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File Nos. G9.5, G9.19.2
234.600

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 (GSU) response to Safety Evaluation Report (SER) Confirmatory Item No. (50) identified in Section 10.4.6 by the Nuclear Regulatory Commission's Chemical Engineering Branch (CHEB). SER Section 9.3.2 should be revised to reflect GSU's November 8, 1983 submittal which provided post-accident sampling system (PASS) technical information for staff evaluation. The attached information provides additional clarification regarding Criteria 1, 2, 3 and 10 from NUREG-0737 Item II.B.3. Where indicated, the attached information will be provided in a future amendment to the FSAR.

Sincerely,

J. E. Booker

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

JEB/RJK/je

Attachment



300'
1/1

Attachment 1

Criterion 1 - address provisions for backup power source.

Response:

The post accident sampling system (PASS) is a nonsafety-related system powered from the normal station service ac supply. The preferred offsite ac power supply provides for all PASS loads when the normal station service ac power source is unavailable. The preferred offsite power is taken from two physically and electrically independent 230-kV circuits, providing two reliable backup sources of power as described in Section 8.2. The onsite normal station service power supply is described in Section 8.3. Power to onsite laboratories are designed with the same configuration.

The 230 kV transmission system connected to River Bend Station is designed to a standard which equals or exceeds the standards for the systems connecting to all other plants within the GSU grid system. A study was performed to determine the reliability of the transmission connections to the switchyards of eleven plants on the GSU grid system. Over their operating life, there have been only eleven "loss of offsite power" incidents in 237 plant years of operation or one event per 21.5 plant years of operation. This includes two Cajun Electric Power Cooperative plants not operated by GSU. For the nine plants operated by GSU, there have been only seven "loss of off-site power" incidents in 220 plant years of operation, or one event per 31.4 plant years. The calculated reliability is well above the industry standard conservatively calculated in EPRI NP-2301, "Loss of Offsite Power Plants: Data and Analysis" (See Enclosure 1).

The restoration times following these events have typically been relatively short with only two of the eleven outages exceeding one hour. The duration of these outages are tabulated below.

| Number of Events | Duration |
|---|---|
| 4 | 0-15 Minutes |
| 2 | 15-30 Minutes |
| 3 | 30-60 Minutes |
| 1 | 1-6 Hours |
| 1 | 6-12 Hours |

Criterion 2 - The applicant must provide plant-specific procedures to estimate the extent of core damage.

Response:

The RBS post-accident core damage procedures incorporate the BWR Owners Group Generic Core Damage Estimation Procedure approved by the NRC in meeting minutes dated September 1, 1983, from Jan A. Norris (NRC, Division of Licensing) to David R. Helwig (Vice-Chairman, BWROG). RBS procedure number COP-1050 "Post-Accident Estimation of Fuel Core Damage" is provided in Enclosure 4.

The information labeled as "LATER" in the procedure will be included in the future. The NRC Region IV radiological preoperational inspector can verify, prior to fuel load, that the information has been included in the core damage procedure.

Criterion 3 - provide confirmation that the PASS valves are environmentally qualified.

Response:

The inaccessible PASS supply and return solenoid operated valves located in a harsh environment will be qualified to operate under their post-LOCA environmental conditions. These valves will be qualified by analysis in accordance with 10CFR50.49 (Enclosure 2).

Criterion 10 - provide information demonstrating the range, accuracy, and the applicability of procedures and instrumentation in the post-accident water chemistry and radiation environment.

Response:

Procedures and instrumentation for the post-accident sample analyses are selected to ensure accurate radiological and chemical data from post-accident samples. The PASS sampling and analyses parameters, design basis ranges, design basis accuracies and design basis time are included in Enclosure 3. The accuracies listed in the enclosed table will be verified during the PASS startup and testing program.

The laboratory equipment being procured for the RBS PASS has been successfully used in similar environments at other nuclear facilities such as Peach Bottom. Operability of the PASS will be demonstrated annually. RBS will utilize procedures and instruments which have been proven acceptable at other BWR facilities using the GE PASS panel. Therefore, a matrix test will not be performed.

PASS operators will be provided with initial and refresher training in post accident sampling, analysis and transport (See Enclosure 2).

Local analyzers are provided where insertion-type conductivity cells, immersion-type pH electrodes, or local turbidity detectors are required.

Recorders and alarms are provided for the process sampling system in both the main and auxiliary control rooms.

9.3.2.6 Post-Accident Sampling System

The River Bend Station (RBS) manual grab post-accident sampling system (PASS) is designed to provide representative liquid and gas samples from within the primary containment for radiological and chemical analysis in association with the possible consequences of a loss-of-coolant accident (LOCA). The PASS is powered from an offsite power source and consists of a liquid and gas sample station located outside the containment building at elevation 114 ft along the east side wall of the auxiliary building adjacent to the elevator and stairwell (see Fig. 1.2-14 and Fig. 12.3-17).

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Radiation exposures are maintained within the levels specified in GDC 19, assuming Regulatory Guide 1.3 source terms, by minimizing the required sample sizes, providing dilution capability, and optimizing the weight of shielded sample containers to facilitate movement through potentially high-level radiation areas. Person-motion studies, training, and drills will be performed to 11 demonstrate compliance with GDC-19 for sampling, transport, and analysis of liquid and gaseous samples. The sampling system and analysis capability will provide an assessment of the pH, dissolved oxygen, hydrogen, chloride, boron, and radionuclides. Stripping of hydrogen and oxygen gases at the panel will preclude taking pressurized reactor coolant samples. Reactor coolant and containment atmosphere sampling during post-accident conditions does not require an isolated auxiliary system to be placed in operation to use the sampling system. RBS does not have brackish water; therefore, chloride analyses results are not required to be obtained within 24 hr but will be available within a 4-day period. Grab samples of primary coolant can be obtained and analyzed for boron within 3 hr onsite. Radiological analysis of gaseous and liquid samples will be provided within 3 hr from the time a decision is made to take a sample. The PASS is capable of providing at least one sample per day for 7 days following the onset of an accident and at least one sample per week for up to 1 year after the accident. A general arrangement of the post-accident sample 14 station is shown in Fig. 9.3-21.

Enclosure 1 (cont'd.)

INSERT

Section 9.3.2.6, pg. 9.3-12

The PASS is a nonsafety-related system powered from the normal station service ac supply. The preferred offsite ac power supply provides for all PASS loads when the normal station service ac power source is unavailable. The preferred offsite power is taken from two physically and electrically independent 230-kV circuits, providing two reliable backup sources of power as described in Section 8.2. The onsite normal station service power supply is described in Section 8.3. Power to onsite laboratories are designed with the same configuration.

The 230-kV transmission system connected to River Bend Station is designed to a standard which equals or exceeds the standards for the systems connecting to all other plants within the GSU grid system. A study was performed to determine the reliability of the transmission connections on the GSU grid system. The calculated reliability is well above the industry standard conservatively calculated in EPRI NP-2301, "Loss of Offsite Power Plants. Data and Analysis"

The PASS samples can be analyzed in the lab to identify and quantify the following radionuclides: noble gases (indicative of cladding failure), iodines and cesiums (indicative of high fuel temperatures), and nonvolatile isotopes (indicative of fuel melting). The gamma detection system allows the monitoring of the reactor coolant activity over a range of $10^{-7}$ to $10^{+1}$ Ci/cc and the containment atmosphere activity over a range of $10^{-9}$ to $10^{-1}$ Ci/cc. To inform the operator of the ambient radiation level at the sample station, a local area radiation monitor is provided.

Instrumentation is provided with adequate ranges and sensitivities to allow the operator to obtain pertinent data to describe the radiological and chemical status of the reactor coolant system. Reactor coolant sample lines are of a diameter such that the rupture of a sample line will limit reactor coolant loss. All sample return lines are routed back to containment. RBS post-accident procedures will incorporate the BWR Owners Group Generic Core Damage Estimation Procedure which has been approved by the NRC in meeting minutes dated September 1, 1983, from Jan A. Norris (NRC, Division of Licensing) to David R. Helwig (Vice-Chairman, BWROG). Plant-unique programs will address post-accident sampling system testing and operational training programs. 11

INSERT A

INSERT B

The RBS position on Regulatory Guide 1.97 for post-accident instrumentation is provided in FSAR Section 1.8.

9.3.2.6.1 Gas, Iodine, and Particulate Samples

Provision has been made to obtain gas samples from both the drywell and wetwell atmospheres. The sample system is designed to operate over the range of potential pressures starting at 1 hr after a LOCA. Heat-traced sample lines are used to prevent condensation of moisture and resultant loss of iodine in the sample lines. The gas samples may be passed through a particulate filter and silver zeolite cartridge for determination of particulate activity and total iodine activity by subsequent counting of the samples on a gamma spectrometer system in the lab.

Alternately, the sample flow can bypass the iodine sampler and be chilled to remove moisture and associated iodine. A 15-ml grab sample can then be taken for determination of gaseous activity and for gas composition by gas chromatography. The sample size is consistent with present off-gas sample vial counting factors. Provisions will be made in the laboratory to aliquot fractions of the initial

Enclosure 2 (cont'd.)

INSERTS

Section 9.3.2.6, pg. 9.3-12a

A. The PASS sampling and analyses parameters, design basis ranges, design basis accuracies and design basis time are included in Table 9.3-5. The laboratory equipment procured for the RBS PASS has been successfully used in similar environments at other nuclear facilities such as Peach Bottom. Operability of the PASS will be demonstrated annually. RBS will utilize procedures and instruments which have been proven acceptable at other BWR facilities using the GE PASS panel. PASS operators will be provided with initial and refresher training in post accident sampling, analysis and transport.

B. The inaccessible PASS supply and return solenoid operated valves located in a harsh environment will be qualified to operate under their post-LOCA environmental conditions. These valves will be qualified by analysis in accordance with 10CFR50.49.

Enclosure 3

Table 9.3-5
Post-Accident Sampling System Analyses Instrumentation

| Parameter | Method | Design Bases Range | Design Bases Accuracy | Design Bases Time |
|---|---|---|---|---|
| Gross Activity Gamma Spectrum | Gamma Spectroscopy | 0.1 Ci/ml to 10 Ci/ml | + 50 percent | Less than 3 hours |
| Boron | Plasma Spectrometry | 0 - 6000 ppm | + 5 percent | Less than 3 hours |
| | Titrimetry (Manitol) | 1 - 100 ppm | | |
| Chloride | Offsite Analysis | N/A | N/A | Less than 96 hours |
| Total Dissolved Gas | GE Dissolved Gas Procedure | 25cc/kg to 50cc/kg greater than 50cc/kg | + 50 percent + 30 percent | Less than 3 hours |
| pH | Micro Electrode | 1-13 pH units | + 0.3 pH units | Less than 3 hours |
| Hydrogen | Gas Chromatograph | 50 to 2000cc/kg 0 to 50cc/kg | + 10 percent + 5 percent | Less than 3 hours |
| Dissolved Oxygen | Via dissolved hydrogen concentration at greater than 10cc/kg | Verifies that dissolved oxygen is less than 0.1 ppm | N/A | Less than 3 hours |