Docket Nos.: 50-445
and 50-446

JUN 2 5 1985

MEMORANDUM FOR: Vincent S. Noonan, Director
for Comanche Peak Project, DL

FROM: S. B. Burwell, Project Manager
Licensing Branch No. 1, DL

SUBJECT: FORTHCOMING MEETING WITH TEXAS UTILITIES TO AUDIT THE COMANCHE PEAK DIESEL GENERATOR RELIABILITY PROGRAM

DATE & TIME: Monday, July 1, 1985 1:00 p.m. - 5:00 p.m.
Tuesday, July 2, 1985 8:30 a.m. - 4:00 p.m.

LOCATION: Visitors Center/Nuclear Operations Support Facility
Comanche Peak Steam Electric Station, F. M. 201
Glen Rose, Texas

PURPOSE: Audit the design review/quality revalidation (DR/QR) program for the Comanche Peak diesel generators manufactured by Transamerica Delaval, Inc. (TDI), a part of Phase 2 of the TDI Owners Group Prgram. The enclosed questions will be used as an agenda. Open issues identified in SSER No. 6 Section 9.5.9 may be discussed.

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Enclosure: As stated

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COMANCHE PEAK

JUN 2 5 1985

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ENCLOSURE

QUESTIONS RAISED IN CPSES DR/QR AUDIT REVIEW

CP102 - Generator Controls

In the opinion of the PNL reviewers, the analysis reported for the generator controls does not meet the objective of the DR/QR effort, primarily because the methodology followed was too limited in scope. It addresses only four of the generators control components and leaves many out that are critical to system reliability.

Design/Quality Concerns

Generally most voltage regulator and exciter failure modes are considered critical to the overall reliability of the diesel generator, especially those involving common mode effects. Comments pertinent to the results and conclusions of the Comanche Peak DR/QR report are:

- Diodes and SCRs -- States that current ratings are adequate subject to proper cooling. Does not address voltage ratings. At least four failure incidents listed in the EDGCTS are unexplained as to probable failure modes. One failure related to out-of-phase paralleling, it may have been caused by the sustained overvoltage conditions prevalent in such events. The temperature monitoring provisions of Attachment 1 would not preclude the occurrence of a failure during an emergency operating condition. It is recommended that tests be implemented to positively identify over-temperature conditions and permanent corrective actions taken as required. This effort should be accomplished by TUGCO as soon as practical.

- Field flashing relay voltage specifications in Attachment 1 may not be adequate. A nominal voltage rating equal to or lower than the lowest expected battery voltage should be specified to insure relay pick-up. A dropping resistor by-passed by a normally closed relay contact should be use to prevent coil damage when energized at higher voltage levels. This is standard practice and is needed to insure relay pick-up under low voltage conditions and to preclude relay coil overheating under maximum voltage conditions.

- Rather than relying only on a device such as Glyptol lacquer to monitor fastener tightness, positive actions should be taken to insure such tightness. Fastener locking devices such as the use of double nuts or a bonding agent such as LOCTITE 271 (Loctite Corporation, Newington, Connecticut 06111) are more positive.

- Substitution of lockable potentiometers may be preferred to monitoring by use of Glyptol lacquer.

- Cabinet ventilation -- forced ventilation can create new reliability problems by sucking-in large quantities of lint and dirt if the cabinet is on the suction side of the fan(s). The presence of vent filters would not help if other openings such as enclosure joints, unused fastener holes, or openings around cable penetrations bypass the filters. These problems require much attention to detail and can be avoided by installing the fans so they discharge into the cabinet through filters or with filters on the

suction cabinet through filters or with filters on the suction side. Or perhaps forced ventilation could be avoided by relocating temperature-critical components to the bottom of the enclosure where air temperatures are lower.

- Power Supply Bypassing -- The recommendations for power supply bypassing were made without an apparent knowledge of the energy levels of transient overvoltages to be suppressed. The EDGCTS shows incidents involving large voltage spikes. An investigation should be made to assess such energy levels to insure adequate semiconductor protection. TUGCO should give this a high priority for resolution.

- Current Feedback Signal — The need for this recommendation is not apparent from available performance data.

- The status remarks of the EDGCTS designated fifteen incidents as random failures having no relevance to Comanche Peak reliability. These random failures include four fuseholder failures and seven relay or relay contact failures representing discernible failure patterns which should be investigated. No effort appears to have been made to identify and document all probable failure modes on other listed incidents. Most of these incidents caused outage of the emergency generator, therefore their impact should have been considered critical to reliability.

F-068 - Intercooler

The report did not confirm that the heat rejection capacity of the cooler is adequate for the application. In the case of the turbocharger this was done via test logs. A related concern is whether the cooler will function adequately if it were 10% (example) fouled.

00-420 - Lube Oil Pressure Regulatory Valve

The QR inspection reports apparently were not available to the Owners' Group Review Team. Does the conclusion regarding adequacy of the component still remain on open question?

00-621A - Fuel Oil Drip Tank

Can TUGCO confirm that fuel return entry is not by means of an open funnel which also can admit dirt?

02-310B - Crankshaft Bearing Shells

The minimum oil film thickness of 147 microinches is about 10% below the expected minimum value for the level of filtration pertaining to CPSES. Moreover, if a 10 micron filter is used it will pass dirt that is twice the size of the oil film thickness.

Normally, bearing shell crush (radial interference) and side location, and details of the design of oil holes and grooves are considered in a design review because these are fundamental to strength, lubrication and cooling of the bearing. Why was this not done?

The QR makes no direct reference to hardware checks (inspections). Was anything done in this regard?

02-310C - Crankshaft Thrust Bearing Rings

The DR did not address axial vibration as a source of thrust bearing loading. This can be a significant force. Please explain.

The QR makes no reference to inspections. Were any done?

02-335B - Front Gear Gasket/Bolting

The QR does not confirm that bolts were torqued to 60 ft-lbs. Was this confirmed?

02-341C - Piston Pin Assembly

The QR indicates a complete inspection of piston pins on EDG-01 with unsatisfactory results. EDG-02 was inspected on all right bank pins with satisfactory results. In view of the unsatisfactory findings on EDG-01 and similar unsatisfactory results on other TDI engines (e.g., River Bend)? Can TUGCO explain why all pins were not inspected on EDG-02?

The application of chrome plating can reduce the fatigue strength of steels. Was this considered in the DR?

02-350B - Exhaust Manifold Bolting and Gaskets

There have been a number of instances of fires caused by impingement of oil on hot engine parts. The exhaust manifold elbow is not insulated from the cylinder head to a point inside of the exhaust manifold shield. It is considered important that TUGCO confirm that lube oil or fuel oil cannot spray on the hot exhaust elbows. In particular all piping joints should be checked to insure that spray could not impinge on hot surfaces if a leak developed. Possible use of shrouded joints should be considered.

02-420 - Engine Driven Lube Oil Pump

It is noted that the pump body and nozzle are made of cast iron; presumably the mounting flanges are also of cast iron. Did the DR confirm these parts can withstand seismic load?

02-540A,B,C - Lube Oil Sump Tank - Strainer Assembly

The DR did not address accessibility for maintenance to verify that the strainer and the lube oil heater can be removed and reinstalled with high probability of maintaining system cleanliness and tightness. Can TUGCO comment on this?

02-689 - Off-Engine Alarm Sensors - Wiring

The QR did not confirm that wiring (items 2, 3, and 4) meet IEEE 383 requirements.

02-7170.H,I - Auxiliary Subbase Gaskets, Bolting, Fittings

The QR did not include a walkdown to confirm the absence of low spots that could trap sludge or foreign matter. Can TUGCO confirm this?

02-810A - Misc. Equipment - Aux. Jacket Water Pump

The DR makes no mention of the capacity of the auxiliary (or engine driven) jacket water pumps. Are they adequate?

02-810C - Jacket Water Heat Exchanger

There is no indication that the heat exchanger performance will be adequate under the extremes of temperature that might prevail at TUGCO. The review does not correlate the performance of the various components of the system such as the jacket water pump, strainers and thermostats. Are they all compatible?

02-810E - Jacket Water Standpipe Heater

Problems with the component were encountered at Shoreham. Can TUGCO confirm that there is no similarity between the Shoreham and CPSES installations?

02-820B - Auxiliary Lube Oil Pump

The DR does not state that the capacity and pressure of this pump is equal to that of the engine driven pump. TUGCO should verify this.

02-8200.E - Lube Oil Keepwarm Strainer/Filter

The DR did not verify that the strainer or filter flow capacity is equal to or greater than that of the prelube oil pump (90 GPM). TUGCO should confirm this.

Note also that a plot of filter dp versus time would be a useful maintenance tool.

02-820F - Fuel Flow Lube Oil Filters

TUGCO should verify that the filter capacity is sufficient for the engine driven lube oil pump (600 GPM). Also, there is no indication as to whether a relief valve and bypass around the filter is provided. If it is, the valve should be installed at the top of the filter to prevent the passage of dirt and sludge into the engine if the valve lifts. If the engine is required to start when the lube oil heater is inoperative, it may be necessary to have a bypass in order to insure that the engine will be lubricated adequately under this cold start condition. In any case, the pressure drop should be checked and recorded at regular intervals so as to anticipate the necessity for a filter change. Appendix C indicates a number of instances of excessive pressure drop across filters which indicates that filter elements are not always changed when they should be.

02-820G - Lube Oil Heat Exchanger

If the cooling water is too cold, sludge in the oil will deposit on the fins and reduce the heat exchanger capacity. Was this considered in the DR/QR?

02-820H - Lube Oil Fuel Pressure Strainer

TUGCO should confirm that the capacity is greater than or equal to that of the engine driven lube oil pump (600 GPM).

02-825A - Fuel Oil Day Tank

There is no indication in the DR/QR that there is adequate means of removing water from the fuel oil to insure that the fuel injection pumps are protected. A drain line at the bottom of the day tank would be useful in view of the intermittent operation of the engine. However, even if the engine runs continuously for several hours at full load, there will be insufficient time for water to settle in the day tank. TUGCO should verify that there is means for stripping or filtering water from the fuel oil.

02-838A - Starting Air Skid Base, Tank Relief Valve, Float Trap and Tank

TUGCO should verify that there is adequate accessibility to the air valves and float traps for maintenance. In addition, it is noted that the starging air relief valve capacity is slightly greater than the compressor capacity. TUGCO should verify that it is not possible to connect more then one compressor to each air tank.