



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

Report Nos.: 50-269/85-07, 50-270/85-07, and 50-287/85-07

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

Inspection Conducted: March 11 - April 10, 1985

Inspectors:	<u>H C Dance / sn</u>	<u>5/8/85</u>
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	<u>H C Dance / sn</u>	<u>5/8/85</u>
	M. K. Sasser	Date Signed
	<u>H C Dance / sn</u>	<u>5/8/85</u>
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Approved by:	<u>H C Dance</u>	<u>5/8/85</u>
	H. C. Dance, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine, unannounced inspection entailed 322 inspector-hours on site in the areas of operations, surveillance, maintenance, refueling shutdown and followup of events.

Results: Of the five areas inspected, no items of noncompliance or deviations were identified.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*M. S. Tuckman, Station Manager
- \*J. N. Pope, Superintendent of Operations
- T. S. Barr, Superintendent of Station Services
- T. B. Owen, Superintendent of Maintenance
- R. T. Bond, Compliance Engineer
- \*T. C. Matthews, Technical Specialist
- \*O. L. White, QA, Surveillance
- \*D. Poland, Performance, Reactor Engineer

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

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on April 11, 1985, with those persons indicated in paragraph 1 above. A Unit 2 process water spill and possible corrective actions and failure of a residual heat removal valve to open normally were discussed. These are subjects of inspector followup items in paragraphs 7 and 9 respectively.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

### 3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

### 4. Plant Operations

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 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
- Units 2 and 3 Reactor Building

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

Unit 1 operated at essentially full power throughout the reporting period, March 11 - April 10, 1985.

Unit 2 continued in refueling shutdown throughout the reporting period. A primary water spill is discussed in paragraph 8 of this report and damage to fuel components in paragraph 9. Unit startup is anticipated during the week of April 21.

Unit 3 operated at essentially full power until March 15 when power was reduced due to above normal levels of sodium and silica in the secondary system. On March 19 the unit was shut down for repair of leaks in the moisture separator reheater tube bundles. This shutdown is discussed in paragraph 10 of this report. The unit was made critical on March 30, returned to full power on March 31, and continued in that mode for the remainder of the reporting period.

## 5. Surveillance Testing

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

Procedures used in several surveillances were reviewed after completion, including Unit 2 control rod drop time test. Surveillances witnessed in progress and reviewed included the following:

PT/3/A/0150/22B	Valve Functional Test, 3LP-1 and 3LP-2
1P/2/A/0310/12C	Engineered Safeguards RB Isolation and Cooling Channel 5 On-Line Test
1P/2/A/0310/13C	Engineered Safeguards RB Isolation and Cooling Channel 6 On-Line Test

#### 6. Maintenance Activities

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.

During the refueling shutdown of Unit 2 and the shutdown for maintenance of Unit 3, a number of maintenance jobs were witnessed, in part, while in progress. The following jobs were witnessed and procedures reviewed:

- a. WR 54288C Disassemble, Inspect, and Repair Turbine Driven Emergency Feedwater Pump, Unit 2
- b. WR 5044D Disassemble, Inspect and Repair 2MS-16, Unit 2
- c. WR 53324C General Inspection of 16 Cylinder Diesel, SSF
- d. WR 53326C General Inspection of 12 Cylinder Diesel, SSF
- e. TM/2/A/1150/2 Reactor Vessel - Correction of Coupling Problem with Rod Drive in Position E-5

#### 7. Unit 2 Primary Water System Spill

On March 31, 1985, a spill of primary water from the Unit 2 low pressure injection system into the east penetration room was experienced. An estimated ten gallons of water flowed down an exterior wall of the auxiliary building and onto a blacktop area of the station yard. The outside spill was contained and, apparently, none entered the yard drain. However, a Keowee unit was started for dilution as a precautionary measure. Calculations based on possibly 100 gallons entering the yard drain determined that no release limit was exceeded.

At the time of the spill the reactor had been shut down about 40 days, had been refueled, and the 2B low pressure injection (LPI) system was in operation for decay heat removal. It was desired to isolate and drain the 2A LPI system to B holdup tank for inservice inspections and valve maintenance. Valve lineups were made by prepared procedure.

While draining the system, of the two isolation valves, LP-9 and LP-10, between LPI trains A and B, LP 10 was left open to make LPI pump C immediately available in the event of failure of LPI pump B. In the current reactor condition, it was not a TS requirement that a backup pump be immediately available.

LPI System A was isolated from the reactor by two check valves. Valve LP 17, in line with the check valves was not closed in order that the entire line could be drained. "A" LPI system was vented via a 1" vent line in the penetration room for draining.

After draining was in progress, it was determined that the reactor level was dropping at a rate of about four inches per hour. Shift personnel decided that water was leaking past the two check valves into 'A' LPI system. They then closed valve LP17 at 11:51 a.m. At 12:01 p.m. the control room was notified of a leak in the east penetration room. Personnel were dispatched to the penetration room to contain the leak. Control room indications showed a pressure increase in LPI header A. At 12:04 p.m. LP10 was closed, header pressure dropped to zero, and the leak stopped. The leak had been through the vent in the penetration room.

Personnel in the penetration room reported that some water leaked down the inside of the penetration exterior wall. This wall is made of metal siding. Personnel in the penetration room dammed this exit. Others, including Health Physics personnel, were sent outside and additional people were called in to assist in cleanup. A light rain was falling and some water entered the year drain. A Keowee unit was started for dilution in case any of the spill water had entered the drain.

A licensee evaluation determined that valve LP9, electrically operated, had not indicated being fully closed when operated at the start of draining the header. An operator had then seated the valve by hand and tagged the valve closed. LPI system pressure and flow had then decreased to zero, indicating that LP9 was closed, even though the control room indication showed an intermediate position.

Ocone yard drains go to the No. 3 chemical treatment pond. Immediately after the spill, the effluent weir was closed and the pond sampled. Samples continued every two hours for approximately 36 hours. No activity increase was ever identified. Flow from the Keowee dam continued during this time.

Evidently, control room personnel made an incorrect assumption that leakage was through valve LP17 rather than LP9. The assumption apparently was influenced by the fact that LP-9 had been seated by hand and control room indications showed that header pressure then dropped to zero. When header

draining began, operations had verified a negative header pressure by air flow through the vent.

The resident inspectors reviewed the event and determined that no violations or deviations had occurred to cause the spill, or in treatment of the spill. They questioned why there was no dam at the point where spill water entered a small pit area and thus escaped from the penetration room. The licensee stated his belief that a dam in that area was not a part of original design. However, such a dam is in place in one of the other units. The inspectors were unable to determine from available drawings whether or not a dam in this area is a part of original design.

This matter will be examined further and is listed as an Inspector Followup Item, IFI 50-270/85-07-01, Penetration Room Dam.

8. Unit 2 - Damage To Control Rod Upper End Fitting

On March 31, when coupling lead screws to control rods following reactor refueling, difficulty was experienced in coupling to rod positions E-5 and E-7. E-7 was coupled, but demonstrated more required lift force than normal. On E-5, the lead screw was removed from the CRDM and a small camera was inserted in the hole. The camera revealed that the control rod lifting lug was offset about two inches from center.

The reactor vessel head was removed and the canal seal plate installed. In a series of steps, the upper plenum was removed and inspected and all control rod end fittings were examined. These actions were taken after a series of discussions and planning sessions. Procedures were written or modified as needed to control the operations, to verify that no fuel or rods were jammed in the plenum when it was raised, and to control personnel radiation exposure.

The resident inspectors attended some of the planning sessions, witnessed removal of the plenum and other portions of the operation, reviewed tapes of the core scan after refueling, witnessed the inspection for assembly damage, and the inspection of the plenum.

The upper end fitting of the E-5 assembly was damaged in that on one side of the assembly one of the guide lugs was bent inward and one outward. The upper end fitting spider was damaged and the control rod lifting lug displaced. The assemblies in positions E-4, E-6, E-7 and E-8 were also damaged to a lesser extent with guide lugs bent inward slightly and, in some instances, in contact with control rods.

The five listed fuel components were removed from the reactor; E-5 for replacement and the other four for repair of the top end fitting. In addition, eight other components in the proximity of E-5 were removed for examination. Due to the replacement of E-5, it was necessary to change out or move several other components for symmetry.

At the end of the reporting period the reactor vessel had been reassembled and all control rod drives connected except for E-5. E-5 lead screw was being installed.

During examination of upper end fittings prior to removal, it was determined that a locking pin was separated from E-5 and was located between E-5 and an adjacent assembly. In attempting to capture this pin, approximately  $\frac{1}{2}$  inch diameter and  $1\frac{1}{2}$  inches long, it was dislodged and fell to the lower part of the fuel basket. After fuel components were removed, further attempts were made to capture the pin. Eventually, it fell to the bottom of the reactor vessel. The licensee is preparing a safety evaluation to permit operation without removal of the pin.

No violations or deviations were identified during this portion of the inspection.

#### 9. Unit 3 Shutdown

Due to decreasing electrical output from Unit 3, the licensee performed an investigation which determined the probable cause as multiple tube leaks in the moisture separator reheaters (MSRs). Since replacement tube bundles could not be obtained before the refueling outage in August, it was decided to remove steam from the MSRs to prevent further damage. This action was taken on March 14.

Removal of steam from the MSRs permitted wetter steam to enter the low pressure turbines. This resulted in washing deposits, which were high in sodium and silica, off the turbine blades and into the secondary system. The concentration of these elements is limited by secondary system specifications in order to protect steam generators. As the concentration increased, reactor power was reduced to aid in removing contaminants from the system.

Despite the reduction in power, contaminants could not be reduced to a satisfactory level. Consequently, on March 19 the reactor was shut down in order to plug MSR tubes. Approximately 130 tubes were plugged. The reactor was taken critical on March 30 at 1:15 p.m. and resumed full power operation on March 31 at 4:50 p.m.

When Unit 3 was taken to cold shutdown, difficulty was experienced in initiating decay heat removal. Valve 3LP2, which is the second valve from the reactor coolant system in the LPI pump suction line, failed to open on demand. Additional amperage was supplied at the valve breaker in order to get the valve lifted off its seat. Once this was done, the valve opened under normal power.

In preparation for unit startup, the valve was cycled several times under normal power with amperage being measured. The valve performed normally. The operator on this valve was replaced with a smaller unit 3 or 4 years ago when the valve stem was bent by the valve operator, rendering the valve almost impossible to open by any means.

The licensee is studying the problem to determine what action should be taken to assure valve operability. The inspector will keep abreast of licensee actions. This will be an Inspector Followup Item, IFI 50-287/85-07-02, Improve Valve LP2 Operability.

10. Unit 2 Main Steam Relief Valves (MSRVs)

Four of the sixteen Unit 2 MSRVs were taken apart and reworked by the licensee and a manufacturer's (Crosby) representative during the refueling outage. MSRVs 13, 14, 15 and 16 were chosen for rework because they had exhibited more setpoint drift than the others during testing over the past several years.

Major work on these valves was the lapping of the seat and disc on valves 13, 14, and 15 and replacement of the disc on valve 16 and rework of its seat using a cutting tool. The valves were reassembled and the blowdown rings adjusted to Crosby specifications to provide the proper reseal setpoint. The relief setpoints will be checked during Unit 2 startup using a pneumatic assist device to provide the required pressure above the 900 psig steam header pressure to reach valve setpoint. The licensee plans to rework four MSRVs on each unit during subsequent refueling outages until all MSRVs have been completed.

11. Failure Of A Reactor Building Cooling Unit (RBCU)

On April 6 an RBCU fan motor failed in Unit 3 and was classified inoperable. TS permit operating in this mode for seven days provided the other two RCBUs are operating and both trains of building spray are operable. If the failed unit is not restored to operability in seven days, the reactor must be placed in hot shutdown. At the end of the reporting period, the licensee is arranging air flow and cooling in the failed fan motor area in order to improve working conditions so that the fan motor may be replaced while Unit 3 remains on line.

No violations or deviations were observed.