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 50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Gas & Electric Co. 05000323
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 MIRAGLIA, F. J. Licensing Branch 3.

SUBJECT: Forwards responses to NRC 800108 ltr re implementation of recommendations of NUREG-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability."

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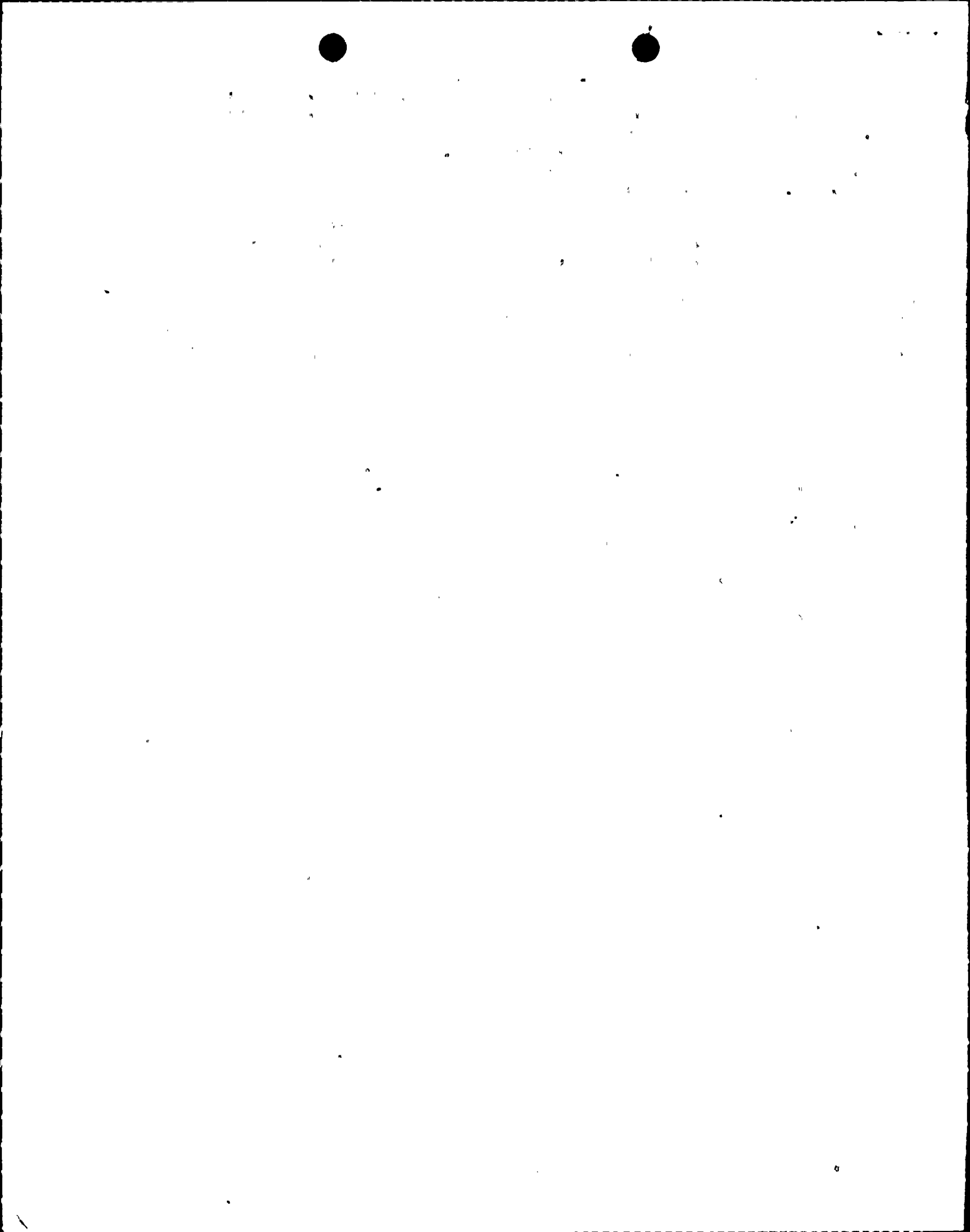
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	GEOSCIENCES 14	1	1	HUM FACT ENG BR	1	1
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	I&E 06	3	3	LIC GUID BR.	1	1
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Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket No. 50-275
Docket No. 50-323
Diablo Canyon Units 1 and 2

Dear Mr. Miraglia:

Attached is our response to a letter dated January 8, 1980 from Mr. John F. Stolz regarding the implementation of the recommendations of NUREG-0660, "Enhancement of On-Site Emergency Diesel Generator Reliability."

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it to me in the enclosed addressed envelope.

Very truly yours,

Philip A. Crane, Jr.

Attachment

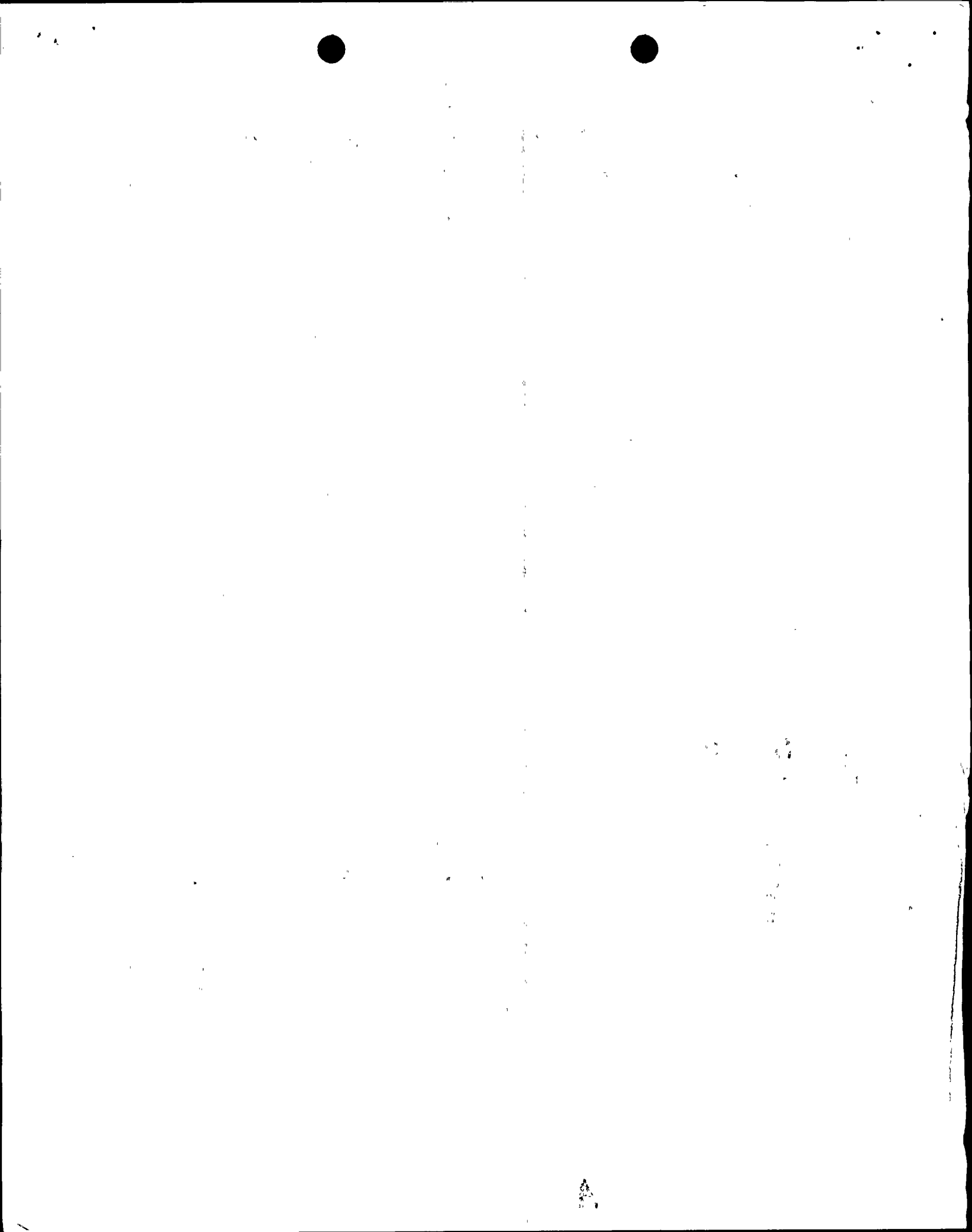
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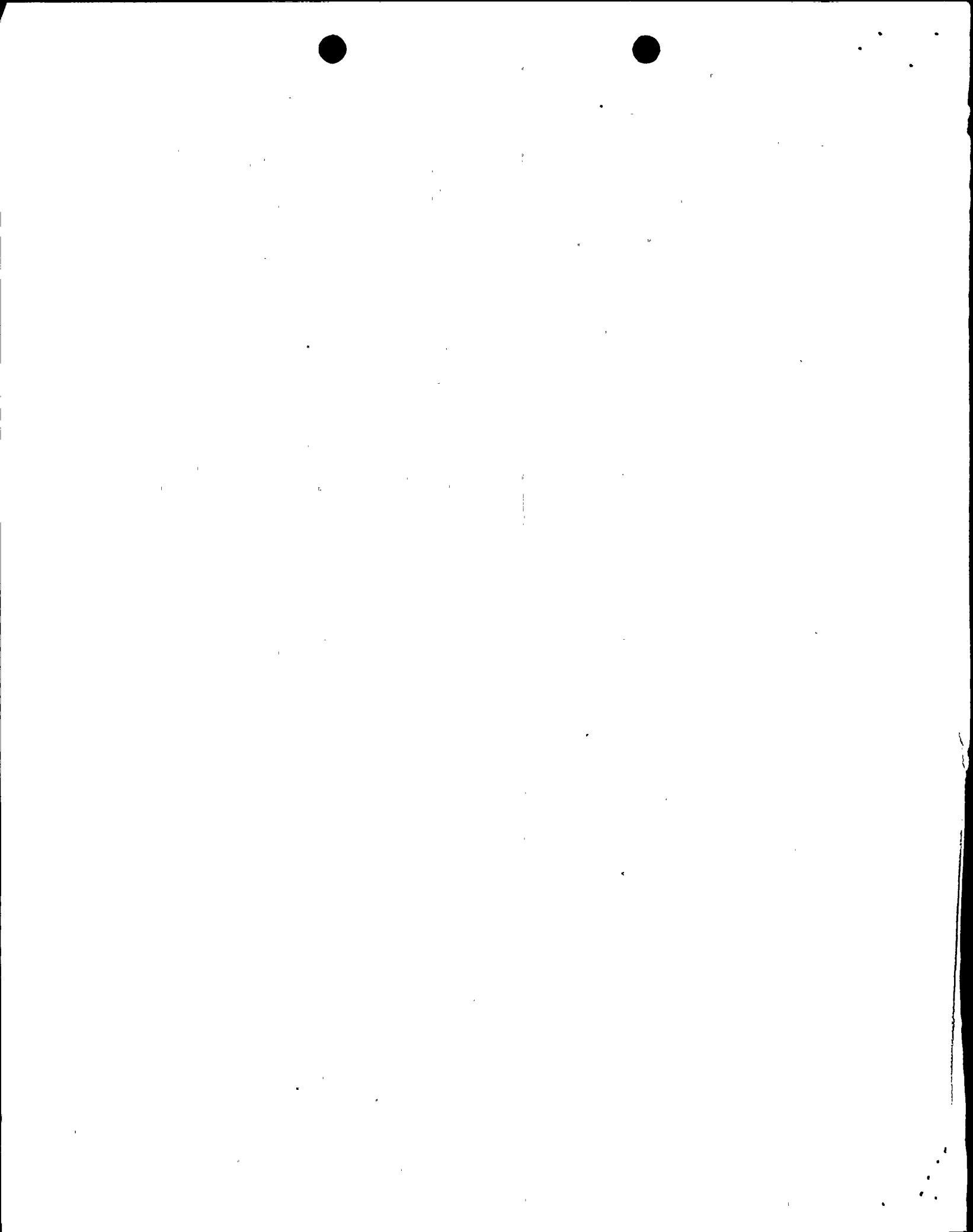
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ENHANCEMENT OF ONSITE EMERGENCY DIESEL GENERATOR RELIABILITY

PGandE response to NRC letter dated January 8, 1980, concerning NUREG-CR-0660

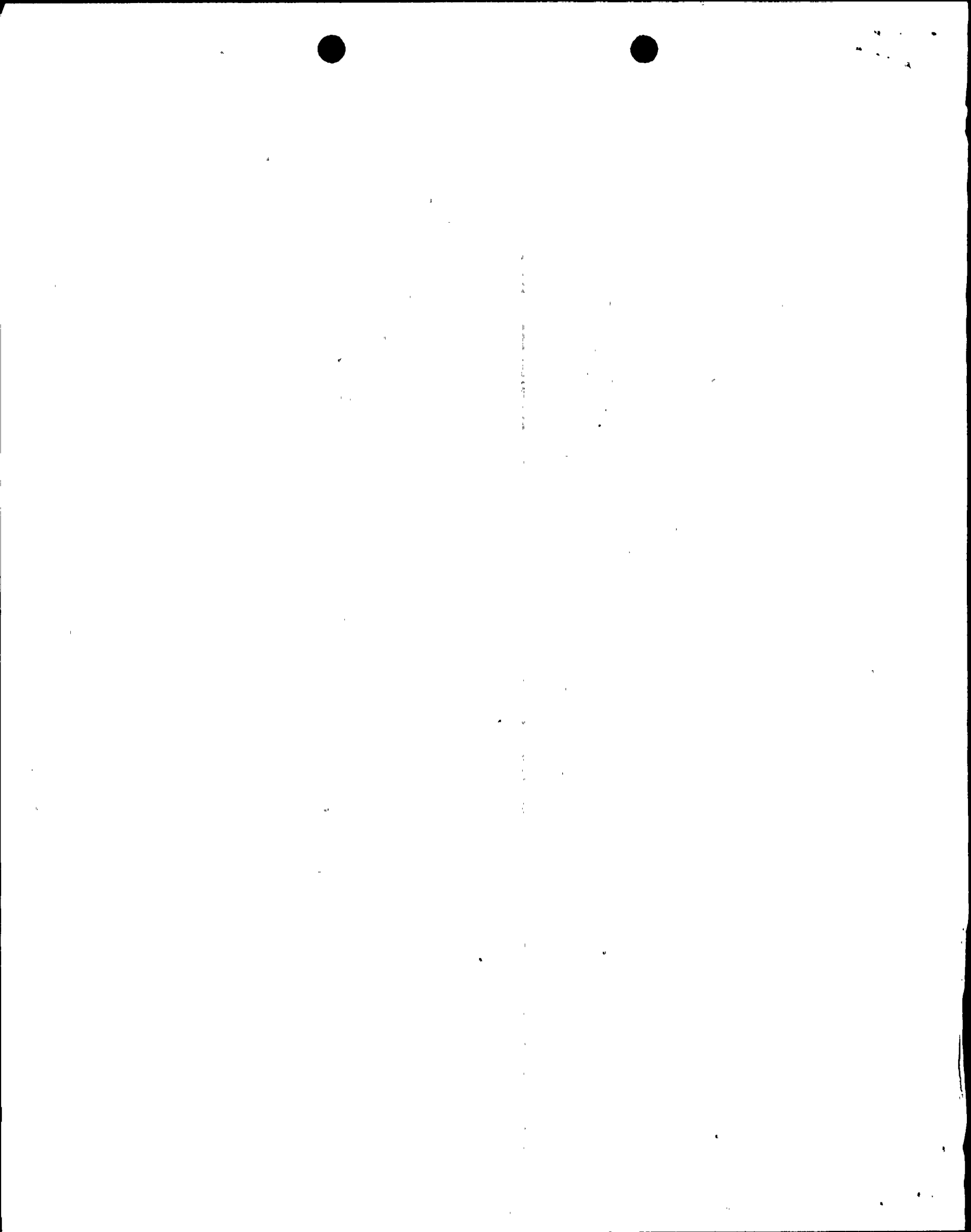
<u>SRP Item</u>	<u>Affected Topic/System</u>	<u>Problem Source</u>	<u>NUREG-CR-0660 Recommendation</u>	<u>PGandE Response</u>
8.1	DG start system	Moisture, rust, and oil in air start system fouling air start valve and filter	Provide for liquid and particulate removal	Each Starting Air System is provided with pre-air intake filter, an air dryer system on the compressor discharge to the receiver tank, an aftercooler, separator and trap, pre-filter and oil filter, and an automatic liquid release trap on the receiver. (See P & ID Drawing 102021 Sheet 3 and 3A, attached)
8.2	Electrical circuits	Dust and dirt accumulation on or in systems that affect reliability	Provide means to reduce or mitigate dust/dirt pathways	<p><u>Building Enclosure</u></p> <p>Surface area outside of both Units 1 and 2 DG Cooling air intakes in Turbine Building is paved. Air for cooling does not flow through the electrical cabinet area but rather exits the building immediately after passing through the radiator. There is little abnormal dust generation associated with Unit 2 construction. The surface area westbound to the cliff drop off to sea level consists of rock and particulates that are not readily susceptible to becoming airborne. The DG engine compartment walls and floor have been covered with a suitable material (either painted or coated) to control concrete dust.</p> <p><u>Controls</u></p> <p>Floor mounted excitation and control cabinets will have had door seals installed. Control relays and switches are of the heavy duty type which perform well in any environment especially at control voltage levels of 120V a-c or 120V d-c. Control modules housed in the static exciter-regulator cubicle are individually metal enclosed.</p>
8.3	Engine performance	Extended operation at reduced load	Make provision to allow engines to operate for an extended period at an unloaded condition.	In a LOCA situation with off-site power available, the engines will be automatically started. Operating the diesels at rated RPM, and unloaded for periods longer than recommended by the manufacturer, there will be no immediate consequence or reduced engine capability to deliver the rated load. The Diablo Canyon ALCO units are designed for Standby Service and have unplated liners which have greater tolerance for the unbalanced temperatures of each cylinder associated with excess cooling caused by incomplete combustion when unloaded. Moreover, we do not intend to allow the diesels to operate in this configuration for extended periods of time. Following verification of availability of off-site power, and reset of safety injection, diesels will be shut down and aligned for automatic starting. Should a loss of off-site power occur, the diesels will automatically start and assume most safeguards loads. Some loads (ECCS pumps) will require operator action to restart.



<u>SRP Item</u>	<u>Affected Topic/System</u>	<u>Problem Source</u>	<u>NUREG-CR-0660 Recommendation</u>	<u>PGandE Response</u>
8.4	Fuel storage	Compliance with ANSI Standard N 195	Comply	ANSI Standard N 195, through the implementing Regulatory Guide 1.137, is not mandatory for Diablo Canyon; however, a review confirms that the existing installation complies with the intent of each element of the standard. The intent of each of the added elements outlined in the Regulatory Guide are also satisfied through modifications which have been made or are being made at the plant. These modifications include a means to clean the sediment and water from the tank bottoms.
8.5	Fuel storage	Sediment turbulence when adding fuel	Mitigate turbulence	The existing tank fill pipe delivers diesel fuel to the tank bottom. Any reasonable delivery flow rate will disturb the limited residual sediment not picked-up by the clean-up system. The fill outlet is at the opposite end of the tank from the fuel oil transfer pump suction, approximately a 60-foot separation. The suction removes fuel oil at approximately 10" from the tank bottom. Larger particulates and water that remain separated would return to the tank bottom. Smaller particulates and water entrained in the fuel oil would be removed by the transfer system separator and filter prior to delivery to DG day tank.
8.6	Fuel storage	Degraded quality of fuel	No recommendation	<p>The Technical specifications require that a sample of the tank be obtained in accordance with ASTM - D270 - 65 and that that sample comply with the limits specified in Table 1 of ASTM - D975 - 74 when checked for viscosity, water, and sediment. Modifications have been made in the access to the storage tank to take samples at various levels.</p> <p>Before taking on fuel to a storage tank, a sample will be taken from the truck and an analysis will be performed in the DC Plant laboratory to confirm viscosity, water and sediment parameters are within limits. Additional analysis at an offsite laboratory will be performed on the remainder of the parameters required. Sources of fuel oil in the area are listed in FSAR Section 9.5.4. Delivery alternatives are discussed on FSAR Page 9.5-14, Amendment 73.</p>



<u>SRP Item</u>	<u>Affected Topic/System</u>	<u>Problem Source</u>	<u>NUREG-CR-0660 Recommendation</u>	<u>PGandE Response</u>
8.7	DG start system	Moisture in instrument control air or start air systems	Provide means of moisture removal	<p>The redundant air start system for each DG unit is described in Section 8.1 above. (See PG&E Drawing P & ID 102021, Sheets 3 and 3A.) Start air is not directed to the engine but rather to a set of air motors capable of starting the engine. Supplementally, turbo boost air will also be directed into the engine intake manifold. There is an independent, duplicate air start system for another set of motors. Each system is provided with a desiccant air dryer system. Provisions are included for compressor oil removal due to carry over. This air dryer system is not subjected to high flow rates since it is at the output of the compressor and not between the air receiver and air motors. Inserting additional components to remove moisture in this section of piping would compromise the reliability of the rapid, uninterrupted air delivery capability to the air motors.</p> <p>There is no control air system associated with the operation of the DG Starting Air System.</p>
8.8	Turbocharger	EMD-DG, gear failure on low-load operation	Replace gear	Not applicable to ALCO DG units.
8.9	Personnel	Lack of training and formal manufacturer's courses along with ongoing testing/examination of personnel dedicated to diesel DG maintenance	NRC request for additional information. Requires only a discussion of present practice.	<p>Within the present maintenance force at Diablo Canyon, one individual has been trained at the ALCO factory. Ongoing training programs for maintenance and operating personnel include on-the-job training. PGandE has historically had a very effective communication link with ALCO through their sales engineering force. Their representatives are called routinely on items of concern and they regularly visit site maintenance and operational personnel to provide updated information.</p>
8.10	Lube oil system	Excessive pre-lube resulting in lube oil fire on exhaust manifold and in turbocharger housing	Limit excessive pre-lube of engine	<p>The ALCO unit precirculation system operates continuously to pre-lube and warm the engine. The system operates at reduced pressure and any leakage detected leads to early corrective action. The lube oil manifold is below the exhaust manifold and therefore leakage is not a source for an exhaust initiated fire. There is no pre-lube circulation flow to the turbocharger bearing. It is important to note, however, that the turbocharger is not started dry, but is started in an oil bath. (A pressure control valve prevents oil passage until 18.6 pounds is reached on engine start.) The ALCO manufacturing instructions recommend precirculation. (See ALCO manual item MI - 17220).</p>
8.11	Lube oil system	System drained on engine start	Provide quick response electric motor in parallel to engine driven pump during engine crank time	This condition is precluded by use of the precirculation system as described in response 8.10.



<u>SRP Item</u>	<u>Affected Topic/System</u>	<u>Problem Source</u>	<u>NUREG-CR-0660 Recommendation</u>	<u>PGandE Response</u>
8.12	Engine performance	1. Operating with minimum load during testing	Limit minimum load, duration, and/or load level	1. See response 8.3.
		2. Surveillance testing requirement inconsistencies between Regulatory Guide 1.109 and Manufacturer's instructions	Identify inconsistencies and resolve	2. We have reviewed the surveillance testing programs committed to in the Technical Specifications and find that there are no inconsistencies. The Technical Specifications comply with Regulatory Guide 1.109.
		3. Failed components are replaced without the investigation and the correction of root causes.	Preventative maintenance should be investigative for long-term reliability	Each engine component or system failure is documented by the operating personnel (Nuclear Plant Problem Report), and an information storage system will be maintained for such documentation. Each report requires resolution of the problem and review by a supervisor. Patterns of failure are brought to the attention of the Plant Staff Review Committee. Failure data through the NPRDS and NRC - LER reporting systems along with data accumulated by ALCO serve to provide feedback on failure trends of components.
		4. Returning unit to service without verification that all affected or maintained systems were actually restored	Establish routine of performing service test prior to returning unit to service	Post maintenance or repair evolutions are followed by an appropriate DG system test that verifies that the system affected will function as designed.
8.13	Control instrumentation	Degradation due to vibration effects	Relocate skid-mounted sensitive instrumentation or critical instrumentation to detached cabinet	The ALCO DG units have separate floor mounted cabinets that house control and excitation circuitry. There is a limited number of temperature and pressure switches mounted integrally with the respective systems on the engine, however, there is a long history of reliable performance of these components that demonstrates their lack of susceptibility to vibration.
8.14	Water Cooling	Unreliable temperature control valve	Justify use of a different temperature control valve than the 3-way valve that has the highest demonstrated reliability	The ALCO DG units use the 3-way control valve (AMOT Thermostatic Valve).

