

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-458/89-45

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

Inspection At: River Bend Station (RBS), St. Francisville, Louisiana

Inspection Conducted: December 4 through 8, 1989

Inspectors:

P. C. Wagner
for J. R. Boardman, Reactor Inspector, Plant
Systems Section, Division of Reactor Safety

12/22/89
Date

P. C. Wagner
P. C. Wagner, Reactor Inspector, Plant
Systems Section, Division of Reactor Safety

12/22/89
Date

Approved:

T. F. Stetka
T. F. Stetka, Chief, Plant Systems Section
Division of Reactor Safety

12/26/89
Date

Inspection Summary

Inspection Conducted December 4 through 8, 1989 (Report 50-458/89-45)

Areas Inspected: Routine, unannounced inspection of the engineering support activities for the RBS. The inspectors also conducted an evaluation of the actions taken in response to the main steam isolation valve (MSIV) problem which occurred on December 1, 1989. In addition, the inspectors performed a followup on a previously identified inspection finding.

Results: No violations or deviations were identified during the inspection.

The majority of the engineering packages that were reviewed by the inspectors were found to contain insufficient detail. The inspectors interviewed the engineers who had performed the evaluations and determined that satisfactory reviews had been conducted but had not been detailed in the documentation package. The inspectors' review of engineering program procedures and qualification requirements identified a weakness in providing sufficient program definition. The procedures lacked the specificity needed to ensure that requirements were being met; the qualification program was judged to be insufficient to assure that inexperienced personnel would be able to accomplish all required technical support actions.

The inspectors found the engineering personnel whom they interviewed during the course of the inspection to be knowledgeable in their assigned areas.

The inspectors also reviewed the engineering effort expended by licensee personnel in response to the MSIV problems. The inspectors found these engineering evaluations to have been sound and to have been well documented.

The inspectors concluded that, although the engineering program documentation had weaknesses, the present engineering implementation was acceptable.

DETAILS

1. Persons Contacted

GSU

R. H. Barrow, Member, Board of Directors
J. E. Booker, Manager, RBS Oversight
V. P. Bacanskas, Design Engineering, Equipment Qualification
T. L. Crouse, QA Manager
J. C. Deddens, Senior Vice President
L. A. England, Director, Licensing
M. S. Feltner, Engineer, Licensing
P. D. Graham, Executive Assistant
J. R. Hamilton, Director Design Engineering
L. G. Johnson, Technical, Operations Manager, Cajun
E. N. Lambremont, Nuclear Safety Advisory Committee
J. R. Langley, Supervisor, NSS/Design
D. N. Lorfing, Supervisor Nuclear Licensing
C. L. Miller, Senior Compliance Analyst
J. M. Miller, Joint Operations Director, Cajun Electric Power
W. H. Odell, Manager Administration
T. H. Pigford, Nuclear Safety Advisory Committee
T. F. Plunkett, Plant Manager
J. J. Pruitt, Director, Management Systems
M. F. Sankovich, Manager, Engineering Department
K. E. Jchrkr, Manager, Project Management
W. J. Simmons, Engineer, Licensing
J. E. Smith, Nuclear Safety Advisory Committee
J. E. Spivey, Senior QA Engineer
M. A. Stein, Supervisor Civil/Structure Design/Design Engineering
R. K. Stover, Senior Engineer/Process Engineering
H. H. Woodson, Nuclear Safety Advisory Committee
E. J. Zoch, Senior Nuclear Engineer/Design Engineering

NRC

J. R. Boardman, Reactor Inspector, Region IV (RIV)
W. Jones, Resident Inspector, RBS
T. F. Stetka, Chief, Plant Systems Section, RIV
P. C. Wagner, Reactor Inspector, RIV

All personnel delineated above attended the exit meeting.

The inspectors also interviewed other licensee employees during the inspection.

2. Followup on Previous Inspection Findings (92701)

(Open) Inspector Followup Item (458/8923-01): Review of the licensee's generic action for the elimination of common grounds for instrumentation signals.

The review of Condition Report (CR) 88-0246 during this inspection identified another example of the RBS generic problem in the use of common grounds for instrument and control (I&C) and power circuits. This example involved an I&C panel card for the Automatic Depressurization System (ADS). When the switch for the calibration unit power was turned on, the trip card status windows showed "Gross Fail" and "DIV 1 ADS/SRV [Safety-Relief Valves] Inoperative." The apparent root cause of the problem was the existence of common signal and power grounds. The condition report stated that the identified problem was similar to previous occurrences noted on CR-0043. (CR-0043 was reviewed by the inspector and was the origin of this item and the basis for this concern.)

Licensee personnel stated that a generic problem of spurious trips and other I&C anomalies related to common grounding had been identified during start-up testing. The root cause of the problem was determined to be as-built deviations from the original General Electric (GE) Nuclear Steam Supply System (NSSS) design. GE then changed the plant design basis to include the cross-connecting of I&C signal and power ground systems to agree with the as-built conditions. The GE justification for the design change was the stability of the plant as demonstrated by the plant start-up tests, surveillance tests, and the warranty run.

Licensee personnel have subsequently identified the root cause of continuing spurious trips and other I&C anomalies to be the common I&C and power circuit grounds. Licensee personnel also indicated that attempts to bound and correct this generic problem, although unsuccessful to date, will continue.

This item remains open pending further NRC review of licensee actions to resolve this problem.

3. Followup on Event (93702)

During a shutdown and cooldown of the River Bend Station (RBS) for maintenance purposes on December 1, 1989, two Main Steam Isolation Valves (MSIVs), which were slow closed as part of the shutdown, failed to remain closed. In accordance with plant operation procedures, the MSIVs were closed by using the test switch, thereby allowing a slow closure in order to limit the stresses on the MSIVs. When the MSIVs were fully closed, the operator placed the normal control switch in the closed position and released the test switch pushbutton. After releasing the test switch, the operator noted that two of the MSIVs (B21-F028A and

B21-F028D) failed to remain closed. The licensee's initial investigation revealed that, although both of the coils on the ASCO Model NP 8323, dual coil solenoid operating valves (SOVs) for these MSIVs were deenergized as a result of placing the control switch to close, the SOVs had failed to reposition to vent the control (instrument) air from the MSIV operators. Thus, when the test switch was released, control air was again allowed to flow through the SOVs which reopened their respective MSIVs.

Problems with the dual coil SOVs used to control the operation of the MSIVs have occurred at a number of facilities. NRC information Notice (IN) 88-43, "Solenoid Valve Problems," was issued on June 23, 1988, and IN 89-66, "Qualification Life of Solenoid Valves," was issued on September 11, 1989, to inform licensees of some of those problems. In order to evaluate the condition of the RBS MSIVs, in light of the information contained in IN 88-43, GSU performed a test of the valves on September 30, 1988. During those tests, two MSIVs (B21-F022B and B21-F022C) failed to remain closed when the test pushbutton was released. Licensee personnel determined that the SOVs for these two MSIVs had failed to reposition to the close MSIV configuration because of gelling of the SOV's internal, Dow-Corning DC-550, lubricant. This condition was reported to the NRC in Licensee Event Report (LER) No. 88-23 on October 31, 1988, and was evaluated by GSU personnel in Modification Request (MR) No. 88-0302.

The corrective actions implemented by GSU following the 1988 failures involved the removal of the lubricant from eight new SOVs, wiping the metallic components with acetone, and lightly lubricating the internal seals. All of the existing SOVs were then replaced with these cleaned spares. Following the failures on December 1, 1989, licensee personnel disassembled and examined one of the failed SOVs and one of the SOVs which had operated properly. The examination revealed a small amount of the same amber colored deposits which had been determined to be the cause of the 1988 SOV failures. The amount of the deposits on the plunger assembly in the SOV which had operated properly was less than the deposits contained in the failed SOV. GSU personnel further evaluated the SOVs and determined that the cleaning process utilized in 1988 had not been sufficient to remove all of the lubricant. A revised method for the removal of the Dow-Corning DC-550 lubricant was implemented on eight additional, new SOVs in accordance with MR 89-0242. The revised cleaning method involved the use of an ultrasonic, acetone bath for the metallic components and an acetone wipe of the elastomers. These SOVs were then reassembled, tested and installed on the MSIVs.

The inspectors reviewed the licensee's evaluations contained in the above MRs, a report prepared for GSU by Franklin Research Center on the analyses of one of the SOVs from the 1988 failure, "Analyses of Components in an ASCO Solenoid Valve," FRC Report P-741-1 dated February 9, 1989, and several ASCO publications and notices. As a result of these reviews, the inspectors were unable to determine positively the failure mechanism or that the corrective actions, which had been implemented, would preclude

future failures. The inspectors did determine that the actions implemented by GSU would enhance the operability of the SOVs and agreed with licensee personnel that additional evaluations were needed.

The inspectors noted that the qualification testing for these SOVs included frequent cycling as part of the accelerated aging portion of the test. The inspectors, therefore, also discussed the advisability of in-service cycling of the SOVs to limit the possibility of binding from the buildup of "foreign material." The material in question may be a combination of gelled lubricant, internal wear products and/or contaminants from the instrument air system. The licensee agreed to consider additional SOV testing but had not determined a frequency which would be acceptable from both the SOV reliability and the plant operability prospective. The licensee did agree to make the decision on SOV testing prior to the conclusion of the mid-cycle outage scheduled for March 1990.

Subsequent to the inspection, the inspectors participated in a telephone discussion with GSU personnel on December 18, 1989, in which the following testing and modification commitments were made:

- a. The SOVs will be tested on approximately monthly intervals until the mid-cycle outage.
- b. The SOVs will be replaced with SOVs of a different design during the mid-cycle outage if replacement SOVs are available.
- c. The SOVs will be tested at quarterly intervals, if not replaced and provided the monthly testing provided acceptable results, until the SOVs can be replaced during the next refueling outage.

The inspectors determined that the SOV problems was a generic concern which should be pursued.

The inspectors noted that an effective licensee engineering effort had been expended on the SOV problem. The results to date appeared to be sound and the records for this effort that were reviewed by the inspectors were considered to be of high quality. No violations or deviations were identified.

4. Engineering Support Program (37702)

The inspectors evaluated the engineering support program for the RBS to ensure that the license requirements (included in the Technical Specifications and the applicable Codes and Standards) were being implemented, and that the commitments (contained in the Updated Safety Analysis Report and other correspondence with the NRC) were being followed. The evaluation consisted of documentation reviews and interviews with the involved personnel. The inspectors conducted an overview of the GSU qualification requirements for new engineers, reviewed selected procedures, and evaluated a number of completed engineering work packages.

The inspectors reviewed the licensee's qualification requirements for Technical Support personnel. The qualification requirements consisted of Required Reading Records (RRRs). These RRRs were lists of documents to be read. After the reading of the specified documents had been completed as documented on the RRR, an individual's supervisor discussed the documents with the individual to ensure familiarity and comprehension. No specific reviews were required or documented, nor were the activities for which the person was qualified documented.

The inspectors noted that the licensee had not established requirements for the technical or the plant-specific knowledge nor for the experience level of supervisors responsible for design considerations. Supervisory understanding of the plant design aspects is desirable to ensure that the qualification of the technical support personnel covers all FSAR requirements which support plant operational safety.

The inspectors reviewed the following two engineering procedures to ascertain if sufficient detail and guidance was provided:

- ° EDP-EE-03, "Preparation, Review, Approval, Revision and Control of Loop Calibration Reports," Revision 1
- ° EDP-EE-13, "Control of the Electrical Cable Schedule Information System," Revision 0

The inspectors noted that these procedures contained detailed instructions on how to complete the forms attached to the procedure, but did not include instructions on allowable limits or required evaluations necessary to determine proper input values. For example, the loop calibration procedure did not include instructions for determining required instrument scaling factors, and the inspectors were informed that no other procedure provided that information. The electrical cable schedule information system procedure did not contain limits for allowable percent fill of cable trays or conduits nor instructions on ampacity corrections; the inspectors were informed that the computer system performed these calculations.

Based on these reviews and discussions with licensee personnel, the inspectors determined that, if the controlling procedures were used by an engineer without an extensive background knowledge in the specific field, the resultant product might not be adequate. The inspectors concluded that this was a weakness.

The inspectors reviewed the engineering effort contained in 33 Condition Reports (CRs), 13 Modification Requests (MRs), and 6 Engineering Evaluation and Assistance Requests (EEARs). One of the most significant findings in the review of licensee CRs and MRs was CR 88-0246. This CR concerned the apparent failure of one train of ADS during testing because of the common grounding of I&C signal circuits with power circuits. This CR is discussed in paragraph 2.

The inspectors noted that all data needed to evaluate the CRs and MRs reviewed was not contained in the documentation packages initially provided to them. Subsequently, licensee technical support personnel were able to provide essentially all necessary data. The data missing from the packages was needed to verify that the plant design changes and other technical support actions had no adverse effect on plant operational safety. The inspectors determined that GSU apparently places reliance on undocumented performance of required technical support actions, and on the memory of individuals for the acceptability of such actions, rather than requiring documentation of the accomplishment of these actions. This lack of documentation could potentially preclude verification that the plant's licensed design basis has been maintained. The inspectors noted that certain older licensed facilities were undergoing extensive design base reconstitutions which may have been necessitated by similar documentation deficiencies.

The inspectors informed licensee personnel that they considered the engineering program to contain weaknesses because of the apparent lack of detailed qualification requirements, procedural guidance and documentation of engineering effort. The inspectors, however, found that the actual engineering effort included all of the necessary considerations and was therefore acceptable. No violations or deviations were identified.

5. Exit Interview

The inspectors summarized the scope and findings of the inspection during the exit interview on December 8, 1989, with the personnel identified in paragraph 1. Although some proprietary documents were reviewed by the inspectors, no proprietary documents were removed from the facility, and no proprietary information is contained in this report. Commitments made relative to the testing and replacement of the main steam isolation valve, solenoid operating valves that were discussed during the exit meeting were superseded by the commitments discussed in paragraph 3.