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

June 9, 2010

EA-10-094

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 INSPECTION REPORT 050000269, 270, 287/2010007; PRELIMINARY GREATER THAN GREEN FINDINGS AND POTENTIAL ESCALATED ENFORCEMENT VIOLATION

Dear Mr. Baxter:

On May 27, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an in-office review to determine the safety significance of the Oconee Nuclear Station Standby Shutdown Facility (SSF) Reactor Coolant Makeup (RCM) letdown line degradation issues previously documented in NRC Integrated Inspection Report (IIR) 050000269, 270, 287/2010002. The enclosed inspection report documents the results of our review which were discussed on June 3, 2010, with you and your staff.

Based on the results of our review, a total of three Apparent Violations (AVs) associated with the SSF RCM letdown line degradation were identified. Two of these AVs involved findings for: (1) the failure to identify and correct Unit 2 and Unit 3 SSF RCM letdown line degradation in a timely manner after degradation was identified on Unit 1 and (2) the failure to ensure the SSF Reactor Coolant Makeup subsystem remained operable as required by Technical Specifications. Please note that AV 050000269, 270, 287/2010002-04 is being re-characterized as an AV for the SSF RCM subsystem being inoperable for greater than the time allowed by Technical Specifications.

These two findings were assessed in accordance with NRC's Reactor Oversight Program Significance Determination Process (SDP) and preliminarily determined to be of greater than very low safety significance (Green) based on the best available information. The preliminary

Enclosures 2 and 3 transmitted herewith contain SUNSI. When separated from enclosures 2 and 3, this transmittal document is decontrolled.

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SDP Phase 3 analysis includes a fire risk contribution. However, based upon NRC ignition source observations this could be a lower bound risk estimation which may result in a change in the safety significance for these findings. To develop a more complete understanding of the fire risk portion, NRC is requesting Duke to provide any additional information that would be germane in rendering a final significance determination. The significance determination documentation for these two findings is provided as Enclosures 2 and 3. The degradation of the SSF RCM letdown line resulted in the inoperability of a single-train system which would be used to control pressurizer level during an SSF event. Your staff implemented actions to restore the SSF RCM letdown line safety function by removing the letdown line filters on all three ONS units. The NRC acknowledged these actions in IIR 050000269, 270, 287/2010002. The AVs associated with these two findings are being considered for escalated enforcement in accordance with the NRC Enforcement Policy. The current Enforcement Policy can be found on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. Additional details for these two AVs are provided in the enclosed inspection report.

In accordance with NRC Inspection Manual Chapter 0609, Significance Determination Process, we intend to complete our risk evaluations using the best available information and issue our final determination of safety significance within 90 days of the initial notification. The SDP encourages an open dialogue between the staff and the licensee; however, the dialogue should not impact the timeliness of the staff's final determination. Before the NRC makes its enforcement decision, we are providing you an opportunity to either (1) present to the NRC your perspectives on the facts and assumptions used by the NRC to arrive at these findings and their significance at a Regulatory Conference or (2) submit your position on these findings to the NRC in writing. If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference to make the conference more efficient and effective. If a conference is held, it will be open for public observation. The NRC will also issue a press release to announce the conference. If you decide to submit only a written response, such a submittal should be sent to the NRC within 30 days of the receipt of this letter. If your response contains security-related information please ensure it is marked appropriately. If your response does not contain security-related information, it will be made available for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. If you decline to either request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination; in that, by not doing either you fail to meet the appeal requirements stated in the Prerequisites and Limitations Sections of Attachment 2 of IMC 0609.

The third AV is related to materially inaccurate information contained in the "Oconee Nuclear Station SSF RC Letdown Action Plan" as previously documented in IIR 050000269, 270, 287/2010002. This information was material to NRC because it was used, in part, as the basis for determining whether the licensee's response to the degraded condition was adequate and whether additional compensatory actions or NRC review would be necessary. This AV is being evaluated using the NRC's traditional enforcement process because it impacted NRC's ability to perform its regulatory function and is being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy can be found on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. Additional detail for this AV is provided in the enclosed inspection report.

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Before NRC makes its enforcement decision for this AV, we are providing you an opportunity to either (1) respond to the apparent violation within 30 days of the date of this letter or (2) request a Predecisional Enforcement Conference (PEC). If a PEC is held, it will be open to public observation in accordance with the NRC Enforcement Policy. If you choose to provide a written response, it should be clearly marked as "Response to Apparent Violation, EA-10-094," and should include: (1) the reason for the apparent violation, or, if contested, the basis for disputing the apparent violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate response is not received within the time specified or an extension of time has not been granted, NRC will proceed with its enforcement decision. Because this issue does not involve security-related information, your response will be made available for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

In recognition of the relationship of these three AVs, the commonality of any likely corrective actions to preclude recurrence, and to minimize administrative and resource burden, we encourage you to consider requesting a joint Regulatory Conference/PEC to discuss the above matters, or as an alternative, you may include your response to these issues and corrective actions in a single written response.

Please contact Jonathan Bartley at (404) 997-4607 within 10 days of the date of this letter to notify the NRC of your intended response. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. You will be advised by a separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination as to the significance of these issues, no Notice of Violation is being issued at this time. Please be advised that the number and characterization of the apparent violations described in the enclosure may change as a result of further NRC review.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and Enclosure 1 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

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(ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). However, because of the security-related concerns contained in the enclosure, and in accordance with 10 CFR 2.390, a copy of Enclosures 2 and 3 will not be available for public inspection.

Sincerely,

/RA/

Leonard D. Wert, Jr., Director
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287

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

Enclosures: Enclosure 1 – Inspection Report

w/Attachment: Supplemental Information

Enclosure 2 – Significance Determination, SRA Analysis Number OCO1003,
w/Attachments (Official Use Only – Security Related Information)

Enclosure 3 – Significance Determination, SRA Analysis Number OCO1004
w/Attachments (Official Use Only – Security Related Information)

cc w/encls: (See page 5)

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Leonard D. Wert, Jr., Director
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Enclosure 3 – Significance Determination, SRA Analysis Number OCO1004
w/Attachments (Official Use Only – Security Related Information)
cc w/encls: (See page 5)

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ADAMS: Yes ACCESSION NUMBER: _____ SUNSI REVIEW COMPLETE

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NAME	ASabisch	KEllis	WRogers	CRapp	JBartley		
DATE	06/08/2010	06/08/2010	06/08/2010	06/08/2010	06/08/2010		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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Section Chief
Radiation Protection Section
N.C. Department of Environmental
Commerce & Natural Resources
Electronic Mail Distribution

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Letter to David A. Baxter from Leonard D. Wert, Jr. dated June 9, 2010

SUBJECT: OCONEE NUCLEAR STATION – NRC INSPECTION REPORT 050000269, 270,
287/2010007; PRELIMINARY GREATER THAN GREEN FINDINGS AND
POTENTIAL ESCALATED ENFORCEMENT VIOLATION

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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 No: 05000269/2010007, 05000270/2010007, 05000287/2010007

Licensee: Duke Energy Carolinas, LLC

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

Location: Seneca, SC 29672

Dates: May 14, 2010, through May 27, 2010

Inspectors: A. Sabisch, Senior Resident Inspector
K. Ellis, Resident Inspector
W. Rogers, Senior Reactor Analyst

Approved by: L. Wert, Jr., Director
Division of Reactor Projects

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Enclosure 1

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SUMMARY OF FINDINGS

IR 05000269/2010-007, 05000270/2010-007, 05000287/2010-007; 05/14/2010 – 05/27/2010; Oconee Nuclear Station Units 1, 2 and 3; Other Activities

The report covers a review of the Standby Shutdown Facility (SSF) Reactor Coolant Makeup (RCM) letdown line degradation by the resident inspectors and a senior reactor analyst. Two preliminary greater than Green findings with two Apparent Violations (AVs) and one AV potentially 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

- TBD. A 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 a condition adverse to quality associated with a degraded condition on Unit 2 and Unit 3 Standby Shutdown Facility (SSF) Reactor Coolant Makeup (RCM) subsystem letdown lines. This apparent violation has been entered into the corrective action program as PIP O-10-1213.

The licensee's failure to promptly identify and correct the degraded condition of the Unit 2 and Unit 3 SSF RCM letdown lines 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 reactor coolant system inventory control during an SSF event. This finding was preliminarily determined to be greater than very low safety significance. This finding does not present an immediate safety concern because the filters have been removed from the SSF RCM subsystem letdown lines on all three units. This finding directly involved the cross-cutting area of Human Performance under the Conservative Assumptions and Safe Actions aspect of the "Decision Making" component (H.1(b)). (Section 4OA5.b.1)

- TBD. A licensee-identified apparent violation of 10 CFR 50.9(a) was identified when the licensee determined that information contained in the "Oconee Nuclear Station SSF RC Letdown Action Plan" was inaccurate. This information was material to NRC because it was used, in part, as the basis for determining whether the licensee's response to the degraded condition was adequate and whether additional compensatory actions or NRC review would be necessary. This apparent violation has been entered into the corrective action program as PIP O-10-0561.

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The failure to provide complete and accurate information impacted the regulatory process in that the inaccurate information was material to NRC's determination that the licensee's response to the degraded condition was adequate. The inspectors determined the severity level of this apparent violation is potentially greater than Severity Level IV. Cross-cutting aspects are not assigned to violations being dispositioned through the traditional enforcement process. (Section 40A5.b.2)

- TBD. A self-revealing apparent violation of Technical Specification 3.10.1 was identified when the Standby Shutdown Facility (SSF) Reactor Coolant Makeup (RCM) subsystem letdown line failed to pass the required flow. As a result, the SSF RCM subsystem was rendered inoperable for greater than the seven days allowed by technical specifications (TSs). This apparent violation has been entered into the corrective action program as PIP O-09-7536.

The licensee's failure to ensure the SSF RCM subsystem remained operable as required by TSs 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 letdown line could not perform its design function during an SSF event. This finding was preliminarily determined to be greater than very low safety significance. This finding does not present an immediate safety concern because the filters have been removed from the SSF RCM subsystem letdown lines on all three units. No cross-cutting aspect was identified because the most significant contributor to this finding was not indicative of current licensee performance. (Section 40A5.b.3)

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Other Activities

a. Inspection Scope

The inspectors performed additional in-office review of the SSF RCM letdown line degradation previously documented in NRC IIR 050000269, 270, 287/2010002. The inspectors completed evaluations of SSF RCM subsystem letdown line degradation using NRC Inspection Manual Chapter (IMC) 0609 and the NRC Enforcement Policy.

b. Findings

.1 Inadequate Operability Evaluation of Unit 2 and Unit 3 SSF Letdown Line

(Closed) Apparent Violation (AV) 05000269/2010002-02, Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility

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 a condition adverse to quality. 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 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) subsystem of the SSF inoperable. This subsystem was designed to provide 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

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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. 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.

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Enclosure 1

- 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. This finding was preliminarily determined to be greater than very low safety significance.

The exposure time used for the Phase 3 analysis was 123 days for Unit 2 and 126 days for Unit 3. The dominant accident sequence was a reactor trip followed by a failure of the Main Feeder Buses. These buses provide power (normal and emergency) to all the accident mitigation equipment except the SSF so the loss would result in a station blackout (SBO) condition. Subsequently, the SSF is manned and placed into service. With the SSF letdown line inoperable, the level in the pressurizer slowly increases. Operators fail to recognize and stop the increasing pressurizer level. After about 3.5 hours, the pressurizer goes solid and the relief valves open. One of the relief valves fails to re-close and a Loss of Coolant Accident ensues. Long term Emergency Core Cooling cannot be maintained and core damage occurs.

This finding does not present an immediate safety concern because the filters have been removed from the SSF RCM letdown lines on all three units. 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, requires, 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. From October 19, 2009, to February 20, 2010, (Unit 2) and February 23, 2010, (Unit 3) the licensee failed to promptly identify and correct a condition adverse to quality involving foreign material on the Unit 2 and 3 SSF letdown line filters. In this case, after identification of a condition adverse to quality on Unit 1, the licensee failed to identify and correct a similar condition adverse to quality on Unit 2 and Unit 3. The condition would

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have adversely affected the operator's ability to control reactor coolant system inventory during a postulated event involving the use of the Standby Shutdown Facility. This apparent violation has been entered into the corrective action program as PIP O-10-1213. Pending safety significance determination, this apparent violation is identified as AV 05000270, 287/2010007-01, Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility.

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

(Closed) AV 05000270, 05000287/2010002-03, Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability

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 NRC in the review to determine if the licensee's response to the degraded condition was adequate.

Description: As documented in 40A5.b.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. 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 that there was sufficient justification to allow both units to remain in operation until the next forced or refueling outage before removing the filter is an apparent violation of regulatory requirements. This apparent violation is more than minor in that additional inspection

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Enclosure 1

would likely 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 apparent 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) requires, in part, that information provided to the Commission by a licensee shall be complete and accurate in all material respects. On December 18, 2009, the licensee provided information to the NRC that was not complete and accurate in all material respects. The information provided described compensatory actions for controlling pressurizer level during an SSF event which 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 material to the NRC because it was used, in part, as the basis for determining whether the licensee's response to the degraded condition was adequate and whether additional compensatory actions or NRC review would be necessary. The licensee corrected the inaccurate information on January 27, 2010. The licensee entered this apparent violation into their corrective action program as PIP O-10-0561. Pending final severity level determination, this apparent violation is identified as AV 05000270, 05000287/2010007-02, Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability.

.3 SSF RCM System Inoperability for Greater than Allowed by Technical Specifications

(Closed) AV 05000269, 270, 287/2010002-04, Failure to Establish a Test Program to Verify SSF Letdown Line Required Flow

Introduction: A self-revealing Apparent Violation of Technical Specification 3.10.1 was identified when the SSF RCM letdown line failed to pass required flow. As a result, the SSF Reactor Coolant Makeup subsystem was rendered inoperable for all three units for greater than the seven days allowed by technical specifications.

Description: The SSF Reactor Coolant Makeup subsystem 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 from the RCS as required. A filter was installed prior to the orifice to prevent clogging of the orifice.

On October 11, 2009, the Unit 1 SSF letdown line discharge flow test indicated that the flow in the line was severely degraded. Subsequently, the licensee determined that the in-line filter assembly had trapped foreign material resulting in reduced flow below the minimum design flow rate. Further inspection by the licensee determined that similar trapped foreign material was found on the filters for Unit 2 and Unit 3. The exact time when the foreign material was trapped on the filter on each of the three units is unknown. The material could have been released at any time following the installation of

the upstream valves. Therefore, the as-found condition which produced less than the required flow in the SSF letdown lines is considered to have existed for a period greater than the seven day allowed out of service time in Technical Specification 3.10.1, Condition C.

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 and on Unit 2 during the May 2010 refueling outage. The licensee's corrective actions include performing the new test procedure on Unit 3 during the upcoming refueling outage and during each subsequent refueling outage on each unit to ensure continued system capability of the SSF letdown line.

Contributing causes to the inoperability were not considering the susceptibility of the filter to clogging by foreign material or the potential deformation that could occur when exposed to elevated differential pressure caused by foreign material on the screen. No actual in-situ testing was performed at the time of initial construction or periodically to ensure the design flow remained achievable. Additionally, testing performed to verify flow existed in the lines proved to be inadequate in detecting flow degradation because it failed to identify the existence of foreign material on the filters in the Unit 2 and Unit 3 SSF letdown lines.

Analysis: The licensee's failure to ensure the SSF Reactor Coolant Makeup subsystem remained operable as required by Technical Specifications 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 SSF letdown line could not 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. This finding was preliminarily determined to be greater than very low safety significance.

The exposure time used for the Phase 3 analysis will be based on one year. T/2 is applicable but the maximum exposure time is one year since t/2 would be 7.5 years based on the 1994-1995 installation dates of the valves from which the Grafoil material was released. The dominant accident sequence for Unit 1 and Unit 2 was an F2 tornado that damages the blockhouse and the Main Feeder Bus distribution system which results in an SBO condition. Operators successfully man and operate the SSF; however, pressurizer level increases until the pressurizer goes solid causing the pressurizer relief valves to cycle. Eventually, one relief valve fails open resulting in a Loss of Coolant Accident (LOCA). Under a LOCA condition, long term emergency core cooling cannot be sustained and core damage ensues. The dominant sequence for Unit 3 was a composite set of tornadoes that damage the Unit 3 Main Feeder Bus distribution system adjacent to the Unit 1/2 blockhouse. This causes an SBO and a similar accident progression as noted for Unit 1 and Unit 2.

This finding does not present an immediate safety concern because the filters have been removed from the SSF RCM letdown lines on all three units. No cross-cutting aspect was identified because the most significant contributor to this finding was not indicative of current licensee performance.

Enforcement: Technical Specification 3.10.1 required the SSF to be operable in Modes 1, 2 and 3 and Condition C allowed the RCM subsystem to be inoperable for up to seven days without additional actions being taken. The SSF RCM subsystem was inoperable whenever the unit was in Modes 1, 2, or 3 over the last operating cycle from May 30, 2008, until October 9, 2009, for Unit1; from December 10, 2008, until February 20, 2010, for Unit 2; and from May 19, 2009, until February 23, 2010, for Unit 3 because the letdown line could not pass the required flow. The licensee has entered this issue into their corrective action program as PIP O-09-7536. Pending determination of safety significance, this apparent violation is identified as AV 05000269, 270, 287/2010007-03, SSF Reactor Coolant Makeup Subsystem Inoperable for Greater than Allowed by Technical Specifications.

4OA6 Management Meetings

.1 Exit Meeting Summary

On June 3, 2010, the inspection results were presented to Mr. Baxter and members of his staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

Attachment: Supplemental Information

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

K. Alter, Regulatory Compliance Manager
S. Batson, Engineering Manager
D. Baxter, Site Vice President
J. Bohlmann, Organization Effectiveness Manager
P. Fisk, Mechanical/Civil Engineering Manager
P. Gillespie, Station Manager
T. King, Acting Safety Assurance Manager

NRC personnel:

J. Bartley, Branch Chief, DRP
M. King, Acting Branch Chief, DRP
L. Wert, Director, Division of Reactor Projects, Region II
W. Rogers, Senior Risk Analyst, Region II

LIST OF REPORT ITEMS

Opened

05000270, 287/2010007-01	AV	Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility (Section 4OA5.b.1)
05000270, 287/2010007-02	AV	Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability (Section 4OA5.b.2)
05000269, 270, 287/2010007-03	AV	SSF Reactor Coolant Makeup Subsystem Inoperable for Greater than Allowed by Technical Specifications (Section 4OA5.b.3)

Closed

05000269/2010002-02	AV	Failure to Promptly Identify and Correct an Adverse Condition Affecting Operability of the Unit 2 and Unit 3 Standby Shutdown Facility (Section 4OA5.b.1)
05000270, 287/2010002-03	AV	Materially Inaccurate Information Provided to NRC Regarding SSF Event Mitigation Capability (Section 4OA5.b.2)
05000269, 270, 287/2010002-04	AV	Failure to Establish a Test Program to Verify SSF Letdown Line Required Flow (Section 4OA5.b.3)

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Attachment