



Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

December 15, 2005

L-2005-246
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: 2005-006-00
Date of Event: October 17, 2005
Equipment Failure Led to Inadvertent Mode Change During Cooldown

The attached Licensee Event Report 2005-006 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 "WJ", with a long horizontal flourish extending to the right.

William Jefferson, Jr.
Vice President
St. Lucie Nuclear Plant

WJ/KWF

Attachment

IE22

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

1. FACILITY NAME		2. DOCKET NUMBER	6. LER NUMBER		3. PAGE
St. Lucie Unit 1		05000335	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
			2005	- 006	- 00
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Equipment Failure Led to Inadvertent Mode Change During Cooldown

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	17	2005	2005	- 006	- 00	12	15	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 4	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
	<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)						
10. POWER LEVEL 000	<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)(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 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 checked="" 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 Kenneth 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
D	SB	HCV	W255	NO	-	-	-	-	-

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO		MONTH	DAY	YEAR

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

On October 17, 2005, St. Lucie Unit 1 was offline and cooling down for a scheduled refueling outage. The atmospheric dump valves were used for the cooldown. While in Mode 4 conditions, a malfunction of the 1A steam generator atmospheric steam dump valve caused an unplanned heatup and subsequent inadvertent change to Mode 3 conditions. Local manual control of the valve was taken and the plant cooldown recommenced.

The event investigation concluded that the valve actuator diaphragm failed and caused the valve to close. Inadequate work instructions led to the conditions that caused the diaphragm failure. Corrective actions included rework of the valve actuator and revising the model work order.

This event had no impact on the health and safety of the public. The Mode change occurred without the required number of operable boration injection flowpaths. However, there was no effect on the boration injection flowpath from the refueling water tank, the allowed outage time for only one boration injection flowpath was not exceeded, and the boric acid makeup tanks remained available if needed.

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Description of the Event

On October 17, 2005, St. Lucie Unit 1 was offline and cooling down for the scheduled SL1-20 refueling outage. At 2047 hours the previous day, with Unit 1 in Mode 3 conditions, the unit entered the action statement for Technical Specification 3.1.2.2 as planned during the plant cooldown. This Technical Specification requires at least two operable boron injection flowpaths in Modes 1 through 4 using the boric acid makeup (BAM) tanks or the refueling water tank (RWT). However, the BAM tanks contents were expended, as planned, when used to increase the boron concentration of the reactor coolant system (RCS) to refueling concentration, leaving only one boron injection flowpath via the RWT. At 2104 hours the previous day, the cooldown method was swapped from the steam bypass system to the atmospheric dump valves (ADV). As the cooldown continued, Unit 1 entered Mode 4 at 0140 hours. At 0245 hours, Unit 1 inadvertently re-entered Mode 3 due to a malfunction that closed HCV-08-2A [EIIS:SB:HCV], the 1A steam generator ADV, that resulted in an unplanned heatup of the RCS.

At 0250 hours, operators were dispatched to take local control of the ADV. Mode 4 conditions were reentered at 0700 hours.

Cause of the Event

The inadvertent Mode change was caused by a malfunction of the 1A steam generator ADV that caused the unplanned heatup of the RCS. HCV-08-2A is an air operated valve (AOV). During the in-situ investigation, a significant amount of air was observed/heard leaking from the top cap of the actuator casing when air was supplied to the actuator. Since the actuator is reverse acting, air is supplied to the underside of the actuator/diaphragm. Therefore, leakage out of the top of the actuator casing indicates a breach in the pressure boundary at the diaphragm/diaphragm plate. Disassembly of the valve actuator confirmed that the diaphragm had failed.

There were no signs of diaphragm degradation or damage that would have caused the failure. The diaphragm failure mode was determined to be overload because the diaphragm failed between two bolt holes, at a cross-section of minimum area. The investigation concluded that inadequate overhaul work instructions (e.g., unspecified torque values and grease application) led to the conditions that allowed the diaphragm overload failure. The overhaul model work order was revised to provide better work instructions. Additionally, to ensure proper assembly, the Unit 1 sister valve HCV-08-2B was overhauled during the outage.

Analysis of the Event

In Modes 1, 2, 3, and 4, Technical Specification 3.1.2.2 requires at least two of the following three boron injection flow paths be operable:

- a. One flow path from the BAM tanks with via a BAM pump through a charging pump to the RCS.
- b. One flow path from the BAM tanks via a gravity feed valve through a charging pump to the RCS.
- c. The flow path from the RWT via a charging pump to the RCS.

Mode 3 was entered without the Technical Specification 3.1.2.2 limiting condition for operation (LCO) being met. Technical Specification 3.0.4 states that an entry into an operational Mode shall not be made when conditions of the LCO are not met and the

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action requires a shutdown. With less than the required boron flowpaths available, the action leads to a unit shutdown if two boron flowpaths can not be restored.

Although the action statement requirements were in effect in Mode 4 and did not change with the inadvertent Mode 3 entry, this condition resulted in a non-compliance with Technical Specification 3.0.4. Therefore, the facility was operated in a condition prohibited by the Technical Specifications and the reporting requirements of 10 CFR 50.73(a)(2)(i)(B) were met.

Analysis of Safety Significance

The only safety function for the ADVs is to maintain pressure boundary integrity of the secondary system pressure boundary upstream of the main steam isolation valves. The ADV actuator failure did not impact the ability of the ADV to perform its pressure boundary safety function. Other functions include the ability to relieve steam to provide decay and sensible heat removal during RCS cooldowns when the steam bypass system (to the condenser) is not available. The ADV actuator failure did not adversely affect the ability for local manual control of the ADV. Personnel were dispatched to locally open the ADV in accordance with procedures and the cooldown was re-established.

During this event, the BAM tank contents were used to increase RCS boron concentration as part of the planned cooldown. Although the BAM tanks were not operable in accordance with the Technical Specification, the tank remained available and their contents could be replenished if needed. The boron injection flowpath via the RWT was not compromised by this event, so it remained operable throughout the evolution. Additionally, the allowed outage time for less than two boron injection flowpaths was not exceeded during this event.

Additionally, this failure mode is not applicable to the St. Lucie Unit 2 ADV actuators because the actuators are motor operated, not air operated. Therefore, this event had no impact on the health and safety of the public.

Corrective Actions

1. The actuator for HCV-08-2A was overhauled and a new diaphragm installed under work order 35024947-01. HCV-08-2B was overhauled under work order 35027570-01.
2. The model work order for overhauling HCV-08-2A and HCV-08-2B was revised to provide bolting sequences and torques for reassembly as well as specifying that grease should not be applied to the diaphragm or diaphragm plate at assembly.

Other Information

Similar Events

None

Failed Equipment

Component: Atmospheric Dump Valve for Steam Generator 1A

Manufacturer: WKM

Model Number: 70-19-3DRTS valve, 70-13-1R size 280 actuator