



June 2, 2003

L-2003-144
10 CFR § 50.73

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

Re: St. Lucie Unit 2
Docket No. 50-389
Reportable Event: 2003-001-00
Date of Event: April 1, 2003
Manual Reactor Scram Due To
Decreasing Main Condenser Vacuum

The attached Licensee Event Report 2003-001 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', is written over the typed name.

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

WJ/KWF
Attachment

JE22

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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 St. Lucie Unit 2	2. DOCKET NUMBER 05000389	3. PAGE Page 1 of 3
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4. TITLE
Manual Reactor Trip Due To Decreasing Main Condenser Vacuum

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
04	01	2003	2003	- 001	- 00	06	02	2003	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	10. POWER LEVEL 100	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more)							
		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)	20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER	20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
		20.2203(a)(2)(v)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)		20.2203(a)(2)(vi)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	
		20.2203(a)(3)(i)							

12. LICENSEE CONTACT FOR THIS LER

NAME Kenneth W. Frehafer, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (772) 467 - 7748
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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
E	SH	PI	H140	NO	E	BA	TUR	D245	YES

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

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

On April 1, 2003, St. Lucie Unit 2 was in Mode 1 operation at 100 percent power. At approximately 1500 hours, control room operators noted that the backpressure in the St. Lucie Unit 2 main condenser was slowly increasing. The operators attempted to perform the off-normal operating procedure for loss of condenser vacuum and recover condenser vacuum by placing the hogging ejectors (hoggers) in service. However, the operators performed a manual reactor trip at approximately 1603 hours when condenser backpressure reached the procedurally defined limit. The plant was stabilized in Mode 3 with feedwater supplied by the main feedwater system.

The cause for the manual reactor trip was a reduction of main condenser vacuum caused by a combination of increased air in-leakage to the condenser via a corrosion induced through-wall hole in the steam jet air ejector piping and the degraded function of the 2A condenser hogger. The 2A hogger degraded operation was caused by an out-of-calibration steam supply pressure gage.

The faulty piping was replaced during the Spring 2003 St. Lucie Unit 2 refueling outage. The steam supply pressure gage that lead to degraded 2A hogger operation was replaced, and the hoggers were inspected during the outage with no significant findings noted. FPL is evaluating the planned and preventative maintenance practices for the hoggers.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Description of the Event

On April 1, 2003, St. Lucie Unit 2 was in Mode 1 operation at 100 percent power. At approximately 1500 hours, control room operators noted that the backpressure in the St. Lucie Unit 2 main condenser was slowly increasing. The off-normal operating procedure for loss of condenser vacuum was implemented and operators attempted to recover condenser vacuum by placing the 2A hogging ejector [EIIS:SH:EJR] (hogger) in service. However, the 2A hogger did not appear to be operating properly, and the 2B hogger was placed in service. While securing the 2A hogger, the operators performed a manual reactor trip at approximately 1603 hours when condenser backpressure reached the procedurally defined limit.

The plant was stabilized in Mode 3 with feedwater supplied by the main feedwater system. All safety related equipment responded to the reactor trip as designed with the exception of the steam-driven 2C auxiliary feedwater (AFW) pump [EIIS:BA:P:TUR]. The pump tripped on an invalid mechanical overspeed trip.

Cause of the Event

The cause for the manual reactor trip was the reduction of main condenser vacuum. The vacuum reduction was caused by a combination of increased air in-leakage to the condenser via a through-wall hole in the steam jet air ejector piping and the degraded function of the 2A condenser hogger. The through-wall hole was caused by corrosion.

The dissolved oxygen levels on Unit 2 had been elevated for several days prior to the event, and FPL had an on-going investigation into the cause of the increased dissolved oxygen. Shortly prior to the event, insulation had been removed from a section of piping near the loop seal between the steam jet air ejector intercondenser and the main condenser and a significant corrosion cell was observed in this area. Chemistry personnel were notified to investigate the corrosion cell as a potential source of air in-leakage. It was subsequently determined that a through-wall hole had been exposed in this piping.

Shortly after discovery of a through-wall hole in the air ejector system line, operators observed a slowly increasing trend in condenser backpressure. The operators attempted to recover vacuum in the condenser by placing the hoggers in service per procedural direction, but condenser backpressure continued to increase. The manual reactor trip was implemented when the administrative limit was reached.

Following the plant trip, FPL determined that the hole in the loop seal piping between the steam jet air ejector intercondenser and the main condenser was approximately 1" x 1/2" in size. Additionally, the event investigation revealed that a local steam pressure gauge, PI-12-48A [EIIS:SH:PI] used to manually adjust the steam pressure supply to the 2A hogger, was out of calibration by 80-85 psig. This resulted in an actual steam pressure of approximately 115 psig at the ejector when the gauge was indicating 200 psig. At pressures below 200 psig, hogger performance rapidly declines. Therefore, instead of drawing vacuum from the main condenser, the 2A hogger acted as a vacuum breaker on the main condenser. Placing the 2B hogger was not effective because the suction piping was cross connected with the degraded 2A hogger. This lineup allowed the degraded 2A hogger to act as a vacuum breaker on the 2B hogger. Therefore, the 2B hogger was unable to draw a vacuum on the main condenser.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Based on a review of the probable causes and inspection of the 2C AFW pump mechanical trip devices, the most likely cause of the mechanical overspeed trip was excessive wear of the overspeed trip mechanism. The overspeed mechanism was reworked.

Analysis of the Event

This condition is reportable under 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in manual actuation of the reactor protection system (RPS).

Analysis of Safety Significance

With the exception of the 2C AFW pump, all safety related equipment responded to the manual reactor trip as designed. The electric-driven AFW pumps were available if required. Steam generator water levels were maintained with the main feedwater system post-trip. Therefore, the manual reactor trip had no adverse impact on the health and safety of the public.

Corrective Actions

1. The loop seal piping between the steam jet air ejector intercondenser and the main condenser was replaced during the Spring 2003 St. Lucie Unit 2 refueling outage under work order (WO) 33006353.
2. The 2A pressure gage was replaced under WO 33006364.
3. The St. Lucie Unit 2 hogging ejectors were inspected during the Spring 2003 St. Lucie Unit 2 refueling outage under WO 33006358 with no significant items noted.
4. St. Lucie is evaluating the current planned/preventative maintenance practices for the hogging ejectors.
5. The 2C AFW overspeed mechanism was repaired under WO 33006356.

Additional Information

Failed Components Identified

Component: Local steam pressure gage PI-12-48A
 Manufacturer: Helicoid Gage Co.
 Model: 440R

Component: Auxiliary feedwater pump turbine
 Manufacturer: Dresser Industries
 Model: GS-2N (103323E)

Similar Events

None