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

Report Nos.: 50-413/92-22 and 50-414/92-22

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 9, 1992 - September 15, 1992

Inspector: _____ 9/24/92
W. T. Orders, Senior Resident Inspector Date Signed

Inspector: _____ 9/24/92
P. C. Hopkins, Resident Inspector Date Signed

Inspector: _____ 9/24/92
J. Zeiler, Resident Inspector Date Signed

Approved by: _____ 9/25/92
for George A. Belisle, Chief Date Signed
Projects Section 3A
Division of Reactor Projects

SUMMARY

Scope: This routine, resident inspection was conducted in the areas of plant status; plant operations review; chemical and volume control (NV) system valve misalignment; safety injection (NI) system valve misalignment; steam generator blowdown (BB) system valve misalignment; review of decay heat removal/shutdown risks (TI 2515/113); verification of plant records (TI 2515/115); Unit 1 ice condenser inspections; review of emergency core cooling system (ECCS) water hammer at Shearon Harris; review of containment vacuum relief valve problem at Sequoyah; surveillance observations; maintenance observations; NRC Bulletin 92-01: Failure of Thermo- Lag 330 Fire Barrier System; Part 21 Reports; review of licensee event reports; and follow-up on previous inspection findings.

Results: In the areas inspected, an apparent violation with four examples was identified and is being considered for escalated enforcement because it represents a programmatic breakdown of the equipment control process, paragraphs 4, 5 and 6. A non cited violation was identified involving a failure to perform surveillance testing in accordance with the frequency required, paragraph 12.c. Another non cited violation was identified involving inadequate maintenance procedures which resulted on improper assembly of the 1B NI pump motor cooler, paragraph 13.c.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

S. Bradshaw, Shift Operations Manager
*J. Forbes, Engineering Manager
S. Frye, Operations Support Manager
*R. Futrell, Regulatory Compliance Manager
*E. Geddie, Operation Superintendent
T. Harrall, Safety Assurance Manager
M. Hazeltine, Compliance
*J. Lowery, Compliance
*W. McCollum, Station Manager
*S. Rose, Manager, Catawba Safety Review Group
*M. Tuckman, Catawba Site Vice-President

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

NRC Resident Inspectors

*W. Orders
*P. Hopkins
J. Zeiler

* Attended exit interview.

2. Plant Status

Unit 1 Summary

Unit 1 began the report period defueled, in day 29 of a planned 71 day End-of-Cycle 6 refueling outage. On August 16, the unit entered Mode 6, when the licensee began reloading the core. Reload was completed on August 19 without incident. On September 1, the reactor vessel head was set and Mode 5 was entered. Major activities initiated or accomplished during this report period included steam generator eddy current testing, main turbine/generator maintenance, ECCS flow balance testing, ice condenser work, Diesel Generator (D/G) 1A and 1B inspections and maintenance, steam generator sleeving and plugging, and engineered safety features (ESF) testing.

Unit 2 Summary

Unit 2 began the report period operating at full power. On August 23, power was reduced to 65 percent following the failure of Turbine Control Valve No. 3 to open following routine testing. After manipulation of the test solenoid valves associated with the control valve, the valve

operated properly. The unit returned to full power the following day and operated at essentially full power for the remainder of the report period.

3. Plant Operations Review (71707)

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 TS Action Item Log, and the Removal and Restoration (R&R) 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 TS. 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
Unit 1 Reactor Building
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 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.

4. Chemical and Volume Control System (NV) Valve Misalignment (71710/71707)

At approximately 10:30 a.m., on August 9 with Unit 1 defueled, operators began raising level in the reactor coolant (NC) system in preparation for performing ECCS flow balance testing. Level was being increased using a centrifugal charging (NV) pump, taking suction from the refueling water storage tank (FWST). In this process, operators established NC pump seal injection in order to prevent the introduction of impurities into the NC pump seals. Shortly after operators had established seal injection, a health physics technician on duty in the Unit 1 reactor building, called the control room to report that water was coming out of some valves in the building. An operations engineer

went into the reactor building to determine the source of the leak and found a drain valve on one of the NC pump seal injection lines open. The drain valve was fitted with tygon tubing which routed the water to flour drains. He informed the control room operators of the situation. They closed the seal injection supply isolation valves terminating the leakage. Approximately 50 minutes passed from the time of the call, until the isolation valves were closed. This resulted in approximately 300 gallons of water being discharged into the reactor building floor and equipment sump. The licensee ultimately discovered that 6 chemical and volume control system (NV) vent and drain valves (1NV50, 1NV61, 1NV72, 1NV83, 1NV73 and 1NV97) had been inadvertently left open.

The inspectors determined that the Block Tagout (BTO) under which these valves had been opened, had been cleared, based on the fact that operations procedure OP/1/A/6200/01A, NV Fill and Vent had been performed. Operators assumed that the valves were returned to their normal position by the procedure but they subsequently determined that the procedure did not list the valves.

TS 6.8.1, Procedures and Programs, requires that written procedures be established, implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, which includes equipment control, filling, venting and draining of emergency core cooling and reactor coolant systems. Implicit in this requirement is the requisite that procedures contain adequate guidance to ensure the task is performed appropriately.

This event constitutes an apparent Violation of TS 6.8.1, in that NV Fill and Vent procedure, OP/1/A/6200/01A was inadequate by virtue of the fact that it did not list the above described valves. This Violation is one of four examples contained in this report which, in the aggregate, comprise Violation 413, 414/92-22-01, Programmatic Breakdown Of Equipment Control Process.

5. Safety Injection (NI) System Valve Misalignment (71707)

At approximately 11:00 a.m., on July 27 with Unit 1 in mode 6, control room operators detected that refueling water storage tank (FWST) level had decreased by what was subsequently determined to be approximately 1 percent. After evaluating the situation to determine where the water could be going, the operators closed valve 1 NI-100, the NI pump suction from the FWST, which had been opened for maintenance some 12 hours previously. Closing 1 NI-100 terminated the spill. A non-licensed operator was dispatched to determine the source of the spill and found valves 1 NI-364 and 1 NI-46, Cold Leg Accumulator Fill vent/drain valves open. They should have been closed. The valves were outfitted with tygon tubing which routed the water to floor drains. Licensee calculations indicate that approximately 3000 gallons of water drained from the FWST through the valves to the floor drains in the mechanical penetration room.

The inspectors determined that Block Tagout (BTO) 12-1558, under which these valves had been opened, had been cleared, erroneously leaving the valves mis-positioned. It was learned that the operators who cleared the BTO failed to follow established procedural requirements pertaining to that process. Specifically, Operations Management Procedure OMP 2-18, R&R Tagouts and Restoration, requires that valves located inside the BTO boundary be repositioned using a system line-up procedure prior to clearing the BTO. This did not occur. The operators realigned only the valves on the BTO which did not list valves 1 NI-364 and 1 NI-46.

The Block Tagout Process had recently undergone a number of significant changes prior to the outage and the operators had received training on the changes. This was this shift's first experience with the actual process of clearing a BTO using the revised process. Previously, when draining a system, all valves, including vents and drains were on an R&R sheet.

This event constitutes an apparent Violation of TS 6.8.1, in that on or about July 27, 1992 operators failed to follow operations procedure OMP 2-18, R&R Tagouts and Restoration, which requires that valves located inside a BTO boundary be repositioned using a system line-up procedure prior to clearing the BTO. Plant staff cleared BTO 12-1558 without performing a system line-up. This resulted in the BTO being cleared with valves located inside the boundary being left open. This Violation is one of four examples contained in this report which in the aggregate comprise Violation 413, 414/92-22-01, Programmatic Breakdown Of Equipment Control Process.

6. Steam Generator Blowdown (BB) System Valve Misalignment (71707)

On August 20, at approximately 3:30 p.m., two non-licensed operators were sent into Unit 1 containment to confirm selected valve alignments as part of a routine containment integrity surveillance. They discovered that BB valves 1BB-12, 13 and 154 were open, and indeed 1BB-13 and 154 were locked in the open position. This was unexpected since the same two operators had verified that these valves were closed on August 14. The licensee subsequently verified that the outside valves associated with the penetration were closed and had been closed throughout the period from August 14 through August 20. Core reload had taken place between the dates of August 16 and August 19.

The licensee initiated an investigation in an effort to determine how the valves in question were re-opened after having been verified closed on August 14. As the investigation progressed, the licensee determined that not only could they not ascertain how the valves were re-opened, they could not resolve how or when the valves were closed from their normal locked open position. The licensee's investigation was expanded to all four S/Gs and revealed a number of apparent problems. The investigation also revealed that the outside valves for all of the BB containment penetrations had been closed during the time in question.

The problems identified pertaining to BB configuration control will be documented for each S/G separately.

S/G A
On August 14, when a containment integrity valve checklist was performed on S/G A, operators found valves 1 BB-2 and 1 BB-153, the S/G blowdown outlet valves, closed. No documentation could be found explaining how or when the valves were unlocked and closed from their normally locked open position. Valve 1 BB-1, a S/G blowdown upper shell sample valve, was found open and was closed to satisfy the desired penetration alignment. On August 15, approximately 12 hours after operators verified that valve 1BB-1, 2 and 153 were closed, operators began filling the S/G without difficulty. Using the method chosen to fill the generator, the only way to access the generator is through either 1 BB-2 or 1 BB-153. This means that one or both valves had to have been reopened within 12 hours of being verified closed the previous day. On August 21, all three valves were verified open and valves 1 BB-2 and 1 BB-153 were locked. The licensee could not determine how or when the valves were realigned.

S/G B
On August 14, when a containment integrity valve checklist was performed on S/G B, operators found valve 1 BB-15, a S/G blowdown upper shell sample valve, and valves 1 BB-16 and 1 BB-155 the S/G blowdown outlet valves closed. Their normal positions are, locked open for valves 1 BB-16 and 1 BB-155, and open for valve 1 BB-15. Although this satisfied the desired containment integrity alignment, the licensee could not determine how or when the valves were unlocked and realigned. On August 15, operators filled the S/G without difficulty. As described above for S/G A, using the method chosen to fill the generator, the only way to access the generator is through either 1 BB-16 or 1 BB-155. This means that one or both valves, 1 BB-16 and 1 BB-155, were reopened within hours of having been verified closed the previous day. On August 21, all three valves were verified open and valves 1 BB-16 and 1 BB-155 were locked. The licensee could not determine how or when the valves were realigned.

S/G C
On August 14, when a containment integrity valve checklist was performed on S/G C, operators found valve 1 BB-12, a S/G blowdown upper shell sample valve, and valves 1 BB-13 and 1 BB-154 the S/G blowdown outlet valves closed. Their normal position is locked open. Although this satisfied the desired containment integrity alignment, the licensee could not determine how or when the valves were unlocked and realigned. On August 15, operators filled the S/G without difficulty. As described above for S/Gs A and B, using the method chosen to fill the generator, the only way to access the generator is through either 1 BB-13 or 1 BB-154. This means that one or both of the valves were reopened within hours of having been verified closed the previous day. On August 20, all three valves were verified locked open. The licensee could not determine how or when the valves were realigned.

S/G D
On S/G D, the outside valves were relied upon for containment integrity purposes for the entire period in question. For that reason, the containment integrity verifications which were performed on the other three S/Gs were not performed on the S/G D. It is known that at least one of the blowdown outlet valves, 1 BB-5 or 1 BB-152, was open on July 31 when the S/G was drained. It is also known that 1 BB-4, the S/G blowdown upper shell sample valve, and both blowdown outlet valves were found locked open on August 21. Since valve position verifications were not performed on these valves between July 31 and August 21, it can not be determined if the valves were realigned during the period.

10 CFR 50 Appendix B, Criterion XIV, Inspection, Test and Operating Status, requires that measures be established for indicating the operating status of structures, systems and components such as by tagging valves and switches, to prevent inadvertent operation.

Technical Specification 6.8.1., Procedures and Programs, requires that written procedures be established , implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, which includes maintaining containment integrity.

Operations Management Procedure 2-18, Tagout Removal and Restoration (R&R) Procedure, specifies the mechanism to be used by the Operations Group to remove equipment from service for maintenance. The procedure requires that an R&R be used anytime a component (valve, breaker, etc.) is in an out of normal position, and defines the implementation process for Block Tagouts.

The above described configuration control events constitute an apparent Violation of the above referenced requirements, in that no evidence could be produced that any procedure or program for alignment, R&R, or status maintenance was employed. This constitutes one of four examples in this report which collectively comprise Violation 50-413,414/92-22-01, Programmatic Breakdown Of Equipment Control Process.

The valves in question are normally locked open during power operation. A review of the operations key log was performed to determine when the key to the valves had been checked out. The review indicated the key had not been checked out during the period of interest.

Technical Specification 6.8.1., Procedures and Programs, requires that written procedures be established , implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, which includes equipment control such as locking and tagging.

Operations Management Procedure 2-9, Administration and Control of Keys, requires that persons requiring the use of a key under Operations control shall contact the Shift Supervisor or his designee for issuance.

The Shift Supervisor or his desginee is to insure that the person requesting the key is authorized to use the equipment/enter the areas as applicable.

The above delineated key control event constitutes an apparent Violation of the above referenced requirements in that for the above described mis-configuration events, it appears that the key control program was not followed. This constitutes one of four examples in this report which collectively comprise Violation 50-413,414/92-22-01, Programmatic Breakdown Of Equipment Control Process.

7. Review of Decay Heat Removal/Shutdown Risks (TI 2515/113)

The Resident Inspectors continued a review of TI 2515/113 that was previously started and documented in NRC Inspection Report Nos. 50-413, 414/92-18.

The inspectors continued to observe the licensee's activities concerning the active decay heat removal path during reduced inventory conditions. Maintenance work, testing, and operational realignments were monitored.

Other activities reviewed included training packages developed for the licensed staff on associated industry mid-loop events and information briefings concerning implications of these events which were conducted for appropriate non-licensed personnel. The inspectors audited these presentations as well as the training which was completed before the unit entered a condition of reduced inventory.

The inspectors reviewed the controls implemented to establish containment closure for each mid-loop operation. These controls included a pre-established barrier similar to containment integrity. Containment closure is established prior to entry into a condition of reduced NC system inventory. Procedures establish the boundary and require a continuous status of each penetration. This is controlled by a dedicated reactor operation (RO). The RO's responsibilities also include reviewing R&Rs that may affect containment penetration status, updating the Penetration Status Board in the Control Room and monitoring plant indications to insure that they accurately reflect containment penetration status.

Core temperatures are indicated on the operator aid computer (OAC) which automatically and continuously monitors core exit temperatures. Alarms are set to insure that developing trends are detected. The temperatures are also plotted on a chart recorder to provide recorded trending information. The use of the OAC; with temporary alarms and hard wired alarms on Residual Heat Removal (ND) pump discharge temperature instrumentation, NC level instrumentation, source range controls, and reactor coolant levels; adds a higher degree of confidence and accuracy during mid-loop activities.

With respect to assured sources of NC makeup, operations coordinators protect at least two sources during all phases of the outage and

identify the sources and flowpaths to the Control Room operators. This information is reviewed at each shift turnover to insure the latest system status is maintained. Adequate procedures are in place to provide the operators information on the use of makeup flowpaths.

The licensee has made improvements in keeping power supplies available during high risk evolutions during outages. Since they completely defuel the reactor during outages, the outages are divided into 2 major blocks of time for configuration control purposes. The first block is called the "High Decay Heat Condition" and is defined as the period of time from Mode 5 (<200° Fahrenheit) until the core is defueled i.e., in No Mode. The second block is called the "Low Decay Heat Condition" and is defined as the period from the start of refueling until the reactor coolant system is filled and vented.

During the "High Decay Heat Condition" from the point of "Loops Not Filled" when draining, until the refueling canal is flooded to >23 feet above the reactor vessel flange, both D/Gs and both offsite power sources are maintained available.

During the "Low Decay Heat Condition" when in the "Reduced Inventory" condition, one operable D/G and 2 offsite power sources are maintained. Mode 5 and 6 TS are met with regards to AC and DC power sources.

When one essential bus is removed from service for work, the other bus and D/G, as well as an offsite power source, are available.

The alignment for offsite power to the outage unit is from the non-outage unit's auxiliary transformers. No protective relaying changes are required for this alignment. The on-site Engineering Group has analyzed this alignment and determined that the auxiliary transformers can handle the load with a LOCA on the non-outage unit and shutdown loads on the outage unit.

Operators and other personnel are trained on Emergency and Abnormal procedures (EPs and APs) that cover loss of power conditions. The load sequencer is normally available when its associated D/G is available; therefore, the conditions do not normally exist where the operator is relied upon to start the D/G in a blackout condition.

Based on the results off the inspector's review, TI 2515/113 "Reliable Decay Heat Removal During Outages" is closed.

No violations or deviations were identified.

8. Temporary Instruction (TI) 2515/115 Verification of Plant Records

On April 23, 1992, the NRC staff issued Information Notice (IN) 92-30, "Falsification of Plant Records", to alert licensees to the NRC's concern that plant mechanics, technicians, and operators may have falsified plant logs at several nuclear power plants.

10 CFR 50.9(a) states that information required by statute or by the Commissions's regulations be complete and accurate in all material aspects. Log keeping activities as well as surveillances performed by licensed or non-licensed personnel are subject to the requirements of 10 CFR 50.9(a) regarding completeness and accuracy of information.

In addition, the administrative section of plant TSs requires that written procedures be implemented concerning the applicable procedures in Appendix A of Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)." Among the activities which Appendix A states should be covered by written procedures are surveillance and log entries.

In response to TI 2515/115, the Resident inspector staff performed a review of the licensee's actions taken in response to IN 92-30. The primary areas of interest were to determine if the licensee had a self monitoring program which would detect personnel that may have falsified information, or in the absence of a self monitoring program, the performance of an independent representative sample to determine if improprieties had occurred.

The inspector's review revealed that the licensee had initiated a monitoring program in response to the IN. In their initial review, data was obtained by reviewing and randomly selecting documentation of activities which would require station personnel to enter vital areas of the station, requiring the use of control access doors and comparing security computer data with the documentation to verify that the personnel actually went to the area and spent the length of time appropriate for the job. Documentation of activities performed between the dates of March 3 and July 20, 1992, was included in the review. The data obtained involved a cross-section of station groups and included work requests, valve alignments, round sheets, fire watch data, radiological surveys, chemical sampling and station testing. The licensee reviewed 194 activities and did not find any instances which would indicate that falsification of plant records had occurred.

The Resident inspectors performed an independent review involving approximately 100 entries employing virtually the same technique as the licensee. Improprieties were not found.

Discussion with licensee staff indicated that the monitoring program will be continued although the frequency of the review had not been determined.

No violations or deviations were identified.

9. Unit 1 Ice Condenser Inspections (71707)

During this report period, the inspectors performed inspections of the Unit 1 ice condenser to verify that previously identified problems at the Tennessee Valley Authority's Sequoyah Nuclear Station and Indiana &

Michigan Electric Company's D.C. Cook Nuclear Station were not present at Catawba.

The problem at Sequoyah Nuclear Station was identified in March 1992 and involved the upheaval and cracking of the top layer of concrete which comprises the ice condenser floor. This caused the metal flashing at the bottom of the ice condenser inlet doors to interfere with the inlet doors as they opened. The problem was caused by the intrusion of water under the floor area, and subsequent freezing, which caused the floor to deform. At the time the problem was identified, it was concluded that it was not likely that similar conditions were present at Catawba because it had been determined that a combination of construction/design deficiencies and adverse maintenance practices had created the problem at the other nuclear stations.

During this report period, the licensee and resident inspectors performed inspections of the Unit 1 ice condenser floor area, which confirmed that there was no indication of problems similar to that found at Sequoyah. In addition, the inspectors witnessed several TS required surveillances which measured the ice condenser inlet door opening and closing torque, and surveillances that ensured that the doors were not impaired by ice, frost, or other obstruction. Only minor discrepancies such as dry door seals were noted, which were resolved during testing.

On July 24, 1992, the licensee was notified of a problem at D.C. Cook Nuclear Station involving the failure of welds in the ice basket bottom support bars which caused the baskets to become unsupported. This could adversely affect the integrity of the ice baskets. Upon notification, the licensee initiated an inspection of the Unit 1 ice condenser. A total of approximately 240 out of 1,944 ice baskets were visually examined for support bar weld failures. Problems were not identified. The inspectors also conducted random independent inspections of the ice baskets and did not find any indications of weld failures. In addition, the licensee discussed this problem with Westinghouse Corporation who determined that the ice baskets at D.C. Cook were purchased from a different manufacturer than the ice baskets at Catawba. Based on this and the results of the licensee's inspections, it was concluded that the potential for a similar problem at Catawba was remote.

No violations or deviations were identified.

10. Review of ECCS Water Hammer Problem at Shearon Harris (71707)

During this report period, the inspectors reviewed the piping configuration of Catawba's Centrifugal Charging and Safety Injection flowpaths to determine if a problem which occurred at Carolina Power & Light Company's Shearon Harris facility could occur at Catawba. The problem involved a degraded High Head Safety Injection System due to the potential for the diversion of water from the reactor coolant system. The degraded condition resulted from relief valve failures in the Centrifugal Charging (CCP) alternate miniflow piping. The valve failures were apparently caused by a water hammer which occurred as a

result of an air void that was trapped below the alternate miniflow relief valves. The air was trapped due to inadequate venting of sections of the alternate miniflow lines.

The ECCS systems at Catawba do not utilize alternate miniflow configurations; therefore, the specific problem which resulted at Shearon Harris could not occur at Catawba. In facilities which have alternate miniflow lines, normal miniflow is isolated on a Safety Injection (SI) signal to protect the CCPs from deadhead operation and to ensure that all safety injection flow is provided to the reactor coolant system. At facilities without alternate miniflow lines, i.e., Catawba, normal miniflow is not automatically isolated on a SI signal, and pump deadhead protection is assured through operator action to open or close the miniflow path of the CCPs. This action is controlled through specific guidance found in the licensee's emergency procedures.

As part of further follow-up, the inspectors reviewed how the licensee controls the filling and venting of the high head portion of the ECCS system. It was noted that a new procedure had been recently developed during the current Unit 1 refueling outage to provide operator instructions for fill and venting sections of the Chemical and Volume Control (NV) System. In the development of this procedure, piping isometrics were reported to have been thoroughly reviewed to ensure that any potential refilling problems were addressed. The inspectors reviewed this procedure and noted that it was detailed and provided greater control over the refilling activity than the normal method which utilized the R&R process. In addition, the licensee plans to develop procedures for filling and venting other ECCS systems. This was considered an enhancement to ensuring adequate system refill and venting.

No violations or deviations were identified.

11. Review of Containment Vacuum Relief Valve Problem at Sequoyah (71707)

During this report period, the Resident inspectors were notified of a problem identified at Sequoyah involving a potential single failure of the Containment Vacuum Relief Isolation Valves. The problem involved the potential unavailability of Train A control air to the containment vacuum relief isolation valves. The inspectors reviewed this problem for applicability at Catawba. Based on this review, it was determined that this was not a potential problem for Catawba since Catawba is not designed with a Containment Vacuum Relief System. Unlike Sequoyah, Catawba is designed with a safety-related Containment Pressure Control system (CPCS) which is designed to protect the Containment from negative pressure by preventing inadvertent or excessive operation of Containment pressure reducing systems and equipment, e.g., the Containment Spray (NS) system. This system allows operation of the NS System only when it is required for reducing containment pressure and inhibits their operation when not required for containment protection. The CPCS is

designed with appropriate physical and electrical separation between redundant trains to meet the single failure criterion.

No violations or deviations were identified.

12. Surveillance Observations (61726)

a. General

During the inspection period, the inspectors verified that 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. Surveillance Activities Reviewed

The inspectors witnessed or reviewed the following surveillances:

PT/0/A/4550/03C	Core Verification
PT/0/A/4150/22	Total Core Reloading
PT/1/A/4200/02C	Containment Closure Verification
PT/1/A/4200/06A	Boron Injection Valve Lineup Verification
PT/1/A/4200/13H	Testing of NI Pumps Hot Leg Injection
PT/1/A/4350/02A	Diesel Generator 1A Operability Test
PT/1/A/4400/01	ECCS Flow Balance
PT/1/A/4600/19F	Pre-Mode 6 Surveillance Items
PT/1/A/4600/02E	Mode 5 Periodic Surveillance Items
PT/2/A/4250/06	Auxiliary Feedwater Pump Head and Valve Verification
PT/2/A/4600/02A	Mode 1 Periodic Surveillance Items

No violations or deviations were identified.

c. Failure to Perform TS Surveillances at Required Frequency

In the previous report period, the inspectors reviewed the licensee's outside containment leakage reduction program. As a result of this review, a concern was identified involving whether the licensee should quantify identified leakage and compare it against that amount assumed in the offsite and control room

operator dose analysis. This issue is being reviewed by the NRC.

During this report period, the inspectors reviewed completed ECCS leakage tests performed over past operating cycles to determine how much leakage is typically observed. During this review, it was noted that the leakage testing was not being performed at the frequency prescribed by TS. TS 6.8.4.a.2 requires a leakage program be established to leak test systems at refueling cycle intervals or less. The licensee's refueling cycle intervals have been between 12 and 15 months. However, the inspectors observed that the time period between testing, e.g., Unit 1 NI and ND systems, was from 17 to as much as 22 months.

The inspectors brought this discrepancy to the attention of the licensee who initiated leakage testing of the appropriate systems. No leakage was identified as a result of this testing.

This is considered a violation of the requirements of TS 6.8.4, however, after review of the circumstances relative to the issue, it was determined that the criteria specified in Section VII.B.(1) of the NRC Enforcement policy were satisfied. The violation was not willful, nor similar to a prior violation for which corrective actions have not been sufficient to prevent recurrence, and appropriate corrective action was initiated prior to the end of the report period. This issue is documented as Non-Cited Violation 413, 414/92-22-02: Failure to Perform Testing in Accordance with the Frequency Required by TS 6.8.4.

One NCV was identified.

13. Maintenance Observations (62703)

a. General

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 affect system performance.

b. Maintenance Activities Reviewed

The inspectors witnessed or reviewed the following maintenance activities:

WO 92062644	N41 Analyzer Channel Operational Test
IP/2/A/2340/04H	Calibration Procedure for Power Range in 41 Analog Channel Operational Test

No violations or deviations were identified.

c. Pump Motor Cooler Installation Deficiencies

On August 10, 1992, the Safety Injection (NI) portion of the ECCS flow balance test was being performed on Unit 1. At this time it was noticed that the motor stator temperature of the Train B NI pump was reading higher than expected. Since the temperature was below the accepted limits as specified in the procedure, a test action item was opened in order to follow-up on the problem upon completion of testing. On August 28, during investigation of the cause of the abnormally high stator temperature, it was discovered that baffle plates in the motor cooler were reversed which allowed cooling flow to make only one pass through the heat exchanger instead of three passes. This reduced the efficiency of the heat exchanger and potentially degraded the pump motor. A past operability evaluation of the NI pump was initiated to determine if the pump could have functioned properly under accident conditions. Preliminary results indicated that there was sufficient motor cooling capability even in this degraded condition.

Further inspections determined that the water cooler baffle in the 1A Spent Fuel Cooling Pump was also backwards. In addition, the water cooler baffles in the 2A Centrifugal Charging Pump were also backwards, but the baffles were reversed such that a three pass flow was still maintained through the heat exchanger.

The licensee indicated that the baffles were installed backwards in the NI pump in May 1991 during maintenance to repair a motor cooler leak. The inspectors reviewed procedure MP/0/A/2002/01, Motor Inspection and Maintenance, which was used to perform the maintenance on the motor cooler. It was determined that the procedure was inadequate to perform the necessary maintenance. The procedure was designed for general motor maintenance and failed to provide specific instructions for the disassembly or assembly of a motor cooler.

TS 6.8.1 requires, in part, that adequate written procedures be established covering the maintenance of safety systems. This is considered a violation of the requirements of TS 6.8.1; however, after review of the circumstances relative to the issue, it was

determined that the criteria specified in Section VII.B.(1) of the NRC Enforcement policy were satisfied. The violation was not willful, nor similar to a prior violation for which corrective actions have not been sufficient to prevent recurrence, and appropriate corrective action was initiated prior to the end of the report period. This issue is documented as Non-Cited Violation 413, 414/92-22-03: Inadequate Maintenance Procedures Resulting in Improper Assembly of the 1B NI Pump Motor Cooler.

One NCV was identified.

14. NRC Bulletin 92-01: Failure of Thermo-Lag 330 Fire Barrier System

NRC Bulletin 92-01 and Supplement 1 to Bulletin 92-01 were issued on June 24 and August 28, 1992, respectively. The purpose of the bulletin was to notify licensees of failures in fire endurance testing of Thermo-Lag 330 fire barrier material which may be installed as a fire barrier for protection and separation of safe shutdown equipment. To ensure that the level of safety for systems or components which may utilize this material was not degraded, three immediate actions were required to be taken. As part of the third action, each licensee who determines that this material is not installed in their facility(s) was required to inform the NRC in writing within 30 days of receiving the bulletin.

The licensee responded to this bulletin by letter dated July 22, 1992, and reported that Catawba did not use this material for fire barriers in their plant. This fulfilled the licensee's requirement for Bulletin 92-01. The inspectors had previously reviewed the licensee's 10 CFR 50, Appendix R Fire Protection Program when this issued was first identified. At that time, it was verified that Thermo-Lag material was not utilized in safe shutdown equipment. This bulletin is considered closed.

No violations or deviations were identified.

15. Part 21 Reports (36100)

a. (Closed) 413, 414/P21-90-01, Part 21 Notification on Rockbestos Silicone Rubber Insulated Cables Involving Energy and Ampacity Valves.

Rockbestos Firewall-SR type cables were used at Catawba. The original testing by Rockbestos established a qualified life of 40 years at a continuous operating temperature of 125 degrees Centigrade and a total integrated radiation dose of 200 megarads. However, based on recent test data, the original dose has been reduced from 200 megarads to 150 megarads. Based on the licensee's evaluation, the total integrated radiation dose at the location of the Firewall-SR cable installation is 130 megarads. Therefore, this cable installation is acceptable.

b. (Closed) 413, 414/P21-91-03, Part 21, Notification on Rockbestos Siiicone Rubber KS-500 Insulated Cables.

Refer to item a. above. This is also applicable to this item.

c. (Closed) 413, 414/P21-90-04, Part 21, Notification on Rosemont Model 710 Trip/Calibration Units and 414 E/F Resistance Bridges.

The licensee's evaluation found that these units were not utilized at Catawba. Therefore, this item is not applicable.

No violations or deviations were identified.

16. Review of Licensee Event Reports (92700, 90712)

The below listed Licensee Event Reports (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.

a. (Closed) 413/91-04 Technical Specification Violation as a Result of a Missed 18 Month Channel Calibration on Radiation Monitor 1 EMF48.

b. (Closed) 413/91-06 Technical Specification Violation When Nuclear Service Water Valves were left without an Emergency Power Supply due to Inappropriate Action.

c. (Closed) 413/91-07 Technical Specification Violation from Failure to Perform Reactor Trip System Surveillance Due to Inappropriate Actions.

d. (Closed) 413/91-08 Inability to Maintain Control Room Pressure During Loss of Power Events Due to Design Deficiency Resulting in Entry of Technical Specification 3.0.3.

e. (Closed) 413/91-12 Technical Specification Violation Due to Violation of Containment Integrity During Core Alteration.

f. (Closed) 413/91-17 Technical Specification Violation as a Result of a Missed 18 month Changer Capacity Test Due to Inappropriate Action.

g. (Closed) 413/91-27 Vital Battery 1EBB Inoperable Due to Resistance Reading Exceeding Technical Specification.

h. (Closed) 413/91-28 Technical Specification Violation Due to Exceeding Liquid Waste Release Limits as a Result of Inappropriate Action.

i. (Closed) 413/91-31 Technical Specification 4.0.5 Violation as a Result of Inappropriate Action Due to a Missed IWV Inservice Inspection Stroke Time Test of Valve 1CA64.

j. (Closed) 414/91-02 Technical Specification Violation Due to a Valve Being Returned to Service with an Expired Surveillance.

k. (Closed) 414/91-04 Technical Specification 3.0.3 Entered for Both Trains of Containment Valve Injection Water System Being Inoperable Due tc Inappropriate Action.

l. (Closed) 414/91-05 Technical Specification 3.0.3 Entered Due to Both Trains of Nuclear Service Water Being Inoperable.

m. (Closed) 414/91-06 Hi Hi Steam Generator Level (P-14) Resulting in a Turbine Trip and Auxiliary Feedwater Start due to Inappropriate Action.

n. (Closed) 414/91-07 Technical Specification 3.0.3 Entered as a Result of Both Trains of Auxiliary Building Ventilation Filtered Exhaust System Being Inoperable Due to An Inadequate Action.

No violations or deviations were identified.

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

a. (Closed) Violation (VIO) 413/90-09-01, Inadequate or Failure to Follow Procedures Resulting in Incorrect Power Supply Being Removed during VC/YC Functional Test, Inoperable P-12 Interlock Channels, Excessive Cooldown of Pressurizer and Failure to Initiate Engineering Evaluation After Excessive Cooldown.

The licensee responded to this violation by letter dated June 6, 1990. The locks on terminal boxes 1TBOX0345 and 1TBOX0346 to the "A" and "B" Train chiller breakers for the Control Room Area Ventilation System have been changed such that different keys are required for each box. This will prevent inadvertent entry into the incorrect box.

To correct the problems identified with the Incore Thermocouple and RTD cross calibration procedures, test procedures IP/1/A/3231/01 and IP/2/A/3231/0' were revised. The revised procedures take one channel of E:F instrumentation out of service at a time, provide explicit cautions associated with the P-12 interlock, provide a method to verify test inputs as they are injected, and provide information to the operators regarding operability of affected instrumentation in a readily understood format.

Surveillance procedure PT/1/A/4200/09, Engineering Safeguards Features Actuation Periodic Test, has been revised to remove power from NI-9A or NI-10B to preclude their opening during the testing

of their respective train. These valves are now tested in a separate test from the main LOCA or Blackout test to preclude further injection. Westinghouse performed a detail engineering evaluation, MI-SMT-032(91), including a fatigue and fracture analysis which indicated that the rapid cooldown and heatup of the pressurizer did not have an adverse effect on the structural integrity of the component.

b. (Closed) VIO 413/90-09-05, Failure to Establish Measures to Accurately Indicate Operating Status Resulting in Closed Steam Generator PORV Block Valves and RN Valves to NW Closed.

The licensee responded to this violation by letter dated June 15, 1990. This item was a part of the enforcement action associated with NRC Inspection Report Nos. 413, 414/90-10. Two violations were identified as a Severity Level III problem and one Severity Level IV violation was identified. These items were closed in NRC Inspection Report 413, 414/92-25. Therefore, this item is also closed.

c. (Closed) VIO 413, 414/90-11-01, Failure of Electrical Drawings to Reflect As-Built Plant Conditions and Lack of Procedures to Ensure Lifting Equipment is Removed or Secured in the Ice Condenser.

The licensee responded to this violation by letter dated July 19, 1992. Operations Startup procedures, OP/1(2)/A/6100/01, Mode 1 through 4 checklists, were revised to verify that the I-Beams/hoists located within the reactor building are properly secured prior to plant entry into Modes 1-4. The plant drawings were revised to indicate that breakers 2KXPA-28 and 2KXPB-27 are spares.

d. (Closed) Inspector Follow-up Item (IFI) 413/90-11-03, Auxiliary Feedwater Pump Turbine SSF Functional Testing.

The licensee performed additional research into the testing procedures for the Turbine Driven Auxiliary Feedwater Pump and found that the trip and throttle valve was not a reliable method of starting the turbine. Modifications are in process to replace the trip and throttle valve operator. The design for these modifications are scheduled to be completed for Unit 1 (CN-11273/00) on April 1, 1993, and for Unit 2 (CN 20665) on December 1, 1993. The licensee is tracking this item by Commitment No. 7323. Completion of this item will be reviewed during the routine NRC resident inspection program.

e. (Closed) IFI 413/90-11-07, Inspection and Repair of NC System Hangers.

On May 16, 1990, Maintenance Engineering Services identified a number of damaged hangers associated with the Chemical and Volume Control System (NV). Subsequently, on May 28, 1990, Design

Engineering completed an operability evaluation and found that, although three hangers were inoperable, a sufficient number of adjacent hangers were in service and the piping system remained operable. The licensee's evaluation of the event identified a water hammer resulting from air in the line during high flow rate conditions. Procedure OMP 2-18, Tagout Removal and Restoration was revised by the addition of a venting restoration sheet to help insure that the system is properly vented prior to the starting of a high pressure injection pump. The damaged hangers were properly repaired.

f. (Closed) VIO 413, 414/91-03-01, Failure to Follow or Inadequate Procedures (three examples).

The licensee responded to this violation by letter dated March 27, 1991. The Unit 2 computer alarm has been reset so that it alarms between the Hi level deviation and the P-14 set point. This should help the operator identify an abnormal high steam generator level prior to the steam generator level reaching the P-14 setpoint of 78 percent. No change was required for Unit 1 since the Unit 1 alarm was already at this setpoint. An evaluation was made of the control room desk layout and the existing layout was found to be acceptable. Operations Management Procedure 2-17, Control Room and Unit Supervisor Logbooks, was revised to permit the Balance of Plant Operator to make entries into to Control Room Logbooks with the concurrence of one of the Operator at the Controls. During shift meetings. operations management emphasized the need to always achieve expected or desired results prior to diverting attention to other matters. Existing maintenance procedures for independent verification were reviewed by the licensee and found to be satisfactory. However, to provide additional guidance to the Maintenance Engineering Services (MES) staff, MES Guide No. 21, Independent Verification When Providing Technical Support, was issued and appropriate training was given to the MES staff.

g. (Closed) VIO 413/91-03-02, Inoperable Personnel Access Hatch Between Upper and Lower Unit 1 Containment Compartments.

The licensee responded to this violation by letter dated March 27, 1991. The latching arms were adjusted for proper hatch securement. A match mark tab has been installed underneath the hatch handwheel to serve as the location for placing the tamper seal in a more restricting configuration. Procedure MP/0/A/7150/96, Submarine Hatch Inspection and Tamper-Proof Seal Installation, has been rewritten to reflect the hatch modifications, as well as the instructions for latch adjustments and correct closure. The area surrounding the hatch has been identified as sensitive equipment and a "Do Not Step" sign has been placed on the hatch. The Mode 1-4 Reactor Building Round sheets now require a visual inspection of the hatch seal.

h. (Closed) VIO 413/91-03-03, Failure to comply with the Requirements of Technical Specification 3.0.4.

The licensee responded to this violation by letter dated March 27, 1991. Procedures OP/1&2/6100/01, Controlling Procedure Unit Startup, and OP/1&2/6100/02, Controlling Procedure for Unit Shutdown, have been revised to track periodic tests in process. Procedures PT/1&2/A/4200/53A, 1&2FW-28 Partial Stroke Test, and PT/1&2/A/4200/53B, 1&2FW-56 Partial Stroke Test, have been revised to explicitly state the impact on ND System operability with valves FW-27A and FW-55B closed. Operations Management Procedure 1-8 has been revised to emphasize the importance of group communication and interface between shift personnel from the start through completion of any testing involving the Control Room. The procedure has also been revised to emphasize the operation's policy of Control Room Operators receiving direct confirmation and approval from the Control Room Senior Reactor Operator for all tasks that may affect the operability of any safety related system or the configuration of any system which has a significant effect on plant operation. The Operations Training Group has discussed this event and the above corrective actions with all shift personnel during requalification training.

i. (Closed) VIO 413, 414/91-07-02, Inadequate System Design Resulting in the Catawba Control Room Area Ventilation System Being Inoperable Since Startup.

The licer ee responded to this violation by letter dated May 24, 1991. A TS change was submitted and approved deleting the requirement to automatically isolate the control room ventilation intakes upon radiation or smoke alarms. Operator action will be relied upon to take appropriate action, if necessary. Automatic isolation of the ventilation system was retained for the chlorine detection system. The control room ventilation system is now in compliance with TS requirements.

j. (Closed) IFI 413, 414/91-23-03, Review Licensee's Program for Controlling Non-SNM in the Spent Fuel Pool.

The storage of non special nuclear materials is now controlled by Station Directive 3.1.32, Temporary Storage of Radioactive Material in the Spent Fuel Pool and Refueling Cavity, and by Nuclear Production Department Directive 2.8.6, Storage of Radioactive Material in the Spent Fuel Pool. These procedures appear to satisfactorily control the storage of Non-SNM material in the Spent Fuel Pool.

k. (Closed) Unresolved Item 413, 414/91-23-04 Resolve Adequacy of the Licensee's Frequency of Conducting SNM Physical Inventories.

The licensee's method of conducting SNM inventories has been evaluated by NRC Region II management and found to meet the intent

of the requirements of 10 CFR 74.59. The SNM inventory program had previously been reviewed during an NRC inspection of the control and accountability of special nuclear materials. This inspection, which was conducted November 26-30, 1990, and documented in NRC Inspection Report Nos. 413, 414/90-30, found that Duke's method of conducting SNM physical inventories was acceptable.

1. (Closed) Unresolved Item 413, 414/92-06-01, Single Failure Design Flow in the Auxiliary Feedwater (CA) System Circuitry.

On March 2, 1992, the licensee determined that the CA systems were inoperable. Under certain conditions, a single failure could prevent the CA system from performing its intended safety function. Compensatory action was implemented. This consisted of requiring a dedicated licensed operator on each unit to take the necessary steps to mitigate hypothesized single failure scenarios. Subsequently, the CA flow optimization circuits were modified to insure proper control circuit separation and operation. This item was reclassified and identified as Non-Cited Violation 413, 414/92-09-02: Failure to Perform Adequate Design Review in NRC Inspection Report Nos. 413, 414/92-09.

No violations or deviations were identified.

18. Exit Interview

The inspection scope and findings were summarized on September 15, 1992, 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.

Item Number	Description and Reference
VIO 413, 414/92-22-01	Programmatic Breakdown Of Equipment Control Process (paragraphs 4, 5 and 6).
NCV 413, 414/92-22-02	Failure to Perform Testing in Accordance with the Frequency Required by TS 6.8.4 (paragraph 12.c).
NCV 413, 414/92-22-03	Inadequate Maintenance Procedures Resulting in Improper Assembly of the 1B NI Pump Motor Cooler (paragraph 13.c)