REGULATORY DOCKET FILE COPY

JUL 28 1980

DISTRIBUTION:
Docket Files (2)
NRC PDR
Local PDR
NRR Reading
LB#3 File
DEisenhut
RPurple
RTedesco
ASchwencer
HRood, (5)
IJLee
I&E (3)
bcc: ACRS (16)
NSIC
TERA

Docket Nos. 50-361
and 50-362

Mr. Robert Dietch
Vice President
Southern California Edison Company
2244 Walnut Grove Avenue
P. O. Box 800
Rosemead, California 91770

Mr. B. W. Gilman
Senior Vice President - Operations
San Diego Gas and Electric Company
101 Ash Street
P. O. Box 1831
San Diego, California 92112

Gentlemen:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATING TO THE STAFF REVIEW OF THE SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

As a result of our review of the Final Safety Analysis Report for the San Onofre Nuclear Generating Station, Units 2 and 3, we find that we need the additional information listed in the Enclosure. Please contact us if you have any questions about the information requested.

Sincerely,

Original signed by

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure:
See next page

App
3

60

8008080201

HR AS

OFFICE	DOL:LB#3	DOL:LB#2/3				
SURNAME	HRood:ph	ASchwencer				
DATE	07/08/80	07/28/80				

NRC FORM 318 (9-76) NRCM 0240 ☆U.S. GOVERNMENT PRINTING OFFICE: 1979-289-369

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 28, 1980

Docket Nos. 50-361
and 50-362

Mr. Robert Dietch
Vice President
Southern California Edison Company
2244 Walnut Grove Avenue
P. O. Box 800
Rosemead, California 91770

Mr. B. W. Gilman
Senior Vice President - Operations
San Diego Gas and Electric Company
101 Ash Street
P. O. Box 1831
San Diego, California 92112

Gentlemen:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATING TO THE STAFF REVIEW OF THE SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

As a result of our review of the Final Safety Analysis Report for the San Onofre Nuclear Generating Station, Units 2 and 3, we find that we need the additional information listed in the Enclosure. Please contact us if you have any questions about the information requested.

Sincerely,

A. Schwencer

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure:
See next page

cc: Charles R. Kocher, Esq.
James A. Beoletto, Esq.
Southern California Edison Company
2244 Walnut Grove Avenue
P. O. Box 800
Rosemead, California 91770

Chickering & Gregory
ATTN: David R. Pigott, Esq.
Counsel for San Diego Gas & Electric Company &
Southern California Edison Company
3 Embarcadero Center - 23rd Floor
San Francisco, California 94112

Mr. George Caravalho
City Manager
City of San Clemente
100 Avenido Presidio
San Clemente, California 92672

Alan R. Watts, Esq.
Rourke & Woodruff
Suite 1020
1055 North Main Street
Santa Ana, California 92701

Lawrence Q. Garcia, Esq.
California Public Utilities Commission
5066 State Building
San Francisco, California 94102

Mr. V. C. Hall
Combustion Engineering, Incorporated
1000 Prospect Hill Road
Windsor, Connecticut 06095

cc: Mr. P. Dragolovich
Bechtel Power Corporation
P. O. Box 60860, Terminal Annex
Los Angeles, California 90060

Mr. Mark Medford
Southern California Edison Company
2244 Walnut Grove Avenue
P. O. Box 800
Rosemead, California 91770

Henry Peters
San Diego Gas & Electric Company
P. O. Box 1831
San Diego, California 92112

Ms. Lyn Harris Hicks
Advocate for GUARD
3908 Calle Ariana
San Clemente, California 92672

Richard J. Wharton, Esq.
Wharton & Pogalies
Suite 106
2667 Camino Del Rio South
San Diego, California 92108

Phyllis M. Gallagher, Esq.
Suite 222
1695 West Crescent Avenue
Anaheim, California 92701

Mr. A. S. Carstens
2071 Caminito Circulo Norte
Mt. La Jolla, California 92037

Resident Inspector, San Onofre/NPS
c/o U. S. Nuclear Regulatory Commission
P. O. Box AA
Oceanside, California 92054

040.0 POWER SYSTEMS BRANCH

040.69 (9.5.6) Provide a discussion of the measures that have been taken in the design of the standby diesel generator air starting system to preclude the fouling of the air start valve or filter with moisture and contaminants such as oil carryover and rust. (SRP 9.5.6, Part III, item 1).

040.69 (9.5.8) Experience at some operating plants has shown that diesel engines have failed to start due to accumulation of dust and other deliterious material on electrical equipment associated with starting of the diesel generators (e.g., auxiliary relay contacts, control switches - etc.). Describe the provisions that have been made in your diesel generator building design, electrical starting system, and combustion air and ventilation air intake design(s) to preclude this condition to assure availability of the diesel generator on demand.

Also describe under normal plant operation what procedure(s) will be used to miminize accumulation of dust in the diesel generator room, specifically address concrete dust control. In your response also consider the condition when Unit 1 is in operation and Unit 2 is under construction (abnormal generation of dust).

040.70 (9.5.5) The diesel generators are required to start automatically on loss of all offsite power and in the event of a LOCA. The diesel generator sets should be capable of operation at less than full load for extended periods without degradation of performance or reliability. Should a LOCA occur with availability of offsite power, discuss the design provisions and other parameters that have been considered in the selection of the diesel generators to enable them to run unloaded (on standby) for extended periods without degradation of engine performance or reliability. Expand your PSAR/FSAR to include and explicitly define the capability of your design with regard to this requirement. (SRP 9.5.5, Part III, Item 7).

040.71 (8.3) Provide a detail discussion (or plan) of the level of training proposed for your operators, maintenance crew, quality assurance, and supervisory personnel responsible for the operation and maintenance of the emergency diesel generators. Identify the number and type of personnel that will be dedicated to the operations and maintenance of the emergency diesel generators and the number and type that will be assigned from your general plant operations and maintenance groups to assist when needed.

In your discussion identify the amount and kind of training that will be received by each of the above categories and the type of ongoing training program planned to assure optimum availability of the emergency generators.

Also discuss the level of education and minimum experience requirements for the various categories of operations and maintenance personnel associated with the emergency diesel generators.

040.72 (8.3) RSP . Operating experience at certain nuclear power plants which have two cycle turbocharged diesel engines manufactured by the Electromotive Division (EMD) of General Motors driving emergency generators have experienced a significant number of turbocharger mechanical gear drive failures. The failures have occurred as the result of running the emergency diesel generators at no load or light load conditions for extended periods. No load or light load operation could occur during periodic equipment testing or during accident conditions with availability of offsite power. When this equipment is operated under no load conditions insufficient exhaust gas volume is generated to operate the turbocharger. As a result the turbocharger is driven mechanically from a gear drive in order to supply enough combustion air to the engine to maintain rated speed. The turbocharger and mechanical drive gear normally supplied with these engines are not designed for standby service encountered in nuclear power plant application where the equipment may be called upon to operate at no load or light load condition and full rated speed for a prolonged period. The EMD equipment was originally designed for locomotive service where no load speeds for the engine and generator are much lower than full load speeds. The locomotive turbocharged diesel hardly ever runs at full speed except at full load. The EMD has strongly recommended to users of this diesel engine design against operation at no load or light load conditions at full rated speed for extended periods because of the short life expectancy of the turbocharger mechanical gear drive unit normally furnished. No load or light load operation also causes general deterioration in any diesel engine.

To cope with the severe service the equipment is normally subjected to and in the interest of reducing failures and increasing the availability of their equipment EMD has developed a heavy duty turbocharger drive gear unit that can replace existing equipment. This is available as a replacement kit, or engines can be ordered with the heavy duty turbocharger drive gear assembly.

To assure optimum availability of emergency diesel generators on demand, Applicant's who have on order or intend to order emergency generators driven by two cycle diesel engines manufactured by EMD should be provided with the heavy duty turbocharger mechanical drive gear assembly as recommended by EMD for the class of service encountered in nuclear power plants. Confirm your compliance with this requirement.

040.73 (9.5.7) RSP Several fires have occurred at some operating plants in the area of the diesel engine exhaust manifold and inside the turbocharger housing which have resulted in equipment unavailability. The fires were started from lube oil leaking and accumulating on the engine exhaust manifold and accumulating and igniting inside the turbocharger housing. Accumulation of lube oil in these areas, on some engines, is apparently caused from an excessively long prelube period, generally longer than five minutes, prior to manual starting of a diesel generator. This condition does not occur on an emergency start since the prelube period is minimal.

When manually starting the diesel generators for any reason, to minimize the potential fire hazard and to improve equipment availability, the prelube period should be limited to a maximum of three to five minutes unless otherwise recommended by the diesel engine manufacturer. Confirm your compliance with this requirement or provide your justification for requiring a longer prelube time interval perior to manual starting of the diesel generators. Provide the prelube time interval your diesel engine will be exposed to prior to manual start.

040.74 (9.5.7) RSP An emergency diesel generator unit in a nuclear power plant is normally in the ready standby mode unless there is a loss of offsite power, an accident, or the diesel generator is under test. Long periods on standby have a tendency to drain or nearly empty the engine lube oil piping system. On an emergency start of the engine as much as 5 to 14 or more seconds may elapse from the start of cranking until full lube oil pressure is attained even though full engine speed is generally reached in about five seconds. With an essentially dry engine, the momentary lack of lubrication at the various moving parts may damage bearing surfaces producing incipient or actual component failure with resultant equipment unavailability.

The emergency condition of readiness requires this equipment to attain full rated speed and enable automatic sequencing of electric load within ten seconds. For this reason, and to improve upon the availability of this equipment on demand, it is necessary to establish as quickly as possible an oil film in the wearing parts of the diesel engine. Lubricating oil is normally delivered to the engine wearing parts by one or more engine driven pump(s). During the starting cycle the pump(s) accelerates slowly with the engine and may not supply the required quantity of lubricating oil where needed fast enough. To remedy this condition, as a minimum, an electrically driven lubricating oil pump, powered from a reliable DC power supply, should be installed in the lube oil system to operate in parallel with the engine

driven main lube pump. The electric driven prelube pump should operate only during the engine cranking cycle or until satisfactory lube oil pressure is established in the engine main lube distribution header. The installation of this prelube pump should be coordinated with the respective engine manufacturer. Some diesel engines include a lube oil circulating pump as an intregal part of the lube oil preheating system which is in use while the diesel engine is in the standby mode. In this case an additional prelube oil pump may not be needed.

Confirm your compliance with the above requirement or provide your justification for not installing an electric prelube oil pump.

040.75 (8.3) RSP

Periodic testing and test loading of an emergency diesel generator in a nuclear power plant is a necessary function to demonstrate the operability, capability and availability of the unit on demend. Periodic testing coupled with good preventive maintenance practices will assure optimum equipment readiness and availability on demand. This is the desired goal.

To achieve this optimum equipment readiness status the the following requirements should be met:

1. The equipment should be tested with a minimum loading of 25 percent of rated load. No load or light load operation will cause incomplete combustion of fuel resulting in the formation of gum and varnish deposits on the cylinder walls, intake and exhaust valves, pistons and piston rings, etc., and accumulation of unburned fuel in the turbocharger and exhaust system. The consequences of no load or light load operation are potential equipment failure due to the gum and varnish deposits and fire in the engine exhaust system.

2. Periodic surveillance testing should be performed in accordance with the applicable NRC guidelines (R.g. 1.108), and with the recommendations of the engine manufacturer. Conflicts between any such recommendations and the NRC guidelines, particularly with respect to test frequency, loading and duration, should be identified and justified.

3. Preventive maintenance should go beyond the normal routine adjustments, servicing and repair of components when a malfunction occurs. Preventive maintenance should encompass investigative testing of components which have a history of repeated malfunctioning and require constant attention and repair. In such cases consideration should be given to replacement of those components with other products which have a record of demonstrated reliability, rather than repetitive repair and maintenance of the existing components. Testing of the unit after adjustments or repairs have been made only confirms that the equipment is operable and does not necessarily mean that the root cause of the problem has been eliminated or alleviated.

4. Upon completion of repairs or maintenance and prior to an actual start, run, and load test a final equipment check should be made to assure that all electrical circuits are functional, i.e., fuses are in place, switches and circuit breakers are in their proper position, no loose wires, all test leads have been removed, and all valves are in the proper position to permit a manual start of the equipment. After the unit has been satisfactorily started and load tested, return the unit to ready automatic standby service and under the control of the control room operator.

Provide a discussion of how the above requirements have been implemented in the emergency diesel generator system design and how they will be considered when the plant is in commercial operation, i.e., by what means will the above requirements be enforced.

040.76
(8.3)
RSP

The availability on demand of an emergency diesel generator is dependent upon, among other things, the proper functioning of its controls and monitoring instrumentation. This equipment is generally panel mounted and in some instances the panels are mounted directly on the diesel generator skid. Major diesel engine damage has occurred at some operating plants from vibration induced wear on skid mounted control and monitoring instrumentation. This sensitive instrumentation is not made to withstand and function accurately for prolonged periods under continuous vibrational stresses normally encountered with internal combustion engines. Operation of senstive instrumentation under this environment rapidly deteriorates calibration, accuracy and control signal output.

Therefore, except for sensors and other equipment that must be directly mounted on the engine or associated piping, the controls and monitoring instrumentation should be installed on a free standing floor mounted panel separate from the engine skids, and located on a vibration free floor area or equipped with vibration mounts.

Confirm your compliance with the above requirement or provide justification for noncompliance.

321.0 EFFLUENT TREATMENT SYSTEMS BRANCH

321.9 Additional Accident Monitoring Instrumentation (Effluent) Action Plan II.F.1

In your status report reagrding TMI concerns submitted in December 1979, you propose to install a high range noble gas effluent monitor prior to receipt of the operating license. We require that you complete final installation and calibration of high range noble gas effluent monitors for each of the independent release lines, i.e., containment purge, continuous exhaust, steam dump/safety valve exhaust and main condenser evacuation system exhaust prior to fuel loading. Also, we request that you submit the information required in Item 2.1.8b, Sections 1.B and 2.B, given in our letter dated November 9, 1979 as soon as practicable. For additional information regarding TMI concerns, see NUREG-0694, "TMI-Related Requirements for New Operating Licenses," June 1980.

321.10 Primary Coolant Sources Outside Containment Action Plan III.D.1.1

We have reviewed your response to Section 2.1.6a of NUREG-0578. In addition to what you plan to implement prior to the issuance of full power operating license, you should complete to following requirements at this time:

a) Provide a description of the practical leak reduction measures you will implement immediately to reduce leakages from all systems outside the containment that could carry radioactive fluids. Your description should include measuring values of actual leakage rates with the systems in operation and a summary report of your test results.

b) Provide a description of the continuing leak reduction program you propose to establish and implement. This description should include the preventive maintenance program to reduce leakages to as-low-as practical limits, the leak rate test method and summary of procedures for each system or subsystem, the test frequencies and acceptance criteria. You should include the steps you will take to minimize occupational radiation exposures and assure system completeness. Your description should also specify the staffing and training requirements and the quality assurance aspects of your program. For further information, see NUREG-0694.

321.11 <u>Post Accident Sampling</u>
<u>Action Plan II.B.3</u>

We have reviewed your response to Section 2.1.8a of NUREG-0578. In addition, we need the following information:

a) Submit a descriptive summary of the interim provisions and procedures for sampling and analyzing the reactor coolant and containment atmosphere. Your summary should include the interim modifications, you will need to conduct the physical, chemical and radiological analysis steps.

b) Provide a description of the final system design of the sample handling and counting facilities. Your final system description should include addition of new sampling station equipment and/or final modifications to existing sample handling and counting facilities to achieve analysis within the time specified in Item 2.1.8a given in the November 9, 1979 letter.

For further information, see NUREG-0694.

361.0 GEOSCIENCES BRANCH

361.66 The following recent papers, reports and other materials have added important data to that included in the publications cited in question 361.60:

(1) Abbott, P.L., and Elliott, W. J., 1979, Earthquakes and other perils; San Diego region: Geol. Soc. America, 227 p.

(2) Abbott, P.L., (edit), 1979, Geological excursions in the southern California area: Dept. Sci., San Diego State Univ., 217 p.

(3) Abbott, P.L., and Gastil, G., 1979, Baja California geology: Geol. Soc. America, 228 p.

(4) Landsat image, color composite, Path 42, Row 32, 16 Feb. 1976.

(5) Gastil, G., 1971, Reconnaissance Geol. Map of the State of Baja California: Geol. Soc. America Memorandum 140, Plate 1-A.

These above new data sources suggest southward extensions of the OZD from the Rose Canyon fault into Baja California, a region of high regional seismicity. This southward extension of activity includes (1) a magnitude 6.8 earthquake in the San Miguel fault zone. The faulting could extend to the prominent Sierra Juarez fault, the San Pedro Martir fault, and the Gulf of California rift zone, for a major continental zone of deformation, (2) a possible branching or distributed zone from San Diego Bay via locality 36 of Legg and Kennedy in Abbott and Elliott (1979), to the active western section of the Agua Blanca fault zone for a continental-partly offshore zone of deformation, or (3) active zones extending south along the west coast of Baja California for a mainly offshore zone of deformation.

Possible extensions inland toward the San Miguel fault zone are not well understood at present with regard to tectonic continuity, fault types, focal mechanisms and surficial evidence for activity. Examinations of the LANDSAT imagery provided by Southern California Edison suggests a diffuse zone along the "Tijuana lineament" of Gastil and others in Abbott and Elliott (1979), to the Vallecitos fault, the San Miguel fault, and the seismic zones shown in Brune and others (1979) in Abbott and Elliott (1979). This zone projects toward the prominent Valle de San Rafael depression and my connect with the Agua Blanca, Valle de Trinidad depression and the Valle de San Felipe. The high or fresh activity of the western section of Agua Blanca fault is recognized, but the possible connections of offshore faults to the OZD is not fully known.

Provide copies of the above publications and in view of the new data:

a) Discuss the tectonic, geological, and structural relationships of the OZD with regard to possible extensions of the OZD to the south of San Diego, including both continental and offshore fault zones.

b) Evaluate and discuss the impact of fault continuity, historic seismicity, and maximum earthquakes on the above fault zones in Baja California on the Safe Shutdown Earthquake for SONGS.

361.67 The Woodward-Clyde consultants report of 1979 implies that the fault slip on the OZD is derived from a decreasing activity to the west of the San Andreas (p. 11), a westward transfer at the Transverse Ranges (p. 13), and a decrease in activity to the south (p. 18). Evaluate and discuss the possibility of causative stress accumulations from the south, either from the Gulf of California or the west coast of Baja California.

361.68 Evaluate and discuss the vibratory ground motion at the SONGS site, with respect to peak acceleration and response spectra, assuming the El Alamo earthquake (14:32:38 GMT, 9 February 1956) to occur on the OZD 8 km from the site. Among the factors to be considered in this evaluation are: effect of oblique fault motion, amount of displacement, surface rupture, stress condition at the source and directivity effects.