OLCR-NLS-86/03

SUBJECT: Facility Operating License No. NPF-29, Page 9, License Condition 2.C.(25)(b) TDI Emergency Diesel Generators

DESCRIPTION OF CHANGE:

Mississippi Power & Light (MP&L) proposes that Operating License Condition (OLC) 2.C.(25)(b) be changed to the following:

(b) MP&L shall comply with the TDI emergency diesel generator requirements specified in Attachment 2 to this license.

It is proposed that Attachment 2 to this submittal will become Attachment 2 to Facility Operating License No. NPF-29.

DISCUSSION: In response to concerns regarding the overall reliability of Transamerica Delaval, Inc. (TDI) emergency diesel generators, a TDI Diesel Generator Owners Group (TDI OG) was formed to address operational and regulatory issues relative to TDI diesel generator sets used for standby emergency power at nuclear power stations. The TDI OG submitted on March 2, 1984 a program to the NRC proposing a combination of design reviews, quality revalidations, engine tests and component inspections to provide an in depth assessment of the adequacy of the TDI emergency diesel generators (EDG) to perform their safety related function.

> In June of 1986 the NRC Safety Evaluation Report of the Operability/Reliability of Emergen y Diesel Generators Manufactured by Transamerica Delaval, Inc. (NRC Generic SER) provided the NRC staff's final evaluation of the findings and recommendations of the TDI OG and Pacific Northwest Laboratory (under contract to the NRC). The NRC Generic SER specified the actions necessary to resolve issues surrounding the TDI EDGs for all affected utilities. Resolution of the issue for the Grand Gulf Nuclear Station (GGNS) requires incorporating the recommendations of the TDI OG and the NRC Generic SER into the GGNS EDG program. In addition, the NRC Generic SER specified that certain key maintenance and surveillance recommendations be a condition of the Operating License. The proposed license condition for GGNS is described above and in Attachment 2 to this submittal.

> On July 18, 1986 MP&L submitted proposed actions in response to the final evaluations and recommendations from the TDI OG Program as required by GGNS OLC 2.C.(25)(b) and MP&L's plans for implementation of the actions specified in the NRC Generic SER.

8609220180 860912 PDR ADDCK 05000416 PDR MP&L proposes that OLC 2.C.(25)(b) be revised from the present requirement to the License Condition as stated in the Description of Change.

JUSTIFICATION: By letter dated July 18, 1986 (AECM-86/0172), MP&L submitted actions in response to the final evaluations and recommendations from the TDI OG Program applicable to GGNS Unit 1, as required by OLC 2.C.(25)(b). It is MP&L's position that this submittal satisfied the present OLC 2.C.(25)(b). The NRC Generic SER requires that the Operating License for GGNS contain key TDI EDG maintenance and surveillance actions to ensure implementation. The NRC Generic SER contains detailed justification for the proposed key component recommendations.

In Part 1 of the license condition entitled "GENERAL" (Attachment 2), MP&L proposes to utilize the 10 CFR 50.59 process to evaluate any changes to TDI OG recommendations, with the exception of Phase 1 component recommendations. The provisions of the 10 CFR 50.59 process ensures (1) a technical basis exists for any proposed change, (2) that an unreviewed safety question is not involved and (3) provides for periodic NRC review of the basis for determining that an unreviewed safety question is not involved in the revision of a TDI OG recommendation. Additionally, the staff has required that the key maintenance and surveillance actions be a condition of the operating license at GGNS, thus ensuring that changes relative to the key TDI OG and Pacific Northwest Labs recommendations are subject to NRC approval prior to revision.

The frequency of major engine overhauls referenced in Attachment 2 is a TDI OG recommendation and is included to define the overhaul frequency for specific components. The original major overhaul frequency was based on a TDI recommendation for engines which were in continuous service. Engines in emergency standby service receive only a small fraction of the service time that continuous service engines receive. For this reason the major engine overhaul frequency was increased from 5 year intervals to 10 year intervals. Additionally, a one time inspection after 5 years of engine service, will be performed on major engine components. The reference to frequency of major overhaul is consistent with the "Sample License Condition" as presented in Appendix A to the NRC Generic SER.

The maintenance and surveillance actions for key components of the GGNS EDGs are derived from the applicable sections of the NRC Generic SER. These maintenance and surveillance requirements will insure that key components receive special emphasis.

The proposed change to the license condition will add additional controls regarding maintenance, surveillance and modification of TDI OG recommendations. These controls will enhance the GGNS TDI EDG program by providing further assurance of the adequacy of the TDI EDG's to perform their safety related function.

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## SIGNIFICANT HAZARDS CONSIDERATION:

The proposed change to the operating license condition does not involve:

 a significant increase in the probability or consequences of a previously evaluated accident because:

the proposed change adds requirements to the operating license for certain key maintenance and surveillance actions consistent with the guidance in the NRC Generic SER on the TDI EDG reliability. The proposed change also applies the 10CFR50.59 process for evaluating future changes to other TDI OG recommendations. These additional requirements help to ensure the EDGs are capable of performing their intended function and do not affect the assumptions of any previously evaluated accident. Thus, the probability or consequences of a previously evaluated accident is not changed.

 creating the possibility of a new or different kind of accident from any previously evaluated accident because:

the placement in the operating license of additional controls on EDG maintenance and surveillance actions does not create a new or different kind of accident. In addition, evaluation of changes to other TDI OG recommendations utilizing the 10CFR50.59 process provides added assurance that new or different kinds of accidents are not created.

3) a significant reduction in a margin of safety because:

the additional controls are intended to place special emphasis on maintenance and surveillance activities and thereby enhance the reliability of the EDGs to perform their safety function. Thus, the margin of safety is not reduced.

In summary, MP&L concludes that the proposed change to the operating license do not involve a significant hazards consideration.

# PROPOSED LICENSE CONDITION TDI EMERGENCY DIESEL GENERATOR

### 1. General

Changes to the GGNS DR/QR report recommendations as identified in MP&L letters dated November 28, 1984 - AECM-84/0525, April 16, 1985 -AECM-85/120, July 18, 1986 - AECM-86/0172, with the exception of Phase 1 component recommendations, shall be subject to the provisions of 10CFR50.59.

The frequency of the major engine overhauls referred to in the license conditions below 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 letter dated May 1, 1986, from J. George, Owners Group, to H. Denton, NRC.

#### 2. Connecting Rods

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

- a. The surfaces of the rack teeth should be inspected for signs of fretting. If fretting has occurred, it should be subject to an engineering evaluation for appropriate corrective action.
- b. All connecting-rod bolts should 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 should be measured ultrasonically pre and post-tensioning.
- c. The lengths of the two pair of bolts above the crankpin should 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 should be determined, appropriate corrective action should be taken, and the interval between checks of bolt tension should be re-evaluated.
- d. All connecting-rod bolts should be visually inspected for thread damage (e.g., galling), and the two pairs of connecting rod bolts above the crankpin should be inspected by magnetic particle testing (MT) to verify the continued absence of cracking. All washers used with the bolts should be examined visually for signs of galling or cracking, and replaced if damaged.
- e. A visual inspection should 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 should 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) should be examined with an

appropriate nondestructive method to verify the continued absence of cracking. Any indications should be recorded for engineering evaluation and appropriate corrective action.

g. The following actions shall be performed if the engines 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 end of cycle.

The above connecting rod disassembly and inspection interval is not required for limited post maintenance testing over 5740 KW for the purpose of seating new piston rings as described in MP&L letter AECM-85/0395 dated December 6, 1985.

### 3. 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 Cyline... Blocks" (FaAA report no. FaAA-84-9-11.1) and dated December 1984. (Note that the FaAA report specifies additional inspections to be performed for blocks with "known" or "assumed" ligament cracks). he 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.

(Condition 3.a applies to the Division I diesel generator and will apply to the Division II diesel generator upon successful completion of inspections required by Condition 3.b.)

b. In addition to inspections specified in the aforementioned FaAA report, blocks with "known" or "assumed" ligament cracks (as defined in the FaAA report) should 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 should be repeated over several refueling outages until the entire block top has been inspected. Liquid-penetrant testing or a similarly sensitive nondestructive testing technique should be used to detect cracking, and eddy current should be used as appropriate to determine the depth of any cracks discovered.

(Condition 3.b applies to the Division II diesel generator until block top inspections per this condition are completed.)

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.

## 4. Cylinder Heads

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:

- a. All cylinder heads are Group III heads (i.e., cast after September 1980.)
- b. Quality revalidation inspections, as identified in the Design Review/Quality Revalidation report, 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.

### 5. Turbochargers

Periodic inspections of the turbochargers shall include the following:

a. The turbocharger thrust bearings should be visually inspected for excessive wear after 40 non-prelubed starts since the previous visual inspection.

- b. Turbocharger rotor axial clearance should be measured at each refueling outage to verify compliance with TDJ/Elliott specifications. In addition, thrust bearing measurements should 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 should be paid to copper level and particulate size which could signify thrust bearing degradation.
- d. The nozzle ring components and inlet guide vanes should be visually inspected at each refueling cutage for missing parts or parts showing distress. If such are noted, the entire ring assembly should be replaced.

\* This report was transmitted to H. R. Denton, NRC, from C. L. Ray, Jr., TDI Owners Group, by letter dated December 11, 1984.

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