APPENDIX B

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

NRC Inspection Report: 50-458/85-18 Construction Permit: CPPR-145

Docket: 50-458 Category: A2

Licensee: Gulf States Utilities (GSU)
P. O. Box 2951
Beaumont, Texas 77704

Facility Name: River Bend Station (RBS)

Inspection At: River Bend Station, St. Francisville, Louisiana

Inspection Conducted: February 25 - May 3, 1985

Inspectors: R. P. Mullikin 6/3/85

R. P. Mullikin, Reactor Inspector, Project Section A, Reactor Project Branch 2 — Date

J. E. Bess 6/3/85

J. E. Bess, Reactor Inspector, Project Section B, Reactor Project Branch 2 — Date

Approved: T. H. Johnson 6/4/85

For J. P. Jaudon, Chief, Project Section A, Reactor Project Branch 1 — Date

Inspection Summary

Inspection Conducted February 25 - May 3, 1985 (Report 50-458/85-18)

Areas Inspected: Routine, unannounced inspection of electrical equipment and instrumentation installations, review of records and procedures, verification of electrical cable terminations and routing, review of QC personnel qualification records, review of electrical separation, and review of licensee's QA audits and surveillance. The inspection involved 188 inspector-hours onsite and 26 inspector-hours in-office by two NRC inspectors.

Results: Within the areas inspected, one apparent deviation was identified (paragraph 2.b.(3)).

DETAILS

1. Persons Contacted

Principal Licensee Personnel

*T. L. Crouse, Quality Assurance (QA) Manager
*B. E. Hey, Engineer, Licensing
*L. A. England, Supervisor, Nuclear Licensing
W. H. Benkert, Senior QA Engineer
B. Bemis, Electrical Maintenance QA Engineer

Stone and Webster (S&W) Personnel

*R. J. Fay, Chief Inspection Supervisor
R. L. Spence, Superintendent, Field Quality Control (FQC)
R. Otis, Senior Inspector, FQC

The NRC inspectors also interviewed other licensee and contractor employees during the course of the inspection.

*Denotes those attending the exit interview.

2. Observation of Completed Electrical Installations

a. Safety-Related Electrical Equipment

The NRC inspector selected several examples of electrical equipment and components for examination. The examination consisted of verifying that the field installation agreed with applicable design drawings, and that separation and protection requirements were being met. The following equipment and components were inspected:

- 125V DC Standby Switchgear B(1ENB*SWG01B)
- 120V AC Standby Vital Regulated Power Bus A(1VBS*XRC14A1)
- Vital Bus B Inverter - (1ENB*INV01B)
- Hydrogen Recombiner Power Panel B - (1HCS*PWRS1B)
- 480V AC Standby Load Center - (1EJS*LDC1B)
- 125V DC Standby Batteries and Racks - (1ENB*BAT01A)
- Diesel Generator Fuel Oil Transfer Pump - (1EGF*P1B)
- Containment Unit Cooler - (1HVR*UC1A)
- Standby Service Water Pump 2A - (1SWP*P2A)
- Residual Heat Removal Pump C - (1E12*C002C)
- Valve Operators for Motor Operated Valves (1E12*F073A, 1E21*F005, 1SWP*MOV505A, 1SWP*MOV511A)

The above equipment and components were found to conform to design drawings. Separation from redundant equipment, protection and housekeeping were found to be adequate.

During the inspection of the motor operator for valve 1E12*F073A, it was discovered that the space heater was inoperable. This condition was brought to the attention of a GSU maintenance department QA engineer who promptly showed the NRC inspector the results of the most recent inspection of these valve operators. The GSU inspection report (85-IR-20180) showed that this space heater, along with several others, were found to be inoperative. Since this deficiency was discovered by GSU and was being corrected through their maintenance program, this item requires no followup by the NRC.

No violations or deviations were identified in this area.

b. Safety-Related Instrumentation

(1) Instrument Transmitters

By direct observation, the NRC inspector inspected completed work to determine whether specific instrument, components and associated devices had been installed in accordance with NRC requirements. The instruments inspected were as follows:

Instruments	Model No.	Serial No.	Rated Range
PT N052A	1152	406269	0-3000 Psig
PT N052B	1152	406103	0-3000 Psig
PT N052C	1152	407012	0-3000 Psig
FT N003A	1152	97048R	0-750" H_2O
FT N003B	1152	97057R	0-750" H_2O
FT N003C	1152	97051R	0-750" H_2O
FT N056	1152	269146	0-150" H_2O
FT N005	1152	270544	0-750" H_2O
PT N050	1152	272205	0-100 Psig

The NRC inspector verified that the installation of the referenced safety-related instruments met NRC requirements in the following areas:

(a) Identification and location
(b) Protection and cleanliness preservation after installation.
(c) Construction testing, including calibration and functional test.
(d) Inspections, including the generation of inspection records by qualified Quality Control (QC) personnel.

No violations or deviations were identified in this area.

(2) Radiation Monitoring Systems

By direct observation, the NRC inspector inspected completed work to determine whether specific radiation monitoring equipment and associated devices had been installed in accordance with NRC requirements. The equipment inspected were as follows:

- 1 RMS* REY13B
- 1 RMS* RE111
- 1 RMS* CAB12
- 1 RMS* CAB16A

The NRC inspector verified that the installation of the referenced safety-related radiation monitoring equipment and devices met NRC requirements in the following areas:

(a) Identification and location.
(b) Protection and cleanliness preservation after installation
(c) Construction testing including functional tests
(d) Inspection, including the generation of inspection records by qualified QC personnel.
(e) Identification and documentation with respect to nonconforming components.

(3) Safety-Related Display Instrumentation

The NRC inspector compared the actual installation of several examples of safety-related display instrumentation with Table 7.5-1 of the River Bend Station FSAR (Amendment 11, dated January 1984). The following instrumentation were inspected:

System	Parameter	FSAR Stated Range
Emergency Core Cooling	HPCS Discharge	0-1,500 psig
	HPCS Flow	0-8,000 gpm
	LPCS Flow	0-8,000 gpm
	RHR Service Water Flow	0-10,000 gpm
Containment Atmosphere Monitoring	Drywell Pressure	0-75 psia
	Containment Pressure	0-75 psia
	Drywell Atmosphere Temperature	40-440°F
	Suppression Pool Temperature	0-200°F

Contrary to the above, the NRC inspector identified the display instrumentation for the High Pressure Core Spray (HPCS) Flow and Residual Heat Removal (RHR) Service Water Flow as having actual ranges of 0-7,000 gpm and 0-8,000 gpm, respectively.

This is an apparent deviation. (458/8518-01)

c. Review of Quality Records (Electrical Installations)

(1) Safety-Related Electrical Equipment Records

The NRC inspector reviewed the Stone and Webster (S&W) quality assurance inspection reports for the electrical equipment denoted in paragraph 2.a above. Included in this review were the inspection reports for: receipt inspection and material certification; storage, handling and identification; installation inspection; and calibration and trip setting data (where applicable). In addition, the qualification and training records for eight S&W field QC (FQC) inspectors that performed the above inspections were reviewed. The inspection reports were found to be complete, performed by qualified personnel, and reviewed by QA.

No violations or deviations were identified in this area.

(2) Safety-Related Instrumentation Records

The NRC inspector reviewed the calibration and data sheets for the following instruments:

Instruments	System
1 E22 PT-N050	Hi-Pressure Core Spray
1 E22 PT-N005	Hi-Pressure Core Spray
1 E22 FT-N056	Hi-Pressure Core Spray
1 C71 PT-N052A	Turbine 1st Stage Pressure
1 C71 PT-N052B	Turbine 1st Stage Pressure
1 C71 PT-N052C	Turbine 1st Stage Pressure

In the areas reviewed, the records confirmed that proper calibration and instrument settings were made as specified, including use of specified procedures and test equipment. Records also confirmed that calibration and related data were current, controlled and reflected "actual conditions."

No violations or deviations were identified in this area.

3. Observation of Completed Electrical Cable Work

a. Safety-Related Electrical Cable Terminations

The NRC inspectors inspected the completed terminations of several safety-related cables. The terminations were inspected in accordance with S&W conductor termination sheets, site drawings, and site procedures. The attributes inspected were whether the terminations were performed in a craftsman-like manner and separation, identification, minimum bend radius, and protection requirements were met. The terminations for the following cables were inspected:

Cable No.	Type	Termination
1ENBARL600	Power	1ENB*BAT01A
1ENBARL607	Power	1ENB*BAT01A
1ENBBBK500	Power	1ENB*INV01B
1ENBBBL600	Power	1ENB*BAT01B
1ENBBBL601	Power	1ENB*INV01B
1ENBBBL602	Power	1ENB*SWG01B
1ENBBBL603	Power	1ENB*SWG01B
1ENBBBL606	Power	1ENB*SWG01B
1EGFBBK001	Power	1EGF*P1B
1EHSBBL201	Power	1EJS*LDC1B
1CSLNRK005	Power	1E21*F005
1HCSBBC500	Power	1HCS*PWRS1B
1HCSBBL200	Power	1HCS*PWRS1B
1HCSBBL201	Power	1HCS*PWRS1B
1HVCBBL200	Power	1EJS*LDC1B
1HVCBBL201	Power	1EJS*LDC1B
1HVCBBL202	Power	1EJS*LDC1B
1HVKBBL200	Power	1EJS*LDC1B
1HVPBBL200	Power	1EJS*LDC1B
1SWPARH300	Power	1SWP*P2A
1SWPARK023	Power	1SWP*MOV511A
1ICSCRK603	Power	1ES1*F019
1CSLNRC005	Control	1E21*F005
1EGSNBC704	Control	1EJS*LDC1B
1HVCBBC519	Control	1EJS*LDC1B
1HVKDBC509	Control	1EJS*LDC1B
1ICSNRC003	Control	1E51*F045
1ICSNRC545	Control	1E51*F010
1ICSNRC011	Control	1E51*F031
1RHSNRC518	Control	1E12*F073A
1RHSNRC519	Control	1E12*F073A
1RHSRRC600	Control	1E12*F073A
1RHSARC073	Control	1E12*F073A
1SWPARC040	Control	1SWP*MOV511A

1SWPARC519	Control	1SWP*MOV511A
1SWPNRC720	Control	1SWP*MOV511A
1CSHNOX400	Instrumentation	1E22*FTN005
1CSHNOX405	Instrumentation	1E22*PTN051
1CSLNRX400	Instrumentation	1E21*FTN003
1ENBBBX800	Instrumentation	1ENB*SWG01B
1HCSBBX400	Instrumentation	1HCS*PWRS1B
1HCSBBX407	Instrumentation	1HCS*PWRS1B
1RHSNRX414	Instrumentation	1E12*FTN007A

During the inspection of the terminations for cables 1CSHNOX400, 1CSHNOX405, 1CSLNRX400 and 1RHSNRX414, the NRC inspector noted that the instrument cables had been spliced and not terminated as specified by issued termination tickets. The licensee responded to this concern by informing the NRC inspector that the instruments had been installed with a sealed conduit (spliced) because the terminal blocks used on these panels were not qualified for use in containment. The rework control forms used to document and track this work was reviewed by the NRC inspector. All documentation appears to reflect the "as-built" status of the installed instruments.

The NRC inspector also observed that an actual termination for cable 1CSCRU603 for motor operated valve 1E51*F019 did not agree with the wiring drawing and the S&W termination sheet. A further investigation revealed that this was a probable drafting error and had been previously discovered by S&W FQC. An engineering and design coordination report (E&DCR) had been issued and was pending incorporation into the affected design drawing. This error was not identified when the valve was terminated but was discovered when another valve was inspected with the same wiring drawing. Since there appears to be no safety significance to these findings and no others were discovered by the NRC inspector, this item is considered an isolated case.

The NRC inspectors observed that the standby 480 volt load center (1EJS*LDC1B) and 125 volt D.C. standby switchgear (1ENB*SWG01B) had an accumulation of dust and dirt within the cubicles. This apparently was due to the floor penetrations within the cubicles not being sealed or covered to prevent the entrance of dust from construction activities on the floor below. This was brought to the attention of the GSU maintenance department and two work requests (Nos. 472 and 473) were initiated to clean these cubicles when they are deenergized. The NRC inspectors felt that there was no need to provide temporary covers for these penetrations at that time since the permanent seals were to be installed when the equipment was to be deenergized. Although, the cubicles had not received a thorough cleaning, the breakers were being maintained under the GSU routine

maintenance program. The corrective action proposed by GSU appears adequate to satisfy the NRC concern.

No violations or deviations were identified in this area.

b. Safety-Related Electrical Cable Routing

The NRC inspector selected several power cables to verify that the field installation agreed with the S&W cable pull tickets. The cables selected were identified at each termination point and then were traced from end to end. The cable trays and conduits that the cables traversed were compared with the routing sequence on the cable pull tickets. The cables selected for examination were as follows:

1EHSBBL201	1HCSBBL200
1ENBARL600	1HCSBBL201
1ENBARL607	1HVCBBL200
1ENBBBL600	1HVCBBL201
1ENBBBL601	1HVCBBL202
1ENBBBL602	1HVKBBL200

No violations or deviations were identified in this area.

4. Review of Licensee's QA Audits

The NRC inspector reviewed several GSU QA audits of electrical cable and associated equipment. The reports were examined to determine whether the required audits were performed and whether deficiencies identified were corrected (or being corrected) in a timely manner, and documented. Also, the audits were examined to ascertain whether the corrective action precluded repetition of the deficiency. The audit documents examined were:

- Site Audit No. 31 - W.O. No. 12210.50, "Electrical Equipment Installation/Raceway and Cable Termination," dated September 28, 1983.

- Site Audit No. 33 - W.O. No. 12210.50, "Electrical Equipment Installation and Inspection, Raceway and Cable Installation," dated March 9, 1984.

- Site Audit No. 35 - W.O. No. 12210.50, "Electrical Installation and Inspection," dated October 1, 1984.

- Site Audit No. 36 - W.O. No. 12210.50, "Raceway and Cable Installation/Inspection," dated January 4, 1985.

In addition to audits, GSU QA perform planned surveillances of work activities which are narrower in scope. The NRC inspector reviewed 14 recent scheduled surveillances of electrical cable work for the same attributes as stated above for audits. The following GSU QA surveillance plan and reports were reviewed:

CSEF 85-01-10	SEG 84-05-14
CSEF 85-02-02	SEG 84-06-01
CSEF 84-08-19	SEG 84-05-02
SEF 84-03-04	CSEG 85-01-09
SEF 84-01-13	CSET 85-01-03
SEF 84-05-03	CSET 84-10-09
SEF 84-01-18	CSET 84-08-12

No violations or deviations were identified in this area.

5. Review of Nonconformance Reports

The NRC inspectors reviewed several S&W nonconformance and disposition reports (N&Ds) relative to electrical cable, equipment, and components. The documents were examined to determine whether the records were legible, complete, reviewed, and readily retrievable. In addition, the records were reviewed to determine whether the nonconformances were adequately described and included the status of the corrective action or resolution. The following N&Ds were examined:

N&D No. 4001	N&D No. 4008
N&D No. 4017	N&D No. 4018
N&D No. 5700	N&D No. 5710
N&D No. 5711	N&D No. 5720
N&D No. 5721	N&D No. 5749
N&D No. 5752	N&D No. 5756
N&D No. 5768	N&D No. 6013
N&D No. 6018	N&D No. 6019
N&D No. 6024	N&D No. 6026
N&D No. 6027	N&D No. 6032
N&D No. 6042	N&D No. 6059
N&D No. 6305	N&D No. 6310
N&D No. 6311	N&D No. 10366
N&D No. 10500	N&D No. 10514
N&D No. 10520	N&D No. 10525
N&D No. 10538	N&D No. 10549
N&D No. 10614	N&D No. 10647
N&D No. 10687	N&D No. 10816
N&D No. 10877	N&D No. 10904
N&D No. 10941	N&D No. 10799

No violations or deviations were identified in this area.

6. Observation of Electrical Separation

The NRC inspectors inspected selected areas in the control building, auxiliary building, containment, and diesel generator building for conformance to electrical separation requirements. The River Bend Station is committed to NRC Regulatory Guide 1.75 and IEEE-384 which define the required separation for cables, trays, and conduits. However, lesser separation requirements are allowed by IEEE-384 based upon analyses or tests. GSU has performed tests to allow smaller distances between circuits, and submitted a proposed FSAR change to NRR on January 28, 1985. Formal acceptance by NRR of this change has not been received as yet. The NRC inspectors performed their inspection based upon the proposed separation criteria. If NRR does not allow the FSAR change then the NRC will have to perform another inspection of electrical separation.

During the inspection, the NRC inspectors found the following separation discrepancies:

- Nonsafety-related flex conduit 1CX016NAZ was within 1 inch of several safety-related cables entering cabinet 1ENS*SWG1B from tray 1TC051B. (Auxiliary Building - 98' El.)

- Nonsafety-related cable 1SPRDNX800 was within 6 inches of safety-related cable 1HVCBBC206 inside cabinet 1ENS*SWG1B. (Auxiliary Building - 98' El.)

- Safety-related cables exiting conduit 1CC020C and entering tray 1TK0010 were in contact with a 120 VAC lighting conduit above MCC E22*S002. (Auxiliary Building - 115' El.)

These discrepancies were brought to the attention of GSU QA and S&W FQC. An S&W QA inspection report (IR No. E5000833) was promptly initiated to correct the above items. The NRC inspectors noted that the discrepancies were in areas of ongoing construction activity and the lack of required separation could easily have occurred after installation and initial inspection. The final S&W FQC inspection of conduits and trays has not been performed as yet. This gives further assurances that other separation violations will be detected and corrected. Due to the large number of separation interactions inspected by the NRC, the identified items are considered isolated cases with no safety significance.

In addition, it was noted that the two safety-related flex conduits connected to junction box CRB-1162-CS (containment-162'El.) were of greater length than allowed. One conduit (1CL540BB) was 7 feet in length, but drawing EE-34YA-3 lists the maximum allowable support span of fire wrapped conduits to be 5 feet. The Appendix R fire wrapping had not been performed at the time of the inspection. The other conduit connecting to containment air handler 1HVR-UC1B was 6 feet long, but only 4 feet

6 inches of unsupported conduit is allowed per inspection plan R 1248000F0557. This conduit had not been inspected by FQC but was scheduled to be done. This item will be followed up by the closure of open item 458/8527-03 concerning the completion of all Appendix R fire wrapping as stated in NRC Inspection Report 50-458/85-27.

No violations or deviations were identified in this area.

7. List of Documents Reviewed

During the course of the inspection, the NRC inspectors reviewed various documents relative to electrical construction. The procedures reviewed were found to be adequate for their intended purposes. The following documents were reviewed:

- RBS Spec. 248.000, Section 2, Revision 8, "Installation of Equipment," dated December 18, 1984.
- RPS Spec. 248.000, Section 3, Revision 8, "Installation of Raceway and Cable," dated December 20, 1984.
- S&W Quality Standard QS-10.51, "Electrical Equipment Installation," dated January 24, 1978.
- S&W Quality Standard QS-13.12-RB, Revision 0, "Material/Equipment Maintenance," dated December 7, 1983.
- S&W Quality Standard QS-15.1, Revision B, "Nonconformance and Disposition Report," dated December 20, 1982.
- S&W Quality Standard QS-10.52, Revision 0, "Raceway and Cable Installations," dated February 16, 1978.
- S&W Quality Standard QS-7.1, Revision D, "Receiving Inspection," dated June 15, 1979.
- S&W Quality Standard QS-10.53, Revision 0, "Cable Terminations and Connections," dated October 5, 1979.
- S&W QA Directive QAD-2.5, Revision G, "Qualification and Certification of Personnel Performing Quality Assurance Activities," dated October 19, 1983.
- S&W QC Instruction QCI No. FR1-D14.1-02D, "Preparing and Reviewing Quality Control Inspection Reports," dated January 14, 1985.

- S&W Construction Department Standard CMP No. 9.2-4.76, "Construction Methods Procedure for Installation of Electrical Equipment," dated April 1976.

- GSU Procedure QAI-2.3, Revision 1, "Planning, Scheduling and Reporting QA Surveillances of Plant Activities," dated October 26, 1984.

- S&W Construction Site Instruction CSI-1.12.1, Revision 9, "Storage and Maintenance of Permanent Plant Equipment," dated October 1, 1984.

- S&W Construction Site Instruction CSI-1.5.14, Revision 3, "Processing Nonconformance and Disposition Reports," dated March 29, 1985.

- S&W QA - Inspection Plan No. R1248000F0543, Revision 0, "Electrical Equipment Installation," dated July 26, 1984.

- S&W QA - Inspection Plan No. R1248000F0542, Revision A, "Electrical Installation," dated December 17, 1984.

- S&W QA - Inspection Plan No. R1248000F0518, Revision E, "Electrical Cable Installation Inspection Plan," dated January 18, 1985.

- S&W QA - Inspection Plan No. R1248000F0536, Revision G, "Electrical Installation," dated January 9, 1985.

- S&W QA - Inspection Plan No. R1248000F0557, Revision A, "Electrical Installation," dated March 25, 1985.

- S&W QA - Inspection Plan No. R1248000F0525, Revision D, "Electrical Installation," dated January 9, 1985.

No violations or deviations were identified in this area.

8. Exit Interview

The NRC inspectors met with licensee representatives (denoted in paragraph 1) and R. E. Farrell, NRC senior resident inspector, on May 3, 1985, and summarized the scope and findings of the inspection.