

Charles R. Pierce  
Regulatory Affairs Director

Southern Nuclear  
Operating Company, Inc.  
40 Inverness Center Parkway  
Post Office Box 1295  
Birmingham, AL 35242

Tel 205.992.7872  
Fax 205.992.7601



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Docket Nos.: 50-366

NL-16-0811

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant  
Licensee Event Report 2016-001-00  
2C EDG Fuel Oil Relief Valve Leakage Caused Train Inoperability

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D) Southern Nuclear Operating Company hereby submits the enclosed Licensee Event Report.

This letter contains no NRC commitments. If you have any questions, please contact Greg Johnson at (912) 537-5874.

Respectfully submitted,

C. R. Pierce  
Regulatory Affairs Director

CRP/cdp

Enclosure: LER 2016-001-00

cc: Southern Nuclear Operating Company  
Mr. S. E. Kuczynski, Chairman, President & CEO  
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer  
Mr. D. R. Vineyard, Vice President – Hatch  
Mr. M. D. Meier, Vice President – Regulatory Affairs  
Mr. D. R. Madison, Vice President – Fleet Operations  
Mr. B. J. Adams, Vice President – Engineering  
Mr. G. L. Johnson, Regulatory Affairs Manager - Hatch  
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission  
Ms. C. Haney, Regional Administrator  
Mr. M. D. Orenak, NRR Project Manager – Hatch  
Mr. D. H. Hardage, Senior Resident Inspector – Hatch

**Edwin I. Hatch Nuclear Plant Unit 2**

**LER 2016-001-001**

**2C EDG Fuel Oil Relief Valve Leakage Caused Train Inoperability**

**LICENSEE EVENT REPORT (LER)**(See Page 2 for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Edwin I. Hatch Nuclear Plant Unit 2										<b>2. DOCKET NUMBER</b> 05000 366				<b>3. PAGE</b> 1 OF 4								
<b>4. TITLE</b> 2C EDG Fuel Oil Relief Valve Leakage Caused Train Inoperability																						
<b>5. EVENT DATE</b>						<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>										
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME						DOCKET NUMBER							
04	13	2016	2016	- 001	- 00	06	08	2016	FACILITY NAME						DOCKET NUMBER							
<b>9. OPERATING MODE</b>						<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>																
1						<input type="checkbox"/> 20.2201(b)			<input type="checkbox"/> 20.2203(a)(3)(i)			<input type="checkbox"/> 50.73(a)(2)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
						<input type="checkbox"/> 20.2201(d)			<input type="checkbox"/> 20.2203(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(ii)(B)			<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
						<input type="checkbox"/> 20.2203(a)(1)			<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(iii)			<input type="checkbox"/> 50.73(a)(2)(ix)(A)							
						<input type="checkbox"/> 20.2203(a)(2)(i)			<input type="checkbox"/> 50.36(c)(1)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(iv)(A)			<input type="checkbox"/> 50.73(a)(2)(x)							
10. POWER LEVEL  100						<input type="checkbox"/> 20.2203(a)(2)(ii)			<input type="checkbox"/> 50.36(c)(1)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(A)			<input type="checkbox"/> 73.71(a)(4)							
						<input type="checkbox"/> 20.2203(a)(2)(iii)			<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(v)(B)			<input type="checkbox"/> 73.71(a)(5)							
						<input type="checkbox"/> 20.2203(a)(2)(iv)			<input type="checkbox"/> 50.46(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(v)(C)			<input type="checkbox"/> 73.77(a)(1)							
						<input type="checkbox"/> 20.2203(a)(2)(v)			<input type="checkbox"/> 50.73(a)(2)(i)(A)			<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)			<input type="checkbox"/> 73.77(a)(2)(i)							
						<input type="checkbox"/> 20.2203(a)(2)(vi)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(vii)			<input type="checkbox"/> 73.77(a)(2)(ii)							
						<input type="checkbox"/> 50.73(a)(2)(i)(C)			<input type="checkbox"/> OTHER			Specify in Abstract below or in NRC Form 366A										
<b>12. LICENSEE CONTACT FOR THIS LER</b>																						
LICENSEE CONTACT Edwin I. Hatch / Carl James Collins – Licensing Supervisor												TELEPHONE NUMBER (Include Area Code) 912-537-2342										
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																						
CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE													SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	
E	EK	DG	F010	Y																		
<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO												<b>15. EXPECTED SUBMISSION DATE</b>		MONTH	DAY	YEAR						

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 03/17/2016, with Unit 2 at 100 percent rated thermal power (RTP), a fuel oil leak was observed at the inlet to the fuel oil relief valve during the performance of the 2C Emergency Diesel Generator (EDG) semi-annual surveillance. The 2C EDG was declared inoperable until the relief valve was replaced. Investigation revealed that the leak was due to a through wall indication in the threaded area of the relief valve. Inspection indicated that the failure was consistent with flaws observed in cases of fatigue failures. Site analysis of the failure provided reasonable assurance of historic operability; however a vendor was engaged to perform an independent review with a detailed seismic model of the system.

On 4/13/2016, the vendor analysis indicated that a seismic event could cause the degraded fuel oil relief valve to adversely affect EDG operation. The analysis concluded that although the 2C EDG could have met its 7-day mission time with the existing leakage rate, a design basis earthquake could reduce the ability of the diesel to maintain the minimum fuel header pressure and sufficient amount of fuel for 7 days. Thus the seismic qualification of the 2C EDG was degraded, but the safety function of the emergency AC system would only be challenged under certain circumstances with a seismic event.

Corrective actions will establish periodic replacement of similar fuel oil relief valves on the EDGs.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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**NARRATIVE****PLANT AND SYSTEM IDENTIFICATION**

General Electric- Boiling Water Reactor (BWR)  
Energy Industry Identification System codes appear in the text as (EIS Code XX)

**DESCRIPTION OF EVENT**

On March 17, 2016 with Unit 2 at 100 percent rated thermal power (RTP), a fuel oil leak was observed at the inlet to the fuel oil relief valve during the performance of the 2C Emergency Diesel Generator (EDG) (EIS Code DG) semi-annual surveillance. During the surveillance, the leak progressed from a constant drip to a steady stream. Investigation revealed that the leak was due to a through-wall crack on the relief valve body inlet thread region. The 2C EDG was initially declared inoperable until the relief valve was fixed on the same day the leak was identified.

Visual inspection of the flaw determined that the failure was consistent with flaws observed in cases of fatigue failures. Follow-up site Engineering analysis of the failure provided reasonable assurance of historic operability; however a vendor was engaged to perform an independent review with a detailed seismic model of the system.

On April 13, 2016, it was determined, based on vendor analysis, that a seismic event could cause the degraded fuel oil relief valve to adversely affect EDG operation. The analysis concluded that although the 2C EDG could have met its 7-day mission time with the existing leakage rate, a design basis earthquake could reduce the ability of the diesel to maintain the minimum fuel header pressure and sufficient amount of fuel for 7 days. Thus the seismic qualification of the 2C EDG was degraded, but the safety function of the emergency AC system would only be challenged in the event of either a loss of offsite power (LOSP) or loss of coolant accident (LOCA) concurrent with a seismic event.

**CAUSE OF EVENT**

The cause of the fuel oil leak was due to a through-wall crack on the relief valve body inlet thread region as a result of high-cycle fatigue due to vibration. Causal factors also included a lack of preventative maintenance to proactively replace the valve and degraded pipe hangers.

**REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT**

This event is reportable under 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications due to the inability of the 2C EDG to maintain minimum fuel header pressure and sufficient amount of fuel for 7 days during a seismic event. Vendor analysis showed that based on a seismic event, the degraded fuel oil relief valve would adversely impact EDG operation resulting in the EDG being inoperable for a period of time longer than allowed by Technical Specifications.

This event is also reportable under 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented fulfillment of a safety function. The 2C EDG fuel oil discharge piping at the relief valve lost its seismic qualification at an indeterminate point in the past. Per NUREG-1022, since the other EDGs which support Unit 2 (2A and 1B EDGs) have been declared inoperable a number of times for maintenance and surveillance testing, these instances provide a potential loss of fulfillment of a safety function such that more than one Unit 2 EDG was inoperable at the same time in the past 3 years.

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CONTINUATION SHEET**

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**NARRATIVE**

This event is not reportable per 10 CFR 50.72(b)(3)(v)(D) since at the time of discovery, the event did not prevent the fulfillment of a safety function that is needed to mitigate the consequences of an accident. When the degraded condition was identified on 2C EDG, neither the 2A nor 1B EDG were inoperable.

Unit 2 requires two associated EDGs to mitigate the consequences of an accident following a LOCA concurrent with a LOSP. Since the 2C EDG was inoperable for an indeterminate amount of time due to the loss of the seismic qualification of the fuel oil discharge piping at the relief valve, the maximum assumed time period used in a reactor oversight process assessment is one year. In the one year time period preceding the failure of the 2C EDG, neither the 1B nor 2A EDG were out of service for a maintenance overhaul. Although the 1B and 2A EDGs were administratively declared inoperable for testing a number of times in the one-year period preceding the 2C fuel oil leak, they were only unavailable to automatically respond to a design basis accident for a short period of time during the actual surveillance interval when the engine control switch was in 'local' control for pre-start operations or system realignment. During the rest of the time period that the associated EDG was declared inoperable for testing, the associated EDG was available to automatically respond to a LOSP or LOCA signal and provide emergency power to the associated Unit. Even if the engine was loaded to the grid for surveillance testing, load shedding would automatically occur to provide emergency AC power to the associated safety-related bus. While in local control, trained system operators were continuously present with procedural guidance to return the EDG to automatic operation if needed.

During the limited time periods when either the 1B or 2A EDG was out of service for minor maintenance or surveillance testing, along with the 2C EDG being inoperable due to the fuel oil relief valve having lost its seismic qualification, there was a loss of safety function for Unit 2 Emergency AC. At no time were all Unit 2 associated EDGs inoperable at the same time.

Even though this condition was contrary to Tech Spec requirements, no loss of standby emergency power occurred. There was always at least one Unit 2 associated EDG operable, with two associated EDGs operable the majority of the time except for short periods of minor maintenance and surveillance testing. Based on this information this reported condition had low safety consequence.

**CORRECTIVE ACTIONS**

Upon identification of the fuel oil leak, the 2C EDG was declared inoperable and the 2C fuel oil relief valve was replaced. As part of an extent of condition, the replacement history of each EDGs fuel oil relief valve was reviewed to determine if the valve needed to be replaced.

Preventive maintenance tasks are also being established for all 5 EDGs to replace each respective fuel pump outlet relief valve every 12 years of service. The PM shall additionally provide for inspection, and if necessary, repair/replacement of piping, unions, and supports/hangers in close vicinity of these relief valves.



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**NARRATIVE****ADDITIONAL INFORMATION**

Other Systems Affected: 4.16 kV ESF bus 2G (lost onsite standby power source when EDG 2C declared inoperable)

**Failed Components Information:**

IIIS System Code: EK  
IIIS Component Code: DG  
Manufacturer: Fairbanks Morse  
Model Number: 3800TD  
Type: Fuel Oil Relief Valve  
Manufacturer Code: F010

Commitment Information: This report does not created any new licensing commitments.

**Previous Similar Events:****LER 2010-004-0**

During operation of Emergency Diesel Generator (EDG) 1A for monthly surveillance on June 3, 2010 with the Unit operating at full power, a section of one-quarter-inch tubing in the fuel oil system became disconnected from its fitting rendering EDG 1A inoperable due to the potential for fire. Applicable requirements of the Technical Specifications were accomplished and plant operations continued. The tubing's function is to route waste fuel oil from the injectors to the fuel oil collection tank. The tubing separation occurred at the fitting to a discharge check valve which prevents backflow of waste oil to the injectors. The apparent cause of both the leakage and subsequent tubing separation was degradation of the tubing connection due to wear and stresses resulting from the repetitive disassembly and re-assembly during scheduled maintenance activities. Subsequent to both the noted leakage and the tubing separation, the corresponding tubing for the other four EDGs was examined for signs of leakage or cracking. None was found and those EDGs were determined to be operable. The separated tubing in the diesel fuel oil system of EDG 1A was repaired and the EDG returned to available status on June 4, 2010. Because the cause of the diesel fuel leak was due to repetitive removal and re-assembly as part of planned diesel generator maintenance, the corrective actions from the 2010 event would not be expected to have prevented the condition reported in this LER.