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

April 28, 2005

Duke Energy Corporation (DEC)
ATTN.: Mr. R. A. Jones
Site Vice President
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - INTEGRATED INSPECTION REPORT 05000269/2005002, 05000270/2005002, 05000287/2005002

Dear Mr. Jones:

On March 31, 2005, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station. The enclosed report documents the inspection findings which were discussed on April 7, 2005, with Mr. Ron Jones and other members of your staff.

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

This report documents two self-revealing findings of very low safety significance (Green), which were determined to be violations of NRC requirements. However, because of their very low safety significance and because the issues were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, 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 facility.

In accordance with 10 CFR 2.390 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/**

Michael Ernstes, 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 05000269/2005002, 05000270/2005002, 05000287/2005002 w/Attachment: Supplemental Information

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REGION II

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|---|---|
| Docket Nos: | 50-269, 50-270, 50-287 |
| License Nos: | DPR-38, DPR-47, DPR-55 |
| Report No: | 50-269/2005002, 50-270/2005002, 50-287/2005002 |
| Licensee: | Duke Energy Corporation |
| Facility: | Oconee Nuclear Station, Units 1, 2, and 3 |
| Location: | 7800 Rochester Highway<br>Seneca, SC 29672 |
| Dates: | January 1, 2005 - March 31, 2005 |
| Inspectors: | M. Shannon, Senior Resident Inspector<br>A. Hutto, Resident Inspector<br>E. Riggs, Resident Inspector<br>M. Scott, Senior Reactor Inspector (Section 1R12.2)<br>E. Michel, Inspector in Training (Section 1R12.2)<br>P. K. VanDoorn, Senior Reactor Inspector (Sections 1R02, 1R17, and 4OA5)<br>J. Lenahan, Senior Reactor Inspector (Sections 1R02 and 1R17)<br>R. Rodriquez, Reactor Inspector (Section 1R02 and 1R17) |
| Approved by: | Michael Ernstes, Chief<br>Reactor Projects Branch 1<br>Division of Reactor Projects |

Enclosure

# SUMMARY OF FINDINGS

IR 05000269/2005002, IR 05000270/2005002, IR 05000287/2005002, 01/01/2005 - 03/31/2005; Oconee Nuclear Station, Units 1, 2, and 3; Identification and Resolution of Problems and Event Followup.

The report covered a three-month period of inspection by the onsite resident inspectors and announced regional-based inspections by five reactor inspectors; one of which was in training. Two Green non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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

Cornerstone: Barrier Integrity

- Green. A self-revealing, non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, was identified for inadequate corrective actions following the 3B reactor building cooling unit (RBCU) fan blade failure, which led to the failure of a 2A RBCU fan blade.

  The finding was considered to be more than minor because it affected the barrier integrity cornerstone attribute of maintaining containment functionality, in that the failure to fully identify and correct the causes of the 3B RBCU fan blade failure resulted in a 2A RBCU fan blade failure less than eight months later. However, during an event requiring control of the containment environment with one RBCU inoperable, the two remaining RBCUs and two trains of reactor building spray would have been available to mitigate the consequences of the event; consequently, the finding was determined to be of very low safety significance using the SDP Phase 1 analysis. This finding also involved the cross-cutting aspect of problem identification and resolution. (Section 4OA2.2)

- Green. A self-revealing, non-cited violation of 10 CFR 50 Appendix B, Criterion III, Design Control, was identified for the installation of improperly sized thermal overloads on the Unit 1/2, B train, control room outside air booster fan (CROABF).

  The finding was considered to be more than minor because it affected the barrier integrity cornerstone attribute of control room habitability, in that the thermal overload relays in the Unit 1/2, train B, CROABF were undersized for the operating current of the fan's motor, resulting in the motor tripping after 2.5 hours of operation during a post maintenance test. Because the finding represented a degradation of the barrier function of the control room against smoke and/or a toxic atmosphere, a Phase 3 evaluation was performed. This evaluation concluded that the finding was of very low safety significance. (Section 4OA3.2)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status:

Unit 1 entered the report period at approximately 100 percent rated thermal power (RTP). On February 11, 2005, while Keowee Hydro Unit (KHU) -2 was concluding a refurbishment outage, the Unit 1 Startup Transformer, CT-1, locked out and was declared inoperable. This resulted in to a Technical Specification (TS) Limiting Condition for Operation (LCO) 3.0.3 action statement entry and a unit shutdown was commenced. The unit was reduced to approximately 86 percent RTP, at which time KHU-2 concluded its refurbishment outage and was declared operable. TS LCO 3.0.3 was subsequently exited, and the unit shutdown was terminated. The unit was returned to 100 percent RTP on February 12, 2004. The unit operated at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 entered the report period at 100 percent RTP. The unit was reduced to approximately 96 percent RTP on January 6, 2005, to perform maintenance on the electro-hydraulic control (EHC) system, and was subsequently returned to 100 percent RTP on the same day. It was also temporarily reduced to approximately 88 percent RTP on January 23, 2005, to perform turbine valve movement testing. For the remainder of the inspection period, the unit operated at or near 100 percent RTP.

Unit 3 began the report period in Mode 3 to investigate problems with the unit's core thermal power demand (CTPD) portion of the integrated control system (ICS). Following the resolution of the CTPD anomalies, the unit was placed on-line on January 4, 2005, and power was escalated to approximately 100 percent RTP on January 6, 2005. The unit was taken off-line on February 16, 2005, and entered Mode 3 to repair a steam leak on a main steam line pressure transmitter impulse line. Following repairs, the unit entered Mode 1 on February 21, 2005. The unit was returned to 100 percent RTP on February 23, 2005, where it operated at or near 100 percent RTP 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 nine 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 nine evaluations reviewed are listed 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 fifteen "screened out" changes reviewed are listed in the Attachment to this report.

The inspectors also reviewed 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. 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 low pressure service water (LPSW) with high pressure service water (HPSW) to high pressure injection (HPI) isolated for cleaning flow sight glass
- KHU-1 while KHU-2 was out of service (OOS) during its refurbishment outage
- Unit 1 and 2 LPSW with the ‘B’ LPSW pump OOS for train maintenance

b. Findings

No findings of significance were identified.

.2 Complete Walkdown of the Standby Shutdown Diesel Generator and Support Systems

a. Inspection Scope

The inspectors performed a system walkdown on accessible portions of the standby shutdown facility (SSF) diesel generator (DG) and its support systems. These included the fuel oil transfer system, and the starting air system. The inspectors focused on verifying proper valve positioning, power availability, no damage to structural supports, and material condition. The inspectors also verified that support system components were in the appropriate inservice test (IST) programs.

Documents and drawings reviewed for this semi-annual inspection sample are listed in the Attachment to this report. A review of PIPs and open maintenance work orders was

also performed to verify that material condition deficiencies did not significantly affect the ability of the SSF DG to perform its design functions, and that appropriate corrective action was being taken by the licensee.

The inspectors conducted the walkdown with the system engineer to observe the material condition and support system alignments during the quarterly maintenance inspections. In addition, any temporary modifications, future modifications, and operator workarounds were discussed to ensure that the impact on the equipment functionality was properly evaluated. The system engineer's trending data and system health report were reviewed to verify that appropriate trending parameters were being monitored and that no adverse trends were indicated.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Area Walkdowns

a. Inspection Scope

The inspectors conducted tours in twelve 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 areas were conducted during this inspection period:

- Unit 1, 2 and 3 equipment rooms (3)
- SSF pump room, diesel room, ventilation room, and control room (4)
- Impairment to fire barrier in the Unit 1 cable room, 2-N-F-19 (1)
- Impairment to fire barrier in the Unit 1 cable room, 2-N-N–2 (1)
- Unit 1, 2 and 3 turbine building third floor (1)
- Keowee Hydro Station (2)

b. Findings

No findings of significance were identified.

.2 Fire Drill Observation

a. Inspection Scope

The inspectors observed a fire drill conducted on January 21, 2005, to assess readiness of the licensee's capability to fight fires. The fire was simulated in the Unit 2 battery room. The inspectors evaluated the drill for the following attributes:

- protective clothing/self-contained breathing apparatus properly worn
- adequacy/appropriateness of fire extinguishing methods
- controlled access to the fire area by the fire brigade members
- adequacy of fire fighting equipment
- command and control effectiveness of the fire brigade leader
- adequate communications
- effectiveness of smoke removal gear

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator simulator training on March 2, 2005. The scenario began with the simulated unit operating at 100 percent RTP with the turbine driven emergency feedwater (TDEFW) pump OOS for maintenance. The component cooling (CC) supply valve to the reactor's control rod drives (CRDs), 1CC-8, failed closed causing the CRD stator temperatures to increase rapidly. When two of the CRD stators reached 180 degrees Fahrenheit, the operators manually tripped the unit, and commenced immediate actions. The Main Turbine failed to trip when the reactor was tripped (automatically or manually), thereby requiring the control room operators to secure both EHC pumps to prevent excessive plant cooldown. After the operating crew stabilized the unit, a loss of all main and emergency feedwater was initiated, requiring the operators to rapidly depressurize the steam generators with the turbine bypass valves and commence feeding with the condensate booster pumps (CBPs). While attempting to cross-connect emergency feedwater from the simulated unit two, the operating CBP failed and the two remaining CBPs failed to start. The operating crew initiated HPI forced cooling to cool the unit's core and declared an Alert. 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 and properly classify the simulated event.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

.1 Routine Maintenance Activities

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 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-05-1128, 3B HPI pump motor outboard bearing vibration levels are greater than the required action level. The licensee replaced the 3B HPI pump and motor.

- PIP O-05-1952, B control room chiller potentiometer has failed several times in the past year. A new potentiometer was installed on the B control room chiller, and Engineering is working with the vendor to obtain a more reliable potentiometer.

b. Findings

No findings of significance were identified.

.2 Maintenance Rule (MR) Implementation - Periodic Evaluation (Biennial)

a. Inspection Scope

The inspectors reviewed the licensee's MR periodic assessment, "Maintenance Rule Periodic Assessment [Report] for Maintenance Rule Implementation - Oconee Nuclear Station, July 1, 2002 - December 31, 2003," dated December 6, 2004. The report was issued to satisfy paragraph (a)(3) of 10 CFR 50.65, and covered the period as indicated for all three units. The inspection was to determine the effectiveness of the assessment and whether it was issued in accordance with the time requirement of the MR, and if it included evaluation of: balancing reliability and unavailability, (a)(1) activities, (a)(2) activities, and use of industry operating experience. To verify compliance with 10 CFR 50.65, the inspectors reviewed selected MR activities covered by the assessment period for the following MR systems: metal clad 4160/6900 VAC switchgear circuit breakers, LPSW, condenser circulating water (CCW), chilled water (control room). The inspectors reviewed previously identified a(1) systems such as 600/208 volt safety-related power system and turbine building flood (super system) activities. Specific procedures and documents reviewed are listed in the Attachment to this report.

The inspectors reviewed selected plant work order data, assessments, modifications, and the site guidance implementing procedure. The inspectors discussed and reviewed relevant PIPs, generic operations event data, and probabilistic risk reports with system engineers. Operational event information was evaluated by the inspectors in its use in MR functions. The inspectors selected work orders, a MR assessment, and other corrective action documents of systems recently removed from 10 CFR 50.65 a(1) status and those in a(2) status for some period to assess the justification for their status. The documents were compared to the site's MR program criteria, and the MR a(1) evaluations and rule-related data bases. The inspectors also attended a MR expert panel meeting on January 5, 2005.

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 seven 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 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.

- 2A low pressure injection (LPI) OOS due to IST gage problems with KHU-2 OOS for governor/voltage regulator modifications
- 3B LPSW train maintenance with KHU-2 OOS for its refurbishment outage
- Red ORAM risk condition, critical activity plan for SSF DG monthly preventive maintenance with KHU-2 OOS for it refurbishment outage
- Orange ORAM risk condition, critical activity plan for the repacking of eight Unit 1 and 2 spent fuel cooling (SFC) valves, four on the suction side of the SFC pumps and four on the discharge side of the SFC pumps
- PIP O-05-1746, Unit 3 reactor coolant makeup pump (RCMUP) inoperable due to pump's suction valve, 3SF-82, failing to close from the SSF control room switch
- Orange ORAM risk condition, complex activity plan for 1A LPI train maintenance 1 LP-19 cable separation
- SSF DG maintenance with equipment lifts occurring over the Unit 3 main steam lines for five year Inservice Inspection of the RB tendons (complex evolution)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

The inspectors reviewed, the operating crew's performance during selected non-routine events and/or transient operations to determine if the response was appropriate to the event. 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 evolutions reviewed during this inspection period included the following:

- February 11, 2005, CT 1 Transformer locked out (PIP O-05-1060)

b. Findings

No findings of significance were identified.

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 LCOs. The inspectors reviewed the following six operability evaluations:

- PIP O-05-0496, 2A LPI Local Flowrate Gage Out of Calibration
- PIP O-05-0120, Cracks Discovered in the SSF Diesel Engine's Rack Shaft Support Caps
- Unit 1 Reactor Coolant Pump Seal Leakage Problem Description and Evaluation
- PIP O-05-1050, Steam Trap 3AS-TP0084 is Installed in the Wrong Direction
- PIP O-05-1060, CT 1 Transformer Locked Out

- PIP O-05-1825, Identified a Potential Unit 1 and 2 Control Room Pressure Boundary Leakage Path

b. Findings

No findings of significance were identified.

1R16 Risk Significant Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed one significant operator work-around to determine if the functional capability of the respective 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 assessed what impact it would have on the unit if the work-around could not be properly performed.

- The work-around reviewed was documented in PIP O-05-1050, Steam Trap 3AS-TP0084 is Installed in the Wrong Direction. The incorrect installation of steam trap 3AS-TP0084 required the nuclear equipment operators to blow down the steam trap each shift to ensure that the auxiliary steam line to the Unit 3 TDEFW pump was free of moisture. Also mitigating this condition, are two additional steam traps with excess capacity located downstream of and below the elevation of 3AS-TP0084.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

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

C NSM 23107, Unit 2 RBAC [Reactor Building Ventilation] LPSW [Low Pressure Service Water] Piping Penetration Modification (Barrier Integrity)

Seismic
Structural
Materials/Replacement Components (material compatibility)
Plant Document Updating (design and licensing documents)
Post-Installation Testing
Installation Records

- ONOE 17428, Isolate LPSW & HPSW [High Pressure Service Water] to Turbine Driven EFW [Emergency Feed Water] Pump Jacket Cooler (Mitigating Systems)

  Materials/Replacement Components (material compatibility)
  Seismic Requirements
  Structural Requirements
  Updating of Licensee Documents (procedures)

- NSM ON-23093, LPI [Low Pressure Injection] Passive Cross-Tie Modification (Mitigating Systems)

  Materials/Replacement Components (compatibility, certification)
  Seismic Requirements
  System Design Analyses
  System Testing Results
  Selected Installation Records (weld nondestructive UT and RT examinations)
  Updating of Licensee Documents (emergency procedure, drawings, analyses)

- ONOE-12466, Modify Actuators on Valves 1BS-1 and 1BS-2 (Building Spray Header Isolation Valves) (Mitigating Systems, Barrier Integrity)

  Functional Analysis
  Component Testing Results
  Updating of Licensee Documents (procedures, analyses)

- OE300044, Replace Globe Valve 3HP-415 with Gate Valve (Mitigating Systems)

  Materials/Replacement Components (compatibility)
  Seismic Considerations

- OE300088, Replace Globe Valves 3FDW-260 & 261 with Gate Valve (Mitigating Systems)

  Materials/Replacement Components (compatibility)
  Seismic Considerations

- NSM ON-33092/00/00/AL, Installation of Three Safety-Related 600V MCCs (Intiating Events, Mitigating Systems)

  Energy Needs
  Materials/Replacement Components (environmental, seismic)
  Equipment Protection (fire)

- NSM ON-53118/00/00/AL, Replacement of SSF [Safe Shutdown Facility] Inverters KSF1 and KSF2 (Mitigating Systems)

  Energy Needs
  Replacement Functional Properties

- OE-300042, 3HPI P0061 Controller Replacement

  Replacement Functional Properties
  Control Signals

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 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 seven tests:

- IP/0/A/0305/014A, RPS Control Rod Drive Breaker Trip and Events Recorder Timing Test, following the installation of a digital CRD system on Unit 3

- TT/0/A/0620/057, Control of testing following Keowee Unit 2 Refurb Outage

- PT/2/A/0202/011, 2C HPI Pump Test, following lubrication and removal of boron from the pump's mechanical seal

- PT/3/A/0400/007, SSF RC Makeup Pump Test, following repairs to Unit 3 RCMU pump's suction valve, 3SF-82 (PIP O-05-1746)

- PT/1/A/0600/12B, 1B Motor Driven Emergency Feedwater Pump Test, following motor inspection, testing and lubrication
- PT/1/A/0251/001, B LPSW Pump Test, following motor inspection, testing, lubrication and backwashing of the pump's suction strainer
- IP/0/A/200/004, Doble Testing, following troubleshooting of the CT1 transformer

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors reviewed the licensee's outage plan and commitments for the KHU-2 refurbishment outage, conducted during the period of January 8 - February 11, 2005. 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. During the outage, the inspectors monitored licensee controls over the outage activities listed below:

- 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, 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.

- IP/0/A/3000/011, Instrumentation and Control Battery Quarterly Surveillance (Unit 2 Control Battery)
- PT/3/A/0290/004, Unit 3 Turbine Stop Valve Test
- PT/1/A/0610/001C, EPSL Standby Busses 1 and 2
- IP/0/A/0301/003D-1, 1NI-4 Neutron Flux Instrument Calibration
- IP/3/A/0305/003B, Instrument Procedure Data Package for RPS Channel B Calibration and Functional Test
- PT/3/A/0600/012, Unit 3 TDEFW Pump Test (IST)

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 item was reviewed under this inspection procedure:

- TT/1/A/0325/014, Unit 1 Precision Feedwater Flow Data Collection

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed and evaluated a simulator based emergency preparedness drill held on January 27, 2005. The drill scenario involved a poison gas leak followed by two dropped rods and a subsequent anticipated transient without scram after an attempted manual trip. The scenario progressed to a general emergency after a steam generator

tube rupture occurred, followed by a main steam line break. This required the operators to identify that the event caused the plant to be in an “General Emergency” condition. The operators were observed to determine if they properly classified the event and made the appropriate notifications, as well as if the counties, state and NRC were promptly notified of the drill condition. The inspectors also verified that the protective action recommendations were issued in accordance with the licensee’s emergency procedures. 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.

## 4. OTHER ACTIVITIES

### 4OA2 Identification and Resolution of Problems

#### .1 Daily Screening of Corrective Action Reports

As required by Inspection Procedure (IP) 71152, "Identification and Resolution of Problems", and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed daily screening of items entered into the licensee’s corrective action program. This review was accomplished by reviewing copies of PIPs, attending daily screening meetings, and accessing the licensee’s computerized database.

#### .2 Focused Review

a. Inspection Scope

The inspectors performed an in-depth review of two issues entered into the licensee’s corrective action program. The samples were within the mitigating systems cornerstone and involved risk significant systems. The inspectors reviewed the actions taken to determine if the licensee had adequately addressed the following attributes:

- **Complete, accurate and timely identification of the problem**
- Evaluation and disposition of operability and reportability issues
- Consideration of previous failures, extent of condition, generic or common cause implications
- Prioritization and resolution of the issue commensurate with safety significance
- Identification of the root cause and contributing causes of the problem
- Identification and implementation of corrective actions commensurate with the safety significance of the issue

The following issues and corrective actions were reviewed:

- PIP O-04-3739, 2A Reactor Building Cooling Unit (RBCU) Hi Vibration

- PIP O-04-7937, Unit 1 and 2 Train B, Control Room Ventilation Outside Air Booster Fan unexpectedly tripped. Licensee Event Report (LER) 269/2004-04, "Improper Overloads Installed on Control Room Ventilation Filter Train." This LER is closed out in Section 4OA3.

b. Findings

Introduction: A Green self-revealing NCV was identified for failure to take adequate corrective actions following the failure of a 3B RBCU fan blade on October 20, 2003, which led to the failure of a 2A RBCU fan blade on June 2, 2004.

Description: As part of the licensee's refurbishment efforts, the RBCUs for Oconee Units 1, 2 and 3 were replaced and tested over the course of three consecutive outages beginning with Unit 1 End-of-Cycle 20 (1EOC20) in May 2002, followed by 2EOC19 in December 2002, and by 3EOC20 in June 2003. On October 20, 2003, with Unit 3 in Mode 1 and the 3B and 3C RBCUs running in high speed, the 3B RBCU experienced a fan blade failure and ejection, resulting in the 3B RBCU being declared inoperable and a TS LCO Action Statement entry.

PIP O-03-6836 documented the licensee's investigation of the 3B RBCU fan blade failure and concluded the failure was due to high cycle, low stress intensity fatigue cracking. The fracture initiated at a casting defect which was created when the blade was cast, and was not detected by the manufacturer's NDE. The licensee also concluded that the 3B RBCU blade failure was transportable to the other eight Oconee RBCUs. The fan blade supplier had previously performed radiographic (RT) and magnetic particle (MT) examinations of the blades. The defect in the failed blade was not detected by either examination. It is the licensee's understanding that the flaw should have been detected by the MT examinations.

One of the licensee's conclusions in their investigation (PIP O-03-6836) of the 3B RBCU fan failure was that their corrective actions would include detailed visual inspections of the blades, which was to be performed from within each RBCU housing. Accordingly, the Unit 2 RBCU fan blades were scheduled for these visual inspections during the spring 2004 refueling outage.

On March 20, 2004, Unit 2 entered an extended Steam Generator/Reactor Vessel Head replacement outage. On May 1, 2004, the licensee conducted a detailed visual inspection of the 2B RBCU fan blades. The licensee did not perform the same detailed visual inspection on the 2A and 2C RBCU fan blades as stated in PIP O-03-6836, nor did the licensee perform any other type of NDE on any of the Unit 2 RBCU fan blades, such as an MT or RT. The licensee decided to reduce the scope of the inspections and focus on the 2B fan as it had the highest run time. However, casting flaws would be independent of the run time as they are introduced during manufacturing.

Subsequently, on June 2, 2004, with Unit 2 in Mode 4 (preparing to startup following the extended outage) and the 2A and 2B RBCUs running in high speed, the 2A RBCU experienced a fan blade failure that caused significant damage to the 2A RBCU. The licensee elevated this issue to a formal root cause investigation of both events (PIP O-04-3739). The casual determination portion of the root cause indicated that the first root cause of the 3B and 2A RBCU fan blade failures was an inadequate design which allowed the fans to run in stalled conditions when two or more fans were running concurrently. The licensee did not address this possibility during the 3B RBCU blade failure investigation. Information was available from post modification voluprobe readings that indicated the existence of stall conditions during certain operating configurations. This condition was not recognized due to unfamiliarity with new equipment and the fact that the fans seemed to be running smoothly. Industry operating experience data was also available, but not utilized, that concluded most fan blade failures are due to either poor operating conditions (stall) or loosening of the nut that secures the blade to the hub. The manufacturer also provided similar information after the 3B failure that blade failures they had seen at other plants were caused by either improper torquing of the blade nuts by the purchaser or installation of the fan in a system in which it was subjected to very poor inlet conditions and/or operated in a 'stall' condition. Stalling can occur during normal operation depending on the number of fans running, or during speed changes, especially from high to low. Testing after the 2A RBCU fan blade failure showed this to be true on both accounts. The second root cause of the 3B and 2A RBCU fan failures was an inadequate NDE by the blade manufacturer that did not detect a sizable casting flaw in the blade. The licensee's decision to reduce the original scope of the Unit 2 fan blade inspections eliminated the opportunity to detect the 2A blade flaw prior to failure. As stated in PIP O-04-3738, the combination of high stresses imposed on the blades due to operation in stalled conditions along with a casting flaw in the blade created conditions for the initiation of a crack which eventually propagated to failure.

Analysis: The licensee's failure to fully identify and correct the causes of the 3B RBCU fan blade failure, and the subsequent failure of a 2A RBCU fan blade were considered to be more than minor because they affected the barrier integrity cornerstone attribute of maintaining containment functionality. The inspectors reviewed this finding in accordance with IMC 0609, Significance Determination Process. The consequences of the licensee's failure to undertake adequate corrective actions following the 3B RBCU fan blade failure and subsequent failure of a 2A RBCU fan blade were assessed through Phase 1 of the SDP. However, if an event had occurred which required the RBCUs to maintain containment environmental control, an Engineered Safeguards actuation would have operated the RBCUs in slow speed, a non-stall condition. Each Oconee Unit also has two additional RBCUs and two trains of Reactor Building Spray to assist in controlling the containment environment. Consequently, the finding was determined to be of very low safety significance (Green). This finding involved the cross-cutting aspect of problem identification and resolution (PI&R).

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected, and in the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition

is determined and corrective action taken to preclude repetition. Contrary to the above, the licensee failed to fully identify and correct the causes of the 3B RBCU fan blade failure, resulting in the 2A RBCU fan blade failure less than eight months later. Because this issue was of very low safety significance and was placed in the licensee's corrective action program under PIP O-03-6836 and PIP O-04-3739, this violation is being treated as a NCV in accordance with Section VI.A.1 of the Enforcement Policy: NCV 05000287/ 2005002-01, Inadequate Corrective Actions Following 3B RBCU Fan Failure Results in 2A RBCU Fan Failure.

.3 Summary of PI&R Cross-Cutting Findings

A Green NCV involving the cross-cutting aspect of PI&R is documented in Section 4OA2.2 above. Adequate corrective actions were not taken following the failure of a 3B RBCU fan blade, which led to the subsequent failure of a 2A RBCU fan blade.

4OA3 Event Followup

.1 February 11, 2005, CT-1 Transformer Locked Out (PIP O-05-1060)

a. Inspection Scope

The inspectors evaluated the event listed above to assess the overall impact on the plant and mitigating actions. As appropriate, the inspectors: (1) observed plant parameters and status, including mitigating systems/trains; (2) determined alarms/conditions preceding 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 (Closed) Licensee Event Report (LER) 50-269/2004-04-00, Improper Overloads Installed on Control Room Ventilation Filter Train

a. Inspection Scope

The inspectors reviewed the licensee's TS LCO action statement entry, casual evaluation, corrective actions and operability assessment surrounding the unexpected tripping of the Unit 1/2, B train, control room outside air booster fan (CROABF). The inspectors determined that the licensee's corrective actions, installation of the proper thermal overloads on the fan's motor, adequate post maintenance testing of the fan, and transportability verifications for the Unit 1/2, A Train and the 3A and 3B CROABFs, were adequate. This issue was entered into the licensee's corrective action program under PIP O-04-7937.

b. Findings

Introduction: A Green self-revealing NCV was identified for failure to maintain adequate design control of the Unit 1/2, B train, CROABF, in that, the fan motor's thermal overload relays were undersized for the operating current of the motor.

Description: On November 17, 2004, the filters of the B Train, Outside Air portion of the Unit 1 and 2 Control Room Ventilation System were replaced, and the associated booster fan's motor bearings were lubricated as part of a preventive maintenance task. During the subsequent post-maintenance testing, the fan operated for approximately 2.5 hours prior to tripping unexpectedly. As documented in PIP O-04-7937, a licensee investigation determined that, "The apparent cause of the tripping of the B Outside Air Booster Fan is undersized overloads on the corresponding motor. Size S4.0 heaters were installed on the motor but the full load current of the motor required S4.4 heaters." PIP O-04-7937 also documents " . . . that the B train was not included in the scope of a 1987 modification which revised the overloads on the A train."

Analysis: The licensee's failure to maintain adequate design control of the Unit 1/2, B train, CROABF was considered to be more than minor because it affected the barrier integrity cornerstone attribute of maintaining control room habitability. The inspectors reviewed this finding in accordance with IMC 0609, Significance Determination Process. Because the finding represented a degradation of the barrier function of the control room against smoke and/or a toxic atmosphere, a Phase 3 evaluation was performed by a Regional Senior Reactor Analyst. This evaluation concluded that the finding was of very low safety significance (Green). The internal events contribution was not applicable since the booster fans would only be considered from a radiological perspective and the Phase I Screening Sheet already assigned a Green color to that aspect. Also, only two external events were initially considered applicable to this finding; fire and toxic gas release. The critical assumptions of the evaluation were that a single booster fan was capable of sustaining positive pressure within the Main Control Room and that the deficient booster fan would operate for 210 minutes before failing. A fire lasting 210 minutes (failure of manual suppression) in one of the safety related 4160 VAC switchgear (population of approximately 150 breakers) was chosen as the surrogate for fires causing the initial operation and subsequent failure of the deficient booster fan. In the dominant accident sequence the other booster fan and the SSF must experience random failures. The toxic gas release was eventually screened as not credible due to the limited amount of toxic gas kept onsite and its distant location from the Main Control Room.

Enforcement: 10 CFR 50, Appendix B, Criterion III, Design Control, requires, in part, that measures shall be established for the selection and review for suitability of application of materials, parts, equipment and processes that are essential to the safety related functions of the structures, systems and components. Contrary to the above, the licensee failed to maintain adequate design control of the Unit 1/2, B train, CROABF, in that, the B train was not included in a 1987 modification to the A Train's fan motor overloads, resulting in the B train fan motor overloads being undersized for the operating motor current. Because this issue was of very low safety significance and was placed in the licensee's corrective action program under PIP O-04-7937, this violation is being treated as a NCV in accordance with Section VI.A.1 of the

Enforcement Policy: NCV 05000269/2005002-02, Improper Thermal Overloads Installed in the Unit 1/2, B Train, CROABF.

4OA5 Other

(Open) 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

The inspectors reviewed associated PIP O-04-00518, which was previously reviewed in NRC Report 05000269,270,287/2004005 to verify that the licensee had performed an adequate root cause evaluation. At that time, the associated corrective action plan had not yet been approved. During this inspection period, the inspectors evaluated the approved corrective actions and held discussions with licensee personnel regarding the status of the corrective actions. It was determined that the licensee had initiated appropriate corrective actions; however, only short-term corrective actions had been completed. In addition, the licensee had not yet evaluated whether additional reviews of completed 10 CFR 50.59 evaluations were warranted based on the root cause of the problem. Therefore, this VIO will remain open pending further review at a later date.

4OA6 Management Meetings (Including Exit Meeting)

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Ron Jones, Site Vice President, and other members of licensee management at the conclusion of the inspection on April 7, 2005. 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

## KEY POINTS OF CONTACT

Licensee
N. Alchaar, Civil Engineering
L. Azzarello, Modification Engineering Manager
S. Batson, Superintendent of Operations
D. Baxter, Engineering Manager
R. Brown, Emergency Preparedness Manager
T. Bryant, Engineering Support
A. Burns, Civil Engineer, Reactor & Electrical Systems
S. Capps, Mechanical/Civil Engineering Manager
N. Constance, Operations Training Manager
D. Covar, Training Instructor
C. Curry, Maintenance Manager
G. Davenport, Compliance Manager
C. Eflin, Requalification Supervisor
P. Fowler, Access Services Manager, Duke Power
T. Gillespie, Reactor and Electrical Systems Manager
T. Grant, Engineering Supervisor, Reactor & Electrical Systems
R. Griffith, QA Manager
B. Hamilton, Station Manager
R. Hester, Civil Engineer
D. Hubbard, Training Manager
R. Jones, Site Vice President
T. King, Security Manager
T. Ledford, Engineering Supervisor, Reactor & Electrical Systems
L. Llibre, Engineering Supervisor
R. Murphy, Engineering Support
S. Neuman, Regulatory Compliance Group
L. Nicholson, Safety Assurance Manager
J. Rowell, Engineer, Reactor & Electrical Systems
J. Smith, Regulatory Affairs
B. Spear, Engineer, Reactor & Electrical Systems
J. Steeley, Training Supervisor
J. Stinson, Engineer, Reactor & Electrical Systems
P. Stovall, SRG Manager
F. Suchar, QC Supervisor
S. Townsend, Keowee Operations
J. Twiggs, Manager, Radiation Protection
J. Weast, Regulatory Compliance

NRC

M. Ernstes, Chief of Reactor Projects Branch 1
R. Haag, Chief of Plant Support Branch 1
L. Olshan, Project Manager, NRR
L. Plisco, Deputy Regional Administrator, RII
L. Wert, Deputy Division Director, RII

## ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

| | | |
|---|---|---|
| 050000270,287/2005002-01 | NCV | Inadequate Corrective Actions Following 3B RBCU Fan Failure Results in 2A RBCU Fan Failure (Section 4OA2.2) |
| 050000269,270/2005002-02 | NCV | Improper Thermal Overloads Installed in the Unit 1/2, B Train, Control Room Outside Air Booster Fan (Section 4OA3.2) |

Closed

| | | |
|---|---|---|
| 05000269/2004-04-00 | LER | Improper Overloads Installed on Control Room Ventilation Filter Train (Section 4OA3.2) |

Items Discussed

| | | |
|---|---|---|
| 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) |

## DOCUMENTS REVIEWED

### 1R02: Evaluations of Changes, Tests, or Experiments

Full Evaluations

ONOE 17428, Isolate LPSW & HPSW to Turbine Driven EFW Pump Jacket Cooler
NSM 23107, Unit 2 RBAC LPSW Piping Penetration Modification
NSM ON-23093, LPI Passive Cross-Tie Modification

ONOE-12466, Modify Actuators on Valves 1BS-1 and 1BS-2 (Building Spray Header Isolation Valves)
UFSAR Change, Revision of the Rod Ejection Accident Failed Fuel Percentage
NSM ON-23090/00/00/AL, Installation of a 3-Minute Time Delay Relay to Start RBCUs Following an ES Actuation Signal.
NSM ON-53118/00/00/AL, Replacement of SSF Inverters KSF1 and KSF2
ONOE-18036, Staffing the SSF Within 10 Minutes of Confirmation of an Active Fire in the Control Room, Cable Room, Equipment Room or Turbine Building.
NSM ON-33090/00/00/AL3, Installation of a 3-min Time Delay Relay to Start RBCUs Following a ES Actuation Signal

Screened Out Items

ONOE-17561, LPI Pipe Supports (Piping Associated with Valves 2 LP-15 and 2 LP-16 OBD/NCI)
ONOE-18193, Control Room Ventilation DBD Changes
OE300044, Replace Globe Valve 3HP-415 with Gate Valve
OE300088, Replace Globe Valves 3FDW-260 & 261 with Gate Valve
ONOE-17556, Install SSF Diesel Emergency Run Timer and Run Aux Relay
UFSAR Change, Power Sources for AFIS Digital Channels
Technical Specification Bases Change, Main Steam Relief Valve Test Code
Technical Specification Bases Change, Valves LPI-15 & 16 Seven Day LCO for LPI Online Maintenance
ONOE-18756, Revise SLC 16.6.1 and OSS-0254.00-000-4001 to Reflect Type C Testing for Penetration 56
NSM ON-33092/00/00/AL, Installation of Three Safety-Related 600V MCCs
ONOE-14036, Resetting Safety-Related Motor Overcurrent Trip Setpoints
ONOE-16061, Replacement of Westinghouse Protective Relays
ONOE-16508, LPI MOV Power Realignment
OE-300042, 3HPI P0061 Controller Replacement
AP/1,2,3/A/1700/008, Rev. 8; Loss of Control Room Procedure Enhancements

Self-Assessment Documents

PIP O-04-08745, Initiate Actions to Create a 10 CFR 50.59 On-Site Review Committee
PIP O-95-00010, Penetration Testing does not Meet NRC Interpretation of 10 CFR 50, Appendix J
PIP O-04-00518, High Energy Line Break 50.59 Evaluation Apparent Violation

**Section 1R04.2: Complete Walkdown of the Standby Shutdown DG and Support Systems**

OP/0/A/1600/010, Operation of the SSF Diesel Generator
OP/0/A/1600/007, SSF Diesel Air System
OP/0/A/1600/003, SSF Diesel Fuel Oil System
PT/0/A/0600/021, Standby Shutdown Facility Diesel-Generator Operation
PT/0/A/0600/023, Standby Shutdown Facility Fuel Oil Inventory
Technical Specifications 3.10.1

Updated Final Safety Analysis Report (UFSAR) Sections; 1.2.2.10, 9.6.3.4
Selected Licensee Comments 16.7.12, 16.7.13, 16.9.14
Drawings OFD 137D-1, 2, 3, 138A-1, 135A, 135B,

**Section 1R12.2: Maintenance Rule Implementation - Periodic Evaluation (Biennial)**

PIPs

O-05-00187, EDM-410 inspection report not completed
O-04-03342, 'B' Chiller slide valve failure
O-00-00921, 600/208V safety related power system maintenance rule a(1)
O-99-01286, Auxiliary Building Flood design basis needs clarification
O-04-05018, Maintenance Rule function LPS.15 is not periodically tested. MR Program requires functions to be periodically proven or the system to be classified as (a)(1)
O-01-04457, LPSW-68 did not open during PT/0/A/0251/026
O-98-04345, LPSW System is Maintenance Rule (a)(1) due to inadequate testing of LPSW-67 and LPSW-68
O-03-00674, Update needed for MR SSC Summary Sheets for BS and LPI systems
O-04-05466, When performing RPS channel "C" trip verification, channel "A" would not indicate the channel "C" had tripped
O-04-05929, ES Analog channel "A" DC power system trip
O-04-03086, This PIP is being written as an implementation PIP for SLC Change 2004-03
O-02-07281, Unit 3 HPI Pump Room Trench not draining is a recurring problem
O-02-00106, Turbine Building Flood Supersystem is Maintenance Rule (a)(1)
O-04-02828, ECCW System test failed to meet acceptance criteria
O-01-00414, Life of non-metal expansion joints
O-03-05567, Calculation needed to document basis for UFSAR information about Turbine Building flood flow rate
O-01-01876, QA1 CCW pump was sent to non-qualified supplier to be re-furbished contrary to the requirements of section 17.4.2.4 Procurement Control of the Topical Report
O-99-00032, Shaft sleeve on Auxiliary Service Water Pump may be susceptible to a stress corrosion cracking/hydrogen embrittlement mechanism
O-00-02321, The Chilled Water System Vital Loads (WC) is declared Maintenance Rule (a)(1)
O-04-09234, Questions/discrepancies identified with data in SSC Functions database application
O-04-05995, 2SA-5, A2 2A RPS Channel on test in alarm
O-04-01001, AFI - Design of piping for portable chiller is not properly documented
O-03-01316, Inadequate installed capability to vent the WC portion of the Control Room Chillers
O-02-04440, "A" Chiller evaporator will not be eddy current tested as intended during the replacement of LPSW-216 under WO 98438175
O-01-03178, The "A" Chiller failed to start initially but did start on the second attempt

Assessments

PIP O-04-00180, Plant Heath Committee review of 2nd Trimester 2003 Health Reports and Action Plans

PIP O-02-02792, Plant Heath Committee review of 3rd Trimester 2002 Health Reports and Action Plans
PIP O-02-0005063, Plant Heath Committee review of 2nd Trimester 2002 Health Reports and Action Plans

Administrative Procedures

Nuclear System Directive 310, Requirements for the Maintenance Rule, Rev. 8
Engineering Directives Manual (EDM) 210, Engineering Responsibilities for the Maintenance Rule, Rev. 16
EDM 410, Inspection Program for Civil Engineering Structures and Components, Rev. 10
EDM-201, Engineering Support Programs, Rev. 8

Site Working Procedures

PT/2/A/0152/028, RB Aux Coolers Valve Stroke Test, Rev. 3
PT/0/A/0261/021, CCW Pump Flange Seal Test, Rev. 2
TT/0/A/0261/007, CCW Pump Flange Seal Test, Rev. 2 (completed 9/6/00)

Miscellaneous

Modification NSM ON-13197, LPSW to RB Aux Coolers, Test Plan (Unit 1)
Calculation OSC-8655, Maximum Turbine Building Flood Flow Rate Caused by Failure of a Condenser Inlet Pipe Expansion Joint, Rev. 0
Oconee PRA, Appendix L and Table 3.3-6, Rev. 2
Oconee Final Safety Analysis Report, section 3.4.1.1
Technical Specification 3.7.16, control Room Area Cooling System, and Bases, dated 4/24/03
Modification Request Form 287, Control Room Chillers, Rev. 2
Maintenance Rule Special Expert Panel Meeting Minutes, 9/29/2004
Maintenance Rule Special Expert Panel Meeting Minutes, 12/9/2004
Maintenance Rule Special Expert Panel Meeting Minutes, 12/1/2004
LPSW Health Report, Report Period 2004T3
Control Room Ventilation System Health Report 2004T2
Condenser Circulating Water Health Report 2004T2
TBF Health Report 2004T2
Metal Clad 4160/6900 VAC Switchgear Circuit Breakers 2004 T2
600/208 V Health Report, Report Period 2004T2
OEM Health Report, Report Period 2003T1
Plant Health Committee Action Item List, To dates of Inspection
TSAIL (Techncial Specification LCO Logs) for last two years on WC

**Section 1R17: Permanent Plant Modifications**

Self-Assessment Documents

PIP O-98-04647, Various Tech Spec Values not Specified as Analytical, Allowable, or Instrument Corrected Values

PIP O-99-00193, Documentation for Auxiliary Building Ventilation Design Needs to be Developed
PIP O-00-00141, DBD OSS-0254.00-00-4001 Discrepancy
PIP O-01-03753, Discrepancy in Calculation for Control Room Cooling System
PIP O-02-05847, Incorrect Piping Installed on LPSW Piping System
PIP O-02-06514, Determine Pipe Wall Thickness of LPSW Piping
PIP O-04-00598, Ensure Minor Mod Prepared to Downgrade LPSW Piping to RBACs
PIP O-04-05411, Inadequate Documentation of 50.59 Review
PIP O-00-03167, UFSAR Sections Differ Regarding Flow for Valves 1BS-1 and 1BS-2
PIP O-03-08024, Modification Engineering Level 1 Assessment
PIP O-04-00075, Keowee Design Basis didn't Force a Change to the Keowee Governor Modification
PIP O-04-00847, LPI Passive Cross Connect Modification Outage Critique
PIP O-04-01244, Effect of LPI Cross Connect Modification an SLC Required Action
PIP-O-04-03528, Environmental Conditions Unacceptable for Coatings for LPI Cross Connect Modification

## LIST OF ACRONYMS

| | | |
|---|---|---|
| ACB | - | Air Circuit Breaker |
| ADAMS | - | Agency wide Documents Access and Management System |
| ANSI | - | American National Standards Institute |
| ARM | - | Area Radiation Monitor |
| AP | - | Abnormal Procedure |
| ASME | - | American Society of Mechanical Engineers |
| ASTM | - | American Society for Testing and Materials |
| ASW | - | Auxiliary Service Water |
| BMV | - | Bare Metal Visual |
| CAM | - | Continuous Airborne Monitor |
| CAP | - | Corrective Action Program |
| CC | - | Component Cooling |
| CCW | - | Condenser Circulating Water |
| CFR | - | Code of Federal Regulations |
| CRD | - | Control Rod Drive |
| CROABF | - | Control Room Outside Air Booster Fan |
| CTPD | - | Core Thermal Power Demand |
| DEC | - | Duke Energy Corporation |
| DG | - | Diesel Generator |
| ECCS | - | Emergency Core Cooling |
| EDG | - | Emergency Diesel Generator |
| EHC | - | Electro-Hydraulic Control |
| EOC | - | End-of-Cycle |
| FDW | - | Feedwater |
| FME | - | Foreign Material Exclusion |
| GPM | - | Gallons per Minute |
| HPI | - | High Pressure Injection |
| HPSW | - | High Pressure Service Water |

| | | |
|---|---|---|
| HX | - | Heat Exchanger |
| ICS | - | Integrated Control |
| IP | - | Inspection Procedure |
| IR | - | Inspection Report |
| ISI | - | Inservice Inspection |
| IST | - | Inservice Testing |
| KHU | - | Keowee Hydroelectric Unit |
| kV | - | Kilo Volt |
| 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 |
| MR | - | Maintenance Rule |
| MS | - | Main Steam |
| MT | - | Magnetic Particle |
| NCV | - | Non-Cited Violation |
| NDE | - | Non-Destructive Examination |
| NIST | - | National Institute of Standards and Technology |
| NRC | - | Nuclear Regulatory Commission |
| NRMCA | - | National Ready Mixed Concrete Association |
| NRR | - | Nuclear Reactor Regulation |
| ODCM | - | Offsite Dose Calculation Manual |
| ONS | - | Oconee Nuclear Station |
| OOS | - | Out of Service |
| OTSG | - | Once-Through Steam Generator |
| PARS | - | Publicly Available Records |
| PASS | - | Post Accident Sampling System |
| PCM | - | Personnel Contamination Monitor |
| PIP | - | Problem Investigation Process report |
| PM | - | Preventive Maintenance |
| PMT | - | Post-Maintenance Testing |
| PT | - | Performance Test |
| PWHT | - | Post Weld Heat Treatment |
| QC | - | Quality Control |
| RRCU | - | Reactor Building Cooling Unit |
| RBES | - | Reactor Building Emergency Sump |
| RBS | - | Reactor Building Spray |
| RCMUP | - | Reactor Coolant Makeup Pump |
| RCA | - | Radiologically Controlled Area |
| RCP | - | Reactor Coolant Pump |
| RCS | - | Reactor Coolant System |
| REMP | - | Radiological Environmental Monitoring Program |
| RFO | - | Refueling Outage |
| RII | - | Region II |
| RP | - | Radiation Protection |

| | | |
|---|---|---|
| RPV | - | Reactor Pressure Vessel |
| RTP | - | Rated Thermal Power |
| RV | - | Reactor Vessel |
| SCBA | - | Self-Contained Breathing Apparatus |
| SDP | - | Significance Determination Process |
| SGRP | - | Steam Generator Replacement Project |
| SLC | - | Selected Licensee Commitments |
| SSC | - | Structure, System and Component |
| SSF | - | Standby Shutdown Facility |
| TDEFW | - | Turbine Driven Emergency Feedwater |
| TI | - | Temporary Instruction |
| TLD | - | Thermoluminescent Dosimetry |
| TS | - | Technical Specification |
| UFSAR | - | Updated Final Safety Analysis Report |
| URI | - | Unresolved Item |
| WO | - | Work Order |