

TEXAS UTILITIES GENERATING COMPANY

P. O. BOX 1002 · GLEN ROSE, TEXAS 76043

December 17, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Comanche Peak Steam Electric Station, Unit No.1
Docket No. 50-445
Texas Utilities Evaluation of the Design/Review
Quality Revalidation (DR/QR) Report on the TDI
Diesel Generators at CPSES Unit 1

- References:
1. Letter OGTP-246-0-132 to J. B. George from C.L. Ray, Jr., dated September 7, 1984;
 2. Letter OGTP-582-0-360 to J.B. George from C.L. Ray, Jr., dated November 21, 1984;
 3. Letter TXX-4326 (CPPA-41258) to H.R. Denton from J.B. George dated October 5, 1984;
 4. Letter TXX-4329 (CPPA-41272) to Dr. David Dingee from J.B. George dated October 8, 1984;
 5. Letter to M.D. Spence from B.J Youngblood dated October 1, 1984;
 6. Letter OGTP-176-0-92 to J.B. George from C.L. Ray, Jr., dated August 9, 1984.
 7. Letter OGTP-591-N-48 to H.R. Denton from C.L. Ray, Jr., dated November 27, 1984.
 8. Letter OGTP-627-N-51 to H.R. Denton from C.L. Ray, Jr. dated December 11, 1984.

Dear Mr. Denton:

Texas Utilities has recently completed a detailed evaluation of the DR/QR report (Reference 1) prepared by the TDI Diesel Generator Owners' Group for the CPSES Unit 1 diesel generators, including the revisions proposed in Reference 2. For all practical purposes, the CPSES DR/QR report represents the final results of Phases I and II of the

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Owners' Group program to assess the adequacy of the CPSES Unit 1 diesel generators to perform their intended safety function. Advance copies of the report were forwarded to NRC Staff and to consultants from Pacific Northwest Laboratories (PNL) via References 3 and 4, prior to review by Texas Utilities. Revisions proposed in Reference 2 have been reviewed by Texas Utilities and comments provided to the Owners' Group. Publication of the final DR/QR report revision by the Owners' Group is expected by January 1, 1985, and Texas Utilities presumes that there will be no substantial technical differences from the proposed revisions. Copies of the final revision will be forwarded to NRC upon receipt.

The purpose of this letter, therefore, is to provide for NRC and PNL review the results of Texas Utilities' evaluation of the revised DR/QR report, particularly the recommendations made therein to assure reliable diesel generator performance over the life of CPSES Unit 1. As established in Reference 5, actions taken and commitments made to date by Texas Utilities have been sufficient for NRC Staff reviewers of TDI diesel generator issues to conclude that the Unit 1 engines are adequate for first cycle operation. A report on Texas Utilities' progress in meeting the commitments identified in Reference 5 is currently under preparation and will be issued by December 20, 1984.

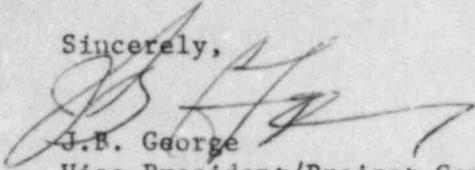
The DR/QR report recommendations are categorized and discussed as follows:

- Recommended modifications to equipment. These are discussed in Enclosure 1 to this letter;
- Recommended maintenance and surveillance activities. These are discussed in Enclosure 2 to this letter;
- Recommended baseline vibration testing for the engine, piping, tubing and components (one engine only). Baseline vibration testing has recently been performed per Owners' Group procedures (Reference 6) as recommended, subject to a restriction to load the engines no higher than 5740 KW (approximately 82 percent of rated capacity) as directed in Reference 5. Baseline data are to be used to identify engine components with unusually high vibration levels and to determine initial vibration characteristics of the engine, thus providing a basis for subsequent trend analysis and comparison with similar engines. Baseline data will be reduced and evaluated against acceptance criteria established by TDI and Owners' Group personnel. The Owners' Group will issue a formal report in mid-January, 1985, on engine vibration testing.

TXX-4377
CPPA-42175

Should there be any questions or concerns on this matter, please feel free to contact us at any time.

Sincerely,



J.B. George
Vice President/Project General Manager

JBG/SMW/ljh

Enclosure

CC: ARMS
M.D. Spence
J.T. Merritt
J.W. Beck
D.H. Wade
R.A. Jones
R.E. Camp
C.K. Moehlman
N.S. Reynolds
V. Noonan - NRC
C. Berlinger - NRC
S. Burwell - NRC
D. Persinko - NRC
C.L. Ray - Duke/TDI Owners' Group
A.P. Cobb - Duke/TDI Owners' Group
B.R. Clements
L.F. Fikar
J. Stefano - NRC
K. Trickett - Doe
W. Laity - PNL
B.J. Youngblood - NRC
Files

Enclosure 1

Results of Texas Utilities Evaluation of the CPSES DR/QR Report
Recommendations for Diesel Generator Equipment Modifications

Texas Utilities concurs with all Owners' Group recommended modifications to piping and tubing supports, couplings and electrical controls as stated in the revised CPSES DR/QR report with the following clarifications:

1) Component CP-102, Generator Controls

Several options were identified in the report for this component. Texas Utilities currently intends to implement the "maintenance and modification" recommendations identified in Attachment 1 to the referenced component report. However, the interval for monitoring of the pertinent sub-components has been modified by Texas Utilities as stated in Enclosure 2 to this letter.

2) Component 02-455B, Fuel Oil Strainers

A recommendation was made for this component to change the size of the fuel oil strainers to a coarser design should the currently installed strainers require excessive cleaning. Based on a lack of problem experience with the installed strainers during engine operation, Texas Utilities does not intend to replace the strainers, however, this position may be reevaluated if the need arises in the future.

The DR/QR equipment modification recommendations as clarified above will be implemented, as applicable, for both CPSES Unit 1 diesel generators. Except for generator control panel modifications, the recommended modifications will be implemented prior to the restart from the first refueling outage at CPSES Unit 1. Generator control panels will be modified prior to exceeding 5% power to enable subsequent monitoring of specified sub-components.

Enclosure 2

Results of Texas Utilities' Evaluation of the CPSES DR/QR
Recommendations Regarding Maintenance and Surveillance Activities

Texas Utilities concurs with all Owners' Group recommended maintenance and surveillance activities as stated in the revised CPSES DR/QR component reports and revised maintenance matrix, with the following proposed modifications and/or clarifications:

1) Component F-068, Intercoolers

Item 2 in the revised maintenance matrix recommends cleaning and inspection of intercooler shell and tube sides after every refueling outage. Texas Utilities concurs with the inspection interval for the tube side, however, it is proposed that the shell side be comparably inspected at a five (5) year interval, based on a lack of identified problem experience for the shell side.

2) Component MP-022/23 Turbochargers

Item 2 in the revised maintenance matrix recommends cleaning of the turbocharger impeller and diffuser at every refueling outage. Texas Utilities proposes as a more practical maintenance approach that the impellers and diffusers be inspected every refueling outage and cleaned if necessary.

A supplementary Phase I report on turbocharger nozzle ring assemblies has also been issued by the Owners' Group (Reference 7) which contains the following additional Utility recommendations:

- a. At any turbocharger disassembly there should be a visual inspection of nozzle ring components for any apparent damage, failure or apparent mispositioning of vanes. Replace all affected nozzle ring components. During reassembly ensure that capscrews are properly installed with recommended pretorque.
- b. Monitor engine operation to ensure exhaust gas temperatures do not exceed those specified.

Texas Utilities will comply with the utility recommendation a) above during all turbocharger disassemblies and will perform pre-turbine exhaust temperature monitoring on a monthly basis.

3) Component 00-420, Lube Oil Pressure Regulating Valve

Item 1 in the revised maintenance matrix recommends valve disassembly and cleaning at every outage. Texas Utilities concurs, but proposes that the interval be changed to alternate refueling outages based on satisfactory industry experience with this valve.

4) Component 02-307B, Lube Oil Fittings, Internal

Texas Utilities concurs with the recommendation in Item 1 to check tubing for dents or crimps at every refueling outage, however, this will be performed on accessible tubing only.

5) Component 02-310A, Crankshaft

Item 2 in the revised maintenance matrix recommends that all crank journal diameters be measured at alternate outages. Texas Utilities proposes that a sample of main journals be measured at alternate refueling outages in order to be compatible with the established sampling frequency for the main bearing shells (see component 02-310B).

6) Component 02-310B, Main Bearing Shells

Item 1 in the revised maintenance matrix recommends visual and dimensional inspection of all main bearing shells for evidence of wear or misalignment at the first refueling outage and at alternate outages thereafter. Texas Utilities believes that the minimal problems encountered with the CPSES Unit 1 DG main bearing shells do not warrant inspection to the degree recommended by the Owners' Group. This position is in agreement with the assessment by NRC and PNL of CPSES main bearing shell experience, as stated on pages 5.12 and 5.13 of PNL-5234 (enclosure to Reference 5). As recommended by NRC and PNL, Texas Utilities will perform a sample inspection of two (2) highly loaded bearings per engine (bearings 5 and 6) at alternate refueling outages. Associated caps and saddles will also be checked. The need for additional inspection will be determined by the results of the initial sample inspection. Due to accessibility restrictions, inspection of bearings 1, 9, and 10 are to be performed only during an engine teardown (every 5 years).

7) Component 02-310C, Thrust Bearing Ring

Item 2 in the revised maintenance matrix recommends a visual inspection of the thrust bearing for signs of wear or degradation concurrently with visual and dimensional main bearing shell inspections as recommended above. However, the main bearing shell inspection frequency has been modified as stated above. Texas Utilities proposes that the recommended visual inspection would be adequate if performed at a five (5) year interval (i.e. at overhauls) since a "bump check" for thrust bearing clearance will be performed at every refueling outage.

8) Component 02-315A, Cylinder Blocks

Item 1 in the revised maintenance matrix recommends a visual inspection of the cylinder block and eddy-current inspection for stud-to-stud cracks between cylinder heads and for cracks between the block edge and studs at the block ends. The recommended frequency for the inspection is prior to returning the engine to standby service after any period of operation above 50% load.

Texas Utilities agrees that surveillance of the block top surfaces to ensure the absence of stud-to-stud cracks and stud-to-edge cracks is appropriate for the first cycle of operation at CPSES Unit 1, until such time as the indications found on Train A, cylinders 4R and 5R and on Train B, Cylinder 1R and 4R are reinspected at the first refueling outage. Future inspection requirements should be based on the results of the above inspections and on any additional information provided by the Owners' Group. This position is in agreement with PNL's position in PNL-5234. Texas Utilities proposes at this time, however, that a visual and boroscopic examination be substituted for the eddy-current technique at the same frequency of performance. Texas Utilities believes that the use of visual/boroscopic examination will result in greater engine availability and is justifiable based on the stated conservatism in the Owners' Group assessment of the CPSES block indications as "ligament cracks" and on the absence of Widmanstaetten graphite in the CPSES cylinder blocks.

The indications in the Train A right bank cylinder block are the largest found at CPSES, but the Owners' Group has concluded that they were casting induced not service induced. The smaller indications in the Train B right bank cylinder block were also determined to be casting defects (by TUGCO) and are less than 0.050 inches in depth. All of these indications are in lower stress regions of the block top than ligament cracks and are all smaller than ligament cracks.

Widmanstaetten graphite is a degenerate microstructure that reduces the strength and fatigue resistance of grey cast iron. The Owners' Group has determined that there is no Widmanstaetten graphite present in the CPSES Unit 1 cylinder blocks.

The Owners' Group has stated in the latest Phase I report (reference 8) that blocks which have or are assumed to have ligament cracks and which have no Widmanstaetten graphite are capable of withstanding a LOOP/LOCA event with sufficient margin, provided no stud-to-stud or stud-to-edge cracks exist. Furthermore, engines with such cracks can still be returned to standby service provided these cracks are less than 1½ inches in depth from the block top. Because initiation of stud-to-stud or stud-to-end cracks occurs at the block top surface and because they propagate downward, visual surface inspection of the block top prior to returning an engine to service will be adequate to assure the absence of such cracks.

As required in Reference 5, Texas Utilities will also perform routine daily visual inspections of the block and external surfaces during operating periods, with a more thorough monthly inspection under strong lighting (also with the engine operating). As stated above, block indications are to be reinspected for propagation at the first refueling outage. The cylinder block camshaft gallery will also be visually inspected at each refueling outage.

9) Component 02-340A, Connecting Rods

Item 2 in the revised maintenance matrix recommends inspection and measurement of connecting rods at 5 year intervals. NRC requirements in Reference 5, however, specify a visual inspection of all rod box external surfaces and a bolt preload check at each 200 hours of operation or at 9 months, whichever comes first.

Texas Utilities will comply with the requirements specified by NRC in Reference 5 for the connecting rods. It is hereby requested, however, that the inspection interval be changed to each 200 hours of operation or each refueling outage, whichever comes first. Texas Utilities believes that hours of operation would have more of an affect on the likelihood of bolt pre-load relaxation than would the passage of time, and should be the parameter of concern.

10) Component 02-340B, Connecting Rod Bearing Shells

Item 1 in the revised maintenance matrix recommends that visual and dimensional inspection of all bearing shells be performed at the outage which precedes 500 hours of operation by at least the sum of hours of operation in a LOOP/LOCA plus the expected hours of operation between outages.

In place of the above scheme, Texas Utilities will perform a visual and radiographic examination of connecting rod bearing shells for 2 sets of pistons per engine, as specified by NRC in Reference 5, at the first refueling outage. Lube oil analysis for contamination will be performed on a monthly basis, and bearing clearance will be measured by "bump check" at every refueling outage.

11) Component 02-341A, Pistons

Items 1 and 2 in the original maintenance matrix recommended visual and liquid penetrant inspections respectively, for pistons at 5 year intervals. NRC has specified in Reference 5 that these inspections also be performed on 2 sets of pistons at the first refueling outage.

Texas Utilities has learned informally through the Owners' Group that substantial positive operating and inspection data have been gained on Type AE pistons as a result of a 750 hour run on an AE-equipped engine at Shoreham Nuclear Power Station. The Owners' Group has also proposed deleting the liquid penetrant inspection in a revision to the maintenance matrix. Based on this information, it is possible that concerns with regard to AE pistons may be eliminated in the near future. Therefore, Texas Utilities hereby defers commitment to an inspection of AE pistons and requests that NRC reevaluate the need for such inspections in light of this information.

12) Component 02-350A, Cam Shaft Assembly

Item 1 in the original maintenance matrix recommended visual inspection of all cam lobe surfaces at 5 year intervals, while the component report specifies inspection at each outage. The Owners' Group has revised the frequency in the maintenance matrix to agree with the component report frequency. This is in conformance with NRC requirements specified in Reference 5 and the inspection will be performed by Texas Utilities at each refueling outage.

13) Component 02-380A, Exhaust Manifold

Item 1 in the revised maintenance matrix recommends magnetic particle examination of a sample of circumferential pipe welds and corresponding heat affected zones at the first refueling outage and at alternate refueling outages thereafter.

Texas Utilities proposes to visually examine all accessible welds at the frequency given above, instead of a sample of magnetic particle tests. It is felt that this procedure would provide a more practical approach with broader weld inspection coverage.

14) Component 02-387A, Crankcase Vacuum Fan

Item 1 in the revised maintenance matrix recommends cleaning and inspection of the fan at alternate outages. Texas Utilities proposes, as a more practical approach, that the fan be inspected at alternate refueling outages with cleaning as necessary.

15) Component 02-390E, Rocker Arm Bushings

Item 1 in the revised maintenance matrix recommends visual and dimensional inspection of intake rocker arm bushings at the outage which precedes 2300 hours of operation by at least the sum of expected hours of operation in a LOOP/LOCA plus the expected hours of operation between outages. However, NRC has concurred in Reference 5 with Texas Utilities earlier proposal to visually inspect rocker arms at each refueling outage.

Based on the above, Texas Utilities will perform a visual inspection of the intake rocker arms at every refueling outage, and will measure them every 5 years during overhauls.

16) Component 02-410A, Overspeed Trip Governor

Recommended settings will be reviewed to ensure compatibility with the Texas Utilities' grid system requirements and may be adjusted accordingly.

17) Component 02-410C, Overspeed Trip Drive Couplings

Item 3 in the maintenance matrix recommends that the present L-110 Lovejoy couplings be replaced with new units at the next outage, per TDI Service Information Memo (SIM) 363. Texas Utilities does not intend to replace these couplings at the first refueling outage because they were already replaced per SIM 363 instructions.

18) Component 02-413A, Governor Linkage

Item 1 in the original maintenance matrix recommends that bolt heads and roll pins be lockwired. The Owners' Group has revised this item to read: "Install positive locking hardware to the lever arm clamp bolt heads and shaft roll pins."

Texas Utilities will install lockwire on all fasteners designed for use with lockwire. Other locking hardware will be installed where specified.

19) Component 02-415A, Woodward Governor

Recommended settings will be reviewed to ensure compatibility with the Texas Utilities grid system requirements, and may be adjusted accordingly.

20) Component 02-500C, Breakers & Contact Blocks

Item 3 in the revised maintenance matrix recommends that circuit breakers be trip-checked at each outage. Texas Utilities believes that breakers of the molded case type should not be tested at frequent intervals and proposes to perform this test every 5 years for this type of breaker. Other types of breakers would be tested at each refueling outage as recommended.

21) Components 02-525B, C, Barring Device Controls & Filter

Because the barring device is not required during engine operation, the Owners' Group recommendations for the associated components may not necessarily be incorporated by Texas Utilities, but will be taken into consideration.

22) Component 02-717C, Jacket Water Piping, Couplings, Fittings, Orifices & Y-Strainers

The DR/QR component report recommends that flanges be torqued per the general torque tables in the TDI Instruction Manual. Texas Utilities flange torquing procedure provides for greater torque than the general torque tables and will provide adequate load transfer to attaching supports.

23) Component 02-717G, K, Lube Oil Valves and Fuel Oil Valves

Item 2 in the original maintenance matrix recommended disassembly, cleaning and checking of lift pressure for lube oil and fuel oil relief valves at every outage, while the lube oil valve component report specifies a 5 year interval for checking lift pressure and the fuel oil valve component report does not address lift pressure at all. A revision to the maintenance matrix has been proposed by the Owners' Group, however, which sets the interval for checking lift pressure on lube oil and fuel oil relief valves at 5 year intervals. Texas Utilities will comply with the revised recommendation.

24) Component 02-810E, Jacket Water Heaters

The Owner' Group recommends in the revised maintenance matrix that the following be performed at each outage: 1) measure heater insulation resistance, 2) inspect and clean heater elements, and 3) check calibration and inspect thermostat. However, this recommendation appears to be arbitrary in that it is not based on either a design review or on adverse component experience according to the component report. Texas Utilities believes that the activities recommended above would be adequate if performed at alternate refueling outages and intends to implement that interval.

25) Component 02-820A, Lube Oil Sump Tank Heaters

The Owners' Group recommends that heater insulation resistance be measured and that thermostats be checked and calibrated at every outage. Based on satisfactory experience with these heaters, however, Texas Utilities proposes that these activities be performed at alternate refueling outages. The heater elements will be inspected at every refueling outage in conjunction with the tank inspection, as recommended.

26) Component CP-102, Generator Controls

Items 6, 7 and 8 in the revised maintenance matrix recommend monthly inspection of temperature sensitive tape and Glyptol lacquer that are to be applied to several control panel components. The tape is also specified to be examined before and after each running of the engine.

Texas Utilities believes that operating experience with the subject components at CPSES Unit 1 has been extremely positive and does not warrant inspection at the recommended frequency. No overheating or vibration problems, which the recommended measures are designed to detect, have been encountered with these components even during extended full load runs of the engines. On this basis, Texas Utilities proposes that the inspection be performed at each refueling outage.

The DR/QR maintenance and surveillance activities recommended by the Owners' Group are to be incorporated into the CPSES Unit 1 diesel generator preventive maintenance and surveillance program, as modified and/or clarified above, as follows:

Monthly and daily surveillance and maintenance items are to be incorporated into the surveillance or maintenance programs prior to exceeding 5% power at CPSES Unit 1. Items based on number of engine starts or hours of operation, as well as 18 month surveillance items, are included in this category.

Surveillance and maintenance items which are to be accomplished on a refueling outage or longer basis will be incorporated into the appropriate programs prior to the first refueling outage.

It should be noted, however, that evolution of the maintenance and surveillance program can be expected to occur based on implementation feedback, inspection results and on additional input from NRC, the Owners' Group, TDI or other applicable sources. Also, variations in the methods of achieving the intent of the recommendations may be necessary upon implementation in order to provide a practical approach to maintenance. NRC is hereby requested to provide guidance on the subject of possible future changes (both major and minor) to the programs for the reasons stated above, particularly regarding NRC notification of prospective changes.

Finally, the TDI inspection and maintenance forms referenced in the "Comments" section of the maintenance matrix may or may not be used in the performance of the recommended activities. Maintenance instructions and procedures will specify which forms are to be used, if any, for a specified activity.