Florida Power & Light Company, 6351 S. Ocean Drive, Jensen Beach, FL 34957

November 24, 1999

L-99-258
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: 1999-006-01
Date of Event: June 6, 1999
Sub-Critical Reactor Trip
Due to Inadvertent MSIV Opening

The attached revision to Licensee Event Report 1999-006 is being submitted pursuant to the requirements of 10 CFR § 50.73 to provide notification of the subject event.

This revision expands on the initial unsuccessful operator attempts to close the MSIVs.

Very truly yours,

J. A. Stall
Vice President
St. Lucie Nuclear Plant

JAS/EJW/KWF
Attachment

cc: Regional Administrator, USNRC, Region II
Senior Resident Inspector, USNRC, St. Lucie Nuclear Plant

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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.

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)

Sub-Critical Reactor Trip Due to Inadvertent MSIV Opening

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	06	1999	1999	- 006 -	01	11	24	1999	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Kenneth W. Frehafer	(561) 467 - 7748

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
A	SB	V	-	NO	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

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

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

On June 6, 1999, St. Lucie Unit 2 was stable in Mode 3 with all control element assemblies fully inserted for troubleshooting of the Unit 2 control element assembly motion control system. The main steam isolation valves were closed in accordance with an equipment clearance order. During the release of the equipment clearance order following completion of maintenance, the 2B main steam isolation valve, HCV-08-1B, unexpectedly opened to approximately 90 percent of full open. Due to the resulting pressure differential between the 2A and 2B steam generators, a reactor trip signal was generated and all trip circuit breakers opened. Subsequently, the 2B main steam isolation valve was closed.

The event was caused due to personnel error when the clearance was released. Procedural guidance on how to restore the main steam isolation valves was not followed.

Corrective actions included Operation supervision instruction to the operating crews, stand down meetings, operator aids, and training.

This revision expands on the initial unsuccessful operator attempts to close the MSIVs.

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

Description of the Event

On June 6, 1999, St. Lucie Unit 2 was stable in Mode 3 with all control element assemblies fully inserted for troubleshooting of the Unit 2 control element assembly (CEA) motion control system [EIIS:AA]. Both steam generators (SGs) were at normal no-load pressures of 900 psia, with heat removal being accomplished using the atmospheric dump valves (ADVs). The main steam isolation valves (MSIVs) [EIIS:SB:V] were closed in accordance with equipment clearance order (ECO) 2-99-06-011S in order to maintain the main steam header vented for personnel safety during an inspection inside the main generator. Following completion of the generator inspection, the ECO was signed off and was being released. During the release of the ECO, the 2B MSIV, HCV-08-1B, unexpectedly opened to approximately 90% of full open. The 2B SG pressure rapidly dropped to approximately 740 psia due to the immediate pressurization of the main steam header. The 2B SG pressure slowly recovered towards normal no-load pressure as pressure between the 2B SG and the main steam header equalized.

Due to the resulting pressure differential between the 2A and 2B SGs, a reactor trip signal was generated on asymmetric steam generator transient at approximately 1859 hours. The reactor protection system (RPS) trip logic was made up and all trip circuit breakers (TCBs) [EIIS:JC:BKR] opened, although no rod motion occurred as all CEAs were already fully inserted prior to the trip. Due to the cooldown resulting from the MSIV opening, pressurizer level began to decrease and the control room crew isolated the letdown system to conserve reactor coolant system (RCS) inventory. Attempts to close the 2B MSIV from the control room were unsuccessful, and the crew entered emergency operating procedure, EOP-5, "Excess Steam Demand," at 1910 hours to verify plant safety functions. As the main steam header was intact at the time of the event, the steam demand effectively ceased once pressures between the 2B SG and main steam header equalized. Initial attempts to locally close the 2B MSIV locally using Appendix I, "MSIV Local Closure", of EOP-99, "Appendixes/Figures/Tables", were unsuccessful, but the 2B MSIV was finally closed at 1953 hours.

Cause of the Event

The cause of the event was personnel error in the failure to utilize operating procedure (OP) 2-0810020, "Main Steam System Initial Valve Alignment," during the release of ECO 2-99-06-011S. Contributing factors include an inadequate pre-job brief by the licensed operator, the assistant nuclear plant supervisor (ANPS), and inadequate operator knowledge of the MSIV air system.

The Unit 2 MSIVs have a complex hydraulic and pneumatic control system and are designed to fail open on a loss of DC control power. Because of this, a specific sequence must be followed to restore air and power in order to prevent inadvertent opening of the valve. The basic sequence, as discussed in OP 2-0810020, is to restore DC control power to the valve first, and then hold the control switch in the CLOSE position while a total of eight air isolation valves are opened. During the release of the ECO, air was being restored to the valve prior to the control power fuses being re-installed, and the control switch was not being held in the CLOSE position.

In order to close the MSIVs, the crew determined that they needed to implement procedure OP 2-0810020, "Main Steam Sys Initial Valve Alignment," Step 8.10, Returning the 2B MSIV (HCV-08-1B) to service, which states in part:

1. Station a nuclear plant operator (NPO) at the MSIV with a radio. Ensure all air valves are fully closed.

Cause of the Event (cont'd)

2. Insert main control circuit fuses for HCV-08-1B at RTGB 206 DC SB F-27and F-28.

3. Take HCV-08-1B handswitch at the RTGB to CLOSE position and hold it there.

However, an oversight on the part of the ANPS who was working through the procedure caused step number two to be missed. Contributing to this oversight was the fact that the MSIV indicating lights were lit (these lights are not dependent on control power) which led the crew to erroneously believe control power was available.

Therefore, the 2B MSIV continued to open during this attempt to close the MSIVs. Therefore the initial attempts to remotely close the valve from the control room were unsuccessful. Additionally, the 2B MSIV air system had not been fully restored and was not in a proper configuration to support local operation of the valve. Therefore, initial attempts to locally close the 2B MSIV, by disconnecting pressure switch fittings in accordance with Appendix I of EOP-99 to allow the air to vent, were also unsuccessful. Later, the proper configuration of the air system was achieved and Appendix I was successful in closing the valve.

Analysis of the Event

This event is reportable under 10 CFR 50.73(a)(2)(iv) as "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)." Although the RPS safety function had been already been completed before the event, the event is still reportable as a valid trip signal was generated in response to actual plant parameters.

Analysis of Safety Significance

The cooldown transient resulting from the opening of the 2B MSIV resulted in the following changes in RCS parameters:

- Pressurizer pressure decreased from 2250 psia to 2150 psia.
- Pressurizer level decreased from 33 percent to 25 percent.
- RCS temperature decreased from 532 degrees to approximately 517 degrees.

Once the 2B S/G and main steam header pressures equalized, the RCS parameters began trending back toward their initial values due to the influence of core decay heat and reactor coolant pump heat. At the time of the event, all CEAs were fully inserted and boron concentration was conservatively elevated to support CEA testing and a planned future reactor start up. Adequate shutdown margin was maintained at all times.

Although the reactor trip signal was incidental to the event, a review of the sequence of events recorder (SOER) printout indicates that RPS responded properly to the event. The correct trip signal was generated on all four RPS channels and all eight TCBs opened within 0.040 seconds of completing the trip logic.

Based on the above, this event had no adverse impact on the health and safety of the public.

Corrective Actions

1. Operations supervision immediately provided short term reinforcement by memorandum to all Operations personnel that ECOs need to be referenced against plant

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

procedures. This instruction dictated that if a plant procedure provided instructions for removing equipment from service or returning equipment to service, then the evolution is to be conducted in accordance with the procedure and the ECO modified as necessary to ensure compliance with the procedure.

2. The operators involved were temporarily removed from licensed activities in order to develop the root cause and corrective actions for this event. They participated in the stand down meetings of corrective action 3 below. The operators were returned to licensed duties after de-briefing the plant general manager on their findings.

3. Operations management issued a night order and conducted several stand down meetings concerning the use of procedures to restore systems to their in service condition as well as the use of check sheet 9 of procedure AP 0010120, "Conduct of Operations," an aid that provide items to consider when planning evolutions, during the performance of pre-evolution briefs.

4. Operations has installed placards at each MSIV cautioning against manipulating components prior to enabling/disabling MSIV without consulting OP 2-0810020, "Main Steam System Initial Valve Alignment."

5. Training will cover this event/MSIV design in licensed operator requalification training (industry events).

Additional Information

Failed Components Identified

None

Similar Events

None