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 FACIL: 50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275
 50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
 AUTH. NAME AUTHOR AFFILIATION
 COOPER, W. E. Teledyne Engineering Services
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 DENTON, H. R. Office of Nuclear Reactor Regulation, Director
 ENGELKEN, R. H. Region 5, Office of Director
 MANEATIS, G. A. Pacific Gas & Electric Co.

SUBJECT: Forwards independent design verification program comments on Phase I Final rept. Rept should contain detailed descriptions of scope, criteria, methodology & models for all structures, sys & components.

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 TITLE: Diablo Canyon (50-275) Independent Design Verification Program

NOTES: J Hanchett 1cy PDR Documents. 05000275
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 PER: H. Schierling

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**TELEDYNE
ENGINEERING SERVICES**

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(617) 890-3350 TWX (710) 324-7508

October 7, 1982
5511-168

UNCORRECTED COPY

DOL

Mr. G. A. Maneatis, Senior Vice-President
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77 Beale Street
San Francisco, California 94106

Mr. H. R. Denton, Director
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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

50-275

Mr. R. H. Engelken, Regional Administrator
Region V
U. S. Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, California 94596

Subject: IDVP Comments to Phase I Final Report

Gentlemen:

Enclosed please find the IDVP integrated (RLCA and TES) review comments to the September 1, 1982 PGandE Phase I Report submittal to the NRC. The comments for Section 2.1 Structural Design Review are given by section and those for Sections 2.2 through 2.6 on piping systems, supports, and equipment are given by page reference.

In general, the PGandE Phase I Final Report submittal is not sufficiently detailed to perform a meaningful review of the corrective action program by the IDVP in those areas covered by the above report submittal. A general comment is the report should contain significantly more detailed descriptions of the scope, criteria, methodology, models etc. for all structures, systems, and components so that the IDVP review of corrective action can be performed solely on the basis of the Final Report contents. The specific comments and questions on the attached pages are intended to point out some areas where, in the IDVP mind, more description or clarification is required.

Very truly yours,

TELEDYNE ENGINEERING SERVICES

J. C. Isaacson for WEC
William E. Cooper
Project Manager

8210250240 821007
PDR ADOCK 05000275
P PDR

WEC/jmc
Enclosure

ENGINEERS AND METALLURGISTS

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Mr. G. A. Maneatis et al.
October 7, 1982
5511-168
Page Two

cc: H. E. Schierling (NRC)(2)
R. F. Reedy (RFR)
F. Sestak (SWEC)
H. B. Brown, Esq.
D. F. Fleischaker, Esq.
J. Reynolds, Esq.
B. Norton, Esq.
A. C. Gehr, Esq.

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October 6, 1982
5511-164

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Mr. R. R. Fray
Pacific Gas & Electric Company
45 Fremont Street
23rd Floor, Section A-17
San Francisco, CA 94105

Subject: IDVP Comments to Phase I Final Report

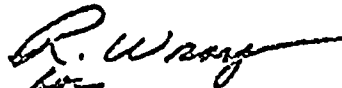
Dear Mr. Fray:

Enclosed please find the IDVP integrated (RLCA and TES) review comments to the September 1, 1982 PGandE Phase I Report submittal to the NRC. The comments for Section 2.1 Structural Design Review are given by section and those for Sections 2.2 through 2.6 on piping systems, supports, and equipment are given by page reference.

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Very truly yours,

TELEDYNE ENGINEERING SERVICES



William L. Cooper
Project Manager

RW/jmc
enclosure

cc: P. J. Cloud (RLCA)
R. Wray (TES)
R. D. Giatto (TES)
R. D. Foli (TES)

ENCL PERS AND METALLURGISTS



SECTION

COMMENTS ON 2.1 - "STRUCTURAL DESIGN REVIEW"

2.1

It is understood that in some cases, buildings will be reviewed but not necessarily reanalyzed. A procedure should be written for the review of structural analyses of safety-related structures with a checklist included. This would ensure uniformity and completeness of the reviews. Please incorporate or reference such procedures in this report.

Define appropriate seismic design criteria as that in this report and controlled spectra documents such as DCM C17, 25 and 30.

Please detail the FSAR 3.0 criteria that apply to DE and DDE and the Hosgri 4.0 criteria that apply to HE.

Please specify benchmarked computer codes. All computer programs must be verified.

Also, Outdoor Water Storage Tanks should be included in the structural design review per the August 6 PGE presentation of the Internal Technical Program.

2.1.1

Scope

Are the NRC accepted criteria, dynamic analysis procedures and methodology given in the following subsections?



SECTION

COMMENTS ON 2.1 (cont.)

2.1.1.2

Criteria

Eq. 2.1.1-1 and 2. All the load factors are 1.0 for the normal conditions. It should be clearly stated that the working stress allowables are used for computing load capacities, C, for normal conditions.

What is the basis for computing C for abnormal conditions, Eq. 2.1.1-3 to 8? Are working stress allowables used here too.

Specify the original licensing criteria for Eqs. 2.1.1-6 and 8. RLCA review does not show these equations in the FSAR or Hosgri.

There should be more discussion of the structural acceptance criteria similar to that given in 3.8-41 of the FSAR.

These comments apply to the criteria for other safety-related structures as well.

2.1.1.3.1

Description of Structures

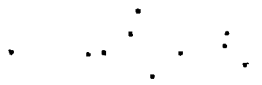
Figures similar to those given for the auxiliary building and the intake structure would be helpful.

2.1.1.3.2

Description of Analytical Models

Some figures and explanatory notes about the models would be helpful here.

- How are member properties formulated - uncracked or transformed concrete sections?



SECTION

COMMENTS ON 2.1 (cont.)

- How are masses lumped?
- How are connections modeled?
- Explain how cranes are modeled in the building analyses, i.e., what are assumed crane loads?

2.1.1.3.2.2

A figure is needed to explain the model.

Table 2.1.1-1

See RLCA letter P105-4 (September 6, 1982). The DDE criteria does not agree with June 21, 1982 statement (DCVP -RLCA 141) that Hosgri event is SSE and DE is OBE.

Clarify why vertical seismic input is N/A for DE and DDE.

2.1.2.1

Scope

Are the NRC accepted criteria, dynamic analysis procedures and methodology given in the following sections?

2.1.2.2

Criteria

Will the Newmark Spectra be considered? (Fig. 2.1.2-3)

Include first FSAR equation on page 3.8-6 under concrete structural elements and for structural steel.

Include FSAR equation on page 3.8-7.

Specify the original licensing criteria for Eq. 2.1.2-4. RLCA review does not show this equation in the FSAR or Hosgri Report. Also, specify the allowable for each equation.

The acceptance criteria should include a check of displacement against structural gaps.



...

SECTION

COMMENTS ON 2.1 (cont.)

2.1.2.3.2.1

Hosgri Evaluation Models

For the vertical model please explain the significance of including only axial areas in the elements. Is there a rotational restraint for the rigid link at Sl. 140'? If so, what is the significance of lateral offsets for elements 1 and 5?

2.1.2.3.2.2

Define the various models.

2.1.2.3.4

Define treatment of torsion and further specify the methodology involved such as that given in DCM C17.

Fig. 2.1.2-4

Explain the noted center of mass.

Fig. 2.1.2-8

Revise this drawing to include the ventilation area.

Fig. 2.1.2-9 & 10

Revise this drawing, to include the portions of the building above elevation 165'.

Fig. 2.1.2-11

Revise these model descriptions to show such items as rigid links and length of soil spring arm.

2.1.3.1

Scope

Please ensure that the as-built structure is evaluated. A statement to that effect should be included herein.

2.1.3.2

Criteria

Specify the original licensing criteria for equations. RLCA review does not show these equations in the FSAR or Hosgri Report.



SECTION

COMMENTS ON 2.1 (cont.)

Describe limitations, if any, on deformation or mechanism formation for loads of 1.0 Y or 1.7 S.

Application of Part 2 of the AISC Code for computing Y is not appropriate when linear elastic analysis is used.

Show 10% for torsion is conservative.

Specify which auxiliary building spectra will be used (5% eccentricity, etc.).

2.1.3.3.2

Description of Model

What are the boundary conditions for Models 2.1 and 2.2 at the building interfaces?

A description of joint modeling at the connections would be helpful.

What is basis for selection of dynamic degrees-of-freedom?

2.1.3.3.4

Description of Analyses

A description of FHB crane modeling and load condition would be helpful. Please indicate assumed crane position.

Will time history or response spectrum method be used for FHB?

2.1.5.1

Scope

Document the problem with the intake structure that led to ventilation additions.



SECTION

COMMENTS ON 2.1 (cont.)

2.1.5.2

Criteria

Table 2.1.5-1

Clarify why there is no DE for Intake Structure.

For U, the comments made for other structures apply.

Specify the original licensing criteria for these equations. RLCA review does not show these equations in the FSAR or Hosgri.

2.1.5.3.1

Description of Intake Structure

Define the boundary conditions for the rock fill sides and seismic input location.

2.1.5.3.3

Description of Wave Force Scale Model

More description required in this section including scaling laws and model instrumentation. Provide or reference test procedures.



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IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT

Page or Figure No.

Review Comment or Required
Text Clarification

SECTION 2.2.1

LARGE BORE PIPING SECTION

2.2.1-1

Revise to show that Westinghouse Electric Co. does not "qualify" DCNPP piping. PG&E is responsible for all "qualifications"

State who will do the review and decide on reanalysis of Westinghouse piping.

It is mentioned that Westinghouse in their reanalysis will use original methods and criteria documents. Either restate these here or reference specific sections of the FSAR and Hosgri Report.

2.2.1-4

Combination of the EW and NS into a horizontal is not part of the original criteria. This represents a built-in conservatism.

Damping values for Hosgri evaluation is different from Hosgri Report. Hosgri Report lists 2% for pipes equal to or less than 12 inches in diameter and 3% for lines greater than 12 inches in diameter.



IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT (Continued)

Page or Figure No.

Review Comment or Required
Text Clarification

2.2.1-5

The method for consideration of ZPA is not consistent with the commitment at previous IDVP meetings.

Specify the original licensing criteria for seismic anchor motion. RLCA review does not show SAM to be in the FSAR or Hosgri.

Clarification is needed on how SAM effects will be treated e.g., direction summation, phasing considerations, etc.

Define whether the thermal modes of operation, i.e., normal and upset, are system or plant conditions.

2.2.1-7

Interpolation is not consistent with the DCM C 17 for Hosgri Spectra.

Rotational spectra are presented for the bulding center of mass not gravity.

Commit to new walkdowns. Should be changed to specify 1982 not 1979.

For determination of spectra at intermediate elevations, interpolation meant to be linear



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IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT (Continued)

Page or Figure No.	Review Comment or Required Text Clarification
2.2.1-7 (Cont'd)	interpolation? The criteria for spectra interpolation should be more explicit such as given in DCM C-17.
2.2.1-9	Justify the moment of inertia ratio of 25 for branch lines.
	Valves with extended masses: A more detailed description on how these valves are to be modeled is needed. Define what structural components are to be considered on pipe support frequency calculations. Is flexible structural steel to be considered.
	Justify treatment of equipment nozzle as a pipe anchor for equipment with frequencies less than 20 Hz. The alternative given appears to be the most appropriate method.
2.2.1-10	Specify the SIFs to be used for welded pipe attachments.
	Overlap criteria could use a diagram for clarification. An axial support located around an elbow doesn't provide support in the 3 rd direction as intended.



IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT (Continued)

Page or Figure No.

Review Comment or Required
Text Clarification

2.2.1-11

Specify the original licensing criteria for valve nozzle stresses. Specify the SIFs.

2.2.1-14

Table 2.2.1.1 doesn't consider fluid dynamic load cases mentioned in Section 2.2.1.3.1.4 This table should also include thermal expansion and SAM cases.

SECTION 2.2.2

SMALL BORE PIPING SECTION

2.2.2-4

Specify criteria to be used in Section 2.2.2.3.2.1 review of dynamic analysis for compliance to as-built conditions.

SECTION 2.2.3

LARGE BORE PIPE SUPPORTS

This document does not agree with DCM M-9 Revision 7. Among the differences: SAMs, 1/3 allowable increase, allowables and Class II supports near Class I supports.

Section 2.2.3.2.1, third sentence should read as shown in Table 2.2.3-5

Same comment for Section 2.2.3.2.3 third sentence.



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IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT (Continued)

Page or Figure No.	Review Comment or Required Text Clarification
2.2.3-4	<p>Provide clarification in Section 2.2.3.3.2 when a new analysis is required to conform to as-built condition. What criteria?</p> <p>Seventh sentence should read "and the Design Class 2 side of".</p> <p>Span Table should be Table 2.2.3-6, not Table 2.2.3-5.</p>

SECTION 2.3

EQUIPMENT SEISMIC DESIGN REVIEW

2.3-1	Define the Westinghouse plus PG&E equipment as the total of Class I equipment.
2.3.1-2	Section 2.1 does not document the control of spectra.
2.3.1-3	Define the proper methodology for combination of spectra.
2.3.2-1	Define the equipment list
2.3.3-1	Define "event criteria"

SECTION 2.4

ELECTRICAL SUPPORTS REVIEW

2.4-1	Section 3.10 of the FSAR and 10.3.29 (not 10.3.2a) of the Hosgri Report do not define raceway criteria. Define raceway criteria.
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IDVP REVIEW OF PG&E PHASE I REPORT
SYSTEMS & EQUIPMENT (Continued)

<u>Page or Figure No.</u>	<u>Review Comment or Required Text Clarification</u>
2.4-2	<p>Specify the original licensing criteria for 7% damping.</p> <p>Revision 38, notes a maximum dimension of 8½ feet. Sheet 140, Revision 41 of this drawing notes a tolerance of 6 inches.</p>
<u>SECTION 2.6</u>	<u>INSTRUMENTATION TUBING AND TUBING SUPPORT REVIEW</u>
2.6-1	<p>Specify the original licensing criteria of 20 Hertz. RLCA review of the FSAR and Hosgri does not show this criteria.</p>

