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7 January 1988

Mr. Donnie H. Grimsley, Director
Division of Rules and Records
Office of Administration and Resources Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

FREEDOM OF INFORMATION
ACT REQUEST
FOIA-88-19
Rec'd 1-11-88

RE: FOIA Request for Records Concerning 1975 NRC Seismic
Design Audit of Diablo Canyon

Dear Mr. Grimsley:

Pursuant to the Freedom of Information Act and 10 CFR Part 9, Subpart A, "Freedom of Information Act Regulations", please make available at the Commission's Washington, D.C., Public Document Room single copies of records 1/ in the following category:

- A. All records in NRC's possession or control concerning a seismic design audit of the Diablo Canyon nuclear power plant, conducted by NRC from April 28 through May 2, 1975. This request includes documents from both the NRC technical and legal staffs (since both were represented during the audit).

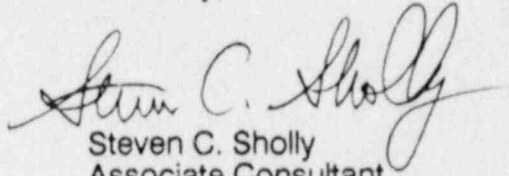
A copy of a May 19, 1975, internal memorandum (minus certain attachments) summarizing the results of the audit is attached in order to facilitate your search. Note that the memorandum identifies NRC attendees and participants in the audit.

1/ As used here, "records" has the definition provided in 10 CFR 9.3(b) of the Commission's regulations. Furthermore, "records" are considered to be those in the possession of the NRC, its contractors, its subcontractors, or others as provided for in 10 CFR 9.4.

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If you or any members of your staff have any questions concerning this request, please contact the undersigned directly by telephone at (408) 266-2716. Your prompt attention to this request will be appreciated.

Sincerely,



Steven C. Sholly
Associate Consultant

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

MAY 19 1975

R. R. Maccary, Assistant Director
for Engineering
Division of Technical Review

HIGHLIGHTS OF PG&E DIABLO CANYON PLANT SEISMIC DESIGN AUDIT

From April 28th to May 2nd, 1975, the members of the Structural Engineering Branch and Mechanical Engineering Branch have performed a seismic design audit of the Diablo Canyon Plant at the PG&E office in San Francisco. Present for the applicant were PG&E, Westinghouse and John A. Blume Associates engineering staff. In an earlier meeting held in Bethesda on April 4, 1975 between the NRC staff and the applicant, general guidelines and scope for the seismic design audit were discussed in considerable detail as part of the preparatory work for the subject audit.

A list of the attendees is enclosed.

The primary objective of the NRC staff was to conduct a seismic design audit of the subject plant. The results of the audit would then be used as basis for judging seismic design adequacy of the plant.

Highlights of the audit are summarized below.

1. NRC staff opened the meetings by first stating the objective of the audit program and defining the specific scope and depth of the week long audit plan.
2. PG&E, its NSSS vendor; Westinghouse and PG&E consultant John A. Blume Associates made presentations on the seismic design criteria, methodology and procedures used in the subject plant. The presentations generally followed the technical subjects included in the plant FSAR and were judged as satisfactory by the NRC staff.
3. A sample list of Category I structures, systems and components of the Diablo Canyon plant covering safety functions similar to those included in Table X-1 of Appendix X to the Rasmussen Report was reviewed for their adequacy of seismic design qualification



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and documentation. The audit staff found that all the Category I structures, systems and components included in the list were properly qualified (i.e., 100% successful qualification as compared to 27% failure to demonstrate adequacy indicated in Appendix X of the Rasmussen Report).

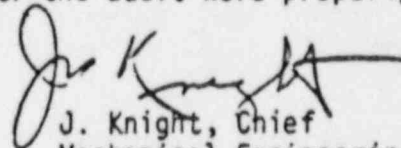
4. Following the above item 3 overall qualification audit, two structures and four components and systems (i.e., containment building, turbine building, steam generators, reactor coolant pump, steam generator support and pump support) were selected for detailed auditing by going through check list items. In addition, the analyses and test reports of six electrical equipment items (i.e., diesel generators, hot shutdown panel, main control console, nuclear instrumentation system, reactor trip switchgear and protective relay board) were also selected for detailed auditing. Except for the turbine building and a few missing data pertaining to the components and systems, which PG&E will provide in a future transmittal to the NRC staff for confirmatory review, the results of the detail audit of these structures, systems and components were found satisfactory and acceptable.
5. Some of the audit staff took a field trip to inspect selected Category I systems and components. The group concluded that the selected components and systems had been qualified for service under seismic loads by acceptable testing and analyses. The group also recommended and PG&E agreed that the installation of field run Category I piping (2-1/2 inch diameter and smaller) be reviewed by the PG&E engineering staff to ensure that the acceptable field installation procedures were fully implemented.
6. The audit staff also reviewed the applicant's and its vendor's design control programs. The methods of design control and coordination utilized by PG&E, Westinghouse and PG&E consultant (JAB) were reviewed and discussed. It was established that adequate control procedures were followed in checking and approving engineering calculations and drawings. The design control program implemented in seismic design of Diablo Canyon was judged satisfactory and acceptable.
7. The ACRS questions related to seismic design of the Diablo Canyon plant were discussed. The discussion yielded some technical viewpoints, which form part of the bases for formulating future response to the ACRS questions.

MAY 19 1975

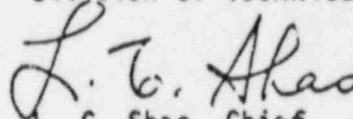
8. The NRC audit staff also reviewed various computer programs used for the design of Category I structures, systems and components by PG&E, JAB and Westinghouse. For programs that are not available in public domain the program verification procedures adopted by PG&E and its vendor/consultant were found to follow the criteria acceptable to NRC staff.
9. A few items, for which additional information is required, have been identified during the course of the audit. The information pertaining to the items will be provided in two to four weeks by PG&E and its vendor/consultant for NRC staff confirmatory review.

At the closing of the audit meeting, NRC audit staff concluded that based on the above described results of the seismic design audit, the seismic design methodology, procedures and design controls implemented for the plant were in general found satisfactory and acceptable. The audit staff also expressed their appreciation for the cooperation and support provided by the technical staff of PG&E and its vendor/consultant.

As a final note, the week long seismic audit effort was carried out in an expeditious manner with adequate depth of auditing. It is concluded that the objectives of the audit were properly implemented.



J. Knight, Chief
Mechanical Engineering Branch
Division of Technical Review



L. C. Shao, Chief
Structural Engineering Branch
Division of Technical Review

Enclosures:

1. List of Attendees
2. Diablo Canyon Seismic Audit Agenda
3. Seismic Category I Audit Check List
4. Detailed Seismic Audit Check List
5. Additional Information to be Provided
by PG&E and Westinghouse
6. Computer Program Verification

cc (Next Page)

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R. R. Maccary

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MAY 19 1975

cc w/encl:

B. Rusche

E. Case

F. Schroeder

A. Giambusso

R. DeYoung

V. Moore

H. Denton

L. Davis

O. Parr

D. Allison

D. Jeng

G. Bagchi

P. Y. Chen

V. S. Noonan

cc w/o encl:

SED Members

MEB Members

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ENCLOSURE 1
LIST OF ATTENDEES

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ENCLOSURE 1

LIST OF ATTENDEES

NAME	TITLE	ORGANIZATION
D. V. Kelly	Ch. M & N Eng.	PG & E
M. J. Gormly	Project Mech. Eng	"
R. V. Bettinger	Chief Civil	"
V. J. Ghio	Senior Civil	"
E. P. Wollak	Supvg Civil & Proj. Civil	"
F. W. Brady	Civil Eng	"
V. S. Noonan	Mech Eng	NRC/MEB
P. Y. Chen	Mech. Eng	"
J. P. Knight	Chief-Mech Eng.Br.	"
L. D. Davis	OELD	NRC/ OELD
D. C. Jeng	Sec. Leader Structural	NRC/SEB
L. C. Shao	Chief, Structural Eng. Br.	"
G. Bagchi	Structural Eng.	"
W. J. Lindblad	Project Eng.	PG & E
D. Nielsen	Senior Electrical & Proj. Eng.	"
B. Young	Senior Electrical	"
R. Gallagher	Vice Pres.	JAB Ass.
D. Javeri	Proj. Eng.	"
G. T. Downs	Supvsg Structural Analysis	<u>W</u> Electro-Mech.
R. M. Laverty	Senior ME	PG & E
J. W. Dorrycott	Proj. Mgr	<u>W</u>
W. C. Gangloff	Proj. Mgr	<u>W</u>
T. E. Campbell	Mgr Support Structure Design	<u>W</u>
D. F. Miller	Mgr System Structural Analysis	<u>W</u>
P. G. Smith	Mgr, Structural Development	<u>W</u> (Tampa Div.)

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ENCLOSURE 4

DETAILED SEISMIC AUDIT CHECKLIST

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Detailed Seismic Audit Checklist - Structures

Plant - Name:	DIABLO CANYON POWER PLANT	Type:
Utility:	PGandE Company	DWR _____
NSSS:	Westinghouse	PWR <u>X</u>
A-E:	PGandE Company, J. A. Blume & Associates	HITGR _____

Structure - Name: Containment

Description (Include sketches): Exterior Shell: 140' ID x 142' High x 3'-10" thick Cylindrical Wall, 140' ID x 2'-10" thick hemispherical dome roof. Interior Structure: 106' OD x 49' high x 3' thick cylindrical crane wall, anchored into base slab, 34' OD x 8' thick x 11' high reactor wall. 4' thick fuel transfer canal walls & floor. 3'-7' concrete main operating deck. Structural steel annulus, platforms between ext. shell and crane wall. Foundation: 15' reinforced concrete base mat.

Responsible Designer:

Stanley Hanusiak - Roger Villatuya (JAB)

Responsible Checker and/or Reviewer:

David C. Landes (Reviewer), R. Y. Chandivala (JAB)

Pertinent Reference Drawings: 443231 thru 443237, 443239, 443240, 443241, 443243, 443251 thru 443254, 443272, 443273, 443276, 443277, 443283 thru 443285, 443286 thru 443287

Seismic Input - acceleration: 0.20g (DE) 0.40g (DDE)

Ground Response spectra location: Surface / foundation

Time History: Hypothetical time history, developed to produce an envelope spectrum which combines input from time histories of March 22, '57 San Francisco and July 21, '52 Taft (Calif) earthquakes. In addition, to these two time histories, arbitrary modifications were introduced following meetings with AEC Staff, for the purpose of making the criteria more conservative.

Method of Analysis -

Model type (each direction): Axisymmetric finite element model. The foundation rock mass and the containment structure are modeled as one structure system, to consider rock-structure interaction (FSAR Figure 3.7-5)

Computer Code: "Dynamic Stress Analysis of Axisymmetric Structures under Arbitrary Loading" - by Sukmar Ghosh and Edward Wilson UC Report No. EERC 69-10

Soil Structure Interaction:

Soil is included in the model.

Soil damping:

Structural ^{7%}damping: 2% (DE), 5% (DDE)

Combination - 3 Components: Largest Horizontal component added to vertical

Torsional consideration: -Axisymmetric Structure

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