



December 17, 2011

L-2011-497  
10 CFR 50.73

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Re: St. Lucie Unit 1  
Docket No. 50-335  
Reportable Event: 2011-002  
Date of Event: October 19, 2011

Unit 1 Manual Reactor Trip Due To High Condenser Backpressure

The attached Licensee Event Report 2011-002 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Richard L. Anderson', written over a horizontal line.

Richard L. Anderson  
Site Vice President  
St. Lucie Plant

RLA/dlc  
Attachment

IE22  
NRR

<b>NRC FORM 366</b> (10-2010)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104	EXPIRES: 10/31/2013
<b>LICENSEE EVENT REPORT (LER)</b>		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 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.	

<b>1. FACILITY NAME</b> St. Lucie Unit 1	<b>2. DOCKET NUMBER</b> 05000335	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Unit 1 Manual Reactor Trip Due To High Condenser Backpressure

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
10	19	2011	2011	002	00	12	17	2011	NA	
									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>									
<b>10. POWER LEVEL</b>  86%	<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 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 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**

NAME Don Cecchett - Principal Engineer, Licensing	TELEPHONE NUMBER (Include Area Code) 772-467-7155
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	SG	PB	G080	YES					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>		<b>15. EXPECTED SUBMISSION DATE</b>			
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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

On October 19, 2011, St. Lucie Unit 1 was operating in Mode 1 at 86% when the unit was manually tripped due to rising condenser backpressure. The cause of the rising backpressure was an unplanned trip of the 1A1 circulating water (CW) pump. Condenser backpressure reached procedural limits which required a manual unit trip. The 1A1 CW pump breaker tripped as a result of an internal motor fault.

Unit 1 was in a planned power reduction at the end of the cycle. All control element assemblies (CEAs) fully inserted and decay heat removal was achieved through main feedwater and steam bypass to the main condenser.

A root cause evaluation (RCE) concluded that ineffective condition monitoring of the 1A1 CW pump motor for degraded air flow passages prior to scheduled motor overhauls, resulted in a buildup of salt and corrosion products in the rotor cooling air flow passages, restricting air flow.

Contributing causes included previous actions to implement quarterly resistance temperature detector measurements for the CW pump motors were ineffective.

Corrective actions will implement temperature monitoring using the CW pump motor winding resistance temperature detectors (RTDs).

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**NARRATIVE**

**Description of the Event**

On October 19, 2011, St. Lucie Unit 1 was operating in Mode 1 at 86% when the unit was manually tripped due to rising condenser[EIIS: COND] backpressure following the 1A1 CW pump breaker trip. Unit 1 was in a planned power reduction at the end of the cycle. The 1A2 CW pump was secured for planned maintenance on a condenser water box. Immediately after the 1A1 CW pump unexpectedly tripped, condenser backpressure rapidly reached the procedural trip criteria of 5.5" Hg requiring a manual unit trip.

The 1A1 CW pump breaker tripped as a result of an internal motor fault. All CEAs [EIIS: ET] fully inserted and decay heat removal was achieved through main feedwater and steam bypass to the main condenser.

**Cause**

The investigation concluded that the 1A1 CW pump motor winding failed from a buildup of salt and corrosion products in the rotor cooling air flow passages which restricted air flow. This restriction resulted in stator winding insulation temperatures in excess of 350°F, which exceeds the National Electrical Manufacturers Association (NEMA) maximum design operating temperature of 311°F. After a similar event in 2010, actions were initiated to re-stack the rotors of all of the CW pump motors and establish a 12 year preventive maintenance activity. In the interim until all of the rotors could be overhauled and re-stacked, monitoring was relied upon to detect adverse conditions prior to failure. The monitoring methods previously identified were thermography and winding RTDs. Of these methods, only thermography was performed. Thermography only measures external surface temperatures and is not effective in detecting excessive temperatures prior to failure of the motor. Corrective actions will implement temperature monitoring using the CW pump motor winding RTDs.

**Analysis of the Event**

On October 19, 2011, St. Lucie Unit 1 was manually tripped due to rising condenser backpressure as a result of an unexpected 1A1 CW pump trip. Unit 1 was at reduced power while the 1A2 CW pump was secured for planned maintenance. When the 1A1 CW pump unexpectedly tripped, condenser backpressure rapidly increased to the procedural trip criteria of 5.5" Hg and the unit was manually tripped per the Abnormal Operating Procedure.

There were no nuclear or industrial safety concerns associated with this event. No operability concerns with any structures, systems, and components (SSC) occurred due to this event.

The failure investigation and troubleshooting indicated an electrical short in the windings of 1A1 CW pump motor. The root cause of the winding failure was swelling of the rotor laminations from the build-up of corrosion products and salt deposits that blocked the rotor air passages, thereby causing the stator windings to overheat and subsequently fail. The stator winding insulation reached temperatures in excess of 350°F, which exceeded the maximum design operating temperature of 311°F.

Thermography was routinely performed to monitor the health of the motor; however, it was not an effective method for monitoring the temperature of the winding insulation. Actions developed following a previous motor failure included use of installed RTDs for monitoring winding temperatures; at the time of the 1A1 CW Pump motor failure, monitoring of the RTD temperatures had not been completed.

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**NARRATIVE**

**Analysis of Safety Significance**

All safety related systems functioned as designed. The plant response to the event was a manual reactor trip due to high backpressure-low vacuum. The automatic turbine vacuum trip set point was never reached and conservative measures were taken before reaching automatic set points. The plant was not at full power when the events occurred and a complete loss of condenser cooling did not occur. There were no safety system actuations as a result of the trip. Given the response of the plant and actions taken, the health and safety of the public was not affected by this event.

Over a period of 24 hours upon reactor trip, the conditional core damage probability (CCDP) and conditional large early release probability (CLERP) values were evaluated to be 2.40E-09 and 1.56E-11, respectively. These values are significantly below the threshold required by RG-1.174 for the risk to be "Small", where CCDP is below 1.0E-06 and CLERP is below 1.0E-07. On-Line Risk Monitor (06R0A) was used for this evaluation.

This event is reportable under 10 CFR 50.73(a)(2)(iv)(A), as any event or condition that resulted in a manual or automatic activation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section. The system listed under (a)(2)(iv)(B) is (1) Reactor protection system (RPS) including: reactor scram or reactor trip.

**Corrective Actions**

The corrective actions listed below are entered into the site corrective action program. Any changes to the actions will be managed under the corrective action program.

1. Ensure that preventive maintenance (PM) for Quarterly CW Pump Motor winding RTD temperature measurements are implemented with the first performance of the PM scheduled for each unit before 6/30/2012. This action will remain open until new quarterly PMs for both units are planned and scheduled.
2. Ensure work orders for the first performance of the new PM for quarterly CW Pump Motor winding RTD temperature measurements are completed before 6/30/2012. This assignment will remain open until the work is completed under the work orders.
3. Evaluate health of the 1B1 and 1B2 CW pump motors to assure equipment reliability.

**Similar Events**

A search of the action request and work order data bases for the 5 years preceding the event was conducted to identify repeat events. One previous event was identified in which the 1A2 CW pump failed because the overhaul scope for the CW pump motors did not address failure modes associated with operation in a salt laden environment; the cause was the same as the current 1A1 CW pump motor failure.

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**NARRATIVE**

**Failed Components**

1A1 CW pump motors

Manufacturer: General Electric

Model: 295X272

Catalog No.: 000410115 Motor; Electric, 1, 500 HP, 4.00 KV, 3 PH, 60.000 HZ, 355.00 RPM