

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report No. 50-458/92-21

Operating License No. NPF-17

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

Facility Name: River Bend Station (RBS)

Inspection At: RBS, St. Francisville, Louisiana

Inspection Conducted: June 8-12, 1992

Inspector: W. M. McNeill, Reactor Inspector, Materials and Quality Programs
Section, Division of Reactor Safety

Approved: I. Barnes 8/7/92
I. Barnes, Chief, Materials and Quality Programs Section Date
Division of Reactor Safety

Inspection Summary

Inspection Conducted June 8-12, 1992 (Report 50-458/92-21)

Areas Inspected: Routine, announced inspection of action on previously identified inspection findings and observation of activities associated with the reactor pressure vessel feedwater nozzle safe end replacement.

Results: Within the areas inspected, two violations were identified: established measures did not assure that reactor pressure vessel feedwater nozzle safe end and feedwater system elbow replacements complied with ASME Code requirements for, respectively, test specimen location and wall thickness (paragraph 2.1); and the welding procedure specification for safe end replacement welding was not fully supported by procedure qualification records for welding position and heat input supplementary essential variables (paragraph 3.1).

A review of welding activities associated with the feedwater nozzle safe end replacement found that the welding activities were well defined and effectively implemented with the exception of the above identified violation.

The following previously identified inspection findings were dispositioned as indicated.

- o Unresolved Item 458/9217-01 (CLOSED)

- Deviation 458/9128-04 (CLOSED)
- Unresolved item 458/9211-01 (OPEN)

DETAILS

I. PERSONS CONTACTED

GSU

- *D. Andrews, Director-Quality Assurance
- D. Banks, Equipment Qualification Engineer
- *R. Barnes, Supervisor-Codes & Standards
- *J. Booker, Manager-Nuclear Industry Relations
- *T. Burnett, Chemical Foreman
- *E. Cargill, Director Radiological Programs
- D. Clymer, Quality Assurance Engineer
- *J. Cook, Technical Specialist
- *T. Crouse, Manager-Administration
- *M. Crowell, Nuclear Training Coordinator-Maintenance
- *R. Easlick, Radwaste Supervisor
- *C. Fantacci, Radiological Engineering Supervisor
- *R. Finkenaur, Senior Electrical Engineer
- *T. Fredieu, Supervisor-Maintenance Services
- *K. Garner, Licensing Engineer
- *J. Hamilton, Director-Design Engineering
- *K. Hodges, Chemistry Supervisor
- D. Johnson, Welder
- *T. Knight, Student Engineer
- *D. Lorfing, Supervisor-Nuclear Licensing
- *G. Mahan, Senior Welding Engineer
- *J. McQuarter, Licensing Engineer
- *J. Mead, Supervisor-Electrical & Special Projects
- W. Nelson, Welder
- *W. Odell, Manager-Oversight
- C. Patrick, Welding Engineer
- C. Phipps, Welding Technical Specialist
- *S. Radebaugh, Assistant Plant Manager-Maintenance
- *R. Roberts, Electrical Maintenance Supervisor
- H. Skaggs, Quality Control Inspector
- *K. Suhrke, General Manager-Engineering & Administration
- C. Walker, Supervisor-Operations Quality Control
- *C. Walling, Process System Supervisor
- R. Whitley, Senior Quality Control Inspector
- *L. Woods, Shift Supervisor
- N. Zink, Contract Engineer

NRC

- *R. Baer, Senior Reactor Health Physicist
- E. Ford, Senior Resident Inspector
- *D. Loveless, Resident Inspector
- *T. McKernon, Reactor Inspector
- *C. Paulk, Reactor Inspector

*K. Weaver, Resident Inspector Co-Op

The inspector also interviewed other employees during the inspection.

*Denotes those persons that attended the exit meeting on June 12, 1992.

2. ACTION ON PREVIOUS INSPECTION FINDINGS (92701 AND 92702)

2.1 (CLOSED) Unresolved Item (458/9217-01): Compliance with ASME Section III Code requirements for test specimen removal from the replacement safe end forgings.

During review of manufacturer heat treatment charts for two replacement feedwater nozzle safe ends, the inspectors observed that the charts contained a typed entry indicating that the forging and test pieces from the forgings had been subjected to the required austenitizing, quench, and temper heat treatment cycles. An unresolved item was identified on this matter, in that there was a potential violation of the specimen location requirements of paragraph NB-2223 (pertaining to distances of specimens from quenched surfaces) in Section III of the ASME Code, if the test material was not an integral part of the forging during the quenching process. Previous licensee review of the manufacturers information during the receipt inspection process did not identify this issue, but had rejected the data as a result of a required simulated postweld heat treatment cycle not having been performed on the test material by the manufacturer.

The manufacturer subsequently provided additional test data from material that had been subjected to the simulated postweld heat treatment cycle required by the licensee. This data was reviewed and accepted by licensee staff on May 14, 1992. A copy of this information was provided to the NRC Region IV office by the licensee prior to the inspection. During NRC staff review of the data, it was noted that the heat treatment chart showed different austenitizing and tempering times to those shown in the initial test data as having been used for heat treatment of the forgings. It was additionally observed that the second heat treatment chart submittal contained all three (i.e., austenitizing, tempering, and simulated postweld heat treatment) cycles on the one chart, whereas the initial submittal provided separate charts for the austenitizing and tempering cycles. As a result of these anomalies, the licensee was again questioned regarding the compliance of the manufacturer with the provisions of paragraph NB-2223 in Section III of the ASME Code. The licensee subsequently ascertained that 4" X 4" X 8" test bars had been subjected to additional austenitizing, quench, and temper heat treatment cycles to those received by the parent forgings. The separate heat treatment of the test bars specifically meant that the provisions of paragraph NB-2223.1 in Section III of the ASME Code (i.e., specimens shall have their longitudinal axes at least 1/4 t from any surface and with the mid-length of the specimens at least t from any second surface, where t is the maximum heat treated thickness) had been violated, in that the practice precluded the ability to obtain a specimen whose mid-length was at least t from any second surface.

The manufacturer subsequently furnished a third set of test data which included requested sketches demonstrating that the ASME Code Section III 1/4 t by t specimen location requirements were satisfied. This data was found acceptable on May 29, 1992. The inspector questioned, however, whether there was evidence to support compliance with ASME Code Section III, paragraph NB-2322.2(2) and ASME Code Section II, Material Specification SA-508, paragraph C.1.4. These references pertain to the longitudinal axes of test specimens being required to be parallel to the direction of major working of a forging. Additional documentation was obtained from the manufacturer after this inspection which established that the test specimens were of the proper orientation.

In this instance, control of procurement of ASME Code materials appeared to be weak. The design requirements of Modification Request 91-0080 and Design Specification 221.1'1 required the replacement safe ends to be SA50C Class 1 and to meet the requirements of ASME Code, Section III, Class 1, 1986 Edition. These requirements were imposed on the vendor in PO 91-J-73927, Revision 1, dated February 21, 1992. Neither the PO nor the attributes developed for receipt inspection showed, however, any recognition that the ASME Code, Section II has explicit specimen location requirements for quenched and tempered materials with stipulated notch toughness properties. The vendor material test data for the safe end forgings, with the exception of the third submittal where sketches were requested, did not indicate the specimen locations that were utilized. The absence of this information was not questioned by licensee staff during review of the received data. The failure to assure compliance with the specimen location requirements of the ASME Code, Section III was identified as an apparent violation of 10 CFR Part 50, Appendix B, Criterion VII (458/9221-01).

A second example of apparent weakness in control of procurement of ASME Code materials was noted with respect to another item procured by PO 91-J-73927. Item 5 of this PO pertained to an ASME Code Section III, Class 1, SA 234 Grade WPC, Schedule 80, long radius elbow. The elbow was accepted by receiving inspection on June 2, 1992. During subsequent machining of weld preparations, anomalies were noted with respect to the wall thickness of the elbow which resulted in a request by engineering for ultrasonic (UT) thickness mapping. The applicable nominal wall thickness for the elbow was 0.688" and the Code minimum wall thickness was 0.535. The UT thickness mapping detected numerous areas where the Code minimum wall thickness was not maintained, with the minimum thickness measured being 0.378". As a result of these thickness measurements, the licensee issued Condition Report (CR) 92-0425 on June 5, 1992, and a subsequent 10 CFR Part 21 report on June 18, 1992.

PO 91-J-73927 did not require thickness verification records to be provided by the manufacturer. The receipt inspection attributes also did not include any verification that the forming process had not reduced thickness on the outside of the bend below Schedule 80 requirements. The failure to assure compliance with the thickness requirements of the ASME Code, Section III was identified subsequent to the inspection as a second example of Violation 458/9221-01. The licensee was informed of this determination by telephone on July 31, 1992.

Based on the inspectors review, the previous unresolved item 458/9217-01 is closed and this issue will be tracked by Violation 458/9221-01.

2.2 (OPEN) Unresolved Item (458/9211-01): A review was to be made of the circumstances pertaining to the delay in initiation of a potentially reportable condition (PRC) form for the combustion air pipe adapter problem identified on CR 90-1194.

In review of CR 90-1194, the licensee established that CR 90-1194 had not been transmitted to the licensing department for PRC evaluation after the CR had a disposition of potentially reportable. This highlights a procedural inadequacy in that procedures did not require evaluation of conditions reportable to the NRC under 10 CFR Part 21 within 60 days which is a regulatory requirement. Procedures did require evaluations once a PRC form had been initiated to be completed within 30 days.

The review by the inspector of other CRs which had a disposition process similar to 90-1194 established that there was an additional example when CR 90-0715 was given a disposition as "Potential 10CFR21" on September 15, 1990, but PRC 91-018 was not issued until August 20, 1991. The inspector noted that quality assurance reviews CRs at the time of closure and among other things checks for the issuance of a PRC when required. However, this review does not verify that a PRC has been issued in a timely manner.

The lack of timely evaluation of PRC forms has been addressed in a previous inspection report (458/92-09) with a Notice of Violation. The licensee has committed to expand its corrective action from Violation 458/9209-01 to address the regulatory requirement for evaluations to be completed within 60 days. This item will be further reviewed following completion of licensee corrective action.

2.3 (CLOSED) Deviation (458/9128-04): The review of procurement documents did not ensure that shipping and storage temperatures for Thermo-Lag 330-1 subliming compound were correctly specified.

Three examples of this deviation were identified and after review the licensee established that the subliming compounds in question were not subjected to any adverse temperature environments. The licensee did issue Revision 4 to the governing Procedure EDP-EQ-01 and trained personnel in regard to this problem. The inspector verified the corrective actions by review of the revised procedure and the pertinent training records (Memorandum EQ-92-0031, dated February 3, 1992).

3. WELDING (55050)

The objectives of this inspection were to determine whether the licensee's specification and procedures for replacement of the reactor pressure vessel N4A feedwater nozzle safe end met applicable ASME Code, regulatory and contract requirements. In addition, the objectives were to determine that records of such activities are prepared, evaluated and maintained and through

direct observation whether welding activities are performed in accordance with the ASME Code and applicable commitments.

3.1 Welding Procedure Specifications

The welding procedure specification (WPS), W3-16-AGT, Revision 0, and the supporting procedure qualification records (PQRs) for welding on the N4A nozzle were mailed to the NRC Region IV office before the inspection. The WPS and PQRs were reviewed by the inspector and regional staff. As a result of this review, it was established that the WPS was not supported by the PQRs submitted. The areas of question involved three ASME Code Section IX gas tungsten arc welding process supplementary essential variables (i.e., QW-405.2, a change from any position to the vertical position "hill progression"; QW-409.1, an increase in heat input over that qualified; and QW-410.7, a change in width, frequency, or dwell time of oscillation, for machine or automatic welding only).

- o For the post weld heat treated condition, there appeared to be no PQR which supported welding in the 3G (i.e., vertical) position with the maximum heat input permitted by the WPS.
- o For the as welded condition, there appeared to be no PQR which supported welding in other than the 1G (i.e., flat) position, although the WPS permitted welding in all positions. In addition, there appeared to be no PQR which supported the maximum heat input permitted by the WPS.
- o There appeared to be no correlation between the frequency and oscillation values listed in the WPS and those used in the PQRs.

It was the licensee's position that ASME Code Section IX, paragraphs QW-200.2 (a) and (f) allowed practices which resulted in the WPS and PQRs which were on file. Paragraph QW-200.2 (f) states that a single WPS may cover several essential and supplementary essential variable changes as long as a supporting PQR exists for each variable. Paragraph QW-200.2 (a) states that a PQR is a record of variables recorded during the welding of the test coupons and the recorded variables normally fall within a small range of the actual variables that will be used in production welding. In addition, the licensee had information that paragraph QW-410.7 was going to be limited to only automatic welding in a future edition of the ASME Code and not machine welding. The welding of the feedwater nozzle safe end replacement was considered by the licensee to be machine welding therefore, this requirement would not be applicable.

The licensee's position with respect to supplementary essential variable QW-410.7 was considered acceptable by the inspector and regional staff. The licensee's position that its practices were permitted by ASME Code, Section IX, paragraph QW-200.2(a) and (f) was not, however, concurred with in regard to supplementary essential variables QW-405.2 and QW-409.1. The licensee's approach appeared to indicate a belief that only a one time

qualification was required for a given supplementary essential variable, with the qualification remaining valid no matter what changes were permitted by a WPS to the essential and supplementary essential variables that were used in the qualification process. This approach is not considered consistent with ASME Code Section IX, paragraph QW-200.1, which stipulates that changes in essential or supplementary essential variables require requalification of the WPS by new or additional PQRs.

As an interim measure in order to proceed with welding of the sacrificial part to the N4A nozzle, the licensee revised WPS W3-16-AGT from Revision 0 to Revision 1. Revision 1 was supported by PQR 92-13-AGT-CV-3. Revision 2 was issued to resolve quality assurance comments such as a minor correction to the table of minimum travel speeds. Revision 3 was issued at the end of this inspection and was supported by two new PQRs. The new PQRs established that welding with and without post weld heat treatment using the original WPS values for heat input, position, and oscillation (frequency values were changed slightly) were qualified.

Procedure RBNP-042, "River Bend Station ASME Section XI Program Organization, and Responsibilities," Revision 4, paragraph 5.6.1 requires that welding procedure specifications be qualified in accordance with the requirements of ASME Code Section IX. The failure to comply with procedural requirements in regard to qualification of WPS W3-16-AGT, Revision 0, for supplementary essential variables QW-405.2 and QW-409.1 is an apparent violation of 10 CFR Part 50, Appendix B, Criterion IX (458/9221-02).

3.2 Welding

The inspector verified compliance with the WPS by observation of welding of the sacrificial part to the N4A nozzle. The current WPS was found at the work station where the welding was being performed. The variables identified on the WPS such as travel speed, current and voltage were found to be complied with by the welders. The inspector verified proper heat input by calculation and verified the individuals qualifications for the welding being performed.

4. EXIT INTERVIEW

The inspection scope and findings were summarized in an exit meeting on June 12, 1992, with the personnel listed in paragraph 1 of this report. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspector during this inspection. An additional exit meeting was conducted by telephone with Mr. D. Lorfing on July 31, 1992, in order to inform the licensee that the acceptance of a feedwater system elbow with wall thickness below minimum ASME Code requirements was considered an additional example of the previously identified 10 CFR Part 50, Appendix B, Criterion VII violation.

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bcc to DMB (IE01) - DRS

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