



JAN 10 2014

LR-N14-0002

10 CFR 50.73

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

LER 272/2013-004-00
Salem Nuclear Generating Station Unit 1 and Unit 2
Renewed Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

SUBJECT: Unfused DC Ammeter Circuits Result in an Unanalyzed Condition

The Licensee Event Report, "Unfused DC Ammeter Circuits Result in an Unanalyzed Condition," is being submitted pursuant to the requirements of the Code of Federal Regulations, 10 CFR 50.73(a)(2)(ii)(B), "The nuclear plant being in an unanalyzed condition that significantly degraded plant safety".

The attached LER contains no commitments. Should you have any questions or comments regarding the submittal, please contact David Lafleur of Salem Regulatory Assurance at 856-339-1754.

Sincerely,

A handwritten signature in black ink, appearing to read "John F. Perry", written in a cursive style.

John F. Perry
Site Vice President – Salem

Attachments (1)

cc

Mr. W. Dean, Administrator – Region 1, NRC
Mr. John Hughey, Licensing Project Manager – Salem, NRC
Mr. P. Finney, USNRC Senior Resident Inspector, Salem (X24)
Mr. P. Mulligan, Manager IV, NJBNE
Mr. T. Joyce, President and Chief Nuclear Officer – Nuclear
Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. L. Marabella, Corporate Commitment Tracking Coordinator
Mr. D. Lafleur, Salem Regulatory Assurance

NRC FORM 366 (10-2010)	U.S. NUCLEAR REGULATORY COMMISSION <div style="text-align: right;"> APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 </div>
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2>	
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 Records and FOIA/Privacy Section (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.	

1. FACILITY NAME Salem Generating Station - Unit 1	2. DOCKET NUMBER 05000272	3. PAGE <div style="text-align: center;">1 of 4</div>
4. TITLE Unfused DC Ammeter Circuits Result in an Unanalyzed Condition		

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
11	14	2013	2013	0 0 4	0	01	10	2014	Salem Generating Station – Unit 2	05000311
										DOCKET NUMBER

9. OPERATING MODE <div style="text-align: center; font-size: 24px;">1</div>	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)																																							
10. POWER LEVEL <div style="text-align: center; font-size: 24px;">100%</div>	<table style="width:100%; font-size: small;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right; font-size: x-small;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>				<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)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(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 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
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12. LICENSEE CONTACT FOR THIS LER	
FACILITY NAME David Lafleur, Senior Compliance Engineer, Salem Regulatory Assurance	TELEPHONE NUMBER (Include Area Code) (856) 339-1754

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	EJ	II	-	N						

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	15. EXPECTED SUBMISSION DATE <div style="text-align: center;"> <input checked="" type="checkbox"/> NO </div>						
	<table style="width:100%; font-size: small;"> <tr> <th style="width:33%;">MONTH</th> <th style="width:33%;">DAY</th> <th style="width:33%;">YEAR</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table>	MONTH	DAY	YEAR			
MONTH	DAY	YEAR					

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

On November 14, 2013, a review of industry operating experience identified a postulated fire induced circuit failure involving unfused DC ammeter circuits leading to a non-compliance with 10 CFR 50, Appendix R requirements. A review of Salem Unit 1 and Unit 2 DC ammeter circuits concluded that a similar configuration exists at both units in which the original plant wiring design and associated analyses for ammeters are not provided with overcurrent protection to limit fault current in the 250 Volt, 125 Volt and 28 Volt DC systems.

A postulated fire that results in a short to ground concurrent with an opposite polarity short from the same battery could result in excessive current flow in the ammeter wiring. This excessive current could result in a secondary fire in another fire area. The secondary fire could adversely affect safe shutdown equipment and cause a loss of alternate shutdown capability contrary to 10 CFR 50, Appendix R, Section III.G requirements.

Compensatory measures have been implemented in the affected areas of the plant and will remain in effect until the deficiency is corrected.

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NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Westinghouse – Pressurized Water Reactor (PWR/4)

DC Power System {EI}

DC Power System, Class 1E {EJ}

* Energy Industry Identification System {EIS} codes and component function identifier codes appear as {SS/CCC}

IDENTIFICATION OF OCCURRENCE

Event Date: November 14, 2013

Discovery Date: November 14, 2013

CONDITIONS PRIOR TO OCCURRENCE

On November 14, 2013, Salem Units 1 and 2 were both in operational Mode 1, operating at 100% power at normal operating temperature and pressure. No additional structures, systems or components were inoperable at the time of the discovery that contributed to the event.

DESCRIPTION OF OCCURRENCE

A review of industry operating experience on November 14, 2013 identified a postulated fire induced circuit failure involving unfused DC ammeter circuits leading to non-compliance with 10 CFR 50, Appendix R requirements. Subsequent analysis of Salem Unit 1 and 2 DC ammeter circuits concluded that a similar configuration exists at both units in which the original plant wiring design and associated analyses for ammeters are not provided with overcurrent protection to limit fault current in the 250 Volt {EI}(V), 125V {EJ} and 28V DC {EJ} systems affecting the Common Unit 1 and 2 Control Room and the Unit 1 and 2 Relay and 460/230V Switchgear Rooms.

The Salem Unit 1 and 2 DC electrical systems are each comprised of three independent battery systems which supply vital and non-vital distribution cabinets. The station battery system includes one non-vital 250V {EI/BTRY}, three vital 125V {EJ/BTRY}, and two vital 28V {EJ/BTRY} batteries.

The 125V DC system provides motive power for solenoids, control power for breaker control (4160V and 460V) and Emergency Diesel Generator start and control circuits. The 125V DC system also provides power to the relay logic circuits. The 28V DC system provides power to control and indication circuits. The 250V DC system provides power to the main turbine and normal feedwater pump auxiliaries.

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NARRATIVE

Both Salem Units 1 and 2 are subject to the requirements of 10 CFR 50, Appendix R, III G., Fire Protection of Safe Shutdown Capability. A postulated fire that results in a short to ground concurrent with an opposite polarity short from the same battery could result in excessive current flow and heat in the ammeter wiring. With enough current flowing through the cable, the potential exists that the cable could self-heat to the point of causing a secondary fire in the electrical tray at some point along the path of the cable. This excessive current could result in a secondary fire in either the Control Room/Relay Room or the 460/230V Switchgear Room areas. The secondary fire in those areas could adversely affect safe shutdown equipment and cause a loss of alternate shutdown capability contrary to 10 CFR 50, Appendix R, Section III.G requirements.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B) as a condition that resulted in the nuclear power plants being in unanalyzed conditions that significantly degraded safety in that the overloaded ammeter wiring could damage cables in multiple fire areas and result in a loss of associated safe shutdown capability.

CAUSE OF OCCURRENCE

The cause of the reported condition is that the original design of the DC ammeter circuits did not include fuses to protect ammeter cables. This design has been in place at Salem Units 1 and 2 since construction and was only recently identified as an issue through the Salem Operating Experience Program.

PREVIOUS SIMILAR OCCURRENCES

A review of LERs at Salem Station dating back to 2010 identified no similar design deficiencies in Post-Fire Safe Shutdown Analyses.

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no actual safety consequences of this condition and the event did not result in a challenge to fission product barriers or the release of radioactive materials. The event did not adversely affect the safe operation of the plant or the health and safety of the public.

The secondary Fire Areas of concern are the Units 1 and 2 Control Room, Relay Rooms and the 460/230V Switchgear Rooms. The Unit 1 and 2 Control Room is equipped with ionization smoke detectors. The Unit 1 and 2 Relay Rooms contain smoke detectors with automatic Halon fire suppression systems. The Unit 1 and 2 460/230V Switchgear Rooms contain smoke and thermal detectors with preaction sprinkler systems. The Control Room is continuously manned and operators can promptly respond to fire events in the plant.

The postulated secondary fire is a very slow fire progression event. The credited operator manual actions implemented in a potentially affected secondary Fire Area are typically completed within minutes following the confirmation of the fire event.

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NARRATIVE

The condition of a negative ground fault can exist until a subsequent ground on the positive and neutral leg of a circuit from the same source occurs. The neutral ground will make the system grounded and any hot leg grounds will result in the control power fuses blowing and loss of control power to all affected circuits.

The affected cables at Salem Units 1 and 2 are thermoset cables with bronze or copper metal shields. In addition to the postulated ground fault hot short and intra-cable interactions, additional ground interactions due to the metal shielding would be likely. Therefore, the potential for only negative grounds without the positive ground are unlikely since the metal shield represents a more readily accessible ground plane. The metal shield tape will introduce additional electrical ground pathways which would result in lower current flow in the ammeter cable.

The factors discussed above support a conclusion that the combination of a significant fire event and the specific wiring faults required to produce a secondary fire that affects the availability of equipment required for safe shutdown is very unlikely.

The design deficiency did not impact the performance of any other component functions and no other safety functions were impacted as a result of this event. A review of this event determined that a Safety System Functional Failure (SSFF) as defined in Nuclear Energy Institute (NEI) 99-02 did not occur.

CORRECTIVE ACTIONS

1. Compensatory measures have been implemented in the affected areas of the plant.
2. Implementation of a modification to add isolation devices for the Ammeter circuits is in progress.

COMMITMENTS

No commitments are made in this LER.