UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-269/84-11, 50-270/84-11, and 50-287/84-13

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270, and 50-287

License Nos.: DPR-38, DPR-47, and DPR-55

Facility Name: Oconee Nuclear Station Units 1, 2, and 3

Inspection Date: May 11 - June 10, 1984

Inspection at Oconee site near Seneca, South Carolina

Inspectors: for J. Bryant A. J. Ignatonis — 6/27/84 Date Signed

for K. Sasser A. J. Ignatonis — 6/27/84 Date Signed

for C. Burger A. J. Ignatonis — 6/27/84 Date Signed

Approved by: Virgil L. Brownlee — 6/28/84 Date Signed
V. L. Brownlee, Section Chief
Reactor Projects, Section 2A
Division of Reactor Projects

SUMMARY

Scope: This routine, unannounced inspection involved 200 resident inspector-hours on site in the areas of operations, maintenance, surveillance, startup operations, LER review, and open item followup.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

M. S. Tuckman, Station Manager
*J. N. Pope, Superintendent of Operations
T. Barr, Superintendent of Technical Services
J. Davis, Superintendent of Maintenance
R. Bond, Compliance Engineer
*T. Matthews, Compliance Engineer

Other licensee employees contacted included reactor operators, mechanics, technicans, security force members, and staff engineers.

*Attended exit interview.

2. Exit Interview

The inspection scope and findings were summarized on June 12 with those persons indicated in Paragraph 1 above.

3. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item 50-269,270,287/78-10-01, Penetration Fire Stop Tests. According to a letter from Duke Power Company to Edson G. Case, NRR, on June 18, 1978, tests were performed on May 10, 1978 of the modified fire stop design. The tests were conducted in accordance with IEEE P614/04, Standard Cable Penetration Fire Stop Qualification Test, and the material met test requirements.

(Closed) Unresolved Item 50-269,270,287/81-01-01, Calibration of Stressing Rams. This item had been held open awaiting completion of Region II review.

(Closed) Unresolved Item 50-287/81-19-01, Radioactive Gas Sampling. Gas sampling and procedures have been inspected by regional health physics inspectors since this event, and no problems remain unresolved. This item is closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Plant Operations (71707)

The inspectors reviewed plant operations throughout the reporting period to verify conformance with regulatory requirements, Technical Specifications (TS), and administrative controls. Control room logs, shift turnover records and equipment removal and restoration records were reviewed routinely. Interviews were conducted with plant operations, maintenance, chemistry, health physics and performance personnel.

Activities within the control rooms were monitored on an almost daily basis. Inspections were conducted on day and on night shifts, during week days and on weekends. Some inspections were made during shift change in order to evaluate shift turnover performance. Actions observed were conducted as required by Section 3.18 of the station directives. The complement of licensed personnel on each shift inspected met or exceeded the requirements of TS. Operators were responsive to plant annunciator alarms and appeared to be cognizant of plant conditions.

Plant tours were taken throughout the reporting period on a routine basis. The areas toured included the following:

Turbine Building
Auxiliary Building
Units 1, 2, and 3 Electrical Equipment Rooms
Units 1, 2, and 3 Cable Spreading Rooms
Station Yard Zone within the Protected Area
Unit 3 Reactor Building

During the plant tours, ongoing activities, housekeeping, security, equipment status, and radiation control practices were observed.

Within the areas inspected, no violations or deviations were identified.

Unit 1 tripped at 2:04 a.m. on May 12 due to reactor high pressure. The trip was caused by a faulty selector switch and relay associated with reactor outlet temperature. This malfunction caused a false low T_{hot} which resulted in a feedwater runback and subsequent reactor trip on high pressure. Two main steam code safeties lifted during the transient and one did not reseat until steam pressure was reduced to 985 psig. It then reseated and held as pressure returned to normal.

The reactor was returned to critical at 8:08 a.m. on May 12 after the relay problem was corrected. It was held at low power until xenon had peaked. Reactor power was then held at 83% until 7:33 a.m. on May 13 due to system load demand.

Unit 2 operated at essentially full power throughout the reporting period, May 11 to June 10.

Unit 3 began the reporting period while still in the Cycle 7 refueling outage. The reactor was taken critical at 7:11 p.m. on May 25 and startup testing began. Power increase was delayed to some extent due to secondary plant problems. The unit reached 100% power at 6:20 a.m. on June 4. Unit 3 tripped from about 15% power, following a runback from 100% at 1:23 p.m. on June 7. Also on June 7, the reactor tripped from 20% power. These trips were related to the secondary plant system malfunctions and are discussed in Paragraph 9 of this report. Unit 3 again reached 100% power on June 9 and remained there until the end of the reporting period on June 10.

6. Surveillance Testing (61726)

The surveillance tests listed below were reviewed and/or witnessed by the inspectors to verify procedural and performance adequacy.

The completed tests were reviewed and examined for necessary test prerequisites, instructions, acceptance criteria, technical content, authorization to begin work, data collection, independent verification where required, handling of deficiencies noted, and review of completed work.

The tests witnessed, in whole or in part, were inspected to determine that approved procedures were available, test equipment was calibrated, prerequisites were met, tests were conducted according to procedure, tests were acceptable and system restoration was completed.

Surveillances reviewed but not witnessed included the following:

IP/0/A/0280/16	Turbine overspeed trip calibration
IP/0/A/0361/01B	Calibration of area monitors
IP/0/A/0360/19	Functional check of process monitors
IP/0/A/0200/31A	Pressurizer valve monitor instrument calibration

Surveillances witnessed, in whole or in part, included the following:

IP/2/A/0305/3A	Instrument procedure data package for RPS Channel A calibration and functional test
PT/0/A/0150/08B	Reactor building emergency airlock leak rate test - Unit 2
IP/0/A/0310/14B	E/S analog Channel B on line instrument calibration
PT/3/A/0600/12	Turbine driven emergency feedwater pump performance test - Unit 3
IP/0/A/0310/12A	E/S system logic, HPI and RV isolation, on line instrument calibration. Subsystem 1.
IP/0/A/0310/13B	E/S system logic, subsystem 2, on line instrument calibration

7. Maint nce Activities (62703)

Maintenance activities were observed and/or reviewed during the reporting period to verify that work was performed by qualified personnel and that approved procedures in use adequately described work that was not within the skill of the trade. Activities, procedures, and work requests were examined to verify proper authorization to begin work, provisions for fire, cleanliness, and exposure control, proper return of equipment to service, and that limiting conditions for operation were met.

Maintenance activities not witnessed but for which records were reviewed included the following:

Work Request No.	Title
WR 53226C	Limitorque testing program
WR 12239B	Repair 3B HPI pump motor upper bearing oil temperature indicator
WR 55309A	Control rod drive patch - repatch procedure
WR 57021A	Repairs to refueling bridge and crane (Witnessed, in part, during previous reporting period)
WR 12552	Unit 2 core flood tank low pressure alarm

Maintenance activities during the report period were directed primarily toward returning Unit 3 to full power operation and did not necessarily involve safety related equipment. Portions of this work were observed by the inspectors to determine that work was conducted in a satisfactory manner but is not listed as safety related work inspected.

8. Unit 3 Startup From Refueling Outage

Following the Cycle 7 refueling outage, Unit 3 was taken critical at 7:15 p.m. on May 25. Control rods and boron concentration were within predicted values at criticality. Prior to startup, the inspectors verified valve lineups on several systems. The inspectors witnessed startup, reviewed the controlling procedure, OP/3/A/1102/1, zero power physics testing and power escalation test procedures, witnessed portions of these tests and witnessed shift changes during the startup.

In the areas inspected, no violations or deviations were identified.

9. Unit 3 Reactor Trips, Recoveries, and Other Events (93702)

a. Background - During the Unit 3 Cycle 7 refueling outage, the high pressure turbine and both main feedwater pump turbines were completely dismantled and overhauled. Also, the control systems received extensive preventive maintenance. These systems were thoroughly tested prior to and during startup; however, since most of the problems encountered during the first few days of operation and described in preceeding paragraphs, were secondary plant related, the possible effect of this major maintenance should be considered.

The licensee and the inspectors have looked for possible interconnection of the problems.

The licensee's actions, evaluations, and reviews following trips were reviewed by the inspectors and no violations or deviations were identified.

b. On June 3, when ICS stations were taken to manual for nuclear instrument calibration, main turbine control valves began ramping closed. Operators successfully terminated the transient. An overly tight dead band on turbine control valves was identified and corrected. This had caused oscillations of the valves.

c. At 6:01 p.m. on June 6, Unit 3 ran back to 15% power due to an indicated loss of stator coolant. This apparently was due to loss of power to the stator coolant panel and not to an actual loss of coolant to the stator. Power increase began at 7:30 p.m. on June 6 and 100% was reached at 6:24 a.m. on June 7.

d. At 1:20 p.m. on June 7, Unit 3 experienced another runback due to indicated stator coolant trouble. There was no actual loss of coolant. The indication was reset, but a reactor trip occurred at 1:23 p.m., apparently due to an erroneous "Both Feedwater Pumps Tripped" indication to the reactor protection system.

During the turbine runback, at low power, feedwater pump (FWP) 'A' ranback and was stopped by the reactor operator to avoid overcooling. Licensee personnel believe that the FWP 'A' runback may have been so rapid that the hydraulic oil pressure system of FWP 'B', which operates control valves, may have indicated inadequate feedwater flow even though actual flow was satisfactory. This could cause the signal to the RPS that both pumps had stopped; resulting in anticipatory reactor trip. This reactor trip is still under investigation by Duke.

The runback due to the erroneous stator coolant signal was to a lower power than intended. It was found that the runback pulser speed was too fast and ran the load reference too far, taking the reactor to a much lower power than intended. This pulser, which is unique to the GE turbine controls and is not a part of the reactor protective runback system, will be replaced when available. PM procedures on the pulser will be reviewed for adequacy.

After the post trip review was completed according to procedure, it was decided to restart the reactor. The stator coolant turbine runback system was disconnected and guidelines developed for operator actions in the event of a stator coolant alarm. This was not a Technical Specification violation, since stator coolant protection is not a part of the Technical Specification.

The reactor became critical at 5:07 p.m. of the same date and then was taken to approximately 18% power. It was held at that power level while licensee investigation continued. At 9:33 p.m. of the same date, the turbine was placed on-line.

e. At 10:33 p.m. on June 7, while at 20% power, the reactor tripped on the Turbine/Generator - Reactor anticipatory trip signal. The turbine was showing 15 mils vibration shortly before the reactor trip. The events recorder apparently was not performing correctly and the record is not complete.

Members of the Oconee engineering staff reported to the site and a review of the circumstances and findings was conducted according to procedure.

At the time of the trip, reactor power was being held, nominally, at 18% which is below automatic reset of the turbine trip breakers. Power had moved up to 20%, which is the point where the turbine trip becomes operable. This small power fluctuation is not unusual at low power on trip recovery.

Cause of the trip could not be determined and turbine vibration could not be determined unless the turbine was operating. It was decided to restart the reactor and hold at low power for turbine examination.

f. At 2:45 a.m. on June 8, trip recovery was initiated. Control rod drive motor fault alarms were received, even when there was no rod motion. The rod drive sequence programmer was replaced. While pulling Group 3 safety rods, faults recurred and rods would not drive in or out; the reactor was tripped manually, and kept at hot shutdown while programmer repairs were in progress and investigation of turbine related problems continued.

The control rod drive problem was found to have been in the programmer that was replaced during the startup, and was the fault of a loose optical disc in the replacement programmer.

g. After reviews, troubleshooting, and evaluations were completed, it was decided to restart the reactor.

Reactor startup began at 5:28 p.m. on June 8 and the reactor was critical at 6:00 p.m. At 5:32 a.m. on June 9, power increase was stopped at 73% by the system dispatcher. Unit 3 reached 100% power at 12:40 p.m. on June 9, and remained there to the end of the reporting period.

h. Summary - The indicated turbine vibrations was due to two loose vibration probes, and vibration has not been excessive since restart. Mechanism of the T/G-Reactor anticipatory trip is still under investigation by the licensee.

The events recorder has been tested in the areas that apparently did not record during the event, and all circuits performed normally. The actual conditions at the time of the trip can not be duplicated. Coincidentally, during the week of the events, the inspector had observed that during surveillances, the technicians verify proper performance of the event recorders.

During the events, there were no failures of the reactor protection system. The licensee performed evaluations according to procedures prior to restart after the trips. The licensee's investigation of the various unanswered questions is continuing and the results will be the subject of a written report.

The inspectors identified no violations or deviations in the licensee's actions. However, the continuing investigation will be reviewed by the inspectors. This will be identified as an inspector followup item, IFI (50-287/84-13-01), Secondary Plant Related Trips.

10. Corrections to Inspection Report 50-287/84-08 - Unit 3

Two errors were made on page 2 of Report Details in the subject report. These errors are corrected below.

Paragraph 4 of page 2 has the following statement:

"On 3A steam generator, of the 2869 tubes inspected by eddy current, four were found below minimum allowable thickness and were plugged. On 3B ..."

Paragraph 4 should have stated:

"On 3A steam generator, of the 2869 tubes inspected by eddy current, three were found below minimum allowable thickness and were plugged. On 3B ..."

Paragraph 5 of page 2 has the following statement:

"On Unit 3, all of the core barrel upper hold down bolts and twelve lower bolts were ultrasonically (UT) examined. Two upper bolts showed indications of cracks. Nothing will be done about these bolts at this time. The bolts are captured, top and bottom, and B&W analysis shows that the plant can be operated with up to five bolts missing. The only significant ..."

These sentences should be corrected to read as follows:

> "On Unit 3, all of the core barrel upper hold down bolts and twelve lower bolts were ultrasonically examined. Two upper bolts showed indications of cracks. Nothing will be done about these volts at this time. The bolts are captured, top and bottom. According to the B&W owners' group meeting of May 7, 1983, only 43 upper core barrel bolts are required to maintain joint integrity. There are 120 upper core barrel holddown bolts. The only significant ..."

11. Licensee Event Reports (92700)

(Closed) LER 50-269/81-22, Variable Spring Hangers Not Carrying Design Load. All piping and support on restraint analyses and modifications were completed for Units 1 and 2. Unit 3 does not have the same piping configuration and was not affected. The six spring hangers for each of Units 1 and 2 were replaced and the insulation modifications, to exclude the spring hangers, were completed.

A Duke Power Company survey to determine if any other safety related variable springs were located in a temperature environment exceeding 350°F was conducted and no other examples were found. Unit 1 modifications were completed on December 14, 1981, per WR 95043B and Unit 2 modifications were completed on April 9, 1982, per WR 95190B.

(Closed) LER 50-287/82-09. Reactor Coolant Pump Degraded Due to Boric Acid Degradation of Studs. The LER reported that five of the twenty studs had been eroded by boric acid to below minimum acceptable diameter. The studs were replaced with a different material which contains 1.8% Ni, which was not present in the original studs. (LER Report dated August 13, 1982)

The new material is expected to reduce corrosion to some extent; however, the licensee's primary goal is to reduce corrosion by reducing leakage.

Pump studs are measured by micrometer on each refueling shutdown, in addition to other NDE. Since the LER 82-09 event, no studs have been replaced due to diameter reduction. All studs have been replaced on two pumps since then, but none were found below minimum diameter. There is no evidence of degradation and the licensee has a program of inspection and replacement.

12. Inspector Followup Items

(Closed) IFI 50-269,270,287/78-10-02, Develop and Implement Fire Fighting Procedures. These procedures are now a part of the Oconee Fire Procedures Manual.