



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

Report Nos.: 50-269/93-05 50-270/93-05 and 50-287/93-05

Licensee: Duke Power Company  
 422 South Church Street  
 Charlotte, NC 28242-0001

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: January 31 - February 27, 1993

Inspector: W. Harmon, Jr.  
 For P. E. Harmon, Senior Resident Inspector

3/15/93  
 Date Signed

W. Harmon, Jr.  
 For B. B. Desai, Resident Inspector

3/15/93  
 Date Signed

W. Harmon, Jr.  
 For W. K. Poertner, Resident Inspector

3/15/93  
 Date Signed

Approved by: M. S. Lesser, Jr.  
 M. S. Lesser, Section Chief

3/17/93  
 Date Signed

SUMMARY

Scope: This routine, resident inspection was conducted in the areas of plant operations, surveillance testing, maintenance activities.

Results: One apparent violation was identified involving an inadequate procedure (Paragraph 2.c.). The use of this procedure resulted in the inadvertent loss of both battery chargers supplying the switchyard batteries. Also, an additional item was identified which is required to be addressed in the resolution of Unresolved Item 269/93-03-03, Past Operability of Valve 1HP-97 (Paragraph 2.e.).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*H. Barron, Station Manager
- S. Benesole, Safety Review
- D. Coyle, Systems Engineering
- \*J. Davis, Safety Assurance Manager
- D. Deatherage, Operations Support Manager
- B. Dolan, Manager, Mechanical/Nuclear Engineering (Design)
- W. Foster, Superintendent, Mechanical Maintenance
- \*J. Hampton, Vice President, Oconee Site
- D. Hubbard, Component Engineering
- C. Little, Superintendent, Instrument and Electrical (I&E)
- \*M. Patrick, Performance Engineer
- \*B. Peele, Engineering Manager
- \*S. Perry, Regulatory Compliance
- G. Rothenberger, Work Control Superintendent
- R. Sweigert, Operations Superintendent

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

#### NRC Resident Inspectors

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

#### NRC Personnel

- \*A. Herdt
- \*A. Gibson
- \*D. Matthews
- \*L. Wiens

\*Attended exit interview.

### 2. Plant Operations (71707)

#### a. General

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 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 Equipment Rooms
- 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
- Unit 1 Containment
- 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.

b. Plant Status

Unit 1 reached full power on February 4 following a scheduled refueling outage. On February 5, the unit was taken off line to repair problems associated with low oil flow to the No. 12 main turbine bearing. The cause of the low oil flow was determined to be gasket material in the supply line. The unit reached full power on February 8. On February 21, power was reduced to approximately 55 percent to correct the Standby Shutdown Facility (SSF) reactor coolant (RC) Makeup pump suction stabilizer pressure. The unit was returned to full power that same day. The unit operated at full power for the remainder of the reporting period.

Unit 2 operated at full power for the entire reporting period.

Unit 3 operated at full power until February 21, when power was reduced to approximately 54 percent to correct the SSF RC Makeup pump suction stabilizer pressure. The unit was returned to full power that same day. The unit operated at full power for the remainder of the reporting period.

c. Both 230 KV Switchyard 125 VDC System Battery Chargers Inoperable

On January 26, 1993, during the performance of PT/1/A/610/06, 100 KV Power Supply From Lee Steam Station, both battery chargers SY-1 and SY-S, serving the 230 KV switchyard 125 VDC system were de-energized for approximately forty minutes causing the voltage on switchyard batteries SY-1 and SY-2 to drop to approximately 121 VDC. The nominal voltage on the batteries is 135 VDC. The 125 VDC system provides both control and switching power to accomplish the switchyard isolation function to provide emergency electrical power to all three Oconee nuclear units.

At the time of the event, the normal battery charger supplying battery SY-2 was out of service and spare battery charger SY-S was tied to battery SY-2. Battery chargers SY-1 and SY-S are fed from Unit 1 4160 V switchgear ITE and battery charger SY-2 is fed from Unit 2 4160 V switchgear 2TE. With SY-2 battery charger out of service, spare charger SY-S was supplying the SY-2 battery. In this alignment, both battery chargers for the 230 KV switchyard 125 VDC system were being fed from a single source, ITE.

Performance of PT/1/A/610/06 involves making dead bus transfers from incoming feeder breakers that results in the 4160 V switchgear ITE being deenergized for greater than 3 seconds. The switchyard feeder from ITE is loadshed during a dead bus transfer.

During the dead bus transfers on January 26, the switchyard feeder was loadshed, as designed, causing power to both the switchyard chargers to be lost. PT/1/A/610/06 did not adequately address the abnormal alignment in the 230 KV switchyard 125 VDC system. Charger SY-2 was out of service at the time, and charger SY-S was being fed from ITE. This abnormal alignment was overlooked by the personnel conducting the performance test. The breakers feeding both the battery chargers were restored following the completion of PT/1/A/610/06. Once the battery chargers were returned to service, the battery voltage returned to the nominal voltage level of approximately 135 VDC.

The failure to have an adequate test procedure is identified as Violation 50-269,270,287/93-05-01: Inadequate Procedure Governing Testing of the 100 KV Power Supply from Lee Steam Station.

A statalarm indicating switchyard battery system trouble is available but is not designed to specifically indicate the status of the chargers. The inspectors were not able to verify whether this alarm was received during the performance of the test. In addition, the procedure step immediately following the dead bus transfer, expecting loss of equipment due to loadshed of certain loads following a dead bus transfer, directs recovery of any equipment that trips off during the transfer. However, the loss of both chargers was not recognized. Under the assumption that

one charger was still operable, no action specific to the battery chargers was taken.

Coincident with this PT, Instrument and Electrical (I&E) technicians were performing IP/A/3000/001D, 230 KV Switchyard Battery Daily Surveillance. The technicians performing this procedure noted that the battery chargers were deenergized and that battery voltage was approximately 121 VDC as opposed to the TS requirement of 125 VDC. The IP requires the technician to notify their supervisor if a TS requirement is not met and to complete a component malfunction sheet documenting the problem. In this case, the TS requirement of 125 VDC was not met. The technicians notified their supervisor and completed the component malfunction sheet. The IP requires the supervisor to determine the operability/justification of the battery upon notification of the TS requirement not being met. Upon receiving the notification, the I&E supervisor did not immediately followup or take any action and attributed the condition to the on going activities in the switchyard.

On February 3, during a review of completed procedure IP/O/A/3000/001D, an I&E engineer recognized that both the 230 KV switchyard chargers had been inoperable during the performance of PT/1/A/610/06. A problem investigation report was initiated to determine past operability of the Switchyard DC system. The licensee performed an operability evaluation and determined that the 230 KV switchyard 125 VDC was operable and that the switchyard isolation function could have been accomplished with the degraded switchyard 125 VDC system.

d. Reactor Building Entries Associated With Standby Shutdown Facility (SSF) Reactor Coolant (RC) Makeup System Suction Stabilizer Pressure Problems

On February 20, 1993, the licensee determined that the SSF RC Makeup Systems for all three units were inoperable and entered a seven day LCO due to certain assumptions made during the initial design of the system. It was determined that the initial design basis temperature of the spent fuel pool used to specify the precharge on the suction stabilizer was far below the worst case accident temperature. The SSF RC Makeup System, which draws suction from the spent fuel pool, provides reactor coolant pump (RCP) seal cooling and makeup water to offset contraction of the RCS inventory during unit cooldown to hot shutdown conditions following certain events such as station blackout.

Each SSF RC makeup system train relies upon a positive displacement pump to provide the injection flow. An elastic gas filled bladder enclosed in a metal cylinder is located at the suction of the RC makeup pump. This bladder functions by expanding and contracting in response to changes in suction pressure to stabilize the suction pressure at the SSF RC makeup

pump. It was determined that the existing precharge pressure in the bladder was inadequate to supply sufficient NPSH for the SSF RC makeup pump under certain spent fuel pool temperature and level conditions.

A minor modification was implemented that involved bleeding the bladder to a pressure commensurate with worst case spent fuel pool temperatures and levels. The modification required entry into the reactor building secondary shield wall on all three units.

Mockups of the cylinder assemblies were built and extensive dry run training was conducted. To keep personnel radiation doses low, the power on Units 1 and 3 was reduced to approximately fifty four percent prior to entry into the building. Unit 2 was approaching the end of its fuel cycle. The licensee determined that a power reduction on Unit 2 would require extensive boration and deboration. To minimize radioactive waste generation and the resultant dose from processing of the waste that would have been generated if power had been reduced, the bladder pressure change was performed at full power. The overall activity was well planned and implemented.

The inspectors discussed the technical aspects and the radiological consequences of the modification with licensee management. Although, a full ALARA evaluation with documented conclusions regarding the relative costs in dose for each case was not provided, the licensee's decisions regarding power reductions for Units 1 and 3 but not for Unit 2 appear to be justified and correct for both cases. The total dose calculated did not exceed the licensee minimum threshold which would have required an ALARA workup.

e. Letdown Storage Tank (LDST) Outlet Check Valve Failure.

In NRC Inspection Report No. 50-269,270,287/93-03, an unresolved item was opened to track the final resolution of an operability evaluation performed by the licensee's engineering department. The initial evaluation was written to determine the past operability status of check valve IHP-97, which had exhibited back-leakage during a system test. The inspectors questioned both the initial evaluation, and the revision. The licensee agreed to review the evaluation after the inspectors disagreed with the evaluations' description of the test sequence and results. The engineers then discovered that they had been using the letdown storage tank (LDST) level chart recorder data for the wrong unit to determine if backleakage was occurring.

The final evaluation, using the correct recorded data, came to the same conclusion as the previous evaluation: the check valve would have seated against reverse flow in an accident situation and was, therefore, operable. This determination was based on a mechanical

inspection of the valve internals and not on the actual performance of the valve during the performance of the test.

Since valve IHP-97 is the only safety related valve which will actuate to isolate the LDST from the high pressure injection (HPI) pumps suction in the piggyback mode of operation (low pressure injection (LPI) aligned to the containment sump and LPI pump discharge aligned to the suction of the HPI pumps), it is essential that the valve operate properly during this mode of operation to mitigate the consequences of a small break loss of coolant accident (LOCA). Failure to seat properly against backflow would allow containment sump water to enter the LDST. Since the LDST is not designed to withstand the pressure developed at the LPI pump discharge and the LDST relief valve is set at 100 psig, a potential leak path exists for recirculated RCS water after a small break LOCA. The inspectors believe that failure of valve IHP-97 constitutes a potential single failure which could render the emergency core cooling system incapable of providing long term recirculation by the HPI-LPI piggyback flow path. This issue was discussed with licensee management. The licensee agreed to provide an evaluation of the single failure question. Pending resolution, this is identified as an additional item to be addressed in the resolution of Unresolved Item 269/93-03-03, Past Operability of Valve IHP-97.

Within the areas reviewed, one violation was identified.

### 3. Surveillance Testing (61726)

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:

PT/0/A/610/06	100 KV Power Supply from Lee Steam Station Lee
PT/3/A/0150/22A	Operational Valve Stroke Test
IP/0/A/310/012C	ES Digital Channel 5 and 6 Online Test
IP/A/3000/001D,	230 KV Switchyard Battery Daily Surveillance.

Within the areas reviewed, licensee activities were satisfactory.

- No violations or deviations were identified.
4. Maintenance 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.

Several maintenance activities were reviewed and witnessed in whole or in part. These included:

WR 93012866  
TN/1/A/OE5601/00

Repair 2LWD-2  
Correct SSF RC Makeup Pump Suction  
Stabilizer Pressure.

Within the areas reviewed, licensee activities were satisfactory.

No violations or deviations were identified.

5. Exit Interview

The inspection scope and findings were summarized on March 5, 1993, 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>
VIO 50-269,270,287/93-05-01	Inadequate Procedure Governing Testing of the 100 KV Power Supply from Lee Steam Station (paragraph 2.c).