U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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Licensee:	Duke Power Company
Facility:	Catawba Nuclear Station, Units 1 and 2
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ENCLOSURE

EXECUTIVE SUMMARY

Catawba Nuclear Station, Units 1 & 2
NRC Inspection Report 50-413/96-16, 50-414/96-16

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection; in addition, it includes the results of announced inspections by regional reactor safety and reactor projects inspectors.

Operations

- Unit 1 restart observations were generally positive in the areas of containment cleanliness, the conduct of zero power physics testing, and the licensee's resolution of an intermediate range reactor trip setpoint discrepancy (Section O1.1).

- Because of ineffective communications between the operations and chemistry organizations, Unit 1 entered Technical Specification (TS) 3.5.4.b action statement when fueling water storage tank boron concentration slightly exceeded its TS maximum limit (Section O1.2).

- Minimal entries in operations logs precluded their use as a diagnostic tool that may have led to the earlier isolation of a reactor coolant system filter leak on Unit 1 (Section M1.1).

Maintenance

- Non-Cited Violation 50-413/96-16-01 was identified because an inadequate leak test resulted in leakage from a reactor coolant system letdown purification filter not being identified and subsequent contamination of the 560 foot level of the Auxiliary Building and some areas of the 543 foot level (Section M1.1).

- Unit 1 restart was appropriately delayed to evaluate the cause of pressurizer pressure control problems and its impact on safe operation of the facility (Section M1.2).

- The licensee identified that the surveillance test for determining controlled reactor coolant system leakage rate was not being performed in accordance with the TS basis for the test. The actions to correct the specific deficiency were timely and appropriate. Pending review of long-term corrective actions, this issue was identified as Unresolved Item 50-413,414/96-16-02 (Section M3.1).

- Testing of control rods performed during the Unit 1 outage complied with NRC Bulletin 96-01, Control Rod Insertion Problems (Section M8.1).

ENCLOSURE

Engineering

- The licensee adequately addressed two issues associated with the Service Water System Operational Performance Inspection (Sections E8.2 and E8.4). Two other issues from the same inspection remain open: (1) Violation 50-413,414/94-17-02 remained open pending NRC review of thermal performance modeling, and (2) Inspector Followup Item 50-413,414/94-17-10 remained open pending additional radiographs to be performed on the nuclear service water to auxiliary feedwater line since records of a previous radiograph could not be located (Sections E8.1 and E8.3).

Plant Support

- An isolated case of an inattentive fire watch was identified by NRC inspectors. Licensee followup actions were appropriate (Section F4.1).

- The delay in correction of a probable floor drain system clog prior to a reactor coolant system filter leak reflected a lack of operational focus within the chemistry organization (Section M1.1).

Report Details

Summary of Plant Status

Unit 1 was in a refueling/steam generator replacement outage until October 2, when unit restart commenced. The unit outage ended on October 4, when the reactor entered Mode 1. The unit reached full power on October 10 and operated at or near 100% power for the remainder of the inspection period.

Unit 2 operated at or near 100% power for the duration of the inspection period.

Review of UFSAR Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description signified the need for a special focus review that compares plant practices, procedures, and/or parameters to the UFSAR descriptions. While performing inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures, and/or parameters. No deficiencies were identified.

I. Operations

O1 Conduct of Operations

O1.1 Unit 1 Restart Observations (61726, 71707, 40500)

Containment Cleanliness Walkdown

The inspector conducted two cleanliness tours of the reactor building and pipe chase perimeter before the unit entered Mode 4. The inspector noted during the first tour, performed on September 21, that a number of items had not been removed from the reactor building or secured to structures. Water covered most of the containment floor at that time, as flushing was in progress in the overhead to wash loose articles and debris to the containment floor for easy retrieval and removal.

The inspector entered containment again on September 22. The containment floor was dry and much cleaner, but several items (i.e., nails, wire, a hand towel, and a pipe end) were identified and carried out of the building. The inspector also made note of some material condition discrepancies and communicated those items to the Reactor Building Coordinator.

The above housekeeping tours were conducted prior to the licensee's final Mode 4 closeout. The inspector found the condition of the reactor building to be much improved from the first tour and considered the controls for containment cleanliness to be effective.

Loose Parts Monitor Indications During Heatup

On September 26, the licensee suspended Unit 1 heatup at approximately 420 degrees F because of frequent loose parts monitor alarms in the reactor vessel head area. The licensee utilized the data acquisition and retrieval features of the recently installed loose parts monitoring system to determine that the alarms resulted from thermal expansion of piping in the vicinity of the loop B hot leg. An industry expert reviewed the data and determined that no reactor coolant system damage resulted because of the small magnitude of the thermal expansion events. Based on these evaluations the licensee resumed Unit 1 heatup. The inspector considered these actions an example of effective engineering support to operations.

Zero Power Physics Testing

The inspector attended the prejob briefing for zero power physics testing. The briefing handout provided a detailed plan for the testing, discussion of applicable requirements, and clearly delineated responsibilities. The briefing was conducted in the control room. However, the high noise level created by the control room ventilation system in conjunction with testing and maintenance activities in the vicinity of the briefing, caused multiple distractions. For these reasons, the designated management lead for the infrequently performed testing requested that the briefing be repeated in a conference room outside the control room, where the noise level was lower and the environment was more conducive to successful communication. The inspector considered this action to be indicative of conservative and conscientious management oversight.

The inspector observed portions of zero power physics testing. The licensee's implementation of several improvements to the test program continued to be effective. These included locating test equipment in the control room horseshoe area and face to face communications between test personnel, control room supervisors, and operators. The inspector observed an example of conservative actions when testing was suspended to repair a cable problem with an information only reactivity chart recorder located at the "operator at the controls" desk. The inspector reviewed data collected and results for the isothermal moderator temperature coefficient measurement (PT/0/A/4150/12A). The increased heat transfer characteristics of the new Unit 1 steam generators were evident to the operators performing the test. The inspector verified that the reactor coolant temperature and core reactivity changes were of sufficient magnitude to generate acceptable test results. The inspector concluded that testing was well coordinated and controlled.

Evaluation of Intermediate Range Trip Setpoint Discrepancy

The inspector reviewed the licensee's resolution of a reactor trip setpoint discrepancy associated with intermediate range channel N35.

Technical Specification (TS) Table 2.2-1 indicates an intermediate range trip setpoint of ≤ 25% Rated Thermal Power (RTP), with an allowable value of ≤ 31% RTP. The purpose of this trip is to provide core protection during reactor startup to mitigate the consequences of an uncontrolled rod withdrawal from a subcritical condition. Power range low setpoint trip also provides redundant protection to the intermediate range trips.

During a setpoint verification performed at approximately 20% power per PT/0/A/4150/01, Controlling Procedure for Startup Physics Testing, the licensee estimated that the N35 trip setpoint would have exceeded the TS allowable limit of 31%. With N35 blocked, measurements of current values were collected as power approached 31%. The licensee subsequently determined that the actual trip setpoint of N35 was greater than 25% RTP, but was less than the TS allowable limit of 31% RTP.

From discussions with engineering personnel, the inspector discerned that a slight asymmetry in core power contributed to the N35 setpoint problem. The intermediate range setpoints are developed and calibrated based on the assumption of uniform core power. Actual core power in the area adjacent to detector N35 was less than anticipated, which resulted in an apparent low setpoint when compared to total core calorimetric power. The inspector determined that the licensee took appropriate actions to declare N35 inoperable (PIP 1-C96-2700), and verified that intermediate range N36 and power range (low) channels were within the TS trip setpoint of ≤ 25% RTP. The licensee continues to investigate the cause of the core power tilt and anticipates that it will be reduced later in core life. The inspector concluded that the licensee took appropriate actions to identify and evaluate the N35 trip setpoint discrepancy.

O1.2 Fueling Water Storage Tank Boron Concentration

a. Inspection Scope (71707)

On October 2, with Unit 1 in Mode 2 during zero power physics testing, the weekly sample of boron concentration in the fueling water storage tank (FWST) revealed that boron concentration was in excess of the upper limit referenced in TS 3.5.4.b and specified in the Core Operating Limits Report (COLR). Zero power physics testing was temporarily suspended, demineralized water was transferred to the FWST, and boron concentration was returned to its allowable limits within the time period of TS 3.5.4. The inspector discussed the issue with licensee personnel and reviewed the TS, the TS Basis, the COLR, and test results from previous samples during the past two months.

b. Observations and Findings

The COLR specifies a boron concentration lower limit of 2475 ppm and an upper limit of 2575 ppm in modes 1 through 4. The inspector determined that boron concentration had been as high as 2644 on September 14 after

highly borated water from the refueling cavity had been transferred to the FWST following the completion of refueling operations. Demineralized water makeup to the FWST reduced boron concentration to 2494 ppm on September 16. Between September 16 and 19, FWST level dropped by roughly 30% for reactor coolant system fill and vent. Blended makeup to the FWST was calculated to result in a final boron concentration of 2525 ppm, the limit mid-range. However, on September 20, boron concentration was 2570 ppm and fluctuated between that concentration and 2558 ppm until September 25. On October 2, boron concentration reached 2579 ppm, and Unit 1 entered TS action 3.5.4 to restore boron concentration within allowable limits within 1 hour or be in Mode 3 within 6 hours.

The licensee took immediate corrective actions to lower FWST level by transferring inventory to the spent fuel pool so that a calculated dilution could be initiated. Once the dilution was completed, the FWST was recirculated via the A containment spray pump and another sample was obtained. Boron concentration had dropped to 2559, and FWST operability was restored within the 6-hours allowable by TS.

Considering the length of time that boron concentration was close to the upper limit and the opportunity to reduce boron concentration to avoid the potential inoperability of the FWST, the inspector questioned the effectiveness of communications between the Operations and chemistry organizations. The inspector discussed the issue with plant personnel and determined that, although the chemistry staff had notified the control room that FWST boron concentration was high and needed to be reduced, operations personnel did not recognize the operational impact of any further boron concentration increase.

The licensee determined that operations personnel did not exercise a questioning attitude to ensure that they understood how boron concentration affected FWST operability, and that the chemistry organization did effectively communicate the consequences of failing to reduce FWST boron concentration. To effect improvement in the interface between these two organizations, the licensee has designed several initiatives to: (1) hold daily meetings between the two groups, (2) designate an operations point of contact for chemistry concerns, (3) draft status sheets for monitoring critical chemistry parameters and communicating items with immediate or impending impact to plant status during the daily operations meeting.

c. Conclusions

The inspector concluded that this issue was indicative of ineffective communications between chemistry and operations. A second example of interface issues between chemistry and operations is discussed in section M1.1 of this inspection report.

O6 Operations Organization and Administration

O6.1 Administrative Control of Keys

a. Inspection Scope (71707)

On September 4, the inspector signed out keys for access to the Nuclear Service Water System pumphouse and the switchyard. The key issued from the Work Control Center to access the pumphouse was not the proper key to unlock the pumphouse door. The keys for the switchyard were correct. The inspector informed the licensee. The licensee initiated PIP C96-2399 to address the discrepancy. The inspector reviewed the PIP corrective actions.

b. Observations and Findings

Until recently, either of two keys would open the pumphouse door. The lock sets on the Technical Support Center (TSC) and the Operations Support Center (OSC) had been changed to make one of the keys unique to them. When this change had been made, the key log was updated to reflect the correct keying for the TSC and OSC, but the entry for the pumphouse was not updated to reflect that only one key would now fit the pumphouse door.

The cause of the problem was identified as incorrect updating of the key log. The licensee performed an audit of the key log and found no other discrepancies. In addition, a change to the key log updating process was initiated which included identification and evaluation of keys that have duplicate entries in the log.

c. Conclusions

The inspector considered the error in the key log to be an isolated instance. The licensee took appropriate corrective action.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Letdown Purification System Leak in Auxiliary Building

a. Inspection Scope (62703, 40500)

On September 7, 1996, Unit 1 core reload was delayed due to leakage in the letdown purification loop which was in service for refueling cavity purification. The leakage, which originated from the letdown 1B Reactor Coolant (NC) filter that had been put in service, contaminated the 560 foot level of the Auxiliary Building and some areas of the 543 foot level. The inspector reviewed the circumstances surrounding the event.

assessed recovery actions, and evaluated the licensee's Failure Investigation Process (FIP).

b. Observations and Findings

The estimated 20 gpm leak originated from the 1B NC filter, which is between the letdown ion exchangers and Volume Control Tank (VCT) in the Unit 1 Chemical Volume Control System. Since the NC filter is put in service remotely because of its location in a covered pit, the filter housing-to-cover leak that was draining to the 560 foot floor drain system went undetected when placed in service around 2:30 a.m. on September 7. Approximately 1.5 hours later a portion of the 560 foot floor drains were found to be backing up, and they continued to do so until letdown was isolated at approximately 8:52 a.m.

Letdown NC Filter 1B Leak

Based on a review of completed Enclosure 4.4 of OP/1/A/6200/01, Transferring From NC filter 1B to 1A, the inspector confirmed that the 1B NC filter had been placed in service for a leak test on September 3, 1996, following a filter cartridge change out. After the leak test, the filter was isolated/placed in standby, where it remained until being placed in service on September 7.

From photographs taken of the "as found" condition of the 1B NC filter cartridge, the inspector noted the existence of a slight downward bend part way around its top o-ring mounting lip (perhaps caused when the hinged filter housing cover was closed). The photographs also revealed that the grooved o-ring pulled away from the mounting lip directly opposite the bend. In view of these "as found" conditions, the inspector verified through record review that charging and letdown from the Residual Heat Removal (RHR) System were in progress during the leak test on September 3. Subsequently, in order to fully understand how the 1B NC filter passed its leak test, the inspector requested a plot of VCT level for the time in question. Although not conclusive, the plot showed a relatively acute downward slope corresponding to the short time (approximately 11 minutes) that the 1B NC filter was in service on September 3. A closer review of the aforementioned Enclosure 4.4 indicated that once the filter was valved into service, the leak test was performed in a very short period of time (approximately 1 minute). In view of the short duration of this leak test, the fact that it was performed (like the cartridge replacement) from above looking down into the pit, and that the pit cover (as indicated in Enclosure 4.4) was installed approximately one minute later, it is conceivable that the filter housing-to-cover leakage indicated by the VCT level plot went undetected.

To preclude such problems in the future, the licensee incorporated a filter leak test in associated Maintenance Procedure MP/0/A/7150/060, Pall-Trinity Filter Removal and Replacement, which requires the filter

to be under pressure for at least 10 minutes before inspecting for leaks. This change reflects the ASME functional test requirements for class II (B) and III (C) systems not required to operate during normal plant operation. The inspector reviewed the revised procedure and, having confirmed that it is used on all such filters in the plant, found it appropriate. Additionally, the licensee implemented actions to determine if other maintenance procedures require similar changes. This licensee-identified and corrected violation is characterized as Non-Cited Violation 50-413/96-16-01, Inadequate Reactor Coolant Filter Leak Test, consistent with Section VII.B.1 of the NRC Enforcement Policy.

560 Foot Floor Drain System

The cause of the 560 foot floor drain system backup was subsequently found to be blockage caused by a ball of small diameter rope, several welding rod stubs, some tie wraps, and approximately 5 gallons of resin. The inspector reviewed Problem Investigation Process (PIP) Report 0-C96-1795 (dated July 15, 1996) concerning the discovery of a large amount of resin in a pre-strainer of the subject floor drain system, as well as higher than usual dose levels on associated inlet piping. Screened as non-significant, PIP resolution remained with chemistry to clean out the strainer. PIP updates approximately one month later indicate that inlet pipe dose levels hadn't dropped significantly, but actions to remove the resin internal to the drain system would be postponed until September after U1EOC9 was completed. Since the higher than usual inlet pipe dose levels were an indication of blockage (i.e., a barrier where resin was accumulating behind), the inspector considered the postponement of internal resin removal to be indicative of a lack of operational focus on the impact of potential drainage increases to the floor drain system.

Recovery of Affected Equipment

Some of the water which backed up the 560 foot floor drain system made its way to a number of the pump rooms on the 543 foot level by seeping through non-water tight hatch covers/floor plugs. Equipment exposed to water and wetted included a Unit 2 spent fuel cooling system panel, three environmentally qualified Rotork valves (2NI-135B, 136B, and 100B), and motors associated with the 1A and 1B charging pumps and the 2B and 1B safety injection pumps. The inspector reviewed data from pump motor/cable testing performed per IP/0/A/4974/13, Horizontal Split Sleeve Bearing Motor Inspection and Maintenance, and PT/0/A/4950/01, Power Cable Testing, as well as the work requests documenting the results of water intrusion inspections, to confirm that no equipment problems resulted from the spill. A review of FSAR Section 3.3.6.1, Critical Auxiliary Building Areas, indicated that equipment submergence, not wetting, is the concern from flooding in the Auxiliary Building. Since submergence of critical Auxiliary Building areas was not a concern in this event, there was no significant risk of flood damage to safety equipment.

A general tour by the inspector of the 560, 543, and 522 foot levels of the Auxiliary Building revealed no additional concerns. No personnel contaminations occurred as a result of the floor drain backup or the decontamination efforts to restore access to the affected areas.

Leak Isolation/Operator Response

Unit 1 had entered Mode 6 at approximately 3:45 a.m., on September 7. According to the event time line developed by the licensee's FIP, the Unit 1 night shift control room crew suspected reactor coolant system leakage early on, but VCT level trending was difficult (due to charging flow indication problems and the necessity to balance charging and letdown to maintain VCT level high to compensate for an inability to provide gas overpressure). The control room operators took the following actions: monitored containment floor and equipment sumps; dispatched an operator to verify spent fuel cooling system purification, since it had been put in service earlier in the shift; dispatched an operator (based on misleading information from Radwaste Chemistry personnel) to ensure VCT divert valve NV-172A wasn't leaking back to the recycle holdup tank since being placed in automatic earlier in the shift; referred to AP/1/A/5500/26, Loss of Refueling Canal or Spent Fuel Pool Level, but didn't enter because specific symptoms were not met; and pursued the spent fuel cooling system demineralizer as a possible leak source since it was placed in service during the shift and resin was found in the floor drain strainer.

The inspector reviewed the Unit 1 Supervisor and Control Room Operator logs for the time of interest. Although information was limited concerning the above activities, the Unit 1 supervisor log did contain two entries around 5:00 a.m. concerning notification of the 560 foot floor drain backup and suspected reactor coolant system leakage. The Control Room Operator log revealed no indication of a problem, nor mentioned the control room actions discussed above. Although placing the 1B NC filter in service around 2:30 a.m. had been prompted by the control room due to a high differential pressure on the 1A NC filter, there was no indication of such in either log until an end of the shift control room operator log entry at 6:19 a.m. documenting issuance of R&R 16-2099 to replace the 1A NC filter. Noting that the night shift placed the 1B NC filter in service and finally having a quantified leak rate (based on VCT level) of approximately 20 gpm, the day shift subsequently: suspended core alterations; entered AP/1/A/5500/26; and closed 1KF-122 (cavity to spent fuel pool cross connect) and secured purification and charging/letdown.

Based on a review of the actions taken, the inspector determined that the operators acted appropriately to the information readily at hand. It was also apparent to the inspector that the lack of sufficient information regarding system/equipment problems and operational status changes (e.g., makeup volumes, NC filter realignment, etc...) precluded the use of the Unit 1 Supervisor and Control Room Operator logs as an

effective diagnostic tool. Such a tool may have led to isolating the leak earlier and reducing the area contaminated.

Failure Investigation Process (FIP) Review

A review of the licensee's FIP for this event found it to be appropriately thorough. It addressed and provided proposed corrective actions for such related issues as: the validity of using existing prestrainers in the 560 foot floor drain system to collect particulate materials that the downstream oil and grit removal tank is designed to collect; Radwaste Chemistry needing to ensure all consequences are considered when establishing the time frame for a plan's implementation; communication deficiencies between Operations and Chemistry which prevented the transfer of complete and accurate information; Operations referral to (versus entry into) AP/1/5500/26 and whether additional guidance is needed for smaller magnitude leaks; the encountered workarounds which made trending VCT level difficult; and whether existing criteria for log entries are reflecting Management's expectations. As discussed earlier, the FIP also tasked Maintenance with ensuring applicable test requirements are clearly stated in the necessary procedures.

c. Conclusions

The licensee's FIP and recovery actions for the NC filter leak and subsequent Auxiliary Building floor drain backup were considered to be appropriate. Post-cartridge replacement leak testing was inadequate to ensure the leak tightness of NC filter 1B. Subsequent implementation of a minimal hold period at test pressure should preclude recurrence. The postponement of removing a probable floor drain clog prior to the leak reflected a lack of operational focus within the Chemistry organization. Minimal entries in operations logs precluded their use as a diagnostic tool that may have led to an earlier isolation of the leak.

M1.2 Pressurizer Pressure Control Problems During Unit 1 Restart

a. Inspection Scope (62703)

During Unit 1 restart from the steam generator replacement outage, control room operators were unable to maintain pressurizer pressure with the normal C bank of pressurizer heaters. A leaking pressurizer spray valve was suspected, and inspection and repair activities revealed that both pressurizer spray valves (1NC-27 and 1NC-29 from reactor coolant system cold legs A and B, respectively) were leaking. The inspector discussed the issue with licensee personnel, reviewed the station Problem Investigation Process (PIP) Report that documented the problem, reviewed work orders, and evaluated the licensee's decision to continue unit restart with one of the valves still leaking.

b. Observations and Findings

On September 27, Unit 1 was in mode 3 at normal operating pressure and temperature, preparing for mode 2 operation. Control room operators noticed that pressurizer pressure control could not be maintained without the additional heat input from the backup pressurizer heater banks. The suspected cause was leakage past a spray control valve. Work order 96077934 was initiated to inspect and repair 1NC-27. The licensee determined that the valve positioner was out of adjustment and proceeded to calibrate the positioner and declare the valve operable.

When the unit was preparing to enter mode 2 on September 30, the problem with maintaining pressurizer pressure without backup heaters was encountered again. Troubleshooting revealed that leakage past 1NC-29 was the cause. Work order 96078640 was initiated on October 1 to inspect and repair 1NC-29. The valve positioner and actuator appeared to be correctly adjusted, and seat leakage was determined to be a result of some internal degradation. On October 2, the licensee decided to continue with the unit restart and initiate work orders to perform more extensive work on both pressurizer spray valves in the next refueling outage.

The inspector reviewed PIP 1-C96-2673. The licensee determined that numerous leakage and setup problems had been experienced on all pressurizer spray valves. At the end of the inspection period, the need for predefined work orders on each valve was being evaluated by the Engineering organization. No other concerns were identified.

c. Conclusions

The inspector concluded that the licensee appropriately delayed Unit 1 startup to evaluate the cause of the pressurizer pressure control problem and its impact on safe operation of the facility. The decision to continue the Unit 1 restart with leakage past 1NC-29 was adequately justified.

M3 Maintenance Procedures and Documentation

M3.1 Nonconservative Reactor Coolant System Controlled Leakage Test

a. Inspection Scope (61726)

On September 26, the licensee discovered that the surveillance test for determining controlled Reactor Coolant (NC) System leakage rate was not conservative. The inspector discussed the finding with plant personnel and reviewed the TS, the corrected procedure, and the associated station Problem Investigation Process (PIP) report.

b. Observations and Findings

During a review of the proposed Improved Technical Specification (ITS) 3.5.5.1, the licensee discovered that the PT/1(2)/A/4150/01, NC System Controlled Leakage Verification, was not being performed to simulate the system flowpath as it is described in the current TS basis. Specifically, the basis states that the controlled leakage limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 40 gpm with the modulating valve in the supply line (NV-294) fully open at a nominal NC System pressure of 2235 psig. This limitation ensures that in the event of a loss of coolant accident (LOCA), the safety injection flow will not be less than assumed in the safety analyses.

The surveillance test had been performed with NV-294 in the normal modulating position to control charging flow. This was not conservative because the accident analysis assumes a station blackout concurrent with the LOCA, and the valve fails to the open position on a loss of power to ensure that adequate seal injection is provided.

Once the discrepancy was identified, the licensee determined that the surveillance for Unit 2 had been missed as a result of the discrepancy. Licensee Event Report (LER) 413/96-09 is currently being drafted to document the procedural inadequacy, and the licensee's past operability evaluation will be included in the report. The licensee initiated an immediate procedure change to ensure that the surveillance could be performed correctly within the 24 hour period allowed by TS 4.0.3. Unit 1 was in Mode 3 with NC System pressure at 1900 psig; the surveillance was not required for that unit until it reached normal operating pressure (2235 psig).

The surveillance was performed in both units on September 27. The controlled leakage for Unit 1 was 35.5 gpm; the controlled leakage for Unit 2 was 33 gpm.

c. Conclusions

The inspector concluded that the licensee was proactive in identifying the discrepancy in the test procedure and correcting it in a timely manner. The impact of the procedural error was minimal, and the subsequent test results indicated that controlled leakage with the modulating valve fully open remained less than the 40 gpm limit imposed by TS. Pending a review of the licensee's past operability evaluation and long-term corrective actions, this issue will be identified as Unresolved Item (URI) 50-413,414/96-16-02: Nonconservative RCS Controlled Leakage Test.

M8 **Miscellaneous Maintenance Issues** (92902)

M8.1 (Closed) Inspector Followup Item (IFI) 50-413/96-08-03: Review of End-Of-Cycle (EOC) Control Rod Drop Timing Data. NRC Bulletin 96-01, Control Rod Insertion Problems, reported that control rods had failed to fully insert in fuel assemblies with greater than 30,000 Megawatt Days/Metric Tonne Uranium (MWD/MTU) exposure and requested measurement and evaluation of drag forces for all fuel bundles with control rod assemblies.

In accordance with Bulletin 96-01, the licensee had conducted control rod assembly drag tests of fuel bundles with control rod assemblies at EOC 9. The inspector reviewed fuel bundle drag testing traces and identified ten fuel bundles that indicated increased drag during control rod insertion. Of these ten fuel bundles, the licensee had identified four fuel bundles as having longer control rod drop times at EOC compared to Beginning-of-Cycle. The inspector reviewed the list of fuel bundles discharged at EOC 9 and determined that only one of the ten fuel bundles was reloaded for Cycle 10 and that fuel bundle did not have a control rod assembly. Based on the inspectors review, the licensee had conducted EOC drag testing as required by Bulletin 96-01 and identified those fuel bundles that may be susceptible to excessive friction. No further licensee action for Bulletin 96-01 was required.

Nine fuel bundles, discharged at EOC 8, were reinserted for Cycle 10 with five of these fuel bundles having control rod assemblies. The inspector noted that Bulletin 96-01 did not address the reinsertion of fuel bundles other than those off-loaded at EOC and questioned if these reinserted Cycle 8 fuel bundles had been drag tested. The licensee said only the fuel bundles from EOC 9 had been drag tested. The licensee said they could take data during drag testing conducted after the upper internals package was set. However, this drag testing was conducted only to assure the control rod drive and the control rod assembly were connected and would not yield the same detailed traces obtained during EOC 9 drag testing. The EOC 10 exposure for the reinserted Cycle 8 fuel bundles was predicted to be greater than the maximum exposure for fuel bundles drag tested during EOC 9. The inspector questioned if the licensee had considered this factor since the EOC 9 drag testing would not be bounding. The licensee stated that this was not considered a problem because Bulletin 96-01 addressed problems observed only with Westinghouse Vantage-5 fuel and not Framatome Mark-BW fuel used in both Catawba Units 1 and 2. The inspector noted that Bulletin 96-01 did not distinguish between different fuel manufacturers' fuel bundles. However, the inspector concluded that the drag testing conducted after setting the upper internals package was adequate to meet the requirements of Bulletin 96-01.

III. Engineering

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Open) Violation (VIO) 50-413,414/94-17-02: Failure to Properly Translate Regulatory Requirements into Specifications, Drawings, and Procedures. The licensee had revised calculation CNC-1150.01-00-001, Standby Nuclear Service Water Pond - Thermal Analysis During One Unit LOCA and One Unit Shutdown, revision 6, to include groundwater recharge and seepage from the Standby Nuclear Service water Pond (SNSWP) dam. The licensee calculated the total inventory loss for the 30-day duration to be 7.36 ac-ft due to groundwater recharge and 0.007 ac-ft due to seepage from the SNSWP dam. However, the license only used inventory losses for the first six days as the input to the thermal analysis model. The licensee had calculated the peak service water intake temperature occurred on the 5th day after event initiation. One additional day of heat input was added for conservatism to obtain the maximum service water intake temperature. Calculation CNC-1150.01-00-001 did not reference any analysis that validated using only 6-day inventory losses verses 30-day inventory losses. The licensee provided a sensitivity analysis that used the 30-day inventory losses as an input to the model. This sensitivity analysis indicated that the additional inventory losses did not affect service water intake temperature beyond the 6-day inventory losses used in the thermal analysis model.

The licensee had also revised CNC-1150.01-00-001 to include pump work as a heat input to the model. However, this input was substantially less than the heat input from various other auxiliary heat inputs, such as motor and oiler coolers, already included in the thermal analysis model.

Based on a review of the calculation and supporting documentation, the inspector concluded the licensee had adequately addressed SNSWP inventory losses due to seepage and increased heat input due to pump work. However, this violation will remain open pending completion of additional NRC review of the SNSWP modeling.

E8.2 (Closed) VIO 50-413,414/94-17-05: Failure to Perform Quality Related Activities per Prescribed Procedures or Drawings. The inspector toured the Service Water (RN) pumphouse and found that the licensee had corrected the instrument lines having a problem as identified in Inspection Report (IR) 413,414/96-10. The licensee had identified that one of the instrumentation lines needed a supporting tray installed and had written a deficiency. The licensee had also placed warning signs against climbing on the instrument lines. The inspector concluded the licensee's actions were adequate.

As identified in IR 413,414/96-10, procedure SI/0/A/5090/001, Tube Fitting and Tubing Installation, revision 0, was not clear as to which section in Enclosure 4.1 was referred to in Enclosure 4.6. The licensee had considered this a generic problem with the format of the Standard

Procedures being developed and issued PIP 96-2449 to initiate a review of the format for these procedures. The inspector concluded this review would address the concern.

E8.3 (Open) IFI 50-413,414/94-17-10: Flush Program Improvements. The inspector had previously requested to review the radiographs of the RN supply to Auxiliary Feedwater (CA) line, but the licensee was unable to produce these radiographs during the earlier inspection. The licensee attempted to locate these radiographs, but was unable to locate the radiographs for the A train RN supply to CA line. Furthermore, there was no documentation of the as-found condition for the A train RN supply to CA line on the work order. The licensee had issued a PIP to initiate documentation of the as-found conditions and to radiograph the RN supply to CA line. This item will be reviewed after the radiographs are taken. The licensee had scheduled this activity for late 1996.

E8.4 (Closed) IFI 50-413,414/94-17-12: Unnecessary Post-Maintenance Tests (PMTs) on Predefined Work Orders. The licensee had previously conducted a review of the predefined work orders and identified the unnecessary PMTs listed in the predefined work orders. However, the licensee had not updated the predefined work orders to reflect only the required PMTs. The inspector reviewed a sample of the predefined work orders for the RN system and found they had been updated.

IV. Plant Support

F4 Fire Protection Staff Training and Qualification

F4.1 Inattentive Fire Watch

a. Inspection Scope (71750, 40500)

On September 4, during a facility tour, the inspector identified that an individual performing fire watch duties was not attentive to those duties. The licensee was informed of the inspector's observation. The inspector reviewed PIP C96-2955 and the licensee's followup actions.

b. Observations and Findings

A floor plug which was part of a fire barrier had been removed for equipment access during the Unit 1 outage. As a compensatory action, a fire watch was posted at the opening. The inspector observed the individual performing fire watch duties reclined, with his shoes and socks removed. When the inspector left the area, the individual was on his feet and attentive. The inspector informed the licensee of his observation. The same day, an individual assessment was performed by the licensee's safety review group. The assessment included a visit to all areas with fire watches posted (7 total) The same individual was found inattentive again by the licensee.

The licensee took disciplinary action with the individual and implemented refresher training to reinforce fire watch responsibilities and expectations based on lessons learned.

c. Conclusions

Based on the results of the licensee's assessment and other facility tours performed by the inspector, the inspector considered the inattentive fire watch to be an isolated instance. The licensee took appropriate corrective action.

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 October 29, 1996. The licensee acknowledged the findings presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Bhatnager, A., Operations Superintendent
Coy, S., Radiation Protection Manager
Forbes, J., Engineering Manager
Harrall, T., IAE Maintenance Superintendent
Kelly, C., Maintenance Manager
Kimball, D., Safety Review Group Manager
Kitlan, M., Regulatory Compliance Manager
Lowery, J., Compliance Specialist
McCollum, W., Catawba Site Vice-President
Nicholson, K., Compliance Specialist
Patrick, M., Safety Assurance Manager
Peterson, G., Station Manager
Propst, R., Chemistry Manager
Rogers, D., Mechanical Maintenance Manager
Tower, D., Compliance Engineer

ENCLOSURE

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 40500: Effectiveness of Problem Identification and Prevention
IP 61726: Surveillance Observation
IP 62703: Maintenance Observation
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92902: Followup - Maintenance
IP 92903: Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-413/96-16-01	NCV	Inadequate Reactor Coolant Filter Leak Test (Section M1.1).
59-413,414/96-16-02	URI	Nonconservative RCS Controlled Leakage Test (Section M3.1)

Closed

50-413/96-08-03	IFI	Review of EOC Control Rod Drop Timing Data (Section M8.1).
50-413,414/94-17-05	VIO	Failure to Perform Quality Related Activities per Prescribed Procedures or Drawings (Section E8.2).
50-413,414/94-17-12	IFI	Unnecessary PMTs on Predefined Work Orders (Section E8.4).

Discussed

50-413,414/94-17-02	VIO	Failure to Properly Translate Regulatory Requirements into Specifications, Drawings, and Procedures (Section E8.1).
50-413,414/94-17-10	IFI	Flush Program Improvements (Section E8.3).
50-413/96-09	LER	Inadequate NC System Controlled Leakage Verification (Section M3.1).

LIST OF ACRONYMS USED

ASME	-	American Society of Mechanical Engineers
CA	-	Auxiliary Feedwater
BOC	-	Beginning-of-Cycle
CFR	-	Code of Federal Regulations
COLR	-	Core Operation Limits Report
DEV	-	Deviation
DPC	-	Duke Power Company
EOC	-	End-of-Cycle
FIP	-	Failure Investigation Process
FSAR	-	Final Safety Analysis Report
FWST	-	Fueling Water Storage Tank
IAE	-	Instrument and Electrical
IEEE	-	Institute of Electrical and Electronic Engineers
IFI	-	Inspector Followup Item
IR	-	Inspection Report
ITS	-	Improved Technical Specification
KF	-	Spent Fuel Pool Cooling System
LER	-	Licensee Event Report
LOCA	-	Loss of Coolant Accident
MCC	-	Motor Control Centers
MWD/ MTU	-	Megawatt Days/Metric Tonne Uranium
NC	-	Reactor Coolant
NCV	-	Non Cited Violation
OSC	-	Operations Support Center
PIP	-	Problem Investigation Process
PMTs	-	Post-Maintenance Tests
PPM	-	Parts per million
RHT	-	Recycle Holdup Tank
RN	-	Nuclear Service Water System
RTP	-	Rated Thermal Power
SNSWP	-	Standby Nuclear Service Water Pond
TS	-	Technical Specifications
TSC	-	Technical Support Center
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
Vac	-	Volts alternating-current
VCT	-	Volume Control Tank
Vdc	-	Volts direct-current
VIO	-	Violation
WO	-	Work Order