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ACCESSION NBR: 8202080313 DOC. DATE: 82/02/04 NOTARIZED: NO DOCKET #
 FACIL: 50-361 San Onofre Nuclear Station, Unit 2, Southern California 05000361
 50-362 San Onofre Nuclear Station, Unit 3, Southern California 05000362
 AUTH. NAME AUTHOR AFFILIATION
 DIETCH, R. Southern California Edison Co.
 RECIP. NAME RECIPIENT AFFILIATION
 EISENHUT, D.G. Division of Licensing

SUBJECT: Forwards potential finding repts processed & classified by
 GA CO as invalid, observation or out of scope.

DISTRIBUTION CODE: B001S COPIES RECEIVED: LTR 1 ENCL 63 ^{on shelf} SIZE: 150
 TITLE: PSAR/FSAR AMDTS and Related Correspondence

NOTES: L Chandler: all FSAR & ER amends. 1 cy: J Hanchett (Region V). 05000361
 D Scaletti: 1 cy all envir info.
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ACTION:	RECIPIENT		COPIES		RECIPIENT	COPIES	
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ACTION:	A/D LICENSNG		1	0	LIC BR #3 BC	1	0
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INTERNAL:	ELD		1	0	IE	06	3 3
	IE/DEP/EPDB 35		1	1	IE/DEP/EPLB 36	3	3
	MPA		1	0	NRR/DE/CEB 11	1	1
	NRR/DE/EOB 13		3	3	NRR/DE/GB 28	2	2
	NRR/DE/HGEB 30		2	2	NRR/DE/MEB 18	1	1
	NRR/DE/MTEB 17		1	1	NRR/DE/QAB 21	1	1
	NRR/DE/SAB 24		1	1	NRR/DE/SEB 25	1	1
	NRR/DHFS/HFEB 40		1	1	NRR/DHFS/LGB 32	1	1
	NRR/DHFS/OLB 34		1	1	NRR/DHFS/PTRB 20	1	1
	NRR/DSI/AEB 26		1	1	NRR/DSI/ASB 27	1	1
	NRR/DSI/CPB 10		1	1	NRR/DSI/CSB 09	1	1
	NRR/DSI/ETSB 12		1	1	NRR/DSI/ICSB 16	1	1
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	NRR/DSI/RSB 23		1	1	NRR/DST/LGB 33	1	1
	REG FILE	04	1	1			
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NRC PDR 02		1	1	NSIC 05	1	1	
NTIS		1	1				

TOTAL NUMBER OF COPIES REQUIRED: LTTR

64

59

63 ENCL

58

26

Southern California Edison Company

SCE

P. O. BOX 800

2244 WALNUT GROVE AVENUE

ROSEMEAD, CALIFORNIA 91770

ROBERT DIETCH

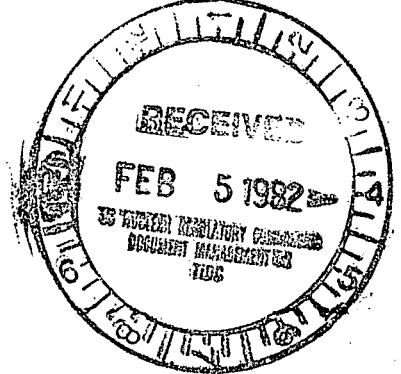
VICE PRESIDENT

February 4, 1982

TELEPHONE

213-572-4144

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



Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Enclosed are sixty-three (63) copies of the Potential Finding Reports (PFR) which have been processed and classified by General Atomic as follows:

PFR-0002	Invalid	PFR-0045	Invalid
0006	Observation	0046	Out of Scope
0008	Observation	0048	Out of Scope
0010	Invalid	0049	Observation
0013	Invalid	0050	Out of Scope
0014	Invalid	0053	Observation
0031	Invalid	0054	Invalid
0036	Observation	0055	Invalid
0037	Observation	0056	Observation
0040	Invalid	0057	Observation
0043	Observation	0058	Observation
0044	Invalid		

Note that PFR Nos. 0046, 0048 and 0050 have been classified by General Atomic as "Out of Scope". The explanation given to us by them was that the reviewers have wandered off into areas in these PFRs that were not in General Atomic's Program Plan, and they did not have the necessary documents to undertake "Out of Scope" work.

We will transmit additional processed and classified PFRs to you as soon as they are completed.

Boo!
5/1/63 on Sheet

8202080313 820204
PDR ADOCK 05000361
PDR

SCE

Director
Office of Nuclear Reactor Regulation

Page 2
February 4, 1982

If you have any questions regarding this matter, please give me a call.

Very truly yours,

Robert Litch/jff

cc: NRC Region V, R. H. Engelken (w encl)
ETECH, H. R. Fleck (w encl)
H. Rood (w encl - 10)

POTENTIAL FINDING REPORT
SONGS 203 SEISMIC DESIGN VERIFICATION

0006
2408-111-1
FIG. NO. _____
REVISION _____

INITIATION BY GA INITIATOR

AFFECTED ITEMS: Safety Injection Line to Reactor Coolant Loop 1A
Piping Stress Analysis Package PSG-78

REQUIREMENT REFERENCE DOCUMENTS:

Pipe Support Drg. No. S2-S1-059-H-009; Computer Run Q22L27: ISO Drg. No. 1204-059-1.

BASIC REQUIREMENT:

Support analyzed to correspond to support used.

DESCRIPTION OF POTENTIAL FINDING: ISO Drg. No. 1204-059-1 and sheet 63 of PSG-78 call for a spring support at node 147. Computer run Q22L27 calls for a rigid support with spring constant of 1050 lbs/in. (spring). Where as Drg. No. S2-S1-059-H-009 calls for Mech. Snubber at Node 147. This is inconsistent.

PREPARED BY: M. Marsh *[Signature]* DATE: 1-11-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

1. REVIEW BY GA TASK LEADER

COMMENTS

☒ APPROVE IS VALID

☐ REQUEST RE-REVIEW

☐ DISAGREE

☐ OTHER COMMENTS

BY *[Signature]* *BSO*

BY _____

BY _____

DATE 1-11-82

DATE _____

DATE _____

DRAW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Isometric dwg. 1204-059-1 the spring is shown located at node point 147 and the snubber (dynamically rigid) at node point 146. The computer run Q22L27 specifies these elements using the locations specified on the isometric.

The node point (147) callout on dwg. no. S2-SI-059-H-009 is incorrect. It should read 146. The location of the snubber, as shown on the support drawing, agrees with the location shown on the isometric and used in the computer analysis. Therefore, the analysis is correct.

☒ AGREE PFR IS VALID - Minor inconsistency; correction would not change design.
☐ DISAGREE

BY: A. H. H. / R. L. R.

DATE: 1-15-82

RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☒ ADEQUATE ☒ INADEQUATE
 VALIDITY: ☒ VALID ☐ INVALID
 10 CFR 21: ☐ NOT APPLICABLE ☐ APPLICABLE
 10 CFR 50.55(e): ☐ NOT APPLICABLE ☐ APPLICABLE
 CLASSIFICATION: ☒ OBSERVATION ☐ FINDING
 JUSTIFICATION:

Request review of documentation of node points 146 & 147. Is the only problem the transposition of 146 & 147.

The only problem is a transposition of node # 147 instead and of node # 146 on dwg. no. S2-SI-059-H-009

March
1/27/81

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING"

COMMENT ON "OBSERVATION" CLASSIFICATION

Hanger mislabeled on hanger drawing but included correctly in stress analysis

Concur.
 RSD, 1/27

BY: S. A. Koutz

DATE: 1/16/82

TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

George L. Newman

1/30/82

REVIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

On isometric dwg. 1204-059-1 the spring is shown located at node point 147 and the snubber (dynamically rigid) at node point 146. The computer run Q22L27 specifies these elements using the locations specified on the isometric.

The node point (147) callout on dwg. no. S2-SI-059-H-009 is incorrect. It should read 146. The location of the snubber, as shown on the support drawing, agrees with the location shown on the isometric and used in the computer analysis. Therefore, the analysis is correct.

☒ AGREE PFR IS VALID - Minor inconsistency; correction would not change design.

☐ DISAGREE *W/C* *W/SNF*

BY: A. H. FIELD / RLR DATE: 1-15-82

RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input checked="" type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

Request review of documentation of node points 146 & 147. Is the only problem the transposition of 146 & 147?

CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION _____

BY: S. A. Koutz DATE: 1/16/82

TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

IMPACT ASSESSMENT

2408-PFR-0006

PFR NO. _____

AFFECTED ITEM: Piping Stress Package PSG-78

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No

The stresses for the seismic analysis are 10% of the allowable

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

John 1/27/82

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

No

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

Similar deviations may exist but none were found by this reviewer.

OTHER COMMENTS:

This deviation is not a problem from a design aspect. The nodes were close enough together to have little or no effect on the analysis.

Neville Marsh.

PREPARED BY: N. Marsh

DATE: 1/26/82

COMMENTS:

Agree with above observations.

BY: A. Cherman

801/27

DATE: 1-26-82

Sheet 61 of 91
M1204-043 2B
DWG. NO. 1204-059-1

BECHTEL POWER CORPORATION

ISOMETRIC SKETCH SHEET

PIPE STRESS CALCULATION NO. M1204-043-2B

PROJECT SONGS UNITS 2 & 3

SUBJECT (1204) 059-12"-A-FEO, 055-12"-C-HEO

ADDITIONAL INFORMATION ON ISOMETRIC DATA AND DETAIL SHEET

CONVENTION

SHEET 61 OF 91

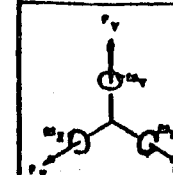
BY MIN DATE 6-22-76

COMP. SERV. NO.

AREA(S) 209

MAXIMUM STRESS

TYPE	PI	RI
THICKNESS		
ADDITIONAL		
WEIGHT		
SEISMIC		

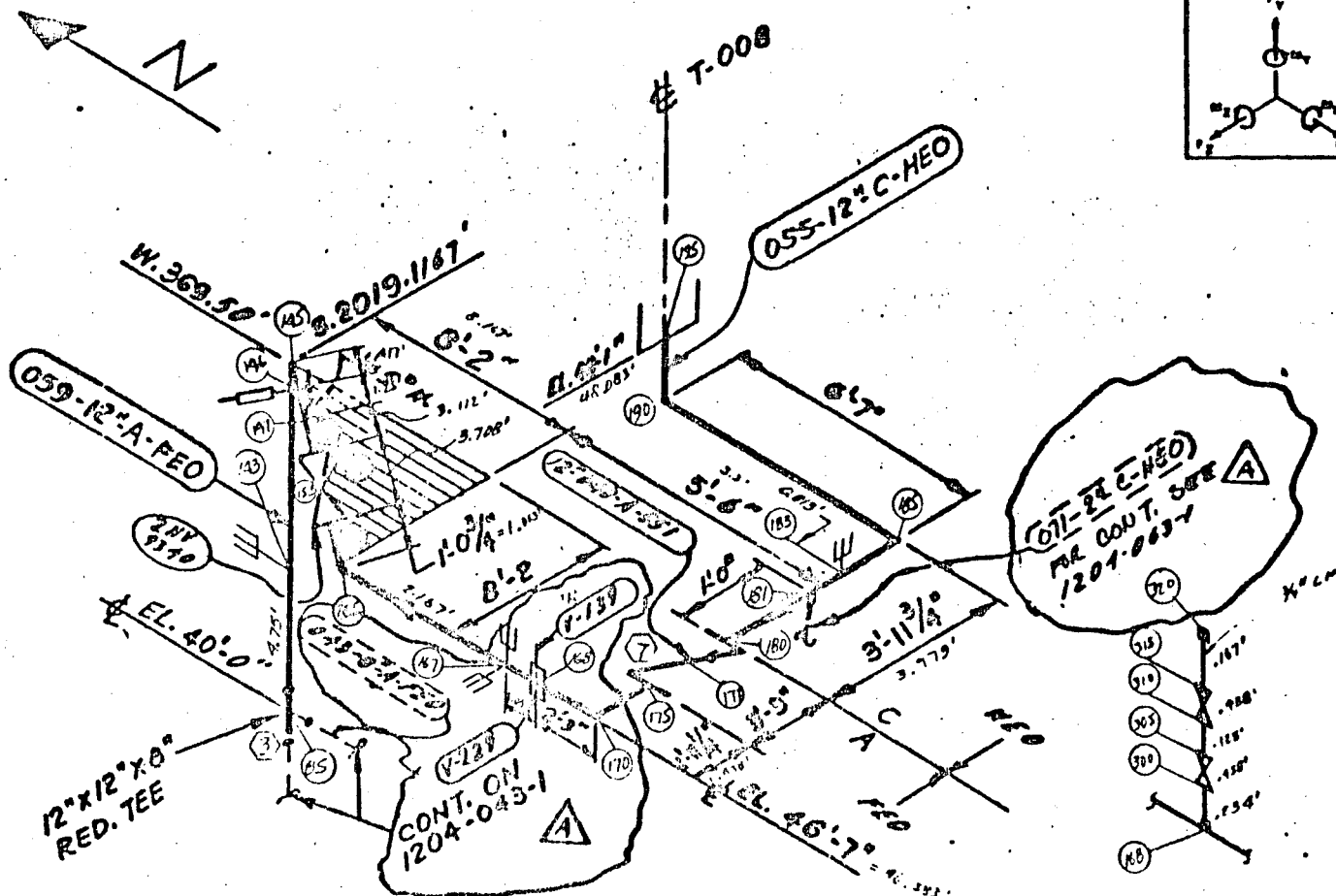


REF DWGS
40422-3

SCN. 405
P & ID
40113-4

INSVL. N/A

	MAX	MIN
PRESS	2183	2235
TEMP	650	553



PSG 78
REV. 3

SMALL DIMENSIONS SHOWN - NO STREAM HEADINGS REQ. PER D-A-R

							B	SB	11	11	11	ADDED 071-2"-C-HEO
C	FM	DATE	CHKD	DATE	DESCRIPTION		A	MIN	11	11	11	UPGRADED & REDRAWN
REV.	BY	DATE	CHKD	DATE	DESCRIPTION		REV.	BY	DATE	CHKD	DATE	DESCRIPTION
REVISIONS						REVISIONS						

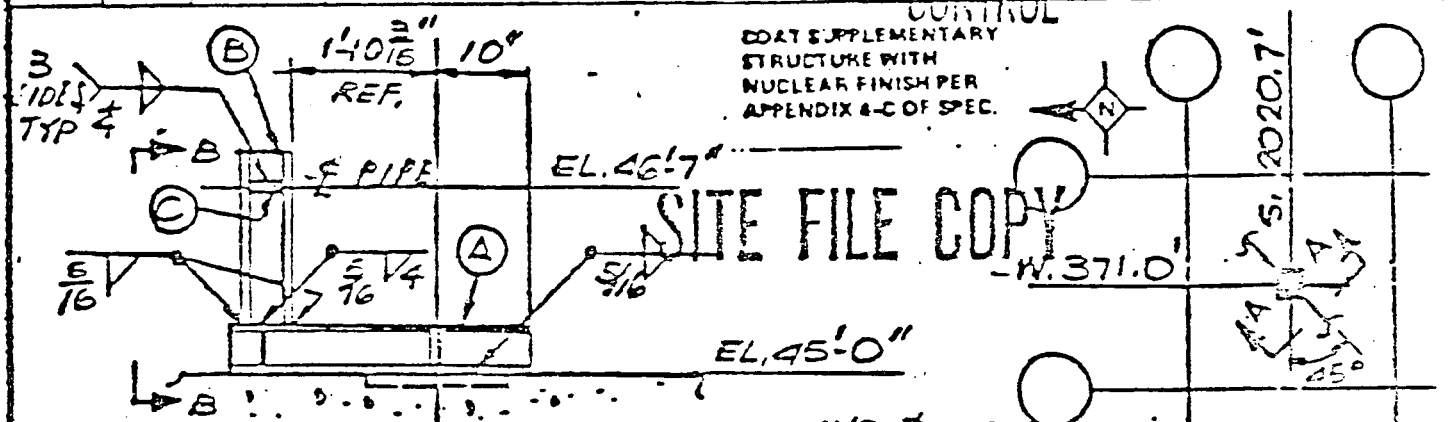
PROJECT NO.

10079

PER 0006

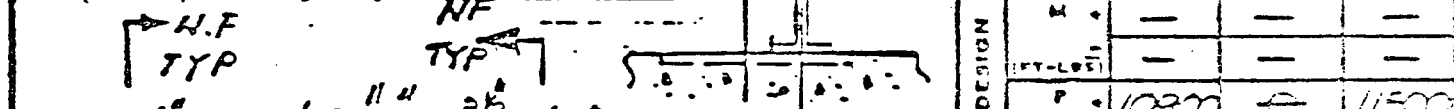
SUS: 2 B

NO	REQ'D	PART NO	SIZE	DESCRIPTION	REF. MATERIAL	NOTES
30	1	—	6" SCH. 80S S.S. DUM. PIPE	—	—	5025-409-23
31	1	—	1" x 12" x 1'-0" S.S. PL	—	—	295 OF 11
52	1	6MS	8T 120B MECH. SNUBBER	—	—	M-DSC-050
			C.P.S. = 2 1/16" H.P.S. = 2 5/16" LOAD = 15825			
			STRUT LENGTH = 2' 2 1/16" B.P.C.			
53	1	HIER	30 BRACKET FOR MECH. SNUBBER	—	—	RY STC
A	1	—	W 8 x 31 x 3'-4"	—	X	SPEC
B	1	—	W 8 x 31 x 1'-8"	—	X	5025-206-15
C	6	—	3/8" STIFF. PL	—	X	
				JUL 24 1973		
				DRIVING		
* INTEGRAL ATTACH - USE ASME SECT. II SUBSECTION "NB" MATL.						



LOOKING NORTHEAST

* BRND ONLY TO GUARANTEE CONCERN



SECTION A-A

SECTION B-B

EL. 46'-7" RECHIEL

AT FIVE ID

TAG NO 52-SI-059-H-009

ISSUED TO REF. DWGS.

PROB. NO. 78 PT. NO. 1471

SPOOL NO. 2-SI-059-2

ISO 1204-059-1

PIPE 40422

STEEL 23153

ISSUED FOR CONSTRUCTION

NO. REVISIONS DATE DR. CHK. EGS.

BECHTEL POWER CORPORATION

WORWALK, CALIFORNIA

JOB NO. 10079

DATE

APPROVED

J.O. NO.

FILE

SAN ONOFRE NUCLEAR GENERATING STATION

PIPE SUPPORT ASSEMBLY

SOUTHERN CALIFORNIA EDISON COMPANY

SCALE: INTS

LOS ANGELES, CALIF.

PFR-0006

61-02-01

1	1/4"	SEAM ATTACHMENT W/ FINE GUTTER	BY FIELD
2	1/4"	WELDLESS FASTEN W/ FLAT	BY GRUBBELL
3	1/2"	HEX. ADUT	
4	1/4" x 1/2"	ROD W/ 1/2" TIE	
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FOR INFORMATION ONLY

A 7
B 2
NBSX35
3/8" STEEL

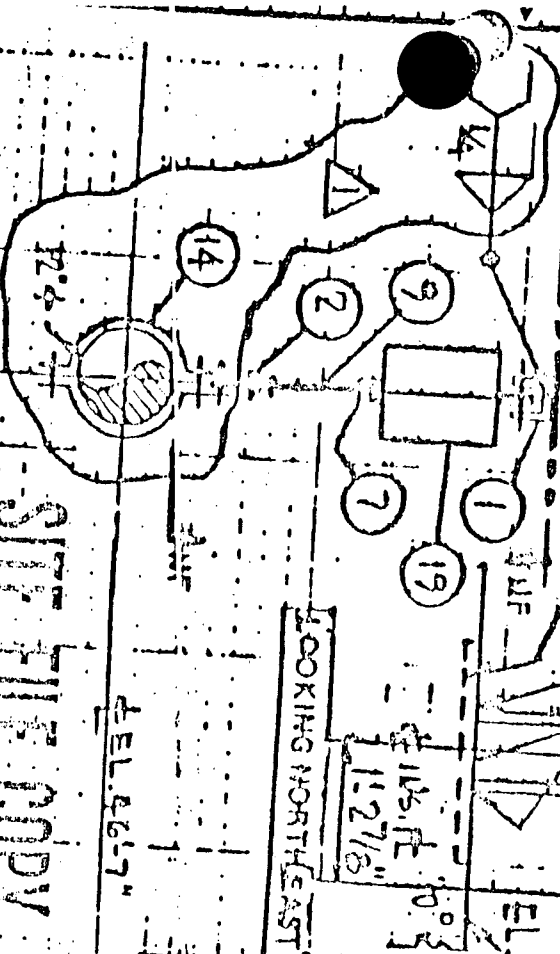
15 DEC.
1963-205-15

REF. MATERIAL ONLY
SHEET 300 OF 321
CALC. # M-DSC-054

EXIST. INSET IS @ 5/16" A

EL. 51'-3"

EL. 45'-0" (1C) AREA NO. 209-4



LOOKING NORTHEAST

EL. 46'-7"

DESIGN CODE	C	TYPE	5
PROJ. CL	PIPE A (QC 2)		
QUAL. CL	STEEL		
NO. 1			
NO. 2			
NO. 3			
NO. 4			
NO. 5			
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NO. 100			

SECT. A-A
SITE FILE COPY

DESIGN NO. 73
PROJECT NO. 1206-059-1
DATE 4-04-62
DRAWN BY 1206-059-1
CHECKED BY 1206-059-1
APPROVED BY 1206-059-1

REVISED AS NOTED
ISSUED FOR CONSTRUCTION 4-5-62
REVISIONS
DATE 4-5-62
BY 1206-059-1
CHECKED BY 1206-059-1
APPROVED BY 1206-059-1

SELF POWER CORPORATION
NORMAL, CALIFORNIA
40 NO. SAN ONOFRE NUCLEAR GENERATING STATION
PIPE SUPPORT ASSEMBLY

JOB NO. 0079
DATE 4-5-62
APPROVED BY 1206-059-1
SOUTHERN CALIFORNIA EDISON COMPANY
LOS ANGELES DIST.

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection (LPSI) System from Pump P-016 (System 1204) to System 1206 in Piping Stress Analysis Package PSG-57.

REQUIREMENT REFERENCE DOCUMENTS:

BPC Calculation No. PSG-57 Computer Run Q36L19

BASIC REQUIREMENT:

Flow orifice weight and node location be included in the piping model.

DESCRIPTION OF POTENTIAL FINDING: The reference ISO Sketch (Sheet 38) shows location and type of flow orifice installed in Line 32. The piping model (PSG-57) does not include the weight (300 lb) of the orifice flanges and/or a node location indicating the flanges are there. The flow orifice weight was not considered in the "Seismic Load on Axial Restraint" calculation sheets either (node 96-X load direction; Sheet 24, and node 98-Y load direction; Sheet 25).

PREPARED BY: L. Pickering *L. Pickering* DATE: 1-19-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY

[Signature]

DATE

1/25/82
☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

VIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

Seismic analysis of this line indicates that the seismic loads and stresses are small. Addition of 300 lbs. for the orifice flanges close to three snubbers in the X, Y and Z directions will not affect the validity of the seismic analysis. This region of the piping system is rigid and the additional weight of the flanges does not affect the mode shapes and natural frequency. Slight increase of the snubber loads is within the capability of the hardware.

The stress engineer considered the effect of the weight of the flanges on the existing spring and its settings (node point 97) as indicated on Sheet 27 and judged the effects on the seismic analysis to be negligible for the reasons discussed above; however, the engineer did not document this judgement on the seismic calculation sheets.

☒ AGREE PF IS VALID

☒ DISAGREE

MC SHF

BY: *John B. Muel*

DATE: *1-28-82*

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☒ VALID

☐ INVALID

~~10 CFR 21:~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

~~10 CFR 50.55(e):~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

CLASSIFICATION:

☒ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION
allowables are not exceeded.

Documentation error but

BY:

S. L. Koub

DATE:

2/1/82

E. TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

BY:

E. J. Wussman

DATE:

2/1/82

IMPACT ASSESSMENT

2408-PFR-0036

PFR NO. _____

AFFECTED ITEM: Piping Stress Package PSC-57

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No, the effect of the additional weight of the flow orifice value (300) should be minimal in the existing 12" pipe run.

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

This subject is beyond the expertise of this reviewer.

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST? Other similar deviations were not found by this reviewer in the piping run segment reviewed.

6. OTHER COMMENTS: I agree with BPC assessment that the impact of the additional weight of the flow orifice on the seismic analysis should be minimal. The lack of documentation and model detail concerning the flow orifice should have been corrected in the calculation check process.

PREPARED BY: L. Pickering

2/1/82

DATE: 1-29-82

COMMENTS:

Agree with impact assessment.

BY: *[Signature]*

DATE: 2/1/82

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-0040

REVISION A

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: I&C Equipment Field Mounting Design - Installation and Applicable Details and Drawings for 2LT-0312 and Associated Devices - Calculations for Seismic Category I Mounting Stand and Plate.

REQUIREMENT REFERENCE DOCUMENTS:

Final Safety Analysis Report - San Onofre Nuclear Generating Station Units 2 & 3 , Volume 11, Section 3.10.3.2, Field Mounted Instruments.

BASIC REQUIREMENT: The minimum natural frequency limit of the Seismic Category I instrument mounting support structure is established in order to avoid dynamic amplification and to facilitate selection of a design seismic level according to the corresponding response spectra.

DESCRIPTION OF POTENTIAL FINDING:

ALG.
Therefore, No in-structure response spectra at the instrument mounting location are given. In addition, the basis for the choice of design seismic acceleration g-levels used in calculation sheets 19, 21, and 23 is not stated in the calculation file. These three sheets are attached herewith for additional information.

ALG.

PREPARED BY: D. Tow *ALG.* DATE: 2-1-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY *Boyle D.*

DATE 2/1/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: *Boyle D.*

DATE: 2/1/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PFR IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEEDEFINITION ADEQUACY: ☒ ADEQUATE ☐ INADEQUATEVALIDITY: ☐ VALID ☒ INVALIDCLASSIFICATION: ☐ OBSERVATION ☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "~~OBSERVATION~~" CLASSIFICATION *SdK 2/1/82*

Committee feels this PFR could have been an "Observation" since in the info reviewed by GA, the response spectra was not referenced. However, conservative accelerations were used in the calcs.

BY: *S. L. Kouz* DATE: *2/1/82*E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: *A. Weissman* DATE: *2/1/82*

The attached instructure response spectra serves as basis of design for the instrument installation. Generally, 5% damping characteristics and DBE serves as basis of the design of the instrument installation. While the engineer has not specifically referred to the response spectra in the calculations, the accelerations are equal or greater than shown in the response spectra.

Level transmitter (2LT-0312) is located in the containment at elevation 63'-6". The review of seismic response spectra curves for the area indicates that seismic acceleration at 15 Hz does not exceed "2.0 g" horizontally and "1.5 g" vertically (minimum of the assumed values in Snts. 19, 21, 23). Actual "g" levels at this elevation for frequency of 15 Hz are "1.2 g" horizontally and "0.8 g" vertically (RSS curves S023-SK-S-633 and S023-SK-S-634). For this floor stand, a frequency of 15 Hz was assumed in the calculation. This frequency was verified by calculations. The calculated frequency is more than minimum frequency of 10 Hz stated in FSAR paragraph 3.10.3.2. The assumptions made in calculations are conservative.

The attached in-structure response spectra supplied by BPC serve as the basis for the instrument field mounting design. In order to verify the design acceleration values used in the calculation file as appropriate and conservative, the reviewer conducts the following check. First, the natural frequency of the floor mounting stand was calculated. Then from the in-structure response spectra (Figures S023-SK-S-633 and S023-SK-S-634) the actual acceleration levels at this frequency were found (1.2g horizontal and 0.8g vertical at the design frequency of 15 Hz). These actual values are lower when compared with the minimum design values of 2.0g horizontal and 1.5g vertical. Therefore, the reviewer concludes that the design acceleration values used in the calculation file are appropriate and conservative. This PFR then becomes invalid.

hl. Gow 1/29/82

Concur that this PFR is invalid.
Bopert 2/1/82

100

50

25

10

5

2

1

.5

.2

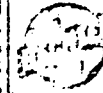
$$S_d = 10 T^2 S_a$$

S_d - DISPLACEMENT RESPONSE (INCHES)

T - PERIOD (SEC.)

S_a - ACCELERATION RESPONSE (g 's)

DAMPING VALUES
AS PERCENT OF CRITICAL



BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

DESIGN BASIS EARTHQUAKE
HORIZONTAL ACCELERATION RESPONSE
SPECTRA FOR CONTAINMENT
INTERIOR STRUCTURE ELEVATION 63'-6"

Prepared By:

JWW KMS

Reviewed By:

LGH G3

Approved By:

W23 JLR

JOB NO.

1304-803

SKETCH NO.

5023-SK-S-634

REV.

Δ

ACCELERATION (g 's)

14

13

12

11

10

9

8

7

6

5

4

3

2

1

0

DAMPING = 0.5%

DAMPING = 1.0%

DAMPING = 2.0%

DAMPING = 5.0%

.01

.02

.03

.04

.06

.08

.1

2

3

4

5

8

1

2

3

4

5

BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

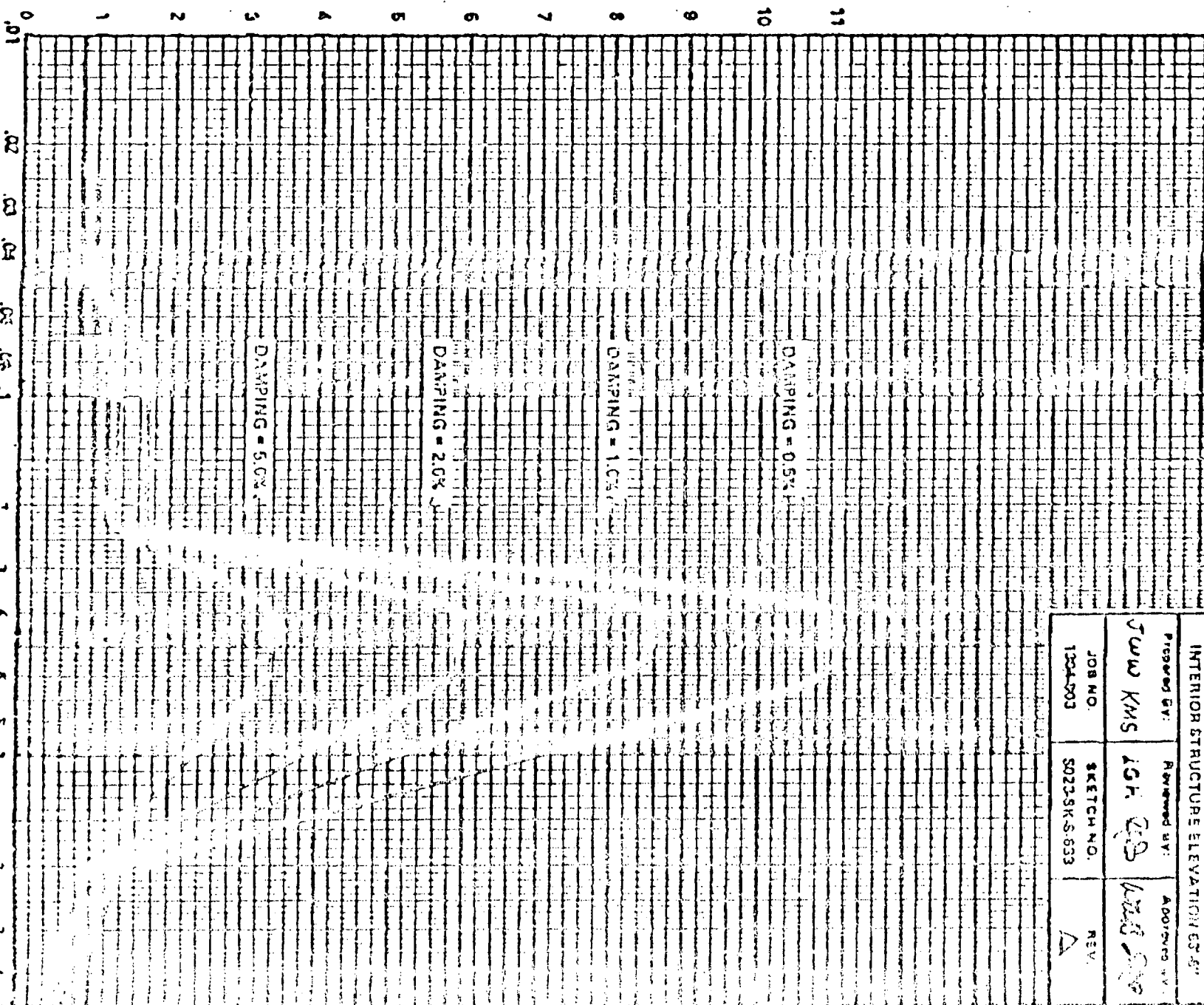
SOUTHERN CALIFORNIA Edison COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 2 D 3

DESIGN BASIS EARTHQUAKE
VERTICAL ACCELERATION RESPONSE
SPECTRA FOR CONTAINMENT
INTERIOR STRUCTURE ELEVATION 65'-0"

Prepared by:	Reviewed by:	Approved by:
JWW KMS	JCH ZJB	WMS SJO
JOB NO. 1334703	SKETCH NO. S022SK-S-553	REV. A

$S_d - 10^{-1} S_s$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_s - ACCELERATION RESPONSE (g)

DAMPING VALUES
AS PERCENT OF CRITICAL



PERIOD (seconds)

0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.1 0.2 0.3 0.4 0.5 1.0 2.0 3.0 4.0 5.0

CALCULATION SHEET

ATTACHMENT (SHEET 1) 10/1/77 PFR-0040

CALC. NO. C-255-1005

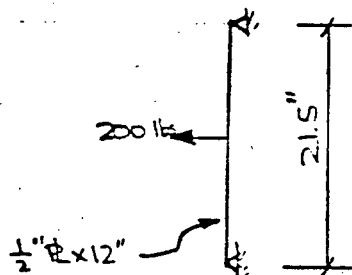
SIGNATURE James Lee DATE 7-22-77 CHECKED T. Dail DATE 2-25-80
 SUBJECT SONGS-233 JOB NO. 10079-003
 SUBJECT PENETRATION AREA - CLASS I SPECIAL SUPPORTS SHEET 19 OF 22 SHEETS

MOUNTING PLATE FOR SENSING LINE

Maximum wt. of instrument : 60 lbs.

Assume total wt. including piping, valves, plate, etc. = 200 lb.

Find transverse natural frequency (most critical)



(See attached dwgs. for typical details)

$$\Delta = \frac{PL^3}{48EI}$$

$$I = \frac{9.5(1.5)^3}{12} = .099 \text{ in}^4$$

$$\Delta = \frac{.2 \times 21.5^3}{48 \times 29,000 \times .099} = .0144 \text{ in}$$

$$f = \frac{1}{.327\Delta} = \frac{1}{.327 \times .0144} = 26 \text{ cps}$$

∴ Frequency is sufficiently high.

Check welds & concrete expansion anchors

Conservatively assuming a 5.0 g. acceleration,
 maximum load = $5 \times 2 = 1 \text{ k}$ in horizontal & vertical directions

Capacity of 1" of $\frac{3}{16}$ " weld = $2.75 \text{ k/in} > 2 \text{ k}$ O.K.

Capacity of 4 - $\frac{1}{2}$ " anchors = $4 \times 1 = 4 \text{ k} > 2 \text{ k}$ O.K.

CALCULATION SHEET

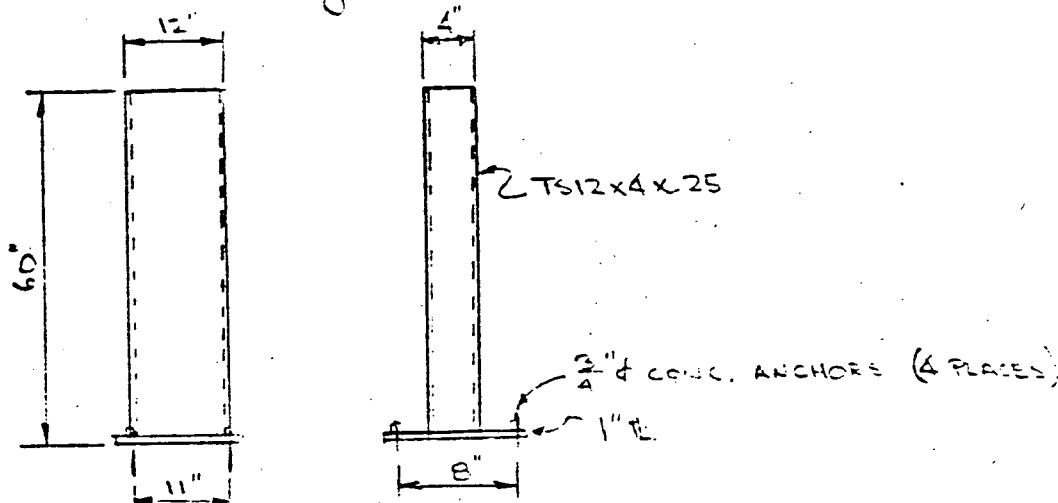
ATTACHMENT (SHEET 2) TO PFR No. 2408-PFR-0040 CALC. NO. C-258-100

SIGNATURE James Ucc DATE 9-20-77 CHECKED T. Oak DATE 2-25-80
 PROJECT SONGS 2 & 3 JOB NO. 10079-003
 SUBJECT PENETRATION AREA - CL I SPECIAL SURVEY SHEET 21 OF 70 SHEETS

FLOOR STAND FOR INSTRUMENT MOUNTING PLATE

Floor stand shall be designed for:

1. Minimum natural frequency of 15 cps
2. Seismic accelerations - 2.5g Horiz.
1.5g Vert.
3. Maximum load - 200 lbs.
4. Maximum height of stand - 60"
5. Maximum height of instrument - 54"



Check Stresses

$$M_{max} = 2.5 \times .2 \times 54 = 27 \text{ K-in}$$

$$P_{max} = 1.5 \times .2 = .30 \text{ k}$$

For TS12x4x25 : $A = 7.48 \text{ in}^2$, $S_x = 20.5 \text{ in}^3$, $S_y = 10.9 \text{ in}^3$
 $I_x = 123.0 \text{ in}^4$, $I_y = 21.9 \text{ in}^4$
 $r = 1.71$

$$f_b = \frac{M}{S} = \frac{27}{20.5} = 1.32 \text{ ksi} < 22 \text{ ksi} \quad \text{O.K.}$$

$$f_t = \frac{M}{S} = \frac{27}{10.9} = 2.48 \text{ ksi} < 22 \text{ ksi} \quad \text{O.K.}$$

URE Engr. J. LeeDATE 11-9-78CHECKED T. D. D.DATE 2-25-80ECT CD-1175-213JOB NO. 10070-003ECT Penetration in Area - C. I. Special. SupportsSHEET 23

OF

70

SHEETS

Alternatives to $\frac{3}{4}" \phi$ Concrete Anchors @ Full Embedment

MAXIMUM LOAD - 125 lbs.

SEISMIC ACCELERATION - 2g, Horiz & Vert (Safety Equip. Bldg.)

$$M_{max} = 2 \times .125 \times 54 = 13.5 \text{ k-in}$$

$$P_{TEN.} = (2-1) \times .125 = .125 \text{ k}$$

Maximum Load on Anchor Bolt

$$P = \frac{13.5}{8} + \frac{13.5}{11} + \frac{.125}{2} = 2.98 \text{ k/2 bolts}$$

$$= 1.49 \text{ k/bolt}$$

$$V = 2 \times .125/4 = .06 \text{ k/bolt}$$

$$\text{Total Load} = 1.55 \text{ k/bolt}$$

\therefore Use $\frac{5}{8}" \phi$ CONC. EXP. ANCHORS - CAPACITY = 2 k
or allow $\frac{3}{4}" \phi$ anchors to have a minimum embedment
of 3".

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION A**A. PREPARATION BY GA INITIATOR****AFFECTED ITEMS:**

Interface Review Requirement

REQUIREMENT REFERENCE DOCUMENTS:Attachment 3 PSAR
Section III, paragraph 11**BASIC REQUIREMENT:**

"Specifications and drawings prepared within the engineering department are reviewed by all engineering departments having an interface with the design area that the document covers."

DESCRIPTION OF POTENTIAL FINDING:

Appendix H of RD-1 sufficiently defines procedural requirement for interface review requirement of design document to invalidate this Potential Finding Report. Agree with original design organization comment.

PREPARED BY: [Signature] DATE: 1-30-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**

Agree that PFR should be considered invalid.

☐ AGREE PF IS ~~VALID~~
BY J. BremerDATE 1/30/82
☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: J. Bremer DATE: 1/30/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The description of the potential finding "The Reactor Design Group design manual, RD-1, did not specifically require review of design documents by interfacing organizations" is incorrect. See Paragraph 6.5, Design Interface Information: The identification of Reactor Design interfaces and the procedures for preparation, transmittal and design quality assurance review of design interface information are contained in Appendix H. See Appendix H - copy attached.

☐ AGREE PFR IS VALID☒ DISAGREEBY: V C HallDATE: 1/29/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☒ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY:

S. L. Koutz

DATE:

1/30/82E. GA PROJECT MANAGER☒ ACCEPT☐ REJECT

BY:

A. L. Newman

DATE:

2/1/82

APPENDIX HProcedures for the Preparation, Transmittal and Quality Assurance of Design
Interface InformationI. Introduction

Table 1 lists the organizations with which Reactor Design interfaces. The interface items and those persons who control the interface are also listed. The organizations listed provide criteria, designs, specifications, technical direction, review and approval or concurrence as applicable on the indicated items. The information transmitted across the interfaces indicated in the table is provided or used by the cognizant design group(s) within Reactor Design. The cognizant design group supervisor is responsible for the technical adequacy of design interface information supplied by his group for Reactor Design. The interface controller assigned in the table is responsible for the review of the information transmitted across the interface and the resolution of problems associated with the interface in Reactor Design. Design interface information shall be prepared and transmitted in accordance with the requirements of Section II, below. The quality assurance of design interface information shall be in accordance with Section III, below.

II. Preparation and Transmittal of Design Interface Information

- A. Transmittals requesting or supplying design interface information shall be made by memorandum.

- B. Transmittals requesting review, concurrence, approval, etc. of a design or design interface information shall contain a document approval/distribution sheet similar to that shown as Exhibit 1, except when review can be documented by an established means such as an RAR. The action requested (ie; review, concurrence, approval, etc.) shall be indicated either on the approval/distribution sheet or in an accompanying memorandum. The completed approval/distribution sheet shall be filed with the original design work.
- C. The following interface information drawings shall be submitted to the indicated organization for review. The acknowledgment of the indicated organization(s) shall be indicated on a document approval/distribution sheet similar to that shown as Exhibit 1 and filed with the drawing request (ECDR) which initiated the drawing or revision.
1. Core Layout Arrangement (Physics and Safety)
 2. Reactor Arrangement Sectional Elevation Layout (Physics and Safety)
 3. Closure Head Nozzle Requirements (Plant Engineering)
 4. Fuel Assembly Outline (Plant Engineering)
 5. Control Element Assembly Outline (Plant Engineering)

III. Quality Assurance of Design Interface Information

A. Memoranda requesting or supplying design interface information shall be reviewed by the interface controller indicated in Table 1. Approval shall be indicated by the initials of the interface controller adjacent to his name on the distribution list. The review shall, as a minimum, cover the following scope:

1. The information being transmitted has received the required design quality assurance review. If not, the cover page of such information shall be clearly marked to indicate that QA has not been performed. The transmittal document shall indicate when the information will receive design quality assurance review.
2. The distribution is adequate. If the information being forwarded is a revision to previously forwarded information the distribution list shall contain at least the names of those persons who were on the distribution list for the original or previous revisions of the document(s).
3. Memoranda requesting information or action shall contain enough identification so that the request can, in the judgment of the reviewer, be referenced in the response.
4. Memoranda transmitting design interface information in response to a request shall reference the request.

TABLE 1

REACTOR DESIGN INTERFACES

ORGANIZATION	INTERFACE ITEMS	INTERFACE CONTROLLED BY
1. Architect-Engineers and Utilities	Drawings, specifications and other design information as requested	Reactor Design functional groups interface through PE/CAE who, in turn, interfaces with the Project Manager
2. C-E Avery	Reactor Internals	Cognizant design group supervisor/manager
3. Nuclear Products Manufacturing	Fuel Assemblies, CEAs and CEDMs, ICI System	Cognizant design group supervisor/manager
4. Outside Vendors	Neutron Sources, ICI System hardware	Cognizant design group supervisor/manager
5. C-E Windsor Design Groups		
a) ICE	CEDM electrical system, ICI System, RPS and other instrument systems	PE/CAE
b) Plant Engineering	Reactor vessel, ICI System, CEDM's, reactor internals	PE/CAE
c) Safety Analysis	Input/Output from Accident analyses	PE/CAE
d) Physics	Fuel Assembly, CEA, reactor internals, thermal-hydraulic design information	PE/CAE
e) Nuclear Labs	Materials, chemistry and component testing	Cognizant design group supervisor/manager

Page H5 of 5

ORIGINATOR

APPROVALS REQUESTED

AREA	SIGNATURE	DATE
<input type="checkbox"/> Inst., Control & Electrical		
<input type="checkbox"/> Nuclear Laboratories		
<input type="checkbox"/> Physics		
<input type="checkbox"/> Plant Engineering		
<input type="checkbox"/> Reactor Design		
<input type="checkbox"/> Safety		
<input type="checkbox"/>		
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Special Comments		

Special Comments

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-0034

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection (LPSI) System from Pump P-016 (System 1204) to System 1206 in Piping Stress Analysis Package PSG-57.

REQUIREMENT REFERENCE DOCUMENTS:

BPC Calculation No. PSG-57, computer run Q36L19
Sheet 43- ISO Sketch Dwg No. 1204-038-1

BASIC REQUIREMENT:

Need analytical justification supporting Unit No. 3 piping configuration.

DESCRIPTION OF POTENTIAL FINDING:

ISO sketch drawing No. 1204-038-1 shows a major configurational difference between Unit No. 2 and Unit No. 3 piping arrangements. The stress report only documents the loads developed in the Unit No. 2 configuration. There is no documented justification for the Unit No. 3 configuration in PSG-57. *1/26/82*

PREPARED BY: L. Pickering *L. Pickering* DATE: 1-22-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

Boyle

DATE

1/25/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Piping stress analysis package PSG-57 is applicable to Unit 2 only.

Documentation for Unit 3 configuration is being finalized in another stress analysis package (PSG-546) which will include ongoing design modifications.

☐ AGREE PFR IS VALID

☒ DISAGREE

BY: Frank B. M. M.

I am satisfied that the documentation for Unit 3 configuration is being finalized in another stress analysis package (PSG-546) and, therefore, agree with BPC response with this PFR (2408-PFR-0054). I agree with this PFR is invalid.

DATE: 1-26-82

1/27/82
Concur: 1/28/82
PFR is invalid

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☒ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE SKK 1/28/82

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: S. A. Koutz

DATE: 1/28/82

E. TPT PROJECT MANAGER

☒ ACCEPT

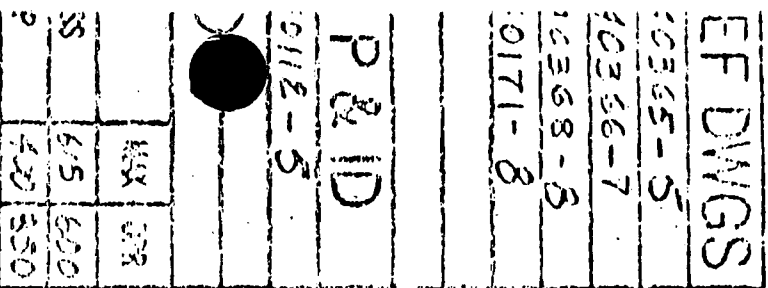
☐ REJECT

BY: S. A. Koutz

DATE: 2/1/82

SECRET (U)

THE UNIVERSITY OF CHICAGO LIBRARY



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D	01	01	01	01	CONSISTENCY CHECK - NO CHANGE
C	01	01	01	01	GENERAL REVISION (II-133)

REVIEWS

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9.

CAT

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150

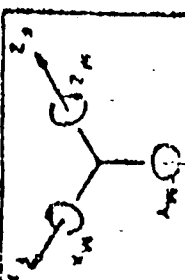
SHEET 43 OF 77

8-25-57

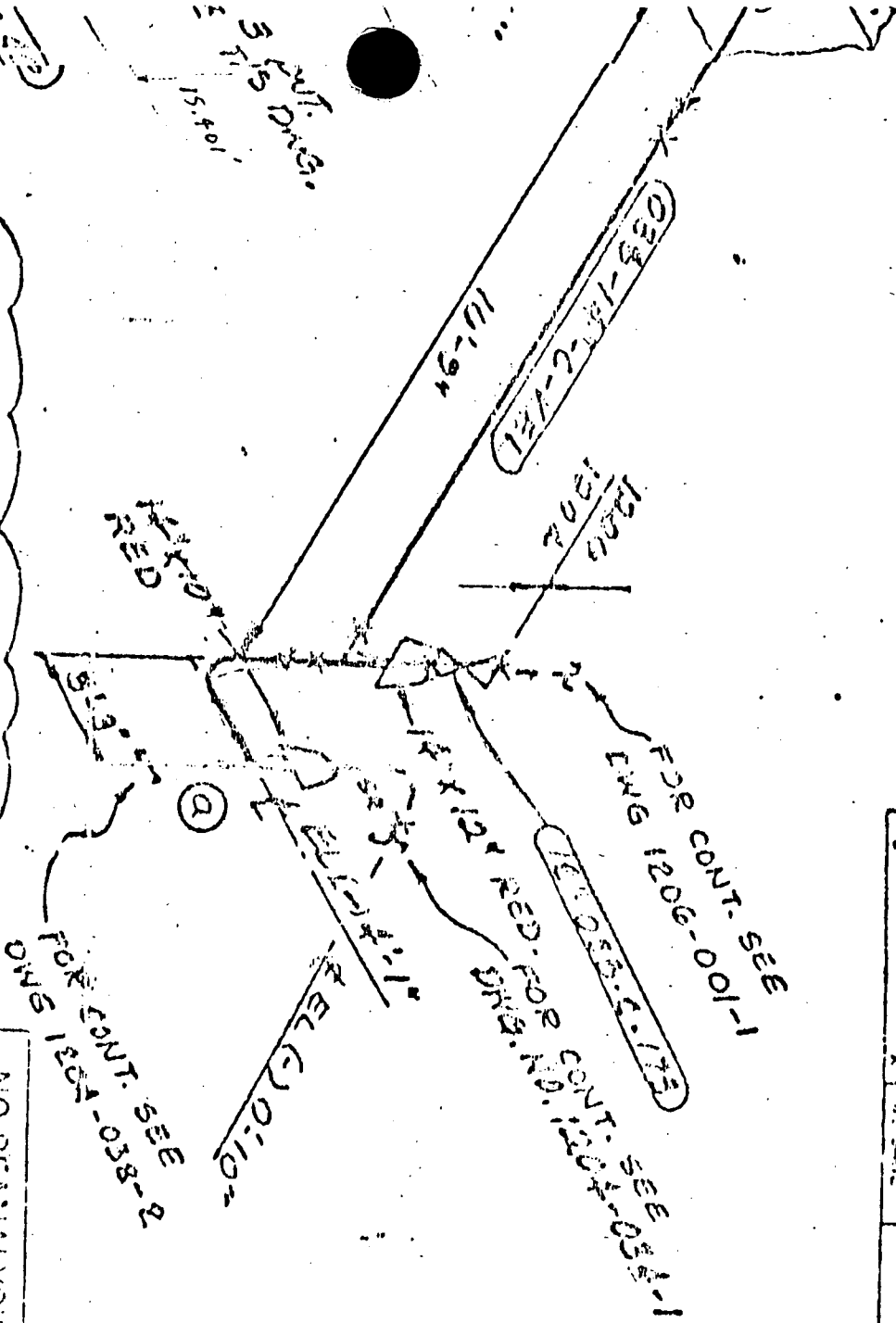
COMP. SERV NO. 207
AREAS: 207

SECURITY EQUIPMENT

SAFETY INJECTION



MAXIMUM STORES	
TYPE	NO.
TRUNK	
ARMED	
UNARMED	
REPAIR	



CHECKED AGAINST UNIT 243

UNIT 3

② 5.1535.0 14.502.3333
5.1430.00 14.502.3333

NO REFINALYSIS
NECESSARY

4-17 4/7/20

55

UPDATED, SUPERSEDES 3-1204-038-1

DATE

[illegible]

REFUGIUMS

100-443887-100

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-0055

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection (LPSI) System from Pump P-016 (System 1204) to System 1206 in piping stress analysis package PSG-57.

REQUIREMENT REFERENCE DOCUMENTS:

BPC Calculation No. PSG-57, Computer Run Q36L19

BASIC REQUIREMENT:

Need justification for "non-applicable" treatment of Seismic Anchor Movement (SAM) reported in Package PSG-57.

DESCRIPTION OF POTENTIAL FINDING:

There is no documented evidence reported in PSG-57 that there is negligible movement between the piping model anchor points (nodes 5, 75, and 115) to warrant the non-applicable assumption for the SAM analysis.

PREPARED BY: L. Pickering DATE: 1-22-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

DATE

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

As stated in the asterisk note on Sheet 8 of calculation M-1204-038-A (PSG-57), consideration of seismic anchor motion is required for Seismic Category I piping only if anchored between buildings or if the interior structure moves relative to exterior walls or shell. All piping analyzed in this calculation is within one building (Safety Equipment Building). Relative motion between interior and exterior structures is only considered inside the Containment Building because of the basic structural design which has distinct interior and exterior structures. The safety equipment building is a fully integrated structure interconnected by heavy concrete floors and walls and therefore, relative displacements are considered to be negligible.

☐ AGREE PFR IS VALID

☒ DISAGREE

BY:

Frank B. MarshallDATE: 1-26-82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☒ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION _____

BY:

L. L. KoutyDATE: 1/28/82

E. TPT PROJECT MANAGER

☒ ACCEPT☐ REJECT

Agree with Bachtels non-applicable treatment of the SAM analysis for PSC-57 based on their statement that the relative displacements are negligible in the safety equipment building. Agree PFR is invalid. Don Pichler
 PFR is invalid. 1/28/82

GW2/1/82

INTERNAL CORRESPONDENCE

GA 1076

FROM

JLP.
J. L. Pickering

IN REPLY
REFER TO

TO

Review Finding Committee

DATE

SUBJECT

PFR 2408-PFR-0055

January 28, 1982

This memo is an amplification to the description given in the potential finding report (PFR) No. 2408-PFR-0055. This PFR is a result of the review of the Bechtel Power Company seismic piping analysis package of the Low Pressure Safety Injection (LPSI) and containment spray piping system calculation no. PSG-57. The scope of the review included 10" and 12" piping between the LPSI pump 016 in system 1204 out to the flow orifice in system 1206 plus valves 10"-025-C-406 and 12"-039-C-173.

An asterisk note in PSG-57 stated; consideration of seismic anchor motion is required for Seismic Category I piping only if anchored between building or if interior structure moves relative to exterior walls or shell. This statement was the only justification given in the stress package for not performing the Seismic Anchor Movement (SAM) analysis. The PFR requested that further justification be given for the "non-applicable" treatment of the SAM analysis for the stress report.

JLP:sc

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Safety Injection Line to Reactor Coolant Loop 1A

Spring Stress Analyses Package PSG 82

REQUIREMENT REFERENCE DOCUMENTS:

P&I Diagram 40112-10

BASIC REQUIREMENT:

The cantilevered line holding valve 3/4" x 114 x C-376, which branches out of main run 002-24" - C-LLO, should be included in the computer run mathematical model.

DESCRIPTION OF POTENTIAL FINDING:

Computer runs Q45H25 or Q39H59 do not depict this line in the mathematical model, although Stress ISO 1204-004-1 (Sh. 50 PSG 82) identifies it as a dashed line at nodal point -5.

PREPARED BY: F. LinDATE: 1-11-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALIDBY C. CharmaDATE 1-11-82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

PF 0000

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Very small piping attached to large main headers are not considered as significant in the dynamic analysis of the main line. This is a case of a 3/4" line attached to a 24" line. The cantilevered line holding valve 3/4"-114-C-376 is a vent line. Vents and drains fall within the scope of our small bore design guide specification, CS-P206. Figure 7 from that document is attached which shows the requirements. For the line of interest (single valve, 3/4"), the requirement is that the overall length be kept below 1'-4". This particular vent is 1'-3 1/2" and, therefore, meets the requirement.

(See attached sheet)

☐ AGREE PF IS VALID

☒ DISAGREE

SAF ME RLR/GEN

BY: L. H. Friedman / RLR

DATE: 1-15-81

The effect of seismic loads on this cantilever vent line has been checked per attached calculations. It conforms to the requirement of BPC's CS-P206. Therefore, BPC's response is accepted and this PF is considered invalid.

Q. Lin 2/3/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

Concur - PF is invalid

F80 2/3/82

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☒ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

SAK 2/3/82

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY:

S. D. Kowalsky

DATE:

2/3/82

E. TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

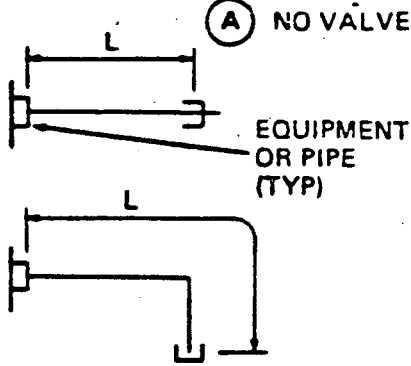
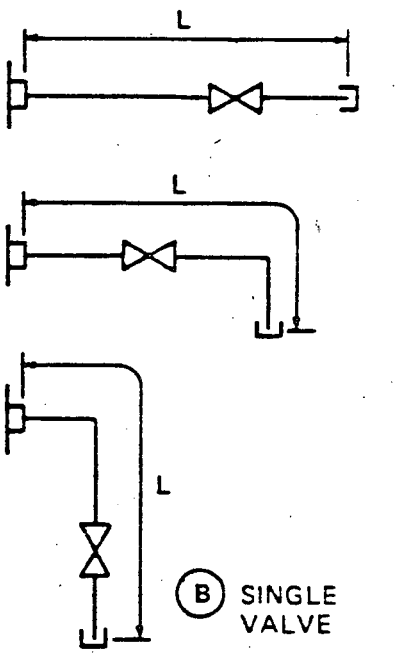
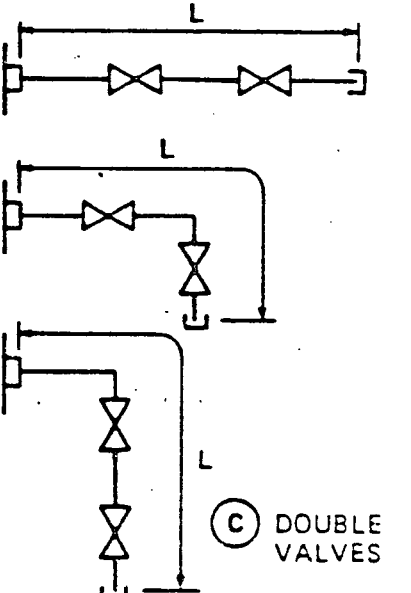
BY:

G. W. Worman

DATE:

2/3/82

2408-PFR-0002
2/3/82
JPC

TYPE	PIPE SIZE	L
 <p>(A) NO VALVE</p>	1/2"	2'-2"
	3/4"	2'-5"
	1"	2'-8"
 <p>(B) SINGLE VALVE</p>	1/2"	1'-2"
	3/4"	1'-4"
	1"	1'-7"
 <p>(C) DOUBLE VALVES</p>	1/2"	0'-9"
	3/4"	1'-4"
	1" (SCH 40)	1'-7"

Applicable

NOTES:

1. MAXIMUM "L" DIMENSIONS APPLICABLE TO SEISMIC CATEGORY I VENTS, DRAINS AND UTILITY STATIONS ONLY.

IF "L" IS EXCEEDED, PIPE SUPPORTS FOR THE VENT AND DRAIN PIPING MUST BE PROVIDED.

2. TABLE BASED ON FOLLOWING ASSUMPTIONS:

- 1/2", 3/4" & 1" VALVES WEIGH 6, 12 & 18 LBS RESPECTIVELY
- 1/2", 3/4" & 1" CAPS WEIGH 0.18, 0.3, 0.5 LBS RESPECTIVELY
- NATURAL FREQUENCY OF 33 CPS OR GREATER

3. VALVES SHALL BE GATE OR GLOBE WITHOUT OPERATORS.

4. VENTS AND DRAINS MAY BE USED IN ANY POSITION.

5. BENDS OR FITTINGS MAY BE USED.

6. THIS INFORMATION TO BE USED WHEN

$$\frac{\text{DIA OF HEADER}}{\text{DIA OF VENT OR DRAIN}} \geq 2$$

FOR (A) & (B), AND ≥ 3 FOR (C)

FOR SMALLER DIA RATIOS L = 12"

(FOR (A) SUPPORT REQUIRED FOR

(B) & (C))

7. APPLIES TO ALL PIPE SCHEDULES, UNLESS OTHERWISE STATED.

Figure 7
STANDARD VENT AND DRAIN PIPING

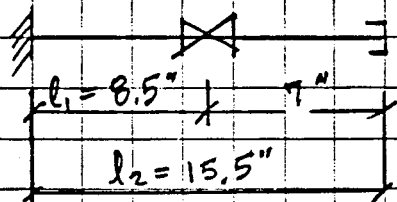
CALCULATIONS FOR

EQUIP. NO.	PROJ. NO.	CALC. NO.	PAGE 1 OF 2
PREPARED BY <i>J. L. J.</i>	DATE 1-27-82	REF. DOCUMENTS: 1408-PFR-0002 2/3/82 <i>SPC</i>	
REVIEWED BY	DATE		
APPROVED BY	DATE		

Circular
Frequency

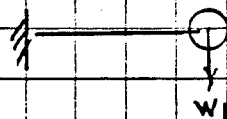
$$D_o = 1.05" \quad t = 0.113"$$

Ref. Mechanical Vibration by W.T. Thomson

 ω_0 

$$W = \text{Weight of } \frac{3}{4}" \text{ pipe Sch. 40} \\ = 1.131 + 0.2301 = 1.3611 \text{ lb/ft}$$

$$W_1 = \text{Weight of valve} = 12 \text{ lb.}$$

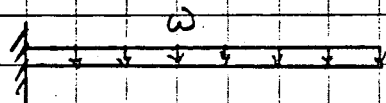
 ω_1 

$$W_2 = \text{Cap Weight} = 0.3 \text{ lb.}$$

 ω_2 

$$E = 28.3 \times 10^6 \text{ psi @ } 70^\circ \text{F}$$

$$I = 0.037 \text{ in}^4 \text{ for } \frac{3}{4}" \text{ sch. 40 pipe}$$

 ω_3 

$$gEI = 386(28.3 \times 10^6)(0.037) = 404.18 \times 10^6$$

$$\omega_1^2 = (3.0)^2 \frac{gEI}{W_1 l_1^3} = (3.0)^2 \frac{404.18 \times 10^6}{12 (8.5)^3} = 493,604 \left(\frac{\text{rad}}{\text{sec}} \right)^2$$

$$\omega_2^2 = (3.0)^2 \frac{gEI}{W_2 l_2^3} = (3.0)^2 \frac{404.18 \times 10^6}{0.3 (15.5)^3} = 3,256,124 \left(\frac{\text{rad}}{\text{sec}} \right)^2$$

$$\omega_3^2 = (3.515)^2 \frac{gEI}{W l_2^4} = (3.515)^2 \frac{404.18 \times 10^6}{1.3611 (15.5)^4} = 63,564 \left(\frac{\text{rad}}{\text{sec}} \right)^2$$

From Dunkerley's Equation p.173 of Ref.

$$\frac{1}{\omega_0^2} = \frac{1}{\omega_1^2} + \frac{1}{\omega_2^2} + \frac{1}{\omega_3^2} = \frac{1}{493,604} + \frac{1}{3,256,124} + \frac{1}{63,564} \\ = 1.80652 \times 10^{-5}$$

$$\therefore \omega_0 = \sqrt{\frac{1}{1.80652 \times 10^{-5}}} = 235 \text{ rad/sec.}$$

$$f_o = \frac{\omega_0}{2\pi} = \frac{235}{2\pi} = 37.4 \text{ Hz} > 33.3 \text{ Hz}$$

CALCULATIONS FOR

EQUIP. NO.	PROJ. NO.	CALC. NO.	PAGE 2 OF 2
PREPARED BY <i>P. Lian</i>	DATE 1-27-82	REF. DOCUMENTS: 2408-PFR-0002 2/3/82 JPC	
REVIEWED BY	DATE		
APPROVED BY	DATE		

$$(ZPA)_{DBE-X} = 0.6 g = (ZPA)_{DBE-Z}$$

$$(ZPA)_{DBE-Y} = 0.75 g$$

$$M_x = 0.6 [12(8.5) + 0.3(15.5) + \frac{1}{2}(1.3611)(15.5)^2] = 162 \text{ in-lb.}$$

$$M_y = (1 + 0.75) [12(8.5) + 0.3(15.5) + \frac{1}{2}(1.3611)(15.5)^2] = 473 \text{ in-lb.}$$

$$M = \sqrt{(162)^2 + (473)^2} = 500 \text{ in-lb.}$$

$$p = 110 \text{ psi}$$

$$Z = \pi r^2 t = \pi (0.4685)^2 (0.113) = 0.0779 \text{ in}^2$$

$$Eq (9) \quad S_{ox} = \frac{p D_o}{4 t_n} + 0.75 i \left(\frac{M}{Z} \right)$$

$$= \frac{110(1.05)}{4(0.113)} + 1.0 \left(\frac{500}{0.0779} \right) = 6,674 \text{ psi} < 1.2 S_u$$

= 19,440 psi

GENERAL ATOMIC COMPANY

2/3/82 *mc*

From: Frederick Lin

Date: January 25, 82

To: To be attached to 2408-PFR-0002

TELEPHONE COMMUNICATION RECORD

(Please hand letter legibly in black or red ink)

Call Initiated by: Frederick Lin at GA Other

Call Received by: Dave Capito at ~~GA~~ Bechtel Other

Other Participants: None

Date 1-25-82 Time 1:20 P.M. Program Name/No.

Task or 189 No.

Subject: PFR-0002

Summary ^{As} I (Fred Lin) did not have Design Guide Spec. CS-P206 at the time of conversation with Dave Capito, I was not sure that if Class 2 pipes equal to & under 2" diameter need not to be analyzed in the mathematical model within the main run. So I asked this question to Dave. Dave's reply was, "No, for 2" and under for Class 2 pipes, they normally follow the Design Guide Spec. CS-P206 for construction, therefore it is not necessarily to be included in the mathematical model with the main run pipes." Dave suggested me to read the Design Guide Spec. so that I would know why it would not be required in the model analyses as long as the pipes were constructed according to CS-P206. I said "I have not received the Spec." Then he said it had been delivered to GA last Thursday (1-21-82). I said "I'll check." I also requested of IOM's and input image of SAM computer run on PSG 82. He said "He will check into it."

Action Items:

Date Req'd

Responsible

Info cc: File No.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION

BA

SLK
1/24/82PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Refueling Water Tank S21203MT006

REQUIREMENT REFERENCE DOCUMENTS:

(see original)

BASIC REQUIREMENT:

(see original)

DESCRIPTION OF POTENTIAL FINDING: BPC supplied the vendor (Brown-Minneapolis Tank) with an addendum to the design specification (Ref. 1) that included design nozzle loads. Out of the six loads given for the 24" Safety Injection Suction nozzle, two of them are not conservative.

Ref. 1

F_b 4334 lbsM_b 2 ft-lbs

Ref. 2

4754 lbs

30 ft-lbs

PREPARED BY: C. Dahms Charles Z. Dahms DATE: 1-23-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: Charles Z. Dahms DATE: 1-27-82B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID☐ REQUEST RE-REVIEW☐ DISAGREE☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: Boyle

BY

BY

BY

DATE

DATE

DATE

DATE: 2/2/82

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2400-PFR-0008

REVISION -

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Refueling Water Tank S21203MT006

REQUIREMENT REFERENCE DOCUMENTS:

- Ref. 1) BPC Design Specification S023-407-13, Addendum No. 7.
Ref. 2) BPC Calculation No. M1204-002-2A (PSG 82)
Ref. 3) Design Report for Refueling Water Tank
BPC Log No. 407-13-110 (Brown-Minneapolis Tank)

BASIC REQUIREMENT: The design nozzle loads listed in the design specification (Ref. 1) should be consistent with the loads derived in the piping analysis (Ref. 2).

DESCRIPTION OF POTENTIAL FINDING: BPC supplied the initial design specification (Ref. 1) to the vendor (Brown-Minneapolis Tank). The vendor then supplied maximum allowable nozzle loads to BPC (Ref. 2, Attachment 1). These allowables are not traceable to the vendor's analysis (Ref. 3). BPC used these allowables as guidelines in performing the piping analysis (Ref. 2) and calculated actual design nozzle loads (Attachment 2). BPC then supplied the vendor with an addendum to the design specification (Ref. 1, Attachment 3) specifying the design nozzle loads. This design specification and the piping analysis, both BPC documents, are not consistent with one another. (see Attachment 2 and 3)

PREPARED BY: C. F. Dahms *C. F. Dahms* DATE: 1-15-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY *[Signature]*

DATE 1/15/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

1/24/82☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEEDEFINITION ADEQUACY: ☒ ADEQUATE ☐ INADEQUATEVALIDITY: ☒ VALID ☐ INVALIDCLASSIFICATION: ☒ OBSERVATION ☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Error in nozzle loads has no effect on design. Committee will check on piping analysis review mentioned in Comments of Impact Assessment Rev B

BY: S. J. Kouz DATE: 1/24/82E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: G. L. W. Wimmer DATE: 1/24/82

REVIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

Attachment (2) provides nozzle loads which were developed at the time the calculation was performed. These were calculated and meet the requirements of Attachment 1.

At a later date, more refined nozzle loads were developed from the computer analyses and these loads with some margin were submitted to the vendor in Reference 1. The computer analyses are referenced in the calculation, Reference 2.

There is no requirement for the design specification and the piping analysis to be identical with one another. The loads in the design specification must be conservative,

☐ AGREE PFR IS VALID (i.e., equal to or exceed) when compared with calculated loads.

☒ DISAGREE *JH* Note: All attachments and references stated above refer to these stated in part A of this PFR.

BY: *S.H.F.*DATE: 1/19/821. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☒ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: *S. A. Kouz*DATE: 1/23/822. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

Need more info on basis for saying allowable are not exceeded. also traceability from piping analysis and design spec.

IMPACT ASSESSMENT

2408-PFR-0008 Rev B
PFR NO. _____

AFFECTED ITEM: Refueling Water Tank S21203MT006

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?
No, the error found in the design specification has negligible effect on the stress analysis performed by the vendor (see attached memo).
2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?
No
3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?
NA
4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?
No
5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST? Similar deviations may exist but cannot be judged on this case alone. However, the document control between the piping analysis and the vendor design specification is unclear and cannot be traced.
6. OTHER COMMENTS: The design nozzle loads calculated in the piping analysis were pointed out as being incorrect (Attachment 4) and therefore explained for the two non-conservative loads in the design specification (see attached memo).

PREPARED BY: C. Dahms C. Z. Osburn DATE: 2-2-82

COMMENTS:

BY: [Signature] DATE: 2/3/82

C. F. Dahms *CEO*IN REPLY
REFER TO

Review Findings Committee

DATE 1-27-82

SUBJECT Impact Assessment Rev. B for PFR-008

To clarify Impact Assessment 2408-PFR-008 Rev. B, the two higher loads (F_B and M_B) calculated in the piping analysis (Ref. 2, Attachment 2) were used in performing additional calculations in the same manner as was done in the tank analysis (Ref. 3, Attachment 5).

$$F_B = V_L = 4754 \text{ lbs}$$

$$r_o = 19 \text{ in.}$$

$$T = 5/8 \text{ in.}$$

$$\frac{V_L}{\pi r_o T} = 127 \text{ psi}$$

$$\text{Total shear stress} = 99 + 127 = 226 \text{ psi} < 0.6 S_m \approx 10,000 \text{ psi}$$

The stresses caused by the moment $M_B = 2 \text{ ft-lbs}$ were not even calculated by the vendor (Ref. 3) because in analyzing a 24" nozzle, 2 ft-lbs is practically zero. This is also the case with $M_B = 30 \text{ ft-lbs}$ instead of 2 ft-lbs.

If the piping analysis (Ref. 2, Attachment 2) was performed incorrectly and the loads were combined in a manner explained by BPC in the telephone conversation (Attachment 4), the net design loads would be substantially lower and all the loads given in the tank design specification (Ref. 1, Attachment 3) would therefore be conservative. Looking at the piping analysis in more detail led to the conclusion that it was done correctly. When computing the design basis earthquake loads (Attachment 2), one must compare the dynamic seismic with a calculated static seismic. Conservatism would require the usage of the larger of the two, then the loads would be combined in the following manner:

$$\text{Thermal Exp.} + \text{Dead Wt.} + \sqrt{(\text{DBE})^2 + (\text{seismic movement})^2}$$

According to the independent calculations (Attachment 6), the piping analysis is correct and therefore does not explain for the error in the tank design specification. However, this error does not have any safety impact on the tank as was shown above.

DESIGNER: RETHIN DATE: 5/15/79 CHECKER: TH DATE: 10/14/79 CALCULATION SHEET

APPROVED: _____ DATE: _____

TITLE: PIPE CONNECTION LINES JOB NO. 10079-003

SUBJECT: NOZZLE CONNECTION LOADING SHEET NO. 82 OF 87

A. EQUIPMENT NAME: RELIABLE GUNNER STORAGE TANK

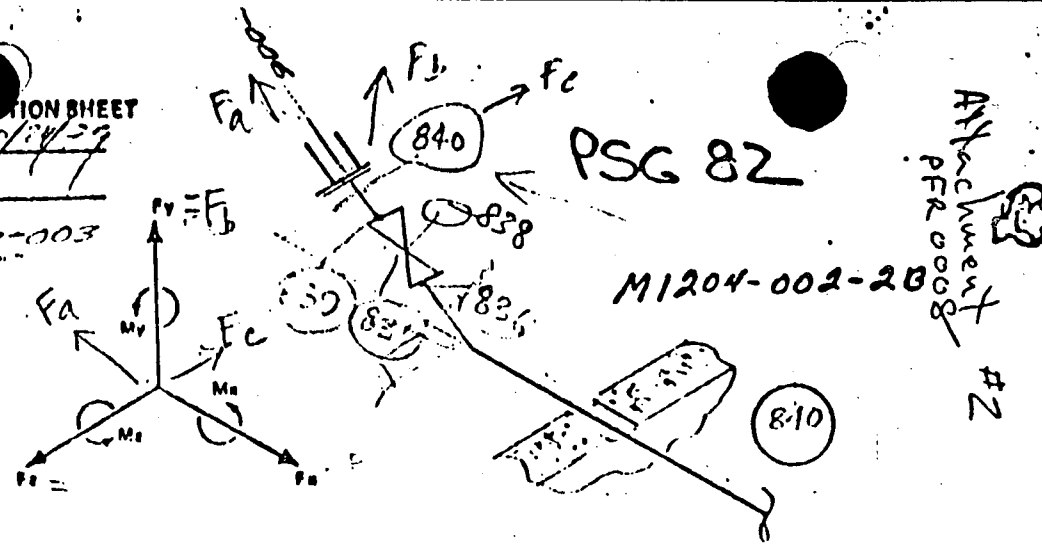
B. NOZZLE OR PENETRATION NUMBER: T-006 Elev 32'

C. SIZE OF NOZZLE OR PENETRATION: 24"

D. REF'D ISOMETRIC SKETCH NUMBER: 10079-003-2

E. ANALYSIS PROBLEM NUMBER: 10079-003

F. DATA PT. NUMBER: 840



NOTE: LOADS GIVEN IN LOCAL COORDINATES

ISSUE NO.	UNIT	ITEM	OPERATING		HYDROSTATIC	OPERATING		DESIGN		SEISMIC MOVEMENT LOAD D.B.E.	* TOTAL NET DESIGN LOAD		
			THERMAL EXPANSION	WEIGHT (PIPE, FLUID & INSULATION)		TEST WEIGHT	BASIS EARTHQUAKE	BASIS EARTHQUAKE					
								O.B.E. (EI)	NORM. P. 34 O.B.E. (EI)			STATIC SEISMIC	DYNAMIC SEISMIC
	FORCE LBS.	F _x	-3278	-48			833	1738	1517	2628	3099 -6473		
		F _y	-631	-1255			741	2745	1349	829	1612 -4124		
		F _z	-5612	60			1625	5690	2258	4207	5658 -8140		
	MOMENT FT. LBS.	M _x	1796	15			2816	9684	5126	1609	1167 -150		
		M _y	0	0			1	23	2	0	30 -30		
		M _z	2754	37			20	107	37	0	2922 -50		

NOTES

(A) SIGN OF SEISMIC, SEISMIC MOVEMENTS LOADS AND DYNAMIC LOADS (DUE TO STEAM OR WATER HAMMER) MAY BE EITHER (+) OR (-)

(B) THE SEISMIC AND SEISMIC MOVEMENTS LOADS MAY ACT EITHER IN THE X + Y OR Z + Y DIRECTIONS BUT NEVER SIMULTANEOUSLY

(C) E. 1.52

* LOADS MEET VENDOR ALLOWABLES.
(SEE GRAPH)

0008

Attachment # 3
2408-PFR-008

TANK S21204MT006 (UNIT TWO)

NOZZLE	SIZE	COMBINED DESIGN LOADS (Thermal and Dead Weight \pm DBE Seismic)	
1 (Cross Tie)	24"	Fa= 6531 lbs Fb= 3174 lbs Fc= 4515 lbs	Ma= 1366 ft-lbs Mb= 5722 ft-lbs Mc= 14756 ft-lbs
2 (Safety Inj. Suction)	24"	Fa= 8293 lbs Fb= 4334 lbs Fc= 8555 lbs	Ma= 11702 ft-lbs Mb= 2 ft-lbs Mc= 9946 ft-lbs
5 (Drain)	3"	Fa= 133 lbs Fb= 123 lbs Fc= 36 lbs	Ma= 18 ft-lbs Mb= 30 ft-lbs Mc= 127 ft-lbs
8 (Overflow)	6"	Fa= 263 lbs Fb= 345 lbs Fc= 129 lbs	Ma= 60 ft-lbs Mb= 220 ft-lbs Mc= 368 ft-lbs
16 (SFP Make-Up)	4"	Fa= 417 lbs Fb= 264 lbs Fc= 198 lbs	Ma= 113 ft-lbs Mb= 262 ft-lbs Mc= 311 ft-lbs
17 (CVCS Gravity Feed)	6"	Fa= 500 lbs Fb= 72 lbs Fc= 102 lbs	Ma= 126 ft-lbs Mb= 107 ft-lbs Mc= 29 ft-lbs
3 10 12 through 15	3" 3" 3"	Instrument Connections - Loads Are Negligible	

TANK S31204MT006 (UNIT THREE)

Same as Unit Two (above).

B		Revised and Redrawn		10-29-80	FGR	JSR	for	12-4	—
NO.		REVISIONS		DATE	DR.	CHK.	E.G.S.	CH.F.E.	P.E.
BECHTEL POWER CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.				J.O. NO.		SAN ONOFRE NUCLEAR GENERATING STATION			
				FILE		TANK NOZZLE LOADS - SHEET 3			
JOB NO.		DATE		APPROVED		SOUTHERN CALIFORNIA EDISON COMPANY		LOS ANGELES, CALIF.	
10079						SCALE			

From: Charles F. Dahms Date: 1/22/82

To: To be attached to PFR 0008 file

TELEPHONE COMMUNICATION RECORD

(Please hand letter legibly in black or red ink)

Call Initiated by: Charles F. Dahms at GA Other

Call Received by: Dave Capito at GA Other

Other Participants: Tony Veca assisted in conversation at GA

Date 1/22/82 Time 11:00 Program Name/No. Task or 189 No.

Subject: Clarification of PFR 0008 comments from APC

Summary Mr. Capito responded to the question about traceability of vendor supplied allowable nozzle loads by stating that they were "preliminary guidelines" and were transmitted informally (probably by phone). No other documentation on that particular information is available. Mr. Capito also clarified the discrepancy between the tank design specification and the piping analysis. He explained the reason for the two non-conservative loads listed in the design specification was that the method of combining loads in the piping analysis was done incorrectly. If the correct methods were applied, Capito indicates that the total net design loads would be substantially lower than what is actually tabulated, thus making the design specification conservative.

Action Items:	Date Req'd	Responsible

Info cc: File No.

24" SAFETY INJECTION SUCTION (2) EDGE OF REPAD

MT006

Table 5—Computation Sheet for Local Stresses in Cylindrical Shells

Applied Loads*

Radial load,
Circ. Moment,
Long. Moment,
Torsion Moment,
Shear Load,
Shear Load,

$P = 8293$ lb.
 $M_c = 24$ in. lb. 360 in.-lb.
 $M_L = 119352$ in. lb.
 $M_t = 140424$ in. lb.
 $V_c = 255$ lb.
 $V_L = 4334$ lb. 4754 lbs

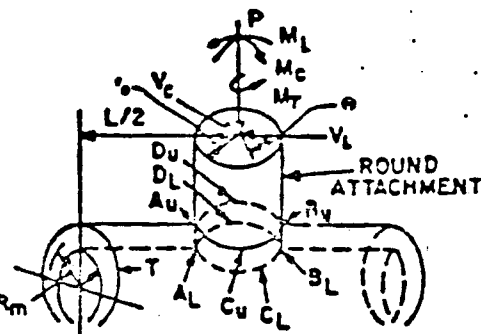
2. Geometric Parameters

$R = 346$
 $B = (0.875) \frac{t}{R_m} = 0.077$

Stress Concentration due to:

a) membrane load, K_n b) bending load, K_b

*NOTE: Enter all force values in accordance with sign convention



CYLINDRICAL SHELL

From Fig.	Read curves for	Compute absolute values of stress and enter result	STRESSES - if load is opposite that shown, reverse signs shown							
			Au	AL	Bu	BL	Cu	CL	Du	DL
3C or 4C	$\frac{M_U}{P/R_m} = 27$	$K_n \left(\frac{M_U}{P/R_m} \right) \cdot \frac{P}{R_m T} =$	-1659	-1659	-1659	-1659	-1659	-1659	-1659	-1659
3C or 2C-1	$\frac{M_U}{P} = .07$	$K_b \left(\frac{M_U}{P} \right) \cdot \frac{6P}{T} =$	-8916	+8916	-8916	+8916	-8916	+8916	-8916	+8916
3A	$\frac{M_U}{M_c/R_m B} = 74$	$K_n \left(\frac{M_U}{M_c/R_m B} \right) \cdot \frac{M_c}{R_m B T} =$								
1A	$\frac{M_U}{M_c/R_m B} = .075$	$K_b \left(\frac{M_U}{M_c/R_m B} \right) \cdot \frac{6M_c}{R_m B T} =$								
3B	$\frac{M_U}{M_L/R_m B} = 74$	$K_n \left(\frac{M_U}{M_L/R_m B} \right) \cdot \frac{M_L}{R_m B T} =$	-744	-744	+744	+744				
1B or 1B-1	$\frac{M_U}{M_L/R_m B} = .074$	$K_b \left(\frac{M_U}{M_L/R_m B} \right) \cdot \frac{6M_L}{R_m B T} =$	-2645	+2645	+2645	-2645				
Add algebraically for summation of σ stresses, σ_Σ										
1C or 2C	$\frac{M_t}{P/R_m} = 45$	$K_n \left(\frac{M_t}{P/R_m} \right) \cdot \frac{P}{R_m T} =$	-2764	-2764	-2764	-2764	-2764	-2764	-2764	-2764
1C-1 or 2C	$\frac{M_t}{P} = .038$	$K_b \left(\frac{M_t}{P} \right) \cdot \frac{6P}{T} =$	-4840	+4840	-4840	+4840	-4840	+4840	-4840	+4840
4A	$\frac{M_t}{M_c/R_m B} = 73$	$K_n \left(\frac{M_t}{M_c/R_m B} \right) \cdot \frac{M_c}{R_m B T} =$								
2A	$\frac{M_t}{M_c/R_m B} = .035$	$K_b \left(\frac{M_t}{M_c/R_m B} \right) \cdot \frac{6M_c}{R_m B T} =$								
4B	$\frac{M_t}{M_L/R_m B} = 73$	$K_n \left(\frac{M_t}{M_L/R_m B} \right) \cdot \frac{M_L}{R_m B T} =$	-691	-691	+691	+691				
2B or 2B-1	$\frac{M_t}{M_L/R_m B} = .03$	$K_b \left(\frac{M_t}{M_L/R_m B} \right) \cdot \frac{6M_L}{R_m B T} =$	-3306	+3306	+3306	-3306				
Add algebraically for summation of τ stresses, τ_Σ										
Shear stress due to Torsion, M_t	$\tau_{\Sigma} = T \cdot \phi$	$\frac{M_t}{2\pi R_m^2 T}$	+99	+99	+99	+99	+99	+99	+99	+99
Shear stress due to load, V_c	$\tau_{\Sigma} = \frac{V_c}{R_m T}$		+229	+229	-229	-229				
Shear stress due to load, V_L	$\tau_{\Sigma} = \frac{V_L}{R_m T}$						-116	-116	+116	+116
Add Algebraically for summation of shear stresses, τ_Σ			+328	+328	-130	-130	-17	-17	+215	+215

127 psi

226 psi

407-13-110-8

S21204 MT006

MADE BY
SFRCHKD BY
1MADE BY
SFRCHKD BY
1CONTRACT NO.
108501-02DATE
7/1/80DATE
12/6/80DATE
12/6/80DATE
12/6/80

SHT. 103 OF

CALCULATIONS FOR

EQUIP. NO.	PROJ. NO.	CALC. NO.	PAGE OF
PREPARED BY C. F. Lehms	DATE 1/25/82	REF. DOCUMENTS: Attachment #6	
REVIEWED BY	DATE		
APPROVED BY	DATE		

$$F_A = -3278 + (-48) + \left(-\sqrt{(1738)^2 + (2623)^2} \right) = \underline{\underline{-6473}}$$

$$= 0 + (-48) + \sqrt{(1738)^2 + (2623)^2} = \underline{\underline{+3099}}$$

$$F_B = -631 + (-1255) + \left(-\sqrt{(2745)^2 + (829)^2} \right) = \underline{\underline{-4754}}$$

$$= 0 + (-1255) + \sqrt{(2745)^2 + (829)^2} = \underline{\underline{+1613}}$$

$$F_C = -2602 + 60 + \left(-\sqrt{(3690)^2 + (4209)^2} \right) = \underline{\underline{-8140}}$$

$$= 0 + 60 + \sqrt{(3690)^2 + (4209)^2} = \underline{\underline{+5658}}$$

$$M_A = 1796 + 12 + \sqrt{(9624)^2 + (1609)^2} = \underline{\underline{+11,625}}$$

$$= 0 + 12 + \left(-\sqrt{(9624)^2 + (1609)^2} \right) = \underline{\underline{-9805}}$$

$$M_B = \underline{\underline{\pm 23}} \quad (\neq \pm 30 \text{ as calculated})$$

$$M_C = 2754 + 59 + 109 = \underline{\underline{+2922}}$$

$$= 0 + 59 + (-109) = \underline{\underline{-50}}$$

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408-PFR-0010

PFR NO. _____

REVISION _____

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety Injection Tank T-008 (SONGS UNIT 2)

REQUIREMENT REFERENCE DOCUMENTS:

1. Evaluation of revised nozzle loads on the Safety Injection Tanks, C-E Calculation #S-PAC-010, 6/24/81.
2. Bechtel letter No. BC-1617 dated May 4, 1981.

BASIC REQUIREMENT: The scope of Ref. 1 includes the design of nozzles on S.I. Tanks for both Units 2 and 3. The Ref. 2 letter states that the attached nozzle load tables are for safety injection tanks in Unit 2. The nozzle load table for Tank 007 is marked applicable to Unit 2 while load tables for Tanks 008, 009, 010 are marked as applicable to both Unit 2 and 3. The validity of nozzle loads used by C-E for Tank 007 in Unit 3 are in question.

DESCRIPTION OF POTENTIAL FINDING:

PREPARED BY: M. Krishnan *Kabel* DATE: 1-13-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY *Boyle*

DATE 1/18/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Loads in Bechtel Letter BC-1617 were transmitted when Bechtel realized they had exceed the C-E allowable nozzle loads as given in C-E Spec. 1370-PE-603. C-E then selected the maximum loads from this letter (from Tanks T-007 and T-009) to determine if these loads were acceptable, in order to provide a bounding solution. Any loads less than or equal to the loads provided by Bechtel whether they are for Unit 2 or Unit 3 would be acceptable. In the event that higher loads are calculated for Unit 3, it is anticipated that Bechtel will once again notify C-E and ask for our concurrence to use these higher loads.

☐ AGREE PFR IS VALID

☒ DISAGREE

It is our understanding that the Bechtel analysis for Unit 3 is not yet complete. Note that C-E Letter S-CE-6756 dated July 31, 1981 to Bechtel relative to these loads does not reference a specific plant or tank, but refers to any tank on either Unit 2 or 3.

Therefore we do not believe that the question of the nozzle loads used by C-E to be a valid concern.

BY: VC Hall

DATE: 1/20/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☒ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING"

COMMENT ON "OBSERVATION" CLASSIFICATION

We regard this PFR invalid for the following reasons:

① We agree with the comments made by the Design Organisation.

② Bechtel is analyzing unit 3 Nozzle loads and intends to concur with CE that they are within the maximum allowables previously obtained for unit 2.

Moheem Kresh

Concur.
FSO
1/27/82

BY:

S. S. Koutz

DATE:

1/27/82

E. TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

BY:

Shl Wexman

DATE:

1/30/82 HHW

INTERNAL CORRESPONDENCE
GA-1076

ATTACHMENT 1

FROM: M. Krishnan *km*
TO: Findings Review Committee
SUBJECT: Safety Injection Tank T-008

IN REPLY
REFER TO:

DATE: 1/27/82

The following is an amplification of the description of Potential Finding on page 1 of PFR-0010.

CE initially issued a design specification which specified the maximum nozzle loads the S.I. tank was designed for. Bechtel then checked the nozzle loads obtained from their piping analysis against the maximum allowables supplied by CE. Bechtel then informed CE of the actual loads obtained for each tank (T-007, 008, 009, and 010) in Units 2 and 3 and this was greater than the CE allowables. CE then re-evaluated the S.I. tank based on the higher nozzle loads supplied by Bechtel and bounds the analysis by evaluating only the tanks with the highest loads (Tanks T-007 and 009). CE then stated that these Bechtel supplied nozzle loads were acceptable and could be valid for Units 2 and 3. The validity of nozzle load on tank 007 was in question since Bechtel's transmittal was not clear if the loads were applicable to both Units 2 and 3.

FROM: _____ LOCATION: _____ DATE: _____
TO: _____ LOCATION: _____ DATE: _____

TELEPHONE COMMUNICATION RECORD

(PLEASE HAND LETTER LEGIBLY IN BLACK OR RED INK)

PFR - 0010

CALL INITIATED BY: N.I. MARSH AT GAC ☒ OTHER: _____
CALL RECEIVED BY: DAVE CAPITO AT GAC ☐ OTHER: BECHTEL
OTHER PARTICIPANTS: MOHAN KRISHNAN (213) 946-1811 x393

DATE: 1/25/82 TIME: 9.30am PROGRAM NAME: SEISMIC REVIEW. PROGRAM NUMBER: 2408

SUBJECT: 12" NOZZLE LOADS ON SAFETY INJECTION TANK T-007

SUMMARY: We asked Bechtel the question whether the 12" Nozzle loads on Tank T-007 were the same for Units 2 & 3 as they are not a mirror image.

Response - Bechtel is doing a reanalysis for unit 3 at this time. They agreed, it is not a mirror image and consequently the reanalysis. They expect the loads to be "Basically the same". They will send a memo to C.E. on completion of the analysis.

ACTION ITEMS:	Date	Person
	Required	Responsible

DISTRIBUTION: F. Ople, M. Krishnan

File No.: _____

POTENTIAL FINDING REPORT
SONGS 223 SEISMIC DESIGN VERIFICATION

REVISION

- 0013

PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Containment Structure Seismic Analysis

REQUIREMENT REFERENCE DOCUMENTS:

Not Applicable

BASIC REQUIREMENT:

~~Not Applicable~~ *TL*

The mass value at a node for vertical translational degree of freedom should be theoretically the same as the mass value for horizontal translational degree of freedom.

DESCRIPTION OF POTENTIAL FINDING:

This PFR documents a deviation noted in the computer input data to SMIS code. Detailed descriptions are given in the attached sheet.

PREPARED BY: T. H. Lee *THL* DATE: 1-15-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

1. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY

[Signature]

DATE

1/27/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

2/3/82 JEC

See attached sheet.

☐ AGREE PF IS VALID

☒ DISAGREE

BY:

Frank B. Muel

DATE:

2/2/82

RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☒ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY:

S. L. Kowch

DATE:

2/3/82 Sdk
2/3/82

TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY:

A. W. Wisman

DATE:

2/3/82

DESCRIPTION OF POTENTIAL FINDING:

This deviation concerns the use of different values of mass at the same node for different directions of motion. This type of deviation was noted in the following documents.

- (a) "Final In-structure Response Spectra Analysis for the Containment and Interior Structure, SOHSS 2 & 3," Aug 1973, Chapter 3; Sec. E Calculation Sheet 10-E of 16-E Sheets.
- (b) "SMIS Finite Element Model For Time-History Analysis of Containment With ES88 Equipment," Sheet 1, Figure A-4.

Description of deviation

In document (a), the mass values are shown as follows for node 10.

Node No.	Horiz(H) or Vert(V)	Mass (K)
x_{10}	H	11,002
y_{10}	V	6,073

In document (b), the mass values are shown as follows for node 16.

Node No.	ADDITIONAL LAPPED INERTIA	
	X-Dir (H)	Y-Dir (V)
16	188	252

Note that the reviewer attempted to justify these direction-dependent mass values from the master-slave nodal relationship but still could not verify these values. Nor could the reviewer duplicate the same ratios of mass values by considering the fact that vertical input level is 2/3 of the horizontal input level. Theoretically, inertia values do not depend upon directions of translational degree of freedom.

It is recognized that generally in a lumped parameter model the same mass value is assigned to all three translational degrees of freedom at a given nodal point. Theoretically, however, there is no basis to require equal mass values along the three translational degrees of freedom. For mathematical modelling of complex structural systems it is warranted, consistent with fundamental theory, to incorporate different masses along each direction as necessary. In lumped parameter models the distribution of mass must be consistent with the directional characteristics of the structural system as governed by the direction of inertial load paths available within the system and by the boundary conditions of subsystems attached to the main system.

With respect to documents (a) and (b), as cited in PFR-0013, the pertinent clarifications are as follows: (numerical values, in units of weights, are weights of corresponding masses)

- (a) The total mass along horizontal direction for node 10 = 11002 k, which includes the steam generator mass = 1893 k (refer to attached sheet 6-E).

The steam generator mass along vertical direction was not assigned to node 10, but distributed to nodes 2 and 3 instead. This distribution of mass was used in recognition of the snubber-type supports of the steam generator. Therefore the mass along the vertical direction for node 10, $Y_{(10)} = 2/3(11002-1893) = 6073$ k as stated in the attached sheet 10-E. The $2/3$ factor was introduced to scale down the inertial forcing function on the right hand side of the equation of motion, which in the calculation sheets is defined as the weighing array used to represent the vertical seismic input as $2/3$ of the horizontal input:

$$[M] \{\ddot{x}\} + [C] \{\dot{x}\} + [K] \{x\} = -[M] \{\ddot{u}\}$$

↑ $2/3$ factor applied to mass terms for vertical degrees of freedom.

The above mass values along the horizontal and the vertical directions are also evident in the attached calculation sheet 6-E, where for node 10:

Horiz. = 11,002 k

Vert. = 9,109 k, and $(2/3) 9109 = 6073$ k

- (b) The total mass along vertical direction for node 16 = 252 k, which includes the mass of snubbers = 32 k each.

Along the horizontal direction the mass of the snubbers was subtracted from node 16 and transferred to nodes 26 and 27, as stated in attached sheet 6-F. The total mass along the horizontal direction at the level of nodes 16, 26 and 27 equals 252 k, as indicated in the attached sheet 15-F:

Node No.	H	V
16	188	252
26	32	0
27	32	0
	<hr/> 252 k	<hr/> 252 k



SIGNATURE S. J. JONES

DATE 12/14/72

CHECKED P. Kline

DATE 12/14/72

PROJECT SOLES - LILIPS 2-3

JOB NO. 13004-7540

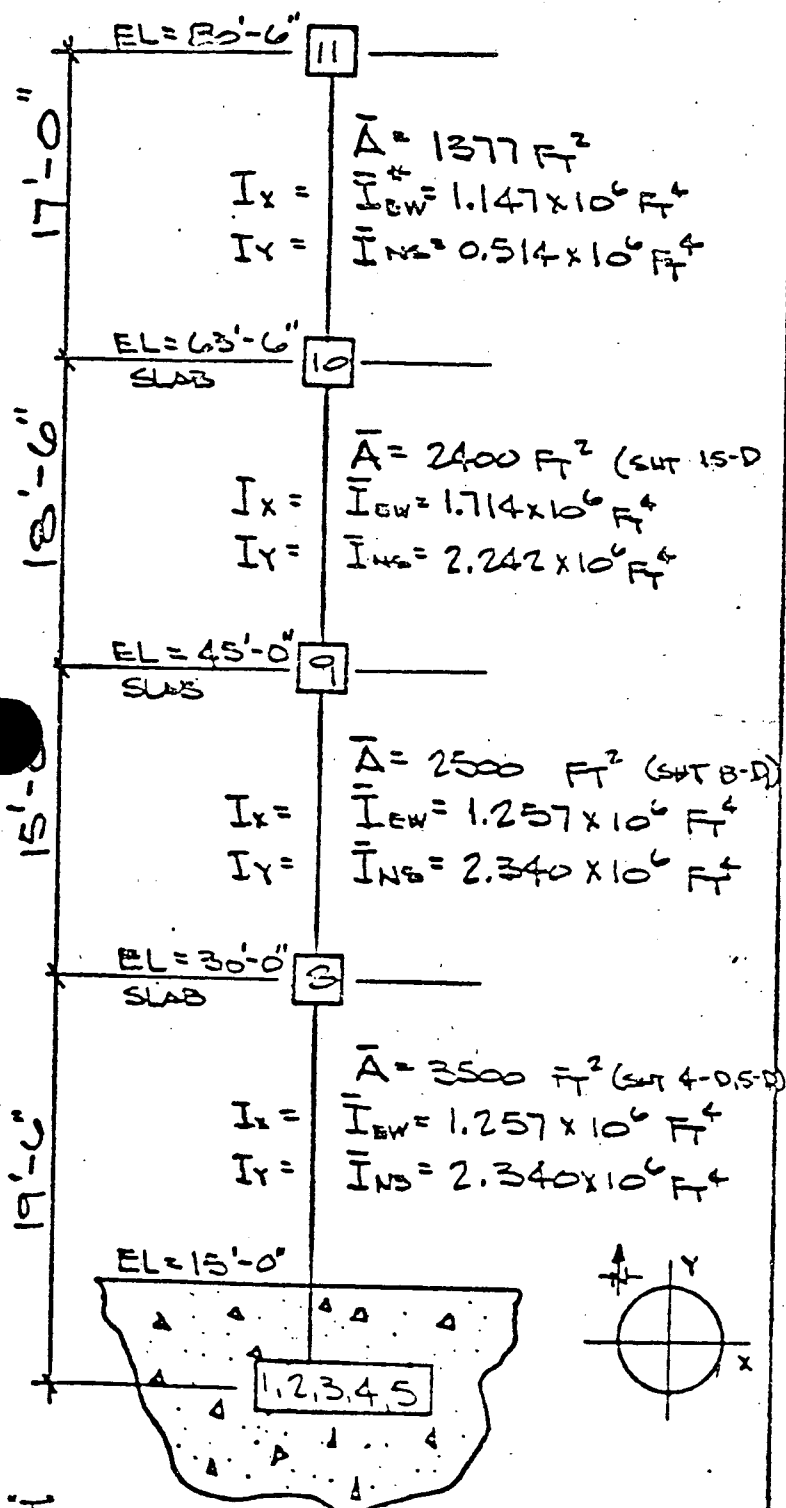
ALSO: COMPLIMENTARY STOCK MODEL SHEET 12-E OF 12-E SHEETS

INSULATION OF NOBIL MASSES (KIPS) TO BE
CONSIDERED AS THE WEIGHTING ARMY FOR THE
HORIZONTAL AND VERTICAL EARTHQUAKE EXCITATION.
Total Weight = 1501874 K
VERTICAL MASSES = $2/3$ OF HORIZONTAL MASSES IN
ORDER TO SCALE THE VERTICAL E.Q. AS $2/3$ OF
THE HORIZONTAL. ROTATIONAL MASSES IGNORED.

D.O.F. No	Node No Direction or R	Mass (K)	D.O.F. No	Node No Direction or R	Mass (K)
1	X ₁	16008	26	Q ₁₀	0
2	Y ₁	10672	27	X ₁₁	3192
3	Q ₁	0	28	Y ₁₁	2128
4	X ₂ , X ₃	16054	29	Q ₁₁	0
5	Y ₂	9317	30	X ₁₂	7524
6	Q ₂ , Q ₃	0	31	Y ₁₂	5014
7	Y ₃	9317	32	Q ₁₂	0
8	X ₄	8141	33	X ₁₃	7488
9	Y ₄	5441	34	Y ₁₃	4992
10	Q ₄	0	35	Q ₁₃	0
11	X ₅	8141	36	X ₁₄	7488
12	Y ₅	5441	37	Y ₁₄	4992
13	Q ₅	0	38	Q ₁₄	0
14	X ₆ , X ₇	81620	39	X ₁₅	8323
15	Y ₆	2873	40	Y ₁₅	5535
16	Q ₆ , Q ₇	0	41	Q ₁₅	0
17	Y ₇	2873	42	X ₁₆	8153
18	X ₈	9941	43	Y ₁₆	5435
19	Y ₈	6641	44	Q ₁₆	0
20	Q ₈	0	45	X ₁₇	9342
21	X ₉	11395	46	Y ₁₇	6241
22	Y ₉	7597	47	Q ₁₇	0
23	Q ₉	0	48	X ₁₈	0
24	X ₁₀	11002	49	Y ₁₈	0
25	Y ₁₀	6073	50	Q ₁₈	0
			51	Dummy	1

SIGNATURE S. BRENZ DATE 10/3/77CHECKED R. Kane DATE 12/1/77 2/3/82 JSEPROJECT SAVES UNITS 2 & 3JOB NO. 1504-779PROJECT 150' & CONTAINMENT STRUCTURE MODEL SHEET 6-E OF 10-E SHEETS

TOTAL WEIGHT DIST.



Node #11 (SEE SHT. 20-D)

WALLS ...	3192 K
TOTAL	3192 K

Node #10

WALLS	5424 K
SLAB	2906 K
MISC EQUIP.	779 K
STM. GEN. (.5)(3785) =	1893 K
(HORIZ. ONLY)	
TOTAL	

HORIZ = 11,002 K
 VERT = 9,109 K

Node #9

WALLS	5414 K
SLAB	4944 K
MISC. EQUIP	746 K
PRESSURIZER	291 K
TOTAL	11,395 K

Node #8

WALLS	7931 K
SLABS	484 K
MISC. EQUIP	746 K
R.C. PUMPS	800 K
TOTAL	9,961 K

Nodes 1,2,3 (EQUIP)

(WEIGHT OF INTERIOR STRUCT. INCL. SHTS 10-D & 11-D)	
REACTOR VESSEL (Node #1)	2050 K
STM. GEN (HORIZ) (Nodes 2 & 3)	1893 K
VERT	3785 K
TOTAL	
(HORIZ)	3943 K
(VERT)	5335 K

* I VALUES OBTAINED FROM SECTPRO PROGRAM
 OUTPUT (LS1500J 3/3/73) ELEV. 30.0' &
 45.0' AREAS WERE SAME IN PROGRAM
 ∴ MOMENTS OF INERTIA ARE SAME (SHT 25-D)

SIGNATURE SAL BORNELL DATE 4-23-73CHECKED [Signature] DATE 6/1/73PROJECT BRIDGE 213JOB NO. 1304-785JECT 150' 6 CONTAINMENT - STICK MODELSHEET 6-F OF 23-F SHEETSNODE #16

$$W = \frac{[1377(6.728 + 10.272)](.160)}{2} = 1873k$$

NODE #17

$$W = \frac{[1377(10.272)](.160)}{2} = 1132k$$

SUMMARY OF NODAL WEIGHTS

NODE No	TOTAL WEIGHT	ELEMENT WEIGHT	ADD'L WEIGHT
10	5460	5478	-18
11	3860	2499	1361
12	3000	2804	196
13	8073	2052	6021
14	3552	3623	-71
15	6850	3114	3736
16	1873	1621	252*
17	1132	980	152

* THE HORIZONTAL WEIGHT OF NODES 26 & 27 HAS TO BE SUBTRACTED FROM THE HORIZONTAL WEIGHT OF NODE 16.

SIGNATURE SAL BOENEL DATE 4-27-73

CHECKED W/LB DATE 6/2/73

PROJECT SONGS 2.33

JOB NO. 1304-735

SUBJECT 15'0" CONTAINMENT - STICK MODEL SHEET 15-E OF 25-E SHEETS

ADDITIONAL MASSES (KIPS) VS. D.O.F. NUMBER

D.O.F. NO	Node No & DIRECTION	Horiz or R	Mass (K)	D.O.F. NO	Node No & DIRECTION	Horiz or R	Mass (K)
1	Y ₁	V	-10	34	Y ₁₄	V	252
2	X ₂ , X ₃	H	1292	35	Q ₁₆	R	0
3	Y ₄	V	646	36	X ₁₇	H	152
4	Q ₄ , Q ₅	R	0	37	Y ₁₇	V	152
5	Y ₅	V	646	38	Q ₁₇	R	0
6	X ₆	I	-159	39	X ₁₈	H	-1175
7	Y ₆	V	-159	40	Y ₁₈	V	-1175
8	Q ₆	R	0	41	Q ₁₈	R	0
9	X ₇	I	-159	42	X ₁₉	H	0
10	Y ₇	V	-159	43	Y ₁₉	V	0
11	Q ₇	R	0	44	Q ₁₉	R	0
12	X ₈ , X ₉	I	508	45	X ₂₀	H	-246
13	Y ₈	V	254	46	Y ₂₀	V	-246
14	Q ₈ , Q ₉	R	0	47	Q ₂₀	R	0
15	Y ₉	V	254	48	X ₂₁	H	330
16	Y ₁₀	V	-18	49	Y ₂₁	V	330
17	Q ₁₀	R	0	50	Q ₂₁	R	0
18	X ₁₁	I	1361	51	X ₂₂	H	-922
19	Y ₁₁	V	1361	52	Y ₂₂	V	-922
20	Q ₁₁	R	0	53	Q ₂₂	R	0
21	X ₁₂	I	196	54	X ₂₃	H	4220
22	Y ₁₂	V	196	55	Y ₂₃	V	4220
23	Q ₁₂	R	0	56	Q ₂₃	R	0
24	X ₁₃	I	6021	57	X ₁ , X ₂ , X ₃	H	-10
25	Y ₁₃	V	6021	58	Q ₁ , Q ₂ , Q ₃	R	0
26	Q ₁₃	R	0	59	Y ₂	V	0
27	X ₁₄	I	-71	60	Y ₃	V	0
28	Y ₁₄	V	-71	61	X ₁₀	H	-18
29	Q ₁₄	R	0	62	Y ₂₄	V	0
30	X ₁₅	I	3736	63	Q ₂₄	R	0
31	Y ₁₅	V	3736	64	Y ₂₅	V	0
32	Q ₁₅	R	0	65	Q ₂₅	R	0
33	X ₁₆	I	183	66	X ₂₄	H	32
				67	X ₂₇	H	32
				77	X ₂₄	H	0
				78	X ₂₅	H	0

INITIATOR'S RE-EVALUATION COMMENTS
(AFTER THE PFR HAS BEEN REVIEWED BY BPC)

The initiator has studied the review comments of BPC and fully understands the technical basis for BPC to use mass values dependent upon directions of translational degree of freedom. The reason that the initiator could not duplicate the same values as given by BPC is that the initiator attempted to justify them through the use of one scale factor while the BPC arrived at those values through the use of two factors, namely, (i) mass value for vertical degree of freedom is initially chosen to be different from that for horizontal degree of freedom, (ii) applying $2/3$ scale factor for vertical-input analysis. Some additional questions generated during this re-evaluation have also been clarified by BPC through long distance phone call. Details of this verbal clarification are given in the attached "Telephone Communication Record".

Since the deviation is not an error, the initiator suggests that the PF be invalidated.

BY: T. H. Lee *THL* DATE: 2-3-82

Concur that this PF is invalid.

flp
2/3

File No.:

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Pipe Support for Node 116 of Safety Injection Line to Reactor Coolant Loop 1A. Calculation Tag S2-S1-043-H-020.

REQUIREMENT REFERENCE DOCUMENTS:

Piping Analysis Package S-78, M1204-043-2B
Cold Leg Safety Injection Line 1204-043 Class 1 Stress Report for S-78,
Calc. No. M-DSC-050 p.274.

BASIC REQUIREMENT:

Drawings and calculations label nodes properly.

DESCRIPTION OF POTENTIAL FINDING:

Node 116 is mislabeled as node 117 on the pipe ^{SUPPORT} assembly drawing and the pipe support calculation TAG: S2-S1-0~~4~~3-H-020. Calculation Tag S2-S1-043-H-020 is actually for node 116.

Alan Zimm for R. Salavatcioglu 1/23/82

PREPARED BY: R. Salavatcioglu DATE: 1-23-82

REJECTION OF GA TASK LEADER COMMENTS BY: DATE:

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: *R. Salavatcioglu* DATE: 2-1-82

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY *[Signature]*

DATE 1/23/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY:

[Signature]

DATE: 2/2/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☒ VALID☐ INVALID

CLASSIFICATION:

☒ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

*Mislabelled mode but design is OK*BY: S. L. Koutz DATE: 1/27/82E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: J. H. Wassman DATE: 2/3/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

- First, the apparent inconsistency is because of an incorrect point no. (117) on the pipe support drawing. The data point on the pipe support drawing should be 116. Secondly, the higher load (69,500 lbs.) used in the pipe support calculation came from a previous piping stress analysis. The final support analysis indicated a lower value of 50,635 lbs. The support calculation was not changed since the design was conservative.

☐ AGREE PFR IS VALID☒ DISAGREEBY: R. RogersDATE: 1/31/82D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☒ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

SRF 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

Verify transportation of nodes 116 + 117 and applicability of calcs.

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: S. L. KoutzDATE: 1/23/82TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

IMPACT ASSESSMENT

2408-PFR-0014-A

PFR NO. _____

AFFECTED ITEM: PSG 78 Node 116, Tag No. S2S1-043-H020

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

NA

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

OTHER COMMENTS: Yes, This is the second mislabeled node we've had.

PREPARED BY: *R. Salavatcioglu* for R. Salavatcioglu 1/23/82
DATE: 1-23-82

COMMENTS:

BY: *R. Salavatcioglu*

DATE: 1/23/82

INTERNAL CORRESPONDENCE

GA 1076

0014A

IN REPLY
REFER TO

DATE 1/27/82

OM

Re Salavatcioglu *R. Salavat*

TO

Review Findings Committee

SUBJECT

PFR-0014 Revision A

The node number on pipe support calculation TAG:S2:SI-043-H-020 is mislabeled as node 117. It is the calculation for node 116. The calculation for node 117 is TAG:S2:SI-0430H-021. We have verified that this is correct by comparing the elevation in the piping isometric and the calculation.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-0031

REVISION A

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Seismic Category I Motor Control Centers (MCC)

REQUIREMENT REFERENCE DOCUMENTS: Bechtel Power Corporation Spec No. S023-302-4
and 8 addendum "Quality Class II and III Spec for Motor Control Centers for
San Onofre Nuclear Generating Stations Units 2 & 3".

N/A

BASIC REQUIREMENT: The specification should not contain any "Preliminary" or
"Non-Final" information.

DESCRIPTION OF POTENTIAL FINDING: The seismic Response Spectra given for MCCs mounted
at Grade Level are marked "Preliminary for bid purposes only". There is no
indication that "Final" copies were sent to the vendor or that the "preliminary"
curves were eliminated.

PREPARED BY: A. Middleton 2/2/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: A. Middleton DATE: 2/2/82

B. REVIEW BY GA TASK LEADER

COMMENTS

Of the two items covered in the original PFR,
the reviewer has accepted BPC's response on
item 2. Item 1 remains a valid PF and is
the subject of Rev. A to PFR 0031

☒ AGREE PF IS VALID

BY [Signature]

DATE 2/2/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: [Signature]

DATE: 2/2/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☒ VALID☐ INVALID

CLASSIFICATION:

☒ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

*Prel info in spec never furnished but correct values
used in tests*

BY: *S. H. Kouty* DATE: *2/2/82*E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: *Shuman* DATE: *2/3/82*

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☐ AGREE PF IS VALID☒ DISAGREE

HNN-SHF

BY: Phil B. MaulDATE: 1-28-82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGCLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

1. The seismic qualification report, Log S023-302-4-2-55, identifies the response spectra used for the qualification of equipment at elevation 50'. The preliminary report with response spectra at grade was for bid purposes only, and it was not utilized in the qualification tests.
2. The Nodes 9 and 9A represent the floor at elevation 50'-0 of the Control Area of the Auxiliary Building in the mathematical lumped parameter model of the building shown in Figure 3.7-19 of the FSAR. The horizontal response spectra curves of SK-S-701 and SK-S-725 for DBE and OBE events, respectively, are applicable to any location on elevation 50' (Node 9) and envelope the maximum horizontal acceleration response along either principal horizontal directions. The vertical response spectra curves of SK-S-737 and SK-S-739 for DBE and OBE events, respectively, are applicable to the Control Area of the Auxiliary Building where the slabs are supported by structural steel columns and beam framing, as designated by Node 9A. The lumped parameter model approach with inclusion of the steel framing, together with the enveloping techniques used, result in conservative response spectra curves.

Supplementary Clarification, issued January 26, 1982:

The horizontal response spectra at elevation 50'-0 is generically given by SK-S-701 and -725 for all areas of the concrete floor slab since in the horizontal direction the floor is a rigid diaphragm.

The vertical response spectra at elevation 50'-0 for floor areas supported by closely spaced concrete bearing walls (Node 9, Radwaste Area) is given by SK-S-702 and -726, and for floor areas supported by steel columns and framing (Node 9A, Control Area) is given by SK-S-737 and -739. It is evident that the vertical spectra for Node 9A are higher than for Node 9, therefore the Node 9A spectra selected is appropriate and conservative for the equipment located in the Control Area.

ITEM 1: WE STILL BELIEVE THIS IS A VALID POTENTIAL FINDING.

ITEM 2: AFTER EXAMINATION OF THE COMPLETE SET OF RESPONSE SPECTRA FOR THE 50 FT. LEVEL IN THE AUXILIARY BLDG., WE NOW AGREE THAT THE RESPONSE SPECTRA INCLUDED WITH SPECIFICATION ARE CONSERVATIVE.

REVISION A OF PFR 0031 RETAINS ITEM 1.

Alan Middleth 2/2/82.


Concur with Item 1
as being valid.
Concur with Item 2
as being invalid. JS/2/2/82

FREQUENCY (cycles per second)

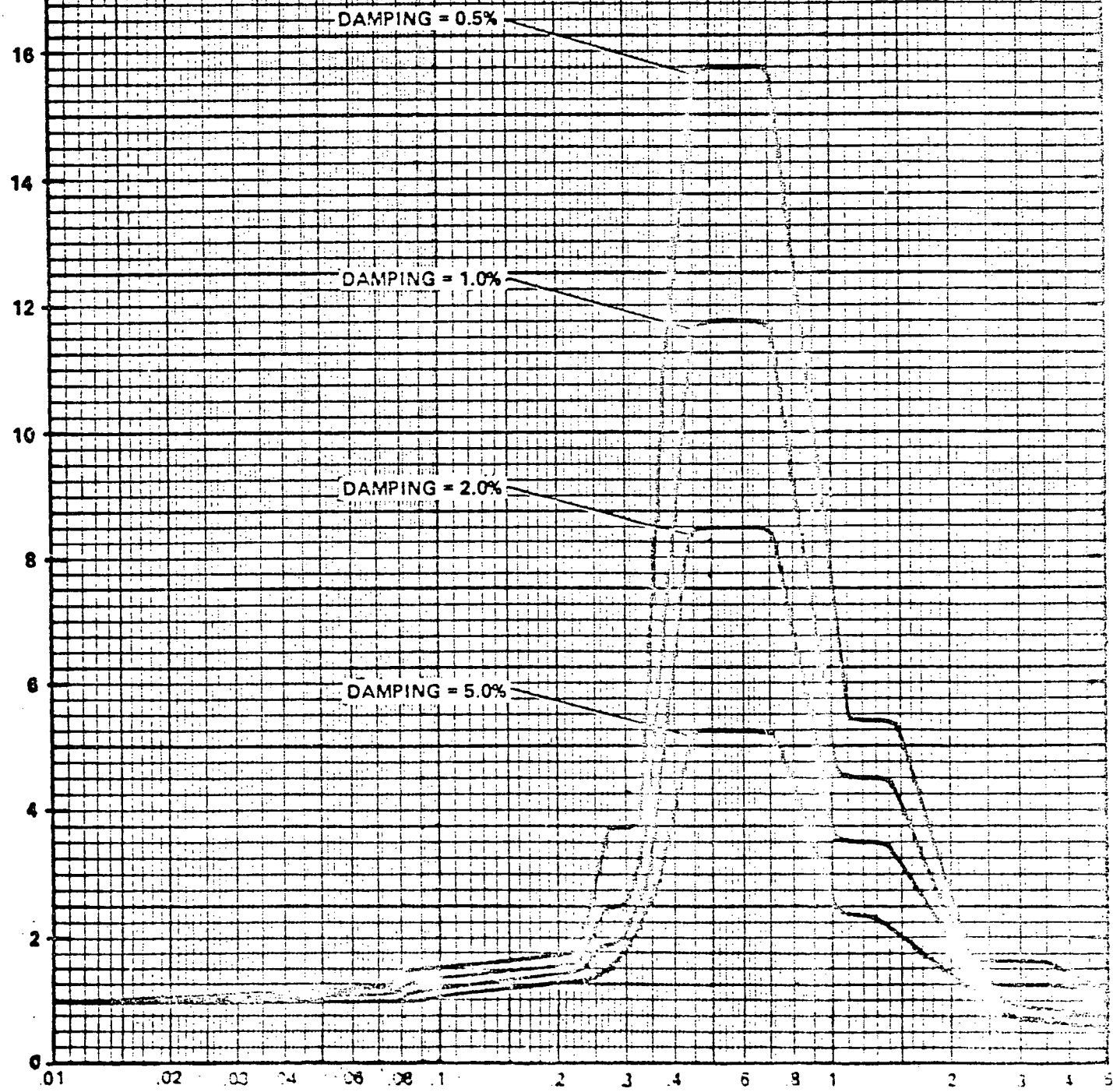
100 50 25 10 5 2 1 .5 2

$S_d = 10 T^2 S_a$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_a - ACCELERATION RESPONSE (g 's)

DAMPING VALUES
AS PERCENT OF CRITICAL

 BECHTEL POWER CORPORATION LOS ANGELES DIVISION		
SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3		
DESIGN BASIS EARTHQUAKE HORIZONTAL ACCELERATION RESPONSE SPECTRA AT NODE 9, ELEVATION 50'-0" OF AUXILIARY BUILDING		
Prepared By: AL	Reviewed By: FLG LGH QBS	Approved By: WAB
JOB NO. 1304-803	SKETCH NO. S023-SK-S-701	REV. A 1/14/73

ACCELERATION (g 's)



FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$S_d = 10 T^2 S_a$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_a - ACCELERATION RESPONSE (g 's)

DAMPING VALUES
AS PERCENT OF CRITICAL



BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

DESIGN BASIS EARTHQUAKE RESPONSE
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9, ELEVATION 50'-0"
OF AUXILIARY BUILDING

Prepared By: Reviewed By: Approved By:

AL

FLG LGH

was

JOB NO.
1304-803

SKETCH NO.
S023-SK-S-702

REV.
A 7/1/72

ACCELERATION (g 's)

12

10

8

6

4

2

0

DAMPING = 0.5%

DAMPING = 1.0%

DAMPING = 2.0%

DAMPING = 5.0%


01 02 03 04 05 06 07 08 1 2 3 4 5 6 7 8 9 10

FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$S_d = 10 T^2 S_a$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_a - ACCELERATION RESPONSE (g 's)

DAMPING VALUES
AS PERCENT OF CRITICAL

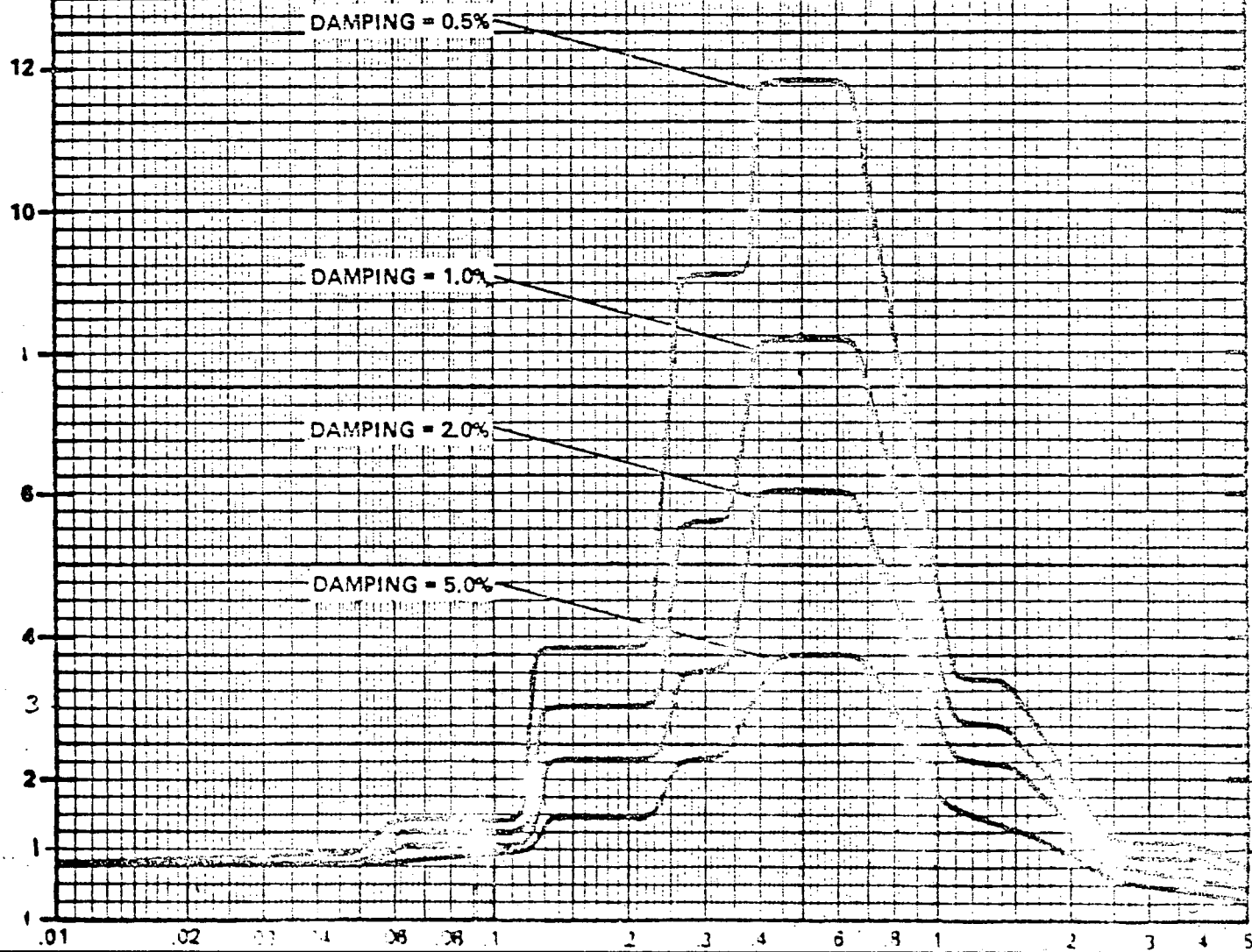
 BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

DESIGN BASIS EARTHQUAKE
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9A, ELEVATION 50'-0"
OF CENTRAL CONTROL AREA, AUX. BLDG.

Prepared By: <i>AL</i>	Reviewed By: <i>FLG LGH QB wab</i>	Approved By:
JOB NO. 1304-803	SKETCH NO. S023-SK-737	REV. <i>A 7/6/73</i>

ACCELERATION (g 's)



FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$S_d = 10 T^2 S_a$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_a - ACCELERATION RESPONSE (g's)

DAMPING VALUES
AS PERCENT OF CRITICAL



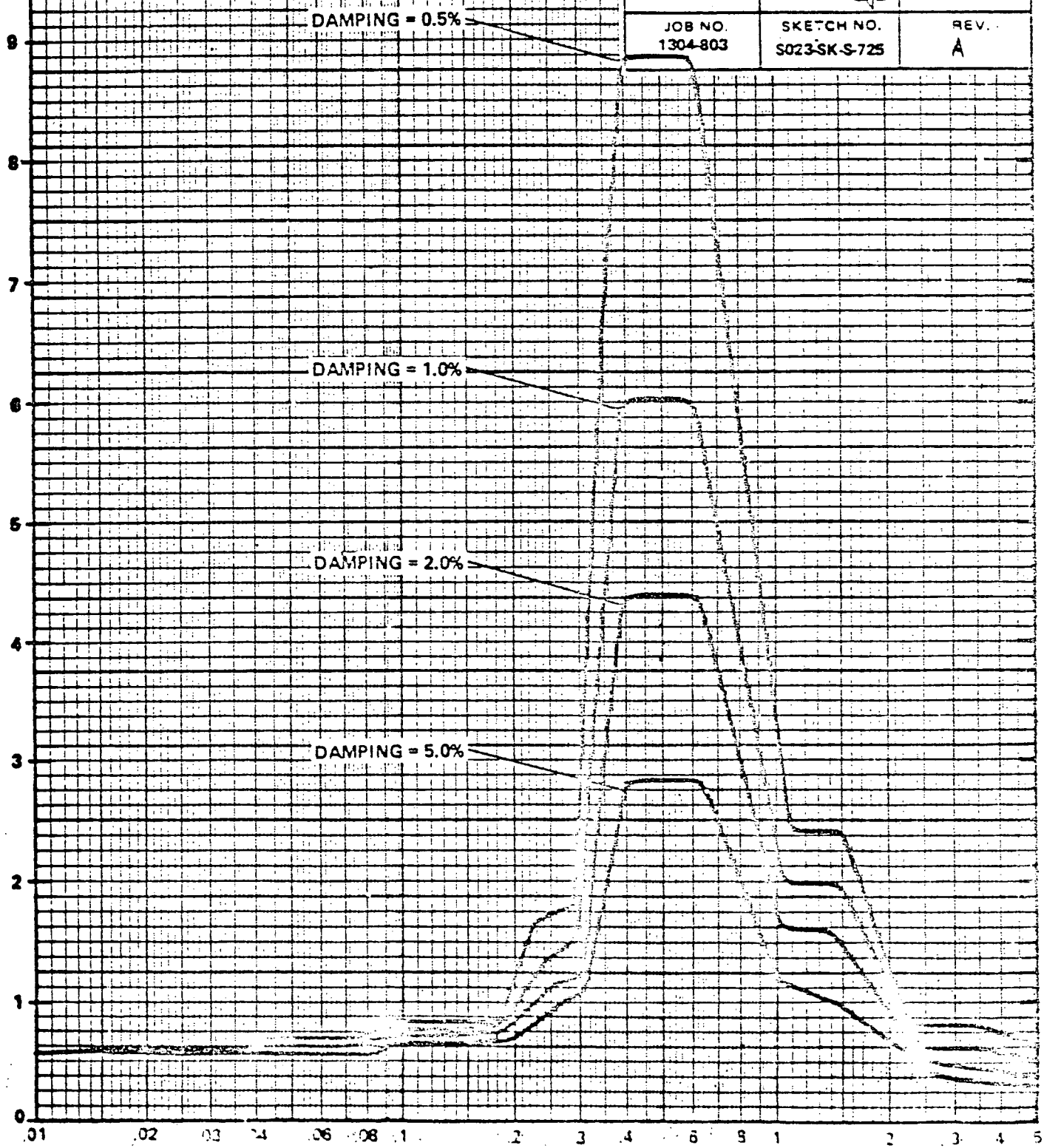
BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

OPERATING BASIS EARTHQUAKE
HORIZONTAL ACCELERATION RESPONSE
SPECTRA AT NODE 9, ELEVATION 50'-0"
OF AUXILIARY BUILDING

Prepared By:	Reviewed By:	Approved By:
AL	FLG LGH QAB	wab
JOB NO. 1304-803	SKETCH NO. S023-SK-S-725	REV. A

ACCELERATION (g's)



FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$$S_d = 10 T^2 S_a$$

S_d = DISPLACEMENT RESPONSE (INCHES)

T = PERIOD (SEC.)

S_a = ACCELERATION RESPONSE (g's)

DAMPING VALUES
AS PERCENT OF CRITICAL



BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

OPERATING BASIS EARTHQUAKE RESPONSE
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9, ELEVATION 50'-0"
OF AUXILIARY BUILDING

Prepared By:

AL

Reviewed By:

FLG

LGH

Approved By:

WAB

JOB NO.

1304-803

SKETCH NO.

S023-SK-S-726

REV.

A

ACCELERATION (g's)

8

7

6

5

4

3

2

1

0

DAMPING = 0.5%

DAMPING = 1.0%

DAMPING = 2.0%

DAMPING = 5.0%

.01 .02 .03 .04 .06 .08 1 2 3 4 5 8 1 2 3 4 5

FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$$S_d = 10 T^2 S_a$$

S_d = DISPLACEMENT RESPONSE (INCHES)

T = PERIOD (SEC.)

S_a = ACCELERATION RESPONSE (g's)

DAMPING VALUES
AS PERCENT OF CRITICAL



BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

OPERATING BASIS EARTHQUAKE CONTROL
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9A, ELEVATION 50'-0"
OF CENTRAL CONTROL AREA AUX. BLDG.

Prepared By:

AL

Reviewed By:

FLG

LGH

Approved By:

WOFB

JOB NO.

1304-803

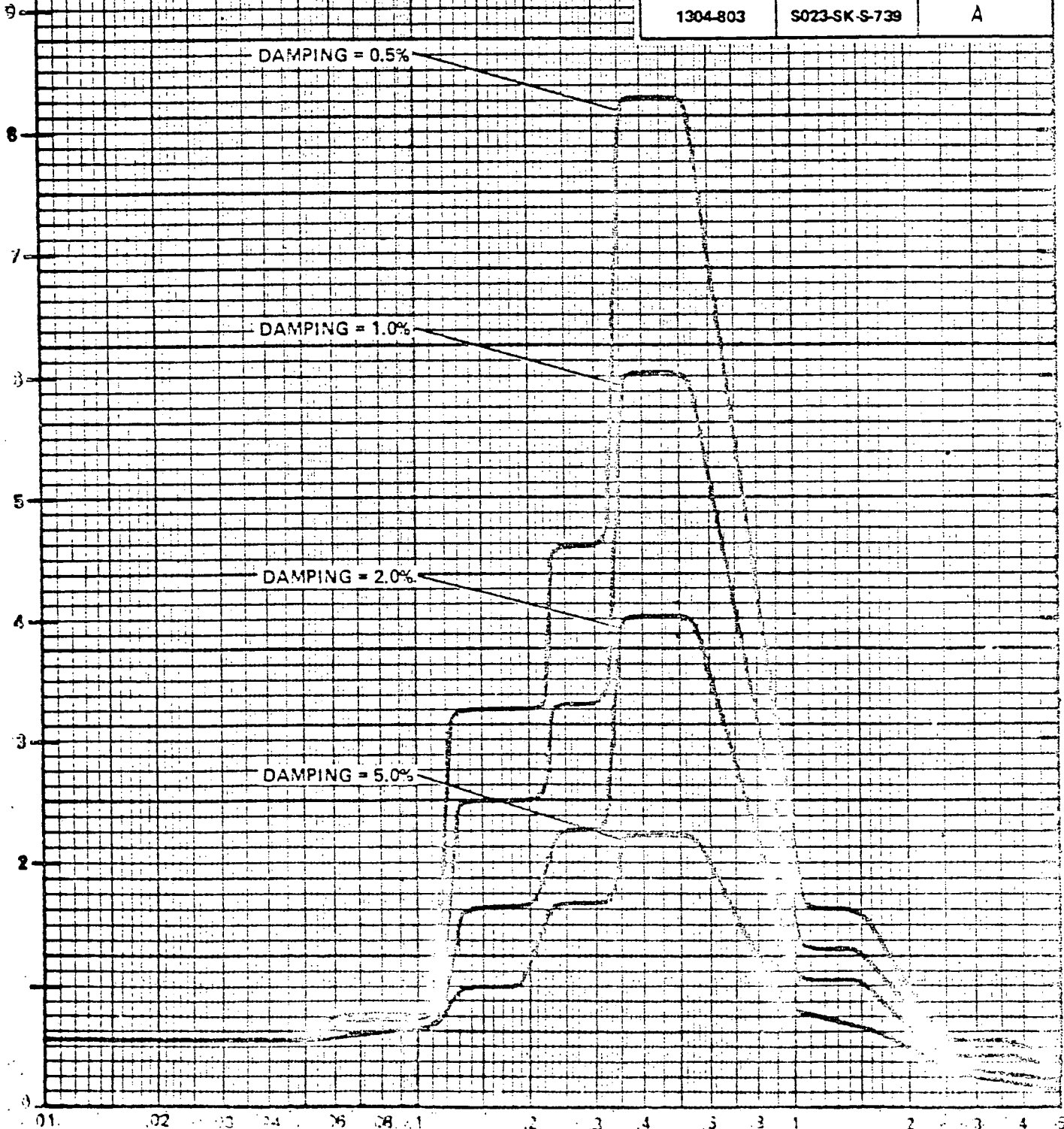
SKETCH NO.

S023-SK-S-739

REV.

A

ACCELERATION (g's)



FREQUENCY (cycles per second)

100

50

25

10

5

2

1

0.5

0.2

$$S_d = 10 T^2 S_a$$

S_d = DISPLACEMENT RESPONSE (INCHES)

T = PERIOD (SEC.)

S_a = ACCELERATION RESPONSE (g 's)

DAMPING VALUES
AS PERCENT OF CRITICAL



BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

DESIGN BASIS EARTHQUAKE RESPONSE
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9, ELEVATION 50'-0"
OF AUXILIARY BUILDING

Prepared By:

AL

Reviewed By:

FLG LGH *003*

Approved By:

was

JOB NO.

1304-803

SKETCH NO.

S023-SK-S-702

REV.

A *1.1*

ACCELERATION (g 's)

12

10

8

6

4

2

1

0.5

DAMPING = 0.5%

DAMPING = 1.0%

DAMPING = 2.0%

DAMPING = 5.0%

0.1 0.2 0.3 0.4 0.5 0.6 0.8 1 2 3 4 5 6 8 10 12 15 20 25 30 40 50 60 80 100

FREQUENCY (cycles per second)

100 50 25 10 5 2 1 .5 2

$S_d = 10 T^2 S_a$
 S_d - DISPLACEMENT RESPONSE (INCHES)
 T - PERIOD (SEC.)
 S_a - ACCELERATION RESPONSE (g's)

DAMPING VALUES
AS PERCENT OF CRITICAL



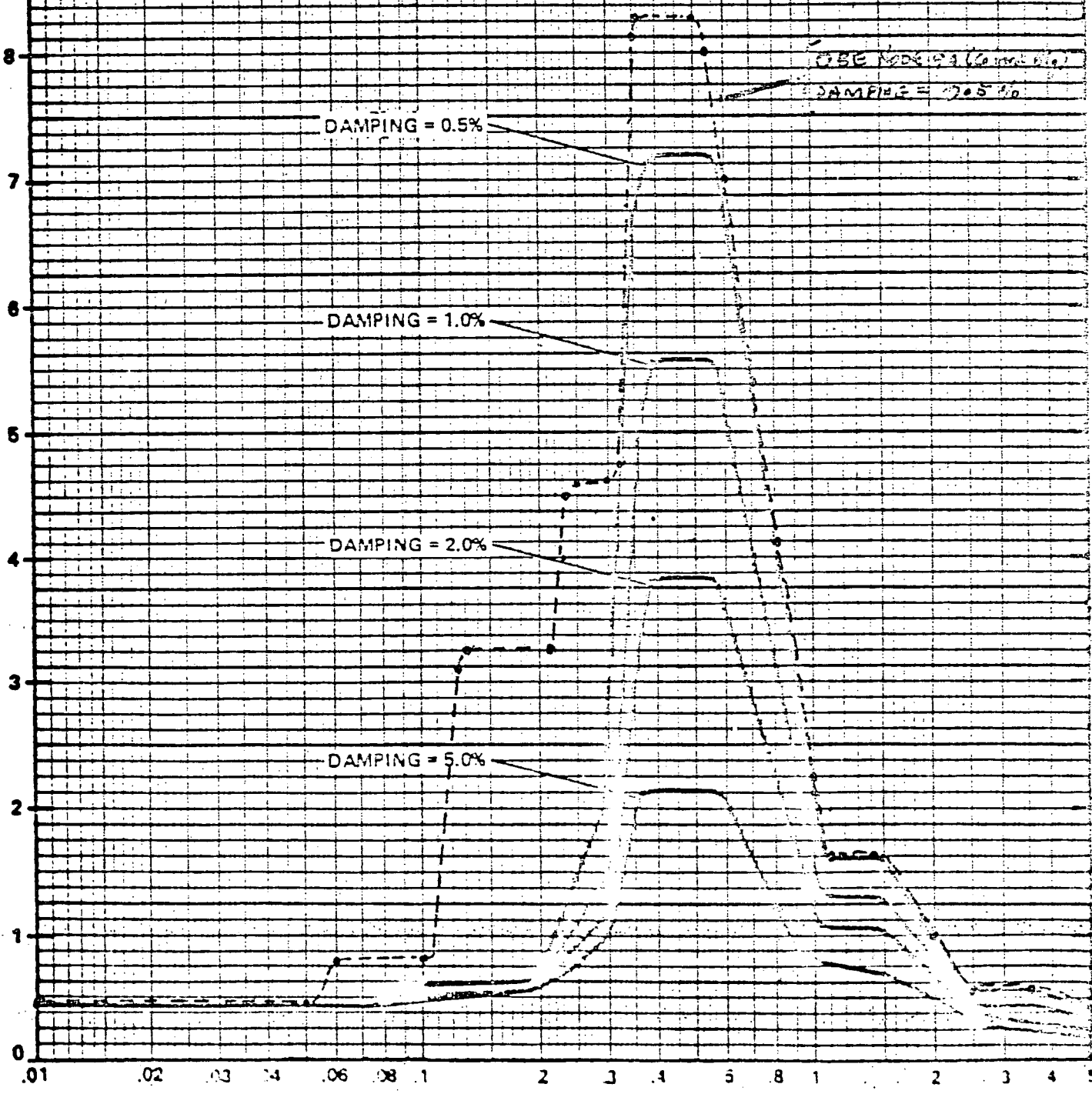
BECHTEL POWER CORPORATION
LOS ANGELES DIVISION

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

OPERATING BASIS EARTHQUAKE RESPONSE
VERTICAL ACCELERATION RESPONSE
SPECTRA AT NODE 9, ELEVATION 50'-0"
OF AUXILIARY BUILDING

Prepared By:	Reviewed By:	Approved By:
AL	FLG LGH	WAB
JOB NO. 1304-803	SKETCH NO. S023-SK-S-726	REV. A

ACCELERATION (g's)



IMPACT ASSESSMENT

2408-PFR-0031

PFR NO. Rev. A

AFFECTED ITEM: 408 volt Motor Control Centers (for motor operated valves HV9301, HV9302 and HV9340)

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No, review of the seismic test report (S023-302-4-2-55) shows that only the correct response spectra for 50 ft were used during seismic testing.

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

No, with 4 redundant trains (2HPSI and 2 LPSI) it is unlikely that loss of power to valves in one train would cause a substantial safety hazard.

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No, it is probable that the Bechtel Purchase Order for the MCCs either included a "final" set of drawings for Grade Level or included only the response spectra for 50'.

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

None

6. OTHER COMMENTS:

None

PREPARED BY: A. Middleton *Alan Middleton* DATE: 2-2-82

COMMENTS:

Concur with impact assessment.

BY: *[Signature]*

DATE: 2/2/82

6637

2408-PFR-0037

PFR NO. _____
REVISION _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety Injection Tank T-008

REQUIREMENT REFERENCE DOCUMENTS:

1. Containment Interior Structure Analyses, No. C-257-5-04.01 (AC-1347-9199).
2. Bechtel letter log BC-664, 4/29/75 (AC-1347-9492).
3. Design Report for Safety Injection Tank, Calculation No. S-PEC-112, Rev. 2, 6/9/76 (AC-1347-9118).

BASIC REQUIREMENT:

The values used for the moment of inertia of the concrete floor slab should be consistent in documents 1, 2, and 3.

DESCRIPTION OF POTENTIAL FINDING: The values used by Bechtel for M.I. are given in Pg 34 of Ref. 1 (attachment 1). The values transmitted by Bechtel to C.E. are shown in Ref. 2 (attachment 2). The values used by C.E. in the dynamic analysis of the S.I. tank are given in pg. B-6 of Ref. 3 (attachment 3). There is an inconsistency in the values used by C.E. for the moment of inertia of the concrete slab.

PREPARED BY: M. Krishnan *[Signature]* **DATE:** 1-19-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ **DATE:** _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ **DATE:** _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ **AGREE PF IS VALID**

BY *[Signature]*

DATE 1/22/82

☐ **REQUEST RE-REVIEW**

BY _____

DATE _____

☐ **DISAGREE**

BY _____

DATE _____

☐ **REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY:** _____ **DATE:** _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The numerical values used by C-E in Reference (C) were conversions from those provided by Bechtel in Reference (B). The units for I_x and I_y were incorrectly listed as lbs.-sec.²/in. instead of lbs.-sec.²-in. The conversion from feet to inches was made as though this term was in the denominator. This resulted in a value of 12,000 lbs.-sec.²-in. The value correctly converted is 1,728,000 lbs.-sec.²-in.

The values are used as input to a larger overall calculation. The two values were run through the computer calculation and it was found that changing this input had no effect on the final results. This is because of the location where the input value is applied, at the base of the tank. The rotary inertia has negligible effect on the response characteristics of the tank at this location. Since the results of the cal-

☒ AGREE P/F IS VALID

☐ DISAGREE

BY:

V. C. Hall

DATE:

2/2/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☒ VALID

☐ INVALID

CLASSIFICATION:

☒ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Numerical error but result is conservative

BY:

S. L. Koutz

DATE:

2/3/82

E. QA PROJECT MANAGER

☒ ACCEPT

☐ REJECT

BY:

S. Weissman

DATE:

2/5/82

Response to 2408-PFR-0037 (Cont.)

culatation were consistent with what would have been expected, the design verification procedure used by the independent reviewer accepted the results as valid. The computer program STRUDL is used to calculate the natural frequency of the safety injection tank.

U710

CALCULATION SHEET

ATTACHMENT 1
PIR-0037 CALC. NO. C-257-G04

SIGNATURE R. Phur DATE 4-16-75 CHECKED D. J. L. DATE 4-22-75
 SUBJECT SONGS 2 & 3 JOB NO. 10079-003
 SUBJECT SAFETY INJ. TANK SUPPORT ANALYSIS SHEET 34 OF 34 SHEETS

3-d) STICK MODEL - SAFETY INJECTION TANK SUPPORT

CONCRETE SLAB MASS WHICH IS ACTING WITH THE SAFETY INJECTION TANK.

1) ASSUME SURFACE AREA = 15' X 15'

$$M_1 = 3'(15')(15')(46.58 \times 10^{-4} \text{ K-SEC}^2/\text{FT}^4) \\ = 3.14 \text{ K-SEC}^2/\text{FT}$$

$$I_1 = M \left(\frac{L^2}{3} + \frac{R^2}{12} \right) \\ = 3.14 \left[\frac{(15)^2}{3} + \frac{(3)^2}{12} \right] = 238 \text{ K-SEC}^2\text{-FT.}$$

2) ASSUME:

$$\text{SURFACE AREA} = \frac{(13.25')(13.5') - \frac{1}{2}(4.75')^2}{1} \\ = 167.59 \text{ FT}^2$$

$$M_2 = (3')(167.59 \text{ FT}^2)(46.58 \times 10^{-4} \text{ K-SEC}^2/\text{FT}^4)$$

$$= 2.34.0 \text{ K-SEC}^2/\text{FT}$$

$$I_2 = 2.34 \left[\frac{(13.5')^2}{3} + \frac{(3')^2}{12} \right] = 144 \text{ K-SEC}^2\text{ FT}$$

SAFETY INJECTION TANK SUPPORT DATA

Attachment- 2
PFR-0037

Bottom Support (El. 45'-0")

$$K_x = 131 \times 10^6 \text{ lbs/in.}$$

$$K_y = 176 \times 10^6 \text{ lbs/in.}$$

$$K_z = 28 \times 10^6 \text{ lbs/in.}$$

$$K_{xx} = 1.0 \times 10^{11} \text{ lbs-in/rad.}$$

$$K_{yy} = 1.4 \times 10^{11} \text{ lbs-in/rad.}$$

$$K_{zz} = 1.0 \times 10^{12} \text{ lbs-in/rad.} \quad (\text{See Note \#1 below})$$

$$M = 2.34 \frac{K - \text{sec}^2}{\text{ft}} \quad (\text{See Note \#2 below})$$

$$I_x = 144 \text{ K - sec}^2 - \text{ft} \quad (\text{See Note \#2 below})$$

$$I_y = 144 \text{ K - sec}^2 - \text{ft} \quad (\text{See Note \#2 below})$$

Upper Support (El. 62'-9")

(See Note \#3 below)

$$K_x = 37 \times 10^6 \text{ lbs/in.}$$

$$K_y = 37 \times 10^6 \text{ lbs/in.}$$

Notation:

K_1 = translational stiffness

K_{ii} = rotational stiffness

M = mass of concrete slab acting together with the tank

I = mass moment of inertia

x = perpendicular to hot leg

y = parallel to hot leg

z = vertical

Notes:

1. The rotational stiffness K_{zz} at the bottom support has not been computed. It may be assumed that this stiffness is at least an order of magnitude greater than the rotational stiffnesses K_{xx} of K_{yy} .

COMBUSTION ENGINEERING, INC.
WINDSOR, CONN.

PRK-0037
Attachment 3

OWNER SCE CONT. NO. S-AEC-112 MADE BY BOW DATE 11/20/75
SAFETY ONCE FIRE UNITS 2+3 DWG. NO. D-339-320-144 CHK'D BY _____ DATE _____

(C) DESIGN DATA AND VESSEL FEATURES

CE SUPPLIED DATA (REF. 1 AND 2)

MOUNTING: VERTICAL

SUPPORTS: SKIRT AND SEISMIC LUGS

MATERIAL: SHELL/HEADS SA 516-GR 70

SKIRT SA 516-GR 70

SEISMIC LUGS SA 516-GR 70

INSIDE DIA: 108"

SHELL THICKNESS: 1.740" W/ .125" NOM CLAD

STRAIGHT SIDE: 32'-5" (TAN-TAN)

VOLUME: 16,860 GAL-TOTAL

13000 GAL-OPERATING

HEAD DATA: ASME 2:1 ELLIPTICAL DISHED

OD 112.465"

ID 108.625"

t 1.920" W/ .125" MIN CLAD

VOL 713.83 GAL

WT 9308 LB (APPROXIMATE)

HEIGHT 23.92'

STRAIGHT FLANGE 10 1/8"

SKIRT: OD = 111"

t = 1"

LENGTH = 77"

NOTE: THE 108.625 AND 112.465 DIMENSIONS ARE FROM CE-AVERY DWG 111-0001

ARCHITECT-ENGINEER SUPPLIED DATA (REF. 4, 5, 6 AND 7)

LOCATION OF SEISMIC LUG \pm : 17 1/2' FROM GROUND

SUPPORT STIFFNESSES AT BASE: $K_x = 131 \times 10^6$ lb/in

$K_y = 28 \times 10^6$ lb/in

$K_z = 176 \times 10^6$ lb/in

$K_{xx} = 1.0 \times 10^{10}$ in-lb/rad

$K_{yy} = 1.0 \times 10^{10}$ in-lb/rad

$K_{zz} = 1.4 \times 10^{10}$ in-lb/rad

SUPPORT STIFFNESSES AT UPPER SUPPORT: $K_x = 30 \times 10^6$ lb/in

$K_z = 30 \times 10^6$ lb/in

CONCRETE FLOOR SLAB (BASE) PROPERTIES: $M_y = 1.95 \times 10^6$ lb-sec²/in

$I_x = 12000$ lb-sec²/in

$I_z = 12000$ lb-sec²/in

RELATIVE HORIZONTAL DISPLACEMENT BETWEEN

BASE AND UPPER SUPPORTS: $OBE(X) = .001$ $OBE(Y) = .005$

$OBE(Z) = .031$ $OBE(2) = .055$

NOTE: A-E Y-COORD. CORRESPONDS WITH THE Z-COORD. USED IN THIS REPORT.

IMPACT ASSESSMENT

2408-PFR-0037

PFR NO. _____

AFFECTED ITEM: Safety Injection Tank T-008

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET ?

No

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE ?

NO

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD ?

I don't know

~~Yes~~ ^{km}

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD ? No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST ? Maybe; this error was caused by an oversight in not differentiating between mass and inertia dimensions.

OTHER COMMENTS:

It could be expected that the value of moment of inertia at this location has negligible impact on the results and moreover the error was made on the conservative side.

Also, a reanalysis performed by CE showed negligible impact on the results.

K. M. R.

PREPARED BY: M. Krishnan

DATE: 2-2-82

COMMENTS:

Agree with impact assessment.

BY: *[Signature]*

DATE: 2/3/82

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION A

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Suction line between refueling water tank (T-006) and low pressure safety injection pump (P-016)

REQUIREMENT REFERENCE DOCUMENTS:

- 1) Stress ISO 1204-004-1, Rev. I
- 2) Stress ISO 1204-002-1, Rev. D
- 3) Stress ISO 1204-002-2, Rev. A

BASIC REQUIREMENT:

Stress isometrics should reflect the field as-built configuration.

DESCRIPTION OF POTENTIAL FINDING:

The three isometrics referenced above had dimensions between restraints and fittings that were not the same as the field installation. These findings are documented in Attachment I.

See Attachment No. 2 to this PFR for review of Original Design Organization's comments.

PREPARED BY: John A. Jones DATE: 1/28/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADERCOMMENTS

☒ AGREE PFR IS VALID BY Brian S. Asanolt DATE 1/28/82

☐ REQUEST RE-REVIEW BY _____ DATE _____

☐ DISAGREE BY _____ DATE _____

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: Brian S. Asanolt DATE: 1/28/82

STRESS ISO FINDINGS

I. ISO No. 1204-004-1

1) The supports on line 109-24"-C-LLO are as described below:

- a) The y-z restraint at data point 52 is shown on ISO as 10'4" south of data point 56. Actual dimension is 7'6".
- b) The Z-snubber at data point 47 is shown on ISO as 29'4" south of data point 56. Actual dimension is 18'3".
- c) The spring hanger at data point 47 is shown on ISO as 29'4" south of data point 56. Actual dimension is 26'2".
- d) Drain line 121 at data point 46 attaches to the wall and does not conform to standard detail given with Bechtel's answer to PFR-0002.

II. ISO No. 1204-002-2

- 1) Distance between data points 812 and 814 is shown on the ISO as 4.917'. Actual dimension is 12'4". Dimension used in analysis is 11.917'.

III. ISO No. 1204-002-1 (line 002-24"-C-LLO)

- 1) ISO shows a spring and a two-way restraint at data point 802 which are 4' down from elbow. The spring and the two-way restraint are not together. The spring is 3'3" down from elbow and the two-way restraint is 2' beyond the spring.

ATTACHMENT II

Review of Original Design Organization comments.

1. ISO No. 1204-004-1

- a) potential finding is Invalid. *dimension of 2'8" was inadvertently left out of calculation*
- b) potential finding is Invalid. *dimension of 2'8" was inadvertently left out of calculation*
- c) potential finding is Invalid. *dimension of 2'8" was inadvertently left out of calculation*
- d) Bechtel agreed with the potential finding, however they provided a calculation for the piping and supports on line 121. *dimension of 2'8" was inadvertently left out of calculation*

II. ISO No. 1204-002-2

Potential finding is Invalid. *Because deviation is within ± 12 " tolerance allowed by Spec. CS-207* JAT 1/28/82

III. ISO No. 1204-002-1 (line 002-24"-C-LLO)

Potential finding is Invalid. *ODC provided a calculation summary sheet subsequent to their written response verifying that the location change was evaluated.* JAT 1/28/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS _____

☐ AGREE PFR IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☒ VALID☐ INVALID

CLASSIFICATION:

☒ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

I (d) is Observation because it does not confirm to Bechtel standard detail. However, pipe is OK as built.
Other parts of PFR are "Involved."

BY: S. L. KoutzDATE: 1/28/82E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: AdelmanDATE: 2/3/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☐ AGREE PF IS VALID☐ DISAGREEBY: AG V. Hauke for P. Rogers DATE: 1-23-82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING☐ CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

I. Iso No. 1204-004-1

- a) As-built location of Y-Z restraint at data point 52 agrees with location as shown on Pipe Support Drawing S2-SI-109-H-003. The 7'4" dimension that the auditors say is the 'actual dimension' is the actual dimension for the axial snubber S2-SI-109-H-005 in the X-direction. The as-built location agrees with the pipe support drawing. The isometric is not a controlling document.

Disagree with potential finding.

- b) DCN 4 of Pipe Support Drawing S2-SI-109-H-002 specifies the support location at S1923.5833. This agrees with the as-built location. The isometric is not a controlling document.

Disagree with potential finding.

- c) Actual dimension south of data point 56 is 28'-9". Pipe Support Drawing S2-SI-109-H-001 Rev. 1 shows the support location at S1931.6. This is 29'-2" south of data point 56 and is the location specified on the Pipe Support Description List and used in the computer model. The as-built dimension is 5 inches north and therefore lies within construction tolerances of ± 12 inches per CS-P207.

Disagree with potential finding.

- d) Drain line 121 at data point 46 does not conform to standard detail given with Bechtel's answer to PFR-002. Therefore, a support was added by the 'Small Pipe Support Group' at the jobsite using the methodology described in CS-P206.

Agree with potential finding. However, above explains nonconformance to referenced detail.

II. Iso No. 1204-002-2

The dimension used in the analysis between data point 812 and 814 is 11.917 feet. This is consistent with the Pipe Support Drawings S2-SI-002-H-024 and H-025. Actual dimension is 12.333 feet. Construction specification CS-P207 allows a tolerance of ± 12 inches on support location. Therefore, the as-built condition is consistent with the design document. The dimension on the isometric (4.917 feet) is not correct. The location of pipe supports is controlled by the Pipe Support Description List which is part of the design calculation.

Disagree with potential finding.

III. Iso No. 1204-002-1

The spring at data point 802 is installed at elevation 8'-3". The support drawing shows it at elevation 7'-3-1/4" (a difference of 11-3/4 inches). The X-Z stop is installed at elevation 6'-3". The support drawing shows it at elevation 5'-8" (a difference of 7 inches). Both are within construction tolerances of ± 12 inches per CS-P207.

Disagree with potential finding.

IMPACT ASSESSMENT

2408- PFR NO. 0043

AFFECTED ITEM: ISO No. 1204-004-1 d

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET ?

No

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE ?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD ?

Unable to assess

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD ?

Not applicable

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST ?

Unable to assess

OTHER COMMENTS:

Bechtel has submitted a calculation showing that the small bore pipe is installed per CS-P206.

PREPARED BY:

John G. Kren

DATE:

1/28/82

COMMENTS: No comments

BY:

Brian Bramott

DATE:

1/28/82

POTENTIAL FINDING REPORT SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION _____

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: The Seismic Category I Switchgear

*am 2/2/82*REQUIREMENT REFERENCE DOCUMENTS:

Bechtel Power Corporation Spec 302-2 and 10
Addendum "Quality Class II Spec for 4160v Switchgear for San Onofre Nuclear Generating Station Units 2 & 3".

N/A

BASIC REQUIREMENT: ~~Appendix 4.B of the spec is essentially the same as S.C.E. FSAR - can~~
~~Section 3.10 A except it incorporates in-structure response curves for the 50 ft level.~~

1. Good engineering practice requires that specifications should be error free
2. Sufficient documentation should be available to evaluate *if response spectra are correct and conservative.* *am 7/2/82*

DESCRIPTION OF POTENTIAL FINDING:

1. Appx B Section C.1, Last Para ... "presented in Fig. 1 & 2 respectively". Should read ... "presented in Fig. 1, 2, 3 and 4 respectively".
2. Appx B Section C.3.1.2, Item 2, Last line "Fig. 3" should be "Fig. 5".
Appx B Section C.3.1.2, Item 2, First line, 2nd Para, "Fig. 3" should be "Fig. 5".
Appx B Section C.3.1.2, Item 3, Second line, "1.5" should be "1.5/Q".
The horizontal Response Spectra for the Auxiliary Building for the 50 ft level are for Node 9 and the vertical response spectra are for Node 9A. Documentation justifying that this choice of curves is conservative is requested.

PREPARED BY: *A. Middleton* *Alan Middleton* DATE: *1-21-82*

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADERCOMMENTS*Items 1 & 2 are editorial in nature.*

Item 3 is similar to PFR 31. BPC has responded to PFR 31. Additional info has been requested. Re-review item 3 after additional info on PFR 31 has been evaluated.

*See attached for
Reviewers disposition.*

☐ AGREE PF IS VALID

BY _____

DATE _____

☒ REQUEST RE-REVIEWBY *frickler*DATE *1/25/82*☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS** _____☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☒ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDING**JUSTIFICATION:**

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION _____

BY: S. L. Kouz DATE: 2/2/82**E. GA PROJECT MANAGER**☒ ACCEPT☐ REJECTBY: G. H. W. man DATE: 2/3/82

PFR

2408 0044

SEISMIC CATEGORY I SWITCHGEAR.2/2/82

ITEMS 1 & 2 I AGREE THESE ARE EDITORIAL IN NATURE. THEY SHOULD NOT CAUSE PROBLEMS FOR AN EXPERIENCED QUALIFIED TEST LAB.

ITEM 3. IN RESPONSE TO PFR-0031, BECHTEL SUPPLIED ADDITIONAL INFORMATION INCLUDING A FULL SET OF RESPONSE SPECTRA FOR THE 50 FT. ELEVATION IN THE AUXILIARY BLDG. EVALUATION OF THIS INFORMATION HAS SHOWN THAT THE RESPONSE SPECTRA IN BOTH THE MOTOR CONTROL CENTER SPEC (S023-302-4) AND THE SWITCHGEAR SPEC (S023-302-2) ARE CONSERVATIVE. THE MCC & SWITCHGEAR ~~ARE~~ OF CONCERN ARE BOTH LOCATED IN THE SAME AREA OF THE AUXILIARY BLDG. (BOTH ARE AT 50' ELEVATION).

THUS I NOW RECOMMEND THAT THIS PFR-2408-0044 IS MADE INVALID.

ALAN MIDDLETON 2/2/82

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION A**A. PREPARATION BY GA INITIATOR****AFFECTED ITEMS:**

Design Requirement, Externally Designed Component

REQUIREMENT REFERENCE DOCUMENTS:

Attachment 3 PSAR
Section III, paragraph 13

BASIC REQUIREMENT: "Verification that equipment not designed by the Nuclear Power Systems Division is adequately designed is the responsibility of the engineering departments preparing the purchase requisition. The adequacy of the design of safety related systems and components not designed by CE is assured by the performance of design reviews, the performance of independent analyses by CE design personnel, or by a suitable testing program."

DESCRIPTION OF POTENTIAL FINDING:

(See Attachment I)

PREPARED BY: Handley/Tyson DATE: 2/2/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**

This revision (A) provides clarification of the Potential Finding

☒ AGREE PF IS VALIDBY JB RussellDATE 2/2/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

*The processing of this PFR is suspended.
It is out of the program scope*

BY: GHW DATE: 2/4/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Your attention is directed to ED-1, Paragraph 1.2, SCOPE, which states in part: "For work in support of the design of safety related components and systems performed by others for the department, the documentation authorizing such work shall require compliance with the design quality assurance requirements of WQC 11.1." Your attention is further directed to WQC 11.1, Vendor Quality Control Specification, Paragraph 5.2.1, Design Control, which states in part: "System for the independent (a person who does not report to the individual who performed the original calculations) review of design calculations, stress analyses, materials and subcomponents including standard commercial items, test programs, and similar design work to the extent such activities are within the vendor's scope of responsibility." This requirement covers the portions of the "BASIC REQUIREMENT" in the PFR regarding

☐ AGREE PFR IS VALID☒ DISAGREEBY: V C HallDATE: 1/29/82

(Continued)

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

Response to 2408-PFR-0046 (Cont.)

"design reviews" and "suitable testing program". Note that these are vendor requirements delineated in the procurement package and must be included in their QA program. If the division of responsibilities require that C-E perform independent analyses, these are adequately covered in RD-1, Paragraph 5.2, and the detailed procedures in Appendix B.

VW

ATTACHMENT I

Description of Potential Finding:

The Reactor Design Group design manual, RD-1, did not establish design adequacy review/verification procedure for safety related systems designed by organization(s) other than CE.

Specifically, the following three points were either inadequately addressed or not addressed at all by RD-1:

1. PSAR, Section III para. 13 clearly requires that the independent analysis be performed by "CE design personnel".
2. Computer Code Verification -
If computer codes were used by supplier for design, WQC-11.1, referenced in RD-1, does not address code verification.
3. CE engineering departments responsible for adequacy of design -
Cognizant engineer, by calling out WQC 11.1 in the Purchase Order, can pass on all design adequacy responsibility to a supplier. No criteria for shared design responsibility is addressed.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. - 0048

REVISION --

PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Project Office Responsibility - Purchase Orders

REQUIREMENT REFERENCE DOCUMENTS:

Attachment 3 PSAR Section IV, paragraph 3

BASIC REQUIREMENT:

"...., the project manager has the responsibility for ensuring that the procurement order has been reviewed by all engineering departments having an interface with the equipment to be procured or manufactured."

DESCRIPTION OF POTENTIAL FINDING:

None of the CE Design Manuals PE 001, RD-1, or QADM addressed Project Office/Manager responsibility in ensuring interface review of procurement order documents.

PREPARED BY: [Signature]

DATE: 1/22/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: [Signature]

DATE: 2/3/82

B. REVIEW BY GA TASK LEADER

COMMENTS

CE's comments & additional information provided do not address the issue of how the Project Manager function described in the PSAR Quality Program Plan is reflected in any CE working-level procedures.

☒ AGREE PFR IS VALID

BY [Signature]

DATE 1/22/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: [Signature]

DATE: 2/3/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Ensuring that an activity is not finished is an administrative or coordinating function that does not require a QA program. The applicable quality assurance procedures provide controls for a safety related design activity when it is accomplished. Administrative controls require that an activity be accomplished. Also see comments on 2408-PFR-0038 and 0052 regarding Project Office activities.

☐ AGREE PFR IS VALID

☒ DISAGREE

BY: V C Hall DATE: 1/29/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☒ ADEQUATE ☐ INADEQUATE
VALIDITY: ☒ VALID ☐ INVALID
CLASSIFICATION: ☒ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Proj. Mgr. comment in PSAR was not covered by procedures. However, function was required to be performed by Proj. Eng. per attached procedures.

BY: S L Kouty DATE: 2/3/82

E. QA PROJECT MANAGER

☐ ACCEPT

☐ REJECT

Processing of this PFR is suspended. It is out of the Program Scope.

BY: A L Wesman DATE: 2/4/82

IMPACT ASSESSMENT

2408 PFR NO. -0048

AFFECTED ITEM: Project Office Responsibility - POs

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

N/A

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

N/A

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

N/A

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

Yes, a PO could have been placed without adequate review or input.

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

N/A

OTHER COMMENTS:

This PFR is of a "procedural" nature that is, the basic requirement was not addressed in a CE written procedure. CE may in fact actually have coordinated POs alright.

PREPARED BY: George Chandler DATE: 2/3/82

COMMENTS:

BY: J. Brewer DATE: 2/3/82

FROM:

J. J. Adrian

2137572-2944

SOUTHERN CALIFORNIA EDISON COMPANY
ROSEMEAD, CALIFORNIA

TELECOPY NUMBER: 213/572-2819

3M - AUTOMATIC SEND ON 6

TO: Mr. George L. Wessman
General Atomic Company
San Diego, California

TELECOPY NO. 714/455-2711 (AUTO, SEND ON 6)

NUMBER OF PAGES, INCLUDING COVER PAGE:

9

Sent 2/1/82

0048

PROJECT PROCEDURE
FOR
REVIEW AND APPROVAL OF SPECIFICATIONS AND DRAWINGS
FOR
COMBUSTION ENGINEERING, INC.
SUPPLIED COMPONENTS

SPECIFICATION No. 1370-PM-0002 REV.00

Southern California Edison Company
San Onofre Units 2 and 3

COMBUSTION ENGINEERING, INC.
Combustion Division
Windsor, Connecticut

Prepared by W. J. [Signature]

Date 7-18-77

Reviewed by [Signature]

Date 7-18-77

Approved by [Signature]

Date 7-19-77


Issue Date 7-19-77

Page 1 of 6

SØ 23-900-A-142-0

3

RECORD OF REVISIONS

REVISION	PAGES INVOLVED	PREPARED	PROJECT MANAGER
<p>IMPORTANT If the price or schedule is affected by this document approval, Bechtel must be notified prior to fabrication or such claims are waived. Approval of documents involving calculation, analysis or test report is only an acceptance of the method used by the supplier. Supplier retains full responsibility for design. Approval of this document does not relieve the supplier from full responsibility for contract or purchase order requirements including, but not limited to, adequacy and suitability of materials and/or equipment represented thereon for the intended function.</p>			
DATE RECEIVED 7-22-77		BOC STATUS BY	
DOCUMENT STATUS 1 <input type="checkbox"/> APPROVED - MANUFACTURER MAY PROCEED 3 <input type="checkbox"/> APPROVED EXCEPT AS NOTED. MAKE CHANGES AND RESUBMIT. MANUFACTURER MAY PROCEED AS APPROVED. 4 <input type="checkbox"/> NOT APPROVED - CORRECT AND RESUBMIT 7 <input type="checkbox"/> INFORMATION ONLY <input type="checkbox"/> DISTRIBUTION REQUIRED		DATE  PF-1218 (10079) 12/75	

INDEX

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	SCOPE	4
2.0	GENERAL	4
3.0	TRANSMITTALS	4
4.0	COMMENTS	4
5.0	REVISIONS	6.

1.0 SCOPE

This procedure outlines the steps to be followed for the transmittal of interface drawings and specifications to the customer and A/E on the San Onofre project. Also covered are the procedures to be followed in resolving comments on these documents.

2.0 GENERAL

Combustion Engineering will use general engineering specifications as the basic specification for equipment. These general engineering specifications will be an attachment to a project engineering specification which will include project information and data sheets delineating specific requirements for San Onofre Units 2 and 3. Where no unique requirements exist for a particular component, a project specification will not be required.

3.0 TRANSMITTALS

Engineering specifications and drawings will be forwarded to Bechtel and SCE with a C-E document transmittal form (Exhibit A). *used?*

The initial transmittal of a design document will normally be for "comment" and will allow six weeks for return of comments. Subsequent transmittals will be for "approval" and will allow four weeks for response. Information which does not require comment or approval by Bechtel and SCE will be marked "other" and a note made under "Remarks" indicating the reason for the transmittal.

4.0 COMMENTS BY CUSTOMER OR A/E

C-E will take appropriate action as indicated by the document status.

Comments on specifications and drawings by SCE and Bechtel will be forwarded to C-E with a Bechtel Supplier Document Transmittal form (Exhibit B). This form will indicate the status of the document. The definition of the status is as follows:

Status 1 APPROVED - MANUFACTURER MAY PROCEED.

Indicates that information delineated on the document is acceptable.

The document is approved without comment.

Status 3 APPROVED EXCEPT AS NOTED. MAKE CHANGES AND RESUBMIT.

MANUFACTURER MAY PROCEED AS APPROVED.

Indicates that information delineated on the document is in basic accord with the specification, purchase order or subcontract.
Deviations have been noted.

Documents which have hold areas, or which do not meet microfilm standards, should receive this status accompanied by a note requesting a resubmittal of the complete and corrected document. All comments must appear on the document or on a sheet attached to the document.

Status 4 NOT APPROVED - CORRECT AND RESUBMIT.

Indicates that information delineated on the document is not acceptable to the project.

Status 7 INFORMATION ONLY

This data is design information which does not require approval and is not required for construction or plant operation (e.g., preliminary design information, examples of designs which a supplier has used for other projects, etc.).

Status 7 INFORMATION ONLY DISTRIBUTION REQUIRED

This information does not require approval but is required for construction, plant operation or permanent record (e.g., instruction manuals (maintenance, erection, operating, etc.) spare parts list, calibration manuals, list of required tools, etc.).

Documents which have been assigned Status 1 or 7 require no further action by C-E. Documents assigned Status 3 or 4 will be forwarded along with the comments to the cognizant application engineer for resolution.

The cognizant application engineer will evaluate the comments and a reply in writing will be prepared addressing each comment. SCE will be advised of those comments which impact cost or schedule and which are required by Bechtel. If a document revision is necessary as a result of comments which C-E agrees to incorporate, the application engineer will initiate the revision.

5.0 REVISIONS

Revised specifications and drawings will be forwarded to Bechtel and SCE for approval of the change. The transmittal will be as indicated in Section 3.0 above for the original documents.

C-E will attempt to incorporate comments in C-E documents within 30 days and for subvendor documents within 60 days.

ENGINE COMBUSTION DIVISION

Date:
Subject:
Your Ref:
Our Ref:
Our File:

[illegible]

Remarks:

Yours very truly,

COMBUSTION ENGINEERING, INC.

900-A-142-0

BAN OHAFHE NUCLEAR GENERATING STATION UNITS 2 & 3
SUPPLIER DOCUMENT
TRANSMITTAL

TO

STATUS

- 1 APPROVED - MANUFACTURER MAY PROCEED
- 3 APPROVED EXCEPT AS NOTED - MAKE CHANGES AND SUBMIT FINAL DRAWINGS. MANUFACTURER MAY PROCEED AS APPROVED
- 4 NOT APPROVED - CORRECT & RESUBMIT
- 7 INFORMATION ONLY ☐ DISTRIBUTION REQUIRED

DATE _____ PACKAGE NO. _____

REQUIRED ACTION BY SUPPLIER

- a. Resubmit by (Date) _____
- b. SHOW LOG NUMBER on reproducible and transmittal.

IMPORTANT:

If the price or schedule is affected by this document approval, Bechtel must be notified prior to fabrication or such claims are waived.

Approval of documents involving calculation, analysis or test procedures is only an acceptance of the method used by the supplier. Supplier retains full responsibility for design.

Approval of this document does not relieve the supplier from full responsibility for contract or purchase order requirements including, but not limited to, adequacy and suitability of materials and/or equipment represented thereon for the intended function.

Enclosed is (1) One copy of the following Documents:

	UNIT	BECHTEL LOG NO	SUB NO.	SUPPLIER NO.	SH	REV	TITLE	DATE
	8	11	20 SUB 72 SED	75	27	46	51	
1								
2								
3								
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19								

COMMENTS:

SIGNED _____ DATE _____
ENGINEERING GROUP SUPERVISOR

99-1000(10010) 01/78

SUPPLIER COPY

Exhibit 10-C. SUPPLIER DOCUMENT TRANSMITTAL - SUPPLIER COPY

10-17

900-A-142-0

8

GE COMBUSTION DIVISION

March 26, 1971

S-CE-411✓

Southern California Edison Co.
San Onofre Units 2 and 3
SCE Order No. N1800001
Bechtel Job No. 1304-606
CE Contract 1370 and 1470

Mr. O. J. Ortega
Project Manager
Southern California Edison Company
P. O. Box 351
Los Angeles, California 90053

Attention: Mr. K. P. Baskin

Subject: Procedure for Approval of Specifications and Vendor Drawings.

References: (A) CE letter S-CE-127 dated August 18, 1970. *see file*
(B) SCE letter File Nos. SO23-N1.04, SO23-A.6.02 *N/A*

Enclosure: (1) CE Procedure for Approval of Specifications and Vendor Drawings. *attached*
(2) CE Transmittal Form 0090060 (2/71). *attached*

Gentlemen:

Attached is a revision to the CE Procedure for Approval of Specifications and Vendor Drawings originally transmitted with reference (A). This revision incorporates certain of the SCE comments forwarded by reference (B). Those comments which have not been incorporated or have been modified are as follows:

- A.2. The following statement has been added at the end of the Review Section:
"All deviations from the specification which affect areas of interface between Bechtel, SCE and CE shall be approved by SCE in a similar manner." This statement modifies the SCE comment so that only areas of interface are subject to SCE approval. Specification changes which do not affect interfaces will be reviewed and approved by CE as part of its responsibility for the design of CE supplied equipment. These changes will be documented in specification revisions which are forwarded to SCE for information.
- A.3. New comment category 3.d is considered to be included in the present 3.e category. Category 3.e has been incorporated and relabeled 3.d.

Southern California Edison

5-CT-411

26,51.5

A.5 The comment that "Procurement will proceed upon specific approval from SCE" does not appear to be consistent with changes in the "Mandatory" category. It is assumed that the costs associated with mandatory changes may be negotiated, however, if the change is to be dropped if the cost is excessive, the comment belongs in category B, desirable provided cost to SCE is acceptable. This will proceed with changes in the mandatory category as noted.

A.7 Comments for a new category 3d have been added consistent with note A.5 above. It should be noted that CE will drop further consideration of comments in this category if costs are involved. If CE desires further consideration of these comments and costs are involved, they should be placed in category B, desirable at no cost to CE.

B.1 Prints and reproductions of contract plans will be sent under the same cover as the transmittal letter whenever possible.

B.3 A turn around time of one month is being requested. It is not expected to be unrealistic and is a desirable goal. It is recommended that this may not be possible in all cases and that some standard may have to be incorporated after the manufacturing process has been initiated. It should be recognized that turn around times generally result in lower costs and less likelihood of schedule delays.

B.4 See comment A.3 above.

B.6 See comment A.5 above.

B.7 See comment A.7 above.

Specifications and drawings will normally be forwarded with a transmittal form as shown in enclosure (2). This form will be marked in the appropriate boxes if approval or comments are required. Those revised specifications or drawings which are transmitted for information do not require action.

It should be noted that we do not intend to transmit specifications and drawings for Bar Joists (Type 3) which are identical to Unit 2. Separate specifications and drawings will be transmitted for Unit 3 where differences exist or when it becomes necessary to incorporate "as built" dimensions on drawings.

If you have further questions on this above procedure, please do not hesitate to contact us.

Respectfully,
R. P. Dragolovich (Assistant-Vice-President)

R. C. Lacy (E&M Plans Eng. Co.)

D. W. Maddams (C&O-Orange, Calif.)

CONTROL
07501/94

Roll No. 76-0274
FRAME NO. —
Julien Date 76292
10-29-76

0048

Southern California Bell Co.

Page 1 of 6
Attach. 600-111

Procedure for Approval of Specifications and Vendor Approval

26.51.5

1. SPECIFICATIONS

1. MEET - Comparison engineering will use general engineering specifications as the basic specification for equipment. These general engineering specifications will be an attachment to a project engineering specification which will also include project information and data sheets which delineate specific requirements for the equipment.

2. REVIEW - The project engineering specifications and attachments will be submitted to Bechtel and the information will be submitted to the review will be completed within the request to bid and to the suppliers by construction engineering. Five copies of each specification will be furnished to Bechtel for comments and one copy to the project and the information.

A review time of one calendar month will be allowed for both the Bechtel and Bechtel is requested to coordinate the review and the review time of the following replies at the completion of their review.

- a. Approved - Project may proceed.
- b. Approved except as noted - Make changes and submit final specification.
- c. Not approved - Correct and resubmit prior to procurement.
- d. Review not required - Project may proceed.

One calendar month prior to taking further action on the review Bechtel will be notified that unless comments are received within one month the review will proceed on the basis of the specification as issued. All deviations from the specification which affect areas of interest between Bechtel, SCM and CM shall be approved by SCM in a written manner.

3. COMMENTS - Comments transmitted by Bechtel shall be categorized as noted below.

- a. Unacceptable - Also costs and submit to SCM.
- b. Acceptable - Provided cost by SCM is acceptable.
- c. Unacceptable - No cost to SCM.
- d. Unacceptable - No cost to SCM.

It is noted that comments in categories (b) or (d) will require the review to place purchase orders in order that the costs can be determined and approved. Bechtel's in categories could result in a review. CM will advise SCM if any delays in deliveries are expected to occur.

4. APPROVAL - The project engineering and vendor approval will be handled as follows:

- a. Comments in category (b) and (d).
- 1. Costs will be obtained from the vendor and submitted to SCM and the results will be compared. At the request of SCM above costs may be applied to the project as applicable.

RECEIVED

JUN 4 1971

ENCL. 1115

Southern California Edison Co.

Page 2 of 2
Attach. 3-CF-111

26.51.5

3. Comments in Category (3.b.)

1. As in a.1. this is a time consuming process so the following informal steps will be taken to expedite agreement:
 - a) A preliminary cost will be obtained from the vendor by Commission Engineering.
 - b) A letter will be sent to SCE with an engineering cost estimate and a request for approval by them.
 - c) SCE will inform us as quickly as possible of their decision. This should be within two weeks if at all possible.
2. Once agreement is reached, the comments will be incorporated and the specification changed, etc., as noted in a.2. above. If no costs will be submitted formally to SCE or applied to "interim" as noted in a.1. above.

c. Comments of Category (3.c.)

1. CE will evaluate the comments to determine technical feasibility and costs.
2. If CE agrees the comments are required and that no cost would accrue to SCE, the change will be accomplished as noted in a.2.
3. If it is the opinion of CE that the change is not required or that the costs are not within the contract, a justification will be forwarded to SCE outlining CE's position and asking SCE to reconsider the change to either a. or b. If, in turn, SCE disagrees with CE's interpretation, the work shall proceed as requested while the final interpretation of the question is resolved in good faith which will be as early as practically and prior to when acceptance monies are due CE under the terms of the contract.
4. Comments of Category (3.d.)
 1. CE will evaluate the comments to determine technical feasibility and costs.
 2. If CE agrees the comments are required and that no cost should accrue to SCE, the change will be accomplished as noted a.2.
 3. If it is the opinion of CE that the change is not desirable or that the change will result in additional costs, a justification will be forwarded to SCE outlining CE's position and the comment will be dropped.

5. REVISION SPECIFICATION - Revised specifications incorporating comments will be forwarded to all end users. Five copies for District A and one copy to San Diego District B.

Southern California Edison Co.

Page 3 of 4
Attach. 8-C-411

26.51.3

B. VENDOR PLANS - Vendor outline plans also require speedy approval if delivery delays are to be avoided. A procedure for final review is noted below:

1. TRANSMITTAL - Vendor plans of equipment outline, foundation details and other interface areas will be forwarded to Bechtel and SCE as soon as received. Two reproducible copies of plans plus two prints will be forwarded to Bechtel while one print will be forwarded to EDOUZ for information.

2. REVIEW - Review by SCE, Bechtel and Construction will be done concurrently. Bechtel is requested to coordinate Bechtel and SCE comments within one calendar month. One Bechtel reproducible will be returned to CE with comments noted and mailed with one of the following:

- Approved - Manufacturer may proceed.
- Approved - Submit final drawings - Manufacturer may proceed.
- Approved except as noted - Make changes and submit final drawings. Manufacturer may proceed.
- Not Approved - Correct and resubmit.
- Review not required - Manufacturer may proceed.

The area of comments should be circled, or otherwise clearly noted on the returned reproducible.

As noted previously, approval will be assumed if no comments are received within the review period. Bechtel and SCE will be notified as indicated previously prior to CE releasing the vendor to proceed.

3. COMMENTS - Comments should be categorized as noted in 1.

- Mandatory; develop costs and submit to CE.
- Desirable at acceptable costs to SCE.
- Mandatory at no cost to SCE.
- Desirable; at no cost to SCE.

4. EVALUATION - Evaluation will proceed as follows:

- Comments in category 1, 2, 3, 4:
 - Costs will be obtained from the vendor and submitted to EDOUZ via the regular sales channels. At the request of SCE these costs may be applied to "hit-picking" as applicable.
 - Comments will be incorporated in plans revised or specifications changed as required to initiate the change.

5. Vendor will be obligated to proceed with material ordering and fabrication provided CE's and comments do not preclude it.

6. Comments in Category (3.b.)

1. As in 3.b. above. This is a time consuming process so the following informal steps will be taken to expedite agreement.

(a) A preliminary cost will be obtained from the vendor by Construction Engineering.

26.51.3

Southern California Edison Company

Page 3 of 1
Attach. 8-CB-111

(b) A letter will be sent to SCE with an engineering cost estimate and a request for approval.

(c) SCE will inform CS as early as possible of their decision. This should be within two weeks if at all possible.

(d) Patent is ordering and fabrication will be paid for until the comments are received.

2. Once agreement is reached, the comments will be incorporated and the specification changed, etc., as noted in a.2 above. The vendor will be "RELEASED" to proceed, but will be restricted formally to SCE or applied to "sit-picking" as noted in a.1. above.

c. Comments of Category (3-c.)

1. CE will evaluate the comments to determine technical feasibility and costs.

2. If CE agrees the comments are required and that no cost should accrue to SCE, the change will be accomplished as noted in a.2. The vendor will be "RELEASED" to proceed.

3. If it is the opinion of CE that the change is not required or that the costs are not within the contract, a justification will be forwarded to SCE outlining CE's position and asking SCE to reconsider the change to either a. or b. Material ordering and fabrication will be held up until comments are resolved. If in turn, SCE disagrees with CE's interpretation, the work shall proceed as scheduled while the final interpretation in question is resolved in good faith which will be as early as practicable and prior to when acceptance routes are laid out under the terms of the contract.

d. Comments of Category (3-d.)

1. CE will evaluate the comments to determine technical feasibility and costs.

2. If CE agrees the comments are required and that no cost should accrue to SCE, the change will be accomplished as noted a.2. The vendor will be "RELEASED" to proceed.

3. If it is the opinion of CE that the change is not desirable or that the change will result in additional costs, a justification will be forwarded to SCE outlining CE's position and the comment will be dropped.

5. APPROVED VENDOR LIST

The approved vendor plans will be used for manufacturing.

CONTRACT
07501

FRAME NO. _____
Julien Date: 75502
10-28-76

0048

COMPUTATION DIVISION

COMPUTATION DIVISION CONSULTING ENGINEERING INC.
SECTION CODE 00076
501-446-1871 CASH COUNSEL

25.51.5

The following are furnished		The following are furnished	
1	2	3	4
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9	10	11	12
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89	90	91	92
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97	98	99	100

COMPUTATION ENGINEERING, INC.

RECEIVED
JUN 4 1971
ENGR. F-5

Subject: PURCHASE AND MANUFACTURING
REQUISITIONS AND SUPPLEMENTS

Classification: NPD-MPI-10

Sheet 1 of 15

Date: March 17, 1971

If this is not an original issue,
the superseded procedure is: Original Issue

PURPOSE

To provide a procedure for the preparation, approval and use of:

- (A) Purchase and Manufacturing requisitions for material, equipment and services for Nuclear Steam Supply System (NSSS) contracts.
- (B) Supplements to Purchase and Manufacturing Orders which are considered official communications (that affect the scope, price or schedule and approvals associated therewith).

DEFINITIONS

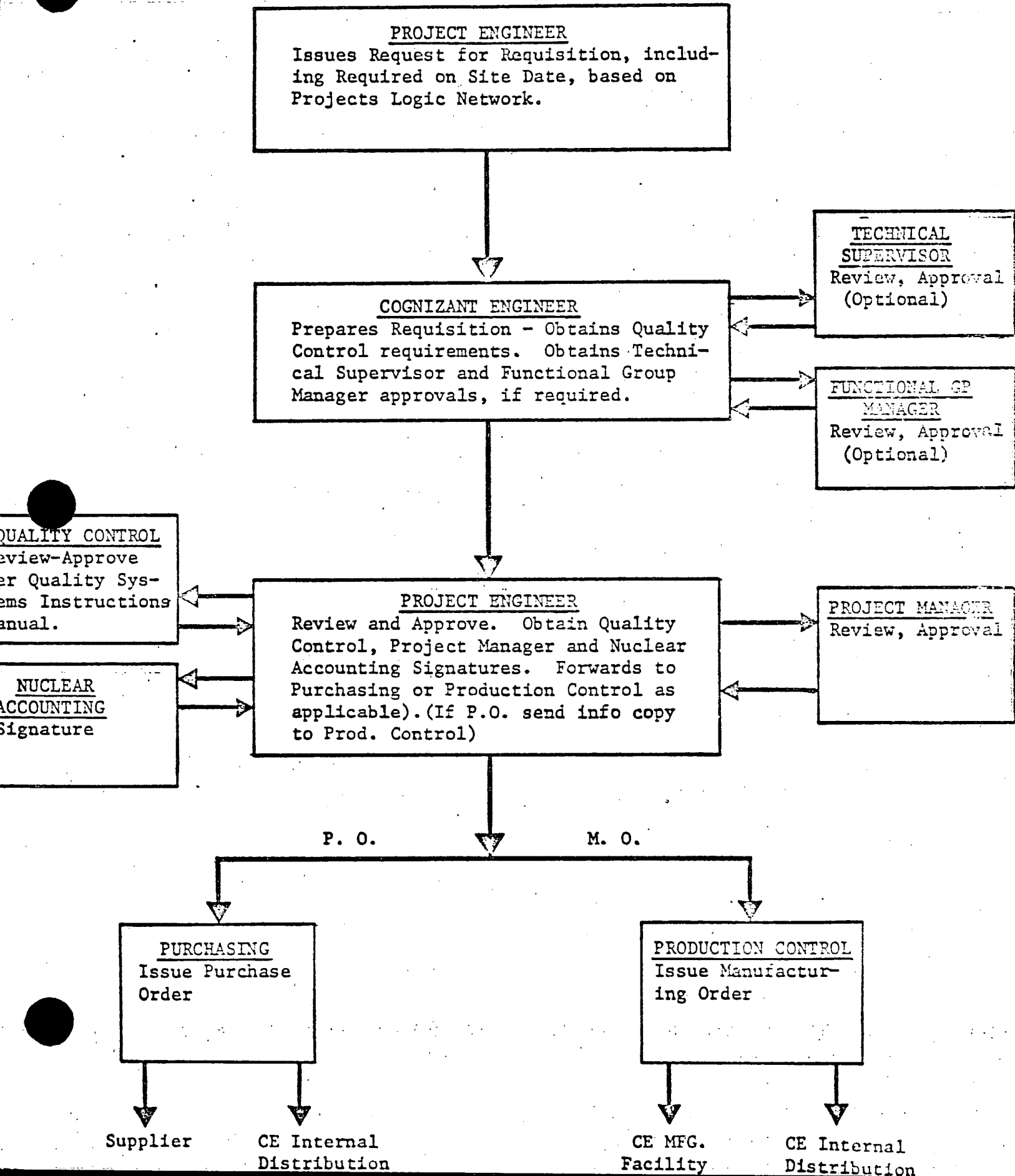
The following definitions pertain to nomenclature as used in this procedure:

- (A) Official Communication - Any communication, with either outside suppliers of hardware or Combustion Division manufacturing facilities, that commits Combustion Engineering on matters of scope, price or schedule and approvals associated therewith.
- (B) Unofficial Communications - Unofficial correspondence is the exchange of information, clarification, or other communication which does not produce commitments for cost, scope, or schedule changes. This correspondence shall contain the disclaimer, "This letter authorizes no change in price or delivery".
- (C) Requisition - C-E form that is used for requisitioning material, equipment, or services from a supplier or from C-E's shops. Purchase Orders (P.O.) are produced from this form by the Purchasing Department and Manufacturing Orders (M.O.) by the Production Control Group.
- (D) Purchase Orders and Supplements - A contract, legally binding on both C-E and a supplier, which is the approved method of official communication with outside suppliers of material, equipment or services that commits C-E on matters of scope, price or schedule and approvals associated therewith.

PURCHASE AND MANUFACTURING REQUISITIONS

PFR-0048
2/3/62
JH

FLOW PATH



TITLE: PROCUREMENT CONTROL	QADP <u>6.0</u>	EFFECTIVE <u>June 6, 1977</u>
	RECOMMENDED APPROVAL	<u>James V. Shuman</u> MANAGER DESIGN QUALITY ASSURANCE AND QUALITY ASSURANCE RECORDS
	APPROVED	<u>Frank A. Miller</u> VICE PRESIDENT ENGINEERING & DEVELOPMENT
	APPROVED PSGOA POLICY	<u>Wm. E. ...</u> VICE PRESIDENT GENERAL SERVICES
REASON FOR REVISION: Delete Provision for TWX		
PREVIOUS ISSUE Original Issue, Dated May 3, 1976		

6.0 PROCUREMENT CONTROL

6.0.1 General Description

NPS uses purchase and manufacturing requisitions to specify the requirements for materials, parts, equipment and services needed to fulfill the requirements of a NSSS. Standard, "off-the-shelf", or previously approved materials, parts, equipment, or services shall be subject to the control measures of this section in the same manner as non-standard or previously unapproved items.

Purchase requisitions are used when the supplier is an organization independent of C-E Power Systems. Manufacturing requisitions are used when the suppliers are within Power Systems of Combustion Engineering, Inc.. The same basic form (Exhibit 6.0-1) is used for both purchase and manufacturing requisitions. Purchase requisitions become purchase orders upon approval by the Purchasing Department. Similarly, manufacturing requisitions become manufacturing orders upon approval by the Production Planning and Control Department.

In this procedure, the term "responsible Project Manager" designates the individual Project Manager, the Start-up Operations Manager, or the

6.0.9 Schedule

The cognizant engineer or other assigned individual ensures that the requisition is approved by all engineering organizations. These approvals are to be completed by a date, mutually agreed to by Project(s) and Engineering, that is consistent with the schedule for shipment of the equipment. The appropriate Project Office will be informed by the cognizant engineer of any unavoidable delays in engineering approval.

After the order has been released by Purchasing or Production Planning and Control, the cognizant engineer is responsible for technical interface with the supplier to ensure that the contract requirements are correctly interpreted. All correspondence between the suppliers and C-E is documented. Documents that are used to control this interface are the Request for Approval and Review (RAR), the Technical Change Request (TCR), and the Deviation of Contract Requirements (DCR). The (RAR), (TCR), and (DCR) are described in QADPs 6.1, 6.2 and 6.3, respectively.

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Internal/External Design Review Considerations.

REQUIREMENT REFERENCE DOCUMENTS:

QA Topical Report CENPD-210A, Rev. 3, para. 17.3.3

BASIC REQUIREMENT: Interface Design Control - "The department/section procedures indicate requirements for review and approval by other engineering groups. The project office submits design documents to the customer, A/E or constructor as required designated for information, review or approval. This review within, outside of the originating section, or outside of NPS considers compatibility of materials, design interfaces, accessibility for in-service inspection, maintenance, repair, and acceptance criteria for tests and inspections.

DESCRIPTION OF POTENTIAL FINDING:

Checklist 5.6-6 in the QADM for reviewing specifications did not include the detail checkpoints in the basic requirement. Further, the check points in the basic requirement did not include the (19) items of ANSI N45.2.11-1974, para. 6.3.1.

PREPARED BY: C. W. Chandler DATE: 1/22/82REJECTION OF GA TASK LEADER COMMENTS BY: DATE: REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: George Chandler DATE: 2/1/82B. REVIEW BY GA TASK LEADER

COMMENTS

CE response + subsequent selections with
CE did not resolve the concern expressed by
G. Chandler.

☒ AGREE PFR IS VALID☐ REQUEST RE-REVIEW☐ DISAGREE☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: J. BrunelDATE 1/24/82DATE DATE DATE: 2/1/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The mandatory quality assurance requirement for review of safety related design documents is the Independent Verification. The first requirement for the Independent Reviewer is in QADP 5.4, Paragraph 2.1, "Verification is accomplished by an individual or a group of individuals judged by previous experience level and technical competence to be capable of performing the verification to the depth and breadth required."

See QADP 5.4, Paragraph 3.2 - "The independent reviewer considers, as a minimum, the applicable items contained in the following checklists." These lists are included in the procedures to facilitate the verification and are not intended to be all inclusive nor to limit the extent of the independent review. Checklist No. 6 can be interpreted to include all of the items enumerated in the PFR.

☐ AGREE PFR IS VALID☒ DISAGREEBY: VC HallDATE: 1/29/82

(Continued)

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☒ VALID☐ INVALID

CLASSIFICATION:

☒ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

There would be less chance for misunderstanding if Check list #6 included all checkpoints for specifications. However item 4 of Check list #6 says "The spec is not in conflict with the design requirements". Also, check list #1, which applies to design inputs, does cover all of the requirements. It therefore appears highly unlikely that the deficiencies of Check list #6 could create a significant safety hazard.

BY: S. L. KautzDATE: 2/2/82

E. GA PROJECT MANAGER

☒ ACCEPT☐ REJECTBY: Ch. WeismanDATE: 2/3/82

Response to 2408-PFR-0049 (Cont.)

Design Input Data are reviewed to Checklist No. 1. Inputs to design specifications are verified at the source. In some cases, the inputs to design specifications are originated in the same group that writes the specification. In those cases, both Checklists Nos. 1 and 6 are identified on the Design Verification stamp. Where the inputs are produced by another group, it can be shown from the objective evidence in that group that Checklist No. 1, which includes the 19 items in ANSI H45.2.11-1974 was applied to the appropriate information in the specification. Additional reviews by consulting organizations and internal and external interfacing organizations are provided for in the design procedures but in most cases these are not mandatory quality assurance steps. Finally, CENPD-210A, Rev. 3, is the reference document that is the basis for this PFR. TPOA was informed by telecon on 1/6/82 that CENPD-210A, Rev. 3, is not applicable to the San Onofre Project.

SPECIFICATION REVIEW CHECKLIST

PFR 0049

2/2/77

ANALYSIS

item

11

1. The specification format and content conforms to the mandatory requirements of this procedure.
2. Codes, standards and regulatory requirements are referenced, or their requirements are included in the specification. # 4
3. The specification reflects experience obtained from previous designs, fabrication, operating experience and maintenance, as applicable. # 5
A standard design is specified, if a suitable standard exists.
4. The specification is not in conflict with the design requirement for the equipment for which the specification is written.
5. Adequate maintenance provisions have been specified, if required. # 11
6. Adequate handling, storage, cleaning and shipping requirements are specified. # 17
7. Adequate identification requirements are specified. # 18
8. Requirements for the preparation and submittal of records, other data, or "as-built" dimensions which must be taken are specified. # 7
9. For specification revisions, changes made or authorized since the previous revision, have been incorporated into the new revision.
10. Is the specification legible and reproducible?

EXHIBIT 5.1-1
CHECKLIST NO. 1
CHECKLIST FOR DESIGN INPUT DATA

PFR 0049

2/2/82

1. Basic functions of each structure, system, and component.
2. Performance requirements, such as capacity, rating, system output.
3. Codes, standards, and regulatory requirements, including the applicable issue and/or addenda.
4. Design conditions, such as pressure, temperature, fluid chemistry, and voltage.
5. Loads, such as seismic, wind, thermal and dynamics.
6. Environmental conditions anticipated during storage, construction, and operation, such as pressure, temperature, humidity, chemical environment, site elevation, wind direction, nuclear radiation, electro-magnetic radiation, and duration of exposure.
7. Interface requirements, including definition of the functional and physical interfaces involving structures, systems, and components.
8. Material requirements, including such items as compatibility, electrical insulation properties, protective coating and corrosion resistance.
9. Mechanical requirements, such as vibration, stress, shock, and reaction forces.
10. Structural requirements covering such items as equipment foundations and pipe supports.
11. Hydraulic requirements, such as pump net positive suction heads (NPSH), allowable pressure drops, and allowable fluid velocities.
12. Chemistry requirements, such as provisions for sampling and limitations on water chemistry.

13. Electrical requirements, such as source of power, voltage, raceway requirements, electrical insulation, motor requirements, and electrical separation requirements.
14. Layout and arrangement requirements.
15. Operational requirements under various conditions, such as plant start-up, normal plant operation, plant shutdown, plant emergency operation, special or infrequent operation, and system abnormal or emergency operation.
16. Instrumentation and control requirements, including indicating instruments, controls, and alarms required for operation, testing and maintenance. Other requirements, such as the type of instrument, number of installed spares, range of measurement, signal level, electrical failure modes, and location of indication should also be included.
17. Access and administrative control requirements for plant security.
18. Redundancy, diversity, and separation requirements of structures, systems, and components.
19. Failure effects requirements of structures, systems, and components, including a definition of those events and accidents which they must be designed to withstand.
20. Test requirements, including in-plant tests and the conditions under which they will be performed.
21. Accessibility, maintenance, repair and inservice inspection requirements for the plant, including the conditions under which these will be performed.
22. Personnel requirements and limitations, including the qualification and number of personnel available for plant operation, maintenance,

2/2/82

testing, and inspection and permissible personnel radiation exposures for specified areas and conditions.

3. Transportability requirements, such as size and shipping weight, limitations, I.C.C. regulations.
24. Fire protection or resistance requirements.
25. Handling, storage and shipping requirements.
26. Other requirements to prevent undue risk to the health and safety of the public.
27. Materials, processes, parts and equipment suitable for application.
28. Safety requirements for preventing personnel injury, including such items as radiation hazards, restricting the use of dangerous materials, escape provisions from enclosures, and grounding of electrical systems.

PFR 0049 ^{DOC} 3/2/82

QADP 5.2 REVISION 3

EFFECTIVE April 2, 1979

PAGE 14 OF 17

EXHIBIT No. 5.2-3

CHECKLIST NO. 2

CHECKLIST FOR REVIEW OF ANALYSIS

1. Is the material presented sufficiently detailed as to purpose, method, assumptions, design input, references, and units?
2. Were the inputs correctly selected and incorporated into the analysis?
3. Have the assumptions necessary to perform the analysis been adequately documented?
4. Are applicable codes, standards, and regulatory requirements, including issue and addenda, employed in the analysis properly identified and were their requirements met?
5. Have interface requirements been satisfied?
6. Have the adjustment factors, uncertainties, and empirical correlations used in the analysis been correctly applied?
7. Was an appropriate method used?
8. Have the versions of the computer codes employed in the design analysis been certified for application? If not, is there sufficient evidence to conclude that the version(s) of the computer code(s) used would produce results substantially the same as the referenced, certified version(s) of the code(s)?
9. Is the purpose sufficiently clear and are the results and conclusions reasonable?

Has an appropriate cover sheet similar to Exhibit 5.2-1 been used?

ENGINEERING AND DEVELOPMENT
QUALITY ASSURANCE OF DESIGN PROCEDURE

500
2/2/82

QADP 5.2 REVISION 3

EFFECTIVE April 2, 1979

PAGE 15 OF 17

EXHIBIT No. 5.2-3 (cont'd)

CHECKLIST NO. 2 (Cont'd)

11. Are all pages sequentially numbered and marked with a valid analysis number?
12. Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?
13. Is the output reasonable when compared to inputs?
14. Is the presentation legible and reproducible?
15. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?

ENGINEERING AND DEVELOPMENT
QUALITY ASSURANCE OF DESIGN PROCEDURE

PFR 0049

QADP 5.5 REVISION 2
EFFECTIVE April 1, 1981
PAGE 13 OF 16
EXHIBIT No. 5.5-4

CHECKLIST NO. 5
DRAWING REVIEW CHECKLIST

1. Codes, standards, and regulatory requirements have been addressed in the drawing where necessary and that design requirements have been met.
2. The item(s) shown on the drawing reflects experience obtained from previous designs, fabrication, operating experience, and maintenance as applicable.
A standard design is presented, if a suitable standard exists.
3. The item(s) shown on the drawing is not in conflict with its Design Requirements and is compatible with the major component or system of which it is a part.
4. The drawing has been reviewed by the Development Department for materials adequacy, if required.
5. Accessibility and other design provisions are adequate to permit future maintenance, repair, and inspection.
5. For the design shown on the drawing, the need to minimize radiation exposure to the public and plant personnel during service, maintenance or storage has been considered.
7. Adequate identification requirements are specified.
8. The requirements for recording "as-built" dimensions are identified.
9. All approved TCRs to date have been considered.
10. Sufficient dimensioning and tolerance requirements have been specified to permit fabrication and inspection.
11. The item(s) shown on the drawing has been checked for interface agreement with other departments and with mating components shown on complementary drawings.

IMPACT ASSESSMENT

2408 PFR NO. -0049

AFFECTED ITEM: Internal/External Design Review Considerations

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

N/A

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

N/A

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

N/A

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?
Yes, the designs may not have received an adequate design review.

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

OTHER COMMENTS:

This PFR is of a "procedural" nature that is, the basic requirement was not addressed in a CE written procedure. CE may in fact actually have done an adequate design review.

PREPARED BY: George Chandle

DATE: 2/1/82

COMMENTS:

BY: J. Bremer

DATE: 2/1/82

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Design Control of Spares

REQUIREMENT REFERENCE DOCUMENTS:

Combustion Engineering Topical, CENPD-210A
Section 17.4

BASIC REQUIREMENT:

"Standard commercial or previously approved materials, parts and equipment including spare or replacement parts essential to the safety related function of structures, systems, and components, are subjected to the same selection and review controls as the original safety-related items."

DESCRIPTION OF POTENTIAL FINDING:

The CE design manual, QADM, did not address spares/replacement procurement control for safety related components. The spares/replacement controls is under another set of manuals and procedures at CE.

However, spares/replacement procurement is outside the scope of this project - therefore this PFR is "invalid".

PREPARED BY: [Signature] DATE: 2/2/92

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY

[Signature]

DATE

2/1/92

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The statement that the QADM did not address spares/replacement parts procurement control is correct. The applicability of the QADM is to safety related design activities performed by the Engineering and Development Departments (in Nuclear Power Systems). Procurement of spares/replacement parts is the responsibility of Power Systems Services which is a different Division in the Power Systems Group. Procurement of spares/replacement parts is controlled by quality assurance procedures that have not been transmitted on this project since they are not part of the seismic design control procedures.

☐ AGREE PF IS VALID

☐ DISAGREE

 BY: V C Hall

 DATE: 1/29/82
D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☒ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING
JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

~~COMMENT ON "OBSERVATION" CLASSIFICATION~~

affected items are "Design control of spares" However the description of the P.F addresses proc. control not design control of spares. Please provide evidence that the seismic design requirements for spares are transmitted to the constructor or the fabricator.

 BY: S. L. Koutz

 DATE: 2/2/82
E. GA PROJECT MANAGER
☐ ACCEPT

☐ REJECT

Processing of this PFR is suspended. It is out of the scope of the program.

 BY: AW isman

 DATE: 2/4/82

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2403-PFR-0053

REVISION A

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: The Seismic Category I Switch Gear

REQUIREMENT REFERENCE DOCUMENTS: Bechtel Power Corporation Spec. No. 302-2 and 10 Addendum "Quality Class II Spec for 4160v Switchgear for San Onofre Nuclear Generating Station Units 2 and 3."

BASIC REQUIREMENT: The specification should state correctly the location and elevation of the 4160 volt switchgear, so that proper seismic design and tests can be undertaken by the supplier.

DESCRIPTION OF POTENTIAL FINDING: (a) Section 4.3.3.01 shows the switchgear elevation as 30'. (b) The electrical "one line dwgs" in Sect. 4.3.4 which should show switchgear location, are illegible. (c) The seismic response spectra in Appendix B (criteria for Seismic Qualification of Class 1 Equipment) are for 50' elevation.

Up to date drawings of the control building confirm that the switchgear is located at 50' (Bechtel ^{Drawing on} Design 35543-5).

The specification is inconsistent with regard to the elevation of the switchgear i.e. 30 ft vs 50 ft.

PREPARED BY: A. Middleton *A. Middleton* DATE: 1-29-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: *A. Middleton* DATE: 2/1/82

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

Boyer

DATE

1/30/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☒ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY:

Boyer

DATE:

2/1/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE☐ INADEQUATE

VALIDITY:

☒ VALID☐ INVALID

CLASSIFICATION:

☒ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Incorrect elevation used in spec but correct elevation was used in equipment qualification.

BY: S. L. KoutyDATE: 2/1/82E. GA PROJECT MANAGER☒ ACCEPT☐ REJECTBY: G. WeissmanDATE: 2/4/82

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Specification Section 4.33.01 indicates 30 feet elevation which is incorrect. However, Section 4.04.01 identifies Exhibit A (one line diagrams) which identifies correct location of equipment (50 feet).

The equipment was qualified to the seismic requirements of the actual location of the switchgear which is elevation 50 feet in accordance with Appendix 4B.

☐ AGREE PF IS VALID

☒ DISAGREE

BY: JEM
[Signature]

DATE: 11-26-82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY:

DATE:

IMPACT ASSESSMENT

2408 *an*
2348-0053

PFR NO. _____

AFFECTED ITEM: 4160 Switchgear (for LPSI Pump No. P016)

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET? No, the only seismic response spectra given with the spec. are for the 50' elevation. So the probability of seismic tests being run with incorrect seismic requirements is remote.
 2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE? No
 3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD? Yes, although with three HPSI pumps and two LPSI pumps all in parallel, and with two separate power supplies, failure of power to one LPSI pump is not likely to cause a substantial safety hazard.
 4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD? No
 5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST? There are several other "editorial" type errors in the seismic test Req. part of the spec. However they should not cause problems for experienced seismic test lab.
- OTHER COMMENTS: Bechtel states that Section 4.04.01 (one line dwgs) show that the switch gear is located at the 50' level. In the copy of the spec. Bechtel sent to GA for review, all one line dwgs. are completely illegible.

ft. an

PREPARED BY: *Alan Meddel* DATE: *1/30/82*

COMMENTS:

Agree with impact assessment. BPC Spec No. 302-2 should be corrected, i.e., Elev. of switch gear should be 50 ft instead of 30 ft.

BY: *FSO/MS* DATE: *1/30/82*

From: ALAN MIDDLETON

Date: 1/30/82

To: SCE SEISMIC REVIEW COMMITTEE

TELEPHONE COMMUNICATION RECORD

(Please hand letter legibly in black or red ink)

Call Initiated by: ALAN MIDDLETON at GA ☒ Other

Call Received by: ERWIN HATZLER at GA Other

BECHTEL (WHITTIER)

Other Participants: 0

Date 1/30/82 Time 13.30 hrs Program Name/No. SCE SEISMIC REVIEW/2408 Task or 189 No. 2408-400

Subject: SONGS UNIT 2 & 3 SEISMIC REVIEW - PFR 2408-0053 4160 VOLT SWGR

Summary

PER 0053 ON THE 4160 VOLT SWITCHGEAR SPEC (302-2 & 10 ADDENDUM) IDENTIFIED AN ERROR IN THE SECTION 4.33.01 BY SHOWING THE EQUIPMENT ELEVATION IN THE AUXILIARY BLDG OF 30 FT.

EQUIPMENT IS ACTUALLY LOCATED AT THE 50 FT ELEVATION. BECHTEL'S RESPONSE (1-26-82) AGREED THERE WAS AN ERROR BUT POINTED OUT THAT ^{SINCE THE SEISMIC} EQUIPMENT TESTING USED CORRECT ^{DISAGREES WITH THE} RESPONSE SPECTRA FOR 50' ELEVATION. ^{THEY A} PFR.

IT WAS POINTED OUT DURING CONSERVATION THAT IT WAS UP TO TPT REVIEW COMMITTEE TO JUDGE THE IMPACT OF ~~AN~~ A VALID ERROR.

UNDER THESE GROUND RULES HATZLER AGREED THAT THE PFR WAS VALID. HOWEVER, HE AGAIN EMPHASIZED THAT THE ERROR HAD NOT AFFECTED CORRECT SEISMIC QUALIFICATION OF THE SWITCHGEAR.

Action Items:	Date Req'd	Responsible

Info cc: _____ File No. _____

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION _____

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection System
Piping Stress Analysis Package PSG-117

REQUIREMENT REFERENCE DOCUMENTS:

BASIC REQUIREMENT: Consistency between Isometric Sketch and Computer Model.

DESCRIPTION OF POTENTIAL FINDING: Nodes 340, 345 and 350 of the Computer Model do not correlate with the corresponding node numbers on the Isometric Sketch. In the Input Data Scan for problem number P03484, node 340 is an intermediate point 4.17' from node 335 in the -X direction. On Isometric Sketch Dwg. No. 1204-037-1E, node 340 describes an elbow 5.67' from node 335 in the -X direction. In the Computer Model, node 345 is an elbow at the same elevation as node 335, while on the Iso node 345 is an elbow at a 5.17' higher elevation. See attached sketch with a comparison of the two models. There are several small deviations in the dimensioning.

PREPARED BY: Peter L. Koefoed DATE: 22 Jan. 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

- ☒ AGREE PF IS VALID
☐ REQUEST RE-REVIEW

BY 1/25/82DATE 1/25/82

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Node point identification is useful in preparation of the Pipe Support Description List. The node points in the Pipe Support Description List are consistent with the computer model which reflects the piping configuration as shown on the isometric. Readjustment of node points within the computer model are not required to be transferred back to the isometric as long as the configurations in model and isometric agree.

Minor dimensioning differences between model and isometric sketch have no impact on the validity of the analysis.

☒ AGREE PF IS VALID

we
☒ DISAGREE *JEM*

BY: *Port B. Maul*

DATE: *1-26-82*

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☒ VALID

☐ INVALID

~~10 CFR 21:~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

~~10 CFR 50.55(e):~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

CLASSIFICATION:

☒ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Modeling errors but design OK

BY: *S. L. Koutz*

DATE: *1/30/82*

E. TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

Al W.

2/14/82

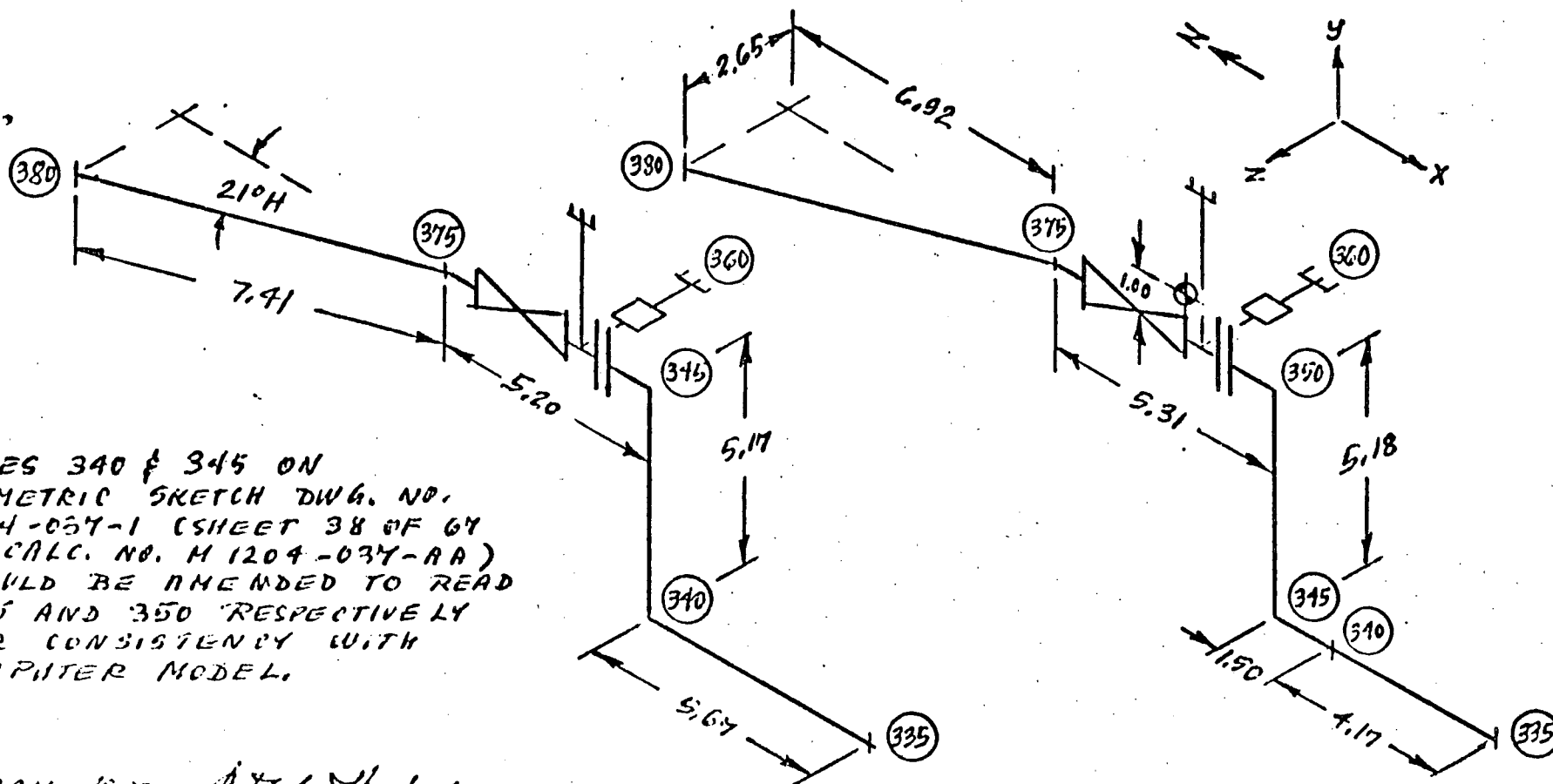
ATTACHMENT

2408 PFR-0056

PIPING MODEL COMPARISON. SCALE: 1/4" = 1 FT

AS PER ISOMETRIC SKETCH
DWG. NO. 1204-037-1E
AND AREA DWGS 40424-11
40426-9
40429-9

AS PER COMPUTER INPUT DATA SCAN
PROBLEM NUMBER P03484,
DTD. 06-26-79



NODES 340 & 345 ON
ISOMETRIC SKETCH DWG. NO.
1204-037-1 (SHEET 38 OF 64
IN CALC. NO. M1204-037-AA)
SHOULD BE AMENDED TO READ
345 AND 350 RESPECTIVELY
FOR CONSISTENCY WITH
COMPUTER MODEL.

22 JAN, 1982 *Det. h. Wm. J. Paul*

PFR 0056

IMPACT ASSESSMENT

2408-PFR-0056
PFR NO. _____

AFFECTED ITEM: Piping Stress Analysis Package -- PSG-117

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?
computer model closely reflects the actual pipe. No, the
2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?
because of this finding. No, not
3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?
safety injection should be required. ~~No~~ Yes, if
4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD? No
5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

Yes. Similar deviations occur in most of the piping packages reviewed.

6. OTHER COMMENTS:

This is a case of incorrect modelling from the isometric sketch to the computer model. The computer model is satisfactory for the analysis. Even so, the isometrics should be updated to reflect what is analyzed and the as built configuration.

PREPARED BY: N. I. Marsh *Nicole Marsh* DATE: 1/28/82

Robert H. Trufant
30 Jan., 1982

COMMENTS:

Agree with impact assessment.

BY: *FSiple R* DATE: 1/30/82

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Containment Structure Seismic Analysis

REQUIREMENT REFERENCE DOCUMENTS:

Not Applicable

BASIC REQUIREMENT:

~~Not Applicable~~ *td*

The stiffness of the rocking soil spring should be consistent with the spring rate values of all the vertical springs under the basemat.

DESCRIPTION OF POTENTIAL FINDING:

This PFR documents a deviation noted in the computer input data to SMIS code. Detailed descriptions are given in the attached sheet.

PREPARED BY: T. H. Lee *TH Lee* DATE: 1-22-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

floulet

DATE

1/27/82☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

2. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The finding of a deviation in the numerical value of rocking stiffness for OBE is valid; however, it is limited to a drafting/typographical error existent only in the tabulation sheet 1, Figure A-4.

The correct calculated value of 1.589×10^9 k-ft/rad is given in the calculation sheet 9-A and in the actual computer input sheet (copies of sheets are attached). The given value as used in the dynamic analyses is consistent with the value of 1.542×10^9 k-ft/rad submitted by the GAC Reviewer.

☒ AGREE PF IS VALID

☐ DISAGREE

o.g. by SDF

BY: *BM*

DATE: *2-1-82*

1. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☒ ADEQUATE

☐ INADEQUATE

VALIDITY:

☒ VALID

☐ INVALID

~~10-CFR 21:~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

~~10-CFR 50.55(e):~~

~~☐ NOT APPLICABLE~~

~~☐ APPLICABLE~~

CLASSIFICATION:

☒ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Documentation error but correct value used in calculation

BY: *S. A. Kouty*

DATE: *2/3/82*

TPT PROJECT MANAGER

☒ ACCEPT

☐ REJECT

BY: *SW*

DATE: *2/3/82*

DESCRIPTION OF POTENTIAL FINDING

This deviation concerns the values of soil springs listed in the following document:

"EMIS Finite Element Model For Time-History Analysis of Containment With NSSS Equipment," Sheet 1, Figure A-4.

Description of deviation

The reviewer has computed the spring rate of the rocking soil spring via alternative method as an independent check. These spring rate values are given below in comparison with the values presented in the above document.

SPRING PROPERTIES (for rocking soil spring)

Element	DBE		OBE	
	Bechtel	Reviewer	Bechtel	Reviewer
1-H	1.104×10^9	1.100×10^9	1.383×10^9	1.542×10^9

The DBE values are apparently in excellent agreement but the reviewer's value for OBE deviates from that given by Bechtel. The stiffness of these rocking springs must satisfy the requirement that they are consistent with the stiffness of all the vertical springs under the basemat. The Bechtel's value of rocking soil spring, which is 1.383×10^9 , does not satisfy this requirement while the reviewer's value, which is 1.542×10^9 , satisfies this requirement.

1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45	2045-46	2046-47	2047-48	2048-49	2049-50	2050-51	2051-52	2052-53	2053-54	2054-55	2055-56	2056-57	2057-58	2058-59	2059-60	2060-61	2061-62	2062-63	2063-64	2064-65	2065-66	2066-67	2067-68	2068-69	2069-70	2070-71	2071-72	2072-73	2073-74	2074-75	2075-76	2076-77	2077-78	2078-79	2079-80	2080-81	2081-82	2082-83	2083-84	2084-85	2085-86	2086-87	2087-88	2088-89	2089-90	2090-91	2091-92	2092-93	2093-94	2094-95	2095-96	2096-97	2097-98	2098-99	2099-00	2100-01	2101-02	2102-03	2103-04	2104-05	2105-06	2106-07	2107-08	2108-09	2109-10	2110-11	2111-12	2112-13	2113-14	2114-15	2115-16	2116-17	2117-18	2118-19	2119-20	2120-21	2121-22	2122-23	2123-24	2124-25	2125-26	2126-27	2127-28	2128-29	2129-30	2130-31	2131-32	2132-33	2133-34	2134-35	2135-36	2136-37	2137-38	2138-39	2139-40	2140-41	2141-42	2142-43	2143-44	2144-45	2145-46	2146-47	2147-48	2148-49	2149-50	2150-51	2151-52	2152-53	2153-54	2154-55	2155-56	2156-57	2157-58	2158-59	2159-60	2160-61	2161-62	2162-63	2163-64	2164-65	2165-66	2166-67	2167-68	2168-69	2169-70	2170-71	2171-72	2172-73	2173-74	2174-75	2175-76	2176-77	2177-78	2178-79	2179-80	2180-81	2181-82	2182-83	2183-84	2184-85	2185-86	2186-87	2187-88	2188-89	2189-90	2190-91	2191-92	2192-93	2193-94	2194-95	2195-96	2196-97	2197-98	2198-99	2199-00	2200-01	2201-02	2202-03	2203-04	2204-05	2205-06	2206-07	2207-08	2208-09	2209-10	2210-11	2211-12	2212-13	2213-14	2214-15	2215-16	2216-17	2217-18	2218-19	2219-20	2220-21	2221-22	2222-23	2223-24	2224-25	2225-26	2226-27	2227-28	2228-29	2229-30	2230-31	2231-32	2232-33	2233-34	2234-35	2235-36	2236-37	2237-38	2238-39	2239-40	2240-41	2241-42	2242-43	2243-44	2244-45	2245-46	2246-47	2247-48	2248-49	2249-50	2250-51	2251-52	2252-53	2253-54	2254-55	2255-56	2256-57	2257-58	2258-59	2259-60	2260-61	2261-62	2262-63	2263-64	2264-65	2265-66	2266-67	2267-68	2268-69	2269-70	2270-71	2271-72	2272-73	2273-74	2274-75	2275-76	2276-77	2277-78	2278-79	2279-80	2280-81	2281-82	2282-83	228
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PAGE NO. 100

SCALE 100

ADDITIONAL 100

SCALE FVS FVS

120317 FVS FVS

-120

SCALE	400	400	
ADJUST	400	400	0.5658

FROM COIL SPRING AT BOTTOM OF THE CASE

STOSH
DELET

REMARKS

199	199	94	93
199	199	91	91
19976	19976		

00578 481 4.281
 57 59
 00578 481 4.281

57	1	50	57	43
10570	437 - 4281	?		
57	1	50	57	43

10577 1512.1 14249.8 13765.9 1.0

57 48

CALCULATION SHEET

PFR-0057 ⁴⁰²
2/2/82

18600 E. IMPERIAL HWY.
NORWALK, CALIFORNIA 90656

SIGNATURE SJ BOENZL DATE 3/13/73 CHECKED K. H. H. DATE 3/27/73
PROJECT Salco 2 & 3 JOB NO. 1304-785
SUBJECT 150' ϕ CONTAINMENT STEEL MODEL SHEET 9-A OF 9-A SHEETS

$$M_d = K_d(\phi) = (3.905 \times 10^9) \frac{2}{154} = 5.071 \times 10^7 \text{ K-FT}$$

$$\frac{M_v}{M_d} = \frac{3.009}{5.071} = 0.593$$

$$M_v = 59.3\% M_d$$

ADD A COIL SPRING AT NODE 1 OF MAGNITUDE
(3.905×10^9)($1.0 - .593$)

$$K_\phi = 1.539 \times 10^9 \text{ K-FT/RAD}$$

ADDITIONAL LUMPED NODAL INERTIAS (KIPS)					
NODE #	X-DIR	Y-DIR	NODE #	X-DIR	Y-DIR
1	-10	-10	15	3755	3756
2	0	0	16	1000	252
3	0	0	17	1000	142
4	646	646	18	-1175	-1175
5	646	646	19	0	2
6	-157	-157	20	-246	-246
7	-157	-157	21	325	320
8	254	254	22	-957	-925
9	254	254	23	4220	4220
10	-1	-1	24	0	0
11	1000	1000	25	0	0
12	195	195	26	0	0
13	6010	6010	27	0	0
14	-71	-71			

DYNAMIC DOF TABLE							
NODE #	X-DIR	Y-DIR	ROTATION	NODE #	X-DIR	Y-DIR	ROTATION
1	51	1	28	15	32	31	32
2	51	59	32	16	35	36	38
3	51	20	33	17	36	37	39
4	2	0	4	18	39	40	41
5	2	5	5	19	42	43	44
6	6	7	6	20	45	46	47
7	9	10	11	21	48	49	50
8	12	13	13	22	51	52	53
9	12	12	14	23	54	55	56
10	51	15	17	24	57	58	59
11	18	19	20	25	58	59	60
12	21	22	23	26	60	—	—
13	24	25	26	27	67	—	—
14	27	28	29				

SPRINGS	
LINE	STIFFNESS
1	4507
2	4507
3	4507
4	4507
5	4507
6	4507
7	4507
8	4507
9	4507
10	4507
11	4507
12	4507
13	4507
14	4507
15	4507
16	4507
17	4507
18	4507
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92	4507
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95	4507
96	4507
97	4507
98	4507
99	4507
100	4507

CONTAINMENT SHELL

STEAM GENERATOR
SNUBBER SUPPORT
POINT

NOTE:
UNITS ARE FT, KIP, SLUG, SEC,
L_x = PROJECTION LENGTH OVER X AXIS
L_y = PROJECTION LENGTH OVER Y AXIS
A = CROSS SECTIONAL AREA
A_{xy} = SHEAR AREA IN LOCAL X AXIS DIRECTION
I_z = MOMENT OF INERTIA ABOUT LOCAL Z AXIS
E = MODULUS OF ELASTICITY
ν = POISSONS RATIO
ρ = MASS DENSITY
θ = CONTROLS LOCAL TO GLOBAL TRANSFORMATION
FOR BEAM ELEMENTS

STEAM GENERATOR
LOWER SUPPORT POINT

HORIZONTAL REACTOR
SUPPORT POINT

VERTICAL REACTOR
SUPPORT POINT

NOTE
CONTAINMENT SHELL BEAM STICK
SHIFTED AWAY FROM ELASTIC LINE
OF INTERIOR BUILDING FOR CLARITY.
CONNECTION TO BASEMAT IS SIMILAR
TO SCHEME SHOWN FOR INTERIOR
BUILDING EXCEPT THAT MULTI-POINT
CONSTRAINTS ARE ALSO CONNECTED
TO NODES 8 AND 9

CONTAINMENT
REACTOR

INITIATOR'S RE-EVALUATION COMMENTS AFTER THE PFR HAS BEEN
REVIEWED BY THE ORIGINAL DESIGN ORGANIZATION(BPC)

BPC has agreed that the PF is valid but stated that the error is limited to the tabulation of one sheet of document because the stiffness value actually used for computer input is a correct value.

The initiator has examined the BPC's supporting data attached to their review comments and found that the input value actually used for computer analyses was 1.589×10^9 k-ft/rad. This value is a correct stiffness value consistent with the 1.542×10^9 computed by the initiator. The slight difference is due to numerical round-off in the element dimensions. The computer output sheet submitted by BPC as attachment to their review was taken from an OBE run. It should be pointed out that computer output sheets for OBE runs were not included in the documents transmitted to GAC.

Based upon the results of this reevaluation, the initiator is able to verify the BPC's clarification that the incorrect value of 1.383×10^9 is truly a localized error of a drafting/typographical nature. This valid PF should therefore, in the opinion of the initiator, be classified as an "observation".

BY: T.H. Lee *TH Lee*

DATE: 2-2-82

IMPACT ASSESSMENT

2408-PFR-0057

PFR NO. _____

AFFECTED ITEM: Containment Structure Seismic Analysis

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No (see attached sheet for explanations)

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

The failure of containment structure could.

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

No, not for this type of deviation.

OTHER COMMENTS:

See attached sheet

PREPARED BY: T. H. Lee *THL* DATE: 2-3-82

COMMENTS:

Agree with impact assessment.

BY: *FSoph*

DATE: *2/3/82*

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 21021-PFR-0058

REVISION -

PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Containment Structure Seismic Analysis

REQUIREMENT REFERENCE DOCUMENTS:

SUPER SMIS, Symbolic Matrix Interpretive System User's Manual, June 1971

BASIC REQUIREMENT:

The area moment of inertia for vertical elements should be I_z if the plane-motion model lies in the y-z plane.

DESCRIPTION OF POTENTIAL FINDING:

This PFR documents a deviation noted in the computer input data to SMIS code. Detailed descriptions are given in the attached sheet.

PREPARED BY: T. H. Lee *TH Lee* DATE: 1-23-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY *B. D. Lee*

DATE 1/27/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

This deviation concerns the orientation of beam element defined by local coordinates. It was noted in the following document.

"SMIS Finite Element Model For Time-History Analysis Of Containment With ESSS Equipment," Sheet 3, Figure A-5.

Description of Deviation

In the requirement document, the orientation of local coordinates of beam elements is defined in such way that, for zero angle of inclination, I_y is used for horizontal element and I_z is used for vertical element. Bechtel's input data are apparently inconsistent with this definition. The following comparison is displayed to describe this deviation.

PLANE-STRESS MODEL LINES IN THE Y-Z PLANE

Input data used by Bechtel		
Elements	I_y	θ
6 - 4	X X X	0
5 - 7	X X X	0
8 - 6	6576.	0
7 - 9	6576.	0
10A-10	2,340,000.	0
10-11	2,340,000.	0
11-12	2,340,000.	0
12-13	2,340,000.	0
13-14	2,242,000.	0
14-15	X X X	0
	X X X	0

Reviewer believes that the input data should be as follows			
Elements	I_y	I_z	θ
6 - 4	X X X		0
5 - 7	X X X		0
8 - 6	6576.		0
7 - 9	6576.		0
10A-10		2,340,000.	0
10 - 11		2,340,000.	0
11-12		2,340,000.	0
12-13		2,340,000.	0
13-14		2,242,000.	0
14-15		X X X	0
		X X X	0

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The finding is correct, but the deviation is limited to an improper designation of I_1 instead of the correct I_2 for elements 10A-10, 10-11, 11-12, 12-13 and 13-14, as tabulated sheet 3, Figure A-6. For these elements $I_1 = I_2$, and the correct values were used for I_1 and I_2 as indicated in the attached sheet of the computer listing of input.

☒ AGREE PF IS VALID

☐ DISAGREE

BY: SB Muel

DATE: 2/1/82

3. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☒ ADEQUATE ☐ INADEQUATE

VALIDITY: ☒ VALID ☐ INVALID

10 CFR 21: ☐ NOT APPLICABLE ☐ APPLICABLE SHK 2/3/82

10 CFR 50.55(e): ☐ NOT APPLICABLE ☐ APPLICABLE

CLASSIFICATION: ☒ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

Incorrect value in final report but corrected values were used in calculations.

BY: S. S. Koutz

DATE: 2/3/82

E. TPT PROJECT MANAGER

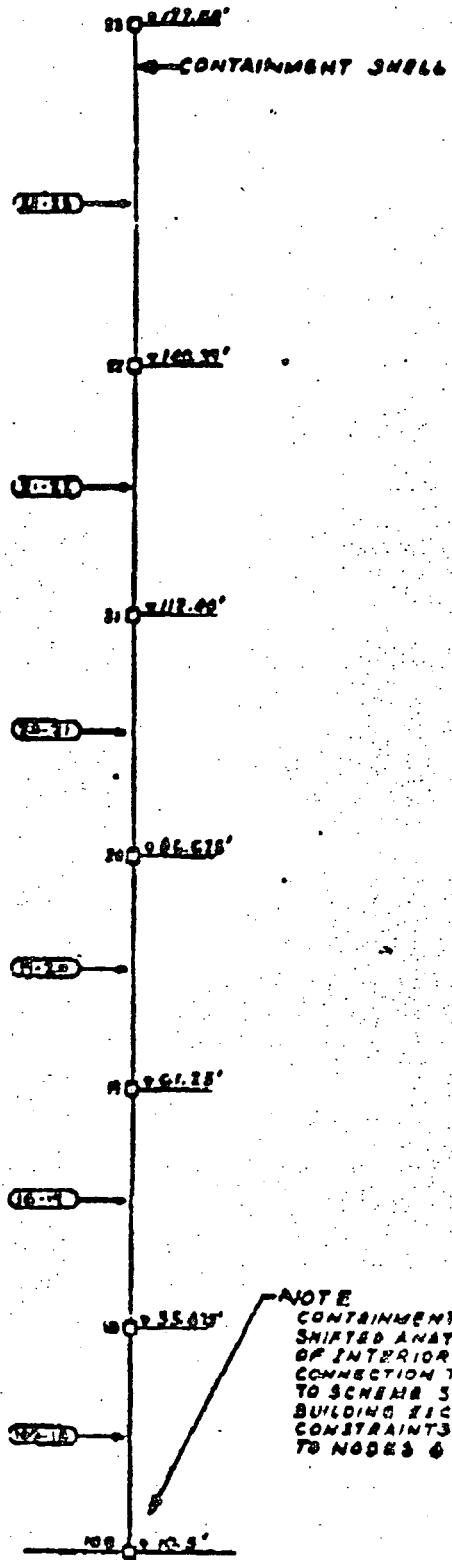
☒ ACCEPT

☐ REJECT

SHK 2/3/82

	6	7	8	16	60	17	
ADDSTF	MST MC610		2				
	7	8		16	60	17	
SCALE	T6					-1.0	
STCSM	TEE TA		2	4			
TRANS	TEE TTEE						
MULT	JTEE KAAR DUM						
PLL1	ULM TEE K0610						
MULT	JTEE HBAR DUM						
MULT	DUM TEE MC610						
ADDSTF	KST K0610		2				
	9 10 11			16	60	17	
ADDSTF	MST MD610		2				
	9 10 11			16	60	17	
GENTDE	K1011 M1011						
	0.0 2.125 0.0 0.22 1132.0 1132.0						
	635800.0 2021.0 → 2340000.0 2340000.0 1.0 0.0						
	0.00575						
ADDSTF	KST K1011		2				
	16 60 17			18	19	20	
ADDSTF	MST M1011		2				
	16 60 17			18	19	20	
GENTDE	K1112 M1112						
	0.0 10.177 0.0 0.22 1132.0 1132.0						
	635800.0 2021.0 → 2340000.0 2340000.0 1.0 0.0						
	0.00575						
ADDSTF	KST K1112		2				
	18 19 20			21	22	23	
ADDSTF	MST M1112		2				
	18 19 20			21	22	23	
GENTDE	K1213 M1213						
	0.0 4.823 0.0 0.22 1132.0 1132.0						
	635800.0 2021.0 → 2340000.0 2340000.0 1.0 0.0						
	0.00575						
ADDSTF	KST K1213		2				
	21 22 23			24	25	26	
ADDSTF	MST M1213		2				
	21 22 23			24	25	26	
GENTDE	K1314 M1314						
	0.0 5.875 0.0 0.22 1169.0 1169.0						
	635800.0 2117.0 → 2242000.0 2242000.0 1.0 0.0						
	0.00575						
ADDSTF	KST K1314		2				
	24 25 26			27	28	29	
ADDSTF	MST M1314		2				
	24 25 26			27	28	29	
GENTDE	K1415 M1415						
	0.0 12.625 0.0 0.22 1169.0 1169.0						
	635800.0 2117.0 → 2242000.0 2242000.0 1.0 0.0						
	0.00575						
ADDSTF	KST K1415		2				
	27 28 29			30	31	32	
ADDSTF	MST M1415		2				
	27 28 29			30	31	32	
GENTDE	K1516 M1516						
	0.0 14.145 0.0 0.22 638.0 638.0						

PFR-0058
2/3/82 JOC

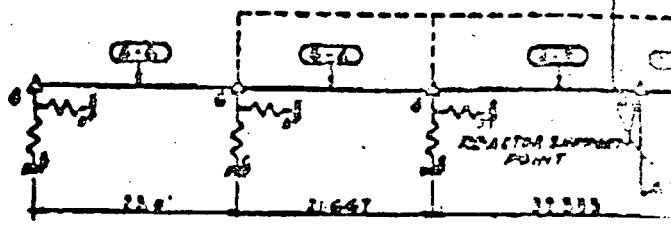
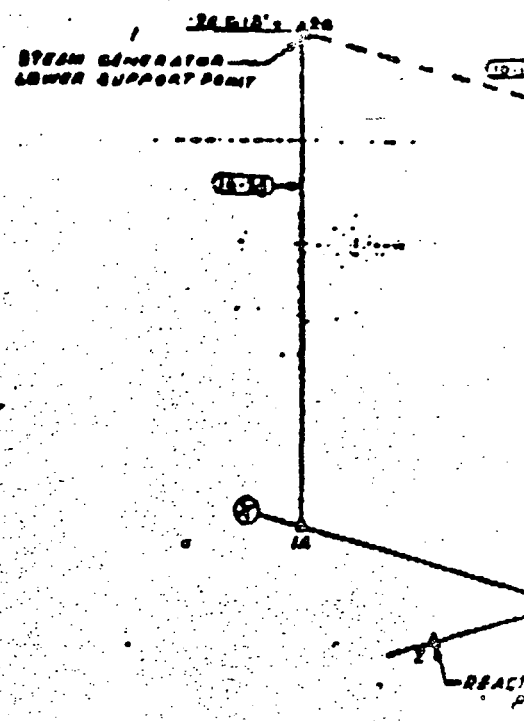


NOTE
CONTAINMENT SHELL BEAM STICK
SHIFTED AWAY FROM ELASTIC LINE
OF INTERIOR BUILDING FOR CLARITY.
CONNECTION TO BASEMAT IS SIMILAR
TO SCHEME SHOWN FOR INTERIOR
BUILDING EXCEPT THAT MULTI-POINT
CONSTRAINTS ARE ALSO CONNECTED
TO NODES 6 AND 9

LEGEND

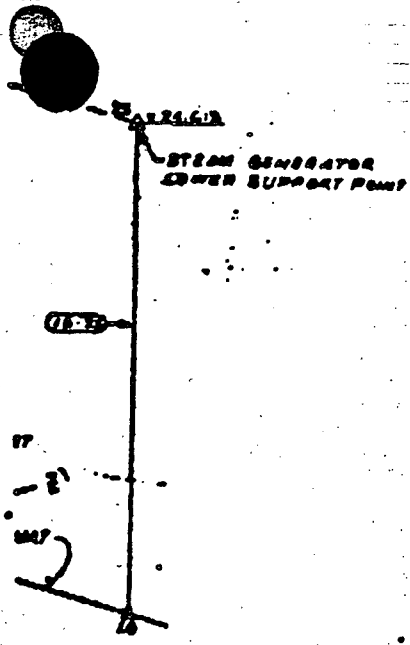


□ NODE - CONTAINMENT SHELL
△ NODE - INTERIOR BUILDING
AND BASEMAT



CONTAINMENT 2
REACTOR 1
1512.111

PFR-0058
2/2/82
JHC



BUILDING

THE VIEW ABOVE

ELEMENTS	LT	LU	A	A _Y	I _Y	E	V	P	D
1	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
21	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
22	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
23	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
24	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
25	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
26	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
27	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
28	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
29	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
30	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
31	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
32	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
33	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
34	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
35	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
36	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
37	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
38	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
39	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
40	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
41	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
42	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
43	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
44	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
45	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
46	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
47	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
48	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
49	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
50	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
51	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
52	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
53	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
54	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
55	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
56	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
57	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
58	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
59	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
60	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
61	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
62	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
63	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
64	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
65	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
66	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
67	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
68	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
69	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
70	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
71	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
72	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
73	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
74	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
75	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
76	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
77	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
78	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
79	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
80	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
81	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
82	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
83	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
84	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
85	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
86	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
87	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
88	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
89	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
90	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
91	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
92	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
93	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
94	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
95	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
96	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
97	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
98	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
99	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
100	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

NOTE:
UNITS ARE FT, KP, SLUG, SEC,
L_y = PROJECTION LENGTH OVER Y-AXIS
L_x = PROJECTION LENGTH OVER X-AXIS
A = CROSS SECTIONAL AREA
A_y = SHEAR AREA IN LOCAL Y-AXIS DIRECTION
I_y = MOMENT OF INERTIA ABOUT LOCAL Y-AXIS
E = MODULUS OF ELASTICITY
V = POISSON'S RATIO
P = MASS DENSITY
C = CONTROLS LOCAL TO GLOBAL TRANSFORMATION FOR BEAM ELEMENTS

NODES	Z	Y
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	0.0	0.0
26	0.0	0.0
27	0.0	0.0
28	0.0	0.0
29	0.0	0.0
30	0.0	0.0
31	0.0	0.0
32	0.0	0.0
33	0.0	0.0
34	0.0	0.0
35	0.0	0.0
36	0.0	0.0
37	0.0	0.0
38	0.0	0.0
39	0.0	0.0
40	0.0	0.0
41	0.0	0.0
42	0.0	0.0
43	0.0	0.0
44	0.0	0.0
45	0.0	0.0
46	0.0	0.0
47	0.0	0.0
48	0.0	0.0
49	0.0	0.0
50	0.0	0.0
51	0.0	0.0
52	0.0	0.0
53	0.0	0.0
54	0.0	0.0
55	0.0	0.0
56	0.0	0.0
57	0.0	0.0
58	0.0	0.0
59	0.0	0.0
60	0.0	0.0
61	0.0	0.0
62	0.0	0.0
63	0.0	0.0
64	0.0	0.0
65	0.0	0.0
66	0.0	0.0
67	0.0	0.0
68	0.0	0.0
69	0.0	0.0
70	0.0	0.0
71	0.0	0.0
72	0.0	0.0
73	0.0	0.0
74	0.0	0.0
75	0.0	0.0
76	0.0	0.0
77	0.0	0.0
78	0.0	0.0
79	0.0	0.0
80	0.0	0.0
81	0.0	0.0
82	0.0	0.0
83	0.0	0.0
84	0.0	0.0
85	0.0	0.0
86	0.0	0.0
87	0.0	0.0
88	0.0	0.0
89	0.0	0.0
90	0.0	0.0
91	0.0	0.0
92	0.0	0.0
93	0.0	0.0
94	0.0	0.0
95	0.0	0.0
96	0.0	0.0
97	0.0	0.0
98	0.0	0.0
99	0.0	0.0
100	0.0	0.0

MODES	Y-DIR	X-DIR	Y-DIR	X-DIR
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	

INITIATOR'S RE-EVALUATION COMMENTS AFTER THE PFR HAS BEEN
REVIEWED BY THE ORIGINAL DESIGN ORGANIZATION(BPC)

BPC agreed that the PF is valid. BPC pointed out that the deviation is limited to an improper designation of I_y (moment of inertia) because the correct values were used in computer input.

In order to verify the correctness of BPC's clarification, the initiator has conducted a re-evaluation which includes a review of all the supporting data attached to BPC's review comments and a re-examination of the SMIS code User's Manual and all relevant computer output sheets. The initiator has found that the actual input arrangement of SMIS computer code is such that the values of both I_y and I_z were made available to the computer by the user and the computer used the correct values internally to form the stiffness matrix. In this case, the final stiffness matrix was correctly formed even though a wrong designation was used by the BPC analyst in sheet 3 of Figure A-6.

In view of the results obtained in this re-evaluation, the initiator agrees that the computer analyses performed by BPC using SMIS computer code were unaffected by an error of this type. This valid PF should therefore, in the opinion of the initiator, be classified as an "observation".

BY: T. H. Lee *TH Lee*

DATE: 2-3-82

IMPACT ASSESSMENT

2408-PFR-0058
PFR NO. _____

AFFECTED ITEM: Containment Structure Seismic Analysis

1. IS THERE THE POTENTIAL FOR REDUCING DESIGN MARGINS TO THE EXTENT DESIGN ALLOWABLES ARE EXCEEDED OR DESIGN REQUIREMENTS ARE NOT MET?

No (see attached sheet for explanations)

2. IS THERE THE POTENTIAL THAT THE ITEM MIGHT FAIL OR ENDANGER OTHER ITEMS DURING AN SSE?

No

3. COULD THE FAILURE OF THIS ITEM DURING AN SSE CREATE A SUBSTANTIAL SAFETY HAZARD?

The failure of containment structure could.

4. COULD THE PROCEDURAL VIOLATION CREATE A SUBSTANTIAL SAFETY HAZARD?

No

5. ARE OTHER SIMILAR DEVIATIONS LIKELY TO EXIST?

No, not for this type of deviation.

6. OTHER COMMENTS:

See attached sheet

PREPARED BY: T. H. Lee *TH Lee* DATE: 2-3-82

COMMENTS:

Agree with impact assessment.

BY: *Bojars*

DATE: *2/3/82*