

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)  
River Bend StationDOCKET NUMBER (2)  
0 5 0 0 0 4 5 8 1 OF 0 8

TITLE (4)

Hand Held Radio Causes Loss of Offsite Power

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	1	0	1	8	6	8	6	0	0	2	0	4	8	6	0	5	0	0	0	0	0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)									
POWER LEVEL (10)	01010	20.402(b)		20.406(a)		X		90.73(a)(2)(iv)		73.71(b)	
		20.406(a)(1)(i)		90.38(a)(1)				90.73(a)(2)(v)		73.71(a)	
		20.406(a)(1)(ii)		90.38(a)(2)		X		90.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text, NRC Form 365A)	
		20.406(a)(1)(iii)		90.73(a)(2)(i)				90.73(a)(2)(vii)(A)			
		20.406(a)(1)(iv)		90.73(a)(2)(ii)				90.73(a)(2)(vii)(B)			
		20.406(a)(1)(v)		X		90.73(a)(2)(iii)		90.73(a)(2)(ix)			

LICENSEE CONTACT FOR THIS LER (12)

NAME  
G. Alan Bysfield - Senior Systems Engineer

TELEPHONE NUMBER

AREA CODE  
51046351-6094

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		
B	F	J	T	M	R	C	G	0	8	0	N
D	F	J	T	M	R	C	G	0	8	0	N

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If you complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X					

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

On 01/01/86 at approximately 0941, preferred station transformers A and C tripped off the line. One hour later, at approximately 1044 preferred station transformers B and D also tripped prior to A and C being restored. This resulted in a total loss of offsite power (LOP) to the station. An Unusual Event was declared at 1045 and operations entered into appropriate Abnormal Operating Procedures. The plant was shutdown at the time of the LOP due to a reactor scram that had occurred approximately six hours earlier. Upon investigation it was determined that hand held radios most likely caused spurious signals in the tone relaying transfer trip receivers of the preferred station transformers. Corrective action is being taken in an effort to minimize the probability of recurrence. This event did not affect the public safety and welfare.

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

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

## Sequence of Events:

On 01/01/86 at 0941 with the unit in operational condition 3 (hot shutdown) and cooling down from a reactor trip which occurred approximately six hours earlier (reference LER 86-001), preferred station transformers 'A' and 'C' tripped. Recirculation pump 'A' tripped, the operating condensate pump tripped, and the Reactor Water Cleanup (RWCU) system isolated. Reactor Protection System (RPS) bus 'A' de-energized initiating a half scram and partial Nuclear Steam Supply Shutoff System (NSSSS) isolation. The partial NSSSS isolation caused an instrument air isolation to the Reactor Building which caused the scram valves to leak filling the Scram Discharge Volume (SDV). This subsequently resulted in an RPS actuation on high SDV level at 0957. Upon the preferred station transformer trips Division I and III diesel generators started, Division I emergency ventilation systems autostarted, and standby service water pumps 1SWP\*P2A, B, C, and D load sequenced. Normal service water pump SWP-P1B and circulating water pump CWS-P1B were still running but without bearing cooling water since bearing cooling water pump BCS-P1A had lost power. At 1001 the Main Steam Isolation Valves (MSIVs) automatically isolated due to decreasing condenser vacuum.

At 1003 operators were dispatched and attempted to recover de-energized load centers. At 1031 RPS bus 'A' was reset. Later, panel 1SCM\*PNL01A was discovered de-energized due to a blown fuse in

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transformer 1SCM\*XRC14A1. This caused several Control Building HVAC (HVC) and Fuel Building HVAC (HVF) dampers to close which caused the Division I Control Building chiller (HVK) to trip. Subsequent attempts to restore operation of HVK chillers 'B' and 'D' were also unsuccessful. The partial NSSSS isolation remained sealed in because of de-energized panel 1SCM\*PNL01A.

The RPS actuation was reset at 1042. At 1044, approximately one hour after the initiating event, preferred station transformers 'B' and 'D' tripped. The station was now in a complete loss of offsite power (LOP). The Division II diesel generator started and sequenced properly. An Unusual Event was immediately declared and Abnormal Operating Procedures (AOP) 004, 005, 0010 and 0042 were initiated. Reactor Water level was +80 inches on the shutdown range and pressure was at 240 psig.

At 1114 the half RPS actuation was reset and power to RPS bus 'B' was restored. At 1124 the preferred station transformers were energized, but the supply breakers to the plant could not be closed. It was determined that breaker closure was locked out by the tone relaying transfer trip (fiber optic) system which could not be reset. At 1130 this backup system was disabled and the breakers were closed. All in house loads were restored and the Unusual Event ended after an hour and ten minute duration. The plant was stabilized.

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## Investigation:

In an effort to determine the cause of the transformer trips an investigation of the protective relaying was conducted and revealed that no protective relaying targets were initiated. It was further determined that the trip signals sent to the lockout relays could only have been initiated by a spurious signal in the backup pilot wire or tone relaying transfer trip circuits. Functional and diagnostic testing of both the pilot wire and tone relaying circuits showed that both systems were operating as designed at the time of testing.

As a result of this testing two items were noted. First, spurious trips could be generated on the tone relaying system with hand held radios in close proximity (within approximately a 10-12 foot radius) of the transmitters/receivers. Second, some of the tone relaying keying and rack power were supplied from two separate battery sources. Although no spurious trips could be simulated by testing, this type of connection could result in transients within the tone relaying equipment. It was decided to correct the wiring in the field such that keying and rack power were supplied by the same battery source.

The two types of hand held radios tested were the 4 watt, 150 MHz Motorola and 5 watt, 450 MHz Motorola. Both are commonly used on site by security and operations personnel. Both of these radios were keyed to transmit inside the control building of the Fancy Point switchyard and both caused spurious trips on the tone relaying system. Also



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tested were 100 watt, 50 MHz and 150 MHz Motorola mobile radios from just outside the switchyard control building with the doors open. The mobile radios did not initiate either a trip or a loss of guard signal in the tone relaying system. After careful consideration it was concluded with high probability that the LOP was caused by radio frequency interference.

Also investigated was the difficulty in resetting the lockout relays. Because of the complexity of the tone relaying and pilot wire tripping circuitry, the resetting of the lockout relays must be performed in the proper sequence. It was determined that operations procedures did not address the required sequence.

#### Corrective Actions:

As a result of this event several corrective actions have been completed or are in progress. These corrective actions include:

1. Installation of shielding on the tone relaying equipment in the Fancy Point switchyard. Shielding of the equipment in the plant is not required because the equipment is enclosed in a reinforced concrete room with locked doors and a sign restricting the use of radios on each door. This activity is presently scheduled for completion by 02/12/86.
2. Rewiring the tone equipment such that both channels are required for tripping. At the time of the event if one channel had a loss

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- of guard and the other channel had a trip signal the transfer trip would have been initiated. This wiring change provides increased reliability to help prevent spurious tripping. Temporary Alterations were installed. This design change (MR 86-0081) is scheduled for completion prior to the planned 35 percent power scram at the conclusion of test condition 2.
3. Changing DC power supplies to tone relaying equipment such that the keying and rack power are both supplied from the same DC source. Temporary Alterations were installed. The design change (MR 86-0026) is scheduled for completion prior to the planned 35 percent scram at the conclusion of test condition 2.
4. Installation of sequence of event recorders in the switchyard and at the generator/transformers protective relaying panel. This requires the completion of two design modifications (MR 86-0027 and MR 86-0098). The final installation of these recorders is to be completed during an outage just after the planned 35 percent power scram.
5. Installation of additional drainage reactors at the plant end of the pilot wire shielding. This design change (MR 86-0093) is scheduled for completion prior to the planned 35 percent scram at the conclusion of test condition 2.
6. Installation of Supervisory Control and Data Acquisition (SCADA) system alarms to provide annunciation in the main control room and

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at the Government Street transmission and distribution control center for loss of channel signals on tone relaying equipment. This is scheduled for completion on 02/05/86. Additional capabilities for monitoring trip and loss of guard signals will be added (MR 86-0094) upon receipt of alarm cards by approximately 04/18/86.

7. Training personnel on the restricted use of radios. Signs have been posted in the Fancy Point switchyard prohibiting the use of radios in the control building. Signs have also been posted on the doors of the room in the turbine building which houses the tone relaying equipment. Letters have been sent to Security, Operations, Maintenance, and Transmission and Distribution personnel informing them of the radio use restrictions. This action is complete.
8. Training operations personnel on the resetting of lockouts, including necessary procedural changes and the posting of operator aids. Operator aids have been posted. Operators are presently undergoing requalification and will be trained on protective relaying, tone relaying, and pilot wire relaying including the proper resetting of the lockout relays. This process is presently scheduled to be completed on or before 03/28/86.
9. A procedure for the periodic testing of the tone relaying equipment and the proper operation of the sequence of event

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Recorders is being written and is scheduled to be completed prior to the planned 35 percent scram at the conclusion of test condition 2.

## Safety Assessment:

There were no safety consequences to the public as a result of this event. The safety implications of a loss of offsite power are however, clearly recognized and it is for this reason that the above corrective actions are being taken.





**GULF STATES UTILITIES COMPANY**

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775  
AREA CODE 504 635-6094 346 8651

February 4, 1986  
RBG-23104  
File Nos. G9.5, G9.25.1.3

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

Dear Sir:

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

Please find enclosed Licensee Event Report No. 86-002 for River Bend Station - Unit 1. This report is submitted pursuant to 10CFR50.73.

Sincerely,

*J. E. Booker*

J. E. Booker  
Manager-Engineering,  
Nuclear Fuels & Licensing  
River Bend Nuclear Group

*THW*  
*JEH*  
JEB/TFP/DRG/BEH/amg

cc: U. S. Nuclear Regulatory Commission  
611 Ryan Plaza, Suite 1000  
Arlington, TX 76011

INPO Records Center  
1100 Circle 75 Parkway  
Atlanta, GA 30339-3064

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