



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

October 29, 2010

Mr. T. Preston Gillespie, Jr.  
Site Vice President  
Duke Energy Carolinas, LLC  
Oconee Nuclear Station  
7800 Rochester Highway  
Seneca, SC 29672

**SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000269/2010004, 05000270/2010004, AND 05000287/2010004**

Dear Mr. Gillespie:

On September 30, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station Units 1, 2, and 3. The enclosed inspection report documents the inspection results, which were discussed on October 7, 2010, with you 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 three NRC-identified findings of very low safety significance which were determined to be violations of NRC requirements. Additionally, four licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Oconee. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at Oconee.

DEC

2

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

Jonathan H. Bartley, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287, 72-04  
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure: NRC Integrated Inspection Report 05000269/2010004, 05000270/2010004,  
05000287/2010004 w/Attachment: Supplemental Information

cc w/encl: (See page 3)

DEC

2

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Letter to T. Preston Gillespie, Jr. from Jonathan H. Bartley dated October 29, 2010

SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000269/2010004, 05000270/2010004, AND 05000287/2010004

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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: 05000269/2010004, 05000270/2010004, 05000287/2010004

Licensee: Duke Energy Carolinas, LLC

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

Location: Seneca, SC 29672

Dates: July 1, 2010, through September 30, 2010

Inspectors: A. Sabisch, Senior (Sr.) Resident Inspector  
G. Ottenberg, Resident Inspector  
K. Ellis, Resident Inspector  
J. Hamman, Resident Inspector  
R. Rodriguez, Sr. Reactor Inspector (Section 1R17)  
R. Hamilton, Sr. Health Physicist (Sections 2RS5, 2RS6, 2RS7 & 4OA1)  
G. Kuzo, Sr. Health Physicist (Sections 2RS5, 2RS6, 2RS7 & 4OA1)  
A. Nielsen, Health Physicist (Sections 2RS5, 2RS6, 2RS7 & 4OA1)  
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L. Suggs, Reactor Inspector (Section 4OA2.2)

Approved by: Jonathan H. Bartley, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000269/2010004, 05000270/2010004, 05000287/2010004; 07/01/2010 – 09/30/2010; Oconee Nuclear Station Units 1, 2 and 3; Plant Modifications, Problem Identification and Resolution

The report covered a three-month period of inspection by the resident inspectors and nine Region and Headquarters-based inspectors. Three Green findings were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Cross-cutting aspects are determined using IMC 0310, "Components Within The Cross-Cutting Areas." 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."

### Cornerstone: Mitigating Systems

- Green: An NRC-identified Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, was identified for the licensee's failure to install Fiber Reinforced Polymer (FRP) on the Unit 1 Auxiliary Building wall in accordance with the installation procedure. The licensee had not identified and repaired all wall defects greater than 0.75 inches deep as required by Procedure TN/1/A/102145/01C, FRP Installation. The issue was entered into the licensee's corrective action program as PIP O-10-7414.

The inspectors determined that the licensee's failure to follow the approved procedure for FRP installation was a performance deficiency. The performance deficiency was more than minor because it was associated with the external events attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective in that continued failure to identify wall defects could result in the FRP failing to provide the required reinforcing for protection against the differential pressures generated by on-site tornados. The inspectors determined the finding to be of very low safety significance (Green) because the licensee's structural analysis determined that the overall structural integrity of the wall would not be affected. This finding had a cross-cutting aspect of taking corrective actions to address safety issues and adverse trends in a timely manner commensurate with their safety significance and complexity in the Corrective Action Program component of the Problem Identification and Resolution area in that corrective actions for a previously identified adverse trend of not following procedures were ineffective. (P.1(d)) (Section 1R18)

- Green: A NRC-identified non-cited violation was identified for the licensee's failure to comply with 10 CFR 50.49(f) in that Rosemount transmitters, Limitorque valve actuators, and electrical penetration assemblies (EPAs), each an item of electric equipment important to safety, were found installed in a configuration other than the tested configuration and the licensee did not establish the qualification of the installed configuration.

Enclosure



The failure to comply with the requirements of 10 CFR 50.49(f) was a performance deficiency. The performance deficiency was more than minor in that if left uncorrected it could have adversely affected indication required by operators to diagnose and respond to an event or resulted in unexpected equipment response. The inspectors determined that a Phase 2 evaluation was required for the Rosemount transmitters with plastic shipping plugs installed because of a potential loss of safety function of the Low Pressure Injection system. The inspectors performed a Phase 2 and concluded that the finding was of very low safety significance (Green) because the ability to achieve hot shutdown was not affected. The other three conditions screened as Green in Phase 1 because the finding did not result in the actual loss of function of the transmitters with improperly torqued covers, the Limitorque actuators, or EPAs. The finding involved the cross-cutting area of Human Performance under the Procedures aspect of the Resources component in that the licensee failed to develop complete and accurate procedures and work packages for the installation and periodic maintenance of Rosemount transmitters. (H.2.c) (Section 40A2.2)

- Green: An NRC-identified non-cited violation of 10 CFR 50.49(l) was identified when the licensee did not follow the requirements for replacing components within EPAs when existing components qualified under the Division of Operating Reactors, Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors (DOR Guidelines), dated November 1979, were combined with replacement components qualified to current standards. The outboard Viking EPA terminal box and associated terminal blocks, not qualified under current standards, were left in 86 EPAs that had been upgraded and made available for use in safety-related or environmentally-qualified applications.

The failure to replace or to justify reasons to the contrary for not replacing the Viking EPA outboard terminal box and terminal blocks was a performance deficiency. The performance deficiency was more than minor because if left uncorrected, the licensee could have used the non 10 CFR 50.49 qualified terminal blocks as an electrical pathway for environmentally qualified or safety related loads. The inspectors completed a Phase 1 screening and determined that the finding was of very low safety significance (Green) because the finding did not result in the actual loss of function of the equipment receiving signals or power supplied through the modified EPAs. The finding directly involved the cross-cutting area of Human Performance under the Proper Maintenance Practices aspect of the Resources component in that the terminal boxes and associated terminal blocks which were not qualified under current standards were left in EPAs that had been upgraded and made available for use in safety-related or environmentally-qualified applications. (H.2.a)

Four violations of very low safety significance that were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program (CAP). These violations and CAP tracking numbers are listed in Section 40A7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at approximately 100 percent rated thermal power (RTP). On August 7, 2010, a rapid downpower was performed following receipt of indication of high reactor coolant pump vibration followed by a manual reactor trip from approximately 17 percent power. The unit was returned to 100 percent RTP on August 12, 2010, where it remained for the rest of the inspection period.

Unit 2 operated at approximately 100 RTP for the inspection period except for brief power reductions during scheduled testing.

Unit 3 began the inspection period at approximately 100 percent RTP. On August 25, 2010, power was reduced to approximately 20 percent RTP to allow a containment entry to be conducted for a relief valve repair. The unit returned to 100 percent RTP on August 27, 2010, and remained there for the rest of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R04 Equipment Alignment

##### a. Inspection Scope

Partial Walkdown: The inspectors performed the four partial walkdowns listed below to assess the operability of redundant or diverse trains and components when safety-related equipment was inoperable or out-of-service and to identify any discrepancies that could impact the function of the system potentially increasing overall risk. The inspectors reviewed applicable operating procedures and walked down system components, selected breakers, valves, and support equipment to determine if they were correctly aligned to support system operation. The inspectors reviewed protected equipment sheets, maintenance plans, and system drawings to determine if the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP. Documents reviewed are listed in the Attachment.

- Walkdown of equipment designated as being protected while the Standby Shutdown Facility (SSF) planned maintenance outage was in-place including the emergency feedwater pumps, high pressure injection pumps, elevated water storage tank, transformer CT-4 and Unit 3 Blockhouse, and Keowee control switches in the Unit 1 / 2 main control room.
- Unit 2 "A" train of Emergency Feedwater (EFW) during "B" EFW train flow control valve and motor driven pump testing

Enclosure

- Walkdown of equipment designated as being protected during the annual SSF planned maintenance outage including the emergency feedwater pumps, high pressure injection pumps, elevated water storage tank, 230 kV switchyard, 230 kV relay house, Unit 1/2 and 3 blockhouses, main steam and feedwater valves, CT-4, as well as the control switches in the main control room and power supplies for the protected components.
- Walkdown of equipment designated as being protected during the Keowee Hydro Station planned and subsequent forced maintenance outage including the operable Keowee unit, transformers, the SSF, the Unit 1/2 and 3 blockhouses, offsite power feeds from the dedicated Lee Combustion Turbine as well as the control switches in the main control room and power supplies for the protected components. In addition, the protection applied to the Lee Combustion Turbines was verified by visiting the Lee Steam Station and inspecting the combustion turbine portion of the site.

b. Findings

No findings were identified.

1R05 Fire Protection

a. Inspection Scope

Fire Area Tours: The inspectors walked down accessible portions of the five plant areas listed below to assess the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures. The inspectors observed the fire protection suppression and detection equipment to determine if any conditions or deficiencies existed which could impair the operability of that equipment. The inspectors selected the areas based on a review of the licensee's safe shutdown analysis probabilistic risk assessment and sensitivity studies for fire-related core damage accident sequences. Documents reviewed are listed in the Attachment.

- Keowee Hydro Units
- Unit 3 Control Room
- Unit 2 East and West Penetration Rooms
- Unit 1 and Unit 2 Cable Spreading Room
- Unit 1 Equipment Room

Fire Drill Observation: On September 17, 2010, the licensee conducted a shift fire drill simulating a fire in the Unit 1 4160V 1TC switchgear cabinet. The inspectors observed this drill to verify the fire brigade's use of protective gear and firefighting equipment; that fire fighting pre-plan procedures and appropriate fire fighting techniques were used; and that the directions of the fire brigade leader were thorough, clear, and effective. The inspectors also observed the post-drill critique to assess if it was appropriately critical, included discussions of drill observations, and identified any areas requiring corrective action. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R06 Flood Protection Measures

a. Inspection Scope

Submerged or Buried Cable Inspection: The inspectors inspected the condition of the following three cable trenches through direct observation. The inspectors verified the trenches were absent of standing water and that the cables were intact and in good condition. Documents reviewed are listed in the Attachment.

- SSF cable trench located at Turbine Building column M-41, third floor
- SSF cable trench located at the northeast corner of the SSF structure
- Cable trench located between the SSF trench and Protected Service Water (PSW) building

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed one active simulator exam to assess the performance of licensed operators during a simulator training session. The scenario included a main turbine trip and Anticipated Transient Without a Scram followed by a loss of offsite power with a failure of the Turbine Driven Emergency Feedwater Pump and a Motor Driven Emergency Feedwater Pump. The inspection focused on high-risk operator actions performed during implementation of the abnormal and emergency operating procedures, and the incorporation of lessons learned from previous plant and industry events. The classification and declaration of the Emergency Plan by the Operations Shift Manager was also observed during the scenario. The post-scenario critique conducted by the training instructor and the crew was observed. Documents reviewed listed in the Attachment.

b. Findings

No findings were identified.

## 1R12 Maintenance Effectiveness

### a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing the following five corrective maintenance activities. These reviews 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 activity 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 structures, systems 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. Documents reviewed are listed in the Attachment.

- Review of 10 CFR 50.65(a)(3) periodic evaluation
- Repair of 1MS-95, Unit 1 Turbine Driven Emergency Feedwater Control valve, following its failure to meet its required stroke time
- Replacement of 3HP-404, SSF Makeup Pump Discharge Relief Valve, due to leakage from the valve into the Reactor Building Normal Sump
- Troubleshooting and repair of the SSF HVAC #1 Compressor
- Keowee dual unit maintenance outage and repair of the Keowee Hydro Unit (KHU) #1 stator fault

### b. Findings

No findings were identified

## 1R13 Maintenance Risk Assessments and Emergent Work Control

### a. Inspection Scope

The inspectors evaluated the following attributes for the five activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. Documents reviewed are listed in the Attachment.

- Planned SSF maintenance outage conducted on July 12, 2010, and the associated impact of other planned and emergent work on the scheduled activities
- Evaluation of the licensee's response to a projected Orange risk condition due to a required emergent nuclear instrumentation calibration on Unit 1 in combination with the SSF out of service for planned maintenance

- Review of Critical Activity Plan for Orange risk condition for Low Pressure Injection (LPI) Flush Through the 2B LPI Test Line Block Valve to Borated Water Storage Tank (BWST)
- Review of the critical activity plan for the Keowee Hydro Station 2010 Dual Outage and response to a ground fault on the Keowee Hydro Unit 1 stator during planned testing
- Review of the protective actions and evaluation of the emergent repair plan of the SSF HVAC #1 compressor with the KHU #1 being out of service for stator coil repairs resulting in a station Orange risk condition

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following eight operability evaluations affecting risk significant systems to assess: (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 Technical Specifications (TS) limiting condition for operations.

- PIP O-10-5063, Unit 2 SSF Auxiliary Service Water System determined to be Operable but Degraded/Non-Conforming based on the increased ambient heat losses on Unit 2's Pressurizer requiring an increased number of available pressurizer heaters to meet operability requirements
- PIP O-10-5887, Top mortar joint for the masonry block walls on the West Side of the Cask Decontamination Room at Elevation 796 foot to 809 foot are not fully covered by the underside of the beam at Elev. 809'
- PIP O-10-5931, 1MS-95, Unit 1 Turbine Driven Emergency Feedwater Control valve, stroke time was outside of acceptable range
- PIP O-10-5890, Low differential pressure on 3A Motor Driven Emergency Feedwater Pump
- PIP O-10-6165; 2LP-40 (2B LPI Test Line Block Valve to BWST) failed to meet acceptance criteria
- PIP O-10-6316; SSF Diesel Generator B Jacket Water is below the Standby Low Level Mark
- PIP O-10-6499; Unit 3 Control Room High Energy Line Break Modification potential impact on acceptance criteria
- PIP O-10-7357; Keowee Unit 1 operability delayed from Keowee outage due to Emergency Start test procedure acceptance criteria

b. Findings

No findings were identified.

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications

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 three changes and additional information, such as calculations, supporting analyses, the UFSAR, and TS to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment. The three evaluations reviewed are listed in the Attachment.

The inspectors 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 10CFR50.59. The seven "screened out" changes reviewed are listed in the Attachment.

The inspectors evaluated engineering design change packages for the following three material, component, and design based modifications to evaluate the modifications for adverse effects on system availability, reliability, and functional capability.

- EC91830: U1 Main Control Room Board Additions for PSW
- EC91879: PSW Main Trunk Raceway
- OD 102145: Unit 1 Fiberwrap Installation Items as follows:
  - Qualification Testing and Reporting for the FRP System
  - Technical Evaluation of the FRP System
  - Development of Technical Procedures for the Installation of the FRP System

Documents reviewed included procedures, engineering calculations, modification design and implementation packages, work orders, corrective action documents, applicable sections of the living UFSAR, supporting analyses, TS, and design basis information. The inspectors additionally reviewed test documentation to ensure adequacy in scope and conclusion. The inspectors review was also intended to verify that all details were incorporated in licensing and design basis documents and associated plant procedures. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

## 1R18 Plant Modifications

### a. Inspection Scope

Permanent Plant Modifications: The inspectors reviewed the following three permanent plant modifications to verify the adequacy of the modification packages, as well as 10 CFR 50.59 screenings, and to evaluate the modifications for adverse affects on system availability, reliability and functional capability, or potential impact to fuel in the core. Documents reviewed are listed in the Attachment.

- OD 500666, SSF Diesel Fuel Tank Vent Pipe Protection
- OD 102145, FiberWrap Installation on the Unit 1 West Penetration Room and Cask Decontamination Tank Room walls
- OD 202152, BWST/SSF Trench Foundation (Unit 2)

### b. Findings

Introduction: An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, was identified for the licensee's failure to install Fiber Reinforced Polymer (FRP) on the Unit 1 Auxiliary Building wall in accordance with the installation procedure. The licensee had not identified and repaired all wall defects greater than 0.75 inches deep as required by Procedure TN/1/A/102145/01C, FRP Installation, prior to FRP installation.

Description: The licensee was installing FRP to strengthen the exterior walls of the Auxiliary Buildings and to protect mitigating systems equipment located in rooms with exterior walls to address potential differential pressure concerns resulting from tornados impacting the site. The FRP was bonded directly to the existing wall in both the vertical and horizontal directions. The installation procedure required that the walls be inspected to ensure that defects greater than 0.75 inches deep were repaired prior to fabric installation. On September 7, 2010, after the licensee completed the pre-installation inspection for one of the twelve wall segments, the inspectors identified three defects which met the procedural criteria in TN/1/A/102145/01C for requiring repair that were not identified by the licensee. The licensee stopped work, generated PIP O-10-7414, and performed a review of the remainder of the wall segments. The licensee found twelve additional defects on four other wall segments that also required repair. These defects ranged from 0.75 inches to 4.375 inches in depth. The licensee developed an enhanced repair technique, added it to the installation procedure, and repaired these additional defects.

The inspectors also observed that the FRP material had already been applied to three Unit 1 Auxiliary Building wall segments. The licensee's evaluation of the condition stated that there was no documentation that the wall had been thoroughly inspected prior to FRP installation; therefore, defects may have existed that exceeded the repair criteria and were not repaired prior to FRP installation. The licensee performed a structural analysis and determined that any unrepaired defects on these three wall segments



would not affect the overall structural integrity of the wall after the addition of structural steel.

Analysis: The inspectors determined that the licensee's failure to follow the approved procedure for FRP installation was a performance deficiency. The performance deficiency was more than minor because it was associated with the external events attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective in that continued failure to identify wall defects could result in the FRP failing to provide the required reinforcing for protection against the differential pressures generated by on-site tornados. Using Inspection Manual Chapter (IMC) 0609, Attachment 4, Determining the Significance of Reactor Inspection Findings for At-Power Situations, the inspectors determined the finding to be of very low safety significance (Green) because the licensee's structural analysis determined that even if defects, similar to those on the three wall segments that had FRP material applied, been found on the remaining wall segments the overall structural integrity of the wall would not be affected. This finding had a cross-cutting aspect of taking corrective actions to address safety issues and adverse trends in a timely manner commensurate with their safety significance and complexity in the Corrective Action Program component of the Problem Identification and Resolution area in that corrective actions for a previously identified an adverse trend for not following procedures were ineffective. (P.1(d))

Enforcement: 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, required, in part, that activities affecting quality shall be accomplished in accordance with instructions, procedures, or drawings appropriate to the circumstances. Procedure TN/1/A/102145/01C required that walls shall be inspected to ensure that defects greater than 0.75 inches deep have been identified and repaired prior to installation of the FRP fabric. Contrary to the above, on September 7, 2010, activities affecting quality were not accomplished in accordance with instructions, procedures, or drawings appropriate to the circumstances. The licensee did not adequately inspect the Auxiliary Building wall that was scheduled to have FRP applied resulting in defects greater than 0.75 inches deep not being repaired as required by Procedure TN/1/A/102145/01C. Because the finding is of very low safety significance and has been entered into the licensee's corrective action program as PIP O-10-7414, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000269/2010004-01, Failure to Follow Fiber Reinforced Polymer Installation Procedure.

## 1R19 Post-Maintenance Testing

### a. Inspection Scope

The inspectors reviewed the following six post-maintenance test procedures and/or test activities to assess if: (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 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;

Enclosure

(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. Documents reviewed are listed in the Attachment.

- Operability run of the SSF diesel generator following planned maintenance as well as the repair of the "A" immersion heater
- Unit 1 "A" LPI Pump Test following planned maintenance
- Leak Test on 2LP-40 (2B LPI Test Line Block Valve to BWST) following travel stop adjustment
- Inspection and repair of Rosemount model 1153, 1153D and 1154 transmitters located in the penetration rooms, LPI / High Pressure Injection pump rooms and containment buildings for all three units
- SSF Diesel Generator Test following two-year and four-year planned Preventive Maintenances
- SSF HVAC compressor #1 functional run following replacement of a failed pressure switch

b. Findings

No findings were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

Unit 1 Shutdown Due to Indicated High Reactor Coolant Pump Vibration: The inspectors observed the rapid shutdown and manual reactor trip of Unit 1 on August 7, 2010, from 100 percent RTP to Mode 3 and subsequent activities associated with identifying and repairing the cause of the vibration indications. Activities observed by the inspectors included the unit shutdown and entry into Mode 3, portions of the power supply repair and post-maintenance testing and review of the result from the Mode 3 walkdown performed by licensee personnel. Inspectors reviewed items entered into the licensee's CAP to ensure that the licensee had identified problems related to the forced outage at an appropriate threshold and entered them into the CAP. The inspectors also reviewed the licensee's formal Reactor Trip Assessment package and the Plant Oversight Review Committee (PORC) meeting to authorize restart of the unit. Documents reviewed are listed in the Attachment.

Unit 3 Refueling Outage: The inspectors reviewed the licensee's outage activities to determine if the licensee considered risk in developing outage schedules; adhered to risk reduction methodologies developed to control plant configuration throughout the planned refueling outage; and followed plant procedures while conducting outage-related activities. The inspectors observed portions of the following activities associated with the Unit 3 refueling outage. Documents reviewed are listed in the Attachment.

- Fuel handling operations during new fuel receipt and movement into the spent fuel pool
- Development and approval of the risk management strategy covering the outage
- PORC and Corrective Action Review Board meetings associated with the development and approval of outage schedules

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors either witnessed and/or reviewed test data for the four surveillance tests listed below to assess if 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. Documents reviewed are listed in the Attachment.

Routine Surveillances

- PT/2/A/0600/013, 2B Motor Driven Emergency Feedwater Pump Test, Rev. 63
- PT/0/A/0610/024, Keowee Emergency Start for Troubleshooting and Post Maintenance Checkouts, Rev. 10

In-Service Tests

- PT/2/A/0400/007, SSF RC Makeup Pump Test, Rev. 60

Reactor Coolant System Leakage Surveillance

- PT/1/A/0600/010, Reactor Coolant Leakage, Rev. 87

b. Findings

No findings were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed and evaluated the following two emergency preparedness exercises. Inspectors observed the operations crew in the simulator to determine if the appropriate declarations and notifications were made in a timely manner. Personnel in the Technical Support Center were also observed to determine if appropriate notifications were made, command and control demonstrated and resources used appropriately in addressing the simulated plant conditions. Notification sheets were reviewed for accuracy and to determine if the appropriate protective action recommendations were made. The inspectors observed the post exercise critiques to

Enclosure

assess whether the licensee appropriately captured identified deficiencies and weaknesses. Documents reviewed are listed in the Attachment.

- August 3, 2010, involved an earthquake tremor felt onsite and the seismic trigger actuating, which resulted in an Alert declaration. The drill scenario also included a large break loss of coolant accident, which led to the declaration of a Site Area Emergency due to a loss of two of the three fission product barriers. A General Emergency was ultimately declared as part of the exercise scenario due to the loss of all three fission product barriers when the Unit 1 Reactor Building emergency hatch began leaking.
- September 15, 2010, involved a failure of the reactor to trip automatically with a successful manual reactor trip which resulted in an Alert declaration. The drill scenario also included a main steam line break followed by a steam generator tube rupture which led to the declaration of a Site Area Emergency due to a loss of two of the three fission product barriers.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2RS5 Radiation Monitoring Instrumentation

a. Inspection Scope

Radiation Monitoring Instrumentation: During tours of the auxiliary building, spent fuel pool areas, and radiation control area (RCA) exit point, the inspectors observed installed radiation detection equipment including the following instrument types: area radiation monitors (ARM)s, control room and auxiliary building air monitors, liquid and gaseous effluent monitors, personnel contamination monitors (PCM)s, small article monitors (SAM)s, and portal monitors. The inspectors observed the physical location of the components, noted the material condition, and compared sensitivity ranges with UFSAR requirements.

In addition to equipment walk-downs, the inspectors observed source checks and alarm setpoint testing of various portable and fixed detection instruments, including ion chambers, telepoles, PCMs, SAMs, portal monitors, and a whole body counter. For the portable instruments, the inspectors observed the use of a high-range calibrator and discussed periodic output value testing with a health physics technician. The inspectors reviewed the last two calibration records and evaluated alarm setpoint values for selected ARMs, PCMs, portal monitors, SAMs, effluent monitors, and a whole body counter. This included a sampling of instruments used for post-accident monitoring such as containment high-range ARMs and effluent monitor high-range noble gas and iodine channels. Radioactive sources used to calibrate selected ARMs and effluent monitors

were evaluated for traceability to national standards. Calibration stickers on portable survey instruments and air samplers were noted during inspection of storage areas for 'ready-to-use' equipment. The most recent 10 CFR Part 61 analysis for dry active waste was reviewed to determine if calibration and check sources were representative of the plant source term. The inspectors also reviewed counting room quality assurance records for gamma ray spectrometry equipment and liquid scintillation detectors.

Effectiveness and reliability of selected radiation detection instruments were reviewed against details documented in 10 CFR Part 20; NUREG-0737, Clarification of TMI Action Plan Requirements; TS Section 3.3.8; UFSAR Chapters 11 and 12; and applicable licensee procedures.

Problem Identification and Resolution: The inspectors reviewed selected PIPs in the area of radiological instrumentation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NSD 208, Problem Investigation Process, Rev. 31. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Documents reviewed are listed in the Attachment. The inspectors completed one sample as required by IP 71124.05.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment

a. Inspection Scope

Program Reviews: The inspectors reviewed the 2008 and 2009 Annual Radiological Effluent Release Report documents for consistency with the requirements in the Offsite Dose Calculation Manual (ODCM) and Technical Specifications. Unexpected results were followed up to determine the cause. Radioactive effluent monitor operability issues were discussed with plant staff. The inspectors reviewed a change to liquid waste processing made to increase cleanup efficiency. The inspectors reviewed the ODCM changes made since the last inspection against the guidance in NUREG-1301 and RG 1.109, RG 1.21, and RG 4.1.

Walk Downs and Observations: The inspectors walked down selected components of the gaseous and liquid discharge systems to ascertain material condition, configuration and alignment. This walk down included visual inspection of RIA 33 Plant discharge liquid radwaste monitor, 0-RIA-RT 0045/46 Rad Waste Facility noble gas radiation monitors, 2-RIA 43 through 49A, 1 and 2-RIA -40 Condenser off-gas radiation monitor, 1-RIA-39 Control Room Gas, and 1-RIA 41 Spent Fuel Building noble gas monitor. To the extent practical, the inspectors observed the material condition of abandoned in place liquid waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. The inspectors also observed the collection and analysis of a liquid effluent sample from the decant

Enclosure

monitoring tank.

Sampling and Analyses: In addition to observing the collection of the sample from the decant monitoring tank the inspectors observed the preparation of the sample for counting, administrative processing and implementation of the release permit. The inspectors noted independent verification of the permit results and concurrent verification of equipment manipulations performed to allow the release. The results of the chemistry count room's inter-laboratory comparison program were reviewed and discussed with licensee personnel.

Dose Calculations: The inspectors reviewed two liquid release permits, several gas release permits, and monthly gaseous/liquid effluent dose calculation summaries. The magnitudes of the releases were determined to be a small fraction of the applicable limits. The inspectors reviewed plant documentation for abnormal or unmonitored releases. The licensee's 10 CFR 61 analysis was reviewed for expected nuclide distribution from the aspects of quantifying effluents, the treatment of hard to detect nuclides, determining appropriate calibration nuclides for instruments and whole body counting libraries. The inspectors also reviewed the licensee's most recent Land Use Census results and changes in the ODCM since the last inspection.

Ground Water Protection: The licensee's implementation of the Industry Ground Water Protection Initiative was reviewed for changes since the last inspection. Groundwater sampling results obtained since the last inspection were reviewed. Licensee response, evaluation, and follow-up to spills and leaks since the last inspection were reviewed in detail.

Problem Identification and Resolution: The inspectors reviewed selected PIPs in the areas of effluent processing and groundwater protection. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with NSD 208, Problem Investigation Process, Rev. 31.

Documents reviewed are listed in the Attachment. The inspectors completed one sample as required by inspection procedure 71124.06.

b. Findings

Introduction: An Unresolved Item (URI) was identified when water was observed in the 1-RIA-40 and 2-RIA-40 rotameters. The rotameters were downstream of the detectors indicating that the monitors had been affected by the presence of condensed water.

Description: Units 1 and 2 were operating at or near 100% RTP and the mechanical vacuum pumps were not in operation. At full power, the N-16 detectors near the main steam lines were used to determine primary-to-secondary leakage. However, these detectors cannot be relied on when the reactor was at low power or shutdown due to the absence of significant N-16 production. The condenser off-gas monitoring system served to detect primary-to-secondary leakage during operation at low power and when the unit was shut down. The inspectors identified that the condenser off-gas monitors for both Units 1 and 2 had water in the rotameters downstream and approximately three feet above the elevation of the noble gas monitor chamber and detector. Gas Bubbles

Enclosure

were passing through the water and it was believed that the monitors' detection chamber was also partially filled with water due to their location below the rotameters. The monitor had a horizontally oriented, fixed volume gas measuring chamber with a beta sensitive detector mounted at the end of the chamber. The fixed volume allowed quantification of noble gas entrained in the effluent stream in the event of primary to secondary side leakage. The presence of water in the chamber would reduce the sensitivity to any radioactive noble gases that may be present. Also water would shield the detector from beta particles further reducing the monitor's sensitivity. The response due to noble gases adsorbed into the water should be dampened due to the time lag between changes in the gas concentration and the time it takes for the water to reach the new equilibrium.

The licensee was performing an analysis on the operability of the detectors and the impact on the ability of the monitor to provide timely detection and quantification of a primary to secondary leak at shutdown and low power conditions. This issue is identified as URI 05000269, 270/2010004-02: Potential Inoperability of Condenser Off-Gas Radiation Monitors.

## 2RS7 Radiological Environmental Monitoring Program (REMP)

### a. Inspection Scope

REMP Status and Results: The inspectors reviewed and discussed changes to the ODCM and results presented in the Annual Radiological Environmental Operating Report (AREOR) documents issued for calendar years 2008 and 2009. REMF contract laboratory cross-check program results and current procedural guidance for offsite collection, processing and analysis of airborne particulate and iodine, broadleaf vegetation, and surface water samples were reviewed and discussed. The AREOR environmental measurement results were reviewed for consistency with licensee effluent data and evaluated for radionuclide concentration trends. The inspectors independently verified detection level sensitivity requirements for selected environmental media analyzed by the offsite environmental laboratory.

Equipment Walk-down: The inspectors observed implementation of selected REMF monitoring and sample collection activities for atmospheric and broadleaf vegetation samples as specified in the current ODCM and applicable procedures. The inspectors observed equipment material condition and verified operability, including verification of flow rates and total sample volume results for the weekly airborne particulate filter and iodine cartridge change-outs at six atmospheric sampling stations. In addition, the inspectors observed and discussed broadleaf vegetation sampling for selected stations. Select milk (control location), and surface water locations were verified and operation of proportional water sampling equipment was observed and discussed. Thermo-luminescent dosimeter material condition and placement were verified by direct verification at select ODCM locations. Land use census results, actions for missed samples including compensatory measures, sediment sample collection/processing activities, and availability of replacement equipment were discussed with environmental technicians and knowledgeable licensee staff. In addition, calibration and maintenance surveillance records for the installed environmental air sampling stations were reviewed.

Enclosure

Procedural guidance, program implementation, quantitative analysis sensitivities, and environmental monitoring results were reviewed against 10 CFR Part 20; Appendix I to 10 CFR Part 50; TS Sections 5.4, Procedures; 5.5.1 Program and Manual, ODCM; and 5.6.2, Reporting Requirements, AREOR; ODCM, Rev. 50; Regulatory Guide (RG) 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment; and the Branch Technical Position, An Acceptable Radiological Environmental Monitoring Program - 1979.

Meteorological Monitoring Program: The inspectors toured the primary and backup meteorological towers and observed local data collection equipment readouts. The inspectors observed the physical condition of the towers and their instruments and discussed equipment operability, maintenance history, and backup power supplies with responsible licensee staff. The inspectors evaluated transmission of locally generated meteorological data from the primary meteorological tower to the main control room operators. For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed applicable tower instrumentation calibration records and evaluated meteorological measurement data recovery for CY 2008 and CY 2009.

Licensee procedures and activities related to meteorological monitoring were evaluated against the ODCM; UFSAR; RG 1.23, Meteorological Monitoring Programs For Nuclear Power Plants, and ANSI/ANS-2.5-1984, Standard for Determining Meteorological Information at Nuclear Power Sites.

Problem Identification and Resolution: The inspectors reviewed selected PIPs in the areas of environmental and meteorological monitoring. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with NSD 208, Problem Investigation Process, Rev. 31. The inspectors also discussed the scope of the licensee's internal audit program and reviewed recent assessment results.

Documents reviewed are listed in the Attachment. The inspectors completed all of the samples detailed in IP 71124.07.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data to confirm the accuracy of reported PI data for the following PIs. To determine the accuracy of the report PI elements, the reviewed data was assessed against PI definitions and guidance contained in Nuclear Energy Institute

Enclosure



99-02, Regulatory Assessment Indicator Guideline, Revision 5. Documents reviewed are listed in the Attachment.

Cornerstone: Mitigating Systems

- Mitigating System Performance Index (MSPI) – Residual Heat Removal (3 units)
- MSPI – Heat Removal (3 units)

Cornerstone: Barrier Integrity

- Reactor Coolant System Leakage (3 units)

For the period July 1, 2009, through June 30, 2010, the inspectors reviewed Operating Logs, Train Unavailability Data, Maintenance Records, Maintenance Rule Data, PIPs, Consolidated Derivation Entry Reports, and System Health Reports to verify the accuracy of the PI data reported for each PI.

Cornerstone: Occupational Radiation Safety

- Occupational Exposure Control Effectiveness

For the period January 1, 2009, through June 30, 2010, the inspectors assessed CAP records to determine if High Radiation Area, Very High Radiation Area or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred. In addition, the inspectors reviewed selected personnel contamination event data, internal dose assessment results, and ED alarms for cumulative doses and/or dose rates exceeding established setpoints.

Cornerstone: Public Radiation Safety

- Radiological Control Effluent Release Occurrences

For the period January 9, 2009, through June 30, 2010, the inspectors reviewed cumulative and projected doses to the public and PIPs related to Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.1 Daily Screening of Corrective Action Reports

In accordance with Inspection Procedure 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 CAP. This review was accomplished by reviewing copies of PIPs, attending daily screening meetings, and accessing the licensee's computerized database.

Enclosure

.2 Annual Sample Review

a. Inspection Scope

The inspectors reviewed the licensee's implementation of their program for meeting 10 CFR 50.49 by examining the environmental qualification (EQ) of electric equipment important to safety located in the east penetration room. The inspectors reviewed the master list of EQ equipment, modifications affecting EQ equipment, EQ qualification files and updates, EQ maintenance, and identification and resolution of EQ problems in the corrective action program. The inspectors focused on those EQ components that were required to mitigate a high energy line break (HELB) in the east penetration rooms of Units 1, 2, and 3. Field inspections were performed on a sample of EQ components located in the east penetration rooms to verify that the installed configuration was consistent with the manufacturers tested configuration. The inspectors used NRC Temporary Instruction 2515/76, "Evaluation of Licensee's Program for Qualification of Electrical Equipment Located in Harsh Environments" for general inspection guidance. Documents and components reviewed are listed in the Attachment.

b. Findings

- .1 Introduction: A Green NRC-identified NCV was identified for the licensee's failure to comply with 10 CFR 50.49(f) in that Rosemount transmitters, Limitorque valve actuators, and electrical penetration assemblies (EPAs), each an item of electric equipment important to safety, were found installed in a configuration other than the tested configuration and the licensee did not establish the qualification of the installed configuration.

Description: During the field inspections of the east penetration rooms, the inspectors found plastic shipping plugs installed in the unused cable entry and conduit connection points on several Rosemount 1153B transmitters. Vendor guidance and licensee procedures required these shipping plugs to be replaced with a stainless steel plug after the cable and conduit had been connected to the transmitter. The inspectors also found that the housing covers on several Rosemount 1153B, 1153D and 1154 transmitters were not appropriately torqued to the manufacturer recommended 200 inch-lbs to ensure the transmitter remained environmentally sealed following a HELB. These conditions were entered into the licensee's corrective action program as PIPs O-10-6409 and O-10-06479. The licensee performed an extent of condition walkdown on all three units and identified additional Rosemount transmitters where the housing cover had not been torqued to the manufacturer's specifications and transmitters where the shipping plugs had not been replaced. Corrective actions taken included replacing the shipping plugs with the required stainless steel plugs, scheduling the inspection and subsequent replacement of the shipping plugs on other Rosemount 1153B transmitters, re-torquing the end caps on transmitters both inside and outside of containment and performing an extent of condition review.

The inspectors found two Limitorque actuators for valves, 3HP EV 0026, Loop 3A High Pressure Injection (HPI), and 3HP EV 0410, HPI Crossover Isolation, installed with the limit switch compartment facing downward and did not have T-drains installed. The

Enclosure

inspectors reviewed the Limatorque EQ test report and noted that Limatorque valves were tested with the limit switch compartment facing up with T-drains installed on the motor to equalize pressure and to vent the condensation resulting from the gradual cooling following a HELB. The inspectors also noted that the installed configuration further increased the possibility of grease leaking into the limit switch compartment. The leakage of grease or accumulation of condensation could cause limit switches to fail, cause electrical shorts or lead to erratic operation. The licensee's EQ Maintenance Manual (EQMM) 1393.01-A02-00, Section 5.1.3, stated that limit switch compartments may be fitted with T-drains to permit this orientation. However, the licensee could not provide justification for why these two installations were acceptable with or without the T-drains. The licensee was unable to demonstrate that the quantity of water or grease accumulation in the limit switch compartment during a HELB would not cause an electrical problem with the Limatorque actuator or if increased surveillance activities were required to ensure that motor operated valves with a downward limit switch compartment orientation would be available to perform their safety function. The licensee documented the issue in PIP O-10-6515 and performed an extent of condition walkdown of the other two units and confirmed that the equivalent valves on Units 1 and 2 did not have the limit switch compartment mounted facing downward.

The inspectors found that from 2002 to 2009, the licensee modified 93 EPAs in which 2 were modified D.G. O'Brien EPAs, 1RX-PN-EC03 and 3RX-PN-WA03. The modified D.G. O'Brien EPAs consisted of subcomponents from different manufacturers resulting in a configuration the licensee identified as a "hybrid" penetration assembly. The inspectors reviewed the supporting documentation and EQ test reports for these EPAs and found that the EPAs (which included the feed through assembly, terminal box and associated terminal blocks, and connections) were not tested as complete assemblies (i.e., each subcomponent of the electrical penetration assembly had its own EQ test report). The licensee used analysis to try to show that the "hybrid" EPA met the 10 CFR 50.49 requirements. The licensee stated that the integrated EPA met the 10 CFR 50.49 requirements since each subcomponent of the EPA was individually qualified in accordance with 10 CFR 50.49 requirements (i.e., each subcomponent had its own EQ test report). However, the licensee did not provide any test records or analysis to demonstrate that these subcomponents could perform their design function as an integrated EPA. NUREG 0588, Category 1, Section 2.1(2) stated in part, "...the staff will not accept analysis in lieu of test data unless (a) testing of the component is impractical due to size limitations, and (b) partial type test data is provided to support the analytical assumptions and conclusions reached." The inspectors determined that the licensee's EQ test records do not establish the qualification of the 'hybrid' EPA because both NUREG 0588 criteria were not met. The licensee's documentation did not provide reasonable assurance that this particular EPA configuration could perform its design function during and following a HELB event. Based on this information, the inspectors determined that the D.G. O'Brien 'hybrid' EPAs were not in compliance with 50.49(f). The issue was entered into the licensee's corrective action program as PIP O-10-1383.

Analysis: The failure to comply with the requirements of 10 CFR 50.49(f) is a performance deficiency. The performance deficiency was more than minor in that if left uncorrected it could have adversely affected indication required by operators to diagnose and respond to an event or resulted in unexpected equipment response. The

Enclosure

inspectors completed a Phase 1 screening for each condition using Inspection Manual Chapter 0609, Significance Determination Process, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings, and determined that a Phase 2 evaluation was required for the Rosemount transmitters with plastic shipping plugs installed because of a potential loss of safety function of the Low Pressure Injection system. The inspectors performed a Phase 2 analysis using IMC 0609 Appendix A, Determining the Safety Significance of Reactor Inspection Findings for At-Power Situations, and the site specific pre-solved tables and concluded that the finding was of very low safety significance (Green) because the ability to achieve hot shutdown was not affected. The other three conditions screened as Green in Phase 1 because the finding did not result in the actual loss of function of the transmitters with improperly torqued covers, the Limitorque actuators, or the EPAs. The finding involved the cross-cutting area of Human Performance under the Procedures aspect of the Resources component in that the licensee failed to develop complete and accurate procedures and work packages for the installation and periodic maintenance of Rosemount transmitters. (H.2.c)

Enforcement: 10 CFR 50.49(f) requires that each item of electric equipment important to safety shall be qualified by one of the following methods:

- (1) Testing an identical item of equipment under identical conditions or under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (2) Testing a similar item of equipment with a supporting analysis to show that the equipment to be qualified is acceptable.
- (3) Experience with identical or similar equipment under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (4) Analysis in combination with partial type test data that supports the analytical assumptions and conclusions.

Contrary to the above, on August 20, 2010, the inspectors identified the following four examples where the following electric equipment important to safety was not qualified by one of the methods described above:

1. Several Rosemount transmitters were installed with plastic shipping plugs in the unused cable entry. The manufacturer required that the plastic shipping plug be removed and replaced with a stainless steel plug after installation to meet the testing requirements. This condition has existed on some of the transmitters since 1991.
2. Several Rosemount transmitter housing covers were not sealed to the manufacturer's specified torque requirements of 200 inch-lbs to meet the testing requirements. The licensee did not have an analysis to demonstrate the acceptability of the installed configurations. This was a continuing problem due to periodic maintenance activity requiring removal and replacement of the housing covers.

Enclosure

3. Two Limitorque valve actuators, 3HP EV 0026 and 3HP EV 0410, were found installed with the limit switch compartment (LSC) oriented vertical down which was different from the tested configuration with the LSC vertical up. The licensee did not have an analysis on file to demonstrate the acceptability of the installed configuration. This problem has existed since 1995.
4. Two D.G. O'Brien EPAs, 1RX-PN-EC03 and 3RX-PN-WA03, were modified with subcomponents from different manufacturers and the licensee's qualification documentation lacked an integrated test of the modified configuration. The modifications occurred sometime between 2002 and 2006.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as PIPs O-10-6409, O-10-06479, O-10-6515, and PIP O-10-1383, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy and is identified as NCV 05000269, 270, 287/2010004-03, EQ Components Not Installed in the As-Qualified Configuration.

- .2 Introduction: An NRC-identified Green NCV of 10 CFR 50.49(l) was identified when the licensee did not follow the requirements for replacing components within EPAs when existing components qualified under the Division of Operating Reactors, Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors (DOR Guidelines), dated November 1979, were combined with replacement components qualified to current standards. The outboard Viking EPA terminal box and associated terminal blocks, not qualified under current standards, were left in 86 EPAs that had been upgraded and made available for use in safety-related or environmentally-qualified applications.

Description: The Viking EPAs were originally installed in all three Oconee Units during construction. The NRC reviewed the qualifications for the original Viking EPA installations and concluded that they were qualified in accordance with the DOR Guidelines. This information was documented in a NRC Safety Evaluation Report (SER) dated April 11, 1983. When 10 CFR 50.49 was effective, existing EPAs qualified using the DOR Guidelines were allowed to remain in service until they were replaced.

In the 2002 to 2009 timeframe, the licensee modified 86 Viking EPAs by replacing the inboard Viking terminal box and the pass-through portion with new Conax components; however, the existing outboard Viking terminal boxes and the associated terminal blocks were reused. Two purchase specifications dated June 12 and 13, 1968, for the Viking EPAs described an EPA assembly as consisting of two hermetically sealed headers, two terminal boxes (inboard and outboard), internal wiring and external wiring from hermetically sealed headers to terminal blocks. Section 7.3.2 of Specification OS-337-C, Specification for Reactor Building Instrumentation Cable Penetration Assemblies, stated in part, "Terminal blocks and connectors shall be mounted into terminal boxes to form an integral part of assemblies." Each specification stated that terminal blocks shall be provided as part of the assembly with external wiring from hermetically sealed headers to terminal blocks. The inspectors determined these EPAs were no longer in the same configuration that was previously evaluated, which effectively voided the DOR Guideline qualification, as documented in the SER.

Enclosure

Therefore, the inspectors determined that the modified EPAs must meet the qualification requirements of 10 CFR 50.49. The licensee did not have an evaluation to demonstrate these EPAs met the qualification requirements specified in 10 CFR 50.49 nor was any evaluation performed to justify re-use of the terminal block and outboard terminal box.

Analysis: The failure to replace or to justify reasons for not replacing the Viking EPA outboard terminal box and terminal blocks is a performance deficiency. The performance deficiency was more than minor because if left uncorrected, the licensee could have used the non 10 CFR 50.49 qualified terminal blocks as an electrical pathway for environmentally qualified or safety related loads in the future as they were all designated as fully qualified for that application in the Environmental Qualification Master List. The inspectors completed a Phase 1 screening using Inspection Manual Chapter 0609, "Significance Determination Process", Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings" and determined that the finding was of very low safety significance (Green) because the finding did not result in the actual loss of function of the equipment receiving signals or power supplied through the modified EPAs. The finding directly involved the cross-cutting area of Human Performance under the Proper Maintenance Practices aspect of the Resources component in that the licensee failed to ensure that equipment is available and adequate to assure nuclear safety. Specifically, terminal boxes and associated terminal blocks not qualified under current standards were left in EPAs that had been upgraded and made available for use in safety-related or environmentally-qualified applications. (H.2.a)

Enforcement: 10 CFR 50.49(l) required replacement equipment to be qualified in accordance with the provisions of this section unless there are sound reasons to the contrary. Contrary to the above, since 2002, the licensee failed to qualify replacement equipment in accordance with the provisions of 10 CFR 50.49 and did not have sound reasons to the contrary when replacing EPA components that were previously qualified under DOR Guidelines. Specifically, the outboard Viking EPA terminal box and associated terminal blocks which were not qualified under current standards were left in 86 EPAs that had been upgraded and made available for use in safety-related or environmentally-qualified applications. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as PIP O-10-1383, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy and is identified as NCV 05000269, 270, 287/2010004-04, Unqualified Electrical Penetration Assemblies.

#### 40A3 Event Follow-up

##### .1 Integrated Control System (ICS) Control Module Failure

###### a. Inspection Scope

The inspectors reviewed the plant response and operator actions in response to an ICS Star module failure that occurred on July 25, 2010, which caused a plant transient from 100 percent RTP to 97 percent RTP. The inspectors verified that the ICS response to the module failure was per system design, and that the operator action to take additional ICS hand/auto stations to "hand" was appropriate given the indications available to the

Enclosure

operator. The inspectors also verified the appropriate abnormal procedure was used to respond to the transient. The event was documented in PIP O-10-5813, ICS Star Module Failure on Unit 3 results in Plant Transient. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Unit 1 High Indicated Vibration on 1 Reactor Coolant Pumps Resulting in a Rapid Downpower and Manual Reactor Trip

a. Inspection Scope

The inspectors responded to the Unit 1 control room following entry into the abnormal operating procedure for high indicated vibration on the 1A1 and 1A2 reactor coolant pumps (RCP) on August 7, 2010. When RCP vibration reached levels requiring action, a rapid downpower was commenced from 100 percent RTP down to 17 percent RTP. Indicated vibration continued to increase and operators manually tripped the reactor followed by securing both RCP's in the "A" loop of the reactor coolant system. The plant was stabilized in Mode 3. Troubleshooting identified a failed power supply in the RCP monitoring cabinet had caused the elevated vibration indication. Following replacement of the power supply and a review of the plant response, restart was authorized. The reactor went critical on the morning of August 9 and reached full power on August 10, 2010. The inspectors observed the plant response and staff actions in response to the vibration indications which included diagnostic measures and implementation of the operating and abnormal procedural guidance. The inspectors also reviewed the licensee's post trip surveillance and the PORC package authorizing restart. The event was documented in PIP O-10-6174, Vibration Alarms on Unit 1's RCP's. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.3 Declaration of a Notice of Unusual Event Following the Loss of Greater than 50 Percent of the Control Room Annunciators on Unit 3

a. Inspection Scope

The inspectors responded to the Unit 3 control room following the declaration of a Notice of Unusual Event (NOUE) on August 11, 2010, due to the loss of greater than 50 percent of the control room annunciators and the need to supplement the normal shift staff to assess plant conditions. The inspectors observed the operators' response to the event, followed the troubleshooting and repair activities, and provided updates and information to the Region II Incident Response Center. The inspectors also followed the licensee's activities that took place once the NOUE was exited and the control room annunciator system was repaired. The event was documented in PIP O-10-6288, Unusual Event

Enclosure

Declared on Unit 3 due to Loss of Greater than 50% of StatAlarms with Resources Beyond Normal Shift Required. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.4 Unit 3 Downpower to 20%

a. Inspection Scope

The licensee developed plans to perform a downpower, enter the reactor building and replace valve 3HP-404. The inspectors attended the Unit Threat meetings where evolution plans were developed and observed the downpower from 100 percent RTP to 20 percent RTP on August 25, 2010. Due to projected dose estimates, the inspectors did not accompany the team conducting the Unit 3 reactor building entry; however, the condition of the valve once it was removed and the subsequent surveillance test to verify system operability was reviewed.

b. Findings

No findings were identified.

.5 (Closed) Licensee Event Report (LER) 05000269, 270, 287/2009002-00, Automatic Initiation of Emergency Feedwater Upon Loss of Main Feedwater. On October 21, 2009, the licensee discovered that there had been sixteen prior instances, distributed among all three Oconee units, where the loss of main feedwater (LOMF) circuitry was not providing accurate status of main feedwater (MFW) pump operability in order to automatically start the emergency EFW pumps. The incorrect status was due to the resetting of a MFW pump turbine upon system start-up following refueling outages, without the pump being aligned to be able to provide feedwater. In this configuration, if the second MFW pump was in a tripped status, a LOMF auto-start signal to the EFW pumps would not have been generated as required. The cause for the condition was an inadequate procedure attributed to a lack of understanding of the effect of resetting the MFW pump turbine on the LOMF circuitry. The enforcement aspects of this issue are discussed in Section 4OA7 of this report. The licensee entered this issue into their CAP as PIP O-09-6670.

.6 (Closed) Licensee Event Report (LER) 05000270/2010001-00; Operation Prohibited by TS Due to Removal of West Penetration Room Brick Wall Support Girts. On July 14, 2010, the licensee discovered that four structural support members required to assure the Unit 2 West Penetration Room brick wall could withstand a seismic event had been removed in violation of the guidance and direction contained in the instructions for the work in-progress. Immediate actions were developed to replace the support members and restore seismic protection for the wall. It was determined that the supports had been removed on July 2, 2010 and were missing for a total of 14 days. The impact of the missing support members would have been in the event of a seismic event, the wall could have impacted the SSF cables located on the interior surface of the wall which

Enclosure



would have resulted in the SSF Reactor Coolant Makeup subsystem being rendered inoperable for Unit 2. The inspectors verified the support members were reinstalled to restore seismic protection, reviewed the licensee's root cause evaluation of the event and the implementation of corrective actions resulting from the evaluation. The enforcement aspects of this issue are discussed in Section 4OA7 of this report. The licensee entered this issue into their CAP as PIP O-10-5561.

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours. These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

###### b. Findings

No findings were identified.

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

###### a. Inspection Scope

Under the guidance of Inspection Procedure 60855.1, the inspectors observed operations involving spent fuel storage. The inspectors reviewed documentation related to Dry Shielded Canister (DSC) 115, and verified that parameters and characteristics for each fuel assembly stored in the DSC was recorded, and that the records were maintained as controlled documents. The inspectors verified that the fuel selected for storage was consistent with the ISFSI Certificate of Compliance. The inspectors also observed selected licensee activities related to the loading, vacuum drying, and transfer of the DSC into the Horizontal Storage Module. The inspectors reviewed selected screening evaluations performed pursuant to 10 CFR 72.48 since the last inspection. There were no 72.48 evaluations performed during this period as all screenings determined no 72.48 evaluations were necessary.

###### b. Findings

No findings were identified.

### .3 Corrections of Tracking Numbers

NRC Inspection Report 05000269, 270, 287/2010008 was issued to document the final significance for one Yellow and one White finding. The identification numbers for these two findings were transposed. The correct tracking numbers are VIO 05000270, 287/2010007-01, Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility, for the White finding and VIO 05000269, 270, 287/2010007-03, SSF Reactor Coolant Makeup Subsystem Inoperable for Greater than Allowed by Technical Specifications, for the Yellow finding. This correction is only for administrative purposes.

#### 40A6 Management Meetings (Including Exit Meeting)

##### Exit Meeting Summary

The resident inspectors presented the inspection results to Mr. Preston Gillespie, and other members of licensee management on October 7, 2010. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary and no proprietary information was identified.

#### 40A7 Licensee Identified Violations

The following four violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as NCVs.

- TS 3.3.14, Emergency Feedwater Pump Initiation Circuitry, required for one or more required Loss of Main Feedwater pump (LOMF) initiation circuits inoperable, that the affected EFW pumps be declared inoperable. Additionally, TS 3.7.5 required, in part, that three EFW pumps shall be operable. Contrary to the above, on October 21, 2009, the licensee identified sixteen instances over the last three years, distributed among all three units, where conditions for declaring the EFW pumps inoperable were met due to a lack of understanding of the effect of the circuitry on operability during unit startup following refueling outages. As a result, the appropriate TS Action Statement of TS 3.7.5, which required the licensee to initiate action to restore one EFW pump to operable status immediately, was not entered as required. The inspectors verified the licensee corrected the procedural inadequacies. This finding is of very low safety significance (Green) because the finding did not represent an actual loss of system safety function. The licensee entered the finding into their CAP as PIP O-09-6670.
- TS 3.10.1, Standby Shutdown Facility, requires the Reactor Coolant Makeup sub-system to be operable in Modes 1, 2 and 3 or to restore operability within seven (7) days. Contrary to the above, between July 2, 2010, and July 16, 2010, the licensee removed four structural support members on the exterior of the Unit 2 West Penetration Room brick wall which adversely impacted the ability of the wall to

withstand a seismic event. The result of a wall failure caused by a seismic event would have damaged cables associated with the Standby Shutdown Facility Reactor Coolant Makeup sub-system which were routed along the interior surface of the wall. The condition was identified on July 14, 2010, and the support members reinstalled by July 16, 2010. The inspectors verified that the licensee took prompt actions to restore the structural integrity of the Unit 2 West Penetration Room brick wall. The licensee entered the finding into their CAP as PIP O-10-5561.

- Technical Specification 5.4.1.a required that procedures defined in RG 1.33 shall be established and implemented. RG 1.33, Appendix A, stated in part that written procedures covering procedure adherence shall be developed and implemented. NSD 303 details the Environmental Qualification (EQ) process and required the licensee verify or create new environmental qualification maintenance manual sections for newly installed EQ equipment. Engineering Directives Manual 601, "Engineering Change Manual," Appendix K.1, Equipment Qualification Sub-Screen on Environmental Qualification (EQ), required that any modification to EQ equipment meet the requirements of NSD 303. Contrary to the above, during the period from 2002 to 2009, the licensee failed to follow the EQ process outlined in NSD 303, in that the licensee failed to assess the potential impact on the environmental qualification aspects of the Viking and D.G. O'Brien electrical penetration assemblies being modified and the equipment they serviced under postulated accident conditions to ensure the equipment was not adversely affected and the appropriate EQ documentation was created or updated. The finding was entered into the licensee's corrective action program as PIP O-10-1383.
- EDM 601, Engineering Change Manual, Appendix K.1, Equipment Qualification Sub-Screen on Environmental Qualification (EQ), required that any modification to EQ equipment meet the requirements of NSD 303. NSD 303 required the licensee to verify or create new EQMM sections for newly installed EQ equipment. Contrary to the above, during the period from 2002 to 2009, the licensee failed to follow NSD 303 in that the licensee did not assess the potential EQ impact on the modified Viking and D.G. O'Brien EPAs and the equipment they serviced under postulated accident conditions to ensure the equipment was not adversely affected and the appropriate EQ documentation was created or updated. The finding was entered into the licensee's corrective action program as PIP O-10-1383.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

K. Alter, Regulatory Compliance Manager  
S. Batson, Engineering Manager / Station Manager  
D. Baxter, Site Vice President  
J. Bohlmann, Organization Effectiveness Manager  
J. Bowmann, Operating Experience Manager  
R. Brown, Emergency Preparedness Manager  
E. Burchfield, Superintendent of Operations  
C. Cash, PSW Building Superintendent  
P. Culbertson, Maintenance Manager  
J. Fisher, Maintenance Manager  
P. Fisk; Mechanical/Civil Engineering Manager  
R. Freudenberger, Safety Assurance Manager  
D. Galloway, BWST Implementation Manager  
P. Gillespie, Station Manager / Site Vice President  
J. Kammer, Modification Engineering Manager  
T. King, Acting Safety Assurance Manager  
R. Medlin, HELB Tornado-Project Manager  
D. Robinson, Radiation Protection Manager  
M. Robinson, Nuclear Engineering Manager

#### NRC

J. Stang, Project Manager, NRR

### LIST OF REPORT ITEMS

#### Opened and Closed

05000269/2010004-01	NCV	Failure to Install Fiber Reinforced Polymer on Unit 1 Auxiliary Building Wall as required by Procedure (Section 1R18)
05000269,270,287/2010004-03	NCV	EQ Components Not Installed in the As-Qualified Configuration (Section 4OA2.1)
05000269,270,287/2010004-04	NCV	Unqualified Electrical Penetration Assemblies (Section 4OA2.2)

#### Opened

05000269,270,287/2010004-02	URI	Potential inoperability of condenser off gas radiation monitors (Section 2RS6)
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Closed

LER 05000269,270,287/2009002-00	LER	Automatic Initiation of Emergency Feedwater Upon Loss of Main Feedwater (Section 4OA3.5)
LER 05000270/2010001-00	LER	Operation Prohibited by TS Due to Removal of West Penetration Room Brick Wall Support Girts (Section 4OA3.6)

**LIST OF DOCUMENTS REVIEWED****Section 1R04: Equipment Alignment**

Protected Equipment List for the SSF maintenance outage on July 12, 2010  
 SOMP 02-02, Operations Roles in the Risk Management Process, Rev. 7  
 Safety Tagging-2 List for Tagout 10-01898  
 OFD-121D-2.1, Flow Diagram of Emergency Feedwater System, Rev. 36  
 OFD-121A-2.8, Flow Diagram of Condensate System (Condensate Make-up & Emergency FDW Pump Suction), Rev. 16  
 OFD-121A-2.7, Flow Diagram of Condensate System (Upper Surge Tanks 2A & 2B, Upper Surge Tank Dome & Condensate Storage Tank), Rev. 37

**Section 1R05: Fire Protection**Fire Area Tours

SLC 16.9.2, Sprinkler and Spray Systems  
 SLC 16.9.4, Fire Hose Stations  
 SLC 16.9.6, Fire Detection Instrumentation  
 Zone 106, Fire Pre-plan, Unit 1 Cable Room  
 Zone 105, Fire Pre-plan, Unit 2 Cable Room  
 Zone 102, Fire Pre-plan, Unit 2 West Penetration Room  
 Zone 103, Fire Pre-plan, Unit 2 East Penetration Room  
 Zone 95, Fire Pre-plan; Unit 1 Equipment Room  
 Keowee Hydro Station, Fire Pre-plan, Elevations 645', 660', 675'-3", 683'-6", and 702'  
 MP/0/A/1705/032, Fire Protection Equipment Inspection, Rev. 31  
 PT/0/A/2200/010, KHS Fire protection Equipment Surveillance, Rev. 25  
 PT/0/A/2200/014, KHS CO2 System Surveillance, Rev. 16

Fire Drill

NSD 112, Fire Brigade Organization, Training and Responsibilities, Rev. 08  
 UFSAR Section 9.5.1, Fire Protection Systems  
 Oconee Nuclear Station Fire Drill Scenario Guide for Fire Drill 03-10-04  
 PIP O-10-7228, Critique of Fire Drill conducted on September 17, 2010 for "A" Shift  
 Fire Pre-Plan for Zone 34, Unit 1 6900V/4160V Switchgear, Turbine Building Mezzanine, Revision 4/4/05

**Section 1R06: Flood Protection Measures**

NEMA WC-8/ICEA S-68-516; Ethylene Propylene Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy  
 NEMA WC-7/ICEA S-66-524; Cross-Linked Thermosetting Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy  
 UFSAR Section 18.3.14; Insulated Cables And Connections Aging Management Program

**Section 1R11: Licensed Operator Requalification**

ASE-05, Active Simulator Exam, dated 5/20/10  
 RP/0/B/1000/001, Emergency Classification, Rev. 28  
 EP/1/A/1800/001 A, EOP-UNPP, Rev. 37  
 EP/1/A/1800/001 L, EOP – Rules & Appendix, Rev. 37  
 EP/1/A/1800/001, EOP – IMAs and SAs, Rev. 37

**Section 1R12: Maintenance Effectiveness**

Maintenance Rule Periodic Assessment for Maintenance Rule Implementation, Oconee Nuclear Station, dated 5/20/09  
 NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Rev. 2  
 PIP O-09-3794, Maintenance Rule 10 CFR 50.65(a)(3) assessment report and follow-up actions  
 PIP O-08-1217, PIP 07-7595 was screened without requiring a Maintenance Rule evaluation  
 Engineering Management Daily Focus Meeting Report, dated July 28, 2010  
 PIP O-10-6613; While performing PT/3/A/0400/007 SSF-RC Makeup Pump Test RB normal sump level increased 0.3 inches  
 PT/3/A/0400/007; SSF RC Makeup Pump Test  
 Unit 3 Downpower to 20% and return to full power schedule for August 25, 2010  
 PIP O-10-5931, 1MS-95, Unit 1 Turbine Driven Emergency Feedwater Control valve, stroke time was outside of acceptable range  
 IP/0/A/3000/029; Maintenance of Valcor Solenoid Valves Model V526-5683-114, Rev. 4  
 PIP O-10-6112; 1MS-87 not controlling properly due to 1TO-145 limit switches not being set correctly  
 PIP O-10-6094; 3MS-87 not controlling properly  
 PT/1/A/0600/012; TDEFDW Pump Test  
 MP/0/A/1320/005; Turbine – General Electric - Emergency Feedwater – Disassembly, Repair, and Assembly, Rev. 30  
 PIP O-10-6839, Portions of Keowee main buss could not be inspected due to cover bolts being painted- Thick paint on threads.  
 PIP O-10-6846, Keowee unit 1 electrical generator “X” phase failed the 24KV HIPot test.  
 PIP O-10-6850, Missing bolt on KHU 1 shaft packing gland  
 PIP O-10-6894, While torquing the KHS Unit 2 Generator Main Neutral Lead Connection, the head of a connecting bolt sheared off. Upon further investigation all of the 84 fasteners in the connection had been overtorqued  
 PIP O-10-6899, INOS deficiency: Human error trap in MP/0/A/2005/001 “Keowee Generator Routine Inspection and Maintenance”, Step 7.9.10.  
 PIP O-10-6900, The proper material and torque of the KHS Unit 1 Generator Main Neutral Lead Connections need to be verified.  
 MP/0/A/2005/001, Keowee Generator Routine Inspection and Maintenance, Rev. 15

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Special Emphasis Report for the period of July 11 – 14, 2010 (covering the period of the planned SSF maintenance outage)  
 Nuclear System Directive 213, Risk Management Process, Rev 8  
 Nuclear System Directive 415, Operational Risk Management, Rev. 5  
 Nuclear System Directive 417, Nuclear Facilities/Generation Status Communications, Rev 11  
 PIP O-10-5195, Several discrepancies were noted in a post-implementation review of EC103904  
 Critical Activity Plan, Keowee Hydro Station 2010 Dual Outage, dated 8/19/2010  
 PIP O-10-6950; SSF A/C Compressor #1 Found Not Running  
 PIP O-10-7068, KHU-1 Critical lift plan for rotor removal developed using incorrect revision of Lifting Program Manual  
 Duke Energy Nuclear Lifting Program, Rev. 15

**Section 1R15: Operability Evaluations**

PIP O-10-5063, Update Operations Support Center 3144  
 PIP O-10-2306, Increasing long term trend of pressurizer heat losses on all three units  
 PIP O-10-5433, Unit 2 pressurizer heater demand gradually increasing during on-line operation at 100 percent full power from 6/5/10 to 7/8/10  
 PIP O-10-6319, Re-performed Unit 2 Pzr Heat Loss Test required revision of IDO in PIP O-10-5063  
 PIP O-10-5900, Unplanned Tech Spec Entry for Unit 3 due to seismic concerns with Unit 3 Cask Decon Room Wall  
 Oconee Nuclear Station – NRC Special Inspection Report 50-269/02-08, 50-270/02-08, and 50-287/02-08, dated April 22, 2002  
 50.59 Evaluation for Change 21 to AP/0/A/1700/025 dated 3/12/2002  
 PIP O-10-5738; 2B MDEFWP developed head low during PT/2/A0600/013  
 PT/3/A/0600/013; Motor Driven Emergency Feedwater Pump Test  
 PIP O-10-6112; 1MS-87 not controlling properly due to 1TO-145 limit switches not being set correctly  
 PIP O-10-6094; 3MS-87 not controlling properly  
 PT/1/A/0600/012; TDEFDW Pump Test  
 MP/0/A/1320/005; Turbine – General Electric - Emergency Feedwater – Disassembly, Repair, and Assembly, Rev. 30  
 PIP O-10-5962; 1MS-87 Controller would not control pressure during Unit 1 TD EFWP run per PT/1/A/0600/012  
 PIP O-10-5963; Possibly Legacy FME  
 PIP O-10-6928, PORC Meeting Minutes, September 2, 2010- Compensatory Actions for PDO in PIP O-10-5063 (Pressurizer Ambient Losses)  
 Technical Specification 3.8.1, AC Sources – Operating and associated Bases document  
 UFSAR Section 8.3.1.1.1; Keowee Hydro Station  
 UFSAR Section 6.3.3.3; Loss of Normal Power Source  
 OSS-0254.00-00-2005; Design Basis Specification for the Keowee Emergency Power, Rev. 18

## **Section 1R17: Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications**

### Full Evaluations

AR00238501: Upper Surge Tank Inventory Protection

AR00242281: Increase in the rate of Unfiltered Inleakage into U1 and U2 Control Room

AR 00214381, Replace U2 CRD Control System with a new Digital CRD Control System

ONS 2007-009, Revision of UFSAR to Incorporate Reg Guide 1.76 Revision 1

### Screened Out Items

AR00262152: Add Vent Valve, Replace Local Low Pressure Service Water Flow Instrument and Add HPSW/IA Supplies to the Main Low Pressure Service Water Leakage Accumulator

AR00297520: Revise SLC 16.9.12

EC91830: U1 MCR Board Additions for PSW

EC91879: PSW Main Trunk Raceway

OD500920: Protected Service Water Building

OD300729: U3 Control Room North Wall

OD500667: SSF Trench Protection

### Modifications

EC91830: U1 MCR Board Additions for PSW

EC91879: PSW Main Trunk Raceway

OD 102145: Unit 1 Fiberwrap Installation

### Basis Documents

Technical Specifications, Current

Technical Specifications Bases, Current

Updated Final Safety Analysis Report, Current

Technical Requirements Manual, Current

### Work Orders

WO 01856171-01, U1 RCP Seal HDR Flow Instrument Calibration

WO 01864545-35, EC 91830 / OD100941 U1 Main Control Room Board Addition

WO 01864545-36, EC 91830 / OD100947 U1 Main Control Room Board Addition

### Calculations

Operations Support Center-6134, 120VAC Vital I&C Power System Analysis, Rev. 27

### Corrective Action Documents

PIP O-09-08396, Installation of some cable tray supports did not match design documents

### Other Documents

SQUG Walkdown of Installed Raceway, 08/29/2009

OP-OC-Wk 4 Proc/OE, PSW Modification Overview

AC125: Acceptance Criteria for Concrete and Reinforced and Unreinforced Masonry

Strengthening Using Externally Bonded Fiber-Reinforced Polymer Composite Systems

Nuclear Logistics Inc. Verification Report for FYFE Co, LLC Materials

Commercial Grade Survey of Accu-Test Structural Laboratories, Inc.



**Section 1R18: Plant Modifications**

OD 500666, SSF Diesel Fuel Tank Vent Pipe Protection, dated 12/19/07  
 OD 500666, Modification test Plan, Rev. 0  
 O-447D, Piping Layout Standby Shutdown Facility Yard Piping Plan and Sections, Rev. 4  
 O-447E, Piping Layout SSF Fuel Oil Enlarged Plan and Sections, Rev. 4  
 OFD-135A-1.2, Flow Diagram of Fuel Oil System (SSF Diesel Engines), Rev. 10  
 OD 102145: Unit 1 Fiberwrap Installation modification package

**Section 1R19: Post-Maintenance Testing**

OP/0/A/1600/010, Operation of the SSF Diesel-Generator, Enclosures 4.6 (SSF D-G Post Startup Data Sheet) and 4.15 (Testing of SSF Diesel-Generator), Rev. 061  
 PIP O-10-5536; Immersion heater issue identified during SSF DG pre-startup checks  
 PIP O-10-5535; SSF "A" engine crankcase lube oil level found to be low during pre-startup check for SSF restoration  
 PIP O-10-5474; SSF work delayed  
 PIP O-10-5495; Approximate 9 hour delay in releasing work on the SSF  
 PIP O-10-5496; Isolation of the SSF for planned outage delayed  
 PT/2/A/0150/067, 2LP-40 & 2LP-41 Leak Test, Rev. 4  
 OM 248.-0680.001, D-Series Full Port Ball Valve with AUMA GS-100.2/VZ4 Actuator, Rev. D  
 PIP O-10-6165, 2LP-40 failed to meet acceptance criteria  
 PT/0/A/0400/011, SSF Diesel Generator Test, Rev. 13  
 PT/0/A/0600/021, Standby Shutdown Facility Diesel-Generator Operation, Rev. 10  
 OP/0/A/1600/010, Operation of the SSF Diesel-Generator, Rev. 62  
 EM 4.11, Engineering is requesting data collection prior to the performance of the PT/0/A/0400/011 and PT/0/A/0600/021. The data is being collected to verify standby conditions of the SSF D/G, dated 8/27/2010  
 PIP O-10-6726, SSF HVAC Compressor #1 not operating properly during PT/0/A/0400/023  
 PIP O-10-6739, SSF Diesel/Generator testing sequence following Maintenance should be evaluated to verify it is not unacceptable preconditioning  
 PIP O-10-6747, SSF Diesel power factor unstable at low load conditions  
 PIP O-10-6755, The 2010 SSF Annual Outage had an original scheduled duration of 80 hours to restore to operable. Final duration was 156 to operable, 76 hours longer than scheduled  
 PIP O-10-6950; SSF A/C compressor #1 found not running  
 PIP O-10-6726; SSF HVAC compressor #1 not operating properly during PT/0/A/0400/023  
 MP/0/A/3007/019; Air Handling Unit – SSF – Air Conditioning – Preventive Maintenance – Safety Related System, Rev 32  
 Work Order 01945075, Unit 0 SSF A/C Compressor #1 Not Running

**Section 1R20: Refueling and Outage Activities**

AP/1/A/A/1700/016, Abnormal Reactor Coolant Pump Operation  
 AP/1/A/1700/029; Rapid Unit Shutdown  
 OP/1/A/1102/010; Controlling Procedure for Unit Shutdown  
 OP/1/A/1103/006; Reactor Coolant Pump Operation  
 PIP O-10-6174; Vibration Alarms on Unit 1's RCP's  
 PIP O-10-6177; Unit 1 Reactor Building Tour Results (Mode 3)  
 PIP O-10-6184; NRC Event Notification #46159; Unit 1 Manual Reactor Trip Due to Indicated High RCP Vibration

PT/0/A/0811/002; Trip/Transient Review, Rev. 015  
3EOC25 IRT Package and Assessment

**Section 1R22: Surveillance Testing**

PIP O-10-5738; 2B MDEFWP developed head low during PT/2/A0600/013  
ONTC-2-121D-0001-001; Test Acceptance Criteria for Motor Driven EFW Pumps 2A and 2B  
OM 206.-0038 001 2A Aux Feedwater Pump Curve  
OM 206.-0039 001 2B Aux Feedwater Pump Curve

**Section 1EP6: Drill Evaluation**

Nuclear Power Plant Emergency Notification Forms, dated 8/3/10, at 0828, 0924, 0956, 1109, 1134, 1201, and 1251  
3<sup>rd</sup> Quarter Emergency Response Drill Guide, Drill 2010-03  
Oconee Nuclear Station Emergency Plan, Rev. 2010-01  
PIP O-10-6066, Evacuation announcement from the TSC was not heard  
PIP O-10-6068, Incorrect Data entry in Raddose Dose Assessment Software resulted in inaccurate Protective Action Recommendation to the State of South Carolina  
PIP O-10-6114, EAL criteria for seismic event is based on UFSAR Design basis Earthquake. Setpoint for seismic trigger does not match UFSAR information.  
PIP O-10-6115, During the exercise on 08/03/2010, Emergency Notification Form (ENF) 6 contained a dose projection period of 1 hour and a release duration of 2.5 hours. This caused confusion with the SC DHEC.  
PIP O-10-6118, Emergency Notification Form #3 inaccuracy  
PIP O-10-6120, Site Assembly – failure to meet the 30 minute time requirement during the exercise  
PIP O-10-6121, Site Evacuation- It was determined that the Site Evacuation process for the Evaluated Exercise was not completed  
PIP O-10-6122, Controller/Evaluator/Observer interaction with Graded Exercise participants  
PIP O-10-6146, FAM 3.19, Objective G.1 (related to news releases) was not adequately demonstrated during the evaluated exercise on 08/03/10.  
PIP O-10-6861, 2010 ONS evaluated Exercise was conducted on August 3, 2010. This is the overall PIP for issues and comments not captured in specific PIPs.  
PIP O-10-7185; Minor errors identified in procedures during ERO drill on 09/15/2010

**Section 2RS5: Radiation Monitoring Instrumentation**

**Procedures and Guidance Documents**

HP/0/B/1004/063, "In-service Radiation Protection Instrument Performance Check", Rev. 8  
HP/0/B/1009/015, "Procedure for Sampling and Quantifying High level Gaseous, Radioiodine and Particulate Radioactivity", Rev. 23  
HP/0/A/1008/005, "RIA Setpoints", Rev. 3  
HP/0/B/1000/067 E, "Quality Assurance for Automated Personnel Monitors", Rev. 27  
IP/0/B/0360/035, "Sorrento Process Radiation Monitor Iodine Detector Calibration", Rev. 27  
RPSM 8.7, "Quality Assurance for Count Room Instrumentation", Rev. 4  
NSD 208, "Problem Investigation Process", Rev. 31

Records

Work Order 01824629 01, Sorrento Process Radiation Monitor Skid Calibration, 2RIA 47, 48, and 49, 1/27/09  
 Work Order 01881832 01, Sorrento Process Radiation Monitor Skid Calibration, 2RIA 47, 48, and 49, 1/29/10  
 Work Order 01825092 01, Auxiliary Building Gas Monitor Calibration, 1RIA-32, 2/24/09  
 Work Order 01911661 01, Auxiliary Building Gas Monitor Calibration, 1RIA-32, 7/6/10  
 Work Order 01850371 01, Sorrento On-line Dual Range Gas Monitor Calibration, 1RIA-37/38, 7/23/09  
 Work Order 01788576 01, Sorrento On-line Dual Range Gas Monitor Calibration, 1RIA-37/38, 7/23/08  
 Work Order 01724345 01, Annual Gas Monitor Calibration, 1RIA-39, 10/31/07  
 Work Order 01837016 01, Annual Gas Monitor Calibration, 1RIA-39, 6/3/09  
 Work Order 01845700 01, Low Vent Gas Detector Calibration, 2RIA-45, 4/25/09  
 Work Order 01893190 01, Low Vent Gas Detector Calibration, 2RIA-45, 4/15/10  
 Work Order 01832399 01, Vent Particulate Detector Calibration, 2RIA-43, 4/23/09  
 Work Order 01731492 01, Vent Particulate Detector Calibration, 2RIA-43, 9/20/07  
 Work Order 01881740 02, Sorrento Digital High Range Area Monitor, 2RIA-57&58, 3/3/10  
 Work Order 01795802 02, Sorrento Digital High Range Area Monitor, 2RIA-57&58, 7/28/08  
 Work Order 01854056 01, Plant Liquid Waste Discharge Radiation Monitor, RIA-33, 6/29/09  
 Work Order 01797308 01, Plant Liquid Waste Discharge Radiation Monitor, RIA-33, 7/31/08  
 Work Order 01832488 01, Vent Iodine Detector Calibration, 2RIA-44, 4/22/09  
 Work Order 01731225 01, Vent Iodine Detector Calibration, 2RIA-44, 9/20/07  
 People Mover Whole Body Counter Efficiency Confirmation, 12/18/09 and 4/4/2010  
 GEM-5 Enrad No. 3354, Calibration Records, 8/2/09 and 7/31/10  
 GEM-5 Enrad No. 3353, Calibration Records, 8/1/09 and 7/31/10  
 GEM-5 Enrad No. 3352, Calibration Records, 8/1/09 and 7/31/10  
 GEM-5 Enrad No. 3351, Calibration Records, 7/12/09 and 7/31/10  
 ARGOS Enrad No. 1903, Calibration Records, 2/25/09 and 2/15/10  
 ARGOS Enrad No. 1902, Calibration Records, 2/23/09 and 2/15/10  
 SAM-11 Enrad No. 1890, Calibration Records, 2/4/09 and 1/11/10  
 SAM-11 Enrad No. 1889, Calibration Records, 2/4/09 and 1/11/10  
 SAM-11 Enrad No. 1888, Calibration Records, 2/4/09 and 1/11/10  
 Cesium-137 Source No. N-267, Certificate of Radioactivity Calibration  
 Barium-133 Source No. 340-31-1, Certificate of Gamma Standard Source  
 Countroom QA/QC Daily Check Records, 1/1/10 – 8/5/10  
 High-purity Germanium Detector No. 4, Efficiency Calibration Checks, 4/1/09 and 4/19/10  
 10 CFR Part 61 Analysis, Dry Active Waste, 9/1/09  
 Radiation Monitor System Health Reports, 2<sup>nd</sup> Quarter 2009 – 1<sup>st</sup> Quarter 2010

CAP Documents

PIP G-09-00265, Annual Radiation Protection Program Review  
 PIP O-08-04660, Challenge smear did not alarm SAM  
 PIP O-10-06116, SAM11 monitors at RCA exit do not have exclusion zone  
 PIP O-10-06108, ARGOS failed source check on gamma foot detector  
 PIP O-10-03739, RP group measure for radioactive material outside the RCA turned yellow in April

PIP O-10-02592, Radioactive material tag placed on bag of naturally occurring radioactive material  
 PIP O-08-07938, Hot machine shop effluent monitor discovered not working properly  
 PIP O-09-02881, External contamination found on individual during followup whole body count

### **Section 2RS6: Radioactive Gases and Liquid Effluent Treatment**

#### Procedures, Guidance Documents, and Manuals

CDP/O/A/5200/045, Liquid Waste Release from RWF, Rev. 001  
 CP/O/A/5200/056, Manual Calculations for Liquid Effluent Releases, Rev. 001  
 CP/O/A/5200/048, Resin Recovery System Operation, Rev. 002  
 CP/O/A/5200/012, Turbine Building Sump Monitor Tank Operation, Rev. 001  
 Oconee Nuclear Station Units 1, 2, and 3, Offsite Dose Calculation Manual (ODCM) 2010  
 Oconee Nuclear Station Updated Final Safety Analysis Report Chapter 11, Rev. 019  
 HP/O/B/1000/060D, Vent and Air Ejector Sampling, Rev. 044  
 HP/O/B/1000/060 B, Reactor Containment Building Sampling and Release Rate Determination for Gaseous Purge, Rev. 056  
 HP/O/B/1000/060 A, Waste Gas Decay Tank Sampling and Release Requirements, Rev. 055  
 HP/O/B/1000/082, Dose Projections for Untreated Radioactive Wastes, Rev. 007  
 HP/O/B/1000/083, Cumulative Off-Site Dose from Liquid and Gaseous Effluents, Rev. 012

#### Records and Data Reviewed

Oconee Nuclear Station Units 1, 2 and 3, 2008 Annual Radiological Effluent Release Report, dated June 16, 2009  
 Oconee Nuclear Station Units 1, 2 and 3, 2009 Annual Radiological Effluent Release Report, dated April 30, 2010  
 Waste Stream/Material Distribution/Sampling /Irradiation Calculation Data Record, DAW -09, 2/10/2009  
 GWR Release Permit Report # 2010021, Unit 2 Reactor Building Purge  
 GWR Release Permit Report # 2010035, Unit 2 Reactor Building Purge  
 GWR Release Permit Report # 2010042, U1 "D" Waste Gas Decay Tank  
 LWR Liquid Waste Release Permit Report # 2010066, Decant Monitor Tank  
 Procedure PT/1-2/A/0110/005 A, Control Room Filter System Test, Rev. 8 Performed 6/18/09  
 Procedure PT/3/A/0110/005 A, Control Room Filter System Test, Rev. 29 Performed 4/22/09  
 Procedure PT/O/A/0110/003, Carbon Sample for Laboratory Analysis, Rev. 06 Performed 6/18/09 (Units 1&2) and 4/16/09 (Unit 3)  
 Interlaboratory Cross Checks performed in May 2008, May 2009, and February 2010  
 Groundwater Analysis Summaries for 2008 and 2009 from AREOR.  
 Ground Water Isotopic Analysis results from multiple wells, alpha, beta, gamma, isotopic and hard to detect for 1<sup>st</sup> and 2<sup>nd</sup> Quarter 2010

#### CAP Documents

PIP O-08-06428, Procedure HP/O/B/1000/060F, Procedure for Correlation of Effluent RIA Monitors to laboratory analysis of radionuclide concentrations has not been completed since 1993.  
 PIP O-09-02122, Rotometer was not registering flow upon arrival for sample change-out.  
 PIP O-09-02551, 3LP-37 relief valve lifted resulting in release of radioactive gas to Auxiliary Building and Unit Vent.

PIP O-09-05814, Possible leak from Spent Fuel Pool indicated by water in Fuel Transfer Tube sleeve.

PIP O-09-07067, SRPMP 8-2, Investigation of Unusual Radiological Occurrence initiated due to valid 1RIA-40 Condenser Off-gas Radiation Monitor High Alarm.

### **Section 2RS7: Radiological Environmental Monitoring Program (REMP)**

#### Procedures and Guidance Documents

Oconee Nuclear Station Units 1, 2 and 3, Offsite Dose Calculation Manual, Rev. 50

EnRad Laboratories Procedure 823, Calibration of Rotometers and Air Sampling Equipment, Rev. 4

EnRad Laboratories Procedure 703, Water Sampling at Oconee Nuclear Station, Rev. 4

EnRad Laboratories Procedure 702, Airborne Radioiodine and Airborne Particulate Sampling at Oconee Nuclear Station, Rev. 6

NSD208 Problem Investigation Process, Rev. 031

#### Records and Data Reviewed

2008 Annual Radiological Environmental Operating Report, 5/13/2009

2009 Annual Radiological Environmental Operating Report, 5/13/2010

Air Sampler Calibration Worksheets for Sampler Serial Number (S/N) 00353 (11/11/09), S/N 00334 (1/27/10), S/N 00333 (2/10/09), S/N 000324 (03/19/10), S/N 000347 (04/13/10), S/N 000350 (04/19/10)

Low Volume Air Sampler Maintenance Checklist for Sampler S/N 00353 (11/11/09), S/N 00334 (1/27/10), S/N 00333 (2/10/09), S/N 000324 (03/19/10), S/N 000347 (04/13/10), S/N 000350 (04/19/10)

Annual Calibration of ISCO Composite Samplers for the following locations: Clemson Water Intake [Site 64] 06/16/09 & 11/16/09; Highway 183 Bridge [Site 63.1], 10/19/09 & 01/14/10; Keowee Hydro [Site 0062], 02/09/09 & 02/08/10

X/Q & D/Q Comparison to ODCM Exclusion Area Boundary (EAB) Values for 2009 Annual Effluent Release Report, March 15, 2010

Annual 2008 X/Q and D/Q Comparison to ODCM Values for EAB, March 13, 2009

Oconee Nuclear Station: Meteorological Data Recovery Reports for Calendar Year 2008 and CY 2009

Work Order (WO) 01880187 01, Unit 0, Meteorological Equipment Calibration Data completed 1/25/10, including the following completed data sheets: IP/0/B/1601/003, Meteorological Equipment Checks; IP/0/B/1601/004, Meteorological 12 VDC Power Supply Calibration; IP/0/B/1601/006, Meteorological Uninterruptible Power System Functional Check; IP/0/B/1601/011, Meteorological Wind Speed Calibration; IP/0/B/1601/012, Wind Direction Channel Calibration; IP/0/B/1601/014, Meteorological Temperature and Delta Temperature Calibration; and IP/0/B/1601/015, Meteorological Data Logger Calibration

WO 01857801 01, Unit 0, Meteorological Equipment Calibration Data completed 7/12/09, Including the following completed data sheets: IP/0/B/1601/003, Meteorological Equipment Checks; IP/0/B/1601/004, Meteorological 12 VDC Power Supply Calibration; IP/0/B/1601/006, Meteorological Uninterruptible Power System Functional Check; IP/0/B/1601/011, Meteorological Wind Speed Calibration; IP/0/B/1601/012, Wind Direction Channel Calibration; IP/0/B/1601/014, Meteorological Temperature and Delta Temperature Calibration; and IP/0/B/1601/015, Meteorological Data Logger Calibration

WO 01828157 01, Unit 0, Meteorological Equipment Calibration Data completed 1/12/09, Including the following completed data sheets: IP/0/B/1601/003, Meteorological Equipment

Checks; IP/0/B/1601/004, Meteorological 12 VDC Power Supply Calibration; IP/0/B/1601/006, Meteorological Uninterruptible Power System Functional Check; IP/0/B/1601/011, Meteorological Wind Speed Calibration; IP/0/B/1601/012, Wind Direction Channel Calibration; IP/0/B/1601/014, Meteorological Temperature and Delta Temperature Calibration; and IP/0/B/1601/015, Meteorological Data Logger Calibration  
 WO 01802055 01, Unit 0, Meteorological Equipment Calibration Data completed 8/22/08, Including the following completed data sheets: IP/0/B/1601/003, Meteorological Equipment Checks; IP/0/B/1601/004, Meteorological 12 VDC Power Supply Calibration; IP/0/B/1601/006, Meteorological Uninterruptible Power System Functional Check; IP/0/B/1601/011, Meteorological Wind Speed Calibration; IP/0/B/1601/012, Wind Direction Channel Calibration; IP/0/B/1601/014, Meteorological Temperature and Delta Temperature Calibration; and IP/0/B/1601/015, Meteorological Data Logger Calibration  
 WO 0193360501, Check of Meteorological Instrumentation, 07/08/10

#### CAP Documents

PIP G-06-00180, Oconee REMP Site 060  
 PIP G-08-01176, 2008 NGO Radiological Effluent Controls Audit 08-23(INOS)(REC)(NGO)  
 PIP-O-08-01766, Meteorological System Trouble Statalarm  
 PIP-O-08-01942, Met Tower 10 Meter Data Bad  
 PIP-O-08-04700, Keowee River Meteorological Tower Wind Direction Vane Damaged by Buzzards Roosting  
 PIP-O-09-00069, Intermittent Problem with Wind Speed  
 PIP-G-09-00248, GEL Interlaboratory Comparison Program Report  
 PIP-G-09-00423, The Results for Cross Check Q091LIM2 and Q091LIM3 Were Not Within Acceptable Limits  
 PIP-G-09-00424, Slight Upward Trend Identified in Environmental TLD Results Between 1996 Through 2008  
 PIP G-09-00708, Results of NUPIC Audit 20459 Duke Audit VA09096  
 PIP G-09-01277, 2009 Documentation of LLD/MDA Test Data for LIMS RGEN Report LLD\_SLC  
 PIP G-09-01293, Oconee Nuclear Station REMP Direct Radiation Measurement, (TLD;s) Assessment No. RP-SA-2009-00026  
 PIP G-09-01300, ONS REMP Equipment Assessment # RP-SA-2009-0015  
 PIP G-10-00993, RETS-REMP OE Experience Regarding Environmental TLD Data Reporting

#### **Section 40A1: Performance Indicator Verification**

NSD 225, NRC Performance Indicators, Rev. 4  
 Nuclear Energy Institute 99-02, Regulatory Assessment Performance Indicator Guide, Rev. 6  
 MSPI Basis Document, Rev. 13  
 PIP O-10-6269, 3B LPI Train Maint exceeded projected MSPI time  
 PIP O-09-7608, Operator overthrust on first as-found stroke Torque switch on 1 & 1  
 PIP O-10-1041, 3LP-5 tagged out a day too early due to miscommunications on Ops worklist  
 NRC Performance Indicator (Radiation Protection Monthly Review) Data Memoranda File OS-854.05 for: June 2010, May 2010, and PIP Analysis Search Results for April 2010, March 2010, February 2010,  
 ED Setpoint Change Documentation for RWP-2032 5/05-07/2010  
 Dose and Dose Rate Alarm Record Data, January 1, 2009, through June 30, 2010

**Section 40A2: Problem Identification & Resolution**Electrical Penetration Assemblies

1-RX-PN-ED09, Viking Model D Electrical Penetration Assembly  
 1-RX-PN-ED10, Viking Model D Electrical Penetration Assembly  
 1-RX-PN-ED11, Viking Model D Electrical Penetration Assembly  
 1-RX-PN-EC03, Conax/D.G. O'Brien (Hybrid) Electrical Penetration Assembly  
 2-RX-PN-ED09, Viking Model D Electrical Penetration Assembly  
 2-RX-PN-ED10, Viking Model D Electrical Penetration Assembly  
 2-RX-PN-ED11, Viking Model D Electrical Penetration Assembly  
 3-RX-PN-ED10, Viking Model D Electrical Penetration Assembly  
 3-RX-PN-ED11, Viking Model D Electrical Penetration Assembly  
 3-RX-PN-WA03, Conax/D.G. O'Brien (Hybrid) Electrical Penetration Assembly

Rotork MOV

1LP VA 0017, 1A Low Pressure Injection

Rosemount transmitters

1BS FT 0003A, 1A Reactor Building Spray Header Flow  
 1LPI FT 0005P, Low Pressure Injection Flow A Hi/Lo  
 1LPS FT 0231, Reactor Building Cooling Unit (RBCU) 1A Inlet Flow  
 1LPS FT 0232, RBCU 1B Inlet Flow  
 3LPS FT 0233, RBCU 3C Inlet Flow  
 3LPS FT 0232, RBCU 3B Inlet Flow  
 1BS PT 0005P, Engineered Safeguards Channel B Reactor Building Pressure

Other Documents Reviewed

OSS-337-B, "Specification for Reactor Building Power and Control Cable Penetration Assemblies," dated June 13, 1968  
 OSS-337-C, "Specification for Reactor Building Instrumentation Cable Penetration Assemblies," dated June 12, 1968  
 Calculation OSC- 8505, "Oconee HELB EQ Analysis For Penetration Rooms," Rev. 2  
 Calculation OSC-9225, "Environmental Qualification (EQ) Evaluation for Revised Oconee Electrical Penetration Configurations," Rev. 0  
 Modification Package NSM ON- 12587 Rev. 0 Unit 1 - TN/1/A/2587/00/AK1 re: Rosemount Transmitters for LPI flow instrumentation  
 Modification Package NSM ON-13105/AK1 Unit 1 – TN/1/A/13105/AK1 re: ECCS-ECDS Pump Flow Rate Improvement  
 Engineering Change Package 101483 Unit 1 re: Replacement of Ch. B Reactor Bldg. NR Pressure Transmitter (1BSPT5P) (Existing Barton Model 764 being replaced by Rosemount Model 1154)  
 OM-245.0979 – Limitorque Master EQ Report  
 QA Condition 1 – EQ Maintenance Manual EQMM-1393.01-J01-00 for D.G. O'Brien, Inc. EPAs Types A, B, B6, C, D, D6, E, F, G, H, J, K, L, M, BF, AL-1 and Cathodic Protection  
 Rosemount EQ Transmitter Replacements from 1/2005 to Present (licensee prepared list)  
 IP/0/A/0075/008 - Rosemount Pressure Transmitter Assembly, Initial Calibration And Mounting Instructions  
 IPS-704 – "Design Qualification Test Report for a Conax Low Voltage Service Classification Conductor Feed thru Assembly" – OM-363-0022 001

IPS-585.2 – “Test Report Qualification of Instrumentation Service Classification Electric Penetration (BF-LVI) for Class 1E Service in BWR & PWR Containment Structures” OM – 363-0024 001

IPS-585.3 – “Design Qualification Test Report of a Low Voltage Power and Control Service Classification (BF-LVP/C) Electric Penetration Assembly for Class 1E Service in BWR & PWR Containment Structures” – OM – 363-0025 001

Environmental Qualification/Documentation Package for Electrical Penetration Assemblies-D.G. O’Brien, INC. Revision 1 February 17, 1988 (TYPES B6, D6, E5, J5, M, BF, and AL-1) OM-337- 0089 002

Environmental Qualification/Documentation Package for Electrical Penetration Assemblies-D.G. O’Brien, INC. Revision 2 October 13, 1988 – OM-337-0089 001

Test Report on the Environmental Evaluation of Terminal Blocks for McGuire Nuclear Station – MCM 1393-02-0004

Environmental Qualification/Documentation Package for Electrical Penetration Assemblies Conax Corporation (TYPES N, BH, CD6-1, CE, CE1, CF1, CF2, CG-1, CG-2, CH1, CH2/CH3, and CJ)(also for CB, CB6, CCI-1, CCI-2, CC2, CD, CD6-2) – OM-363-0023 001

D.G. O’Brien, INC. ER 303 Prototype Test Report S/N 6014J Sub-Report SR 303-22-MSLB Environmental Test Outside Containment End

Nuclear Component Qualification Test Report for the General Qualification of WEED Instrument Company Temperature Sensor Assemblies – OM-357-0008 001

Environmental Qualification/Documentation Package for Electrical Penetration Assemblies Viking Industries INC. (Types A, B, C1, C2, D, E, E1, F1, F2, G, H1, H2, 7 H3, J and K) OM-337-0080 001

Rotork EMO Environmental Qualification NA1 Pre-1978 – OM-245-1451 001

Environmental Qualification Maintenance Manual Section EQMM-1393.01-A01-00 – Electric Motor Acuator-Rotork NA1

Environmental Qualification Package for Swagelok QF Series Quick-Connect Connectors, Parker and Cajon Stainless Steel Pipe Fittings (NPT), and 3M Scotchcast Brand Resin No. 9 Termination Sealant-CNM 1364.00-0007 001

Licensee white paper, “EQ Qualification by Combination of Existing Qualification Reports,” on the hybrid electrical penetration assemblies.

### **Section 4OA3: Event Follow-up**

PIP O-10-5813, ICS Star Module Failure on Unit 3 results in Plant Transient

PIP O-10-6174; Vibration alarms on Unit One RCP’s

PIP O-10-4904, 2A1 and 2A2 RCP high vibration alarms received on the OAC and Stat-Alarm panels

PIP O-10-4885, Multiple OAC points for the 2A1 and 2A2 RCP vibrations go negative (BAD) to (GOOD) for a period of time

PIP O-10-4592, Working to address erratic vibration indications on 2A1 and 2A2 RCPs

PIP O-10-6177; NRC Event Notification for Unit 1 manual reactor trip due to indicated high reactor coolant pump vibration

PIP O-10-6181; RPS Channel A Trip and RPS “A” Flux/Pump trip Stat-Alarms illuminated when the 1B1 RCP was secured

PIP O-10-6184; Unit 1 Reactor Building Mode 3 tour results

PIP O-10-6187; Unit 1 Reactor Building Mode 3 tour results

PIP O-10-6288, Unusual Event Declared on Unit 3 due to Loss of Greater than 50% of StatAlarms with Resources Beyond Normal Shift Required



NRC Event Notification Worksheet for NOUE on August 11, 2010  
 Nuclear Power Plant Emergency Notification Form for NOUE on August 11, 2010  
 Work Request 01013644; StatAlarm Panel 3SA-18 failure to function  
 RP/0/B/1000/001, Emergency Classification  
 AP/1/A/1700/016, Abnormal Reactor Coolant Pump Operation  
 AP/1/A/1700/029, Rapid Unit Shutdown  
 PT/0/A/0811/002; Trip / Transient Review  
 NSD 505, Investigation of Reactor Trips or Significant Transients  
 OP/3/A/1102/004A; ICS Operation, Rev. 6  
 OP/3/A/1102/004; Operation at Power, Rev. 106

#### **Section 40A5: Other Activities**

MP/0/A/1500/023, Independent Spent Fuel Storage Installation Phase V and VI DSC Loading and Storage  
 ONEI-0400-340, Oconee Nuclear Station DSC 115 (3-43), dated 8/19/2010  
 Certificate of Compliance for Spent Fuel Storage Casks, Cert. No. 1004, Amendment No. 9  
 A/R 00307014, ONS General License ISFSI 10 CFR72.212 Evaluation Phase V, Rev. 0  
 A/R 00312719, ONS General License ISFSI 10 CFR72.212 Evaluation Phase VI, Rev. 0  
 A/R 00313415, PT/0/A/1500/001, Independent Spent Fuel Storage Installation Horizontal Storage Module Temperature Rise Verification, Rev. 8  
 A/R 00315491, PT/0/A/0600/001 C, ISFSI Storage Facility Surveillance, Rev. 4  
 A/R 00315591, OP/2/A/1102/020 D, SSF and Outside Rounds, Rev. 41  
 A/R 00315996, AP/0/A/1700/006, Natural Disaster, Rev. 19  
 A/R 00313758, MP/0/A/1500/023, independent Spent Fuel Storage Installation Phase V and VI DSC Loading and Storage, Rev. 13  
 A/R 00316803, MP/0/A/1500/023, independent Spent Fuel Storage Installation Phase V and VI DSC Loading and Storage, Rev. 14

#### **LIST OF ACRONYMS**

AREOR	-	Annual Radiological Environmental Operating Report
ARM	-	Area Radiation Monitor
BWST	-	Borated Water Storage Tank
CAP	-	Corrective Action Program
CAP	-	Corrective Action Program
CFR	-	Code of Federal Regulations
DOR	-	Division of Operating Reactors
DSC	-	Dry Shielded Canister
EDM	-	Engineering Directive Manual
EFW	-	Emergency Feedwater
EOC	-	End-of-Cycle
EPA	-	Electrical Penetration Assembly
EQ	-	Environmental Qualification
EQMM	-	EQ Maintenance Manual
FRP	-	Fiber Reinforced Polymer
HELB	-	High Energy Line Break
HPI	-	High Pressure Injection
HVAC	-	Heating, Venting and Air Conditioning

ICS	-	Integrated Control System
IEEE	-	Institute of Electrical and Electronics Engineers
IMC	-	Inspection Manual Chapter
IP	-	Inspection Procedure
IR	-	Inspection Report
ISFSI	-	Independent Spent Fuel Storage Installation
KHU	-	Keowee Hydro Unit
LER	-	Licensee Event Report
LOMF	-	Loss of Main Feedwater
LPI	-	Low Pressure Injection
LSC	-	Limit Switch Compartment
MFW	-	Main Feedwater
MOV	-	Motor Operated Valve
MPSI	-	Mitigating System Performance Index
NCV	-	Non-Cited Violation
NOUE	-	Notice of Unusual Event
NRC	-	Nuclear Regulatory Commission
NSD	-	Nuclear System Directive
ODCM	-	Offsite Dose Calculation Manual
PCM	-	Personnel Contamination Monitor
PI	-	Performance Indicator
PIP	-	Problem Investigation Process
PORC	-	Plant Oversight Review Committee
PSW	-	Protected Service Water
QA	-	Quality Assurance
RCA	-	Radiation Control Area
RCP	-	Reactor Coolant Pump
REMP	-	Radiological Environment Monitoring Program
Rev.	-	Revision
RG	-	Regulatory Guide
RTP	-	Rated Thermal Power
SAM	-	Small Article Monitor
SDP	-	Significance Determination Process
SSC	-	Structures, Systems, and Components
SSF	-	Standby Shutdown Facility
TI	-	Temporary Instruction
TS	-	Technical Specifications
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
WO	-	Work Order