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

March 13, 2009

EA-09-054

Mr. Dennis R. Madison
Vice President
Southern Nuclear Operating Company, Inc.
11028 Hatch Parkway, North
Baxley, Georgia 31513

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, NRC INSPECTION REPORT 05000321/2008009 AND 05000366/2008009 AND PRELIMINARY WHITE FINDING

Dear Mr. Madison:

On March 10, 2009, the Nuclear Regulatory Commission (NRC) completed an in-office inspection of the 1B Emergency Diesel Generator (EDG) generator coupling failure which occurred on July 12, 2008. Additional inspection activities were documented in NRC Special Inspection Report 05000321/2008008 and 05000366/2008008, which was issued on September 6, 2008.

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. Based on the results of this inspection, a finding was identified involving the failure to identify and correct cracks observed during routine maintenance inspections which resulted in degradation of the 1B EDG generator coupling. Consequently, the generator coupling failed during a routine surveillance test causing the 1B EDG to be declared inoperable on July 12, 2008. On July 16, 2008, the generator coupling was replaced and the 1B EDG returned to service.

This finding was assessed, based on the best available information, including influential assumptions, using the applicable Significance Determination Process (SDP) and was preliminarily determined to be a low to moderate safety significance (White) finding. The final resolution of this finding will convey the increment in the importance to safety by assigning the corresponding color, i.e., White, a finding with low to moderate increased importance to safety that may require additional NRC inspections. The dominant accident sequences involved: (1) Loss of offsite power (LOOP) with loss of emergency power (2) a Transient induced LOOP with failures of primary containment suppression (PCS) and high pressure coolant injection (HPCI) (3) LOOP with loss of emergency power, reactor core isolation cooling (RCIC), and HPCI with failure to recover offsite power and the EDGs. These events ultimately could result in the loss of all injection due to inability to recover EDGs or offsite power leading to core damage. The exposure period was a total of 182 days including the 4 day repair interval and the178 day

interval consisting of the individual success periods. The SDP analysis included an increase in the EDG common cause fail to run probability due to failure of the 1B EDG. All five Hatch EDGs were vulnerable to an increased likelihood of coupling failure because all couplings had similar age related deterioration, environmental conditions and overall operating history. The 1B EDG coupling experienced a catastrophic failure during voluntary testing while the other couplings had indications of the same degradation mechanism. As such, the EDG coupling components met the criteria for common cause treatment in the Risk Assessment of Operational Events (RASP) Handbook Volume 1 Internal Events (Revision1.01), sections 3.4 pages 3-6. The NRC's evaluation of the common cause within the SDP analysis recognized that the 1B EDG, being the swing diesel for Hatch, had approximately 20% more operating hours on its coupling than the other EDGs; however, the increased common cause probability for the other couplings was still considered to be applicable for environmental, age and other considerations. The SDP analysis is included as Enclosure 2.

The finding is also an Apparent Violation (AV) of 10 CFR 50 Appendix B Criterion XVI, Corrective Action, for failure to identify and correct a condition adverse to quality and is being considered for escalated enforcement in accordance with the Enforcement Policy. In addition, this finding is considered to have a cross-cutting aspect related to the identification of issues [P.1(a)], as described in the corrective action program component of the problem identification and resolution cross-cutting area. Accordingly, for administrative purposes, Unresolved Item 05000321, 366/2008008-01 is considered closed. The current Enforcement Policy is included on the NRC's website at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html.

In accordance with Inspection Manual Chapter (IMC) 0609, we intend to complete our evaluation using the best available information and issue our final determination of safety significance within 90 days of the date of this letter. 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 we make a final decision on this matter, we are providing you an opportunity to: (1) present to the NRC your perspectives on the facts and assumptions used by the NRC to arrive at the finding and its significance at a Regulatory Conference or (2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within approximately 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a Regulatory 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.

Please contact Mr. Scott Shaeffer at (404) 562-4521 within 10 business days of the date of your receipt of this letter to notify the NRC of your intentions. If we have not heard from you within 10 business days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for this inspection finding at this time. In addition, please be advised that the number and characterization of the apparent violation 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 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.

Sincerely,

/RTM RA for/

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

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

Enclosures: 1. NRC Inspection Report 05000321/2008009 and 05000366/2008009
2. SDP Phase 3 Summary **(OFFICIAL USE ONLY - PROPRIETARY INFORMATION)**

cc w/encl.: (See page 4)
cc w/o encl. 2: (See page 4)

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

Sincerely,

/RTM RA for/

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

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

Enclosures: 1. NRC Inspection Report 05000321/2008009 and 05000366/2008009
2. SDP Phase 3 Summary **(OFFICIAL USE ONLY - PROPRIETARY INFORMATION)**

cc w/encl.: (See page 4)
cc w/o encl. 2: (See page 4)

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

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

OFFICE	RII:DRP	RII:DRP	RII:EICS	RII:DRP	RII:DRP	RII:EICS	RII:DRS
SIGNATURE	JAH /via email/	TXL /RA/		SMS /RA/	JTM /RA/	CFE /via email/	GMD /via email/
NAME	JHickey	TLighty	SSparks	SShaeffer	JMunday	CEvans	GMcDonald
DATE	03/10/2009	03/10/2009		03/11/2009	03/13/2009	03/11/2009	03/10/2009
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: I:\RPB2\HATCH\EDG COUPLING SDP\1B EDG CHOICE LETTER W-ENCL.DOC

cc w/encl:
Jeffrey T. Gasser
Executive Vice President
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

L. Mike Stinson
Vice President
Fleet Operations Support
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

David H. Jones
Vice President
Engineering
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Moanica Caston
Vice President and General Counsel
Southern Nuclear Operating Company, Inc.
Bin B-022
P.O. Box 1295
Birmingham, AL 35201-1295

cc w/o encl:
Laurence Bergen
Oglethorpe Power Corporation
2100 East Exchange Place
P.O. Box 1349
Tucker, GA 30085-1349

Arthur H. Domby, Esq.
Troutman Sanders
Nations Bank Plaza
600 Peachtree Street, NE, Suite 5200
Atlanta, GA 30308-2216

Dr. Carol Couch
Director
Environmental Protection
Department of Natural Resources
2 Martin Luther King Drive, S.E.
Suite 1152 East Tower
Atlanta, GA 30334

Cynthia Sanders
Program Manager
Radioactive Materials Program
Department of Natural Resources
4220 International Parkway
Suite 110
Atlanta, GA 30354

Reece McAlister
Executive Secretary
Public Service Commission
244 Washington Street, SW
Atlanta, GA 30334

Chairman
Appling County Commissioners
County Courthouse
69 Tippins Street, Suite 201
Baxley, GA 31513

Mr. K. Rosanski
Resident Manager
Oglethorpe Power Corporation
Hatch Nuclear Plant
P.O. Box 2010
Baxley, GA 31515

Senior Engineer
Power Supply
Municipal Electric Authority of Georgia
1470 Riveredge Parkway NW
Atlanta, GA 30328-4684

Letter to Mr. Dennis Madison from Leonard D. Wert, Jr. dated March 13, 2009

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, NRC INSPECTION REPORT 05000321/2008009 AND 05000366/2008009 AND PRELIMINARY WHITE FINDING

Distribution w/encl:
C. Evans, RII
L. Slack, RII EICS
OE Mail
RIDSNRRDIRS
PUBLIC
R. Martin, NRR
D. Wright, NRR
B. Westreich, NSIR (hard copy w/encl)
E. McNiel, NSIR (hard copy w/encl)

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	05000321, 05000366
License No.:	DPR-57 and NPF-5
Report No.:	05000321/2008009 and 05000366/2008009
Licensee:	Southern Nuclear Operating Company, Inc.
Facility:	Edwin I. Hatch Nuclear Plant
Location:	Baxley, GA
Dates:	July 12, 2008 – March 10, 2009
Inspectors:	J. Hickey, Senior Resident Inspector (Section 4OA5, 4OA6) P. Niebaum, Resident Inspector (Section 4OA5, 4OA6) G. MacDonald, Senior Reactor Analyst (Section 4OA5) T. Lighty, Project Engineer (Section 4OA5)
Approved by:	Scott M. Shaeffer, Chief Reactor Projects Branch 2 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000321,366/2008-009; 7/12/2008-3/10/2009; Edwin I. Hatch Nuclear Plant; Unit 1; Other Activities.

The report transmits the results of the NRC's preliminary assessment of the 1B Emergency Diesel Generator coupling failure. One Apparent Violation with potentially low to moderate safety significance (White) was identified. The significance of most findings is indicated by its color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or assigned a severity level after 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 self-revealing apparent violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for failure to promptly identify and correct a condition adverse to quality. Since 1988, the licensee had observed cracks in the glands of the EDG couplings, but did not identify the cracking was an indication of coupling degradation. Therefore, no condition report was written to identify and correct the 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.

  The failure to promptly identify and correct a condition adverse to quality for the observed degraded condition of the 1B EDG coupling is a performance deficiency. This finding is more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the objective in that there was no reasonable assurance the 1B EDG could meet its mission time. This finding was assessed using the applicable SDP and preliminarily determined to White because there was a calculated risk increase over the base case between 1E-5 and 1E-6. The dominant sequences included (1) LOOP with loss of emergency power (SBO), success of RCIC, successful depressurization, failure to recover offsite power and the EDGs within 5 hours, and failure of firewater injection due to repressurization caused by inability to operate SRVs without DC power (2) a Transient induced LOOP with failures of PCS and HPCI, successful depressurization and failure of all injection due to inability to recover EDGs or offsite power and (3) LOOP with loss of emergency power, RCIC, and HPCI with failure to recover offsite power and the EDGs. The HPCI system is failed in the model with loss of room cooling due to SBO. The exposure period was a total of 182 days including the 4 day repair interval and the 178 day interval consisting of the individual success periods.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Other

(Opened) Apparent Violation (AV) 05000321,366/2008009-001, 1B EDG Coupling Failure

a. Inspection Scope

The inspectors conducted a review and significance evaluation of the failure of the 1B EDG coupling.

b. Findings

Introduction. A self-revealing apparent violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for failure to promptly identify and correct a condition adverse to quality. Since 1988, the licensee had observed cracks in the glands of the EDG couplings, but did not identify the cracking was an indication of coupling degradation. Therefore, no condition report was written to identify and correct the condition adverse to quality. Consequently, the 1B coupling developed higher than normal vibration due to coupling degradation on July 12, 2008, during a routine surveillance which prompted the licensee to declare the 1B EDG inoperable.

Description. On July 12, 2008, the 1B EDG was manually shutdown due to excessive vibration and declared inoperable. As part of the troubleshooting effort, vibration monitoring equipment was installed for an unloaded maintenance run of the 1B EDG on July 14, 2008. This run was stopped after approximately 45 minutes due engine block vibration levels exceeding an operational limit recently supplied by the EDG vendor. Post-event inspections by the licensee identified several cracks of the rubber gland on both the diesel engine flywheel side and the generator side of the coupling. It was later determined that the cause of the excessive vibration was the age-related cracks in the rubber gland of the EDG coupling. Subsequent to the 1B EDG coupling vibration issues, the licensee replaced all five EDG couplings. During the root cause analysis, the licensee determined that cracks on the 2C EDG coupling had been observed as early as 1988 and similar cracks had been seen on the other EDG couplings. However, these conditions were not documented during routine maintenance inspections and no condition report was written to identify this condition adverse to quality. As the condition was not identified, corrective actions were not taken to address the degraded conditions.

In November 2008, the licensee completed voluntary offsite testing on the 1B EDG coupling to determine if the 1B EDG could meet the 24 hour mission time. The coupling catastrophically failed about 30 minutes into a fully loaded 2-hour test run. This indicated that the 1B EDG would not have met its mission time. The failure mechanism was determined to be age related deterioration of the coupling combined with running the 1B EDG in it's fully loaded condition. This resulted in high stress on the EDG couplings. However, start-up torque conditions could also have contributed to coupling deterioration. The 1B EDG had 20% more run time than the other EDGs (approximately 2754 hours vs. 2200 hours). Therefore, the 1B EDG coupling was considered to be the bounding case for all the EDGs with regards to run hours. The 1C EDG coupling did not fail during the full load offsite testing and all other EDG couplings did not exhibit any operational problems prior to replacement in 2008. However, the EDG couplings had several strong factors which support common cause treatment including common hardware, maintenance program, environment, equipment age, operating hours and similar degradation.

Analysis. The failure to identify and correct a condition adverse to quality for the observed degraded condition of the 1B EDG coupling is a performance deficiency. This finding is more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the objective in that there was no reasonable assurance the 1B EDG could meet its mission time. This finding was assessed using the applicable SDP and preliminarily determined to White because there was a calculated risk increase over the base case between 1E-5 and 1E-6. The analysis included an increase in the emergency diesel generator (EDG) common cause fail to run probability due to all five Hatch EDGs being vulnerable to an increased likelihood of coupling failure due to degraded couplings. All couplings had similar age and operating history and one EDG coupling suffered a catastrophic failure while the other couplings had indications of the same degradation mechanism which meets the criteria for common cause treatment in the Risk Assessment of Operational Events (RASP) Handbook Volume 1 Internal Events, sections 3.4 page 3-6. The dominant sequences included (1) LOOP with loss of emergency power (SBO), success of RCIC, successful depressurization, failure to recover offsite power and the EDGs within 5 hours, and failure of firewater injection due to repressurization caused by inability to operate SRVs without DC power (2) a Transient induced LOOP with failures of PCS and HPCI, successful depressurization and failure of all injection due to inability to recover EDGs or offsite power and (3) LOOP with loss of emergency power, RCIC, and HPCI with failure to recover offsite power and the EDGs. The HPCI system is failed in the model with loss of room cooling due to SBO. The exposure period was the 178 day interval consisting of the individual success periods and a 4 day repair interval for a total of 182 days.

Enforcement. 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. In addition, this finding is considered to have a cross-cutting aspect related to the identification of issues [P.1(a)], as described in the corrective action program component of the problem identification and resolution cross-cutting area. Specifically, that the licensee identifies issues completely, accurately, and in a timely manner commensurate with their safety significance. URI 05000321, 366/2008008-01, which was opened during the special inspection is considered closed. Pending final significance determination, this finding is identified as Apparent Violation (AV) 05000321,366/2008009-01, 1B EDG Coupling Failure.

4OA6 Meetings, Including Exit

On March 10, 2009, the NRC presented the inspection results to Mr. Dennis Madison who acknowledged the findings.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

LIST OF REPORT ITEMS

Opened

05000321, 366/2008009-01 AV 1B EDG Coupling Failure (Section 4OA5)

Closed

05000321, 366/2008008-01 URI Review of EDG Coupling Root Cause Evaluation (Section 4OA5.3).