UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-269/82-01, 50-270/82-01 and 50-287/82-01

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

Facility Name: Oconee Nuclear Station

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

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

Inspection at Oconee site near Seneca, South Carolina

Inspectors: J. C. Bryant for — 1/26/82
W. Orders — Date Signed

J. C. Bryant for — 1/26/82
D. Falconer — Date Signed

Approved by: J. C. Bryant — 1/26/82
J. C. Bryant, Section Chief, Division of Resident and Reactor Project Inspection — Date Signed

SUMMARY

Inspection on December 10, 1981 - January 10, 1982

Areas Inspected

This routine, announced inspection involved 152 inspector-hours on site in the areas of operations, surveillance testing, maintenance, zero power physics testing and NUREG 0737 modifications.

Results

Of the 5 areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

   Licensee Employees

   *J. E. Smith, Plant Manager
   *J. N. Pope, Supervisor Operations
   *T. Owen, Supervisor Technical Services
   *J. Davis, Supervisor Mechanical Maintenance
   *T. Cribbe, Licensing 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 January 8, 1982 with those persons indicated in paragraph 1 above. The licensee acknowledged the results of the inspection with no significant comment.

3. Licensee Action on Previous Inspection Findings

   Not inspected.

4. Unresolved Items

   Unresolved items were not identified during this inspection.

5. Plant Operations

   The inspector reviewed plant operations throughout the report period, December 10, 1981 - January 10, 1982, to verify conformance with regulatory requirements, technical specifications and administrative controls. Control room logs, shift supervisors logs, shift turnover records and equipment removal and restoration records for the three units were routinely perused. Interviews were conducted with plant operations, maintenance, chemistry, health physics, and performance personnel on day and night shifts.

   Activities within the control rooms were monitored during all shifts and at shift changes. Actions and activities observed were conducted as prescribed in Section 3.08 of the Station Directives. The complement of licensed personnel on each shift met or exceeded the minimum required by technical specifications. 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 frequent basis. The areas toured included but are not limited to 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 1 Reactor Building

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

Oconee Unit 1 began the reporting period preparing for unit restart. The reactor was made critical on December 28, 1981, ending the 185 day outage. Zero power physics testing immediately ensued and was completed on December 31, 1981; the turbine was placed on line later that day. Four turbine trips, three of which initiated reactor trips occurred on January 1 and 2, 1982. Three of the turbine trips were the result of moisture separator high level and the other was attributed to an erroneous signal indicating loss of generator stator coolant signal. The apparent cause of the above trips is improper return to service of equipment in that certain non-safety-related equipment, necessary for turbine/generator operability, was found to be valved out.

The resident inspector is currently investigating the above events and will document the results in his next report. The turbine/generator was again placed on line at 11:40 a.m. on January 3, 1982, but was taken off on January 6, 1982 in order to perform a balance shot on the main generator and repair a main generator hydrogen seal leak. At the close of the report period, the reactor is being maintained at 300 psig and 125°F pending completion of the above work. On line date is tenatively scheduled for January 23, 1982.

Oconee Unit 2 began the report period operating at a reduced power level of 50% in order to extend unit life until Unit 1 restart. On December 21, 1981 unit load was reduced to 30% percent in order to further extend core life; at that time Unit 1 on line date was scheduled as December 29. Unit 2 was taken off line at 10:00 p.m. on December 29 beginning what is scheduled to be a 128 day ISI/refueling outage.

Oconee Unit 3 operated at virtually full power throughout the reporting period aside from an ICS runback to 65% power on December 14, 1981. The runback was attributed to the failure of an RCS flow transmitter; the problem was rectified and the unit was returned to full power by 10:00 p.m. on the same day. At the close of the report period, the unit remains at 100% power.

6. Surveillance Testing

The surveillance tests detailed below were analyzed and/or witnessed by the inspector to ascertain procedural and performance adequacy.

The completed test procedures examined were analyzed for embodiment of the necessary test prerequisites, preparations, instructions, acceptance criteria and sufficiency of technical content.

The selected tests witnessed were examined to ascertain that current written approved procedures were available and in use, that test equipment in use was calibrated, that test prerequisites were met, system restoration completed and test results were adequate.

The selected procedures perused attested conformance with applicable Technical Specifications. They appeared to have received the required administrative review and they were performed within the surveillance frequency prescribed.

Procedure	Title
PT/O/A/201/03	Core Flood Test
PT/O/A/305/01	Rx Manual Trip Test
PT/O/A/250/05	HPSW Pumps Test
PT/O/A/230/15	HPI Motor Coolant Flow
PT/1/A/251/01	LPSW Pump Test
PT/1/A/251/17	RC Bleed Transfer pump
PT/1/A/251/03	Boric Acid Transfer Pump
PT/O/A/161/4	Reactor Building Purge
IP/O/A/275/5z	Emergency OTSG Level Control
IP/O/A/0310/12A	HPI and RB Isolation
IP/O/A/301/03S	Source and Intermediate Range
IP/O/B/330/3C	Turbine Trip/Rx Trip

The inspector employed one or more of the following acceptance criteria for evaluating the above items:

10 CFR
ANSI N18.7
Oconee Technical Specifications
Oconee Station Directives
Duke Administrative Policy Manual

Within the areas inspected no items of noncompliance or deviations were identified.

7. Maintenance Observations

Maintenance activities were observed and/or reviewed throughout the inspection period to verify that activities were accomplished using approved procedures or the activity was within the skill of the trade and that the

work was done by qualified personnel. Where appropriate, limiting conditions for operation were examined to ensure that while equipment was removed from service, the technical specification requirements were satisfied. Also, work activities, procedures, and work requests were reviewed to ensure adequate fire, cleanliness and radiation protection precautions were observed, and that equipment was tested and properly returned to service. Acceptance criteria used for this review were as follows;

-Station Directives
-Administrative Policy Manual, section 3.3 and 4.7
-Technical Specifications

Sixty-two maintenance activities were observed and/or reviewed during the report period. Of particular interest was post-Furmanite valve stroke timing on 1-LP-1 and permissive logic repair on 1-LP-2.

Pending is the post maintenance review associated with the misaligned equipment responsible for the previously mentioned unit 1 trips of January 1 and 2, 1982. The results of the review will be documented in the resident inspector's next report.

8. Zero Power Physics Test

The Zero Power Physics Test (ZPPT) is performed to verify the nuclear parameters upon which the safety analysis and technical specifications are based. The inspector reviewed the completed Unit 1, Cycle 7 ZPPT. No violations or deviations were identified.

The RCS flow measurement, all rods out critical boron concentration measurement, temperature coefficient measurement, and ejected rod worth measurement portions of the ZPPT were reviewed to verify that the precautions and prerequisites were met, plant conditions during the measurements corresponded to those conditions assumed in the analytical predictions, and measured values met the acceptance criteria.

The worst case ejected rod, worth was measured to be 34% less than the analytically predicted value. This exceeded the $\pm$ 20% of predicted worth acceptance criterion for the worst case ejected rod. As a result, the licensee measured the worth of the rods symmetric to the worst case ejected rod to verify that no adverse tilting would occur due to its greater than predicted worth.

9. TMI Action Items

Categorized below are those TMI Action Items which were required to have been implemented by January 1, 1982, or in certain instances within a few months of Oconee Unit 1 startup of December 28, 1981. As reported below, those modifications which were installed on Oconee 1 were verified by the resident inspector prior to restart. Selected TMI Action Items with an implementation date of January 1, 1982, are not complete on the Oconee units. In conversations with NRC Licensing Project Manager/Oconee and Duke

Corporate Licensing, the resident inspector discerned that communication is ongoing between the two offices concerning the licensee's inability to meet the required implementation schedule for those items.

II.B.1. Reactor Coolant System Vents

Item II.B.1 requires that remotely operated reactor coolant system and reactor vessel head high point vents be installed. The Oconee design of the RCS high point vent system entails two solenoid operated valves mounted in series in each of the two steam generator piping high points and in the reactor vessel head high point. The resident inspector verified the installation of the above described modification on Oconee Unit 1 prior to start-up of that unit on December 28, 1981. Operation of the high point vent system is pending NRC approval.

This modification is incomplete on Oconee Unit 3, but is to be completed prior to the July 1, 1982 deadline. The modification will be installed on Oconee Unit 2 during the ongoing refueling/ISI outage.

II.B.2. Plant Shielding

Item II.B.2 requires the licensee to perform a radiation and shielding design review of the spaces around systems that may, as a result of an accident, contain highly radioactive materials.

The licensee's review resulted in the identification of nine areas of concern over potential personnel access difficulties. Further, two of the nine areas identified, the control room areas and the low pressure injection system valve rooms, were identified as requiring design modifications. (The results of the licensee's review were transmitted to NRC staff in a March 7, 1980 letter).

The Oconee control rooms are located adjacent to their respective unit's mechanical penetration room. The routing of low pressure recirculation piping within the penetration rooms could result in control room personnel exposures in excess of GDC 19. With the Technical Support Centers located inside their respective Control Room Complex, TSC personnel exposures could also exceed GDC 19. Permanently installed lead shielding has been located along control room walls adjacent to the penetration rooms in such a manner as to assure personnel exposures in the Control Room and TSC do not exceed GDC 19.

Located in the LPI pump valve areas are manual valves that would need be operated if chemical addition to the containment sump became necessary. To facilitate operating these valves in an accident situation, system modifications consisting of installation of reach rods on the valves in question were deemed necessary. The modification is complete for Unit 1, will be installed this ongoing outage on Unit 2 and during a future outage on Unit 3.

II.B.3. Postaccident Sampling

Item II.B.3 requires that a design and operational review of the reactor coolant and containment atmosphere sampling systems be performed to determine ability to sample under accident conditions. Should the review reveal that personnel could not promptly and safely obtain samples, additional design features and/or shielding are to be provided.

At Oconee, sampling points have been selected to allow collection of pressurized and unpressurized reactor coolant samples. Pressurized and unpressurized reactor coolant will be collected from the cold leg drain line on each unit. A sump sample will be collected from the low pressure injection system coolers. The pressurized and unpressurized reactor coolant and sump samples lines will be routed to a sampling hood designed to reduce radiation exposures during sample collection.

In addition to the reactor coolant and sump samples, a containment atmosphere sample line will also be routed to this sampling hood. The containment atmosphere sample will be obtained from the hydrogen analyzer sample lines.

The resident inspection staff verified the installation of the in-containment portions of this item on Oconee Unit 1 prior to start-up. The system is not complete, but is scheduled to be operational before the end of the first quarter of 1982. The licensee informed NRC staff in a December 29, 1981 letter of their inability to meet the January 1, 1982 deadline for Oconee 1. These modifications are to be installed on Oconee Unit 2 during the ongoing outage.

Oconee Unit 3 has received only partial modification. The licensee informed NRC staff in an August 3, 1981, letter of their inability to comply with the January 1, 1982 deadline and their intent to complete the modifications during a future outage.

II.E.1.1. Auxiliary Feedwater Evaluation

Item II.E.1.1 requires reevaluation of the auxiliary feedwater (AFW) systems for all PWR operating plant licensees and operating license applications. This action includes:

1. Perform a simplified AFW system reliability analysis that uses event-tree and fault-tree logic techniques to determine the potential for AFW system failure under various loss of main-feedwater-transient conditions. Particular emphasis is given to determining potential failures that could result from human errors, common causes, single-point vulnerabilities, and test and maintenance outages;

2. Perform a deterministic review of the AFW system using the acceptance criteria of Standard Review Plan Section 10.4.9 and associated Branch Technical Position ASB 10-1 as principal guidance; and

3. Reevaluate the AFW system flowrate design bases and criteria.

The resident inspector, in conversations with NRC Operating Reactors Branch, verified that the licensee has submitted the required information. NRC staff is currently evaluating licensee responses to staff recommendations.

II.F.1.(1) Noble Gas Effluent Monitor

Item II.F.1.(1) requires that noble gas effluent monitors be installed with an extended range designed to function during accident conditions as well as during normal operating conditions.

At Oconee, unit vent monitors for noble gases are to be provided for each unit with a range adequate to cover normal and accident conditions. Three monitors will be required to measure activities from 1 x 10-7 uCI/cc to 1 x 10^5 uCi/cc of noble gases.

Continuous indication of unit vent radiation level and the appropriate alarms will be provided in the Control Room.

The resident inspector verified the installation of the above monitors on Oconee Units 1 and 3. The monitors are installed and functioning. The subject monitor is to be installed on Unit 2 during the ongoing outage.

II.F.1.(2) Iodine/Particulate Sampling

Item II.F.1(2) requires continuous sampling of plant gaseous effluent for post-accident releases of radioactive iodines and particulates.

In a letter to NRC staff dated November 21, 1979 and referenced again in a letter dated January 2, 1980, the licensee stated that through their ongoing program of employing silver zeolite radioactive sampling cartridges for sampling air when the presence of noble gases is suspected, they meet the requirement of the item.

II.F.1.(3) Containment High Radiation Monitor

Item II.F.1.(3) requires that containment radiation-level monitors with a maximum range of 10^8 rad/hr be installed; a minimum of two such monitors that are physically separated be provided; and monitors be developed and qualified to function in an accident environment.

The licensee committed, in a letter dated January 2, 1980 to install two physically and electrically separated containment radiation monitors to monitor 10^8 Rad/hr. These monitors shall be qualified to IEEE-323, 1971 and powered from the vital instrument buses.

The monitor output shall be indicated continuously in the Control Room.

In a letter dated July 23, 1981, the licensee informed NRC staff that the in-containment cabling and connector to the instrument, a Model 877 Victoreen, have failed to pass the specified environmental qualification tests. In light of the test results, Duke Power decided to postpone the installation of this instrument and cabling until the device is acceptably qualified. When the qualification tests are complete and the instrument is qualified, Duke Power will provide the schedule for implementation.

Current plans are to install the recently qualified monitors on Unit 2 during the ongoing outage and on units 1 and 3 as outages permit.

II.F.1.(4) Containment Pressure Monitor

Item II.F.1.(4) requires that continuous indication of containment pressure be provided in the control room of each operating reactor. Measurement and indication capability shall include three times the design pressure of the containment for concrete, four times the design pressure for steel, and -5 psig for all containments.

The licensee committed in a letter to NRC staff dated January 2, 1980, to installing two identical safety class pressure transmitters to monitor the Reactor Building (RB) pressure and provide signals to Control Room indicators, (one per transmitter), and a shared chart recorder. Each channel will be powered by vital instrument busses. Each transmitter will be located outside the RB and will monitor the pressure with a bellows sensor coupled with a filled capillary tube. Each transmitter will have its own separate independent containment penetration and will be completely independent from the other channel. This instrumentation will meet Regulatory Guide 1.97, dated December 1975.

Each transmitter will monitor a range of-5 psig to 175 psig, a range of three times the RB design pressure.

The resident inspector verified the installation of the above equipment on Oconee Unit 1. The equipment is to be installed on Oconee Unit 2 during the ongoing outage and on Oconee Unit 3 during a future outage.

II.F.1.(5) Containment Water Level Monitor

Item II.F.1.(5) requires that continuous indication of containment water level be provided in the control room for all plants. A narrow range instrument shall be provided for PWRs and cover the range from the bottom to the top of the containment sump. A wide range instrument shall also be provided for PWRs and shall cover the range from the bottom of the containment to the elevation equivalent to a 600,000 gallon capacity.

At Oconee, the reactor Building (RB) water level will be monitored by a wide range and a narrow range system. The narrow range level

transmitter will be qualified to Regulatory Guide 1.89, dated November 1974. The transmitter shall be powered from the vital instrument busses and will provide Control Room indication and will be monitored by the plant computer. This transmitter shall have a range of 0-3' (one foot above the containment floor).

The wide range level monitors shall be qualified to meet Regulatory Guide 1.97, dated December 1975 and shall monitor the level from the containment floor to a level of 15' or 600,000 gallons. Each transmitter shall provide a Control Room indication with an input to a shared chart recorder. Each transmitter shall be powered from the vital instrument busses.

The resident inspection staff verified the installation of the above equipment on Oconee Unit 1. The modification will be installed on Oconee 2 during the ongoing outage and Oconee 3 during a future outage.

II.F.1.(6) Containment Hydrogen Monitor

Item II.F.1.(6) requires that continuous indication of hydrogen concentration in the containment atmosphere be provided in the control room. Measurement capability shall be provided over the range of 0 to 10% hydrogen concentration under both positive and negative ambient pressure.

In a letter to NRC staff dated January 2, 1980, the licensee committed to install two separate identical analyzer systems per unit. These analyzers operate independent of the recombiner system and are supplied by vital sources of power. Each analyzer will be able to monitor either of two identical containment sampling headers or the calibration gases. Each analyzer shall have, along with control panel indicator and alarm, a separate Control Room indicator and alarm with a shared chart recorder.

Each containment sample header will have five inlet samples available for monitoring:

1. Top of containment

2. Operating level

3. Basement

4. Radiation Monitor/Recombiner Inlet header

5. Radiation Monitor/Recombiner Discharge header.

Sample selection and switching is accomplished manually by the operator from the remote analyzer control panel. Each analyzer shall have its own sample and return containment penetrations. The installation of this modification on Oconee Unit 1 is 95% complete at the close of this

reporting period. The licensee indicates the system is to be operable by January 16, 1982 barring any unforeseen circumstances. The hydrogen analyzer are to be installed on Oconee Unit 2 during the ongoing outage and on Oconee Unit 3 during a future outage.

II.F.2 Instrumentation For Detection of Inadequate Core Cooling

Item II.F.2 requires that licensees provide a description of any additional instrumentation or controls (primary or backup) proposed for the plant to supplement existing instrumentation (including primary coolant saturation monitors) in order to provide an unambiguous, easy-to-interpret indication of inadequate core cooling (ICC). A description of the functional design requirements for the system shall also be included. A description of the procedures to be used with the proposed equipment, the analysis used in developing these procedures, and a schedule for installing the equipment shall be provided.

In a letter to NRC/ONRR dated December 29, 1981, the licensee informed the staff that additional instrumentation to detect inadequate core cooling beyond that which is presently in the plant is in the design phase. Proposals for systems have been received from several vendors and are being evaluated. Schedule for completion of design, procurement of equipment, and installation has not been established.