GULF STATES UTILITIES COMPANY

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AREA CODE 504 635-6094 346-8651

February 12, 1986
RBG-23176
File Nos. G9.5, G9.25.1.5

Mr. Robert D. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

RECEIVED
FEB 18 1986

Dear Mr. Martin:

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

Attached for your information is a report containing a brief description of changes to the River Bend Station (RBS) initial test program (ST-17, ST-18 and ST-21) and a summary of the safety evaluation for each change. This report is provided with regard to the RBS Facility Operating License NPF-47, Section 2.C(12).

Sincerely,

J. E. Booker

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

~~JEB~~ RJK /RJK/ebm
Attachments

cc: Director of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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ATTACHMENT 1 RBG-23176
February 12, 1986

Summary Description Of Change
(ST-17)

Table 14.2-1 of the River Bend Station (RBS) Final Safety Analysis Report (FSAR) identifies thermal expansion evaluation criteria. This revision corrects a typographical error in the FSAR.

Summary of Safety Evaluation

DISCUSSION

The objective of the thermal expansion startup test (ST-17) is to confirm that the pipe suspension system is working as designed and that the pipe is free of obstructions that could constrain free pipe movement.

Table 14.2-1 is derived from General Electric Co. (GE) system expansion data. ST-17 was written and performed based on the correct data from the GE system expansion data. Thus, this change to the FSAR does not affect testing data or plant safety systems but corrects a typographical error in the FSAR.

CONCLUSION

This revision does not alter the functional performance of the test or the test results and does not affect any safety related systems or the safe operation of the plant. Therefore, this change does not involve an unreviewed safety question and the typographical errors in FSAR Table 14.2-1 can be corrected.

Summary Description Of Change
(ST-18)

Section 14.2.12.3.15 of the River Bend Station (RBS) Final Safety Analysis Report (FSAR) describes the testing of "Core Power Distribution". This change to the test program deletes Startup Test-18 (ST-18).

Summary of Safety Evaluation

DISCUSSION

The objective of ST-18 is to determine the reproducibility of the Traversing Incore Probe (TIP) system readings. Regulatory Guide 1.68 (Revision 2; August 1978), Appendix A, paragraph 5.y requires that the incore neutron flux instrumentation be calibrated as necessary and proper operation verified. The TIP system is one of several incore neutron/gamma flux instrumentation systems. It provides gross core power distribution information for several applications. TIP system operability is demonstrated during preoperational testing of the TIP hardware and electronics and during power ascension testing when the process computer undergoes the dynamic system test case. ST-18 determines the uncertainty of the TIP system readings.

During power ascension testing of the process computer, the process computer program OD-1 is used in conjunction with the TIP system to provide information on the gross core power distribution. ST-18 is a separate test performed later in the power ascension test program. It provides a measure of the uncertainty in TIP system data.

Uncertainty in TIP indication affects the accuracy of LPRM calibrations, thermal limits calculations, operating recommendations, etc. The acceptance criterion for ST-18 states that total TIP uncertainty shall be less than 6.0%.

Total TIP uncertainty is comprised of geometric and random noise components. Geometric uncertainty results from the off-center placement of the TIP tube within the LPRM instrument tube, bowing of the instrument tube, and water gap dimensional variations. These geometric differences cause the thermal neutron TIP detectors to indicate flux levels different from the values ideally obtained by an axial scan down the center of the water gap. A measure of this uncertainty is obtained by comparing data from symmetric TIP locations and correcting for random noise uncertainty.

Random noise uncertainty is caused by neutron, electronic and boiling noise in the reactor. This uncertainty is determined by comparing data from repetitive scans in the common instrument tube by each TIP detector.

Measurement of these uncertainties at the beginning-of-life of an initial core, during power ascension testing, provides the best measure of TIP uncertainty because the fuel bundle power asymmetry is at a minimum. Results from previous plant startups show that measured total TIP asymmetry has always been well below the acceptance criterion, 6%. Detailed analysis of 45 TIP sets from eight plants for power levels ranging from 18% to 100% and core flow from 33% to 105% showed that the average total TIP uncertainty was 3.8%. Results from more recent power ascension testing of 7 plants, show that the average values of the geometric uncertainty, random noise uncertainty and total TIP uncertainty were 1.85, 1.02 and 2.17 percent, respectively.

CONCLUSION

Based on the test results from previous plant startups, TIP uncertainty for River Bend Station is expected to be much less than the limiting value of 6%. TIP system operability has been demonstrated during preoperational testing of the TIP hardware and electronics and during power ascension testing of the process computer. In view of these considerations, it is concluded that deletion of ST-18 does not adversely affect any safety related systems or the safe operation of the plant and as such does not involve an unreviewed safety question. Therefore, ST-18 can be deleted from the Power Ascension Test Program.

Summary Description Of Change
(ST-21)

Section 14.2.12.3.18 of the River Bend Station (RBS) Final Safety Evaluation Report (FSAR) describes the initial testing of the "Core Power-Void Mode". This change to the test program deletes Startup Test 21 (ST-21).

DISCUSSION

Regulatory Guide 1.68 does not provide any specific requirements to perform stability testing during the power ascension program. However, paragraphs 5.s, 5.v and 5.h.h require the demonstration of acceptable control system response during steady state and transient conditions. ST-21, "Core Power-Void Mode", measures the stability of the core power void dynamic response by moving a very high worth control rod one or two notches. In conjunction, Startup Test 22 (ST-22), "Pressure Regulator", performs pressure regulator step changes to measure the core power-void dynamic response. These test are currently planned to be performed at Test Conditions 4 and 5. The control rod movement tests are being deleted at Test Conditions 4 and 5, while still maintaining the pressure regulator testing at Test Condition 5.

Response of the core power-void mode is determined by analyzing test data and comparing to an acceptance criterion which defines the required system performance. The criterion requires that all system related variables must exhibit non-divergent behavior. System related variables are heat flux and reactor pressure.

Measurement of system stability by movement of control rods was developed for small reactor cores. Use of this technique for large loosely coupled BWRs, such as River Bend Station, will not provide significant information on the stability of the system because of the poor signal-to-noise ratio. Instead, core wide disturbances provide more meaningful data for large cores. ST-22 testing measures the system response to pressure disturbances caused by actions of the pressure regulator system. This testing yields valuable core stability data at the limiting high power/low flow condition encountered during normal operation (Test Condition 5). In addition, normal observations of operational power maneuvers provide sufficient data to determine the normal stability characteristics and response of the system.

In addition to the pressure regulator testing, Service Information Letter (SIL) 380 provides detailed recommendations for the monitoring of system behavior. These recommendations which have been incorporated into the River Bend Station

Technical Specifications, provide for monitoring of neutron flux characteristics during normal operation at high power/low flow conditions and during abnormal operating conditions. To supplement monitoring requirements, current Technical Specifications do not allow continued operation at natural circulation flow which is the least stable condition of the operating region.

Extensive special testing of stability characteristics has also been performed at several BWR's, including a BWR/6 plant similar to River Bend Station. The test data has demonstrated the stability characteristics of BWR's over a wide range of conditions and has been reviewed along with extensive supporting analyses, as part of the Staff's Safety Evaluation Report on core thermal-hydraulic stability (Letter, C.O. Thomas (NRC) to H.C. Pfefferlen (GE) dated April 24, 1985).

CONCLUSION

As a result of the extensive testing and analysis of core thermal hydraulic stability, it has been demonstrated that BWR fuel and core designs meet the stability criteria set forth in General Design Criteria 10 and 12 of 10CFR50, Appendix A (NEDE-24011, Rev. 6, Amendment 8). Based on the above discussion and the Staff's Safety Evaluation Report, the proposed change will not adversely affect safety related systems or safe operation of the plant and therefore, does not involve an unreviewed safety question. System stability is adequately measured during ST-22 and has been extensively tested at several BWRs covering a wide range of designs. In addition, information on the system's stability is continuously provided by SIL-380 recommendations for the monitoring of neutron flux. Therefore, ST-21 can be deleted from the Power Ascension Test Program.