U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Commonwealth Edison (ComEd)
Facility:	Braidwood Nuclear Plant, Units 1 and 2
Location:	RR #1, Box 84 Braceville, IL 60407
Dates:	April 8 through May 20, 1997
Inspectors:	C. Phillips, Senior Resident Inspector J. Adams, Resident Inspector T. Esper, Illinois Department of Nuclear Safety
Approved by:	R. D. Lanksbury, Chief, Projects Branch 3 Division of Reactor Projects

EXECUTIVE SUMMARY

Braidwood Nuclear Plant, Units 1 & 2
NRC Inspection Report 50-456/97007; 50-457/97007

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

Operations

- The inspectors concluded that an augmented control room staff for the outage unit improved the supervision of evolutions and demonstrated a strong safety focus on shutdown operations. The inspectors also concluded that the operating staff in the control room demonstrated excellent team work and communications during most evolutions. (Section O1.1)

- The inspectors were concerned about the closure of the Unit 1 containment. Although cleanliness was generally good, following the licensees closeout inspection, the inspectors found a 2 foot long by 5 inch diameter metal cylinder laying on the floor and debris in floor drains that were part of a TS leakage detection system. The inspectors were also concerned about standing water observed in the floor drains that was not questioned by licensee personnel. (Section O1.2)

- The inspectors identified that the licensee failed to perform a 10 CFR 50.59 safety evaluation prior to placing the Unit 2 motor driven feed pump discharge isolation valve out-of-service (OOS) open. The valve had an automatic closure function on a feedwater isolation signal. A Notice of Violation was issued. The inspectors also concluded that the communications within the operating department for this evolution were poor. (Section O2.1)

Maintenance

- The inspectors concluded that outage maintenance on the 1A emergency diesel was performed well. However, on the 1B emergency diesel, the inspectors observed two examples where foreign material exclusion (FME) control was lost and one example where the maximum jacket water pressure, allowed by the procedure, was exceeded. (Section M1.1)

- The inspectors concluded that the preparation for and performance of fuel movements for refuel outage A1R06 was good. Fuel handlers and supervisors were knowledgeable of procedures, equipment, and of their responsibilities. (Section M4.1)

- The inspectors observed several surveillance tests and concluded that most surveillances were properly performed and met the testing requirements of the Updated Final Safety Analysis Report and the TS. However, the inspectors concluded that check valve surveillance testing on the safety injection and

centrifugal charging systems was poorly controlled by the system engineers acting as the test directors. The inspectors observed two instances where acceptance criteria were exceeded without the test director identifying a problem, and one instance of the test director failing to record required data. The inspectors also concluded that there was a breakdown in communications between maintenance and engineering that resulted in the use of the wrong instrument range in flow calculations. A Notice of Violation was issued for two examples of failing to follow procedures. (Sections M4.3 and 4.4)

Plant Support

- The inspectors observed several examples of failing to follow procedures regarding the fire protection program. On April 23, the inspectors identified that an individual was sleeping while acting as a fire watch during ongoing welding activities. On April 22, the inspectors found a fire door blocked open with no one in attendance without a required Plant Barrier Impairment (PBI) completed, and on May 19, the inspectors found combustible material in the auxiliary building with no one in attendance and no transient fire load permit completed. The inspectors concluded that attention to detail regarding fire protection requirements during this inspection period was poor. (Sections F1.1, 1.2, and 1.3)

Report Details

Summary of Plant Status

Unit 1 entered the period shut down for a scheduled refueling outage and remained shut down for the entire period.

Unit 2 entered the period at or about 100 percent power and remained at or about 100 percent power for the entire period.

I. Operations

O1 Conduct of Operations

O1.1 Unit 1 Control Room Observations

a. Inspection Scope (71707)

The inspectors observed the performance of the Operating Department personnel while engaged in assigned control room duties. The following major plant evolutions were in progress during the observation period:

- reactor coolant loop venting
- reactor trip response time testing
- 1B diesel generator 24-hour run test and hot restart
- containment spray additive tank flow verification test

b. Observation and Findings

From May 8 to May 20, the inspectors made the following observations:

- a Nuclear Station Operator (NSO) was assigned to each evolution,
- the unit NSO was assigned to maintain an overall awareness of the Unit 1 status without distraction,
- the NSOs assigned to plant evolutions routinely informed the unit NSO and the unit supervisor of changes in plant conditions,
- the unit supervisor was continuously present in the area of the controls and was observed supervising most evolutions,
- two additional senior reactor operators (SROs) were utilized on Unit 1 to perform routine administrative tasks normally performed by the unit supervisor,
- the assisting supervisors screened control room access requests,

- the shift manager made frequent tours of the control room,
- procedures for each evolution were used and frequently consulted by the NSOs and unit supervisor,
- short briefings were conducted prior to performing important procedural steps,
- three-way communication was consistently used in the control room and with personnel in the field,
- an emergency report of a personal injury was received in the control room and expeditiously handled without sacrificing control and oversight of the evolutions in progress, and
- two of the evolutions were briefly halted when field personnel experienced problems with their radios.

c. Conclusions

The inspectors concluded that the shift staffing exceeded procedural and TS requirements but was not excessive considering the number of evolutions in progress and that the unit supervisor maintained control of the multiple evolutions. The outage organizational structure of adding additional SROs improved the supervision of evolutions and demonstrated a strong safety focus on shutdown operation. The use of additional supervisory operating personnel to screen work packages and control access resulted in a reduction of distractions and was considered a strength.

The inspectors also concluded that excellent team work and communications were demonstrated by the operating staff in the control room for observed activities. All of the NSOs in the control room understood their specific responsibilities and the chain of command. NSOs responsible for the performance of an evolution coordinated the performance of critical steps through the unit supervisor and unit NSO to prevent the need to perform critical steps on multiple plant evolutions simultaneously. This level of coordination was facilitated through the use of frequent discussions and briefings between the personnel performing the evolutions, the unit supervisor, and the unit NSO.

O1.2 Unit Containment Closeout

a. Inspection Scope (71707)

The inspectors toured the Unit 1 containment to perform a closeout inspection on May 15, 1997.

b. Observation and Findings

Following the licensee's closeout inspection, the inspectors observed that the general cleanliness of the containment was good. However, there were exceptions. The inspectors observed the following:

- A metal cylinder of unknown origin, about 2 feet long and 5 inches in diameter was found laying in the trackway for the reactor cavity bridge crane.

- Containment floor drains inside the missile barrier on the 377 foot elevation were observed to have debris in at least three drains and standing water in three more.

The inspectors questioned the presence of the standing water. The licensee subsequently determined that the floor of the Unit 1 containment was not built in accordance with the original plans and there was a high spot in the floor drain system which resulted in the standing water. The licensee performed an operability evaluation and determined that the condition was acceptable. The licensee also committed to perform a 10 CFR 50.59 safety evaluation.

c. Conclusion

The cleanliness of the containment was generally good with the exception of a lone cylinder and debris in several floor drains. The floor drains were significant because they communicated with a technical specification leakage detection system. The inspectors also were concerned that licensee personnel did not question the presence of standing water in the floor drain system until prompted by the inspector.

O2 Operational Status of Facilities and Equipment

O2.1 Feed Water Valve Required To Shut During Feedwater Isolation, Taken Out-Of-Service Open With No Safety Evaluation

a. Inspection Scope (71707, 37551)

The inspectors performed a routine inspection of the Unit 2 control room panels, reviewed the Updated Final Safety Analysis Report (UFSAR) Table 15.0.7, "Plant Systems and Equipment Available For Transients and Accident Conditions," and Section 15.1.2, "Feedwater System Malfunctions Causing An Increase In Feedwater Flow," and interviewed the Unit 2 operating engineer.

b. Observations and Findings

The inspectors observed on April 18 that the Unit 2 motor driven feedwater pump discharge isolation valve (2FW002A) was out-of-service in the open position and

the feedwater pump control switch was in the pull-to-lock position. The inspectors questioned this lineup and found that the valve had been taken out-of-service on April 14 for work scheduled on the valve actuator. The maintenance had been moved to a later date but the schedule held by operations had not been changed. The schedule change had been communicated to the weekend operations crews, which were directed not to hang the out-of-service, but not to the Monday crew. This resulted in the valve being out-of-service for 5 days for no reason.

The inspectors reviewed the UFSAR and identified that 2FW002A automatically closes on a feedwater isolation signal. Although, the motor driven feedwater pump was not in operation, there were no restrictions on placing the motor driven feedwater pump in operation with the automatic closure capability of the 2FW002A removed. In addition, the inspectors identified that no 10 CFR 50.59 safety evaluation was prepared to remove the automatic closure capability of 2FW002A and keep the valve in operation.

c. Conclusions

The inspectors concluded that the communications within the operations department for this evolution were poor. The inspectors also concluded that the failure to perform a 10 CFR 50.59 safety evaluation for removing the automatic closing feature of 2FW002A was a violation of 10 CFR 50.59 (50-457/97007-01(DRP)).

O8 Miscellaneous Operations Issues (92700)

O8.1 (Closed) Licensee Event Report 50-457/96002-00: Both Trains of Emergency Core Cooling System Inoperable Due To An Inadequate Out-Of-Service Caused By Personnel Error. This event was discussed in Inspection Report 96005 and was discussed as one of several examples of failure to follow procedures and inadequate corrective action that resulted in a Cited Level III Problem and a Civil Penalty. The corrective actions for this event are part of the total corrective actions for 50-456/457/96005-01 through 05 which are discussed below. This item is closed

O8.2 (Closed) Violation 50-456/457/96005-01 through 05: Five apparent violations were identified in Inspection Report 96005. Five violations culminating in a Level III Problem for the failure to follow procedures and inadequate corrective actions were issued under the headquarters tracking numbers 01013, 01023, 01033, 01043, and 01053. The inspectors verified by observation or review of documentation the completion of the following corrective actions:

- work analysts and operators were counseled on procedure adherence and management expectations;

- formal classroom training was conducted on what level of detail was necessary to properly fill out the additional information section of the electronic out-of-service request;

- a work execution center was manned and implemented within the expected dates and that the work execution center functioned as expected to remove administrative burden from the control room staff and review OOSs prior to placement;

- a dedicated OOS group manned by the operations department created the majority of the OOSs used and the location of the OOS group was such that it optimized communication with work planning;

- operators were instructed that prior to any valve manipulation the required position of the valve should be known;

- signs were posted inside and outside the hydrogen monitor cabinets warning that internal throttle valves affected operability, and the shift engineer shall be contacted prior to operation;

- changes were made to the corrective action system to improve timely followup of previously identified issues;

- operations department performed complete walkdowns of all electrical and mechanical lineups, walkdowns of all systems were planned to be reperformed within a three year time schedule; and

- an effectiveness review process was implemented for all Level III and above corrective action items; the effectiveness of the effectiveness review process was not evaluated.

In addition, specific operations department managers were assigned to track OOS errors and configuration control problems. In March 1997, a series of OOS errors were identified by the licensee before the OOSs were placed in the field. This demonstrated that the implementation of the work execution center function as a final check on OOS work was effective. The inspectors observed that the licensee identified the trend and initiated corrective action.

The inspectors have concluded the licensee was moderately successful in reducing the number of valve mispositionings and configuration control events. The number of events appears to correspond to the amount of emphasis placed on configuration control by plant management. The inspectors have no further concerns at this time. This item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Observation of Unit 1 18-Month Diesel Generator Maintenance Activities

a. Inspection Scope (62707)

The inspectors observed maintenance performed on the 1A and 1B Emergency Diesel Generators (EDG) during Unit 1 refueling outage A1R06. The following maintenance activities were observed:

1A EDG

- jacket water pressure test with boroscopic examination of engine cylinders,
- installation and maintenance of FME barriers,
- cleaning preparation of gasket surfaces,
- governor oil replacement preparations,
- measurement of piston crown thickness,
- priming of the fuel oil system,

1B EDG

- installation and maintenance of FME barriers,
- jacket water pressure test with boroscopic examination of engine cylinders,
- jacket water heat exchanger inspection,
- reset of engine driven lubricating oil discharge pressure,
- bearing high temperature eutectic trip device inspection,
- installation of cylinder head covers and rocker arm covers, and
- turbocharger boroscopic inspection.

The inspectors also reviewed all or portions of the following documents:

- BwMP 3100-22, "Diesel Generator Annual Inspection," Revision 8
- SMP-M-04, "Foreign Material Exclusion," Revision 0
- Work Package 960022660, "1A EDG 18 Month Inspection"
- Work Package 960022979, "1B EDG 18 Month Inspection"
- Work Package 970029414, "Ultrasonic Measurement of Piston Crown Thickness"

b. Observations and Findings

1A EDG

1) Boroscopic Inspection of Power Cylinders and Jacket Water Leakage Inspection

The inspectors reviewed the results of the boroscopic inspection of the 20 power cylinders and interviewed the Mechanical Maintenance Department (MMD) foreman and the system engineer. The licensee's documentation of the inspection did not indicate the presence of any leakage around the rocker arms, cylinder external flanges, or cylinder liner bellows. No surface irregularities were observed on the cylinder liners, face of the cylinder head, piston crowns, or piston skirts.

2) Installation and Maintenance of FME Barriers

The inspectors observed the installation and maintenance of FME barriers throughout the progression of the maintenance on the 1A EDG. The inspectors observed compliance with SMP-M-04 and the required FME documents were included in the work package.

3) Cleaning and Preparation of Gasket Surfaces

The inspectors observed the cleaning of the gasket surfaces for the crankcase access covers. The inspector observed the application of a aerosol solvent to remove residual gasket material and noticed that the overspray was going into the crankcase. The inspectors questioned this practice with the MMD foreman who told the inspectors that the solvent was approved for use under the chemical control program. The inspectors confirmed this by checking the labeling on the aerosol can and found no material use restrictions nor any indication that the solvent was corrosive to metals. The maintenance foreman also indicated that the crankcase receives a thorough cleaning prior to performing the crankcase inspection section of BwMP 3100-022.

4) Preparations for the Change of Governor Oil

The inspectors observed the preparation for the change of 1A EDG governor oil. The inspectors verified that the oil obtained for the replacement was required by Section F.24.b of BwMP 3100-022 and that the proper material control documentation was attached.

5) Piston Crown Thickness Measurement

The inspectors observed the ultrasonic (UT) measurement of piston crown thickness on the 1A EDG's 5 exposed pistons. The system engineer told the inspectors that these measurements were to address concerns raised by the

failure of a piston on Zion Station's 2A EDG. The licensee established a minimum crown thickness of 0.185 inch which was based on verbal information from Cooper-Bessemer. The inspectors observed that pistons in cylinders 9L and 10R had measured crown thicknesses of less than 0.185 inch. These pistons were subsequently removed and replaced with pistons having sufficient crown thickness. The inspectors observed the UT technician make numerous measurements to ensure the entire crown thickness was measured, perform frequent accuracy checks of the UT instrument, and refer to the work package for guidance.

6) Priming of the 1A EDG Diesel Fuel Oil System

The inspectors observed the priming of the fuel oil system. MMD personnel performed the priming in accordance with Section F.18 of BwMP 3100-022. The inspectors verified the proper installation of the priming pump from the day tank instrument leg drain to the fuel oil header priming connection. The inspectors observed the sequential venting of fuel line components up to and including the cylinder fuel pumps. The maintenance personnel were careful to minimize the amount of fuel oil released and immediately cleaned up released fuel oil. Following the priming, the inspectors checked for fuel oil system leaks but found none.

1B EDG

7) Installation and Maintenance of FME Barriers

The inspectors made frequent walk-through inspections of the 1B EDG room to evaluate the licensee's FME controls. On two occasions, the inspectors identified conditions that were not in compliance with the licensee's FME procedure, SMP-M-04, and work package #960022979 requirements. The inspectors discussed these findings with licensee management on April 25.

On April 21, the inspectors observed that FME covers were missing on two of the engine's cam shaft access ports. The inspectors did not observe any maintenance in progress that would require the removal of the FME covers and the FME covers had not been reinstalled prior to all maintenance personnel leaving the work area. After the inspectors informed the system engineer of this condition, the FME covers were properly reinstalled.

On April 25, the inspectors observed that the plastic sheeting FME barrier used to cover the cylinder heads had been folded back exposing the right bank of cylinder heads and no work was in progress at the time. In addition, upon further investigation, the inspector noticed foreign material in the 10R cylinder head. The inspector informed the system engineer who told the inspectors that the foreign material was small pieces of insulation from the diesel exhaust header. The inspectors returned later that day to verify that corrective action had been taken to remove the foreign material and replace the FME barrier.

The inspectors identified two examples where the requirements of Section 6.4.2, of SMP-M-04 were not met. The failure to follow SMP-M-04 is a violation of TS 6.8.1a (50-456/97007-02a(DRP)).

8) Boroscopic Inspection of Power Cylinders and Jacket Water Leakage Inspection

The inspectors reviewed the results of the boroscopic inspection of the 20 power cylinders and interviewed the system engineer. The licensee's documentation of the inspection did not indicate the presence of any leakage around the rocker arms, cylinder external flanges, or cylinder liner bellows, and no surface irregularities were observed on the cylinder liners, face of the cylinder heads, piston crowns, or piston skirts.

The licensee identified that the jacket water (JW) system had been over-pressurized during the performance of this inspection. A Problem Identification Form (PIF) was written and an investigation was to be performed by the mechanical maintenance master mechanic. The inspectors found through review of the licensee's investigation that the jacket water pressure exceeded the maximum pressure permitted by Section F.5.b.1 of BwMP 3100-022 by more than 12 psig for approximately 10 minutes before it was discovered and corrected. The licensee identified that the root cause was that the first line supervisor's attention was diverted. This diversion resulted in his failure to close one of the two isolation valves from the demineralized water system to the JW system and a failure to tightly close the other. Leakage past the closed valve caused the jacket water system to increase to greater than 30 psig with a limit of 18 psig.

The licensee took the following actions in response to the jacket water over-pressurization event:

- performed a informational tailgate session with diesel generator crews detailing the inappropriate actions taken in this event;
- contacted Cooper-Bessemer to discuss post-event inspection actions;
- performed a visual inspection with the system pressurized to 15 psig;
- disassembled the turbocharger and inspected intercoolers for the presence of water;
- visually inspected cylinder liner bellows (wrinkle bellies);
- sampled crankcase oil and examined it for water; and
- performed an engineering evaluation assuming a maximum possible pressure of 80 psig (demineralized water pressure adjusted for head loss).

The licensee's visual inspections revealed no signs of jacket water leakage.

The licensee identified the following long term corrective action to prevent recurrence:

- evaluate the installation of a pressure relief valve in the JW system, and

- incorporate lessons learned into BwMP 3100-022.

TS 6.8.1.a requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applies to BwMP 3100-022 and therefore, the failure to follow BwMP 3100-022 is a violation of TS 6.8.1.a. This licensee identified and corrected violation is being treated as a Non-Cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy. (50-456/97007-03(DRP))

9) Jacket Water Heat Exchanger Inspection

The inspectors observed a routine inspection of the 1B EDG JW heat exchanger. The tube side of the heat exchanger's as-found condition was clear of sediment. The inspectors observed no plugged tubes; however, the licensee unexpectedly found sediment in the shell side of the heat exchanger (JW side). A Cooper Bessemer engineer indicated that the source of the sediment was probably casting and milling debris from the manufacturing of the engine. This was subsequently confirmed by chemical analysis. The inspector observed the licensee pull and clean the tube bundles and noticed that there was only a very small amount of sediment in the heat exchanger.

10) Adjustment of Engine Driven Lube Oil Discharge Pressure

The inspector observed operations and maintenance conduct a pre-job briefing where the diesel operator was instructed to manually trip the engine if problems were encountered in setting the lube oil pressure. The inspectors observed maintenance personnel review the applicable section of the procedure prior to making the adjustment, monitored diesel lube oil pressure during and following the adjustment, and ensured that the adjustment had been properly made.

11) Bearing High Temperature Eutectic Trip Device Inspection

The inspectors observed maintenance personnel and the Cooper-Bessemer technical representative measure the clearances on the eutectic (rod bearing and main bearing over-temperature fusable link) trip devices. The inspector verified that maintenance personnel used the applicable section of the

procedure, that personnel were taking the proper safety precautions prior to turning the engine over with the turning gear, and FME covers were removed only as needed and replaced upon completion of the measurement.

c. Conclusion

Conclusions for maintenance observations 3-6 and 9-11

The inspectors concluded that these maintenance activities were performed in accordance with the applicable procedural guidance. Procedures for these activities were well written and provided the necessary guidance. Supervision of these activities was good.

Conclusions for maintenance observations 2 and 7

The inspectors concluded that the FME controls were good on the 1A EDG. However, the inspectors identified two examples of a violation for failure to follow FME procedures on the 1B EDG.

Conclusion for maintenance observations 1 and 8

The inspectors concluded that the pressurized inspection of the jacket water system on the 1A EDG was performed in accordance with the procedure and the results met acceptance criteria; however, this was not the case for the same inspection on the 1B EDG. The inspectors concluded that this resulted from the maintenance foreman becoming involved in the performance of non-supervisory tasks concurrent with his supervisory responsibilities.

The licensee identified the event, took immediate corrective action, identified long-term corrective actions to prevent recurrence, and it's investigation of the event was prompt and thorough. The inspectors concluded that the immediate corrective actions were adequate and that the problem was a noncited violation.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 1RC8002C, Reactor Coolant System (RCS) Loop C Cold Leg Stop Valve Repair

a. Inspection Scope (62707)

The inspectors observed portions of the repair of the Unit 1, RCS Loop C Cold Leg Stop Valve; viewed the video tapes of the as-found internal condition of the valve; conducted interviews with the project manager, work supervisors, in-service inspection (ISI) technician; and reviewed associated work package 960094676-01.

b. Observation and Findings

The inspectors observed portions of the disassembly and assembly of 1RC8002C which progressed smoothly with no observable delays.

The inspectors also observed the video tape of the as-found inspection and the more detailed ISI inspection of the valve internals. The as-found inspection confirmed the conditions observed on the radiograph taken during the previous mid-cycle outage where the tab at the bottom of the valve guide was missing allowing the valve guide to move in the path of the valve disc preventing the valve's full closure. The inspectors confirmed the licensees finding of no evidence of any damage to the valve body caused by the failure of the valve guide. The inspectors did observe cracks in the failed valve guide and the location of the cracks supported the licensee's evaluation that they were caused by the initial attempt to close the valve following dislocation of the valve guide.

c. Conclusion

The inspectors concluded that the repair work on 1RC8002C was completed expeditiously in accordance with the work package. The maintenance was well planned and practiced on the mock up valve prior to the outage.

M3 Maintenance Procedures and Documentation

M3.1 Procedure Problems With Westinghouse Contracted Breaker Refurbishment

a. Inspection Scope (62707,37551)

The inspectors reviewed Operability Determinations 97-040 and 97-041, and interviewed site engineering personnel.

b. Observations and Findings

Westinghouse Corporation contracted with ComEd to perform breaker refurbishment for 12 DS-206 480V breakers. After the refurbishments were completed Westinghouse Corporation personnel performed a quality assurance check of the work performed and identified 12 concerns.

The concerns were all based on Westinghouse Corporation procedure and documentation weaknesses of the work performed. The inspectors questioned why the procedures had not been approved by the licensee before work began. Licensee personnel stated that Westinghouse Corporation would not allow the licensee to review the procedures because of the proprietary nature of the information.

The inspectors reviewed the licensee's operability evaluations and how each procedure or documentation weakness was addressed. The inspectors reviewed the licensee's determination of operability and the outcome of additional testing that was performed by the licensee when the problems were discovered. The inspectors had no additional concerns.

The inspectors also reviewed a report issued by Westinghouse Corporation on May 14, 1997, on the procedural defects as required by 10 CFR 21.21. The only stations affected by the procedural defects were Braidwood and Byron.

c. Conclusions

The inspectors concluded that the licensee's review of the problem, additional testing, and determination of operability were satisfactory. The inspectors determined that the problem appeared to be properly reported by Westinghouse Corporation in accordance with 10 CFR Part 21.

M4 Maintenance Staff Knowledge and Performance

M4.1 Unit 1 Refueling Activities

a. Inspection Scope (62707)

Unit 1 refueling outage A1R06 began March 29, 1997. During this inspection period and the previous inspection period, the inspectors observed refueling practices, including new fuel receipt, reactor core offload, and reactor core reload. Fuel movement operations were observed in the fuel handling building, reactor containment building, and main control room. The inspectors interviewed nuclear engineering, operations, fuel handling, maintenance, and radiation protection personnel who were either performing and/or supporting fuel movements. The inspectors also reviewed the following procedures to verify UFSAR and technical specification requirements were satisfied:

- BwAP 370-3, "Administrative Control During Refueling," Revision 16
- BwFP FH-1, "New Fuel Receipt," Revision 8
- BwFP FH-2, "New Fuel Inspection," Revision 5
- BwFP FH-5, "Fuel Movement In Containment," Revision 5
- BwFP FH-12, "Operation of the Spent Fuel Pool Bridge Crane," Revision 5
- BwFP FH-14, "Operation of Refueling Machine," Revision 3

b. Observations and Findings

During the previous inspection period, the inspectors observed portions of the new fuel receipt activities in the fuel handling building including plant personnel following appropriate procedures while moving fuel.

During this inspection period, the inspectors noted that maintenance personnel supporting fuel receipt were knowledgeable on use of equipment and provided efficient support for fuel handling personnel. Fuel handlers were proficient in the use of fuel movement equipment and nuclear engineering personnel were present to inspect the fuel assemblies as they were unpacked. Radiation protection personnel were present during unpacking of new fuel assemblies and closely monitored the assemblies for radiation and contamination.

During new fuel receipt, the inspectors verified that areas of the fuel building were well controlled and that the licensee was following FME procedures around the new fuel vaults and in the area where new fuel was unpacked.

Reactor core offload and reload operations were also observed by the inspectors. The inspectors verified that operations and fuel handling personnel followed procedures and updated documentation continuously during fuel movement including updating status boards and Nuclear Component Transfer Lists, and maintaining constant communications between the Unit 1 Control Room and the SRO in containment. Fuel handling personnel were knowledgeable of their responsibility and in the use of fuel movement equipment. FME areas were also established and appropriately controlled around the spent fuel pool and around the reactor refueling cavity during fuel movements. Radiation levels in refueling areas were also routinely checked by radiation protection personnel.

During previous refueling outages, water clarity in the refueling cavity and spent fuel pool was a concern. However, during this outage, the inspectors noted improvement in the water clarity during fuel movement in the spent fuel pool and in the refueling cavity. This was attributable to the licensee using different filters in the spent fuel pool cooling system that had higher filtering capability.

The inspectors also verified the availability and operability of systems and components during fuel movement such as proper configuration of Residual Heat Removal and Spent Fuel Cooling.

Several problems caused minor delays during fuel movement including blown fuses on the fuel hoist and the trolley in the fuel handling building. Plant engineering and maintenance personnel promptly evaluated the situations and took corrective actions. This resulted in satisfactory performance of the equipment during the remainder of the fuel moves.

The review of procedures showed that technical specifications and UFSAR requirements would be satisfied by performance of the procedures.

c. Conclusions

The inspectors concluded that plant support for fuel movement in preparation for and during refueling outage A1RO6 was good. Plant personnel were knowledgeable of their responsibilities and the use of fuel movement equipment. Documentation and status boards were maintained as required by procedure.

Plant systems were found properly configured to support fuel movement. Areas involved with fuel movement were properly controlled.

Personnel response to problems that arose during refueling was good. Engineering and maintenance personnel provided troubleshooting to solve problems in a timely manner.

M4.2 Surveillance Observations

a. Inspection Scope (61726)

The inspectors observed all or portions of the following surveillance activities:

- 1BwVS 6.2.1.b-2, "ASME Surveillance Requirements for 1B Containment Spray Pump and Check Valves 1CS003B and 1CS011B," Revision 2;
- BwVS 8.1.1.2.f-19, "1A Diesel Generator 5500 KW Load Rejection and Simulated SI In Conjunction With UV During Load Testing," Revision 7;
- 1BwVS 8.1.1.2.f-21, "1A Diesel Generator 24 Hour Endurance Run and Hot Restart Test 18-Month," Revision 0;
- 1BwVS 8.1.1.2.f-15, "1A Diesel Generator Loss of ESF Bus Voltage With No SI Signal," Revision 5;
- 1BwVS 900-34, "1B Diesel Generator Isolate Switch Functional Test," Revision 1;
- 1BwVS 8.1.1.2.f-22, "1B Diesel Generator 24-Hour Endurance Run and Hot Restart Test 18-Month," Revision 0; and
- 1 BwVS 8.2.1.2.d-112 "Unit One 125 Volt ESF Battery Bank 112 Service Test," Revision 1.

b. Observations and Findings

The inspectors observed pre-job or Heightened Level of Awareness (HLA) briefings for each of the surveillances listed above. The inspectors found that the briefings exceeded the requirements of BwAP 100-12, "Human Performance Awareness." Briefings stressed the sequence of tasks for the activity to be performed, direction of the activity, potential problems, and contingency plans in the event that a problem arises.

The inspectors observed and verified that all surveillances were performed in accordance with their applicable procedures, that equipment operation and performance parameters met acceptance criteria, that proper communications between the control room and personnel in the field occurred, and that all instruments were in calibration. The inspectors reviewed applicable TSs and applicable sections of the UFSAR and found no discrepancies.

c. Conclusions

The inspectors concluded that the surveillances listed above were performed in accordance with procedures and all acceptance criteria were met. HLA and pre-job briefings were thorough and exceeded minimum briefing requirements. The

inspectors also concluded that the procedures were well written and ensured TS and UFSAR requirements were tested.

M4.3 Several Problems Observed During Safety Injection Valve Surveillance

a. Inspection Scope (61726)

The inspectors reviewed 1BwVS 0.5-2.SI.2, "Safety Injection System Check Valve Stroke Test," Revision 15; attended the HLA briefings; observed portions of the above surveillances on April 28; reviewed UFSAR Section 6.3; and interviewed system engineers and the system engineering supervisor.

b. Observations and Findings

On April 28, the inspectors observed that BwVS 0.5-2.SI.2, Step 1.11 (which tested the cold leg injection check valves) clearly listed the acceptance criteria for total flow from the 1A safety injection pump as between 612 and 655 gallons per minute (gpm). The upper flow limit was based on TS 4.5.2.h.2.b limits to prevent safety injection pump runout. The inspectors observed that the documented flow for Step 1.11 was 656.5 gpm, which exceeded the clearly marked acceptance criteria. The inspectors brought this to the attention of the test director who stated that the 655 gpm was not an acceptance criteria and the recorded flow value would have to be evaluated.

Step 1.13 recorded differential pressures across flow orifices installed in the injection lines to the cold legs. Each individual injection line flow was calculated and added to recirculation line flow to give a total flow of 653.1 gpm. The licensee considered this to be the more accurate of the readings based on the accuracy of the instrumentation and the conservative values used for the constants to calculate flow.

The inspectors observed later during the same surveillance that for flow testing of the hot leg injection check valves with the minimum flow valves shut, in Steps F.3.7 and F.4.7, the 655 gpm upper flow limit was not listed as an acceptance criteria. The B train flow recorded in Step F.4.7 was 660 gpm based on control room instrumentation for pump flow however, the calculated value for flow at that orifice was later determined to be 654.9 gpm.

During the review of the completed surveillance the inspectors identified that the licensee failed to record pump minimum flow line flow during system restoration as required by Step F.4.24. The pump flow instrument (FI 922) was affected by the minimum flow line flow read at flow instrument FI 972 because the minimum flow line taps off up stream of FI 922. Had the minimum flow been recorded properly by summing the values of RI 922 and FI 972, the acceptance criteria for that step may have been exceeded. System engineering management stated that having the minimum flow line open during Step F.4.24 changed the system flow curve for the expected system configuration when injecting into the reactor coolant system hot legs and thus would have changed system flow. System engineering management

stated that the procedure should have closed the minimum flow valve before pump flow was measured. The licensee's operability determination stated that pump operability was demonstrated in Step F.4.7 where pump flow was calculated to be 654.9 gpm.

c. Conclusions

The inspectors reviewed the operability determinations for BwVS 0.5-2.SI.2, "Safety Injection System Check Valve Stroke Test," Revision 15 and had no further concerns with the operability of the safety injection system pumps. However, the inspectors were concerned with the failure of the system engineers acting as test directors to understand TS limits, control the evolution, and ensure procedural compliance.

The inspectors concluded that the test director failed to recognize test acceptance criteria. The test director failed to complete Step F.4.24 of BwVS 0.5-2.SI.2 in that a required flow as the sum of flow instruments FI 972 and FI 922 was not recorded. This could have resulted in exceeding the acceptance criteria without being detected. TS 6.8.1.a requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applies to BwVS 0.5-2.SI.2, Revision 15, and therefore, the failure to follow BwVS 0.5-2.SI.2 is a violation of TS 6.8.1.a (50-456/97007-02b (DRP))

M4.4 Observed Problems During Charging System Check Valve Surveillance

a. Inspection Scope (61726)

The inspectors reviewed BwVS 0.5-2.SI.2-3, "Safety Injection System Check Valve Stroke Test," Revision 8E1; attended the HLA briefings; observed portions of the above surveillances on April 29; reviewed UFSAR Sections 6.3; and interviewed system engineers and the system engineering supervisor.

b. Observations and Findings

On April 29, the inspectors observed testing of the Unit 1 charging system check valves in accordance with BwVS 0.5-2.SI.2-3. During Step 3.11 for the B train of the charging system the inspectors observed that total recorded flow exceeded 550 gpm. The inspectors observed that the test director stopped the test and informed the shift manager who directed that the B centrifugal charging pump be stopped in accordance with Steps D.2 and E.1 of BwVS 0.5-2.SI.2-3. Step D.2 specifically stated that total flow was not to exceed 550 gpm based on TS 4.5.2.h.1.b.

The licensee later determined that the reason for the high charging system flow was due to an instrument that had been installed by instrument maintenance personnel that had a different output range than what was called for in the procedure. The instrument read out in percent of full range. A 0-800 inches of

water instrument had been substituted for a 0-1000 inches of water instrument specified in the procedure. This resulted in a higher flow indication than what actually existed due to the failure to consider the difference in the scales.

The inspectors reviewed the data from the testing that had been performed on the A train of the charging system the previous shift and found that total flow for the A train had also exceeded 550 gpm. The inspectors determined that the same instruments were used for the A train section of the surveillance. However, there was no indication that the A centrifugal charging pump was stopped in accordance with Steps D.2 and E.1 of BwVS 0.5-2.SI.2-3. Step D.2 specifically stated that total flow was not to exceed 550 gpm based on TS 4.5.2.h.1.b.

c. Conclusions

The inspectors reviewed the operability determination for BwVS 0.5-2.SI.2-3, "Safety Injection System Check Valve Stroke Test," Revision 8E1; and had no further concerns with the operability of the charging system pumps. However, the inspectors were concerned with the failure of the system engineers acting as test directors to control the evolution and ensure procedural compliance. The inspectors concluded that the test director should have stopped the A charging pump following Step 2.11, of BwVS 0.5-2.SI.2-3, due to a indicated flow greater than 550 gpm.

The inspectors also concluded that there was a breakdown in communications between maintenance and engineering that resulted in the use of the wrong instrument range in flow calculations. The substitution of the 0-800" instrument for the 0-1000" instrument was documented on the surveillance cover sheet in accordance with Step E.4 of BwVS 0.5-2SI.2-3. However, the cover sheet description of the substitution failed to discuss the affect the change in instrument range would have on the flow rate calculations.

TS 6.8.1.a requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applies to BwVS 0.5-2.SI.2-3, Revision 8E1, and therefore, the failure to follow BwVS 0.5-2.SI.2-3 is a violation of TS 6.8.1.a (50-456/97007-02c(DRP)).

M4.5 Review of Work On the Unit 1 Steam Generator Automatic Blowdown Flow Control Valve 1SD007

a. Inspection Scope (62707)

The inspectors reviewed work in progress on 1SD007; the Unit 1 steam generator automatic blowdown flow control valve work request (WR960104793-01); SMP-M-04, "Foreign Material Exclusion," Revision 0; and radiation work permit (RWP) 970013, "Routine Contractor Inspections, Walkdowns, and Miscellaneous Work Approved By Radiation Protection."

b. Observations and Findings

The inspectors visited the job site and noted that adequate scaffolding was in place for the work performed. The work package was reviewed and adequate engineering evaluation of the rigging necessary to perform the job was documented.

The valve (1SD007) was open and covered with an FME barrier. The FME procedure SMP-M-04 required logging of materials in and out of an FME area only if foreign material could fall into an area that would not be visible or retrievable. Also, the procedure did not require that an FME boundary be established in this type of area. The FME protection at the work site appeared to be adequate.

The inspectors reviewed RWP 970013, "Routine Contractor Inspections, Walkdowns, and Miscellaneous Work Approved By Radiation Protection." The work on 1SD007 was performed in a clean area with a general area dose rate of less than 1 mrem per hour. The inspectors considered the RWP to be adequate for the work performed.

The work request prejob briefing sheet had both the RWP and OOS number written on it and appeared to be signed by all workers assigned to the job.

c. Conclusions

The inspectors concluded that pre-job briefing, scaffolding, and RWP documentation for the job was adequate. The inspectors also concluded that the FME protection established on the jobsite was adequate for the work to be performed.

III. Engineering

E8 Miscellaneous engineering Issues (92902)

E8.1 (Closed) Licensee Event Report (LER) 50-456/96007-00: "Improper Placement of Spent Fuel Assemblies With Regards to Checkerboarding Due to Personnel Error, and Procedural and Management Deficiencies." On June 17, 1996, spent fuel was repositioned in the spent fuel pool into a configuration that was not bounded by the existing criticality analysis. The inspectors verified that BwAP 2364-3T3, "Nuclear Component Transfer List Verification," was created to list the requirements for fuel positioning. The inspectors verified that fuel interface requirements had been incorporated into Attachment B of procedure BwAP 2364-3, "Safeguarding and Controlling Movements of Nuclear Fuel Within a Station." The inspectors also interviewed nuclear engineering personnel and reviewed the Nuclear Material Custodian qualification guide to verify that specific guidance for fuel movement reviews was incorporated into the guide. Additionally, the licensee counselled personnel involved in this event regarding the failure to meet expectations. The inspectors considered the licensee's corrective actions appropriate. The safety significance of the event was minimal based on a Westinghouse analysis showing excess boron in solution in the fuel pool water kept the shutdown margin as

required. The inspectors concluded that the failure to identify fuel positioning requirements and a failure to use verified and controlled information to generate a Nuclear Component Transfer List resulted in inadequate procedural requirements and was a violation of 10 CFR Part 50, Appendix B, Criterion V. This licensee identified and corrected violation is being treated as a Non-Cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy (50-456/97007-04(DRP)). This item is closed.

E8.2 (Closed) LER 50-456/96008-00: "Improper Placement of Spent Fuel Resulting in Technical Specification Violation Due to Personnel Error." On July 10, 1996, during verification of spent fuel storage locations, it was discovered that one assembly was stored in Region 2 of the spent fuel pool, and not in the required checkerboard configuration, based on the burnup versus initial enrichment. The inspectors verified that BwAP 2364-9, "Controlling Movements of Nuclear Fuel Into the Spent Fuel Racks," was revised to require independent verification of the calculations, retention as plant documentation, and performance of the procedure when the burnup versus initial enrichment limits are changed. Licensee personnel verified the location of all fuel assemblies in the spent fuel pool using an underwater camera. Additionally, the licensee counselled the individual involved in this event regarding the failure to meet expectations. The licensee also planned to perform an effectiveness review of the corrective actions before December 31, 1997. The inspectors considered the licensee's corrective actions appropriate. The failure to maintain the fuel in Region 2 of the spent fuel pool in a required checkerboard configuration was a violation of TS 5.6.1.1.b.2. This licensee identified and corrected violation is being treated as a Non-Cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy (50-456/97007-05(DRP)). This item is closed.

E8.3 (Closed) Inspection Followup Item (IFI) 50-456/96011-01: During an inspection in June 1996, the inspectors reviewed reactor defueling practices and the licensing basis. As part of the review, the inspectors noted that the licensee proposed to revise the UFSAR to explicitly state that full core offload is a routine, or normal, practice. The revision to UFSAR was not scheduled until December 16, 1996, and the Inspector Followup Item was generated to track the proposed changes. The inspectors reviewed revised Section 9.1.3 of the UFSAR and verified the changes were incorporated. This item is closed.

IV. PLANT SUPPORT

R4 Staff Knowledge and Performance in Radiation Protection

R4.1 RCS Loop C Cold Leg Stop Valve Repair

a. Inspection Scope (71750)

The inspectors monitored the work in progress and interviewed radiation protection personnel.

b. Observations and Findings

The inspectors observed good ALARA practices by workers moving to low dose areas when not directly engaged in the valve work. The inspector also observed good Radiation Protection Department support throughout the project. The inspectors interviewed radiation protection personnel to determine the person-rem for the work on 1RC8002C. The inspectors were told a total of 15.7 person-rem was estimated and the actual exposure was 13.477 person-rem.

c. Conclusions

The inspectors concluded that compliance with radiation protection procedures was good and total radiation exposure was less than expected.

S2 Status of Security Facilities and Equipment

S2.1 Perimeter Surveillance Equipment Operation

a. Inspection Scope (71750)

The inspectors observed the operation of the perimeter surveillance equipment shortly following a heavy rain and during high winds.

b. Observations and Findings

On April 30, the inspectors observed the operation of the perimeter surveillance equipment. The inspectors observed that the security system appeared to be functioning normally. Perimeter lighting was sufficient for surveillance.

The alarm system appeared to be functioning normally since several alarms were received due to wind blown debris. The inspector observed security personnel successfully perform a routine check of system operability.

The inspectors did not observe any degradation in system performance due to the heavy rain or high winds.

c. Conclusion

The inspector concluded that the perimeter surveillance equipment was performing as expected and was being properly operated by security personnel.

F1 Control of Fire Protection Activities

F1.1 Inattentive (Sleeping) Hot Work Fire Watch

a. Inspection Scope (71750)

The inspectors performed a routine inspection tour of the turbine building; reviewed BwAP 1100-15, "Fire Prevention When Welding, Cutting, Grinding or Performing Open Flame Work (Hot Work)," Revision 7; and interviewed the operations field supervisor.

b. Observations and Findings

On April 23, the inspectors observed an individual sitting in the dark under the Unit 1 turbine hood. The hood had been removed and placed on the Unit 2 turbine deck. The inspectors informed the operations shift field supervisor who, along with another senior reactor operator found the individual and told the inspectors that the individual was found asleep. The field supervisor informed the inspectors that the sleeping individual was a contract worker assigned as the fire watch for welding that was in progress.

The inspectors then informed the station manager of the finding. The sleeping individual was given a day off without pay.

BwAP 1100-15, Step F.2.c.10) instructs the job supervisor to ensure that a fire watch is available (attentive) throughout the job and at least 30 minutes after. BwAP 1100-15, Step 6a states in part that one or more individuals in each welding, grinding, or open flame work area SHALL be designated to watch for potential fire or smoldering. This task could not be performed while the fire watch was asleep or even with his eyes shut.

c. Conclusions

The inspectors concluded that the fire watch was inattentive to his duties. The failure to perform the duties of a fire watch was an example of a violation of TS 6.8.1.g. (50-456/97007-06a(DRP)).

F1.2 Blocked Open Fire Door

a. Inspection Scope (71750)

The inspectors routinely monitored status of plant fire doors during the period. The inspector also reviewed procedure BwAP 1110-3, "Plant Barrier Impairment Program," Revision 3 and interviewed the Fire Marshall.

b. Observations and Findings

On April 22, the inspectors discovered that a fire door from the condensate polisher room to the turbine building on the 401 foot elevation was propped open with a hose passing through it to support maintenance activities on the 1B emergency diesel generator. No PBI tag was affixed to the door. The inspectors questioned fire protection personnel and found that no PBI permit was in place as required by BwAP 1110-3. The inspectors reported the condition to plant management and fire protection personnel directed maintenance personnel to remove the hose and close the door.

c. Conclusions

The inspectors concluded that the failure to obtain a PBI permit prior to blocking open the Condensate Polisher Room door on April 22, in accordance with BwAP 1110-3, was an example of a violation of TS 6.8.1.g (50-456/97007-06b(DRP)).

F1.3 Transient Combustibles in Auxiliary Building

a. Inspection Scope (71750)

The inspector routinely monitored conditions in the Auxiliary Building, including status of fire loading in the building. The inspector also reviewed procedure BwAP 1100-11, "Fire Prevention for Use of Lumber and Other Combustibles," Revision 7.

b. Observations and Findings

On May 19, the inspector found combustible material in the auxiliary building on the 346 foot elevation at column P-23. The area was roped off and labeled "SX Water Laydown Area." Combustible materials in the area included large rubber hoses, several pieces of lumber, and temporary ductwork. There was no one attending the material at the time the inspectors found it.

In order to temporarily store combustibles in the auxiliary building, a transient fire load permit is required by procedure BwAP 1100-11. No transient fire load permit tag was found at the location and fire protection personnel indicated to the inspector that no permit was in effect for the materials.

Fire protection personnel contacted the supervisor in charge of the area and generated a transient fire load permit. Fire protection personnel also generated PIF A1997-02213 to investigate the causes for the failure to follow plant procedures.

c. Conclusions

Combustible materials were stored in the auxiliary building without proper authorization by the fire protection department. Failure to obtain a transient fire load permit per BwAP 1100-11 prior to storing material in the Auxiliary Building is an example of a violation of TS 6.8.1.g (50-456/97007-06c(DRP)).

F1.4 Conclusions On Control Of Fire Protection Activities

The inspectors concluded based on the findings in Paragraphs F1.1 through F1.3 that the control of fire protection activities during this inspection period was poor.

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 May 20, 1997. 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

Licensee

H. G. Stanley, Site Vice President
*T. Tulon, Station Manager
A. Haeger, Health Physics and Chemistry Supervisor
*R. Byers, Maintenance Superintendent
*R. Graham, Work Control Superintendent
T. Simpkin, Regulatory Assurance Supervisor
*C. Dunn, System Engineering Supervisor
*J. Meister, Engineering Manager
*R. Wegner, Operations Manager
*K. Bartes, Quality and Safety Assessment Manager/SQV Director
*B. Boyle, Fire Marshall
*M. DiPonzio, Licensing
*L. Weber, Shift Operations Supervisor
*M. Cassidy, Regulatory Assurance - NRC Coordinator

NRC

*R. Lanksbury, Chief, Reactor Projects Branch 3
*C. Phillips, Senior Resident Inspector
*J. Adams, Resident Inspector

IDNS

*T. Esper, Resident Engineer

* Denotes those who attended the exit interview conducted on May 20, 1997.

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-457/97007-01	VIO	failure to comply with 10 CFR 50.59
50-456/97007-02	VIO	failure to follow procedure
50-456/97007-03	NCV	failure to follow procedure
50-456/97007-04	NCV	inadequate procedure
50-456/97007-05	NCV	failure to comply with TS 5.6.1.1.6.2
50-456/97007-06	VIO	failure to follow procedures

Closed

50-457/96002-00	LER	failure to follow procedures
50-456/96005-01	VIO	failure to follow procedures
50-457/96005-02	VIO	failure to follow procedures
50-457/96005-03	VIO	failure to follow procedures
50-457/96005-04	VIO	failure to follow procedures
50-457/96005-05	VIO	failure to follow procedures
50-456/96007-00	LER	failure to meet expectations
50-456/96008-00	LER	improper placement of spent fuel
50-456/96011-01	IFI	reactor defueling practices
50-456/97007-03	NCV	failure to follow procedure
50-456/97007-04	NCV	inadequate procedure
50-456/97007-05	NCV	failure to comply with TS 5.6.1.1.6.2

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CV	Centrifugal Charging
EDG	Emergency Diesel Generator
ESF	Engineered Safety Features
FME	Foreign Material Exclusion
gpm	Gallons Per Minute
HLA	Heightened Level of Awareness
ISI	In-Service Inspection
JW	Jacket Water
LER	Licensee Event Report
MMD	Mechanical Maintenance Department
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSO	Nuclear Station Operator
OOS	Out of Service
PBI	Plant Barrier Impairment
PIF	Problem Identification Form
RCS	Reactor Coolant System
RWP	Radiation Work Permit
SRO	Senior Reactor Operator
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic
VIO	Violation