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

June 4, 2009

EA-09-054

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

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF WHITE FINDING AND NOTICE OF VIOLATION (NRC INSPECTION REPORT NO. 05000321/2009008 AND 05000366/2009008), EDWIN I. HATCH NUCLEAR PLANT

Dear Mr. Madison:

This letter provides you the final significance determination of the preliminary White finding discussed in NRC Inspection Report No. 05000321/2008009 and 05000366/2008009, dated March 13, 2009. The inspection finding was assessed using the Significance Determination Process and was preliminarily characterized as White, a finding with low to moderate increased importance to safety, that may require additional NRC inspections. The finding involved a failure to identify and correct cracks in the 1B emergency diesel generator (EDG) coupling which were previously observed during routine maintenance inspections.

In lieu of requesting a Regulatory Conference, Southern Nuclear Operating Company, Inc., (SNC) provided a written response dated April 15, 2009. In its response, SNC stated that the NRC's application of common cause failure (CCF) treatment is not appropriate in this case for the following reasons:

- EDG coupling failures are unique, infrequent, and independent events, as supported by review of the NRC CCF Database and Analysis System;
- The 1B EDG is the Unit 1/2 shared diesel generator. Its coupling had significantly worse cracking and over 20% more run time than the other couplings, with more than twice as much run time over 1800 hours, the approximate point at which surface cracks begin to progress. Run time is the dominant factor related to coupling failure;
- Post-event examination and testing of the other couplings revealed them to be in significantly better condition than 1B, supporting estimated remaining lifetimes equating to several years of standby service; and
- Testing confirmed that probabilistic risk assessment (PRA) mission times for the couplings would have been clearly met for the remaining EDGs.

SNC also reviewed the NRC Risk Assessment of Operational Events (RASP) handbook, NUREG/CR 5485, "Guidelines on Modeling Common-Cause Failures in Probabilistic Risk Assessment," and concluded that the guidance would allow for consideration of actual extent of condition to be a factor towards the decision to apply common cause. SNC requested in its April 15 submittal that the NRC explain why the actual condition of the remaining couplings was not considered in the decision to apply common cause treatment. Based on its risk assessment, SNC concluded that the finding should be appropriately characterized as very low to low increased importance to safety (i.e., Green).

After considering the information developed during the inspection and information provided in SNC's written response, the NRC has concluded that SNC's coupling testing and test results analyses do not provide a sufficient basis for concluding that the July 2008 failure of the 1B EDG generator coupling should be treated as an independent failure. Additional discussion of the basis for this conclusion is detailed in Enclosure 2. The NRC considered that the testing only demonstrated that the remaining couplings did not fail during the test and did not eliminate the potential for common-cause failure of these couplings because all were similarly degraded as explained below. Furthermore, the application of common cause in our assessment was done in accordance with NRC's RASP Handbook. Component run time is only one coupling characteristic considered when determining common cause. All of the coupling characteristics listed below, including run time, were considered by the NRC when calculating the risk. NRC considered the actual condition of the couplings and other factors in developing the conclusion that the failure circumstances do not merit treatment as an independent failure. All the couplings were in a degraded, age-hardened condition; had varying degrees of cracking present; and had similar susceptibility factors of manufacturer, environment, age-related deterioration, maintenance/testing program, pre-existing cracking, and operating conditions. Therefore, the NRC has determined that the final significance of the finding is appropriately characterized as low to moderate increased importance to safety (i.e., White), as further discussed in
Enclosure 2.

You have 30 calendar days from the date of this letter to appeal the staff's significance determination for this finding. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual Chapter 0609, Attachment 2.

The NRC has also determined that the failure to identify and correct a condition adverse to quality involving cracks in the 1B EDG generator coupling is a violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, as cited in the enclosed Notice of Violation (Notice) (Enclosure 1). The circumstances surrounding the violation were described in NRC Inspection Report No. 05000321/2008009 and 05000366/2008009. In accordance with the NRC Enforcement Policy, the Notice is considered an escalated enforcement action because it is associated with a White finding. Accordingly, Apparent Violation (AV) 05000321, 366/2008009-01 is now Violation (VIO) 05000321, 366/2008009-01, 1B EDG Coupling Failure.

In addition, the NRC has identified an associated cross-cutting aspect in the area of Problem Identification & Resolution in conjunction with the subject Violation. Specifically, the identified cross-cutting aspect relates to the corrective action program and the need to properly identify issues that potentially impact nuclear safety [P.1(a)]. If you disagree with the characterization of this finding, you should provide a response within 30 days from the date of this letter, with the basis for your disagreement. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response.

Because plant performance for this issue has been determined to be in the regulatory response band, we will use the NRC Action Matrix to determine the most appropriate NRC response for this event. We will notify you, by separate correspondence, of that determination.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Sincerely,

/RA/

Luis A. Reyes
Regional Administrator

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

Enclosures: 1. Notice of Violation
2. NRC Basis for Final Significance Determination

cc w/encls: (See page 4)

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Luis A. Reyes
Regional Administrator

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cc w/encls: (See page 4)

*FOR PREVOUS CONCURRENCE SEE ATTACHED SHEET

X PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE X NON-SENSITIVE

ADAMS: ☐ Yes ACCESSION NUMBER: ML091590406 X SUNSI REVIEW COMPLETE ***/SMS/***

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NAME	*SShaeffer	*GMcDonald	*CEvans	*LWert	VMcCree	Bowman/f/Hilton	MGalloway email
DATE	5/21/2009	5/22/2009	5/22/2009	05/26/2009	06/02/2009	05/28/2009	05/28/2009
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Letter to Dennis R. Madison from Scott M. Shaeffer dated June 4, 2009

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF WHITE FINDING AND NOTICE OF VIOLATION (NRC INSPECTION REPORT NO. 05000321/2009008 AND 05000366/2009008), EDWIN I. HATCH NUCLEAR PLANT

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NOTICE OF VIOLATION

Southern Nuclear Operating Company, Inc.
Edwin I. Hatch Nuclear Plant
Units 1 and 2

Docket Nos. 50-321, 50-366
License Nos. DRP-57, NPF-5
EA-09-054

During an inspection completed by the NRC on March 13, 2009, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is set forth below:

> 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected.
>
> Contrary to the above, the licensee failed to promptly identify and correct a condition adverse to quality. Since 1988, the licensee had observed cracks in the EDG couplings, but did not identify the cracking as an indication of coupling degradation. The licensee did not document the conditions during routine maintenance inspections and no condition report was written to identify and correct this condition adverse to quality. Consequently, the 1B coupling developed higher than normal vibration on July 12, 2008, during a routine surveillance which prompted the licensee to declare the 1B EDG inoperable.

This violation is associated with a White finding for Units 1 and 2.

Pursuant to the provisions of 10 CFR 2.201, Southern Nuclear Operating Company, Inc. (Licensee), is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation; EA-09-054" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (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 previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be publicly available in the NRC Public Document Room or from the NRC's document system (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 4th day of June 2009

NRC Basis for Final Significance Determination

In its written response, SNC challenged the application of common cause treatment by the NRC in determining the significance of the 1B EDG generator coupling failure in July 2008. The licensee provided test data from destructive testing of the 1B and other EDG generator couplings which SNC believes supports its position. NRC Senior Reactor Analysts (SRAs) from NRC Headquarters, Regional SRAs, and an independent Risk Analyst from Idaho National Lab (INL) performed a detailed review of the coupling test data and SNC's test results analysis. Based on this review, NRC concluded that SNC's coupling test data and test results analysis do not provide a sufficient basis to conclude that the 1B EDG generator coupling failure should be treated as an independent failure.

NRC reviewed the details of the vendor testing and believes that the conclusion that the remaining couplings were not susceptible to the same failure mode is not supported by the facts and the data. Some of the concerns with the testing and conclusion are:

1. The testing does not fully model the actual in-plant conditions in that the couplings experience significant vibration when in actual service.

2. SNC concluded that run time was the dominant factor related to coupling failure and only considers run time in predicting remaining coupling life. Age-related deterioration (hardening) of the rubber was considered a shared root cause; however, it is not considered in predicting coupling life. The vendor stated that increased resonant frequency due to age-related hardening of rubber was a contributor to the failure mode of the 1B EDG generator coupling.

3. The failure criterion of 50% cracking based on the 51.4% cracking observed on the 1B generator coupling is not supported. No data or analysis was presented that characterized the actual cracking percentage which was on the 1B coupling before the severe vibration occurred on the 1B EDG engine.

4. The correlation between coupling hours of operation and amount of cracking was only developed for generator-side, inner diameter (ID) cracks. No data or analysis was presented that cracks in other locations could not lead to high vibration and EDG failure to run for the required mission time. If cracking on both the generator-side and diesel-side of the coupling is used, EDG 1C is the second worst degraded coupling after the 1B coupling yet has the shortest cumulative run time at 1746 hours.

5. The statistical regression model developed by the vendor was based on only four data points and only considered inner diameter, generator-side cracking. Thus, there are large uncertainties in making predictions using this model. The model was used to make predictions of remaining coupling life without consideration of these uncertainties.

SNC's response letter requests that NRC explain why the actual condition of the couplings was not considered in the decision to apply common cause treatment. NRC has taken the actual condition of the couplings into account, along with other considerations, in making the decision that the failure circumstances do not merit treatment as an independent failure. All the couplings were in a degraded, age-hardened condition, and all had varying degrees of cracking

present.

All the couplings had similar susceptibility factors of manufacturer, environment, age-related deterioration, maintenance/testing program, pre-existing cracking, and operating conditions. While the 1B EDG generator coupling had approximately 20% more operating history than the other generator couplings, that single factor does not exclude the other couplings from having an increased likelihood of failure due to the same failure mode. The actual condition of the 1B coupling at the time of failure did not prove that the remaining couplings were not susceptible to failure from age-related deterioration combined with operating time under load. It is for this reason that the common cause increase was justified. Some amount of increase in the failure frequency for common cause is required because all the generator couplings were subject to similar susceptibility factors.

SNC's response letter references a Nuclear Energy Institute (NEI) letter dated November 4, 2008, which submitted industry comments on the RASP Handbook. Comment number 3 of the NEI letter addressed guidance related to classifying failures as independent or common cause and NEI suggested that testing and inspection of the redundant components in the common cause component group (CCCG) should be acknowledged as valid means of establishing that a common cause failure due to the same causes present in the observed failure are unlikely. In NRC's response to the NEI letter dated April 6, 2009, NRC agreed that testing and inspection of redundant components are sound engineering practices to demonstrate that multiple trains are not failed. However, these activities only prove that the component was not in a failed state. Redundant components may show greater likelihood of CCF due to observed degradation from the same root cause. The risk analysis of the Hatch 1B EDG coupling has been performed according to this guidance.

In summary, the conclusion of the review is that the circumstances of the failure and the actual condition of the couplings merit treatment as a potential common cause failure.