

Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

John T. Herron
Vice President, Browns Ferry Nuclear Plant

July 24, 2000

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

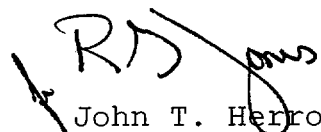
10 CFR 50.73

Dear Sir:

**BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 3 - DOCKET NO. 50-296
- FACILITY OPERATING LICENSE DPR-68 - LICENSEE EVENT REPORT (LER)
50-296/2000-006-00**

The enclosed report provides details concerning Unit 3 main steam safety/relief valves that exceeded their technical specifications setpoint tolerances during surveillance testing. This report is submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications.

Sincerely,


John T. Herron

cc: See page 2

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U.S. Nuclear Regulatory Commission

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Enclosure

cc (Enclosure):

Mr. William O Long, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. Paul E. Fredrickson, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
61 Forsyth Street, S. W.
Suite 23T85
Atlanta, Georgia 30303

NRC Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611

LICENSEE EVENT REPORT (LER)

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

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TITLE (4) Main Steam Safety/Relief Valves Exceeded The Technical Specifications Setpoint Tolerance Due To Pilot Valve Disc/Seat Bonding.

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	22	2000	2000	-- 006	-- 00	07	24	2000	NA	05000
									FACILITY NAME	DOCKET NUMBER
									NA	05000
									FACILITY NAME	DOCKET NUMBER
									NA	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	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)(B)	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 Steve Austin, Senior Licensing Project Manager	TELEPHONE NUMBER (Include Area Code) (256) 729-2070

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
X	SB	RV	T020	Y						

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

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

On June 22, 2000, TVA determined that 8 of the 13 Unit 3 main steam safety/relief valve (SRV) pilot cartridges removed during the Unit 3 Cycle 9 refueling outage bench tested outside the Technical Specifications (TS) setpoint tolerance of +/- 3 percent. Seven (7) of the SRV pilot cartridges tested above the TS setpoint and one (1) tested less than the setpoint. The Unit 3 SRV pilot cartridges were installed during the Cycle 8 refueling outage and were in service from September 1998 to April 2000.

The cause for the SRV setpoint drift is attributed to SRV pilot disc/seat corrosion bonding at pilot disc/seat interface. Setpoint drift is a generic concern experienced by utilities using Target Rock Two-Stage SRVs (Model No. 7567F) in boiling water reactors. SRV pressure switches were previously installed during the Unit 3 Cycle 8 outage. The pressure switches ensure the initiation of any SRV should it fail to open at its setpoint; thus, minimizing the effects of SRV setpoint drift.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the plant's TS.

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

I. PLANT CONDITION(S)

At the time of the discovery of this condition, Unit 3 was at 100 percent power following the Unit 3 Cycle 9 refueling outage. Unit 2 was also operating at 100 percent power and, Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On June 22, 2000, TVA determined that eight (8) of the thirteen (13) main steam [SB] safety/relief valves (SRV) [RV] pilot cartridges tested at Wyle Laboratory in Huntsville, Alabama failed the setpoint tolerance bench tests. Testing revealed that seven (7) of the pilot cartridges tested above the setpoint and one (1) tested below the setpoint. The pilot cartridges were previously removed from the Unit 3 SRVs (Target Rock Two-Stage SRV Model No. 7567F) during the scheduled Unit 3 Cycle 9 refueling outage in April 2000 and shipped to Wyle Laboratories for testing. The pilot cartridges had been installed during the Unit 3, Cycle 8 refueling outage.

Altogether, Wyle Laboratories tested 4 SRV platinum-stellite and 9 stellite pilot disc cartridges. One (1) platinum-stellite and seven (7) stellite cartridges failed the as-found setpoint tolerance bench tests. See the Table on page 7 of this report for specific SRV pilot cartridge test results.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the plant's TS.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

September 1998

Pilot cartridges installed on Unit 3 SRVs during Cycle 8 outage.

April 15, 2000

Unit 3 entered Cycle 9 refueling outage.

April 28, 2000

Pilot cartridges removed from SRVs and shipped to Wyle Laboratories.

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June 22, 2000

The SRV pilot cartridge test results indicated several cartridges were outside the TS range.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

This condition was identified during valve bench testing at Wyle Laboratories in Huntsville, Alabama.

F. Operator Actions:

None.

G. Safety System Responses:

None.

III. CAUSE OF THE EVENT**A. Immediate Cause:**

None.

B. Root Cause:

Seven (7) of the 13 SRV pilot cartridges opened above the TS setpoint tolerance of + 3 percent and one opened below the TS setpoint tolerance of -3 percent. The cause attributed to the elevated drift of the SRV is pilot disc/seal corrosion bonding at the two-stage SRV pilot disc/seal interface. The corrosion bonding results in an increase in the valve opening pressure due to the need for additional opening force. The one SRV whose setpoint was below the TS setpoint tolerance was not affected by corrosion bonding. The cause of its drift could not be definitively determined.

SRV setpoint drift is a generic concern experienced by utilities using Target Rock Two-Stage SRVs in boiling water reactors and was investigated by the BWROG SRV Drift Fix Development Committee and the valve manufacturer. A final remedy for the problem has yet to be identified.

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TVA had previously implemented the BWROG recommendation of replacing some of the SRV pilot cartridges with cartridges that have 0.3 percent platinum alloyed stellite pilot disc. Use of platinum-stellite discs has not corrected the SRV setpoint drift problem (see LERs 260/96004, 260/96008, 260/97008, and 296/98006), but the platinum-stellite discs generally demonstrate better performance than non-platinum discs. This cycle only one of four platinum-stellite disc valves was outside the TS limit.

IV. ANALYSIS OF THE EVENT

There are 13 SRVs on the main steam piping. The valves are designed to perform the mechanical overpressure safety/relief function for the primary reactor system boundary by opening at a reactor pressure of 1135, 1145, and 1155 psig respectfully. The safety/relief function of the SRVs is to limit primary reactor system pressure in the event of a pressurization transient resulting from a turbine trip [TA] or a main steam isolation valve closure [SB]. The failure of 7 SRVs (from approximately + 3.81` to +6.78 percent above their setpoint pressure) would not have resulted in exceeding a TS abnormal operational transient.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The reload licensing analysis which defined the operating limits for the Unit 3 Cycle 9 pressurization transients were performed assuming an average of + 6 percent SRVs drift from its TS values, and assuming one inoperable SRV. The as-found average SRV setpoint drift was + 2.98 percent. The average setpoint drift was well within the analyzed average + 6 percent drift. Therefore, Unit 3 was within the reload specific analysis for this cycle.

TVA has previously performed sensitivity evaluations (reference LERs 260/87005 and 296/97003) which show that SRV setpoint deviations of several percent in the high direction can be assumed in the core transient analyses and still provide margin to reactor vessel pressurization limits. For example, the (current) Unit 2 Cycle 10 and Unit 3 Cycle 9 cycle specific transient reports assume a average of + 6 percent SRV drift with acceptable results. Based on the as-found data, the previous sensitivity evaluations and the existing cycle specific analysis, the SRV drift would not have resulted in exceeding any safety limits. Accordingly, there were no actual or potential safety consequences as a result of this event.

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VI. CORRECTIVE ACTIONS**A. Immediate Corrective Actions:**

Prior to the recent Unit 3 restart, TVA replaced all 13 SRV pilot cartridges with cartridges certified to be within +/-1 percent.

B. Corrective Actions to Prevent Recurrence:

SRV setpoint drift is a generic concern experienced by utilities using Target Rock Two-Stage SRVs in boiling water reactors and is being investigated by the BWROG SRV Drift Fix Development Committee and the valve manufacturer. TVA will continue to participate in the BWROG evaluation of the long-term solution for the SRV setpoint drift problem.¹

During the Unit 3, Cycle 8 refueling outage, a modification was implemented that installed pressure switches to actuate the SRVs. The pressure switches ensure the initiation of any SRV should it fail to open at its setpoint; thus, minimizing the effects of SRV setpoint drift.

VII. ADDITIONAL INFORMATION**A. Failed Components:**

Target Rock, Two-Stage SRVs Model No. 7567F.

¹ TVA does not consider this corrective action a regulatory commitment. The completion of this item will be tracked in TVA's Corrective Action Program.

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

B. Previous LERs on Similar Events:

There have been several previous LERs written concerning main steam SRV setpoint drift due to pilot valve disc/seat corrosion bonding (LERs 260/87005, 259/88053, 260/93003, 260/95003, 260/96004, 260/96008, 296/97003, 260/97008 and 260/99006).

Previous corrective actions included use of platinum-stellite pilot discs with some performance improvement. In addition, Unit 2 and Unit 3 have pressure switch modifications which provide additional assurance that the SRVs will actuate when required.

C. Additional Information:

None.

D. Safety System Functional Failure:

This event did not result in a safety system functional failure in accordance with NEI 99-02, Revision 0.

VIII. COMMITMENTS

None.

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SRV AS-FOUND TEST RESULTS

Eight (8) of the following thirteen (13) Unit 3 main steam SRVs failed to meet the required TS setpoint tolerance (+/- 3 percent). The information for the failed SRV pilot cartridges is shown in bold type.

Valve Cartridge Serial No.	Pilot Disc Composition	Nameplate Setpoint Pressure (PSIG)	As-Found Actuation Pressure (PSIG)	Pressure Difference (PSIG)	Percent Difference (%)
1071	stellite	1155	1215	60	5.19
1240	stellite	1145	1195	50	4.37
1030	stellite	1145	1090	-55	-4.8
1234	stellite	1135	1192	57	5.02
1021	platinum	1145	1141	-4	-0.35
1033	platinum	1135	1212	77	6.78
1070	platinum	1145	1150	5	0.44
1069	platinum	1135	1169	34	3
1060	stellite	1135	1180	45	3.96
1019	stellite	1155	1177	22	1.9
1078	stellite	1155	1199	44	3.81
1064	stellite	1155	1233	78	6.75
1233	stellite	1155	1186	31	2.68