 6.4.1.1 of the UFSAR.

b. Observations and Findings

On October 27, engineering determined the existing control room configuration was unable to meet Section 6.4.1.1 of the UFSAR. This section required the control room emergency zone be pressurized to at least +1/8 inch differential pressure (d/p) with respect to adjacent areas. Engineering determined the CREVS could not meet the design functions and operations declared the CREVS inoperable on October 28.

The inspectors reviewed various documents associated with this issue and noted weaknesses in the licensees approach for determining operability of the CREVS.

i. Iodine Scrubbing Methodology

The licensee performed an operability evaluation and determined the CREVS was operable based on a calculation of thyroid dose to operators and measured control room emergency zone in-leakage. The measured in-leakage was greater than the in-leakage assumed in the UFSAR. The calculation concluded thyroid doses were below 10 CFR Part 50, Appendix A, Criterion 19 limits. The calculation adopted new methodologies not previously utilized in the original control room habitability study referenced in the UFSAR, including removal of iodine by the torus.

Standard Review Plan (SRP) 6.5.5 allowed licensees to utilize iodine scrubbing by the torus provided specific criteria were met. Criterion II.3 of SRP 6.5.5, required licensees maintain charcoal filters to the minimum level in Regulatory Guide (RG) 1.52, Table 2. Table 2 required laboratory tests for a representative filter sample meet less than 1 percent penetration. However, TS 4.7.P.2.b. required the standby gas treatment system (SBGTS) filter sample meet less than 10 percent penetration. The inspectors considered the licensee had not met the provisions allowed by SRP 6.5.5 for the iodine removal methodology. This is considered an **Inspector Followup Item (50-254/265-96017-07)** pending further NRC review.

ii. Station Building Ventilation Status Post-Accident

The licensee determined that a positive d/p could not be maintained in the control room emergency zone without securing Service Building Ventilation (SBV). The licensee changed QCOP 5750-09, "CREVS Operating Procedure," and QCOS 5750-02, "CREFS Monthly Test," to ensure SBV was secured to maintain a positive d/p in the control room emergency zone.

The inspectors questioned whether the licensee could take credit for conditions established by manual intervention of a nonsafety-related piece of equipment if it can affect safety-related equipment during post accident conditions. The inspectors noted SBV will be lost during a loss of offsite power (LOOP) concurrent with a loss of coolant accident (LOCA) but not during a LOCA without LOOP unless secured by manual intervention. The inspectors consider this an **Inspector Followup Item (50-254/265-96017-08)** pending further NRC review.

iii. Reactor Power Level Assumed in the Control Room Dose Calculation

The inspectors noted that the control room dose calculation had assumed that the reactor power level at the time of the accident was 100 percent core thermal power. Both the calculation described in the UFSAR and the calculation performed for the operability determination used 100 percent core thermal power. The inspectors questioned the licensee if the evaluation should be done under the assumption that the reactor was operating at 102 percent core thermal power, as done in the LOCA analysis. The licensee responded that this particular assumption would be re-evaluated prior to performing the calculations for submittal to the NRC. The inspectors consider this an **Inspector Followup Item (50-254/265-96017-09)** pending further NRC review.

c. Conclusions

The inspectors identified the above weaknesses in the licensee's approach for determining control room operability in post accident situations. These issues were considered Inspector Followup Items pending further NRC review.

E8 Miscellaneous Engineering Issues (92902)

E8.1 (Closed) Licensee Event Report (LER) (50-265/95006): Motor Control Center 29-2 Main Feed Breaker Tripped Due to Inadequate Trip Setting. As documented in Inspection Reports 50-254/265-95007 and 95011, the events which resulted in generation of LER 50-265/95006 were the subject of an NRC enforcement conference held on November 25, 1995. This LER is closed.

E8.2 (Closed) Inspection Followup Item (50-254/265-94004-07): Prioritization of Work Requests. As documented in IR 50-254/265-94004, the work control process was burdened by such a large number of nuclear work requests (NWRs) that only high priority corrective maintenance items could be worked. In addition, there was no central focus on establishing equipment priorities.

As documented in IR 50-254/265-96010, the inspectors reviewed the licensee's work control process and determined that a revised work control process was in place which utilized both system engineers and lead unit planners to prioritize corrective maintenance activities. This Inspection Followup Item is closed.

E8.3 (Closed) LER (50-254/94017): Banked Position Withdrawal Sequence Rules Violated Since October 1991 Due To Training, Procedure, and Work Practice Deficiencies In The Nuclear Engineering Group. As discussed in

IR 50-254/265-94028. Unresolved Item (URI) 50-254/265-94028-01 was opened following discovery by the licensee that some control rods were withdrawn in the incorrect sequence during reactor startups since October 1991. This LER is administratively closed due to tracking it as URI 94028-01. The URI is still open pending inspector review.

E8.4 <u>(Closed) Unresolved Item 50-254/265-96014-05):</u> Torus Baseplate Bolt Inconsistencies Identified by the Inspector. The inspectors had identified inconsistencies in the bolting on the torus system saddle support baseplates. The licensee engineers performed additional system walkdowns and consulted with Duke Engineering and Services to provide an engineering assessment to determine whether the existing conditions were acceptable. Duke Engineering and Services Document 1598.00043.014 was submitted to the licensee design engineering supervisor on November 4, 1996. The inspectors reviewed this document and discussed the contents with the engineers. In conclusion, the documentation provided by the licensee verified that the as-found condition had not invalidated the design basis of the torus bolting. The inspectors verified that all observed inconsistencies were bounded by the design calculations. This item is closed.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 <u>Material Condition Issues Affecting Exposures</u>

The inspectors reviewed operator logs, PIFs, and viewed activities in progress. The inspectors interviewed operators, maintenance personnel, and radiological protection staff.

Due to various material condition concerns (See Section M2.3), the inspectors noted additional radiation exposures were received in an effort to either repair deficient material condition issues or to continue operating the unit with the deficient material condition. For example, operators were required to manually control gland seal condenser level when both level control valves for Unit 1 were inoperable. The local control station was in the feedwater heater bay; an area of elevated radiation dose. This dose plus the dose to workers attempting repairs on the valves may have been avoided with better repair efforts to these valves which have a history of problems. Dose rates in the area of the valves were much lower with the Unit shut down. The licensee did take efforts to reduce dose once both level control valves failed by lowering power in order to make the repairs. Operators were also required to enter the Unit 2 containment at power to manually isolate a reactor water cleanup valve because the remotely operated valve had not provided proper isolation when a leak on another valve occurred.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on December 6, 1996. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

ComEd

B. Pearce, Station Manager
F. Famulari, Site QV Director
J. Hutchinson, Engineering Manager
F. Tsakeres, Radiation Chemistry Superintendent
M. Wayland, Maintenance Superintendent

INSPECTION PROCEDURES USED

IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 62703:	Maintenance Observation
IP 64704:	Fire Protection Program
IP 71707:	Plant Operations
IP 71714:	Cold Weather Preparations
IP 73051:	Inservice Inspection - Review of Program
IP 73753:	Inservice Inspection
IP 83729:	Occupational Exposure During Extended Outages
IP 83750:	Occupational Exposure
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92902:	Followup - Engineering
IP 92903:	Followup - Maintenance
IP 93702:	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-254/265-96017-01	URI	poor understanding and control of licensing basis
50-254/265-96017-02	VIO	use of incorrect bolt material in RHRSW LP pumps
50-254/265-96017-03	NCV	Unit 2 operated past 30 days allowed by TS
50-254/265-96017-04	VIO	failure to report prohibited plant condition within 30 days
50-254/265-96017-05	IFI	engineering review of post modification testing reveals deficiencies
50-254/265-96017-06	VIO	failure to incorporate TS requirements into applicable surveillance procedures
50-254/265-96017-07	IFI	iodine scrubbing methodology
50-254/265-96017-08	IFI	station building ventilation status post-accident
50-254/265-96017-09	IFI	reactor power level assumed in the control room dose calculation

Closed

50-254/265-94004-23	URI	reactor vessel temperatures not recorded during cooldown
50-254-94011	LER	control cod L-11 failed to scram during rod time testing
50-254/265-94017-01	VIO	violation of procedure adherence, test control, and corrective actions associated with failure of a control rod scram during testing
50-254/265-96011-04	VIO	three examples of workers not properly executing work
50-254/265-96002-08	VIO	improper storage of EDG air start motors
50-265/95006	LER	MCC 29-2 main feed breaker tripped due to inadequate trip setting
50-254/265-94004-07	IFI	prioritization of work requests
50-254/94017	LER	banked position withdrawal sequence rules violated since October 1991 due to training, procedure, and work practice deficiencies in the nuclear engineering group
50-254/265-96014-05	URI	torus baseplate bolt inconsistencies identified by the inspector

LIST OF ACRONYMS USED

CFR - Code of Federal Regulations
CREFS - Control Room Filtration System
CREVS - Control Room Emergency Ventilation System
CST - Central Standard Time
d/p - differential pressure
DET - Diagnostic Evaluation Team
DRP - Division of Reactor Projects
EA - Enforcement Action
EDGCW - Emergency Diesel Generator Cooling Water
ENS - Emergency Notification System
FME - Foreign Material Exclusion
GDC - General Design Criteria
HP - High Pressure
HPCI - High Pressure Coolant Injection System
HVAC - Heating, ventilation, and air conditioning
IDNS - Illinois Department of Nuclear Safety
IR - Inspection Report
LCO - Limiting Condition for Operation
LCV - Level Control Valve
LER - Licensee Event Report
LOCA - Loss of Cooling Accident
LOOP - Loss of Offsite Power
LP - Low Pressure
LPCI - Low Pressure Coolant Injection
MMD - Mechanical Maintenance Department
MWe - Megawatts Electric
NRR - NRC Office of Nuclear Reactor Regulation
NWR - Nuclear Work Request
PDR - Public Document Room
PIF - Problem Identification Form
PM - Planned Maintenance
PMT - Post Maintenance Testing
PORC - Plant On-site Review Committee
QCOP - Quad Cities Operating Procedure
QCOS - Quad Cities Operating Surveillance
QCTS - Quad Cities Technical Staff Procedure
RG - Regulatory Guide
RHR - Residual Heat Removal
RHRSW - Residual Heat Removal Service Water
RPM - revolutions per minute
RWCU - Reactor Water Clean Up
SBV - Service Building Ventilation
SCFM - Standard Cubic Feet per Minute
SRP - Standard Review Plan
TS - Technical Specification
UFSAR - Updated Final Safety Analysis Report
UHS - Ultimate Heat Sink
URI - Unresolved Item