



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 26, 2006

Duke Power Company, LLC d/b/a
Duke Energy Carolinas, LLC (Duke)
ATTN: Mr. B. H. Hamilton
Site Vice President
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - INTEGRATED INSPECTION REPORT
05000269/2006004, 05000270/2006004, 05000287/2006004, AND
INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION
REPORT 07200040/2006001

Dear Mr. Hamilton:

On September 30, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station. The enclosed report documents the inspection findings which were discussed on October 5, 2006, with you and 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, no findings of significance were identified. However, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest this NCV, 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, D.C. 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Oconee Nuclear Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and any response 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/

Michael E. Ernstes, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287, 72-40

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

Enclosure: NRC Integrated Inspection Report 05000269/2006004, 05000270/2006004, 05000287/2006004 and 07200040/2006001 w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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/

Michael E. Ernstes, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287, 72-04

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

Enclosure: NRC Integrated Inspection Report 05000269/2006004, 05000270/2006004, 05000287/2006004 and 07200040/2006001 w/Attachment: Supplemental Information

X SISP REVIEW COMPLETE: Initials: _____ ☐ SISP REVIEW PENDING*: Initials: _____ *Non-Public until the review is complete
X PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE X NON-SENSITIVE
ADAMS: X Yes ACCESSION NUMBER: _____

OFFICE	RII/DRP	RII/DRP	RII/DRP	RII/DRS	RII/DRS	RII/DRS	RII/DRS
SIGNATURE	DWR /RA/	GAH /RA/	ETR /RA/	MSA /RA/	JDF /RA/	BWM /RA/	LMC /RA/
NAME	DRich	GHutto	ERiggs	MScott	JFuller	BMiller	LCain
DATE	10/26/2006	10/25/2006	10/25/2006	10/25/2006	10/25/2006	10/25/2006	10/25/2006
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICE	RII/DRS	RII/DRS	RII/DRS				
SIGNATURE	DLM /RA/	WRL /RA/	PKV /RA/				
NAME	DMas-Penaranda	WLewis	KVanDoorn				
DATE	10/26/2006	10/25/2006	10/25/2006				
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY

DOCUMENT NAME: C:\FileNet\ML062990358.wpd

cc w/encl:

B. G. Davenport
Compliance Manager (ONS)
Duke Energy Corporation
Electronic Mail Distribution

Lisa Vaughn
Associate General Counsel
Duke Energy Corporation
526 South Church Street
Mail Code EC 07H
Charlotte, NC 28202

Timika Shafeek-Horton
Assistant General Counsel
Duke Energy Corporation
526 South Church Street-EC07H
Charlotte, NC 28202

David A. Repka
Winston & Strawn LLP
Electronic Mail Distribution

Beverly Hall, Acting Director
Division of Radiation Protection
N. C. Department of Environmental
Health & Natural Resources
Electronic Mail Distribution

Henry J. Porter, Assistant 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

R. L. Gill, Jr., Manager
Nuclear Regulatory Issues
and Industry Affairs
Duke Energy Corporation
526 S. Church Street
Charlotte, NC 28201-0006

Charles Brinkman
Director, Washington Operations
Westinghouse Electric Company
12300 Twinbrook Parkway, Suite 330
Rockville, MD 20852

Distribution w/encl (See page 4)

Letter to B. H. Hamilton from Michael E. Ernstes dated October 26, 2006

SUBJECT: OCONEE NUCLEAR STATION - INTEGRATED INSPECTION REPORT
05000269/2006004, 05000270/2006004, 05000287/2006004, AND
07200040/2006001

Distribution w/encl:

L. Olshan, NRR
C. Evans
L. Slack, RII EICS
OE Mail
RIDSNNRRDIRS
PUBLIC

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-269, 50-270, 50-287, 72-40

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

Report Nos: 05000269/2006004, 05000270/2006004, 05000287/2006004, and
07200040/2006001

Licensee: Duke Power Company

Facility: Oconee Nuclear Station, Units 1, 2, and 3

Location: 7800 Rochester Highway
Seneca, SC 29672

Dates: July 1, 2006 - September 30, 2006

Inspectors: D. Rich, Senior Resident Inspector
A. Hutto, Resident Inspector
E. Riggs, Resident Inspector
M. Scott, Senior Reactor Inspector (Sections 1R02, 1R17, 1R07,
and 4OA5.3)
J. Fuller, Reactor Inspector (Section 1R07)
B. Miller, Reactor Inspector (Section 1R07)
L. Cain, Senior Reactor Inspector (Sections 1R02 and 1R17)
D. Mas-Penaranda, Reactor Inspector (Sections 1R02 and 1R17)
W. Lewis, Reactor Inspector (Section 1R02 and 1R17)
K. Van Doorn, Senior Reactor Inspector (Sections 4OA2 and
4OA5.4)

Approved by: Michael E. Ernstes, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000269/2006004, IR 05000270/2006004, IR 05000287/2006004, IR 07200040/2006001, 07/01/2006 - 09/30/2006; Oconee Nuclear Station, Units 1, 2, and 3; Routine Integrated Inspection Report.

The report covered a three-month period of inspection by the onsite resident inspectors and announced regional-based inspections conducted by seven reactor inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

One violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation is listed in Section 4OA7.

Enclosure

REPORT DETAILS

Summary of Plant Status:

Unit 1 began the report period at 100 percent rated thermal power (RTP). On September 23, 2006, a unit coast down commenced in advance of the end-of-cycle (EOC) 23 refueling outage (RFO). The unit ended the inspection period at 91 percent RTP.

Unit 2 entered the report period at approximately 100 percent RTP. The unit was reduced to approximately 88 percent RTP on July 9, 2006, to perform turbine valve movement testing. The unit was returned to 100 percent RTP on the same day. On September 1, 2006, the unit was reduced to approximately 18 percent RTP and taken off line due to elevated main turbine oil temperatures. Following repairs to the main turbine oil cooler, the unit was placed on-line and achieved 100 percent RTP on September 9, 2006. The unit operated at or near 100 percent RTP for the remainder of the inspection period.

Unit 3 entered the report period at approximately 100 percent RTP. On August 16, 2006, group 6, rod 6 dropped into the core. On August 18, 2006, the unit was taken off-line and entered Mode 3. On August 20, 2006, the unit was taken critical and achieved 100 percent RTP on August 22, 2006, where it operated for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R02 Evaluations of Changes, Tests or Experiments

a. Inspection Scope

The inspectors reviewed selected samples of evaluations to confirm that the licensee had appropriately considered the conditions under which changes to the facility, Updated Final Safety Analysis Report (UFSAR), or procedures may be made, and tests conducted, without prior NRC approval. The inspectors reviewed evaluations for seven changes and additional information, such as calculations, supporting analyses, the UFSAR, and drawings to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment. The seven evaluations reviewed are listed under the List of Documents Reviewed in the Attachment to this report.

The inspectors also reviewed samples of changes for which the licensee had determined that evaluations were not required, to confirm that the licensee's conclusions to "screen out" these changes were correct and consistent with 10 CFR 50.59. The twenty-one "screened out" changes reviewed are listed under the List of Documents Reviewed in the Attachment to this report.

Enclosure

The inspectors also reviewed programmatic Problem Investigation Process reports (PIPs) to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Walkdown

a. Inspection Scope

The inspectors conducted partial equipment 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 (OOS). 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 following three systems were included in this review:

- Unit 1, 2 and 3 main feeder busses, standby busses, emergency feedwater systems, the standby shutdown facility (SSF) and CT-5 during Keowee Hydroelectric Unit (KHU) out-of-tolerance test
- The A high pressure service water (HPSW) train with the B train OOS for maintenance
- Unit 1 B low pressure injection (LPI) train with the A train OOS for maintenance

b. Findings

No findings of significance were identified.

.2 Complete Walkdown of the Unit 1 HPSW System

a. Inspection Scope

The inspectors performed a system walkdown on accessible portions of the Unit 1 HPSW system. The inspectors focused on verifying proper valve and breaker positioning, power availability, no damage to piping or cable tray structural supports, and material condition.

Documents and drawings reviewed for this semi-annual inspection sample included:

- OP/0/A/1104/011, HPSW
- PT/0/A/0250/005, HPSW Pump Functional Test

Enclosure

- PT/1/A/0152/024, HPSW System Valve Stroke Test
- UFSAR Section 9.2, Water Systems
- Selected Licensee Commitment; 16.9.8a, HPSW Requirements to Support Loss of Low Pressure Service Water (LPSW) and Condenser Circulating Water (CCW)
- Drawings; OFD 124C-1.1, OFD 124C-1.2, OFD 124C-1.3, OFD 124C-1.4

A review of PIPs and open maintenance work orders was performed to verify that material condition deficiencies did not significantly affect the HPSW system's ability to perform its design functions and appropriate corrective action was being taken by the licensee.

The inspectors conducted a review of the system engineer's trending data and system health reports to verify that appropriate trending parameters were being monitored and that no adverse trends were noted.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Area Walkdowns

a. Inspection Scope

The inspectors conducted tours in 14 areas of the plant 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 the probabilistic risk assessment based sensitivity studies for fire-related core damage sequences. Inspections of the following 14 areas were conducted during this inspection period:

- Unit 3 Cable Spreading Room (1)
- Unit 1, 2 and 3 Main, Auxiliary and Start Up Transformers (3)
- Unit 1, 2 and 3 Equipment Rooms (3)
- Unit 1, 2 and 3 Turbine Building Basement Level (3)
- Unit 1, 2 and 3 Turbine Building Ground Level (3)
- CT-5 (1)

b. Findings

No findings of significance were identified.

.2 Fire Drill Observation

a. Inspection Scope

As part of the annual fire drill observation, the inspectors evaluated the self-contained breathing apparatus (SCBA) program by reviewing training records and associated course content summaries for initial and refresher training, the SCBA maintenance program and procedures, and verified that SCBAs were available and properly stored.

b. Findings

No findings of significance were identified.

1R07 Biennial Heat Sink Performance

a. Inspection Scope

The inspectors reviewed inspection records, test results, maintenance work orders, and other documentation to ensure that heat exchanger (HX) deficiencies that could mask or degrade performance were identified and corrected. Test procedures and records were also reviewed to verify that these were consistent with Generic Letter (GL) 89-13 licensee commitments, and industry guidelines. The inspectors reviewed the following risk significant HXs:

- The Low Pressure Injection/Decay Heat Removal (LPI/DHR) System HX (3A - performance testing and cleaning, 1B - eddy current testing)
- Keowee Generator Cooling HXs
- Reactor Building Cooling Units (RBCUs) (Units 1, 2, and 3 - mitigation of air flow stall conditions, Unit 2 - all aspects of HX performance)

The inspectors reviewed support equipment and components associated with the heat sink function such as: the Essential Siphon Vacuum (ESV) System vacuum pump performance testing, KHU Generator Cooling units instrumentation work orders, Emergency Circulation Cooling Water (ECCW) system performance testing, and inspection reports for the three dikes and dams associated with Lake Keowee, the ultimate heat sink source.

The inspectors reviewed HX inspection and cleaning work instructions, work maintenance history, and completed inspection records for all the safety related HXs selected. The documents were reviewed to verify inspection methods were consistent with industry standards, to verify HX design margins were being maintained, and to verify overall performance of the HXs under the current maintenance frequency was adequate.

The general health of the service water system was assessed by the inspectors through review of design basis documents, system health reports, inservice testing results, and HX performance testing calculations. Additionally, the inspectors held discussions with the system engineers for low and high pressure service water and KHU.

Enclosure

The inspectors verified that the design basis was being maintained. Also verified was adequate service water system performance under current preventive maintenance, chemical treatments, cleaning, inspections, and test frequencies. The inspectors physically walked down accessible portions of the ESV, ECCW, KHU and its dam.

The inspectors verified that LPSW system corrosion and degradation were being monitored, and reviewed licensee LPSW pipe replacement and material condition action plans and maintenance inspection findings. Plant corrective action reports were reviewed for potential common cause problems and problems which could affect system performance to confirm that the licensee was entering problems into the corrective action program and initiating appropriate corrective actions. Documents reviewed are listed under the List of Documents Reviewed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification

a. Inspection Scope

The inspectors observed licensed operator simulator training on September 20, 2006, to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The scenario involved entry into multiple abnormal procedures (APs) which included AP-34, Degraded Grid, AP-16, Abnormal Reactor Coolant Pump (RCP) Operation, due to low oil pot levels and high vibrations, and AP-22, Loss of Instrument Air. The scenario ultimately led to a manual reactor trip and entry into the emergency procedure immediate manual actions. 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 Technical Specification (TS) actions and properly classify the simulated event.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing routine maintenance activities. This review included an assessment of the licensee's practices pertaining to the identification, scoping, and handling of degraded equipment conditions, as well as

Enclosure

common cause failure evaluations. For each item selected, the inspectors performed a detailed review of the problem history and surrounding circumstances, evaluated the extent of condition reviews as required, and reviewed the generic implications of the equipment and/or work practice problem. For those systems, structures, and components (SSCs) scoped in the maintenance rule per 10 CFR 50.65, the inspectors verified that reliability and unavailability were properly monitored and that 10 CFR 50.65 (a)(1) and (a)(2) classifications were justified in light of the reviewed degraded equipment condition. The inspectors reviewed the following items:

- PIP O-06-5224, Unit 3 Dropped Control Rod
- PIP O-06-5768, Unit 1, 2 and 3 Turbine Driven Emergency Feedwater (TDEFW) Governor/Debris Issues

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluations

a. Inspection Scope

The inspectors evaluated the following attributes for the eight selected SSCs and activities 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 unforeseen 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.

- Orange Operational Risk Assessment Monitor (ORAM) risk condition, Critical Activity plan for HPSW maintenance and modification work
- PIP O-06-4982, Unit 3 A2 Moisture Separator Reheater high level trip switch failed resulting in a Yellow ORAM risk condition
- PIP O-06-5404, Unit 2 AMSAC/DSS Channel 1 OOS during Reactor Protective System (RPS) testing
- PIP O-06-5522, 3FDW-315 Instrument Air problems during RPS testing
- PIP O-06-5742, Unexpected Orange ORAM risk condition due to KHU-2 OOS due to exciter critical alarms while CT-5 OOS for planned maintenance
- PIP O-06-6010, Carryover work from previous work week results in unexpected Red ORAM risk condition
- PIP O-06-6105, Unexpected Yellow ORAM risk condition due to Emergency Lockout of KHU-2
- Orange ORAM risk condition, Critical Activity Plan for KHU-2 Electrical Generator Forced Outage

b. Findings

No findings of significance were identified.

Enclosure

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected 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 condition for operations (LCOs). The inspectors reviewed the following six operability evaluations:

- PIP O-06-4055, One-inch, stainless steel pipe used in the LPI system has variations in wall thickness
- PIP O-06-4540, SSF B diesel engine jacket water expansion tank level less than standby level
- PIP O-06-4691, Unit 1 incore tubing leak at tank connection F-8
- PIP O-06-5078, Brake pad odor emanating from KHU-1 on unit startup
- PIP O-06-5768, Unit 1 TDEFW pump steam/speed control problem
- PIP O-06-6014, 2FDW-315 valve stroke failed to meet acceptance criteria

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

.1 Annual Review

a. Inspection Scope

The inspectors reviewed one modification package related to a safety significant system (NSM OD 100885, Cut and remove pipe between 1LP-168, 166 and 170) to verify that the associated systems' design bases, licensing bases, and performance capability would be maintained following the modifications; and that the modifications would not leave the plant in an unsafe condition. The associated 10 CFR 50.59 screenings/evaluations were also reviewed for technical accuracy and to verify license amendments were not required.

b. Findings

No findings of significance were identified

.2 Biennial Review

a. Inspection Scope

Enclosure

The inspectors evaluated design change packages for six modifications, in the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstone areas, to evaluate the modifications for adverse effects on system availability, reliability, and functional capability. The modifications and the associated attributes reviewed are as follows:

OD500664, High Pressure Injection (HPI) Emergency Flow Setpoint Revision (Mitigating Systems)

- Energy Needs
- Control Signals
- Post-Installation Testing
- Update of Licensee Documents
- Functional Testing Adequacy and Results

OE18851, LPI Orifice Changeout (Mitigating Systems)

- Materials/ Replacement Components Control Signals
- Control Signals
- Failure Modes
- Process Medium
- Post-Installation Testing
- Update of Licensee Documents
- Functional Testing Adequacy and Results

OD100291, 100293, 100308, and 100427, RCP 50G Relays (Mitigating Systems)

- Energy Needs
- Control Signals
- Process Medium
- Post-Insulation Testing
- Update of Licensee Documents
- Functional Testing Adequacy and Results

OD400005, KHU Exciter Control Logic Change to Delay Generator Field Flash (Initiating Events)

- Energy Needs
- Control Signals
- Process Medium
- Timing
- Post-Insulation Testing
- Update of Licensee Documents
- Functional Testing Adequacy and Results

ONOE-17652, Replace RCP 2A1 Protective Relays (Initiating Events)

- Materials/ Replacement Components Control Signals
- Energy Needs
- Control Signals
- Process Medium
- Timing
- Post-Insulation Testing
- Update of Licensee Documents

Enclosure

- Functional Testing Adequacy and Results
- Vendor Manuals

NSM ON-53110/00/00/AL1, SSF Pressurizer Heater Capacity (Mitigating System, Barrier Integrity)

- Materials/ Replacement Components Control Signals
- Energy Needs
- Control Signals
- Failure Modes
- Post-Insulation Testing
- Update of Licensee Documents
- Functional Testing Adequacy and Results

For selected modification packages, the inspectors observed the as-built configuration. Documents reviewed included procedures, engineering calculations, modification design and implementation packages, work orders, site drawings, corrective action documents, applicable sections of the living UFSAR, supporting analyses, TSs, and design basis information.

The inspectors also reviewed selected PIPs associated with modifications to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

The inspectors reviewed PMT procedures and/or witnessed test activities, as appropriate, for selected 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 five tests:

- PT/0/A/0600/021, SSF Diesel Generator Operation following replacement of the B diesel right bank jacket water pump
- PT/2/A/0600/013A, 2A Motor Driven Emergency Feedwater (MDEFW) pump test following lubrication and the installation of oil sampling ports
- PT/1/A/0600/012, Unit 1 TDEFW pump test following pump lubrication

Enclosure

- PT/2/A/0600/012, Unit 2 TDEFW pump test following control valve/governor inspections and maintenance
- PT/0/A/0400/015, SSF Submersible pump test following the installation of plug connection on the pump's cable reel

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors conducted reviews and observations for selected 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 September 23, 2006, and September 30, 2006, the following activities related to the KHU-2 electrical generator forced outage were reviewed for conformance to applicable procedures and selected activities associated with each evaluation were witnessed:

- Licensee Outage Risk Management Plan/Assessment
- Licensee Control of Outage Activities
- Clearance Activities
- Unit 1, 2 and 3 Emergency Electrical Power Availability
- Identification and Resolution of Problems
- Outage Configuration Management
- Emergent Work

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

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

- PT/0/A/0620/018, KHU Out of Tolerance Test
- IP/0/B/0276/002, Unit 3 Anticipated Transient Without Scram (ATWS) Mitigation System AMSAC/DSS Logic Test
- PT/0/A/0400/004, SSF Diesel Engine Service Water Pump Test (IST)

Enclosure

- PT/0/A/0400/019, SSF Sump Pump Discharge Check Valve Test
- WO 98753857, CCW-100 Check Valve Inspection
- PT/2/A/0150/22M, 2FDW-315 Stroke Test (IST)
- PT/0/A/0620/019, Keowee Over Frequency Protection Functional Test

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed documents and observed portions of the installation of one temporary modification (TSM OD501058, Temporary Installation of Plug in SSF Sewer Vent). 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.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

Emergency Preparedness Drill (Simulator based)

a. Inspection Scope

The inspectors observed and evaluated a simulator based emergency preparedness drill from both the simulator and the technical support center, held on August 30, 2006. The drill scenario involved a security event with the initial classification of an "Unusual Event" due to a credible site-specific security threat notification. The scenario progressed to an "Alert" condition due to hostile action occurring in the owner control area. Additional instrument failures occurred throughout the scenario. The operators were observed to determine if they properly classified the event and made the appropriate notifications and if the counties, state and NRC were promptly notified of the drill condition. The inspectors observed the post drill critique to verify that the licensee captured any drill deficiencies or weaknesses.

b. Findings

No findings of significance were identified.

Enclosure

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

Annual Sample Review

a. Inspection Scope

The inspectors selected PIP O-04-00518 for review. This PIP involved the licensee's evaluation for Violation 05000269,270,287/2004007-01; Failure to Obtain Prior NRC Approval to a Change to the Facility Involving Unreviewed Safety Questions on High Energy Line Break Analysis. This PIP was previously reviewed (see NRC Reports 05000269,270,287/2004005, 2005002, and 2005005) to verify that the licensee had performed an adequate Root Cause (RC) evaluation and initiated appropriate interim and long term corrective actions. Short term actions had included additional rigorous in line review of evaluations, increased screening assessments, and lessons learned training. The inspectors noted previously that long term corrective actions were incomplete and the licensee had not conducted an extent of condition review required by the licensee's process. The inspectors reviewed the new computerized 10 CFR 50.59 process and associated training, related licensing basis training conducted by the licensee, the extent of condition review and associated corrective actions (PIP O-06-02008), recent oversight results, and a screening assessment. In addition, the inspectors reviewed 10 selected 10 CFR 50.59 documents which were the subject of the licensee's extent of condition and screening assessment.

b. Findings

No findings of significance were identified.

The extent of condition was reasonable with appropriate corrective actions initiated. The new computerized 10 CFR 50.59 process was a clear improvement and contained helpful cross links to additional information. A reasonable schedule for final implementation, after a validation period, has been established as approximately November, 2006. The licensee plans to continue the additional in line reviews of evaluations and the screening assessments. The inspectors concluded that the licensee had made sufficient progress and provided reasonable controls to assure quality 10 CFR 50.59 reviews.

4OA3 Event Followup

.1 PIP O-06-6105, Emergency Lockout of KHU-2

a. Inspection Scope

On September 23, 2006, an emergency lockout of KHU-2 occurred. The inspectors evaluated the event to assess the overall impact on the plant and mitigating actions. As appropriate, the inspectors: (1) observed plant parameters and status, including

Enclosure

mitigating systems/trains; (2) determined alarms/conditions preceding and/or indicating the event; (3) evaluated performance of mitigating systems and licensee actions; and (4) confirmed that the licensee properly classified the event in accordance with emergency action level procedures and made timely notifications to NRC and state/county governments as required.

b. Findings

No findings of significance were identified.

.2 Unit 3 Dropped Rod

a. Inspection Scope

On August 16, 2006, Unit 3 dropped Regulating Group 6, Rod 6 during steady state operations. The dropped rod was a result of the digital rod control system inhibiting gating pulses to both redundant power supplies for that rod to protect the system from a high supply voltage from the regulated power supplies. The integrated control system automatically ran back power to approximately 55 percent as a result of the dropped rod as expected. The inspectors responded to the site and verified that TS and core operating limits report requirements were met by the licensee for quadrant power tilt ratio, axial flux and rod alignment. The inspectors also verified that the appropriate abnormal operating procedures were implemented by the operators, and that required adjustments were made to nuclear overpower trip setpoints. The unit was ultimately taken to mode 3 for troubleshooting and repairs and was returned to 100 percent power on August 22, 2006.

b. Findings

No findings of significance were identified.

.3 (Closed) Licensee Event Report (LER) 05000287/2006-01-00, Actuation of Emergency Generator Due to Spurious Transfer Lockout. The inspectors' inspection activities and evaluation of the risk significance of this event are discussed in detail in Inspection Report (IR) 050000269,270,287/2006003, Section 4OA3, and documented as NCV 05000287/2006003-06. This LER is closed.

.4 (Closed) LER 05000270/2006-01-00, Loss of Isolation During Pump Instrument Check Results in Reactor Trip. On April 12, 2006, while operating at 100 percent RTP with testing of the 2B2 RCP power transducer in progress, Unit 2 automatically tripped. The event was caused by the unexpected loss of the RCP during the testing of the pump power transducer, which provides computer indication of the pump's power consumption. The pump trip occurred due to a failure of an electrical isolator between the power transducer being tested and the operating circuit while connected to the test equipment. This resulted in a current imbalance between the three phases of the pump operating circuit which was sensed by the pump's protective relaying. The protective relaying caused the pump to trip automatically, which resulted in a reactor trip due to

Enclosure

insufficient reactor coolant flow for that reactor power level. The licensee entered this issue into their corrective action program as PIP O-06-2079. This LER is closed.

- .5 (Closed) LER 05000287/2005-01-00, TS LCO Allowed Outage Time and Required Completion Time Exceeded. The inspectors' inspection activities and evaluation of the risk significance of this event are discussed in detail in IR 050000269,270,287/2005004 as Unresolved Item (URI) 05000287/2005004-06, and documented as a licensee identified violation in Section 4OA7 of IR 050000269,270,287/2005005. This LER is closed.

4OA5 Other Activities

- .1 (Closed) URI 05000269/2006003-04, Inadequate Foreign Material Exclusion Controls for the Unit 1, A and B Train Reactor Building Emergency Sump (RBES) Suction Lines. This issue was discussed in detail in IR 05000269,270,287/2006003 and was left unresolved pending further inspection and assessment. Similar to URI 05000270/2005005-02, which dealt with foreign material in the Unit 2 RBES, this finding could have resulted in the failure of the B train LPI pump during the recirculation phase of a postulated medium break or large break loss of coolant accident (LOCA) scenario. However, since this issue impacted only one LPI pump, it is considered to be of very low safety significance (Green).

Because of the very low safety significance of this issue, because it has been entered into the licensee's corrective action program as PIP O-06-3928, and because it was identified by the licensee, this violation is being treated as a licensee identified non-cited violation (NCV), which is documented in Section 4OA7 of this report.

- .2 Operation of an Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

Under the guidance of Inspection Procedure 60855.1, the inspectors reviewed the licensee's procedure for loading spent fuel shipments to the ISFSI (MP/0/A/1500/023). The inspectors reviewed Oconee Nuclear Engineering Instruction ONEI-400 data sheets for Dry Storage Certification (DSC) for ISFSI shipments DSC-085, DSC-86, and DSC-087 and discussed spent fuel documentation with the cognizant reactor engineer to verify that the licensee had identified each fuel assembly, recorded the parameters and characteristics of each fuel assembly, and had maintained a record of each fuel assembly as a controlled document. The inspectors also observed selected licensee activities related to the shipment DSC-85 to verify that they performed these activities in a safe manner and in compliance with approved procedures.

The inspectors reviewed selected completed procedures for physical inspection and inventory of the ISFSI (PT/0/A/0750/003, Physical Inventory of Reportable Special Nuclear Material, Enclosure 13.6, Dry Cask Storage Inspections) and completed ONEI-400s to verify that records had been established for all spent fuel in storage in the ISFSI, that duplicate records were maintained by the licensee, and that an inventory had been conducted on all spent fuel stored in the ISFSI at least every 12 months.

Enclosure

The inspectors reviewed selected screening evaluations performed pursuant to 10 CFR 72.48 since January 1, 2005. There were no 72.48 evaluations performed during this period, as all procedure changes screened as not needing a 72.48 evaluation. The inspectors reviewed the following 72.48 screening evaluations:

- XSFM-002, Revision 12, Workplace Procedure for Selecting Spent Fuel for Use of the NUHOMS-24P Storage System at the Oconee General licensee Independent Spent Fuel Storage Installation
- XSFM-008, Revision 0, Workplace Procedure for Selecting Spent Fuel for Use of the NUHOMS-24PHB Storage System at the Oconee General licensee Independent Spent Fuel Storage Installation
- MP/0/A/1500/023, Revision 0, Independent Spent Fuel Storage Installation Phase V DSC Loading and Storage
- XSFM-008, Revision 1, Workplace Procedure for Selecting Spent Fuel for Use of the NUHOMS-24PHB Storage System at the Oconee General licensee Independent Spent Fuel Storage Installation
- MP/0/A/1500/023, Revision 3, Independent Spent Fuel Storage Installation Phase V DSC Loading and Storage

b. Findings

No findings of significance were identified.

- .3 (Closed) URI 05000269,270,287/2006006-02, Possible Vacuum Breaker Failure Impact to Keowee Emergency Power Function. During the original inspection (IR 05000269, 270,287/2006-006), the inspectors determined that the MT-25 vacuum breakers on the KHUs have not been included in a preventive maintenance program (PIP 06-01183) and have not been in the scope for the maintenance rule and license renewal. The inspectors were concerned that normal operational testing may not be adequate to detect valve degradation. In addition, design aspects of the MT-25 vacuum breakers such as possible failure modes and significance were not available for review by the inspectors. This issue had remained unresolved pending the inspectors' review of the licensee's determination of any impacts the potential vacuum breaker failures could have on the Keowee emergency power function. Subsequently the licensee gathered information addressing the points of concern.

The licensee has entered the subject valves in their maintenance program, procured a new valve with valve parts, and have plans to rotate the installed valves through a preventive maintenance overhaul. Since there were no known failures since plant startup, there is no performance deficiency.

Existing testing assured valve closure. The valve had been observed to fail open during generator no-load operation. The equipment vendor provided technical information to

Enclosure

support that the valve failing open was not a major concern; therefore, there was no performance deficiency. The licensee was planning to enhance valve testing.

The vendor provided technical corroboration that the valve failing to open under a load rejection would result in possible KHU damage (PIP-06-1475). The existing licensee document (KC-0085, Keowee Active Valves) has the MT-25 valves listed as a single failure potential. Thus, if one KHU failed during a load rejection scenario, the second KHU would be available to support plant operation on an alternate power path to the plants. The inspectors found this explanation satisfactory.

The inspectors had thought the MT-25 valve was not in the licensee's maintenance rule program and was not identified as being in license renewal. Under their maintenance rule program, this licensee identifies basic system functions in lieu of specific components. As indicated in PIP 06-1183, a MT-25 operational state (valve in operation during a KHU no-load run during the original inspection) was evaluated under the KHU super-system function and thus the supporting equipment would be normally evaluated as to its impact on unit operation and operability. The licensee did add an additional definition to the KHU super-system boundary description of the program to describe the protective importance of the MT-25 valves and their impact on providing air admission for smooth unit operation. Due to the fact that the piping drawings had not clearly depicted the valves, the practical result was that the drawing did not capture the valves and associated piping for license renewal. A corrective action was added to fix the drawings and clearly identify the valves in licensee renewal documentation. The correction of the inadvertent omission is acceptable. The fact that the drawing did not clearly show the valve and piping is considered a minor issue without any performance deficiency.

Based on the above review and the lack of a significant deficient condition, URI 05000269,270,287/2006006-002 is considered closed. There were no violations of regulatory requirements.

- .4 (Closed) Violation (VIO) 05000269,270,287/2004007-01, Failure to Obtain Prior NRC Approval to a Change to the Facility Involving Unreviewed Safety Questions on High Energy Line Break Analysis. This violation is considered closed based on the review discussed in section 4OA2 above.

4OA6 Management Meetings (Including Exit Meeting)

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Bruce Hamilton, Site Vice President, and other members of licensee management at the conclusion of the inspection on October 5, 2006. 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

Enclosure

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

- Technical Specification 5.4.1 requires that written procedures shall be established, implemented, and maintained as recommended in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. Section 9.e of RG 1.33 recommends procedures be prepared for control of maintenance, repair, replacement, and modification work. Nuclear System Directive (NSD) 104, Material Condition/Housekeeping, Cleanliness/Foreign Material Exclusion and Seismic Concerns, contains requirements to prevent foreign object entry into plant systems and components. Contrary to the above, prior to June 14, 2006, adequate foreign material exclusion controls were not implemented for the Unit 1 RBES, in that on June 14 and 15, 2006, foreign material was discovered in the 1A and 1B RBES suction line. The risk significance and enforcement aspects of this issue were discussed in detail in IR 05000269,270,287/2006003 and Section 4OA5.1 of this report.

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

N. Alchaar, Civil Engineering
K. Alter, Mechanical Engineering Supervisor
L. Azzarello, Modification Engineering Manager
S. Batson, Superintendent of Operations
D. Baxter, Station Manager
R. Brown, Emergency Preparedness Manager
T. Bryant, Engineering Support
A. Burns, Civil Engineer, Reactor & Electrical Systems
B. Carney, Repair and Replacement Program
S. Capps, Mechanical/Civil Engineering Manager
T. Coleman, ISI Coordinator
N. Constance, Operations Training Manager
D. Covar, Training Instructor
C. Curry, Maintenance Manager
G. Davenport, Compliance Manager
K. Davis, Corporate Eddy Current Level III Examiner
P. Downing, Corporate Steam Generator Manager
C. Eflin, Requalification Supervisor
P. Earnhardt, Modifications Engineer
P. Fowler, Access Services Manager, Duke Power
T. Gillespie, Reactor and Electrical Systems Manager
J. Gilreath, Site Steam Generator Engineer
M. Glover, Engineering Manager
T. Grant, Engineering Supervisor, Reactor & Electrical Systems
R. Griffith, QA Manager
B. Hamilton, Site Vice President
L. Hekking, BACC Program
R. Hester, Civil Engineer
D. Hubbard, Training Manager
T. King, Security Manager
T. Ledford, Engineering Supervisor, Reactor & Electrical Systems
L. Libre, Engineering Supervisor
D. Mayes, Corporate Consultant Engineer
R. Murphy, Engineering Support
S. Neuman, Regulatory Compliance Group
L. Nicholson, Safety Assurance Manager
J. Patterson, Engineering Supervisor
W. Pursley, Radiation Protection Supervising Scientist
J. Rowell, Engineer, Reactor & Electrical Systems
J. Smith, Regulatory Affairs
B. Spear, Engineer, Reactor & Electrical Systems
J. Steele, Training Supervisor
J. Stinson, Engineer, Reactor & Electrical Systems

P. Stovall, SRG Manager
 F. Suchar, QC Supervisor
 S. Townsend, Keowee Operations
 J. Twiggs, Radiation Protection Manager
 J. Weast, Regulatory Compliance
 A. Well, Civil Engineer

NRC

M. Ernstes, Chief of Reactor Projects Branch 1
 L. Olshan, Project Manager, NRR

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

None

Closed

05000287/2006-01-00	LER	Actuation of Emergency Generator Due to Spurious Transfer Lockout (Section 4OA3.3)
05000270/2006-01-00	LER	Loss of Isolation During Pump Instrument Check Results in Reactor Trip (Section 4OA3.4)
05000287/2005-01-00	LER	TS LCO Condition Allowed Outage Time and Required Completion Time Exceeded (Section 4OA3.5)
05000269/2006003-04	URI	Inadequate Foreign Material Exclusion Controls for the Unit 1, A and B Train Reactor Building Emergency Sump Suction Lines (Section 4OA5.1)
05000269,270,287/2006006-02	URI	Possible Vacuum Breaker Failure Impact to Keowee Emergency Power Function (Section 4OA5.3)
05000269,270,287/2004007-01	VIO	Failure to Obtain Prior NRC Approval to a Change to the Facility Involving Unreviewed Safety Questions on High Energy Line Break Analysis (Section 4OA5.4)

Items Discussed

None

DOCUMENTS REVIEWED

Section 1R02: Evaluation of Changes, Tests, or Experiments

Full Evaluations

ONOE-18851, LPI Orifice Changeout
ONOE-16164, Leaking CRDM Nozzles
ONOE-17652, 17654 to 60, Replace RCP Protective Relays
ONOE-18036, SSF 10 Minute Transfer DBD Change
ONOE-17645, 18246, and 18799, Unit 3 T_{ave} Reduction Coastdown
NSM ON-53110/00/00/AL1, SSF PZR Heater Capacity
NSM ON-13098, Upper Surge Tank Protection

Screened Out Items

NSM ON-23073/00/00/AL2, EHC Upgrades
OD500664, HPI Emergency Flow Setpoint
OE500474, KHU MSU Transformer F/O Control Power Replacement
OE500768, PZR Safe End Socket Weld Connection Addition to Drawings
ONOE-16875, Perform Changes per CRACS Assessment
ONOE-18408, Replace 2MS-163
OD100291, 100293, 100308, and 100427, RCP 50G Relays
OD100476, U1 PZR Htr Grp C Feeder Breaker/Fuse Replacement
OD400005, KHU Exciter Control Logic Change to Delay Generator Field Flash
OD300590, Remove 150A Fuses for PZR Htr Bank 1 Controller
OD500007, U1&2 LWD Flow Restriction for a Aux Building Flood
OD100264, Modify U1 1A RBCU LPSW Supply
OE300052, Replace Defective Relay 83-2 in Transformer CT3
OE400170, Replace KHU Valve K2-WL-30
OE400198, DTA Replacement for DB-50 and DB-25 Breakers
OE500229, Replace EFW 7300 Control Card with a NLP G05 Card
OE500406, Alloy 600 Component Replacement for PZR
OE500497, Alloy 600 Vent Nozzle Replacement for PZR
OE500804, Weed Temperature Transmitter Replacement
ONOE-18110, Revise ONS EQCM
ONOE-18739, Replace U3 PZR Heater Controller

Corrective Action Documents (PIPs)

O-05-05496, KHU MSU XFMR Normal Selector Switch Fails To Energize Contactor
O-06-02713, Vendor Drawings not Entered into Equipment Data Base
O-06-02739, Traveler to Capture Safe End Machining Requirements
O-05-00729, Both Atmospheric Dump Lines on Unit 2's Main Steam Lines have Steam Leaking
O-05-02364, While performing 'As-Found' Valve Strokes on 1MS-161 and 163, Valves would not opened
O-02-03205, T_{ave} Reduction Consideration
O-05-02527, 1A2 RBCU Coil Interference

O-05-01052, 50.59 Evaluation for the RCP Protective Relay Replacement Modifications
O-02-01241, CT3 Radiator Fans Do Not Swap to Alternate Source Properly
O-04-01805, Review Westinghouse TB 04-6 for Applicability to Keowee

Work Orders

WO98770830, Remove 150A Fuses for PZR Htr Bank 1 Controller
WO98695896, Replace Relays 51X, 51Z, 81, 46, 87M, in 2TA3
WO98697905, Replace 83-2 Relay in CT3 Transformer
WO98375016, Weed Instrument Testing

Procedures

Nuclear System Directive 209, Rev 12, 10CFR 50.59 Process
IP/0/B/4980/551, Rev 2, SEL Type 551 Relay Test
IP/0/B/4980/701, Rev 3, SEL Type 701 Relay Test

Miscellaneous Documents

KM 301-0010, GE Power Transformer I/B
OSS-0254.00-00-1037, Rev 26, DBS for Main Steam
OSS-0254.00-00-4005, Rev 18, DBS for Design Basis Event
WSI Traveler No. 102459-02, Rev 0, 4-25-06, Weld ID #3-RC-0272-20V
OM 302-0711.002, SEL-551 Motor Protection Relay Settings
OM 302-0712.002, SEL-701 Motor Protection Relay Settings
TB-04-6, DTA (9026A05G01) Test Procedure

Drawings

KM-301-0001.001, Rev D12, KHU Elementary Diagram TR Vendor Drawing No. 364D968BW, Sheet 1, PO 7240021
KM-301-0002, Rev D9, KHU Elementary Diagram TR Vendor Drawing No. 364D968BW, Sheet 2, PO 7240021

KM-301-0007.002, Rev D9, KHU Connection Diagram Vendor Drawing No 744E211, Sheet 2, PO 7240021
OM-201.3228.001, Rev A1, Replacement [Pressurizer] Safe End
OM-201.3231.001, A1, ONS-1/2/3 Pressurizer Upper Level Sensing Nozzle Modification
OM-245-2195, Sht 1, Rev F, 1"-800lb Globe Valve
OM-245-2195, Sht 2, Rev DG, 1"-800lb Globe Valve

Self-Assessment Documents

G-06-00406, Compliance with NSD-209
O-05-00400, Onsite Assessment Committee

Section 1R07 : Biennial Heat Sink Performance

Procedures (completed)

OP/0/A/2000/043, Rev. 28, KHS Shift Turnover and Rounds, 7/3/6
PT/3/A/0261/020, Rev. 4, ECCW System Test, 5/2/6
PT/2/A/026/020, Rev. 7, ECCW System Test, 10/22/5
PT/1/A/0261/020, Rev. 3, ECCW System Test, 4/11/5
PT/3/A/0261/010, Rev. 16, Essential Siphon Vacuum System Test, 7/3/6
PT/2/A/0261/010, Rev. 16, Essential Siphon Vacuum System Test, 7/14/6
PT/3/A/0230/015, High Pressure Injection Motor Cooler Flow Test, 8/17/05 (Typical of other flow tests)
OP/3/A/1104/015, Reactor Building Cooling System, Rev 032
TT/2/A/0110/031, 2A RBCU Fan Blade Failure Testing, Rev 2, 6/12/04
TT/2/A/0110/031, 2A RBCU Fan Blade Failure Testing, Rev 2, 6/10/04
PT/0/A/0160/006, Reactor Building Cooling Units Performance Test, Rev 031

Corrective Action Documents (PIPs)

04-03739, 2A RBCU high vibration
04-07416, Eddy current testing of 3A RBCU Coil Tubes
05-05451, Review of 2EOC21 RBCU coil sleeving
05-06913, MT inspection of 2C RBCU fan blades
04-05317, KHU Generator Cooler inspection documentation
04-05566, CCW-8 cable was cut
00-02515, Recommended cleaning of 3A LPI cooler due to reduced thermal performance
06-02270, Performance of eddy current testing on 3A LPI cooler aborted due to valve leakage
05-05980, Remove scheduled 2A LPI eddy current testing due to 2LP-7 leakage
06-04813, Eddy current PMs for LPI Coolers
06-04812, No formal calculations exist for LPI or RBCU Tube Plugging Limits
06-04825, Technical evaluation for HPI motor, upper bearing oil cooler and thrust shoe

Procedures Reviewed

IP/1/B/0400/036, Rev. 8, KHU-1 Resistance Temperature Instrument Calibration
IP/1/B/0400/006, Rev. 9, KHU-1 Bearing Temperature Relay Instruction and Testing
OP/1/A/1104/012, Rev. 72, CCW System
OP/1/A/2000/047, Rev. 5, KHU-1 Thrust Bearing Heat Exchanger
OP/1/A/2000/048, Rev. 6, KHU-1 Generator Coolers

Calculations

OSC-2346, Rev. 6, ECCW System Performance Evaluation
OSC-3629, Minimum Wall Thickness for the Decay Heat Removal (LPI) Cooler Tubes
OSC-4338, U3 LPI Heat Exchanger Performance Calculation

Drawings

KFD-100A-1.1, Rev. 15, Flow Diagram of Turbine Generator Cooling Water System
0-1482B, Rev. 11, Heating - Ventilation - Air Conditioning, Reactor Building - Unit 2, Partial Plan
& Elevations
OFD-133A-1.2, Rev. 23, Flow Diagram of Condenser Circulation Water System(Normal Intake
& Discharge)
OFD-133A.2.1, Rev. 26, Flow Diagram of Condenser Circulating Water System (CCW Intake
Pumps Discharge)
K-425a, Rev. 25, Piping Layout and Equipment Gallery (KHU)

Miscellaneous

Inservice LPSW pump performance data for last two years
Service Water Program Manual, Rev. 7
KHU Generator cooling water and air temperature trend data for one year
ESV seal water flow trend data
CKIMT001, UT measured on piping blow MT-25, 5/24/6
KHU-2 Turbine PM, weekly (TYPICAL)
Keowee Dam Inspections - Keowee Hydro Station, March 28, 2006
1B HPI Pump Motor Cooling Coil Performance Test, dated 6/11/06
Eddy Current Inspection Report of LPI-1B Cooler for 1EOC18 Outage, performed by Duke
Engineering Services, dated May/June 1999
PIP O-04-03739, Root Cause Failure Analysis Report for 2A RBCU Fan blade Failure, Rev 2
ONS RBCU 2A Fan blade Metallurgy File #3275
ONS U-Bend from 3A RBCU Cooling Coil #3
DEAC-TR-1032, Finite Element Analysis and Crack Growth Studies of Series 2000 Blade From
66-30-1200 Fan for Duke Power ONS 3 RBCU
Eddy Current Inspection Report of LPI-1B Cooler for 1EOC22 Outage, performed by Anatec
Int'l, dated 4/5/05
Work Order 98321549, Perform Chemical Cleaning of 3A LPI Cooler, dated 11/29/02
Work Order 98667161, Install New 3A HPI Motor, dated 11/14/04 (Typical of WO's for other
motors)
HPI pump motor cooler LPSW flowrate trend data for last ten years, both normal and
emergency supplies
3A HPI pump motor upper bearing temperature trend data for last 8 years
Updated Final Safety Analysis Report Section 18.3.17.7, Decay Heat Cooler Tubing
Examination

Completed Work Orders

98670901 15, MT of 2A RBCU Fan Blades
98670991 03, MT of 2B RBCU Fan Blades
98670992 03, MT of 2C RBCU Fan Blades
98670992 03, Reinspection MT of 2C RBCU Fan Blades
98670993 03, MT of 1A RBCU Fan Blades
98670994 03, MT of 1B RBCU Fan Blades
98670995 03, MT of 1C RBCU Fan Blades
98670996 03, MT of 3A RBCU Fan Blades

98676198 03, MT of 3B RBCU Fan Blades
98670997 03, MT of 3C RBCU Fan Blades
98673293, RBCU Vibration Readings for Unit 1
98673286, RBCU Vibration Readings for Unit 2

Section 1R17: Permanent Plant Modifications

Corrective Action Documents (PIPs)

O-99-00500, Oconee OAC Capabilities Not Being Fully Utilized
O-05-03558, Digital Alarm Setpoint for HPI Loop Injection Flows Set Too Low
O-05-00496, Calibration Procedure Not Updated for Orifice Changeout
O-05-02181, Flow Transmitter Will Not Calibrate to Orifice
O-05-02759, Root Valves Found Closed on Transmitter
O-05-03608, 50.59 Screening/Evaluation Inadequacies
O-06-06237, Enhancement Needed to Prevent SSF PZR Htrs from Being Energized from B2T
O-03-04579, Modify Control Logic for Keowee U2 Exciter
O-05-03019, 1A2 RCP Failed to Start
O-05-03070, RCPM Has Interlocks Which Prevent Restart Until Thermal Load <5%
O-05-03393, 1B2 RCP Failed to Start

Work Orders

WO98691034, Modify Control Logic for U2 Keowee Exciter
WO01642464, OD 40005 Perform OP/0/A/2000/041

Procedures

TT/1/A/0150/071, Rev 001, ONOE-18851 Unit 1 PIM - LPI System Flow Instrument Orifice Replacement Post Modification Test
TN/1/A/18851/AM1, Rev 0, U1 LPI Flow Orifice Replacement, Differential Gauge Replacement, and Flow Instrument Calibration
IP/0/A/0203/001C, Rev 059, LPI System Accessible Flow Instruments Calibration
Nuclear System Directive 301, Rev 24/27, Engineering Change Program
OP/1/A/1102/001, Rev 262, Controlling Procedure for Unit Startup
OP/1/A/1103/002, Rev 90, Filling and Venting RCS
OP/1/A/1600/005, Rev 21, SSF Normal Power
OP/1/A/1600/011, Rev 15, SSF Tagout Procedure
IP/O/A/0200/041 C, Rev 28, ICCM System Data and Constants Check
IP/O/A/0100/001, Rev 24, Controlling Procedure for Troubleshooting and Corrective Maintenance

Miscellaneous Documents

OSS-0254.00-00-1028, Rev 28, DBS for Low Pressure Injection and Core Flood
OSS-0254.00-00-1001, Rev 37, DBS for High Pressure Injection and Purification & Deborating Demineralizer Systems
OM 201-3216.001, Rev 0, 10" Orifice Flow Meter Calibration DPC0003 thru 0008

TT/0/A/0620/057, Control of Testing Following Keowee U2 Refurb Outage
IB-18.1.7-2, ITE Ground Protection Systems, Issue G
RE-3.01, Rev 4, Relaying - Auxiliary Systems - Equipment Protection Settings

Drawings

O-0705, Rev 85, One Line Diagram 120 VAC & 125 VDC Station Aux. Circuits Instrumentation
Vital Buses
OEE-151-51-0A, Rev 0, Elementary Diagram High Pressure Injection System Miscellaneous
Devices
OEE-151-51, Rev 3, Elementary Diagram High Pressure Injection Flow 1HPIFT0007A Train 'A'
OEE-151-52, Rev 3, Elementary Diagram High Pressure Injection Flow 1HPIFT0008A Train 'B'
OM-2300-0038.002, Rev D04, Connection Diagram TR
OM-2300-0025.001, Rev D08, Elementary Diagram Sht 1 of 2
OM-2300-0025.002, Rev D07, Elementary Diagram Sht 2 of 2

Calculations

OSC-2820, Rev 31, Emergency Procedure Setpoints, Section 7.3.1
OSC-2533, Rev 9, High Pressure Injection Pump Crossover Flow Instrument Loop Accuracy
Calculation FT-159, 160
OSC-4083, Rev 8, HPI Flow Loop Instrument Accuracy
OSC 3566, Rev13, Loop Uncertainty
OSC 7632, Rev 09, LPI System Passive Cross-Connect Modification
OSC 8175, Rev 11, I&C Design Input Calculation
OSC-8268, Rev 04, Unit 1 LPI Hydraulic Calculation
OSC-8555, Rev 00, LPI Header Flow Orifice Sizing Calculation
OSC-4151, Rev 13, Penetration Overcurrent Protection
OSC-8284, Rev 2, Electrical Design Inputs for NSM ON-53110

Self-Assessment Documents

O-04-04704, Electrical Modification Assessment
O-06-02328, Modification Engineering Corrective Action

LIST OF ACRONYMS

ADAMS	-	Agency wide Documents Access and Management System
ATWS	-	Anticipated Transient Without SCRAM
AMSAC	-	ATWS Mitigation System Actuation Circuitry
AP	-	Abnormal Procedure
CCW	-	Condenser Circulating Water
CFR	-	Code of Federal Regulations
DEC	-	Duke Energy Corporation
DHR	-	Decay Heat Removal
DRS	-	Division of Reactor Safety
DSC	-	Dry Storage Certification
ECCW	-	Emergency Circulation Cooling Water

EOC	-	End-of-Cycle
ESV	-	Essential Siphon Vacuum
FDW	-	Feedwater
FME	-	Foreign Material Exclusion
GL	-	Generic Letter
HPSW	-	High Pressure Service Water
HX	-	Heat Exchanger
ICS	-	Integrated Control
IP	-	Inspection Procedure
IR	-	Inspection Report
ISFSI	-	Independent Spent Fuel Storage Installation
ISI	-	Inservice Inspection
IST	-	Inservice Testing
KHU	-	Keowee Hydroelectric Unit
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
LOCA	-	Loss of Coolant Accident
LPI	-	Low Pressure Injection
LPSW	-	Low Pressure Service Water
MDEFW	-	Motor Driven Emergency Feedwater
NCV	-	Non-Cited Violation
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
NSD	-	Nuclear Site Directive
NSM	-	Nuclear Station Modification
ONS	-	Oconee Nuclear Station
OOS	-	Out-Of-Service
ORAM	-	Operational Risk Assessment Monitor
PARS	-	Publicly Available Records
PI	-	Performance Indicator
PIP	-	Problem Investigation Process report
PMT	-	Post-Maintenance Testing
PT	-	Liquid Penetrant Test
QC	-	Quality Control
RBCU	-	Reactor Building Cooling Unit
RBES	-	Reactor Building Emergency Sump
RCP	-	Reactor Coolant Pump
RFO	-	Refueling Outage
RG	-	Regulatory Guide
RII	-	Region II
RPS	-	Reactor Protection System
RTP	-	Rated Thermal Power
SCBA	-	Self-Contained Breathing Apparatus
SDP	-	Significance Determination Process
SRG	-	Safety Review Group
SSC	-	Structure, System, and Component
SSF	-	Standby Shutdown Facility

A-10

TDEFW	-	Turbine Driven Emergency Feedwater
TS	-	Technical Specification
TSM	-	Temporary Station Modification
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
VIO	-	Violation
WO	-	Work Order