



**GULF STATES UTILITIES COMPANY**

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775  
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March 12, 1990  
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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 for River Bend Station - Unit 1. This report is being submitted pursuant to 10CFR50.73.

Sincerely,

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

*PDG*  
WHO/PDG/RGW/DCH/AOF/CLM/pg  
*ODG*

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) RIVER BEND STATION DOCKET NUMBER (2) 0 5 0 0 0 4 5 8 1 OF 0 5

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	11	9	0	9	0	0	4	0	0	0
											0 5 0 0 0

OPERATING MODE (9) 1

POWER LEVEL (10) 1 0 0

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

20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	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

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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15) 0 5 0 1 9 0

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 include revising the preventive maintenance tasks, developing new preventive maintenance tasks to include checking of the inverter trip setpoints, troubleshooting of the battery charger, evaluation of modifications to address automatic restart events, 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

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (if more space is required, use additional NRC Form 388A'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\*MOVFO76, F063, F064, and F031) 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.

These actions were taken to prevent actuation of the above systems and components upon resetting of the Topaz inverter unit.

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TEXT (if more space is required, use additional NRC Form 308A's) (17)

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 (\*BN\*) 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\*MOVFO42B 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. Based on this evaluation, the Topaz inverter unit appears to have operated per design and the problem is suspected to be associated with the battery charger.

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 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

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TEXT (If more space is required, use additional NRC Form 308A's) (17)

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 continues to evaluate the root cause of the voltage spike on the 125 VDC bus. The results of this evaluation will be provided in a supplemental report by May 1, 1990. 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, will not be performed again prior to the mid-cycle outage in March, 1990. GSU will evaluate potential revisions to the PMs to minimize transients when switching from float to equalize. This evaluation will be completed by May 1, 1990.
- . Troubleshooting of the battery charger will be performed during the mid-cycle outage in March, 1990. In the interim, the charger is being checked weekly for proper outputs.
- . PMs will be developed for the 3 Topaz inverters which will include checking trip setpoints. The Division II PM will be performed during the mid-cycle outage and Division I PMs will be performed during the third refueling outage, currently scheduled to start in September, 1990.

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TEXT (if more space is required, use additional NRC Form 300A's) (17)

GSU will address the issue of automatic restart events by evaluating the following:

- manual reset of the inverter unit
- setpoint changes for the inverter and/or charger
- changing to a different type of inverter
- addition of time delays

In addition to the above actions, GSU is developing load lists for the two Division I Topaz inverters and the one Division II Topaz inverter. These will be incorporated into the applicable procedures with outlines for specific actions for loss and restoration. Applicable personnel will be trained on these procedures and hardware. These actions will be completed prior to start-up from the third refueling outage.

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\*).