

MAY 27 1986

Mr. Kenneth P. Baskin, Vice President  
Nuclear Engineering  
Safety and Licensing Department  
Southern California Edison Company  
2244 Walnut Grove Avenue  
P.O. Box 800  
Rosemead, California 91770

Dear Mr. Baskin:

SUBJECT: TRANSAMERICA-DELAVAL (TDI) DIESEL ENGINE RELIABILITY  
AND OPERABILITY

Re: San Onofre Nuclear Generating Station Unit (SONGS-1)

Reference 1: Letter dated November 19, 1984, D. M. Crutchfield (NRC) to  
K. Baskin (SCE)

Reference 2: Letter dated March 14, 1986, G. E. Lear (NRC) to K. Baskin (SCE)

Reference 3: Letter dated April 17, 1986, M. Medford (SCE) to G. Lear (NRC)

Reference 1 transmitted the NRC staff's Safety Evaluation regarding the TDI diesel engines used as emergency power sources at SONGS-1. The staff concluded that these engines would continue to provide reliable standby power in accordance with the requirements of General Design Criterion 17 (GDC-17) until the next refueling outage. The November 19, 1984 letter also stated that the staff would address long-term operability of these engines after completing the review of the generic TDI Owners Group Program Plan. A draft of the staff's Safety Evaluation addressing the generic TDI issue was sent to you by Reference 2. The staff's final Safety Evaluation on the TDI Owners Group Program is expected to be issued in a few weeks.

Because of staff concerns described in Reference 2 related to crankshaft transient torsional stresses, the staff will not be able to complete the evaluation of long-term operability of the SONGS-1 engines prior to restart from the current refueling outage. However, your April 17, 1986 response (Reference 3) to our draft Safety Evaluation committed to investigate methods to fully resolve the crankshaft fatigue problem. You also stated SCE's position that the currently recommended periodic inspections of the crankshaft will fully ensure the continued safety and reliability of the engines until

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suitable corrective modifications have been completed or other agreements have been reached with the NRC.

The staff notes that Section 4.8.5 of our contractor's Technical Evaluation Report, (PNL-5600), transmitted to you by Reference 2, is in agreement with SCE's position. Our contractor concludes and the staff agrees that during startup and coastdown of the San Onofre 1 engines, crankshaft stress cycles are beyond the endurance limit of the material and thus are likely to eventually lead to the initiation of fatigue cracks. Crack growth models predict that a crack which has reached a depth of 18 mils would be able to propagate under steady-state stresses. It is reasonable to assume that cracks larger than 10 mils could be readily detected by crankshaft inspections. Analysis indicates that the number of engine start-stop cycles over which a crack is predicted to grow from 10 mils to 18 mils is on the order of 100. During a typical fuel cycle at SONGS-1, the engines would be started less than 50 times. Thus, the staff concludes that during a single fuel cycle, an assumed crack that is less than 10 mils and not detected by crankshaft inspections would not propagate to the 18 mil depth at which it could grow under steady-state conditions.

SCE has performed thorough inspections of both SONGS-1 engines during the current refueling outage and has stated that no cracks were found in the engine crankshafts. Your May 19, 1986 submittal provided complete results of the inspection performed on Engine No. 1 and committed to provide a similar report for Engine No. 2 by June 13, 1986. Based upon these inspections and the above discussion, the staff concludes that interim operation of the SONGS-1 engines until the next refueling outage is acceptable and will provide reliable standby power in accordance with the requirements of GDC-17, subject to the following conditions:

1. Prior to restart from the current outage, provide a written commitment to comply with the May 1, 1986 revised TDI Owners Group Maintenance/Surveillance program.
2. Within 45 days after facility restart, propose a schedule for investigation of alternatives and associated corrective actions to reduce crankshaft transient torsional stresses.
3. Within 90 days after facility restart, provide
  - a. a detailed report on the status and implementation dates and/or schedules for all Owners Group Phase 1 and Phase 2 recommendations for quality revalidation inspection and component replacement or modification; and
  - b. a revision to your February 14, 1985 license amendment application to modify your proposed technical specifications so that "slow" starts of the diesel generators are at least 24 seconds in duration and thus consistent with the torsionograph data provided by your April 22, 1985 submittal, or a detailed technical justification for the "slow" start duration in your application.

The information requested above will be examined by the staff as part of the long-term operability review of the SONGS-1 engines.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents, therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

*/s/*

Richard F. Dudley, Project Manager  
Project Directorate #1  
Division of PWR Licensing-A

cc's: See Next Page

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*over see for notes - Jg*

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