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August 8, 2013

Docket No.: 50-348

NL-13-1603

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

Joseph M. Farley Nuclear Plant – Unit 1  
Licensee Event Report 2013-001-00  
Automatic Reactor Trip and B-Train Loss of Off-Site Power Caused by the  
Failure of a Startup Transformer Lightning Arrester

Ladies and Gentlemen:

In accordance with the requirements of 10CFR50.73(a)(2)(iv)(A) Southern Nuclear Operating Company hereby submits the enclosed Licensee Event Report. This letter contains no NRC commitments. If you have any questions, please contact Bill Arens at (334) 814-4765.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Lynch".

T. A. Lynch  
Vice President – Farley

TAL/WNA

Enclosure: Unit 1 Licensee Event Report 2013-001-00

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cc: Southern Nuclear Operating Company

Mr. S. E. Kuczynski, Chairman, President & CEO

Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer

Mr. B. L. Ivey, Vice President – Regulatory Affairs

Mr. B. J. Adams, Vice President – Fleet Operations

Mr. C. R. Pierce, Regulatory Affairs Director

Mr. J. G. Horn, Regulatory Affairs Manager - Farley

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U. S. Nuclear Regulatory Commission

Mr. V. M. McCree, Regional Administrator

Mr. R. E. Martin, NRR Project Manager - Farley

Mr. P. K. Niebaum, Senior Resident - Farley

Joseph M. Farley Nuclear Plant – Unit 1

NL-13-1603

Automatic Reactor Trip and B-Train Loss of Off-Site Power Caused by the  
Failure of a Startup Transformer Lightning Arrester

Enclosure

Unit 1 Licensee Event Report 2013-001-00

# LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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> Joseph M. Farley Nuclear Plant, Unit 1	<b>2. DOCKET NUMBER</b> 05000 348	<b>3. PAGE</b> 1 OF 3
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**4. TITLE**  
Automatic Reactor Trip and B-Train Loss of Off-Site Power Caused by the Failure of a Startup Transformer Lightning Arrester

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	11	13	2013	- 001 -	00	08	08	2013	FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> <i>(Check all that apply)</i>			
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME J.M. Farley Nuclear Plant, William N. Arens – Licensing Supervisor	TELEPHONE NUMBER (Include Area Code) (334) 814-4765
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	FK	LAR	O030	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
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**ABSTRACT** *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On June 11, 2013 at 2105, Unit 1 automatically tripped from 100% power due to a Reactor Coolant Pump (RCP) undervoltage condition on the 1B and 1C RCPs and experienced a B-Train loss of off-site power (LOSP). The RCP undervoltage condition and B-Train LOSP were caused by the trip of the 1B Startup Transformer. The B-Train LOSP resulted in the automatic start and load sequencing of the 1B Emergency Diesel Generator. All three Auxiliary Feedwater (AFW) Pumps auto-started during the event. All systems responded as expected to the reactor trip and B-Train LOSP. The reactor trip, diesel generator auto-start, and AFW auto-start are reportable as system actuations per 10 CFR 50.73(a)(2)(iv)(A). The direct cause of the trip of the 1B Startup Transformer was the failure of a lightning arrester on the switchyard supply to the startup transformer. The 1B Startup Transformer was returned to service following replacement of the failed lightning arrester. The root cause of the event was determined to be a compromise of the lightning arrester sealing plate during factory assembly which led to moisture ingress into the arrester. Corrective actions for this event will include replacement of similar vintage lightning arresters.

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

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Joseph M. Farley Nuclear Plant, Unit 1	05000 348	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2	OF	3
		2013	- 001	- 00			

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A)

Westinghouse - Pressurized Water Reactor  
Energy Industry Identification Codes are identified in the text as [XX].

**Description of Event**

At 2105 on June 11, 2013, while Unit 1 was operating in Mode 1 at 100% reactor power, the Unit 1 B-Train Startup Transformer [XFMR] was automatically de-energized by protective relay actuation. This resulted in the loss of power to the 1B and 1C Reactor Coolant Pump (RCP) buses [BU] and an automatic reactor trip on an RCP undervoltage signal. The de-energized transformer also resulted in a B-Train Engineered Safety Feature (ESF) Bus [BU] Loss of Off-Site Power (LOSP). The 1B Emergency Diesel Generator [DG] automatically started and re-energized the B-Train ESF Buses and the B-Train LOSP sequencer [2] automatically started LOSP loads. All control rods completely inserted during the reactor trip. Forced flow of reactor coolant was maintained by the 1A RCP [P] which remained running throughout the event. All three Auxiliary Feedwater (AFW) Pumps [P] automatically started and provided makeup water to the steam generators. The secondary steam dumps remained in service to remove decay heat to the main condenser. No secondary or primary reliefs lifted during the event. All plant systems responded as designed to the reactor trip and B-Train LOSP. The operating crew responded to the event by entry into the appropriate emergency response procedures (FNP-1-EEP-0.0, "Reactor Trip or Safety Injection", and FNP-1-ESP-0.1, "Reactor Trip Response") and stabilized the plant in a hot-standby condition. The A-Train ESF buses remained energized from an operable off-site power source via the 1A Startup Transformer throughout the event with an operable emergency diesel generator available as a backup power source. There were no major components or systems that were out of service at the time of the event that contributed to the severity of the event. The reactor trip, diesel generator auto-start, and AFW auto-start are reportable as system actuations per 10 CFR 50.73(a)(2)(iv)(A).

Immediate investigation of the event identified a failed lightning arrester [LAR] at the phase 2 230kV terminal of the 1B Startup Transformer. All three lightning arresters on the 1B Startup Transformer were replaced and the transformer was returned to service, supplying the B-Train ESF Buses, on June 13, 2013, at 0429. The Unit 1 reactor returned to critical operation on June 13, 2013 at 1632.

**Cause of Event**

Investigation of the event determined that the lightning arrester on the phase 2 230kV terminal of the 1B Startup Transformer had shorted to ground resulting in protective relay actuation which opened the switchyard supply breakers to the startup transformer.

The failed lightning arrester is a type 'VN' arrester, model number 215920, manufactured by Ohio Brass Company. The arrester has been in service since 1992. A failure analysis conducted by the manufacturer determined the root cause of the failure was an undetected compromise of the arrester sealing plate during factory assembly resulting in extremely slow moisture ingress into the arrester during its service life. Farley performs industry-accepted monitoring and testing activities on lightning arrestors. This particular failure mode was not detected by these monitoring and testing methods.

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**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A)

**Safety Assessment**

All systems responded as designed to the reactor trip and the B-Train LOSP. The B-Train ESF buses were automatically re-energized from the B-Train emergency diesel generator. The A-Train ESF Buses remained powered from off-site power with an operable emergency diesel generator available to supply backup power if needed. No major components or systems were out of service during the event. All equipment operated as-designed to mitigate the event. There was no loss of safety function and no radioactive release associated with this event. There was no actual consequence detrimental to the health and safety of the public.

**Corrective Action**

A root cause analysis of this event identified that all lightning arresters of this vintage may have a higher susceptibility to moisture intrusion due to the manufacturing and acceptance test procedures that were in place at the time. Corrective actions include the implementation of an accelerated schedule for replacement of lightning arresters of the same vintage.

**Additional Information**

**Similar previous events**

- LER 2012-004-00      Unit 1 – Unplanned B Train LOSP During Switchyard Breaker Testing
- LER 2012-003-00      Unit 1 – Unplanned LOSP during SI with LOSP Testing
- LER 2010-001-00      Unit 2 – Unplanned LOSP during SI with LOSP Testing