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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington D. C. 20555

Dear Mr. Denton:

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

Enclosed for your review is Gulf States Utilities Company's response to the Nuclear Regulatory Commission's Power Systems Branch issue relating to the alarms and monitors for the Division III D.C. power system. Attachment 1 contains changes to the Final Safety Analysis Report which will be included in a future amendment.

Sincerely,

J. E. Booker

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

JEB/ERG/JEP/kt

Attachment

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ATTACHMENT 1

diesels are based on a 24-hr average electrolyte temperature of 77°F.

8.3.2.1.6 Instrumentation and Alarm

Important system components are either alarmed on failure or capable of being tested during service to detect faults. Indicators are provided to monitor their status in the main control room. The station operating procedures provide for system status checks at every shift change that include the charging status of batteries in the unlikely event that a battery charger should fail without annunciating the condition in the control room. | 13

Control of the battery chargers and the distribution switchgear is local. The Division I and II dc power system includes the following monitors and alarms: | 21

a. Main Control Room Annunciation and Monitors | 19

1. Battery current (ammeter-charge/discharge)

2. Dc bus voltage (voltmeter)

3. Dc bus voltage low alarm (set at open circuit voltage) | 13

4. Dc bus voltage low-low alarm

5. Dc bus ground fault alarm (for ungrounded systems)

6. DC Bus battery breaker open alarm

7. DC Bus battery charger output breaker open alarm

8. Battery charger trouble alarm

9. Backup charger breaker open alarm.

10. Supply or distribution breaker overcurrent trip alarm

b. Local Annunciation and Monitors | 19

1. Battery charger output current (ammeter)

2. Battery current (ammeter-charger/discharger)

21 5. Battery charger overvoltage

13 6. Battery charger low ac supply voltage

7. Battery charger overcurrent

8. Battery charger temperature high

c. Local (Remote) Supervisory Control Panels, 19 Annunciation

1. Battery charger trouble

The Non-Class 1E dc power system includes the following monitors and alarms:

1. "125 V dc battery charger trouble" alarm located in the main control room and local supervisory control panel (1BYS-CHGR1C) annunciates in the event of:

   a. Overvoltage

   b. Ground detection

   c. 125 V dc bus undervoltage (low or low-low)

   d. Charger cabinet temperature high

   e. Phase failure, or

21 f. 460-V dc input undervoltage.

2. "48-V dc battery charger trouble" alarm located in the main control room and local supervisory control panel (for 1BXY-CHGR1) annunciate in the event of:

   a. 460-V ac input undervoltage

   b. Ground detection

   c. Overvoltage

   d. 48-V dc bus undervoltage

   e. Charger cabinet temperature high.

3. "Battery charger trouble" alarm (1BYS-CHGR1A, 1B, and 1D) located in the main control room annunciate in the event of:

a. 460-V ac input undervoltage

b. Overvoltage

c. Charger cabinet temperature high

d. Phase failure.

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Uninterruptible power supplies have been specified to include protective circuitry which protects internal components from dc input voltage spikes which may have originated on the dc power system.

8.3.2.1.7 Maintenance and Testing

The station batteries and other equipment associated with the 125-V dc systems are easily accessible for maintenance and testing. The batteries will be periodically checked for specific gravity and individual cell voltages. An equalizing (overvoltage) charge, where recommended by the battery manufacturer, is applied to bring all cells up to an equal voltage. Over a period of time, the above-mentioned tests will reveal a weak or weakening trend in any cell and replacement is made if necessary. Periodically, the battery charger is disconnected and the ability of the unit battery to maintain voltage and assume the dc load is verified. This test uncovers any high-resistance connections or cell internal malfunctions. The normal station batteries and the standby batteries for Divisions I, II, and III have access to a battery load tester, as shown in Fig. 8.3-6. Testing complies with IEEE-308, Criteria for Class 1E Electrical Systems for Nuclear Power Generating Stations. Periodic testing requirements of each battery system during normal or accident periods of operation are described in the Technical Specifications.

The battery chargers may be operated with the battery disconnected since the charger's stability is not load dependent. With the battery disconnected the charger's regulation is 0.5 percent from no load to full load and ripple does not exceed 105 millivolts (rms).

The only foreseen mode of electrical operation during which the battery chargers would supply power to the dc switchgear loads without the batteries also being connected to the dc switchgear load would occur during periodic battery discharge tests.

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Testing of the Division III 125-V dc batteries includes the following:

1. The specific gravity, voltage, and temperature of the pilot cell of each battery are measured and logged in accordance with the technical specification. | 15

2. Every 3 months, voltage measurements of each cell to the nearest 0.01 V, specific gravity of each cell, and temperature of every sixth cell are made. | 15 These measurements are logged.

3. Once each refueling cycle, the batteries are subjected to a service test. The specific gravity and voltage of each cell are measured after discharge and logged.

8.3.2.2.9 Test Requirements of Station Batteries

Provisions are made in the dc power system so that surveillance and service tests can be performed in accordance with IEEE-450.

8.3.2.2.10 Instrumentation and Alarm

Important system functions are either alarmed on failure or capable of being tested during service to detect faults. Indicators for critical parameters are provided to monitor their status in the main control room.

Additionally, station operating procedures provide for system status monitoring at every shift change that will include a check of the charging status of the battery in the unlikely event that the battery charger fails in a manner which is not alarmed in the control room. | 13

Main control room instrumentation includes a voltmeter, and an ammeter for each dc system. Control of the battery chargers and the distribution switchgear is local. The dc power system includes the following alarms and monitors:

1. "125 V dc System Trouble" alarm located in the main control room annunciates in the event of:

   a. Battery output breaker trip

   b. 125 V dc bus ground, or | 21

   c. 125 V dc bus undervoltage.

2. "HPCS Battery Charger Trouble" alarm located in the main control room annunciates in the event of:

   a. Battery charger output breaker trip

   b. Battery charger high output voltage, or

   c. Battery charger loss of ac power supply.

3. "Battery Trouble" alarm located on the local diesel-generator control panel annunciates in the event of:

   a. 125 V dc bus ground, or

   b. 125-V dc bus undervoltage.

4. The following voltmeters are provided to monitor 125 V dc supply voltage:

   a. 125 V dc voltmeter in the main control room

   b. 125 V dc voltmeter in the main control room

   c. 125 V dc voltmeter locally at battery charger

   d. 125 V dc voltmeter at local diesel-generator control panel.

5. The following ammeters are provided to monitor 125 V dc system load current:

   a. Ammeter in the main control room

   b. Ammeter at local diesel-generator control panel

   c. Ammeter locally at battery charger.

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8.3.2.3 Analysis - Divisions I and II

8.3.2.3.1 Compliance

8.3.2.3.1.1 General Functional Design Requirements

During normal operation, the 125-V dc loads (Fig. 8.3-6) are fed from the battery chargers, with the batteries floating on the 125-V dc system. Upon loss of ac power to the battery chargers, the entire dc load is supported from the batteries until ac power is restored from the normal or preferred transformers or standby diesel generators, to energize the battery chargers. The 125-V dc systems are designed on the following general functional bases:

1. The 125-V dc systems are designed to meet the single failure criterion in which failure of any single component of the system does not result in a