

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-458/91-02

Operating License: NPF-47

Docket: 50-458

Licensee: Gulf States Utilities (GSU)  
P.O. Box 220  
St. Francisville, Louisiana 70775

Facility Name: River Bend Station (RBS)

Inspection At: Site, St. Francisville, Louisiana

Inspection Conducted: January 28 through February 1, 1991

Inspectors:

*W. C. Seidle for*  
M. E. Murphy, Reactor Inspector, Test Programs  
Section, Division of Reactor Safety

2/12/91  
Date

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Date

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2/12/91  
Date

Approved:

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W. C. Seidle, Chief, Test Programs Section  
Division of Reactor Safety

2/12/91  
Date

Inspection Summary

Inspection Conducted January 28 through February 1, 1991 (Report 50-458/91-02)

Areas Inspected: Routine announced inspection of startup testing and followup on previously identified items.

Results: Startup testing for Cycle 4 operation had been completed in accordance with requirements. There appeared to be conservative margins to core thermal limits. Computer backup data capability was good. Training of personnel involved in the startup testing met the licensee's requirements and appeared to be effective. The licensee's procedure for determining shutdown margin was reviewed and found to be accurate. However, inputs provided by General Electric Company in the Cycle 4 Management Report and used by the licensee in the shutdown margin calculations contained two discrepancies. These erroneous inputs both resulted in small nonconservatisms in shutdown margin. These nonconservatisms did not result in a violation of Technical Specification requirements. No violations or deviations were identified. The review of licensee actions on previously identified items resulted in the closing of one violation and one inspector followup item.

DETAILS

1. PERSONS CONTACTED

Gulf States Utilities

- \*R. Backen, Supervisor, Quality Assurance (QA) Systems
- \*J. Booker, Manager, Nuclear Industry Relations
- \*G. Bysfield, Assistant Plant Manager, Systems Engineers
- \*J. Cook, Technical Assistant, Licensing
- \*T. Crouse, Manager, Administration
- \*W. Curran, Site Representative, Cajun Electric
- \*J. Deddens, Senior Vice President
- D. Dietzel, Nuclear Training Coordinator - General Employee Training
- L. England, Director, Licensing
- \*P. Graham, Plant Manager
- \*C. Greene, Senior Nuclear Engineer
- \*J. Hamilton, Director, Design Engineering
- \*G. Henry, Director, Quality Operations
- R. Jackson, Nuclear Training Coordinator - License
- L. Leatherwood, Supervisor, Core Analysis
- \*J. Leavines, Supervisor, Nuclear Safety Advisory Group
- \*D. Lorfing, Supervisor, Licensing
- \*J. Maher, Engineer, Licensing
- \*C. Miller, Senior Compliance Analyst
- \*J. Miller, Director, Engineering Analysis
- \*W. Odell, Manager, Oversight
- \*J. Pruitt, Manager, Business Systems
- \*M. Sankovich, Manager, Engineering Department
- \*J. Spivey, Jr., Senior QA Engineer
- \*D. Wells, Senior Licensing Analyst
- \*G. Young, Supervisor, Reactor Engineering

NRC

- E. Ford, Senior Resident Inspector
- \*D. Loveless, Resident Inspector

The inspectors also interviewed other licensee employees during the inspection.

\*Denotes those attending the exit meeting on February 1, 1991.

2. FOLLOWUP ON PREVIOUSLY IDENTIFIED ITEMS (92701, 92702)

2.1 (Closed) Violation (458/8818-01): "Failure to Properly Evaluate and Document Surveillance Test Results." A number of surveillance test documentation deficiencies were cited in this violation. They involved a missing data page, improperly written test exceptions on acceptance criteria, and incomplete data. In Letter RBG-28911 of September 30, 1988, the licensee

reflected satisfactory resolution of the cited deficiencies. Although the licensee believed the cited examples were isolated cases, a random review of the surveillance test documentation and completion process was initiated. The results of this review were documented in Memorandum PAS-88-0127 of October 28, 1988. In that deficiencies not affecting acceptance criteria were identified in 77 of 200 test results packages reviewed, the compliance department concluded that a moderate problem in documenting surveillance tests existed. Consequently, additional corrective steps to avoid further violations were identified in Supplemental Response RBC-29498 of November 30, 1988. They included the following:

- ° Identification of additional pages added to a surveillance test documentation package on page 1 prior to transmittal to files;
- ° Review and revision of all 18-month surveillance test procedures to incorporate temporary changes prior to the second refueling outage; and
- ° Instruction of all personnel associated with the development, performance, and documentation of surveillance test procedures on the identified discrepancies.

The inspector determined that the above actions had been completed. Also, a followup inspection was performed subsequent to the second refueling outage and documented in NRC Inspection Report 50-458/90-19. Because no recurrences of the specific deficiencies cited in this violation and the licensee's review were identified, the licensee's actions to avoid further violations appeared to have been effective, and this violation is therefore closed. However, the inspector advised licensee management that additional issues, including weaknesses in the comments section of the test results packages, were identified in NRC Inspection Report 50-458/90-19. The inspector was not able to determine that these additional issues were resolved. Therefore, followup will be performed in accordance with the routine inspection program. This item is closed.

2.2 (Closed) Inspector Followup Item (458/8914-02): Pipe Support Spring Hanger. The inspector identified Spring Hanger ISVV \* PSSH-3120-A3, which is located in the drywell, as having a bottomed-out indication.

The licensee subsequently issued Condition Report 89-0404. The licensee's review of a maintenance work order (MWO) found that the hanger spring was improperly set during the first refueling outage. The licensee determined that the maintenance personnel and the quality control (QC) inspector who worked the MWO were not aware that the specific spring setting was required for the hanger.

The licensee's corrective actions for this issue were: reset the hanger; require all maintenance personnel who adjust spring hangers to be trained, or have the MWO provide detailed instructions; require applicable MWOs to require recording of the as-found spring settings; require applicable MWOs to reference installation specifications; revise applicable QC procedures to require verification of spring settings; and review other relevant MWOs to identify similar problems. In fulfilling the latter corrective action, the licensee found four pipe supports that were questionable in regard to their spring settings. These supports are located in contaminated, high radiation or very high radiation

exclusion areas. The licensee concluded that these four springs will operate within their working range even if improperly set, so a special inspection was not performed. These supports will be inspected during the licensee's next scheduled inservice inspection (ISI). This item is closed.

### 3. STARTUP TESTING - REFUELING (72700)

The purpose of this inspection was to verify that startup testing following Refueling Outage 3 (beginning of Cycle 4) was in accordance with NRC requirements, fuel vendor instructions, and licensee procedures. The inspectors reviewed the data from all required core physics tests and surveillance tests associated with the postrefueling startup and verified that the results met acceptance criteria and that all deficiencies were resolved in a timely manner.

To determine the licensee's startup test program, the inspectors interviewed operations and engineering personnel and reviewed the following documents:

- ° Startup schedule, dated November 19, 1990;
- ° Procedure ADM-0024, "Conduct of Reactor Engineer," Revision 5, dated November 28, 1990; and
- ° Procedure GOP-0001, "Plant Startup," Revision 10E, dated June 12, 1990.

Taken together and used by trained personnel, these documents appeared to constitute an appropriate startup test program. The following startup practices were described to the inspectors:

- ° An extra crew operating foreman (SRO) was assigned to attend to administrative requirements.
- ° A reactor engineer was assigned to each shift.
- ° The crew expected to perform the startup was provided with special simulator training.

The inspector reviewed Startup Test Procedure STP-052-3701, "Control Rod Scram Testing," completed November 25, 1990, and determined that all but one rod, 48-21, met the acceptance scram time. One rod, 40-29, was also declared inoperable because of mechanical problem with a hydraulic valve. Both rods were repaired under maintenance work requests and subjected to a retest under STP-052-3701; this retest was satisfactorily completed December 2, 1990. The inspector also reviewed the Emergency Response Information System (ERIS) data for a plant scram that occurred on December 12, 1990. This provides scram times for each rod; all data was satisfactory.

It was determined by procedure review and operator interviews that nuclear instrument response to rod movement was routinely monitored by operators. There were no anomalies noted during this startup or in subsequent plant operations.

Specific physics tests are discussed in detail in the following subparagraphs.

### 3.1 Surveillance of Core Power Distribution Limits (61702)

This part of the inspection was conducted to verify that the plant was being operated within the licensed power distribution limits. Pursuant to this objective, the inspector reviewed the following documents and data:

- ° RBS, Cycle 4, "Core Operating Limits Report," dated November 1990 and approved by the Nuclear Review Board on November 21, 1990;
- ° Report 23A6503, Revision 0, "Supplemental Reload Licensing Submittal for RBS, Reload 3, Cycle 4," dated May 1990; and
- ° Procedure STP-050-3001, Revision 3, "Power Distribution Limits Verification," completed on December 5, 1990, at 74.1 percent rated thermal power (RTP) and on January 24, 1991, at 100 percent RTP.

The data reviewed covered operation at 100 percent RTP. It was observed that there were conservative margins to thermal limits in each instance. All data appeared to be accurate and reasonable.

The inspector determined that the process computer had been updated for Cycle 4 by review of the following documents:

- ° Report CA-R-90-343, Revision 0, "Process Computer Data Bank Verification for RBS, Cycle 4"; and
- ° Procedure EDP-CC-0202, Revision 1, "Process Computer Initialization Following Refueling Outages," completed November 26, 1990.

The computer updating process appeared to be rigorous and the inspector did not note any anomalies in the data.

### 3.2 Calibration of Nuclear Instrumentation (NI) Systems (61705)

The purpose of this part of the inspection was to determine the following:

- ° The local power range monitor (LPRM) system had been properly calibrated to the local neutron flux.
- ° The average power range monitor (APRM) system had been properly calibrated to the core thermal power.

The inspector verified that operability of traversing in-core probe (TIP) detectors had been normalized by performance of Procedure STP-506-3700, Revision 3, "TIP System Operability Test," on December 10, 1990. The LPRMs were then calibrated using the TIP system by performance of Procedure STP-505-4251, Revision 5, "Reactor Protection System/LPRM 1000 EFPH CHCAL (APRM A through H) (C51\*K605 A through H)," on December 10, 1990. The LPRM final readings were contained in Computer Printout OD1 which was completed at 4:10 p.m. on December 10, 1990. The APRM readings were consistent with the core thermal power computed by the process computer.

The data in the above test packages indicated that all prerequisites had been completed and appropriate initial conditions had been established. All acceptance criteria were satisfied.

The inspector noted that only one LPRM was out of service. The reactor engineering supervisor stated that each LPRM may be replaced individually. If end of life for an LPRM is anticipated during a fuel cycle, it is replaced at the beginning of the cycle. The LPRM management program appeared sound.

### 3.3 Core Thermal Power Evaluation (61706)

In addition to the process computer, the licensee uses REP-0030, Revision 3, "Reactor Heat Balance," to determine the core thermal power. The procedure, which involves a manual calculation, was last performed on January 23, 1991. The inspector reviewed the calculation for accuracy and proper plant input conditions. There were no discrepancies identified. The inspector noted that the result of the calculation was in good agreement with the calculation (P1, "Periodic Core Evaluation") that was performed by the process computer. The process computer performs the P1 routine on an hourly basis when reactor power is greater than 25 percent. The inspector reviewed P1 calculations for the period of December 17, 1990, to January 30, 1991, and found that the frequency of the calculations exceeded the Technical Specification 3.2.2 requirement. The inspector noted that there were no instances where reactor power exceeded 102 percent or where reactor power exceeded 100 percent for more than an operating shift.

### 3.4 Determination of Reactor Shutdown Margin (61707)

In demonstrating conformance to the Technical Specification requirements for shutdown margin throughout the operating cycle, the licensee used STP-050-3601, "Shutdown Margin Demonstration," Revision 7. The procedure is also used for determining the estimated critical control rod position and reactivity anomalies. The procedure establishes shutdown margin testing via the in-sequence withdrawal critical technique. The inspector determined that the licensee had been performing shutdown margin calculations in accordance with the Technical Specification 4.1 requirement. The licensee last performed the procedure on November 30, 1990. The licensee representative stated that there have been no instances in Cycle 4 operation wherein shutdown margin could not be met nor had there been any occurrences of immovable or untrippable control rods.

Utilized in the shutdown margin calculations were inputs from the "Cycle 4 Management Report," which was supplied by General Electric (GE) Company, Nuclear Operations. According to EDP-AA-65, "Review and Processing of Vendor Technical Information," Revision 5, the Cycle 4 Management Report was internally distributed and reviewed by the licensee's Core Analysis Section in the Engineering Department. This review did not require nor involve Facility Review Committee approval. The Cycle 4 Management Report was subsequently approved for use on November 26, 1990, following revision by GE. (During the week of the inspection, the licensee informed the inspector that it had submitted to NRC's Office of Nuclear Reactor Regulation a safety analysis that,

if approved for licensing applications, will allow GSU to rely on their in-house capabilities for this analysis.)

In reviewing the Cycle 4 Management Report, the inspector found there were different R values provided on two separate pages. (The R value is an exposure-dependent measure of the maximum increase in shutdown margin needed from beginning of cycle due to burnout of burnable poisons.) The inspector noted that in performing the shutdown margin calculation, pursuant to the instructions given in STP-050-3601, that the licensee had correctly utilized the R value on the page specified by the procedure. The licensee was queried about why two R values were given in the report and which was the correct value. In response to this finding, the licensee promptly issued Condition Report 91-0041 and contacted GE about the disparity. Through that discussion, the licensee learned that the correct R value was the R value not used in the licensee's calculations. The use of the correct R value resulted in the determination of a shutdown margin that was less conservative than that previously calculated, but a shutdown margin still in conformance with the Technical Specification limit. It was the licensee's understanding that fuel management changes necessitated by the removal of the two leaking fuel bundles, which were specifically located during the most recent refueling outage, were not fully incorporated by GE into the revised Cycle 4 Management Report.

The licensee's Condition Report provided several recommended corrective actions that included issuing a "NOTEPAD" report to all nuclear plant licensees.

Following this discovery, GE personnel contacted the licensee and informed it that another error had been identified in the Cycle 4 Management Report. This error involved an incorrect value of the estimated minimum shutdown margin at beginning of cycle. This error is also believed to have resulted from an incomplete reanalysis of the fuel management changes resulting from the off loading of the two leaking fuel bundles during the most recent refueling outage. Again, the licensee's use of the correct value of the minimum shutdown margin at beginning of cycle resulted in a small nonconservatism. The incorporation of both of the above described nonconservatisms did not result in a violation of the Technical Specification limit.

The inspector noted another discrepancy in the Cycle 4 Management Report. Specifically, the report referenced the GE Generic Topical Report NEDE-21493, "PCIONR Implementation Procedures." This topical report is not applicable to the River Bend Station type of fuel. The inspector brought this matter to the attention of the licensee who indicated that the licensee had previously identified the matter and expected the reference would be removed from any future GE-supplied reports. The inspector did not identify any nonconservatisms in the Cycle 4 Management Report resulting from the erroneous reference.

#### 4. EXIT MEETING

The inspectors met with the licensee representatives denoted in paragraph 1 on February 1, 1991, and summarized the scope and findings of this inspection. Proprietary materials provided to the inspectors were returned at the conclusion of the inspection and none of their contents are reproduced in this report.