GULF STATES UTILITIES COMPANY

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AREA CODE 504 635-6094 346-8651

February 28, 1989
RBG- 30175
File No. G9.5, G9.42

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

Gentlemen:

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

Please find attached a response to your verbal request for supplemental information regarding GSU's submittal dated August 5, 1988 (reference RBG-28399). GSU's submittal requested an amendment to the River Bend Station Operating License NPF-47 to allow continued plant operation in the event that feedwater heater(s) become inoperable. If you have any further questions, contact Mr. Rick J. King at (504) 381-4146.

Sincerely,

J. E. Booker
Manager-River Bend Oversight
River Bend Nuclear Group

JEB/LAE/RJK/JSM/DRS/ch

Attachment

cc: U.S. Nuclear Regulatory Commission
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A001
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Mr. William H. Spell, Administrator-NED
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ATTACHMENT 1

Response to Verbal Request for Additional Information

1. Provide the basis for feedwater heater out of service (FWHOS) operation effect on turbine first stage pressure (TFSP) identified on page 4 of GSU's amendment request dated August 5, 1988.

   The sentence in GSU's amendment request referred to states, "Analysis has shown this reduced TFSP corresponds to 1.5 and 5.4% of rated thermal power at the (low power setpoint) and high power setpoint, respectively, for operation with 100 degrees F reduction in rated feedwater temperature." As stated in GSU's amendment request, this was based on plant specific data which is provided as Attachment 2. This data represents the compilation of almost 5000 measurements at River Bend Station (RBS). A quadratic curve was fitted to the measured plant data. From this plant data and curve fit, it was determined that the TFSP would be 175 psia at the low power setpoint (27.5% of rated thermal power (RTP)) for a rated power feedwater temperature of 420 degrees F. From a heat balance calculation for a rated power feedwater temperature of 320 degrees F similar to the one presented on Table 2-1 of NEDO-31583, the TFSP at 27.5% of RTP was determined to be 164 psia. Since TFSP is directly proportional to reactor power, the turbine valve wide open value of 754.6 psia from the measured plant data curve fit at 105% of RTP was used to determine the corresponding change in reactor power as a result of the above change in TFSP (11 psia). The change in reactor power was determined to correspond to 1.5% of RTP.

   The FWHOS operation effect on TFSP at the current high power setpoint of 62.5% of RTP was determined in a similar manner. The measured plant data provided a TFSP of 420 psia for a rated power feedwater temperature of 420 degrees F. From a heat balance for a rated power feedwater temperature of 320 degrees F, the TFSP at 62.5% of RTP was determined to be 381 psia. This change in TFSP (39 psia) was determined to correspond to a change in reactor power of 5.4% of RTP.

   It should be noted that the above results were not used in determining the proposed change to the current Technical Specification high power setpoint. They were used to provide a magnitude of the effect of FWHOS operation on TFSP instrumentation for comparison purposes and as input for determining the in-plant setpoint as described below.

2. Provide the assumptions used in determining the proposed change to the high power setpoint.

   As stated above, the effect of FWHOS operation was not considered in establishing the proposed change to the high power setpoint. As stated in GSU's amendment request, the high power setpoint analytical limit of 70% of RTP was established from the rod withdrawal error analysis presented in Updated Safety Analysis Report (USAR) Section 15.4.2.3.3. The high power setpoint provides an input to the rod withdrawal limiter to initiate more restrictive control rod movement constraints (1 foot vs.

2 foot withdrawal) at reactor power greater than 70% of RTP. There is no safety basis for a lower bound on the high power setpoint.

The proposed Technical Specification allowable value (AV) and nominal trip setpoint (NTSP) were calculated by subtracting uncertainty components from the analytical limit of 70% of RTP (461.2 psig from the measured plant data) as follows:

The AV was calculated by subtracting uncertainties due to measurement accuracies. These include process measurement accuracy, instrument loop accuracy and calibration accuracy. The magnitudes assumed for these uncertainties are provided below. The components of uncertainty were assumed to be independent and normally distributed and therefore, could be combined using the square root of the sum of the squares (SRSS) method. The appropriate statistical allowance which yields a 95% probability of trip actuation (2σ) was used.

The NTSP was calculated by subtracting the uncertainty due to instrument channel drift from the AV. The drift was also assumed to be independent and normally distributed and was therefore, also subtracted using the SRSS method.

The magnitudes assumed for the uncertainties used in calculating the AV and NTSP are:

1. Process measurement accuracy = 12.8 psig
2. Instrument loop accuracy = 10 psig
3. Calibration accuracy = 3 psig
4. Drift accuracy = 10 psig.

The results of this calculation correspond to the proposed Technical Specification high power setpoint AV and NTSP provided in GSU's amendment request.

The in-plant setpoint for the high power setpoint was then determined by subtracting the FWHOS effect on TFSP (39 psia) from the above AV and NTSP. An additional uncertainty was included (6.4 psia) to account for heat balance modeling. This will therefore ensure that the in-plant setpoint will be less than that proposed in GSU's amendment request, even with a rated power feedwater temperature of 320 degrees F.

A calculation was also performed that verified that the current Technical Specification trip setpoint tolerance of +/- 3% of RTP for the low power setpoint provides enough margin to account for instrument uncertainties in addition to the effect of FWHOS operation.

3. Provide an evaluation of the impact of operation with FWHOS and single loop operation (SLO).

Each of the evaluations described in NEDO-31441 for SLO and in NEDO-31583 for FWHOS operation were re-evaluated for combined FWHOS and SLO conditions. The evaluation basis and results of the abnormal transients, rod withdrawal error, loss of coolant accident, fatigue usage of feedwater nozzle, sparger and piping, thermal-hydraulic stability and containment response were covered in this review.

The minimum operating limit MCPR specified by Technical Specification 3.2.3 for SLO conditions (70% power/54% core flow) is 1.42. The CPR for the limiting pressurization transient (feedwater controller failure) during SLO conditions (0.12) with the additional effect of FWHOS (0.02) results in a total CPR of 0.14. Therefore, the SLO safety limit MCPR of 1.08 is still maintained. As a result, the current operating limit MCPR for SLO bounds that required for the combined FWHOS and SLO conditions.

The combined operation evaluation also concluded that the restrictions imposed by the separate analyses for the remaining evaluations cited above also bound operation in the combined FWHOS and SLO conditions. Therefore, it has been concluded that an additional restriction to prevent combined FWHOS and SLO is not necessary. This combined operation is within the bounds of the separate analyses.

Attachment 2

Reactor Power (%) vs. Turbine First Stage Pressure (psig)