

FEB 6 1985

Docket No. 50-458

Mr. William J. Cahill, Jr.
Senior Vice President
River Bend Nuclear Group
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704
ATTN: Mr. J. E. Booker

Dear Mr. Cahill:

SUBJECT: DRAFT SAFETY EVALUATION REPORT SUPPLEMENTAL INPUT ON EQUIPMENT
QUALIFICATION

Please find enclosed draft SSER input for equipment qualification covering
the following topics:

- 1) Seismic and Dynamic Qualification of Seismic Category I
Mechanical and Electrical Equipment
- 2) Pump and Valve Operability Assurance Program

This draft input incorporates the results of the site audit at River Bend
conducted the week of October 29, 1984. The enclosure describes items which
must be resolved prior to staff acceptance of these programs.

Your expedited response will be appreciated. Licensing Project Manager
Edward Weinkam is available to coordinate meetings and discussions on this
topic.

Original signed by:

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosures:
As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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A handwritten signature in cursive script, appearing to read "A. Schwencer".

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosures:
As stated

cc: See next page

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Status of Review for River Bend Docket No. 50-458

Seismic and Dynamic Loads Section

Equipment Qualification Branch

October, 1984

- (1) Seismic and Dynamic Qualification of Seismic Category I Mechanical and Electrical Equipment: SER input is attached. Review is continuing.
- (2) Pump and Valve Operability Assurance Program: SER input is attached. Review is continuing.
- (3) Containment Isolation Dependability (Part of TMI Action Item II.E.4.2): Applicant provided information on operability of containment purge and vent valves. Under staff review.
- (4) Performance Testing of Relief and Safety Valves (Part of TMI Action Item II.D.1): Applicant asked to respond to plant specific request for additional information.
- (5) Verify Qualification of Accumulators for Automatic Depressurization System Valves (Part of TMI Action Item II.K.3.28): Waiting for submittal from applicant. Review is open.
- (6) Long Term Operability of Deep Draft Pumps (IE Bulletin 79-15): Under staff review.

Equipment Qualification Branch
Input for River Bend Safety Evaluation Report
Docket # 50-458

3.10 SEISMIC AND DYNAMIC QUALIFICATION OF SAFETY-RELATED
ELECTRICAL AND MECHANICAL EQUIPMENT

3.10.1 Seismic and Dynamic and Qualification

3.10.1.1 Introduction

As part of the review of the applicant's Final Safety Analysis Report (FSAR) Sections 3.7.3 A, 3.7.3 B, 3.9.2 A, 3.9.2 B, 3.10 A and 3.10 B, an evaluation is made of the applicant's program for seismic and dynamic qualification of safety-related electrical and mechanical equipment. The evaluation consists of: (1) a determination of the acceptability of the procedures used, standards followed, and the completeness of the program in general, and (2) an audit of selected equipment to develop a basis for the judgement of the completeness and adequacy of the seismic and dynamic qualification program.

Guidance for the evaluation is provided by the Standard Review Plan (SRP) Section 3.10, and its ancillary documents, Regulatory Guides (R.G.) 1.100, 1.61, 1.89, and 1.92, NUREG-0484, and Institute of Electrical and Electronics Engineers (IEEE) Standards 344-1975 and 323-1974. These documents define acceptable methodologies for the seismic qualification of equipment. Conformance with these criteria is required to satisfy the applicable portions of: the General Design Criteria 1, 2, 4, 14, and 30 of Appendix A to 10 CFR Part 50, as well as Appendix B to 10 CFR Part 50 and Appendix A to 10 CFR Part 100. Evaluation of the program is performed by a Seismic Qualification Review Team (SQRT) which consists of engineers from the Equipment Qualification Branch (NRC/EQB) and the Brookhaven National Laboratory (BNL, Long Island).

3.10.1.2 Discussion

The SQRT has reviewed the equipment seismic and dynamic qualification information contained in the FSAR Sections 3.7.3 A, 3.7.3 B, 3.9.2 A, 3.9.2 B, 3.10 A and 3.10 B and made a plant site visit from October 29 through November 2, 1984. The purpose was to determine the extent to which the qualification of equipment, as installed at River Bend meets the criteria described above. A representative sample of safety-related electrical and mechanical equipment, as well as instrumentation, included in both Nuclear Steam Supply System (NSSS) and Balance of Plant (BOP) scopes, was selected for the audit. Table 3.10.1.1 identifies the equipment audited. The plant-site visit consisted of field observation of the actual, final equipment configuration and its installation. This was followed by a review of the corresponding qualification document. The field installation of the equipment was inspected in order to verify and validate equipment modeling employed in the qualification program. During the audit the applicant presented details of the qualification and in-service inspection program.

3.10.1.3 Summary

On the basis of the observation of the field installation, review of the qualification documents, and responses provided by the applicant to SQRT's questions during the audit, the applicant's seismic and dynamic qualification program, subject to generic findings discussed in Section 3.10.1.4, has been found to be defined and being implemented. The equipment-specific findings as a result of the SQRT audit are identified in Table 3.10.1.1 and the generic comments are listed in the following section. Upon satisfactory resolution of these specific findings and generic comments, the seismic and dynamic qualification of safety-related equipment at the River Bend Station, Unit 1, will meet the applicable portions of GDC 1, 2, 4, 14

and 30 of Appendix A to 10 CFR Part 50, Appendix B to 10 CFR Part 50, and Appendix A to 10 CFR Part 100.

3.10.1.4 Confirmatory Issues

The satisfactory resolution of the specific findings identified in Table 3.10.1.1 and the generic comments listed below, is required prior to staff acceptance of the applicant's seismic qualification program for equipment:

1. Each equipment qualification document package contains summary statements and overall conclusions. The conclusion for each package was that the equipment was fully qualified. However, in many instances it was observed that evidence necessary to reach the state of complete qualification was unavailable. More recent documentation packages were incomplete and appeared to be put together without adequate checking after the selection of equipment was transmitted to the applicant. Therefore, the applicant is to develop a more systematic program to perform the acceptance review of all safety-related equipment.

2. Where the qualification document package identifies a need for equipment modification, the applicant is to develop a systematic program to include in the qualification package either a statement indicating implementation of the modification or justification for not implementing the modification.

3. In many cases, it was observed that the equipment qualification report identified parts with a limited-life. Such equipment could be located in either a mild or a harsh environment. The applicant is to develop a systematic procedure for identifying limited-life parts and to ensure their replacement at appropriate intervals during the acceptance review of equipment.

4. There were equipment pieces found to be incorrectly or improperly installed. The applicant is to develop a procedure to check proper mounting of all safety-related equipment consistent with the qualification mounting configuration.

5. It was observed that for many equipment the enclosure panel was partially removed or screws were loose reportedly in order to facilitate preoperational testing. The applicant is to develop a procedure to insure that such equipment is returned to the qualified status.

6. Upon completion of as-built piping analysis for all pipe-mounted safety-related equipment, the applicant must confirm that the g-values used for qualification of these equipment were not lower than the g-values obtained from the as-built piping analysis.

7. The qualification of those pieces of equipment which were originally qualified to meet IEEE Std 344-1971, should be identified and upgraded to meet the requirements of IEEE Std 344-1975 as applicable.

8. Upon completion of the on-going qualification process, the applicant must confirm that all safety-related equipment have been qualified.

Table 3.10.1.1

SQRT ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
MSSS-1	IC11*ACTD001	Hydraulic Control Unit. Assembly consists of N ₂ cylinder, water accumulator and various valves.	Translates scram signal into hydraulic energy to insert the control rod drive and allow its return flow to discharge through the exhaust valve.	The additional brace used during qualification test of the equipment was missing from the installed unit.	Pending	Open	
MSSS-2	H13-P680	Plant Control Console. A U-shaped monitoring benchboard.	The console supports instruments which are used to monitor and control the safe operation and shutdown of the plant.	1. The dynamic similarity between the tested specimen and the River Bend console was not established. 2. The test mounting was not documented in the test report. 3. For components qualification, the capability g-values were not defined and demonstrated to envelop the RRS over the entire frequency range.	Pending	Open	
MSSS-3	C61-P001	Remote Shutdown Vertical Board	It provides redundant means for safe shutdown of the plant.	The installation condition of being next to another cabinet and the wall was not addressed in the qualification.	Pending	Open	

Table 3.10.1.1 (Cont'd)

SQHT ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
MSSS-4	E1Z-C002A,C	RHR Pump and Motor	The assembly is required to pump water in the suppression pool during pool cooling modes and LPCI vessel injection modes.			Qualified	
MSSS-5	H1J-P601	Reactor Core Cooling Bench Board. A monitoring panel.	It contains instruments that are used for manual control for accident mitigation of the emergency core cooling system.	<ol style="list-style-type: none"> 1. Dynamic similarity between the tested specimen and the River Bend Unit was not established. 2. Test mounting was not completely documented in the test report. 3. For component qualification, the capability g-values were not defined and demonstrated to envelop to RRS over the entire frequency range. 4. Qualification of some devices below 5 Hz was missing. 5. Controller and recorder units were sliding during tests. It could not be verified from documentation presented wheth- 	Pending	Open	

Table 3.10.1.1 (Cont'd)

SQ# ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
NSSS-5 (Cont'd)				er River Bend panel contains these devices. 6. Site Inspection revealed the following: a) One unistrut was loose. b) GE ERIS terminals were very flexible.			
NSSS-6	H13-P670	Neutron/Process Radiation Monitoring System.	Provides information about power levels and power distribution in the reactor, and is tied to a trip system (Reactor Protection System).	The cabinet was installed with 1/2" diameter bolts although the specimen was tested with 5/8" diameter bolts.	Pending	Open	
NSSS-7	H22-P041,42	Main Steam Flow Local Panel	It supports Class 1E devices	1. Transmitters were not environmentally aged prior to seismic testing. 2. Transmitter output variation was detected during testing apparently due to incomplete instruction provided by GE to	Pending	Open	

Table 3.10.1.1 (Cont'd)

SQHT ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
MSSS-7 (Cont'd)				testing engineers regarding calibration. GSU/GE is to confirm that River Bend installation engineers have received the complete instruction and the transmitters are properly calibrated.			
MSSS-8	B21-F02L ^R	Main Steam Isolation Valve	It isolates the steam line upon demand.	1. Adequacy of the valve body was not demonstrated. 2. GSU is to confirm compliance with GE's recommendation regarding the following required for qualification: a) Bracket modification for Limit Switch. b) Elimination of junction box. 3. The source of River Bend specific RRS was not presented during the audit.	Pending	Open	

Table 3.10.1.1 (Cont'd)

SQRT ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
BOP-1	ICCP*MOV138	10" Motor Operated Valve	The valve is required to isolate the containment and to intercept the water flow of the reactor plant component cooling water system (RPCCW) to the non-regenerative heat exchanger.			Qualified	
BOP-2	IRCP*YCA03	Termination Cabinets	The cabinets are required at penetrations to contain the wiring used in instrumentation monitoring and control of equipment used in various safety related functions.			Qualified	
BOP-3	1EHS*MCC	Motor Control Center. A two-bay rectangular cabinet containing starters, circuit breakers, switches, terminal blocks, etc.	MCC is required to provide Class 1E power distribution.	1. Qualification of devices apparently covered by Gould reports R-ST5-10,31 and analysis was not available for review. 2. Test mounting was not documented. 3. It is not clear from test report whether the MCC was tested for 5 OBE and 1 SSE for <u>both</u> the	Pending	Open	

Table 3.10.1.1 (Cont'd)

SQR# ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
BOP-3 (Cont'd)				energized and de-energized conditions. 4. Supplemental evaluation report for HE 4-3 circuit breakers was not part of the qualification documentation package.			
BOP-4	1E12*PC003	Centrifugal fill pump. A pump/motor assembly.	It maintains the RHR system piping filled and ready for main RHR pump start-up.	The site inspection revealed the following deficiencies: 1. The shim stack was loose. 2. One nut in the seal housing was loose and another was missing. 3. The motor name plate was missing.	Pending	Open	
BOP-5	1HVC*ACU1B	Control building air conditioning unit.	It maintains the control building at design temperature and humidity.			Qualified	
BOP-6	1HVR*A0010A	Air operated damper. It is duct mounted and supported from the ceiling.	It operates only during LOCA when it bypasses the air to the Standby Gas Treatment Building.			Qualified	

Table 3.10.1.1 (Cont'd)

SQRT ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
BOP-7	ILSV*C3A	Leakage Air system compressor. A single rotary compressor with electric motor drive	It provides pressurized air to containment isolation valves to prevent release of fission products after LOCA.			Qualified	
BOP-8	ISCM*XRC14	Transformer	It furnishes power to various Class 1E Instruments as part of the Uninterrupted Power Supply System.	<ol style="list-style-type: none"> 1. Dynamic similarity between the tested specimen and the River Bend transformer was not established. 2. Test mounting was not completely documented in the test report. 3. Test anomalies were mentioned, but neither described nor justified in the test report. 4. Site inspection revealed the following: <ol style="list-style-type: none"> a) There was no contact between the base plate and concrete in most places b) Side panels were loose c) Base plate was not addressed in the 	Pending	Open	

Table 3.10.1.1 (Cont'd)

SWR ID No.	Applicant ID No.	Equipment Name and Description	Safety Function	Findings	Resolution	Status	Remarks
BOP-8 (Cont'd)				qualification documents presented.			
BOP-9	IEJS*LDCIA	Load Centers	They are required to furnish power distribution to HVAC systems in the Control and Diesel Generator Building and also to Class 1E Motor Control Centers.	Only a summary of test report was available. The original Wyle Test Report is needed for review and documentation.	Pending	Open	
BOP-10	ISWP*P2B	Standby Service water pump. An electrically driven vertical turbine pump.	It provides cooling water for safety related equipment when normal service water is lost.	1. Torsional frequency of assembly needs to be computed and compared to motor's operational speed. 2. Operability of pump under seismic load needs to be assured.	Pending	Open	

3.10 Seismic and Dynamic Qualification of Seismic Category I Mechanical and Electrical Equipment

3.10.1 Seismic and Dynamic Qualification

Input to be provided by the Seismic Qualification Review Team (SQRT).

3.10.2 Operability Qualification of Pumps and Valves

3.10.2.1 Introduction

To assure that an applicant has developed and implemented a program regarding the operability qualification of safety-related pumps and valves, the Equipment Qualification Branch (EQB) performs a two-step audit. The first step is a review of Section 3.9.3.2 of the FSAR for the description of the applicant's pump and valve operability assurance program. The information provided in the FSAR, however, is general in nature and not sufficient by itself to provide confidence in the adequacy of the licensee's overall program for pump and valve operability qualification. To provide this confidence, the Pump and Valve Review Team (PVORT), consisting of staff from Brookhaven National Laboratory (BNL) and the NRC, conducts an on-site audit of a small representative sample of safety-related pumps and valves and supporting documentation.

The criteria by which the audit is performed is described in Section 3.10 entitled, "Seismic and Dynamic Qualification of Mechanical and Electrical Equipment" of the Standard Review Plan. Conformance with SRP 3.10 is required in order to satisfy the applicable portions of General Design Criteria (GDC) 1, 2, 4, 14, and 30 of Appendix A to 10 CFR 50 as well as Appendix B to 10 CFR 50.

3.10.2.2 Discussion

The EQB staff in performing the first step of the audit, reviewed Section 3.9.3.2 of the River Bend Station Unit 1 FSAR. The on-site audit, or second step, was performed by the PVORT during the week of October 29, 1984. The purpose of this two-step review process is to determine the extent that Gulf States Utility (GSU) meets the criteria of Section 3.10 of the SRP. A sample of three NSSS and seven BOP components were selected to be audited.

The on-site audit includes a plant inspection of the as-built configuration and installation of the equipment, a review of the normal, accident, and post accident conditions under which the equipment and systems must operate, the fluid dynamic loads, and a review of the qualification documentation (status reports, test reports, analysis specifications, surveillance programs, and long-term operability program(s), etc.).

Table 3.10.2.1 identifies the equipment audited and the findings that remained open as a result of the audit.

3.10.2.3 Summary

On the basis of the observation of the field installation, review of the qualification documents, and responses provided by the applicant to PVORT's questions during the audit, the applicant's pump and valve operability qualification program, subject to generic findings discussed in Section 3.10.2.4, has been found to be defined and being implemented. The equipment specific findings as a result of the PVORT audit are identified in Table 3.10.2.1 and the generic comments are listed in the following section. Upon satisfactory resolution of these specific and generic comments, the seismic and dynamic qualification of safety-related equipment at the River Bend Station, Unit 1, will meet the applicable portions of GDC 1, 2, 4, 14 and 30 of Appendix A to 10 CFR Part 50, Appendix B to 10 CFR Part 50, and Appendix R to 10 CFR Part 100.

3.10.2.4 Generic

The satisfactory resolution of the specific findings in Table 3.10.2.1 and the generic concerns listed below are required prior to staff acceptance of the applicant's pump and valve operability qualification program.

1. In many instances, it was observed that evidence of complete qualification was unavailable. More recent documentation packages were incomplete and appeared to be put together without checking. The PVORT long forms contained numerous inconsistencies ranging from serial numbers, capability, and qualification information of the actual equipment. The applicant is to develop a more systematic program to perform the acceptance review of safety related pumps and valves.
2. During the acceptance review of equipment, a procedure should be developed to identify limited life parts and ensure their replacement at appropriate intervals;
3. Procedures should be established to return tested equipment to its qualified status;
4. Components were found to be incorrectly or improperly installed. Procedures should be established verifying equipment installation requirements and qualification;
5. All pumps and valves important to safety have had their required pre-operational tests completed prior to fuel loads;
6. All pumps and valves important to safety are qualified prior to fuel load;
7. The applicant shall confirm that new loads resulting from LOCA or analysis of as-built conditions applicable to pumps and valves important to safety do not exceed those loads originally used to qualify the equipment.

Table 3.10.2.1 Audit Findings.

Plant I.D. Number	Description	Safety Function	Findings/Resolution	Status	Remarks
E22-F015	20-inch motor operated gate valve (NSSS).	Open in response to either a suppression pool high-level signal or a low condensate tank level - containment isolation.	The operability of the valve was established using analysis only. A test program is presently being performed and a similar analysis with a similar valve which was tested will be submitted as demonstration of operability and qualification.	Open	
ISWP-P2A	Standby service water pump (BOP).	Provide cooling water for safety-related equipment if normal service water is lost.	<ul style="list-style-type: none"> - Clarify vibration acceptance criteria (displacement velocity)? - Coupling runout value (driven member) is inconsistent with alignment requirement. - Pumps weight incorrect on PVORT sheets. - Final qualification subject to compliance with endurance testing recommended in I&E Bulletin 83-05. 	Open	
B33-F060A	20-inch flow control valve (NSSS).	Maintain pressure boundary integrity.	Satisfactory	Closed	

Table 3.10.2.1.1 Audit Findings (Cont'd.)

Plant I.D. Number	Description	Safety Function	Findings/Resolution	Status	Remarks
1E12-MOVF021	14-inch motor operated globe valve (BOP).	Containment isolation.	<ul style="list-style-type: none"> - Have stem leakoff requirements been met? - N&D No. 6189 motor starter housing welded to motor flange. Have possible effects of welding on valve flange and valve shaft assembly been considered? - Dates of issue on qualified documents very recent (i.e., ST-7003 "Operability Test Procedure" is dated 11/2/84 which was the exit meeting date. Completeness and approval required. 	Open	
1HVC-MOVI8	24-inch MO butterfly valve (BOP).	Isolate main control room during LOCA.	<ul style="list-style-type: none"> - Actuator is serialized (260880), adapter plant is also serialized (260953). PVORT form picked up the adapter serial no. in place of the actuator no. Clarification required. 	Open	

Table 3.10.2.1.1 Audit Findings (Cont'd.)

Plant I.D. Number	Description	Safety Function	Findings/Resolution	Status	Remarks
ICCP-MOV138	10-inch motor oper- ated gate valve (BOP).	Outboard con- tainment iso- lation valve.	<p>Valve has serial no. 809 (1980) on "N" stamp tag. Manufacturer's name plate serial no. is 1413-2. PVORT form lists valve serial no. as 809 (1980). Inspection and test record form lists serial no. as 1413. Clarification required.</p> <ul style="list-style-type: none"> - Stroke time requirements need clarification, they vary from 30 sec. (spec. sheet) to 22 sec. (inspection and test record) to 20 sec. (PVORT form). - Have stem leakoff requirements been provided? - Have space heaters been removed? - Rev. 2 to MOV Checkout Procedure 1 1-G-EE-18 initiated due to excessive torque values in Rev. 1. Comparing Rev. 1 and 2, the torque valves appear to be the same? 	Open	
				Open	
				Open	
				Open	
				Open	

Table 3.10.2.1.1 Audit Findings (Cont'd.)

Plant I.D. Number	Description	Safety Function	Findings/Resolution	Status	Remarks
B21-AOVF32A (BOP)	20-inch check valve.	Containment isolation and reactor cool- ent pressure boundary.	Satisfactory	Closed	
E33-SOV14	2-inch solenoid operated globe valve (BOP).	Provide ini- tial pressuri- zation of main steam positive leak control system.	<ul style="list-style-type: none"> - Valve installation contradicts note 18 of FSAR Fig. 6.7-1, qualification documentation and manufacture recommendations. - If the working fluid (air) provides opening force; what is the minimum air pressure required to open the valves? - Are the forces delivered by the spring capable of closing the valve against the loads of the working fluid? - What assurance is there that the delivered air quality is in agreement with the manufacturer's requirements? 	Open	
				Open	
				Open	
				Open	

Table 3.10.2.1.1 Audit Findings (Cont'd.)

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Plant I.D. Number	Description	Safety Function	Findings/Resolution	Status	Remarks
E33-SOV14 (Cont'd.)			- List tests performed by GSU to date or to be performed in the future.	Open	
			- How is or will GSU track manufacturer's recommendations regarding maintainability of components subject to aging?	Open	
E12-C002C	RHR pump (NSSS).	Supply water to the core in the event of an accident. Supression pool cooling.	- How is pump performance (curves, vibration levels, bearing temp., etc.) established without the use of manufacturer's data/acceptance criteria?	Open	
			- Discharge pressure transmitter has a reject tag and as built acceptance tag? Clarify difference and the reason for the reject tag and the action taken.	Open	
			- Serial number on motor qualification documentation and long form disagree.	Open	

