

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

Report Nos.: 50-269/92-08, 50-270/92-08, 50-287/92-08

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: February 2 - February 29, 1992

3-23-92 Inspectors: U.H. Date Signed Harmon, Senior Inspector 3-23-92 Resident Date Signed 3-23-92 Poertner, Resident Date Signed

Approved by:

G. A. Belisle, Section Chief Division of Reactor Projects

## SUMMARY

S/24/92 Date Signed

- Scope: This routine, resident inspection was conducted in the areas of operations, surveillance testing, maintenance activities, and followup on previous inspection findings.
- Results: A reactor trip from full power occurred on Unit 3 during the inspection period. The trip was caused by an instrument technician mistakenly performing a surveillance on Unit 3 components instead of the shutdown Unit 2. In another event, Operations Department personnel marked a procedural step as not applicable. Additionally, several other procedural steps that ensure Low Temperature Overpressurization Protection (LTOP) were not followed, Subsequently, an LTOP system train was inoperable in a condition where the system was required. The events represent continued problems in each area. A violation with two examples of failure to follow procedures was identified (paragraph 2.d and 3.b). An unresolved item relating to corrective actior to the Low Pressure Service Water isolation was also identified (paragraph 5).

## REPORT DETAILS

## 1. Persons Contacted

Licensee Employees

\*H. Barron, Station Manager

\*J. Davis, Quality Assurance Manager

D. Deatherage, Operations Support Manager

\*W. Foster, Superintendent, Mechanical Maintenance

\*'. Hampton, Vice President, Oconee Site

\*O. Kohler, Compliance Engineer

C. Little, Superintendent, Instrument and Electrical (1&E)

\*M. Patrick, Performance Engineer

\*S. Perry, Assistant Licensing Coordinator

G. Rothenberger, Supe. intendent, Integrated Scheduling

\*R. Sweigart, 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
\*A. Herót, Chief, Reactor Projects
Branch 3, DRP, RII

\*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 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 Unit 2 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.

Within the areas reviewed, licensee activities were satisfactory.

b. Plant Status

Unit 1 operated at full power for most of reporting period. On February 22, a trip of the 1A Feedwater pump occurred. A functional test of the pump's turbine trip system was being conducted at the time. The Feedwater turbine experienced an unanticipated trip, causing the Integrated Control System to initiate a unit runback to 65 percent. The runback stopped at a power level of 72 percent when the Feedwater pump turbine trip reset. The unit then began a power increase back to the previous power when operators stopped the increase at 78 percent to investigate the event. A work request was written to have I&E investigate the event. The unit returned to full power later that same day.

Unit 2 remained in a refueling outage during the reporting period.

Unit 3 was at full power for most of the period, but experienced difficulty reaching 100 percent power due to steam generator limitations. Adjustments in the delta-Tc controller were made to allow the unit to reach 100 percent. These adjustments resulted in slight quadrant power tilts during operation, and significant tilts during Xenon transients, such as after a reactor trip from power on February 27. This trip was caused by an instrumentation technician mistakenly working on a Unit 3 turbine trip relay instead of the shutdown Unit 2 trip relay. During the trip recovery, startup was delayed due to quadrant power tilts attributed to the non-uniform burnup associated with mismatched RCS cold leg (Tc) temperatures.

### Letdown Isolation

At 11:45 p.m., on February 3, an air line common to both Unit 1 and Unit 2 failed, and several air operated valves on Unit 1 were affected. In particular, the letdown isolation valve closed. Operators quickly determined the cause as a loss of control air, and entered the appropriate Abnormal Procedure, AP/1/A/1700/14, Loss of Normal Makeup, Loss of Letdown. When attempts to respen the letdown isolation valve were unsuccessful, operators began reducing Reactor Coolant System (RCS) average temperature, Tave. This step is specified in the procedure and was followed. With minimum makeup into the RCS in the form of RC pump seal injection and no letdown path available, pressurizer level began to increase. Lowering Tave reduces the pressurizer level, providing more time to continue corrective actions.

Maintenance personnel were able to isolate the leak and letdown was restored approximately 20 minutes after the event began. At the end of the event, Tave had been reduced to 574 degrees F, a 5 degree decrease. The decreased Tave caused a reduction in RC<sup>c</sup> cold leg temperature, Tc. The density change in Tc reduced the excore power range to approximately 95 percent, even though true power had not changed from the 100 percent value. As a result, all four power range channels were reading non-conservative relative to true power. The limit for thermal power exceeding the indicated power assumed in the Accident Analysis is 4 percent. Oconee's Technical Specifications (TSs) require the power range detectors to be operable, or be in hot shutdown within the next 12 hours. Even though all four power ranges were inoperable, no violation occurred since the time period did not exceed the TS requirements.

After letdown was reinitiated, normal Tave and full power were restored. Indicated power from the power range channels also returned to 100 percent.

The Oconee design does not provide an alternate path for letdown similar to other designs. Since minimum seal injection must be provided while the RC pumps are running, pressurizer levels will critinue to rise until either letdown is restored, or the RC pumps are stopped and seal injection isolated. This could eventually require that all RC pumps be tripped and a cooldown via natural circulation be commenced if the letdown path is not restored.

The licensee has agreed to review the Abnormal Procedure for possible enhancements.

#### d. LTOP Inoperable

At 7:30 p.m., on February 26 during startup activities following a refueling outage, reactor operators on Unit 2 discovered that the procedural requirements for LTOP were not being met. While making rounds in the cc trol room, the operators noted that the High Pressure Injection (HPI) train A and B injection valves 2HP-26 and 2HP-27 were not deenergized. Additionally, there were no white tags on the HPI crossover flow valves 2HP-409 and 2HP-410 as required by the LTOP procedure, OP/2/A/1104/49 for current plant conditions of RCS pressure at 60 psig and RCS temperature at 100 degrees F. Upon discovery, immediate actions were initia'ed to deenergize 2HP-26 and 2HP-27 and hang appropriate white tags. LTOP requirements were satisfied by 8:04 p.m.

LTOP consists of two trains as required by TS 3.1.2.9. One LTOP train is comprised of the Power Operated Relief Valve (PORV) being operable and the other LTOP train is predicater controls that assure ten minutes are available for operator action to mitigate a low temperature overpressurization event. One of the several controls that comprise the second LTOP train is deactivating both HPI trains. Deactivation of an HPI train is achieved by either shutting and deenergizing the injection and the crossover flow valves on the associated HPI train or deactivating the associated HPI pumps aligned to the train .nd tagging the pump breakers open. An HPI train is not considered deactivated if the valves as well as the pumps on that train are/or remain energized.

On February 25, to allow performing a performance test, HPI pumps A. B, and C breakers were racked out and breakers for 2HP-26, 27, 409, and 410 were closed and all white tags cleared. On the following day, the Low Pressure Injection(LP1)/HPI check valve functional test, PT/2/A/251/09, was performed with status-quo being maintained on the aforementioned HPI components. During this entire time, the LTOP requirement for having the HPI trains deactivated was met by having the HPI pumps deenergized. Following completion of the LPI/HPI check valve functional test for each train, the breakers for 2HP-26 and 27 were left closed and the step in PT/2/A/251/09 that requires deenergization and white tagging of the applicable HPI valves per the LTOP procedure, OP/2/A/1104/49, was signed off as N/A (not applicable) with a footnote that said, "LTOP Procedure In Progress Using HPI Pump Breakers For LTOP". At this point, although the LTOP requirements were met, the intent of the step to deenergize the HPI valves in preparation for HPI pump startup was negated by marking the step N/A. The status of LTOP was discussed with the on-coming day shift during turnover at approximately 6:30 a.m. At approximately 5:10 p.m., the 2C and 2A HPI pump breakers were racked in and the pumps were started at 5:35 p.m. The pumps were started to supply RCP seal injection flow in accordance with OP/2/A/1102/01, Unit Startup

Procedure from Cold Shutdown. With the HPI injection and crossover valves still energized, the LTOP requirements were not met from the time the pump breakers were racked in. Both OP/2/A/1102/01 as well as the HPI System procedure, OP/2/A/1104/02, that were used to start the HPI pumps had steps that required the operator to ensure that the LTOP requirements were met per OP/2/A/1104/49. However, the operators failed to recognize that the associated HPI valves were still energized prior to racking in and starting an HPI pump. The inspectors were informed that the same crew had recently received extensive training on LTOP.

In light of previous examples involving operators not following procedural steps or marking steps N/A, the inspectors expressed concern to plant management. Operators and other plant personnel have demonstrated an inclination to hypass a procedural step or mark the step N/A if the current conditions appear to be different from those for which the procedure was specifically written. The Oconee procedures do not always specify when a step is not applicable, or is conditional on circumstances. These judgements have been relegated to the procedure performers. Both operators and maintenence personnel have demonstrated a lack of consistency in their approach to performing steps out of sequence, marking a step N/A, and similar procedure adherence issues.

This failure to follow a required procedure is considered as an example of violation 50-269,270,287/92-08-01. It should be noted that though the HPI system remained activated during a portion of the time when LTOP was required, actual overpressurization of the reactor vessel did not occur.

Following discovery of this event, a one hour notification was made to the NRC Operations Center for deviation from plant TS. This notification was retracted the following day since the LTOP requirement was not met for only 2 hours and 55 minutes. The action statement associated with TS 3.1.2.9 allows up to 4 hours to restore the inoperable LTOP train.

e. Continued Problems With "X-Relay" on Keowee Hydro

On January 29, 1992, the licensee determined that an x-relay on the Keowee Unit 1 field circuitry had not automatically reset following a normal shutdown of the Keowee Unit. The failure of the x-relay to reset render: the associated Keowee Hydro unit inoperable. This issue was initially discussed in NRC Inspection Report Nos. 50-269,270,287/91-12. Since the failure of the x-relay that occurred in June 1991, the relay was replaced with relays that were subjected to qualification testing. This has not solve the problem since there were five additional x-relay failures since June 1991. Failure of the x-relay prevents the Keowee unit generator field breaker from automatically closing. This prevents a successful start of the Keowee unit. Following Keowee unit shutdown, a mechanical finger within the x-relays, if not reset, causes the x-relay contact to remain open upon energization of the relay coil, thus preventing the Keowee unit from starting.

The licensee has removed the failed x-relay and Westinghouse (manufacturer) is conducting an evaluation as to the cause of the failure. The licensee is also considering replacing the x-relays or installing an alternate design which would eliminate the need for the x-relays.

Pending further evaluation. the licensee is visually verifying that the x-relay is reset following each shutdown of the Keowee unit, and logging that the relay has reset in the Keowee operator's log. The inspectors have expressed concerns regarding problems with the emergency power supply source that persists and will continue to monitor licensee's resolution of this problem.

Within the areas reviewed, one example of a failure to follow procedure violation was identified.

- Surveillance Testing (61726)
  - a. Observations

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, 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/2/A/0610/01J EPSL Functional Test. PT/2/A/0261/07 Emergency CCW System Flow Test.

Within the areas reviewed, licensee activities were satisfactory.

## b. Unit 2 Turbine Trip System

On February 27 at 4:27 p.m., during performance testing of the turbine trip system for Unit 2 which was in a refueling shutdown condition, an instrument lechnician performed a test on the operating Unit 3 turbine trip system instead of the Unit 2 system. As a result, a turbine trip followed by a reactor trip occurred on Unit 3. At the time of the trip, Unit 3 was operating at 100 percent power. During the trip, all systems and controls functioned as designed. After determining the cause of the trip, Unit 3 was restarted, and returned on-line within twelve hours. Both inadequate procedures to directly identify the components involved, and the failure to follow all pertinent procedures were the cause of this event. The applicable procedure, 1P/0/B/280/12A, Turbine and Auxiliaries Turbine Generator Trip, requires the person performing the procedure to verify the correct component and unit. This is a general requirement in the introductory portion of the procedure, and does not provide positive controls or check points to the performer. Failure to follow the requirements of IP/0/B/280/12A is another example of Violation, 50-270,287/92-08-01.

Within the areas reviewed, one example of a failure to follow procedure violation was identified.

. Unit 2 Pressurizer Relief Valves Found Out of Tolerance

On February 21, the resident staff was notified by the licensee that both of the pressure safety relief valve lift setpoints on Unit 2 were found to be out of tolerance by approximately 7.9 percent as-found by Wyle Labs. Pressurizer safety relief valves serve to prevent the RCS design pressure from being exceeded during normal operation or anticipated operational occurrences. The nominal lift setpoint for these valves is 2500 psig. With the drift of 7.9 percent in the lift setpoint, Unit 2 safety valves would have lifted at approximately 2700 psig. Lift accumulation of an additional 3 percent to full lift could have resulted in RCS pressures above the system's design limit of 2750 psig under certain accident scenarios. Since both relief valves were out of tolerance by 7.9 percent, a notification pursuant to the requirements of 10 CFR 50.72(b)(2)(iii)(D) was made. This was based on a condition alone that could have prevented the fulfillment of the safety function of the system needed to mitigate the consequences of an accident.

The licensee theorized that the high setpoint on the Unit 2 valves may have been caused by the multiple adjustments made while determining the setpoint the previous time they were set. These valves were identified is leaking after the set pressure test and the jack and lap process that had been performed on them.

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Since the same setting standards were also used on the pre-surizer valves on Unit 3, the inspectors questioned the operability of the Unit 3 pressurizer safety valves. The licensee performed an operability evaluation and determined that the safety valves were Lapable of lifting such that the design safety limit of 2750 psig would not be exceeded. The licensee based the operability of the Unit 3 pressurizer safety relief valves on the fact that although the valves on Unit 3 were subjected to the same setting standards, they did not undergo the multiple adjustments or experience the post test Teakage that the valves on Unit 2 experienced. Unit 3 valves were never found to have as-found lift pressures greater than 6 percent of setpoint. The absence of leakage on Unit 3 valves as compared to Unit 2 valves has historically resulted in as-found lift pressure setpoints exhibiting less drift. Therefore, the valves on Unit 3 would be bounded by the assumption made in the safety analysis and would perform their intended function. The safety relief valve setpoints on Unit 1 were set using an enhanced procedure which precludes significant setpoint drift.

Drifting of the pressure relief setpoint of the pressurizer safety valves is a generic issue and enhanced methods are being developed to minimize this drift. The NRC, Region II, coordinator for this issue was made aware of the problem at Oconee. Additionally, the resident staff will follow-up on the as-found lift pressure on Unit 3 relief valves during the upcoming refueling outage scheduled in August of 1992.

Within the areas reviewed, one example of a failure to follow procedure violation was identified.

## 4. Maintenance Activities (2703)

Maintenance activities were observed and/or reviewed during the reporting period to verify that work was performed by qualified personial 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:

MP/0/A/1800/001	Tools and Materials Inventory	Checklist on Upen	
	Safety Related Systems		

MP/0/A/1800/12 Installation of Piping Orifice Plate (WR 99594C)

Within the areas reviewed, licensee activities were satisfactory.

No violations or deviations were identified.

#### Design Baseline Documentation Findings

On February 25, the licensee informed the NRC and the resident staff that the Design Baseline Documentation (DBD) effort had found a problem in the Low Pressure Service Water (LPSW) system for the Unit 1/2 and Unit 3 systems. Isolation v." as LPSW 139 and 3LPSW 45 are required to close in the LPSW systems to isolate non-safety, non-seismically qualified portions of the systems during a seismic event. The accident assumptions are that the non-seismic portions will fail d<sup>1</sup> ing a seismic event, and must be isolated to preserve the operability of the rest of the systems. The DBD identified that the isolation valves are electric motor-operated valves which are powered from a load-shed power supply. A seismic event coincident with station blackout requiring load shed would leave the valves open, and the LPSW systems vulnerable to failure through the faulted portion of the system.

The licensee has initiated corrective actions to change procedures to allow manual isolation of the valves, with long-term modifications of either the qualification of the systems or the valve power supplies. Problem Identification Report, PIR 4-092-0043, was initiated on February 17, 1992, to process the problem resolution. Engineering evaluations are being performed by the licensee to letermine the operability and qualification of the LPSW system. The issue will be tracked as Unresolved Item 269,270,287/92-08-02, Operability of the LPSW system.

No violations or deviations were identified.

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

The following open item was reviewed using licensee reports, inspection, record review, and discussions with licensee personnel, as appropriate:

(Closed) Violation 50-269,270,287/88-13-05: Failure to document the Basis for 10 CFR 50.59 Determinations. The licensee's responses dated September 2, 1988, and January 1, 1989, were reviewed and found to be acceptable. The inspector reviewed the licensee's corrective actions associated with the maintenance of design records for the 10 CFR 50.59 evaluations on the valve replacement program and found them to be acceptable.

# 7. Exit Interview (30703)

The inspection scope and findings were summarized on March 2, 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.

Item Number	Description/Reference Paragraph
50-269,270,287/92+08-01	Violation-Failure to Follow Procedures, (par maphs 2.d and 3.b)
50-269,270,287/92+08-02	Unresolved Item Operability of the LPSW systems (paragraph 5)