NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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 Plant (BFN) Unit 2	05000260	1 OF 6

TITLE (4) Reactor scrammed on a loss of main condenser vacuum as a result of the steam jet air ejectors isolating on a high offgas temperature.

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 NA	DOCKET NUMBER
08	19	95	95	007	00	09	18	95	FACILITY NAME NA	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)	100		20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)	
			20.405(a)(1)(I)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
			20.405(a)(1)(iii)		50.73(a)(2)(I)(B)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
James E. Wallace, Compliance 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	WF	JX	G080	Y						
X	WF	CAP	G080	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 August 19, 1995, at 0124 hours, an offgas hold up volume high temperature alarm was received. This condition eventually resulted in isolating the steam jet air ejectors (SJAEs). When the SJAEs isolated, the main condenser began to lose vacuum resulting in a turbine trip. The turbine trip subsequently caused the reactor to scram at 0201 hours. The cause of this event was a faulty power supply resulting in an improper level control of the offgas condenser (OGC). The additional water in the OGC drastically reduced its heat removal capability. This caused the offgas holdup volume temperature to increase. Corrective actions were taken to restore the plant to a safe configuration. Additional corrective actions were to replace the faulty power supply, manually drain the OGC and clean the Raw Cooling Water (RCW) strainers filtering the RCW to the offgas dehumidifier chiller (OGDC). This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in an automatic actuation of an Engineered Safety Feature system.

I. PLANT CONDITIONS

At the time this event occurred, Unit 2 was operating at 100 percent power. Unit 3 and Unit 1 were shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event

On August 19, 1995, at 0124 hours CDT, an offgas [WF] hold up volume high temperature alarm was received. The Assistant Shift Operations Supervisor (licensed, utility) dispatched personnel (licensed and non-licensed, utility) to investigate the cause of the high temperature. An assistant unit operator (non-licensed, utility) observed that the offgas dehumidifier chiller (OGDC) had tripped. At 0128 the steam jet air ejectors (SJAEs) isolated on high offgas temperature (160°F). When the SJAEs isolated, the main condenser began to lose vacuum.

At 0152 hours, a power reduction was initiated due to decreasing main condenser vacuum. At 0201 hours, the main turbine tripped on low main condenser vacuum. Subsequently, the turbine stop and control valves closed and the reactor scrammed.

When the scram occurred, the following actuations occurred: group 2 - shutdown cooling mode of the residual heat removal system [BO]; group 3 - reactor water cleanup system [CE]; group 6 - primary containment purge and vent [JM], the Unit 2 reactor zone ventilation [VB] and refueling zone ventilation [VA] systems, the standby gas treatment system [BH], and control room emergency ventilation system [VI]; and group 8 - transverse incore probe [IG] withdrawal.

A post-scram investigation revealed that the Raw Cooling Water (RCW) strainers to the OGDC were partially clogged and the thermal overloads for the OGDC had tripped prematurely. During the startup on August 20, 1995, TVA personnel continued troubleshooting to determine the cause of the high offgas temperature. At 0825 hours, the SJAEs were placed on nuclear steam and the heat load on the OGDC began to increase unexpectedly. Investigation into the source of the heat load revealed that the offgas condenser (OGC) level indication was not increasing from zero level. Maintenance personnel troubleshot the OGC drain valve level control loops and at approximately 1700 hours identified the power supply to the level controller's transmitter common to both control loops was degraded. This degraded power supply caused the level

controller transmitter's output current to decrease resulting in the OGC drain valves closing.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in an automatic actuation of the ESF system.

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

A General Electric power supply to the offgas condenser level control transmitter. The model number for the power supply is 50-570062FAAC1.

C. Dates and Approximate Times of Major Occurrences:

August 19, 1995

at 0124 hours CDT	A high temperature offgas hold-up volume alarm was received in the control room
at 0128 hours CDT	SJAEs isolated on high offgas temperature
at 0152 hours CDT	Condenser vacuum began to fall, and power reduction was initiated
at 0201 hours CDT	Reactor scrammed and turbine tripped on low main condenser vacuum
at 0345 hours CDT	TVA provided a 10 CFR 50.72(b)(2)(ii) notification to NRC Operations Center

August 20, 1995

at 0825 hours CDT	SJAEs placed on nuclear steam, and the heat load on the OGDC began to increase
at 1700 hours CDT	Discovered degraded power supply for the level controller transmitter
at 1900 hours CDT	Power supply for OGC level instrumentation replaced and automatic level control was restored

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

This condition was discovered when the control room Operations personnel [licensed, utility] received alarms and indicators that the reactor tripped on low main condenser vacuum.

F. Operator Actions:

Once the reactor scrammed, Operations personnel responded to the scram in accordance with appropriate procedures, and the reactor was stabilized and safety brought to a shutdown condition.

G. Safety System Responses:

Safety systems responded as designed for this type of event.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the scram was the loss of main condenser vacuum.

B. Root Cause:

The event occurred because of a random end of life failure of an electrolytic capacitor in the power supply feeding both level control loops for the OGC drain valves. This power supply failure caused a false OGC level indication and signaled the OGC level controllers to close the drain valves.

Because the drain valves closed, the offgas condenser continued to fill with water. This drastically reduced the heat removal capability of the OGC, resulting in an increased heat load on the OGDC. The increased heat load resulted in the OGDC tripping. As a result, the offgas holdup volume temperature increased causing the SJAEs to isolate and the subsequent loss of the main condenser vacuum.

Contributing Causes:

Because of the partial failure of the capacitor, the OGC level alarm was not received in the Control Room.

IV. ANALYSIS OF THE EVENT

Plant responses during and after the reactor scram were consistent with the responses described in the BFN Updated Final Safety Analysis Report. The OGC is designed to chill the offgas and strip the condensibles, thereby reducing the offgas volume. Even though the offgas temperature reached approximately 210°F after the OGDC tripped, it did not exceed the 250°F design temperature. Accordingly, the event did not adversely affect the health and safety of plant personnel or the general public.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

By monitoring and investigating the high offgas temperature, Operations personnel discovered the OGDC and the SJAEs tripped. Operations personnel attempted to place the OGDC and the SJAEs in service. Additionally, a power reduction was initiated in an attempt to slow the main condenser vacuum loss. Following the scram, the plant was placed in hot shutdown. A problem evaluation report (PER)(BFPER 951076) was written to document this event.

B. Corrective Actions to Prevent Recurrence:

The faulty power supply was replaced, the RCW strainers were cleaned, and the thermal overloads were replaced.

VI. ADDITIONAL INFORMATION

A. Failed Components:

An electrolytic capacitor (General Electric, 1 microfarad, 440 VAC, part number 23F1025P011) was degraded in a GEMAC 570-06 power supply. The power supply's model number is 50-570062FAAC1.

B. Previous LERs on Similar Events:

A review of previous events identified two events (LERs 50-260/92004 and 50-260/94010) that resulted from power supply capacitor degradation.

LER 260/92004 addresses a reactor scram resulting from a low water level caused by the downscale failure of the master feedwater level controller system. The downscale failure was the result of a degraded electrolytic capacitor. The corrective action taken for LER 260/92004 was to test wet type electrolytic capacitors prior to installing a level controller. This action would not have precluded this event (260/95007) since the power supply with the failed electrolytic capacitors was already installed. Additionally, the failed component in LER 260/92004 was in the level controller and not in the power supply to the level controller's transmitter, and had a different part number. Therefore, this corrective action for LER 260/92004 would not have precluded this event (LER 260/95007).

LER 260/94010 addresses a failure of the plant's Division II Emergency Core Cooling System. The failure was the result of a blown fuse in an analog trip unit inverter capacitor bank. The capacitors in the bank were removed and tested. Only one of the capacitors in the bank was found defective. The faulty capacitor in LER 260/94010 was made by a different manufacturer than the capacitor in this event (LER 260/95007). Additionally, the capacitor in LER 260/94010 was near the end of its expected service life and came from a lot number that was identified as exhibiting a defect. Consequently, the corrective actions for LER 260/94010 involved replacing the failed capacitor. Therefore, the corrective actions taken in LER 260/94010 would not have precluded this event.

VII. COMMITMENTS

None.

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