(4)

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

SEP 29 1983

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Licensing
Division of Licensing

FROM: James P. Knight, Assistant Director
Components & Structures Engineering
Division of Engineering

SUBJECT: DIESEL GENERATOR INTAKE/EXHAUST SEISMIC DESIGN BOARD NOTIFICATION NO. 83-03

Plant Name: Diablo Canyon Unit 1
Docket No.: 50-275
Licensing Stage: Post OL Review
Responsible Licensing Branch: Licensing Branch #3
Project Manager: H. Schierling
Review Status: Complete

In response to a staff inquiry on an allegation concerning seismic design of emergency diesel generator intake and exhaust system, the licensee Pacific Gas and Electric Company (PG&E) provided additional information contained in a letter dated September 9, 1983 from J. O. Schulyer to D. G. Eisenhut. The staff in Equipment Qualification Branch, DE:C&SE has reviewed the additional information and in addition obtained further clarification through telephone conference on September 20, 1983. The purpose of this memorandum is to provide you with the staff assessment of the seismic capability of the emergency diesel generator intake and exhaust system at Diablo Canyon Unit 1.

The diesel generator inlet and exhaust piping is classified as Design Class II, the intake air filter and air silencer are classified as Design Class I, and the engine exhaust silencer is classified as Design Class II. The criteria for Design Class I and II are defined in Section 3.2.1 of the FSAR. Design Class II components are considered important to reactor operation, but not essential for safe shutdown and isolation of the reactor. However, the diesel generator intake and exhaust system including filters and silencers have been qualified to the original Hosgri Spectra and current Hosgri Spectra where appropriate. Qualification models included explicit representation of exhaust silencer, piping and pipe supports. As a result of the Hosgri spectra qualification it has been determined that stresses in critical sections are within allowable values defined in ANSI B31.1-1967 standard. The Hosgri spectrum qualification has also identified the need for modification

Contact: G. Bagchi
X28251

8310110367 XA

10

of piping supports as well as mounting braces of one exhaust silencer. Based on the above discussion the staff concludes that any loss of efficiency in the operation of the diesel generators due to a large earthquake such as the postulated Hosgri event is not likely, provided that modifications to braces and piping supports are properly installed.

for George Lear
James P. Knight, Assistant Director
Components & Structures Engineering
Division of Engineering

cc: V. S. Noonan
G. Knighton
H. Schierling
A. Vietti
A. Lee

(5)

Mark G. Jones
Engineering Consultants, Inc.
330 Hayes Street
San Francisco California

415 864-2535

Correspondence No.:
JC-00213

Mr. L. W. Horn
Pacific Gas and Electric Company
45 Fremont Street 81B22
San Francisco, California 94106

JUN 21 1983

PLEASE HANDLE — URPLY
COMMENT — PREPLY
NCHNDTN — DISCUSS
CENTRAL FILES
DEPT. FILES

Subject: Diablo Canyon Project SIP
Light Fixture Interactions

References: 1) SIP Transmittal dated May 27, 1983
2) Technical Review No. 8216-TR-0321

Dear Mr. Horn:

Our Technical Review 0321 pertains to interactions in which the sources are fluorescent light fixtures (detail 9 per dwg. 050041). The SIP Transmittal of May 18, 1983 from S. Auer/J. Swain to L.W. Horn (part of Reference 1) provides some additional input from the engineering disciplines on this matter. However there do remain several significant concerns with the final resolutions to these interactions which are outlined as follows:

- The resolution analysis assumed the support system of the light fixture is capable of accommodating the postulated vertical accelerations. No supporting calculations were provided for the conduit/fixture connection.

- The resolution analysis assumed the conduit connections to the fluorescent fixture to be hinge connections. A field inspection by MGJEC personnel revealed that the conduit connection to the light fixture is a fixed connection and deflection in the longitudinal direction results in deformation and possible failure of the sheet metal fixture at the connection (see attached Figure 1). In some cases the paint on the sheet metal around the conduit/fixture connection has chipped away due to the excessive sheet metal deformation and corrosion of the metal is taking place. Tearing of the sheet metal at the conduit support connection point was observed for some fixtures. In many instances the lock nut at the conduit/fixture connection is loose and no washer is present. All these considerations make the conduit/fixture connection very suspect.

Due to the concerns outlined above, it appears that the most expedient resolution is to secure the light fixtures so that failure of the existing connections will not allow the fixtures to fail.

Very truly yours,

MARK G. JONES
ENGINEERING CONSULTANTS, INC.

Steven E. Traisman

Steven E. Traisman
Project Manager
MRB:SL
Enclosures: References 1, 2 and Figure 1

(6)

5. PGIR Instrument Racks

The PGIR instrument racks must withstand during a DDE simultaneous horizontal and vertical accelerations of 1.44g and 0.36g, respectively, with natural frequency of vibration greater than 20 Hz, based on rack location at 128-foot elevation. The seismic qualification of the PGIR instrument racks was made by analysis in accordance with IEEE-344-1971, Paragraph 3.1.3. The qualification for instruments mounted in the racks was made by seismic testing. The test procedure and qualification are in accordance with IEEE-344-1971, Paragraphs 3.2.2.3.1 and 3.2.2.4.2. These qualification reports were submitted by the supplier, Fisher Controls Co.

6. Diesel Generators

Seismic calculations based on the Company's design horizontal and vertical acceleration criteria were made by the manufacturer for the diesel engine, skid mounting and components. In addition, the engine as a whole was tested while operating on a barge in the proximity of an underwater explosion in accordance with Military Specification MIL-S-901C. Many components on the engine were not reviewed dynamically but were qualified on the basis that normal operating experience has proven them capable of withstanding much higher accelerations. The generator is a ruggedly built device which must withstand forces during normal operation which exceed the seismic forces and therefore needs no dynamic analysis or testing. A governor similar in design to the one used was vibration tested in accordandce with Military Specification MIL-STD-167. There are no parts that have a natural frequency between 5 Hz and 33 Hz. Seismic test data were provided for essential electrical items mounted on the engine skid, indicating satisfactory performance. The natural frequency of the engine gauge and control panel was calculated to be 36.9 Hz, and seismic data for relays, switches, and other equipment mounted on it were submitted. Test results were all satisfactory, except for one type of auxiliary relay that had contact chatter. Those relays have been replaced by ones which perform properly under seismic conditions. A test report submitted for the exciter-regulator indicated satisfactory performance. Microswitches and timers were qualified to 100g shock under MIL-S-8805 and MIL-R-5757, respectively.

12

(1) Qualification under MIL-S-901C, MIL-STD-167, MIL-R-5757, and MIL-S-8805, (2) sine beat tests and centrifuge tests, and (3) seismic calculations performed by the manufacturer on the diesel generator, and its mounted electrical components, meet or exceed test and analysis requirements of IEEE-344-1971. The DDE requirement (0.4g horizontal and 0.26g vertical) for the diesel generator location in Turbine Building, Area A, is satisfied under the above military standard qualifications.

7. Class IE A-C Electrical Distribution Equipment

a. Vital Switchgear

The vital 4,160 volt switchgear was analyzed structurally, and typical relays were tested for seismic adequacy by the manufacturer. The structural stress analysis was based on simultaneous input seismic accelerations of 1.0g horizontal and 0.3g vertical. The manufacturer determined that all critical components have a natural frequency of vibration greater than 20 Hz. The analysis shows that stresses in the
9 switchgear structure and anchorage would not exceed yield stresses and that the breaker in its support system had a natural frequency of vibration greater than 20 Hz.

Vibration testing of typical relays mounted in their operating configuration showed that the relays would operate satisfactorily and withstand, without malfunction, the required range of frequencies and accelerations of the DDE supporting floor response accelerations.

General Electric Company, the manufacturer, submitted a Seismic Stress and Vibration Report, a Seismic Test Report for 350 MVA, 4,160 volt switchgear, and a Seismic Qualification Report for 250 and 350 MVA, 4,160 volt switchgear. The seismic test and the qualification analysis were conducted in accordance with IEEE-344-1971 and were submitted for the purpose of seismic qualification documentation of the (similar and lighter weight) 250 MVA switchgear used at the plant. The use of seismic test and analysis reports of similar type equipment instead of specific plant equipment is considered justifiable under the terms of Paragraph 3 of IEEE-344-1971.

MR. SMITH: I don't know the answer to that question. I think since this was mentioned in the TRG meeting, they could make a case that this came out of the TRG meeting, which has not ended yet. Whether they have already put it on some other list or not, I don't know.

[redacted]

I questioned that to the mechanical supervisor on Diablo, and he said he had already written a memo to Piping asking them to do that a while back, but nothing had been done; and checking further, I found out that the piping schematic, the reason this was not Class I in the first place, the piping schematic showed it as non-Class I, which amazed me. [redacted]

[redacted] It is 22-inch piping, to my knowledge. As of early December, this was not reported. [redacted]

MR. MATTSON: Let's see. It is clear from looking at this that if those intake and exhaust pipes fail, the diesel generator won't function? You didn't say that but you implied it.

MR. SMITH: That's right. This piping system on the intake and exhaust, it is not a short run of piping or anything. It goes up quite a few feet. I saw it at the site. And the silencer is quite mammoth on the exhaust one, especially. [redacted], which is the thing I believe you were talking about earlier, about the [redacted] -- they call it the SIP program, Systems Interaction -- in trying to eliminate some reactor protection system circuits that come off the turbine that Westinghouse puts into their systems typical of BWRs also.

I was trying to make a case that a lot of these functions are not safety-related because there are other functions within Category I structures that have

(8)

[illegible] [illegible]IC GAS AND ELECTRIC COMPANY

[illegible] STREET • SAN FRANCISCO, CALIFORNIA 94106 • [illegible]

September 9, 1983

George Knight
for action as necessary
T
BV

Turbine Bldg.

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Docket No. 50-275, OL-DPR-76
Diablo Canyon Unit 1
Diesel Generator Intake/Exhaust Seismic Design
Board Notification No. 83-03

Dear Mr. Eisenhut:

This letter provides information requested by the NRC Staff regarding an allegation concerning the seismic design of emergency diesel generator intake/exhaust piping, silencers, and filters. PGandE was notified in Board Notification No. 83-03 of this allegation. Prior to the allegation, PGandE had already initiated an analysis to demonstrate the seismic adequacy of the inlet and outlet piping support system.

On January 28, 1983, PGandE met with the NRC Staff to discuss the above concern and provide information on the design philosophy related to the diesel intake and exhaust system.

As provided in the Diablo Canyon FSAR, the diesel generator inlet and exhaust piping is classified as Design Class II. However, the piping support system was designed to the same criteria as Design Class I equipment. The exhaust silencers are classified as Design Class II. Their design includes features which would not result in flow restriction to the extent that there would be a loss of efficiency in diesel operation. The air intake filter and silencer were procured as Design Class I.

The intake and exhaust piping and the silencers were included as part of the Phase I Internal Technical Program (a part of the design verification program) to ensure the adequacy of the seismic design qualification.

The piping and pipe supports have been qualified to the current Hosgri spectra. Piping support modifications are being performed at DCPP and they are targeted for completion in early September, 1983.

8309160296

Modifications to support pipe

The silencers and filters have been qualified to the current Hosgri spectra. Modifications to the mounting braces of one exhaust silencer are required and have been designed. Installation of the mounting braces is targeted for completion in early October, 1983.

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

Sincerely,

J.O. Schuyler

cc: Service List

Stage 1 Final Report
Max stress (1) 0.86 of Allowable 20.3 ksi B 31.1 Code
(2) 0.95 " , 26.4 ksi
(3) 0.95
Diesel exhaust

Phase 1 Final Report
T 2.2.8-34 Rev. 8 ~~Rang 34 of~~
Dated 6-20-83
Analysis 14-101, 102, and 103

Diesel Gen supported on the ground, there was no increase in spectra, but the silencer supports had increased input, and they had to be modified.

(9)

3.2 CLASSIFICATION OF STRUCTURES, COMPONENTS, AND SYSTEMS

This section provides a guide to the classification of Diablo Canyon structures, systems, and components. Criterion 1 of the AEC General Design Criteria requires that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. This section describes how Criterion 1 has been implemented by relating the classifications of structures, systems, and components to the various criteria, codes, regulations, standards, etc., which dictate specific quality requirements.

In this regard, it is recognized that during the design and construction of Units 1 and 2, significant industry and regulatory progress has been made in establishing common and agreed upon methods of classification, e.g., ANSI N18.2, AEC Safety Guide 26 and AEC Safety Guide 29. These newer classification methods all differ slightly in detail from that used for Diablo Canyon, but the form and intent of all are equivalent as will be shown in the following discussion of (1) the seismic classification of structures, systems, and components, and (2) the system quality group classification of pressure-containing components of fluid systems.

3.2.1 SEISMIC CLASSIFICATION

Criterion 2 of the AEC General Design Criteria, and proposed Appendix A to 10 CFR 100, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," require that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of earthquakes. Specifically, proposed Appendix A to 10 CFR 100 requires that all nuclear power plants be designed so that, if the Safe Shutdown Earthquake (SSE) occurs, all structures and components important to safety remain functional. Plant features important to safety are those necessary to assure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (3) the capability to prevent or mitigate the consequences of accidents which could result in potential off-site exposures comparable to the guideline exposures of 10 CFR 100.

15

The general applicability and requirements of the Seismic Classifications, Design Classes I, II, and III, are summarized in Table 3.2-1.

The seismic classifications of specific Diablo Canyon structures, systems, and components are given in Table 3.2-4, and the piping schematic drawings, Figures 3.2-01 through 3.2-27.

PG&E has developed a piping symbol system which appears on all piping schematics and piping drawings to indicate piping fabrication, erection, and test criteria. These piping symbols can be correlated to the nuclear and non-nuclear codes and code classes as shown below.

		Fabrication, Erection, and Test Codes and Classes		Design Code and Class
PG&E Piping Symbol	Design Class	ANSI B31.7 Nuclear Power Piping Code	Others	
A	I	Class I	-	ANSI B31.1-1967
B	I	Class II	-	ANSI B31.7, Cl. II
C	I	Class III	-	ANSI B31.7, Cl. III
E	II	-	ANSI B31.1-1967	ANSI B31.1-1967
G	I*	-	ANSI B31.1-1967 and NFPA Standards	NFPA Standards 81
G1	II*	-	NFPA Standards	NFPA Standards
Reactor Coolant Loop Piping				
None	I	-	ASME Boiler & Pressure Vessel Code, Section I, 1968 Edition	ASA B31.1-1955 and "N" Code Case
Portions of Main Steam, Feedwater, Auxiliary FW Piping and Steam Generator Blowdown to First Valve Outside Containment				
None	I	-	ASME Boiler & Pressure Vessel Code, Section I, 1968 Edition	ANSI B31.1-1967

*10CFR50 Appendix B or alternate quality assurance provisions apply to these systems. 81

8. Radioactive waste treatment, handling and disposal systems except those portions of these systems whose postulated simultaneous failure would not result in conservatively calculated potential off-site exposures in excess of 0.17 rem whole body (or its equivalent to parts of the body) at the site boundary or beyond.

9. Systems or portions of systems that are required to supply fuel for emergency equipment.

10. Systems or portions of systems that are required for monitoring and actuation of systems important to safety.

11. The protection system.[3]

12. The spent fuel storage pool structure, including the fuel racks.

13. The reactivity control systems, i.e., control rods, control rod drives, and boron injection system, that are required to achieve safe shutdown of the plant.

14. The control room, including its associated vital equipment and life support systems, and any structures or equipment inside or outside of the control room whose failure could result in incapacitating injury to the operators.

15. Reactor containment structure, including penetrations.

16. Portions of the on-site electric power system, including the on-site electric power sources, that provide the emergency electric power needed for functioning of plant features included in Items 1 through 15, above.

17. Structures, systems, and components whose failure could reduce the functioning of any plant feature included in Items 1 through 16, above, to an unacceptable safety level.

The Diablo Canyon quality classification system for fluid systems and components of fluid systems consists of: (1) four quality groups, Code Classes I, II, III, and a group which has no class designation, (2) methods for assigning components and fluid systems to these quality groups, (3) the specific quality standards applicable to each quality group.

Three quality groups, Code Classes I, II, and III, are encompassed by the Design Class I seismic classification. (Refer to Paragraph 3.2.1 for a discussion of the seismic classifications.) As a result, the seismic design and quality assurance requirements for Design Class I structures, systems, and components apply to the fluid systems and components of fluid systems identified as Code Class I, II, and III. These are in addition to the specific requirements dictated by the quality standards applicable to each of the respective code classes.

The fourth quality group consists of Design Classes II and III fluid systems and components of fluid systems. This group has not been assigned a code class.

Code Class I Fluid Systems and Components

Section 50.55a of 10 CFR 50, "Codes and Standards," requires that certain components of the reactor coolant pressure boundary be designed, fabricated, erected, and tested in accordance with the requirements for Class A* components of Section III of the ASME Boiler and Pressure Vessel Code, or the highest available industry codes and standards. Code Class I has been applied those components of the reactor coolant pressure boundary and implements for Diablo Canyon the quality standards that satisfy the requirements of Section 50.552, 10 CFR 50. Diablo Canyon Code Class I components of the reactor coolant pressure boundary are given in Table 3.2-4 and the piping schematic drawings, Figures 3.2-01 through 3.2-27, along with the industry codes and standards used for their design, fabrication, erection, and test. The Code Class I classification includes the components of the reactor coolant pressure boundary identified as Safety Class 1 in ANSI N18.2 and Quality Group A in AEC Safety Guide 26.

*The 1971 edition of the ASME Boiler and Pressure Vessel Code, Section III, "Nuclear Power Plant Components," uses the term Class I in lieu of Class A.

Diablo Canyon Code Class II fluid systems and components of fluid systems are given in Table 3.2-4 and the piping schematic drawings, Figures 3.2-01 through 3.2-27, along with the industry codes and standards used for their design, fabrication, erection, and test. The Code Class II classification generally includes the fluid systems and components identified as Safety Class 2a in ANSI N18.2 and Quality Group B in AEC Safety Guide 26. However, the classification and quality standards for Diablo Canyon fluid systems and components were established prior to the existence of these documents and therefore do not always fall within their strict definitions. All Class II fluid systems and components are in accordance with the accepted industry codes and standards that were in effect during the design and construction of Diablo Canyon. If fluid systems and components were designed and constructed to codes and standards outside of the requirements of the above mentioned documents, additional quality standards have normally been applied so that their intent has been met.

Code Class III Fluid Systems and Components

Generally, Code Class III has been applied to include fluid systems and fluid system components not part of the reactor coolant pressure boundary, nor included in Code Class II, but part of:

1. Component Cooling Water, Auxiliary Saltwater and Auxiliary Feedwater Systems or portions of these systems that are required for (1) emergency core cooling, (2) postaccident containment heat removal, (3) post-accident containment atmosphere cleanup, and (4) residual heat removal from the reactor.

2. Component Cooling Water System and seal water systems or portions of these systems that are required for functioning of Reactor Coolant System components important to safety, such as the reactor coolant pumps.

3. Systems or portions of systems that are connected to the reactor coolant pressure boundary and are capable of being isolated from that boundary during all modes of normal reactor operation by two valves, each of which is either normally closed or capable of automatic closure.

and components are Code Class III, and since all other Code Class III fluid systems and components are Design Class I, for consistency, these radioactive waste systems and system components are designated Design Class I also.

The other fluid systems and components of fluid systems which are not included in the Design Class I seismic classification are either Design Class II or III. These items comprise a quality group, but have not been assigned a code class.

These Design Classes II and III fluid systems and components of fluid systems are given in Table 3.2-4, and the piping schematic drawings, Figures 3.2-01 through 3.2-27, along with the industry codes and standards used for their design, fabrication, erection, and test. This quality group includes the fluid systems and components identified as Quality Group D in AEC Safety Guide 26, i.e., those fluid systems and components that contain or may contain radioactive material, but whose failure would not result in calculated potential exposures in excess of 0.17 rem whole body (or its equivalent to parts of the body) at the site boundary. These fluid systems and components are in accordance with the accepted industry codes and standards in effect during the design and construction of Diablo Canyon. If they were designed and constructed to codes and standards outside of the requirements of the Safety Guide 26, additional quality standards have normally been applied so that its intent has been met.

Summary of System Quality Group Classifications

Table 3.2-2 summarizes the four system quality group classifications applied to the Diablo Canyon fluid systems and components of fluid systems and their relationships to the other methods of classification. The classification for those fluid systems and components that do not fall within the strict definitions of AEC Safety Guide 26 and ANSI N18.2, were established prior to ANSI N18.2 Safety Guide 26 and the issuance of revised industry codes and standards.

Industry codes and standards signify and specify the quality standards used for fluid systems and components of fluid systems. In general terms, the principal quality standards generally applicable to each system quality group

TABLE 3.2-4
(Sheet 19 of 38)

SECTION II - MECHANICAL EQUIPMENT & COMPONENTS

Structure, System, Component	Design Class	Code Class	Design, Fabrication, Erection & Test Code
LUBE OIL DISTRIBUTION AND PURIFICATION SYSTEMS			
Lube Oil Reservoir	II	-	
Lube Oil Coolers	II	-	
Lube Oil Transfer Pump	II	-	
Lube Oil Centrifuge	II	-	
Dirty & Clean Lube Oil Storage Tanks	II	-	
Lube Oil Overflow Tank	II	-	ASME B&PV Code, Section VIII
DIESEL ENGINE GENERATING SYSTEMS			
Diesel Fuel Oil Transfer Pump	I	III	
Diesel Engine Generator Unit	I	-	
Engine Starting Air Compressors	I	-	
Engine Starting Air Receivers	I	-	ASME B&PV Code, Section VIII
Engine Intake Air Filter	I	-	
Engine Intake Air Silencer	I	-	
Engine Exhaust Silencer	II	-	
Diesel Fuel Oil Storage Tanks	I	III	UL Standard No. 58(1)
Diesel Fuel Oil Transfer Filters	I	III	ASME B&PV Code, Section VIII
TURBINE & GENERATOR ASSOCIATED SYSTEMS			
Turbine-Generator Unit	II	-	
Electrohydraulic Control Unit	II	-	
Gland Steam Condenser	II	-	
Gland Steam Condenser Air Exhauster	II	-	
Seal Oil Unit	II	-	
Stator Coil Cooling Unit	II	-	
Hydrogen Coolers	II	-	

Notes: (1) Welders qualified per ASME B&PV Code, Section IX.

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

NOV 3 0 1983

MEMORANDUM FOR: Attached List

FROM: George W. Knighton, NRR Member
Diablo Canyon Allegation Management
Program Staff

SUBJECT: GUIDANCE FOR PREPARATION OF THE DIABLO CANYON ALLEGATIONS EVALUATION

In our memorandum of November 29, 1983, on the above subject you were advised that a standard format for responding to the allegations or concern was in preparation. Enclosed is that format with appropriate instructions to your typist. It is hoped that using this format and typing instructions will permit us to assemble the SER for the Commission without reprocessing your work.

If you have several allegations or concerns on the same issue you may include them on the same task evaluation sheet. The item "Implied Significance to Plant Design, Construction or Operation" is designed to focus on the impact suggested by the allegation or concern. The "Assessment of Safety Significance" would present your detailed assessment of the safety significance the perceived impact would have on the health and safety of the public. This assessment should include any generic consideration of the concern applied to the plant where appropriate. The "Staff Position" should present our regulatory position developed with respect to the allegation and should consider the impact on low power and full power licensing.

Should the "Staff Position" require specific actions to be taken to resolve the allegation or concern, the actions and the schedule necessary would be presented under "Action Required".

8312090330

16

It must be stated again, that the short review time demands quick determination of informatin needs. We have received only limited contacts to date for information.

George W. Knighton, NRR Member
Diablo Canyon Allegation Management
Program Staff

Enclosure:
As stated
cc: R. Mattson
R. Vollmer
T. Speis
D. Eisenhut
T. Bishop
R. Houston
L. Rubenstein
D. Muller
J. Knight
W. Johnston
F. Rowsome
H. Schierling

INSTRUCTION TO TYPISTS

Start each task on a separate page.

Type all entires in letter gothic typeface.

Type all text flush to left margin (see sample format below).

Double space between all title lines (underscored titles) and text (see sample format below).

SAMPLE FORMAT

Task: Allegation or Concern No. ________

ATS No.: ________________ BN No.: ___________________

Characterization

Start text here

Implied Significance to Plant Design, Construction or Operation

Start text here

Assessment of Safety Significance

Start text here

Staff Position

Start text here

Action Required

Start text here

(10) NOV 3 0 1983

ADDRESSEES

Olan Parr, Chief
Auxiliary Systems Branch
Division of Systems Integration

Faust Rosa, Chief
Instrumentation & Control Systems Branch
Division of Systems Integration

Brian Shearon, Chief
Reactor Systems Branch
Division of Systems Integration

Vincent Noonan, Chief
Equipment Qualification Branch
Division of Engineering

George Lear, Chief
Structural and Geotechnical
Engineering Branch
Division of Engineering

Robert Bosnak, Chief
Mechanical Engineering Branch
Division of Engineering

Ashok Thandani, Chief
Reliability & Risk Assessment Branch
Division of Safety Technology

Task: Allegation #8

ATS No.: NRR 83-02 BN No.: BN 83-03 (1/7/83)

Characterization

Seismic Design of Diesel Generator Intake and Exhaust

Implied Significance to Plant Design, Construction or Operation

Availability of on-site power could be degraded and eventually interrupted and potentially hinder cold shutdown of reactor following a large earthquake event.

Assessment of Safety Significance

In response to a staff inquiry on an allegation concerning seismic design of emergency diesel generator intake and exhaust system, the licensee Pacific Gas and Electric Company (PG&E) provided additional information contained in a letter dated September 9, 1983 from J. O. Schulyer to D. G. Eisenhut. The staff in Equipment Qualification Branch, DE:C&SE has reviewed the additional information and in addition obtained further clarification through telephone conference on September 20, 1983. The approach in the staff review has been to determine the extent to which the diesel generator exhaust piping can maintain its integrity following a large earthquake. Availability of on-site power following a large earthquake is important for maintaining reactor in a safe shutdown condition. The diesel general intake air filter and air silencer are designed to withstand the safe shutdown earthquake. The concern with the integrity of the exhaust piping is that the operation and the efficiency of the diesel generator could be degraded, should the exhaust piping fail in an unusual way to block the pipe and build-up significant back pressure.

The licensee's commitment in the FSAR is that the diesel generator inlet and exhaust piping is classified as Design Class II, the intake air filter and air silencer are classified as Design Class I, and the engine exhaust silencer is classified as Design Class II. The criteria for Design Class I and II are defined in Section 3.2.1 of the FSAR. Design Class II components are considered important to reactor operation, but not essential for safe shutdown and isolation of the reactor. However, the diesel generator intake and exhaust system including filters and silencers have been qualified to the original Hosgri Spectra and current Hosgri Spectra where appropriate. Qualification models included explicit representation of exhaust silencer, piping and pipe supports. As a result of the Hosgri spectra qualification it has been determined that stresses in critical sections are within allowable values defined in ANSI B31.1-1967 standard. The Hosgri spectrum qualification has also identified the need for modification of piping as well as mounting braces of an exhaust silencer.

Based on the above discussion the staff concludes that any loss of efficiency in the operation of the diesel generators due to a large earthquake is not likely, provided that modifications to braces and piping supports are properly installed.

Staff Position

This issued is satisfactorily resolved subject to completion of modifications.

Action Required:

Proposed modification to diesel generator silencer bracing and pipe supports should be completed prior to reactor power ascencion beyond 5 percent.

Task: Allegation #35

ATS No.: ________________ BN No.: BN 83-168 (10/27/83)

Characterization

Lack of support calculations for support of fluorescent light fixtures (control room).

Implied Significance to Plant Design, Construction or Operation

Falling light fixtures as a result of a large earthquake could incapacitate operators.

Assessment of Safety Significance:

This issue was discussed with the licensee in a telephone conference call on December 6, 1983 in order to obtain pertinent background information. The light fixtures in the control room are not safety related. However, their gross failure in a manner that could incapacitate operators in the control room is not acceptable. The approach in the staff review has been to understand the general arrangement of the control room suspended ceiling and the fluorescent lighting fixtures, and to develop an engineering judgment as to the seismic capability of the control room ceiling and light fixtures.

The licensee described the general arrangement of the control room suspended ceiling and light fixtures during the conference call on December 6, 1983, and provided a sketch of the general arrangement which was received and reviewed on December 9, 1983. The licensee indicated that the suspended ceiling has been designed and constructed as a structural grid system to withstand earthquake loading from both vertical and horizontal components. The fluorescent light fixtures are attached to the structural grid system holding up the suspended ceiling and at an elevation several inches above the level of the ceiling tiles. Thus even if one of the fluorescent tubes comes off the fixture it should drop on the ceiling tile.

The staff did not review any calculations. However, based on the review of the structural details and the statement by the licensee that a proper evaluation of the seismic capability of the ceiling and fluroescent light fixtures for the control room had been conducted, the staff feels that the likelihood of a falling fluorescent light fixture and incapacitating an operator as a result of an earthquake is very low. Furthermore, there is a remote shutdown panel away from the control room providing alternate capability to bring the reactor to a hot shutdown condition.

Staff Position

This issue is satisfactorily resolved.

Action Required

None

Task: Allegation #36

ATS No.: ________________ BN No.: BN 83-16B (10/27/83)

Characterization

Resolution analysis of fluorescent light fixture interaction assumed conduit connection to be hinged-inspection found fixed connections.

Implied Significance to Plant Design, Construction or Operation:

Fluorescent light fixtures that are hung by their conduits may fail as a result of a large earthquake and fall on safety related equipment causing it to malfunction. The safety implication is that of adverse interaction between safety and non-safety equipment during and following a large earthquake.

Assessment of Safety Significance:

This issue was discussed with the licensee in a telephone conference call on December 8, 1983 in order to obtain pertinent background information. The basis for this concern is discussed in a letter from Steve Traisman of M. G. Jones Engineering Consultants, Inc. to L. W. Horn of Pacific Gas and Electric Company dated June 21, 1983. Since failure of non-safety lighting fixtures interfering with the function of safety equipment is clearly unacceptable, the approach in the staff review has been to understand broadly how safety and non-safety system interaction has been addressed by the licensee, to review typical details light fixtures involved, and to determine the adequacy of effort undertaken by the licensee.

The licensee indicated that a comprehensive program was conducted to review the potential for adverse interaction between safety and non-safety systems as a result of an earthquake and to eliminate those that were identified. The effect of falling lighting fixtures having an adverse consequence effect was identified and the licensee reviewed a large number of lighting fixture details throughout the plant in safety related areas. Resolution is very much dependent upon the details of the light fixture and what it sorientation is with respect to fragile safety equipment. Licensee also indicated that the detailed process of checking is largely complete and in many cases chains have been provided to support the loads of light fixtures.

On December 8, 1983 staff also requested the resident NRC inspector to perform a plant walk-down of selected vital safety areas to determine the potential for falling light fixtures causing damage to the safety equipment during and following a large earthquake. Light fixtures were reviewed in 480KV Switchgear Room of Unit 1, 480V Vital Buses 1F, G, and H, Hot Shutdown Remote Control Panel, D.C. Switchgear Unit No. 1-1, Battery Room No. 1-1, D.C. Switchgear No. 1-2, Battery Room No. 1-2, D.C. Switchgear Units 1-2, 1-3, 2-3, Battery Rooms No. 2-1, 2-2, 3-1 and D.C. Switchgear No. 3-2. Also, the cable spreading rooms for both Unit 1 and Unit 2 were looked at. In various cases light fixtures are secured by chains attached at three points on the fixtures, in some cases chains are used to secure light fixtures at two attachment points. In some instances light fixtures are also supported by substantial conduits (3/4 to 1 inch in diameter) securely supported at regular intervals. In all cases reviewed, it was judged that no potential for any harmful interaction during and following an earthquake exists. The staff feels that adequate attention has been paid by the licensee to preclude adverse interaction between falling light fixtures and safety related equipment during and following a large earthquake.

Staff Position:

This issue is satisfactorily resolved pending completion of the safety and non-safety system interaction program.

Action Required:

Written Confirmation of a satisfactory completion of the safety and non-safety system interaction program, particularly with respect to the potential for light fixtures falling and causing malfunction of safety related equipment, is required prior to reactor power ascension beyond 5%.