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

Report Nos. 50-413/89-29 and 50-414/89-29

Licensee: Duke Power Company
422 South Church Street
Charlotte, N.C. 28242

Docket Nos.: 50-413 and 50-414 License Nos.: NPF-35 and NPF-52

Facility Name: Catawba Units 1 and 2

Inspection Conducted: September 3, 1989 - October 6, 1989

Inspector: _____ 11/1/89
W. T. Orders, Senior Resident Inspector Date Signed

Inspector: _____ 11/1/89
M. S. Lesser, Resident Inspector Date Signed

Approved by: _____ 11/3/89
M. B. Shymlock, Section Chief Date Signed
Projects 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; calibration; review of licensee nonroutine event reports; and followup of previously identified items. Special inspections were conducted concerning the Control Room Ventilation and the Annulus Ventilation Systems.

Results: One weakness was identified in the licensee's program for post maintenance testing which allowed installation of a safety related circuit breaker without starting the load to verify operability. This resulted in a violation in that maintenance procedures were inadequate (paragraph 8.e).

Two other violations were identified:

- One violation involves the inability of one of two trains of Control Room Ventilation to maintain an adequate positive pressure in the control room (paragraph 4.b).

- One violation involves the inability of the Annulus Ventilation System to maintain the Technical Specification required negative pressure in the annulus area (paragraph 4.d).

8911200184 891103
PDR ADOCK 05000413
Q PDC

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. Beaver, Performance Engineer
B. Caldwell, Station Services Superintendent
*R. Casler, Operations Superintendent
*T. Crawford, Integrated Scheduling Superintendent
***J. Forbes, Technical Services Superintendent
*R. Gill, Corporate Compliance
***R. Glover, Compliance Engineer
*T. Harrall, Design Engineering
R. Jones, Maintenance Engineering Services Engineer
F. Mack, Project Services Engineer
W. McCollough, Mechanical Maintenance Engineer
W. McCollum, Maintenance Superintendent
*B. Morgan, Corporate Compliance
**T. Owen, Station Manager
J. Stackley, Instrumentation and Electrical Engineer

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

NRC Resident Inspectors

*W. Orders
*M. Lesser

*Attended exit interview on October 6, 1989
**Attended exit interview on November 3, 1989
***Attended both exit interviews

2. Unresolved Items

An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation. There was one unresolved item identified in paragraph 3e.

3. Plant Operations Review (71707 and 71710)

a. The inspectors reviewed plant operations throughout the reporting period to verify conformance with regulatory requirements, Technical Specifications (TS), and administrative controls. Control room logs, 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 the 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, fire protection activities and radiological control practices. The inspectors reviewed Problem Investigation Reports to determine if the licensee was appropriately documenting problems and implementing corrective actions.

b. Unit 1 Summary

The unit started the inspection period at 100% power, however, power was reduced to 13% on September 3 to repair feedwater regulating valve positioners which had caused two previous trips. Full power operation was resumed on September 5. On September 8 a Technical Specification shutdown was initiated due to the expiration of the TS action statement on the inoperable Turbine Driven Auxiliary Feedwater Pump. Problems with the turbine governor had resulted following oil replacement. This in turn had caused overspeeding. In addition to maintenance on the governor, modifications were performed to reduce steam condensation which had been collecting in the governor valve bonnet and were causing governor valve stem corrosion. The licensee also determined that the margin to the overspeed trip was too small during turbine acceleration and modified the steam admission valves to provide for a slower opening stroke. Later that day, after completion of the modifications and repairs the pump was successfully tested and the reactor shutdown was terminated. On September 13 a unit runback to 54% power occurred when one of the two parallel main generator output breakers tripped open. A fitting on an air pressure gauge failed which bled down air pressure causing the breakers to fail open. The gauge was repaired and the unit returned to full power. On September 22 condenser vacuum dropped when the unit's cooling tower fans tripped after water leaked onto the fans' 13.8 kv switchgear. The water was from excessive rain caused by hurricane Hugo and service building roof leakage. Power was reduced to 25% until repairs could be made. The unit returned to full power on September 25 and remained there for the duration of the inspection period.

c. Unit 2 Summary

The unit started the inspection period at 97% power. Power was reduced to 30% on September 22 following rain water leakage onto 13.8 kv switchgear and the subsequent shutdown of cooling tower fans until repairs to the service building roof could be completed. Upon power ascension high differential pressures were observed across the main condenser and the feedwater pump condensers. The unit was held at 47% to facilitate the inspection of the condensers. Debris from the cooling towers was found in the water boxes. The debris was

identified as drift eliminator material which had been blown into the cooling tower basins by high winds associated with hurricane Hugo. The condensers were cleaned, the cooling towers inspected and repaired, and the unit was returned to 97% power on September 29, 1989. The unit remanined at or near full power throughout the end of the report period.

d. Effects of Hurricane Hugo (September 22, 1989)

(1) As mentioned above, excessive rain and service building roof leaks resulted in power reductions on both units due to loss of some cooling tower fans. Some damage to the cooling tower drift eliminators caused debris to collect in secondary system condenser water boxes on Unit 2.

(2) The highest sustained winds (15 minute average) experienced at the site were approximately 65 miles per hour. Emergency action levels were not required to be declared as the licensee's procedures state that a Notification of Unusual Event would be declared with sustained winds grater than 73 mph and a plant shutdown with winds greater than 95 mph.

(3) Widespread area power outages affected the emergency planning sirens. The licensee was unable to initially determine how many of its 77 sirens were inoperable and immediately notified local authorities to implement route alerting procedures in the event of an emergency. As of September 27, 16 sirens remained without power, with corrective actions being implemented as soon as practical. Additionally many mounting poles had to be straightened. A siren test was conducted on October 7, in which 5 sirens failed.

(4) Licensee management authorized overtime to shift watchstanders as relief personnel experienced difficulty getting to work on time due to widespread downed trees and power lines blocking roads.

e. On October 3, 1989, the inspector observed a maintenance technician in the auxiliary building who was not wearing dosimetry. The technician had exited a contaminated room, removed his anti-contamination clothing, was dressed only in gym shorts and was in the process of tracing a pipe which entered the room. The inspector observed that his dosimetry had been placed on top of an instrument mounting bracket. Health Physics Management was informed of the observation and committed to review the incident. Of interest to the inspector is the licensee's policy of requiring the wearing dosimetry above the waist even though undershirts and neck straps are not worn with anticontamination clothing. Health Physics management stated that wearing dosimetry on the gym shorts or carrying it in hand is acceptable in such cases, however this policy may not be clearly understood by radiation workers.

A review of Station Directive 3.8.6, Radiation Exposure Control, states that all persons with assigned dosimetry shall wear it properly at all times when working in the radiation control area (RCA). The directive further describes proper wearing of dosimetry to be in the center upper portion of the chest, with the beta window positioned away from the body. At the close of the inspection it was not clear whether this incident constituted a personnel error, an inadequate licensee policy or inadequate radiation training. Accordingly this incident is identified as Unresolved Item 413/89-29-01: Failure to Properly Wear Dosimetry While In The Radiation Control Area, pending completion of the licensee's investigation of the incident and determination of program adequacy.

f Containment Vessel Corrosion

Based on observation of corrosion of the containment vessel at McGuire Nuclear Station, the licensee performed inspections to ascertain the extent, if any, of corrosion on the Catawba units. The licensee identified very minor corrosion to exist at 1/3 to 1/2 the containment circumference where the annulus concrete floor meets the outside containment wall. Most of the corrosion could be easily scraped off, however, at one point on Unit 2 some scaling was observed. The corrosion was characterized as much less significant than that detected at McGuire and, therefore, immediate corrective measures were not required. The licensee suspects that the corrosion is a result of standing water on the annulus floor from instrument line leaks and clogged drains. Corrective action includes actions similar to those taken at McGuire to prevent the spread of the corrosion including, sand blasting and recoating the corroded areas and increased inspection of floor drains.

No violations or deviations were identified.

4. 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 inspector 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.

The inspectors witnessed or reviewed the following surveillances:

PT/2/A/4200/55	RN to CA Piping Flush
PT/1/A/4200/09	Auxiliary Safeguards Test

b. Control Room Ventilation Inoperability

On September 15, 1989 the licensee was performing testing on Train A Control Room Area Ventilation System (VC) using PT/0/A/4450/08, VC System Performance Test, in response to a request from Design Engineering to verify the ability of the system to maintain the required positive pressure of 1/8 inch water gauge (wg) in the control room. The test was the result of a concern from Design Engineering following a potential overpressurization of the control room on August 23, 1989 when the housing to the Control Room Air Handling Unit was mistakenly opened.

The test performed on September 15 failed and train A was declared inoperable at 1:15 p.m.. Train B had been previously declared inoperable for maintenance activities on September 13. Since VC is a shared system between Units 1 and 2, the licensee placed both units into Technical Specification 3.0.3 which requires action to be taken within 1 hour to place the units in hot shutdown within the next 6 hours.

The VC system, shared between the units, consists of two redundant trains of ventilation equipment, each train consisting of an outside air pressurizing filter and fan section, a Control Room Air Handling Unit to supply the control room and a Control Room Area Air Handling Unit to supply areas adjacent to the control room. Each pressurizing filter section takes suction from a common header which is supplied by outside air intakes from the Unit 1 side and the Unit 2 sides of the auxiliary building. The outside air intakes each have two redundant isolation dampers which will automatically close on the detection of either chlorine gas, smoke or high radiation.

During normal operations, one train is running, both units' outside intakes are open supplying 4000 cubic feet per minute (cfm) to the operating pressurization fan. The supply air mixes with 2000 cfm recirculation air, is filtered and then splits, 3000 cfm each going to the suction of both the Control Room Air Handling Unit through damper CR-D-1 and the Control Room Area Air Handling Unit through damper CRA-D-2. The 3000 cfm through CR-D-1 mixes with 2500 cfm recirculation air and is supplied to the control room. The outside source of 4000 cfm, makes up for losses and keeps the control room pressurized and thus is termed pressurization flow.

The Technical Specifications require the system to be capable of maintaining the control room at a positive pressure of greater than or equal to 1/8 inch wg with a pressurization flow of less than or equal to 4000 cfm. Additionally a maximum pressure drop of 8 inches wg is allowed across the filter bank at a system flow rate of 6000 cfm +/- 10%.

The licensee's test method was to test each train individually with both intakes open. With one train running, the air stream velocity from each intake is measured and summed to assure that pressurization air is less than or equal to 4000 cfm and that control room pressure is greater or equal to 1/8 in wg.

On September 15 the test for Train A, was performed. Independent of the test, the Unit 2 intake had been isolated due to the intake radiation monitor 2EMF-43 being inoperable. Pressurization flow was, therefore, from the Unit 1 intake only and was measured at 2395 cfm, meeting part of the acceptance criteria; however, control room pressure was observed to be only .05 inches wg. In troubleshooting, the licensee discovered that if the Unit 2 intake was opened, the control room could be pressurized above the acceptance criteria. The train was declared inoperable, however, because the design basis of the system is such that the control room shall remain pressurized from only one source of outside uncontaminated air, regardless of wind direction, as stated in section 9.4.1 of the FSAR. It was subsequently determined that Train A of VC had never been properly tested prior to this event. The licensee determined that train B had been successfully tested on May 5, 1988 with the Unit 2 intake isolated (again due to an inoperable radiation monitor).

Until the cause for the Train A inoperability could be determined, the licensee proposed a series of compensatory measures to ensure the system could perform its intended safety functions. The measures included an hourly fire watch in the area of the intakes, administrative controls to limit flames and welding in the vicinity of the intakes, a temporary halt to chlorine movement and temporary instructions to open the intakes on a high radiation signal (filtering would prevent excessive exposures). Based on these measures, Train A was declared operable and the unit shutdowns were terminated.

The licensee determined that preoperational and periodic testing had never adequately balanced flow such that the control room could remain pressurized with one intake isolated. On September 15, damper CRA-D-2 was adjusted to restrict flow to the control room area and allow more flow to the control room. This was sufficient to meet the design basis of the system. On September 16, further flow balancing was conducted on both trains to verify operability. Train B was declared operable at 9:09 a.m. and Train A at 5:51 p.m.

The design basis for pressurizing the control room stems from General Design Criterion 19 of Appendix A to 10 CFR 50 which requires adequate radiation protection to be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body for the duration of the accident. The September 15, test of Train A resulted in a positive pressure of 0.05 inches wg. Although this demonstrated the train had been inoperable since initial

licensing, it can be concluded that the inoperability would not have resulted in control room personnel exposures in excess of 5 rem since a slight positive pressure was achieved. This is identified as Violation 413/89-29-02: Inoperable Train of Control Room Ventilation Duke to Inadequate Flow Balancing.

c. Upper Surge Tank Level Measurement

While reviewing control board indications for the auxiliary feedwater (CA) suction sources the inspector identified that the level recorder for the Upper Surge Tank (2 CSLT 5840) was overranged. Followup revealed that the system operation is such that the Upper Surge Tank is normally overflowing to the Condensate Storage Tank and, therefore, filled to an amount greater than the level instrument's range. The licensee determined that this condition will not damage the pen recorder; however, the inspector was concerned with the reliability of the level measuring method as summarized below:

- The reliability of the level indicating system is questionable in that an instrument failure may not be immediately detectable since it normally indicates off scale high. There have been at least two incidents with this type of failure:

  (1) On March 9, 1988 the instrument failed and indicated a higher than actual UST level. This contributed to a momentary loss of suction pressure signal to the CA pumps and a swap to Nuclear Service Water.

  (2) On September 20, 1989 during an evolution to reduce UST level, no indication of level decrease was observed on the pen recorder. It was later determined that the instrument's reference leg was partially drained, causing an indication of 100%.

Other factors which indicate the importance of this indication include the following:

- The pen recorder is the only indication of UST level available in the control room; no local indication is installed.

- To maintain adequate suction head under certain conditions, operators are required to maintain level greater than 90% full.

- The recorder is used to verify an adequate volume of condensate pursuant to Technical Specification 4.7.1.5.

- Low level annunciator setpoint of 5% is not intended to warn of a low tank level but to ensure the tank is isolated after a loss of water.

The licensee has written a Station Problem Report and Problem Investigation Report 2-C89-0286 to evaluate methods to improve the level measurement. This is identified as Inspector Followup Item 414/89-29-03: Upper Surge Tank Level Measurement Reliability.

d. Annulus Ventilation System Inoperability

Summary

On September 19, 1988 the NRC issued Information Notice No. 88-76: Recent Discovery of a Phenomenon Not Previously Considered in the Design of Secondary Containment Pressure Control, which described a situation in which a licensee had not adequately considered the temperature-induced difference in the elevation pressure gradients inside and outside secondary containment as these change with elevation.

Duke Power received the Notice in September, 1988. No action was taken, however, until January 1989, when a copy was forwarded to corporate Design Engineering (DE) for review. DE initially believed that the Duke plants were not subject to the problem but continued to review the issue. On August 24, 1989 DE determined that the upper regions of the annulus at McGuire would be at a positive pressure relative to outside atmosphere under certain temperature profiles. Ultimately the set points were changed at McGuire to maintain an appropriate negative annulus pressure during all temperature profiles.

Like the plant described in the Notice, the pressure transmitter sensing points for the Annulus Ventilation System (VE) at McGuire and Catawba are located in the lower part of the annulus.

Although discussions with the licensee indicate that corporate DE had begun the Notice review process for applicability to Catawba, no action took place at the site until August 31, 1989 when Catawba became aware of the aforementioned problem at McGuire. At that time, the Catawba compliance group initiated Problem Investigation Report (PIR) O-C89-0278 to request that Design Engineering review the associated McGuire PIR and perform an operability evaluation of Catawba's VE system. On September 6, 1989, DE issued an operability determination which stated that the VE systems at Catawba were "conditionally operable", the condition being outside air temperature at or above 45 degrees F.

On September 11, 1989, the Catawba resident office received and reviewed the PIR and questioned the licensee relative to the VE systems' operability. These questions were raised because of the references in the operability evaluation to the ability of the system to maintain a negative pressure of 0.25 inches wg and the knowledge that the Technical Specifications require a negative pressure of 0.5 irches wg.

As a result of the above discussions, Catawba management reached the decision that the VE systems were incapable of performing their intended safety function, placed both units in TS 3.0.3 and began shutting them down. Later that evening, however, after additional discussions with corporate DE personnel, the licensee concluded that the VE systems were capable of performing their design function and met TS requirements. Based upon that premise the licensee removed the units from TS 3.0.3 and returned both units to full power.

On the following day, September 12, the Resident Inspectors in further review of the issue and in discussions with NRC systems design experts reached a much different conclusion.

The Resident Inspectors review of the FSAR and SER revealed that the VE systems at Catawba could not meet the system design criterion specified therein, nor the requisites of TS 3.6.1.8 in that the systems could not "...produce a negative pressure of greater than or equal to 0.5 inch Water Gauge..." throughout the annulus. In a conference call that afternoon between the licensee and NRC management it was concluded that Catawba had not been meeting the TS and that the systems' set points would be adjusted such that the systems could achieve and maintain a negative pressure of -0.5 inches wg at all points in the annulus.

System Description

Each containment building at the Catawba Nuclear Station consists of a primary containment and a concentric reactor building. The space between the two is the containment annulus which has the design purpose of the secondary containment. The function of the containment annulus is to prevent unfiltered leakage to the environment following a LOCA. This purpose is to be achieved by the establishment of a negative delta pressure (P) between the annulus and the adjacent areas with the VE system.

VE consists of two redundant trains of fans, filters, dampers, and ductwork. The fans are automatically started upon receipt of a Hi Hi Containment Pressure (SP) signal. The dampers are aligned and controlled so that the annulus is maintained at a negative pressure with respect to surrounding areas.

Event Analysis

In an Operability Evaluation which was generated on September 6, 1989, in response to the aforementioned site generated PIR, corporate design engineering stated that the NRC has defined an acceptable functional capability for secondary containment as the capability to maintain a negative delta P, relative to adjacent regions, of at most -0.25 inches wg. This value was decreased to -0.5 inches wg in the design of the Catawba VE System in order to provide assurance of achieving -0.25 inches wg. To account for instrument errors, the

actual VE operating setpoint was reduced to -1.0 inch wg, providing further assurances of achieving -0.25 inch wg in the annulus.

The VE pressure transmitters (PT) at Catawba are located 162' 3" below the top of the annulus. Based on the information contained in the operability evaluation, the phenomonen of unequal pressure gradients inside and outside the annulus as reported in Notice 88-76 could occur at Catawba. Hence making the annulus delta P less negative at the top of the containment than at the elevation at which the VE PTs are located. As of September 6, licensee analysis indicated that the VE System, as then configured, would maintain a "negative pressure" throughout the entire annulus at outside ambient air temperatures down to 15 degrees F. Note here that "negative" simply means less than zero and does not mean -0.25 inch wg. At outside air temperatures greater than 45 degrees F, the VE System would maintain a negative pressure of at least -0.25 inch wg throughout the annulus.

The licensee, based on the foregoing, stated that although VE would perform its intended function over a wide range of outside temperatures, the acceptance criteria of -0.25 inch wg could only be met with outside air temperatures equal to or grater than 45 degrees F. Design Engineering recommended that VE be declared conditionally operable, contingent upon outside air temperatures equal to or greater than 45 degrees F.

The Resident Inspectors were concerned with the licensee's position that VE could perform its intended safety function, and that the system met TS requirements.

A review of the Catawba FSAR, Section 9.4.9, revealed that the design basis of VE is to: (1) produce and maintain a negative pressure in the annulus following a LOCA; (2) minimize the release of radioisotopes following a LOCA by filtering and recirculating a large volume of annulus air relative to the volume discharged for negative pressure maintenance; and (3) provide long-term fission product removal capacity by decay and filtration.

Further, in section 9.4.9.2 of the FSAR the operation of VE is described. It states that VE functions to discharge sufficient air from the annulus to effect a negative pressure with respect to the containment and the atmosphere 60 seconds following a LOCA. Subsequent to attaining a negative pressure, additional air is discharged as necessary to maintain the pressure at or below -0.5 inches water gauge.

Upon receipt of a start signal the recirculation dampers and discharge dampers are aligned to exhaust 9000 cfm to the unit vent until the annulus negative pressure is -0.5 inches water gauge. The recirculation dampers and discharge dampers then modulate to exhaust air as required to maintain the annulus negative pressure at -0.5 inches water gauge.

In Section 6.2.3 of the FSAR, Secondary Containment Functional Design, the design evaluation of VE states that:

> "The results of an analysis of the functional capability of the Annulus Ventilation System to depressurize and maintain a uniform negative pressure of -0.5 in. water in the annulus following a design basis accident are provided in Table 6.2.3-2."

The key word here is "uniform". The design of the system assumes a negative pressure of -0.5 inches water gauge at all points in the annulus.

The licensee's contention that the VE system could perform its intended safety function appears to be invalid. As discussed above, the intended safety function of the system is to achieve and maintain a uniform negative pressure of 0.5 inches water gauge in the annulus under post LOCA conditions. The VE system could not perform that function.

Further, the licensee's contention that the VE system met the requirements specified in TS 3.6.1.8, specifically surveillance requirement 4.6.1.8.d which requires at least once per 18 months that the VE system be demonstrated to produce, "a negative pressure of greater than or equal to 0.5 inch Water Gauge in the annulus within 1 minute after a start signal", was also invalid. The test performed to meet the surveillance requirement simply verified the system could produce that negative pressure at the transmitter. In as much as the pressure in the annulus is not uniform, and the pressure setpoint verified by the test did not verify that at least a -0.5 inch negative pressure was achieved at all points in the annulus, the TS surveillance did not verify system operability.

Conclusions

> The VE systems at Catawba could not meet the design function as described in the FSAR and SER of achieving and maintaining a uniform negative pressure or greater than or equal to -0.5 inch water during post LOCA conditions.
>
> The test performed at Catawba to meet the requirements of TS 4.6.1.8.d to verify system operability did not do so in that the test merely verified a negative pressure at the sensing point and did not verify at least a -0.5 inch negative pressure throughout the annulus.

Safety Signifiance

The inability of the VE system to perform its intended design function would have led to increased radioactive release into the environment during post LOCA conditions.

Licensee analysis of the worst case scenario revealed, however, that the increase in the offsite release would result in only a seven percent increase. Thus the safety significance of this event is minimal.

This is identified as Violation 413/89-29-04: Inadequate Design Controls to Ensure VE System Operability.

Two Violations were identified in paragraphs 4b and 4d.

5. Calibration (56700)

The inspectors conducted a detailed review and evaluation of licensee's calibration program to determine its conformance with licensee requirements, technical specifications, licensee commitments and industry guides and standards. To accomplish the above the inspectors:

a. Conducted a review of the licensee's records, interviewed testing and calibration personnel, observed actual activities in the program and verified that the calibration frequencies of equipment met the requirements of Technical Specifications.

b. Conducted indepth reviews of over 40 completed tests to establish that the licensee's documentation was completed, acceptance criteria had been met, approved test procedures were used and the personnel conducting the tests were qualified.

c. Examined the technical content of over 31 surveillance test procedures (TP) and observed the performance of three TP's to ensure adequacy and that adequate readings were taken in proper sequences.

d. Examined the technical content and adequacy of 22 instrumentation and control maintenance procedures used to calibrate safety equipment not addressed in Technical Specifications.

e. Reviewed the backlog of past due calibrations.

f. Reviewed tags, log entries, line up sheets, removal and restoration logs to insure proper removal and restoration to service of affected components.

The results of the above reviews, interviews, research and observations indicate that the licensee's calibration program has been properly implemented. Procedures are properly reviewed and approved prior to implementation. Procedures contain steps that require signatures/initials after each major item is completed; second verification of critical steps is required; corrective action is taken and proper notification and review by proper personnel is accomplished when equipment is found out of calibration; test equipment is identified and tracked; and limiting conditions for operations are addressed. A review of the calibration backlog indicates that management is notified and action is taken on past due calibrations.

Based on this review it appears that the licensee's Calibration Program is implemented by adequate procedures, adequate administrative controls and is staffed by trained and qualified personnel.

No violations or deviations were identified.

6. 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 inspector verified licensee conformance to the requirements in the following areas of inspection: the 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 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 the following maintenance activity::

44412 OPS	Pressurizer Pressure Low Alarm Out Of Tolerance.

No violations or deviations were identified.

7. Review of Licensee Non Routine Event Reports (92700)

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 for those reports indicated by an (*). The following LERs are closed:

413/89-19, Rev. 1	Two Unplanned Alignments of the Nuclear Service Water System Due To Defective Procedures.
*414/88-33	Inoperable Containment Air Return Train A Because Of Swapped Control Wiring.
*414/89-02	Manual Reactor Trip Due To Decreasing Steam Generator Level Because Of Equipment Malfunction.

414/89-15	Loss of Feedwater And Auxiliary Feedwater Automatic Start Due To Equipment Malfunction And Inappropriate Action.
*414/89-16, Rev. 1	Upper Range Reactor Vessel Level Instrumentation Inoperable Due To Unqualified Technician.

No violations or deviations were identified.

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

a. (Closed) Inspector Followup Item 414/88-34-04: Testing and Adjustment of Rotork Add On Pack Switches. Design Engineering approved instructions to adjust add on pack (AOP) switches to actuate between 5 and 15% of valve travel prior to the primary control switch actuation. IP/0/A/3820/09; Removal, Replacement and Field Setup of Rotork Actuators, was revised accordingly. This will ensure the AOP switches actuate prior to valve stroke completion. The licensee additionally obtained "as found" data on applicable valves using Movats signature analysis equipment to determine the extent to which AOP switch failures may have occurred. Although some settings were found very close to the end of travel, no cases were identified where AOP actuation failed to occur. Based on this the item is closed.

b. (Closed) Violation 414/88-34-02: Failure to Take Prompt Corrective Action to Ensure Operability of 2CA-62A. The licensee responded to the violation in correspondence dated December 15, 1988. Emergency Operating Procedures were revised to incorporate alternate methods for isolating a faulted steam generator. Additional testing of valves was conducted to obtain empirical data on valve friction factors. The results were reported in LER 414/89-10. The NRC issued Information Notice 89-61, Failure of Borg Warner Valves to Close Against Differential Pressure, which described potentially unconservative valve friction factor assumptions, used to calculate required actuator thrust. Based on this, the item is closed.

c. (Closed) Unresolved Item 413,414/88-18-03: Evaluation of Repetitive Sticking of RHR Hot Leg Suction Valves. The licensee conducted a review of historic failures of the Residual Heat Removal (RHR) Suction Valves to identify root causes and corrective action. The licensee identified a number of failures associated with various electrical problems such as motor failure, interlock failure or torque switch failures. Additionally two failures were identified where a valve was actually stuck closed on the seat. The electrical failures appeared to have been adequately corrected. Further analysis was required to understand the cases where the valve stuck closed. Three problems were identified:

- A valve actuator gear ratio providing a low speed, high torque output resulted in a locking condition between the motor and worm gear which prevented any relaxation in the motor drive

train after valve closure. This contributed to the inability to engage the declutch mechanism and place the actuator in manual handwheel operation.

- The Rotork design in use utilizes a mechanical latch to temporarily bypass the torque switch during valve unseating, however, the low stem speed could have resulted in premature actuation of the torque switch prior to complete valve unseating.

- Seating torque/thrust was identified through diagnostic testing to be excessive.

The licensee implemented corrective actions to address the problems:

- Seating thrust was reduced by an average of 33% for Unit 1 valves and by 47% for Unit 2 valves. This will reduce the seating force and minimize problems with actuator handwheel engagement.

- Modifications were performed on the torque switch to extend the bypass during valve unseating.

Corrective actions appear to be adequate and based on these the item is closed.

d. (Closed) Inspector Followup Item 413/89-07-04: Corrective Actions Regarding Two Failures of 1SV-13. Partial followup to this issue was conducted in Inspection Report 89-13. The licensee performed modifications to the Steam Generator Power Operated Relief Valves on both units in accordance with recommendations from the manufacturer. Increased testing was conducted as a verification of operability until the modifications were complete. The licensee will also implement piston ring replacement on a 2 year interval and partial stroke testing under full differential pressure on an 18 month interval. Based on these corrective actions this item is closed.

e. (Closed) Unresolved Item 414/89-21-07: Overcurrent Trips of Hydrogen Skimmer Fan Motors. The licensee submitted Licensee Event Report 413/89-26 on October 3, 1989 in accordance with 10 CFR 21, reporting potential problems with Westinghouse 600 VAC circuit breakers which are ambient temperature compensated. In conjunction with Westinghouse, the licensee determined that the non-adjustable instantaneous trip of the 125 amp, 600V HFB3125A circuit breakers are not tested and may not exhibit trip characteristics in accordance with the manufacturer's curve in that instantaneous tripping may unnecessarily occur on motor start.

During review of this event and work request for the May 12, 1989 replacement of a Hydrogen Skimmer (VX) Fan 2A circuit breaker, it was determined by the licensee that the load was not started as a post maintenance retest. The breaker was tested prior to

installation at 300% rated current to verify overload operation, however, the instantaneous trip was not tested, nor was the fan motor started to verify proper operation. Furthermore the licensee's program for testing does not require a load start following circuit breaker replacement. On June 19, 1989 while performing a surveillance test to verify operability of the 2A VX Fan, the load tripped on instantaneous overcurrent. This raised the question of the VX 2A fan operability during the time frame between May 12, and June 19 in that the post maintenance retest was inadequate to detect the failure mode and the breaker tripped upon starting.

The licensee performed an evaluation to determine if the circuit breaker would have tripped on overcurrent during accident conditions. Using actual instantaneous overcurrent trip setting data from the breaker, the calculated lower switchyard voltage which would be obtained following a turbine generator trip and the fan motor test report the licensee determined that the motor would not have tripped and the fan was, therefore, operable.

Catawba Maintenance Manual Procedure (MMP)1.0, Work Request Preparation, defines a retest as a test to demonstrate that a component meets or exceeds minimum acceptance criteria as defined in Technical Specifications. A functional verification is defined as one which demonstrates that a component will operate as designed. Section 4.9.10, of MMP 1.0 requires that motors and ventilation equipment be run after maintenance to observe for vibration, excessive current etc., however, this was not explicitly required for circuit breaker replacement. The licensee's program is, therefore, considered to have been inadequate in that MMP 1.0 did not require a verification of motor operability when instantaneous overload settings were unavailable. This is identified as Violation 414/89-29-05: MMP 1.0 Inadequate To Ensure Proper Testing Of Loads Following Circuit Breaker Replacement.

9. Licensed Operator Physical Examination Management Meeting (30703)

A management meeting was held in the Region II office on August 29, 1989, to discuss an apparent failure of Duke Power Company to meet the licensed operator medical exam two year requirements. It appeared that the Duke program had allowed some operator physicals to exceed the two-year requirements. The Duke presentation included a brief history of the requirements for operator physicals, a review of medical exam data collected at all three Duke sites, root cause, and actions to prevent recurrence. Duke identified the root cause of the problem as an apparent misunderstanding of the meaning of "every two years." It was acknowledged by the NRC that generic guidance would be forthcoming to the industry on this topic. Pending further review of this item it will be tracked as an Unresolved Item for Oconee.

10. Exit Interview

The inspection scope and findings were summarized on October 6, 1989, with those persons indicated in paragraph 1. On November 3, 1989, revisions to previous findings were summarized. These revisions resulted from our review of new information presented in Atlanta on October 20, 1989. The licensee offered dissenting comments on the inspectors findings which identified an apparent violation associated with post maintenance testing of an electrical breaker which supplies Containment Air Return Fan 2A. 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
UNR 413/89-29-01	Failure to Properly Wear Dosimetry While in the Radiation Control Area. (paragraph 3d.)
VIO 413/89-29-02	Inoperable Train of Control Room Ventilation Due to Inadequate Flow Balancing. (paragraph 4b.)
IFI 414/89-29-03	Upper Surge Tank Level Measurement Reliability. (paragraph 4c.)
VIO 413/89-29-04	VE System Inoperability. (paragraph 4d.)
VIO 414/89-29-05	MMP 1.0 Inadequate to Ensure Proper Testing of Loads Following Circuit Breaker Replacement. (paragraph 8e.)