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

July 25, 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 50-269/02-02, 50-270/02-02, AND 50-287/02-02

Dear Mr. McCollum:

On June 29, 2002, the NRC completed an inspection at your Oconee Nuclear Station. The enclosed report documents the inspection findings which were discussed on July 3, 2002, with Mr. Bruce Hamilton 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, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified two issues of very low safety significance (Green). These issues were determined to involve violations of NRC requirements. 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 deny any of these non-cited violations, 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.

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/

Binoy Desai, Acting 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 50-269/02-02, 50-270/02-02, and 50-287/02-02 w/Attachment - Supplemental Information

cc w\encl.:
Compliance Manager (ONS)
Duke Energy Corporation
Electronic Mail Distribution

Lisa Vaughn
Legal Department (PB05E)
Duke Energy Corporation
422 South Church Street
Charlotte, NC 28242

Anne Cottingham
Winston and Strawn
Electronic Mail Distribution

Mel Fry, Director
Division of Radiation Protection
N. C. Department of Environmental
Health & Natural Resources
Electronic Mail Distribution

Henry J. Porter, Director
Div. of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

R. Mike Gandy
Division of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

County Supervisor of
Oconee County
415 S. Pine Street
Walhalla, SC 29691-2145

Lyle Graber, LIS
NUS Corporation
Electronic Mail Distribution

Manager
Nuclear Regulatory Licensing
Duke Energy Corporation
526 S. Church Street
Charlotte, NC 28201-0006

Peggy Force
Assistant Attorney General
N. C. Department of Justice
Electronic Mail Distribution

Distribution w/encl:
L. Olshan, NRR
RIDSNRRDIPMLIPB
PUBLIC

OFFICE	DRP	DRP	DRP	DRP	DRS	DRS	DRS
SIGNATURE	MCS	MCS for	E. Christnot	MS Freeman	M. Lesser for	M. Lesser for	JHM for
NAME	Mshannon	Dbillings	Echristnot	Sfreeman	MScott	RChou	RSchin
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-269, 50-270, 50-287
License Nos:	DPR-38, DPR-47, DPR-55
Report No:	50-269/02-02, 50-270/02-02, 50-287/02-02
Licensee:	Duke Energy Corporation
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	March 31, 2002 - June 29, 2002
Inspectors:	M. Shannon, Senior Resident Inspector S. Freeman, Resident Inspector D. Billings, Resident Inspector E. Christnot, Resident Inspector M. Scott, Senior Reactor Inspector (Section 1R07.2) E. Lea, Operator License Examiner (Section 1R11.2) G. Laska, Operator License Examiner (Section 1R11.2) R. Chou, Reactor Inspector (Sections 1R08 and 4OA5.2) R. Schin, Senior Reactor Inspector (Section 4OA5.3)
Approved by:	B. Desai, Acting Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000269-02-02, IR 05000270-02-02, IR 05000287-02-02, on 03/31/2002–06/29/2002, Duke Energy Corporation, Oconee Nuclear Station; Inservice Inspection and Other Activities.

The inspection was conducted by the resident Inspectors, three regional based reactor inspectors, and two regional based operator license examiners. The inspectors identified two Green findings, which were identified as 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 a failure to assure that a Penetrant Examination (PT) was performed on the correct weld or component in accordance with requirements of Technical Specification (TS) 5.4.1, which requires the use of written procedures; specifically in this case, Procedure NDE-35 and Drawing No. ISI OCN 1-009, Reactor Coolant Pump 1B1 Suction Piping.

This finding was of very low safety significance because, although the inspectors identified that the licensee examiners performed the PT on the wrong weld, the PT was subsequently performed on the correct weld and found to be acceptable (Section 1R08).

Cornerstone: Mitigating Systems

Green. A non-cited violation was identified for a failure to promptly identify conditions adverse to quality by completing the operability evaluation following identification that non-seismic piping was located in the ceiling of the shared control room for Units 1 and 2. The licensee was developing a modification package to remove the non-seismic piping from the control room.

This issue was considered to be of very low safety significance because of the low probability of piping failure and the ability of the operators to evacuate the control room and successfully shutdown Units 1 and 2 from the remote shutdown stations (Section 4OA5.1).

B. Licensee Identified Violations

None

Report Details

Summary of Plant Status:

Unit 1 began the inspection report period in the End-of-Cycle (EOC) 20 refueling outage. On April 28, 2002, the unit was taken critical. On May 2, 2002, the unit reached 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 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 3 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).

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the abnormal procedure for tornadoes following a tornado warning from the national weather service, which occurred during the evening on April 29, 2002. The inspectors verified that the operator's actions specified in the abnormal procedure were taken in a timely manner prior to the onset and during the adverse weather condition. Adequate operator staffing was maintained during this adverse weather condition. The inspectors did not identify any additional plant modifications, new evolutions, procedure revisions or operator workarounds that would pose a challenge to safe plant operation related to potential tornado conditions.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial System Walkdown

a. Inspection Scope

The inspectors conducted partial system alignment walkdowns to evaluate the operability of selected redundant trains or backup systems, 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, verification of critical components to identify any discrepancies which could affect operability of the redundant train or backup system, and verification that alignment problems that could cause initiating events or affect mitigating systems or barriers were identified and corrected. The following systems were included in this review:

- Unit 1 essential siphon vacuum and syphon seal water system during isolation of the B syphon seal water header for replacement of a leaking relief valve
- Unit 3 high pressure injection (HPI) system during preventive maintenance activities on the 3C HPI pump
- Unit 2 motor driven emergency feedwater system during surveillance testing of the turbine driven emergency feedwater pump

b. Findings

No findings of significance were identified.

.2 Complete Walkdown of the Keowee Hydro Units (KHUs)

a. Inspection Scope

The inspectors performed a system walkdown on accessible portions of KHUs. The inspectors focused on verifying proper valve positioning, power availability, component labeling, component lubrication, no obstacles to equipment cooling, adequate area ventilation, no damage to structural supports, support systems 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:

- KFD-100A-1.1, 2.1, Flow Diagram of Turbine Generator Cooling Water System, Units 1 and 2
- KFD-101A-1.1, 2.1, Flow Diagram of Turbine Guide Bearing Oil System, Units 1 and 2
- KFD-102A-1.1, 2.1, Flow Diagram of Turbine Sump Pump System, Units 1 and 2
- KFD-103A-1.1, 2.1, Flow Diagram of High Pressure Oil System, Units 1 and 2
- KFD-104A-1.1, 2.1, Flow Diagram of Governor Air System, Units 1 and 2
- KFD-105A-1.1, 2.1, Flow Diagram of Governor Oil System, Units 1 and 2
- KFD-107A-1.1, Flow Diagram of Air Circuit Breaker Air System
- Technical Specification (TS) 3.8.1

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, that fire detection and suppression capabilities were intact, and that related problems were identified and entered into the corrective action program. 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. Inspections of the following areas were conducted during this inspection period:

- Unit 2 east and west penetration rooms
- KHUs 1 and 2
- Unit 1 east and west penetration rooms
- Units 1 and 2 cable spreading rooms
- Unit 3 east and west penetration rooms

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

.1 Annual Inspection

a. Inspection Scope

The inspectors reviewed Unit 3 Work Order (WO) 98448564, Clean, inspect, and eddy current test the 3A component cooling heat exchanger, to ensure that the cooler 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 exchanger 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.

b. Findings

No findings of significance were identified

.2 Biennial Inspection

a. Inspection Scope

During the week of June 10, 2002, the inspectors selected risk important heat exchangers (HX) and critical system components to inspect. Items evaluated were:

- Unit 3 Low Pressure Service Water (LPSW) to Low Pressure Injection (LPI) HX performance
- Unit 1 High Pressure Injection (HPI) motor coolers performance
- Unit 3 Reactor Building Cooling Units (RBCU) performance
- Heat sink retaining dams around Lake Keowee
- Risk-significant valve failures and histories of work (two years)
- LPSW pump performance
- Circulating Cooling Water (CCW) expansion joints
- Duke Power clam inspection report
- Intake structure and weir physical condition

During this period, the inspectors reviewed to determine that: selected heat exchanger test methodology was consistent with accepted industry standards (Electric Power Research Institute Service Water Heat Exchanger Testing Guidelines, TR-107397) or equivalent (NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment); test conditions were appropriately considered; test criteria were met; test frequency was appropriate; as-found results were appropriately dispositioned such that the final condition was acceptable; and, test results considered test instrument inaccuracies and differences.

The inspectors walked down: the CCW/LPSW intake structure; siphon seal water pumps and piping; all units LPSW crossover valves; and, the Unit 1 and 2 LPSW pumps. The inspectors inspected a removed 1B LPSW pump rotating assembly. They examined the physical state of several of the LPSW main discharge and cross over valves. The inspectors observed a reverse flow leakage test of 1A LPSW pump check valve 1-LPSW-31.

The inspectors reviewed: select risk important valve frequency of failures/histories for the past two years; LPSW/LPI and RBCU HX inspection procedures and completed inspections; and preventive and corrective maintenance program work activities on selected components. The corrective maintenance actions are considered corrective action documentation. These reviews were evaluated against Inservice Test Inspections information, Technical Specifications, Maintenance Rule status, probabilistic risk assessments, Updated Final Safety Analysis Report, and design documents.

The inspectors reviewed potential common cause problems associated with LPSW components and repair activities. The inspectors reviewed the last heat sink dam inspection report and the results of an intake weir wall inspection. Major documents reviewed during the inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI)

a. Inspection Scope

The inspectors observed in-process ISI work activities and reviewed selected ISI records. The observations and records were compared to the TS and the applicable Code (ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition to verify compliance).

Portions of the following Unit 1 ISI examinations were observed:

Ultrasonic (UT)	Reactor Coolant Pump 1B1 Suction piping weld 1-PIBI-5 Erosion/corrosion for piping 1CDH-006 Reactor Head bolt and nut numbers 46, 47, and 48 Reactor vessel nozzle welds at 90 and 270 degrees outlet nozzle
Magnetic Particle (MT)	Reactor Head bolt numbers 46, 47, and 48
Liquid Penetrant (LPT)	Reactor Coolant Pump 1B1 Suction piping branch weld 1-PIB1-12
Radiographic (RT)	Reactor Coolant Pump 2A1 Discharge Thermal Sleeve film review

Qualification and certification records for examiners and nondestructive examination (NDE) procedures for the above ISI examination activities were reviewed.

b. Findings

The inspectors identified a Green finding that was determined to be a Non-Cited Violation (NCV) for failure to assure that a LPT was performed on the correct weld or component in accordance with requirements of TS 5.4.1, which requires the use of written procedures; specifically in this case, Procedure NDE-35 and Drawing No. ISI OCN 1-009, Reactor Coolant Pump 1B1 Suction Piping.

During observation of an intended LPT on reactor coolant piping branch weld 1-PlB1-12, the inspectors identified that the licensee's examiners applied cleaner and penetrant to piping branch weld 1-PIB2-12, which is on a different line. When the error was pointed out to the licensee's examiners, they immediately cleaned the penetrant from the wrong weld and re-performed the LPT on the intended one. The subsequent LPT on intended weld 1-PlB1-12 was found to be acceptable. Problem Investigation Process report (PIP) O-02-01762 was issued for corrective actions.

This finding had credible impact on safety because had the error not been detected, inspection of the intended weld (which could have been cracked) under the 10 year ISI program would not have been performed. Failure to test the correct component can affect the equipment performance attribute of the Initiating Events Cornerstone, in that availability and reliability problems would not be identified. This affects the objective of the cornerstone, which is to limit the likelihood of initiating events, such as loss of coolant. The examiners applied penetrant to the wrong component, which was a

violation of TS 5.4.1, which requires the use of written procedures; in this case Procedure NDE-35, Liquid Penetrant Examination and Drawing No. ISI OCN 1-009, Reactor Coolant Pump 1B1 Suction Piping. Section 13.1 of Procedure NDE-35 states that the examiners shall verify that the component and/or the weld to be examined is correct. The issue was evaluated using the significance determination process. This finding was of very low safety significance because, although the examiners performed the LPT on the wrong weld, the LPT was later performed on the correct weld and found to be acceptable. This is being treated as a NCV, consistent with Section VI.A.1 of the enforcement policy and is identified as NCV 50-269/02-02-01: Failure to Follow Procedures Resulting in Conducting Penetrant Examination on the Wrong Weld.

1R11 Licensed Operator Requalification

.1 Simulator Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on May 28, 2002. The scenario involved a steam generator tube leak and subsequent steam generator tube rupture. During mitigation of the tube rupture, the scenario involved a loss of vacuum and a subsequent loss of power. This placed the simulated unit in a condition requiring a natural circulation cool down with a steam generator tube rupture. 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.

.2 Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of individual job performance measures operating tests, and simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee during calender year 2002. The biennial written examination was administered during calender year 2001.

a. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors sampled portions of selected structures, systems and components

(SSCs) listed below, as a result of performance-based problems, to assess the effectiveness of maintenance efforts that apply to scoped SSCs:

- PIP O-02-1898, Control Room Chiller "A" failed to start after preventive maintenance due to failed breaker
- PIP O-02-2027, Pressurizer heater capacity places the Standby Shutdown Facility (SSF) in the (a)1 status due to the inability to compensate for ambient heat loss
- PIP O-02-2140, 1C HPI pump failed to start after preventive maintenance due to failed breaker
- PIP O-02-2533, Relief Valve 3LP-100, located on the B low pressure injection (LPI) suction header, lifting at lower than set pressure
- PIP O-02-2911, KHU forebay lake level indication unreliable, inaccurate, difficult to maintain, and out of service on numerous occasions
- PIP O-02-2972, Functional failure of Unit 3 HPI pump motor emergency power cables due to improper installation of cables
- PIP O-02-2982, Post accident hydrogen analyzers classified as (a)1 status due to repetitive maintenance preventable functional failures

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.

- PIP O-02-1380, Unexpected entry into an Orange risk condition during Unit 1 shutdown due to the unavailability of the third LPI pump and the OTSG levels below 50 percent.
- PIP O-02-2003, Risk management of the operating Units 2 and 3 during the performance of the Unit 1 emergency power test, PT/1/A/0610/01J
- PIP O-02-2864, Splitting the direct current control battery busses to search for a ground while the 1CB battery was out of service and the elevated water storage tank was drained

- Work Order (WO) 98460558, Maintenance on instrument air system dryer B affecting all units, coded orange risk
- WO 98328349, Removal of KHU underground power path to Oconee Unit 1
- PIP O-02-2896 and WO 98416326, Drain down high pressure service water (HPSW) elevated water storage tank for inspection, cleaning, maintenance, and testing coded orange
- PIP O-02-2912, Performing tests on the KHU while the SSF is out of service for preventive maintenance
- PIPs O-02-2972 and 2978, Damage discovered during maintenance to Unit 3 HPI pump motor emergency power cables

b. Findings

No finding of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

The inspectors reviewed, as described below: (1) personnel performance during selected non-routine events and/or transient operations; (2) licensee event reports focusing on those events involving personnel response to non-routine conditions; and (3) operator response after reactor trips that required more than routine expected operator responses, or which involved operator errors. As appropriate, the inspectors: (1) reviewed operator logs, plant computer data, or strip charts to determine what occurred and how the operators responded; (2) determined if operator responses were in accordance with the response required by procedures and training; (3) evaluated the occurrence and subsequent personnel response using the SDP; and (4) confirmed that personnel performance deficiencies were captured in the licensee's corrective action program. The non-routine evolution reviewed during this inspection period included the following:

- Unit 1 startup on April 28, 2002, after EOC 20 refueling outage

b. Issues and Findings

No finding 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; (5) where continued operability was considered unjustified, the impact on TS limiting conditions for operation; and (6) that related problems were identified and entered into the corrective action program. The inspectors reviewed the operability evaluations described in the following PIPs:

- PIP O-02-1457, Past operability of TS required equipment during decreasing MODE changes from MODE 5, to MODE 6, and to NO MODE
- PIP O-02-1577, Operability of valves 1,2,3 LP 19 and 20, suction from the reactor building emergency sumps, regarding non-safety related cables and cable separation
- PIP O-02-1777, Operability of 125V DC switchyard system due to deletion of required voltage readings from surveillance test procedure
- PIP O-02-2533, Operability of Unit 3 LPI system crossover line due to relief valve 3LP-100 lifting at lower then required lift pressure setpoint
- PIP 0-02-2813, Operability of the 2C ESV pump due to seal water for the pump failing to meet the required flow rate
- PIP O-02-2812, Operability of Unit 1 Automatic Feedwater Isolation System (AFIS) due to alarming digital Channels 1 and 2 as abnormal, alarms clear immediately and all analog inputs indicate normal
- PIP O-02-2924, Operability of Unit 1 emergency sump due to a 12' by 4' oil cloth being unaccounted for by the foreign material exclusion program inside the reactor building

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed selected operator workarounds to determine if the functional capability of the system or the human reliability in responding to an initiating event were affected. The inspectors specifically evaluated the effect of the operator workarounds on the ability to implement abnormal or emergency operating procedures. The inspectors also reviewed the workarounds that if not performed properly could result in a significant impact on the unit. The following item was reviewed:

- PIP-O-02-2213, Lack of level indication in LPI pump room sumps, requires operators to monitor the room during drain downs to prevent overflow into the rooms.

1R17 Permanent Plant Modifications

Installation of the Automatic Feedwater Isolation System

a. Inspection Scope

The inspectors reviewed NSM ON-13053, Automatic Feedwater Isolation System, to verify that the feedwater isolation system design basis, licensing basis, and performance capability was not degraded due to the modification; and that the modification did not leave the plant in an unsafe condition.

The inspectors observed work in progress during the modification and post-modification testing to verify that the circuits worked as designed and that proper indications and controls were verified.

The inspectors reviewed the following documents during the inspection:

- NSM-13053 AFIS Modification Scope Document, Revision 0
- TN/1/A/13053/00/AL1, AFIS, Revision 0
- NSM -3053, AFIS Operations training handouts
- PT/1/A/0152/020, AFIS Circuitry Test, Revision 11

In addition, the inspectors reviewed the problem investigation process reports to confirm that the licensee was identifying issues and initiating actions to resolve concerns.

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; (8) equipment was returned to the status required to perform its safety function; and (9) that related problems were identified and entered into the corrective action program. The inspectors observed testing and/or reviewed the results of the following tests:

- MP/O/A/1800/22, Controlling Procedure for Mechanical Troubleshooting and/or

Corrective Actions, Revision 19, and WO 98497782 repairs and PMT on relief valve 3LP-100

- PT/1/A/0251/24, HPI Full Flow Test, Revision 15, and WO 98493139, repairs and PMT on breaker 1TD-9,
- WO 98398080, PMT on 3A HPI pump motor following relay maintenance
- WO 98480154, PMT on primary instrument air compressor and dryers
- PT/O/A/0230/001,Radiation Monitor Check, Revision 124, CP/1/A/2002/001, Revision 45, OP/O/A/1106/031, Revision 82, Primary to Secondary Leak Rate Monitoring and Instrumentation, and PIPs O-02-02441, O-02-02433, O-02-01376 and O-02-01427, all related to PMT on 1RIA-40 following replacement of the monitor. This radiation monitor is used to monitor primary to secondary leakage which had been increasing and was estimated to be at approximately 2-3 gallons/day.
- PT/1/A/0152/020, Revision 11, AFIS Circuitry Test, following installation of modified AFIS circuitry.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

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 March 30, 2002, and May 3, 2002, the following activities related to the Unit 1 refueling outage were reviewed for conformance to the applicable procedure and selected activities associated with each evaluation were witnessed:

- defueled (No Mode) operations
- refueling operations
- reduced inventory and mid-loop conditions for removal of steam generator nozzle dams
- activities involving the 1B steam generator tube failure
- reactor startup
- Mode changes from Mode 6, Refueling, to Mode 1, Power Operation
- system lineups during major outage activities and Mode changes

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

Routine Surveillance Testing Observations

a. Inspection Scope

The inspectors witnessed surveillance tests and/or reviewed test data of the selected risk-significant SSCs listed below, to assess, as appropriate, whether the SSCs met TS, UFSAR and licensee procedure requirements. In addition, the inspectors determined if the testing effectively demonstrated that the SSCs were ready and capable of performing their intended safety functions. The following testing was observed and/or reviewed:

- PT/1/A/0610/01L, Load Shed of 4160V Switchgear 1TE, Revision 05
- PT/1/A/0610/01J, Emergency Power Switching Logic Functional Test, Revision 34
- PT/1/A/0204/09, Component Test of ES Channels, Revision 09
- PT/1/A/0150/15D, Inter-system LOCA Test, Revision 33
- PT/3/A/0204/07, Reactor Building Spray Pump Test, Revision 62
- PT/2/A/0600/12, Turbine Driven Emergency Feedwater Pump Test, Revision 60
- PT/O/A/0400/15, SSF Submersible Pump Test, Revision 12
- PT/1/A/0400/007, SSF Reactor Coolant Makeup Pump Test, Revision 33

b. Findings

No findings of significance were identified.

1R23 Temporary Modifications

a. Inspection Scope

The inspectors reviewed documents and observed portions of the installation of selected temporary modifications. 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, was in accordance with the configuration control process, adequate procedures and changes were made, and post installation testing was adequate. The following items were reviewed under this inspection procedure:

- TM-2127, Install a gag temporarily on relief valve 3LP-100
- TM-2128, Install a temporary relief valve, TM-3LP-100, to temporarily replace relief valve 3LP-100

b. Findings

No findings of significance were identified.

Cornerstones: Emergency Preparedness

1EP6 Drill Evaluation and Simulator Observations

a. Inspection Scope

The inspectors observed an emergency drill and simulator scenario conducted on June 26, 2002, to evaluate licensee performance in the area of emergency preparedness, and to assess the licensee's critique of those performances. The inspectors specifically verified the proper classification and notification of events and development of protective action recommendations during the simulations. These observations were made in the control room simulator and the technical support center. Operator performance and communication during the drill were also monitored at the simulator.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA3 Event Follow-up

(Closed) Licensee Event Report (LER) 50-269/2000-004, Non-Compliance With Surveillance Interpretation Due to Mis-communication

This event was discussed originally in Section 1R22, Surveillance, of Integrated Inspection Report 50-269,270,287/2000-05 as an URI for potential inadequate surveillance testing. It was entered in the licensee's corrective action program (CAP) as PIP O-00-00783. The URI was subsequently closed in Integrated Inspection Report 50-269,270,287/2001-03 as an NCV and a Green finding for failure to meet the surveillance requirements and was entered into the CAP as PIP O-00-3229. There was no new information gathered from the LER.

4OA5 Other

.1 (Closed) Apparent Violation (AV) 50-269,270,287/01-08-05: Failure to Correctly Identify and Evaluate a Condition Adverse to Quality Involving a Potential Control Room Flooding Issue

This issue involved non-seismic piping (e.g., plant drinking water, plant heating, sanitary sewer, and service water) located in the control room ceiling directly above control panels for safety-related systems (including Keowee hydro-electric power units, low

pressure service water, and containment ventilation coolers). The licensee had identified a concern with potential leaks from non-safety piping in the control room in PIPs O-99-01268 and O-00-02273. The licensee's concern was that operators had no guidance on how to isolate these pipes should they begin to leak. However, the licensee had not identified that the pipes were located directly above control panels for safety-related systems or that the pipes were not seismically designed. Further, the licensee had not evaluated the potential effect, of these pipes breaking during a seismic event, on the operability of the safety-related systems. (The inspectors had observed that the control panels were apparently not designed to be waterproof.) The failure to address the control room non-seismic piping issue was initially considered to be contrary to the requirements of 10 CFR 50, Appendix B, Criterion XVI.

In response to inspector concerns, the licensee performed a review of this potential control room flooding issue and documented the review in PIP O-00-02273. In the PIP, the licensee stated that "In case of a seismic event, the pressurized piping (located in the control room ceiling) could potentially leak/break and spray a large amount of water over vital instruments and controls which could render them inoperable." The licensee also assumed that flooding in the Unit 1 and 2 control rooms would "result in water spraying on the main control boards and will require that the control room be evacuated." The licensee subsequently concluded that, "The control rooms are OPERABLE because the plant design and plant operating procedures clearly include provision for loss of the control room" and "The control rooms are DEGRADED/NON-CONFORMING because of the presence of non-seismically designed piping within the control rooms that could result in loss of control room function." After further review of this condition, the licensee subsequently stated in PIP O-00-02273 that they would remove the subject non-seismic piping from the control room ceilings.

The potential need to evacuate the main control rooms due to a failure of the non-seismic piping located in the ceiling was considered to have a credible impact on plant safety. The issue was processed through the SDP and was analyzed by the Region II Senior Risk Analyst. For the analysis, it was assumed that a failure of the piping caused a loss of control room functions. It was also assumed that there were no other ongoing plant accidents. Based on the ability to operate systems from the auxiliary shutdown panel, a complete loss of safety system functions was not postulated. In evacuation of the control room, the SSF would be available to mitigate the event. The review indicated that sufficient mitigation equipment would be available to mitigate a loss of control room function due to flooding. This issue was considered to be of very low safety significance (Green).

Licensee PIP O-00-02273 documented a concern with non-safety piping in the control room on June 19, 2000. The licensee did not complete an operability evaluation for the potential consequences of these pipes breaking during a non-seismic event until March 27, 2001, after the NRC identified the failure to perform such an operability evaluation. The licensee's design criteria, as stated in UFSAR Section 3.2.1, is that the control room will withstand a seismic event (earthquake) without loss of function. Also, UFSAR Section 3.1.2 states that essential (safety-related) systems will withstand natural phenomena including earthquakes. NSD 203, Operability, Section 2.03.6.3 in part requires the timely completion of operability evaluations commensurate with the safety significance so that timely corrective actions can be identified and accomplished as stated in NSD 203, Section 203.6.4, Timeliness of Corrective Action. The untimely completion of the operability evaluation was considered to be contrary to the

requirements of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action and the licensee's implementing procedure, NSD 203, Operability, and is considered to be a violation. The failure to promptly identify conditions adverse to quality by completing the operability evaluation is being treated as an NCV, consistent with Section VI.A.1 of the enforcement policy and is identified as NCV 50-269,270/02-02-02: Failure to Complete a Timely Operability Evaluation for Failure of Non-Seismic Piping in the Control Rooms. AV 50-269,270,287/01-08-05 is closed.

.2 (Closed - Unit 1 only) Temporary Instruction (TI) 2515/145: Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01)

a. Inspection Scope

The inspectors observed activities relative to inspection of the Unit 1 reactor vessel head penetrations (VHPs) in response to NRC Bulletin 2001-01. The guidelines for the inspection were provided in NRC temporary instruction (TI) procedure TI2515/145, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01). The inspection included review of nondestructive examination (NDE) procedures, assessment of NDE personnel training and qualification, and observation and assessment of Ultrasonic (UT) and Liquid Penetrant (PT) 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 the nozzle for 5 penetrations; and (2) PT examination of the J-Groove weld of the nozzle for one penetration.

Findings

The licensee performed a qualified visual inspection for all Control Rod Drive Mechanism (CRDM) nozzles and identified masked leak indications on two nozzles (1 and 7). Nozzles 5, 8, and 9 were visually examined with insufficient clearance to view 360 degrees all around. In order to confirm the leaks, the licensee performed UT on all five nozzles 1, 5, 7, 8, and 9. The examination method for UT is a top-down probe movement inside the nozzles with five transducers each 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 improved to have more accuracy in finding and sizing cracks when compared results to previous inspections. Based on UT results, the licensee identified leaks in nozzle 7 and indications on nozzles 1 and 8. The licensee identified cracks found in nozzles 7 and 8 were axial cracks either ID, OD, or weld. The leak on nozzle 7 was a through wall leak. The licensee dispositioned nozzle 1 by performing PT examination on nozzle 1 OD and J-Groove weld and found no crack indications on the weld.

The licensee decided to repair two nozzles 7 and 8 which were identified to have leak and crack indications based on the UT results.

Framatome Procedure 54-ISI-100-06, Remote Ultrasonic Examination of Control Rod Drive Mechanism (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 PWSCC 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.

The licensee captured this issue in their corrective action program as PIP O-02-01402**.** This leakage problem violated Oconee TS 3.4.13 which states that Reactor Coolant System operational leakage shall be limited to no pressure boundary leakage. This event constituted a violation of NRC requirements. Pending determination of the significance of the issue, this is an Unresolved Item (URI) 50-269/02-02-03: Reactor Pressure Boundary Leakage During Operation.

.3 (Closed) URI 50-269,270,287/98-03-08: Licensing Basis Issues With Control Room Habitability

This URI was opened for further NRC review of four licensing basis issues with control room habitability. The four issues were: (1) Unfiltered Air Inleakage Due To Control Room Pressure Less Than 1/8 Inch Water Gauge; (2) Unfiltered Air Inleakage Due To Single Failures; (3) Operator Dose Limits; and (4) TS. The inspector concerns with these issues involved apparent inconsistencies and non-conservatisms in operator dose calculations, operator dose limits, and TS requirements, with respect to NRC standards described in Three Mile Island (TMI) Action Item III.D.3.4, Control Room Habitability. Each of these apparent non-conservatisms could potentially result in higher operator radiation doses during a design basis accident than what was allowed by the regulations.

The further NRC review of these issues involved inspector review of historical licensing basis documents, including letters between the NRC and the licensee related to TMI Action Item III.D.3.4; inspector and regional management discussions with NRR staff; public meetings between the licensee and the NRR staff; and the licensee's submittal of a license amendment request (LAR) regarding control room habitability issues, dated October 16, 2001.

The inspectors found that the NRC had closed TMI Action Item III.D.3.4 in a letter to the licensee dated December 7, 1989, without the licensee meeting all of the standards in the action item. The NRC had stated: "The NRC staff is in the process of developing new criteria and methodology for evaluating control room habitability issues which may lead to the conclusion that the proposed relocation of the (control room ventilation) intake is unnecessary. Therefore, your actions in response to NUREG-0737, Item III.D.3.4, Control Room Habitability, are considered complete for Oconee Units 1, 2, and 3." Consequently, the inspectors and NRR staff concluded that the NRC had not clearly required the licensee to meet the standards of the action item and that the four licensing basis issues of this URI did not involve clear violations of NRC requirements.

The licensee's LAR and NRR staff review of the LAR will potentially resolve the concerns of this URI. The LAR includes licensee commitments to implement the new NRC source term regulations and to install significant plant modifications, including relocating the control room ventilation intake. The NRR staff plans to consider the four concerns of this URI in their review of the licensee's LAR and in the resolution of similar generic industry concerns with control room habitability. This URI is closed.

.4 (Open) URI 50-269/00-05-11: Operation in Mid-Loop with Containment Purge Valves that Subsequently Failed to Hold Design Pressure

This URI encompassed two examples of failure to maintain containment closure for loss of decay heat removal events while operating in mid-loop conditions. The example discussed here involved purge valve testing activities. During outages in which containment work activities are expected, the licensee opens the purge valves to ventilate containment. At the end of the outage, the licensee performs iterative leak testing on the valves (performing adjustments) until acceptable leakage results are achieved. From that point on, until the end of the operating cycle, the valves are not disturbed (barring an interim outage requiring containment ventilation).

The inspectors noted that if an event occurred with the plant in a reduced inventory or mid-loop condition, the licensee's long-standing practice of iteratively adjusting the purge valves could not be relied upon to ensure that the purge valves would provide containment integrity and during that postulated event access to the valves would be prohibited.

A NRC headquarters Risk Analyst performed an evaluation of the issue and concluded that the matter was of very low safety significance (Green). The risk metric used of ascertaining safety significance was Large Early Release Frequency. The containment leakage rate was estimated at 4 percent volume/day, assuming a pressure of 15 psig and an equivalent bypass diameter of 3.23 inches. Information from NUREG-1493, "Performance-Based Containment Leak-Test Program," and NUREG/CR 6144, "Surry Shutdown Probabilistic Risk Assessment," was used to establish a threshold of 100 percent volume/day before the performance issue could be of low to moderate safety significance. This URI remains open pending final significance determination of the second example associated with the URI regarding the aluminum cover on the containment emergency hatch as discussed in IR 50-269,270,287/00-07 (Section 1R20.2).

4OA6 Management Meetings

Exit Meeting

The inspectors presented the inspection results to Mr. Bruce Hamilton, Manager of Engineering and other members of licensee management at the conclusion of the inspection on July 3, 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.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Batson, Mechanical/Civil Engineering Manager
T. Curtis, Reactor & Electrical Systems Manager
W. Foster, Safety Assurance Manager
B. Hamilton, Manager of Engineering
D. Hubbard, Modifications Manager
R. Jones, Station 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, CLOSED, AND DISCUSSED

Opened

50-269/02-02-03	URI	Reactor Pressure Boundary Leakage During Operation (Section 4OA5.2)

Opened and Closed

50-269/02-02-01	NCV	Failure to Follow Procedures Resulting in Conducting Penetrant Examination on the Wrong Weld (Section 1R08)
50-269,270,287/02-02-02	NCV	Failure to Complete a Timely Operability Evaluation for Failure of Non-Seismic Piping in the Control Rooms (Section 4OA5.1)

Previous Items Closed

50-269/2000-004	LER	Non-Compliance with Surveillance Interpretation due to Mis-communication (Section 4OA3)
50-269,270,287/01-08-05	AV	Failure to Correctly Identify and Evaluate a Condition Adverse to Quality Involving a Potential Control Room Flooding Issue (Section 4OA5.1)

2515/145	TI	Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01) - Unit 1 only (Section 4OA5.2)
50-269,270,287/98-03-08	URI	Licensing Basis Issues With Control Room Habitability (Section 4OA5.3)

Items Discussed

50-269,270,287/00-05-11	URI	Operation in Mid-Loop with Containment Purge Valves that Subsequently Failed to Hold Design Pressure (Section 4OA5.4)

LIST OF ACRONYMS

AFIS	-	Automatic Feedwater Isolation System
AV	-	Apparent Violation
CAP	-	Corrective Action Program
CCW	-	Condenser Circulating Water
CFR	-	Code of Federal Regulations
CRDM	-	Control Rod Drive Mechanism
DEC	-	Duke Energy Corporation
EOC	-	End-of-Cycle
HPI	-	High Pressure Injection
HPSW	-	High Pressure Service Water
HX	-	Heat Exchanger
IR	-	Inspection Report
ISI	-	Inservice Inspection
KHU	-	Keowee Hydro Unit
LAR	-	License Amendment Request
LER	-	Licensee Event Report
LPI	-	Low Pressure Injection
LPT	-	Liquid Penetrant
MT	-	Magnetic Particle
NCV	-	Non-Cited Violation
NDE	-	Non-Destructive Examination
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
NSD	-	Nuclear System Directive
NSM	-	Nuclear System Modification
ONS	-	Oconee Nuclear Station
PIP	-	Problem Investigation Process report
PMT	-	Post-Maintenance Test
PT	-	Performance Test
PWSCC	-	Pure Water Stress Corrosion Cracking
RBCU	-	Reactor Building Cooling Unit
RT	-	Radiographic
SDP	-	Significance Determination Process
SSC	-	Structure, System and Component

SSF	-	Standby Shutdown Facility
TI	-	Temporary Instruction
TMI	-	Three Mile Island
TS	-	Technical Specification
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
UT	-	Ultrasonic
WO	-	Work Order

LIST OF DOCUMENTS REVIEWED

(Section 1R07.2)

Procedures and Completed Procedure Testing Data

MP/0/A/1100/015, Cooler - LPI (Decay Heat Removal) - Chemical Cleaning, Revision 11, completed 11/8/01 (Unit 3)
PT/0/A/0251/018, LPI Cooler Test, Revision 17, completed 4/16/00 (Unit 3)
PT/3/A/-160/003, Component Test of ES Channels 5 & 6, completed 11/27/01
PT/3/A/0251/23, Low Pressure Service Water System Flow Test, Revision 6, completed 1/28/97
PT/0/A/0160/006, Reactor Building Cooling Unit Performance Test, Revision 21,completed 4/30/01 (Unit 3)
PT/0/A/0160/002, Reactor Building Cooling Unit Air Flow Test, Revision 10, completed 3/29/01 (Unit 3)
PT/3/A/0251/001, Low Pressure Service Water Pump Test, Revision 65, completed 4/9/02
PT/1/A/0251/001, Low Pressure Service Water Pump Test, Revision 73, completed 4/4 & 5/02
TT/1/A/0251/073, Setup of LPSW Pump Packing Seal Water Regulator, Revision 0, 7/9/01

PIPs Generated

02-03206, RBCU Procedures Enhancements
02-03220, Completed Test Procedure Lost Prior to Document Storage
02-03186, Valve Pits Contain Standing Water
02-03182, MCE should Evaluate CCW Crossover Valve Leakage
01-00414, Life of Non-metal Expansion Joints
01-00162, LPSW Pump Bearing Particle Count Levels

Support Documents

Keowee Project, FERC Project No. 2503-SC, Sixth Five-Year Safety Inspection, dated March 2001
Duke Power Company Group Environment, Health, and Safety - Corbicula Populations and Their Biofouling Potential In the Oconee Nuclear Station Intake Structures in 2000, dated May 4, 2001
Calculation OSC-3531, DHR Coolers Tube Plugging Criteria - Type IV, Revision 1
Calculation OSC-4156, U2 LPI Heat Exchanger Performance Calculation, Revision 9
Calculation OSC-4338, U3 LPI Heat Exchanger Performance Calculation, Revision 7

PIPs Reviewed

00-02515, 3A LPI Cooler Operability
02-01347, CCW Valve Covers
02-02813, Seal Water Failed to Meet Flow Rate

Works Orders/Requests Reviewed

98151588, 91044362, 91044370

Valve and Component History Data Reviewed on the Following Components

0 LPSV001, 1 CCWVA0004,1 ESVVA001, 1 ESVVA0002, 1 ESVVA0028, 1 ESVVA0029, 1 HPSFL0001, 1 HPSFL009, 1 HPSVA0061, 2 LPSFL0002, 2 LPSVA0149, 2 LPSVA0251, 2 LPSVA0252, 0 LPSFL000A, 0 LPSFL000B, 0 LPSFL000C, 0 LPMR000APUM, 0 LPMR000BPUM, 0 LPMR000CPUM, 0 LPSPU000A, 0 LPSPU000B, 0 LPSPU000C, 1 CCWEV0010, CCWEV0011, 1 CCWEV0012, CCWEV0013, 1 CCWVA0010, 1 CCWVA0011, 1 LPSEV0139, 2 CWEV0010, 2 CWEV0011, 2 CWEV0012, 2 CWEV0013, 2 LPSEV0139, 3 CCWEV0010, CCWEV0011, CCWEV0012,CCWEV0013, 3 CCWEV0268, 2 CCWEV0287, 3 CCWVA0013, 3 LPSFL000A, 3LPSFL000B, 3 LPSMR0001PUM, 3 LPSMR0002PUM, 3 LPSPU0001, 3 LPSPU0002, 3LPSVA0196

(Section 1R08)

Procedures

Duke Nondestructive Examination Procedure NDE-25, Magnetic Particle Examination
Duke Nondestructive Examination Procedure NDE-35, Liquid Penetrant Examination
Duke Nondestructive Examination Procedure NDE-600, Ultrasonic Examination of Similar Metal Welds in Ferritic and Austenitic Piping
Duke Nondestructive Examination Procedure NDE-946, Ultrasonic Thickness Measurement
Framatome Procedure 54-ISI-800-03, Remote Ultrasonic Examination of Reactor Vessel Welds in Accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6
Duke Nondestructive Examination Procedure NDE-105, Radiographic Examination of Oconee Nuclear Station Thermal Sleeves

Examination Reports and Others

Ultrasonic Data Sheet for Planar Flaw Sizing Report for Component/Weld ID 1-PIB1-5 ISI Item No. B09.011.036, dated April 3, 2002
Erosion/Corrosion Inspection Report Form for Component ID. 1-CDH-006
Liquid Penetrant Examination Report for Weld/ID No. 1-PIB1-12
Drawing No. 6009329, Oconee-1 10 Year RV ISI Logistics Plan URSULA Examination, Sheet 2 of 14
PIP O-01-04764, Reactor Cooling Discharge Pump Thermal Sleeves
PIP O-01-01876, QA1 CCW Pump Sent to Non-qualified Supplier for Re-furbishing
PIP O-02-01762, Liquid Penetrant Examination on Wrong Component

(Section 4OA5.2)

Procedures

Framatome Procedure 54-ISI-100-06, Remote Ultrasonic Examination of CRDM Nozzles
Duke Procedure NDE-35, Liquid Penetrant Examination

Examination Report and Others

Qualification and Training Records for NDE Examiners
PIP O-02-01402, Reactor Vessel Head CRDM Nozzle Leakage
Framatome Oconee Unit 1 CRDM Nozzle Ultrasonic Examination Results for Nozzles 1, 5, 7, 8, and 9