



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

May 14, 2010

Mr. David A. Baxter  
Site Vice President  
Duke Energy Carolinas, LLC  
Oconee Nuclear Station  
7800 Rochester Highway  
Seneca, SC 29672

**SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000269/2010002, 05000270/2010002, 05000287/2010002**

Dear Mr. Baxter:

On March 31, 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 April 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 two findings concerning obstruction of the Standby Shutdown Facility (SSF) letdown line which potentially have safety significance greater than very low safety significance and were determined to be violations of NRC requirements. These findings do not present an immediate safety concern because an in-line filter that caused the obstruction has been removed from all three units. In addition, this report documents one violation which is potentially greater than Severity Level IV.

Additionally, one NRC-identified finding of very low safety significance (Green), which was determined to involve violations of NRC requirements, was identified. Also, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section VI.A.1 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. Further, 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. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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/*

Michael F. King, Acting 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 05000269/2010002, 05000270/2010002,  
05000287/2010002 w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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/RA/

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Letter to David A. Baxter from Michael F. King dated May 14, 2010

SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000269/2010002, 05000270/2010002, 05000287/2010002

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

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

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

Report No: 05000269/2010002, 05000270/2010002, 05000287/2010002

Licensee: Duke Energy Carolinas, LLC

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

Location: Seneca, SC 29672

Dates: January 1, 2010, through March 31, 2010

Inspectors: A. Sabisch, Senior Resident Inspector  
E. Riggs, Resident Inspector  
G. Ottenberg, Resident Inspector  
K. Ellis, Resident Inspector  
R. Chou, Reactor Inspector (Section 1R18)

Approved by: Michael F. King, Acting Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000269/2010-002, 05000270/2010-002, 05000287/2010-002; 01/01/2010 – 03/31/2010; Oconee Nuclear Station Units 1, 2 and 3; Fire Protection, Operability Evaluations, Plant Modifications, Surveillance Testing

The report covered a three-month period of inspection by the resident inspectors and one reactor inspector. One Green non-cited violation (NCV), two Apparent Violations (AV) with potential safety significance greater than Green, and one AV with potentially severity level greater than Severity Level IV 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 were 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. A Green NRC-identified NCV of Condition 3.D of Facility Operating Licenses DPR-38 (Unit 1), DPR-47 (Unit 2) and DPR-55 (Unit 3) was identified for the licensee's failure to identify, critique, and develop corrective actions for fire brigade performance weaknesses during a fire drill as required by NSD 112, "Fire Brigade Organization, Training and Responsibilities." This violation has been entered into the corrective action program as PIP O-10-1247.

The licensee's failure to identify, critique, and develop corrective actions for fire brigade performance weaknesses during a fire drill as required by NSD 112 was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective in that fire brigade performance weaknesses may delay fire brigade response allowing a fire to propagate leading to a more significant event. This finding was determined to be of very low safety significance because the condition of the automatic fire detection and suppression systems was satisfactory and the performance weaknesses would not have affected the ability to achieve safe shutdown. This finding directly involved the cross-cutting area of Human Performance, component of Work Practices, and aspect of personnel follow procedures in that the requirements of NSD 112; Section 112.6, were not met (H.4(b)). (Section 1R05)

- TBD. An NRC-identified Apparent Violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for the licensee's failure to promptly identify and correct an adverse condition. The licensee failed to identify and correct a degraded condition on Unit 2 and Unit 3 SSF letdown lines following the confirmation of blockage in the Unit 1 SSF letdown line in October 2009. This finding does not represent an immediate safety concern because the in-line filters have been removed on all three units. This violation has been entered into the corrective action program as PIP O-10-1213

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The licensee's failure to promptly identify and correct the degraded condition of the Unit 2 and Unit 3 SSF letdown line as required by 10 CFR 50, Appendix B, Criterion XVI was a performance deficiency. The performance deficiency was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely impacted the cornerstone objective because the degraded condition had the potential to affect RCS inventory control during an SSF event. The inspectors determined that a Phase III analysis was required because this finding represented a potential loss of function for a single train system which was not addressed by the Phase II pre-solved tables or the plant-specific worksheets. The finding directly involved the cross-cutting area of Human Performance under the Conservative Assumptions and Safe Actions aspect of the "Decision Making" component, in that the licensee failed to demonstrate conservative decision making in their evaluation of the operability of the Unit 2 and Unit 3 SSF letdown lines (H.1(b)). (Section 1R15.1)

- TBD. A licensee-identified apparent violation of 10 CFR 50.9(a) was identified when it was determined that information contained in the "Oconee Nuclear Station SSF RC Letdown Action Plan" was inaccurate. This information, combined with an evaluation that showed RCS letdown flow rates on Unit 2 and Unit 3 were greater than the flow rate required for pressurizer level control during the last surveillance test, was used by the NRC in the review which allowed both units to remain at power until the next forced or refueling outage. This violation has been entered into the corrective action program as PIP O-10-0561.

The failure to provide complete and accurate information impacted the regulatory process in that the inaccurate information was material to NRC's determination there was sufficient justification to allow both units to remain in operation until the next forced or refueling outage before removing the filter. This violation is more than minor in that additional inspection would have resulted had the information been accurate when reviewed by the inspectors. The inspectors reviewed Supplement VII of the Enforcement Policy and determined the severity level of this violation is potentially greater than Severity Level IV. Cross-cutting aspects are not assigned to violations being dispositioned through the traditional enforcement process. (Section 1R15.2)

- TBD: An NRC-identified apparent violation of 10 CFR 50, Appendix B, Criterion XI, Test Control, was identified for the licensee's failure to establish a test program to verify the required design basis flow through the Standby Shutdown Facility (SSF) letdown line. Surveillance test procedure PT/1/A/0400/020 was not adequate to demonstrate that the SSF letdown line could perform its design function during an SSF event. The finding does not represent an immediate safety concern because the in-line filters have been removed from all three units. This violation has been entered into the corrective action program as PIP O-10-7536.

The licensee's failure to establish a test program that demonstrated that the SSF letdown line could perform its design function was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely impacted the cornerstone objective in that the licensee did not have testing that demonstrated that the SSF letdown line could perform its design function during an SSF event. It was determined that a Phase III analysis was required because this finding



represented a potential loss of function for a single train system which was not addressed by the Phase II pre-solved tables or the plant-specific worksheets. No cross cutting aspect was identified because the most significant contributor to this finding was not indicative of current licensee performance. (Section 1R22)

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and the corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at approximately 100 percent rated thermal power (RTP) and remained there for the inspection period.

Unit 2 began the inspection period at approximately 100 percent RTP. Power was reduced to 20 percent RTP on February 20, 2010, to support a reactor building entry required to remove the filter in the Standby Shutdown Facility (SSF) letdown line due to suspected partial blockage. The unit returned to 100 percent RTP on February 22, 2010, and remained there for the rest of the inspection period.

Unit 3 began the inspection period at approximately 100 percent RTP. Power was reduced to 20 percent RTP on February 23, 2010, to support a reactor building entry required to remove the filter in the SSF letdown line due to suspected partial blockage. The unit returned to 100 percent RTP on February 25, 2010, and remained there for the rest of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

Actual Adverse Weather Conditions: The inspectors assessed the licensee's response to the following three adverse weather conditions. Documents reviewed are listed in the Attachment.

- On January 4, 2010, during a period of extreme cold weather, the inspectors reviewed selected areas identified on the operator's cold weather checklist to ensure adequate measures were in place to ensure availability of safety related components and piping. The inspectors also observed excavation activities that had the potential to impact safety related buried piping due to the piping being uncovered and not heat traced. The inspectors verified that the required heat trace circuits were functional.
- On January 28, 2010, the licensee entered the response procedure for severe weather based on predicted ice and snow accumulations at the site expected the following afternoon. The inspectors reviewed the actions taken in preparation for the severe weather by the assigned station work groups and reviewed the impact the weather had on the site once the storm had passed through the area.
- On February 10, 2010, the licensee entered the abnormal procedure due to a high wind warning being declared for Oconee County by the National Weather Service with predicted wind speeds to reach 55 miles per hour at the plant. The inspectors reviewed the actions taken to prepare for the predicted high wind conditions by the assigned station work groups and conducted walkdowns of the plant site to identify any items that could create missiles and impact permanent plant equipment.

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b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

Partial Walkdowns: The inspectors performed partial walkdowns of the three systems listed below to assess the operability of redundant or diverse trains and components when safety-related equipment was inoperable or out-of-service (OOS) 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.

- Keowee Hydro Units 1 and 2, Units 1, 2, and 3 motor driven emergency feedwater (MDEFW) pumps and turbine driven emergency feedwater (TDEFW) pumps, and current transformer (CT)-4 during SSF maintenance outage
- 1A and 1C low pressure service water (LPSW) pumps during 1B LPSW pump testing
- Unit 1 B and C High Pressure Injection (HPI) pumps during the period the 1A HPI pump and breaker maintenance was being performed

Complete System Equipment Alignment: The inspectors conducted one detailed walkdown/review involving the alignment and condition of the SSF diesel-generator including the associated support systems. The inspectors utilized licensee procedures and drawings, as well as licensing and design documents to verify that the system (i.e., pumps, valves, and electrical) alignment was correct. During the walkdowns, the inspectors verified that: major portions of the system and components were correctly labeled, hangers and supports were correctly installed and functional, and that essential support systems were operational. In addition, CAP documents were reviewed to determine if the identified deficiencies significantly impacted the system's functions. Items included in this review were: the operator workaround list, System Health Reports, and outstanding maintenance work requests/work orders. A review of open Problem Investigation Process (PIPs) was also performed to verify that the licensee had appropriately characterized and prioritized SSF diesel generator-related equipment problems for resolution in the corrective action program (CAP). Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance 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.

- CT-1, CT-2 and CT-3 Transformer Area; 1T, 2T and 3T Transformer Area; Unit 1, 2 and 3 Main Transformer Area
- SSF Building
- Unit 1 & 2 HPI, LPI, and Reactor Building Spray (RBS) Pump Rooms
- Independent Spent Fuel Storage Installation (ISFSI) Facility
- Unit 1 and Unit 2 Main Control Room

Fire Drill Observation: On February 5, 2010, the licensee conducted a shift fire drill simulating a hydrogen fire on the Unit 1 main generator hydrogen purifier skid. The inspectors observed this drill to verify the fire brigade's use of protective gear and fire fighting 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

Introduction: A Green NRC-identified NCV of Condition 3.D of Facility Operating Licenses DPR-38 (Unit 1), DPR-47 (Unit 2) and DPR-55 (Unit 3) was identified for the licensee's failure to identify, critique, and develop corrective actions for fire brigade performance weaknesses during a fire drill as required by NSD 112, "Fire Brigade Organization, Training and Responsibilities."

Description: The inspectors observed the February 5, 2010, fire drill from various locations including the main control room, fire brigade staging area and command post, and the simulated fire location. A licensee drill controller was also present at these locations. The inspectors noted several performance weaknesses during the drill including the following:

- There was no discussion between the Fire Brigade Leader and the control room regarding the need for offsite fire fighting support.

- While the use of the thermal imaging camera as critical in combating the fire was discussed during the pre-drill briefing, it was not used to assess the fire location or combat the fire.
- There were multiple weaknesses in the fire brigade leader's command and control including leaving the area without a turnover, failing to refer to the fire preplan until late in the scenario and then not using the information to combat the fire, and failing to communicate to the response teams the conditions present or warn them of apparent dangers.
- Control room personnel had difficulty determining the emergency classification of the event.

These areas were required by NSD 112 to be assessed by the licensee drill controllers and the fire brigade's performance documented on each drill controllers critique sheet. The inspectors observed that these performance weaknesses were not discussed during the post-drill critique and were not included in PIP O-10-0868 to ensure the appropriate corrective actions for the fire brigade's performance weaknesses were developed. NSD 112, Section 112.6, required that all drills be critiqued to determine the effectiveness in meeting drill objectives and that performance weaknesses shall be noted with appropriate actions taken to address the weaknesses. Upon identification of these weaknesses the licensee strengthened the critique process by having the Operations Department lead the critique in lieu of the Emergency Planning Department.

Analysis: The licensee's failure to identify, critique, and develop appropriate actions for fire brigade performance weaknesses during a fire drill as required by NSD 112 was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective in that fire brigade performance weaknesses may delay fire brigade response allowing a fire to propagate leading to a more significant event. Findings associated with the fire brigade were excluded from Inspection Manual Chapter (IMC) 0609, Appendix F, "Fire Protection Significance Determination Process." Therefore, the significance of this finding was assessed using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," Table 4.1, and was determined to be of very low safety significance (Green) because the condition of the automatic fire detection and suppression systems was satisfactory and the performance weaknesses would not have affected the ability to achieve safe shutdown. The finding directly involved the cross-cutting area of Human Performance, component of Work Practices, and aspect of personnel follow procedures in that the requirements of NSD 112; Section 112.6, were not met. (H.4(b))

Enforcement: Facility Operating Licenses DPR-38 (Unit 1), DPR-47 (Unit 2) and DPR-55 (Unit 3), Condition 3.D, required that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in Updated Final Safety Analysis Report (UFSAR), Section 9.5.1. UFSAR Section 9.5.1.3, "Administrative Procedures and Controls," stated that fire brigade training was provided in accordance with the Nuclear Production Department Fire Protection Training and Qualification Manual. This manual referenced NSD 112 which defined the fire drill performance requirements. NSD 112 also required a post drill critique for personnel participating in the drill and that performance weaknesses be identified and appropriate

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action taken. Contrary to the above, during a fire drill conducted on February 5, 2010, the licensee failed to meet the provisions of Facility Operating Licenses DPR-38 (Unit 1), DPR-47 (Unit 2) and DPR-55 (Unit 3), Condition 3.D, as implemented by NSD-112, when fire brigade performance weaknesses were not indentified, discussed during the post-drill critique, or documented for development of appropriate actions. Because the finding is of very low safety significance and because it was entered into the CAP as PIP O-10-1247, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000269, 270, 287/2010002-01, Failure to Identify and Correct Fire Brigade Performance Weaknesses.

#### 1R06 Flood Protection Measures

##### a. Inspection Scope

Submerged or Buried Cables: The inspectors inspected the condition of the following two electrical cable trenches. The inspectors verified the trenches were absent of standing water and that the cables were intact and in good condition.

- Unit 3 SSF
- Unit 2 Essential Siphon Vacuum

##### b. Findings

No findings of significance were identified.

#### 1R07 Heat Sink

##### a. Inspection Scope

The inspectors reviewed the results of a performance test of the Unit 1 "A", "B", and "C" Reactor Building Cooling Units (RBCUs). The inspectors verified that appropriate data was being collected and analyzed to determine the heat removal capability of the cooler. The inspectors verified that there was adequate margin to operability of the coolers based on the results of the testing. The inspectors verified the frequency of testing was appropriate to detect heat exchanger degradation prior to operability being affected. Documents reviewed are listed in the Attachment.

##### b. Findings

No findings of significance were identified.

#### 1R11 Licensed Operator Regualification

##### a. Inspection Scope

The inspectors observed a simulator training session to assess the performance of licensed reactor operators. The scenario included a failure of the normal makeup valve in the closed position and entry into AP-14, Loss of Normal HPI Makeup and/or Reactor

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Coolant Pump (RCP) seal injection, a small break loss of coolant accident (SBLOCA) occurred concurrent with a failure of the 'A' HPI header injection valve, failure of the '1B' low pressure injection pump to start on the engineered safeguards signal, and a failure of the '1B' reactor building cooling unit to go to slow speed. The scenario progressed to a large break loss of coolant accident (LBLOCA) and a General Emergency declaration. The inspection focused on high-risk operator actions during implementation of both the abnormal and emergency operating procedures and the incorporation of lessons learned from previous plant and industry events. The inspectors also observed classification and declaration of the Emergency Plan by the Operations Shift Manager. The post-scenario critique conducted by the training instructor and the crew was observed. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing routine and corrective maintenance activities. This review included an assessment of the licensee's practices pertaining to the identification, scoping, and handling of degraded equipment conditions, as well as common cause failure evaluations. For each item selected, the inspectors performed a detailed review of the problem history and surrounding circumstances, evaluated the extent of condition reviews as required, and reviewed the generic implications of the equipment and/or work practice problem. For those 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 for the following three maintenance activities.

- Fuel assembly NJ168K recaging activities
- Unit 1 'C' reactor trip breaker replacement as a result of increasing trip times
- Unit 3 Control Rod Drive signal conditioning module replacement due to system and power fault alarms

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated the following attributes for the four 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

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activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. Documents reviewed are listed in the Attachment.

- CT-4 activities and Keowee Unit 2 train maintenance Critical Activity Plan and Plant Operating Review Committee (PORC) meeting review
- 91-01 Activity Plan for Fuel Assembly NJ168K Removal from Upender and Recaging
- Risk assessment and execution plan for the down power on Unit 2 and removal of the SSF letdown line filter
- Review of planned work schedule and associated risk profile using the new risk management tool for Work Week 10W08

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following five 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) when compensatory measures were identified, whether the compensatory measures were implemented, 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-10-0042; 3B Inadequate Core Cooling Monitor Reactor Coolant Wide Range Pressure Does Not Meet Requirements of PT/3/A/0600/027 (Post Accident Monitoring Instrument Check)
- PIP O-10-0938; PIP Written to Request Engineering Assistance in Determining Adequacy of Piping Supports on 3A and 3B Motor Driven Emergency Feedwater Pump (MDEFW) Sensing Lines
- PIP O-10-0185; 1A MDEFW Pump ARC Valve Did Not Immediately Close as Expected
- PIP O-10-1869; Compliance With 10 CFR 50.49(l) in Regards to Electrical Penetrations
- PIP O-10-0494, Potential Flow Degradation on Unit 2 SSF Letdown Line

b. Findings

.1 Inadequate Operability Evaluation of Unit 2 and Unit 3 SSF Letdown Line (Closed) Unresolved Item (URI) 05000269/2009005-002, SSF Reactor Coolant Letdown Line Discharge Test

Introduction: An NRC-identified Apparent Violation (AV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for the licensee's failure to promptly identify and correct an adverse condition. The licensee failed to identify and correct a

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degraded condition on Unit 2 and Unit 3 SSF letdown lines following the confirmation of blockage in the Unit 1 SSF letdown line in October 2009. This finding does not represent an immediate safety concern because the in-line filters have been removed on all three units.

Description: On October 11, 2009, the licensee performed PT/1/A/0400/020, SSF RC Letdown Line Discharge Test, to verify the Unit 1 SSF letdown flow path was unobstructed. The results of this test indicated that the flow path was obstructed based on no observed flow. The licensee determined that an in-line filter had trapped foreign material that included gasket material from an upstream valve, epoxy-based debris, and metal shavings. This foreign material had reduced flow in the line to a value significantly below the required minimum flow rate rendering the Reactor Coolant Makeup (RCM) and Letdown sub-system of the SSF inoperable. This subsystem was designed to allow reactor coolant system (RCS) inventory control during an SSF event to prevent overfilling of the pressurizer which could result in loss of reactor coolant greater than the capacity of the RCM pump.

A root cause evaluation was initiated which included an extent of condition determination for the Unit 2 and Unit 3 SSF reactor coolant letdown lines. The licensee concluded that the Unit 2 and Unit 3 reactor coolant letdown lines were not affected because the blockage on Unit 1 was caused by deterioration of the backseat gasket on an upstream valve due to an isolated manufacturing defect. However, on February 20, 2010, and on February 23, 2010, the licensee removed the in-line filters from the Unit 2 and Unit 3 SSF letdown lines and discovered foreign material similar to that found on Unit 1.

The inspectors determined that there were several missed opportunities to identify and correct the degraded conditions with the Unit 2 and Unit 3 SSF letdown lines.

- In November 2009, the inspectors determined that the root cause conclusion that the failure was due to an isolated manufacturing defect was not supported by the details of the root cause investigation or information received from the valve manufacturer.
- On November 23, 2009, informal testing conducted on-site showed that the in-line filter could collapse with debris loading due to increased differential pressure across the in-line filter. However, the licensee did not establish if the filter could collapse without any debris loading. Although the licensee had test data that indicated the filter could collapse and obstruct flow, the extent of condition evaluation was not re-examined to determine if the operability of the Unit 2 or Unit 3 letdown line was adversely affected.
- In December 2009, the licensee's review of the Unit 2 2008 and Unit 3 2009 discharge line test data identified that the Unit 2 flow was degraded. The licensee stated that the flow was sufficient to meet the design flow requirements and no further action was required. The licensee did not consider if the degraded flow was due to a partially blocked in-line filter.
- On January 25, 2010, after the inspectors asked additional questions, the licensee performed an operability determination of the Unit 2 and Unit 3 SSF letdown lines.

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On February 16, 2010, the licensee determined that the flow in Unit 2 was more degraded than previously identified in December 2009. The licensee reiterated their position that the gasket material found on Unit 1's in-line filter was the result of an isolated manufacturing defect and the failure mechanism was therefore not applicable to Unit 2 and Unit 3. The licensee failed to consider that the valves installed in Unit 2 and Unit 3 were of the same type and were manufactured at the same time as the Unit 1 valve.

- On February 18, 2010, the resident inspectors questioned the basis for the licensee's conclusion that the Unit 2 and Unit 3 SSF letdown lines were fully operable solely based on the calculated flow rate being greater than the minimum design flow at the test conditions. The inspectors questioned the ability of the in-line filter to withstand a larger differential pressure (dP) that would be expected at NOP conditions due to the testing that was performed on November 23, 2009. Following additional engineering review, the licensee was unable to ensure the in-line filter would not collapse with debris loading and render the SSF letdown line unable to pass the minimum design flow during an SSF event.
- Following the removal of the in-line filter from the Unit 2 SSF letdown line on February 20 and discovering debris similar to that found on Unit 1 in October 2009, actions were taken to remove the in-line filter from Unit 3. However, the licensee non-conservatively declared Unit 3 SSF inoperable only during the period when the filter being removed on February 23 instead of February 20 when Unit 2 SSF was declared inoperable. Similar debris was also found on the Unit 3 in-line filter and in the upstream piping.

Analysis: The licensee's failure to promptly identify and correct the degraded condition of the Unit 2 and Unit 3 SSF letdown line as required by 10 CFR 50, Appendix B, Criterion XVI, was a performance deficiency. The performance deficiency was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely impacted the cornerstone objective because the degraded condition had the potential to affect RCS inventory control during an SSF event. The inspectors assessed this finding for significance in accordance with IMC 0609, Attachment 4, and determined that a Phase III analysis was required because this finding represented a potential loss of function for a single train system which was not addressed by either the Phase II pre-solved tables or the plant-specific worksheets. The safety significance of this finding has not yet been determined. The finding directly involved the cross-cutting area of Human Performance under the Conservative Assumptions and Safe Actions aspect of the "Decision Making" component, in that the licensee failed to demonstrate conservative decision making in their evaluation of the operability of the Unit 2 and Unit 3 SSF letdown lines (H.1(b)).

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, required, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, deficiencies, and defective material are promptly identified and corrected. Contrary to the above, from October 19, 2009, to February 23, 2010, the licensee failed to promptly identify and correct blockage existed in the Unit 2 and Unit 3 SSF letdown lines. This violation has been entered into the corrective action program as PIP O-10-

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1213. Pending safety significance determination, this apparent violation is identified as AV 05000270, 287/2010002-02, Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility.

.2 Available Actions to Mitigate the Consequences of SSF Letdown Line Blockage on Unit 2 and Unit 3

Introduction: A licensee-identified AV of 10 CFR 50.9(a) requirements was identified when it was determined that information contained in the "Oconee Nuclear Station SSF RC Letdown Action Plan" was inaccurate. This information, combined with an evaluation that showed RCS letdown flow rates on Unit 2 and Unit 3 were greater than the flow rate required for pressurizer level control during the last surveillance test, was used by the NRC in the review which allowed both units to remain at power until the next forced or refueling outage.

Description: As documented in 1R15.1, on October 11, 2009, the licensee performed PT/1/A/0400/020, to verify the Unit 1 SSF letdown flow path was unobstructed. The results of this test indicated that the flow path was completely obstructed based on no observed flow. To justify the continued operation of Unit 2 and Unit 3, the licensee performed an extent of condition review and developed an action plan with compensatory actions that could be taken for pressurizer level control in the event the SSF letdown line became blocked. On December 18, 2009, the Unit 2 and Unit 3 SSF letdown line flow test data and the action plan were provided to the NRC for review. Based on information in the action plan and the extent of condition assessment, the NRC determined there was sufficient justification to allow both units to remain in operation until the next forced or refueling outage before removing the filter. The accuracy of the information in the action plan was material to the NRC determination that both units could continue operation. However, on January 27, 2010, the licensee identified that the information in the action plan was not accurate in that a compensatory action was not available due to a closed manual isolation valve located inside containment on each unit. The licensee's action plan assumed that these manual isolation valves were open. The licensee had relied on the system flow diagram to develop the document rather than referring to the system operating procedure's valve alignment checklist, which showed that the valve was identified as being normally closed, as called for in their Engineering Directives.

Analysis: The failure to provide complete and accurate information for compensatory actions to control pressurizer level during an SSF event impacted the regulatory process in that the inaccurate information was material to NRC's determination there was sufficient justification to allow both units to remain in operation until the next forced or refueling outage before removing the filter. This violation is more than minor in that additional inspection would have resulted had the information been accurate when reviewed by the inspectors. The inspectors reviewed Supplement VII of the Enforcement Policy and determined the severity level of this violation is potentially greater than Severity Level IV. Cross-cutting aspects are not assigned to violations being dispositioned through the traditional enforcement process.

Enforcement: 10 CFR 50.9(a) required, in part, that information provided to the Commission by a licensee shall be complete and accurate in all material respects. Contrary to the above, on December 18, 2009, the licensee provided information to the inspectors that was not complete and accurate in all material respects. The information provided described compensatory actions for controlling pressurizer level during an SSF event was not available due to a closed manual valve inside containment. This information, combined with an evaluation that showed flow rates on Unit 2 and Unit 3 were greater than the required value for level control in the last as-tested condition, was used by the NRC to allow both units to remain at power until the next forced or refueling outage. The licensee corrected the inaccurate information on January 27, 2010. The licensee entered this violation into their corrective action program as PIP O-10-0561. Pending final severity level determination, this apparent violation is identified as AV 05000270, 05000287/2010002-03, Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability.

#### 1R18 Plant Modifications

##### a. Inspection Scope

The inspectors observed the excavation, back filling, and soil moisture density laboratory testing for the Borated Water Storage Tanks (BWSTs) and Protective Service Water (PSW) Building. The inspectors examined installation of the reinforcing steel and form work configuration for the Unit 2 BWST, manhole #3 in the duct bank, and slab 6 in the PSW Building. The inspectors observed the concrete placement, testing, and standard cylinder preparation for the compressive testing for the manhole #3 and slab 6. The inspectors reviewed procedures, specifications, construction documents, and corrective actions such as licensee PIPs and contractor Nonconformance Reports (NCRs) related to the excavation, rebar installation, soil testing, concrete mix testing, and concrete pour.

The inspectors examined the rebar installation to ensure that the licensee had measured the reinforcing steel size, spacing, splice length, and the concrete minimum protection coverage in accordance with design drawings and the American Concrete Institute (ACI) 349, Code Requirements for Nuclear Safety-Related Concrete. The inspectors reviewed the concrete pre-placement inspection checklist prior to the concrete pour. The inspectors reviewed the procedures, specifications, and documents related to the concrete construction activities. The inspectors also reviewed the licensee's cold weather concrete activity protection against the requirements of ACI 306.1, Standard Specification for Cold Weather Concreting.

The inspectors observed placement activities to verify that activities pertaining to concrete delivery time, flow distance, layer thickness, and concrete consolidation or vibration conformed to industry standards established by the American Concrete Institute. Concrete batch tickets were examined to verify that the specified concrete mix was delivered to the site. The inspectors observed that concrete placement activities were continuously monitored by contractor quality control personnel and engineers. The inspectors witnessed in-process testing and reviewed the results for slump, air content, temperature, unit weight, and molding of the concrete cylinders for compressive strength testing, and also witnessed sample points and truck loads to verify that concrete samples

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for the field testing and cylinders for the testing were obtained at the point of placement (end of pump line) and the middle portion of the truck loads. The inspectors reviewed cylinders to determine whether they were molded in accordance with applicable American Society for Testing and Materials (ASTM) requirements of ASTM C 172, Standard Method of Sampling Freshly Mixed Concrete, and determined whether concrete field testing was performed by Quality Control (QC) inspectors from the contractor.

The inspectors reviewed records for work packages, travelers, testing, and drawings related to the work activities. The inspectors examined the repaired stud welding for the base plates to be used in the PSW building which were previously identified and rejected by the contractor due to unacceptable quality.

b. Findings

No findings of significance were identified.

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; (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.

- PT/0/A/0400/011; SSF Diesel Generator Test following Jacket Water Pump Replacement on 'B' Diesel Generator
- PT/1/A/0251/001; 'A' Low Pressure Service Water Pump Test following Mechanical Preventive Maintenance (PM)
- PT/3/A/0600/013; Motor Driven Emergency Feedwater Pump Test following 3A pump lubrication (PM)
- PT/2/A/0600/012; Turbine Driven Emergency Feedwater Pump Test following Pump Lubrication PM and Packing Replacement
  
- PT/0/A/0610/017; Operability Test of 4160 V Breakers following Unit 3 standby bus 2 breaker refurbishment
- PT/0/A/0620/009; Keowee Hydro Operation following CT-4 PM and inspection

b. Findings

No findings of significance were identified.

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1R22 Surveillance Testinga. Inspection Scope

The inspectors either witnessed and/or reviewed test data for the five 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 capable of performing their intended safety functions. Documents reviewed are listed in the Attachment.

Routine Surveillances

- IP/0/A/0305/014A; Reactor Protection System Control Rod Drive Breaker Trip and Events Recorder Timing Test
- PT/0/A/0620/016; Keowee Hydro Station Emergency Start Test
- PT/0/A/0620/018; Keowee Hydro Station Out of Tolerance Test
- PT/1/A/0400/020, SSF Letdown Discharge Flow Test

In-Service Tests

- PT/2/A/0600/013; Motor Driven Emergency Feedwater Pump Test

b. Findings

Introduction: An NRC-identified AV of 10 CFR 50, Appendix B, Criterion XI, Test Control, was identified for the licensee's failure to establish a test program to verify the required design basis flow through the Standby Shutdown Facility (SSF) letdown line. Surveillance test procedure PT/1/A/0400/020 was not adequate to demonstrate that the SSF letdown line could perform its design function during an SSF event. The finding does not represent an immediate safety concern because the in-line filters have been removed from all three units.

Description: The SSF Reactor Coolant Makeup and Letdown sub-system was designed to provide reactor coolant pump seal cooling, makeup for normal reactor coolant system (RCS) leakage, allow addition of negative reactivity to the reactor, and control of pressurizer level during SSF events. An orifice was installed in the SSF letdown line to limit the flow rate. A filter was installed prior to the orifice to prevent clogging of the orifice. A performance test was conducted in a temporary test device prior to installation to verify the letdown line would pass the minimum required flow rate of 14,448 lbm/hr. NSD 408, Testing, required that components be tested after any modification and that the test challenge all components to ensure the system will function as designed. In addition, NSD 408 required that periodic testing to ensure continued system capability. The licensee did not perform any testing to verify that the required letdown line flow was achievable when the SSF was initially placed in service. Furthermore, no scheduled periodic testing was established to verify to ensure continued system capability. Although the licensee infrequently performed PT/1/A/0400/020, the testing did not verify the required letdown line flow was achievable nor ensure continued system capability.

On October 11, 2009, the Unit 1 SSF letdown line discharge flow test indicated that the flow in the line was severely degraded. Subsequent troubleshooting and inspections

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revealed that the in-line filter assembly had trapped foreign material. This foreign material had reduced flow in the line to a value significantly below the minimum design flow rate rendering the SSF Reactor Coolant Makeup and Letdown sub-system inoperable.

The licensee developed a test procedure to accurately measure the flow through the SSF letdown line and performed it on Unit 1 prior to its return to service in December 2009. The licensee's corrective actions include performing the new test procedure on Unit 2 and Unit 3 during the upcoming refueling outages and each subsequent refueling outage to ensure continued system capability of the SSF letdown line.

Analysis: The licensee's failure to establish a test program that demonstrated that the SSF letdown line could perform its design function was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely impacted the cornerstone objective in that the licensee did not have testing that demonstrated that the SSF letdown line could perform its design function during an SSF event. The inspectors assessed the safety significance of this finding in accordance with IMC 0609 and determined that a Phase III analysis was required because this finding represented a potential loss of function for a single train system which was not addressed by either the Phase II pre-solved tables or the plant-specific worksheets. No cross cutting aspect was identified because the most significant contributor to this finding was not indicative of current licensee performance.

Enforcement: 10 CFR 50, Appendix B, Criterion XI, Test Control, required, in part, that a test program shall be established to assure that all testing required to demonstrate that systems will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant operation of systems. Test results shall be documented and evaluated to assure that test requirements have been satisfied. NSD 408 required that components shall be tested in as close to design basis conditions as practical after any modification and the test shall challenge all components to ensure the system will function as designed. In addition, NSD 408 further required that periodic testing shall occur to ensure continued system capability. Contrary to the above, from the period of 1982 to November 2009, the licensee failed to establish a test program to verify that the minimum flow required for SSF system operability was achievable prior to placing the SSF in service or periodically thereafter to ensure the SSF letdown line could perform its design function. The licensee has entered this issue into their corrective action program as PIP O-10-7536. Pending determination of safety significance, this apparent violation is identified as AV 05000269, 270, 287/2010002-0-03, Failure to Establish a Test Program to Verify SSF Letdown Line Capability.

## Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

The inspectors evaluated the March 30, 2010, Emergency Response Organization drill which involved activation of the Oconee Technical Support Center (TSC), Operations Support Center (OSC) and Emergency Operations Facility in Charlotte. The licensee's response to the simulated equipment malfunctions and failures was observed from the Technical Support Center. The staff's implementation of the Emergency Plan and offsite notifications were also observed. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verificationa. Inspection Scope

The inspectors sampled licensee data to confirm the accuracy of reported PI data for the nine indicators during periods listed below. To determine the accuracy of the report PI elements, the reviewed data was assessed against PI definitions and guidance contained in Nuclear Energy Institute 99-02, Regulatory Assessment Indicator Guideline, Revision 5.

Cornerstone: Initiating Events

- Unplanned Scrams (3 units)
- Unplanned Power Changes (3 units)
- Unplanned Scrams with Complications (3 units)

For the period January 1, 2009, through December 31, 2009, 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. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.



4OA2 Identification and Resolution of ProblemsDaily Screening of Corrective Action Reports

In accordance with IP 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing copies of PIPs, attending daily screening meetings, and accessing the licensee's computerized database.

4OA3 Event Follow-up.1 AP-18 Entry Due to Spike on Units 1 and 2 Turbine Building Sump Radiation Monitora. Inspection Scope

The inspectors responded to a control room entry into AP-18, Abnormal Release of Radioactivity, due to 1,2RIA-54, Turbine Building Sump radiation monitor, exceeding the alert level. The inspectors observed plant parameters and status, including turbine building sump level, radiation monitor status, and steam generator tube leakage monitors. The inspectors also determined alarms/conditions preceding or indicating the event and evaluated the operations crew in response to the event. The inspectors confirmed that any releases as a result would be monitored releases. The licensee performed chemistry sampling on the turbine building sump to verify the activity in the sump was below allowable limits.

b. Findings

No findings of significance were identified.

.2 Removal of SSF Letdown Line Filter on Unit 2 and Unit 3a. Inspection Scope

The inspectors reviewed the licensee's response to the Unit 2 SSF letdown line being declared inoperable. The licensee developed plans to perform a power reduction, enter the reactor building, and remove the filter. Based on the as-found condition of the Unit 2 filter, the decision was made to remove the filter from the Unit 3 SSF letdown line and the power reduction and filter removal was performed on February 23, 2010. The inspectors observed the condition of the filter after it was removed.

b. Findings

No findings of significance were identified.

.3 (Closed) Licensee Event Report (LER) 05000270/2009-01-00, Several Prior Spent Fuel Pool Configurations Did Not Comply With TS 3.7.13. This LER was previously reviewed and documented in NRC Inspection Report (IR) 2009004 for Unit 1 but was not closed

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Oconee Unit 2. The spent fuel pool for Unit 1 and Unit 2 are shared and the identified condition documented in the LER was corrected for both units at the same time.

- .4 (Closed) LER 05000270/2008-02-01, Main Steam Relief Valves Exceeded Lift Setpoint Acceptance Band. The inspectors previously reviewed this LER and closed Revision 0 of the LER in Oconee report 2009002. The related enforcement actions were discussed in NRC I R 2009002. The revision to the LER was issued to include the results of the cause evaluation and to correct a typographical error the inspectors identified while reviewing Revision 0 of the LER. No additional findings of significance were identified. The licensee documented the condition in their CAP as PIP O-08-06525.

#### 4OA5 Other

##### .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 of significance were identified.

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

###### a. Inspection Scope

Under the guidance of IP 60855.1, the inspectors observed operations involving spent fuel storage. The inspectors reviewed documentation related to Dry Shielded Canister (DSC) 111, 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, welding, and moving of the DSC. The inspectors confirmed the necessary surveys for radiation and contamination were performed. All 72.48 evaluations screenings during this period determined no 72.48 evaluations were necessary.

###### b. Findings

No findings of significance were identified.

3. Temporary Instruction 2515/180; Inspection of Procedures and Processes for Managing Fatigue

a. Inspection Scope

The objective of this TI was to determine if licensees' implementation procedures and processes required by 10 CFR 26, Subpart I, "Managing Fatigue" were in place to reasonably ensure the requirements specified in Subpart I were being addressed. The TI applied to all operating nuclear power reactor licensees, but was performed for one site per licensee. The inspector interfaced with the appropriate station staff to obtain and review station policies, procedures and processes necessary to complete all portions of this TI.

b. Findings and Observations

No findings of significance or observations were identified.

4OA6 Management Meetings (Including Exit Meeting)

Exit Meeting Summary

The resident inspectors presented the inspection results to Mr. David A. Baxter and other members of licensee management on April 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.

4OA7 Licensee-Identified Violations

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

- 10 CFR 50.65(a)(4), Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, requires in part, that prior to performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Nuclear System Directive (NSD) 415, Operational Risk Management (Modes 1-3) per 10 CFR 50.65(a)(4), implements the requirements set forth in 10 CFR 50.65(a)(4) during power operation. Contrary to the above, on November 30, 2009, with Unit 1 in Mode 3, the licensee failed to assess emergent work and allowed the Unit 1 Power Operated Relief Valve and Pressurizer Spray Valve to be concurrently out of service. This configuration resulted in the licensee entering an unplanned Red ORAM-Sentinel condition. The safety significance of this violation was assessed using IMC 0609, Appendix K and determined to be of very low safety significance (Green) based on the calculated incremental core damage probability increase for the exposure period of approximately 11 hours being  $1.8E-7$ . The licensee entered the finding into their CAP as PIP O-09-8959.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

K. Alter, Regulatory Compliance Manager  
S. Batson, Engineering Manager  
D. Baxter, Site Vice President  
J. Bohlmann, Organization Effectiveness Manager  
S. Boggs, Emergency Services Coordinator  
R. Brown, Emergency Preparedness Manager  
E. Burchfield, Superintendent of Operations  
C. Cash, PSW Building Superintendent  
P. Culbertson, Maintenance Manager  
W. Edge, Engineering Supervisor II  
P. Fisk; Mechanical/Civil Engineering Manager  
P. Gillespie, Station Manager  
M. Glover, General Manager of Projects  
J. Kammer, Modification Engineering Manager  
T. King, Security Manager / Acting Safety Assurance Manager  
W. Lindsay, Duck Bank Superintendent  
R. Medlin, HELB Tornado-Project Manager  
B. Meixell, Regulatory Compliance  
B. Millsaps, Modification Manager  
J. Schwalm, BWST Superintendent  
S. Severance, Regulatory Compliance  
J. Smith, Regulatory Compliance  
B. Stares, Civil Engineer

#### NRC

J. Stang, Project Manager, NRR

### REPORT ITEMS

#### Opened

005000270, 287/2010002-02	AV	Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility (Section 1R15)
05000270, 287/20100002-03	AV	Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability (Section 1R15)
05000269, 270, 287/2010002-04	AV	Failure to Establish a Test Program to Verify SSF Letdown Line Required Flow (Section 1R22)

Opened and Closed

05000269, 270, 287/2010002-01	NCV	Failure to Identify and Correct Fire Brigade Performance Weaknesses (Section 1R05)
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Closed

05000269/2009005-002	URI	SSF Reactor Coolant Letdown Line Discharge Test (Section 1R15)
05000270/2009-01-00	LER	Several Prior Spent Fuel Pool Configurations Did Not Comply With TS 3.7.13 (Section 4OA3.3)
05000270/2008-02-01	LER	Main Steam Relief Valves Exceeded Lift Setpoint Acceptance Band (Section 4OA3.4)
TI 2515/180	TI	Inspection of Procedures and Processes for Managing Fatigue (Section 4OA5.3)

**DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**

RP/0/B/1000/035; Severe Weather Preparations, Rev. 04

AP/0/A/1700/006, Natural Disaster, Rev. 017

PIP O-10-0009; BWST Instrument Heater Fail Alarm Point O3D2298 is Received Intermittently

PIP O-10-0018; AHU 1-9 and AHU 1-10 found tripped during Operator rounds

PIP O-10-0014; On rounds NEO discovered 525kV relay house battery rooms SY-3 and SY-4 temps low

PIP O-10-0046; Turbine Building east side dampers found open when should have been closed per cold weather checklist

PIP O-10-00073; Plant Heating valves were still labeled as "Time Critical" valves after the valves had been removed from AP/1&2/A/1700/030 Auxiliary Building Flood

OP/1/A/1102/020; Control Room Rounds, Rev 121

OP/1/A/1102/020A; Primary Rounds, Rev 30

OP/1/A/1102/020C; Turbine Building Third and Fifth Floor Rounds, Rev 27

OP/2/A/1102/020; Control Room Rounds, Rev 110

OP/2/A/1102/020A; Primary Rounds, Rev 29

OP/2/A/1102/020C; Turbine Building Third and Fifth Floor Rounds, Rev 23

OP/2/A/1102/020D; SSF and Outside Rounds, Rev 39

OP/3/A/1102/020; Control Room Rounds, Rev 117

OP/3/A/1102/020A; Primary Rounds, Rev 32

OP/3/A/1102/020C; Turbine Building Third and Fifth Floor Rounds, Rev 26

CSM 4.14; Chemistry Area Rounds and Equipment Status, Rev. 37

**Section 1R04: Equipment Alignment****Simple Equipment Alignment**

OFD-124A-1.1; Flow Diagram of Low Pressure Service Water System Turbine Bldg. (Low Pressure Service Water Pumps), Rev. 46

OFD-124A-1.2; Flow Diagram of Low Pressure Service Water System Turbine Bldg. (Main Turbine Oil Tank), Rev. 51

OFD-124A-1.3; Flow Diagram of Low Pressure Service Water System (Turbine Bldg. Services), Rev. 21  
 OFD-124A-2.2; Flow Diagram of Low Pressure Service Water System Turbine Bldg. (Main Turbine Oil Tank), Rev. 29  
 OFD-124A-2.3; Flow Diagram of Low Pressure Service Water System (Turbine Building Services), Rev. 24  
 OFD-124B-1.1; Flow Diagram of Low Pressure Service Water System (Auxiliary Building Services), Rev. 49  
 OFD-124B-1.2; Flow Diagram of Low Pressure Service Water System (Reactor Building Cooling Units), Rev. 30  
 PIP O-10-00200; Non-conditional N/A required due to change in plant conditions

#### Complete System Equipment Alignment

OP/0/A/1600/010; Operations of the SSF Diesel Generator, Rev. 061  
 OP/0/A/1600/005; SSF Normal Power; Rev. 030  
 OP/0/A/1600/012; SSF Sump Systems; Rev. 003  
 OP/0/A/1600/003; SSF Fuel Oil System Operation, Rev. 019  
 OP/0/A/1600/007; SSF Diesel Air System, Rev. 016  
 Drawing OFD-135A-1.2; Fuel Oil System, SSF Diesel Engine, Rev. 10  
 Drawing OFD-135B-1.4; Lube Oil System, SSF Diesel Engine, Rev. 6  
 Drawing OFD-135D-1.1; Starting Air System, SSF Diesel Engine A, Rev. 11  
 Drawing OFD-135D-1.2; Starting Air System, SSF Diesel Engine B, Rev. 12  
 Drawing OFD-135D-1.3; Air Intake and Exhaust System, SSF Diesel Engine, Rev. 5  
 System Health Report – SSF Supersystem

#### **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  
 Fire Pre-Plan for Unit 1 Transformers  
 Fire Pre-Plan for Unit 2 Transformers  
 Fire Pre-Plan for Unit 3 Transformers  
 Fire Pre-Plan for Standby Shutdown Facility  
 MP/0/A/1705/032; Fire Protection Equipment Inspection, Rev. 30  
 MP/0/B/1705/012; Fire Protection – Fire Hose – Hydrostatic Pressure Test, Rev. 13  
 PIP O-10-0048; Concerns with SSF Equipment Room Fire Doors  
 PIP O-10-1092; Leaking Valves Creating Safety Hazard  
 PIP O-10-1096; SSF Fire Protection System Evaluation  
 Fire Pre-Plan for Unit 1 and 2 Auxiliary Building 758' Elevation  
 Fire Pre-Plan for Unit 1 and 2 Control Room 822' Elevation  
 PIP O-10-01234; One halon extinguisher found to be out of date at Unit 1 computer room 513  
 PIP O-10-01302; Fire plans for Unit # 1 & 2 Control Room found to contain inaccurate drawings

##### Fire Drill

NSD 112; Fire Brigade Organization, Training and Responsibilities; Rev. 08  
 UFSAR Section 9.5.1; Fire Protection Systems  
 PIP O-10-0868; Failed first quarter fire drill for Echo shift

PIP O-09-9233; B Shift 4<sup>th</sup> quarter fire drill conducted on 12/11/09  
 PIP O-09-6433; 3<sup>rd</sup> quarter fire drill failure

**Section 1R07: Heat Sink**

PT/0/A/0160/006; Unit 1 Reactor Building Cooling Units Performance Test, Rev. 34  
 OSC-5665; Reactor Building Cooling Unit Performance Test Unit 1, Rev. 47  
 OSC-8064; ROTSG Long-Term Containment Response Following a Large Break LOCA, Rev. 10  
 PIP O-10-00713; Required Reactor Building Cooling system capacity, as documented in OSC-8064, is different than that used in RBCU performance calculations, OSC-5665, 5666, 5667. EM 4.9; Calculation Impact Assessment Process, Rev. 11  
 ONEI 0400-0103, Oconee Nuclear Station Minimum RBCU Capacity Requirements, Rev. 11

**Section 1R11: Licensed Operator Requalification**

EP/1/A/1800/001; EOP- IMAs and SAs, Rev. 36  
 RP/0/B/1000/001; Emergency Classification, Rev. 25

**Section 1R12: Maintenance Effectiveness**

TT/0/A/0750/024; Controlling Procedure for Repair of NJ168K, Rev. 0  
 PIP O-10-00431; Two issues identified during setup for NJ168K (damaged fuel assembly) recage work  
 PIP O-10-01151; NJ168K recage project was not completed  
 PIP O-10-00619; Allowable pull force used during "normal" fuel reconstitution or recaging does not appear to have been rigorously evaluated to ensure a sound rod will not be damaged  
 PIP O-10-01344; CRD Trip Time exceeding 60ms  
 PIP O-10-08271; There is a procedure error in PT/0/A/0300/001 in the CRD breaker times to use to calculate CRD trip times  
 WO 01914098; 1 CRD BK 000C: Replace Breaker  
 CRD System Health Reports for Q4-2009 and Q1-2010  
 IP/0/A/2001/003D; Removal and Installation of Metal Clad Air Circuit Breakers, Rev. 8  
 IP/0/A/0305/014A; RPS Control Rod Drive Breaker Trip and Events Recorder Timing Test, Rev. 8  
 IP/0/B/0350/004; CRD System Checkout Prior to Maintenance/Testing, Rev. 10  
 PIP O-10-01830; Unit 3 CRD System Voltage Alarms  
 PIP O-10-01977; Unexpected OAC alarm for O3X3926 "SRPS DC Under Voltage Train A"  
 EM 4.11; PIP 10-1830 (U3 CRD System Train A Voltage Indication Problems, dated 3/18/10  
 WR 01002786; I/R Cause of Alarm 'CRD AC Power Fault'

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

WO 01861335; U0, Perform Minor PM on CT4 Transformer  
 WO 01874472; 0 EL RL 86CT4X, Perf Wire Ck & Provide Marked Up Drawing  
 WO 01878654; Perf PM On Breaker & relays in B2T-8 (S2-1)  
 WO 01865336; Keowee Unit #2 Generator CO2 Actuation & Flow Test  
 WO 01875702; K2, PM Differential Relay 87G-2  
 10W02 (Projected Schedule) 01/11/2010 through 01/17/2010  
 PIP O-10-00178; PORC Minutes for Critical Plan review for CT-4 and Keowee Unit 2 Train Maintenance  
 Critical Activity Plan, CT-4 Minor PM and Work Activities, Rev. 1

PIP O-10-00440; Security was not included in the planning process for the 9101 activity in the Unit 1&2 spent fuel pool.

**Section 1R15: Operability Evaluations**

PIP O-10-00007; 3A RCS WR Pressure > 3B RCS WR Pressure on ICCM

PIP O-10-00938; PIP written to request Engineering assistance in determining adequacy of piping supports on 3A and 3B MDEFW pump sensing lines

OSS-0060.00-00-0001; Instrumentation and Controls Field Installation Standards, Rev. 22

**Section 1R18: Plant Modifications**

Fluor Procedure 770.510.C218.A3PB, Installation/Inspection of Concrete Forming, Embedment, and Reinforcing Steel Placement, Revision 4

Fluor Procedure 770.510.C314.A3PB, Installation/Inspection of Concrete Placement, Grouting, and Post Pour, Revision 5

Fluor Procedure 770.510.C314.A3PB, Compacted Fill Placement and Inspection, Revision 2

ASTM 2216-05, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Specification OSS-0160.00-00-0001, Specification for Procurement of Concrete for QA Condition Structures, Revision 8

Specification OSS-0160.00-00-0002, Specification of Receiving and Placing Concrete for QA Condition Structures

INPOP-2009-002, INOS Project Oversight Plan for Oconee Tornado/HELB Project, Revision 00

ACI 306.1 Standard Specification for Cold Weather Concreting

ACI 349, Code Requirements for Nuclear Safety-Related Concrete

American Society for Testing and Materials (ASTM) C 94, Standard Specification for ready-Mixed Concrete

ASTM C 172, Standard Method of Sampling Freshly Mixed Concrete

Traveler # T202152C055, Unit 2 BWST/SSF Foundation, Pour Concrete Area "A"

Traveler # T302153C007, Unit 3 BWST/SSF Foundation, Excavate Foundation Area Section "A"

Traveler # T302153C011, Unit 3 BWST/SSF Foundation, Excavate Foundation Area Section "B"

Traveler # T500947C011-A, Manhole #3 Excavation

Traveler # T500947C003-B, Segment Mud Mat

Traveler # T 500920C011, Place Backfill at PSW Building

Traveler # T500920C012, Install Forms & Rebar, Place Concrete for Slab S-06 for PSW Building

Temporary Changes TPC-10-001, To Add Forms and Instructions for Installation and Inspection of Concrete Placement, Grouting, and Post Pour

PIP O-09-04683, Concrete Uniformity Test Was Not Completed in the Timely Manner

PIP O-09-06571, Concrete Placement for Duct Bank Segment 3CA Failed Acceptance Testing

PIP O-09-05577, Multiple Problems Associated with Forming and Rebar Installation for PSW Building

PIP O-10-00369, Concrete Anchor (Welded Nelson Stud) Missing

PIP O-10-00392, Discrepancies with Vendor/Fabricator Welding Program

PIP O-10-00989, Welding and Quality Program Implementation on Tornado Project Vendor Program

NCR A3PB-NC-09-273, The "Proctor Block" in Duke Lab Was Not Used for Soil Proctor Testing

NCR A3PB-NC-09-279, Using Hot Plate In-Lieu -of an Oven to Dry-Out the Specimen for Density Test of Soil in Place



NCR A3PB-NC-10-019, A Nelson Stud was Identified Detached from an Uninstalled Door Anchor Plate  
 Audit Report 09-07, Design Control  
 Surveillance Report SR S-10-S-03, Stud Repair for Embedded Plates to be Used in PSW Building  
 Drawing A31Q-2153-15-05, Unit 3 BWST/SSF Trench Protection Foundation Plan

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

OFD-124B-1.1; Flow Diagram of Low Pressure Service water System (Auxiliary Building Services), Rev. 61  
 PT/0/A/0600/021; SSF Diesel-Generator Operation, Rev. 10  
 OP/0/A/1600/010; Operation of the SSF Diesel-Generator, Rev. 60  
 OFD-121D-3.1; Flow Diagram of Emergency Feedwater System, Rev. 38  
 PIP O-10-00938; PIP written to request Engineering assistance in determining adequacy of piping supports on 3A and 3B MDEFW pump sensing lines.  
 OSS-0060.00-00-0001; Instrumentation and Controls Field Installation Standards, Rev. 22  
 IP/0/A/2007/001; Transformer Inspection and Maintenance, Rev. 25  
 PT/0/A/0610/017; Operability Test of 4160 V Breakers, Rev. 24  
 WO 01822231; Refurb Breaker for B2T-07 (S2-3)

**Section 1R22: Surveillance Testing**

PT/2/A/0600/013; Motor Driven Emergency Feedwater Pump Test, Rev. 63  
 OFD-121D-2.1; Flow Diagram of Emergency Feedwater System, Rev. 36  
 OFD-121A-2.7; Flow Diagram of Condensate System (Upper Surge Tanks 2A & 2B, Upper Surge Tank Dome & Condensate Storage Tank), Rev. 37  
 OFD-121A-2.8; Flow Diagram of Condensate System (Condensate Make-Up & Emergency FDW Pump Suction), Rev. 16  
 OFD-121B-2.3; Flow Diagram of Feedwater System (Final Feedwater), Rev. 28  
 PIP O-10-01486; While performing procedure PT/0/A/0620/016, it was discovered that the specified acceptance criteria for the Keowee voltage was outside the Tech Spec surveillance limit, SR 3.8.1.9  
 PT/0/A/0620/016; Keowee Hydro Emergency Start Test, Rev. 42

**Section 1EP6: Drill Evaluation**

PIP O-10-2825; Issues Identified related to TSC personnel during ONS Drill 2010-01  
 PIP O-10-2879; Issues Identified during ONS Drill 2010-01  
 ONS Drill 2010-01 Scenario Guide

**Section 4OA1: Performance Indicator Verification**

Unit 1 PI Summary Data for period Q1 2009 through Q4 2009  
 Unit 1 PI Summary Data for period Q1 2009 through Q4 2009  
 Unit 1 PI Summary Data for period Q1 2009 through Q4 2009  
 Unit 3 Operating Data Report for Reporting Period April 2009  
 Unit 1 Operating Data Report for Reporting Period September 2009

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

PIP O-10-00629; 1&2 RIA-54 Came Into Alert Alarm  
 PIP O-10-0494; Unit 2 SSF letdown flowpath inoperable

PT/0/A/1103/020, Power maneuvering prediction for Unit 2 for downpower on 2/20/10 and return to service on 2/21-22/10  
 OP/2/A/1102/004; Operation at Power, Enclosures 4.1 (Power Escalation) and 4.2 (Power Reduction), Rev. 101  
 OP/2/A/1106/002B; FDWPT Operation, Rev. 018  
 OP/2/A/1106/001; Turbine Generator, Enclosure 4.5 (Capability Curve) and 4.6 (Oconee Generator Operating Limits), Rev. 107  
 Unified Operator Logs for Unit 2 and Unit 3 for the period encompassing the downpower and subsequent return to 100 percent RTP  
 OP/3/A/1102/004; Operation at Power, Enclosure 4.2 (Power Reduction), Rev. 106  
 OP/3/A/1106/002B; FDWPT Operation, Rev. 022  
 PT/0/A/1103/020, Power maneuvering prediction for Unit 3 for downpower on 2/23/10  
 LER 270/2008-02, Main Steam Relief Valves Exceeded Lift Setpoint Acceptance Band, Rev. 1

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

ONEI-400-325, Oconee Nuclear Station DSC-111 (3-39), Rev. 0  
 Certificate of Compliance for Spent Fuel Storage Casks, Certificate No. 1004, Amendment No. 9  
 MP/0/A/1500/023; ISFSI Phase V DSC Loading and Storage, Rev. 12  
 10 CFR 72.48 Screen; MP/0/A/1500/023 ISFSI Phase V DSC Loading and Storage, Rev. 10  
 10 CFR 72.48 Screen; MP/0/A/1500/023 ISFSI Phase V DSC Loading and Storage, Rev. 11  
 10 CFR 72.48 Screen; PT/0/A/1500/001; Independent Spent Fuel Storage Installation Horizontal Storage Module Temperature Rise Verification, Rev. 7  
 10 CFR 72.48 Screen; MP/0/A/1810/019 Cask- NUHOMS 24P Dry Storage Canister- Welding Revision 19

#### **Temporary Instruction 2515/180; Inspection of Procedures and Processes for Managing Fatigue**

Duke NSD 200, Work Hour Guidelines and Limits, Rev 10  
 Duke NSD 218, Nuclear Access Authorization and Fitness for Duty Program, Rev. 10  
 NEI 06-11, Managing Fatigue, Rev. 1  
 10CFR26; Fitness for Duty Programs  
 NRC Regulatory Guide 5.73, Fatigue Management for Nuclear Power Plant Personnel  
 Duke Nuclear Fleet Fatigue Rule SharePoint on the internal LAN  
 Duke Fact Sheet for Fatigue Rule Implementation  
 PIP C-09-7029; While supporting Incore Thermocouple repair work in the Reactor Cavity, two Technicians unintentionally violated the Fatigue Rule (> 72 hr in any 7 day period) due to correcting a personal safety issue.  
 PIP C-09-7480; Fatigue rule violated.  
 PIP C-09-7603; Fatigue Rule Violation during 1EOC18.  
 PIP C-10-0667; A security employee exceeded Fatigue Rule work hour limitations due to working more than 26 hours in a 48 hour period.  
 PIP C-10-0668; A security employee exceeded Fatigue Rule work hour limitations due to working more than 26 hours in a 48 hour period.  
 PIP M-09-7222; A maintenance technician incurred a Fatigue Rule Violation the week ending 11/22/09.  
 PIP M-09-7542; Employee came in to meeting during break period between shifts. This issue resulted in a fatigue rule violation (min break between shifts).  
 PIP M-09-6510; Primary Chemistry technician incurred the following Fatigue Rule violation:

Attachment

- PIP M-10-0115; Work hours limit exceeded without an extention.
- PIP M-10-0117; Employee violated the Fatigue Rule requirements on the days listed. The employee was transitioning from McGuire Nuclear station (Outage Schedule) to Catawba Nuclear Station (Innage Schedule).
- PIP M-10-0924; Employee 1 went 1 day extra in overtime within a 4 week evaluation period.
- PIP M-10-1095; Employee called in to work overtime was not able to work due to Minimum Days Off limitation
- PIP M-10-1123; Two Ops Test Group employees granted Wavier for exceeding 16/24.
- PIP M-10-1954; Heat exchanger team working on removal of LT oil cooler had 4 technicians exceeded Fatigue Rule requirements.
- PIP O-09-7513; Technician exceeded Employee Center fatigue management/NSD200 work hour rule.
- PIP O-09-7873; Work hours exceeded by two hrs.
- PIP O-09-8816; Documenting QC inspection personnel working in excess of 72 hours in a 7 day window not covered under NSD-200 for Fatigue Rule Work Hour Controls.
- PIP O-09-9221; Employees exceeded work hour rule based on consecutive days worked.
- PIP O-10-1292; Employee Violated the NSD 200 Fatigue Work Hour Limits

### LIST OF ACRONYMS

ACI	-	American Concrete Institute
ADAMS	-	Agency Wide Documents Access and Management System
ASTM	-	American Society for Testing and Materials
AV	-	Apparent Violation
BWST	-	Borated Water Storage Tank
CAP	-	Corrective Action Program
CFR	-	Code of Federal Regulations
dP	-	Differential Pressure
DSC	-	Dry Shielded Canister
EOC	-	End-of-Cycle
EOP	-	Emergency Operating Procedure
HPI	-	High Pressure Injection
IMC	-	Inspection Manual Chapter
IP	-	Inspection Procedure
IR	-	Inspection Report
ISFSI	-	Independent Spent Fuel Storage Installation
LER	-	Licensee Event Report
LOCA	-	Loss of Coolant Accident
LPSW	-	Low Pressure Service Water
LPI	-	Low Pressure Injection
MDEFWP	-	Motor Driven Emergency Feedwater Pump
NCV	-	Non-Cited Violation
NCR	-	Non-Conformance Reports
NEI	-	Nuclear Energy Institute
NRC	-	Nuclear Regulatory Commission
NSD	-	Nuclear System Directive
OOS	-	Out-of-Service
OSC	-	Operations Support Center

PARS	-	Publicly Available Records
PI	-	Performance Indicator
PIP	-	Problem Investigation Process
PM	-	Preventive Maintenance
PORC	-	Plant Operating Review Committee
PSW	-	Protected Service Water
QC	-	Quality Control
RBCU	-	Reactor Building Cooling Unit
RBS	-	Reactor Building Spray
RCS	-	Reactor Coolant System
RCP	-	Reactor Coolant Pump
RTP	-	Rated Thermal Power
SBLOCA	-	Small Break Loss of Coolant Accident
SDP	-	Significance Determination Process
SSC	-	Structures, Systems, and Components
SSF	-	Standby Shutdown Facility
TDEFWP	-	Turbine Driven Emergency Feedwater Pump
TBD	-	To Be Determined
TI	-	Temporary Instruction
TS	-	Technical Specification
TSC	-	Technical Support Center
UFSAR	-	Updated Final Safety Analysis Report
WO	-	Work Order