



May 12, 2014

L-2014-132
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: 2014-001
Date of Event: January 9, 2014
Internal RAB Flooding During Heavy Rain Due to Degraded Conduits Lacking Internal Flood Barriers

The attached revision 1 to Licensee Event Report 2014-001 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Respectfully,

A handwritten signature in black ink, appearing to read "JJ", with a long horizontal line extending to the right.

Joseph Jensen
Site Vice President
St. Lucie Plant

JJ/KWF

Attachment

JE22
MLR

NRC FORM 366 (02-2014)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 01/31/2017				
 LICENSEE EVENT REPORT (LER) (See Page 2 for required number of digits/characters for each block)											
1. FACILITY NAME St. Lucie Unit 1					2. DOCKET NUMBER 05000335		3. PAGE 1 OF 3				
4. TITLE Internal RAB Flooding During Heavy Rain Due to Degraded Conduits Lacking Internal Flood Barriers											
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	
1	9	2014	2014	001	01	5	12	2014	FACILITY NAME	DOCKET NUMBER	
										05000	
										05000	
9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
1		☐ 20.2201(b)			☐ 20.2203(a)(3)(i)			☐ 50.73(a)(2)(i)(C)		☐ 50.73(a)(2)(vii)	
		☐ 20.2201(d)			☐ 20.2203(a)(3)(ii)			☐ 50.73(a)(2)(ii)(A)		☐ 50.73(a)(2)(viii)(A)	
		☐ 20.2203(a)(1)			☐ 20.2203(a)(4)			☒ 50.73(a)(2)(ii)(B)		☐ 50.73(a)(2)(viii)(B)	
		☐ 20.2203(a)(2)(i)			☐ 50.36(c)(1)(i)(A)			☐ 50.73(a)(2)(iii)		☐ 50.73(a)(2)(ix)(A)	
100		☐ 20.2203(a)(2)(ii)			☐ 50.36(c)(1)(ii)(A)			☐ 50.73(a)(2)(iv)(A)		☐ 50.73(a)(2)(x)	
		☐ 20.2203(a)(2)(iii)			☐ 50.36(c)(2)			☐ 50.73(a)(2)(v)(A)		☐ 73.71(a)(4)	
		☐ 20.2203(a)(2)(iv)			☐ 50.46(a)(3)(ii)			☐ 50.73(a)(2)(v)(B)		☐ 73.71(a)(5)	
		☐ 20.2203(a)(2)(v)			☐ 50.73(a)(2)(i)(A)			☐ 50.73(a)(2)(v)(C)		☐ OTHER	
		☐ 20.2203(a)(2)(vi)			☐ 50.73(a)(2)(i)(B)			☐ 50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A	
12. LICENSEE CONTACT FOR THIS LER											
LICENSEE CONTACT K. W. Frehafer, Licensing Engineer								TELEPHONE NUMBER (Include Area Code) (772) 467-7748			
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		
B	N/A	N/A	N/A	N/A							
14. SUPPLEMENTAL REPORT EXPECTED ☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO					15. EXPECTED SUBMISSION DATE						
					MONTH DAY YEAR 						
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) On January 9, 2014, the St. Lucie site was experiencing heavy rainfall. Storm drain blockage caused water to backup within the emergency core cooling system (ECCS) pipe tunnel. Water entered the reactor auxiliary building (RAB) through two degraded conduits that lacked internal flood barriers. At 1803 hours St. Lucie declared an Unusual Event (UE) due to storm drain capacity degradation. The UE was terminated at 0001 hours on January 10, 2014, when the storm had passed and the drains had been cleared. The extent of condition identified four additional conduits that lacked the required internal flood barriers. All the affected conduits subsequently had qualified internal water seals installed. During this event there was no loss of any safety related accident mitigation or safe shutdown equipment. The safety significance of this event is being evaluated by FPL.											

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

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.

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St. Lucie Unit 1	05000335	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3
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NARRATIVE**Description of the Event**

On January 9, 2014, St. Lucie Unit 1 was in Mode 1 operation at 100 percent reactor power. The St. Lucie site was experiencing heavy rainfall. In the early afternoon the site storm drain system was challenged as the storm water basins started to back up.

At ~1610 hours, operators reported that water was backing up through the -0.5 feet elevation floor drains in the reactor auxiliary building (RAB) and into the emergency core cooling system (ECCS) pump room sumps at the -10.0 feet elevation. The water was observed entering the RAB through an electrical junction box which was below the elevation for which the RAB flood protection was designed.

At ~1620 hours, the control room received the B Safeguards Pump Room Sump Level High/High-High alarms.

At ~1628 hours the operators entered procedure 1-AOP-24.01, "RAB Flooding," and immediately closed the ECCS sump isolation valves to preclude flooding of the ECCS pump room. However, the water level in the RAB -0.5 feet elevation continued to rise.

At ~1635 hours, after pre-briefing the evolution and potential contingency actions, the operators took control and managed the RAB flooding by cycling the ECCS sump isolation valves to allow batch removal of RAB water via the ECCS sump pumps.

At ~1732 hours, a higher capacity temporary pump at the yard sump was used to reduce the rate of water entry into the RAB.

At ~1803 hours, an Unusual Event (UE) was declared as the significant rainfall exceeded the site's storm drain system capacity.

The UE was terminated at ~0001 hours on January 10, 2014, after the significant rains subsided and the storm drain were observed draining site water accumulation.

All safety related accident mitigation and safe shutdown equipment remained operable prior to, during, and after the event.

Cause of the Event

The cause of the RAB flooding was due to legacy installation issues with two non-safety electrical conduits [EIS:CND] in the ECCS pipe tunnel that lacked the required internal flood barriers. Degradation of the conduits provided a water entry path into the RAB. The extent of condition identified four more conduits with the same legacy installation issue, for a total of six conduits without internal flood seals. Qualified flood seals have now been installed where these conduits terminate in the building in order to restore the RAB to a waterproofed condition.

The direct cause of the storm water basin back up that allowed the ECCS pipe tunnel to flood was blockage of the piping that connects east storm water basin to the overflow basin. The blockage that contributed to the storm drain system flow restriction has been removed.

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NARRATIVE

Analysis of the Event

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. Although this event did not result in any loss of function, postulated external flooding events could result in RAB water levels exceeding the analyzed RAB internal flooding event, as a result of the discovery of these missing conduit seals. This is contrary to design as it is assumed that design features seal the RAB below the +17.2 feet elevation from water sources external to the RAB.

The site is comprised of an east and a west drainage system that outflows to the east and west storm water basins, which in turn flow to the southwest overflow basin and to the southeast overflow basin through a 36-inch interconnection. The southeast overflow basin has a high level outflow valve that can be opened during excessive rainfall events. Due to flow blockage from the east storm water basin to the overflow basins, the severe rainfall caused the water level of the east storm water basin to rise above its banks and flood the plant area west of the G1 and G2 warehouses. Once the water level exceeded the elevation of the Unit 1 component cooling water (CCW) building floor (elevation +12 feet) the building no longer drained and allowed the backflow to flood the adjacent ECCS pipe tunnel and yard sump. The degraded conduit within the ECCS pipe tunnel, along with the lack of internal conduit flood barriers in the RAB side, provided a direct path for water to enter the RAB.

The water intrusion into the RAB continued until the storm drain blockage was corrected and the remaining volume of water in the ECCS pipe tunnel drained into the building. Operators took action to remove the flood water, by cycling the ECCS room sump isolation valves in order to utilize the installed sump pumps.

As previously noted, during this event there was no loss of safety related accident mitigation or safe shutdown equipment. Florida Power & Light (FPL) evaluated various external flooding scenarios to determine if any postulated conditions could have resulted in the loss of safety related accident mitigation or safe shutdown equipment.

Safety Significance

FPL concluded that although there were scenarios that may result in the loss of the chemical and volume control system pumps, manual operator actions to close the ECCS room sump isolation valves would protect the ECCS pumps from the flooding. The safety significance of the RAB flood protection bypass provided by the degraded conduits is currently being assessed by FPL.

Corrective Actions

1. All conduits identified as lacking internal flood barriers during the extent of condition reviews were provided with qualified seals.

Failed Component(s)

Various non-safety conduits

Similar Events

On December 27, 2012, FPL reported degraded penetration seals within electrical manways that bypassed St. Lucie Unit 1 RAB external flood protection features in LER 50-335/2012-010. The insights developed from the detailed St. Lucie flooding models being developed for the January 9, 2014 flooding event was applied to the 2012 LER condition, with the conclusion that St. Lucie Unit 2's internal flood analyses results were not bounded as previously documented. The 2012 LER was revised to reflect this information.