



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

August 17, 2009

10 CFR 50.73

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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Washington, D. C. 20555-0001

Browns Ferry Nuclear Plant Units 1, 2, and 3  
Facility Operating License No. DPR-33, DPR-52, and DPR-68  
NRC Docket No. 50-259, 50-260 and 50-296

**Subject: LICENSEE EVENT REPORT (LER) 50-259/2009-003**

The enclosed report provides details of the A Standby Gas Treatment Train being inoperable due to a failed relative humidity heater relay longer than allowed by the plants Technical Specifications.

TVA is reporting this in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications. There are no commitments contained in this letter. Should you have any questions concerning this submittal, please contact F. R. Godwin, Site Licensing and Industry Affairs manager, at (256) 729-2636.

Respectfully,

R. G. West  
Vice President

cc: See page 2

JE22  
NRB

U.S. Nuclear Regulatory Commission  
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Enclosure  
cc (Enclosure):

Regional Administrator - Region II

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Browns Ferry Nuclear Plant Unit 1	<b>2. DOCKET NUMBER</b> 05000259	<b>3. PAGE</b> 1 of 5
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**4. TITLE: A Train Standby Gas Treatment System Inoperable Longer Than Allowed By The Technical Specifications**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	19	2009	2009	003	00	08	17	2009	Browns Ferry Unit 2	05000260
									Browns Ferry Unit 3	05000296

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> <i>(Check all that apply)</i>									
<b>10. POWER LEVEL</b>  100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<small>Specify in Abstract below or in NRC Form 366A</small>							

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> Steve Austin, Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> 256-729-2070
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	BH	37	W120	Y					

**14. SUPPLEMENTAL REPORT EXPECTED**

YES (If yes, complete 15. EXPECTED SUBMISSION DATE)  NO

**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR
N/A	N/A	N/A

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

On June 19, 2009, at approximately 1330 hours Central Daylight Time (CDT) plant Engineering notified Operations that the A-Train of Standby Gas Treatment (SGT-A) relative humidity (RH) heater 37C relay had failed. Consequently, the C-phase heating element was not functioning. Operations immediately declared SGT-A inoperable in accordance with the Plant's Technical Specifications (TSs) and entered a seven day Limiting Condition for Operation (LCO) 3.6.4.3, Action A1 for Units 1, and 3: With one SGT subsystem inoperable, restore SGT subsystem to operable status in seven days. At the time of the event Unit 2 was in Mode 4 and SGT was not required to be operable. On June 19, 2009, TVA replaced the 37C relay. On June 20, 2009, at approximately 0138 hours CDT, following post maintenance testing, SGT-A was declared operable and the TS LCO for an inoperable SGT subsystem was exited. TVA's investigation into this event also found that on November 11, 2008, a work order was generated to trouble shoot and correct main control room annunciator indicating loss of power on the RH heating element. Trouble shooting performed on January 22, 2009, found the RH heater relay coil circuit was open and relay coil failed. On June 19, 2009, when plant engineering notified operations that the C-phase relative humidity heaters were not functional, operations determined SGT-A was inoperable. Units 1, 2, and 3 were in a condition prohibited by the plant's TSs. Therefore, TVA is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition prohibited by the plant's Technical Specifications.

**LICENSEE EVENT REPORT (LER)**

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Nuclear Plant Unit 1	05000259	2009	-- 003	-- 00	2 of 5

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

**I. PLANT CONDITION(S)**

At the time the inoperability condition was identified, Units 1 and 3 were at 100 percent power (3458 Megawatts thermal) and was unaffected by the event. Unit 2 was in Mode 4 and the Standby Gas Treatment (SGT) [BH] system was not required to be operable. At the time of discovery, Unit 2 was also unaffected by the event.

**II. DESCRIPTION OF EVENT**

**A. Event:**

On June 19, 2009, at approximately 1330 hours Central Daylight Time (CDT) plant engineering notified operations that the A-Train of Standby Gas Treatment (SGT-A) relative humidity (RH) heater 37C relay [37] had failed. Consequently, the C-phase heating element was not functioning. Operations immediately declared SGT-A inoperable in accordance with the Plant's Technical Specifications (TSs) and entered a seven day Limiting Condition for Operation (LCO) 3.6.4.3, Action A1 for Units 1 and 3: With one SGT subsystem inoperable, restore SGT subsystem to operable status in seven days.

On June 19, 2009, TVA replaced the 37C relay. On June 20, 2009, at approximately 0138 hours CDT, following post maintenance testing, SGT-A was declared operable and TS LCO for an inoperable SGT subsystem was exited for both Units 1 and 3.

TVA's investigation into this event also found that on November 11, 2008, a work order was generated to trouble shoot and correct main control room annunciator indicating loss of power on the RH heating element. The alarm would only come in only when SGT-A was operating. Trouble shooting performed on January 22, 2009, found the RH heater relay coil circuit was open and relay coil failed. On June 19, 2009, when plant Engineering notified operations that the C-phase of the relative humidity heaters was not functional, Operations determined SGT-A was inoperable.

During the review of the Operation's Logs for this event, TVA determined BFN had more than one SGT inoperable during the period that SGT-A was inoperable. On January 29, 2009, at 0500 hours Central Standard Time (CST) to January 31, 2009, at 0045 hours CST, SGT-B was inoperable and, from February 17, 2009, at 2352 hours CST to February 18, 2009, at 0004 hours CST SGT-C was inoperable for planned activities.

As such, Units 1, 2, and 3 were in a condition prohibited by the plant's TSs. Therefore, TVA is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition prohibited by the plant's Technical Specifications.

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

None.

**C. Dates and Approximate Times of Major Occurrences:**

November 11, 2008	TVA issued a work order to trouble shoot and correct main control room annunciator on loss of power to the SGT-A RH heater.
June 19, 2009 1330 hours CDT	TVA determined that SGT-A was inoperable longer than allowed by TSs.

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**D. Other Systems or Secondary Functions Affected**

None.

**E. Method of Discovery**

Engineering notified Operations SGT-A relative humidity heater relay had failed. The heater is required for SGT subsystem operability.

**F. Operator Actions**

None.

**G. Safety System Responses**

None.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause**

The immediate cause for this event was a failed heater under current power relay. This relay was in service for at least 30 years and was probably at the end of its life. Visual examination of the relay revealed the relay experienced severe overheating prior to failure. The cause for the overheating is not known at this time.

**B. Root Cause**

Operations Shift Personnel failed to issue a Problem Evaluation Report (PER) on November 11, 2008, so an operability review could be documented. Plant Operations, Maintenance and Engineering misdiagnosed SGT-A RH heater power loss alarm. The original trouble shooting made an incorrect diagnosis in that the annunciator circuit had failed and not the RH heater element circuit. This led those to the conclusion that SGT-A was operable when it was not.

The plant surveillance instructions detailing SGT system operation verified the RH heater status by ensuring the status light associated with the RH heater control hand switch. This provided false indication of RH heater status. With the red ON light illuminated, the heaters were in service, however, all of the individual elements may not be energized.

**C. Contributing Factors**

None.

**IV. ANALYSIS OF THE EVENT**

Operations personnel identified an issue with the "SGT Filter Bank A Heating Element Power Loss" remaining illuminated during SGT-A operation on November 11, 2008. They initiated a work order to trouble shoot the alarm; however, they did not issue a PER. Due to training, previous experience, and flawed procedures, the RH heaters were assumed to be functioning when the red indicating light associated with the RH heater hand switch was illuminated. The red light only indicates that power to the RH heaters is available. This mindset led to the misdiagnosis of the problem as an annunciator circuit problem.

On December 12, 2008, trouble shooting by maintenance personnel documented the initial diagnosis was incorrect. However, the diagnosis did not trigger any additional technical review.

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

Further trouble shooting on January 22, 2009, determined the coil for the 37C relay was burned and open. The communications continued to indicate that the annunciator circuit had failed and not the RH heater circuit. The relay coil provides power to the C-phase RH heater element. Subsequent to the January 22, 2009, trouble shooting activity, a new relay was ordered and the work order given a low priority.

On June 17, 2009, because the alarm was received each time SGT-A was in service, Operations initiated a PER on the SGT RH alarm. They requested additional detail for monitoring that should be performed to detect additional RH heater related failures that could potentially make SGT-A inoperable or disable the alarm. On June 19, 2009, following the issuance of a second PER, operations determined that SGT-A was inoperable and entered the appropriate 7 day LCO.

**V. ASSESSMENT OF SAFETY CONSEQUENCES**

The safety consequences of this event were not significant. The BFN SGT System consists of three redundant 50 percent capacity subsystems, each with its own dampers, charcoal filter train, and controls. With one SGT subsystem inoperable, the remaining two subsystems are adequate to perform the required radioactive release control function. Also, TVA's Alternate Source Term Analysis does not credit iodine removal by the SGT charcoal filters. TVA performed an assessment of the as found condition of SGT-A, and established the following:

The RH heater is designed to reduce the humidity of the air entering the charcoal filters to less than 70 percent. The SGT heater bank, consisting of three heating elements, must dissipate more than or equal to 40 kW when tested in accordance with American National Standard Institute (ANSI) N510-1975. During the July 15, 2009, performance of Surveillance Instruction, Standby Gas Treatment Filter Train A Humidity Control Heater Test, the RH heater circuit was capable of generating 49.2 kW of heater power. With one of the three heater elements out of service the heater circuit can produce approximately 32.8 kW of heater power or 82 percent of the required 40 kW. TVA found that with 32.8 kW of heater power and saturated influent (100 percent RH) at 150 degrees F, and a flow rate of 9900 cubic feet per minute (TSs flow rate for SGT is 9000 ± 10 percent), the influent to the charcoal filter will be 74.5 percent RH and 162.5 degrees F.

Based on the conditions described above, the charcoal filter efficiency was 99.98 percent under the conditions reflected in this LER. Therefore, the overall effect on SGT-A performance due to the loss of one of the three heaters is negligible and did not adversely impact the SGT System's ability to mitigate the consequences of accidents assumed in the safety analyses. As such, TVA concludes that the health and safety of the public was not affected by this event.

**VI. CORRECTIVE ACTIONS**

**A. Immediate Corrective Actions**

Operations declared SGT-A inoperable. The failed RH heater relay was replaced and following successful post maintenance testing, SGT-A was declared operable.

**B. Corrective Actions to Prevent Recurrence** - The corrective actions are being managed by TVA's corrective action program.

The plant procedures associated with the operation of SGT will be revised, adding additional actions to be taken when a RH Heater alarm is received. These included revising Surveillance Procedure, Standby Gas Treatment System Train Operation, to include verification of RH heater capacity using an ammeter and volt meter.

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

TVA will have a focused group meeting with the groups involved in this event to reiterate the need to immediately issue a PER when issues with TS equipment arise.

Corrective actions to address the failed relay include identification and replacement of other under current relays of the same vintage as the failed relay.

A preventative maintenance item will be established to perform thermography on the SGT system heater under current relays.

**VII. ADDITIONAL INFORMATION**

**A. Failed Components**

A Westinghouse Type SC, Style 292B400A15, under current relay [37] failed.

**B. PREVIOUS LERS ON SIMILAR EVENTS**

None.

**C. Additional Information**

Corrective action document for this report is Problem Evaluation Reports 174416 and 174597.

**D. Safety System Functional Failure Consideration:**

This event is not a safety system functional failure according to NEI 99-02.

**E. Scram With Complications Consideration:**

This event was not a complicated scram according to NEI 99-02.

**VIII. COMMITMENTS**

None.