

Gulf States Utilities Company
Program Plan
for the
Transamerica Delaval, Inc.
Standby Diesel Generators
at
River Bend Station

Revision 1
May 17, 1985

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1.0 INTRODUCTION

This topical report has three purposes:

- (1) To present the Gulf States Utilities Company (GSU) Program Plan to qualify the Transamerica Delaval, Inc. (TDI) manufactured standby diesel generators for River Bend Station.
- (2) To provide the Staff an opportunity to review the plans for testing, post test inspection, and long term surveillance and monitoring.
- (3) To submit for NRC Staff review, the current results of design review and preservice inspection activities at River Bend Station.

GSU initiated the TDI Diesel Generator Qualification Program at River Bend Station in November 1983 in response to TDI diesel generator component failures elsewhere and identified potential deficiencies in TDI's quality assurance program.

The objectives of the River Bend Station Diesel Generator Qualification Program are:

- (1) To evaluate the TDI diesel generators, and;
- (2) To determine what is necessary to assure reliable standby power at River Bend Station. The Diesel Generator Qualification Program includes activities to solve the known problems of the TDI diesel generators, and;
- (3) To obtain NRC approval of the standby power supplies for River Bend Station.

The GSU approach to qualification of the TDI diesel generators is:

- (1) To correct the known problems before the diesel generators are operated at River Bend Station. This involves preservice engine disassembly for inspection, upgrading, and rebuilding.
- (2) To confirm engine reliability by testing and post test inspection, without engine disassembly.
- (3) To assure continued diesel generator reliability by a program of inservice surveillance, inspection, monitoring, and preventive maintenance.

The feasibility of this approach has been established through the design reviews provided by the TDI Diesel Generator Owners Group, the testing and inspections performed by the TDI diesel generator owners, and the product improvement recommendations provided by TDI. GSU and its contractors have devoted an intensive effort to accumulate this experience and to implement corrective action to improve diesel generator reliability prior to operation of the engines at River Bend Station. After rebuilding, the engines are tested to confirm operational reliability. After testing, the engines are inspected to identify latent defects not disclosed during rebuilding or testing. This inspection involves minor disassembly, sufficient to detect latent problems, but not so extensive as to require retesting.

Figure 1 shows the logical relationship of program tasks. The initial phase involves evaluation of industry experience, design review recommendations, and preservice inspection results. The second phase involves engine rework, rebuilding, confirmatory testing and post test inspection. This phase is expected to result in successful qualification of the TDI diesels generators at RBS.

The last phase is a program of continuing surveillance, inspection, monitoring, and preventive maintenance. The continuing surveillance and monitoring program is finalized after the post test inspection is completed.

This report describes the plans for design reviews, inspections, testing, and long term preventive maintenance, surveillance and monitoring. The format of the report permits the results of ongoing activities to be added by revisions or supplements as the work proceeds. When complete, the report will describe, or incorporate by reference, the results of the design reviews, preservice inspections, rework activities, testing, and post test inspections.

FIGURE 1
RIVER BEND DIESEL ACTIVITIES

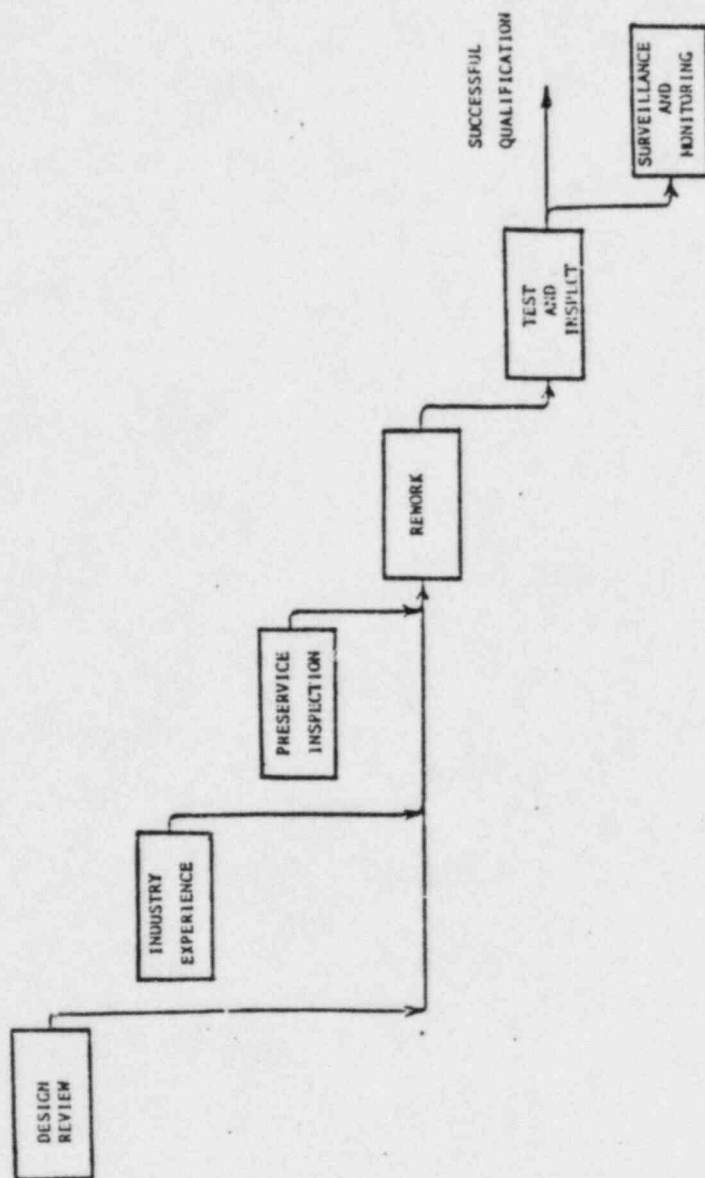


FIGURE 2

This figure was deleted on 5/17/85
since the TDI diesel generator testing
program is complete

2.0 PROGRAM ACTIVITIES

The following subsections provide information relating to current activities with respect to GSU's approach to the qualification of the TDI diesel generators. GSU is a member and an active participant in the TDI Diesel Generator Owners' Group. GSU has assembled and utilized the experience of other TDI diesel generator owners in the River Bend Station program. All the recommendations of the Phase I design review received to date and all the recommendations of the manufacturer are incorporated into this program. The recommendations from the Phase II design review are also incorporated into this program. The Design Review and Quality Revalidation (DR/QR) Report, Revision 1 (See Reference 1) incorporated the recommendations from the Phase II Design Review. In the letter listed as Reference 2 of this report, a tabulation of the recommended modifications from the DR/QR Report, Revision 1, was made. This letter identified all recommendations including those which would not be incorporated at RBS and provided technical justification supporting each exclusion.

The following sections document GSU's compliance to the Staff position for interim licensing as outlined in Section 4 of the NRC Staff Safety Evaluation Report (SER) on the TDI Diesel Generator Owners' Group Program Plan dated August 13, 1984:

Phase I - Resolution of Known Problems

The River Bend Station TDI Diesel Generator Qualification Program meets the recommendations of the TDI Diesel Generator Owners' Group with respect to resolution of known problems.

Phase II - Design Review and Quality Revalidation

The River Bend Station Phase II Design Review Program was issued on December 7, 1984. See the DR/QR Report, Revision 1 (Reference 1).

Engine Testing and Inspection

The following paragraphs address the interim test and inspection considerations stated in Section 4.6 of the SER.

- 1) The qualified load for the River Bend Station diesel generators is provided in Table 8.3-2 of the Final Safety Analysis Report. Applicable experience from testing of the DSR-48 engine at the Shoreham Nuclear Power Station and at other facilities is factored into the River Bend Station Program.
- 2) Item 2 of Section 4.6 of the SER is not applicable since the piston skirts in the River Bend Station engines are the AE design.
- 3) GSU has prepared appropriate operating procedures to ensure that the River Bend Station diesel generators are not loaded above qualified load.

- 4) GSU has revised the River Bend Station Technical Specifications to limit testing of the TDI diesel generators to the qualified load.
- 5) With regard to the requirements of Item 5 of Section 4.6 "Interim Basis for Licensing," both diesel generators were disassembled for inspection and rebuilding prior to preoperational testing. The inspections defined in Section 2.3 of this report include all components considered part of the TDI Diesel Generator Owners' Group Phase I program, plus inspection of engine gears and wrist pin bushings. Other components are included in the inspection based on operating experience at other plants, and the recommendations of the TDI Diesel Generator Owners' Group.

A summary of the inspections performed and the results are included in Section 2.3 of this report. Where the type of inspection or acceptance criteria deviate from that of the TDI Diesel Generator Owners' Group, the deviation is specifically identified and justification provided.

- 6) Following engine reassembly, hot and cold crankshaft deflection measurements were taken to verify that the crankshaft alignment is within manufacturer's recommendations. The hot deflection measurements began within 15 to 20 minutes of engine shutdown, when practicable, consistent with personnel safety. A torsionograph test was performed for Diesel Generator 1A. Engine tests consistent with Item 6 and defined in Section 2.5 of this report were performed.
- 7) A program for maintenance and surveillance has been developed by the TDI Diesel Generator Owners Group. This program is included in the Phase II Design Review Report which has been submitted for NRC Staff review in the DR/QR Report, Revision 1 (Reference 1) and in the letter identified as Reference 6 in this report.

2.1 Industry Experience Review

The purpose of this activity is to define the known problems of the TDI engines and to determine if these problems might be applicable to River Bend Station:

- Review of industry experience data accumulated by the TDI Diesel Generator Owners Group.
- Visits by River Bend Station personnel to observe diesel generator inspections at other nuclear stations.
- Participation in TDI Diesel Owners Group meetings and activities.

- Informal exchange of information with other TDI diesel generator owners.

The accumulated experience is evaluated for applicability to the River Bend Station diesel generators. Those items considered applicable are further investigated. This either is done as part of the TDI Diesel Generator Owners Group Design Review and Quality Revalidation effort, or they are added to the work list of inspections, tests, or investigations conducted by GSU and its contractors at River Bend Station. Results of industry experience reviews conducted to date are reflected in the plans for design review, preservice inspection, rework, testing, post test inspection, and surveillance and monitoring which are described in later sections of this report.

2.2 Design Review

The purpose of this activity is to verify the design adequacy of the diesel generator components and systems. The TDI Diesel Generator Owners Group has performed design reviews of TDI supplied components whose failure might affect the safety functions of the diesel generators.

The TDI Diesel Generator Owners Group has prepared a comprehensive, RBS specific DR/QR Report, Revision 1 (Reference 1) for TDI supplied components. This report constitutes final documentation of the completion of the DR/QR Program on the River Bend Station TDI Diesel Generators with exceptions to modifications recommended by the DR/QR Report, Revision 1 noted in the letter identified as Reference 2 of this report.

2.3 Preservice Inspection

The purpose of the preservice inspection effort is to verify that the installation is complete and correct and that the manufactured quality of the engines complies with the design requirements. This is done in three steps:

- (1) As built installation verification. This includes inspections by TDI and major subvendors to TDI, including Electric Products (electric generator), RTE Delta (switchgear), Elliot (turbocharger), and Woodward (governor). In addition, GSU inspects other components selected from industry experience information. The purpose of these inspections is to verify that the engine installation is complete and correct.
- (2) Preliminary testing of auxiliary components and systems. The purpose of these tests is to verify that auxiliary systems, interlocks, controls, and alarms operate in accordance with specifications. This includes system flushing, hydrostatic testing, relief valve testing for setpoint and seal leakage, initial startup, operation, performance and vibration testing of

pumps and compressors, performance testing of air dryers, and individual checkout of all electrical components and instrument loops. Results of this testing was submitted in the response to RAI No. 4 of the letter identified as Reference 4 of this report.

- (3) Preservice disassembly inspection. The purpose of this inspection is to verify that the manufactured quality of the engines is in accordance with the requirements established by the TDI Diesel Generator Owners Group design reviews. This inspection involves removal of cylinder heads, pistons, connecting rods, and cylinder liners for detailed part-by-part inspection. In addition, the turbochargers are disassembled for inspection. Inspection of the crankshaft, gear case, and camshaft is performed in situ.

A summary of the engine component groups and inspection results are listed in Table 3A (Engine 1A) and 2B (Engine 1B). Where parts are replaced, the replacements are subjected to the same inspections.

TABLE 3A
PRESERVICE INSPECTION SUMMARY
STANDEY DIESEL - 1A

<u>Part Name</u>	<u>Part Number</u>	<u>Class</u>	<u>Results</u>
Turbocharger	MP-020	B	See Appendix 2
Base & Bearing Caps-Base Assembly	03-305A	A	See Appendix 2
Base and Bearing Caps	03-305D	A	See Appendix 2
Crankshaft	03-310A	A	See Appendix 3
Crankshaft Bearing-Bearing Shells	03-310B	A	See Appendix 2
Engine Cylinder Block	03-315A	A	See Appendix 3
Cylinder Block Liner	03-315C	A	See Appendix 2
Cylinder Block Liner & Manifold	03-315D	B	See Appendix 3
Cylinder Block Stud	03-315E	B	See Appendix 3
Cylinder Block Nuts	03-315F	B	See Appendix 2
Front Gear Case Gaskets/Bolting	03-335B	C	See Appendix 3
Connecting Rod	03-340A	A	See Appendix 3
Connecting Rod Bearing Shells	03-340B	A	See Appendix 3
Pistons	03-341A	A	See Appendix 2
Piston Rings	03-341B	A	See Appendix 2
Piston Pin Assembly	03-341C	A	See Appendix 3
Tappets & Guides-Intake & Exhaust	03-345A	A	See Appendix 3
Tappets & Guides-Fuel Tappet Assy	03-345B	A	See Appendix 3
Camshaft Assembly	03-350A	A	See Appendix 3
Camshaft-Supports, Bolting & Gear	03-350C	A	See Appendix 3
Idler Gear Assy Crank to Pump Gear	03-355A	A	See Appendix 2
Idler Gear Assembly	03-355B	A	See Appendix 3
Air Start Valve	03-359	A	See Appendix 3
Cylinder Head and Valves	03-360A	B	See Appendix 3
Cylinder Hd Vlvs-Intake & Exhst	03-360B	B	See Appendix 3
Cylinder Hd Vlvs-Bolting & Gaskt	03-360C	B	See Appendix 2
Cylinder Hd Vlvs-Sprngs & Retainers	03-360D	B	See Appendix 2
Cylinder Head Subcover Assembly	03-362A	B	See Appendix 2
Fuel Injection Tube Assembly	03-365C	B	See Appendix 2
Fuel Pmp Lkge-Fuel Pmp Cntrl Shaft	03-371A	A	See Appendix 2
Fuel Pump Linkage	03-371B	A	See Appendix 2
Intake Manifold	03-375	B	See Appendix 2
Exhaust Manifold Gaskets & Bolting	03-380B	B	See Appendix 3
Cylinder Block Covers	03-385B	C	See Appendix 3
Intke & Intrmdte Rkr Arm Shft Assy	03-390A	B	See Appendix 3
Exhaust Rocker Arm Assemblies	03-390B	B	See Appendix 3
Pushrods-Intake and Exhaust	03-390C	B	See Appendix 2
Pushrod-Connector	03-390D	B	See Appendix 2
Rocker Arm Bolts & Drivestuds	03-390G	B	See Appendix 3
Govnr Drive Coupling, Pins, & Keys	03-402B	A	See Appendix 3
Overspeed Governor	03-410A	A	See Appendix 2
Governor & Accessory Dirve Assy	03-410B	A	See Appendix 3
Overspeed Trip - Couplings	03-410C	A	See Appendix 3
Governor Linkage	03-413	A	See Appendix 2
Governor Head Exchanger	03-415C	A	See Appendix 2
Jacket Water Pump	03-425A	A	See Appendix 2
Fuel Oil Filters & Strainers	03-455A	B	See Appendix 2
Trbochrgr Brkt-Air Btrfly Vlve Assy	03-475B	A	See Appendix 2
Lube Oil Sump Tank	03-540B	B	See Appendix 3

TABLE 3B
PRESERVICE INSPECTION SUMMARY
STANDBY DIESEL - 1B

<u>Part Name</u>	<u>Part Number</u>	<u>Class</u>	<u>Results</u>
Turbocharger	MP-020	B	See Appendix 4
Crankshaft	03-310A	A	See Appendix 4
Engine Cylinder Block	03-315A	A	See Appendix 4
Cylinder Block Liner	03-315C	A	See Appendix 4
Cylinder Block Liner & Manifold	03-315D	B	See Appendix 4
Cylinder Block Stud	03-315E	B	See Appendix 4
Cylinder Block Nuts	03-315F	B	See Appendix 4
Front Gear Case Gaskets/Bolting	03-335B	C	See Appendix 4
Connecting Rod	03-340A	A	See Appendix 4
Connecting Rod Bearing Shells	03-340B	A	See Appendix 4
Pistons	03-341A	A	See Appendix 4
Piston Rings	03-341B	A	See Appendix 4
Piston Pin Assembly	03-341C	A	See Appendix 4
Tappets & Guides-Intake & Exhaust	03-345A	A	See Appendix 4
Tappets & Guides-Fuel Tappet Assy	03-345B	A	See Appendix 4
Camshaft Assembly	03-350A	A	See Appendix 4
Camshaft-Supports, Bolting & Gear	03-350C	A	See Appendix 4
Idler Gear Assy Crank to Pump Gear	03-355A	A	See Appendix 4
Idler Gear Assembly	03-355B	A	See Appendix 4
Air Start Valve	03-359	A	See Appendix 4
Cylinder Head and Valves	03-360A	B	See Appendix 4
Cylinder Hd Vlvs-Intake & Exhst	03-360B	B	See Appendix 4
Cylinder Hd Vlvs-Bolting & Gaskt	03-360C	B	See Appendix 4
Cylinder Hd Vlvs-Sprngs & Retainers	03-360D	B	See Appendix 4
Cylinder Head Subcover Assembly	03-362A	B	See Appendix 4
Fuel Injection Tube Assembly	03-365C	B	See Appendix 4
Fuel Pump Linkage	03-371B	A	See Appendix 4
Intake Manifold	03-375	B	See Appendix 4
Exhaust Manifold Gaskets & Bolting	03-380B	B	See Appendix 4
Intke & Intrmdte Rkr Arm Shift Assy	03-390A	B	See Appendix 4
Exhaust Rocker Arm Assemblies	03-390B	B	See Appendix 4
Pushrods-Intake and Exhaust	03-390C	B	See Appendix 4
Pushrod-Connector	03-390D	B	See Appendix 4
Rocker Arm Bolts & Drivestuds	03-390G	B	See Appendix 4
Govnr Drive Coupling, Pins, & Keys	03-402B	A	See Appendix 4
Overspeed Governor	03-410A	A	See Appendix 4
Governor & Accessory Dirve Assy	03-410B	A	See Appendix 4
Overspeed Trip - Couplings	03-410C	A	See Appendix 4
Governor Linkage	03-413	A	See Appendix 4
Governor Head Exchanger	03-415C	A	See Appendix 4
Fuel Oil Filters & Strainers	03-455A	B	See Appendix 4
Trbochrgr Brkt Bolting & Gaskets	03-475D	B	See Appendix 4
Lube Oil Sump Tank	03-475D	B	See Appendix 4

2.4 Rework & Replacement

A number of product improvements and upgrades are now available for TDI engines which improve reliability. GSU has elected to install a number of these improvements. The following paragraphs describe the benefits of the significant upgrades.

- 1) Cylinder block and liners. The cylinder liners, cylinder head, studs and block liner landing surfaces were modified to comply with TDI's current manufacturing specification. The modification reduces cylinder block stress by reducing mechanical interference between the cylinder head, block and liner, and by increasing the vertical distance between the stud threads in the block and the liner landing surface. These measurements increase the margin against cylinder block cracking. Stud threads were cleaned using dies.
- 2) Pistons. The original pistons were replaced by the improved model "AE" piston, the current TDI production standard, and then inspected to the criteria of the TDI Diesel Generator Owners Group. As part of the AE piston installation, other TDI product improvements have been installed. These include improved piston rings to reduce the likelihood of liner scuffing during break-in, rework of piston crowns to reduce liner wear and oil consumption, and an improved piston pin retaining ring to improve maintainability.
- 3) Valve pushrods. The improved friction welded pushrods were installed as recommended by the TDI Diesel Generator Owners Group Design Review.
- 4) Jacket water pump. The jacket water pump will be reworked to include a nodular iron impeller without a keyway as recommended by the TDI Diesel Generator Owners Group.
- 5) Turbocharger. The turbocharger lubrication system was modified to improve lubrication during starting and reduce thrust bearing wear. The turbocharger mounting bracket was stiffened to reduce vibration. Turbocharger lube oil pressure was monitored to verify turbocharger thrust bearing wear status.

- 6) Fuel injection equipment. Fuel injection tubing, shown by inspection to have ID surface defects deeper than the 0.004 inch acceptance criteria, have been shrouded on a temporary basis to permit engine testing. The shrouding will contain fuel spray in the event of tubing rupture. By the end of 1984 TDI will be able to supply fuel injection tubing which has been given an autofrettage treatment to improve its fatigue resistance. This tubing has been ordered.

The original fuel injector tips with a 140 degree spray angle were replaced with an improved model with a 135 degree spray angle to eliminate fuel spray on cylinder walls and reduce liner wear. The 135 degree tips are the current TDI production standard.

The fuel injection pump return line has been replaced with heavier wall tubing as recommended by TDI.

- 7) Idler gear. An improved idler gear locknut has installed as a TDI recommended product improvement.
- 8) Cylinder heads. New manufactured cylinder heads are installed on Diesel Generator 1A. These cylinder heads are referred to as Group III heads in the TDI Diesel Generator Owners Group Design Review Report (see Section 2.2). These heads were 100% inspected as described in the detailed inspection reports.

2.5 Confirmatory Testing

The purpose of this activity is to verify engine reliability following engine inspection and rebuilding. Table 5A and 5B describes the confirmatory testing performed on Engines 1A and 1B, respectively. The preoperational tests described in FSAR Section 14.2.12.1.36 (revised in Enclosure 3 of the letter identified as Reference 5 of this report.)

The proposed testing program complies with the requirements of Regulatory Guide 1.108 as clarified in the letter identified as Reference 11 to this report.

TABLE 5A
OPERATIONAL TESTING
STANDBY DIESEL - 1A

NOTE: Testing Complete

TEST OBJECTIVE	ACCEPTANCE CRITERIA	RESULTS OR SCHEDULED COMPLETION
1) Manufacturer recommended test in accordance with TDI Service Information Memoranda #99	.	
a) Initial start, slow idle, No load, (15 minutes)	Operating parameters in the normal range Satisfactory crankcase inspection	Satisfactory
b) 450 rpm, no load, (30 minutes)	Adjust governor Overspeed trip satisfactory Verify generator differential shutdown Operating parameters in normal range Satisfactory crankcase inspection	Satisfactory
c) Generator phasing	Satisfactory Generator electrical checks Set electrical portion of governor	Satisfactory
d) 1 hour at 25% rated load	Operating parameters in normal range	Satisfactory
e) 1 hour at 50% rated load	Operating parameters in normal range	Satisfactory
f) 2 hours at 75% rated load	Operating parameters in normal range	Satisfactory
g) Return to 25% rated load	Operating parameters in normal range Verify parameters consistent with Step (d)	Satisfactory
h) 4 hours at 100% load (3500KW), followed by internal engine inspection, turbocharger vibration, bearing cooling and lubrication test	Operating parameters in normal range Crankcase inspection Crankshaft web deflection Piston skirt wear Cylinder liner wear Gear set wear Valves and rocker arms wear and clearances Cold compression pressure	Satisfactory

NOTE: Testing Complete

TABLE 5A
OPERATIONAL TESTING
STANDBY DIESEL 1A
(Continued)

RESULTS OR SCHEDULED COMPLETION

ACCEPTANCE CRITERIA

TEST OBJECTIVE

Satisfactory

Generator winding temperature

Satisfactory

Smooth operation

Cylinder firing pressures in balance

Operating parameters in normal range

Crankcase web deflection

Test complete. Satisfactory

Crankshaft stresses with allowable values

Operating parameters in normal range. All start attempts successful.

Satisfactory

Satisfactory

Satisfactory

NOTES

1. A modified start is defined as a start including a prelube period as recommended by the manufacturer and a 3 to 5 minute loading to the specified load level. Modified starts may be conducted with the engine at operating temperature.
2. Fast starts are simulated "black starts" on simulation of an ESF signal with the engine on ready standby status.

NOTE: Testing Complete

TABLE 5B
OPERATIONAL TESTING
STANDBY DIESEL - 1B

TEST OBJECTIVE	ACCEPTANCE CRITERIA	RESULTS OR SCHEDULED COMPLETION
1) Manufacturer recommended test in accordance with IDI Service Information Memoranda #99		
a) Initial start, slow idle, No load, (15 minutes)	Operating parameters in the normal range Satisfactory crankcase inspection	Satisfactory
b) 450 rpm, no load, (30 minutes)	Adjust governor Overspeed trip satisfactory Verify generator differential shutdown Operating parameters in normal range Satisfactory crankcase inspection	Satisfactory
c) Generator phasing	Satisfactory Generator electrical checks Set electrical portion of governor	Satisfactory
d) 1 hour at 25% rated load	Operating parameters in normal range	Satisfactory
e) 1 hour at 50% rated load	Operating parameters in normal range	Satisfactory
f) 2 hours at 75% rated load	Operating parameters in normal range	Satisfactory
g) Return to 25% rated load	Operating parameters in normal range Verify parameters consistent with Step (d)	Satisfactory
h) 4 hours at 100% load (3500kW), followed by internal engine inspection, turbocharger vibration, bearing cooling and lubrication test	Operating parameters in normal range Crankcase inspection Crankshaft web deflection Piston skirt wear Cylinder liner wear Gear set wear Valves and rocker arms wear and clearances Cold compression pressure	Satisfactory

TABLE 5B
OPERATIONAL TESTING
STANDBY DIESEL - 1B
(Continued)

NOTE: Testing Complete

<u>TEST OBJECTIVE</u>	<u>ACCEPTANCE CRITERIA</u>	<u>RESULTS OR SCHEDULED COMPLETION</u>
2) Engine timing and adjustments. 24 hours at 100% load. (power duration may vary)	Generator winding temperature Smooth operation Cylinder firing pressures in balance Operating parameters in normal range Crankcase web deflection	Satisfactory
3) Engine performance test. Demonstrate that each diesel operates within design parameters at 100% rated load, and demonstrate starting reliability.	Operating parameters in normal range. All start attempts successful.	
a) 24 hours at 100% rated load		Satisfactory
b) Ten modified starts (Note 1) to the load required by a loss of offsite power (approximately 75% of rated load) and run for a minimum of one hour.		Satisfactory
c) Two fast starts (Note 2) to 100% of rated load, and run for a minimum of four hours.		Satisfactory

NOTES

1. A modified start is defined as a start including a prelube period as recommended by the manufacturer and a 3 to 5 minute loading to the specified load level. Modified starts may be conducted with the engine at operating temperature.
2. Fast starts are simulated "black starts" on simulation of an ESF signal with the engine on ready standby status.

2.6 Post Test Inspection

Following the tests described in Section 2.5, GSU performs an engine inspection on many of the component groups. A summary of the engine component groups and post test inspection results are listed in Table 6A (Engine 1A) and 6B (Engine 1B). The purpose of this inspection is to look for potential latent problems not discovered in earlier inspections and tests and verify readiness for further operation. The preoperational test phase, consisting of the tests defined in FSAR Section 14.2.12.1.36, began upon satisfactory completion of the inspection and any required rework or retesting.

The post test inspection program is designed to provide a thorough engine inspection without major engine disassembly. Major disassembly is not considered necessary because of the thoroughness of the preservice inspection and design review program. Critical components can be adequately inspected by removing access covers and by oil analysis. The oil analysis indicates abnormal wear of bushings and bearings and the elemental analysis identifies the component in distress. The oil analysis also serves as a baseline for continued surveillance in the operating phase. Visual inspections to verify nominal wear, absence of discoloration from overheating, water leakage, and absence of wear products (metal particles) identifies distress conditions in combination with oil analysis.

TABLE 6A
POST TEST INSPECTION SUMMARY
STANDBY DIESEL - 1A

<u>Part Name</u>	<u>Part Number</u>	<u>Class</u>	<u>Results</u>
Tappets & Guides-Intake & Exhaust	03-345A	A	See Appendix 5
Tappets & Guides-Fuel Tappet Assy	03-345B	A	See Appendix 5
Camshaft Assembly	03-350A	A	See Appendix 5
Camshaft-Supports, Bolting & Gear	03-350C	A	See Appendix 5
Idler Gear Assy Crank to Pump Gear	03-355A	A	See Appendix 5
Cylinder Hd Vlvs-Bolting & Gasket	03-360C	B	See Appendix 5
Overspeed Trip - Coupling	03-410C	A	See Appendix 5
Governor Linkage	03-413	A	See Appendix 5
Lube Oil Sump Tank	03-540B	B	See Appendix 5

TABLE 6B
POST TEST INSPECTION SUMMARY
STANDBY DIESEL - 1B

<u>Part Name</u>	<u>Part Number</u>	<u>Class</u>	<u>Results</u>
Tappets & Guides-Intake & Exhaust	03-345A	A	See Appendix 6
Tappets & Guides-Fuel Tappet Assy	03-345B	A	See Appendix 6
Camshaft Assembly	03-350A	A	See Appendix 6
Camshaft-Supports,Bolting & Gear	03-350C	A	See Appendix 6
Idler Gear Assy Crank to Pump Gear	03-355A	A	See Appendix 6
Idler Gear Assembly	03-355B	A	See Appendix 6
Air Start Valve	03-359	A	See Appendix 6
Cylinder Hd Vlvs-Bolting & Gaskt	03-360C	B	See Appendix 6
Govnr Drive Coupling, Pins, & Keys	03-402B	A	See Appendix 6
Governor Linkage	03-413	A	See Appendix 6
Lube Oil Sump Tank	03-540B	B	See Appendix 6

2.7 Surveillance and Monitoring

GSU will implement a program of preventive maintenance, surveillance and monitoring to ensure long term engine reliability. This program is contained in Appendix II of the TDI Diesel Generator Design Review and Quality Revalidation (DR/QR) Report Revision 1 (Reference 1).

3.0 CONCLUSIONS

GSU believes that the problems of the TDI diesel generators are now understood as a result of the work of the TDI Diesel Generator Owners Group and the TDI diesel generator owners. Solutions to those problems are provided for River Bend Station through the measures described in this report. This program includes all the recommended actions of the TDI Diesel Generator Owners Group and Transamerica Delaval Inc. GSU believes these measures will provide reliable standby power for River Bend Station.

4.0 REFERENCES

1. DR/QR Revision 1 Report - Letter from J. C. Deddens (GSU) to H. R. Denton (NRC) dated March 7, 1985 (GSU Letter No. RBG-20351).
2. Tabulation of DR/QR Modifications - Letter from J. E. Booker (GSU) to H. R. Denton dated May 3, 1985 (GSU letter No. RBG-20891).
3. Partial Response to 12/29/83 NRC RAI - Letter from J. E. Booker to H. R. Denton dated April 11, 1985 (GSU Letter No. RBG-20685).
4. Completed response to 12/29/83 NRC RAI - Letter from J. E. Booker to H. R. Denton dated April 22, 1985 (GSU Letter No. RBG-20791).
5. Partial reponse to 1/29/85 NRC RAI - Letter from J. E. Booker to H. R. Denton dated April 11, 1985 (GSU Letter No. RBG-20684).
6. Completed response to 1/29/85 NRC RAI - Letter from J. E. Booker to H. R. Denton dated April 22, 1985 (GSU Letter No. RBG-20790).
7. Completed response to 2/11/85 NRC RAI - Letter from J. E. Booker to H. R. Denton dated April 9, 1985 (GSU Letter No. RBG-20681).
8. Information regarding the crankshaft - Letter from J. E. Booker to H. R. Denton dated April 9, 1985 (GSU Letter No. RBG-20646).
9. Diesel Generator 1A Inspection Reports - Letter from J. E. Booker to H. R. Denton dated October 16, 1984 (GSU Letter No. RBG-19210).

10. Diesel Generator Program Plan, Revision 0 - Letter from J. E. Booker to H. R. Denton dated December 21, 1984 (GSU Letter No. RBG-19762).
11. Completed Response to 4/1/85 and 4/30/85 NRC RAIs - Letter from J. E. Booker to H. R. Denton dated 5/15/85 (GSU Letter No. RBG-20994).

APPENDIX 1

Deleted 5/17/85 - See FSAR Section 14.2.12.1.36
as modified by Reference 5

APPENDIX 2

Submitted as part of Reference 9

APPENDIX 3

Submitted as part of Reference 10

APPENDIX 4

Submitted as part of Reference 10

APPENDIX 5

Submitted as part of Reference 10

APPENDIX 6

Submitted as part of Reference 10