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

December 18, 2009

Mr. Dennis R. Madison
Vice President
Southern Nuclear Operating Company, Inc.
Edwin I. Hatch Nuclear Plant
11028 Hatch Parkway North
Baxley, GA 31513

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT - NRC SUPPLEMENTAL INSPECTION REPORT 05000321/2009009, 05000366/2009009

Dear Mr. Madison:

On November 18, 2009, the U.S. Nuclear Regulatory Commission (NRC) staff completed a supplemental inspection pursuant to Inspection Procedure 95001, (Inspection for One or Two White Inputs in a Strategic Performance Area), at your Edwin I. Hatch Nuclear Plant, Units 1 and 2. The purpose of the inspection was to examine the causes and actions taken related to a White inspection finding issued in the first quarter of 2009 for failure to promptly identify and correct a condition adverse to quality. This finding resulted in a Violation (VIO) 05000321, 366/2008009-01, 1B EDG Coupling Failure. The enclosed inspection report documents the inspection results, which were discussed at the exit meeting on November 18, 2009, with you and other members of your staff.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and the contributing causes for the risk-significant issues were understood; (2) the extent of condition and extent of cause of the issues were identified; and (3) corrective actions were or will be sufficient to address and preclude repetition of the root and contributing causes.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed the root cause determination report, selected procedures and records, and interviewed personnel.

Based on the results of this supplemental inspection, no findings of significance were identified. The inspector determined that, in general, the problem identification, root cause, and corrective actions taken by your staff were adequate. However, the inspector noted several areas in the root cause determination report that could have been improved. In addition, weaknesses were identified in the recently revised maintenance procedure used to inspect the engine/generator coupling.

In accordance with the Code of Federal Regulations 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/Joel Munday RA for/

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

Docket Nos.: 50-321, 50-366
License Nos.: DPR-57, NPF-5

Enclosure: Inspection Report 05000321/2009009, 05000366/2009009
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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DATE	12/16/2009	12/15/2009	12/15/2009				
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Letter to Dennis R. Madison from Leonard D. Wert dated December 18, 2009

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT - NRC SUPPLEMENTAL INSPECTION REPORT 05000321/2009009, 05000366/2009009

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-321, 50-366
License No.:	DPR-57 and NPF-5
Report No.:	05000321/2009009, 05000366/2009009
Licensee:	Southern Nuclear Operating Company Inc.
Facility :	Edwin I. Hatch Nuclear Plant
Location:	Baxley, Georgia 31513
Dates:	November 16, 2009 – November 18, 2009
Inspector:	T. Chandler, Resident Inspector, Region II
Approved by:	Scott M. Shaeffer, Chief Reactor Projects Branch 2 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000321/2009009, 05000366/2009009; 11/16/2009 – 11/18/2009; Edwin I. Hatch Nuclear Plant, Units 1 and 2; Supplemental Inspection IP 95001 in response to a White inspection finding for failure to promptly identify and correct a condition adverse to quality.

This inspection was conducted by a resident inspector. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with Inspection Procedure 95001, Inspection for One or Two White Inputs in a Strategic Performance Area, to assess the licensee's evaluation associated with the inoperability of the 1B emergency diesel generator in June 2008. The NRC staff previously characterized this issue as having low to moderate safety significance (White) as documented in NRC IR 05000321/2008009, 05000366/2008009. During this supplemental inspection, the inspector determined that the licensee performed a comprehensive evaluation of the self-revealing EDG failure, which occurred during a routine technical specification surveillance requirement test. The licensee identified the primary root causes of the issue to be (1) less-than-adequate EDG coupling inspection procedures and (2) less-than-adequate risk perception for degrading components. These two primary root causes, along with six other root causes and three contributing causes, led the maintenance and engineering personnel to believe that cracking and separation in the engine-generator coupling gland was acceptable. The NRC inspector also determined that the licensee's extent of condition and extent of cause evaluations were adequate, and that the corrective actions were comprehensive and properly prioritized, and sufficient to prevent recurrence of the event.

The inspector did note several areas in the root cause determination report that could have been more timely. Specifically, because the readiness assessment was not conducted until just a few weeks before the 95001 inspection was scheduled to begin; time available to incorporate needed improvements into the final root cause determination reviewed by the inspector was limited. Also, the MORT analysis was not fully utilized to evaluate the role of supervision in the event. In addition, weaknesses were identified in the revised maintenance procedure used to inspect the engine/generator coupling. For example, no specific criteria was provided on how to determine when inspection of the engine side of the coupling would be needed.

Given the licensee's acceptable performance in addressing the inoperable EDG, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in IMC 0305, "Operating Reactor Assessment Program." The implementation and effectiveness of the licensee's corrective actions will be reviewed during future inspections.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

No findings of significance were identified.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspection (95001)

.01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with IP 95001 to assess the licensee's evaluation of a White finding, which affected the mitigating systems cornerstone in the reactor safety strategic performance area. The inspection objectives were to:

- Verify that the licensee understands the root causes and contributing causes of the 1B EDG failure.
- Verify that the licensee has determined the extent of condition and extent of cause of the identified root and contributing causes.
- Verify that the corrective actions for these issues are sufficient to address the root and contributing causes and to prevent recurrence.
- Verify that the procedures have been revised to perform visual inspections of both sides of the coupling (generator/motor).

The licensee entered the Regulatory Response Column of the NRC's Action Matrix in the first quarter of 2008 as a result of one inspection finding of low to moderate safety (White) significance. The finding was associated with the inoperability of the 1B EDG in July 2008. On July 12, 2008, the 1B EDG was manually shutdown due to excessive vibration and declared inoperable. The finding was characterized as having White safety significance based on the results of a Phase 3 risk analysis performed by a region-based senior reactor analyst (SRA), as discussed in NRC IR 05000321/2008009, 05000366/2008009. The excessive vibration was attributed to age-related cracks in the rubber gland on both the diesel engine side and generator side of the generator/motor coupling. On July 16, 2008, the generator/motor coupling was replaced and the 1B EDG was returned to service.

The licensee had performed its initial root cause determination (CR 2008107432 RCCA version 1.0, dated 09/04/08) to identify weaknesses that existed in various organizations, which allowed for a risk-significant finding and to determine the organizational attributes that resulted in the White finding. As part of the root cause determination, the licensee also completed a safety culture assessment. The licensee staff informed the NRC staff on September 23, 2009, that they were ready for the supplemental inspection. In October 2009, in preparation for the 95001 inspection, the licensee conducted an in-depth readiness assessment of the original root cause determination report. As a result of that self-critical readiness assessment, the licensee made numerous significant improvements to the original report. As a result, the revised root cause determination

report (CR 2008107432 RCCA version 2.0, dated 11/12/09) was issued just prior to the inspection.

The inspector reviewed the licensee's root cause determination report, along with several evaluations that were conducted in support of the root cause determination. The inspector reviewed the licensee's extent of condition and extent of cause evaluations to ensure they were sufficient in breadth. The inspector reviewed the corrective actions that were taken or planned to address the identified causes. The inspector also held discussions with licensee personnel to ensure that the root and contributing causes, as well as the contribution of safety culture components, were understood and that corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.02 Evaluation of the Inspection Requirements

02.01 Problem Identification

a. IP 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and the conditions under which the issue was identified.

The self-revealing issue occurred during a Technical Specification surveillance requirement. The initial indications of the issue were high engine vibrations approximately four hours into the 24-hour test run of the 1B EDG.

b. IP 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents how long the issue existed and prior opportunities for identification.

The licensee's RCCA documented that the cracks in the coupling gland were first identified back in 1988. However, it was determined at that time that the cracks did not impact EDG operability due to the coupling gland passing a vendor recommended air test and the EDG's ability to pass the Technical Specification surveillance requirement.

c. IP 95001 requires that the inspection staff determine that the licensee's evaluation of the issue documents the plant-specific risk consequence, as applicable, and compliance concerns associated with the issue.

The NRC determined this issue was a White finding, as documented in NRC IR 05000321/2009008 and 05000366/2009008. The inspector determined that the licensee conducted a plant specific risk consequence analysis and provided its results in the final root cause determination report. Using the Hatch PRA model with a 93 day exposure time yields a probable core damage frequency (CDF) of 9.16 E-7. The large early release frequency (LERF) is 3.89 E-9 and is considered negligible. Due to the small amount of risk increase (less than 1.0 E-6) the licensee determined this to be a Green finding. It is also noted that Plant Hatch requires only one EDG per unit for performance of LOSP functions.

d. Findings

No findings of significance were identified.

02.02 Root Cause and Extent-of-Condition Evaluation

a. IP 95001 requires that the inspection staff determine that the licensee evaluated the issue using a systematic methodology to identify the root and contributing causes.

The licensee used the following systematic methods to complete their RCCA:

- Fault tree analysis
- Barrier analysis
- MORT analysis
- Event and causal factors chart
- Event timeline

The inspector determined that the licensee evaluated the issue using a systematic methodology to identify the root and contributing causes.

b. IP 95001 requires that the inspection staff determine that the licensee's RCCA was conducted to a level of detail commensurate with the significance of the problem.

The licensee's RCCA included an extensive timeline of events, as well as an event and causal factors chart as discussed in the previous section. Using a multidisciplinary team, the licensee identified eight root causes and three contributing causes. Based on the extensive work performed for this root cause evaluation, the inspector concluded that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

c. IP 95001 requires that the inspection staff determine that the licensee's RCCA include a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The licensee's RCCA included a review of both internal and external OE. A search of the Plant Hatch condition report data base for previous reports of the same or similar problems found no reports of previous problems with the EDG couplings. However, the event and causal factors chart reviewed the history of the event and looked for previous opportunities to correct the problem. As a result of this review, the licensee identified that their use of vendor information was poor, and as a result, several of the root causes are tied to inadequate dissemination of vendor information. Based on the licensee's detailed evaluation and conclusions, the inspector determined that the licensee's RCCA considered prior occurrences and operating experience.

d. IP 95001 requires that the inspection staff determine that the licensee's RCCA addresses the extent of condition and the extent of cause of the issue.

To address the extent of condition issue, the licensee's RCCA contained a review of several components that contain similar elastomer-coupled elements and the preventive maintenance items associated with them. As a result of this review, the couplings were replaced on the other four EDGs at Plant Hatch, and the inspection and replacement requirements on several other major components that contain similar elastomer-coupled elements were greatly improved. Also, a review of the actions taken in relationship to the causes was documented in the RCCA to provide assurance that the actions were sufficiently broad to address the extent of causes. The inspector determined that the licensee's RCCA addressed the extent of condition and the extent of cause of the issue.

e. IP 95001 requires that the inspection staff determine that the licensee's root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in IMC 0305.

As part of the RCCA, the licensee performed a Safety Culture Assessment. This assessment identified three areas needing improvement: Decision Making, Corrective Action Program, and Operating Experience. In addition, a MORT analysis was performed to provide additional focus on why condition reports were not initiated. Based upon the corrective actions listed in the Safety Culture Assessment, the inspector determined that the licensee's root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in IMC 0305.

f. Findings

No findings of significance were identified. However, the inspector did note several areas in the root cause determination report that could have been more timely. Specifically, because the readiness assessment was not conducted until just a few weeks before the 95001 inspection was scheduled to begin; time available to incorporate needed improvements into the final root cause determination reviewed by the inspector was limited. Also, the MORT analysis was not fully utilized to evaluate the role of supervision in the event.

02.03 Corrective Actions

a. IP 95001 requires that the inspection staff determine that: (1) the licensee specified appropriate corrective action(s) for each root and/or contributing cause; or (2) an evaluation that states no actions are necessary is adequate.

The licensee took immediate corrective actions to restore operability of the 1B EDG by replacing the cracked coupling. All root and contributing causes listed in the RCCA were linked to an appropriate corrective action. The inspector determined that the proposed corrective actions are appropriate and addressed each root and contributing cause.

b. IP 95001 requires that the inspection staff determine that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.

The licensee's immediate corrective actions restored the 1B EDG to operable status within 86 hours. While the 1B EDG was inoperable, the licensee performed monthly TS surveillance procedures to verify operability of the 1A, 1C, 2A, and 2B EDGs. Over the next few weeks, the licensee conservatively replaced the couplings in the 1A, 1C, 2A, and 2B EDGs, greatly reducing the risk of an additional coupling failure. Based upon these corrective actions, as well as the other corrective actions identified in the RCCA, the inspector determined that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.

c. IP 95001 requires that the inspection staff determine that the licensee established a schedule for implementing and completing the corrective actions.

The inspector determined that all of the corrective actions listed in the RCCA have been either scheduled or completed.

d. IP 95001 requires that the inspection staff determine that the licensee developed quantitative and qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition.

The inspector determined that an interim effectiveness review for the corrective actions listed in the RCCA is scheduled for December 2009 (ref. AI 2009203209) Because the RCCA was revised on November 12, 2009, the final effectiveness review will be delayed until June 2010 to allow additional time to completed newly added corrective actions. The inspector determined that the licensee has developed quantitative and qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition of this event.

e. IP 95001 requires that the inspection staff determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.

The NRC issued an NOV to the licensee on June 4, 2009. The licensee provided the NRC a written response to the NOV on July 2, 2009. The licensee's response described: (1) corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken; (3) the date when full compliance will be achieved; and (4) the reasons for the violation. During this inspection, the inspector confirmed that the licensee's RCCA and planned and taken corrective actions addressed the NOV. The licensee restored the 1B EDG to full compliance on July 16, 2008.

f. <u>Findings</u>

No findings of significance were identified. Inspectors did note weaknesses in the revised maintenance procedure used to inspect the engine/generator coupling. For example, no specific criteria was provided on how to determine when inspection of the engine side of the coupling would be needed. Based on observations provided by the inspector the licensee initiated actions to add criteria to address this issue.

4OA6 Exit Meeting

On November 18, 2009, the inspector presented the results of the supplemental inspection to Mr. Dennis R. Madison and other members of licensee management and staff, who acknowledged the findings. The inspector confirmed that no proprietary information was provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
G. Johnson – Engineering Director
D. Madison – Site Vice President
L. Mikulecky – Root Cause Analyst
S. Tipps – Principle Licensing Engineer

NRC personnel:
E. Morris, Senior Resident Inspector – Hatch
P. Niebaum, Resident Inspector - Hatch
S. Shaeffer, Chief, Reactor Projects Branch 2

ITEMS OPENED, CLOSED AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Action Items

2001202296	2008203824	2004202167	2008203692	2008204097	2008204098
2008204099	2009204100	2008204101	2008204102	2008204103	2008204104
2008204105	2008204106	2008204107	2008204108	2008204109	2008204110
2008204111	2008204112	2008204113	2008204114	2008204115	2008203209
2008204651	2008205554				

Procedures
52SV-R43-001, Diesel, Alternator, and accessories inspection, various revisions

Maintenance Work Orders
10100390, Replace inboard and outboard alternator bearings on 1B EDG
28603340, 2C EDG bearing seizure
28603681, Inspect 2C EDG inboard bearing

Condition Reports

1996001491	1998002701	2001004250	2000011063	2001000624	2004104711
1996001491	2007108168	2008107432			

Miscellaneous
Fermi Event Card 02-14329
Sure-Flex Elastomeric Couplings Manual
Test Report 08-0372-TR-001, Altran Technical Report on Hatch EDG Coupling Assessments
Vendor document SX28733
Vendor document SX13147