

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-458/91-08

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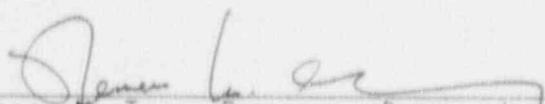
Licensee: Gulf States Utilities (GSU)  
P.O. Box 220  
St. Francisville, Louisiana 70775

Facility Name: River Bend Station (RBS)

Inspection At: RBS, St. Francisville, Louisiana

Inspection Conducted: February 25 through March 1, 1991

Inspector:

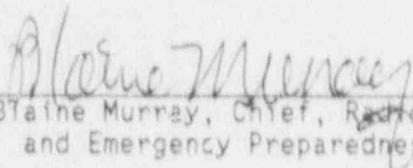
  
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Section

3-14-91  
Date

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3/14/91  
Date

Inspection Summary

Inspection Conducted February 25 through March 1, 1991 (Report 50-458/91-08)

Areas Inspected: Routine, announced team inspection of the licensee's performance and capabilities during an annual exercise of the emergency plan and procedures. The inspection team observed activities in the control

room (CR), Technical Support Center (TSC), the Emergency Operations Facility (EOF), and the Operations Support Center (OSC) during the exercise.

Results: Within the areas inspected, no violations or deviations were identified. Five exercise weaknesses were identified by the inspection team (paragraphs 5 through 8). The weaknesses involved discrepancies and inadequacies in the notification process, use of uncontrolled procedures, delay in classifying and acting upon a general emergency condition, and inadequacies in the operational support center.

The performance of the licensee during the 1991 exercise was good. The licensee demonstrated the ability to protect the health and safety of emergency workers and the public by identifying and classifying accident conditions, making accurate and timely notifications to off-site officials, taking adequate protective actions onsite, making protective action recommendations to the states, performing adequate technical reviews to mitigate accident consequences, and determining the magnitude of site releases.

DETAILS

1. Persons Contacted

GSU

- \*J. Deddens, Senior Vice President
- \*P. Graham, Plant Manager
- \*M. Dreher, Administrator, Municipal Affairs
- \*K. Shurhke, General Manager, Engineering and Administration
- \*J. Cadwallader, Senior Licensing Analyst
- \*J. Booker, Manager, Nuclear Industry Relations
- \*W. Smith, Supervisor, Emergency Planning
- \*D. Lorfing, Supervisor, Nuclear Licensing
- \*G. Kimmell, Director, Quality Services
- \*J. Spivey, Senior Quality Assurance Engineer
- \*T. Crouse, Manager, Administration
- \*W. Odell, Manager, Oversight

The inspection team also held discussions with other station and corporate personnel in the areas of security, health physics, operations, training, and emergency response.

\*Denotes those present at the exit interview.

2. Followup on Previous Inspection Findings (92701)

(Closed) Open Item (458/5946-01): During a previous inspection of the operational status of emergency preparedness, the inspectors noted that the number of dosimeters in emergency response facilities (ERFs) did not appear to take into account the number of personnel that would be present during an actual emergency. In addition, habitability criteria in the ERFs were based on radiation dose rates. Since dose rates are instantaneous readings that may fluctuate considerably with time, they are not reliable indicators of accumulated individual radiation doses. After the inspection, the licensee added sufficient numbers of dosimeters to ERFs and changed habitability criteria for ERFs from a criterion based on dose rates to one based on accumulated dose. These changes were incorporated in the appropriate procedures.

(Closed) Exercise Weakness (458/9006-01): During the April 1990 exercise, the licensee delayed initial notifications to off-site authorities. During the February 1991 exercise, the inspectors noted that the licensee had made changes in the computer program and in the notification procedure to speed up notification of off-site authorities. The result was that, during the 1991 exercise, all notifications were effective and timely.

(Closed) Exercise Weakness (458/9006-02): During the April 1990 exercise, the licensee delayed site evacuation of nonessential personnel from the protected area and failed to perform personnel accountability within the required 30 minutes after declaration of a site-area emergency (SAE) as

established by NUREG D654, Section J.5, and by the emergency plan. Since the last exercise, the licensee has incorporated additional card readers and other means to expedite the accountability process. During the 1991 exercise, site evacuation and accountability proceeded in an effective and expeditious manner and within the specified time limits.

(Closed) Exercise Weakness (458/9015-01): During a previous inspection of the operational status of emergency preparedness, the inspectors noted that after the reorganization of GSU on February 1, 1990, the emergency planning staff was significantly reduced and a substantial amount of emergency planning expertise had been lost. On January 1, 1991, the licensee incorporated a new member to the emergency planning staff and filled two positions for senior emergency planners. The new individuals will start work on April 1, 1991.

(Closed) Exercise Weakness (458/9015-02): During a previous inspection of the operational status of emergency preparedness, the inspectors noted that during training interviews, emergency responders were not always clear about the methods and capabilities of dose assessment/projection methods available to them. After the inspection, lesson plans pertaining to the performance of dose assessment were modified to emphasize available methods. Hands-on training was performed during 1990 with members of the Emergency Response Organization (ERO) who will be expected to perform dose calculations.

### 3. Program Areas Reviewed

The inspection team observed licensee activities in the CR, TSC, OSC, and EOF during the exercise. The inspection team also observed emergency response organization staffing, facility activation, detection, classification, and operational assessment; notifications of licensee personnel, notifications of off-site agencies; formulation of protective action recommendations; off-site dose assessment; in-plant corrective actions, security/accountability activities; and recovery operations.

Various concerns were identified during the course of the exercise; however, none of the concerns were of significance to be classified as a deficiency as defined in 10 CFR 50.54(s)(2)(ii). Each of the observed concerns has been characterized as an exercise weakness according to 10 CFR 50, Appendix E, IV.F.5. An exercise weakness is a finding that a licensee's demonstrated level of preparedness could have precluded effective implementation of the emergency preparedness plan in the event of an actual emergency and thus needs licensee corrective action.

### 4. Scenario

The 1991 RBS exercise scenario began with the reactor operating at full power. An unidentified drywell leak increased in excess of 50 gallons per minute causing the declaration of an Alert. An existing crack in the recirculation suction piping failed catastrophically, resulting in a large break loss of coolant accident (LOCA). This, in turn, resulted in reactor

water level decrease, drywell pressure increase, a reactor scram, turbine trip, and containment isolation. Part of the emergency core cooling system was activated automatically. A site-area emergency condition was declared. Independent failures causing loss of power to vital components prevented operators from replenishing the reactor water inventory. The core was exposed; hydrogen was produced as a consequence of cladding/water interaction taking place at high temperatures in the core. Radiation and hydrogen concentration levels in containment increased steadily, indicating that fuel damage was significant, although no on-going release of radioactivity to the environment was taking place at the time. A general emergency was later declared when the containment postaccident radiation monitor increased to 10,000 R/hr. Higher pressure and hydrogen levels in the containment eventually caused isolated explosions which breached the containment and resulted in a release of radioactivity to the environs.

The inspection team concluded that the scenario used for the 1991 exercise was effective and allowed free play among players and decisionmakers in the ERO. The exercise scenario was stressful, demanding, and presented challenges to all levels of the ERO. The scenario was technically adequate and complete. It included piping diagrams, electrical one-line diagrams, and detailed in-plant damage/repair supplemental scenarios. However, since the simulator was not used in a dynamic mode, the artificiality of a table top exercise was introduced.

5. Control Room (823G1)(1)

The inspection team observed and evaluated the CR staff as they performed tasks in response to the exercise. These tasks included detection and classification of events, analysis of plant conditions and corrective measures, and notifications of off-site authorities.

The inspection team noted that the CR staff worked satisfactorily as a team. The shift supervisor (SS) demonstrated the ability to detect abnormal plant events and the ability to classify the events in accordance with the emergency action levels (EALs). The declarations of Notification of Unusual Event and Alert were timely, and notifications were promptly ordered by the SS. The SS demonstrated the use of protective action recommendation (PAR) decisionmaking procedures and flow charts.

Several discrepancies were identified in the notification process from the CR and other ERFs as follows:

- o Throughout the exercise, the computer clock time was allowed to lag behind the CR clock by 6 minutes. In a similar manner, clocks at different ERFs were not synchronized during the exercise.
- o The initial notification for Alert was transmitted using the "long form," which did not agree with Procedure EIP-2-006, "Notifications," that requires the use of the "short form" to increase efficiency for

each initial notification message. Furthermore, the Alert follow-up message was transmitted using the short form instead of the long form as was required by Procedure EIP-2-006. During the general emergency, the long form was used to make the initial notification instead of the short form as required by the procedure. The inspectors noted that Procedure EIP-2-006, "Notifications," did not include clear and complete instructions on the use of the short form.

- ° One of two communicators in the TSC was unfamiliar with notification procedures, the computer keyboard, and the communications software. The inspector concluded that the individual was not proficient in his task as a communicator and would not be able to accomplish his emergency duties without continuous and extensive coaching by the other communicator in the TSC. (This item was also identified by the licensee.)
- ° "Zero" instead of the number one was used to designate the first notification message form in a sequence of messages transmitted to off-site agencies. This was identified as an inadequate practice since it can result in message numbering errors further along the accident time line.

The above discrepancies and inadequacies in the notification process are considered to be an exercise weakness (50-458/9108-01).

No violations or deviations were identified in this program area.

#### 6. Technical Support Center (82301)(2)

The inspection team observed and evaluated the TSC staff as they performed tasks in response to the exercise. These tasks included activation of the TSC, accident assessment and classification, dose assessment, protective action decisionmaking, notifications, and technical support to the CR.

The licensee demonstrated improvement in this area in that the TSC staff promptly made initial notifications to off-site authorities. The TSC manager, the operations support coordinator, and radiation protection (RP) coordinator provided strong and effective support to the emergency director (ED). As a consequence, the TSC staff worked effectively as a team. The TSC staff performed generally well in the areas of accident detection and classification, information gathering and dissemination, technical support to the CR staff, and OSC staff.

The ED relieved the SS from Command and Control responsibilities at 9:19 a.m. prior to declaring the TSC operational. Apparently, the ED followed the sequential steps found in Attachment 1, Procedure EIP-2-0018, "TSC - Activation." The TSC activation procedure was found not to clearly delineate all the prerequisites for declaring the TSC operational. However, the procedure did specify minimum staffing requirements.

The inspection team identified the following inadequacies in the TSC:

- Core damage assessments were made from an uncontrolled letter or memo provided by the core physics specialist. The TSC staff appeared to be unaware of the existence of Procedure COP-1050, "Post Accident Estimation of Fuel Damage." The inspection team noted that Procedure COP-1050 was not available in the TSC desk folder provided for that station. This is the only controlled procedure approved by the licensee on the subject of core damage assessment. Failure to provide and use an existing controlled procedure and using an uncontrolled procedure is considered to be an exercise weakness (458/9108-02).
- The TSC staff used Procedure EIP-2-001, "Classification of Emergencies," to classify accident conditions. However, the specific nature of the postulated accident scenario demonstrated that the classification procedure does not fully incorporate the intent of the guidance in NUREG-0654 and impeded, to some extent, players' decisions. This resulted in a delay in the declaration of the general emergency (GE) as follows:
  - At 10:15 a.m., a large break LOCA was in progress steadily increasing hydrogen concentration, and containment radiation levels indicated core degradation was ensuing at a rapid pace. In addition, with the loss of reactor heat removal (RHR) pumps water injection capability existed, vessel water level was below two-thirds of the core height and dropping rapidly.
  - At 10:30 a.m., vessel water level was near the bottom of the core. Significant core damage was obvious without need for a Post Accident Sample System (PASS) sample.
  - According to the classification procedure, it was not until 11 a.m. that GE conditions were met. The GE was declared 4 minutes later. The ED, who was in Command and Control in the TSC until about 10:50 a.m., remained indecisive for 45 minutes until plant conditions degraded sufficiently to match the emergency action level specific value of an EAL in the procedure for declaration of GE. This precluded early recommendations to off-site authorities (see paragraph 7).
  - The inspection team compared plant conditions to the EAL guidance in NUREG-0654 and concluded that NUREG-0654 required declaration of GE for "any core melt situation" (NUREG-0654, Appendix 1, General Emergency Initiating Condition No. 4). The inspection team concluded that the licensee's EALs did not address accident situations for a general emergency in a manner with the same degree of effectiveness and conservatism.
  - The inspection team reviewed other EALS, compared them against existing regulatory guidance, and noted that some other EALS

were constrained in such a manner that they did not completely meet guidance requirements.

The delay in classifying and acting upon the general emergency condition is considered to be an exercise weakness (458/9108-03).

No violations or deviations were identified in this program area.

7. Emergency Operations Facility (82301)(3)

The inspection team observed and evaluated the EOF staff as they performed tasks in response to the exercise. These tasks included activation of the EOF, accident assessment and classification, off-site dose assessment, protective action decisionmaking, notifications, implementation of protective actions, preparations for entering the recovery phase, and interaction with state and local officials.

During the later parts of the accident sequence, a number of examples of ineffective Command and Control actions were observed involving principal decisionmakers in the EOF and TSC, as follows:

- ° In the TSC, Command and Control functions were emerging continuously from the TSC manager instead of the ED.
- ° The ED in the TSC who had Command and Control responsibilities until the activation of the EOF at 10:50 a.m., and the recovery manager (RM) in the EOF did not appear to appreciate the extent of plant damage, or to take proper actions in response to emergency conditions which were evident at 10:25 a.m. Instead of acting upon the information available and declaring a General Emergency, the ED and RM waited passively for the postaccident containment monitor to reach 10,000 R/hr in order to meet a specific EAL. At 10:31 a.m., an entry in the EOF recovery manager's log stated that a General Emergency may be declared shortly since the emergency director noted that following a large break LOCA the reactor vessel water level was at -284 inches. The EOF log said that a GE will be declared soon (using Block 14, Scenario 26) of Procedure EIP-2-007, "Protective Action Recommendation Guidelines," based on the 10,000 R/hr reading. From 10:15 to 10:30 a.m., the containment readings increased from 5,000 R/hr to 6,500 R/hr, and read 7,000 R/hr at 10:45 a.m. indicating a clear trend to increasing accumulation of large amounts of fission products in the containment.

At 10:36 a.m., the RM (not yet in Command and Control) asked the ED in the TSC whether they were approaching GE conditions. At 10:50 a.m., the EOF was declared operational, and at 10:53 a.m. the containment monitor reached 10,000 R/hr. When presented with this reading, the RM was not sure if both the containment monitor and drywell monitor should read 10,000 R/hr before declaring a General Emergency. At 11:04 a.m., the technical advisor at the request of the RM confirmed that two out of three fission product barriers had

been breached. The RM finally declared the GE at that time (11:04 a.m.) and made PARs according to Block 14 of Procedure EIP-2-007.

The inspection team concluded that at 10:31 a.m. conditions were clearly in place requiring the use of Block 11 of Procedure EIP-2-007 and corresponding PARs and that a GE should have been declared from the TSC at that time. As a consequence of the ED and RM not acting decisively, a delay occurred in declaring the General Emergency and in implementing commensurate Protective Action Recommendations.

The inspection team noted that Procedure EIP-2-007, page 10 of Attachment 2, Block 11, indicates "For core melt sequences where significant releases from containment are NOT yet taking place, and large amounts of fission products are NOT yet in containment atmosphere, the protective recommendations are to: Evacuate 2 mile radius and Shelter 5 mile downwind."

The inspection team also noted that procedure EP-2-001, "Classification of Emergencies," pages 41 and 42 under Emergency Action Level GE 4.b states, in part, that: "Other plant conditions exist that make Release of Large Amounts of Radioactivity in a short time possible. A small or large LOCA with failure of the ECCS to perform leading to a core melt degradation or melt in minutes to hours. Loss of containment integrity may be imminent." However, the same EAL appears to set forth a series of Initiating Conditions which were not met at 10:30 a.m.

- The inspection team observed that the EOF was not orderly and information flow as not converging towards the RM in a systematic way. The EOF instead was disorderly and noisy, and the RM toured the EOF requesting information.

The ineffective actions of Command and Control in the TSC and EOF, the delays in recognizing the severity of the accident, and the lack of decisive actions by the ED and the RM are considered an exercise weakness (458/9108-04).

No violations or deviations were identified in this program area.

#### 8. Operations Support Center (82301)(4)

The inspection team observed and evaluated the OSC staff as they performed tasks in response to the simulated accident. These tasks included activation of the OSC; support to the CR, TSC and EOF staffs and in-plant teams.

The inspection team noted that the OSC was moved to a different location on the second floor of the service building near the entrance to the radiation controlled area (RCA). After the Alert was declared, the OSC was rapidly manned, configured as specified in Procedure EIP-2-016, "OSC

Activation," and the facility was declared operational within 33 minutes. Accountability in the OSC was properly established and well maintained throughout the exercise using card readers, although these were not conveniently located.

Upon arrival, the OSC coordinator announced himself and advised personnel to "card in" so that accountability could be initiated. He utilized the facility activation checklist and ensured that activation of the OSC was completed. The habitability of the OSC was verified, and personnel were periodically advised to read their pocket dosimeters. Excellent logs of certain activities and communications were kept, and status boards were quickly located and implemented.

A blank status board, an "OSC status" board, and a "Chronology of Events," board were quickly located and implemented. The inspectors had the following observations regarding OSC activities:

- ° During the conduct of the emergency exercise, it became clear that OSC existing status boards were inadequate to efficiently display the available manpower pool and its composition; that is, the types and numbers of personnel available in the OSC according to trade. As a consequence, the OSC coordinator was not always aware of his available manpower and its composition. For example, when asked how many plant operators were present, the OSC coordinator made a headcount based on his personal knowledge of their status.
- ° The inspection team noted that status boards were not structured in a manner that would effectively keep track of tasks assigned by the TSC staff and/or their prioritization. The status boards did not maintain status accountability and control of tasks being performed by a large number of teams operating simultaneously.
- ° For long periods of time, OSC personnel lost track of the status of completion of tasks being performed by in-plant teams. A factor contributing to the disjuncture between the OSC supervising staff and in-plant repair/corrective teams was the absence of adequate means of communication between them.
- ° The practice of requiring that technical briefings of OSC teams take place in a location distant from the OSC and from the entry point to the radiological controlled area (i.e., in the TSC) delayed repair efforts. The practice of sending personnel to the TSC for a technical briefing without knowing what the assigned task will entail, and then returning to the OSC for a radiological briefing is a time-consuming procedure which may prevent the proper selection of individuals most qualified for a specific job.
- ° Observed team briefings and debriefings appeared to be adequate, but were performed using "ad hoc" briefing checklist forms which had not been incorporated in the licensee's procedures.

The inadequacy of status boards, communications, the logistics of briefings, and the lack of formalized briefing procedures constitutes an exercise weakness (458/9108-05).

No violations or deviations were identified in this program area.

9. Security/Accountability (82301)(8)

The inspection team observed and evaluated the security staff response to the exercise. The tasks included personnel accountability of the protected area during site evacuation, access control, and evacuation of the owner controlled area.

The inspectors noted that the site evacuation of unessential personnel from the protected area and personnel accountability proceeded promptly and effectively. This is an improvement from the previous exercise. No weaknesses were identified in this area.

No violations or deviations were identified in this program area.

10. Licensee Self-Critique

The inspectors observed and evaluated the licensee's self-critique for the exercise and determined that the process of self-critique involved adequate staffing and resources and involved the participation of higher management. The inspectors noted that the licensee was able to properly identify and characterize exercise weaknesses and that, for the most part, the licensee's findings coincided with findings by the inspectors.

No violations or deviations were identified in this program area.

11. Exit Interview

The inspection team met with licensee representatives indicated in paragraph 1 on March 1, 1991, and summarized the scope and findings of the inspection as presented in this report. The licensee acknowledged their understanding of weaknesses and agreed to examine them to find root causes in order to take adequate corrective measures. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspectors during the inspection.