



ENTERGY

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Vice President
Operations
Grand Gulf Nuclear Station

June 17, 1994

U. S. Nuclear Regulatory Commission
Mail Station P1-37
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Operating License Amendments
Emergency Diesel Generator Maintenance and Surveillance
Proposed Amendment to the Operating License (PCOL-94/02)

GNRO-94/00090

Gentlemen:

This letter contains proposed amendments to the Grand Gulf Nuclear Station (GGNS) Operating License. These proposed changes would remove license conditions for Emergency Diesel Generators (EDGs) associated with NUREG-1216. These license requirements came about as a result of concerns with the reliability of large bore, medium speed, standby diesel generators manufactured by Transamerica Delaval, Inc. (TDI). NUREG-1216 called for extensive periodic engine teardowns as the major part of a maintenance and surveillance program for the TDI engines. The inspections that have been performed to date have not shown any unusual wear patterns that would have caused engine failure. The health of the majority of the components inspected during these teardowns could be determined by other methods such as monitoring and or trending of operational parameters.

The TDI Owners Group Topical Report, (Reference 1), contains the submittals to remove the NUREG-1216 requirements. On March 17, 1994, the NRC issued a generic safety evaluation report (SER), (Reference 2), granting approval to remove the license requirements associated with NUREG-1216 from utilities licenses. On the bases of NRC generic approval in the SER dated March 17, 1994, Entergy Operations requests removal of the NUREG-1216 requirements from the GGNS Operating License.

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Entergy Operations agrees that the owners group submittals as well as the generic SER are representative of the design and operation of the TDI engines at GGNS. Entergy Operations is in agreement with all points of NRC's SER with the clarification noted in Attachment 2.

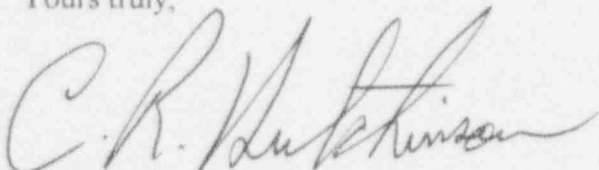
Attachment 2 provides a description of the proposed changes, associated justification, and the No Significant Hazards considerations basis. Attachment 3 is a copy of the marked-up pages.

In accordance with the provisions of 10CFR50.4, the signed original of the requested amendment is enclosed. This amendment request has been reviewed and accepted by the Plant Safety Review Committee and the Safety Review Committee.

It is requested that approval of this PCOL be granted by September 1, 1994 in order to finalize plans for RF07 scheduled for spring 1995. This submittal supercedes all previous commitments.

If you have any questions concerning this PCOL, please contact James Owens at (601) 437-6483.

Yours truly,



CRH/JEO/mtc

attachments: 1. Affirmation per 10CFR50.30
 2. GGNS PCOL-94/02
 3. Mark-up of Affected Pages
cc: (See Next Page)

cc:

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BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-29

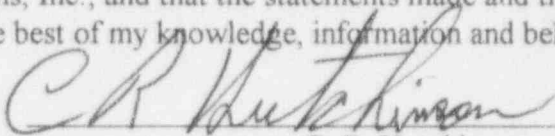
DOCKET NO. 50-416

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION
and
ENTERGY OPERATIONS, INC.

AFFIRMATION

I, C. R. Hutchinson, being duly sworn, state that I am Vice President, Operations GGNS of Entergy Operations, Inc.; that on behalf of Entergy Operations, Inc., System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this application for amendment of the Operating License of the Grand Gulf Nuclear Station; that I signed this application as Vice President, Operations GGNS of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information and belief.

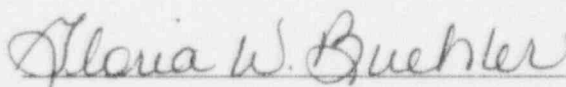


C. R. Hutchinson

STATE OF MISSISSIPPI
COUNTY OF CLAYBORNE

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 7th day of June, 1994.

(SEAL)



Notary Public

My commission expires:

MISSISSIPPI STATEWIDE NOTARY PUBLIC
BY EXAMINATION BEGAN MAY 18, 1997
BONDED WITH STORAGE BUREAU #100000

A. SUBJECT:

1. PCOL-94/02: Deletion of the License Requirements imposed by NUREG-1216
2. Affected Operating License Pages
 - a. Reliability of Diesel-Generators, Page 10 of the Operating License, Item 25 (b)
 - b. Attachment 2 to the Grand Gulf Nuclear Station Operating License, Pages (all)

B. DISCUSSION:

The TDI Owners Group was formed in late 1983 as a result of the failure of a crankshaft at the Shoreham Nuclear Plant. The crankshaft failure at Shoreham raised questions about the overall suitability of the TDI engines for nuclear service. In response to these concerns, the owners developed a detailed plan to review the design and validate the acceptability of the TDI engines for nuclear service. This program, the Design Review/Quality Revalidation (DR/QR) program, was reviewed by the NRC and endorsed as NUREG-1216. The DR/QR program served the purpose for which it was intended, that being to ensure the TDI engines were suitable for nuclear service. It is on the basis of the following information and the NRC's Safety Evaluation Report dated March 17, 1994, that removal of the requirements of NUREG-1216 from the Grand Gulf Operating License is requested.

The Owners Group submittals included data from past engine teardowns and reliability and availability data for all the TDI engines currently in nuclear service. The Owners Group submittals also included plant specific differences in design of the engines (e.g. Grand Gulf's 1 7/8" connecting rod bolts). It is Entergy's position that the TDI Owner's Group submittals cover the entire spectrum of design issues for the TDI engines.

Entergy Operations views the NRC's Generic Safety Evaluation as a positive step in improving both reliability and availability of the TDI engines. However, one point of the SER bears clarification. The SER on page 9, paragraph 5, implies that all licensees are committed to implement slow starts. Entergy agrees that slow starts reduce stress and wear on internal engine components. Our experience, however, has shown that fast starts have not adversely affected engine performance or resulted in excessive or rapid engine wear when proper pre-lubrication procedures are used prior to planned engine starts. Our operating procedure controls require pre-lubrication of the diesel with the Auxiliary Lube Oil Pump immediately prior to starting the engine. This method has proven very effective in maintaining very low wear rates on internal engine components and turbocharger thrust bearings. We believe that our pre-lubrication controls are equivalent to slow starts in addressing the underlying concerns associated with cold fast starts. On the other hand, we do commit to evaluate implementation of slow start

capability if wear monitoring, through lubricating oil analysis or other reliable methods, reveals an excessive wear rate.

C. JUSTIFICATION:

The following information provides the justification for PCOL-94/02.

1. The Owners Group submittals contained in Reference 1, provided data from teardowns and inspections of all the TDI engines currently in nuclear service. This data did not reveal any unusual or abnormal wear patterns for the components inspected. Given past inspection results and the better than required average reliability for these machines, it is no longer necessary to subject the TDI engines to a program of strict time based teardowns that are more stringent than requirements for other manufacture's engine.
2. The teardowns called for in NUREG-1216 require a significant amount of time to perform, causing outage scheduling problems and increased outage risk. During these inspections the diesel generator is not available to perform its design function of supplying emergency power. With recent studies highlighting the risk associated with shutdown reactors, having emergency power available has proven to be a vital contributor to reducing outage risk.
3. As pointed out in the NRC safety evaluation report for the owners group generic submittal, research (Reference 3) has indicated the potential negative consequences of intrusive inspections (engine teardowns) on engine reliability. This study showed a marked decrease in reliability immediately following intrusive inspections. After the components of the engine are broken in (wear in period) there is a extended period of increased reliability lasting until the machinery reaches the end of its lifetime.
4. The Owners Group report envelopes Grand Gulf design and operation.

D. NO SIGNIFICANT HAZARDS CONSIDERATION:

10CFR50.92 states that a proposed amendment involves no significant hazards consideration if operation in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or the consequences of an accident previously evaluated:

The proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated. Elimination of the required teardowns and inspections has no effect on the probability of an accident occurring, because the diesel generators are not accident initiating equipment. Also, deleting

the teardowns and inspections would decrease the consequences of an accident because the availability of the engines would increase as a result of the less frequent teardowns. Additionally, the high average reliability of the TDI engines would not be negatively affected due to this change. NRC research has shown there is a period of decreased reliability immediately following intrusive teardowns, (break in period), followed by a long period of high reliability.

2. Create the possibility of a new or different kind of accident from any previously evaluated:

The proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed amendment will not cause any physical change to the plant or the design or operation of the diesel units.

3. Involve a significant decrease in the margin of safety.

The proposed amendment would not involve a significant reduction in a margin of safety. The proposed amendment will increase the reliability and availability of the EDGs and therefore will not result in a decrease in a margin of safety at Grand Gulf.

E. REFERENCES:

1. Transamerica Delaval, Inc. Emergency Diesel Generators Owners Group, Generic Topical Report, TAC-M85325, "Basis for Modification to Requirements for Transamerica Delaval, Inc. Emergency Diesel Generators," dated April 28, 1994.
2. NRC Safety Evaluation Report, "Operability and Reliability Review of Emergency Diesel Generators Manufactured by Transamerica Delaval, Inc." dated March 17, 1994.
3. NUREG/CR-5057, K. R. Hoopingarner and F. R. Zaloudek, "Aging Mitigation and Improved Programs for Nuclear Service Diesel Generators," Pacific Northwest Laboratory, PNL-6397, December 1989.

ATTACHMENT 3

MARK-UP OF AFFECTED OPERATING LICENSE PAGES

(24) Interplant Communication Systems (Section 9.6.1.2, SER, SSER #2, SSER #4, SSER #5)

Tests of the communication systems used to mitigate the consequences of an event and attain a safe plant shutdown shall be completed during preoperational and startup tests. An evaluation of the test results shall be provided for NRC review within 90 days after test completion. Any system modifications found necessary as a result of NRC review shall be completed prior to startup following the first refueling outage.

(25) Reliability of Diesel-Generators (Sections 8.3.1, 9.6.3 through 9.6.7, SER, SSER #2, SSER #4, SSER #6)

(a) Prior to startup following the first refueling outage, a heavy duty turbocharger gear drive assembly shall be installed on all EMD diesel-generators.

~~(b) EOI shall comply with TDI emergency diesel generator requirements specified in Attachment 2 to this license.~~

(26) Turbine Disc Integrity (Section 10.2.1, SER, SSER #1)

EOI shall ultrasonically inspect the bores and keyways of the low pressure turbine discs for indications of cracking prior to exceeding 50,000 hours of operation. All unacceptable indications and their dispositions shall be reported prior to startup for the next cycle of operation. These inspections shall continue on a 50,000 hour interval until the potential for turbine disc cracking has been assessed and an acceptable alternate inspection schedule has been established.

(27) Circulating Water System (Section 10.4.5, SER)

EOI shall not fill the Unit 2 circulating water system (including the natural draft cooling tower basin) until Unit 1 flooding concerns related to this system are resolved to the satisfaction of the NRC staff.

(28) Advisor to the Vice President

MP&L shall have on its nuclear operations staff, one or more corporate management officials or advisors (who may be either permanent employees or contracted consultants) who have substantial commercial nuclear power plant operating management experience and who will advise on all decisions affecting safe operation of the plant. This requirement shall be in effect until the plant has accumulated at least 6 months at power levels above 90 percent of full power.

Attachment 2

Transamerica Delaval Inc. (TDI) Diesel Generator

Maintenance and Surveillance Requirements

(NUREG-1216, August 1986)

1. Maintenance and Surveillance Program

EOI shall implement and maintain in effect the provisions of the maintenance and surveillance program for the TDI emergency diesel generators at GGNS Unit 1 as identified in the MP&L letter dated July 18, 1986 (AECM-86/0172) and as approved in the staff's Safety Evaluation Report attached to the NRC letter dated December 9, 1986, subject to the provisions of paragraphs 2 and 3 below.

2. Changes

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EOI may make changes to the approved maintenance and surveillance program without prior approval of the Commission provided the changes do not adversely affect the operability or reliability of the diesel generators or involve changes in the Phase 1 Surveillance requirements of paragraph 3 below or otherwise change license conditions or Technical Specifications or result in an unreviewed safety question as defined in 10 CFR 50.59. EOI shall maintain in auditable form, a current record of all such changes, including an analysis of the effects of the change on diesel generator operability and reliability, and shall make such records available to NRC inspectors upon request. All changes to the program shall be reported annually to the Director of the Office of Nuclear Reactor Regulation, along with the FSAR revisions required by 10 CFR 50.71(e).

3. Phase 1 Component Surveillance Requirements

EOI shall comply with the following requirements:

3.1 Connecting Rods

Connecting rod assemblies shall be subjected to the following inspections at each major engine overhaul*:

- a. The surfaces of the rack teeth shall be inspected for signs of fretting. If fretting has occurred, it shall be subject to an engineering evaluation for appropriate corrective action.

*The frequency of the major engine overhauls referred to in these requirements shall be consistent with Section IV.1. "Overhaul Frequency" in Revision 2 of Appendix II of the Design Review/Quality Revalidation report which was transmitted by MP&L letter dated July 18, 1986.

- b. All connecting-rod bolts shall be lubricated in accordance with the engine manufacturer's instructions and torqued to the specifications of the manufacturer. The lengths of the two pairs of bolts above the crankpin shall be measured ultrasonically pre and post-tensioning.
- c. The lengths of the two pair of bolts above the crankpin shall be measured ultrasonically prior to detensioning and disassembly of the bolts. If bolt tension is less than an equivalent of 2400 ft-lbs, the cause shall be determined, appropriate corrective action shall be taken, and the interval between checks of bolt tension shall be re-evaluated.
- d. All connecting-rod bolts shall be visually inspected for thread damage (e.g., galling), and the two pairs of connecting rod bolts above the crankpin shall be inspected by magnetic particle testing (MT) to verify the continued absence of cracking. All washers used with the bolts shall be examined visually for signs of galling or cracking, and replaced if damaged.
- e. A visual inspection shall be performed of accessible external surfaces of the link rod box to verify the absence of any signs of service induced distress.
- f. All of the bolt holes in the link rod box shall be inspected for thread damage (e.g., galling) or other signs of abnormalities. In addition, the bolt holes subject to the highest stresses (i.e., the pair immediately above the crankpin) shall be examined with an appropriate nondestructive method to verify the continued absence of cracking. Any indications shall be recorded for engineering evaluation and appropriate corrective action.
- g. If the diesel generators are operated in excess of 5740 KW steady state, all connecting rods shall be disassembled and inspected at an interval of approximately 5 years coincident with the end of a fuel cycle, except that connecting rod disassembly and inspection is not required for limited post maintenance testing over 5740 KW for the purpose of seating new piston rings as described in the MP&L letter dated December 6, 1985 (AECM-85/0395).

3.2 Cylinder Blocks

- a. Cylinder blocks shall be inspected for "ligament" cracks, "stud-to-stud" cracks and "stud-to-end" cracks as defined in a report by Failure Analysis Associates, Inc. (FaAA) entitled, "Design Review of TDI R-4 and RV-4 Series Emergency Diesel Generator Cylinder Blocks" (FaAA report no. FaAA-84-9-11.1) dated December 1984.** (Note that the FaAA report specifies

** Transmitted to H. R. Denton, NRC from C. L. Ray, Jr., TDI Owners Group, by letter dated December 11, 1984.

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additional inspections to be performed for blocks with "known" or "assumed" ligament cracks). The inspection intervals (i.e., frequency) shall not exceed the intervals calculated using the cumulative damage index model in the subject FaAA report. In addition, inspection method shall be consistent with or equivalent to those identified in the subject FaAA report.

- b. In addition to inspections specified in the aforementioned FaAA report, blocks with "known" or "assumed" ligament cracks (as defined in the FaAA report) shall be inspected at each refueling outage to determine whether or not cracks have initiated on the top surface exposed by the removal of two or more cylinder heads. This process shall be repeated over several refueling outages until the entire block top has been inspected. Liquid-penetrant testing or a similarly sensitive nondestructive testing technique shall be used to detect cracking, and eddy current shall be used as appropriate to determine the depth of any cracks discovered.
- c. If inspection reveals cracks in the cylinder blocks between stud holes of adjacent cylinders ("stud-to-stud" cracks) or "stud-to-end" cracks, this condition shall be reported promptly to the NRC staff and the affected engine shall be considered inoperable. The engine shall not be restored to "operable" status until the proposed disposition and/or corrective actions have been approved by the NRC staff.

3.3 Cylinder Heads

Delete

The following air roll test shall be performed as specified below, except when the plant is already in an Action Statement of Technical Specification 3/4.8.1, "Electric Power Systems, A.C. Sources":

The engines shall be rolled over with the airstart system and with the cylinder stopcocks open prior to each planned start, unless that start occurs within 4 hours of a shutdown. The engines shall also be rolled over with the airstart system and with the cylinder stopcocks open after 4 hours, but no more than 8 hours after engine shutdown and then rolled over once again approximately 24 hours after each shutdown. (In the event an engine is removed from service for any reason other than the rolling over procedure prior to expiration of the 8-hour or 24-hour periods noted above, that engine need not be rolled over while it is out of service. The licensee shall air roll the engine over with the stopcocks open at the time it is returned to service.) The origin of any water detected in the cylinder must be determined and any cylinder head which leaks due to a crack shall be replaced. The above air roll test may be discontinued following the first refueling outage subject to the following conditions:

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- a. All cylinder heads are Group III heads (i.e, cast after September 1980.)
- b. Quality revalidation inspections, as identified in the GCNS Design Review/Quality Revalidation Report, Revision 2, have been completed for all cylinder heads.
- c. Group III heads continue to demonstrate favorable leakage performance. This should be confirmed with TDI prior to deleting air roll tests.

3.4 Turbochargers

Delete

Periodic inspections of the turbochargers shall include the following:

- a. The turbocharger thrust bearings shall be visually inspected for excessive wear after 40 non-primed starts since the previous visual inspection.
- b. Turbocharger rotor axial clearance shall be measured at each refueling outage to verify compliance with TDI/Elliott specifications. In addition, thrust bearing measurements shall be compared with measurements taken previously to determine a need for further inspection or corrective action.
- c. Spectrographic and ferrographic engine oil analysis shall be performed quarterly to provide early evidence of bearing degradation. Particular attention shall be paid to copper level and particulate size which could signify thrust bearing degradation.
- d. The nozzle ring components and inlet guide vanes shall be visually inspected at each refueling outage for missing parts or parts showing distress. If such are noted, the entire ring assembly shall be replaced.

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