U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/94008(DRP)

Docket No. 50-331 License No. DPR-49

Licensee: IES Utilities Incorporated
IE Towers, P. O. Box 351
Cedar Rapids, IA 52406

Facility Name: Duane Arnold Energy Center

Inspection At: Palo, Iowa

Inspection Conducted: March 20 through May 6, 1994

Inspectors: J. Hopkins
C. Lipa
T. Tongue
B. Bartlett

Approved: for R. D. Lanksbury, Chief
Reactor Projects Section 3B

5/26/94
Date

Inspection Summary

Inspection on March 20 through May 6, 1994 (Report No. 50-331/94008(DRP))

Areas Inspected: Routine, unannounced inspection by the resident inspectors and region based inspectors of followup, licensee event reports followup, followup of events, operational safety, maintenance, surveillance, onsite engineering, regional requests, and report review.

Results: An executive summary follows:

EXECUTIVE SUMMARY

Plant Operations

A thorough pre-evolution briefing and excellent communications were observed in the control room during the routine, monthly down power operation for turbine control valve testing (Section 4.b). A non-cited violation was issued for failure to make a timely notification of a valid reactor water cleanup isolation (Section 5.c). An unresolved item was identified for additional review of training records (Section 9).

Maintenance

The lack of formal guidance to ensure instrument lines were filled and vented when restoring piping systems that had been drained was a weakness in the maintenance program (Section 5.a). Two examples of inadequate procedures to rebuild safety-related motors were considered an unresolved item. These procedures were further examples of the licensee's failure to ensure vendor recommended maintenance activities were incorporated into plant procedures (Section 5.e). Corrective actions to improve the reliability of the condensate storage tanks level switches has been effective. However, the inability to verify that the discharge piping on the high pressure coolant injection and the reactor core isolation cooling systems is full limits the licensee's ability to operate with the suctions for these systems lined up to the torus instead of the condensate storage tanks, (Section 6.a). Good identification during the biennial procedure review process revealed that the Rod Worth Minimizer surveillance testing did not meet technical specifications. Failure to perform the required surveillance resulted in a non-cited violation (Section 6.b).

Engineering

The inspectors observed good involvement by system engineering, reactor engineering, and management in ensuring replacement parts were available to rebuild the reactor recirculation pump seal, and in developing the degraded seal action plan (Section 4.a). The licensee conducted a thorough engineering review to determine if there were any generic considerations for the residual heat removal check valve failure (Section 5.a). Good engineering involvement was evident during the initial troubleshooting and replacement of the failed solenoid valves in the emergency service water pump start logic (Section 5.b). The initial documentation of the engineering evaluation regarding the use of quality level IV repair parts in the "B" standby diesel generator was considered weak (Section 7).

Plant Support

Failure to ensure a high radiation access door was shut and locked resulted in a non-cited violation (Section 2). Significant portions of the southeast corner room, which contains emergency core cooling system equipment, and the RCIC room were decontaminated. This improved the operators' access to safety-related equipment for routine inspections (Section 4).

DETAILS

1. Persons Contacted

*J. Franz, Vice President Nuclear
*D. Wilson, Plant Superintendent, Nuclear
R. Anderson, Operations Supervisor
*P. Bessette, Supervisor, Regulatory Communications
*J. Bjorseth, Maintenance Superintendent
*L. Henderson, Manager, Emergency Planning
J. Kinsey, Licensing Supervisor
*M. McDermott, Manager, Engineering
*K. Peveler, Manager, Corporate Quality Assurance
*S. Swails, Manager, Nuclear Training
*G. Van Middlesworth, Assistant Plant Superintendent, Operations and Maintenance
*T. Wilkerson, Manager, Radiation Protection
*K. Young, Manager, Nuclear Licensing

In addition, the inspectors interviewed other licensee personnel including operations shift supervisors, control room operators, engineering personnel, and contractor personnel (representing the licensee).

*Denotes those present at the exit interview on May 6, 1994.

2. Followup (92701)

(Closed) Unresolved Item 50-331/94006-01(DRSS): Locked High Radiation Area (LHRA) Door Found Ajar. On February 27, 1994, at approximately 5:02 p.m. (CST), with the plant at approximately 100 percent power, a locked high radiation area door to the steam jet air ejector (SJAE) room was found ajar by the licensee. The door was closed and resting against the door jamb, but not latched and locked. The SJAE room had been accessed several times prior to 5:00 a.m. on February 27, 1994, to support surveillance and maintenance activities in the room during a planned down power evolution. The last known exit through the door was approximately 5:07 a.m. by a non-licensed auxiliary operator (AO). There was no security card reader for the door. The AO thought the door had properly shut when the SJAE room was exited.

The licensee conducted an investigation of the event and determined that the event was caused by personnel error due to lack of attention to detail. The investigation concluded that no other personnel entered the SJAE room after the AO exited at 5:07 a.m. The licensee's immediate corrective actions included repairing the door latch mechanism, verifying all LHRA doors were closed and locked, and providing training to plant personnel involved with the event. Additionally, operations personnel were no longer allowed to make high radiation area entries for routine rounds without health physics personnel being present. The past practice had been that operators were allowed to enter high radiation areas unaccompanied due to the special training they received on the

entry requirements and the use of radiation survey instruments. This restriction will be lifted upon completion of requalification training on the entry requirements being provided for operations personnel. This was the first time a LHRA door was found ajar since 1991. Failure to ensure a high radiation access door was shut and locked was a violation of technical specification (TS) 6.9.3. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B (2) of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C). This unresolved item is closed.

One non-cited violation and no deviations were identified in this area.

3. Licensee Event Reports (LER) Followup (92700) (90712)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective actions were accomplished, and corrective actions to prevent recurrence had been accomplished in accordance with technical specifications.

(Closed) LER 50-331/92018-00 and 01: Turbine Trip and Reactor Scram Resulting from the "A" Circulating Water Pump Failure and Subsequent Loss of Condenser Vacuum. This event was caused by a failure of bolts in the "A" circulation water (CW) pump. The bolts in question had been in service for about 7 months and were subsequently found with excessive corrosion and pitting from CW treatment chemicals. In addition, they were found to have been torqued to less than 20 percent of the manufacturer's recommendation. The low torque allowed the CW pump flanges to rotate during pump operation and cock the bolts. That led to large stresses on the bolts and eventual failure. All of the bolts in question were replaced during the pump repair. All of the bolts in the "B" CW pump were examined and found to be acceptable. This LER is closed.

(Closed) LER 50-331/92016-00: Loss of Control Building Air Conditioning Due to Inoperability of Both Control Building Chillers Caused by Air Intrusion Into the Chilled Water Piping. The investigation revealed that air was entrapped in the chilled water system. However, the source was unknown and the event did not recur. During a maintenance period in November 1992, the electrical and mechanical systems were checked. One loose wire was identified and tightened in the control circuit, but it was unlikely to have been the cause of this event. The licensee appears to have conducted an extensive evaluation and diagnosis. This LER is closed.

No violations or deviations were identified in this area.

4. Operational Safety Verification (71707) (71710)

The inspectors observed control room operations, reviewed applicable logs, and conducted discussions with control room operators during the inspection. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified proper return to service of affected components. Tours of the reactor building and turbine building were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, and excessive vibrations and to verify that maintenance requests had been initiated for equipment in need of maintenance. It was observed that the Plant Superintendent, Assistant Plant Superintendent of Operations and Maintenance, and the Operations Supervisor were well-informed of the overall status of the plant and that they made frequent visits to the control room. The inspectors, by observation and direct interview, verified that the physical security plan was being implemented in accordance with the station security plan.

The inspectors observed plant housekeeping and cleanliness conditions and verified implementation of radiation protection controls. As part of the plant's ongoing program to reduce the amount of contaminated area in the plant, significant portions of the southeast corner room, which contained emergency core cooling system (ECCS) equipment, and the RCIC room were decontaminated. This improved the operators' access to safety-related equipment for routine inspections.

These reviews and observations were conducted to verify that facility operations were in conformance with the requirements established under technical specifications, Title 10 of the *Code of Federal Regulations*, and administrative procedures.

a. Pressure Oscillations on "B" Reactor Recirculation Pump Number Two Seal

Pressure oscillations of the "B" reactor recirculation pump number two seal continued during the report period. Oscillations were first observed during the routine down power operation on January 18, 1994. (See inspection report (IR) 331/94006 for additional information). The pressure oscillations were most pronounced during the routine, monthly down power operations for turbine control valve testing on March 26 and April 23, 1994. Pressure indications on the number one seal and both of the "A" reactor recirculation pump seals were normal. Identified drywell leakage increased to approximately 1.6 gallons per minute (gpm) during the pressure oscillations and then returned to the nominal 1.51 gpm. The maximum TS limit for unidentified leakage into the primary containment was 5 gpm, and 25 gpm total leakage. The licensee verified that all parts required to rebuild one seal package were available onsite. Control room operating orders were developed to provide an action plan if seal performance continued to deteriorate. Special operating orders for the reactor recirculating pumps were used during plant down power operations

to minimize transient of "B" recirculation pump seal. The inspectors observed good involvement by system engineering, reactor engineering, and management in ensuring replacement parts were available to rebuild the seal and in developing the degraded seal action plan. The inspectors will continue to monitor the performance of the pump seals.

b. Down Power Operations

On March 26, 1994, the inspectors observed the routine, monthly down power operations for turbine control valve testing. The pre-evolution briefing was thorough, and special emphasis was placed on reactor recirculation pump operation. Communications during observed portions of the evolution were excellent.

No violations or deviations were identified in this area.

5. Monthly Maintenance Observation (62703) (93702)

Station maintenance activities of safety-related systems and components listed below were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards, and in conformance with technical specifications (TS).

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and fire prevention controls were implemented.

Work requests were reviewed to determine status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which might affect system performance.

Portions of the following maintenance activities were observed and/or reviewed:

- "A" control building chiller well water return valve (MO-2077) Valve Operation Testing and Evaluation System (VOTES) testing.

- RWCU pressure gage and switch calibration (PDIS-2747).

- "A" core spray motor operated valve (MOV) refurbishment (MO-2100) and VOTES testing (MO-2147).

- "A" residual heat removal service water (RHRSW) pump replacement.

- "B" emergency service water (ESW) pump control power fuse failure.

a. "B" Residual Heat Removal (RHR) Pump Discharge Check Valve

On March 21, 1994, with the reactor at approximately 100 percent power, the licensee determined that the "B" RHR pump discharge check valve, V19-003, was not properly seated. With the 12-inch check valve not properly seated, the "keep fill" system could not maintain the discharge piping of the core spray and RHR systems full of water to prevent a water hammer during pump start. The "B" RHR pump was declared inoperable, the 30-day TS limiting condition for operation (LCO) was entered, and repair activities were initiated. The hinge pin on the check valve had slipped out of the hinge support post and prevented the valve from properly seating. The hinge pin set screw, which was "tack welded" to the hinge support post, had not been properly installed by the valve manufacturer, Anchor-Darling, during initial installation. A larger set screw was properly installed, "tack welded" in place, post-maintenance testing was satisfactorily completed, and the "B" RHR pump was declared operable on March 25.

The licensee determined that the check valve was original equipment and had never been rebuilt. Based on a records review, the licensee confirmed that all of the hinge pin set screws on the Anchor-Darling check valves used in safety-related applications had been inspected to determine if the set screws were "tack welded" in place. The inspections had not confirmed that the set screws were properly installed. A review was conducted of different models and manufacturers of check valves to determine if there were any generic considerations. Based on the different designs, the licensee concluded that only the 12-inch Anchor-Darling check valves were susceptible to this failure mechanism. Since 7 of these 10 check valves had been rebuilt at the plant, the licensee concluded there was reasonable assurance the set screws were properly installed and additional inspection was not warranted. Additionally, the licensee concluded that since the existing testing programs and control room indications could identify a performance concern prior to the valves' failure, the remaining three valves would be inspected no later than the refueling outage scheduled in early 1995. The licensee conducted a thorough engineering review to determine if there were any generic considerations related to the check valve failure.

During the post-maintenance testing of V19-003, the inspectors were concerned that there were no clear maintenance directions to ensure that the instrument lines in the RHR piping that had been drained, were properly filled and vented prior to returning the system to service. The licensee stated that the procedures used to restore systems to service (valve lineup sheets and tagout sheets) did not specifically address filling and venting instrumentation. The licensee relied on the operating experience and memory of control room personnel to identify instruments that

required filling and venting prior to being returned to service. The lack of guidance to ensure instruments were filled and vented when the piping system was drained was a weakness in the maintenance program.

The licensee's interim corrective actions included: (1) identification of instruments that were historically difficult to vent and (2) development of an instrument recovery plan, if needed, for instruments in systems that have been drained. Long term corrective actions included: (1) revising the tagout procedure to require development of a recovery plan for instruments in systems that have been drained and (2) equipment and/or procedure modifications for instruments that were difficult to vent. The inspectors will continue to evaluate the license's actions on returning equipment to service.

b. "B" ESW Pump Control Power Fuse

On April 1, 1994, with the plant operating at approximately 100 percent power, a control power fuse in the "B" ESW pump start logic failed. The failed fuse actuated an annunciator in the main control room. The cause was a ground fault on normally energized solenoid valve (SV) 1956B. The failed fuse would have prevented a manual start of the "B" ESW pump from the control room. The pump could have automatically started in response to an engineered safety feature signal and could have manually started from the remote shutdown panel. The failed fuse and solenoid valve were replaced, post-maintenance testing was successfully completed, and the "B" ESW pump was declared operable on April 2. If this failure had occurred on the "A" ESW pump, it would also have alarmed in the control room. However, the "A" ESW pump would not have started automatically or manually. The purpose of SV-1956B was to switch the control building chiller cooling water discharge from the normal, nonsafety-related well water system, to the safety-related ESW system.

Valve SV-1956B had previously failed on February 24, 1994. The valve was replaced, and the failed component was returned to the manufacturer, American Solenoid Company (ASCO), for failure analysis. The inspectors reviewed the maintenance history for SV-1956A and 1956B and determined that SV-1956A had been inspected in 1990 and both solenoid valves replaced during the refueling outage in September 1993. The solenoids were replaced with different ASCO models because safety-related rebuild kits were no longer provided for the existing model. Both solenoid valves had been in service for at least 15 years. Since SV-1956B had failed two times since the 1993 refueling outage, the licensee suspected that the "lot" was defective and replaced the solenoid valves for both ESW pumps with another ASCO model solenoid valve. Both solenoid valves and the spare in the warehouse were returned to ASCO for failure analysis. The ESW pump start logic was the only application where that model was used. The replacement solenoid

valve model was being used in a similar application for the standby diesel generator (SBDG) cooling system and had a good performance history. Valves SV-1956A and 1956B were replaced on April 11 and 14 respectively.

The inspectors reviewed the 10 CFR 50.59 evaluation and the engineering maintenance action that justified the use of a different model ASCO solenoid valve and had no concerns. Good engineering involvement was evident during the initial troubleshooting and replacement of the solenoid valves. The inspectors will continue to evaluate the licensee's root cause analysis for the failed solenoid valves.

c. RWCU Isolation During Preparation for Maintenance

On April 26, 1994, at approximately 4:00 a.m. (CDT), with the plant operating at approximately 100 percent power and while the "A" RWCU pump was being tagged out, isolated, and drained for maintenance, the RWCU system isolated due to a high differential flow signal. The suspected cause was the "A" RWCU manual discharge valve (V-27-05), which was operated with a reach rod, had not been fully closed when the valve was tagged shut. With V-27-05 not fully shut, backflow through the pump discharge line to the drain path resulted in a flow mismatch between flow entering and leaving the RWCU system. The licensee implemented interim guidance in the form of shift orders to locally verify position at the valve for those valves that have reach rods. Long term actions were being discussed. The inspectors will continue to follow the licensee's progress in resolving these issues.

The licensee's preliminary determination was that the event was not reportable based on the conclusion that the signal was invalid. However, upon further review, the licensee determined that the event was reportable within 4 hours as required by 10 CFR 50.72(b)(2)ii and made the notification at 11:30 a.m. on April 26, 1994. The licensee's corrective action for the late notification was to provide training on reportability and the distinction between valid and invalid signals. The failure to notify the NRC of a valid RWCU isolation within 4 hours was a violation of 10 CFR 50.72(b)(2)ii. This violation was not cited because the violation met the criteria specified in Section VII.B(1) of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C).

d. MOV Testing

The inspectors observed portions of MOV maintenance and VOTES testing and reviewed several completed test packages. The inspectors noted that the mechanics and technicians involved with MOV work were knowledgeable and the testing was performed properly. The licensee's acceptance criteria and engineering

evaluation of the test results were thorough and had improved since a weakness was identified in this area during the Generic Letter (GL) 89-10 inspection in December 1993. (See IR 331/93019 for additional information.) The inspectors will continue to evaluate the licensee's progress in this area.

e. "A" RHRSW Pump Replacement

Between April 18 and 22, 1994, with the plant operating at 100 percent power, the "A" RHRSW pump was replaced due to increased vibrations identified by the licensee's predictive maintenance and inservice testing (IST) programs. The pump's performance had deteriorated, but had remained within TS limits. Since there were no indications that the performance of the motor had been affected by the pump's vibrations, the motor was not replaced. The licensee determined that the bottom impeller had separated from the shaft lock collet. (The shaft lock collet holds the impeller in place on the pump shaft.) A root cause analysis for the failure was in progress. The new pump was installed, post-maintenance testing was completed, and the "A" RHRSW pump was declared operable on April 22. The RHRSW pumps were on a 5-year replacement cycle, and the "A" pump had been last replaced in August 1991.

On April 26, while gathering new baseline pump performance data, upward axial motion of the motor shaft was identified. Based on the design of the motor bearings, there should not have been any upward motion. This was an example of good attention to detail by the maintenance technicians. The motor was removed and inspected. Motor axial downward endplay was measured at 0.108 inches, vice the nominal 0.015 to 0.020 inches. The lock washer for the top motor shaft nut was found properly installed. No damage to the motor or bearings was identified. The upper and lower motor bearings were replaced, the endplay was correctly adjusted, post-maintenance testing was completed satisfactorily, and the "A" RHRSW pump was declared operable on April 29. After discussions with the vendor, the licensee's initial conclusion was that the excessive axial motion was not responsible for the early degradation of the pump.

During the initial troubleshooting for the excessive endplay, the licensee determined that the plant procedure used to rebuild the "A," "C," and "D" RHRSW motors in 1991 was inadequate. The "B" RHRSW motor has never been rebuilt. Maintenance department procedure, MOTOR-G080-002, "General Electric High Thrust Vertical Induction Motors," had not provided specific instructions for bearing removal or installation, motor endplay adjustment, or motor nut locking ring installation. The procedure had been revised in 1991, after the motors were rebuilt, when this specific weakness was identified by contract personnel involved in maintenance procedure development. After an engineering evaluation and discussions with the vendor, the licensee concluded

that "C" and "D" RHRSW pumps were operable even though excessive endplay of the motor was possible. The basis for the conclusion was: (1) the excessive axial motion was not responsible for the early degradation of the "A" RHRSW pump and (2) the predictive maintenance and IST programs, which had identified the degradation on the "A" RHRSW pump, were reviewed for the "C" and "D" pumps and no concerns were identified. The axial endplay for the "D" RHRSW motor, measured on May 3, 1994, was 0.035 inches. It was adjusted to 0.017 inches. The licensee planned to measure the "C" RHRSW motor during the next routine scheduled maintenance in July 1994. The inspectors reviewed the licensee's initial evaluations and had no immediate concerns. Good engineering involvement was observed in the thorough and detailed evaluation for continued operability of the "C" and "D" RHRSW pumps.

Based on the similarities between the excessive endplay of the "A" RHRSW motor and the "C" RHR pump (see IR 331/94002 for additional information on the "C" RHR pump), the inspectors reviewed the licensee's evaluation of the generic implications of the failure of the "C" RHR pump. Pumps with vertical thrust motors, such as core spray (CS), ESW, RHRSW, river water supply (RWS), and condensate system were included in the evaluation. The cause for the excessive endplay of the "C" RHR pump was that the locking washer for the top motor shaft nut was not properly bent to prevent motor nut rotation. The licensee had verified that the locking tab was properly bent on the other three RHR pumps and the two CS pumps. Additionally, the endplay on the "A" CS and "A" RHR pumps was measured in February and March 1994 respectively. The "A" CS pump required a minor adjustment, and the "A" RHR pump was within tolerance. The remaining RHR and CS pumps were scheduled to be measured during the next routine scheduled maintenance in 1994. The licensee concluded that based on motor and pump design, only the RHR and CS pumps were susceptible to the motor nut backing off. The inspectors concluded that the licensee's evaluation of the generic implications of the failure of the "C" RHR pump was comprehensive.

Additionally, the licensee's evaluation determined that the plant procedure used to rebuild the "B" and "C" RWS motors in 1985 and 1987 respectively, was inadequate. Maintenance department procedure, MOTOR-W120-001, "Westinghouse Vertical High Thrust Induction Motors," had not provided specific instructions for bearing removal or installation, motor endplay adjustment, or motor nut locking ring installation. The "A" RWS motor had never been rebuilt, and the "D" RWS motor had been rebuilt by Westinghouse in 1991. Trending data from the predictive maintenance and IST programs for the RWS pumps was reviewed and no concerns were identified. At the end of the report period, the licensee was determining if additional inspection of the RWS motors was needed, and was revising the motor maintenance procedure.

The maintenance procedures used to rebuild the RHRSW and RWS motors were further examples of the licensee's failure to ensure vendor recommended maintenance activities were incorporated into plant procedures. This same concern contributed to an inoperable SBDG during the 1993 refueling outage and a missed TS surveillance, identified in January 1994. (See IRs 331/93021 and 94002 for additional information.) As part of the licensee's response to the Notice of Violation for the inoperable SBDG, maintenance procedures that were developed using direct observation of maintenance activities performed by a vendor, were being reviewed to determine if important technical information had been omitted. At the end of the report period, the licensee was determining if the procedure used to rebuild the RWS motors was developed using the direct observation method described above.

Since the issue was identified late in the report period, the two examples of inadequate procedures to rebuild safety-related motors were considered an unresolved item (URI) 331/94008-01(DRP). The inspectors will continue to evaluate the licensee's actions to ensure important technical information had been incorporated into plant procedures.

One non-cited violation and no deviations were identified in this area. One URI was identified.

6. Monthly Surveillance Observation (61726) (93702)

The inspectors observed technical specification (TS) required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting conditions for operation were met, that removal and restoration of the affected components were accomplished, that test results conformed with TS and procedure requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The inspectors witnessed portions of the following test activities:

STP 42A022-CY - RCIC Exhaust Diaphragm Functional/Calibration.

STP 42B008-Q - Functional and Calibration of Reactor Pressure - Low (Low Pressure Coolant Injection (LPCI) Loop Select) Channel Instrumentation.

STP 42B019 - Condensate Storage Tank Low Water Level Quarterly Calibration.

STP 42C001-Q - Quarterly Functional Test and Calibration of Average Power Range Monitor.

STP 42F001-SA - Reactor Water Level and Pressure Instrument Calibration.

STP 43C002 - Rod Worth Minimizer Operability Check.

STP 45A008-A - LPCI Subsystem Simulated Automatic Actuation.

STP 45D001-Q - HPCI System Quarterly Operability Test

STP 45J002-Q - RWS System Operability Test.

STP NS93001 Main Turbine Operational Tests.

a. "B" CST Level Switch

On April 7, 1994, during the performance of preplanned maintenance on "B" CST level switch (LS) 5219, the support plate in the level switch junction box was determined to be corroded. The level switch was declared inoperable and a 24-hour limiting condition for operation (LCO) was entered at approximately 7:58 a.m. If the level switch was not repaired within 24 hours, a plant shutdown would have been required within the following 12 hours. The licensee contacted Region III management to discuss possible enforcement discretion if the repairs were not completed in time to perform a controlled reactor shutdown. The support plate was replaced, the preplanned maintenance was completed, LS 5219 was recalibrated, and the LCO exited at approximately 10:47 a.m. on April 8. Since the level switch was declared operable before the plant needed to begin the shutdown, enforcement discretion was not required. The plant was at approximately 100 percent throughout the repair activities. The support plate for the "A" CST level switch was inspected and no concerns were identified.

The purpose of CST level switches was to transfer the high pressure coolant injection (HPCI) and RCIC systems suction paths from the CST to the torus, on low CST level. There was one level switch for each CST, and both were required by TS to be operable. As stated above, the TS action statement required the level instrument to be placed in the tripped condition within 24 hours, if repairs were not completed. Placing either CST low level switch in the tripped position would have caused RCIC and HPCI suction paths to transfer to the torus. Due to the HPCI and RCIC system configurations, if the suctions were switched to the torus, there were no assurances that the discharge piping for the systems would remain full, since neither system had a keep-fill system. This would have rendered the HPCI and RCIC systems inoperable. Technical specifications required the plant to be in hot shutdown within 12 hours if HPCI and RCIC were inoperable.

On April 8 at approximately 11:05 a.m., the licensee notified the NRC in accordance with 10 CFR 50.72 that the HPCI system was not capable of performing its intended function. All other ECCS were operable. After further review of the event, the licensee determined that the HPCI and RCIC systems were capable of automatically injecting into the reactor vessel even though the

suctions of the systems would not have automatically transferred to the torus on a low CST level signal. Existing plant procedures provided adequate directions to the control room operators to transfer the pumps' suctions to the torus on low CST level. The inspectors reviewed the licensee's evaluation and had no immediate concerns. The 10 CFR 50.72 notification was retracted on April 21.

The licensee had experienced problems with the CST level switches several times in the past, most recently in April and May 1993. (See IR 331/93007 for additional information.) The planned maintenance on April 7, 1994, was part of the corrective actions to improve the reliability of the CST level switches. The licensee's corrective actions to improve the reliability of the CST level switches has been effective. However, the cause of the concern, the inability to verify that the HPCI and RCIC systems discharge piping is full, continues to be of concern. The improvements were completed on the "A" CST in the summer of 1993. The licensee was also evaluating various methods to verify that the HPCI and RCIC systems discharge piping is full when taking suction from the torus. The inspectors will continue to follow the licensee's progress in resolving these issues.

b. Missed Rod Worth Minimizer Surveillance

On April 19, 1994, during the biennial review of STP-43C002, "Rod Worth Minimizer Operability Check," Revision 1, the licensee identified that the Surveillance Test Procedure (STP) did not demonstrate the inability to withdraw an out-of-sequence control rod during reactor shutdown as required by TS 4.3.C.1.d. The STP adequately tested the inability to withdraw an out-of-sequence control rod during startup. The inspectors considered the identification of the omission to be good. A deviation report (DR) was issued to document the condition, a document change form was promptly issued to correct the STP, and the licensee was pursuing identification of root cause in response to the DR. The failure to meet the TS surveillance requirement was a violation of TS 4.3.C.1.d. This violation was not cited because the licensee's efforts in identifying and correcting the violation met the criteria specified in Section VII.B(2) of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C).

c. RCIC Exhaust Diaphragm Pressure Switches.

On March 30, 1994, with the reactor at approximately 100 percent power, three of the four RCIC exhaust diaphragm pressure switches were replaced. This was due to a negative trend in performance identified during the fall of 1993 on several of the switches. The fourth spare switch had failed pre-installation bench testing and was not used as a replacement. Each of the Barksdale diaphragm pressure switches was checked for its "as found"

setpoint and then replaced with the new pressure switch, prior to moving on to the next switch. STP 42A022-CY, "RCIC Exhaust Diaphragm Functional/Calibration," was used to record the "as found" values for the pressure switches. Three of the four pressure switches were found high out of tolerance. The licensee notified the NRC in accordance with 10 CFR 50.72 that the RCIC steam line isolation system was not capable of performing its intended function. All other ECCs were operable while the pressure switches were being replaced.

The purpose of the pressure switches was to detect a degraded or leaking inner rupture diaphragm by monitoring the pressure between the diaphragms. If the inner disk leaked, the pressure switches would close the RCIC steam supply isolation valves, which were primary containment isolation valves (PCIS), before the outer rupture diaphragm was challenged. The licensee reviewed the event and concluded that the intended function of the pressure switches was to provide early warning of a potentially degraded inner rupture diaphragm and not to provide a primary containment isolation function. The steam leak detection system provided the primary containment isolation function in the event that both diaphragms ruptured. The inspectors reviewed the licensee's evaluation and had no immediate concerns. The 10 CFR 50.72 notification was retracted on April 26.

Based on recent concerns with instrument drift of Barksdale pressure switches, the inspectors reviewed the licensee's evaluation of the performance of the pressure switches. (See IRs 331/93023 and 94002 for additional information.) The licensee's action plan was focused on Barksdale bourdon tube pressure switches because the other models and manufacturers had not exhibited a poor performance history. The action plan developed from the evaluation included: (1) replacement of wide range pressure switches used in low setpoint applications with models with a smaller range; (2) continued increased surveillance frequency until the models were replaced; and (3) modification of the maximum margin for setpoint drift between surveillance testing. Changes to TS were required in some cases prior to completing item number three.

The licensee's long term corrective action for the RCIC exhaust diaphragm pressure switches was to replace all four with models having a smaller range. The inspectors will continue to evaluate the licensee's actions to improve the performance of the Barksdale pressure switches.

One non-cited violation and no deviations were identified in this area.

7. Onsite Engineering (37551) (93702)

"B" SBDG Servo-Motor Booster Assembly Oil Leak

During operator rounds on May 1, 1994, low oil level was noted in the "B" SBDG governor sight glass. The licensee promptly evaluated the condition, determined the source and severity of the leak, entered a 7-day LCO in accordance with the TS, and repaired the servo-motor booster assembly on May 3. The inspectors considered the identification of the leak to be a good effort, however, they were concerned that the licensee declassified the repair parts from quality level one to quality level four without sufficient justification. Specifically, the Classification of Subcomponents and Materials (CSM) form used to determine the required quality level for the repair parts did not adequately document the justification for the acceptability of the quality level four parts in this case. On May 4, the licensee received a complete quality level one assembly from Coltec Industries and decided to replace the assembly rather than perform additional evaluation regarding the acceptability of the quality level four repair parts. The SBDG was declared operable on May 5, 1994. The inspectors had no further concerns regarding repair or operability of the SBDG, but will continue to evaluate the licensee's CSM process.

8. Regional Requests (92701)

Containment Emergency Sump (90700)

In August 1993, during the recent refueling outage, an inspection of the six ECCS suction strainers, located in the torus, was conducted. The inspection determined that the strainers were in good operating condition with less than 1 percent of the strainer screens fouled with debris. The debris was removed. The condition of the stainers was video taped before and after the cleaning.

Based on the results of the August 1993 inspection, the licensee concluded that the concerns identified in Information Notice 89-77, Supplement 1, "Debris in Containment Emergency Sumps and Incorrect Screen Configurations," had been adequately reviewed and evaluated.

No violations or deviations were identified in this area.

9. Training Records Inspection

The purpose of the inspection was to review training attendance sheets to determine if the records used to document attendance, specifically licensed operator requalification training program, attendance, met the NRC's expectations as outlined in 10 CFR Part 55. The inspection consisted of a review of program implementing procedures, representative records, and interviews with training department personnel.

The inspectors determined that the licensee's past and current methods of maintaining records for course and class attendance, though

improving, does not assure that attendance sheets accurately reflect the actual training received by attendees. This issue was considered unresolved pending further review by Region III specialists (URI 331/94008-02(DRS)).

No violations or deviations were identified in this area. One URI was identified.

10. Report Review (90713)

During the inspection period, the inspectors reviewed the licensee's monthly operating report for April 1994. The inspectors confirmed that the information provided met the requirements of TS 6.11.1.C and Regulatory Guide 1.16.

No violations or deviations were identified in this area.

11. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. Unresolved items disclosed during the inspection are discussed in Sections 5.e and 9.

12. Violations For Which A "Notice of Violation" Will Not Be Issued

The NRC uses the Notice of Violation to formally document the failure to meet a legally binding requirement. However, because the NRC wants to encourage and support licensee initiatives for self-identification and correction of problems, the NRC will not issue a Notice of Violation if the criteria set forth in Section VII.B(2) of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C) are met. Violations of regulatory requirements identified during the inspection for which a Notice of Violation will not be issued are discussed in Sections 2, 5.c, and 6.b.

13. Exit Interview (30703)

The inspectors met with licensee representatives (denoted in Section 1) on May 6, 1994, and informally throughout the inspection period and summarized the scope and findings of the inspection activities. The inspectors also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspectors. The licensee did not identify any such documents or processes as proprietary. The licensee acknowledged the findings of the inspection.