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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
St. Lucie Unit 2	05000389	Page 1 of 5

TITLE (4)

New MOV Methodology Caused Past PORV Block Valve Operability Problem

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
08	07	1998	1998	- 005 -	01	11	25	1998	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)	X	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)		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)
K. W. Frehafer, Licensing Engineer	(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
B	AB	V:MO	L200	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 August 7, 1998, St. Lucie Unit 2 was in Mode 1 at 100 percent power. During a review of NRC Information Notice 96-48, Supplement 1, Engineering discovered that the Unit 2 power operated relief valve block valve (V-1476 and V-1477) margins were insufficient to accommodate the additional conservatism specified in NRC Information Notice 96-48, Supplement 1, and assure valve closure. Operations entered the one-hour ACTION statement for Technical Specification 3.4.4.a at 19:59 hours on August 7, 1998. The ACTION statement was exited at 20:07 hours the same day when both Unit 2 power operated relief valve block valves were closed with power removed in accordance with Technical Specification requirements.

The cause of this event was inadequacies in the original vendor motor operated valve methodology as documented in Limitorque Technical Update 98-01 and NRC Information Notice 96-48 Supplement 1. The new methodology required additional conservatisms when evaluating a Limitorque AC powered motor operator's performance.

Corrective actions include the immediate actions taken on August 7, 1998, and the implementation of the planned valve actuator modifications during the upcoming fall Unit 2 Cycle 11 1998 refueling outage.

This LER revision changes the safety significance for inoperable PORV block valves based on subsequent safe shutdown analysis re-validation effort findings documented in LER 50-389/1998-007-00.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St. Lucie Unit 2	05000389	1998	- 005	- 01	Page 2 of 5

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

Description of Event

On August 7, 1998, St. Lucie Unit 2 was in Mode 1 at 100 percent power. During review of NRC Information Notice (IN) 96-48, Supplement 1, Engineering discovered that the Unit 2 power operated relief valve (PORV) block valve (V-1476 and V-1477) [EIIS:AB:V:MO] margins were insufficient to assure valve closure. In light of recent tests and studies of motor actuator output, Limitorque retracted its relaxation of the sizing criteria for AC powered motor actuators through issuance of Limitorque Technical Update (TU) 98-01. The Limitorque TU revised requirements such that an additional factor of conservatism needs to be added to evaluate motor operator performance. NRC IN 96-48, Supplement 1, titled "Motor Operated Valve Performance Issues," disseminated this information to the industry.

Operations entered the one-hour ACTION statement for Technical Specification 3.4.4.a at 19:59 hours on August 7, 1998. The ACTION statement was exited at 20:07 hours the same day when both Unit 2 PORV block valves were closed with power removed in accordance with Technical Specification requirements.

Cause of the Event

The cause of this event was inadequacies in the original vendor motor operated valve (MOV) methodology as documented in Limitorque TU 98-01 and NRC IN 96-48, Supplement 1.

Analysis of the Event

Technical Specification 3.4.4. requires that each PORV block valve be operable in Modes 1, 2, and 3, with no more than one block valve open. ACTION a. states that:

> *"With one or more block valve(s) inoperable, within 1 hour either restore the block valve(s) to OPERABLE status or close the block valve(s) and remove power from the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."*

The past inoperability of the PORV block valves constitutes a condition for which firm evidence exists that the condition existed in the past. It is concluded that the past inoperability time exceeded the allowed outage time (i.e., greater than 1 hour) of Technical Specification 3.4.4.a and therefore constitutes operation prohibited by the plant's Technical Specifications. Accordingly this condition is reportable under 10 CFR 50.73(a)(2)(i)(B), that states "Licensees shall report: 'any operation or condition prohibited by the plant's Technical Specifications.'"

Limitorque Technical Update 98-01 Requirements

The purpose of the Limitorque Technical Update (TU) was to provide new guidance to determine the output torque capability of a Limitorque valve actuator with an AC motor. The motor operated valve (MOV) output torque capability is determined by using the following factors:

1. Motor Rated Torque

2. Pullout Efficiency

Limitorque Technical Update 98-01 Requirements (cont'd)

3. Overall Actuator Gear Ratio

4. Motor Terminal Voltage

5. Motor Rated Voltage

6. Application Factor (AF) selected in accordance with Limitorque SEL-4

Engineering reviewed the current NRC Generic Letter (GL) 89-10 MOV program calculations and determined that the Motor Rated Torque, Overall Actuator Gear Ratio, and the Motor Terminal and Rated Voltage factors were consistent with the TU requirements.

Unit 2 PORV Block Valve Issue

However, for some MOVs, calculations utilized motor running efficiency (versus pullout efficiency) and the relaxed AF criteria previously provided by Limitorque in TU 93-03. TU 93-03 allowed the assumption of an AF of 1.0 (rather than 0.9) when the motor voltage was less than 90 percent of the motor's rated voltage. Engineering reviewed applicable MOVs, and determined that several valves did not have sufficient margin to account for the additional conservatism introduced by Limitorque TU 98-01. However, only the Unit 2 PORV block valves, V-1476 and V-1477, were determined to be a Technical Specification OPERABILITY concern. Using the new methodology for the Unit 2 PORV block valves, the calculated closing thrust was 10,464 lbs., and the required closing thrust is 17,440 lbs. Therefore, there is a possibility that the PORV block valves would not close if required.

Analysis of the Effect on Safety

The past inoperability of the PORV block valves did not constitute operation outside the design basis of the plant and would not have prevented the fulfillment of a safety function. The Technical Specifications require that one block valve be closed during power operation. In the event of an inadvertent PORV opening, the safety analysis does not credit closing of the associated block valve to prevent exceeding safety limits.

The PORVs are discussed in Emergency Operating Procedure EOP-15 for initiation of once through cooling. However, this is a beyond design basis scenario that requires multiple safety related system failures.

The past inoperability of the PORV block valves would not have adversely affected the operation of the PORVs for low temperature over pressure protection (LTOP). In the LTOP mode the PORV block valves only need to be open and are not required to be operated.

The PORV system is a high/low pressure interface with the primary system. To preclude a fire-induced LOCA, the safe shutdown analysis protects the PORVs from possible spurious operation. The PORVs' control and power cables are protected or manual action is taken to isolate the PORVs' power by use of isolate switches in the electrical penetration room in case of a fire in the control room or cable spread room. No credit is taken for operation of the Unit 2 PORV block valves as far as the 10 CFR 50, Appendix R safe shutdown analysis is concerned.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St. Lucie Unit 2	05000389	1998	- 005	- 01	Page 4 of 5

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

Analysis of the Effect on Safety (cont'd)

A subsequent St. Lucie Unit 2 LER (50-389/1998-007-00) documents a concern pertaining to inadequate protection of the St. Lucie Unit 2 PORVs from hot shorts resulting from a fire within the control room reactor turbine generator (RTG) boards. This could result in a spurious operation of a PORV during a control room fire. Although operation of the PORV block valves are not credited for a fire, this new discovery may require operation of the PORV block valves to terminate a fire induced LOCA.

The fire must occur inside of the control room RTG boards at the correct location to cause the insulation to burn off two or more cables of the correct polarity and cause hot shorts to occur before the control room operators have any chance of responding. Because the control room is continuously occupied and fire detection exists inside of the control room RTG boards, the existence of a fire of this magnitude would have a low probability of occurrence. In the unlikely event a PORV spuriously opened as a result of a fire, the event could be mitigated by opening the PORV DC feeder breaker. Although this action was not proceduralized, it is a readily apparent action that the operators could take to mitigate the transient.

As an interim compensatory measure, a procedure change was issued for procedure 2-ONP-110.02, Appendix A, "Control Room Inaccessibility," which de-energizes the 125 volt PORV DC feeder breakers as the first step when evacuating the control room. This action removes both the motive and control power from the PORVs and eliminates the potential for spurious PORV operation during a fire.

Based on the preceding discussion, past PORV block valve inoperability had no adverse affect on the health and safety of the public.

However, in order to provide operational flexibility to the operators during postulated beyond design bases events, St. Lucie implemented temporary system alterations (TSAs) on the Unit 2 PORV block valves to restore these valves to operable status. The TSA for V-1476 was implemented on August 14, 1998, and the TSA for V-1477 was implemented on August 19, 1998. The TSAs will be removed after the permanent plant modifications are implemented next outage.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St. Lucie Unit 2	05000389	1998	- 005	- 01	Page 5 of 5

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

Corrective Action

1. Immediate action was taken on August 8, 1998 to close the PORV block valves and remove power in accordance with the requirements of Technical Specification 3.4.4.a.
2. St. Lucie implemented temporary system alterations (TSAs) on the Unit 2 PORV block valves to restore these valves to operable status on August 14, 1998, for V-1476, and August 19, 1998, for V-1477.
3. Both PORV block valves will be modified during the upcoming fall 1998 Unit 2 Cycle 11 refueling outage under PC/M 98013.
4. The St. Lucie GL 89-10 program requires review of industry operating experience and the incorporation of new information into the program documentation. The information and issues identified in NRC IN 98-48 Supplement 1 will be incorporated into the GL 89-10 program documentation by January 31, 1999.
5. Corrective actions for the Unit 2 PORV SSA fire protection deficiencies are documented in LER 50-389/1998-007-00, "Fire Protection SSA Re-Verification Identified Potential PORV and 2A EDG Cable Failure Modes."

Similar Events

LER 50-335/97-009, dated September 17, 1997, reported MOV calculation deficiencies associated with the St. Lucie Unit 1 PORV block valve V-1403.

Failed Components Identified

Component: V-1476 and V-1477, PORV block Valve Motor/Actuator

Manufacturer: Limitorque

Model Number: SB-00 (3G0861A)