UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 28, 2002

Duke Energy Corporation
ATTN: Mr. W. R. McCollum
Site Vice President
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 50-269/01-04, 50-270/01-04, AND 50-287/01-04

Dear Mr. McCollum:

On December 30, 2001, the NRC completed an inspection at your Oconee Nuclear Station. The enclosed report documents the inspection findings which were discussed on January 7, 2002, with Mr. Ron Jones and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observations of activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified four issues of very low safety significance (Green). Three of these issues were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest any non-cited violations in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Oconee facility.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC issued an advisory recommending that nuclear power plant licensees go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. This advisory was followed by additional advisories, and although the specific actions are not releasable to the public, they generally include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and more limited access of personnel and vehicles to the sites. The NRC has conducted various audits of your response to these advisories and Oconee's ability to respond to terrorist attacks with the

capabilities of the current design basis threat. From these audits, the NRC has concluded that Oconee's security programs are adequate at this time.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert Haag, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure: NRC Integrated Inspection Report 50-269/01-04, 50-270/01-04, and 50-287/01-04

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-269, 50-270, 50-287
License No:	DPR-38, DPR-47, DPR-55
Report No:	50-269/01-04, 50-270/01-04, 50-287/01-04
Licensee:	Duke Energy Corporation
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	September 30, 2001 - December 29, 2001
Inspectors:	M. Shannon, Senior Resident Inspector D. Billings, Resident Inspector E. Christnot, Resident Inspector S. Freeman, Resident Inspector W. Bearden, Reactor Inspector (Section 1R08) A. Nielsen, Health Physicist (Sections 2OS1, 4OA1.2 and 4OA7) R. Chou, Reactor Inspector (Section 4OA5)
Approved by:	R. Haag, Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000269-01-04, IR 05000270-01-04, IR 05000287-01-04, on 09/30–12/29/2001, Duke Energy Corporation, Oconee Nuclear Station: Flood Protection Measures, Refueling and Outage Activities, and Surveillance Testing.

The inspection was conducted by resident inspectors, a regional radiation specialist and two regional reactor inspectors. The inspection identified four Green findings, three of which were non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using the Significance Determination Process (SDP) found in Inspection Manual Chapter 0609. Findings to which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website.

A. Inspector Identified Findings

Cornerstone: Initiating Events

- Green. A non-cited violation was identified for failure to implement the immediate actions specified in abnormal procedure AP/3/A1700/030, Auxiliary Building Flood, once the entry conditions had been met. Operators did not respond to a high level alarm for the high activity waste tank and the tank subsequently overflowed into the high pressure injection pump room.

  This finding was considered to be of very low safety significance since the failure to follow procedure did not result in significant flooding of the auxiliary building and all mitigation systems remained operable. (Section 1R06.2)

Cornerstone: Mitigating Systems

- Green. A non-cited violation was identified for an inadequate procedure used for stroke testing emergency feedwater control valves. The procedure preconditioned the valves by opening them from their normally closed position before the actual stroke time testing was performed.

  This issue was considered to be of very low safety significance because there has been no indication that any of the emergency feedwater control valves were failing to stroke properly or that repairs were necessary. (Section 1R22.2)

Cornerstone: Barrier Integrity

- Green. A non-cited violation was identified for the failure to implement corrective action for an inadequate technical specification (TS) required containment isolation valve position verification surveillance procedure. On two previous occasions the valve position verification had not been performed and the resulting corrective actions failed to prevent another violation of this TS surveillance verification during the Fall 2001, Unit 3 refueling outage.

This finding was considered to be of very low safety significance since the containment isolation valve was subsequently found to be in its required closed position. (Section 1R22.3)

Cornerstone: Occupational Radiation Safety

- Green. A finding was identified for a situation where test technicians did not notify radiation protection (RP) personnel following an inadvertent spill in the low pressure injection pump room. In addition, the test technicians inappropriately began cleaning up the spill prior to receiving authorization from RP.

  This issue was considered to be of very low safety significance because subsequent surveys by RP found only low levels of contamination. (Section 1R20.2)

B. Licensee Identified Violations

One violation of very low significance has been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. This violation is discussed in Section 4OA7 of this report.

Report Details

Summary of Plant Status:

Unit 1 began the inspection report period at 100 percent power and remained there through the end of the inspection period (except for brief periods of power reduction for control rod and main turbine valve testing).

Unit 2 began the inspection report period at 15 percent power in a forced outage status for the replacement of the main turbine generator disconnect switch. The unit was returned to 100 percent power on October 2, 2001, and remained there through the end of the inspection period (except for brief periods of power reduction for control rod and main turbine valve testing).

Unit 3 began the inspection report period at 100 percent power. On November 10, 2001, the unit was shutdown for its End-of-Cycle (EOC) 19 refueling outage. Following completion of refueling activities, the unit was taken critical on December 11, 2001, and was returned to 100 percent power on December 15, 2001. The unit remained there through the end of the inspection period (except for brief periods of power reduction for control rod and main turbine valve testing).

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed the licensee's preparations to protect the Unit 1, 2, and 3 borated water storage tanks (BWSTs) and associated piping from freezing during cold weather. The review included: the design drawings of the heat trace system, the procedures used to check operation of the heat trace circuits, and a sample of work orders used for checking the proper operation of the heat trace circuits and calibrating the associated alarms. The inspectors also walked down associated heat trace circuit piping to ensure proper insulation installation, visually inspected the heat trace alarm panels for abnormal alarms, and verified the electrical alignment of the heat trace breaker panels and power supplies to ensure availability of power. The intent of the review was to confirm that the licensee had completed preparations that would ensure that systems and components remained functional when challenged by adverse cold weather conditions. Specific documents reviewed included:

- IP/0/B/1606/009, Preventive Maintenance and Operational Check of Freeze Protection, Revision 12
- Work Order (WO) 98398428-01, Unit 1 Freeze Protection Preventive Maintenance (PM)
- WO 98398428-02, Unit 2 Freeze Protection PM
- WO 98398428-03, Unit 3 Freeze Protection PM
- WO 98398428-04, Unit 0 Freeze Protection PM

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial System Walkdown

a. Inspection Scope

The inspectors conducted partial equipment alignment walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, while the other train or system was inoperable or out of service. The walkdowns included, as appropriate, reviews of plant procedures and other documents to determine correct system lineups, and verification of critical components to identify any discrepancies which could affect operability of the redundant train or backup system. The intent of the review was to reasonably verify the operability of the redundant train/system when the other train/system was out-of-service. The following systems were included in this review:

- The emergency electrical power system alignment from the Lee combustion turbines to the standby busses during the Keowee Hydro Station (KHS) emergency start testing
- The plant control battery system alignment during load testing of battery 2CA
- The Unit 2 low pressure injection (LPI) and reactor building spray (RBS) systems during work on valves 2LP-12 and 2LP-19

b. Findings

No findings of significance were identified

.2 Complete Walkdown of the Unit 2 Emergency Feedwater (EFW) System

a. Inspection Scope

The inspectors performed a system walkdown on accessible portions of the Unit 2 EFW system. The inspectors focused on verifying proper valve positioning, power availability, adequate lubrication in oil reservoirs, no obstacles to equipment cooling, adequate area ventilation, no damage to structural supports, support systems were lined up and functional, and acceptable material condition. The inspectors also held discussions with the system engineer on temporary modifications, proposed modifications, and operator workarounds, to ensure that the impact on the equipment functionality had been properly evaluated. Documents and drawings reviewed included:

- Operating Procedure OP/2/A/1106/06, Emergency Feedwater, Revision 85
- Operating Procedure OP/2/A/1104/12 Enclosure 4.3, Condenser Circulating Water System (CCW), Rev 67

- Abnormal Procedure AP/2/A/1700/19, Loss of Main Feedwater, Revision 11
- Technical Specification (TS) 3.3.14, 3.7.5, and 3.7.6
- Updated Final Safety Analysis Report (UFSAR) Sections 10.4.7.1 and 10.4.7.2
- Selected Licensee Commitments (SLC) 16.10.1, 16.10.3, 16.10.6, and 16.10.7
- Drawings OFD 121A-2.8, OFD 121D-1.2, and OFD 121D-2.1.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors conducted tours of selected areas to verify that combustibles and ignition sources were properly controlled and that fire detection and suppression capabilities were intact. The inspectors selected the areas based on a review of the licensee's safe shutdown analysis and probabilistic risk assessment based sensitivity studies for fire-related core damage accident sequences. Inspection of the following areas were conducted during this inspection period:

- Unit 1, 2, and 3 motor driven and turbine driven emergency feedwater pumps
- Unit 1, 2, and 3 vital equipment rooms
- Unit 1 and 2 east and west penetration rooms
- Unit 3 "A" and "B" LPI/RBS pump rooms

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

.1 General Inspection Activities

a. Inspection Scope

The inspectors reviewed internal and external flood protection barriers. For all three units, the inspectors walked down the control rooms, cable spreading rooms, and equipment rooms that contain risk important equipment in order to identify potential flood sources and ensure they had been adequately evaluated. The inspectors also reviewed licensee instructions for shutdown in the event of flooding and evaluated the availability of selected structures, systems, and components (SSC) in the control rooms, cable

spreading rooms, and equipment rooms, for safe shutdown under design worst case assumed water levels and spray from potential pipe cracks.

b. Findings

No findings of significance were identified.

.2 Untimely Response to Indications of Auxiliary Building Flooding

a. Inspection Scope

The inspectors reviewed the licensee's actions in response to the high activity waste tank (HAWT) high level alarm and subsequent overflowing of the HAWT into the high pressure injection (HPI) pump room. The inspectors reviewed operator logs, computer status alarm response procedures, and the abnormal procedure for auxiliary building flood.

b. Findings

A Green finding was identified and dispositioned as a non-cited violation (NCV) for failure to implement the immediate actions specified in abnormal procedure AP/3/A1700/030, Auxiliary Building Flood, Revision 0, once the entry conditions had been met.

On November 10, 2001, at 6:05 P.M., a radiation monitor alarm actuated for the Unit 3 HPI and LPI/RBS rooms. At 6:53 P.M., a computer alarm for high level in the HAWT actuated. The operators did not respond to the alarm. Subsequently at 8:58 P.M., while on a plant tour, the operations shift manager identified that the HAWT level was off scale and the HAWT was overflowing into the HPI pump room. At this time operations personnel identified that the 3A LPI cooler relief valve was stuck open and discharging into the HAWT at a rate of about 8 gpm.

When reviewing this event, the inspectors identified that the operators had not implemented the abnormal procedure for auxiliary building flooding as required when the HAWT reached the Hi level alarm point. Abnormal Procedure, AP/3/A1700/030, lists (as a symptom) the HAWT high level alarm as a procedure entry condition. The required immediate manual action for the alarm is to dispatch an operator to determine the validity of the alarm, attempt to identify the source, and to establish communications with the control room for flood status monitoring. These actions were not initiated until the operations shift manager noted the overflowing HAWT approximately two hours later.

This issue was considered to be of very low significance (Green) because the failure to immediately implement the Auxiliary Building Flooding procedure did not result in significant flooding of the HPI/LPI rooms; therefore, no equipment was adversely affected. However, the inspector concluded that this issue could have a credible impact on safety, in that, by not taking prompt actions in response to a flooding condition in the auxiliary building once alarms are received, the licensee may not be able to identify and mitigate an auxiliary building flooding condition within the 45 minutes assumed in the licensee's 2000 Auxiliary Building Flooding Design Study, ONDS-0340. If the flooding

condition was not identified and corrective actions implemented in a timely manner, accident mitigation equipment for all three units could be impacted.

Technical Specification 5.4.1 requires in part that written procedures shall be established, implemented, and maintained covering activities as outlined in Regulatory Guide 1.33. Regulatory Guide 1.33, Appendix A, Section 5 requires procedures for abnormal conditions and requires the procedure to contain immediate operator actions. The failure to implement the immediate operator actions once the procedure entry conditions were met was considered to be a failure to implement the abnormal procedure for auxiliary building flooding. This failure to follow a procedure is being treated as an NCV, consistent with Section VI.A.1 of the enforcement policy and is identified as NCV 50-287/01-04-01: Failure to Follow Abnormal Procedure for Auxiliary Building Flooding. This violation is in the licensee's corrective action program as Problem Investigation Process report (PIP) O-01-04195.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the Unit 3 procedure TT/3/A/0150/061, LPI Cooler Test, Revision 0, to ensure that the 3A and 3B coolers would be able to supply the necessary cooling as described in the UFSAR. The inspection focused on deficiencies that could mask degraded performance of the heat exchangers and/or result in common cause heat exchanger performance problems. Also, assessed was whether the license has adequately identified and resolved heat sink performance problems that could affect multiple heat exchangers in mitigating systems. Results of internal cleaning and inspection of the 3B LPI heat exchanger was also discussed with the system engineer.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI)

Once Through Steam Generator (OTSG) Inspection

a. Inspection Scope

The inspectors reviewed selected inspection records for the eddy current examination of the Unit 3 OTSGs. The records were compared to the TS, License Amendments, and applicable Industry Established Performance Criteria to verify compliance. Qualification and certification records for examiners, equipment, and procedures for the above eddy current examination activities were reviewed. Approximately 10 examples of Bobbin and Rotating Coil inspection eddy-current test data were reviewed to evaluate the adequacy of completed data analysis. Additionally, the inspectors reviewed the results of in-situ tube testing for 13 OTSG tubes being plugged during the ongoing refueling outage.

In addition, a sample of ISI issues related to the data analysis process that were in the licensee's corrective action program were reviewed. The review included the associated corrective action documentation.

The following documents were reviewed during this inspection:

- Framatome Field Procedure for In-Situ Tube Pressure Test Using the Triplex Pump
- Vendor Exam Evaluation Report: Oconee 3EOC-19 OSTG In-Situ Tube Tests Results
- Duke Power Assessment SGMEP-105, OTSG Specific Assessment of Potential Degradation Mechanisms
- Condition Monitoring and Operational Assessment for Oconee Unit 3 EOC-18

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator simulator training on December 11, 2001, for a failure of the turbine pressure transmitter and subsequent reactor trip, a reactor coolant pump seal failure, and operation of the auxiliary shutdown panel due to an evacuation of the control room from a solvent spill. The inspectors observed crew performance in terms of communications; ability to take timely and proper actions; prioritizing, interpreting, and verifying alarms; correct use and implementation of procedures, including the alarm response procedures; timely control board operation and manipulation, including high-risk operator actions; and oversight and direction provided by the shift supervisor, including the ability to identify and implement appropriate TS actions.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed structure, system and component (SSC) problems listed below, to assess the effectiveness of maintenance efforts that apply to scoped SSCs. The reviews focused, as appropriate, on: (1) maintenance rule scoping in accordance with 10 CFR 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) or (a)(2) classifications; and (5) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1).

- PIP-O-01-03415, Unit 1 main generator disconnect switches following overheating of the switches
- PIP-O-01-03416, Unit 2 main generator disconnect switches following failure of the switches
- PIP-O-01-00938, Turbine building sump pumps following failure of the bearings
- PIP-O-01-04025, Unavailability of Keowee overhead path associated with maintenance of main pneumatic control breakers PCB-18 and PCB-27
- PIP-O-01-04118, Unavailability of the station auxiliary service water pump switchgear used for backup to HPI motors for all units during maintenance activities
- PIP-O-01-04664, low pressure service water (LPSW) valve LPSW-68 (line B crossconnect to Unit 3) could not be opened due to previous furmaniting

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors evaluated, as appropriate for the selected SSCs listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved.

- Work Request (WR) 98202641, assessment of work on the Unit 2 train A RBS flow instrument due to a reading of 170 gpm with pump off
- Assessment of emergency power to all units, with power to the standby busses from the Lee Steam Station combustion turbines, while KHS was out of service for emergency start tests of both KHS units
- WOs 98400039 and 98408690, assessment of effects of the aborted testing of the 2CA and Keowee batteries caused by a failure of the load bank
- WR 98205508, assessment of maintenance activities related to the problems with the seal water supply to the 3B feedwater pump outboard seal
- WO 98396112, assessment of the Unit 2 LPI and RBS systems during maintenance of valve 2LP-19

- PIP O-01-03987, assessment of the change in system configuration due to closing of 1CCW-30 during the LPSW flush
- PIP O-01-04291, assessment of circulation water valve 1CCW-84 failure to open fully and the affects on reverse gravity flow
- PIP O-01-04349, assessment of main steam valve 3MS-156, Atmospheric Vent Block, not opening fully

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

The inspectors reviewed, as described below, personnel performance during non-routine operations. As appropriate, the inspectors: (1) reviewed operator logs, plant computer data, or strip charts to determine plant conditions and the adequacy of operator responses; (2) determined if operator actions were in accordance with procedures consistent with training expectations; and (3) confirmed that personnel performance deficiencies were captured in the licensee's corrective action program. The non-routine evolutions reviewed during this inspection period included the following:

- Unit 2 power escalation on October 1, 2001, following forced outage
- Unit 3 shutdown for EOC 19 refueling outage
- Unit 3 power escalation following EOC 19 refueling outage startup and testing

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed operability evaluations affecting risk significant systems to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered; (4) if compensatory measures were involved, whether the compensatory measures were in place, would work as intended, and were appropriately controlled; and (5) where continued operability was considered unjustified, the impact on TS limiting conditions for operation. The inspectors reviewed the operability evaluations described in the following PIPs:

- PIP O-01-03607, additional loading of supports for the section of LPSW piping that supplies LPSW flow to the reactor coolant pump lube oil and air coolers due to possible water hammer during loss of offsite power events

- PIP O-01-03753, loss of instrument air to LPSW control valve for control room chillers could cause a loss of the control room chillers during times when Keowee lake temperature is low

- PIP O-01-03757, procedures do not account for operability of LPI/RBS systems during manipulation of valves LP-21 and LP-23 during testing

- PIP O-01-03770, operability evaluation of KHS Unit 1 following identification that the generator collector ring brush tension was backed off

- PIP O-01-04140, operability evaluation for lack of procedure to provide shutdown mitigation strategy for a potential fire in the west penetration rooms

- PIP O-01-04052, operability evaluation following identification that the switchyard battery SY-2 charger breaker was found in the trip free position

- PIP O-01-04462, evaluation of a fuel assembly with a slipped intermediate spacer grid

- PIP O-01-04499, evaluation of structural supports for valve 3FDW-108, which were found with the wrong size U-bolts

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed post-maintenance test (PMT) procedures and/or test activities for risk significant systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors observed testing and/or reviewed the results of the following tests:

- Performance Test (PT)/1/A/0251/ 01C, LPSW Pump Test, Pump C, Revision 70, following maintenance on LPSW motor

- PT/3/A/0110/04, Enclosure 13.1, Carbon Filter Test, Revision 4, following charcoal replacement of Unit 3 penetration room ventilation system, Train B
- PT/2/A/0203/06AA, LPI Pump Test-Recirculation, Pump 2A, Revision 68, for WO 98396112, following maintenance on valves LP-12 and LP-19
- PT/2/A/0203/06AC, LPI Pump Test-Recirculation, Pump 2C, Revision 68, WO 98272626, following modification to pump power supply breaker
- Temporary Test (TT)/3/A/0251/93, PMT for modification NSM-33082, following modification of the automatic start circuitry for the Unit 3 LPSW pumps
- TT/3/A/0261/11, PMT following repair of the essential siphon vacuum float valve

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 General Inspection Activities

a. Inspection Scope

The inspectors conducted reviews and observations for selected licensee outage activities to ensure that: (1) the licensee considered risk in developing the outage plan; (2) the licensee adhered to the outage plan to control plant configuration based on risk; (3) that mitigation strategies were in place for losses of key safety functions; and (4) the licensee adhered to operating license and TS requirements. Between November 10, 2001, and December 14, 2001, the inspectors reviewed the following activities related to the Unit 3 refueling outage to verify conformance to applicable procedures and witnessed selected portions of each evolution:

- reactor shutdown
- reactor cooldown and shutdown cooling operation
- mode changes from Mode 3, Hot Standby, to Mode 6, Refueling
- inspection of the reactor vessel head for control rod drive nozzle leaks
- reduced inventory and mid-loop conditions for: (1) installation and removal of steam generator nozzle dams and (2) repair of HPI nozzle thermal sleeves
- defueling and refueling operations
- system lineups, including electrical, during major outage activities

- repair and inspection activities involving the reactor vessel head control rod drive nozzles
- mode changes from Mode 6, Refueling, to Mode 3, Hot Standby
- reactor startup
- zero power physics testing
- control rod worth testing

b. Findings

No findings of significance were identified.

.2 Failure to Notify Radiation Protection (RP) Personnel following a Spill in the LPI Room

a. Inspection Scope

The inspectors performed routine plant walkdowns to review ongoing outage activities. A part of this review was to ensure that changing radiological conditions were being monitored and appropriately controlled by the licensee.

b. Findings

A Green finding was identified for technicians failing to notify RP personnel of an inadvertent spill in the Unit 3 LPI room while draining a potentially contaminated system (liquid waste). In addition, the technicians began to clean up the spill prior to determining contamination levels of the spill and prior to RP authorizing decontamination efforts.

On November 8, 2001, while draining liquid waste system piping, water was spilled on the floor and contaminated approximately 40 square feet. While touring the area, the inspectors noted this condition and that technicians had begun to wipe up the spill area. Approximately 30 minutes later when leaving the radiological controlled area, the inspectors identified that RP personnel had not been informed of the spill. The inspectors noted that the spill could have changed the radiological conditions in the room based on the activity levels in the water.

Following questioning by the inspector, the licensee determined that the technicians had not followed the guidance/responsibilities provided in Nuclear System Directive (NSD) 507, Decontamination, which stated that personnel should immediately notify RP when a clean area becomes contaminated and that personnel should not perform decontamination functions unless authorized by RP. Because in this case the NSD 507 responsibilities were considered to be guidance, the inspectors concluded that this issue was not a violation of NRC requirements.

This issue was considered to have credible impact on safety in that there was potential for the technicians to receive unplanned and unintended dose. The liquid waste system has the potential to contain a wide range of contamination levels and the failure to follow the guidance in the NSD could have resulted in unintended dose (including internal) while

standing in the area and during the clean-up effort. This issue was considered to be of very low safety significance (Green) because subsequent surveys by RP found only low levels of contamination. This issue is in the licensee's corrective action program as PIP O-01-04165.

1R22 Surveillance Testing

.1 General Inspection Activities

a. Inspection Scope

The inspectors observed the following surveillance tests and/or reviewed applicable test data, to verify that the subject risk-significant SSCs were capable of performing their intended safety function. The inspectors conducted reviews of TS, UFSAR, and licensee procedure requirements, as well as evaluated the tests for potential preconditioning effects on plant risk, clear and adequate acceptance criteria, operator procedural adherence, test data completeness, and whether test control was properly coordinated with the control room.

- PT/O/A/0620/16, Keowee Emergency Start Test, Revision 26
- PT/1/A/0251/01B, Low Pressure Service Pump Test - Pump B, Revision 70
- PT/O/A/3000/23, 125 VDC I and C Battery Performance Test, Revision 26
- PT/1/A/0203/06A, LPI Pump Test-Recirculation, Pump 1A, Revision 68
- PT/1/A/0400/07A, SSF RC Makeup Pump Test, Revision 32
- PT/3/A/0610/01J, Emergency Power Switching Logic (EPSL) Functional Test, Unit 3 EPSL load shed and Keowee emergency start, Revision 32

b. Findings

No findings of significance were identified.

.2 Inadequate Surveillance Procedure for Stroke Testing of Emergency Feedwater (EFW) Valves

a. Inspection Scope

The inspectors reviewed the surveillance procedures for stroke testing of the EFW control valves (1, 2, and 3 FDW-315 and FDW-316).

b. Findings

A Green finding was identified and dispositioned as a NCV for an inadequate procedure used for testing EFW control valves. The procedure was inadequate because the valves were preconditioned prior to performing the actual stroke time testing.

During a review of PT/3/A/0150/022M, 3FDW-315 and 3FDW-316 Stroke Test, Rev. 17, the inspectors identified that the EFW control valves were stroked prior to performing the actual stroke time testing. Procedure steps 12.1.9-12.1.12, directs the operators to initially open the EFW valves from their normally closed position. The valves are then time tested as they are stroked closed and open. The inspectors noted that performing the surveillance in this manner is considered to be preconditioning, as described in Information Notice IN 97-16, Preconditioning of Plant Structures, Systems, and Components Before ASME Code Inservice Testing or Technical Specification Surveillance Testing. This would result in not obtaining the as-found condition of the valve and valve actuator. The inspectors concluded that the procedure was inadequate because the preconditioning could mask valve degradation and would not meet the requirements of the American Society of Mechanical Engineers (ASME) Section XI, Inservice Testing of Valves, for implementing corrective actions for valves with degraded performance.

This issue was considered to be of very low safety significance (Green) because the valves have previously operated satisfactorily with no signs of degradation. However, the inspectors concluded that this issue could have a credible impact on safety, in that, preconditioning could mask future valve degradation and expected corrective actions would not be initiated. Accordingly, resultant failure of these valves would have an impact on the operability of the EFW mitigation systems.

TS 5.4.1 requires, in part, that written procedures shall be established, implemented, and maintained covering activities outlined in Regulatory Guide 1.33. Regulatory Guide 1.33, Appendix A, Section 8.b., requires procedures for surveillance tests listed in TS. TS 5.5.9, Inservice Testing Program, contains the requirements for testing of ASME Code Class 1, 2, and 3 pumps and valves. Preconditioning of the EFW control valves prior to performance of the stroke time testing was considered to be a failure to adequately establish a procedure for stroke time testing of valves in accordance with the intent of the Inservice Testing Program. This inadequate procedure issue is being treated as a NCV, consistent with Section VI.A.1 of the enforcement policy and is identified as NCV 50-269,270,287/01-04-02: Inadequate Procedure for Stroke Time Testing of the Emergency Feedwater Control Valves. This violation is in the licensee's corrective action program as PIP O-01-04936.

.3 Failure to Complete Corrective Actions For Containment Isolation Valve (CIV) Position Verification

a. Inspection Scope

The inspectors reviewed the PIPs associated with the identification of an unlabeled CIV. The inspectors reviewed operator logs and the surveillance procedure for CIV position verification. The PIP proposed corrective actions and the violation of TS surveillance requirements issues were also discussed with operations personnel.

b. Findings

A Green finding was identified and dispositioned as a NCV for the failure to implement corrective actions for an inadequate TS required CIV position verification surveillance

procedure. The licensee had previously identified that the TS required CIV position verification for an unlabeled containment isolation valve had not been completed prior to changing modes.

On December 13, 2001, with Unit 3 in Mode 2, the licensee identified that a drain valve in the LPSW system had not been verified in its closed position prior to entering Mode 3 as required by TS 3.6.3. The licensee noted that the drain valve was not shown on plant drawings and did not have identifying labels or tags. The licensee had previously identified that they failed to perform the CIV position verification for this valve in July 1998 (PIP O-98-03705) and again in April 2000 (PIP O-00-01799). The licensee's proposed corrective actions in these PIPs was to implement a plant modification to remove the drain valve. This modification had not been implemented. The licensee also proposed interim corrective action to track the unnumbered drain valve in a procedural discrepancy sheet to the containment isolation surveillance test, 3/PT/A/0115/008. The PIPs were closed following the proposal of interim corrective action. After reviewing the most recent failure to perform the CIV position verification, the inspectors identified that the proposed interim corrective action was not performed. In addition, the ineffectiveness of the previous corrective actions (i.e., interim action not being performed and a 1998 proposal to remove the drain valve not being accomplished by December 2001) were not discussed in PIP O-01-05117. Subsequently, the licensee has identified additional LPSW valves inside containment that were not being checked on the containment closure valve position verification list.

This issue was considered to be of very low significance (Green) because the valve was found to be in its required closed position and in addition, since the line is pressurized, any leakage from the valve would probably have been identified due to an increase in reactor building sump levels. However, the inspectors concluded that the failure to implement corrective actions could have a credible impact on safety, in that, in this case it resulted in the failure to verify containment closure was established.

10 CFR 50, Appendix B, Criteria XVI, Corrective Actions, states in part that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. The inspectors concluded that failure to implement corrective actions to address an inadequate containment valve verification surveillance procedure, was a violation of 10 CFR 50, Appendix B, Criteria XVI corrective action requirements. This inadequate corrective action issue is being treated as an NCV, consistent with Section VI.A.1 of the enforcement policy and is identified as NCV 50-287/01-04-03: Failure to Perform Corrective Actions to Address an Inadequate TS Required Containment Valve Position Verification Surveillance Procedure. This issue is in the licensee's corrective action program as PIP O-01-05117.

1R23 Temporary Modifications

a. Inspection Scope

The inspectors reviewed documents and observed portions of temporary modification installations. Among the documents reviewed were system design bases, the UFSAR, TS, system operability/availability evaluations, and the 10 CFR 50.59 screening. The inspectors observed, as appropriate, that the installation was consistent with the

modification documents, it was in accordance with the configuration control process, that adequate procedures and changes were made, and that post installation testing was adequate. The following items were reviewed under this inspection procedure:

- Modification per WO 98446113: Temporarily blocked open valve 1CCW-84 for reverse gravity flow purposes as required by SLC 16.9.11, Turbine Building Flood Protection Measures, Section C, until completion of Unit 3 outage

- Modification per WO 98339722: Install temporary equipment for vibration monitoring of the reactor coolant pump seal injection lines 2HP-64, 65, 66, and 67 as directed by TSM-2111

- Modification per PIP O-01-05001: Operate 3C reactor building auxiliary cooler and ventilation fan on low speed, versus high speed as stated in the UFSAR, until the next refueling outage, 3EOC20.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed and evaluated an emergency organization preparedness practice drill on October 4, 2001. The activities observed during the drill were in the control room simulator, technical support center, and operations support center. Activities observed and evaluated included event classification, notification of government authorities, onsite protective measures, command and control, the transfer of emergency responsibilities between facilities, communications, adherence to procedures, and accident mitigation.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

The inspectors reviewed the procedurally established access controls, posting requirements, and surveillance standards for radiation areas (RAs), high radiation areas (HRAs), extra high radiation areas (EHRAs), and very high radiation areas (VHRAs).

The following documents were reviewed for consistency with 10 CFR 20:

- SH/O/B/2000/012, Rev. 001, “Access Controls for High, Extra High, and Very High Radiation Areas”
- SH/O/B/2000/005, Rev. 001, “Posting of Radiation Control Zones”
- HP/O/B/1000/054, Rev. 035, “Plant Radiological Status”
- Radiation Protection Policy Manual, Policy II-5, Rev. 2, “Radiation Area Access and Monitoring Devices”
- Radiation Protection Policy Manual, Policy III-15, Rev. 0, “Access Controls for High Radiation Areas, Extra High Radiation Areas, and Very High Radiation Areas”
- Task # HP-387-0, “ETQS Training and Qualification Guide: Posting of Radiation Control Zones”

The following radiation work permits (RWPs) were examined to determine if dose and dose rate alarm set points and other access controls were appropriate for the specific work location:

- RWP # 5029, Rev. 11, “Surveillance/ System Operation and Corrective Maintenance in Extra High Radiation Area Fields”
- RWP # 15, Rev. 12, “Routine Radiological Surveys”
- RWP # 3275, Rev. 9, “U3 Aux Bldg Misc Valve Work”

Access control policies and procedures were discussed with the RP Manager and first line RP supervisors, including a discussion and demonstration of audible alarms for electronic dosimeters.

The inspectors reviewed in-plant postings of RAs, HRAs, and EHRAs for compliance with 10 CFR 20. The inspectors checked the locking status of all EHRAs. During plant tours, the inspectors independently measured radiation fields using licensee instruments in three RAs and two HRAs and compared these measurements to posted survey maps.

The inspectors observed two RP technicians taking survey measurements and interviewed them to determine level of knowledge in the area of access controls and general radiation safety. The inspectors observed an RP supervisor interview a radworker crew to verify knowledge of RWP information. The inspectors observed entrance and exit transactions from the Radiologically Controlled Area (RCA) via closed-circuit monitor.

Corrective actions (PIPs) and a self-evaluation in the area of access controls were reviewed to assess the strength of the licensee’s corrective action program. The

following documents were reviewed: PIPs O-01-04136, O-01-04251, O-01-04379, and O-01-05045 (self-evaluation).

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Reactor Safety PIs

a. Inspection Scope

The inspectors conducted annual reviews of the following six Reactor Safety PIs for Oconee Units 1, 2, and 3, as submitted to the NRC by the licensee, for accuracy:

Cornerstone	PI
Initiating Events	Unplanned Transients per 7000 Critical Hours (All Units)
Mitigating Systems	Safety System Unavailability for the Residual Heat Removal System (All Units)
Mitigating Systems	Safety System Unavailability for the High Pressure Injection System (All Units)
Mitigating Systems	Safety System Functional Failures (All Units)
Barrier Integrity	Reactor Coolant System (RCS) Specific Activity (All Units)
Barrier Integrity	RCS Leak Rate (All Units)

b. Findings

No findings of significance were identified.

.2 Radiation Safety PIs

a. Inspection Scope

The inspectors evaluated the accuracy of performance indicators in the occupational radiation safety and public radiation safety cornerstones. Monthly PI reports for the period December 2000 - November 2001 were reviewed. The inspectors examined PIPs in the area of radiation protection, paying particular attention to any instances of unintended exposure. The 2000 annual effluent report was reviewed for any anomalous releases that could have provided significant dose to the public. The inspectors reviewed

the licensee's procedure for the collection and analysis of performance indicator data. The following documents were reviewed:

- SH/O/B/2006/001, Rev. 000, NRC Performance Indicator Data Collection, Validation, Review, and Approval
- Oconee Nuclear Station Effluent Release Data for 2000
- PIPs O-01-03281, O-01-03477, O-01-01493, O-01-01635, and O-01-04619

b. Findings

No findings of significance were found.

4OA2 Identification and Resolution of Problems

Section 1R22.3 discusses a Green inspection finding that is related to a cross-cutting area. Specifically, the corrective actions for an inadequate containment isolation valve position verification procedure were not effectively implemented.

4OA3 Event Followup

(Closed) Licensee Event Report (LER) 50-269/01-02-00: Reactor Trip after Automatic Main Turbine Trip Due to Isolated Phase Bus Problem

This LER addressed Oconee Unit 1 reactor trip, which occurred on September 12, 2001. The cause and details of the event were documented in NRC Inspection Report 50-269, 270,287/01-03. No new item or finding of significance were identified. This LER has been entered into the licensee's corrective action program as PIP O-01-03367.

4OA5 Other Activities

Reactor Vessel Head Penetration (VHP) Inspection

a. Inspection Scope

The inspectors observed activities relative to inspection of the Unit 3 reactor VHPs in response to NRC Bulletin 2001-01. The guidelines for the inspection were provided in NRC temporary instruction (TI) procedure TI 2515/145, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01). The inspection included review of non-destructive examination (NDE) procedures, assessment of NDE personnel training and qualification, and observation and assessment of Ultrasonic (UT) and Liquid Penetrant (LPT) examinations. Discussions were also held with contractor representatives and other licensee personnel. The activities were examined to verify licensee compliance with regulatory requirements and gather information to help the NRC staff identify possible further regulatory positions and generic communications. Specifically, the inspectors reviewed or observed: (1) UT scanning analysis activities of the inside diameter (ID) of nine penetrations and (2) LPT examination of the J-Groove weld for three penetrations.

b. Findings

The licensee performed a qualified visual inspection for all Control Rod Drive Mechanism (CRDM) nozzles and identified leaks on four nozzles (26, 39, 49, and 51) and suspected leaks on three nozzles (2, 10, and 46) out of 69 nozzles. In order to confirm the leaks, the licensee performed UT on these seven nozzles and two adjacent nozzles (29 and 31). The examination method for UT is a top-down probe movement inside the nozzles with five transducers for axial and circumferential crack examinations. This qualified UT examination method was used previously at all three Oconee units to identify axial and circumferential cracks. The techniques and equipment used during this inspection were much improved over previous inspections, for they provided more accuracy in finding and sizing cracks. Based on UT results, the licensee identified leaks in five nozzles (2, 26, 51, 39, and 49) and indications on two nozzles (10 and 31). The licensee identified two circumferential cracks initiating from the outside diameter (OD): one crack was not far above the J-groove weld for nozzle 2 and another crack was progressing from the J-groove weld for nozzle 26. The rest of cracks found in the nozzles were axial cracks either on the ID or OD. The majority of the leaks were through the welds and partial cracks on the nozzles. Only nozzle 2 had three through wall cracks on the nozzle. The licensee performed LPT examinations on three nozzle OD and J-Groove welds (10, 31, and 46) and found two nozzles to have crack indications (10 with one crack and 31 with two cracks) on welds.

The licensee decided to repair seven nozzles, which were identified to have leaks and crack indications based on the NDE results. The licensee also expanded the inspection sample to other nozzles which were not inspected during this refueling outage or during the Spring 2001 forced outage to ensure they did not have circumferential crack development.

Framatome Procedure 54-ISI-100-06, Remote Ultrasonic Examination of CRDM Nozzles, was used for axial and circumferential UT scanning of the ID of the nozzles. The inspection techniques had been previously demonstrated capable of detecting pure water stress corrosion cracking type manufactured cracks, as well as cracks from operation. The inspectors found that the UT inspections were being performed in accordance with approved and demonstrated procedures with trained and qualified inspection personnel. All examiners had significant experience, including experience inspecting vessel head penetrations. No additional circumferential cracking was detected. The condition of the reactor head was clean and small boron deposits could be readily identified. Accordingly, TI 2515/145 is considered closed for Unit 3. Documents reviewed during this inspection are listed at the end the report.

No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Ron Jones, Plant Manager and other members of licensee management at the conclusion of the inspection on January 7, 2002. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

The following finding of very low safety significance was identified by the licensee and is a violation of NRC requirements, which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a NCV.

NCV Tracking Number	Requirement Licensee Failed to Meet
50-269,270,287/01-04-04	10 CFR 20.1501 requires licensees to perform surveys that are reasonable under the circumstances to evaluate concentrations or quantities of radioactive material. The licensee failed to perform adequate surveys resulting in a discrete radioactive particle being released offsite in the inner sole of a worker's shoe on or about November 29, 2001. The issue is in the licensee's corrective action program as PIP O-01-05007 (Green).

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Curtis, Mechanical System/Equipment Engineering Manager
W. Foster, Safety Assurance Manager
B. Hamilton, Engineering Manager
D. Hubbard, Modifications Manager
R. Jones, Station Manager
C. Little, Civil, Electrical& Nuclear Systems Engineering Manager
W. McCollum Site Vice President, Oconee Nuclear Station
B. Medlin, Superintendent of Maintenance
L. Nicholson, Regulatory Compliance Manager
R. Repko, Superintendent of Operations
J. Twiggs, Manager, Radiation Protection
J. Weast, Regulatory Compliance

NRC

L. Olshan, Project Manager

ITEMS OPENED AND CLOSED

Opened and Closed During this Inspection

50–287/01-04-01	NCV	Failure to Follow Abnormal Procedure for Auxiliary Building Flooding (Section 1R06.2)

50-269,270,287/01-04-02	NCV	Inadequate Procedure for Stroke Time Testing of the Emergency Feedwater Control Valves (Section 1R22.2)
50-287/01-04-03	NCV	Failure to Perform Corrective Actions to Address an Inadequate TS Required Containment Valve Position Verification Surveillance Procedure (Section 1R22.3)
50-269,270,287/01-04-04	NCV	Failure to Perform Adequate Survey Results in Discrete Radioactive Particle Being Released Offsite (Section 4OA7)

Previous Items Closed

50-269/01-02-00	LER	Reactor Trip After Automatic Main Turbine Trip Due to Isolated Phase Bus Problem (Section 4OA3)
2515/145	TI	Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles - Unit 3 Only (Section 4OA5)

LIST OF ACRONYMS USED

ASME - American Society of Mechanical Engineers
BWST - Borated Water Storage Tank
CCW - Condenser Circulating Water
CFR - Code of Federal Regulations
CRDM - Control Rod Drive Mechanism
EFW - Emergency Feedwater
EHRA - Extra High Radiation Area
EOC - End-of-Cycle
GPM - Gallons Per Minute
HAWT - High Activity Waste Tank
HPI - High Pressure Injection
HRA - High Radiation Area
KHS - Keowee Hydro Station
LER - Licensee Event Report
LPI - Low Pressure Injection
LPSW - Low Pressure Service Water
LPT - Liquid Penetrant
NCV - Non-Cited Violation
NDE - Non-Destructive Examination
NRC - Nuclear Regulatory Commission
NSD - Nuclear System Directive
NSM - Nuclear System Modification
PI - Performance Indicator
PIP - Problem Investigation Process

PMT - Post-Maintenance Testing
PT - Performance Test
RBS - Reactor Building Spray
RCA - Radiologically Controlled Area
RCS - Reactor Coolant System
RP - Radiation Protection
RWP - Radiation Work Permit
SDP - Significance Determination Process
SLC - Selected Licensee Commitment
SSC - Structure, System and Component
TS - Technical Specification
TT - Temporary Test
UFSAR - Updated Final Safety Analysis Report
UT - Ultrasonic
VHRA - Very High Radiation Area
WO - Work Order
WR - Work Request

List of Documents Reviewed in Section 4OA5

Procedures

- Framatome Procedure 54-ISI-100-06, Revision 6, Remote Ultrasonic Examination of CRDM Nozzles
- Duke Power Procedure NDE-35A-SE-A, Revision 18, Liquid Penetrant Examination
- Framatome Process Traveler 50-5015155-00, Revision 0, Ambient ID Temper Bead Repair for B&W CRDM Nozzles

Vendor Exam Evaluation Reports

- Framatome Oconee Unit 3 CRDM Nozzle Ultrasonic Examination Results for Nozzles 2, 10, 26, 29, 31, 39, 46, 49, and 51

Other Documents

- Duke Power Company Liquid Penetrant Examination Report Form NDE-35A at J-weld for Nozzles 10, 31, and 46
- Licensee Letter to NRC dated August 28, 2001, Oconee Nuclear Station Units 1, 2, &3 Response to NRC Bulletin 2001-01
- Qualification and Training Records for NDE Examiners
- Framatome Drawing 5015228E, Revision0, CRDM Nozzle ID Temperbead Weld Repair for Oconee 3