CATEGORY 1

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FACIL:50-296 Browns Ferry Nuclear Power Station, Unit 3, Tennessee 05000296
AUTH.NAME AUTHOR AFFILIATION
WALLACE,J.E. Tennessee Valley Authority
CRANE,C.M. Tennessee Valley Authority
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-003-00:on 970314,Unit 3 main steam SRVs pilot cartridges failed setpoint tolerance bench tests.Caused by corrosion bonding of SRV pilot disc/seat interface resulting in drifting.Main steam SRV pilot replaced.W/970409 ltr.

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

Christopher M. (Chris) Crane
Vice President, Browns Ferry Nuclear Plant

April 9, 1997

10 CFR 50.73

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

Dear Sir:

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 3 - DOCKET NO. 50-296 - FACILITY OPERATING LICENSE DPR-68 - LICENSEE EVENT REPORT 50-296/97003

The enclosed report provides details concerning eleven (11) of the thirteen (13) Unit 3 main steam safety/relief valves that exceeded their technical specifications setpoint limit during 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,

M. Bajestani

FOR C. M. Crane

Enclosure
cc: See page 2

150030

IE22

Enclosure
cc (Enclosure):
Mr. Mark S. Lesser, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

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

Mr. J. F. Williams, Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Browns Ferry Nuclear (BFN) Plant Unit 3	05000296	1 OF 5

TITLE (4)

Main Steam Safety/Relief Valves Exceeded the Technical Specifications Required Setpoint Limit as a Result of 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
03	14	97	97	003	00	4	09	97	NA	05000
									FACILITY NAME: NA	DOCKET NUMBER: 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	X 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	TELEPHONE NUMBER (Include Area Code)
James E. Wallace, Licensing Engineer	(205) 729-7874

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	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 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 14, 1997, with Unit 3 in a refueling outage, Units 2 operating at 100 percent power, and Unit 1 shutdown and defueled, Wyle Laboratories notified TVA that 11 of the 13 Unit 3 main steam safety/relief valves (SRV) pilot cartridges failed setpoint tolerance bench tests. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the plant's technical specifications (TS).

Testing by Wyle Laboratories discovered that the SRVs' as found setpoints were outside the TS setpoint tolerance of +/- 11 psi. The cause was attributed to corrosion bonding of the SRV pilot disc/seat interface resulting in drifting of the SRV setpoints. The Unit 3 SRVs were installed during the Unit 3, cycle 6 refueling outage. Setpoint drift is a generic concern experienced by utilities using Target Rock Two-Stage SRVs (Model No. 7567F) in boiling water reactors and is being investigated by the Boiling Water Reactors Owners Group (BWROG) SRV Drift Fix Development Committee and the manufacturer. TVA will continue to participate in the BWROG's evaluation of the long-term solution for the SRV setpoint drift problem. In addition, TVA will evaluate other possible solutions including use of pressure switch actuated SRVs.

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Browns Ferry Unit 3	05000296	97	-- 003	-- 00	2 of 5

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

I. PLANT CONDITIONS

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

II. DESCRIPTION OF EVENT

A. Event

On March 14, 1997, TVA was notified that eleven of the thirteen main steam [SB] safety/relief valves (SRV) [RV] failed the 'as found' setpoint tolerance bench tests. The setpoints were found outside the TS tolerance of +/- 11 pounds per square inch (psi) (approximately 1 percent) (See page 6 to this LER for specific SRV as-found data results). The SRV pilot cartridges were removed from the Unit 3 SRVs (Target Rock Two-Stage SRV Model No. 7567F) and shipped to Wyle Laboratories for testing. Prior to the restart of Unit 3, replacement SRVs were installed.

The above 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:

November 19, 1995	Unit 3 restarted in Cycle 7.
February 22, 1997	Unit 3 entered its refueling outage.
February 26, 1997	Unit 3 SRV pilot cartridges were removed and shipped to Wyle Laboratories for testing.
March 14, 1997	Wyle Laboratories notified TVA of the results of the 'as found' SRV bench tests.

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.

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

F. Operator Actions:

None.

G. Safety System Responses:

None.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause was SRV pilot disc/seat bonding resulting in the SRV setpoints deviating outside the TS setpoint tolerance of +/- 11 psi.

B. Root Cause:

The cause of this bonding was attributed to corrosion at the two-stage SRV pilot disc/seat interface. This bonding caused the SRV setpoints to drift.

Corrosion bonding caused an increase in the valve opening pressure due to the need for additional opening force above the setpoint value.

IV. ANALYSIS OF THE EVENT

There are thirteen SRVs on the main steam piping. The valves are designed to perform the safety/relief function for the primary reactor system boundary by opening at a sensed pressure of 1105, 1115 or 1125 psig. The safety/relief function of the SRVs is to limit primary reactor system pressure to less than 1375 psig in the event of a pressurization transient resulting from a turbine trip or a main steam isolation valve closure.

TVA performed a limiting pressurization transient analysis for unit 2 cycle 6 assuming a spectrum of main steam SRV failures and setpoint drifts. The analysis concluded that even if four main steam SRVs completely fail to open and the remainder operate at ten percent above setpoint, the primary reactor system pressure would not exceed the TS safety limit of 1375 psig. Considering the conservative inputs to this analysis and the low sensitivity of the pressurization transient to cycle-by-cycle loading differences, the failures observed in this Unit 3 event would not have resulted in exceeding the TS safety limit during any abnormal operational transient. Thus, the plant and public safety would not have been adversely affected and safety of plant personnel was not compromised.

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

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

All thirteen main steam safety/relief valve pilot cartridges were replaced with certified cartridges or tested and recertified with their setpoint within TS requirements.

B. Corrective Actions to Prevent Recurrence:

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

TVA will evaluate interim solutions including use of pressure switch actuated SRVs. Additionally, TVA has requested a Technical Specification change which raises the setpoint tolerances from approximately +/- 1 percent to +/- 3 percent which corresponds to the inputs currently used in the Unit 2 and 3 cycle-specific core reload analyses. This change will provide added margin for SRV testing. Long-term corrective actions associated with this problem will be tracked by the TVA corrective action program.

VI. ADDITIONAL INFORMATION

A. Failed Components:

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

B. Previous LERs on Similar Events:

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

VII. COMMITMENTS

None.

Energy Industry Identification System (EIIS) system and component codes are identified in the text with brackets (e.g., [XX]).

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

SRV AS-FOUND DATA RESULTS

Eleven of the following thirteen Unit 3 main steam SRVs failed to meet the required TS tolerance. Six served as Automatic Depressurization System (ADS) valves.

Valve Cartridge Serial Number (S/N)	Pilot Disc Composition	Nameplate Setpoint Pressure (psi)	As-Found Actuation Pressure (psi)	Percent Difference (%)
1073	stellite	1125	1177	+ 4.62
1075 ADS	stellite	1115	1143	+ 2.51
1030 ADS	stellite	1115	1133	+ 1.61
1059 ADS	stellite	1105	1238	+12.04
1018 ADS	stellite	1115	1144	+ 2.60
1063	stellite	1105	1158	+ 4.80
1065	stellite	1115	1256	+12.65
1023	stellite	1105	1130	+ 2.26
1034 ADS	stellite	1105	1142	+ 3.35
1085 ADS	stellite	1125	1150	+ 2.22
1068	stellite	1125	1128	+ 0.27
1024	stellite	1125	1150	+ 2.22
1027	stellite	1125	1129	+ 0.36