



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

Report Nos.: 50-269/90-34, 50-270/90-34 and 50-287/90-34

Licensee: Duke Power Company  
 P. O. Box 1007  
 Charlotte, NC 28201-1007

Docket Nos.: 50-269, 50-270, 50-287, 72-4

License Nos.: DPR-38, DPR-47, DPR-55, SNM-2503

Facility Name: Oconee Nuclear Station

Inspection Conducted: December 2 - December 31, 1990

Inspector:	<u><i>W. H. Miller, Jr.</i></u>	<u>1-9-91</u>
	P. H. Skinner, Senior Resident Inspector	Date Signed
	<u><i>W. H. Miller, Jr.</i></u>	<u>1-9-91</u>
	B. B. Desai, Resident Inspector	Date Signed
	<u><i>W. H. Miller, Jr.</i></u>	<u>1-9-91</u>
	W. K. Poertner, Resident Inspector	Date Signed
Approved by:	<u><i>G. A. Belisle</i></u>	<u>1/11/91</u>
	G. A. Belisle, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine, announced inspection involved inspection on-site in the areas of operations, surveillance testing, maintenance activities, review of High Pressure Injection System operational problems and inspection of open items.

Results: One apparent violation was identified (see paragraph 5). The licensee's prompt actions associated with this problem indicates a continuing strength in the design engineering review process.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*B. Barron, Station Manager
- \*C. Baldwin, Quality Assurance
- D. Couch, Keowee Hydrostation Manager
- \*T. Curtis, Compliance Manager
- \*J. Davis, Technical Services Superintendent
- D. Deatherage, Operations Support Manager
- \*B. Dolan, Design Engineering Manager, Oconee Site Office
- W. Foster, Maintenance Superintendent
- T. Glenn, Engineering Supervisor
- C. Little, Instrument and Electrical Manager
- H. Lowery, Chairman, Oconee Safety Review Group
- B. Millsap, Maintenance Engineer
- \*D. Powell, Station Services Superintendent
- \*G. Rothenberger, Integrated Scheduling Superintendent
- \*R. Sweigart, Operations Superintendent

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

#### NRC Resident Inspectors:

- \*P. Skinner
- \*W. Poertner
- \*B. Desai

\*Attended exit interview.

### 2. Plant Operations (71707)(71710)

#### a. General Observations

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, temporary modification log and equipment removal and restoration records were reviewed routinely. Discussions were conducted with plant operations, maintenance, chemistry, health physics, instrument & electrical (I&E), 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 weekdays and on weekends. Some inspections were made during shift change in order to evaluate shift turnover performance. Actions observed were conducted as required by the licensee's administrative procedures. The complement of licensed personnel on each shift inspected met or exceeded the requirements of TS. Operators were responsive to plant annunciator alarms and were 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
- CCW Intake Structure
- Independent Spent Fuel Storage Facility
- Units 1, 2 and 3 Electrical Equipment Rooms
- Units 1, 2 and 3 Cable Spreading Rooms
- Units 1, 2 and 3 Penetration Rooms
- Units 1, 2 and 3 Spent Fuel Pool Rooms
- Station Yard Zone within the Protected Area
- Standby Shutdown Facility
- Keowee Hydro Station

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

All three units operated at power during the entire reporting period.

b. Walkdown of the Low Pressure Injection System (Unit 1)

The inspectors walked down the majority of the Low Pressure Injection System (LPI) outside of containment. This walkdown included verification of system condition and configuration including piping, valves, pumps, coolers, motor control centers and the control room. The inspectors also reviewed the valve lineup procedure OP 1/A/1104/04, LPI Switchover Mode To ES Valve Checklist, for current mode of operation. The system was found to be in an acceptable condition and all valves were found in their required positions. The lighting in the "A" LPI pump room was found to be poor and two other minor discrepancies were also noted. These discrepancies were brought to the attention of the unit operation support staff for resolution.

No violations or deviations were identified.

## 3. Surveillance Testing (61726)

## a. General

Surveillance tests were reviewed 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, test results were acceptable and systems restoration was completed. Surveillances reviewed and witnessed in whole or in part:

IP 0/A/0310/014A	Unit 1 - Engineered Safeguards System Analog Ch. A On-line Calibration
PT 0/A/115/07	Unit 1 - RBS Valve Verification
IP 0/A/0275/006C	Unit 1 - Safety Related Functional Test of the MDEFWP Initiation Pressure Switches
PT 0/A/0150/22D	Unit 1 - Individual Valve Functional Test on 1LP-8

## b. Emergency Feedwater Pump Motor Cooling Water Valve Failures

On December 12, 1990 during pump performance testing of the 1A Motor Driven Emergency Feedwater (MDEFW) pump on Unit 1, valve 1LPSW-516 failed to open on the pump start signal, as required. LPSW-516 is a normally closed air operated valve that receives an open signal upon closure of the pump motor breaker and allows Low Pressure Cooling Water (LPSW) flow to be initiated to the MDEFW pump motor for cooling. The valve is designed to fail to an open condition upon a loss of air. The valve operates via a solenoid valve and a pilot valve connected to an air accumulator. During a pump start, the normally energized solenoid valve is deenergized which isolates supply air to the pilot valve and vents the pilot valve to atmosphere. This repositions the pilot valve which allows air from the accumulator to open LPSW-516. MDEFW pump A was declared inoperable and a work request was initiated to troubleshoot and repair the valve. The inspector witnessed portions of the troubleshooting process. During the troubleshooting effort, the valve appeared to function correctly. The licensee removed the pilot valve, cleaned the internals and then reassembled the valve. The valve was stroke tested and appeared to operated properly. The pump performance test was then satisfactorily performed.

On December 14, 1990, during performance testing of MDEFW pump B, the similar LPSW valve for this pump (1LPSW-525) failed to open on the pump start signal. MDEFW pump B was declared inoperable and a work request was written to investigate this failure. As a result of this second failure, the licensee decided to test Units 2 and 3 LPSW valves associated with their MDEFW pumps. The Unit 2 valves functioned properly, however, the 3B MDEFW pump valve failed to open due to the solenoid valve sticking. As a result of these actions the licensee declared all MDEFW pumps on each unit inoperable. The licensee failed all three unit's valves to the open position and declared the pumps operable. This action was determined by Design Engineering to be acceptable pending final resolution of the valve failure problems. The inspectors attended a licensee's meeting on December 17, 1990, where corrective actions were identified and discussed. As a result of this meeting, the licensee decided to replace all the solenoid and pilot valves presently installed with new valves and to inspect all removed valves. The licensee also decided to increase the frequency of testing from quarterly to monthly and develop a preventive maintenance procedure to lubricate and inspect the pilot valves per the manufacturer's recommendations. The licensee has also decided to periodically replace the solenoid valves as part of this program. As of the end of this report period, the valves were still failed to the open position and the solenoid valves and pilot valves had been replaced. The review of the licensee's corrective actions with respect to this issue is identified as Inspector Followup Item 50-269,270,287/90-34-01: Corrective Actions Associated with LPSW Pilot and Solenoid Operated Valves for MDEFW Pumps.

No violations or deviations were identified.

4. Maintenance Activities (62703)

a. General

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 reviewed and witnessed in whole or in part:

WR 99365C	Unit 2 - Main purge fan temporary modification
WR 31264C	Unit 1 - RBS flow instrument calibration
WR 55427B	Unit 2 - Replace, calibrate and functionally test Feedwater A and B discharge pressure low pressure switches
WR 52459K	Unit 1 - Replace 1SV203
WR 93907C	Unit 1 - LPSW-516 did not open when starting 1A MDEFW pump. Investigate and repair

b. Modification of Equipment Hatch Hoist

During this inspection period, the inspectors reviewed the licensee's specific actions associated with the ability to close the containment equipment hatch during a reduced inventory condition with a concurrent loss of all onsite power. The licensee has implemented a modification to the hoist which operates the equipment hatch closure doors. The modification allows for manual operation of the hoist during a loss of electrical power condition. A procedure has been prepared and issued to accomplish these actions and the shift maintenance personnel have been trained on this activity. Following the modification, a test was conducted to verify the modification was acceptable. The time required to manually lower the equipment hatch door was 45 minutes. The modification was completed on Unit 2 during the recent refueling outage and is scheduled to be performed on Units 1 and 3 during the next refueling outages on each of these units prior to operation in a reduced inventory condition.

No violations or deviations were identified.

5. Operation of High Pressure Injection System in an Unanalyzed Condition (37700)(92700)

On November 19, 1990, the licensee identified that the requirements specified by TS 3.3.1 for High Pressure Injection (HPI) System operation below 60 percent of full power and greater than 350°F could potentially result in inadequate Emergency Core Cooling System (ECCS) flow for certain postulated small line breaks in the HPI System. During a review of the historical records on November 16, in response to a Self Initiated Technical Audit finding, a Design Engineer (DE) recognized that the April 1978 TS submittal did not appear to consider the consequences of a break in the HPI line between the last check valve and the Reactor Coolant System injection nozzle. The DE contacted Babcock and Wilcox (B&W) and requested them to assess the potential for reduced HPI System flow during the postulated break. On November 19, B&W confirmed that the current TS for operation below 60 percent full power and greater than 350°F was inadequate for the assumed condition. This event was reported to the NRC in accordance with 10CFR50.72 on November 20.

The licensee took immediate corrective actions by implementing the requirements for operation above 60 percent full power which includes maintaining the operability of all three HPI pumps, two flow paths and the applicable cross connection valves during any operation above 350 degrees. A TS interpretation was issued on November 26 detailing these requirements.

The licensee has reviewed this problem in detail and the results of this review is contained in LER 50-269/90-15: Unit Operation in an Unanalyzed Condition Due to Design Deficiency, Design Oversight, submitted to the NRC in correspondence dated December 20, 1990. This LER identifies that over the life of the plant, power operation below 60 percent full power and greater than 350°F with only two operable pumps has occurred. This event is an apparent violation and is identified as Violation 50-269, 270, 287/90-34-03: Failure to Perform All Required Analysis Identified in 10CFR50.46 Resulting in Operation in an Unanalyzed Condition.

6. Inspection of Open Items (92700)(92701)(92702)

The following open items were reviewed using either licensee reports, inspection, record review, or discussions with licensee personnel, as appropriate:

- a. (Closed) Violation 50-269, 270, 287/89-25-02: Inadequate Corrective Action to Preclude Recurrence of Events - Two Examples. The licensee responded to this violation in correspondence dated October 9, 1989; March 9, 1990; and April 10, 1990. The corrective actions consisted of changes to procedures associated with the Reactor Protection System (RPS) manipulations with a channel inoperable or with a dummy bistable installed. Changes were made to these procedures to incorporate the establishment of appropriate conditions before and after work is accomplished for a channel. Also included in this corrective action were requirements for operations personnel to review these related system alignments and independent verification of the configuration. Station Directive 3.2.1, Work Request, dated February 6, 1990, was changed to direct personnel to notify all test groups of the work scope performed. Performance Manual Section 4.9 was also changed to direct Performance personnel to verify the actual work accomplished to assure that all appropriate retesting will be performed. Based on the review of these actions by the inspectors, this item is closed.
- b. (Closed) LER 50-269/90-07: Actuation of Emergency Safeguards System Due to Defective Procedure, Lack of Procedural Precautions. This LER was submitted to the NRC in correspondence dated June 14, 1990. The root cause of this problem was attributed to an inadequate procedure. The corrective actions associated with this event has been completed and reviewed by the inspectors. Based on the reviews of this action, this item is closed.

- c. (Closed) LER 50-269/90-08: Improper Temporary Sampling Lineup Results in Technical Specification Violation Due to Inappropriate Action. This LER was submitted to the NRC in correspondence dated June 18, 1990. The root cause of this event was attributed to a lack of attention to detail by the personnel performing the activity. The corrective action for this problem was to provide training to various personnel on the importance of visually inspecting connections prior to releasing a temporary system for use. The corrective actions have been completed and reviewed by the inspectors. Based on this action, this item is closed.
- d. (Closed) LER 50-287/88-03: Potential Degraded Performance of Reactor Building Cooling Units (RBCUs) Due to Service Induced Fouling. This LER addressed a situation in which performance testing data indicated that service induced fouling of the Unit 3 RBCUs may have reduced their post LOCA heat removal capabilities below acceptable limits. This item was addressed in NRC Inspection Reports 50-269, 270, 287/89-11, 89-28 and 90-04. The licensee is still performing testing at least quarterly on each of the units. Unit 3 testing is presently being performed approximately every 28 days. All planned corrective actions listed in the LER have been completed. Discussions with the licensee determined that at the present time, the cooling coils in Unit 3 will be replaced due to degradation and testing will continue until actions to fully resolve the fouling mechanism are completed. Based on this action this item is closed. Followup of the actions associated with the licensee's long term corrections of this issue is identified as an Inspector Followup Item 50-269, 270, 287/90-34-02: Long Term Resolution of RBCU Fouling.

#### 7. Exit Interview (30703)

The inspection scope and findings were summarized on January 3, 1991, with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

<u>Item Number</u>	<u>Description/Reference Paragraph</u>
50-269, 270, 287/90-34-01	Inspector Followup Item - Corrective actions associated with LPSW pilot and solenoid operated valves for MDEFW pumps (paragraph 3.b)
50-269, 270, 287/90-34-02	Inspector Followup Item - Long term resolution of RBCU fouling (paragraph 6.d)
50-269, 270, 287/90-34-03	Violation - Failure to Perform All Required Analysis Identified in 10CFR50.46 Resulting in Operation in an Unanalyzed Condition (paragraph 5)