CATEGORY 1

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FACIL:50-260 Browns Ferry Nuclear Power Station, Unit 2, Tennessee 05000260
AUTH.NAME AUTHOR AFFILIATION
WALLANCE,J.E. Tennessee Valley Authority
CRANE,C.M. Tennessee Valley Authority
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 96-008-01:on 961101,Unit 2 main steam SRV pilot cartridges failed setpoint tolerence bench tests.Caused by SRV pilot disc/seat bonding resulting in SRV setpoints.SRV pilot cartridges replaced.W/970409 ltr.

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CATEGORY 1 DOCUMENT

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 2 - DOCKET NO. 50-260 - FACILITY OPERATING LICENSE DPR-52 - LICENSEE EVENT REPORT 50-260/96008 REVISION 1

The enclosed supplemental report provides a clarification in the 'Analysis of the Event' section of Revision 0. The clarification eliminates a reference to the fuel vendor's and TVA's reload analyses. Revision 0, as written, could lead one to believe that the two analyses were identical in nature. However, these analyses were not identical in scope. Therefore, the reference was deleted.

Revision 0 of this report was 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

IE22

Enclosure
cc (Enclosure):
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U.S. Nuclear Regulatory Commission
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10833 Shaw Road
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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 2	05000260	1 OF 6

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
11	01	96	96	008	01	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 November 1, 1996, Wyle Laboratories notified TVA that 10 of the 13 Unit 2 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). The pilot cartridges had been removed from the Unit 2 main steam SRVs following a failure to lift when reactor pressure exceeded the setpoint tolerance of the two lowest set groups of SRVs during a Unit 2 scram on October 29, 1996 (reported in LER 260/96007).

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 2 main steam SRVs were installed during the Unit 2 Cycle 8 refueling outage. Three of the SRVs had pilot cartridges with platinum (pt) alloyed stellite pilot discs and ten of the SRVs had pilot cartridges with stellite discs. 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 and different applications of pt-stellite discs.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Unit 2	05000260	96	-- 008	-- 01	2 of 6

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 2 was in a cold shutdown condition. Unit 3 was operating at 100 percent power. Unit 1 was shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event

On November 1, 1996, TVA was notified that of the three main steam [SB] safety/relief valves (SRV) [RV] pilot platinum (pt) - stellite disc cartridges and ten stellite cartridges tested, three pt-stellite and seven stellite cartridges 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 the attachment to this LER for specific SRV test results.

The SRV pilot cartridges were removed from the unit 2 main steam SRVs (Target Rock Two-Stage SRV Model No. 7567F) and shipped to Wyle Laboratories for testing following a failure to lift when reactor pressure exceeded the setpoint tolerance of the two lowest set groups of SRVs during a scram occurring on October 29, 1996. This event was reported in LER 260/96007.

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:

March 22-April 23, 1996	During the Unit 2 Cycle 8 refueling outage, the Unit 2 main steam SRV pilot cartridges were replaced.
October 29, 1996	Unit 2 scrammed. Measured reactor pressure reached approximately 1130 psig. No SRVs lifted.
October 30-November 1, 1996	Unit 2 main steam SRV pilot cartridges were removed and shipped to Wyle Laboratories for testing.

November 1, 1996 — 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.

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 main steam 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.

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

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 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.

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 previously had implemented the BWROG recommendation of replacing SRV pilot cartridges with cartridges that have a 0.3 percent platinum (pt) alloyed stellite pilot disc. During the unit 2 cycle 8 refueling outage, three of the SRVs were replaced with the pt-stellite pilot disc cartridges and ten were replaced with stellite pilot disc cartridges.

The Wyle Laboratories' setpoint acceptance test results show that the SRVs with the pt-stellite discs experienced setpoint drift comparable to the SRVs with stellite discs.

TVA will continue to participate in the BWROG's evaluation of the long-term solution for the SRV setpoint drift problem. In addition, because the current application of pt-stellite discs has not solved the drift problem at Browns Ferry, TVA will evaluate other potential solutions including use of pressure switch actuated SRVs and different applications of pt-stellite discs. Long-term corrective actions associated with this problem will be tracked by the TVA corrective action program.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

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 and 260/96004).

VII. COMMITMENTS

None.

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

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Unit 2	05000260	96	-- 008 --	01	6 of 6

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

ATTACHMENT TO LER 260/96008

Ten of the following thirteen Unit 2 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 (%)
1078	stellite	1125	1135	+ 0.89
1017 ADS	stellite	1115	1240	+11.21
1079	pt-stellite	1115	1147	+2.87
1072 ADS	stellite	1105	1183	+7.06
1232 ADS	stellite	1115	1129	+1.26
1084	stellite	1105	1169	+5.79
1061 ADS	stellite	1115	1131	+1.43
1031 ADS	stellite	1105	1141	+3.26
1060 ADS	stellite	1105	1163	+5.25
1015	pt-stellite	1125	1183	+5.16
1032	pt-stellite	1125	1160	+3.11
1064	stellite	1125	1136	+0.98
1071	stellite	1125	1136	+0.98