APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-458/90-26 Operating License: NPF-47

Docket: 50-458

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

Facility Name: River Bend Station (RBS)

Inspection At: RBS, St. Francisville, Louisiana

Inspection Conducted: September 5 through October 16, 1990

Inspectors: E. J. Ford, Senior Resident Inspector
D. P. Loveless, Resident Inspector
R. C. Sorensen, Region V Resident Inspector

Approved: _____ 11/2/90
G. L. Constable, Chief, Project Section C Date
Division of Reactor Projects

Inspection Summary

Inspection Conducted September 5 through October 16, 1990 (Report 50-458 /90-26)

Areas Inspected: Routine, unannounced inspection of followup of events, operational safety verification, maintenance observations, surveillance test observations, engineered safety feature system walkdown, and followup of previously identified items.

Results: Within the areas inspected, one deviation was identified (paragraph 4). A tour by the inspectors on October 4, 1990, of the D tunnel in the auxiliary building, disclosed a severe lack of lighting in that approximately 75 percent of the installed lighting was not lit. This is not consistent with the RBS Updated Safety Analysis Report (USAR), which states that the station lighting systems provide lighting intensities at levels recommended by the Illuminating Engineering Society and in accordance with current OSHA requirements.

On September 29, 1990, the inspector observed evolutions involving the shutdown of the reactor for entry into Refueling Outage No. 3. It was noted that the operators worked well together, were knowledgeable of the procedures in use, and stabilized the plant in a timely manner after the planned manual scram.

During this inspection report period, GSU announced the resignation of Mr. Thomas F. Plunkett, General Manager, Oversight and Business Systems, to be

effective on September 24, 1990. Mr. Plunkett previously held the position of plant manager at the River Bend station for 5 years. No replacement has been named.

Open Items: During the inspection period, inspection items and findings were reviewed and/or opened. The following items were designated as tracking items:

- One deviation was identified which involved a failure to to meet USAR commitments with regard to plant lighting.

  Deviation 458/9026-01, Lack of Adequate Lighting in the D Tunnel - paragraph 4

- One inspector followup item was identified which involved the failure of the B recirculation pump to properly transfer to the low frequency motor generator set (LFMG) following a trip of the high speed breaker.

  Inspector Followup Item 458/9026-02, Recirculation Pump B Failure to Transfer to the LFMG Following High Speed Trip - paragraph 3

- Two previously identified items were closed:

  Violation 458/8826-01, Reactor Core Isolation Cooling System Inoperable Because the Turbine was not Mounted per Seismic Design - paragraph 8.

  Inspector Followup Item 458/8802-04, Evaluation of Licensee's Use of the Open Torque Switch Bypass in Limitorque Operators - paragraph 8.

DETAILS

1. Persons Contacted

*D. L. Andrews, Director, Nuclear Training
*G. A. Bysfield, Supervisor, Control Systems
E. M. Cargill, Director, Radiation Programs
*J. W. Cook, Technical Assistant
*W. L. Curran, Site Representative
*J. C. Deddens, Senior Vice President, River Bend Nuclear Group
*L. A. England, Director, Nuclear Licensing
P. E. Freehill, Assistant Plant Manager - Outage
*P. D. Graham, Plant Manager
*J. R. Hamilton, Director, Design Engineering
W. C. Hardy, Supervisor, Radiation Protection
*G. K. Henry, Director, Quality Assurance Operations
*G. R. Kimmell, Director, Quality Services
*D. N. Lorfing, Supervisor, Nuclear Licensing
*J. C. Maher, Licensing Engineer
I. M. Malik, Supervisor, Quality Operations
*J. F. Mead, Supervisor, Electrical Design
*W. H. Odell, Manager, Oversight
*J. P. Schippert, Assistant Plant Manager - Operations, Radwaste and Chemistry
*K. E. Suhrke, General Manager - Engineering and Administration
S. L. Woody, Supervisor, Nuclear Security

The inspectors also interviewed additional licensee personnel during the inspection period.

*Denotes those persons that attended the exit interview conducted on October 18, 1990.

2. Plant Status

At the beginning of the inspection period, the reactor was operating at approximately 65 percent power in single-loop operation.

On September 28, 1990, at approximately 9:30 p.m.(CDT), the licensee began reducing power to enter Refueling Outage No. 3. On September 29, 1990, just after 12 midnight, the licensee tripped the B recirculation pump and initiated a manual reactor scram at 12:01 a.m. from 40 percent reactor power. The inspector observed the operator response to this planned evolution. On September 30, 1990, at 4:09 a.m. (CDT), the reactor was taken into Mode 4, and on October 4, 1990, at 5:18 p.m. (CDT), the first reactor stud was detensioned placing the reactor in Mode 5.

Various problems impeded the progress of the outage during the first 2 weeks. Polar crane and auxiliary hoist trouble delayed reactor head removal. Problems with water clarity and refueling equipment delayed and

hampered refueling efforts. The first spent fuel bundle was removed from the core on October 15, 1990. At the end of the inspection period, the reactor was in Mode 5, and the licensee had completed approximately 153 steps out of approximately 1100 needed to complete fuel movement.

3. Followup of Events (93702)

a. On September 30, 1990, at approximately 4:26 a.m. (CDT), while the plant was shutdown in Mode 4 with the reactor depressurized, an RPS actuation signal was generated on high water level in the scram discharge volume. The reactor mode switch had been in the refuel position as required by ongoing surveillance testing. The at-the-controls operator returned the mode switch to the shutdown position (which resulted in an anticipated scram), verified the scram discharge volume high water level alarm was not in, and reset the scram. The refueling senior reactor operator observing the evolution told the operator to bypass the scram discharge volume (SDV) high level trips. This is necessary because the SDV instrument volume fills more slowly at reduced pressures, and water from the previous scram could still be filling the volume. Before the operator could respond, the RPS actuation occurred. All plant systems responded as designed.

The resident inspector reviewed the event to verify procedural compliance and appropriate licensee corrective action. The licensee stated that the governing procedure for the event was AOP-0001, Reactor Scram. However, this procedure was written for scrams from power and not designed to address the recovery from a routine scram signal, while shutdown, that did not include control blade motion. The event was caused by shutdown conditions that could not have happened during plant operations. The licensee verified that prior scram signals at shutdown had taken approximately 60 seconds to fill the SDV instrument volume. Scrams while at power fill the volume almost instantaneously. Because AOP-0001 is written for scrams at power, the operators are not expected to follow all of the procedural requirements. For example, the operators do not normally initiate a manual scram signal after placing the mode switch in shutdown when the reactor is in cold shutdown.

At the time of the event, the shift supervisor stopped all work in the main control room and briefed the operators on the occurrence. He emphasized the need to maintain control and the use of procedures regardless of the current operational condition. The licensee has determined that the event was caused by an inadequate procedure and is currently considering revising AOP-0001 or developing a new procedure for scram signals while at shutdown. This item will be reviewed further following the issuance of the 30 day report.

b. On September 28, 1990, the licensee began decreasing power to begin their third refueling outage. Just after 12 midnight on September 29, 1990, with the reactor at 40 percent power as part of

planned testing, the licensee tripped the fast speed reactor Recirculation Pump B breaker (3B). This action was followed immediately by a manual reactor scram. The inspector observed the scram and recovery, and noted that the operators worked well together, appeared to be knowledgeable of the recovery procedures, and stabilized the plant in a timely manner.

The plant had been in single loop operations with the A recirculation pump out of service. During the transient, the B pump did not transfer to slow speed as expected. On a second start attempt, Breaker 1B closed, but Breaker 2B failed to close. This caused breaker 1B to trip on the incomplete sequence timer timing out. One of the relays in the start sequence, KA-136A, powered from the low frequency motor generator set (LFMG) available, stuck open and indicated that the sequence was incomplete even though everything responded normally. This prohibited the slow speed breakers from closing on the LFMG. The licensee is still investigating this event and committed in the exit to complete the review of Condition Report (CR) 90-0820 and take initial corrective action, as deemed necessary, prior to restarting the unit. This item will be tracked by the resident inspectors and will be identified as Inspector Followup Item 458/9026-02, Recirculation Pump B Failure to Transfer to the LFMG Following High Speed Trip.

No violations or deviations were identified.

4. Operational Safety Verification (71707)

a. The inspectors routinely made tours of the facility, including walkdowns of the control room panels. The inspectors noted that the system status as indicated met Technical Specification requirements, and that the operators were aware of off normal conditions. Plant management was observed in the plant throughout the period, with routine control room coverage by the Assistant Plant Manager - Operations, Radwaste and Chemistry. Additionally, the inspectors were informed of the resignation of Mr. Thomas F. Plunkett, General Manager, Oversight and Business Systems, to be effective on September 24, 1990. Mr. Plunkett previously held the position of plant manager at River Bend for 5 years. The licensee is not currently planning to fill this position.

b. During a tour of the auxiliary building on October 3, 1990, the inspectors noted that the lack of lighting in the D Tunnel was creating a hazardous condition in that approximately 75 percent of the lights were burned out and the intensity was such that valves and piping could only be seen with the aid of a flashlight. Further research by the inspectors disclosed that the RBS USAR, Section 9.5.3.1.1, dated August 1987, states that "The station lighting systems provide lighting intensities at levels recommended by the Illuminating Engineering Society and in accordance with current OSHA requirements."

OSHA good practice procedures give, as a rule-of-thumb, 20-30 foot-candles for areas where services are performed and 50-60 foot-candles for areas where tasks are being performed. The Illuminating Engineering Society Handbook, Section 9, Electric Generating Stations, recommends illuminance levels for nuclear power plants at 15 foot-candles for uncontrolled auxiliary building areas. It was obvious to the inspector that large portions of the D tunnel had illumination levels far below the most limiting of these requirements in that many of the areas were dark.

This is a deviation (458/9026-01), Lack of Adequate Lighting in the D Tunnel).

c. During the inspection period the licensee experienced some delay in removing irradiated fuel from the reactor because of poor water clarity in the refueling pool. In previous outages, the licensee has filled the hotwell to well above the condenser tubes and placed the condensate system on short cycle cleanup. This greatly improved the quality of the water prior to filling the refueling and upper pool. This method had caused the condenser tube plugs, normally held in place by the condenser vacuum, to be rejected, causing additional outage time to replace.

The pool was filled more directly during this outage to avoid problems with the condenser plugs. However, this caused the water to be routed directly through the carbon steel piping of the hotwell reject line, and it picked up additional corrosion particles. The normally scheduled 24-hour cleanup of the refueling pool was greatly extended as a result of clarity problems associated with the excess corrosion products. The licensee, therefore, took 6 1/2 days from the time the refueling pool was full on October 7 until fuel movement commenced on October 14, 1990.

d. On October 4, 1990, the inspector conducted a walkdown of the Class 1E station batteries, specifically 1EGS*EG1A, 1EGS*EG1B, and 1E22*EGS001. Electrolyte levels were observed and found to be in compliance with Technical Specification requirements. In addition, the batteries, battery racks, and floor beneath were inspected for evidence of electrolyte leakage. No leakage was evident.

Also on October 4, the inspector conducted a walkdown of large portions of the reactor building on all elevations accompanied by a radiation protection foreman. This walkdown excluded the drywell and the suppression pool. The inspector observed the areas for proper radiological postings and for general housekeeping. Several contaminated zones were noted to have an unusually large amount of used and discarded protective clothing on the floor. This would have the potential to spread contamination to uncontaminated areas. The inspector pointed this out to the radiation protection foreman who acknowledged the problem and took prompt corrective action. General housekeeping was good throughout the remainder of the toured areas.

e. The inspector reviewed and observed certain daily activities performed by the nuclear station security officers. Responses to alarms were found to be timely and thorough. Officers appeared to be alert and well informed of their job functions. The secondary alarm station was maintained in good condition, and the alarm boards were clear and understandable.

f. Routine observation of safety system alignments were performed throughout the inspection period from both control room indications and local position checks as part of other inspection activities. However, the following specific subsystems were verified by system walkdown and control board indication to be in proper flow path alignment:

- Residual Heat Removal Train C (Low Pressure Coolant Injection)
- Reactor Core Isolation Cooling System

No violations were identified. One deviation was identified in subparagraph b. above.

5. Maintenance Observation (62703)

On October 2, 1990, the inspector observed a portion of work in progress on the Division II Emergency Diesel Generator, 1EGS*EG1B. The work involved refurbishment of components and corrective actions of licensee identified problems. Portions of the following MWO's were observed:

- MWO R 142211, Service the Starting Air Block and Vent Valves. The inspector observed portions of the disassembly and removal of the 1B Starting Air Valve, 1EGA*SOVX11B. This was performed under Cooper Industries' procedure, Refueling Outage (RFO)-335, Diesel Generator Inspection and Maintenance Procedure, Revision 0. This procedure had been reviewed and approved for use by RBS design engineering. The technicians were following proper procedure and were tagging lifted leads and equipment removed as required throughout the effort. The inspector determined that the following tags were utilized properly:

  - Disassembled Components Identification and Control Tag
  - Lifted Lead/Jumper Tag
  - Equipment Removal Tag

  The leads were lifted in accordance with General Maintenance Procedure (GMP)-0042, Circuit Testing and Lifted Leads and Jumpers. The component was disassembled and removed in accordance with Maintenance Section Procedure (MSP)-0021, Equipment Removal/Disassembly Identification.

- MWO R 125198, Standby Diesel Generator Jacket Water Cooler - Clean Water Boxes and Tubesheets. The inspector observed portions of the hydrolazing of the tubes on the service water side of the diesel generator jacket water cooler. This work was being performed as

corrective action for CR 89-0550. This CR stated that the design corrosion allowance of 1/16 inch on the tubesheet of the jacket water cooler had been exceeded. The CR calls for ASME repair for metal thicknesses below 1.25 inches, as required.

The planning for the work appeared to be adequate. Quality control hold points and witness points were observed. Procedural steps were clear and adequate to cover the evolution. The craftsmen were following the procedure and procedural steps were signed off as completed.

No violations or deviations were identified. The work observed in this section indicated that the licensee had good control over contractor activities, in that the contractors observed were following the GSU administrative controls.

6. Surveillance Test Observation (61726)

a. On September 12, 1990, the inspector observed a portion of Surveillance Test Procedure (STP) 051-4548, ECCS Reactor Vessel Pressure Low/SRV Actuation Instruments Time Monthly Channel Functional Test, in progress. The portion observed involved the calibration of Reactor Bistable B21-N668F. This instrument controls relief valve initiation during low low setpoint operations of the safety relief valves.

The inspector reviewed the procedure to determine that it was properly approved. The work was approved by the shift foremen and the unit operator who were cognizant of the scope and nature of the testing. The instrument as-found setpoint was within procedural acceptance criteria and Technical Specification limits. The technicians were following the procedure as required.

b. On September 12, 1990, the inspector observed a portion of Plant Engineering Procedure (PEP)-0053, Sensor Response Time Testing Using Process Noise, in progress. This procedure calculates a sensor response time for numerous process instrumentation channels. The procedure calls for monitoring of normal system environmental noise (i.e. system vibrations, valve chatter, flow disturbances, etc.) with the reactor between 50 and 100 percent power. The analyzer looks at a 10 Hz frequency range and samples every 50 milliseconds. The wave form channel analyzer performs least squares fit of the curve of amplitude-vs-frequency. This curve is used to determine the roll-off point (the point at which the sensor is saturated) of the instrument. The point at which the instrument can no longer respond to higher frequencies can be utilized to calculate the sensor response time. This information is also archived as a sensor baseline to be used for future troubleshooting activities.

The inspector observed the data taking on the Main Steam Line Flow Sensors E31-N086C, E31-N087C, E31-N088C and E31-N089C. These

instruments provide a signal to a Rosemont trip unit providing for closure of the main steam isolation valves when high steam line flow is sensed. These instruments are part of the reactor protection system (RPS) Trip Channel A, Division III. The vendor's procedure was properly verified as meeting GSU guidelines by design engineering and was approved for work by the control room, and the Westinghouse technicians were observed to be following it. The preliminary data showed acceptable response times. However, reduction of the final data and preparation of the report will not be accomplished on site.

The inspector also verified that this work on RPS Division III could not cause a reactor scram or ESF actuation by interaction with the work discussed in Section a. above and conducted in accordance with STP 051-4548.

No violations or deviations were identified.

7. Engineered Safety Feature System Walkdown (71710)

During the inspection period, the inspector walked down the accessible portions of the high pressure core spray (HPCS) system. The inspector verified that the System Operating Procedure (SOP)-0030 and the system flow diagram, PID 27-4A, agreed with each other, and that the plant was aligned in standby in accordance with the SOP. This was the case with the following exceptions which were reported to the licensee:

1. The following valves were designated as locked closed in SOP-0030, and found to be locked closed in the plant, but were not listed as locked closed on PID 27-4A:

   - E22*VF026
   - E22*V69
   - E22*V37
   - E22*V53

   The inspector discussed the above valves with the licensee, and it was stated that, although the PID's at RBS are drawn to show the system lineup at 100 percent reactor power, they may not always agree with the SOP lineup. For example, the PID will show a primary pump running while the SOP may allow for backup pump operations or, specific to this discussion, the SOP may show a more conservative approach by operations in locking closed a valve that is not required by the design shown on the PID. The Assistant Plant Manager for Operations, Radwaste and Chemistry stated that they would review the specific examples to determine if they are adequate.

2. The following valves and equipment had missing identification tags or tags were broken off:

   - E22*TW102
   - E22*V73

- E22*V8
- T/C 140

These were reported to the licensee, and were added to the normal tagging system punchlist.

3. E22*MOV-F011 has flex conduit on main power cable pulling loose at the top fitting. (This power cable was not required to be environmentally qualified.)

This item was documented for work during the outage under MWO R141163.

The above items do not directly affect the operability of the system and are considered minor in nature. General housekeeping in the area including condulet covers, wiring conditions, paint and coatings, handwheels, tagging and cleanliness was good.

No violations or deviations were identified. The licensee has made great efforts in upgrading the aesthetic condition of the HPCS system. The lineup was found to be as required by the SOP, and overall housekeeping in the area was in superior condition as compared with other plants and other plant areas at RBS.

8. Followup of Previously Identified Items (92701,71707)

a. (Closed) Violation 458/8826-01: Reactor Core Isolation Cooling System (RCIC) Inoperable Because the Turbine was not Mounted per Seismic Design.

During a review by the licensee design engineering group to prioritize outstanding modification packages, it was noted that an oil piping support addition had not been completed, the coupling pedestal bolting had not been lock wired, and the pedestal dowel pins were not in place. These items made the RCIC system pump turbine inoperable contrary to the requirements of Technical Specification Limiting Condition for Operation 3.4.7.3.

The licensee's initial corrective action was to return the Terry turbine to its design configuration by implementing Modification Request (MR) 85-1243. STP 209-3302, RCIC Pump Operability and Flow Test, was performed as a postmodification test to verify operability.

The licensee determined that the item was an isolated case by screening all the remaining MRs that had not been prioritized and determining that none had an impact on operability. The licensee also determined that, based on the seismic testing of the prototype turbine, the RCIC turbine at RBS would not have failed during an operational basis earthquake or a safe shutdown earthquake.

The inspector reviewed CR 88-0936 documenting the adverse condition, the LER, and the licensee response to the violation. A walkdown was performed to verify that the as-built configuration was as documented

in MR 85-1243. The configuration management program at RBS and the review and prioritizing of MRs is now designed to assure that plant operability considerations are factored into the final scheduling decisions.

This violation is closed.

b. (Closed) Inspector Followup Item 458/8802-04: Evaluation of Licensee's Use of the Open Torque Switch Bypass in Limitorque Operators.

When an open torque switch is used, bypassing the switch during the initial portion of the open stroke is required so that the switch will not prematurely stop valve travel during the high torque condition at initial valve movement. There is no specific requirement for the amount of valve travel during which the torque switch should be bypassed. However, the initial high torque condition must be bypassed.

Data reviewed by the inspectors during the closeout inspection for Inspection and Enforcement Bulletin (IEB) 85-03, Motor Operated Valve Common Mode Failure During Plant Transients Due to Improper Switch Settings, showed that the open torque switch was bypassed for the majority of the open stroke for most valve operators. This should assure that valves will open against the high unseating thrust even if the torque switch does trip. However, data for four valves indicated open torque switch bypass settings of 0.7, 3, 1, and 2.7 percent of valve stroke. It was stated by licensee personnel that a process was underway to change bypass settings to 10 percent. The previous inspector left this item open pending further review by the licensee and the NRC.

Neither the licensee nor the inspector could determine which valves the previous inspector was discussing because they were not specified in the report. The inspector did note that, of the valves identified under IEB 85-03 with an opening safety function, all have the opening torque switch bypassed for 95 percent of valve travel in the opening direction. This is shown on Design Drawings 12210-ESK-2L, -2M, and -2N in the safety function open diagrams as Contact No. 11. Those valves discussed in the previous inspection report were, therefore, determined by the licensee not to have an opening safety function. The bypass modification discussed by the previous inspector is being installed on a number of safety-related and nonsafety-related motor operated valves (MOV) in response to an INPO comment. But none of the MOVs covered by the bulletin were scheduled for this modification. Therefore, none of the valves with open safety functions will be modified in this manner.

The inspector had no further questions. This item is closed.

No violations or deviations were identified. In each item addressed above, the licensee had performed sufficient review and/or corrective action prior to determining the issue to be closed.

9. Exit Interview

An exit interview was conducted with licensee representatives identified in paragraph 1 on October 18, 1990. During this interview, the NRC inspectors reviewed the scope and findings of the report. The plant manager committed to complete the review of CR 90-0820 and take initial corrective action, as deemed necessary, prior to restart of the unit following the current refueling outage. This item is discussed in more detail in paragraph 3 of this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.