



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-413/90-24 and 50-414/90-24

Licensee: Duke Power Company
P.O. Box 1007
Charlotte, N.C. 28201-1007

Docket Nos.: 50-413 and 50-414

License Nos.: NPF-35 and NPF-52

Facility Name: Catawba Nuclear Station Units 1 and 2

Inspection Conducted: August 3, 1990 - September 5, 1990

Inspectors:	<u>W. H. Miller, Jr.</u>	<u>9-27-90</u>
	W. T. Orders, Senior Resident Inspector	Date Signed
	<u>W. H. Miller, Jr.</u>	<u>9-27-90</u>
	P. C. Hopkins, Resident Inspector	Date Signed
	<u>W. H. Miller, Jr.</u>	<u>9-27-90</u>
	J. Zeiler, Resident Inspector	Date Signed

Approved by:	<u>M. B. Shymlock</u>	<u>9-26-90</u>
	M. B. Shymlock, Chief	Date Signed
	Projects Section 3A	
	Division of Reactor Projects	

SUMMARY

Scope: This routine, resident inspection was conducted in the areas of plant operations; surveillance observation; maintenance observation; review of licensee event reports; followup of previously identified items; and refueling outage activities.

Results: One violation was identified involving two examples of failure to follow procedures. The two examples involved a Shift Supervisor and Control Room Operator who failed to ensure that audible count rate was present in the Control Room and in Containment when Unit 2 commenced core alterations for loading fuel. Paragraph 5.b.

One Non-Cited Violation was identified involving the failure to establish procedures to control the alignment of the Diesel Generator fuel oil storage tanks during reduced inventory situations. Paragraph 2.e.

A strength was identified involving the recently established program of pre-test "Tailgate" meetings held between testing groups and operations personnel. "Tailgate Packages", provided by the testing group for these meetings, have become more detailed, providing operations personnel with greater understanding of the tests will have on plant systems and components. The effectiveness of this program was evidenced by the successful and relatively trouble-free completion of the Unit 2 Engineered Safety Features Actuation Test. Paragraph 3.c.

A strength was also noted in the licensee's origination of the HVAC Review Committee which was created to resolve problems in the Annulus Ventilation (VE) System. The program which was designed by the committee to analyze the problems with VE has become the model for completing design basis reviews of ventilation systems. These efforts will undoubtedly have positive effects on plant operational status. Paragraph 6.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

B. Caldwell, Station Services Superintendent
R. Casler, Operations Superintendent
T. Crawford, Integrated Scheduling Superintendent
*J. Forbes, Technical Services Superintendent
*R. Ferguson, Shift Operations Manager
R. Glover, Performance Manager
T. Harrall, Design Engineering
*L. Hartzell, Compliance Manager
R. Jones, Maintenance Engineering Services Engineer
*V. King, Compliance
F. Mack, Project Services Manager
W. McCollum, Maintenance Superintendent
*T. Owen, Station Manager

Other licensee employees contacted included technicians, operators, mechanics, security force members, and office personnel.

NRC Resident Inspectors

*W. Orders
*P. Hopkins
*J. Zeiler

Other NRC Personnel

*M. Shymlock
*Attended exit meeting.

2. Plant Operations Review (71707 and 71710)

- a. The inspectors reviewed plant operations throughout the report period to verify conformance with regulatory requirements, Technical Specifications (TS), and administrative controls. Control Room logs, the Technical Specification Action Item Log, and the removal and restoration log were routinely reviewed. Shift turnovers were observed to verify that they were conducted in accordance with approved procedures. Daily plant status meetings were routinely attended.

The inspectors verified by observation and interviews that measures taken to assure physical protection of the facility met current requirements. Areas inspected included the security organization, the establishment and maintenance of gates, doors, and isolation zones in the proper conditions, and that access control and badging were proper and procedures followed.

In addition to the areas discussed above, the areas toured were observed for fire prevention and protection activities and radiological control practices. The inspectors also reviewed Problem Investigation Reports to determine if the licensee was appropriately documenting problems and implementing corrective actions.

b. Unit 1 Summary

Unit 1 started the report period in Mode 1, at 100 percent power and remained in Mode 1 throughout the period with no major problems.

c. Unit 2 Summary

Unit 2 began the report period in Mode 6, continuing the refueling outage which began on June 10. The outage was relatively unremarkable with no extraordinary modifications or maintenance performed. The unit regained Mode 5 on August 17. The Engineered Safety Features (ESF) Actuation Test was successfully completed on August 26 with relatively few problems. Mode 4 was entered on September 3, and current plans are to have the unit back on line by September 16.

d. Unit 2 Mid-Loop Operations

During the Unit 2 refueling outage, the inspectors witnessed operating conditions during periods of reduced Reactor Coolant (NC) System inventory, paying special attention to the entrance into and operating in mid-loop operations. Administrative controls and controlling procedures governing mid-loop operations were reviewed in detail previously and the results documented in NRC Inspection Report 50-413, 414/90-11.

The inspectors verified that required instrumentation was installed and operating reliably to monitor NC system level and temperature during reduced inventory conditions. Completed procedures for Containment closure were reviewed to ensure that Containment integrity was achieved before entry into these conditions. The inspectors verified that the licensee maintained at least two means of supplying inventory to the NC system to mitigate the consequences of a loss of normal Residual Heat Removal cooling. Further, the licensee avoided operations that could have led to NC system perturbations.

e. Diesel Generator Fuel Oil Supply Availability

On August 22, while conducting a routine safety system walkdown of the Unit 2 Diesel Generators (DGs), the inspectors noticed that the 2A and 2B DG Engine Fuel Oil Systems were in what appeared to be an abnormal alignment. Specifically, one of the two main fuel oil storage tanks feeding each DG was isolated by its manual outlet valve. A similar alignment was found on Unit 1 DGs. The inspectors discussed the observation with the licensee. It was noted that in this alignment, only one storage tank, with a capacity of 45,000 gallons of fuel, would be available automatically to supply fuel to its respective DG engine during accident situations. The inspectors also noted that there did not appear to be clear procedural guidance to align the isolated tank during an emergency.

Each DG engine is provided with a separate fuel oil storage and transfer system. Two underground fuel oil storage tanks provide a combined capacity sufficient to operate the DG engine at full load for seven days.

Technical Specifications 3.8.1.1.b and 3.8.1.2.b requires that in Modes 1 through 6, at least one DG be operable with a separate fuel oil storage system containing a minimum of 77,000 gallons of fuel to provide for a seven-day supply of fuel oil for each engine. In the licensee's present fuel oil system alignment, the second fuel oil storage tank would have to be manually aligned to its respective diesel engine to meet the seven day requirement.

After a review of the DG Fuel Oil system as described in the FSAR, and discussions with NRR/PSB, it was concluded that although it would be prudent to have both fuel oil storage tanks aligned during normal operation, it seems reasonable to allow single tank alignment, as long as adequate administrative controls are in place to ensure that the second tank is aligned correctly when needed.

The inspectors reviewed OP/2/A/6550/01, Diesel Generator Fuel Oil System Operation, Enclosure 4.2, which provides control of the normal alignment of the fuel storage tank isolation valves. The enclosure ensures that one of the storage tank's isolation valves are open during normal operation. However, the procedure did not provide controls to ensure that the second storage tank would be aligned when needed. Also, review of the low level annunciator responses for the fuel oil storage tanks indicated that there were no provisions for directing personnel to swap to the second storage tanks when the level in the normally aligned tanks are low. Before the end of the report period, the licensee had initiated efforts to enhance station procedures and the annunciator responses to ensure control of the supply of fuel oil from the fuel oil storage tanks.

This issue was identified as a violation of the requirements of Technical Specification 6.8.1 which requires in part that written procedures be established, implemented, and maintained covering operation of safety related equipment. However, after review of the circumstances relative to this issue and the criteria specified in Section V.A. of the NRC Enforcement Policy it was determined that this violation will not be cited. This is documented as Non-Cited Violation (NCV) 413, 414/90-24-01: Failure to Establish Procedures to Control Alignment of the DG Fuel Oil Storage System.

3. Surveillance Observation (61726)

- a. During the inspection period, the inspector verified plant operations were in compliance with various TS requirements. Typical of these requirements were confirmation of compliance with the TS for reactor coolant chemistry, refueling water tank, emergency power systems, safety injection, emergency safeguards systems, control room ventilation, and direct current electrical power sources. The inspectors verified that surveillance testing was performed in accordance with the approved written procedures, test instrumentation was calibrated, limiting conditions for operation were met, appropriate removal and restoration of the affected equipment was accomplished, test results met acceptance criteria and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

- b. The inspectors witnessed or reviewed the following surveillances:

PT/1/A/4350/02B	Diesel Generator 1B Operability Test
PT/1/A/4200/02A	Monthly Outside Containment Integrity Verification
PT/1/A/4200/06A	Boron Injection Valve Lineup Verification
PT/1/A/4200/62	RN to NW Flow Verification
PT/1/A/4600/02A	Mode 1 Periodic Surveillance Items
PT/1/A/4600/01	RCCA Movement Test
PT/1/A/4250/02B	Weekly Main Turbine Valve Movement
PT/1/A/4450/13B	Unit 1 Auxiliary Feedwater Pump Room CO ₂ Weekly Test
PT/1/A/4550/04	Diesel Generator Fuel Oil Storage Tank Water Inspection
PT/1/A/4450/09A	Spent Fuel Ventilation System Train A Operability Test
PT/2/A/4200/02H	Containment Closure Verification (Part V)
PT/2/A/4350/03	Electrical Power Source Alignment Verification
PT/2/A/4450/09B	Spent Fuel Ventilation System Train B Operability Test

PT/2/A/4550/04	Diesel Generator Fuel Oil Storage Tank Water Inspection
PT/2/A/4600/19E	Premode 5 Periodic Surveillance Items
PT/2/A/4600/02E	Mode 5 Periodic Surveillance Items
PT/2/A/4350/02A	Diesel Generator 2A Operability Test
PT/2/A/4200/09	Engineered Safety Features Actuation Periodic Test
PT/2/A/4350/02E	CA, CF, and Turbine Interlock Periodic Test

c. Engineered Safety Features Actuation Test

The Resident Inspection staff witnessed the performance of the Catawba Unit 2 Engineered Safety Features Actuation Periodic Test. The inspection efforts included but were not limited to the verification that:

- the procedure had undergone the proper review and received the necessary approval,
- the procedural test requirements were consistent with regulatory requirements, licensee commitments, and administrative controls
- minimum test crew requirements were met
- test prerequisites were completed
- required data was recorded for final review and analysis by proper personnel
- system component restoration to normal operation was accomplished upon completion of surveillance testing or as required by TS
- the qualifications of the individuals participating in the test were appropriate, and
- the test results and data appear adequate

The test is divided into three main sections; a simultaneous LOCA and Blackout, a LOCA without a Blackout and a Blackout without a LOCA.

In the first section, the test verifies that ESF components actuate correctly to their safety position within their required time limits in response to a Safety Injection, Phase A Isolation, Phase B Isolation, and a Blackout, as well as verifying the proper operation of the D/G.

The next section is essentially a repeat of the first, except there is no blackout of the essential switchgear.

The last major section of the test verifies proper D/G starting, load shedding, and load sequencing in response to a blackout.

Throughout the test, correct valve movements, response times, and system responses are verified.

It should be noted that this is the first time this test has been performed since the procedure was re-written to facilitate running it at the conclusion of the refueling outage as opposed to the beginning of an outage.

It should also be noted that the licensee has implemented a program of pre-test "tailgate" meetings. The purpose of the meeting is to have participants in major test evolutions briefed prior to the start of a test such that each knows what to expect, and to raise any questions or concerns.

It is believed that the combination of the revised procedure and the tailgate meetings led to the successful and relatively trouble free completion of this test.

No violations or deviations were identified.

4. Maintenance Observations (62703)

- a. Station maintenance activities of selected systems and components were observed/reviewed to ascertain that they were conducted in accordance with the requirements. The inspectors verified the following: activities were accomplished using approved procedures; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities performed were accomplished by qualified personnel; and materials used were properly certified. Work requests were reviewed to determine the status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which may effect system performance.

- b. The inspectors witnessed or reviewed the following maintenance activities:

47025	OPS	Investigate/Repair Chiller Failure to Start
06605	MNT	Inspect/Replace Fan Belt and Filter on Incore Instrument Air Handling Unit 2A
54015	OPS	Investigate/Repair Compressor Failure on 1TB-AHU-4
28267	OPS	Investigate/Repair Auxiliary Building Ventilation Problem

No violations or deviations were identified.

5. Review of Licensee Event Reports (92700)

- a. The below listed Licensee Event Reports (LER) were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of description, verification of compliance with Technical Specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event. Additional inplant reviews and discussion with plant personnel, as appropriate, were conducted. The following LERs are closed:

LER 413/89-07	Failure of the Turbine Driven Auxiliary Feedwater Pumps Due to Stress Corrosion Cracking of the Final Stage Shaft Sleeve.
LER 413/89-12	Potential Relief Path From Containment Sump to the Refueling Water Storage Tank During Cold Leg Recirculation.
LER 413,414/89-10	Technical Specification Required Unit Shutdown Due to Control Room Area Air Handling Unit Motor Malfunction.
LER 413/89-21	Technical Specifications Required Power Reduction Due to Failure of Two Refueling Water Storage Tank Level Channels Caused by Lightning.
LER 413/89-27	Technical Specification Requires Unit Shutdown Due to an Inoperable Chemical and Volume Control System Centrifugal Charging Pump.
LER 413/89-29	Potential Inoperability of Component Cooling Isolation Valves Due to Age Hardened Elastomeric Seat Material.
LER 413/89-28	Technical Specification Violation as a Result of Loss of Train A Main Steam Isolation for Steam Generator Power Operated Relief Valve Due to a Failed Fuse.
LER 414/89-21	Technical Specification Violation for Greater than 15 Percent Power Reduction Without Iodine Sample due to Inappropriate Action.

b. Source Range Neutron Flux Monitor Inoperability

On July 22, at approximately 11:59 p.m., the on-duty Shift Supervisor, who was working to prepare the unit for core reload, verified and documented by sign-off in operating procedure OP/2/A/6100/02, Controlling Procedure for Unit Shutdown, that two Source Range Neutron Flux Monitors (SRNF) were operable with audible indication in the Control Room and in Containment. Approximately an hour and a half later at approximately 1:37 a.m., the on-duty Control Room Operator (CRO) likewise verified and documented by sign-off in procedure PT/2/A/4600/19F, Pre-mode 6 Periodic Surveillance Items, that the SRNF Monitors were operable with audible indication in the control room and containment.

At 5:26 a.m. that same morning, the unit commenced core reload. At approximately 7:15 a.m., the oncoming Shift Supervisor (shift change was at 7:00 a.m.) questioned the Control Room Operators about the lack of audible SRNF count rate indication in the Control Room. A subsequent investigation revealed that the SRNF Monitor's audio multiplier switch was in the off position, which rendered the audio function of the monitors inoperable. The switch was immediately placed in the appropriate position to obtain the required audible count rate.

It was subsequently learned that on July 10, 1990, with Unit 2 defueled, both trains of the Boron Dilution Mitigation System (BDMS) had been placed in the "defeat" mode and were declared inoperable due to both trains reading less than the required one-half decade above the steady-state count rate. Both trains remained inoperable from this date through the commencement of core reload on July 23.

The inspectors discussed this incident with both the Shift Supervisor and Control Room Operator involved. Both had failed to recognize that the SRNF Monitor's audio multiplier switch had been placed in the off position. In this position, continuous visual indication in the Control Room was still present, but audible indication in the Control Room and in Containment was disabled. The inspectors were told that the audio output had apparently been turned off after the unit had been defueled during which time the SRNF Monitors were not required. It is hypothesized that someone turned the switch off due to the annoyance of the audible background count rate heard in the Control Room.

Technical Specification 3.9.2.1 requires two trains of the Boron Dilution Mitigation System (BDMS) be operable and operating when the unit is in mode 6. If one or both trains of BDMS is inoperable, both Source Range Neutron Flux (SRNF) Monitors are required to be operable with continuous indication in the Control Room, as well as audible indication in the Control Room and in Containment.

Technical Specification 6.8.1 requires in part that procedures be established, implemented and maintained covering plant operations. The Shift Supervisor failed to follow operating procedure OP/2/A/6100/02 in that the sign off in the procedure indicated that the verification of the required audible SRNF indication was operable when in fact it was not. Similarly, the CRO failed to follow PT/2/A/4600/19F in that the sign off in the procedure verified that the required audible indication was operable when in fact it was not. This issue is considered a violation of the requirements of TS 6.8.1 and represent two examples which collectively constitute Violation 414/90-24-02: Failure to Follow Procedures.

6. HVAC Review Committee

Catawba has experienced several significant problems involving ventilation systems during the past year. As a result of these problems the licensee has formed a committee to identify, mitigate and/or prevent future problems. The basic approach of the committee includes but is not limited to validating the analysis presented in the Final Safety Analysis Report (FSAR) for each selected system and then ensuring that periodic testing of the system adequately challenges the design basis.

The design basis review was first performed on the annulus ventilation system (VE). Each component in the VE system was scrutinized including postulating different failure modes. The effects of each of these failures was then compared against a pre-established set of limiting failures for the system's operating modes.

The results of the review indicated among other things a need to improve the periodic testing designed to verify the integrity of the annulus pressure boundary.

Based on the analysis performed on the VE system, the Review Committee has been tasked with performing similar analyses of the Auxiliary Building, Control Room, Annulus, Fuel Pool, Containment Purge, and Containment Air Return Ventilation Systems

This initiative is considered a strength.

7. Exit Meeting

The inspection scope and findings were summarized on September 5, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

<u>Item Number</u>	<u>Description and Reference</u>
NCV 413, 414/90-24-01	Failure to Establish Procedures to Control Alignment of the DG Fuel Oil Storage Systems. Paragraph 2.e
VIO 414/90-24-02	Failure to Follow Shutdown and Surveillance Procedures. Paragraph 5.b