

LICENSEE EVENT REPORT (LER)

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

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 (MNRB 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.

FACILITY NAME (1) South Texas, Unit 2		DOCKET NUMBER (2) 05000 499	PAGE (3) 1 OF 07
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TITLE (4) Entry into Technical Specification 3.0.3 due to Containment Isolation Valves failing to close.

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
04	28	92	92	004	01	04	01	93		05000
									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)	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)	X 50.73(a)(2)(i)	50.73(a)(2)(vii)(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)(vii)(B)							
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)							

LICENSEE CONTACT FOR THIS LER (12)

NAME Jairo Pinzon - Senior Engineer	TELEPHONE NUMBER (include Area Code) (5 1 2) 9 7 2 - 8 0 2 7
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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
X	W I	I S V	T O 2 0	YES					

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On April 28, 1992, at 1730 hours, Unit 2 was in Mode 1 at 100% power when an Unusual Event was declared. Unit 2 commenced the plant shutdown due to an entry into Technical Specification (TS) 3.0.3. The entry into TS 3.0.3 was required when the Action Statement of TS 3.6.3 could not be met. The Action Statement requires that at least one isolation valve be operable in each affected penetration that is open. In this case, both containment isolation valves (SB-FV-4187 and SB-FV-4187A) for penetration M-86 were declared inoperable after attempts were made to close each valve without success. The cause of SB-FV-4187A failure was suspended solids accumulating in the valve, plugging the pilot actuation hole. The cause of SB-FV-4187 failure to close on demand was a low differential pressure across the valve and limit switch misalignment. The corrective actions to address this event are: a temporary modification has been installed in Unit 1 and will be installed in Unit 2 to bypass the valves and allow sampling at upstream drain lines. These temporary modifications are being evaluated to convert them into permanent modifications. A TS change has been submitted to the NRC to allow credit for the steam generator tubes, tubesheet and shell as an isolation barrier.

REQUIRED NUMBER OF DIGITS/CHARACTERS
FOR EACH BLOCK

BLOCK NUMBER	NUMBER OF DIGITS/CHARACTERS	TITLE
1	UP TO 46	FACILITY NAME
2	8 TOTAL 3 IN ADDITION TO 05000	DOCKET NUMBER
3	VARIABLES	PAGE NUMBER
4	UP TO 76	TITLE
5	6 TOTAL 2 PER BLOCK	EVENT DATE
6	7 TOTAL 2 FOR YEAR 3 FOR SEQUENTIAL NUMBER 2 FOR REVISION NUMBER	LER NUMBER
7	6 TOTAL 2 PER BLOCK	REPORT DATE
8	UP TO 18 - FACILITY NAME 8 TOTAL - DOCKET NUMBER 3 IN ADDITION TO 05000	OTHER FACILITIES INVOLVED
9	1	OPERATING MODE
10	3	POWER LEVEL
11	1 CHECK BOX THAT APPLIES	REQUIREMENTS OF 10 CFR
12	UP TO 50 FOR NAME 14 FOR TELEPHONE	LICENSEE CONTACT
13	CAUSE VARIES 2 FOR SYSTEM 4 FOR COMPONENT 4 FOR MANUFACTURER NPRDS VARIES	EACH COMPONENT FAILURE
14	1 CHECK BOX THAT APPLIES	SUPPLEMENTAL REPORT EXPECTED
15	6 TOTAL 2 PER BLOCK	EXPECTED SUBMISSION DATE

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South Texas, Unit 2	05000 499	9 2	- 0 0 4 -	0 1	02 OF 07

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

DESCRIPTION OF EVENT:

On April 28, 1992, at 1730 hours, Unit 2 was in Mode 1 at 100% power when an Unusual Event was declared. A plant shutdown was commenced due to an entry into Technical Specification 3.0.3 when the Action Statement of Technical Specification 3.6.3 could no longer be met since both containment isolation valves were declared inoperable and could not be verified to be in the closed position.

At approximately 1800 hours, on April 27, 1992, the containment isolation valves were opened on the "C" Steam Generator Bulk Water sample line. This was done to allow monitoring of Steam Generator chemistry while Steam Generator blowdown was secured for maintenance activities. Later in the evening, a purge was initiated on the same sample line with a subsequent sample being collected. The sample line was left purging with the intent to collect additional samples. After the maintenance activities were completed, the blowdown on Steam Generator "C" was restored and the sample sink flow was secured. During a Control Room walkdown by the Shift Supervisor, on April 28, 1992, both containment isolation valves (SB-FV-4187 and SB-FV-4187A) for the "C" Steam Generator Bulk Water sample line were noticed to be open. Normal lineup with no sample flow is SB-FV-4187 closed and SB-FV-4187A open. After the Control Room Operators determined that sampling was no longer required, they attempted to close SB-FV-4187. The valve would not indicate closed. The fuses for the control power were removed with no success in closing the valve. At 1633 hours, on April 28, 1992, SB-FV-4187 was declared inoperable, and the plant entered the Action Statement of Technical Specification 3.6.3. Attempts to close SB-FV-4187A were also unsuccessful. At 1730 hours, the plant was unable to meet the Actions of Technical Specification 3.6.3 and entered Technical Specification 3.0.3. An Unusual Event was declared at 1730 hours, and at 1740 hours, a plant shutdown was commenced.

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 80.0 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.

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DESCRIPTION OF EVENT: (cont'd)

After a continuous effort to close both containment isolation valves, SB-FV-4187 indicated closed at approximately 1815 hours. The closure of SB-FV-4187 was verified and a clearance was hung on the valve. The plant exited Technical Specification 3.0.3 at 1835 hours. The termination of the Unusual Event was made at 1839 hours, at which time power had been decreased to approximately 93%. At the termination of the Unusual Event, SB-FV-4187A could not be closed.

In June of 1992, the containment isolation valve, SB-FV-4187A, was disassembled and inspected to determine the cause of its failure. During the disassembly, material was found to be plugging the pilot actuation hole of the main disc assembly and was also present in the area between the main disc and the positioning ring. The material between the main disc and the positioning ring had locked the piston ring to the sleeve wall. This material was analyzed and is similar in composition to the soft, powdery sludge periodically removed from the steam generators. Since these valves are used in Steam Generator Blowdown lines, it is reasonable to assume that there will always be some levels of suspended material in the lines. Based on this, the use of this type of valve in this application was not appropriate.

In March of 1993, troubleshooting on valve SB-FV-4187 was performed. The troubleshooting revealed that the indication limit switches were slightly out of alignment. The valve is susceptible to seat leakage at low differential pressure. These factors gave indication that the valve was not closed when the handswitch for the valve was taken to "Close". Attempts to verify the valve closed by establishing sample flow did not initially allow sufficient differential pressure to completely seat the valve. With sample flow lined up to the sample sink, the pressure regulator in the sample line will act to maintain a low differential pressure as it maintains a set flow rate. As the differential pressure increased across the valve, the seat leakage decreased, the limit switch contacted, and the valve indicated closed.

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

CAUSE OF EVENT:

The cause of the containment isolation valve, SB-FV-4187A, failure was inadequate application of this Target Rock valve. The design of these type valves makes them susceptible to binding due to suspended materials and the blowdown sample line will always have some level of suspended material. The cause of the failure of valve SB-FV-4187 to close on demand is attributed to both a low differential pressure across the valve and limit switch misalignment. The entry into Technical Specification 3.0.3 was required since the Technical Specification 3.6.3 Action Statement could no longer be met. This event could have been avoided if Technical Specification 3.6.3 had taken credit for the steam generator and piping being a closed system (as allowed by 10CFR50 Appendix A, Criterion 57) instead of only addressing isolation valves. Without this written allowance, the conservative and correct action was to enter TS 3.0.3.

ANALYSIS OF EVENT:

Reportability was required by 10CFR50.73 when the plant entered Technical Specification 3.0.3. Entry into Technical Specification 3.0.3 was made when the Limiting Condition for Operation (LCO) for Technical Specification 3.6.3 was unable to be satisfied. Technical Specification 3.6.3 Limiting Condition for Operation states "...maintain at least one isolation valve operable in each affected penetration that is open...". Containment isolation valves FV-4187 and 4187A in "C" Steam Generator sample line, penetration M-86 were both declared inoperable. The two valves are listed in Updated Final Safety Analysis Report (UFSAR) Figure 6.2.4-1 as containment isolation valves for this line.

This penetration is designed to meet the requirements of General Design Criteria (GDC) 57 of 10CFR50 Appendix A, which requires the following:

"Criterion 57 - Closed system isolation valves. ...shall have at least one containment isolation valve which shall be either automatic, or locked closed, or capable of remote manual operation."

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ANALYSIS OF EVENT: (cont'd)

One containment isolation valve is required on penetration M-86 to satisfy the requirements of GDC 57. Containment penetrations are required to have two barriers so that no single failure can prevent isolation. The UFSAR, 6.2.4.1, states, "An "isolation barrier" is either an isolation valve or a closed system." The Steam Generator tubes, tube sheets and shells are considered an isolation barrier, as supported by the UFSAR, Figure 6.2.4-1, Sheet 1A which states:

"The barriers against fission product release to the environment are the Steam Generator tubes, the Steam Generator shell, and the piping associated with the Steam Generators."

With the steam generator and piping now being identified as a closed system and/or an isolation barrier, the Limiting Condition for Operation 3.6.3 action requirement can be met with one containment isolation valve inoperable and open. The failure of both isolation valves would have been an entry into a 4 hour Action Statement to close one of the containment isolation valves instead of the conservative approach to enter into Technical Specification 3.0.3.

The elapsed time from when the first valve, SB-FV-4187, was declared inoperable until the plant exited Technical Specification 3.0.3 was approximately one hour and fifty-four minutes, thus meeting the 4 hour Action Statement. Indications are that the containment isolation valve closest to containment (SB-FV-4187) had been opened for approximately twenty-four hours prior to attempting to shut it. The other containment isolation valve (SB-FV-4187A) is normally open.

CORRECTIVE ACTIONS:

1. HL&P has inspected the two containment isolation valves and determined the root causes for the failures of SB-FV-4187A and 4187.

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CORRECTIVE ACTIONS: (cont'd)

2. Plant Operations has placed administrative controls on SB-FV-4187 to maintain containment integrity. An Equipment Clearance Order tag is in place to assure it remains closed and power to the operator has been removed in accordance with Technical Specification requirement.
3. HL&P has submitted a Technical Specification change to 3.6.3 to properly address those containment penetrations that meet the requirements of General Design Criteria 57.
4. A Temporary Modification has been installed in Unit 1 with appropriate procedurally prescribed compensatory actions. This temporary modification will be used to sample the steam generator secondary fluid until a permanent modification is implemented. The temporary modification will be installed in Unit 2 during the third refueling outage, presently in progress.
5. Engineering has evaluated the design for these valves and determined the different options to make a permanent corrective action. This evaluation is under management review and the final decision will be made by May 14, 1993.
6. Design Engineering will address the generic issues related to Solenoid Operated Valve (SOV) applications as part of the SOV task force action plan. This task force was developed for Generic letter 91-015 and NUREG-1275. This action will be completed by the end of 1994.

ADDITIONAL INFORMATION:

The Steam Generator 2C sample isolation valve was supplied by Target Rock. The Target Rock model number is 84DD-003 and the part number is 1011105-3-5-1-P.

A similar event was reported under a Unit 1 LER 90-018 regarding a Technical Specification 3.0.3 entry due to an inoperable feedwater isolation valve.

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ADDITIONAL INFORMATION: (cont'd)

Also, Unit 2 LER 92-001 was initiated due to a reactor trip caused by a dropped rod. During the event, SB-FV-4189A, a valve identical to SB-FV-4187A, failed to close initially. The cause was attributed to poor seating of the disc due to a low differential pressure across the valve. The corrective action was to lap the seating surfaces to ensure proper seating.

A review of Nuclear Plant Reliability Data System indicates other failures of Target Rock valves used as containment isolation valves. The failures were related primarily to indication problems, failure to open or close, or excessive leakage.