



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
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May 13, 2011

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 TEMPORARY INSTRUCTION 2515/183  
INSPECTION REPORT 05000269/2011014, 05000270/2011014,  
05000287/2011014**

Dear Mr. Gillespie:

On April 29, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station using Temporary Instruction 2515/183, "Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on May 12, 2011, with you and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of Oconee to respond to extraordinary consequences similar to those that have recently occurred at the Japanese Fukushima Daiichi Nuclear Station. The results from this inspection, along with the results from this inspection performed at other operating commercial nuclear plants in the United States, will be used to evaluate the U.S. nuclear industry's readiness to safely respond to similar events. These results will also help the NRC to determine if additional regulatory actions are warranted.

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report. You are not required to respond to this letter.

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made 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), 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  
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure: NRC 05000269/2011014, 05000270/2011014, 05000287/2011014

cc w/encl: (See page 3)



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cc w/encl:

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Letter to T. Preston Gillespie, Jr. from Jonathan H. Bartley dated May 13, 2011

SUBJECT: OCONEE NUCLEAR STATION – NRC TEMPORARY INSTRUCTION 2515/183  
INSPECTION REPORT 05000269/2011014, 05000270/2011014,  
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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: 05000269/2011014, 05000270/2011014, 05000287/2011014

Licensee: Duke Energy Carolinas, LLC

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

Location: Seneca, SC 29672

Dates: March 23, 2011, through April 29, 2011

Inspectors: A. Sabisch, Senior Resident Inspector  
G. Ottenberg, Resident Inspector  
K. Ellis, Resident Inspector

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

Enclosure

## **INSPECTION RESULTS**

IR 05000269/2011-014, 05000270/2011-014, 05000287/2011-014; 03/23/2011 – 04/29/2011; Oconee Nuclear Station, Units 1, 2 and 3; Temporary Instruction 2515/183 – Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event

This report covers an announced Temporary Instruction (TI) inspection conducted by the resident inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

## **INSPECTION SCOPE**

The intent of the TI is to provide a broad overview of the industry's preparedness for events that may exceed the current design basis for a plant. The focus of the TI was on (1) assessing the licensee's capability to mitigate consequences from large fires or explosions on site, (2) assessing the licensee's capability to mitigate station blackout (SBO) conditions, (3) assessing the licensee's capability to mitigate internal and external flooding events accounted for by the station's design, and (4) assessing the thoroughness of the licensee's walk downs and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. If necessary, a more specific follow-up inspection will be performed at a later date.

## **INSPECTION RESULTS**

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report.

Enclosure

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events, typically bounded by security threats, committed to as part of NRC Security Order Section B.5.b issued February 25, 2002, and severe accident management guidelines (SAMGs) and as required by Title 10 of the Code of Federal Regulations (10 CFR) 50.54(hh). Use Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," Section 02.03 and 03.03 as a guideline. If IP 71111.05T was recently performed at the facility the inspector should review the inspection results and findings to identify any other potential areas of inspection. Particular emphasis should be placed on strategies related to the spent fuel pool. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	<i>Describe what the licensee did to test or inspect equipment.</i>
<p>a. Verify through test or inspection that equipment is available and functional. Active equipment shall be tested and passive equipment shall be walked down and inspected. It is not expected that permanently installed equipment that is tested under an existing regulatory testing program be retested.</p> <p>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>The licensee identified equipment required to address B.5.b events as well as those considered to be "beyond design basis" and covered under Oconee Severe Accident Guidelines (OSAG) for inspection &amp; testing. Testing of permanently installed equipment was verified to be current and did not have any outstanding deficiencies. Equipment used to implement B.5.b mitigation strategies was reviewed to ensure the equipment was available and functional. Active equipment (e.g., Hale pumps) was tested and all passive equipment in the procedures was walked down, verified to be in-place, and in good condition. Vehicles designated for transporting the equipment were verified to be available; the pathways they would use were unobstructed and would remain so following an event; and were the correct ones to use.</p>



	<p><i>Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).</i></p> <p>The inspectors reviewed the results of the licensee's walkdowns and performed walkdowns of selected procedures to ensure the required equipment was properly staged and ready for use. The walkdowns were done without prior review of the licensee's results to provide for an independent assessment of the equipment's readiness and availability.</p> <p>The inspectors observed the functional test of the second Hale pump and reviewed testing that the licensee performed in mid-March which included test procedures and any work orders resulting from the testing.</p> <p>Following completion of the walkdowns, the inspectors reviewed the results of the licensee's walkdowns to assess issues the licensee had identified and the actions that had been taken or initiated to address them. The inspectors met with the licensee to discuss any additional issues the inspectors had identified during their independent walkdowns and ensured the issues were entered into the licensee's Corrective Action Program (CAP).</p>
	<p><i>Discuss general results including corrective actions by licensee.</i></p> <p>In general, all required equipment in the station procedures was available and functional with a few minor issues noted as a result of the licensee's and inspector's walkdowns. The licensee incorporated the observations resulting from the inspector walkdowns into their CAP and will address them in conjunction with the issues they identified.</p>

Licensee Action	<i>Describe the licensee's actions to verify that procedures are in place and can be executed (e.g. walkdowns, demonstrations, tests, etc.)</i>
<p>b. Verify through walkdowns or demonstration that procedures to implement the strategies associated with B.5.b and 10 CFR 50.54(hh) are in place and are executable. Licensees may choose not to connect or operate permanently installed equipment during this verification.</p> <p>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>The licensee reviewed several groups of procedures including the OSAG, Accident Mitigation (AM) guidance, Extensive Damage Mitigation (EDM) procedures, Loss of Spent Fuel Cooling and/or Level procedures and Beyond Design Basis Mitigation Strategies (BDBMS). Personnel from operations, maintenance and engineering performed walkdowns of these procedures to ensure the guidance / direction could be performed as written. An issue affecting the option to vent the Unit 2 reactor building (RB) pressure when in the OSAG procedures was identified and entered into the licensee's CAP for resolution.</p> <p>A table top review of the EDM and the Loss of Spent Fuel Cooling and/or Level Abnormal Operating Procedures (APs) was performed followed by an actual walkdown of all field actions to ensure the actions called for could be performed as directed and that the necessary equipment was in fact available.</p> <p>The BDBMS were all walked down to ensure the guidance provided was clear and that the required equipment was available.</p> <p>Procedures governing actions called for by Security personnel, providing access past security barriers or the use of Security vehicles to transport severe damage mitigation equipment were reviewed and walked down to verify they could be performed as written.</p>

	<p><i>Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.</i></p>
	<p>The inspectors reviewed the B.5.b, EDM, BDBMS, and the OSAG strategies and performed independent reviews and walkdowns of selected procedures to ensure the actions were clear, executable as written, and reflected the current plant conditions. The walkdowns were done without prior review of the results of the licensee's walkdowns and table top reviews to provide for an independent assessment of the procedures required to implement the strategies associated with B.5.b and 10 CFR 50.54(hh). The inspectors determined that the procedures were in place and executable.</p>
	<p><i>Discuss general results including corrective actions by licensee.</i></p>
	<p>The licensee identified some issues during the walkdown and review of the procedural guidance and instructions. Corrective actions were immediately initiated to address discrepancies; i.e., procedures revised, communications sent out, or changes made as to where specific equipment or supplies were staged. Items flagged as "Enhancements" were collected and were evaluated for prioritization, development of corrective actions and resolution. For areas that were identified as having "Discrepancies" or "Enhancements," the inspectors reviewed the immediate actions taken as well as the proposed corrective actions intended to address the identified issues.</p> <p>The licensee incorporated the observations resulting from the inspector walkdowns into their CAP and plans to address them in conjunction with the issues they identified.</p>

Licensee Action	<i>Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.</i>
<p>c. Verify the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).</p>	<p>The licensee reviewed the training and qualification matrix for members of the On-Shift personnel called out for having training requirements to support responding to accident / severe event conditions, the Security force, Maintenance and the Emergency Response Organization.</p> <p>Due to a deficiency in the process used to maintain the qualification matrix for on-shift personnel, some qualification lapses occurred. However, based on the specifics and the number of personnel involved, it was determined that there was no adverse impact to the ability of the overall on-shift staff to respond to an event as adequate shift resources remain available on all shifts to complete these tasks if needed.</p> <p>The Security Force and Emergency Response Organization training qualification matrices were reviewed and no members were found to be deficient in their qualifications.</p> <p>The training qualification matrix for the Maintenance personnel designated as B.5.b and SAMG responders was reviewed and no members were found to be deficient in their qualifications.</p>

	<p><i>Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff.</i></p> <p>The inspectors reviewed the results of the licensee's training and qualification assessment and independently reviewed a sample of training records for individuals in On-Shift operations department, the Security force, Maintenance, and the Emergency Response Organizations to verify that their required training was current and properly documented to ensure that the individuals were qualified for their assigned tasks.</p> <p><i>Discuss general results including corrective actions by licensee.</i></p> <p>Personnel that were not current with all required training were scheduled for the training needed to complete their qualifications. They had already been flagged as requiring the training and had not been assigned to the duty area in their normal on-shift rotation. There are sufficient personnel that are qualified to avoid reducing manning below minimum required levels on all shifts. No other gaps or areas requiring action were identified by the licensee or the inspectors.</p>
<p>Licensee Action</p>	<p><i>Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.</i></p>
<p>d. Verify that any applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events.</p> <p>This review should be done for a reasonable sample of mitigating strategies/equipment.</p>	<p>The licensee had the following agreements / contracts in-place to support the mitigation of events covered by this TI:</p> <p><u>Local Fire Departments:</u> Agreement letters were in-place with the four local fire departments that are designated as responders to the site. They have been selected to provide response from different directions so that support will be available regardless of what access roads are not available. The Fire Chief of each department was contacted to ensure their capabilities to respond to site emergencies as specified in letters of agreement had not changed or been compromised and all stated that their capabilities had not changed and confirmed their capability to respond as requested.</p> <p><u>Radiological Emergency Assistance Center / Training Site Oak Ridge (REAC/TS) and Department of Energy:</u> Agreements were in place to provide support and response as</p>

	<p>requested. These agencies were contacted by the licensee and it was verified that the existing agreements were still in effect and nothing had changed which would limit their ability to respond as requested.</p> <p><u>Vendor Support:</u> The vendor used by all three Duke sites for maintenance of their B.5.b / SAMG pumps was contacted and verified the agreement to provide repair services for the pumps if required remained in place and that they were available to provide support on demand.</p> <p><u>Law Enforcement:</u> Oconee Site Security Management contacted local law enforcement (Pickens and Oconee County and SC State Law Enforcement Division) and the local Federal Bureau of Investigation offices to confirm their ability to support the sites security needs on request.</p>
	<p><i>For a sample of mitigating strategies involving contracts or agreements with offsite entities, describe inspector actions to confirm agreements and contracts are in place and current (e.g., confirm that offsite fire assistance agreement is in place and current).</i></p> <p>The inspectors reviewed the licensee’s matrix that documented the verifications performed to ensure the agreements remained in effect and were understood by the current contact points for the offsite agencies for which agreements were in place. The inspectors also independently contacted a sample of the agencies for which agreements were in place to verify that the specific agreement was current and understood.</p> <p><i>Discuss general results including corrective actions by licensee.</i></p> <p>Based on the licensee’s assessment of this area, no corrective actions were identified. No issues were identified by the RIs in their review that required immediate actions to be taken by the licensee.</p>

Licensee Action	<i>Document the corrective action report number and briefly summarize problems noted by the licensee that have significant potential to prevent the success of any existing mitigating strategy.</i>
<p>e. Review any open corrective action documents to assess problems with mitigating strategy implementation identified by the licensee. Assess the impact of the problem on the mitigating capability and the remaining capability that is not impacted.</p>	<p><u>Problem Investigation Program reports (PIP) O-11-2808 &amp; 2926</u>: A review of the SAMGs identified that a 2010 modification removed the piping that was used to vent the Unit 2 RB. The guidance in the SAMG removed the blank flange from the end of the unused hydrogen recombiner piping and opened the RB radiation monitor penetration valves to vent the RB should RB pressure exceed 100 psig. The Unit 2 piping was cut and capped rendering the reactor building vent path unavailable. The piping on Unit 1 and 3 is still intact; however, these pipes will also be capped when the tornado modifications are completed.</p> <p><u>PIP O-11-2928</u>: A review of the equipment that would be used to pump water from the low pressure injection (LPI) or high pressure injection (HPI) rooms in the event of flooding in the Auxiliary Building identified that the plug on the sump pumps that would be lowered into the rooms did not fit any outlet in the area. If the air system was not available, alternate capabilities to remove water using air operated pumps would not be available. The plugs on all sump pump drop cords were changed to allow them to be used with the available outlets.</p> <p><u>Work Request 01030170</u>: During functional tests of the sump pumps that would be used to pump water from the LPI or HPI rooms, the start capacitor failed on two of four pumps tested. Plans to replace the capacitors are in place and periodic tests are being developed to ensure the pump will start when required. Alternate capabilities to remove water were available through the use of air operated pumps.</p> <p><u>PIP O-11-2927</u>: Following a review of procedures that would be used to maintain spent fuel pool cooling following various events, it was recognized that when certain Accident Mitigation or Abnormal Operating procedures were being used, the backup spent fuel pool level indication would be unavailable if offsite power and power from the SSF was unavailable which would require personnel to visually verify spent fuel pool levels. – an unacceptable requirement under some scenarios. Engineering is reviewing options that could be implemented to provide level indication without requiring personnel to physically enter the SFP area under all conditions. If spent fuel pool levels are decreasing, this requirement could impact the ability to determine actual level.</p>

Enclosure

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63, "Loss of All Alternating Current Power," and station design, is functional and valid. Refer to TI 2515/120, "Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22" as a guideline. It is not intended that TI 2515/120 be completely re-inspected. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	<i>Describe the licensee's actions to verify the adequacy of equipment needed to mitigate an SBO event.</i>
<p>a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>The licensee reviewed the applicable design documents and licensing bases to identify the equipment required to mitigate a SBO. The plant procedures were reviewed to identify specific equipment credited for SBO as well as other selected equipment that was expected to actuate and maintain the units in Mode 3.</p> <p>Equipment reviewed included the SSF (and support systems), the Class 1E batteries, circulating cooling water (CCW) components required to support refill of the CCW header, steam valves credited to close to control cooldown, auxiliary feedwater isolation system along with related main and startup feedwater control valves, diesel air compressors and portions of the instrument air system and the turbine driven emergency feedwater system (although the turbine driven emergency feedwater pump is not credited for SBO, the licensee stated that it should be available and hence was included in the review / walkdown). The licensee verified that all of the equipment identified in their review was available and functional.</p> <p>Actual testing to address the Institute of Nuclear Power Operations Event Report recommendation was not performed as the referenced equipment is tested on a periodic basis under Technical Specification (TS) or Selected Licensee Commitment (SLC) surveillance requirements and all testing was found to be current.</p>



	<p><i>Describe inspector actions to verify equipment is available and useable.</i></p> <p>The Inspectors conducted independent walkdowns to verify that the equipment called for in the applicable procedures was located where it was called out to be, that it was readily accessible and that it was identifiable based on the description in the procedure or through the use of markings or signage on the equipment itself. No issues were identified in the Inspectors' walkdown of the equipment and supplies staged to mitigate a SBO event.</p> <p>As stated above, the licensee did not need to perform any testing of equipment as it was all covered under existing TS / SLC surveillance procedures and all of the testing was current. As a result, the inspectors did not observe the testing of the required equipment during the processing of this TI.</p> <p><i>Discuss general results including corrective actions by licensee.</i></p> <p>The licensee's review identified the following deficiencies associated with the service air system: 1) some of the preventive maintenance activities had been deferred several times and were currently outside of the recommended frequency for performance; and 2) full system capacity would not be available if one of the backup air dryers was isolated for routine maintenance. These issues were captured in the CAP (PIP O-11-3218) and actions are being developed to address them.</p> <p>An issue similar to that under Section 03.01 was identified based on observations and feedback from both licensee's and the inspectors' walkdowns. To ensure that SBO equipment was available when called upon, the licensee has initiated several corrective actions. Areas that are being addressed under these actions include: 1) securing equipment with the standard EOP tamper seals rather than combination locks; 2) conducting routine inventory inspections of designated storage areas to ensure equipment is available as was performed on EOP and EFM equipment; and 3) clearly marking required equipment and storage areas as being for SBO use and communicating the new markings to the station staff.</p>
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Licensee Action	<i>Describe the licensee's actions to verify the capability to mitigate an SBO event.</i>
b. Demonstrate through walkdowns that procedures for response to an SBO are executable.	Reviews and walkdowns of procedures including EPs, APs, Operating procedures, and Emergency Maintenance (EM) procedures were conducted by the licensee to ensure the procedures could be performed as written and that there were no revisions required. Once the applicable procedures were identified, the licensee performed a review of DocuTracks to determine if there were any outstanding changes pending on these procedures.
	<i>Describe inspector actions to assess whether procedures were in place and could be used as intended.</i>
	The inspectors independently performed walkdowns of the procedures to mitigate a SBO event to ensure the actions were clear and executable as written. Overall, there were no issues identified that would have adversely impacted the licensee's ability to perform the procedures as written. Two minor items were identified by the Inspectors during the procedure validation. The licensee initiated corrective actions to address these issues.
	<i>Discuss general results including corrective actions by licensee.</i>
	The licensee determined that all procedures were executable as written. The licensee did identify several procedural enhancements that were captured in the CAP and entered into DocuTracks.

<p>03.03 Assess the licensee’s capability to mitigate internal and external flooding events required by station design. Refer to IP 71111.01, “Adverse Weather Protection,” Section 02.04, “Evaluate Readiness to Cope with External Flooding” as a guideline. The inspection should include, but not be limited to, an assessment of any licensee actions to verify through walkdowns and inspections that all required materials and equipment are adequate and properly staged. These walkdowns and inspections shall include verification that accessible doors, barriers, and penetration seals are functional.</p>	
<p>Licensee Action</p>	<p><i>Describe the licensee’s actions to verify the capability to mitigate existing design basis flooding events.</i></p>
<p>a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>The licensee reviewed, walked down, inspected, and/or tested materials, equipment and procedures required to mitigate internal and external floods to verify their availability and functionality. In some situations, periodic testing was verified as current to ensure functionality. The list of equipment that was inspected was developed based on a review of licensing basis documents (TS, SLC, Updated Final Safety Analysis Report), Site Directives, and procedures including operating procedures, APs, EPs and OSAGs.</p>
	<p><i>Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.</i></p>
	<p>The inspectors performed walkdowns of staged equipment and the associated procedures that would be used to mitigate internal and external flooding. Several of these procedures were also reviewed as part of section 03.01 as much of the equipment serves a dual role in mitigating beyond design basis events and site flooding events.</p> <p>The inspectors provided feedback to the licensee on some procedures which identified potential enhancements and/or clarifications that were entered into the licensee’s CAP.</p>

	<p><i>Discuss general results including corrective actions by licensee.</i></p> <p>The licensee identified some issues requiring immediate resolution to restore functionality to equipment. Work orders were initiated to address equipment-related issues and set on an expedited schedule to be completed. One example, which was discussed under Section 03.01, pertained to start capacitor failures on sump pumps that would be used to pump water from the LPI or HPI rooms. Plans were in place to replace the capacitors and periodic tests were developed to ensure the pump will start when called upon. In addition, the plug on the sump pump cords was of a different style than the outlets in the general area and was replaced to ensure they could be used. It was also noted that when the plugs were replaced the cords had been spliced using an unapproved method which would not have supported use in a submerged environment.</p>
<p>03.04 Assess the thoroughness of the licensee’s walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment’s function could be lost during seismic events possible for the site. Assess the licensee’s development of any new mitigating strategies for identified vulnerabilities (e.g., entered it in to the corrective action program and any immediate actions taken). As a minimum, the licensee should have performed walkdowns and inspections of important equipment (permanent and temporary) such as storage tanks, plant water intake structures, and fire and flood response equipment; and developed mitigating strategies to cope with the loss of that important function. Use IP 71111.21, “Component Design Basis Inspection,” Appendix 3, “Component Walkdown Considerations,” as a guideline to assess the thoroughness of the licensee’s walkdowns and inspections.</p>	
<p>Licensee Action</p>	<p><i>Describe the licensee’s actions to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies.</i></p>
<p>a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.</p>	<p>The licensee reviewed, walked down, and inspected systems and components required for fire suppression and flood mitigation to verify availability and functionality. Also, as part of this assessment, their seismic vulnerabilities were evaluated.</p> <p>For fire suppression response, walkdowns and inspections were performed by three teams which consisted of a system engineer or cognizant person responsible for the area/function inspected and a civil engineer. These teams walked down portable fire protection equipment and permanent fire suppression components such as hydrants, interior power</p>

	<p>block fire suppression systems and components, and Keowee fire suppression and components. The walkdowns and inspections addressed material condition (i.e. the readiness of the equipment to suppress a fire) and the potential for seismic interactions. A table top drill was performed by Operations of the fire brigade response procedure.</p>
	<p><i>Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.</i></p>
	<p>The inspectors reviewed the licensee's procedural guidance for responding to flooding in the turbine or auxiliary buildings as well as a seismic event. Areas of the protected area and power block containing equipment that would be used to respond to flooding and fire events were walked down to identify vulnerabilities as a result of a seismic event.</p> <p>In walking down the applicable seismic or flooding event response procedures, the inspectors identified some areas where additional clarification or guidance was warranted to ensure the intended actions were performed in a timely and consistent manner. In reviewing the auxiliary building flooding procedures, the inspectors identified the need to evaluate the step sequence that would ensure personnel could access components before they were submerged. The AP did not have direction on where to start searching for the source of the leak based on the indications received by the operators.</p>
	<p><i>Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.</i></p>
	<p>The majority of the firefighting equipment identified by the licensee was not seismically qualified for the design basis earthquake (DBE). Therefore, a generic vulnerability exists relative to fire suppression following a seismic event and the licensee has stated that most fire suppression components may fail during a DBE. Some support equipment (i.e. 4kV and 600V power supplies, hose stations and related piping inside containment, CCW intake structure/components, SSF piping, essential siphon vacuum system) was seismically qualified and would be available following a DBE. The licensee recognized the vulnerability that many of the fire suppression components would not function following a DBE; however, plans and supporting agreements were in place for offsite support to provide fire fighting capabilities. Potential mitigating strategies were being developed by the licensee; however, there were no additional strategies currently in-place beyond the AP procedures that cover earthquake response or the flooding of the turbine/auxiliary buildings.</p>

Enclosure

	<p>A review of potential additional pre-planning and staging of equipment such as the Hale pumps was underway. The relocation of some portable equipment was being evaluated which would place the firefighting equipment in a more protected, seismically-rated area. Supplemental protection for fire hydrants was being reviewed.</p> <p>Scaffolding that could have impacted equipment that would be used for firefighting following a seismic event was identified. Some was removed and other scaffolds required for in-progress work was planned to be removed when the work was completed. Communications have been distributed to groups involved in scaffold installation to prevent this issue from recurring in the future.</p> <p>Some of the flooding issues identified by the licensee resulted from the non-seismic design of the affected structures, systems, and components and may be unavailable or damaged following a DBE. The licensee did not identify any new mitigating strategies to address flooding caused by events considered beyond DBE.</p> <p>Some procedural enhancements were identified by the licensee during the walkdowns and tabletops and from feedback received from the inspectors. Procedure Change Requests were initiated for all identified enhancements/clarifications and corrective actions initiated for other issues that require correction or review.</p>
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4OA6 Meetings

On May 12, 2011, the inspectors presented the inspection results to Mr. T. Preston Gillespie, Jr., Oconee Vice President, and other members of licensee management. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

Attachment: Supplemental information

Enclosure

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

K. Alter, Regulatory Compliance Manager  
S. Batson, Station Manager  
S. Boggs, Emergency Services Coordinator  
J. Bohlmann, Organization Effectiveness Manager  
E. Burchfield, Superintendent of Operations  
D. Crowl, Emergency Services  
M. Dunton, Maintenance Manager  
P. Fisk, Engineering  
R. Freudenberger, Regulatory Support Manager  
P. Gillespie, Site Vice President  
C. Hamlin, Engineering  
T. King, Security Manager  
B. Meixell, Regulatory Compliance Engineer  
T. Patterson, Safety Assurance Manager

#### Nuclear Regulatory Commission

G. Hopper, Branch Chief, DRP Branch 7, RII

### LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events

Number	Description or Title	Date or Revision
OP/0/A/1106/042	Hale Portable Pump Operation	002
AM/0/A/1300/089	Pumping water from LPI and HPI Pump Rooms in Case of AB Flood	004
PT/0/B/0120/032	Field Equipment and Procedure Surveillance	37
SP/0/1303	Security Patrol Requirements, Section 6.5, Security Patrol Vehicle Availability for Movement of EDM Hose Trailer	
SP/0/1305	Vehicle Barrier System (VBS) Access Control and Search Requirements	

Attachment



SP/C/1600	Security Event Response	
AP/0/A/1700/046	Extensive Damage Mitigation	005
EM 5.1	Engineering Emergency Response Plan, Enclosure F, Makeup and Monitoring of the SFP and Recovery From a Boiling Condition and Enclosure U, Loss of SFP Level	
EM.5.2	Evaluations by Station Management in the TSC - Beyond Design Basis Mitigation Strategies	
AM/0/A/1300/059	Pump - Submersible - Emergency SSF Water Supply - Installation And Removal	008
AP/1-2/A/1700/035	Loss of Spent Fuel Cooling and/or Level	010
AP/3/A/1700/035	Loss of Spent Fuel Cooling and/or Level	010
RP/0/B/1000/022	Procedure For Major Site Damage Assessment And Repair	011
AP/0/A/1700/025	SSF EOP	049
EP/1,2,3/A/1800/001B	Station Blackout	37, 39, 37
AM/0/A/1300/059	Pump – Submersible – Emergency – SSF Water Supply	8
AM/0/A/3009/12 A	Emergency Plan for Refilling Spent Fuel Pools	006
N/A	Training records for personnel assigned to the fire brigade, Emergency Response Organization, Security force and selected personnel in the Maintenance organization	
Emergency Plan, Appendix 5	Support agreements in-place with local fire departments, local law enforcement and offsite support agencies	

### 03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions

Number	Description or Title	Date or Revision
EP/1,2,3/A/1800/001B	Station Blackout	37, 39, 37
AP/1,2,3/A/1107/22	Loss of IA	
OP/0/A/1107/003	100 kV Pwr Supply	077
OP/0/A/1107/003A	Furnishing Pwr to Oconee	004
OP/0/A/1107/011F	Sharing Startup Transformers	009
OP/0/A/1106/027	Compressed Air - Monitor Operation of Diesel Air Compressors	104
EM/0/A/1500/013	Manual Lowering of Fuel Assembly in SFP	
Engineering Calculation OSC-2322	ECCW system	
Tech Spec 3.7.1	Main Steam Relief Valves	
Tech Spec 3.7.3	Main FS Control Valves & Startup FCVx	
SLC 16.10.9,	AOVs Required to Support SSF During SBO	
SLC 16.9.10	CC & HPI Seal Injection to RC Pumps	
PT/1/A/0600/001	Periodic Instrument Surveillance	318
OSS-0254.00-00-2026	AFIS DBD; section 2.1.1.3, Loss of All AC Power, Station Blackout	
EP/1/A/1800/001B	EOP Blackout	037

OP/1,2,3/A 1102/010	Unit Shutdown	206,196, 223
EM 5.1	Engineering Emergency Response Plan	
AP/0/A/1700/025	Standby Shutdown Facility Emergency Operating Procedure	
AP/2/A/1700/022	Loss of Instrument Air	037
UFSAR	Various sections applicable to this area (Section 8 and 15)	

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design

Number	Description or Title	Date or Revision
AP/1,2,3/A/1700/10	Turbine Building Flood	7, 7, 6
AP/1,2,3/A/1700/30	Auxiliary Building Flood	16, 16, 14
AM/0/A/1300/89	Pumping Water from LPI/HPI Rooms	004
Engineering Manual 5.3	Beyond Design Basis Mitigation Strategies for External Flood Mitigation	
SLC 16.9.11	Turbine Building Flood Protection Measures	
SLC 16.9.11a	Auxiliary Building Flood Protection Measures	
SLC 16.9.21	SSF External Flood Protection	

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events

Number	Description or Title	Date or Revision
RP/0/B/1000/029	Fire Brigade Response	16
SLC 16.9.11	Turbine Building Flood Protection Measures	
SLC 16.9.11.a	Auxiliary Building Flood Protection Measures	
SLC 16.9.21	SSF External Flood Protection	
SD 3.2.16	Control of Passive Design Features	0
AP/1-2, 3/A/1700/010	Turbine Building Flood	7, 7, 6
AP/1,2,3/A/1700/030	Auxiliary Building Flood	16, 16, 14
AM/0/A/1300/89	Pumping Water from LPI/HPI Rooms	4
EM 5.3	Beyond Design Basis Mitigation Strategies for External Flood Mitigation	
SLC 16.9.1	Fire Suppression Water Supply System	
SLC 16.9.2	Sprinkler and Spray Systems	
SLC 16.9.3	Keowee CO2 System	
SLC 16.9.4	Fire Hose Stations	
AP/0/A/1700/005	Earthquake	23
AP/0/A/2000/001	Keowee Hydro Station – Natural Disaster	5
AP/0/A/1700/006	Natural Disaster	21

Corrective Action Program Documents

PIP O-11-2789; IER L1-11-1, Fukushima Daiichi Nuclear Station Fuel Damage Caused by Earthquake and Tsunami Assessment

PIP O-11-2808; During review of severe accident mitigation strategies following the Japan OE, it appears that the reverse osmosis modification removed the hydrogen recombiner piping that the SMAG document uses to vent the U2 RB

PIP O-11-2925; INPO IER 11-1 required an assessment of the capability to mitigate Beyond Design Basis Accidents. Part of this capability is the ability to plug a SFP leak per EM 5.2 Encl 1.7. (See detailed problem description). Some warehouse material could not be located during the assessment performed on weekend of March 19, 20 2011

PIP O-11-2926; Documentation of the results of the review of plant readiness for SAMG

PIP O-11-2927; Documentation of the results of the review of plant readiness for loss of spent fuel pool cooling

PIP O-11-2928; Results of detailed walk down of Oconee Nuclear station Emergency Plan to determine current state of readiness to address conditions beyond design basis events

PIP O-11-2931; Independent Nuclear Oversight (INOS) evaluator (ER/EN/CM evaluator) assistance requested to support the Line Organization at ONS in the development of the site's response associated with INPO Event Report Level 1 11-1 issued: Fukushima Daiichi Nuclear Station Fuel Damage Caused by Earthquake and Tsunami.

PIP O-11-2995; This PIP is to document all the enhancement items that have not been previously captured in PIPs 11-2927 (Assessment of SF Cooling per INPO IER 11-1) or 11-2926 (Assessment of SAMG per INPO IER 11-1).

PIP O-11-3018; Some SAMG manuals were not up to date

PIP O-11-3020; Results of field walkdowns of fire protection equipment

PIP O-11-3021; EM 5.2 (Evaluations by Station Management in the TSC - Beyond Design) Encl 1.2 (Portable Spray Strategies) Step 2.6 needs clarification

PIP O-11-3066; Vehicles designated for movement of the Extensive Damage Mitigation (EDM) hose trailer

PIP O-11-3142; Maintenance walkdown of the ONS Emergency Plan to assess readiness

PIP O-11-3263; Walkdowns identified enhancements to AP/0/A/1700/025 (Standby Shutdown Facility Emergency Operating Procedure).

PIP O-11-3266; Walkdowns identified enhancements to OP/0/A/1107/003 (100 KV Power).

PIP O-11-3269; Walkdowns identified enhancements to EOPs

PIP O-11-3410; Cabinets on CCW intake are close to CCW pumps and SSW piping

PIP O-11-3418; Items requiring removal were noted on LPSW walkdowns

PIP O-11-3419; Results of EFFM pump run

PIP O-11-3575; AM/0/A/3009/012A (Emergency Plan for Refilling Spent Fuel Pools) drawings do not depict current location of security fence.

PIP O-11-4127; RP/0/B/1000/029 (Fire Brigade Response) was table top validated with enhancements identified

PIP O-11-4285; Walkdowns and inspection were conducted of systems and components credited for fire suppression, in response to INPO Event Report 11-1, Fukushima Daiichi Nuclear Station Fuel Damage

PIP O-1104389; Long Term effectiveness of changes to the communications standards within Operations identified during walkdowns and tabletops

PIP O-11-4411; Fire Hose Station was found partially removed from its rack

PIP O-11-4383; Valves identified where a change in torque switch settings is needed to support SAMG use

## LIST OF ACRONYMS

ADAMS	Agency-wide Documents Access and Management System
AM	Accident Mitigation
AP	Abnormal Operating Procedure
BDBMS	Beyond Design Basis Mitigation Strategies
CAP	Corrective Action Program
CCW	circulating cooling water
CFR	Code of Federal Regulations
DBE	Design Basis Earthquake
EDM	Extensive Damage Mitigation
EFM	External Flood Mitigation
EM	Emergency Maintenance
EOF	Emergency Operations Facility
EOP	Emergency Operating Procedure
HPI	high pressure injection
IP	Inspection Procedure
LPI	low pressure injection
NRC	United States Nuclear Regulatory Commission
OSAG	Oconee Severe Accident Guidelines
PIP	Problem Investigation Program
RB	Reactor Building
RI	Resident Inspector
SAMG	Severe Accident Mitigation Guideline
SBO	Station Blackout
SLC	Selected Licensee Commitment
SSC	Structures, Systems, and Components
SSF	standby shutdown facility
TI	Temporary Instruction
TS	Technical Specification
TSC	Technical Support Center