Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

John A. Scalice
Site Vice President, Watts Bar Nuclear Plant

JUN 0 9 1997

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

Gentlemen:

In the Matter of the) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 FACILITY OPERATING LICENSE NPF-90 - SUPPLEMENT TO LICENSEE EVENT REPORT (LER) 50-390/97004 - AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS) INOPERABLE

The purpose of this letter is to provide supplemental information to further address the safety significance of LER 50-390/97004 submitted on March 17, 1997, and provide more specific information concerning component failure. The status of corrective actions have also been updated to reflect completion. The enclosure provides a revised report.

If you should have any questions, please contact P. L. Pace at (423) 365-1824.

Sincerely,

J. A. Scalice

IE22 1/1

160003

Enclosure
cc: See page 2

cc (Enclosure):
NRC Resident Inspector
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

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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 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20603.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Watts Bar Nuclear Plant - Unit 1	05000390	1 OF 8

TITLE (4)

AUXILIARY BUIDLING GAS TREATMENT SYSTEM (ABGTS) INOPERABLE

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
										05000
01	18	97	97	004	01				FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		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)	X	50.73(a)(2)(v)		Specify in Abstract below
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R. M. Brown, Licensing Engineer	(423)-365-8195

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
B	VF	CNTR	I005	NO						

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 February 14, 1997, TVA discovered that the Auxiliary Building Gas Treatment System (ABGTS) Train-B air heater had not been operational since January 18, 1997. The air heater, located in the first stage of the air cleaning filter assembly, had not been working due to a loose terminal connection at the thermal overloads for the associated magnetic starter. The problem had not been properly diagnosed during 10 hour surveillance test runs. The amount of time the heater was inoperable exceeded the Watts Bar Nuclear Plant Technical Specifications Limiting Condition for Operation (LCO) LCO 3.7.12, action statement A, for one train of ABGTS out-of-service for more than 7 days. Further review determined that ABGTS Train-A had been removed from service for approximately 36 hours to perform surveillance testing and to repair a filter assembly stud during the period that Train-B had been inoperable. Train-A was removed from service at 0830 EST on February 7, 1997. While ABGTS Train-A was inoperable, the Operations crew was unaware that the ABGTS Train-B air heater problem existed. Thus, both ABGTS trains were inoperable until Train-A was restored. The cause of this event has been attributed to a lack of questioning attitude by Operations personnel during Train-B 10 hour surveillance test runs. Corrective actions consist of determining the cause of the hardware failure, correcting hardware problems, improving the test acceptance criteria in the applicable surveillance procedures, development of additional training, and counseling and retraining applicable personnel concerning management expectations for similar situations.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	2 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97	004	01	

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

I. PLANT CONDITIONS:

Watts Bar Nuclear Plant Unit 1 was operating in Mode 1 at approximately 100 percent rated thermal power (RPT) in steady state.

II. DESCRIPTION OF EVENT

A. Event

On February 14, 1997, TVA discovered that the Auxiliary Building Gas Treatment System (ABGTS) (Energy Industry Identification System (EIIS) code VF) Train-B air heater (0-HTR-030-0156-B) (EIIS code EHTR) had not been operational since January 18, 1997. The air heater, located in the first stage of the air cleaning filter assembly, had not been working due to a loose terminal connection at the thermal overload relay (EIIS code RLY) on the "B " phase of the magnetic starter (contactor) (EIIS code CNTR). Heat from the loose connection had caused the thermal overload relay to trip open. The condition had not been diagnosed during a previous 10 hour surveillance test run. The amount of time the heater was inoperable exceeded the Watts Bar Nuclear Plant Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.7.12, action statement A, for one train of ABGTS out of service for more than 7 days. Further review determined that ABGTS Train-A had been removed from service for approximately 36 hours to perform surveillance testing and to repair a filter assembly stud during the period that Train-B had been inoperable. Train-A was removed from service at 0830 EST on February 7, 1997. While ABGTS Train-A was inoperable, the Operations crew was unaware that the ABGTS Train-B air heater starter problem existed. Thus, both ABGTS trains were inoperable until Train-A was restored.

On one prior occasion, December 21, 1996, the B phase thermal overload relay for heater 0-HTR-030-156-B tripped during a 10 hour surveillance test run. The condition was documented under Work Order No. 961867600 as test deficiency notice (DN) No. 1. The proposed corrective action was to reset the overload relay and retest the circuit. The heater circuit then satisfactorily passed the 10 hour test run after one overload reset with no apparent reason for the prior trip. The DN was dispositioned/closed accordingly based on acceptable test performance. Operations returned the circuit to service in accordance with General Operating Instruction (GOI)-7, "General Equipment Operating Guidelines," which states that the reason should be determined before resetting and only one attempt to restart made before initiating repairs. Action to restore the circuit to service was considered appropriate and subsequently the wording in GOI-7 was strengthened to clarify expectations for resetting protective devices.

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

1. ABGTS Train-B air heater magnetic starter (EIIS code CNTR) (0-HTR-030-0156-B)

2. ABGTS Train-A had been removed from service to perform surveillance testing and to repair a filter assembly stud.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	3 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97	004	01	

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

II. DESCRIPTION OF EVENT (continue)

C. Dates and Approximate Times of Major Occurrences

January 18, 1997:

Operations performed ABGTS Train-B 10 hour surveillance test run. A review of records indicate the B phase overload relay tripped open during the test run.

February 7, 1997:

ABGTS Train-A was removed from service at 0830 EST and remained out of service for approximately 36 hours for surveillance testing and repairs. ABGTS Train-A test data was acceptable. ABGTS Train-B was not tested.

February 14, 1997:

Operations performed ABGTS Train-B 10 hour surveillance test run. A review of records indicates the air heater overload relay tripped open during the test run.

D. Other Systems or Secondary Functions Affected

No other systems or secondary functions were affected.

E. Method of Discovery

During a different surveillance (ABGTS Train-B filter test), the system engineer questioned the air heater performance on February 11, 1997, and initiated a test deficiency notice. The deficiency notice was dispositioned by resetting the overload relay and running the heater for about 25 minutes. Subsequently, when the Train-B ABGTS 10 hour test run was performed on February 14, 1997, the system engineer followed the heater performance and identified a loose contact at the heater starter overload relay B phase contact. The system engineer's follow-up review of prior surveillance test documentation for Train-B identified discrepancies with the results of the January 18, 1997, 10 hour surveillance test run.

F. Operator Actions

Watts Bar TS LCO 3.7.12 was entered at approximately 1100 hours on February 14, 1997, after ABGTS Train-B had been discovered inoperable. The required LCO action for one train inoperable is to restore the ABGTS train to operable status within 7 days. LCO 3.7.12 was exited after the problem was diagnosed and corrected and Train-B was restored to service at approximately 0300 hours on February 15, 1997.

G. Automatic and manual safety system responses

No automatic or manual safety system responses were necessary.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
	05000				4 OF 8
Watts Bar Nuclear Plant, Unit 1	0500039C	97	004	01	

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

III. CAUSE OF EVENT

The cause of this event has been attributed to a lack of questioning attitude by Operations personnel for test data taken during the 10 hour surveillance test run performed on January 18, 1997.

A contributing factor was that the surveillance instructions contained poor written communication because the acceptance criteria for the heater test run air temperature increase was not quantified. The acceptable criteria only specified that the final measured test temperature shall be greater than the start temperature.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

A. Evaluation of Plant Systems/Components

The ABGTS is a subsystem of the Auxiliary Building Heating, Ventilating, and Air Conditioning (HVAC) system. Together, with the Auxiliary Building Secondary Containment Enclosure (ABSCE), the two systems serve a primary safety function by providing a secondary containment barrier maintained under negative pressure during certain postulated accidents involving airborne radioactivity, and provide contaminant removal sufficient to keep radioactivity levels in the air released to the environment low enough to assure compliance with the requirements of the Code of Federal Regulations 10CFR100. The ABGTS maintains pressure within the ABSCE at or below ¼ inch water gauge (negative) with respect to atmospheric. The ABGTS consists of two 100 percent capacity redundant air cleanup units (ACUs) located in separate rooms of the Auxiliary Building adjacent to each reactor unit. The ACUs include air treatment components, instrumentation, test fittings and access for maintenance. The air treatment components include a demister, a relative humidity heater, prefilter bank, high efficiency particulate air (HEPA) filter bank, two banks of charcoal adsorbers, and another HEPA filter bank. The relative humidity heater in each ACU is an electric heater designed to reduce the maximum expected relative humidity of the entering air stream to a maximum of 70 percent in the housing space between the moisture separator and the prefilter stage at the system design flow rate. Maintaining a relative humidity (RH) of less than or equal to 70 percent RH assures the maximum activated carbon decontamination efficiencies for iodine removal are maintained.

The ABGTS filters are required for an accident in containment with radionuclides leaking into the Auxiliary Building, or an accident in the Auxiliary Building. The large break Loss of Coolant Accident (LOCA) results in the highest required charcoal efficiency and is the worst case accident that could have occurred during the time frame of this evaluation.

The capability of the ABGTS to perform its intended safety function under post accident conditions while the Train-B ABGTS relative humidity heater was inoperable is discussed in Section IV.C.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
	05000				5 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97	-- 004	-- 01	

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

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES (continued)

B. Evaluation of Personnel Performance

Refer to Section III, Cause of Event.

C. Safety Significance

The affects of the inoperable relative humidity heater on ABGTS Train-B have been evaluated for safety significance under TVA calculation WBN0SG4-243. The time period the relative humidity heater was inoperable was conservatively assumed to be between November 27, 1996, and February 14, 1997, since November 27, 1997, was the last surveillance test run date prior to the first known phase B overload relay trip (Refer to VI.B). Results of the relative humidity evaluations for this period indicate that 70 percent relative humidity entering the charcoal beds would have been exceeded on three dates, e.g., December 1, 1996 (79 percent), December 11, 1996 (72 percent), and December 29, 1996 (82 percent).

The TS ABGTS charcoal bed filter efficiency requirement is less than 0.175 percent penetration when tested at less than or equal to 30 °C. The penetration for charcoal during the time evaluated has been conservatively calculated to be 0.1092 percent based on 90 percent relative humidity air entering the charcoal beds. This equates to a margin of approximately 37 percent greater efficiency than the TS requirements. Thus, it exceeds the TS requirement for charcoal efficiency. It should be noted that none of the three dates experiencing a greater than 70 percent relative humidity were consecutive; therefore, the bed would have been expected to dry out and return to performing within its less than 70 percent relative humidity design basis. In addition, the LCO logs were reviewed for each of the three days exceeding 70 percent relative humidity. This review verified that Train-A ABGTS was not in an LCO and would have also been capable of performing its intended safety function.

TVA has calculated that the charcoal bed would have functioned to maintain off-site dose below the allowed values for relative humidity 90 percent or less. Since 82 percent humidity (December 29, 1996) was the highest value reached during this period and it is less than 90 percent, Train-B would have met its assigned charcoal decontamination efficiency during the period in question. Therefore, the consequences of the event did not cause a decrease in nuclear safety.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

The thermal overload relays on the heater magnetic starter (EIIS code CNTR) for 0-HTR-030-156-B were replaced under Work Order No. 9701979000. A loose terminal connection was found on the B phase power cable and was repaired. (The starter assembly was later replaced for other reasons under the Corrective Action Program. Refer to Section VI.B - April 13, 1997.)

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
	05000				6 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97 --	004 --	01	

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

V. CORRECTIVE ACTIONS (continued)

B. Corrective Actions to Prevent Recurrence

1. Personnel crews involved in the 10 hour surveillance test runs with respect to the subject event have been counseled for their actions, responsibilities, and the need to improve performance.

2. The possible consequences of resetting tripped breakers without questioning why the trip occurred and relative differences with respect to other plant protective equipment (fuses) have been addressed in an Operations training newsletter.

3. Operations Training has developed in-plant training material designed to reinforce management's expectations for performance activities. This training was centered around surveillance performance, but applicable to all Operations activities. This training material has been designed to be implemented by the on-shift Senior Reactor Operators. Lessons learned from the event have been incorporated into the Stop, Think, Act, Review (STAR) simulator training.

4. A shift turnover briefing has been issued to Operations crews explaining the subject event and management expectations regarding performance improvement (questioning attitudes).

5. Surveillance instructions for the ABGTS surveillance test runs have been revised to include more specific air temperature acceptance criteria.

6. Ventilation system procedures have been reviewed to determine if similar test acceptance conditions exist. The review found that no other ventilation surveillance instructions contained similar criteria except those for the Emergency Gas Treatment System (0-SI-65-6-A and -B, "Emergency Gas Treatment System Train A/B 10 Hour Operation"). These instructions have also been revised to include more specific air temperature acceptance criteria.

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

Only ABGTS Train-B had been inoperable with respect to an undetected component failure.

2. Component/System Failure Information

a. Method of Discovery of Each Component or System Failure:

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	7 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97	004	01	

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

VI. ADDITIONAL INFORMATION (continued)

Failure of the 10 hour surveillance test run on February 14, 1997, and subsequent review of prior test data revealed heater performance problems. Follow-up investigation found a loose cable at the B phase overload relay on the heater contactor/starter. Further review of Train-A surveillances revealed that both trains were inoperable on February 7 - 8, 1997, for approximately 36 hours.

b. Failure Mode, Mechanism, and Effect of Each Failed Component:

The breaker opened on two consecutive test runs.

c. Root Cause of Failure:

Although the thermal overload relays were replaced on the magnetic starter, a loose terminal connection was determined to be the cause of the overload relay trips during the 10 hour test runs.

d. For Failed Components With Multiple Functions, List of Systems or Secondary Functions Affected:

There were no component failures of this nature.

e. Manufacturer and Model Number of Each Failed Component:

Magnetic starter, ITE/Telemecanique part No. A203E8

B. Other Starter Issues

During the performance of 0-SI-30-8-B on April 13, 1997, the humidity heater failed to remain in service during full 10 hour operation of ABGTS Train-B. When ABGTS Train-B was started, the heater was verified to be in service. Near the end of the scheduled 10 hour operation, the heater was recognized to be off. During trouble shooting of the heater malfunction, the associated ABGTS fan stopped operating. The apparent cause for heater to stop operating has been attributed to contacts 10-11 which are auxiliary contacts in the Train-B ABGTS fan contactor which had developed high resistance during heater operation. This high resistance apparently caused the heater contactor to drop out. This method of failure is similar to the one experienced on the fan failure involving the same contactor (contacts 6-7) later on April 15, 1997. In this instance, when the contactor was taken to the shop for bench testing, resistance on contacts 6-7 was measured to be 38.7 ohms. After cycling the contactor, the measured resistance was less than 1 ohm. Prior to the fan stopping, when the same contactor was cycled after the heater failed to operate properly, the heater performance was restored and no indication of the cause of failure remained detectable. The apparent cause for the fan to stop operating has also been attributed to high resistance between contacts 6-7. The magnetic starter/contactor was replaced under Work Order (WO) 97-05595-00 and no additional hot spots have been identified through the use of thermography.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	8 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	97	004	01	

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

VI. ADDITIONAL INFORMATION (continued)

The contactor problems discussed above have been determined to be unrelated to the thermal overload trips that resulted in the subject LER condition. In this case, troubleshooting identified a loose terminal connection which was corrected. Once corrected, the B phase thermal overload trip did not reoccur.

C. Similar Events

No other similar events have occurred at Watts Bar.