



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

Report Nos.: 50-413/90-29 and 50-414/90-29

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: October 7, 1990 - November 3, 1990

Inspectors:	<u>W. T. Orders, Senior Resident Inspector</u>	<u>11-21-90</u> Date Signed
	<u>P. C. Hopkins, Resident Inspector</u>	<u>11-21-90</u> Date Signed
	<u>J. Zeiler, Resident Inspector</u>	<u>11-21-90</u> Date Signed

Approved by:	<u>M. B. Shymrock, Chief</u>	<u>11-21-90</u> Date Signed
	Projects Section 3A	
	Division of Reactor Projects	

SUMMARY

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

Results: One violation was identified involving a failure to follow an operating procedure which resulted in a valve misalignment and the spraydown of the 1A ND pump room. (Paragraph 2.e)

Two Non-Cited Violations were identified involving inadequate procedures. (Paragraphs 5.a and 6.a)

A strength was identified involving Catawba personnel sponsoring a utility workshop on October 2-3, 1990, to share operating experience and common problems associated with turbine driven auxiliary feedwater pumps. (Paragraph 2.f)

REPORT DETAILS

1. Persons Contacted

Licensee Employees

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

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

NRC Resident Inspectors

- *W. Oruers
- *P. Hopkins
- *J. Zeiler

*Attended exit interview.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Operations Review (71707)

- a. The inspectors reviewed plant operations throughout the report period to verify conformance with regulatory requirements, Technical Specifications, and administrative controls. Control Room logs, the Technical Specification Action Item Logs, and the Removal and Restoration Log were routinely reviewed. Shift turnovers were observed to verify that they were conducted in accordance with approved procedures. The complement of licensed personnel on each shift inspected, met or exceeded the requirements of Technical Specifications. Further, daily plant status meetings were routinely attended.

Plant tours were performed on a routine basis. The areas toured included but were not limited to the following:

- Turbine Buildings
- Auxiliary Building
- Units 1 and 2 Diesel Generator Rooms
- Units 1 and 2 Vital Switchgear Rooms
- Units 1 and 2 Vital Battery Rooms
- Standby Shutdown Facility

During the plant tours, 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, the areas toured were observed for fire prevention and protection activities and radiological control practices. The inspectors also reviewed Problem Investigation Reports (PIRs) to determine if the licensee was appropriately documenting problems and implementing corrective actions.

b. Unit 1 Summary

Unit 1 began the report period in Mode 3 after a forced shutdown on October 5 to repair the motor operator on a steam generator blowdown containment isolation valve. The valve was repaired and the unit was returned to 100 percent power on October 10. On October 12, an automatic turbine runback to 50 percent power occurred due to the loss of cooling to one of the main transformers when heavy rain caused an electrical short in a group of transformer cooling fans. The Unit returned to 100 percent power on October 13 and completed the report period operating at full power.

c. Unit 2 Summary

Unit 2 began the report period in Mode 1, at 98 percent power, restricted to that power level due to an abnormally high feedwater flow demand to the D Steam Generator. Precision heat balance testing is scheduled in order to determine and resolve the cause of the flow demand and allow power operation at full rated power. On the evening of October 7, the Unit tripped on low-low steam generator level during a transient initiated by the trip of the 2A Main Feedwater Pump. The feedwater pump tripped due to the failure of two pressure switches designed to trip the pump on high discharge pressure. The pressure switches were repaired and the Unit was returned to 98 percent power on October 10 where it remained for the duration of the report period.

d. Ice Condenser Operability Concern

On November 1, 1990, the licensee discovered a number of U-Bolts used to secure the ice baskets in the ice condensers of both McGuire Units to be broken. Catawba personnel initiated PIR 0-C90-0322 to determine if similar problems existed at Catawba. Design Engineering performed an operability evaluation which concluded that based on information which was currently available, the Catawba ice condensers were fully operable. All analyses associated with these bolt failures are not yet complete. Nor have corrective actions been formulated. Accordingly, this item will be carried as an Inspector Followup Item. 50-413,50-414/90-29-01, Review Of Ice Condenser U-Bolt Corrective Action.

e. Valve Misalignment Resulting In ND Pump Room Spraydown

On October 18, Unit 1 was in Mode 1, at 100 percent power. Operations personnel were in the process of conducting PT/1/A/4200/53A, 1FW-28 Partial Stroke Test, when the 1A ND Pump Room was sprayed down after a direct flowpath was established from the FWST through an open vent valve in the room. The spill was quickly isolated by the CRO when he was alerted by an NLO, who heard water spraying in the room. The licensee subsequently determined that the cause of the spill was due to the misalignment of a drain valve as described below.

PT/1/A/4200/53A is designed to verify the freedom of movement of valve 1FW-28, the 1A ND Pump suction check valve from the FWST. This is accomplished by isolating and draining the ND pump suction supply from the FWST and then refilling the suction header causing 1FW-28 to open.

The CRO isolated the ND pump suction supply by closing 1FW-27A, the 1A ND Pump Suction from the FWST. A NLO was then dispatched to drain the pump's suction supply line. This was to be accomplished by opening 1ND-7, the 1A ND Pump Suction Line Drain valve, and 1ND-15, the ND Pump 1A to Drain Header valve. When the NLO attempted to open 1ND-7 using its reach rod located outside the ND room, it would not open. Without alerting the CRO or other operating personnel of his problem with the reach rod, he obtained a pipe wrench, entered the pump room, and opened the valve manually. After allowing the suction line to drain, the NLO was to re-close both 1ND-7 and 1ND-15. The NLO reportedly closed both 1ND-7 and 1ND-15 using their respective reach rods, returned to the ND Pump Room and used the pipe wrench to verify that 1ND-7 was closed. The NLO then notified the CRO that these valves were closed, and the CRO opened 1FW-27A to repressurize the suction line. When 1FW-27A was opened, the NLO heard water spraying inside the room and contacted the CRO to have 1FW-27A re-closed, which terminated the spill.

Upon investigation, the licensee discovered that the NLO had erroneously locked 1ND-7 open instead of closed. In addition, it was found that a vent valve downstream of 1ND-7, was also open with its pipe cap removed. When 1FW-27A was opened to re-pressurize the ND Pump suction line, a direct flow path was established from the FWST, through 1ND-7, and the open vent valve resulting in the spraydown of the room.

Technical Specifications 6.8.1 requires in part, that procedures be established, implemented, and maintained covering plant operations. The NLO failed to follow PT/1/A/4200/53A in that he signed off Step 8.0 indicating that he had closed and locked valve 1ND-7 when in fact he had locked the valve open. This issue is considered a violation of the requirements of TS 6.8.1 and is identified as Violation 413/90-29-02: Failure to Follow Procedure Resulting In ND Valve Misalignment.

f. Turbine Driven Auxiliary Feedwater Workshop

In late May of 1990, in response to several recent failures of the CAPTs, Catawba personnel researched the NPRDS for similar failures in the industry. As a result of this research, they found that there were many utilities that have experienced difficulties with their turbine driven auxiliary feedwater pumps. An INPO Network question to all utilities was then issued inquiring as to their interest in attending a workshop for the purpose of sharing operating experience and to discuss some of the common problems associated with these turbine driven pumps.

Response to the INPO Network question was favorable, and Catawba decided to host a utility workshop. The workshop was a two day event with technical presentations during the morning sessions and round table discussions in the afternoon sessions.

The workshop had 47 engineers attend representing 13 nuclear utilities as well as representatives from Dresser-Rand (turbine manufacturer), Woodward Governor (turbine governor manufacturer), and an independent consultant (formally with Terry Turbine).

Indications are that the workshop was very successful. The discussions indicated that most of the attendees are having or have had similar difficulties with their CAPTs. Most of these problems were common, and involved a combination of turbine, governor and system design problems.

It was indicated that what was most beneficial to most of the utilities were the discussions on the actions other utilities had taken in correcting their problems and how successful those actions were.

The initiative by the Catawba personnel to organize and host the workshop is considered a Strength.

One Violation was identified in paragraph 2.e.

3. Surveillance Observation (61726)

a. During the inspection period, the inspectors verified plant operations were in compliance with various TS requirements. Typical of these requirements were confirmation of compliance with the TS for reactivity control systems, reactor coolant systems, safety injection systems, emergency safeguards systems, emergency power systems, containment, and other important plant support systems. The inspectors verified that: surveillance testing was performed in accordance with 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 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/0/A/4400/22A	Nuclear Service Water Pump Train A Performance Test
PT/1/A/4600/02A	Mode 1 Periodic Surveillance Items
IP/2/A/3176/01	Containment Hydrogen Monitor System Calibration Procedure
PT/2/A/4200/13A	Safety Injection Valves Inservice Test
PT/2/A/4200/13E	Auxiliary Feedwater Valves Inservice Test
PT/2/A/4200/20	Feedwater Valves Inservice Test
PT/2/A/4350/02B	Diesel Generator 2B Operability Test
PT/2/A/4450/10D	Unit Diesel Generator CO ₂ Semi-Annual Test
PT /A/4400/06F	KD Heat Exchanger 2B Heat Capacity Test
PT/2/A/4600/02A	Mode 1 Periodic Surveillance Items
PT/2/A/4600/06A	Incore Instrumentation Detector Calibration
PT/1/A/4450/03B	Annulus Ventilation System Train 1B Operability Test

No violations or deviations were identified.

4. Maintenance Observations (62703)

a. Station maintenance activities of selected systems and components were observed/reviewed to ensure that they were conducted in accordance with the applicable requirements. The inspectors verified licensee conformance to the requirements in the following

areas of inspection: activities were accomplished using approved procedures, and 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:

Work Request	Work Performed
007042 SWR	Annual Preventative Maintenance on Diesel Generator 1B Starting Air System
005928 SWR	ACOT on 2-EMF-42
000208 TRD	Replace Undervoltage Relay 27H on the 2B Diesel Generator

No violations or deviations were identified.

5. Review of Licensee Event Reports (92700)

The below listed LERs 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 in-plant reviews and discussions with plant personnel were conducted as appropriate.

- a. (Closed) LER 414/90-C1: Auxiliary Feedwater Automatic Start Due to an Inadequate Periodic Test Procedure.

On January 5, 1990, Unit 2 was in Mode 3, Hot Standby, in a forced outage to repair the actuator on 2-BB-19A, SG 2B Blowdown Containment Isolation Valve. Other maintenance and testing activities requiring Mode 3 status were also being performed. These activities included shaft realignment of CF Pumps 2A and 2B. The CF Pumps were tripped and the SG levels were being maintained by CA Pumps 2A and 2B. At approximately 9:00 p.m., an unexpected Train B CA Automatic Start signal occurred coincident with the reset of the 2B DG Sequencer which was undergoing routine testing pursuant to Section 12.42 of PT/2/A/4200/09A. Since CA Pump 2B was already in operation, there was no major operation perturbation.

Review of the test procedure and electrical elementaries did not reveal the cause of the CA automatic start signal. The licensee

decided to repeat the test which was being performed on the 2B DG sequencer to determine if the testing had been the cause of the signal.

At approximately 3:00 a.m. on January 5, a second CA automatic start signal occurred when the 2B DG sequencer was reset. Further review of the electrical elementaries determined that a "loss of CF Pump" CA start signal is generated when the sequencer is reset if both CF Pumps are in a tripped condition. During previous performance of this test, this sequence of events was not experienced because a CF Pump is normally in operation during Mode 3 operation above 700 psig steam pressure.

This incident was the result of an inadequate procedure in that PT/2/A/4200/09A allowed Section 12.42 to be completed in Mode 3 with CA Automatic start enabled and both CF Pumps tripped without measures to prevent or mitigate the consequences of the generation of the CA Automatic start signal.

Technical Specification 6.8.1 requires that written procedures shall be established, implemented and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978 which includes plant operations and maintenance. Implicit in those requirements is the requisite that the procedures be accurate, and appropriate to the circumstances.

After a review of the circumstances relative to this issue and the criteria specified in Section V.G. of the NRC Enforcement Policy, it was determined that this event constitutes a licensee identified Violation. Accordingly, this item is identified as NCV 414/90-29-03, Inadequate Procedures for Auxiliary Safeguards Testing.

- b. (Closed) LER 413/89-30: Shipment of Two Liners of Secondary Bead and Powdex Resin Mixture in Violation of the Process Control Program.
- c. (Closed) LER 414/89-10: Failure of Motor Actuated Borg-Warner Model 6J-219 Valve to Fully Close Under High Differential Pressure Conditions Due to Manufacturers Design.

One NCV was identified in paragraph 5.a.

6. Followup on Previous Inspection Findings (92701 and 92702)

- a. (Closed) IFI 414/90-26-01: Review Licensee Analysis of Pressurizer Transient Event.

On September 1, 1990, Unit 2 experienced a temperature transient in the NC System Pressurizer which resulted in the Technical Specification heatup limit being exceeded. The transient occurred during the performance of PT/2/A/4200/10B, Residual Heat Removal Pump 2B Operability Test, which required the isolation of letdown from the NC System. With letdown isolated, a cooldown occurred in the pressurizer followed by a heatup which exceeded the pressurizer heatup limit.

The inspectors reviewed PT/2/A/4200/10B and concluded that the procedure was inadequate in that it unnecessarily prescribed the isolation of both trains of ND letdown, when only isolation of the train of ND which was being tested was required. This resulted in the cooldown of the pressurizer which occurred.

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 activities important to safety. However, after review of the circumstances relative to this issue and the criteria specified in Section V.G. of the NRC Enforcement Policy, it was determined that this violation will not be cited. Accordingly, this issue is documented as NCV 414/90-29-04: Inadequate Procedure for Testing ND Pump.

- b. (Closed) Deviation (DEV) 413/90-01-01: Licensees Corrective Actions Were Not Implemented Until After Commitment Dates.

By letter dated August 10, 1989, in response to Operational Safety Team Inspection findings documented in report 50-413/89-09 the licensee informed the NRC that corrective actions associated with item number one of Violation 50-413/89-09-01 would be accomplished by September 1, 1989. These corrective actions entailed placing a stem bolt and washer on each of the KC pumps suction and discharge valves on Unit one. Further, in a letter dated October 10, 1989, the licensee committed to correcting selected Inspector Followup Items identified during the same inspection. These items included correcting the Maintenance Management Procedure concerning the control of standing work requests; correcting the performance test procedures for the containment spray pumps; and preparing a proposal for corrective actions concerning control room noise.

During the performance of inspection 50-413,414/90-01 which took place between the dates of January 8-11, it was noted that the corrective actions associated with the Violation had not been performed by September 1, 1989 as committed to, rather the actions were completed on January 2, 1990 some 120 days beyond the commitment date. It was also noted that the actions associated with the commitments made in the letter of October 10, 1989 had not been completed. Accordingly, Deviation 413/90-01-01 was issued.

During this report period, these commitments were reviewed, appear adequate, and are complete. This item is closed.

- c. (Closed) Violation 414/90-09-05: Failure to Establish Measures to Accurately Indicate Operating Status.

On April 5, 1990, Unit 1 was in Mode 3, heating up in preparation for startup testing with the steam generators being relied upon for decay heat removal. During a review of the Mode 3 Critical Parameter Checklist, which contains the status of important plant parameters, the licensee discovered that the Main Steam power operated relief valve (PORV) block valves (1SV-25B, 26B, 27A, and 28A) were closed. The valves were opened and PIR 1-C90-115 was initiated to determine why the valves had not been opened prior to entering Mode 4, an operating mode where the PORV's are required to be operable. The resultant investigation revealed that the PORV block valves had been closed during ESF testing of the PORVs on March 28th when the Unit was in Mode 5. The ESF test procedure did not indicate a required position for the block valves but operations personnel determined that it was necessary to close them before the PORV's were to be opened in order to prevent depleting the vacuum established in the steam generators. The block valves were closed without generating an R&R tagout or making a Control Room Open Item entry even though Operations Management Procedure (OM?) 2-17, Control Room and Unit Supervisor Logbooks, require a Control Room Open Item entry to be made for controlling the status of equipment in an "Out of Normal" position. Operations failed to open the block valves following the ESF test and the valves remained closed for three days while the unit was in an operating mode requiring PORV operability. It was also noted that during this time, the plant operating crews were unaware that the PORV block valves were closed.

This event was identified as a Violation of 10 CFR 50, Appendix B, Criterion XIV, Inspection, Test and Operating Status, which requires in part that measures be established for indicating the operating status of structures, systems and components.

Licensee corrective actions to the Violation included: 1) revising the critical parameters checklist to include the PORV block valves as being open in Mode 4, 2) revising the ESF test to include the PORV block valves, and 3) revising Operations Management Procedure 1-17 to re-define the independent verification requirements for "return" positions indicated on R&R sheets. These corrective actions have been reviewed and are adequate. This item is closed.

No violations or deviations were identified.

7. Exit Interview

The inspection scope and findings were summarized on November 6, 1990, with those persons indicated in paragraph 1. The inspectors 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>
IFI 413,414/90-29-01	Review Ice Condenser U-Bolt Corrective Action. Paragraph 2.d.
VIO 413/90-29-02	Failure to Follow Procedures. Paragraph 2.e
NCV 414/90-29-03	Inadequate Procedures for Auxiliary Safeguards Testing. Paragraph 5.a
NCV 414/90-29-04	Inadequate Procedures for IWP Testing of ND Pumps. Paragraph 6.a

8. Acronyms and Initialisms

ACOT	-	Analog Channel Operational Test
BB	-	Steam Generator Blowdown
CA	-	Auxiliary Feedwater System
CAPT	-	Auxiliary Feedwater Steam Driven Turbine Pump
CF	-	Main Feedwater System
CNS	-	Catawba Nuclear Station
CRO	-	Control Room Operator
DG	-	Diesel Generator
EMF	-	Radiation Monitor
FW	-	Feedwater
FWST	-	Refueling Water Storage Tank
IAE	-	Instrumentation and Electrical
IFI	-	Inspector Followup Item
INPO	-	Institute of Nuclear Power Operations
KD	-	Diesel Generator Cooling System
RC	-	Reactor Coolant System
NCV	-	Non-Cited Violation
ND	-	Residual Heat Removal System
NLO	-	Non-Licensed Operator
NM	-	Nuclear Sampling System
PIR	-	Problem Investigation Report
SG	-	Steam Generator
TS	-	Technical Specifications