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

October 13, 2004

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 - NRC SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT NOS. 05000269/2004006, 05000270/2004006, and 05000287/2004006

Dear Mr. Jones:

On September 3, 2004, the U. S. Nuclear Regulatory Commission (NRC) completed a safety system design and performance capability inspection at your Oconee Nuclear Station, Units 1, 2, and 3. The enclosed report documents the inspection findings which were discussed on September 2, 2004, with you and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of the inspection, no findings of significance were identified.

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 the 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/

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure: (See page 2)

Enclosure: NRC Inspection Report Nos. 05000269/2004006, 05000270/2004006, and 05000287/2004006
w/attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-269, 50-270, 50-287
License Nos.:	DPR-38, DPR-47, DPR-55
Report Nos.:	05000269/2004006, 05000270/2004006, and 05000287/2004006
Licensee:	Duke Energy Corporation
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	August 16 - 20, 2004 August 30 - September 3, 2004
Inspectors:	F. Jape, Senior Project Manager (Lead Inspector) J. Moorman, Team Leader R. Moore, Senior Reactor Inspector R. Cortes, Reactor Inspector D. Mas-Penaranda, Reactor Inspector A. Nielsen, Health Physicist (second week only) J. Chiloyan, Consultant
Accompanied by:	C. Peabody, Nuclear Safety Professional
Approved by:	Charles R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000269/2004-006, 05000270/2004-006, 05000287/2004-006; 08/16-20/2004 and 08/30/2004-09/03/2004; Oconee Nuclear Station Units 1, 2, and 3; Safety System Design and Performance Capability Inspection.

This inspection was conducted by a team of regional inspectors and a contractor. No findings of significance were identified. 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

No findings of significance were identified.

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

The inspection team reviewed selected components and operator actions that would be used to prevent or mitigate the consequences of a steam generator tube rupture (SGTR) event. Components in the main steam (MS) system, emergency feedwater (EFW) system, makeup system, reactor coolant system (RCS), high pressure injection (HPI) system, and radiation monitoring system were included. This inspection also covered supporting equipment, equipment which provides power to these components, and the associated instrumentation and controls.

.1 System Needs

.11 Process Medium

a. Inspection Scope

The team conducted electrical system walkdowns, observed instrument indications, and reviewed selected operations surveillances to verify that the power supplies for the motor driven EFW pumps and HPI pumps would be available and unimpeded during accident/event conditions. Reviews were based on the Updated Final Safety Analysis Report (UFSAR) system descriptions and Technical Specification (TS) requirements. Specifically, the team reviewed procedures for the operation, maintenance and testing of the EFW and HPI pumps as well as motor operated valves (MOVs) to verify proper design configuration and control. The team reviewed the EFW and HPI pump and MOV power supply calculations, operating lineup procedures, drawings, licensing and design basis information, surveillance procedures, and vendor manuals.

The team reviewed the water sources for components and systems required for the mitigation of the SGTR event. These included the borated water storage tank (BWST), the upper surge tanks (UST), and the hotwell. The team reviewed the availability, reliability, and adequacy of the water sources with respect to the anticipated water source requirements for the SGTR event. The team reviewed design criteria information, drawings, vendor manuals, and calculations to determine the minimum water levels for pump net positive suction head (NPSH) and tank volume to verify that the design and UFSAR accident analysis assumptions were consistent with system and equipment capability. Specifically, the team reviewed operating/lineup procedures, drawings, and surveillance procedures to determine the common valves associated with flow paths from the UST and hotwell to the EFW pump to verify proper configuration control. The review also included the minimum-flow flowpaths for the EFW pumps as well as vortexing considerations for both the UST and BWST. Additionally, the team reviewed foreign material exclusion (FME) problem investigation process reports (PIPs) for the UST, once-through steam generators (OTSGs) and BWST to determine if water supplies to the EFW and HPI systems would be obstructed by foreign material or tank degradation.

The team conducted walkdowns of instrumentation systems, observed instrument indications, and reviewed selected operations surveillance to verify that the process medium for the EFW would be available and unimpeded during accident/event conditions. Reviews were based on the UFSAR system descriptions and Calculation OSC-6116, "SGTR: Event Mitigation Requirements."

In addition to the above, the team reviewed calibration procedures and calibration records for the level instruments used on the condensate storage tank (CST) and upper surge tank to verify that the procedures accurately incorporated set point values delineated in calculations of record.

b. Findings

No findings of significance were identified.

.12 Energy Sources

a. Inspection Scope

The team reviewed the electrical overcurrent, undervoltage, and ground protection relay settings for selected circuits to verify that the trip setpoints would not spuriously interfere with equipment fulfilling its safety function, and secondarily, that protection was provided. Specific relays reviewed were the overcurrent, undervoltage, differential and ground relays associated with the 4160 volt alternating current (4160VAC) buses and switchgears supplying power to EFW and HPI pump motors, as well as the 600VAC load centers (LCs) and motor control centers (MCCs) for power and control of HPI motor operated valves. Data sheets for the last relay calibration were reviewed to verify that the calibrations were within the calculated limits and that excessive drift was not taking place.

During the review of the 4160VAC, 600VAC, 208VAC and 125 volts direct current (125VDC) systems, the team focused on the appropriateness of design assumptions, adequacy of analytical models and methods, calculations, and acceptance criteria for surveillance and performance validation tests to verify that the AC and DC power sources were adequate to meet minimum voltage specifications for electrical equipment during and following an SGTR event. Among the reviewed components were the EFW, HPI pump motors and HPI motor operated valves. Specific pumps and valves reviewed were:

- EFW Pump Motor 1A
- EFW Pump Motor 1B
- HPI Pump Motor 1A
- HPI Pump Motor 1B
- HPI Pump Motor 1C
- HPI to Reactor Inlet Valve, 1A-1HP-26
- HPI to Reactor Inlet Valve, 1B-1HP-27
- HPI Isolation Valve, 1HP-409
- HPI Isolation Valve, 1HP-410

The team conducted walkdowns, and control room and equipment status reviews of selected electrical energy sources to verify the availability during accident/event conditions. Reviews were based on design basis documents, system operation procedures, UFSAR, and TS requirements.

The team conducted walkdowns and equipment status reviews of selected energy sources to verify availability and reliability during accident/event conditions. Reviews were based on design basis documents, vendor manuals, system operating procedures, TS, and UFSAR requirements. Systems of focus included instrument air for the pneumatically operated valves used to mitigate an SGTR event such as the EFW flow control valves (FCVs) (1FDW-315, -316), turbine bypass valves (1MS-19, -22, -28, -31), and back-up nitrogen supply to the former. The team reviewed valve lineup procedures, testing and maintenance history for the steam supply valves (1MS-82, -84, -93) and check valves (1MS-83, -85, -91) to the turbine-driven EFW pump (1C) to verify that the system design basis assumptions were consistent with the actual capability of the system. The team also reviewed operating procedures to verify proper steam isolation to the turbine driven EFW pump from the faulted OTSG.

b. Findings

No findings of significance were identified.

.13 Instrumentation and Controls

a. Inspection Scope

The team reviewed the electrical control schematics for EFW control systems and pressurizer power operator relief valve (PORV) controls, to verify that the logic of operation satisfies the requirements of the plant's design bases and licensing bases requirements. The team reviewed the controls for the motor driven EFW Pump A, low steam generator (SG) level start circuit, condensate system valve 1FDW-315, EFWDWP discharge valve to SG 1A, and pressurizer relief valve 1RV-67. In addition, the team reviewed surveillance procedures, calibration test records, and setpoint calculations for process instrument channels monitoring SG narrow range and wide range level, SG pressure, RCS pressure, pressurizer level, RCS temperature, and radiation monitors to verify that the setpoint calculations were documented accurately on the surveillance procedures for these instrument channels.

b. Findings

No findings of significance were identified.

.14 Operator Actions

a. Inspection Scope

The team reviewed plant operating procedures, emergency operating procedures (EOPs), abnormal procedures (APs), and annunciator response procedures (ARPs) that would be used for the identification and mitigation of an SGTR event. The team

reviewed these SGTR related procedures to verify that appropriate guidance was provided to the operators for identification and mitigation of the event and procedures were consistent with the owners group guidelines, the station emergency procedures writers guide, the station UFSAR, and SGTR training provided to the operators. The team reviewed the EOP deviations from the owners group guidelines. A simulator SGTR event scenario was observed to assess the operators' use of procedures and available instrumentation and controls for identification and mitigation. The team reviewed the design documentation and accident analysis assumptions which established the set points and time related tasks for EOPs for this event to verify this information had been appropriately incorporated into procedures. The team compared a sample of the requirements in Nuclear System Directive (NSD) 513, "Primary-to-Secondary Leak Monitoring Program," to the implementing steps in Abnormal Procedure AP/1/A/1700/031, "Primary to Secondary Leakage," to verify that the NSD requirements were properly translated into the working level procedure.

The team conducted in-plant walkdowns with station operators of procedures used to accomplish SGTR related actions outside of the control room to verify that the procedures would accomplish their stated objective in a reasonable time under conditions that would exist during the event. These actions included operation of atmospheric depressurization valves (ADVs), refill of the BWST, cross-connect of unit EFW, local manual action to open turbine building sump pump breakers, and line up of the EFW pump suction to the main condenser. Additionally, the team conducted in-plant walkdowns of tasks contained in the SGTR EOP and AP that would be performed by radiation protection technicians during the event. These tasks included locally measuring condenser steam air ejector flow (CSAE), obtaining a sample from the CSAE, and measuring radiation levels on the main steam lines.

b. Findings

No findings of significance were identified.

.15 Heat Removal

a. Inspection Scope

The team reviewed design calculations, drawings, and surveillance test procedures for selected equipment to assess the reliability and availability of cooling for equipment required to mitigate an SGTR event. The team conducted field walkdowns of the equipment to verify that operating conditions were consistent with design assumptions. The equipment reviewed included HPI and EFW pumps and testing of these pumps at both full and minimum flow conditions. The team also reviewed design calculations, vendor manuals, and machinery history to verify that the HPI pump upper bearing oil cooler had adequate heat transfer capability using the low pressure service water system to remove heat from the thrust bearing housing during design bases accidents.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

.21 Installed Configuration

a. Inspection Scope

The team reviewed design drawings and performed walkdowns of portions of the Class 1E electrical distribution systems; including 4160VAC buses and switchgears, 600VAC load centers, 600VAC and 208VAC motor control centers, 120VAC and 125VDC panelboards applicable to the EFW and HPI pumps and valves. The purpose of the inspection was to assess general material condition, verify system alignments were consistent with design and licensing basis assumptions and to identify degraded conditions of SGTR mitigation equipment. The team reviewed the 4160VAC and 600VAC circuit breaker control logic design drawings applicable to the EFW and HPI pump motors and motor operated valves and performed field and control room walkdowns to verify that the installed local and remote circuit breaker control switches and breaker position indicating lights were consistent with design drawings.

The team performed field inspections of accessible SGTR mitigation mechanical equipment in the EFW, HPI, and main steam (MS) systems to assess observable material condition, identify degraded conditions, and verify the installed configuration was consistent with design drawings and design inputs to calculations. This review was also conducted to verify that selected valves and components in these systems were in their required position and that the valve line-up configuration was consistent with the design bases. For the HPI, and EFW systems, particular attention was placed on verifying selected valves and components that could cause a common mode failure in these systems. Among the selected components were the atmospheric dump valves (ADVs) (1MS-162, -164), the turbine bypass valves (1MS-19, -22, -28, -31), HPI suction valves (1HP-24, -25), HPI discharge valves (1HP-26, -27), and the EFW FCVs (1FDW-315, -316).

Additionally, the team reviewed FME PIPs, and system health reports for selected systems and met with selected system engineers to discuss system design basis and to evaluate identified degraded components. The team also reviewed human factors items in the walkdown areas (e.g. lighting, noise, accessability, labeling) to verify proper consideration had been given to these areas for SGTR mitigation actions.

The team examined the material condition of the level instruments on the UST and the protection and routing for redundant sensing lines. This review was performed to verify that the observable material condition was acceptable and that redundant instrumentation sensing lines were adequately routed and protected to prevent common cause failure of the instruments.

In addition, the team observed installed configuration and material condition for the following radiation monitoring instruments on all three units:

- RIA-16/17, Main Steam Line Area Radiation Monitors
- RIA-59/60, Main Steam Line Nitrogen-16 Detectors, Unit 1 only

- RIA-40, Condenser Steam Air Ejector Off-Gas Monitor

The installed configuration was evaluated against UFSAR requirements and design calculation documents listed in the Attachment.

b. Findings

No findings of significance were identified.

.22 Operations

a. Inspection Scope

The team performed field walk downs of selected components specified in the SGTR EOP for which local manual operation was required to verify the equipment was accessible, required tools and ladders were available, and adequate lighting and indications were available for operation and determination of equipment status. These components included the EFW unit cross-connect valves, ADVs, main condenser vacuum breakers, backup nitrogen supply for EFW flow control valves, CSAE exhaust lines used for flow monitoring and radiation sampling, and locations for local radiation monitoring of main steam lines.

b. Findings

No findings of significance were identified.

.23 Design

a. Inspection Scope

Mechanical Design

The team reviewed a sample of the TS, the UFSAR, calculations, and vendor manuals for the EFW (1A, 1B, 1C) and HPI (1A, 1B, 1C) pumps and valves to verify that vendor recommendations and licensing basis requirements had been appropriately translated into the surveillance requirements and design calculations. The team also reviewed operating experience (OE) of the EFW FCVs (1FDW-315, -316) and EFW minimum-flow lines potential for failure and isolation, respectively. The team reviewed NPSH calculations for the EFW, and HPI pumps to verify that adequate water head was available from each of the applicable water sources, both the USTs and the hotwell, and the BWST, respectively. Also, the team reviewed volumetric water level calculations to verify that vortexing considerations had been properly translated into the surveillance tests acceptance criteria and to the equipment monitoring activities. In addition, the team reviewed the EFW FCVs backup nitrogen tanks regulator setting controls to verify that backup nitrogen would be available if needed.

Electrical Design

The team reviewed the AC and DC electrical power and control distribution system design to ensure the system would provide adequate power to the EFW and HPI pumps and valves. This included review of design bases, design changes, design assumptions, calculations of short circuits, voltage drops and relay setpoints. Additionally, the team performed limited calculations to verify the appropriateness of the design values.

The team reviewed the uncertainty calculations for the following instrument loops associated with the SGTR accident and verified that plant instrument calibration procedures have accurately incorporated set point values delineated in the calculations of record for the following instruments channels: SG narrow range and wide range level, SG pressure, RCS pressure, pressurizer level, and RCS temperature.

b. Findings

No findings of significance were identified.

.24 Testing

a. Inspection Scope

The team reviewed a sample of records of preventive maintenance, functional performance and surveillance tests to verify that the tests were appropriately verifying the assumptions of the licensing and design bases and that the equipment was being properly maintained. This review included the testing of the 4160VAC emergency power switching logic and protective relay settings. The components reviewed included the 4160VAC main bus 1 and main bus 2 circuit breakers and associated overcurrent, undervoltage, differential, and ground relays.

The team also reviewed MOV bench and motor power monitor (MPM) test results to verify the capabilities of the MOV actuators are adequate to provide the required thrust under degraded voltage conditions. The components reviewed included the HPI motor operated valves HP-26, HP-27, HP-409, HP-410 and associated motor and starter circuits.

The team reviewed records of preventive maintenance, surveillance tests, maintenance history, head curves, and performed field walkdowns of selected components in the HPI, EFW, and MS systems to verify that the tests and inspections were appropriately verifying that the assumptions of the design and licensing bases were being maintained. This review included testing of HPI and EFW pumps discharge pressures and flowrates during full and recirculation flow conditions, relief valve pressure set points; and analysis of pump bearing oil samples. A more detailed list of the components is provided in the Attachment.

The team reviewed valve stroke time testing, MOV thrust capability with differential pressure included, and post-maintenance testing to verify that the tests and inspections were appropriately verifying the assumptions of the licensing and design bases; that the

equipment was being properly maintained; and that performance degradation would be identified during tests.

The team reviewed alarm setpoint calculations, maintenance history, and calibration records for Unit 1 radiation monitoring instruments, RIA-16/17, RIA-59/60, and RIA-40. Radiation monitoring equipment operability was reviewed against requirements contained in the UFSAR and applicable design basis drawings and procedures listed in the Attachment.

In addition, the team reviewed data sheet records for SG narrow range and wide range level, SG pressure, RCS pressure, pressurizer level, and RCS temperature instruments. The reviews were performed to verify that the plant surveillance procedures had correctly incorporated acceptance criteria and instrument uncertainties that were specified in the instrument loop uncertainty calculations of record. Also, the team reviewed records of completed surveillance tests and preventive maintenance that were performed on these instruments in order to verify that the related problems were being adequately corrected.

b. Findings

No findings of significance were identified.

.3 Selected Components

.31 Component Degradation

a. Inspection Scope

The team reviewed PIPs and surveillance records to assess the licensee's actions to verify and monitor the safety function, reliability and availability of selected components. Components included in this review were the 4160VAC Class IE type HK switchgears auxiliary switches and type CO relays. The team held interviews with licensee personnel to review licensee's actions to address vendor recommended breaker and relay refurbishment and replacement. A list of reviewed PIPs is provided in the Attachment.

The team reviewed selected systems with Maintenance Rule functional failures, maintenance records, testing documentation, work orders, condition reports, and performance trending of selected components in the HPI, EFW, MS, RCS, instrument air, and nitrogen backup systems to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of selected components. Among the selected components were air operated valves, MOVs, main steam safety valves, ADVs, pumps, and air compressors. A more detailed list of components reviewed is provided in the Attachment.

Additionally, the team assessed potential common cause failure mechanisms due to maintenance, parts replacement, and modifications to verify that components that were relied upon to mitigate an SGTR event were not degrading to unacceptable performance

levels. The team reviewed the licensee's analysis of an OE item related to main steam safety valve cotter pin failures to verify that actions were taken in accordance with OE recommendations. The team also reviewed the turbine driven EFW pumps' steam supply piping to verify inclusion of steam traps to prevent turbine overspeeding.

The team reviewed preventive maintenance records, testing documentation, calibration records, and work orders for SG narrow range and wide range level, SG pressure, RCS pressure, pressurizer level, RCS temperature and radiation monitoring instruments to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of the components in the system.

b. Findings

No findings of significance were identified.

.32 Equipment Protection

a. Inspection Scope

The team performed field walkdowns of selected components in the HPI, MS, and EFW systems to verify that the components were adequately protected from the potential effects of missiles, flooding, impacts from other equipment such as scaffolds, and high or low outdoor temperatures.

b. Findings

No findings of significance were identified.

.33 Component Inputs/Outputs

a. Inspection Scope

The team reviewed the EFW FCVs to verify fail safe position of open valves in accordance with the design bases for SGTR.

The team performed field walkdowns of condensate storage tank level tansmitters 1-C-LT-0016A and 1-C-LT-0016P as well as upper surge tank level transmitter 1-C-LT-0036-1A to assess suitability of the environment in terms of temperature and humidity anticipated under accident conditions. In addition, the team reviewed environmental specifications for the standby shutdown facility (SSF) SG pressure transmitters (Rosemount 1154) to verify that the instruments were suitable for their application. The team reviewed environmental qualification requirements in the vendor manuals for a sample of instrument loops listed below.

- Condensate Storage Tank level (1-C-LT-0016A,-0016P)
- Upper Surge Tank (1-C-LT-0036-1A)
- SG NR Lvl (1-FDWLT-0053-P,-0066,-0080,0008-A)
- S/G WR Lvl (1-FDWLT-00070P,-0055-P,-0082,-0051)
- SG Pressure (1-FDWP-0231)

- RCS Pressure (3-RC-PT-0224)
- Pressurizer Level (3-RC-LT-0072,-0004-P1,-P2,-P3)

b. Findings

No findings of significance were identified.

.34 Operating Experience

a. Inspection Scope

The team reviewed the licensee's applicability evaluations and corrective actions for industry experience issues related to turbine driven EFW pumps, MOVs, check valves, and instrument air system failures. The team also reviewed the licensee's evaluations of operating experience reports applicable to the SGTR event to verify that applicable insights from those reports had been applied to the appropriate components.

The team specifically reviewed the following events:

- IN-2003-13, Steam Generator Tube Degradation at Diablo Canyon.
- NSAL-03-5, Steam Generator Sludge Lance Tube Wear
- IN 03-05, Failure To Detect Freespan Cracks in PWR Steam Generator Tubes.
- OE 15901, Steam Generator Sludge Lance Damage to U-Tubes
- IN 2002-21, Axial Outside-Diameter Cracking Affecting Thermally Treated Alloy 600 Steam Generator Tubing
- OE11624 - All Three Auxiliary Feedwater Pumps Declared Inoperable Due to the Potential to Plug Their Suction Strainers
- OE12078 - Turbine Driven Emergency Feedwater Pump Trip Following a Plant Trip
- IN 2002-10, Non-Conservative Water Level Setpoints on Steam Generators
- SEN 213, Steam Generator Tube Failure - Indian Point Unit 2

b. Findings

No findings of significance were identified.

.35 Foreign Material Exclusion Control Program And Loose Parts Monitoring

a. Inspection Scope

The team reviewed procedural guidelines and performance records for the loose parts monitoring system to verify that these systems were operational and were being used to monitor for loose parts in the RCS. In addition, the team reviewed records of foreign material control activities to verify that this program was being utilized.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed a sample of PIPs initiated over the past two years for systems, structures, or components required to mitigate an SGTR event to confirm that the licensee was adequately identifying, evaluating, and dispositioning adverse conditions. The specific documents reviewed are listed in the Attachment.

The team reviewed a sample of PIPs initiated over the past three years for SG narrow range and wide range level, SG pressure, RCS pressure, pressurizer level, RCS temperature and radiation monitors instruments to verify that the licensee was adequately identifying, evaluating, and dispositioning adverse conditions.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Meetings, Including Exit

The lead inspector presented the inspection results to Mr. R. Jones, Site Vice President, and other members of the licensee staff, at an exit meeting on September 2, 2004. The licensee acknowledged the findings presented. Proprietary information is not included in this inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

G. Davenport, Regulatory Compliance Manager
L. Nicholson, Safety Assurance Manager
J. Smith, Regulatory Compliance
J. Weast, Regulatory Compliance

NRC (attended exit meeting)

C. Casto, Director - Division of Reactor Safety
G. Hutto, Resident Inspector
J. Moorman, Team Leader, NRC Region II
E. Riggs, Resident Inspector
M. Shannon, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

None.

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R.21.11 - Process Medium

Instructions/Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
OP/1/A/1106/006, Emergency FDW System (valve line-up), Rev. 107
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17

Drawings
OFD-121D-1.1, Flow Diagram of Emergency Feedwater System - Unit 1, Rev. 28
OFD-101A-1.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 38
OFD-101A-2.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 39
OFD-101A-1.2, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 31
OFD-101A-1.3, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 18
OFD-101A-1.4, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 35
O-402A, Piping Layout Upper Surge Tank Platform - Plan and Sections - Unit 1, Rev. 27
O-422K-3, Instrument Detail Condensate Storage Tank Level , Rev. 10
O-422K-6, Instrument Detail Upper Surge Tank Level, Rev. 3
O-402B, Piping Layout Upper Surge Tank Platform Sections Turbine Building, Rev. 22

Surveillance Test Procedures
IP/O/B/0275/010 K, Upper Surge Tank Level Instrument Calibration, 1/13/4
IP/O/A/0275/010L, CST Level Instrument Calibration, 2/7/3

Calculations
OSC-611, SGTR: Event Mitigation Requirements (Type III) Rev

Vendor Technical Manuals
OM 1149-0001, Upper Surge Tanks - Unit 2 MK. 2A & MK.2B, Rev. DG

Problem Investigation Process (PIPs)
02-05815, Foreign material found in Unit 2 upper surge tanks.
03-06560, Foreign material in 1B RCS hot leg piping and in the vicinity of decay heat drop line suction piping.
03-00384, Challenges with oil sampling and analysis.

Calculations and Evaluations
OSC-1579, HPI Pumps NPSH Analysis (Injection from BWST), Rev. 2
OSC-2820, Emergency Procedure Setpoints (selected portions for BWST vortexing), Rev. 26
OSC-2155, Motor Driven and Turbine Driven EFW Pump NPSHA from the Upper Surge Tank, Rev. 9
OSC-2826, Seismic study of the hotwell and associated components, Rev. 2
OSC-2251, Upper Surge Tank Setpoint Analysis, Rev. 2
OSC-6104, Loss of Main Feedwater (LOMF) Event Mitigation Requirements, Rev. 6
SRC-OSA-SA-84-001-0, Feed and Bleed Cooldown, pages 1 through 17, dated 07/12/84
OSC-5964, Emergency Feedwater Combined Inventory UST (vortexing), Rev. 5
OSC-7212, Unit 1 Motor Driven Emergency Feedwater Pump NPSH from the hotwell, Rev. 4
OSC-4478, SG Emergency Range Level Uncertainty and EFW Low Level, Rev. 5

Miscellaneous Documents
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Section 1R.21.12 - Energy Sources

Instructions/Procedures
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OP/1/A/1106/006, Emergency FDW System (valve line-up), Rev. 107

Drawings
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OFD-122A-1.2, Flow Diagram of Main Steam System - Unit 1, Rev. 13
OFD-122A-1.4, Flow Diagram of Main Steam System - Unit 1, Rev. 22

Design Basis Documents
General Design Criteria Document No. OSS-0254.00-00-1037, Main Steam System, pages 1 through 21, Rev. 23

Problem Investigation Process (PIPs)
02-05815, Foreign material found in Unit 2 upper surge tanks.
03-06560, Foreign material in 1B RCS hot leg piping and in the vicinity of decay heat drop line suction piping.

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Section 10.3, Main Steam System, pages 10.3-1 through 10.3-6

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Part Number 31533VX, Instructions Operating and Repairing Consolidated Electromatic Relief Valve, dated 03/17/87

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Section 1R.21.13 - Instrumentation and Controls

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Design Basis Documents
OSS-0254.00-00-1000, Emergency Feedwater and the Auxiliary Service Water System, Rev.36
OSS-0254.00-00-1036, Feedwater System

Calculations

OSC-2746, SSF Pressurizer Level Loop Instrument Accuracy Calibration, Rev.4
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OSC-6757, SG Full Range Level Instrument Loop Accuracy 1 /2 / 3 FDWLT0007P &9P, Rev.14
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OM 1149-0001, Upper Surge Tanks - Unit 2 MK. 2A & MK.2B, Rev. DG
OM 267-0846.001, Model 1151 DP Alphaline Differential and High Differential Pressure Transmitter, Rev. 4
OM 267-0968.001, Rosemont Model 1154 Alphaline Pressure Transmitter for Nuclear Service, Rev. 4
OM 333-0306.001, Switchboard Edgewise Instrument Five-Inch Classification, Rev. 2

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lP/0/A/0375/001 B, Standby Shutdown Facility (SSF) Auxiliary Service Water System Steam Generator Level Indication Instrument Calibration, Rev. 37, dated 11/20/3
IP/0/A/0200/052 A, Pressurizer Level Indication Instrument Calibration, Rev. 18, Dated 5/12/3
IP/0/A/0275/014, Steam Generator Startup Level Instrument Calibration, Rev. 10, dated 10/26/03
lP/0/A/0275/015, Steam Generator Full and Operate Range Levels Instrument Calibration, Rev. 22, dated 10/19/3
lP/0/A/0275/19 A, Emergency Feedwater System Emergency Steam Generator Level Control System Calibration and Functional Test, Rev. 5, dated 11/4/3
lP/0/A/0275/19 B, Emergency Feedwater System Emergency Steam Generator Level Transmitter Calibration, Rev. 5, dated 10/26/3

Drawings

O-422K-3, Instrument Detail Condensate Storage Tank Level , Rev. 10
O-422K-6, Instrument Detail Upper Surge Tank Level, Rev. 3
O-402B, Piping Layout Upper Surge Tank Platform Sections Turbine Building, Rev. 22
O-422AA-7, Instrument Piping SG Level Connection Unit 1, Rev. 10
O-422CC-1, SG Level Transmitter Unit 1, Rev. 20
O-422CC-1.01, Instrument Detail SG Level Transmitters Unit 1, Rev. 3
O-2422BB-4, Pressurizer Level Transmitter 3RCLT-0004P1, 3RCLT-0004P2, 3RCLT-0004P3, Rev.17
O-2422BB-4.01, Instrument Detail Pressure-Level Transmitter, Rev. 9
OEE-117-90, Elementary Diagram 4160V Switchgear #1TD Unit 0 Motor Driven Emergency Feedwater Pump Motor #1A, Rev. 11
OEE-155-41, Elementary Diagram SG Level Control Driven Pump A Low SG Level Start Circuits, Rev 6
OEE-145-68-0C, Elementary Diagram Condensate System Valve 1FDW-135 EFDWP Discharge to SG A1 Block Diagram, Rev.0
OEE-150-7 Elementary Diagram Pressurizer Relief Valve (1RV-67)1RC66, Rev.11

OEE- 150-7B, Elementary Diagram Current Loop 1RCPT0148 Low Range Reactor Coolant, Rev. 3
OEE-150-7A, Elementary Diagram Pressurizer Relief Valve (1RV-67) 1RC66, Rev. 4
O-795-w, Connection Diagram TB-444 and TB-445 MS-1B Signal and Power Junction Boxes, Rev. 0
O-795-v, Connection Diagram TB-442 and TB-443 MS-1A Signal and Power Junction Boxes, Rev. 0
W-SGLCS, Sheet 1, Oconee Nuclear Station SG Level Control System Card Frame Bay 1, SG-A Train-A

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98582873, Unit 1 SSF Aux. Service water SG level, 12/5/3
98583124, Unit 1, SG Startup Level Inst., 11/21/3
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98583404, Unit 1, Emergency SG Level transmitter Calibration, 12/5/3
98545692, Unit 3, SSF RC Prz Level & Pressure transmitter, 6/2/3
98545900, Pressurizer Level Instrument Calibration, 5/17/3
98545904, Unit 3 Pzr thermocouple checkout/TE, 6/6/3

Section 1R21.14 - Operator Actions

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AP/1/A/1700/31, Primary To Secondary Leakage, Rev. 8
OP/1A/1104/004 A, BWST Operation, Rev. 9
CP/0/B/3002/023, Primary to Secondary Leak Rate Monitoring and Response, Rev. 5
HP/0/B/1000/060 D, Procedure for Vent, Air Ejector and Reactor Building Sampling and Analysis, Enclosure 5.12, Valve Checklist of Collecting and Terminating 2 (3) RIA-40 Samples, Rev. 39
OMP 1-18, Oconee Nuclear Station, Implementation Standard During Abnormal and Emergency events, Rev. 21
EP/1,3/A/1800/001, Steam Generator Tube Rupture (SGTR), Rev. 31

Instructions/Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
OP/1/A/1106/006, Emergency FDW System (valve line-up), Rev. 107
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17
AP/1/A/1700/031, Primary to Secondary Leakage, Rev. 8

Design Basis Documents/Calculations
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Framatome Technical Document 74-1152414-09, Generic Emergency Operating Guideline Bases, Section III.E, - SGTR, 3/31/2000
OSC-6810, SGTR Accident Dose Analysis, Rev. 7
OSC-8028, ROTSG UFSAR Section 15.9 - SGTR Accident, Rev. 0
OSC-6116, SGTR: Event Mitigation Requirements (Type III), Rev. 5
OSC-2516, Verification of EFW System Flow Utilizing Unit Cross-Connects, Rev. 4

ODUK-0310.00-0001-001, Limits for Operation as Controlled by Pressure Boundary Structural Analysis, Unit 1, For Use After ROTSG Installation, Rev. 0

Miscellaneous Documents
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Oconee Operations Training Lesson Plan, SG Tube Rupture, EAP-SGTR, 12/12/02
Oconee Nuclear Station Writer's guide for Two Column Emergency and Abnormal Procedures, Rev. 000

Section 1R.21.15 - Heat Removal

Calculations and Evaluations
OSC-2042, HPI Pump Motor Upper Bearing Cooling Report, Rev. 4

Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17

Drawings
OFD-100A-1.1, Flow Diagram of Reactor Coolant System - Unit 1, Rev. 29
OFD-121B-1.3, Flow Diagram of Feedwater System - Unit 1, Rev. 28
OFD-121D-1.1, Flow Diagram of Emergency Feedwater System - Unit 1, Rev. 28
OFD-101A-1.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 38
OFD-101A-2.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 39
OFD-101A-1.2, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 31
OFD-101A-1.3, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 18
OFD-101A-1.4, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 35
O-402A, Piping Layout Upper Surge Tank Platform - Plan and Sections - Unit 1, Rev. 27

Surveillance Test Procedures
PT/1/A/0251/024, HPI Full Flow Test, Rev. 24
PT/1/A/0202/011, High Pressure Injection Pump Test, Rev. 76
PT/1/A/0600/013, Motor Driven Emergency Feedwater Pump Test, Rev. 51
PT/1/A/0600/012, Turbine Driven EFW Pump Test, Rev. 72

Problem Investigation Process (PIPs)
03-07727, 1A HPI Pump needs rebaselining
02-05815, Foreign material found in Unit 2 upper surge tanks.
03-06560, Foreign material in 1B RCS hot leg piping and in the vicinity of decay heat drop line suction piping.
00-00852, 1FDW-316 found 100% open when it should have been closed.
00-01837, N2 regulator for 3FDW-315 and -316 was found to be set improperly in both regulators.
03-07724, 1A HPI Pump needs rebaselining.
02-00287, 1FDW-315 fails to stroke with manual loader.
03-00384, Challenges with oil sampling and analysis.

01-01402, 1B MDEFWP outboard bearing temperature exceeded acceptable temperature limits during testing.

Vendor Manuals
EFW Motor Driven Pump Installation, Operation and Maintenance Instructions, dated 01/02/87
EFW Turbine Driven Bingham Centrifugal Pumps, dated 02/11/85
HPI Ingersoll-Rand Instruction Manual for Centrifugal Pumps, dated 05/19/70
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Miscellaneous Documents
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Section 1R.21.21 - Installed Configuration

Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
OP/1/A/1106/006, Emergency FDW System (valve line-up), Rev. 107
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17

Design Basis Documents
OSS-0254.00-00-2022, Design Basis Specification for the Process Radiation Monitoring System, Rev. 6

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Section 11.5 Process and Effluent Radiological Monitoring and Sampling Systems

Calculations
OM 268-0019 001, Monte Carlo simulation using the MCNP4C code: sensitivity calculation for N16 monitors at Oconee Nuclear Power Plants Units #1, #2, and #3, Rev. 00B

OEE-081-08	Rev. 6	Protective Relay Settings
OEE-081-09	Rev. 3	Protective Relay Settings
OEE-081-14	Rev. 13	Protective Relay Settings
OEE-081-14-01	Rev. 7	Protective Relay Settings
OEE-081-15	Rev. 16	Protective Relay Settings
OEE-081-21	Rev. 3	Protective Relay Settings
OEE-081-23	Rev. 9	Protective Relay Settings
OEE-081-24	Rev. 9	Protective Relay Settings
OEE-081-33	Rev. 1	Protective Relay Settings
OEE-081-35	Rev. 10	Protective Relay Settings
OEE-117	Rev. 0	4160 Volt Switchgear
OEE-117-1	Rev. 6	Elementary Diagram Breaker Internal Diagram
OEE-117-2	Rev. 16	Elementary Diagram 4160 Volt Switchgear No. B1T Start-Up Breaker Unit No. 1
OEE-117-2A	Rev. 12	Elementary Diagram 4160 Volt Switchgear No. B1T Start-Up Breaker – Unit No. 1 Start-Up Breaker – Unit No. 1

OEE-117-2B	Rev. 16	Elementary Diagram 4160 Volt Switchgear No. B1T 4160 Volt Switchgear No. B1T
OEE-117-4	Rev. 7	Elementary Diagram 4160 Volt Switchgear No. B1T Normal Breaker Unit No. 3
OEE-117-4A	Rev. 13	Elementary Diagram 4160 Volt Switchgear No. B1T Normal Breaker Unit. No. 3
OEE-117-54	Rev. 6	Elementary Diagram 4160 Volt Switchgear No. 1TD Feeder Breaker, Unit 1
OEE-117-62	Rev. 8	Elementary Diagram 4160V Switchgear #1TD - Unit # 9 H.P. Injection Pump Motor No. 1C
OEE-117-67	Rev. 7	Elementary Diagram 4160 Volt Switchgear #1TD Feeder Breaker Unit #14
OEE-117-90	Rev. 11	Elementary Diagram 4160 Volt Switchgear #1TD Unit #0 Motor Driven Emergency Feedwater Pump Motor #1A
OEE-117-90-0A	Rev. 0	Elementary Diagram 4160V Switchgear #1TD Unit #0 Motor Driven Emergency Feedwater Pump Motor #1A
OEE-117-90-0B	Rev. 0	Elementary Diagram 4160V Switchgear #1TD Unit #0 Motor Driven Emergency Feedwater Pump Motor #1A
OEE-151-06	Rev. 12	Elementary Diagram HP Inj. To Reactor Inlet Vlv FS/1/51/60
OEE-151-06-01	Rev. 3	Elementary Diagram HP Inj. Reactor Inlet Vlv FS/1/51/60
OEE-151-33	Rev. 8	Elementary Diagram HPI Isolation Valve 1HP – 410
O-700	Rev. 24	One Line Diagram Relays & Meters 19KV
O-702	Rev. 28	One Line Diagram 6900V & 4160V Sta Auxiliary Sys.
O-702-A	Rev. 26	One Line Diagram 6900V & 4160V Auxiliary Sys.
O-702-A1	Rev. 18	One Line Diagram 6900V & 4160V Sta. Auxiliary Sys.
O-702-A2	Rev. 10	One Line Diagram 6900V & 41260V Station Auxiliary Sys.
O-0703-K	Rev. 46	One Line Diagram 600V & 208V Essential Motor Control Centers Auxiliary Power Systems Standby Shutdown Facility
O-703-G	Rev. 77	One Line Diagram Station Auxiliary Circuits 600/208V/480
O-705	Rev. 81	One Line Diagram 120VAC & 125VDC Station Aux. Circuits Instrumentation Vital Buses
O-721-A	Rev. 50	Connection Diagram Valves High Pressure Injection & Purification System
O-769-N	Rev. 9	Connection Diagram High Pressure Injection Isolation Valves 1HP – 409 & 1HP- 410

Electronic Data Base (ONED-EDB) Equipment ID

ON1	EL	RL	51TE1X
ON1	EL	RL	87TX1T
ON1	EL	RL	87BB1T2X
ON1	EL	RL	87B2T12X
ON1	EL	RL	51GTC1
ON1	EL	RL	51TC1X
ON1	EL	RL	51GTD1

ON1	EL	RL	51TD1X
ON1	EL	RL	51GTE1
ON1	EL	RL	51TD9X
ON1	EL	RL	50GTD9
ON1	EL	RL	51TDOX
ON1	EL	RL	50GTDO
ON1	EL	RL	51TC3X
ON1	EL	RL	50GTC3
ON1	EL	RL	51TD3X
ON1	EL	RL	50GTD3
ON1	EL	RL	87TXCT1

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OM 254.-0002-001, High Capacity Nozzle Type Safety Valve, Rev. D1
OM 251-0793.001, Diaphragm Actuator Control Valve Drawing - 657 ED, Rev. B
OFD-122A-1.1, Flow Diagram of Main Steam System - Unit 1, Rev. 16
OFD-122A-1.2, Flow Diagram of Main Steam System - Unit 1, Rev. 13
OFD-122A-1.4, Flow Diagram of Main Steam System - Unit 1, Rev. 22
OFD-121B-1.3, Flow Diagram of Feedwater System - Unit 1, Rev. 28
OFD-121D-1.1, Flow Diagram of Emergency Feedwater System - Unit 1, Rev. 28
OFD-101A-1.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 38
OFD-101A-2.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 39
OFD-101A-1.2, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 31
OFD-101A-1.3, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 18
OFD-101A-1.4, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 35
O-402A, Piping Layout Upper Surge Tank Platform - Plan and Sections - Unit 1, Rev. 27
OFD-121A-1.8, Flow Diagram of Condensate System - Unit 1, Rev. 16A
OFD-121A-1.7, Flow Diagram of Condensate System - Unit 1, Rev. 33
O-422K-3, Instrument Detail Condensate Storage Tank Level , Rev. 10
O-422K-6, Instrument Detail Upper Surge Tank Level, Rev. 3
O-402B, Piping Layout Upper Surge Tank Platform Sections Turbine Building, Rev. 22

Problem Investigation Process (PIPs)

00-00852, 1FDW-316 found 100% open when it should have been closed.
00-01837, N2 regulator for 3FDW-315 and -316 was found to be set improperly in both regulators.
03-07724, 1A HPI Pump needs rebaselining.
02-00287, 1FDW-315 fails to stroke with manual loader.
01-01402, 1B MDEFWP outboard bearing temperature exceeded acceptable temperature limits during testing.
02-05043, Trip of Unit 2 TDEFW Pump.
02-02140, Attempted to start 1C HPI pump per PT/1/A/0251/024 (HPI Full Flow Test) and pump did not start.

Vendor Manuals

Part Number 672471-1, Operation and Maintenance Instructions Drag Velocity Control Element, Rev. D

Part Number 412391-1, Operation and Maintenance Instructions Drag Velocity Control Element, dated 06/03/86
Part Number 31533VX, Instructions Operating and Repairing Consolidated Electromatic Relief Valve, dated 03/17/87
EFW Motor Driven Pump Installation, Operation and Maintenance Instructions, dated 01/02/87
EFW Turbine Driven Bingham Centrifugal Pumps, dated 02/11/85
HPI Ingersoll-Rand Instruction Manual for Centrifugal Pumps, dated 05/19/70
Instruction Manual for HPI Pumps, dated 04/17/87
OM 1149-0001, Upper Surge Tanks - Unit 2 MK. 2A & MK.2B, Rev. DG

Section 1R21.22 - Operation

Procedures
AP/1/A/1700/31, Primary To Secondary Leakage, CSAE Flow Rate Determination, Enclosure 5.6, Rev. 8
P/1/A/1700/31, Primary To Secondary Leakage,, Local SG isolation, Enclosure 5.3, Rev. 8
EP/1/A/18000/001, Extended EFDW Operation, enclosure 5.9,
HP/0/B/1000/060 D, Procedure for Vent, Air Ejector and Reactor Building Sampling and Analysis, Valve Checklist of Collecting and Terminating 2 (3) RIA-40 Samples, Enclosure 5.12, Rev. 39
Rule 3, EP/1/1800/001, Loss of Main or Emergency FDW, Rev. 31
Enclosure 5.19, EP/1/A/1800/01, Control of Plant Equipment During SD for SGTR, Rev. 31
EP/1/A/1800/01, Operation of ADVs, Enclosure 5.24, Rev. 31
EP/1/A/1800/01, Alternate Methods of Controlling EDFW Flow, Enclosure 5.27, Rev. 31
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CP/0/B/3002/023, Primary to Secondary Leak Rate Monitoring and Response, Rev. 5
HP/0/B/1002/046, Operation of Portable Radiation Survey Instruments, Rev. 18
HP/0/B/1000/060 D, Procedure for Vent, Air Ejector and Reactor Building Sampling and Analysis, Enclosure 5.12, Valve Checklist of Collecting and Terminating 2 (3) RIA-40 Samples, Rev. 39
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
OP/1/A/1106/006, Emergency FDW System (valve line-up), Rev. 107
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17

Surveillance Test Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
PT/1/A/0251/024, HPI Full Flow Test, Rev. 24
PT/1/A/0202/011, High Pressure Injection Pump Test, Rev. 76
PT/1/A/0600/013, Motor Driven Emergency Feedwater Pump Test, Rev. 51
PT/1/A/0600/012, Turbine Driven EFW Pump Test, Rev. 72
FD-106A-1.1, Flow Diagram of Coolant Treatment System (RC Bleed Holdup Tanks), Rev. 9
OFD-106A-1.2, Flow Diagram of Coolant Treatment System (Concentrated Boric Acid Storage Tank), Rev. 16
OFD-104A-1.2, Flow Diagram of Spent Fuel Cooling System (Purification Loop), Rev. 10
OFD-109A-1.2, Flow Diagram of Deborating Demineralizes, Rev. 8

Section 1R.21.23 - Design

Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17

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Design Basis Documents
General Design Criteria Document No. OSS-0254.00-00-1037, Main Steam System, pages 1 through 21, Rev. 23
General Design Criteria Document No. OSS-0254.00-00-1001, High Pressure Injection System, pages 1 through 17, Rev. 28
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General Design Criteria Document No. OSS-0254.00-00-4001, Reactor building Containment Isolation, Rev. 23

Calculations
OSC-6116, Steam Generator Tube Rupture: Event Mitigation Requirements (Type III), Rev. 10
OSC-2820, Emergency Procedure Setpoints (Vortexing BWST), Rev. 26
OSC-2042, HPI Pump Motor Upper Bearing Cooling Report, Rev. 4
OSC-2515, Verification of Emergency Feedwater System Flow Utilizing MFW System Bypass, Rev. 18
OSC-2155, Motor Driven and Turbine Driven EFW Pump NPSHA from the Upper Surge Tank, Rev. 9
OSC-2826, Seismic Study of the Hotwell and Associated Components, Rev. 2
OSC-2251, Upper Surge Tank Setpoint Analysis, Rev. 2
OSC-6104, Loss of Main Feedwater (LOMF) Event Mitigation Requirements, Rev. 6
OSC-1579, HPI Pumps NPSH Analysis (Injection from BWST), Rev. 2
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OSC-5964, Emergency Feedwater Combined Inventory UST (vortexing), Rev. 5
OSC-7212, Unit 1 Motor Driven Emergency Feedwater Pump NPSH From the Hotwell, Rev. 4
OSC-2746, SSF Pressurizer Level Loop Instrument Accuracy Calibration, Rev.4
OSC-2741, Calculation Impact Assessment, Rev.4
OSC-2745, Calculation Impact Assessment, Rev. 4
OSC-4478, SG Emergency Range Level Uncertainty and EFW Low Level Actuation Setpoint, Rev. 5
OSC-6757, SG Full Range Level Instrument Loop Accuracy 1 /2 / 3 FDWLT0007P &9P, Rev.14
OSC-611, SGTR : Event Mitigation Requirements (Type III) Rev.10
OSC-259, Rev. 18 Oconee Unit 1, Voltage and Load Study
OSC-2182, Rev. 7, Oconee Unit 1-3 125V DC Control Power Systems Fault Duty Calculation
OSC-3120, Rev. 8, Oconee Relay Settings and Breaker Coordination
OSC-4300, Rev. 7, Appendix P – Protective Relay Setting
OSC-5674, Rev. 18, Valve Thrust Calculation

OSC-6116, Rev. 010, Steam Generation Tube Rupture: Event Mitigation Requirements (Type III)
OSC-7608, Rev. 0, Appendix D – ETAP Buses/Nodes

Drawings
OM 254.-0002-001, High Capacity Nozzle Type Safety Valve, Rev. D1
OM 251-0793.001, Diaphragm Actuator Control Valve drawing - 657 ED, Rev. B
OFD-100A-1.1, Flow Diagram of Reactor Coolant System - Unit 1, Rev. 29
OFD-122A-1.1, Flow Diagram of Main Steam System - Unit 1, Rev. 16
OFD-122A-1.2, Flow Diagram of Main Steam System - Unit 1, Rev. 13
OFD-122A-1.4, Flow Diagram of Main Steam System - Unit 1, Rev. 22
OFD-121B-1.3, Flow Diagram of Feedwater System - Unit 1, Rev. 28
OFD-121D-1.1, Flow Diagram of Emergency Feedwater System - Unit 1, Rev. 28
OFD-101A-1.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 38
OFD-101A-2.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 39
OFD-101A-1.2, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 31
OFD-101A-1.3, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 18
OFD-101A-1.4, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 35
O-402A, Piping Layout Upper Surge Tank Platform - Plan and Sections - Unit 1, Rev. 27
OFD-121A-1.8, Flow Diagram of Condensate System - Unit 1, Rev. 16A
OFD-121A-1.7, Flow Diagram of Condensate System - Unit 1, Rev. 33
OFD-102A-1.1, Flow Diagram of Low Pressure Injection System - Unit 1, Rev. 43A
OFD-102A-1.2, Flow Diagram of Low Pressure Injection System - Unit 1, Rev. 41
OM 206-0048-001, Motor Driven EFW Pump Head Curve Drawing 3B, Rev. 04/09/91
OM 206-0047-001, Motor Driven EFW Pump Head Curve Drawing 3A, Rev. 04/09/91
OM 206-0046-001, Motor Driven EFW Pump Head Curve Drawing 2B, Rev. 11/14/90
OM 206-0045-001, Motor Driven EFW Pump Head Curve Drawing 2A, Rev. 11/15/90
OM 2201-600, High Pressure Injection Pump Head Curve Drawing (most limiting curve), Rev. 01/26/72
OM 206-0042-001, Motor Driven EFW Pump Head Curve Drawing 1A, Rev. 01/16/87
OM 206-0041-001, Motor Driven EFW Pump Head Curve Drawing 1B, Rev. 01/14/87
OM 206.A-0007.001, Turbine Driven EFW Pump Head Curve Drawing 2C, Rev. D2
OM 206.A-0008.001, Turbine Driven EFW Pump Head Curve Drawing 3C, Rev. D2
OM 206.A-0006.001, Turbine Driven EFW Pump Head Curve Drawing 1C, Rev. D1
OSFD-SG-1, Summary Flow Diagram of Steam Generator Isolation, Rev. 2
OEE-081-08, Rev. 6, Protective Relay Settings
OEE-081-09, Rev. 3, Protective Relay Settings
OEE-081-14, Rev. 13, Protective Relay Settings
OEE-081-14-01, Rev. 7, Protective Relay Settings
OEE-081-15, Rev. 16, Protective Relay Settings
OEE-081-21, Rev. 3, Protective Relay Settings
OEE-081-23, Rev. 9, Protective Relay Settings
OEE-081-24, Rev. 9, Protective Relay Settings
OEE-081-33, Rev. 1, Protective Relay Settings
OEE-081-35, Rev. 10, Protective Relay Settings
OEE-117, Rev. 0, 4160 Volt Switchgear
OEE-117-1, Rev. 6, Elementary Diagram Breaker Internal Diagram

OEE-117-2, Rev. 16, Elementary Diagram 4160 Volt Switchgear No. B1T Start-Up Breaker - Unit No. 1
OEE-117-2A, Rev. 12, Elementary Diagram 4160 Volt Switchgear No. B1T Start-Up Breaker – Unit No. 1
OEE-117-2B, Rev. 16, Elementary Diagram 4160 Volt Switchgear No. B1T Start-Up Breaker – Unit 1
OEE-117-4, Rev. 7, Elementary Diagram 4160 Volt Switchgear No. B1T Normal Breaker Unit. No. 3
OEE-117-4A, Rev. 13, Elementary Diagram 4160 Volt Switchgear No. B1T Normal Breaker - Unit. No.3
OEE-117-54, Rev. 6, Elementary Diagram 4160 Volt Switchgear No. 1TD Feeder Breaker, Unit # 1
OEE-117-62, Rev. 8, Elementary Diagram 4160V Switchgear #1TD - Unit # 9 H.P. Injection Pump Motor No. 1C
OEE-117-67, Rev. 7, Elementary Diagram 4160 Volt Switchgear #1TD Feeder Breaker Unit #14
OEE-117-90, Rev. 11, Elementary Diagram 4160 Volt Switchgear #1TD Unit #0Motor Driven Emergency Feedwater Pump Motor #1A
OEE-117-90-0A, Rev. 0, Elementary Diagram 4160V Switchgear #1TD Unit #0 Motor Driven Emergency Feedwater Pump Motor #1A
OEE-117-90-0B, Rev. 0, Elementary Diagram 4160V Switchgear #1TD Unit #0 Motor Driven Emergency Feedwater Pump Motor #1A
OEE-151-06, Rev. 12, Elementary Diagram HP Inj. To Reactor Inlet Vlv FS/1/51/60
OEE-151-06-01, Rev. 3, Elementary Diagram HP Inj. Reactor Inlet Vlv FS/1/51/60
OEE-151-33, Rev. 8, Elementary Diagram HPI Isolation Valve 1HP – 410
O-700, Rev. 24, One Line Diagram Relays & Meters 19KV
O-702, Rev. 28, One Line Diagram 6900V & 4160V Sta Auxiliary Sys.
O-702-A, Rev. 26, One Line Diagram 6900V & 4160V Auxiliary Sys.
O-702-A1, Rev. 18, One Line Diagram 6900V & 4160V Sta. Auxiliary Sys.
O-702-A2, Rev. 10, One Line Diagram 6900V & 41260V Station Auxiliary Sys.
O-0703-K, Rev. 46, One Line Diagram 600V & 208V Essential Motor Control Centers Auxiliary Power Systems Standby Shutdown Facility
O-703-G, Rev. 77, One Line Diagram Station Auxiliary Circuits 600/208V/480
O-705, Rev. 81, One Line Diagram 120VAC & 125VDC Station Aux. Circuits Instrumentation Vital Buses
O-721-A, Rev. 50, Connection Diagram Valves High Pressure Injection & Purification System
O-769-N, Rev. 9, Connection Diagram High Pressure Injection Isolation Valves 1HP – 409 & 1HP – 410

Section 1R.21.24 - Testing

UFSAR
Section 12.3.3, Area Radiation Monitors
Section 16.11.3 (SLC Manual), Radioactive Effluent Monitoring Instrumentation

Completed Work Orders
98486092-01, 2HP-24 Perform Mechanical/Electrical PM, 10/25/02

98545465-01, 3HP-24 perform mechanical/electrical PM, 05/14/03
98561954-01, 2FDW-315 repair seat leak, 03/31/04
98565534, 2MS-93 perform a diagnostic test, 04/26/04
98668855, Stroke test 3FDW-315 on increased frequency, 07/13/04
98582873, Unit 1 SSF Aux. Service water SG level, 12/5/3
98583124, Unit 1, SG Startup Level Inst., 11/21/3
98583125, Unit 1 SG Full and Operated Range Level Instrument,11/20/3
98583404, Unit 1, Emergency SG Level transmitter Calibration, 12/5/3
98545692, Unit 3, SSF RC Prz Level & Pressure transmitter,6/2/3
98545900, Pressurizer Level Instrument Calibration,5/17/3
98545904, Unit 3 Pzr thermocouple checkout/TE,6/6/3
1RIA-16,17 calibration records, 7/29/03, 9/21/03, and 2/18/02
1RIA-40 calibration records, 8/7/03 and 8/7/02
1RIA-59,60 calibration records, 4/12/04
1,2,3 RIA-16,17,40 maintenance history, 1/1/02 - 9/1/04

Surveillance Test Procedures
OP/1/A/1104/002, HPI System (valve line-up), Rev. 116
PT/1/A/0251/024, HPI Full Flow Test, Rev. 24
PT/1/A/0202/011, High Pressure Injection Pump Test, Rev. 76
PT/1/A/0600/013, Motor Driven Emergency Feedwater Pump Test, Rev. 51
PT/1/A/0600/012, Turbine Driven EFW Pump Test, Rev. 72
PT/O/A/0610/017, Rev. 017, Operability Test of 4160V Breakers *Dated 08-03-04*
PT/O/A/0610/017, Rev. 017, Operability Test of 4160V Breakers *Dated 06-30-04*
PT/O/A/0610/026, Rev. 008, Electrical System Weekly Surveillance Common *Dated 08-13-04*
PT/O/A/0610/026, Rev. 008, Electrical System Weekly Surveillance Common *Dated 08-06-04*
PT/1A/0610/001A, Rev. 022, EPSL Normal Source Voltage Sensing Circuit *Dated 09-21-03*
PT/1/A/0610/001J, Rev. 037, Emergency Power Switching Logic Functional Test *Dated 11-12-03*
PT/1/A/0251/024, Rev. 023, HPI Full Flow Test *Dated 12-04-03*
lP/0/A/0375/001 B, Standby Shutdown Facility (SSF) Auxiliary Service Water System Steam Generator Level Indication Instrument Calibration, Rev. 37, dated 11/20/3
lP/0/A/0200/052 A, Pressurizer Level Indication Instrument Calibration, Rev. 18, Dated 5/12/3
lP/0/A/0275/014, Steam Generator Startup Level Instrument Calibration, Rev. 10, dated 10/26/03
lP/0/A/0275/015, Steam Generator Full And Operate Range Levels Instrument Calibration, Rev. 22, dated 10/19/3
lP/0/A/0275/19 A, Emergency Feedwater System Emergency Steam Generator Level Control System Calibration and Functional Test, Rev. 5, dated 11/4/3
lP/0/A/0275/19 B, Emergency Feedwater System Emergency Steam Generator Level Transmitter Calibration, Rev. 5, dated 10/26/3

Problem Investigation Process (PIPs)
02-05815, Foreign material found in Unit 2 Upper surge tanks
03-06560, Foreign material in 1B RCS Hot leg piping and in the vicinity of Decay Heat drop line suction piping.
00-00852, 1FDW-316 found 100% Open when it should have been closed.
00-01837, N2 regulator for 3FDW-315 and -316 was found to be set improperly in both regulators.
03-07724, 1A HPI Pump needs rebaselining
02-00287, 1FDW-315 fails to stroke with manual loader.
03-00384, Challenges with oil sampling and analysis.
01-01402, 1B MDEFWP outboard bearing temperature exceeded acceptable temperature limits during testing.
02-05043, Trip of unit 2 TDEFW Pump.
02-02140, Attempted to start 1C HPI pump per PT/1/A/0251/024 (HPI Full Flow Test) and pump did not start.

Procedures
MP/0/A/1210/017, Operator-Fisher-Diaphragm Actuator-Type 657-Disassembly and Reassembly, Rev. 30
MP/0/A/1200/015, Valve-Main steam-Safety Relief-Reconditioning, Rev. 24
MP/0/A/1200/089, Main Steam Relief Valve Set point Test Data Sheet - Enclosure 13.3 for valves 1MS-1 through -16, page 15
EP/1/A/1800/001, Enclosure 5.4 - Makeup to the BWST, pages 1 through 17
AP/1/A/1700/031, Primary to Secondary Leakage, Rev. 8
OP/0/A/1103/027, Radiation Monitor Information, Rev. 0
PT/0/A/0230/001, Radiation Monitor Check, Rev. 135

Drawings
OM 254.-0002-001, High Capacity Nozzle Type Safety Valve, Rev. D1
OM 251-0793.001, Diaphragm Actuator Control Valve drawing - 657 ED, Rev. B
OFD-122A-1.1, Flow Diagram of Main Steam System - Unit 1, Rev. 16
OFD-122A-1.2, Flow Diagram of Main Steam System - Unit 1, Rev. 13
OFD-122A-1.4, Flow Diagram of Main Steam System - Unit 1, Rev. 22
OFD-121B-1.3, Flow Diagram of Feedwater System - Unit 1, Rev. 28
OFD-121D-1.1, Flow Diagram of Emergency Feedwater System - Unit 1, Rev. 28
OFD-101A-1.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 38
OFD-101A-2.1, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 39
OFD-101A-1.2, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 31
OFD-101A-1.3, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 18
OFD-101A-1.4, Flow Diagram of High Pressure Injection System - Unit 1, Rev. 35
O-402A, Piping Layout Upper Surge Tank Platform - Plan and Sections - Unit 1, Rev. 27
OFD-121A-1.8, Flow Diagram of Condensate System - Unit 1, Rev. 16A
OFD-121A-1.7, Flow Diagram of Condensate System - Unit 1, Rev. 33
OFD-102A-1.1, Flow Diagram of Low Pressure Injection System - Unit 1, Rev. 43A
OFD-102A-1.2, Flow Diagram of Low Pressure Injection System - Unit 1, Rev. 41
OM 206-0048-001, Motor Driven EFW Pump Head Curve Drawing 3B, Rev. 04/09/91
OM 206-0047-001, Motor Driven EFW Pump Head Curve Drawing 3A, Rev. 04/09/91

OM 206-0046-001, Motor Driven EFW Pump Head Curve Drawing 2B, Rev. 11/14/90
OM 206-0045-001, Motor Driven EFW Pump Head Curve Drawing 2A, Rev. 11/15/90
OM 2201-600, High Pressure Injection Pump Head Curve Drawing (must limiting curve), Rev. 01/26/72
OM 206-0042-001, Motor Driven EFW Pump Head Curve Drawing 1A, Rev. 01/16/87
OM 206-0041-001, Motor Driven EFW Pump Head Curve Drawing 1B, Rev. 01/14/87
OM 206.A-0007.001, Turbine Driven EFW Pump Head Curve Drawing 2C, Rev. D2
OM 206.A-0008.001, Turbine Driven EFW Pump Head Curve Drawing 3C, Rev. D2
OM 206.A-0006.001, Turbine Driven EFW Pump Head Curve Drawing 1C, Rev. D1
OSFD-SG-1, Summary Flow Diagram of Steam Generator Isolation, Rev. 2
OM-302-0680-001

Westinghouse I.L.	41-100G	Jan. 1984	Type CO (HI-LO) Relay
	41-766IJ	Dec. 1984	Type SC and SV Relays
	41-106C	Oct. 1975	Type CO-4 Relay
	41-201J	Apr. 1973	Type CV Relay

Specifications
OSS-308-00-00-003, Rev. 1, Procurement Specification for the Replacement of *Dated 04-29-98* Safety Related CY Starters

Miscellaneous Documents
2004T1, Health report, pages 1 through 59
HPI & EFW Pumps IST Performance Data - Vibration Results from 08/22/03 to 08/16/04
HPI & EFW Pumps Oil Analysis Results for 2004
EPRI Grease Compatibility Study, Nebula EP with MOV Long Life pages 235 through 241, Nov. 01
HPI 1A and 1B Parameter Trends, from 05/11/01 through 03/21/03
OSS-0254.00-00-2022, Design Basis Specification for the Process Radiation Monitoring System, Rev. 6
Components Referenced
Pumps
- HPI (1A, 1B, 1C)
- EFW Pumps (1A, 1B, 1C)

Air Operated Valves
- EFW FCV's (1FDW-315, -316)

Relief valves
- Main Steam Safety Relief valves (1MS-1 through -16)

Valves
- HPI suction valves (1HP-24, -25)
- HPI discharge valves (1HP-26, -27)
- Atmospheric Dump valves (1MS-162, -164)
- Shutdown Cooling suction valves (1LP-1, -2)

Section 1R.21.31 - Component Degradation

Calculations and Analyses
OSC-2042, HPI Pump Motor Upper Bearing Cooling Report, Rev. 4
OSC-2820, Emergency Procedure Setpoints (vortexing), Rev. 26
OSC-2515, Verification of Emergency Feedwater System Flow Utilizing MFW System Bypass, Rev. 18
OSC-2155, Motor Driven and Turbine Driven EFW Pump NPSHA from the Upper Surge Tank, Rev. 9
OSC-2826, Seismic study of the hotwell and associated components, Rev. 2
OSC-2251, Upper Surge Tank Setpoint Analysis, Rev. 2
OSC-1579, HPI Pumps NPSH Analysis (Injection from BWST), Rev. 2

Completed Work Orders
91042100-01, Perform MS relief valve setpoint Popts, 05/11/04
98545465-01, 3HP-24 perform mechanical/electrical PM, 05/14/03
98561954-01, 2FDW-315 repair seat leak, 03/31/04
98565534, 2MS-93 perform a diagnostic test, 04/26/04
98668855, Stroke test 3FDW-315 on increased frequency, 07/13/04
98596286-01, 2MS-19 check valve torque on yoke to bonnet, 03/22/04
98520244, Unit 2 repair limit switch cables on 2MS-19, 04/21/04
98520243-01, Unit 2 repair limit switch cables on 2MS-22, 04/01/04
98596290, 2MS-22 check torque, valve/yoke & actuator/yoke, 05/24/04
98596289, 2MS-28 check torque, valve/yoke & actuator/yoke, 05/24/04
98596284, 2MS-31 check torque on yoke to bonnet, 05/24/04
98477772, 2HP-24 replace valve wedge, 05/26/04
98477764, 2HP-25 replace valve wedge, 05/26/04
98661796, 2HP-26, disc/rem/ref/bench/ins/rec/op, 05/04/04
98663767-06, 2HP-27, disc/rem/ref/bench/ins/rec/op, 04/28/04
98636179, 2HP-26 stroke first availability, 05/11/04
98605753, Adjust packing “U3" TDEFW pump, 09/11/03
98643998, 2HP-27 I/R boron buildup at packing gland, 06/08/04
98663767, 2HP-27 remove springpack, 06/03/04
98657592, 2HP-31 disassembly/repair/reassemble valve, 06/08/04
98661352, OE-18358 change stroke length of 2HP-31, 07/01/04
98480128-01, 2LP-1 replace wedge, 04/24/04
98605368, OE-16338 pressure locking relief between 2LP-1 & 2, 06/04/04
98635272-02, 2LP-1 determine ideal location for QSS mounting, 04/05/04
98635273, 2HP-25 cut threads to support mount of QSS, 06/03/04
98635274 2HP-24cut threads to support mount of QSS, 05/11/04
96081583-09, VOTES test report analysis for 1LP-2, 11/03/97
98427567-01, VOTES test report analysis for 1LP-2, 04/28/02
98009690-03, VOTES test report analysis for 1HP-24, 06/08/99
98477763-05, VIPER test report analysis for 1HP-24, 10/25/03
98427560-01, VOTES test report analysis for 1HP-25, 04/20/02
95093376-05, VOTES test report analysis for 1HP-25, 11/20/97
98081609-04, VOTES test report analysis for 1HP-26, 12/23/00

98160203-04, VOTES test report analysis for 1HP-26, 06/07/99
98253115-04, Surveillance MPM data, for 1HP-27, 04/06/00
98224555-04, Surveillance MPM data, for 1HP-27, 01/13/00
98277823-04, Surveillance MPM data, for 1HP-27, 07/17/00
98171984-01, VOTES test report analysis for 1HP-27, 02/21/99
98081611-05, VOTES test report analysis for 1Hp-27, 06/06/99
98583228, As found VIPER analysis for 1HP-27, 10/28/03
98624216-01, As left VIPER analysis for 1HP-27, 10/28/03
98426646-01, VOTES test report analysis for 1LP-1, 04/22/02
98427566-01, VOTES test report analysis for 1LP-1 retest, 04/28/02
98477776-05, VOTES test report analysis for 1LP-1, 11/08/03
98495237, U1 Replacement O-Rings
98137726, U2, Replacement 2FDWLT0066
98032215, U2 Repair/Replace Tubing associated w/ PZR

Drawings
OM 254.-0002-001, High Capacity Nozzle Type Safety Valve, Rev. D1
OM 251-0793.001, Diaphragm Actuator Control Valve drawing - 657 ED, Rev. B
OM 206-0048-001, Motor Driven EFW Pump Head Curve Drawing 3B, Rev. 04/09/91
OM 206-0047-001, Motor Driven EFW Pump Head Curve Drawing 3A, Rev. 04/09/91
OM 206-0046-001, Motor Driven EFW Pump Head Curve Drawing 2B, Rev. 11/14/90
OM 206-0045-001, Motor Driven EFW Pump Head Curve Drawing 2A, Rev. 11/15/90
OM 2201-600, High Pressure Injection Pump Head Curve Drawing (must limiting curve), Rev. 01/26/72
OM 206-0042-001, Motor Driven EFW Pump Head Curve Drawing 1A, Rev. 01/16/87
OM 206-0041-001, Motor Driven EFW Pump Head Curve Drawing 1B, Rev. 01/14/87
OM 206.A-0007.001, Turbine Driven EFW Pump Head Curve Drawing 2C, Rev. D2
OM 206.A-0008.001, Turbine Driven EFW Pump Head Curve Drawing 3C, Rev. D2
OM 206.A-0006.001, Turbine Driven EFW Pump Head Curve Drawing 1C, Rev. D1

Miscellaneous Documents
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HPI & EFW Pumps Oil Analysis Results for 2004
EPRI Grease Compatibility Study, Nebula EP with MOV Long Life pages 235 through 241, Nov. 01
HPI 1A and 1B Parameter Trends, from 05/11/01 through 03/21/03

Vendor Manuals
Part Number 672471-1, Operation and Maintenance Instructions Drag Velocity Control Element, Rev.D, Part Number 412391-1, Operation and Maintenance Instructions Drag Velocity Control Element, dated 06/03/86 Part Number 31533VX, Instructions Operating and Repairing Consolidated Electromatic Relief Valve, dated 03/17/87
HPI Ingersoll-Rand Instruction Manual for Centrifugal Pumps, dated 05/19/70
Instruction Manual for HPI Pumps, dated 04/17/87

Records
OM 1149-0001, Upper Surge Tanks - Unit 2 MK. 2A & MK.2B, Rev. DG
OM 267-0846.001, Model 1151 DP Alphaline Differential and High Differential Pressure Transmitter, Rev.4

OM 267-0968.001, Rosemount Model 1154 Alphaline Pressure Transmitter for Nuclear Service, Rev.4
OM 333-0306.001, Switchboard Edgewise Instrument Five inch classification, Rev.2

Components Referenced
Pumps
- HPI (1A, 1B, 1C)
- EFW Pumps (1A, 1B, 1C)

Air Operated Valves
- Pressurizer PORV (1RC-66)
- EFW FCV's (1FDW-315, -316)

Relief valves
- Main Steam Safety Relief valves (1MS-1 through -16)

Valves
- HPI suction valves (1HP-24, -25)
- HPI discharge valves (1HP-26, -27)
- Atmospheric Dump valves (1MS-162, -164)
- Turbine Bypass valves (1MS-19, -22, -28, -31)
- Shutdown Cooling suction valves (1LP-1, -2)

Section 1R.DS1.32 - Loose Parts Monitoring

Instruments/Procedures
3-ONOP-099, 1 Response to Metal Impact Monitor Alarm, Revision Approval Date 4/17/97C
3-ARP-097.CR, Control Room Annunciator Response, G 4/3, RCS METAL IMPACT, Approval Date 7/23/02

Condition Reports
CR 03-774, Reactor Upper Head Accelerometers Maintenance Not Performed During Scheduled Outage, dated, 3/20/03

Completed Work Orders and Work Requests
31022885 dated 3/31/02
31022287 dated 3/31/02

Plant Specific Technical Guidelines Documents
3-PMI-099.2, Loose Parts Monitoring System Calibration, Revision Date 6/24/03

Section 1R.21.33 - Component Inputs/Outputs

Drawings
5610-E-1, Main Single Line Unit 4, Sheet 2, Rev. 9
5610-E-1, C-Bus Auxiliary Power Upgrade, Sheet 3, Rev. 9
5610-E-1, Main Single Line Unit 3 Sheet 1, Rev. 34
5610-T-E-1591, Operating Diagram Electrical Distribution, Sheet 1, Rev. 56
5610-T-E-1592, 125VDC & 120V Instrument AC Electrical Distribution, Sheet 2, Rev. 1
5610-T-E-1592, Auxiliary 125VDC & 120V Instrument AC Electrical Distribution, Sheet 2, Rev. 1
5613-E-10, Moptor Control Venters 3A, NV3A, 3B, NV3B, 3C, NV3C, Sheet 1, Rev. 39

Calculations
PTN-BFJE-90-006 Motor Operated Valve Voltage Drop Calculation (GL-89-10) Rev. 19
PTN-BFJE-92-032 125 VDC Valve Actuator Motor Voltage Drop Calculation (GL 89-10) Rev. 0

Section 1R.21.34 - Environmental Qualification

Vendor Manuals
HPI Ingersoll-Rand Instruction Manual for Centrifugal Pumps, dated 05/19/70
Instruction Manual for HPI Pumps, dated 04/17/87
EFW Motor Driven Pump Installation, Operation and Maintenance Instructions, dated 01/02/87
EFW Turbine Driven Bingham Centrifugal Pumps, dated 02/11/85

Miscellaneous Documents
EQMM-1393.01-P02-04, Environmental Qualification Maintenance Manual Pressure Transmitter Rosemount 1154 Rev.5
OM 2201-0925.001, I/B-ICS/NNI I/B Vol.1, Unit 3, Rev, D65

Calculations
OSC-2746, SSF Pressurizer Level Loop Instrument Accuracy Calibration, Rev.4
OSC-2741, Calculation Impact Assessment, Rev.4
OSC-2745, Calculation Impact Assessment, Rev. 4
OSC-4478, SG Emergency Range Level Uncertainty and EFW Low Level Actuation Setpoint, Rev. 5
OSC-6757, SG Full Range Level Instrument Loop Accuracy 1 /2 / 3 FDWLT0007P &9P, Rev.14

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OM 1149-0001, Upper Surge Tanks - Unit 2 MK. 2A & MK.2B, Rev. DG
OM 267-0846.001, Model 1151 DP Alphaline Differential and High Differential Pressure Transmitter, Rev.4
OM 267-0968.001, Rosemount Model 1154 Alphaline Pressure Transmitter for Nuclear Service, Rev.4
OM 333-0306.001, Switchboard Edgewise Instrument Five inch classification, Rev.2

Section 1R.21.35 - Foreign Material Exclusion Control Program And Loose Parts Monitoring

Procedures
MP/O/A/1800/001 A, Open System Or Component - Foreign Material Exclusion, Rev 000
NSD 104, Material Condition/Housekeeping, Cleanliness/Foreign Material Exclusion and Seismic Concerns

Section 1R21.4 - Identification and Resolution of Problems

Procedure change requests for EP/1/A/1800/001 and AP/1/A/1700/31:

2002-009197	2002-001070	2004-000415
2002-007693	2002-007443	2004-000476
2002-007768	2002-003537	2004-002233
2002-007138	2002-008536	2004-000094
2002-006135	2002-003050	2004-002219
2002-009429	2002-000550	2004-000097
2002-007328	2002-009172	2004-000064
2002-009425	2002-000792	
	2002-007101	

Condition Reports
00-00852, 1FDW-316 found 100% Open when it should have been closed.
00-01837, N2 regulator for 3FDW-315 and -316 was found to be set improperly in both regulators.
02-00287, 1FDW-315 fails to stroke with manual loader.
01-01402, 1B MDEFWP outboard bearing temperature exceeded acceptable temperature limits during testing.
02-05043, Trip of unit 2 TDEFW Pump.
02-02140, Attempted to start 1C HPI pump per PT/1/A/0251/024 (HPI Full Flow Test) and pump did not start.
03-00384, Challenges with oil sampling and analysis.
O-04-00162, Level indications on GS are noisy
O-04-00206, CST level indication lower than actual level
O-03-07076, 1FDWLT0066 was damaged by work in basement
O-04-01972,Damage to electrical connector on ON2-RCPT-0224
O-03-08080, New tubing installation for steam generator level do not meet slope requirements.
O-03-08152, Chattering Relays in the Unit 1 Emergency Steam Generator Level control cabinet
O-03-04499, 3RIA-16 experiences a loss of pulses during thunderstorms, 7/14/03
O-03-08270, 1RIA-40 has excessive moisture in its gas line, 12/25/03

UFSAR
Section 8

Technical Specifications
3.3.17 Emergency Power Switching Logic (EPSL) Automatic Transfer Function
3.3.18 Emergency Power Switching Logic (EPSL) Voltage Sensing Circuits
3.3.23 Main Feeder Bus Monitor Panel (MFBMP)

Technical Specification Bases
ONS-TSB-B B.3.5.2 High Pressure Injection (HPI)
ONS-TSB-B B3.7.5 Emergency Feedwater (EFW) Systems

Design Basis Documents
OSS-0254-00-00-1000, Design Basis Specification for Emergency Feedwater and Auxiliary Service Water Systems, Rev. 36
OSS-0254-00-00-1001, Design Basis Specification for the High Pressure Injection And Purification and Deborating Demineralizer System, Rev. 28

Selected Licensee Commitments
Section 16.8, Electrical Power System

Electrical Engineering Criteria Manual
RE-3.03, Relaying-Motor Control Center Breaker and Overload Heater Selection Oconee Rev. 4

PIPs Initiated Due to this Inspection

G-04-00332, Minor Discrepancies in Calculation OSC-8028
G-04-05399, No Procedure for Monitoring of Main Steam Lines To Identify Ruptured SG
O-04-5399, Instruction for accomplishing surveys of MS lines to determine which SG has a tube leak does not exist
O-04-05669, Instrument uncertainty calculations OSC-6753 and OSC-6757 need to be updated to reflect the current instrument loop configuration for SG startup and full range level, respectively.
O-04-05483, Editorial changes required. Dwg. O-721-A and OSC-3120
Calculations, corrections required in the Electronic Data Base (EDB) Files
O-04-05652 Editorial changes required to Relay Calculations Tripping Curve.
O-04-05658 Editorial changes required on Dwg. O-702.
O-04-05739 Due to the large number of errors in EDB files a more extensive review of EDB files may be required.
O-04-5741 Additional information required in OSC-4300 Calculation regarding Cable Design and Protection.
O-04-05681, Monte Carlo modeling of N-16 detector on main steam line 1B does not agree with installed configuration, 8/31/04