U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-237/95004; 50-249/95004

Docket Nos. 50-237; 50-249

License Nos. DPR-19; DPR-25

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place - Suite 300
Downers Grove, IL 60515

Facility Name: Dresden Nuclear Power Station, Units 2 and 3

Inspection At: Morris, IL

Inspection Conducted: January 25 through February 10, 1995

Inspectors: C. Phillips, Resident Inspector
A. M. Stone, Resident Inspector

Approved By: P. L. Hiland 2/24/95
P. L. Hiland, Chief Date
Reactor Projects Section 1B

Inspection Summary

Inspection from January 25 through February 10, 1995 (Report Nos. 50-237/95004; 50-249/95004)

Areas Inspected: Special safety inspection of the circumstances involved in the trip and restart of the 2B reactor recirculation pump on January 10, 1995, and the loss of suppression chamber to reactor building vacuum breaker check valve primary containment integrity identified on February 3, 1995.

Results: One apparent violation of 10 CFR 50, Appendix B, Criterion V, with three examples, and two apparent violations of technical specification requirements were identified.

EXECUTIVE SUMMARY
Dresden Nuclear Power Station
Report No. 95004

Plant Operations

Procedural adherence and adequacy, and training were considered poor. Operators started an idle reactor recirculation pump at power, apparently in violation of the technical specification and plant procedure. The operating crew identified the technical specification and procedure problems but did not contact senior operations management, station management, or engineering personnel prior to the pump start. In addition, an operator performed a surveillance test on containment vacuum breaker check valves and left a breach in the containment boundary. The as-left condition resulted in exceeding the technical specification primary containment leakage limits (0.6 La) for 4 weeks.

Maintenance and Surveillance

Poor maintenance practices resulted in tripping the 2B reactor recirculation pump.

Engineering and Technical Support

Site engineers demonstrated a good questioning attitude during the review of an operating surveillance on primary containment valves.

Safety Assessment and Quality Verification

An ISEG (independent safety engineering group) engineer was in the control room when the 2B reactor recirculation pump tripped. The ISEG engineer became aware of a pump start procedure problem and advised the operating crew to stop and contact engineering. The ISEG engineer took no further action until after the pump was restarted (NOTE: At Dresden, the ISEG engineers were part of the site quality verification (SQV) organization). Initially, station management took minimal action after the event.

DETAILS

1.0 2B REACTOR RECIRCULATION PUMP TRIP AND RESTART

1.1 Overview

The 2B reactor recirculation pump tripped while at power as a result of tripping the associated motor-generator. The recirculation pump was restarted without meeting the requirements of the technical specification or the pump restart procedure. The cause of the failure to comply with the procedure and the technical specification was a combination of equipment failures and the operating crew's decision to work around equipment and procedure problems. In addition, the operating crew failed to secure seal purge flow to the 2B recirculation pump while the loop was idle as required by the pump trip procedure. The inspectors concluded that actions taken by an ISEG engineer present in the control room, and station management's initial response to the event were weak. The licensee reporting of the event and the short term corrective actions appeared adequate.

One apparent violation of 10 CFR 50, Appendix B, Criterion V, with two examples, and one apparent violation of Technical Specification 4.6.H.5 were identified.

1.2 Trip and Restart of Reactor Recirculation Pump 2B

On January 10, 1995, mechanical maintenance personnel were assigned Work Package D29163 to repair the 2A recirculation pump motor-generator set temperature control valve (TCV). The mechanical maintenance foreman requested assistance from instrument maintenance (IM) personnel to verify proper operation of the TCV's positioner. The IM technician inadvertently manipulated and closed the controller for the 2B TCV. This action caused an increase in oil temperature and a subsequent 2B motor-generator and recirculation pump trip.

The cause of the recirculation pump trip was promptly identified by the operating crew as the maintenance personnel error on the TCV controller. The operators prepared to start the 2B recirculation pump but discovered that the pump start procedure instructions could not be met. Specifically, Dresden Operating Procedure (DOP) 0202-01, "Unit 2 Reactor Recirculation System Startup," Revision 14, step G.10.b, stated that prior to starting a second pump verify the following temperature limitations: "If reactor pressure is greater than or equal to 25 psig, then reactor vessel bottom head thermocouple temperature is within 145°F of the steam space temperature." The reason for maintaining the temperature difference less than 145°F was to prevent thermal stress to the control rod drive stub tubes. The indicated temperature difference prior to the pump trip was about 150°F.

Pump Restart

The operating crew referred to Technical Specification 3.6.H.5 which stated, "An idle recirculation pump shall not be started unless the temperature differential between the reactor vessel steam space coolant and the bottom head drain line coolant is less than or equal to 145°F." Technical Specification Surveillance 4.6.H.5 required that the temperature differential be determined within 15 minutes prior to the pump start. The bottom head drain line had been blocked for many years and had no flow at the time the pump tripped. The bottom drain line thermocouple read 126°F when the pump tripped making the temperature differential about 400°F. Therefore, restart of the pump in accordance with the technical specification was not possible under the existing plant conditions.

The operating crew concluded that alternate temperature indications could be used to meet the technical specification and procedural intent. This determination was made without discussion with senior operations management, station management, or engineering personnel. The operators interviewed all stated that the problem had been discussed and the course of action agreed upon. However, there appeared to be a difference between what the reactor operator and the shift manager understood. The unit operator's log stated that the temperature difference between the bottom head and the active recirculation loop discharge temperature was used and was less that 145°F. The shift manager's log stated that the temperature difference between the running recirculation pump discharge and the steam space was used. The shift manager's log also stated that this temperature differential met the intent of the technical specification.

At about 10:50 a.m. the 2A reactor recirculation pump was restarted based on the crew's belief that the intent of the procedure and technical specifications was met.

Site Quality Verification (SQV) Oversight

An ISEG engineer present in the control room during the event advised the operating crew to stop and consult with engineering about the procedure problem before proceeding. The ISEG engineer was not aware of the technical specification requirement. The crew took the ISEG engineer's advice under consideration but, because an engineering decision would take too long, decided to continue with the pump start. After the pump start, the ISEG engineer returned to the control room with an SQV supervisor and discussed the procedural problems observed. The next day (January 11) SQV management met with the operations managers for Units 2 and 3 and discussed the lack of procedural adherence.

Licensee's Initial Response

On January 15, five days after the event, the Unit 2 operations manager generated a problem identification form (PIF) stating that the shift had to use alternate indications to ensure that the technical specification requirement was met. On January 19 the involved shift manager wrote a PIF stating that no technical guidance had been issued to resolve what had been deemed a procedural adherence violation. Following inquiries from the inspectors and Region III management, the licensee designated an investigative team to review the event.

Short Term Corrective Actions

The failure to comply with the technical specification was reported as required by 10 CFR 50.73 in Licensee Event Report 50-237/95003-00, dated February 9, 1995. That report appeared complete and accurate in the description and evaluation of the event.

The licensee took the following short term corrective actions:

- The shift operations supervisor distributed operations orders that the units will shut down if a recirculation pump trip occurs.
- The Unit 2 operations manager discussed the event with the operations management team involved and coached them on conservative decision making.
- Each shift manager and unit supervisor (licensed senior reactor operators) acknowledged an understanding that literal compliance with technical specifications was required except under emergency situations defined by 10 CFR 50.54(x).
- All-station meetings were conducted concerning the importance of procedural adherence.

Procedural Implementation And Training

Service Information Letter (SIL) No. 251, dated October 31, 1977, discussed the need to determine the differential temperature between the steam space and the bottom head drain line coolant temperature before starting a recirculation pump in an idle loop. SIL No. 430, dated September 27, 1985, discussed reactor pressure vessel temperature monitoring and stated that if bottom head drain line coolant temperature was not available, recirculation line suction temperature was an acceptable alternative.

Technical Specification Amendment 127, effective July 17, 1994, imposed differential temperature limits between the drain line coolant and the steam space coolant. Procedure revision 13 to DOP 0202-01, intended to implement the technical specification requirement, did not agree with the technical specification. The temperature monitoring points in the technical specification were different from those used in the pump start

procedure. Revision 13 to DOP 0202-01 was not made until November 3, 1994, four months after the technical specification became effective. Training records indicated that the operators had reviewed the required reading that described the technical specification change; however, the operators interviewed did not recall training provided on the technical specification change. There was no documentation that the operations department was trained on procedure revision 13 to DOP 0202-01.

Seal Purge Flow

Dresden Operations Abnormal (DOA) Procedure 0202-01, "Recirculation Pump Trip - One or Both Pumps," Revision 10, step 12 required that if idle loop starts were not planned within an hour, then isolate seal purge flow. Initially, the operating crew intended to restart the pump and did not isolate seal purge flow to the 2B recirculation pump. However, the pump was not restarted until 2 hours and 22 minutes after the trip. The purpose for isolating seal purge flow was to minimize idle loop cooldown in areas not detected by the loop's thermocouple. When the pump was started, the idle loop recirculation discharge temperature decreased 8°F.

1.3 Inspectors Summary

The failure to verify temperature differential between the steam space and the bottom head drain line coolant was less than 145°F within 15 minutes prior to the start of the 2B reactor recirculation pump is contrary to Technical Specification Surveillance 4.6.H.5 and is considered an Apparent Violation (50-237(249)/95004-01(DRP)). Dresden Operating Procedure (DOP) 0202-01, Revisions 13 & 14, did not properly implement the technical specification requirements for verification of differential temperature and is contrary to 10 CFR 50, Appendix B, Criterion V, and is considered an example of an apparent violation (50-237(249)/95004-02a(DRP)). The failure to secure seal purge flow to the 2B recirculation pump as required by DOA 0202-01, Revision 10, step 12, is contrary to 10 CFR 50, Appendix B, Criterion V, and is considered an example of an apparent violation (50-237/95004-02b(DRP)).

2.0 LOCAL LEAK RATE TEST FAILURE OF CONTAINMENT CHECK VALVES

2.1 Inspectors Overview

An operating surveillance on containment isolation check valves was not performed properly and resulted in exceeding technical specification type B & C leakage limits and the commencement of a Unit 3 shut down. A good questioning attitude during an engineering review identified the problem.

One example of an apparent violation of 10 CFR 50, Appendix B, Criterion V, and one apparent violation of Technical Specification 3.7.A.2.b.(2).(a) were identified.

2.2 Surveillance of Containment Vacuum Breaker Check Valves

In 1990 the licensee determined that hinge pin access plates for the Unit 3 suppression chamber to reactor building vacuum breakers (check valves) were part of the containment boundary. At the time, Dresden Operating Surveillance (DOS) 1600-13, "Suppression Chamber To Reactor Building Vacuum Breaker Full Stroke Exercise Test," required the removal of an access plate to a hinge pin on the check valve. A socket tool was then used to cycle the check valve and the access plate was reinstalled. As previously discussed in Inspection Report 50-237/249-94014, paragraph 3.3, dated August 24, 1994, the licensee did not perform required local leak rate tests after the access plates were removed and reinstalled during DOS 1600-13. In 1992 the licensee revised DOS 1600-13 to have the operator open an inspection hatch **outside** of the containment boundary and cycle the check valve using a special extension rod.

On January 6, 1995, an operator was assigned to perform DOS 1600-13, revision 7, on both the 3-1601-31A & B check valves. The field supervisor directing the activity had never performed that surveillance. The operator assigned the task last performed the surveillance in 1991. The operator knew from experience that a tool was needed to perform the surveillance, and the field supervisor provided the operator the old socket tool instead of the special extension rod. The operator completed the surveillance using the old technique of opening the hinge pin access plate. The required local leak rate test was not performed until February 3 when engineering personnel identified the wrong technique was used.

Neither the field supervisor nor the assigned operator were aware of the procedure revision. The following changes had been made:

- Step I.2.b stated:

  "Using an adjustable wrench, remove the inspection plate upstream (Reactor Building Side) of vacuum breaker 3-1601-31A(B)."

  The operator believed this meant the hinge pin access plate, which had been the access point during earlier test performances.

- Step I.2.d stated:

  "(AC) Use the Special Extension Rod to exercise the vacuum breaker to the full open position."

  The operator believed this meant the socket tool, which had also been used during earlier test performances.

Engineering Review Identified Problem

On February 3 site engineering personnel identified that an incorrect method had been used during the check valve test conducted January 6. Engineering had performed this test for operations for the previous 2 years, even though there was no requirement to do so. The reviewing engineer was aware that the test was due but had not been contacted by operations personnel. When the completed surveillance appeared for review, the engineer questioned how the check valve test was performed. The site engineer identified that the primary containment boundary was opened and a required local leak rate test (LLRT) was not performed.

Containment Leakage Limits Exceeded

Engineering personnel performed LLRTs on both containment vacuum breaker check valves on February 3. The maximum leak rates at both of the check valve flanges were beyond the measuring capability of the test equipment. Technical Specification 3.7.A.2.b.(2).(a) required that when primary containment integrity is required, primary containment leakage rates shall be limited to a combined leakage rate of less than or equal to 60 percent of La for all testable penetrations and isolation valves subject to Type B and C tests. The minimum measured leakage resulted in exceeding the technical specification requirement. The licensee commenced a Unit 3 shutdown as required by Technical Specification 3.0.A. However, the flanges were repaired and the shutdown was terminated. Exceeding the technical specification leakage requirement and the commencement of the unit shutdown were reported by the licensee in accordance with 10 CFR 50.72.

2.3 Inspectors Summary

The failure to perform Type B LLRTs when the containment vacuum breaker hinge pin access plates were removed was previously identified by the licensee. A violation was cited in Inspection Report 50-237/249-94014, dated August 24, 1994, for the failure to conduct Type B LLRTs after removal of the containment vacuum breaker check valve hinge pin access plates. That violation required no response since the licensee had implemented corrective actions by revising the effected surveillance procedure to prevent disturbing the primary containment boundary. The apparent cause for the current problem was the failure to adequately correct the procedure or train operations personnel on the procedure changes. Failure to implement an adequate procedure is contrary to 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and is considered an example of an apparent violation (50-237(249)/95004-02c(DRP)). Type B and C primary containment leakage exceeding sixty percent of La is contrary to Technical Specification 3.7.A.2.b.(2).(a) and is considered an apparent violation (50-237(249)/95004-03(DRP)).

3.0 MANAGEMENT MEETINGS

3.1 Preliminary Inspection Findings (Exit)

At the conclusion of the inspection on February 10, 1995, the inspectors met with licensee representatives listed below and summarized the scope and findings of the inspection activities. The licensee acknowledged the inspectors' comments. The inspectors also discussed the likely informational 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.

T. Joyce, Site Vice President
R. Bax, Unit 2 Station Manager
E. Drumhiller, Technical Staff Superintendent
J. Eenigenburg, Unit 3 Station Manager
P. Holland, Regulatory Assurance Supervisor
T. Nauman, Unit 1 Station Manager
M. Pacilio, Unit 3 Maintenance Manager
W. Sheldon, Unit 2 Maintenance Manager
F. Spangenberg, Site Engineering Manager
R. Stols, Director, Site Quality Verification
G. Tietz, Unit 3 Operations Manager