NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
South Texas, Unit 2	05000499	1 OF 06

TITLE (4) Unplanned ESF Actuation of an Isolation Valve for the Above Seat Drain Line

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
0 9	1 2	9 2	9 2	0 0 7	0 1	1 2	1 6	9 2	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Charles Ayala - Supervising Licensing Engineer	(5 1 2) 9 7 2 - 8 6 2 8

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

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 September 12, 1992, Unit 2 was in Mode 1 at 100% power. Operators were performing quarterly Main Steam system valve operability testing of the solenoid operated containment isolation valve. An operator was dispatched to the Isolation Valve Cubicle (IVC) building to open the Main Steam upstream manual drain isolation valve. At 0535 hours, approximately one minute after the valve was manually opened, the above seat drain line valve on the Main Steam line "D" (MS7903A) indicated open in the Control Room. No intentional action was taken to open MS7903A. The cause of the unexpected opening of the isolation valve is "burping", an undesirable, but avoidable characteristic of piloted SOVs. The slow closure of MS7903A following the "burping" transient was apparently due to a position indication malfunction caused or influenced by unequal temperatures internal to the SOV. Corrective actions include providing training to appropriate plant departments describing the burping characteristics of piloted SOVs including suggested operational means for avoiding the problem. Additionally, a review of other systems containing piloted SOVs will be performed to determine the susceptibility of "burping." System surveillance procedures will be revised as necessary.

DESCRIPTION OF EVENT:

On August 31, 1992, a Unit 2 Equipment Clearance Order (ECO) was written for Unit 2 to close the Main Steam drain isolation valve (MS0546), a normally locked open valve and the isolation valve for the above seat drain line on Main Steam line "D" (MS7903A) to isolate a leak on a downstream valve. MS0546 was manually closed and the Control Room handswitch for MS7903A was placed in the "CLOSE" position. MS7903A is a normally energized open Solenoid Operated Valve (SOV) and automatically closes on a Containment Isolation signal. (See Figure)

On September 12, 1992, Unit 2 was in Mode 1 at 100% power. Operators were performing quarterly Main Steam system valve operability test. A partial release of the ECO was obtained to open MS0546 so that the test of the isolation valve for the above seat drain line on the Main steam line "D" (MS7903A) could be performed under pressure. The Control Room handswitch for MS7903A remained in the closed position and the valve indicated closed. An operator was dispatched to the Isolation Valve Cubicle (IVC) building to open MS0546. At 0535 hours, approximately one minute after the valve was manually opened, MS7903A indicated open in the Control Room. A few minutes later, both position indicator lights went out, signifying either a loss of power, a SOV reed switch misalignment, or an SOV in an indeterminate position. While the operators were checking power supplies and Technical Specifications, the MS7903A close position indication re-illuminated.

Following the return of position indication, a stroke time check of MS7903A was performed. The required stroke time was not achieved, but no indicator problems occurred. Because of the failure to achieve the required stroke time, MS7903A was declared inoperable and was re-isolated by closing MS0546 in accordance with Technical Specification 3.6.3, "Containment Isolation Valves."

As a result of the unexpected indication that MS7903A had opened when its handswitch was in the "CLOSE" position, a four hour notification was made to the NRC at 0704 hours.

CAUSE OF EVENT:

The cause of the unexpected opening of the isolation valve for the above seat drain line (MS7903A) is "burping", an undesirable, but avoidable characteristic of piloted SOVs. EPRI/NMAC Solenoid Valve Maintenance and Application Guide, NP-7414, addresses the phenomenon called "burping". "Burping" is the unintentional opening of an SOV, for a fraction of a second, when a rapid inlet pressure transient occurs. "Burping" is characteristic of piloted SOVs installed in steam/gas systems. "Burping" of SOV MS7903A could have been avoided if the SOV had been opened prior to opening the upstream isolation valve (MS-0546). "Burping" of piloted SOVs is not a widely recognized characteristic and has not been addressed in training.

The slow closure of MS7903A following the "burping" transient was not due to binding (determined by troubleshooting) but was apparently due to a position indication malfunction caused or influenced by unequal temperatures internal to the SOV. The SOV stroke time test should not have been performed so soon following the "burping" transient. The SOV should have been in its normal operating configuration for the test.

The surveillance procedure for SOV MS7903A:

- assumes that the SOV is in the OPEN position at the initiation of testing.
- does not contain barriers to either preclude "burping" or to warn of the potential for "burping" to occur under certain conditions.
- does not provide for placing the SOV in a normal operating configuration for testing.

SOV position indication problems are mainly the result of the imprecise setting of the SOV reed switches. Precise setting is nearly impossible and rarely reproducible with the currently installed reed switches. Purchase and installation of the now available upgraded position indication assemblies will facilitate precise setting and minimize position indication problems.

ANALYSIS OF EVENT:

Unplanned actuation of an Engineered Safety Feature (ESF) is reportable pursuant 10CFR50.73(a)(2)(iv). At STPEGS, the Containment Isolation system is an ESF system as described in the Updated Final Safety Analysis Report. Unplanned individual actuations of containment isolation valves are conservative established to be reportable. While any unnecessary challenge to an ESF is undesirable, actuation of the Unit 2 containment isolation valve for the above seat drain line (MS7903A) represented a minimal hazard since it did not cause, worsen, or prevent mitigation of any accident.

Although reportable for the above reason, Unit 2 containment integrity has been maintained by the manual closing of MS0546 pending repair of MS7903A.

CORRECTIVE ACTIONS:

1. Administrative controls, via the Operability Tracking Log, have been placed on MS7903A and MS0546. These valves have been tagged out to ensure that containment integrity is maintained.

2. Troubleshooting on MS7903A was performed in an attempt to replicate the conditions reported to assess the cause of the problem.

3. Training will be provided to appropriate Maintenance personnel, via a Maintenance Training Bulletin, and Operations personnel, via Licensed Operator Requalification Training, which:

   a. describes the "burping" characteristic of piloted SOVs and includes suggested operational means for avoiding the problem, and

   b. addresses the conditions needed to obtain consistent SOV surveillance test results.

   The Maintenance Training Bulletin will be issued by March 17, 1993. The Operations training will be completed by August 13, 1993.

CORRECTIVE ACTIONS: (Con't)

4. A review of other systems containing piloted SOVs will be performed to determine susceptibility to "burping". System Surveillance procedures will be revised as necessary to incorporate appropriate cautions, precautions, or steps to avoid "burping" piloted SOVs and to obtain more consistent test results. The procedures will be revised by September 23, 1993.

5. Upgraded position indication assemblies for the Main Steam Line Above Seat Drain line isolation SOVs will be added to facilitate precise setting and minimize position indication problems. This will be installed by the end of the third refueling outage in Unit 2 and the end of the fifth refueling outage in Unit 1.

6. A modification to rotate the above seat drain line isolation SOVs to below the horizontal plane has been implemented during the fourth refueling outage for Unit 1 and is scheduled to be implemented in the third refueling outage for Unit 2. The purpose of this modification is to reduce SOV coil temperature and is suggested by the manufacturer as a method to reduce the potential for burping.

ADDITIONAL INFORMATION:

The isolation valve for the above seat drain line (MS7903A) is a Target Rock model number 77CC-008 Solenoid Operated Valve.

Other problems involving Target Rock SOVs have been reported by STPEGS and the industry.

No previous events of this specific nature have been reported to the NRC.

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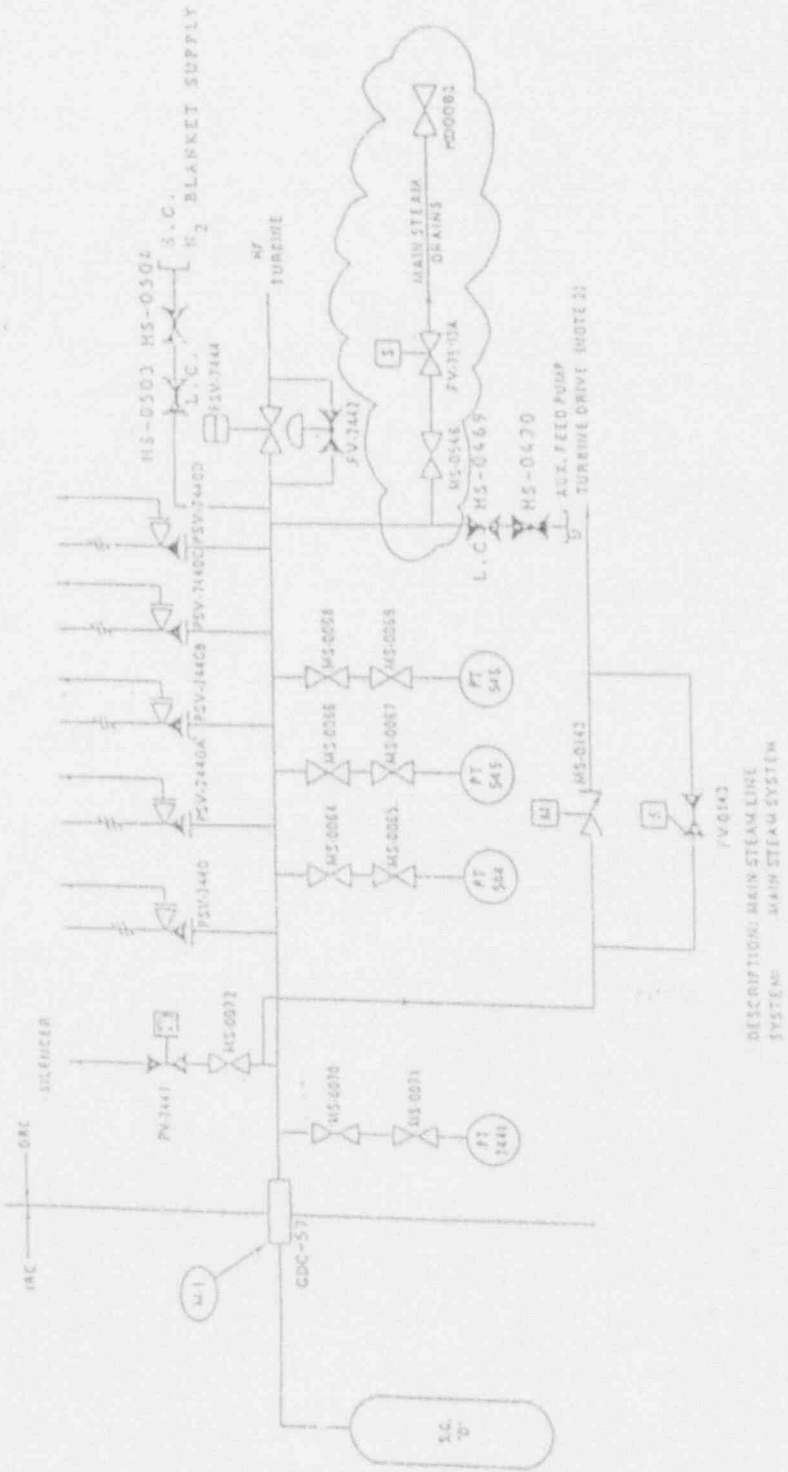
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
South Texas, Unit 2	05000 499	9 2	- 0 0 7 -	0 1	06 OF 06

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



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