



GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775

AREA CODE 504 835-8094 346-8661

1/30, 1991
REG-34400
File Nos. G9.5, G9.25.1.3

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

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Please find enclosed Licensee Event Report No. 90-004, Revision 2 for River Bend Station - Unit 1. This supplemental report is being submitted pursuant to 10CFR50.73.

Sincerely,

W. H. Odell
Manager-Oversight
River Bend Nuclear Group

Handwritten initials: JAB, PG, DCH, QJB, PG, DW
JAB/PG/DCH/QJB/PG
DW

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) RIVER BEND STATION	DOCKET NUMBER (2) 0 5 0 0 0 4 5 8 1	PAGE (3) 1 OF 0 5
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TITLE (4)
Engineered Safety Feature Actuations due to Tripping of a Topaz Inverter Unit

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 NAMES	DOCKET NUMBER(S)
0	2	1	1	9	0	9	0	0	0	0
0	2	0	1	4	0	2	0	1	3	0

OPERATING MODE (9) 1

POWER LEVEL (10) 11010

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(e)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(d)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.36(e)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.406(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME L. A. England, Director-Nuclear Licensing	TELEPHONE NUMBER 5 0 4 3 8 1 - 4 1 4 5
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	
X	E	I	N	V	T	T	2	4	8	Y

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single space typewritten lines) (16)

At 1009 on 02/11/90, with the plant at 100 percent power (Operational Condition 1), the Division II emergency 125 VDC bus experienced a voltage spike which caused a Topaz inverter unit (1E12A-PS1) to trip, resulting in a loss of power to specific instrumentation on control room panel H13-P618 (Division II). This event occurred coincident with a scheduled preventive maintenance task (PM) on Division II battery charger (ENB*CHGR1B) when the float/equalize switch on the charger was moved from the float position to the equalize position. Upon restoration of the inverters, multiple Division II engineered safety feature (ESF) actuations occurred. Therefore, this event is reportable pursuant to 10CFR50.73(a)(2)(iv).

Corrective actions included revising the preventive maintenance task frequencies, developing new preventive maintenance tasks to include checking of the inverter trip setpoints, troubleshooting of the battery charger, and development of load lists for the Topaz inverters.

Operations personnel properly responded to this event by limiting the number of ESF system actuations. Those ESF systems which did actuate responded per design. Therefore, this event did not adversely affect the health and safety of the public.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

REPORTED CONDITION

At 1009 on 02/11/90, with the plant at 100 percent power (Operational Condition 1), the Division II emergency 125 VDC bus (*BU*) experienced a voltage spike which caused a Topaz inverter (*INVT*) unit (1E12A-PS1) to trip, resulting in a loss of power to specific instrumentation on control room panel (*PL*) H13-P618 (Division II). This event occurred coincident with a scheduled preventive maintenance task (PM) on Division II battery charger (*BYC*) (1ENB*CHGR1B) when the float/equalize switch on the charger was moved from the float position to the equalize position.

Upon loss of power to control room panel H13-P618, the appropriate Technical Specification action statements were implemented. At 1111 on 02/11/90, the inverter was reset and power was restored to the control room panel. Upon restoration, multiple Division II Engineered Safety Feature (ESF) actuations occurred. Therefore, this event is reportable pursuant to 10CFR50.73(a)(2)(iv).

INVESTIGATION

At 1009 on 02/11/90, with the plant at 100 percent power (Operational Condition 1), the Division II emergency 125 VDC bus experienced a voltage spike which caused a Topaz inverter unit (1E12A-PS1) to trip, resulting in a loss of power to specific instrumentation on control room panel H13-P618 (Division II). This event occurred coincident with a scheduled preventive maintenance task (PM) on a Division II battery charger (1ENB*CHGR1B) when the float/equalize switch on the charger was moved from the float position to the equalize position.

Upon loss of power to control room panel H13-P618, the Division II reactor core isolation cooling (RCIC) containment isolation valves (E51*MOV076, F063, F064, and F031) (*ISV*) were verified to be closed per Technical Specification 3.3.2. Prior to resetting the Topaz inverter unit, Operations personnel took the following actions:

- . The Division II residual heat removal (RHR) pump breakers were racked out.
- . The Division II automatic depressurization system (ADS) was placed in inhibit.
- . The reactor core isolation cooling (RCIC) system trip and throttle valve were closed.
- . The "B" safety relief valve (SRV) solenoids were placed in the "off" position.

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TEXT (If more space is required use additional NRC Form 306A's.)
These actions were taken to prevent actuation of the above systems and components upon resetting of the Topaz inverter unit.

Upon restoration of the Topaz inverter unit (E12A-PS1), the following Engineered Safety Feature (ESF) actuations automatically initiated:

- . The Division II emergency diesel generator (*EK*) started.
- . The control building ventilation (*VI*) filter (*FLT*) unit (HVC*FLT1B) started.
- . The containment building unit cooler (*VA*) (*CLR*) HVR-UC1C tripped, while containment building unit cooler HVR-UC1B started and the associated service water (*BI*) valves (*V*) (SWP*502B and 503B) opened.
- . Reactor core isolation cooling (RCIC) system (*CN*) initiation signal sealed in.
- . The Division II residual heat removal (RHR) initiation signal (*BO*) sealed in and residual heat removal (RHR) containment isolation valves (*ISV*) (1E12*MOV042B and 42C) opened.

An extensive evaluation of these ESF actuations was performed by Engineering personnel. This evaluation determined that all systems operated per their design and no other actuations should have occurred.

The results of the investigation that followed the event were presented to an NRC augmented inspection team (AIT). This investigation revealed that the loss of 125 VDC power to specific instrumentation on control room panel P-618 occurred when the float/equalize switch on the battery charger 1ENB*CHGR1B was moved from the float position to the equalize position. At that time, a voltage spike was induced into the 125 VDC battery bus that was of sufficient magnitude to cause the Topaz inverter unit (two inverters in a master-slave arrangement) to trip off line. The data obtained from the emergency response information system (ERIS) showed that a maximum voltage of 146.3 volts was received from battery bus 1ENB*BATD1B. This was above the 140 volt specification trip setting for the Topaz inverter. This gave the impression that the Topaz inverter unit had operated per design. However, GSU's evaluation later revealed that the high voltage trip setpoint of the inverter unit had drifted below the equalize voltage of the charger. This was the root cause of the event.

An investigation and analysis of previous corrective and preventive maintenance tasks (PM) revealed that no similar problems have occurred during maintenance activities or in the performance of this quarterly

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TEXT (if more space is required, use additional NRC Form 366A (17))
PM task. Additionally, a search of previous condition reports was conducted to identify related deficiencies or events but none were found.

GSU's investigation included an analysis of the opening of the RHR injection valves. This analysis identified three conditions that must be satisfied for these valves to stroke open. First, power must be available to the RHR pump bus. Second, an RHR initiation signal must be provided either on reactor low water level, drywell high pressure or manual initiation. Third, the low reactor pressure vessel (RPV) pressure interlock permissive signal must be provided to the trip units. The first condition was satisfied throughout the event as power was always available to the pump bus. The second and third conditions were satisfied upon re-energization of the the Topaz inverter unit. At this time, the reactor low water level and RPV pressure interlock permissive trip signals were received momentarily which resulted in the valves opening.

Previous LERs have been reviewed to identify similar events. This review identified no other cases in which Topaz inverters have tripped resulting in ESF actuations. LER 89-038 reported the loss of the 125 VDC bus during maintenance on a battery charger, resulting in numerous ESFs. The ESF actuations were due to momentary signals being provided to trip units. However, this event bears only superficial similarity to the Topaz inverter event since the root causes are different.

CORRECTIVE ACTION

GSU has evaluated the root cause of the Topaz inverter unit trip, and determined that the high voltage trip set point on the inverter had drifted below the equalize voltage of the charger. Based on the investigation and engineering analysis to date, the following corrective actions are being implemented as a result of this event:

- . Battery charger PMs, Division I and Division II, were performed during the mid-cycle outage in March, 1990 and henceforth will be scheduled during refueling outages. The PM frequencies have been revised in order to minimize the number of transients when switching from float to equalize.
- . Troubleshooting of the battery charger was performed during the mid-cycle outage in March, 1990. Following the Topaz inverter unit trip and prior to the mid-cycle outage, the charger was checked weekly for proper outputs. No abnormalities were identified.
- . All Topaz Category I inverters were calibrated to ensure proper high voltage trip point values. PMs have been developed to check calibration in each refueling outage beginning with refueling outage 4 (RF-4).

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATES TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20548, AND TO THE PAPERWORK REDUCTION PROJECT (3180-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

Based on the root cause determination and the corrective actions described above, GSU has concluded that the trip of the inverter unit has been adequately addressed. Replacement or modification of Topaz inverter units is not required.

As described in Revision 1 to this LER, GSU has developed load lists for the two Division I Topaz inverters, the Division II Topaz inverter and the Division III Topaz inverter. These have been incorporated into the applicable procedures with outlines for specific actions for loss and restoration. Training of applicable personnel on procedures and hardware has been implemented through a diagnostic simulator training scenario which duplicated this event. In addition, a procedure review covered abnormal operating procedure (AOP)-014, "Loss of 125 VDC." Both of these training components were implemented during licensed operator requalification training in June 1990.

The remaining Category I inverters are of a different manufacturer and type. They have three sources of power instead of the single power source found in Topaz inverters. Load lists and preventive and corrective maintenance procedures already exist for the non-Topaz Category I inverters. Therefore, the remaining Category I inverters (non-Topaz) should not be associated with Topaz inverter failures.

SAFETY ASSESSMENT

Operations personnel properly responded to this event by limiting the number of ESF system actuations. Those ESF systems which did actuate responded per design. Therefore, this event did not adversely affect the health and safety of the public.

NOTE: Energy Industry Identification System Codes are identified in the text as (*XX*).