ENCLOSURE 1

FW-04

PIPING FUNCTIONALITY

EVALUATION

CALCULATION/PROBLEM COVER SHEET

Calculation/Problem No: FW-04

Title: Safe Shutdown Piping Functionality Assessment

Client: SCE **Project:** SONGS-1

Job No: 0310-022-1352

Design Input/References:

Contained within.

Assumptions:

- All IP, IR and IM type of supports are considered active in the calculation.
- Other assumptions relative to the hand calculation are detailed within the calculation.

Method:

- Hand calculations or QUICKPIPE analysis to check acceptance using the functionality criteria.
- Bechtel/W "as-built" and Revision 0 analysis results will be used where applicable.

Remarks:

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL		2/12/83

EDS 0008 5/78

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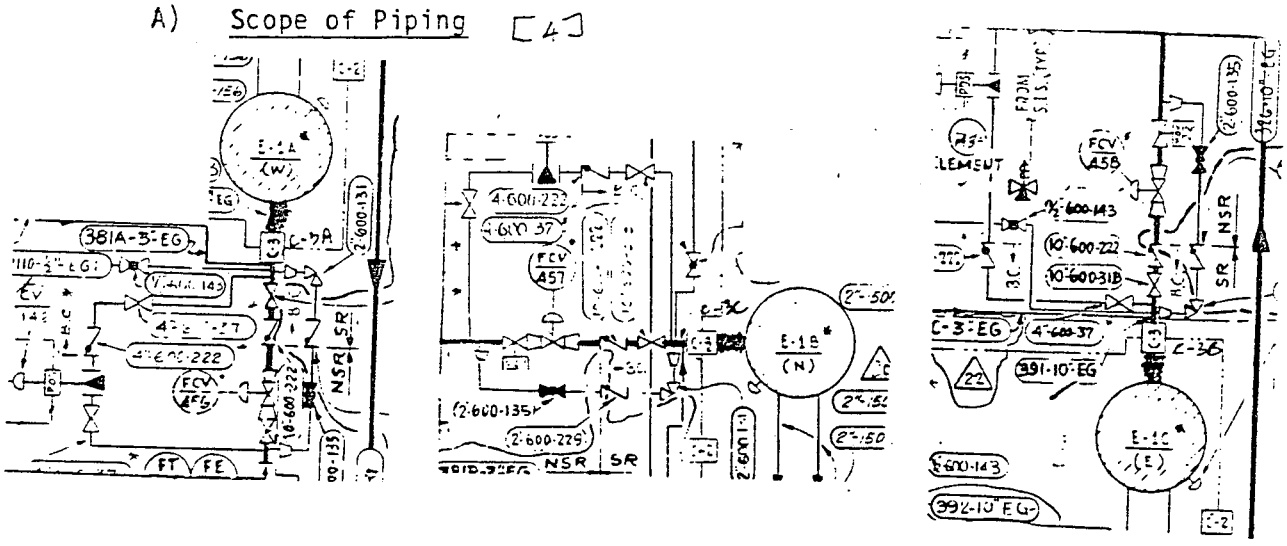
0	CH	1/21/83	MKT	12/14/83			

1.0 DESCRIPTION OF PROBLEM

A) Scope of Piping [4]



The scope of piping covered by this calculation includes the following lines:

Line no. 393-10"-EG (include 4" and 2" branches) from PEN C3-A to (see above lines from figures above)

Line no. 391-10"-EG (include 4" and 2" branches) from PEN. C3-B to

Line no. 392-10"-EG (include 4" and 2" branches) from PEN. C3-C to

Line no. (include 2" and 4" branches) from _____ to _____

Line no. _____ from _____ to _____

Line no. _____ from _____ to _____

Line no. _____ from _____ to _____

Line no. _____ from _____ to _____

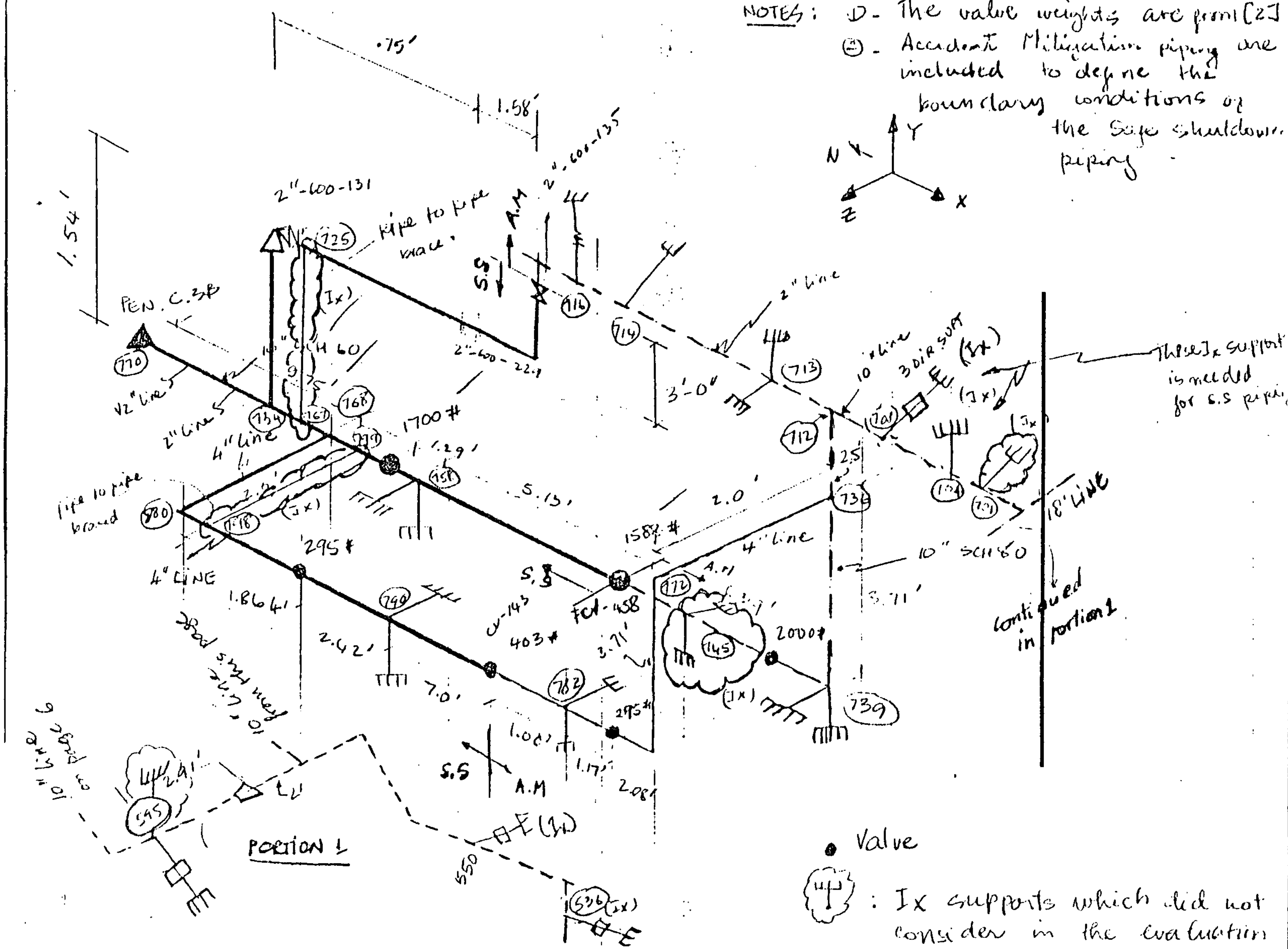
B) Loading

The subject piping is to be qualified for the combined gravity, pressure and SSE inertia, faulted condition loading. Qualification is based on meeting the functionality criteria as detailed in Impell report number 04-0310-0063, Revision 0.

2.0 MATHEMATICAL MODEL OF THE "AS-INSTALLED" CONFIGURATION [1]

See pages 5, 6 and 7

NOTES: ① - The valve weights are from [2]
② - Accident Mitigation piping are included to define the boundary conditions of the Safe shutdown piping.



● Valve

(symbol) : 1x supports which did not consider in the evaluation. Note that support @ 745 was found later in Section 4B (stiffness considered) needed

FIGURE 1.

REV	BY	DATE	CHECKED	DATE
0	KH	11/20/93	MVT	12/14/93

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SSE / SSMRP1

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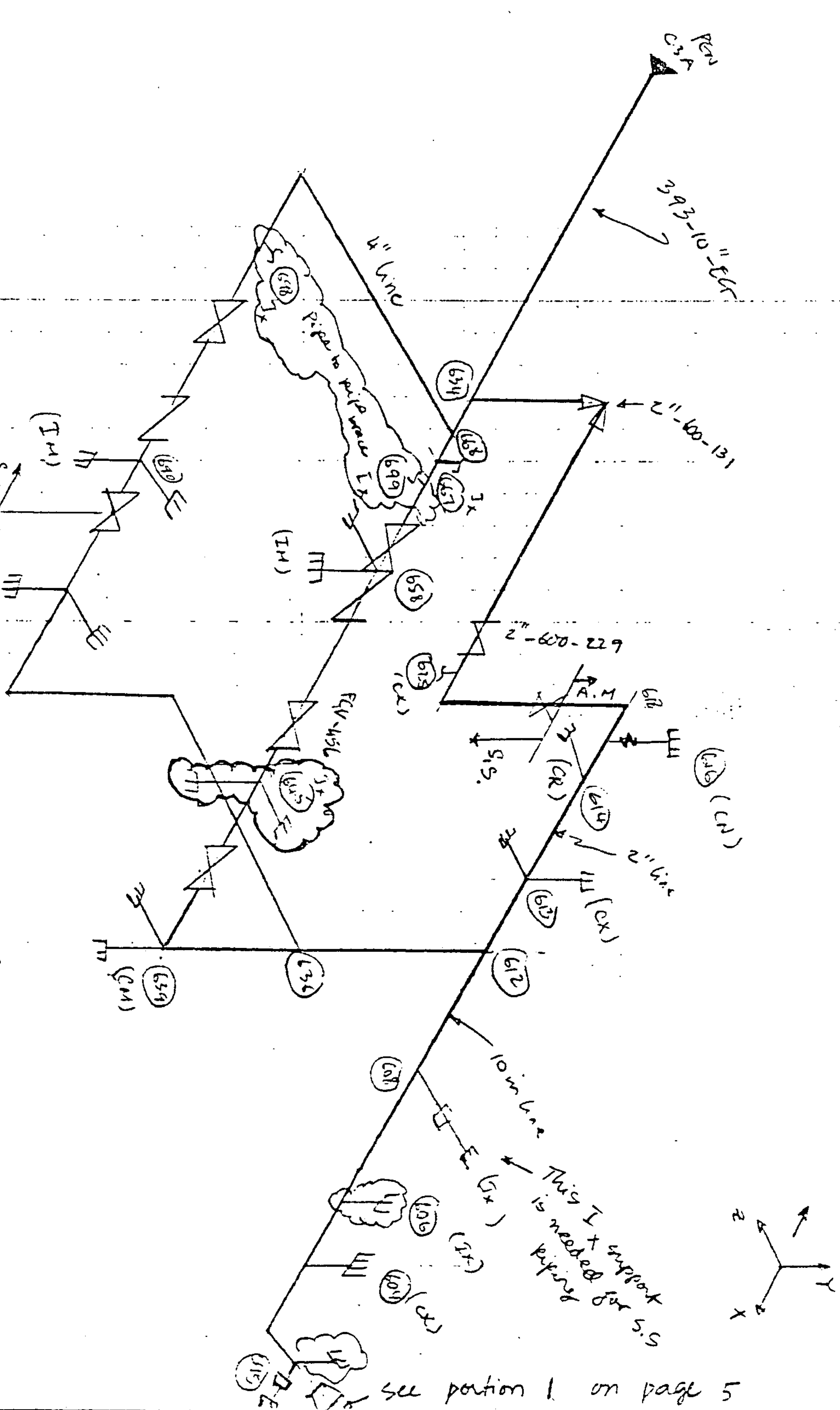

FIG. 2

Note that support @ 645 was found later needed in Section 4.B of file (Original considered)

Note : • Those Ix clouded supports are there did not considered in the analysis.

• See note on page 5.

SCE / SONGS -1

REV	BY	DATE	CHECKED	DATE
0	KH	11/21/83	[illegible]	12/6/83

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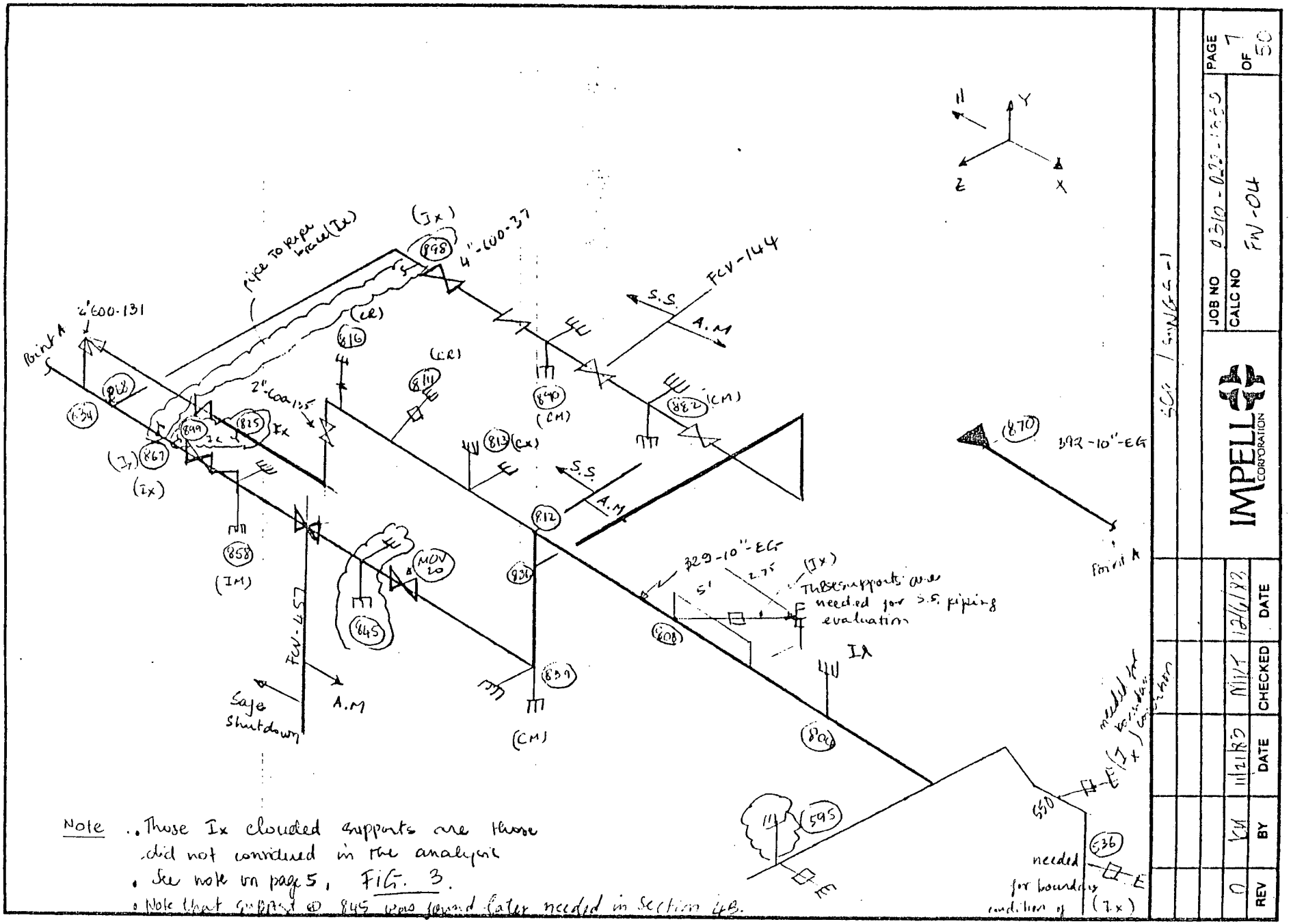

Note .. Those Ix clouded supports are those did not considered in the analysis

- See note on page 5, FIG. 3.
- Note that support @ 845 was found later needed in Section 4B.

3. DISCUSSION OF ANALYSIS

A. Safe shutdown piping from Penetration C-3B

The subject piping includes line 391-10"-EG from penetration C-3B to and included valve FCV-438; 4" line attached to line 391-10"-EG to and included valve CV-143; 2" line attached to the above 10" line to and included valve 2"-600-135. [1]

In order to evaluate this piping, It will be broken into 3 portions.

Portion 1: 2" piping

Portion 2 10" piping

Portion 3 4" piping.

① Piping data: [2]

For 2" line: SA106B OD = 2.37' t_2 = .218" W/unit length = 3.43#/FT

For 4" line: SA 106B OD = 4.5" t_4 = .337" W/unit length = 24.53#/FT

For 10" line: SA 106B OD = 10.75" t_{10} = .593" W_{10}/unit length = 104.21#/FT

SCE / SONGS -1

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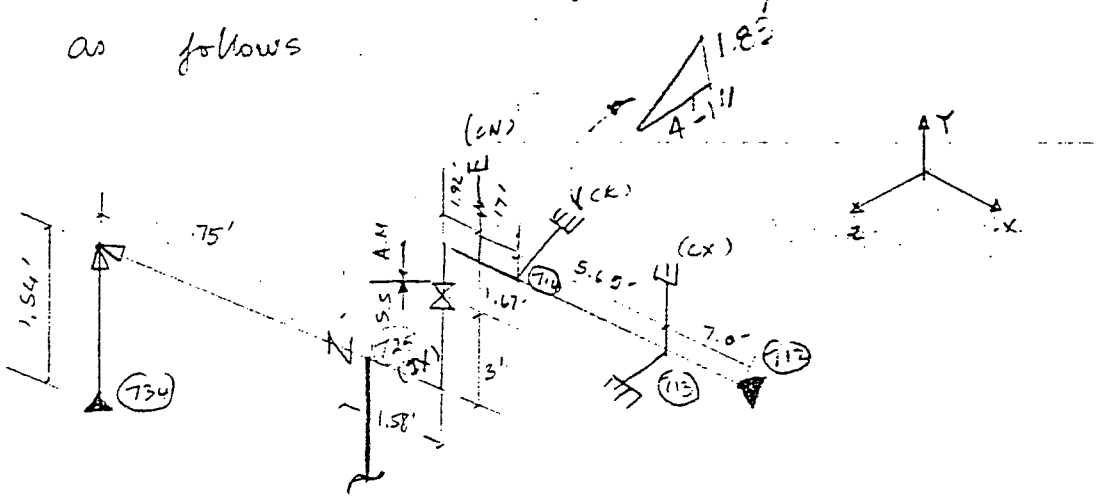
Max Operating temperature 420 °F [2]

Max Operating pressure 1210 PSI [2]

② - Piping Evaluation

• Portion 1

For the 2" line, DP (734), (712) can be considered as an anchored [8], The "as installed" of this 2" line can be shown as follows



From [1], all supports on this line are installed except for the pipe to pipe brace between the 10" line and the 2" line as shown on ISO 228674 [1]. A hand calculation will be provided here to see if this portion meet the functionality stress limits. without the pipe to pipe brace.

From the above configuration, the most flexible

					SEE / CONFIG-1
0	KH	11/20/85	MKT	12/6/83	IMPELL CORPORATION
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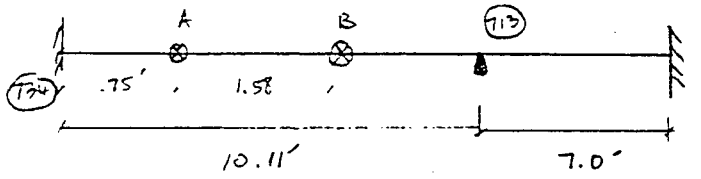
direction is the Y direction since support @ (714) takes [illegible] more load on the Z direction than the Y direction and the pipe to pipe brace was not installed.

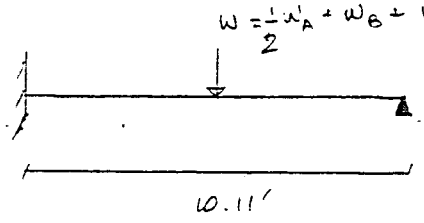
Y acceleration: (Neglect the Y restraint at (714).)



From [2], the 2" valve weight was not included. But in this calculation a standard 2" valve weight will be used (80 lbs)

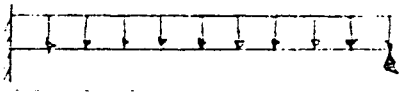
Frequency calculation

The above piping can be considered as



$I = \frac{\pi}{4}(a^4 - c^4) = .862\ in^4$

Using superposition method.



(1)

+

					SEE ISOMETRICS -1
0	KH	11/20/03	MKT	12/16/03	IMPELL CORPORATION
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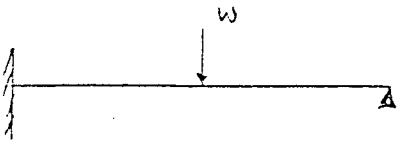

For (1) $\Delta_{Max_1} = \frac{WL^4}{185EI} = \frac{9.43(10.11\times12)^4}{42\times185\times27.9\times10^6\times.862} = .038"$

For (2) $\Delta_{Max_2} = \frac{7PL^3}{768EI} = \frac{7\times165\times(10.11\times12)^3}{768\times27.9\times10^6\times.862} = .1114"$

$K_1 = \frac{P_1}{\Delta_{Max_1}} = \frac{95.34}{.038} = 2509\ \#/in$

$K_2 = \frac{P_2}{\Delta_{Max_2}} = \frac{165}{.1114} = 1481.\ \#/in$

$\frac{1}{K} = \frac{1}{K_1} + \frac{1}{K_2} = 0.0011 \Rightarrow K = 931.3$

$T = 2\pi\sqrt{\frac{m}{K}} = 0.169\ sec.$

$f = \frac{1}{T} = 5.92\ Hz.$

From [9], 3% damping is used, the SSE seismic loads are

Horizontal (to account for vertical acc.) $= 1.5 \times 1.85G = 2.78G$

Vertical $= 1.5 \times 2.0G = 3.0G$. (for gravity)

Total load : $\sqrt{(2.78)^2+(2.78)^2+(3.0)^2} = 4.9G + 1G = 5.9G$

Stress Calculation

Since the Y direction span is the most flexible span. It will be used

					JCE / SNFC 1		
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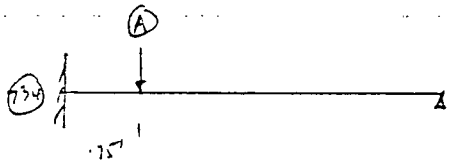
for stress calculation in all 3 directions.

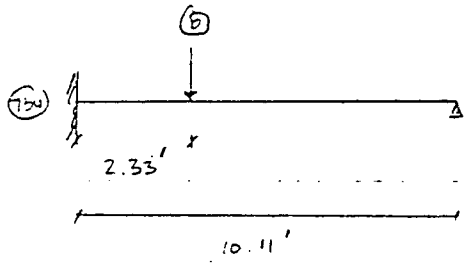
The maximum stress will be on (T34) to (T13) span

Using superposition method

For (1) $M_{(1)} = \frac{wL^2}{8} = \frac{.786(5.9)\times(10.11\times12)^2}{8} = 8532$ #in



(3)



(4)

For (3)

$M = \frac{Pb^2}{2L^3}(a+2L)a$ $\quad a = 9.36'$ $\quad b = .75'$

$M_{(3)} = \frac{80(5.9)\times(.75)^2}{2(10.11)^3}(9.36+2\times10.11)9.36 = 36$ FT #

For (4)

$M = \frac{Pb^2}{2L^3}(a+2L)a$ $\quad a = 7.78'$ $\quad b = 2.33'$

$M_{(4)} = \frac{80(5.9)\times(2.33)^2}{2(10.11)^3}(7.78+2\times10.11)7.78 = 270.$ FT #

					SHEET 1 OF 1 SHEET
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$$M_{Seismic} = M_{(1)} + M_{(3)} + M_{(4)} = 12\,204 \text{ ft-in}$$

$$\sigma_{Seismic} = \frac{12204}{Z} = \frac{12204}{\pi R^2 t} = \frac{12204}{0.7929} = 15392 \text{ PSI}$$

$$\sigma_{Pressure} = \frac{PD}{4T} = \frac{1210 \times 2.37}{4 \times .218} = 3287 \text{ PSI}$$

The maximum SIF of 2.1 for this region is used

$$\sigma_{Total} = .75 \times 2.1 \times 15392 + 3287 = 27,529 \text{ PSI}.$$

At 420°F $2S_y = 59.3$ KSI [7]

$\sigma_{Total} < 2S_y$

∴ The 2" line portion meets the functional stress limit without the pipe to pipe brace between IP (767) and (727)

					SCE / CNG-1	
0	KH	11/20/93	MKT	12/6/93	IMPELL CORPORATION	JOB NO 0210-022-1252
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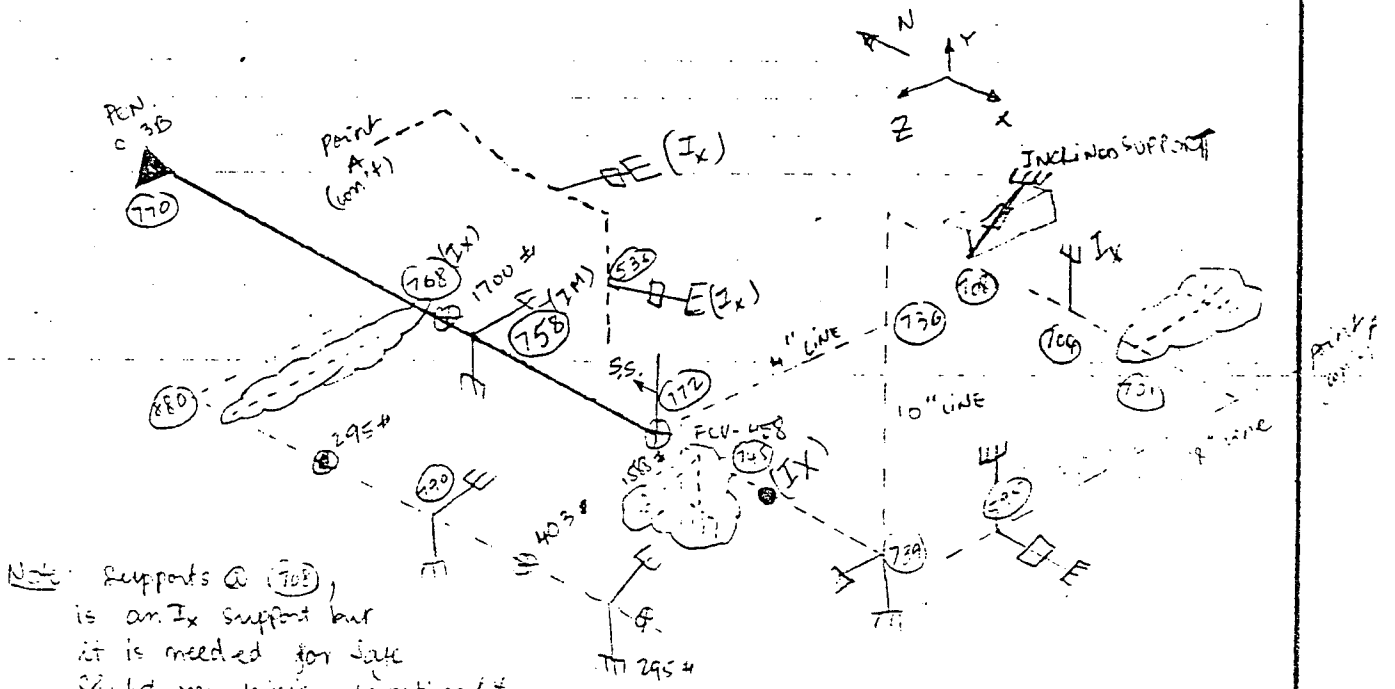
Portion 2 (10" Piping)

The safe shutdown portion is from penetration C-38 to and included valve FCV-458. The boundary conditions can be defined as shown.



Note: Supports @ (768), is an I_x support bar it is needed for safe shutdown piping functionality

From the above configuration, the most flexible direction will be the z direction.

Frequency calculation.

The model can be simplified as follows

					SCE ISOMETRIC-1		
0	KJ	11/20/83	MKT	12/6/83	IMPELL CORPORATION	JOB NO 0510-1122-1202	PAGE 14
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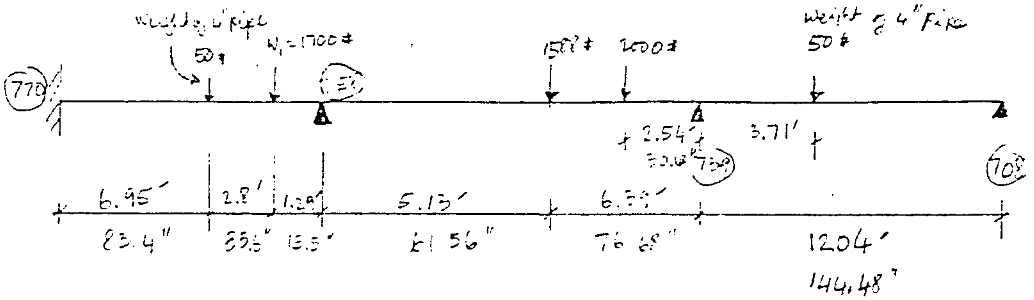
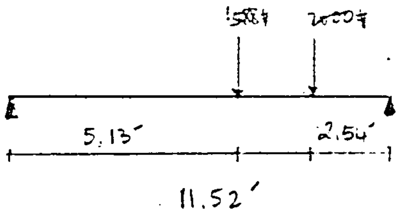
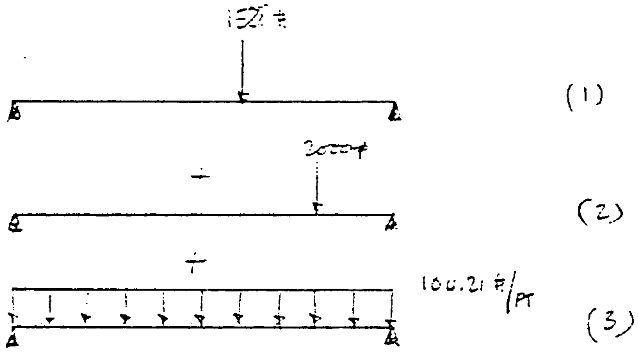


The natural frequency of the above figure can be conservatively calculated by using the second span



Using superposition method



From (1)

$$\Delta_1 = \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EIL} \qquad [10]$$

$$= \frac{1588 \times 5.13 \times 12 \times 6.39 \times 12\left[(5.13 \times 12) + (2 \times 12 \times 6.39)\right]}{27 \times 27.9 \times 10^6 \times 245 \times 11.52 \times 12} \times \sqrt{3 \times 5.13 \times 12\,(5.13 \times 12 + 2 \times 12 \times 6.39)} = 0.0126''$$

From (2) $\Delta_2 = \dfrac{2000 \times 8.98 \times 12 \times 2.54 \times 12\left[(8.98\times12)+(2\times2.54\times12)\right]}{27 \times 27.9\times10^6 \times 245 \times 11.52\times12} \times$

$\dfrac{}{\sqrt{3\times8.98\times12(8.98\times12+2\times12\times2.54)}} = 0.0101"$

From (3) $\Delta_3 = \dfrac{5WL^4}{384EI}$ [10] $= \dfrac{5\times104.21\,(11.52\times12)^4}{12\times384.\times27.9\times10^6\times245} = 0.0061"$

$K_1 = \dfrac{P_1}{\Delta_1} = 126{,}031\ \#/in$

$K_2 = \dfrac{P_2}{\Delta_2} = \dfrac{2000}{0.0101} = 198{,}020\ \#/in$

$K_3 = \dfrac{P_3}{\Delta_3} = \dfrac{156.21\times11.52}{0.0061} = 196{,}803\ \#/in$

$\dfrac{1}{K_{Total}} = \dfrac{1}{K_1} - \dfrac{1}{K_2} + \dfrac{1}{K_3} = 1.806\times10^{-5}$

$K_{Total} = 55353\ \#/in$

From [11] $T = 2\pi\sqrt{\dfrac{m}{K}} = 2\pi\sqrt{\dfrac{11.61}{55353}} = 0.0910$ sec

$f = \dfrac{1}{T} = 10.99$ Hz

Shear Calculation

From [3], 3% damping, the DBE seismic load @ 10.99 Hz (↙ base for modal anal.) are: Horizontal $1.5 \times 1.05 = 1.575$

Vertical $1.5 \times .75 = 1.125$

SEE CONTINUATION-1

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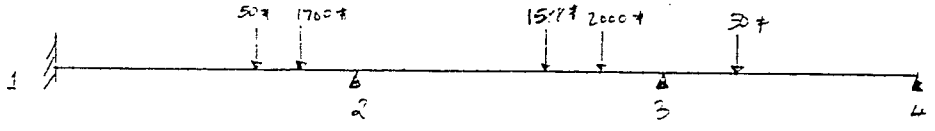
0	[illegible]	[illegible]-93	MKT	12/12/93		CALC NO 5.1-04	

Since the TF support were taken out. Therefore only the forces on the TF directions are calculated and added back to the existing forces from Ref. 3 analysis [2]



Using moment distribution method.

$$K_{12} = \frac{4EI}{L_{12}} = \frac{4 \times 27.9 \times 10^6 \times 245}{11.04 \times 12} = 206.38 \times 10^6 \ \#/in$$

$$K_{23} = \frac{4EI}{L_{23}} = \frac{4 \times 27.9 \times 10^6 \times 245}{11.52 \times 12} = 198 \times 10^6 \ \#/in$$

$$K_{34} = \frac{4EI}{L_{34}} = \frac{4 \times 27.9 \times 10^6 \times 245}{12.04 \times 12} = 189 \times 10^6 \ \#/in$$

$r_{12} = 0$ (fixed end)

$$r_{21} = K_{12} / K_{12} + K_{23} = \frac{206.38 \times 10^6}{206.38 \times 10^6 + 198 \times 10^6} = .51$$

$$r_{23} = K_{23} / K_{12} + K_{23} = \frac{198 \times 10^6}{206 \times 10^6 + 198 \times 10^6} = .49$$

$$r_{32} = K_{23} / K_{23} + K_{34} = \frac{198 \times 10^6}{198 \times 10^6 + 189 \times 10^6} = .51$$

$$r_{34} = K_{34} / K_{23} + K_{34} = \frac{189 \times 10^6}{198 \times 10^6 + 189 \times 10^6} = .49$$

$r_{43} = K_{34} / K_{34} = 1$

Span L_{12}

				1	
0	BY	Hanks	MKT	12/6/83	eds nuclear
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$M_{1\,50\#}$ = Moment at end ① due to 50 # load

$M_{1\,1700\#}$ = Moment at end ① due to 1700 # load

M_{1W} = Moment at end ① due to sfy weight

$M_{2\,50\#}$ = Moment at end ② due to 50 # load

$M_{2\,1700\#}$ = Moment at end ② —— 1700 # ——

M_{2W} = Moment at end ③ due to sfy weight.

From [10],

$$M_{1\,50\#} = \frac{Pab^2}{L^2} = \frac{50 \times 83.4 \times 49.1^2}{132.5^2} = 573 \text{ in-#}$$

$$M_{2\,50\#} = \frac{Pa^2b}{L^2} = \frac{50 \times 83.4^2 \times 49.1}{132.5^2} = 973 \text{ in-#}$$

$$M_{1\,1700\#} = \frac{1700 \times 117 \times 15.5^2}{132.5^2} = 2722 \text{ in-#}$$

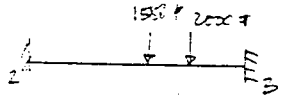
$$M_{2\,1700\#} = \frac{1700 \times 117^2 \times 15.5}{132.5^2} = 20{,}546 \text{ in-#}$$

$$M_{1W} = M_{2W} = \frac{wL^2}{12} = \frac{104.21 \times 132.5^2}{12 \times 12} = 12{,}705 \text{ in-#}$$

$M_{1\,Total} = 573 + 2722 + 12705 = 16{,}000$ in-#

$M_{2\,Total} = 973 + 20{,}546 + 12{,}705 = 34{,}224$ in-#

FROM: L_{23}



$M_{2\,1580\#}$ = Moment at end ② due to 1580 # load

$M_{2\,200\#}$ = Moment at end ② due to 200 # load

SEE LINKS

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M_{2w} = Moment at end (2) due to self weight

$M_{3_{1588\#}}$ = Moment at end (3) due to 1588 # load

$M_{3_{2000\#}}$ = Moment at end (3) due to 2000 # load

M_{3w} = Moment at end (3) due to self-weight

From [10]

$$M_{2_{1588\#}} = \frac{Pab^2}{L^2} = \frac{1588 \times 61.56 \times 76.68^2}{138.24^2} = 30{,}078 \text{ in}\#$$

$$M_{3_{1588\#}} = \frac{Pa^2b}{L^2} = \frac{1588 \times 61.56^2 \times 76.68}{138.24^2} = 24{,}147 \text{ in}\#$$

$$M_{2_{2000\#}} = \frac{2000 \times 107.76 \times 30.48^2}{138.24^2} = 10{,}477 \text{ in}\#$$

$$M_{3_{2000\#}} = \frac{2000 \times 107.76^2 \times 30.48}{138.24^2} = 37{,}042 \text{ in}\#$$

$$M_{2w} = M_{3w} = \frac{wL^2}{12} = \frac{104.21 \times 138.24^2}{12 \times 12} = 13{,}830 \text{ in}\#$$

$$M_{2_{Total}} = 54385 \text{ in}\#$$

$$M_{3_{Total}} = 75{,}019 \text{ in}\#$$

<u>Span L_{34}</u>

$M_{3_{50\#}}$ = Moment at end (3) due to 50 # load

M_{3w} = Moment at end (3) due to self-weight

$M_{4_{50\#}}$ = Moment at end (4) due to 50 # load

M_{4W} = Moment at end ④ due to self weight

From [10]

$$M_{3Sol} = \frac{Pab^2}{L^2} = \frac{50 \times 44.52 \times 99.96^2}{144.48^2} = 1066 \text{ in-k}$$

$$M_{4Sol} = \frac{Pa^2b}{L^2} = \frac{50 \times 44.52^2 \times 99.96}{144.48^2} = 475 \text{ in-k}$$

$$M_{3W} = M_{4W} = \frac{wL^2}{12} = \frac{104.21 \times 144.48^2}{12 \times 12} = 15,106 \text{ in-k}$$

$$M_{3Total} = 1066 + 15106 = 16,172 \text{ in-k}$$

$$M_{4Total} = 475 + 15106 = 15,581 \text{ in-k}$$

					SCE / Series -1		
0	KK	11/20/83	MYT	12/16/83	eds nuclear	JOB NO 0310-022-1752	PAGE 30
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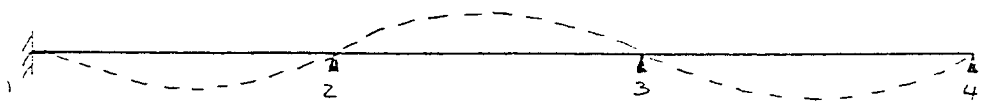
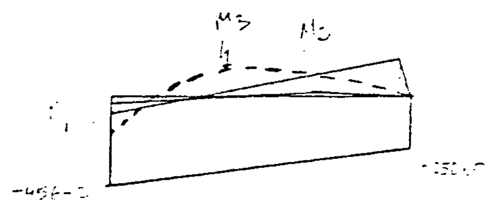


1	2	2	3	3	4
0	.51	.49	.51	.49	1.0
-16000	+34224	+54385	-75019	+16172	+15521
-22595	-45191	-43418	-21709		
		+20542	+41,084	+39472	+19736
-5238	-10476	-10066	-5033	-17659	-35317
		+5786	+11573	+11119	+5560
-1475	-2951	-2835	-1418	-2780	-5560
		+1070	+2141	+2057	+1029
-273	-546	-524	-262	-514	-1029
		+198	+396	+380	+190
-51	-101	-97	-49	-95	-190
		+37	+73	+71	+36
-10	-19	-18	-9	-18	-36
		+7	+14	+13	+7
				-3	-7
-45,642	-25060	+25067	-49218	+49215	0

Calculate the actual moment on span L_{12}



M_1 = [illegible]

M_2 = Moment due to [illegible]

M_3 = Moment due to [illegible]

					SCE / LONGS -1		
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From [10]

$$M_{1@\text{fixed end}} = \frac{Pab}{2L^2}(a+L) = \frac{50 \times 49.1 \times 23.6}{2 \times 132.5^2}(49.1 + 132.5) = 1050 \text{ in-k}$$

$$M_{1@\text{roller end}} = \frac{Pa^2b}{2L^3}(a+2L) = \frac{50 \times 49.1^2 \times 23.6}{2 \times 132.5^3}(49.1 + 2 \times 132.5) = 1573 \text{ in-k}$$

$$M_{2@\text{fixed end}} = \frac{1700 \times 15.5 \times 117}{2 \times 132.5^2}(15.5 + 132.5) = 12{,}995 \text{ in-k}$$

$$M_{2@\text{roller end}} = \frac{1700 \times 15.5 \times 117^2}{2 \times 132.5^3}(15.5 + 132.5 \times 2) = 21{,}767 \text{ in-k}$$

$$M_{3_{max}} = \frac{wL^2}{8} = \frac{100.21 \times 132.5^2}{12 \times 8} = 19{,}058 \text{ in-k}$$

$$M_{3_1} = \frac{9}{128} wL^2 = \frac{9}{128} \times \frac{100.21}{12} \times 132.5^2 = 10{,}720 \text{ in-k}$$

					LOE/SONGS - 1		
						JOB NO 0310-022-1252	PAGE
0	KH	11/20/85	MM	12/6/85	eldsnuclear	CALC NO FN-04	OF 50
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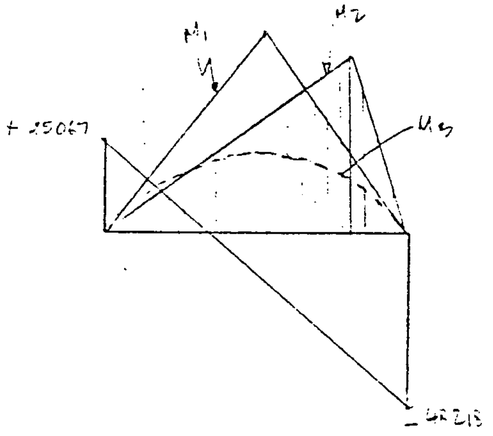
From the moment diagram above the max. moment of span L_{12} will be at fixed end $M_{Max\,L_{12}}$ = 78756 in #

Calculate the actual moment on span L_{23}



M_1 = Moment due to 1588 # load

M_2 = Moment due to 2000 # load

M_3 = Moment due to self-weight

From [10]

$$M_{1_{Max}} = \frac{Pab}{L} = \frac{1588 \times 76.68 \times 61.56}{138.24} = 54,225 \text{ in \#}$$

$$M_{2_{Max}} = \frac{Pab}{L} = \frac{2000 \times 30.68 \times 107.76}{138.24} = 47,519 \text{ in \#}$$

$$M_3 = \frac{wL^2}{8} = \frac{104.21 \times 138.24^2}{8 \times 12} = 20,745 \text{ in \#}$$

From the above moment diagram, the maximum moment is at 1588 # point load. M_{Max} = 54,225 + 20745 + 27340 - 7565

Moment due to M_2 @ 1588 # point load by interpolation

= 94745 in #

The actual moment on span L_{23} will [illegible] calculated since the concentrated weight is negligible compared to the concentrated [illegible] on span L_{23}.

SEE / SONGS-1

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0	KH	11/20/83	MKT	12/6/83

eds nuclear

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Thus the maximum moment on all 3 spans is 17,775 in-# [illegible] supports were taken out. Therefore only the stress on the Y and Z directions are calculated and conservatively added back to the existing stress from "Rev. 0" analysis [2]. The most flexible span (Z acceleration piping) is used to calculated both Z and Y acceleration stress.

From previous evaluation, the seismic loads in

Z direction = 1.51 g
Y direction = 1.125 g
} SRSS method, seismic load = 1.94 g

Seismic + Gravity = 2.94 g

$$\sigma_{additional} = \frac{94745 \times 2.94}{Z} = \frac{94745 \times 2.94}{48.05} = 5797 \text{ psi}$$

From [2] Max. SIF is 3.767. Thus $.75 i \sigma_{add}$ = 16378 PSI

$$\sigma_{Pressure} = \frac{PD}{4T} = \frac{1210 \times 10.75}{4 \times .593} = 5484 \text{ psi}$$

From [2] the maximum seismic stress in the [illegible] piping region is 30296 PSI

Faulted condition stress [8] = 5484 + 16378 + 30296 =

= 52158 PSI = 52.2 ksi

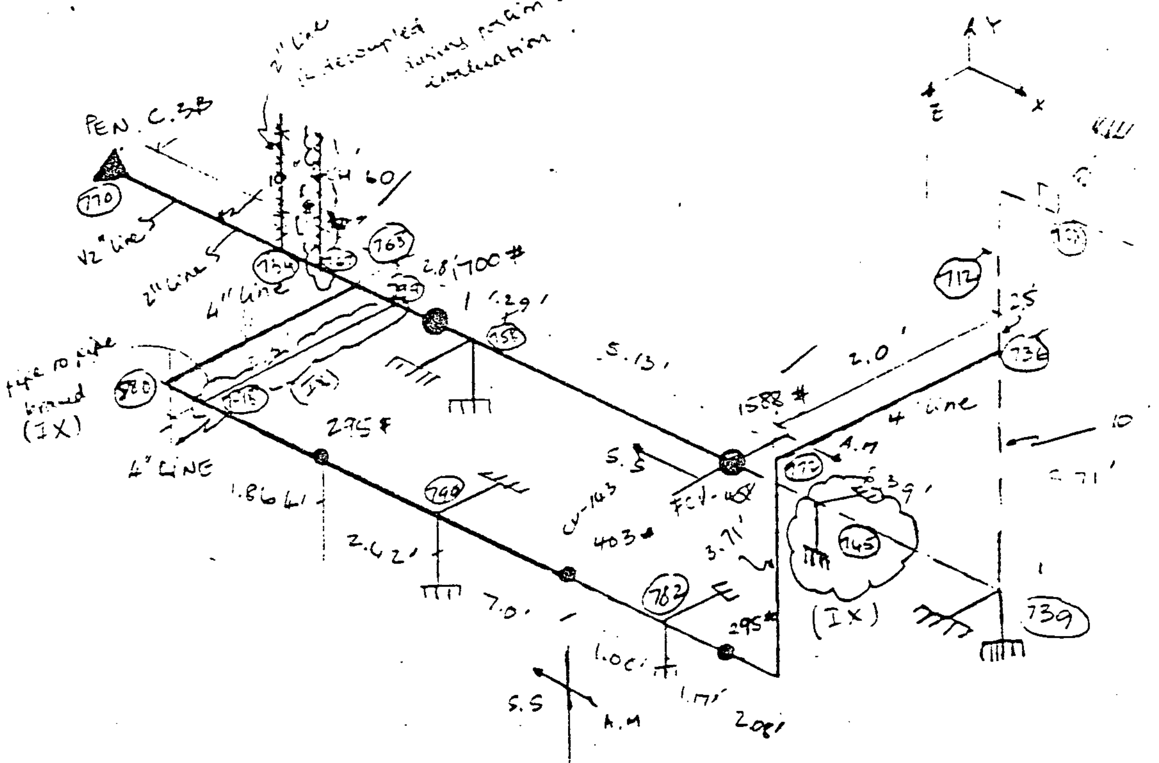
$3 S_c$ = 59.3 KSI [7]

∴ The 10" Safe Shutdown piping [illegible] [illegible] qualified with all-[illegible] [illegible] the [illegible] stress [illegible].

• Portion 3 (4" piping)

The "As installed" configuration of this portion is the same as the "rev. 0" configuration except for the pipe to pipe brace between DP (798) and (799) as shown on the ISO 228677 Rev. 0. Hand calculation is perform to see if this 4" line meet the functionality stress limit without the pipe to pipe brace.

In order to evaluate the 4" piping, the boundary conditions are defined as shown.



					SCE / SONGS-1		
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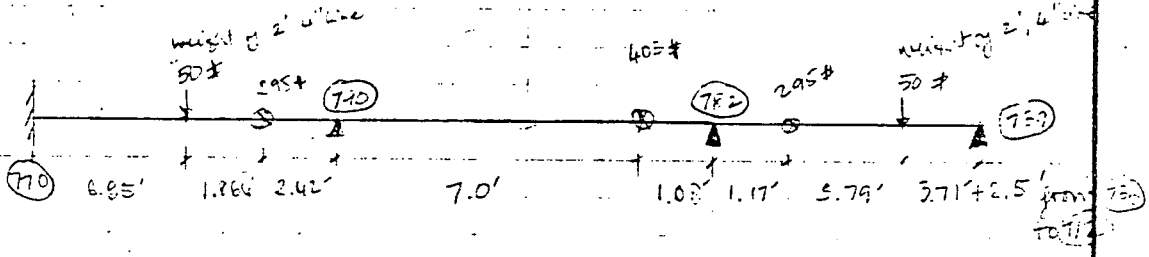
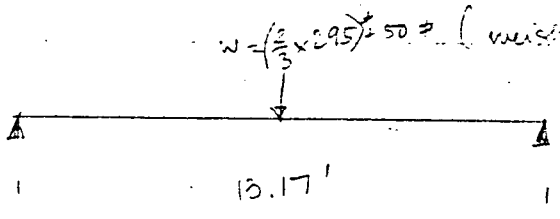
The brace is acting more or less as a z direction support for the 4" line. Therefore only the z direction will be evaluated and the given result will be considered only added into "Rev. 0" given result

Frequency Calculation

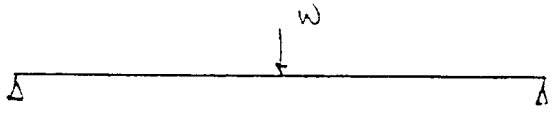
The above configuration can be simplify as shown.



The span from (712) to (713) is the longest span, it will be used to calculate the piping frequency



Using superposition method



(1)

					SEE ICONICS -1		
0	KH	11/20/93	NKT	12/12/93	IMPELL CORPORATION	JOB NO 0310-020-12-2	PAGE 16
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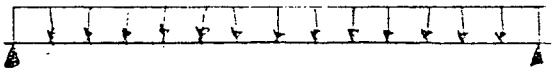
24.52 #/FT



(2)

From (1), $\Delta_1 = \frac{PL^3}{48EI}$ [10]

$I = \frac{\pi}{4}(a^4 - b^4)$

$= 9.61\ in^4$

$= \frac{247 \times (13.17 \times 12)^3}{48 \times 27.9 \times 10^6 \times 9.61} = 0.0758''$

From (2), $\Delta_2 = \frac{5WL^4}{384EI} = \frac{5 \times 24.52 \times (13.17 \times 12)^4}{12 \times 384 \times 27.9 \times 10^6 \times 9.61} = 0.0619''$

$K_1 = \frac{P_1}{\Delta_1} = 3254\ \#/in$ $\quad K_2 = \frac{P_2}{\Delta_2} = 5217\ \#/in$

$\frac{1}{K_{Total}} = \frac{1}{K_1} + \frac{1}{K_2} = 0.0005 \Rightarrow K_{Total} = 2004\ \#/in$

$T = 2\pi\sqrt{\frac{m}{K}}$ [11]

$T = 2\pi\sqrt{\frac{1.474}{2004}} = 0.17\ sec$ $\quad f = \frac{1}{T} = 5.87\ Hz$

Stress calculation

from [9], 3% damping, the DBE seismic loads @ 5.87 Hz in the Z direction is (modal combination factor)

Horizontal $1.5 \times 1.85\,G = 2.78\,G$

To account for gravity stress 1G will be added to the above seismic load

					ACE / CONTROL		
				1 1		JOB NO 210-922-1272	PAGE 27
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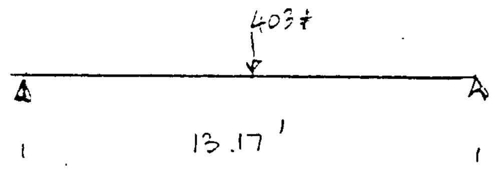
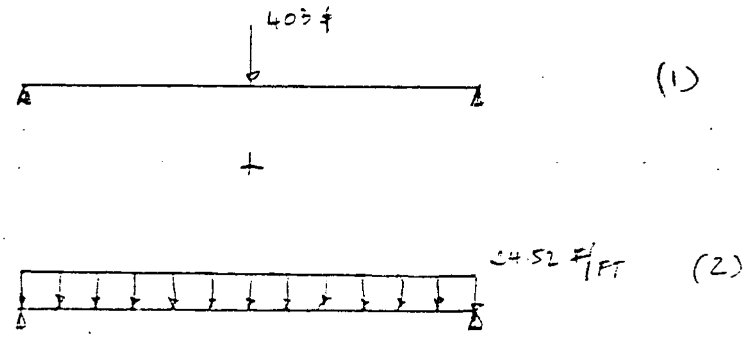
The maximum stress can be calculated by using max. span length and max concentrated weight at the center of span as shown.



Using superposition method



From (1) $M_1 = \frac{PL}{4} = \frac{403 \times (2.78+1)(13.17 \times 12)}{4} = 60187$ in #

From (2) $M_2 = \frac{wL^2}{8} = \frac{(24.52)(3.78)(13.17 \times 12)^2}{12 \times 8} = 24,114$ in #

$M_{Total} = 84301$ in #

$\sigma = \frac{M_{Total}}{Z} = \frac{84301}{\pi r^2 t} = \frac{84301}{4.59} = 18,378$ PSI

From [2] the max SIF is 1.682

$.75 i \sigma = 23184$ PSI

$$\sigma_{Pressure} = \frac{PD}{4T} = \frac{1210 \times 4.5}{4 \times .337} = 4039 \text{ PSI}$$

Faulted stress = 4039 PSI + 23184 + 10538 = 37762 PSI

↑ Max. existing stress from Rev. 0 analysis

which is less than $2S_y$ = 59.3 KSI.

∴ The 4" Safe shutdown piping meets the functionality stress limit without the pipe to pipe brace at (798) and (799)

E. Safe Shutdown portion from Penetration C-3A

Piping includes line 393-10"-EG from penetration C-3A to and included valve FCV-456, a 2" line attached to 393-10"-EG from DP (634) to and included valve 2"-600-135 and 4" line from DP (668) to and included valve FCV-143 as shown in figure 2.

By comparing fig. 1 and fig. 2, the Safe Shutdown piping from penetration C-3B and the Safe Shutdown piping from penetration C-3A, it was found that (included the boundary fixing).

- Piping configuration: They are exactly the same (Dimensions and directions) except for the 84' from the pen C3A to the Mezz. wall penetration. Since the hand calc is very conservative. Thus this difference can be neglected
- Support scheme: Then support schemes are the same except that piping from penetration C-3A has a pipe to pipe brace between DP (657) and (625), an additional Y Stop at (604) (status cx). These additional supports will make the piping more rigid and reduce the piping stress. Safe Shut down piping from pen. C-3B meets the functionality stress limit as shown previously

∴ Safe Shut down piping from pen. C-3A automatically meets the functionality

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C_ Safe Shutdown portion from Penetration C-3C

Piping include line 392-10"-EG from penetration to and included valve FCV-456, 2" line from line 392-10"-EG to and included valve 2"-600-135 and the 4" line from this 10" line to and included valve FCV-144. as shown in figure 3.

By comparing figure 1 and figure 3, the safe shut down piping from penetration C-3B, it was found that

- Piping configuration (included boundary piping) They are the same except the distance from the penetration to the first wall penetration From fig 1 is 2.91' and from fig 3 is 4.25' The difference is 1.34'. Based on piping analysis experience, the allowable tolerance for support locations is from 1 to 2 diameters. Thus the hand-calculated stress results are still valid for this portion of piping
- Support scheme (included supports in boundary region)

All supports are the same except for the X support location as shown in figure 1 and 3. Thus calculation is needed to evaluate the difference

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				1 1		JOB NO 0310-022-1352	PAGE 31
0	KM	11/21/83	HKT	12/16/83	IMPELL CORPORATION	CALC NO FW-04	OF 59
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For 10" piping

Piping from penetration C-3C is more flexible on the x direction than piping from penetration C-5B. Since there is no X supports considered taken out, the moment on the pipe caused by x excitation should be the same as rev. 0 analysis.

During x excitation, the max. moment will be at DP (838) (local M_z in [2]). This moment will be added to the calculated moment with no YZ support at (845)

$M_{calculated}$ (part A section 3 of file) = 278550 in #

$M_{due\ to\ x\ excitation}$ (rev. 0 analysis) = 49511 FT#

= 594132 in #

$M_{Total\ for\ seismic}$ = 872682 in #

$\sigma_{pressure}$ = 5484 (calculated previously)

$\sigma_{seismic} = \frac{M}{Z} = \frac{872682}{48.05} = 18162$

SIF = 3.767 [2]

$.75 i\ \sigma_{seismic}$ = 51312 PSI

Faulted Stress [8] = 51312 + 5484 = 56796 PSI < 2Sy = 59300 PSI

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					IMPELL CORPORATION — JOB NO 0310-032-1552 — CALC NO 50-04 — PAGE 32 OF 50
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∴ The 10" Safe Shutdown piping from penetration C-3C meets the functionality stress limit

For 4" piping

To account for the difference described above the calculated stress for 4" piping will be added to the existing rev. 0 analysis stress.

$\sigma_{\text{from calc}}$ = 2184 PSI

σ_{press} = 4039 PSI

$\sigma_{\text{rev.0 analysis (Max)}}$ = 11,471 PSI

Faulted stress σ = 38694 PSI . $< 2S_y$ = 59300 PSI

∴ The 4" Safe shutdown piping meets the functionality stress limit.

For 2" piping.

There is no difference in terms of piping configuration and support scheme between fig 1 and fig. 3 2" piping.

∴ The 2" Safe shutdown piping meets the functionality stress limit.

					SCE /SONGS-1		
0	KH	12/6/83	MKT	12/6/83	IMPELL CORPORATION	JOB NO 0310-022-FSV	PAGE 33
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0	KK	4/2/93	[illegible]	12/10/93

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SONGS-1

Safe Shutdown Piping Functionality Assessment

JOB NO 0310-022-1352

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RESULT SUMMARY

A) MAXIMUM STRESS SUMMARY

Line Number	Isometric Number	Bechtel ~~Gate~~ Number [2]	Nodal Points	Maximum Stress (KSI)	Functionality Criteria 2.2Sy ~~or 2.05Sy~~ [7]	Ratio % Allowable	Remarks
392-10" -EG	22678	FW-04	10" ϕ Pipe	56.8 (1)	59.3	.96	Qualified

Note: (1) From hand calculation

SECTION 4A : FW-04 COMPUTER ANALYSIS WITH ALL SUPPORTS CONSIDERED RIGID

In order to show the hand calculation method is adequate, one piping portion of FW-04 was analyzed using IMPELL "SUPERPIPE" computer program. The piping was chosen such that it will represent for the worst case configuration (long span, less support etc..)

As discussed in section 3 of this file, there are 3 similar portions of piping in this FW-04 calc. The Safe shutdown piping from penetration C-3A The Safe shutdown piping from penetration C-3B The Safe Shut down piping from penetration C-3C. The Safe Shutdown piping from penetration C-3C was chosen to run computer analysis. The math model include the safe shutdown piping and its boundary

10" piping from pen. C-3C at data point 870 to data point 565 to DP 595 and DP 536. It also include 10" piping from 580 to support data point 739 (see [1])

4" and 2" branches from the above 10" line

					SEE ISONGS-1		
					IMPELL CORPORATION	JOB NO 0310-022-1452	PAGE 35
0	KH	12/7/93	MPT	12/12/93		CALC NO FW-04	OF
REV	BY	DATE	CHECKED	DATE			

Note that in this analysis as same as the hand calculation, all supports are considered rigid and they both have the same support scheme. The faulted stress results will be checked with the hand calculation stress results. The active valve accelerations will be summarized and compared to the 5.G allowable as stated in [8]

					SCE 15-??? -1		
0	CK	12/7/83	MKT	12/12/83	IMPELL CORPORATION	JOB NO 0210-022-1??? CALC NO FW-04	PAGE 36 OF ??
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SIF Calculation

① - For 2" by 10" branch connection

As per B31.1, the branch connection can be calculated as follows

$$SIF = 1.5\left(\frac{R_m}{T_r}\right)^{2/3}\left(\frac{r'_m}{R_m}\right)^{1/2} \times \left(\frac{T'_b}{T_r}\right)\left(\frac{r'_m}{r_p}\right)$$

R_m = Mean radius of run pipe

T_r = Thickness of run pipe

r'_m = Mean radius of branch pipe

T'_b = Thickness of branch pipe

$r_p = r'_m$

Run : 10.75" D, T = .5"

Branch : 2.37" D, T = .218"

$$SIF = 1.5\left(\frac{5.125}{.5}\right)^{2/3}\left(\frac{1.076}{5.125}\right)^{1/2} \times \left(\frac{.218}{.5}\right)\left(\frac{.218}{.218}\right) = 1.414$$

② - For 4" by 10" branch connection. Branch (4.5", .337"(T)) From Rev. 0 analysis, it was model as 10"×10"×4" cast welding tee (SIF = 1.7). Since the stub ISO did not indicate this component Type. This SIF will be used.

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					1		
						JOB NO 4510-022-1350	PAGE 37 OF 50
D	KK	12/7/93	MKT	12/12/83	IMPELL CORPORATION	CALC NO FW-01	
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In SUPERPIPE computer output [14], The SIF of 1.0 is used for 4"x10" and 2"x10" branches (instead of 1.414 (see SIF calculation)). These branches are at data points

834 (2"x10")

812C (2"x10")

868 (4"x10")

836 (4"x10")

From [14] the max faulted condition stress ratio at 834 and 812C is .694. By applying SIF = 1.414 the stress ratio will be .694 x .75 x 1.414 = .736 (conservatively applied SIF to pressure stress also) which still meets the functionality stress limit.

From [14] the max. faulted condition stress ratio at 868 and 836 is .546 by applying SIF = 1.7 The stress ratio will be .546 x 1.7 x .75 = .6962 which still meets the functionality stress limit.

SQE/CONCC-1

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0	KX	12/7/83	MVT	12/12/83

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0	CP	12-15-93	[illegible]	12/22/93

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SONGS-1

Safe Shutdown Piping Functionality Assessment

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RESULT SUMMARY

A) MAXIMUM STRESS SUMMARY OF SAFE SHUTDOWN PIPING REGION

Line Number	Isometric Number	Bechtel / W Calc. Number	Nodal Points	Maximum Stress (KSI)	Functionality Criteria ~~2.25Sy~~ or 2.0Sy [7]	Ratio % Allowable	Remarks
392-10"-EG	228678	N/A	804	47.6*	59.3	.80	Qualified

Note : From hand calculation result, the Sfun ratio is .96. Thus the hand calculation is inadequate.
* From SUPERPIPE computer analysis [14]

RESULT SUMMARY

C) ACTIVE VALVE ACCELERATION SUMMARY

Valve I.D. Number	Nodal Point	Comp.	SSE Acceleration (g)[14] ENVELOPED	Allowable [8] acceleration (g)	Allowable [8] ref.	Remark
FCV-457	848	X	.796			
	852	Y	.892			Qualified
	850	Z	1.12			
		Result	1.635	5.0 G		
FCV-456	648	X	Same as FCV-457			
	652	Y	due to the similarity			"
	650	Z				
		Result				
FCV-458	748	X	Same as FCV-457			
	750	Y	due to the similarity			"
	750	Z				
		Result				
		X				
		Y				
		Z				
		Result				

Ref. P&ID 5A779-22, isometric # 227467 TO 227478

Bechtel W calc. # N/A

[14] : SUPERPIPE Computer Analysis 83/12/07 . 04.52.56

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2	KH	12/7/83	MKT	12/12/83

SONGS-1

Safe Shutdown Piping Functionality Assessment

IMPELL CORPORATION

JOB NO 0310-022-1352

CALC NO FN-04

SECTION 4B : FW-04 COMPUTER ANALYSIS WITH SUPPORT STIFFNESS CONSIDERED.

As per [13], the following supports in FW-04 have stiffness as shown

Support Name	DCP	Stiffness
S1-02-325-H019	658	Same as support @ 758 stiffness
S1-02-325-H014	645	10^4 (Y) 8.5×10^3 (Z)
S1-02-325-H013	639	10^4 (Y) 8.5×10^3 (Z)
S1-02-325-H012	690	Same as support @ 890 stiffness
S1-02-325-H011	682	10^4 (Y) 8.5×10^3 (Z)
S1-02-326-H015	758	10^4 (Y) 8.5×10^3 (Z)
S1-02-326-H010	745	10^4 (Y) 8.5×10^3 (Z)
S1-02-326-H009	739	10^4 (Y) 8.5×10^3 (Z)
S1-02-326-H008	790	Same as support @ 890 stiffness
S1-02-326-H007	782	Same as support @ 882 stiffness
S1-02-329-H011	858	10^4 (Y) 8.5×10^3 (Z)
S1-02-329-H008	845	10^4 (Y) 8.5×10^3 (Z)
S1-02-329-H007	839	10^4 (Y) 8.5×10^3 (Z)
S1-02-329-H013	890	1.4×10^4 (Y) 8.5×10^3 (Z)
S1-02-329-H012	882	"

SCE / CANGS

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0	EH	12/01/83	MVT	12/12/83	IMPELL CORPORATION	JOB NO 0310-022-1353 CALC NO FW-04	41 OF 50

SUPERPIPE computer program will be used to analyze FW-04 safe shutdown piping with the above stiffness considered. The same piping described in Section 4A is analysed here. The max. faulted stress result and the active valve accelerations are summarized in this section.

In SUPERPIPE computer output [15], the SIF @ 1.0 is used for 4"x10"x10" and 2"x10"x10" connections. They are at data points 834 (2x10x10), 812C (2x10x10), 868 (4x10x10) and 836 (4x10x10).

From [15], the max faulted stress ratio @ 2" connection is .619. Using SIF = 1.414 the ratio become .66 which is still qualified.

From [15], the max faulted stress ratio @ 4" connection is .494. Using 1.7 SIF the ratio becomes .63. which is still qualified.

REV	BY	DATE	CHECKED	DATE
0	[illegible]	12/7/83	[illegible]	12/12/83

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Safe Shutdown Piping Functionality Assessment

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RESULT SUMMARY

A) MAXIMUM STRESS SUMMARY OF SAFE SHUTDOWN PIPING REGION

Line Number	Isometric Number	Bechtel / W Calc. Number	Nodal Points	Maximum Stress (KSI)	Functionality Criteria ~~2.2Sy~~ or 2.0Sy [7]	Ratio % Allowable	Remarks
392-10"-EG	228678	N/A	848	54.2*	59.3	.91	Qualified

Note

* From SUPERPIPE computer analysis [15] 83/12/08 - 14 46.50

RESULT SUMMARY

C) ACTIVE VALVE ACCELERATION SUMMARY

Valve I.D. Number	Nodal Point	Comp.	SSE Acceleration (g) [5] ENVELOPE	Allowable [8] acceleration (g)	Allowable [8] ref.	Remark
FCV-457	848	X	.804			Qualified
	852	Y	1.95			
	850	Z	2.17			
		Result	3.03	5.0G		
FCV-456	648	X	same as FCV-457			"
	652	Y	due to the similarity			
	650	Z				
		Result				
FCV-458	748	X	same as FCV-458			"
	752	Y	due to the similarity			
	750	Z				
		Result				
		X				
		Y				
		Z				
		Result				

Ref. P&ID 5687J9-22, isometric # 228667 TO 228678

Bechtel W calc. # N/A

[15] : SUPERPIPE Computer Analysis 83/12/08. 14.46.50

REV	BY	DATE	CHECKED	DATE
0	EH	12/7/83	MKT	12/12/83

SONGS-1

Safe Shutdown Piping Functionality Assessment

IMPELL CORPORATION

JOB NO 0310-022-1352

CALC NO F:N-04

PAGE 41 OF 50

Result Summary - D) Support Status

(i) List of Supports Considered Active in the Subject Calculation

These include all the original "as-built" supports which are completed as well as incomplete, and the already installed new supports.

Data Point ~~As-Built~~ /Rev. 0	Support I.D. Number	Current Status	Remark
C-1	Safe shutdown piping from pen. C-3C		
890	S1-02-329-H013	CM	
882	S1-02-329-H012	CM	
858	S1-02-329-H011	IM	
839	S1-02-329-H007	CM	
816	S1-02-329-H004	CR	
814	S1-02-329-H005	CR	
813	S1-02-329-H010	CX	
808	S1-02-329-H006	IX	Existing
704	S1-02-325-H001	IX	Existing
606	S1-02-325-H004	IX	Existing
804	S1-02-324-H001	IX	Existing
540	S1-02-325-H017	IX	Existing

NOTE1: From the stress Isometric 228674 (in Appendix A) support S1-02-325-H022 has been deleted. However it was considered in Rev 0 analysis (x snubber) and it shows that this support is taking a very high load (see Rev 0 analysis) thus it is the only Y support near the Safe Shutdown piping. Thus this Y snubber support has to be reinstalled.

NOTE2: Support S1-02-325-H009(595) has CX status but the remarks said "not installed" Thus it is not considered in the evaluation (Y-direction)

					SONGS-1 Safe Shutdown Piping Functionality Assessment		
						JOB NO 0310-022-1352	PAGE 46
0	KH	11/21/93	MKT	12/14/93		CALC NO FW-04	OF 50
REV	BY	DATE	CHECKED	DATE			

Result Summary - D) Support Status

(i) List of Supports Considered Active in the Subject Calculation

These include all the original "as-built" supports which are completed as well as incomplete, and the already installed new supports.

Data Point As-Built /Rev. 0	Support I.D. Number	Current Status	Remark
A - Safe shutdown piping from Pen. C-36			
758	S1-02-326-H015	IM	
739	S1-02-326-H009	CM	
716	S1-02-326-H003	CN	
714	S1-02-326-H004	CR	
713	S1-02-326-H012	CX	
708	S1-02-326-H005	IX	Existing
782	S1-02-326-H007	CM	
790	S1-02-326-H008	IM	
595	S1-02-325-H022	CM	See note on next page.
536	S1-05-325-H005	IX	New
B - Safe shutdown piping from Pen. C-34			
667	S1-02-325-H526	CX	
658	S1-02-325-H019	IM	
639	-H013	CM	
625	-H323	CX	
616	-H007	CN	
614	-H008	CR	
613	-H020	CX	
608	-H010	IX	Existing
604	-H005	CX	
682	S1-02-325-H011	IM	
690	S1-02-325-H012	IM	
550	S1-02-325-H021	IX	Existing

REV	BY	DATE	CHECKED	DATE	SONGS-1 Safe Shutdown Piping Functionality Assessment	JOB NO 0310-022-1352	PAGE 45
0	KH	11/27/85	MKT	12/13/85		CALC NO FW-04	OF 57

(ii) List of Inactive Supports

These are the incomplete new supports that are not required to meet the piping functionality criteria as demonstrated in the subject calculation.

These supports need not be installed:

Data Point As ~~Built~~/Rev. 0	Support I.D. Number	Current Status	Remarks
A- Safe Shutdown piping from Rev. C-3B			
701	S1-02-326-H006	IX	New
725	S1-02-326-H313	Ix	New
745	S1-02-326-H010	Ix	New
767	S1-02-326-H514	Ix	"
798	S1-02-326-H016	Ix	"
799	S1-02-326-H017	Ix	"
595	S1-02-325-H019	CX	See note 2 on previous page C
B- Safe Shutdown piping from Rev. C-3A			
645	S1-02-325-H014	Ix	New
698	S1-02-325-H125	Ix	New
699	S1-02-325-H026	Ix	New
C- Safe Shutdown piping from Rev. C-3C			
825	S1-02-329-H314	Ix	New
845	S1-02-329-H008	Ix	New
867	S1-02-329-H515	Ix	"
898	-H016	Ix	"
899	-H017	Ix	"
570	S1-02-325-H516	Ix	"

REV	BY	DATE	CHECKED	DATE
0	KH	11/21/85	[illegible]	[illegible]

SONGS-1
Safe Shutdown Piping Functionality Assessment
JOB NO 0310-022-1352
CALC NO FW-04
PAGE 47 OF 52

5.0 CONCLUSION/RECOMMENDATION

The subject piping system as described in this report in its "as-installed" support configuration (see mathematical model in Section 3.0) does not meet

- the piping functionality stress criteria

for loading as described in Section 1B.

- Some Rev. 0 new/modified support(s) will be needed to limit the stress within the allowables

Subsequent to the careful review of the overall behavior of the piping system under faulted loading, Impell believes by

- installing the following incompleted support(s),

the system can be demonstrated to meet the functionality criteria.

Support I.D. Number The X, snubber support @ DP (595)
S1-05-325-H005 @ (556)

					SONGS-1		
					Safe Shutdown Piping Functionality Assessment		
0	KH	11/21/83	MHT	12/14/83		JOB NO 0310-022-1352 CALC NO FW-04	PAGE 12 OF 50
REV	BY	DATE	CHECKED	DATE			

6.0 REFERENCES

1. SCE Isometric Number 228667 TO 228678 (See Appendix A (of this problem file))
2. Bechtel Calculation Number FW-04 (Rev. 0)
3. W Calculation Number N/A
4. P&ID Number 568779-22
5. Impell Report #04-0310-0063, Revision 0
6. ANSI B31.1, 1980 Edition, Winter 1980 Addenda.
7. Appendix I of ASME B&PV Code, Section IV, 1980 Edition, Winter 1980 Addenda.
8. Impell Project Instruction No. 50-01 "SCE SONGS-1 Application of Functionality Criteria to Safe Shutdown Piping", Rev. 0
9. San Onofre Nuclear generating Station unit 1, Balance of Plant Structures Seismic Evaluation Instructure response Spectra dated 7/82 (Appendix A)
10. AISC Steel Manual 8TH Edition
11. "Structural Dynamic" Biggs.
12. FW-04 Hanger Sketch
13. Support Stiffness of FW-04; Hand delivered from G. Gardland of SCE dated 12/8/83 (In Appendix A of this file)
14. SUPERPIPE computer Analysis with Supports considered rigid (Sequence No AEYADSV dated 12/7/83)
15. SUPERPIPE computer Analysis with support stiffness considered. (Sequence No. AEYA4WH dated 12/8/83)

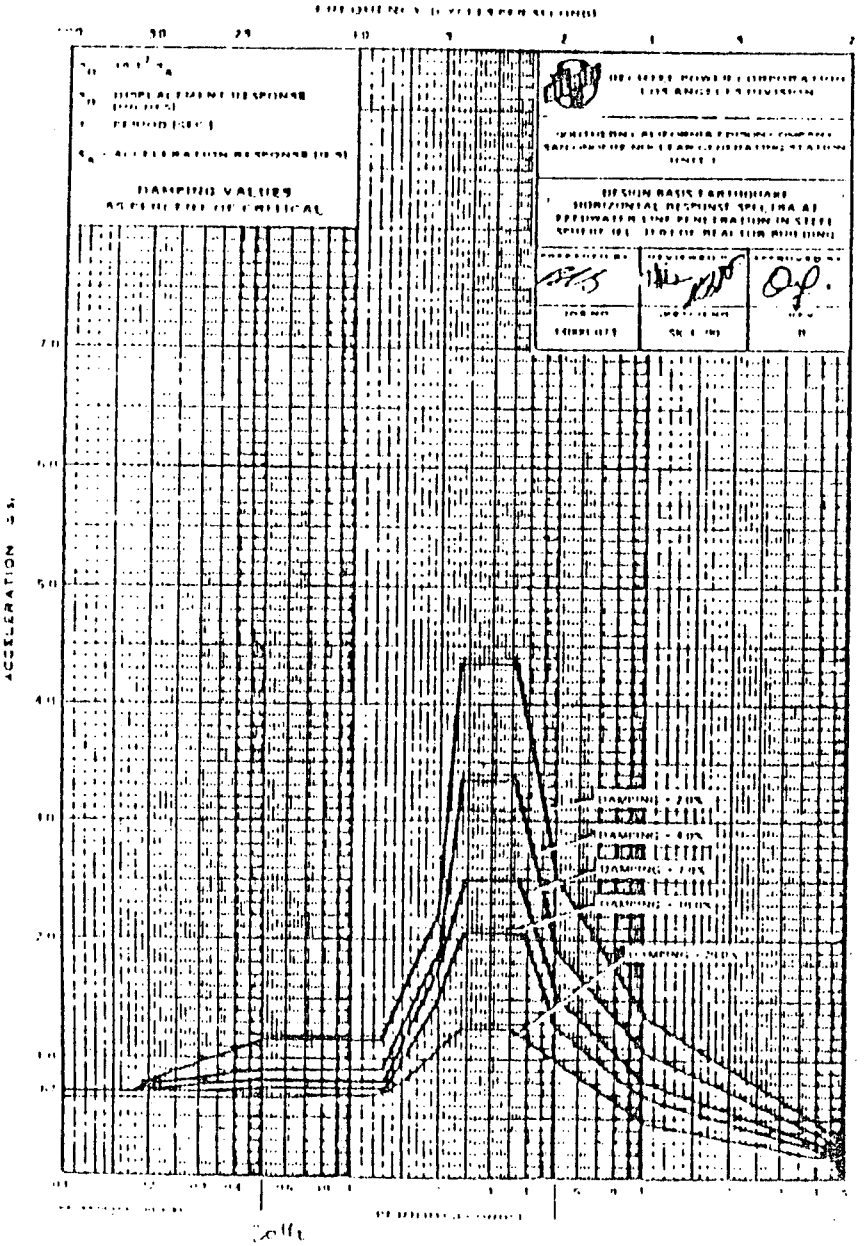
					SONGS-1		
					Safe Shutdown Piping Functionality Assessment		
						JOB NO 0310-022-1352	PAGE 40
0	KH	11/21/83	NMT	12/12/83		CALC NO FW-04	OF 50
REV	BY	DATE	CHECKED	DATE			

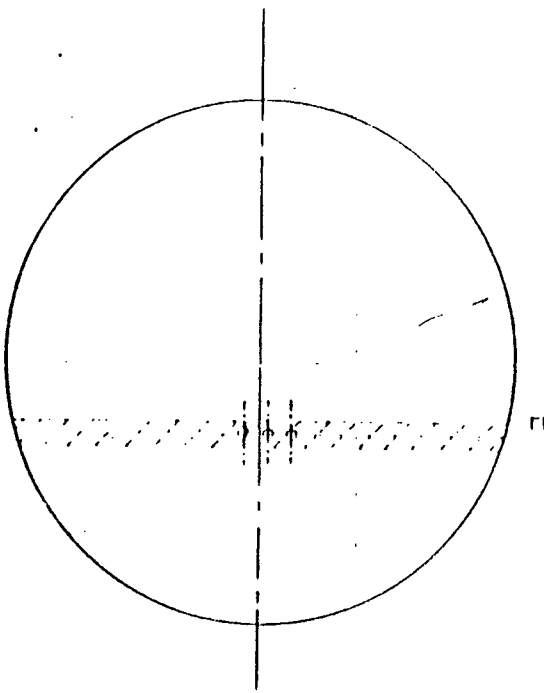
APPENDIX A:

- SCE "As-Installed" Stress Isometrics

- RESPONSE SPECTRA CURVES
- HAND DELIVERED SUPPORT STIFFNESS IN FW-04
- ROC between Ashwin Kadakia and Gordie Haw dated 12/1/83
- "SUPERPIPE" Computer Analysis with support considered rigid
- "SUPERPIPE" Computer Analysis with support stiffness considered

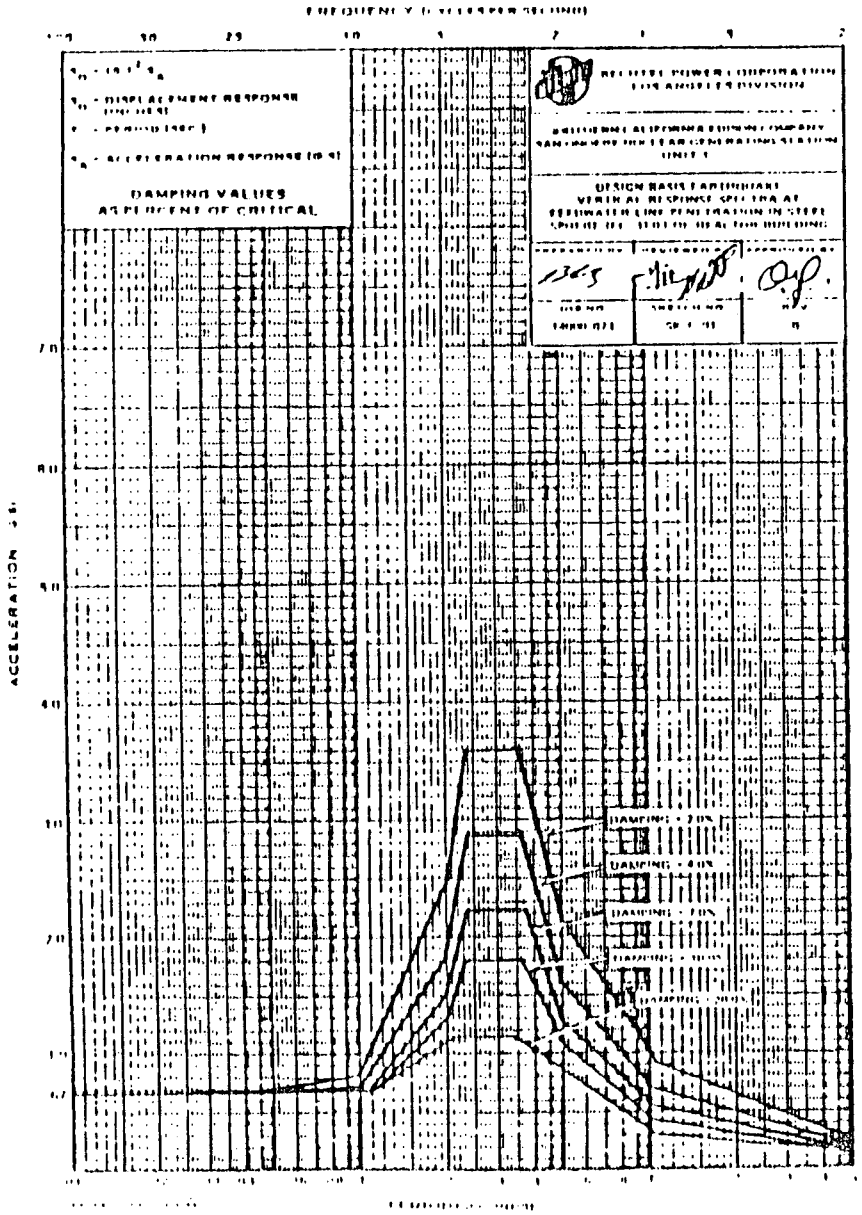
					SONGS-1		
					Safe Shutdown Piping Functionality Assessment		
					JOB NO 0310-022-1352	PAGE 50
0	KK	1/21/83			CALC NO FW-04	OF 50
REV	BY	DATE	CHECKED	DATE		

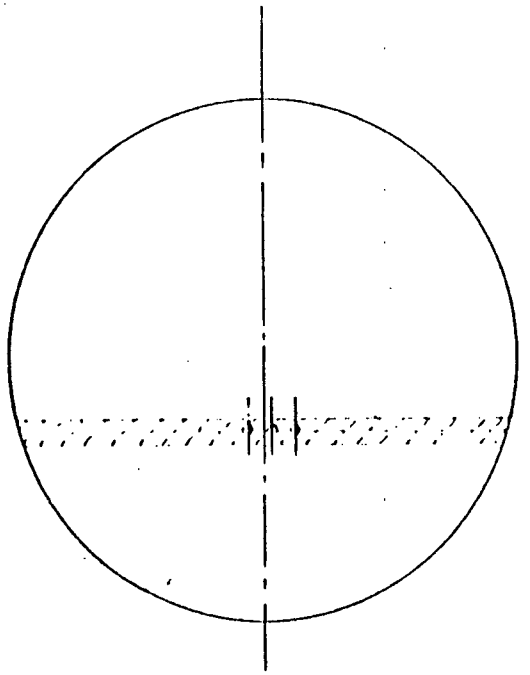




ELEVATION
FEEDWATER LINE PENETRATION
IN STEEL SPHERE EL. 31'-0"

LEGEND
APPLICABLE
AREA





ELEVATION
FEEDWATER LINE PENETRATION
IN STEEL SPHERE EL. 31'-0"

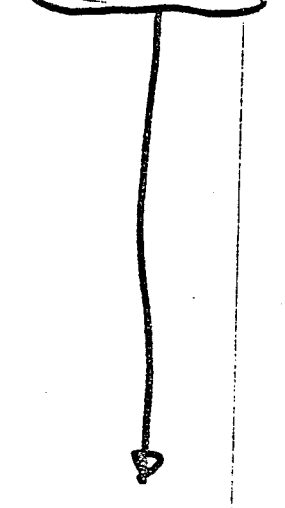
LEGEND

APPLICABLE
TABLE A

FW-04

Spring Constants AS01

890	Y 1.4 x 10⁴
882	Z 8.5 x 10³
859	"
685½	Y 10⁴
645	Z 8.5 x 10³
639	
758	
745	
739	
845	
858	
~~8[illegible]~~	



Hand delivered from G. Gartland of SCE

dated 12/8/83

REV	BY	DATE	CHECKED	DATE	SCE / SONGS-1	JOB NO 0310-023-[illegible]	PAGE
0	KH	12/9/83			IMPELL CORPORATION	CALC NO FW-04	OF

IMPELL CORPORATION

Record of Conversation

File: 0310-022

Copy: M. Shulman
WD Gallo
T. Lau
W. Hahn
K. Barkle
~~K. Hoang (FW-04 file~~

☒ Telephone ☐ Meeting ☐ Other

To: Ashvin Kadakia

From: G. Hau

Company: Bechtel - Norwalk

Phone No.: (213) 807-3716 Date: 12/1/83

Subject: SONGS 1

Summary of Conversation:

On the status of supports attached to the mezzanine floor in the Turbine Building with 3 kip/inch stiffness, Ashvin gave me the following information. (I called G. Gartland of SCE early this week, but Gerry is out of the office until 12/6):

- Only two analyses FW-04 and SI-51 have supports attached to this floor. Bechtel does not have a list of support ID numbers for these supports.

- There is no decision on stiffening this floor yet.

Our approach:

SI-51 is not in our scope. For FW-04, we'll locate these supports from the support design sketches (We made a copy two weeks ago at Bechtel-Norwalk). From there we'll investigate whether or not these supports can be deleted by applying our functionality criteria.

GH/slm

SUPERSEDED

SUPERSEDED

By [illegible]

NOS 1.4-573/564-3 83/
OPERATING SYSTE
JOB ORIGIN = REM

USER NUMBER = SCE1
JOBCARD NAME = JOB

```
 AAAAAAAAAA    EEEEEEEEEEEE  YY        YY   AAAAAAAAAA    DDDDDDDDD     SSSSSSSSS   VV        VV
AAAAAAAAAAAA   EEEEEEEEEEEE  YY        YY  AAAAAAAAAAAA   DDDDDDDDDD   SSSSSSSSSSS  VV        VV
AA        AA   EE            YY        YY  AA        AA   DD       DD  SS          S  VV        VV
AA        AA   EE            YY        YY  AA        AA   DD       DD  SS             VV        VV
AA        AA   EE            YY        YY  AA        AA   DD       DD  SS             VV        VV
AA        AA   EE            YY        YY  AA        AA   DD       DD  SS             VV        VV
AA        AA   EE            YYY      YYY  AA        AA   DD       DD  SS              VV      VV
AA        AA   EEEEEEEE       YYY    YYY   AA        AA   DD       DD  SSSSSSSSSS      VV      VV
AAAAAAAAAAAA   EEEEEEEE        YYY  YYY    AAAAAAAAAAAA   DD       DD   SSSSSSSSS      VV      VV
AAAAAAAAAAAA   EE               YYYY       AAAAAAAAAAAA   DD       DD            SS     VV  VV
AA        AA   EE               YY         AA        AA   DD       DD            SS     VV  VV
AA        AA   EE               YY         AA        AA   DD       DD            SS     VV  VV
AA        AA   EE               YY         AA        AA   DD       DD            SS      V  V
AA        AA   EE               YY         AA        AA   DD       DD  S         SS      VVVV
AA        AA   EEEEEEEEEEEE     YY         AA        AA   DDDDDDDDDD   SSSSSSSSSSS      VVVV
AA        AA   EEEEEEEEEEEE     YY         AA        AA   DDDDDDDDD     SSSSSSSSS        VV
```

83/12/07. 05.37.16.

FW-04
w/ support mgrd.

*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*

EDS NUC[redacted] INC
PROGRAM [redacted]PIPE
VERSION: 15C DATE: [redacted]/82 SYSTEM: EDS - NOS

SUPERPIPE IS A COMPREHENSIVE COMPUTER PROGRAM FOR THE STRUCTURAL ANALYSIS AND CODE COMPLIANCE VERIFICATION OF PIPING SYSTEMS, WITH PARTICULAR EMPHASIS ON NUCLEAR POWER PIPING DESIGNED TO MEET THE REQUIREMENTS OF THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, FOR CLASS 1, 2 AND 3 NUCLEAR PIPING SYSTEMS. THE PROGRAM HAS THE FOLLOWING MAJOR FEATURES....

** SPECIFICATION AND PLOT OF SYSTEM GEOMETRY.
** STATIC AND THERMAL LOAD ANALYSIS.
** DETERMINATION OF DYNAMIC PROPERTIES.
** RESPONSE SPECTRUM ANALYSIS.
** FORCE AND EARTHQUAKE TIME-HISTORY ANALYSIS.
** CODE COMPLIANCE CHECKS FOR ASME SECTION III.
** PIPE BREAK LOCATION DETERMINATION.
** PIPE SUPPORT LOADS AND DISPLACEMENT SUMMARIES.

****

SUPERPIPE INCLUDES MANY USER ORIENTED OPTIONS SUCH AS...

** COMPLETE PIPING ANALYSIS IN A SINGLE COMPUTER RUN OR IN DISCRETE PHASES OVER A PERIOD OF TIME.
** STORAGE OF DATA RESULTS AND RECALL FOR SUBSEQUENT USE.
** EXTENSIVE COORDINATE GENERATION CAPABILITY FOR MODEL GEOMETRY.
** LARGE LIBRARY OF STANDARD MATERIAL PROPERTIES,PIPING CROSS SECTIONS, AND FLEXIBILITY AND STRESS INTENSIFICATION FACTORS FOR COMPONENTS.
** EXTENSIVE ERROR AND WARNING MESSAGES TO AID DATA CHECKING.
** MULTIPLE LOAD CASES FOR THERMAL EXPANSION AND STATIC ANALYSIS.
** CAPABILITY TO EVALUATE STRESSES AND SUPPORT LOADS DUE TO INTERNAL PRESSURE LOADINGS.
** VARIOUS RESPONSE SPECTRUM ANALYSIS OPTIONS FOR MODAL AND DIRECTIONAL COMBINATIONS AND MULTIPLE RESPONSE SPECTRA INPUT EXCITATION AT DIFFERENT SUPPORTS.
** AUTOMATIC GENERATION OF MASS POINTS FOR DYNAMIC ANALYSIS TO OBTAIN THE DESIRED ACCURACY IN DYNAMIC CHARACTERISTICS.
** OPTION TO ADD EXTRA DATA POINTS FOR CODE COMPLIANCE CHECKS WITHOUT REANALYSIS.
** OUTPUT OF RESULTS IN A FORMAT APPROPRIATE TO STRESS REPORTS.

****

SUPERPIPE HAS BEEN DEVELOPED, DOCUMENTED AND VERIFIED FOR PRINCIPAL USE ON ANALYSES RELATING TO NUCLEAR SAFETY.

SUPERPIPE IS A CONTROLLED PROGRAM AVAILABLE FOR USE EXCLUSIVELY THROUGH EDS NUCLEAR INC. FOR INFORMATION CONTACT....DIVISION MANAGER, ENGINEERING SERVICES DEVELOPMENT DIVISION. TELEPHONE (415) 544-[redacted].

*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*

SUPERPIPE NEWS

UPDATED : 06/28/82

****
SUPERPIPE VERSION 15C 06/28/82 PROGRAM RELEASE
****

SUPERPIPE VERSION 15C 06/28/82 IS RELEASED FOR PRODUCTION USE. THIS VERSION CORRECTS THREE ERRORS RECENTLY IDENTIFIED IN THE 11/15/79 AND 15B 01/31/82 VERSIONS. THESE ERRORS ARE :

- MODE SHAPE PLOTTING ERROR
- SUPPORT PLOTTING ERROR (VERSION 15B 01/31/82 ONLY)
- CALCULATION OF AVERAGE YOUNGS MODULUS IN CLASS 1 FATIGUE CALCULATIONS

THE PLOTTING ERRORS DO NOT AFFECT ANALYSIS RESULTS. THE CALCULATION OF THE AVERAGE YOUNGS MODULUS VALUE (EAB) IN CLASS1 FATIGUE STRESS ANALYSES MAY, IN CERTAIN CASES, AFFECT ANALYSIS RESULTS. USERS SHOULD REVIEW THE ERROR IMPACT EVALUATION REPORT ISSUED 07/20/82 DISCUSSING POSSIBLE EFFECTS OF THIS ERROR.

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE 1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ION
CALCULATION NO. FW-04

DESIGN VERIFICATION

CLIENT SCE / SONGS-1

JOB NO. 0310-022-1352

CALC./PROB. NO. FW-04

PREPARED BY: Kim Noons DATE: 12/7/83

CHECKED BY: Ronald J. Shiu DATE: 12/9/83

```
SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE        I
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

COLUMN                                                                                       INPUT
         1         2         3         4         5         6         7         8             CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789 0 SEQUENCE

 SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UNIT 1                                           1
 SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION                                         2
*CALCULATION NO. FW-04                                                                          3
 NOEL                                                                                           4
 EXEC STAT DYNP SPEC DESC                                                                       5
    F   FT    IN    IN LBIN LBIN LBIN LBIN                                                      6
 GEOM    5     1                                                                                7
 RUN1 CLS2              10"PIPING FROM PEN C-3C TO SUPPORTS AT 535 & 595                        8
 PC3C                   DIP    9.0      31.458     0.0                                          9
 MEZZ                   OFF    4.25                             PC3C                           10
  834                   OFF   2.550                             MEZZ                           11
  868                   OFF    1.5                               834                           12
  866                   OFF    1.512                             868                           13
  859                   OFF    1.29                              866                           14
 S858                   OFF    1.29                              859                           15
  856                   OFF    2.58                             S858                           16
 854A                   OFF    1.0                               856                           17
  852                   OFF     .58                             854A                           18
  849                   OFF     .975                             852                           19
  848                   OFF     .975                             849                           20
  846                   OFF     .58                              848                           21
 S845                   OFF     .5                               846                           22
  844                   OFF     .5                              S845                           23
  841                   OFF    1.29                              844                           24
  840                   OFF    1.29                              841                           25
 838A  TNP              TAN                                                                    26
 S838                   CVA   45.0                                                             27
  838  TIP    1.25      OFF    2.542                             841                           28
 838B  TNP              TAN                                                                    29
  836                   OFF               3.71                   838                           30
 812A  TNP              TAN                                                                    31
 812C  BRP              CVA   45.0                                                             32
  812  TIP    1.25      OFF               2.5                    836                           33
 812B  TNP              TAN                                                                    34
  81                    OFF    4.96                              812                           35
 P810A                  OFF    2.0625                            810                           36
  809                   OFF    1.0625                           P810A                          37
 P809  BFP              OFF    2.75       2.833      -5.!        808                           38
  8 6                   OFF    5.1875                            808                           39
  8 4                   OFF    4.667                             806                           40
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                                   INPUT
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12345678901234567890123456789012345678901234567890123456789012345678901234567890                     SEQUENCE

  802                 OFF   5.833                                  804                                 41
 802A                 OFF   0.5625                                 802                                 42
  565                 OFF   1.156                                 802A                                 43
*565T  BRP            OFF   1.0104                                 565                                 44
 RUN2 CLS2            2"PIPING FROM DATA POINT 812C TO 836                                             45
 812C  BRP            DUP                                                                              46
  991                 OFF  -2.3661                                812C                                 47
  813                      -5.6                                    991                                 48
  814                      -5.69                                   813                                 49
 R814  REP                            1.83      -4.17              814                                 50
  816                      -0.16667                                814                                 51
 818A  TNP            TAN                                                                              52
  818  TIP     .25         -1.92                                   816                                 53
 818B  TNP            TAN                                                                              54
  820                                -1.32                         818                                 55
 820A                                 -.35                         820                                 56
 820B                                 -.35                        820A                                 57
 824A  TNP            TAN                                                                              58
  824  TIP     .25                  -2.6339                       820A                                 59
 824B  TNP            TAN                                                                              60
  825                      -2.33                                   824                                 61
  826                      -0.92                                   825                                 62
  828                      -0.67                                   826                                 63
  830                      -0.06                                   828                                 64
 830B  TNP            TAN                                                                              65
 830A  TIP    .25     OFF  -0.35                                   830                                 66
 830C  TNP            TAN                                                                              67
  832                                -0.35                        830A                                 68
* 834                 DUP                                                                              69
 RUN3 CLS2            4"PIPING FROM DATA POINT 836 TO 868                                              70
  836                 DUP                                                                              71
 872A  TNP                                                                                             72
  872  TIP     0.5                              -2.0               836                                 73
 872B  TNP                                                                                             74
 874A  TNP                                                                                             75
  874  TIP    .5                     -3.71                         872                                 76
 874B  TNP                                                                                             77
  876                      -1.333                                  874                                 78
  877                      -0.71                                   876                                 79
  880                      -  .71                                  877                                 80
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-04

ECHO PRINT OF INPUT DATA

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885		-0.71			884			83
888		-0.71			885			84
890		-6.29			888			85
892		-0.29			890			86
894		-1.42			892			87
895		-0.71			894			88
897		-0.71			895			89
898		-0.317			897			90
9.0A TNP	TAN							91
9.0 TIP	2.5	-1.86			895			92
900B TNP	TAN							93
* 86R	DUP							94
RUN4 CLS2	325-18"-EG PIPING							95
585				2.92	585			96
585A				1.25	585			97
585				2.0	580			98
580B				1.125	580			99
580 BRP				4.25	575			100
580A				-1.125	580			101
575				.75	570			102
571				2.0	565T			103
565B				1.125	565T			104
565T BRP	DUP							105
565C				-1.125	565T			106
560A TNP								107
560 TIP	1.5			-2.650	565T			108
560B TNP								109
555A TNP								110
555 TIP	2.25	2.4688	-2.4688		560			111
555B TNP								112
551		6.75			555			113
P55 BRP		1.583	-2.083	-5.583	550			114
545A TNP								115
545 TIP	2.250	7.0			550			116
545B TNP								117
540			-3.5		545			118
536			-3.33		540			119
*P536 BRP		5.75		-1.583	536			121

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. EW-04

ECHO PRINT OF INPUT DATA

COLUMN 1	2	3	4	5	6	7	8	INPUT CARD SEQUENCE
12345678901234567890	12345678901234567890	12345678901234567890	12345678901234567890	12345678901234567890	12345678901234567890	12345678901234567890	12345678901234567890	
RUNS CLS2		10"PIPING FROM DATA POINT 580 TO 739.						121
58 PRD		DUP						122
580C		-1.6104			580			123
701		-2.25			580			124
704		-6.73			701			125
706		-4.67			704			126
708		-5.19			706			127
708 PRE		2.75	2.72	-5.0	708			128
710A		-2.8125			708			129
71		-3.0625			710A			130
710A TNP								131
710 TIP	1.25	-4.96			710			132
710B TNP								133
736			-2.5		712			134
* 739			-3.71		736			135
86 MND			0.95		859			136
85 MND			1.0		849			137
89 MND			0.5		895			138
886 MND			0.75		885			139
842 MND			3.75		841			140
* 879 MND			.500		877			141
STRP 1 SCH8 S		10.75	0.5					142
MASS		5.75						143
STRP 1 SCH8 S		10.75	0.593					144
MASS		8.684						145
STRP 4SCH8 S		4.5	0.337					146
MASS		2.94						147
STRP 2SCH8 S		2.37	0.218					148
MASS		1.786						149
STRP 1 SCH8		10.7	0.937					150
MASS		22.76						151
RTEE 1 X1 X1		10.7	0.937	10.75	0.593			152
MASS		22.76	8.684					153
RRED 1 X1 RED		10.7	0.937	10.75	0.593			154
MASS		22.76						155
VALV 1 INVALV		11.94	1.186					156
VALV 1 INVALV		9.62	1.0					157
RRED 1 X4 RED		10.75	0.593	8.62	0.50			158
MASS		8.684						159
RELB 1 INELB		10.75	0.593					160

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ION
CALCULATION NO. FW-54

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                          INPUT
         1         2         3         4         5         6         7         8               CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890           SEQUENCE

                 MASS    8.064                                                                  161
 BELB  10INELB           18.0        0.937                                                      162
                 MASS   22.76                                                                   163
 BELB  4INELB             4.5        0.337                                                      164
                 MASS    2.54                                                                   165
 SELB  2INELB            2.37        0.218                                                      166
                 MASS    6.786                                                                  167
 VALV  4INVALV          5.176        0.674                                                      168
 VALV  2INVALV          2.856        0.436                                                      169
*VLOP  VLOP             30.0        10.0                                                        170
*SA106 B                                                                                        171
   A1 STRP  10SCH80S SA106 B           866                                                      172
   A2 VALV  10INVALV SA106 B           856                                                      173
   A3 STRP  10SCH80  SA106 B          854A                                                      174
   A3 BREDR 10XERED  SA106 B           852                                                      175
   A4 VALV  8INVALV  SA106 B           848                                                      176
   A5 BREDE 10XPRED                    846                                                      177
   A6 STRP                             844                                                      178
   A7 VALV  10INVALV                   840                                                      179
  A7A STRP                            838A                                                      180
   A8 BELB  10INELB  SA106 B          838B                                                      181
   A9 STRP  10SCH80                   812A                                                      182
  A10 BELB  10INELB                   812B                                                      183
  A11 STRP  10SCH80                    565                                                      184
* A12 BTEEB 18X18X10 SA106 B          565T                                                      185
   B1 STRP  2SCH80S                   818A                                                      186
   B2 SELB  2INELB   SA106 B          818B                                                      187
   B3 STRP  2SCH80S                    820                                                      188
   B4 VALV  2INVALV  SA106 B          820B                                                      189
   B5 STRP  2SCH80S                   824A                                                      190
   B6 SELB  2INELB                    824B                                                      191
   B7 STRP  2SCH80S                    826                                                      192
   B8 VALV  2INVALV  SA106 B           828                                                      193
   B9 STRP  2SCH80S                   830B                                                      194
  B10 SELB                            830C                                                      195
* B12 STRP  2SCH80S                    834                                                      196
   C1 STRP  4SCH80S  SA106 B          872A                                                      197
   C2 BELB  4INELB                    872B                                                      198
   C3 STRP  4SCH80S  SA106 B          874A                                                      199
   C4 BELB  4INELB                    874B                                                      200
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SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]TION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

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COLUMN                                                                                  INPUT
         1         2         3         4         5         6         7         8        CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  SEQUENCE

   C5 STRP                        876                                               201
   C6 VALV   4INVALV   SA106 B    880                                               202
   C7 STRP                        884                                               203
   C8 VALV   4INVALV              888                                               204
   C9 STRP                        892                                               205
  C10 VALV                        897                                               206
  C11 STRP                       900A                                               207
  C12 BELB                       900B                                               208
* C13 STRP                        868                                               209
   D1 STRP   18SCH80   SA106 B   585A                                               210
   D2 PREDE  18X10RED  SA106 B    585                                               211
   D3 STRP   18SCH80   SA106 B   580B                                               212
   D4 BTEER  18X18X10  SA106 B   580A                                               213
   D5 STRP                       565B                                               214
   D6 BTEER  18X18X10            565C                                               215
   D7 STRP                       560A                                               216
   D8 BELB   18INELB   SA106 B   560B                                               217
   D9 STRP                       555A                                               218
  D10 BELB                       555B                                               219
  D11 STRP                       545A                                               220
  D12 BELB                       545B                                               221
* D13 STRP                        536                                               222
   E1 BTEEB  18X18X10  SA106 B   580C                                               223
   E2 STRP   10SCH80             712A                                               224
   E3 BELB   10INELB             712B                                               225
*  E4 STRP   10SCH80              739                                               226
 VLOP                  RIGID VALVE OPERATOR                                         227
   F1 VLOP   VLOP      SA106 B      859   860                                       228
   F2 VLOP   VLOP      SA106 B      849   850                                       229
   F3 VLOP   VLOP      SA106 B      895   896                                       230
   F4 VLOP   VLOP      SA106 B      885   886                                       231
   F5 VLOP   VLOP      SA106 B      841   842                                       232
*  F6 VLOP   VLOP      SA106 B      877   878                                       233
   W1  866     253.                                                                 234
   W2  869    1134.                                                                 235
   W3 585B     638.                                                                 236
   W4  856     355.                                                                 237
   W5  852     264.                                                                 238
   W6  859    1159.                                                                 239
   W7  848     264.                                                                 240
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SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                         INPUT
         1         2         3         4         5         6         7         8        CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   SEQUENCE

    W8   844     849.                                                                   241
    W9   842      360.                                                                  242
   W10   840     849.                                                                   243
   W11   810     188.                                                                   244
   W12  810A     188.                                                                   245
   W13  802A     188.                                                                   246
   W14   802     188.                                                                   247
   W15   710    188.                                                                    248
   W16  710A    188.                                                                    249
   W17   820     32.                                                                    250
   W18  820B     32.                                                                    251
   W19   826     19.                                                                    252
   W20   828     19.                                                                    253
   W21   830     38.5                                                                   254
   W22   832     38.5                                                                   255
   W23   876     49.                                                                    256
   W24   883      49.                                                                   257
   W25   878    197.                                                                    258
   W26   886    265.                                                                    259
   W27   884     67.                                                                    260
   W28   888     67.                                                                    261
   W29   892     86.                                                                    262
   W30   894    129.                                                                    263
   W31   896    197.                                                                    264
 * W32   897     49.                                                                    265
  PENC  PC3C ANCH                                                                       266
  858Y  S858 SNGL                                           Y                           267
  858Z  S858 SNGL                                           Z                           268
  839Y  S839 SNGL                                           Y                           269
  S816   816 CONF                                           Y                           270
  839Z  S839 SNGL                                           Z                           271
  S808   808 SNUB                                        INCL R808                      272
  814Y   814 SNGL                                           Y                           273
  S814   814 SNUB                                        INCL R814                      274
  S540   540 CONF                                           Y                           275
  813Y   813 SNGL                                           Y                           276
  550S   550 SNUB                                        INCL R550                      277
  813Z   813 SNGL                                           Z                           278
  890Y   890 SNGL                                           Y                           279
  890Z   890 SNGL                                           Z                           280
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          SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
          SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL  ION
          CALCULATION NO. FW-04


ECHO PRINT OF INPUT DATA

COLUMN.                                                                                    INPUT
          1         2         3         4         5         6         7         8           CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  SEQUENCE

 882Y   882 SNGL                                               Y                            281
 882Z   882 SNGL                                               Z                            282
 595X   595 SNUB                                               X                            283
 536S   536 SNUB                                          INCL R536                         284
 S708   708 SNUB                                          INCL R708                         285
 739Y   739 SNGL                                               Y                            286
*739Z   739 SNGL                                               Z                            287
*                                                                                           288
*GRAV GRAV                                 GRAVITY ANALYSIS                                 289
 TEMP          420.                                                                         290
*GRAV                                                                                       291
 DYNP         33.             PRN1      PMOD                                                292
*TEMP          420.                                                                         293
 HORZ  F G  LOG  HORIZONTAL RESPONSE SPECTRA OF FEEDWATER LINE PEN AT EL. 31'               294
    1.        .67       6.       .67      20.       .9       8.5       .9                   295
    5.        1.9       4.7      3.35     3.0      3.35      2.0       1.9                  296
*   1.0       1.1       .20      .3                                                         297
*VERT  F G  LOG  VERICAL    RESPONSE SPECTRA OF FEED WATER LINE PEN AT EL. 31'              298
   1 .        .67       1 .      .7       5.0      1.80      4.6      2.88                  299
*   3.2       2.88      2.       1.6      1.0      .7        .2       .21                   300
*SEIS                                     ACCN             SEISMIC  ANALYSIS                301
 LIST                   866  860 S858  856  852  850  848  844  842  840                    302
 LIST                   802A  802  710 710A  820 820B  826  828  830  832  876  880         303
*LIST                   878  886  884  888  892  894  896  897  810 810A                    304
 HORZ VERT HORZ                                                                             305
 CL2A                   NEWC NEWP NEWT               STRESS CHECK SUMMARY                   306
 GRAV                        GRAV                                                           307
*SEIS                        SEIS                                                           308
*PRES                  MAXIMUM PRESSURE                                                     309
*                    1219.                                                                  310
*TEMP                  MAXIMUM TEMPERATURE                                                  311
*                    420.                                                                   312
*EQ9F GRAV SEIS         EQ9F PRES TEMP         3.953FUNCTIONALITY STRESS CHECK              313
*SUPP                   NEWC NEWP NEWT               SUPPORT LOAD SUMMARY                   314
 GRAV                        GRAV                                                           315
*SEIS                        SEIS                                                           316
*PRES                  MAXIMUM PRESSURE                                                     317
*                    1219.                                                                  318
*TEMP                  MAXIMUM TEMPERATURE                                                  319
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SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

DATA STORAGE INDICATORS

DATA FILE = NOFL (NO FILE)

REMAINING INDICATORS IGNORED

ANALYSIS CONTROL INDICATORS

DATA EXECUTION = EXEC (EXECUTION REQUIRED)

ANALYSES TO BE EXECUTED

STAT (STATIC LOAD ANALYSIS)
DYNP (COMPUTE DYNAMIC PROPERTIES)
SPEC (RESPONSE SPECTRUM ANALYSIS)
DESC (CODE COMPLIANCE CHECKING)

UNITS SPECIFICATION

TEMPERATURE SCALE	= F
COORDINATE INPUT	= FT
COMPONENT DIMENSIONS	= IN
DISPLACEMENTS, ETC.	= IN
SUPPORT, ETC. STIFFNESSES	= LBIN
FORCES AND MOMENTS	= LBIN
COMPONENT WTS, UNIF LOADS	= LBIN
STRESSES, MODULI, PRESSURES	= LBIN

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

GEOMETRY DATA CONTROL INFORMATION

DATA NAME = GEOM
DATA TITLE =

NO. OF PIPE RUNS = 5
NO. OF MISC. MEMBER GROUPS = 1

ASME CODE EDITION = (BLANK - DEFAULTS TO E-80)

COORDINATE CODE = (BLANK - NO COORDINATE TRANSFORMATION)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

CONTROL POINT COORDINATES, AS COMPUTED AND STORED

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN1					
	FC3C		3.000	31.458	0.000
	NE77		4.253	31.458	0.000
	874		6.754	31.458	0.000
	868		8.252	31.458	0.000
	866		9.762	31.458	0.000
	859		11.252	31.458	0.000
	S858		12.342	31.458	0.000
	856		14.822	31.458	0.000
	854A		15.822	31.458	0.000
	852		16.582	31.458	0.000
	849		17.477	31.458	0.000
	848		18.452	31.458	0.000
	846		19.032	31.458	0.000
	S845		19.532	31.458	0.000
	844		20.032	31.458	0.000
	841		21.322	31.458	0.000
	841		22.612	31.458	0.000
	838A	TNP	22.614	31.458	0.000
	S838		23.498	31.824	0.000
	838	TIP	23.864	31.458	0.000
	838B	TNP	23.864	32.708	0.000
	836		23.864	35.168	0.000
	812A	TNP	23.864	36.418	0.000
	612C	BRP	24.230	37.302	0.000
	812	TIP	23.864	37.668	0.000
	812B	TNP	25.114	37.668	0.000
	81[illegible]		28.924	37.668	0.000
	81[illegible]A		28.887	37.668	0.000
	8[illegible]8		29.540	37.668	0.000
	R8[illegible]8	REP	32.699	40.501	-5.000
	8[illegible]6		35.137	37.668	0.000
	8[illegible]4		37.864	37.668	0.000
	8[illegible]2		45.436	37.668	0.000
	8[illegible]2A		45.698	37.668	0.000
	565		46.855	37.668	0.000
	565T	BRP	47.065	37.668	0.000
RUN2					
	812C	BRP	24.23[illegible]	37.3[illegible]2	[illegible].000
	991		21.864	37.302	[illegible].000
	813		16.564	37.302	[illegible].000
	814		11.174	37.302	[illegible].000
	R814	REP	11.174	39.132	-4.175

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. FW-P4

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN2 (CONTD.)					
	816		11.997	37.302	0.000
	818A	TNP	9.337	37.302	0.000
	818	TIP	9.187	37.302	0.000
	818B	TNP	9.187	37.052	0.000
	820		9.087	35.982	0.000
	82?A		9.087	35.632	0.000
	82?B		9.087	35.282	0.000
	824A	TNP	9.087	33.248	0.000
	824	TIP	9.087	32.998	0.000
	824B	TNP	8.837	32.998	0.000
	825		8.757	32.998	0.000
	826		7.837	32.998	0.000
	828		7.167	32.998	0.000
	83?		7.197	32.998	0.000
	83?B	TNP	7.006	32.998	0.000
	83?A	TIP	6.757	32.998	0.000
	832C	TNP	6.756	32.749	0.000
	832		6.757	32.648	0.000
	834		6.756	31.458	0.000
RUN3					
	836		23.864	35.168	0.000
	872A	TNP	23.864	35.168	-1.500
	872	TIP	23.864	35.168	-2.000
	872B	TNP	23.864	34.668	-2.000
	874A	TNP	23.864	31.958	-2.000
	874	TIP	23.864	31.458	-2.000
	874B	TNP	23.364	31.458	-2.000
	876		22.491	31.458	-2.000
	877		21.781	31.458	-2.000
	881		21.971	31.458	-2.000
	882		21.611	31.458	-2.000
	884		21.241	31.458	-2.000
	885		19.531	31.458	-2.000
	886		19.821	31.458	-2.000
	891		12.531	31.458	-2.000
	892		12.241	31.458	-2.000
	894		11.821	31.458	-2.000
	895		11.111	31.458	-2.000
	897		9.401	31.458	-2.000
	898		9.184	31.458	-2.000
	900A	TNP	8.751	31.458	-2.000
	900	TIP	8.251	31.458	-2.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALU[illegible]ON
CALCULATION NO. FW-04

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN3 (CONTD.)					
	[illegible]0B	TNP	8.251	31.458	-1.500
	86B		8.250	31.458	0.000
RUN4					
	595		47.865	37.668	11.920
	585A		47.865	37.668	10.250
	585		47.865	37.668	9.000
	583B		47.865	37.668	8.125
	583	BRP	47.865	37.668	7.000
	582A		47.865	37.668	5.875
	575		47.865	37.668	2.750
	57[illegible]		47.865	37.668	2.000
	565B		47.865	37.668	1.125
	565T	BRP	47.865	37.668	0.000
	565C		47.865	37.668	-1.125
	564A	TNP	47.865	37.668	-1.150
	563	TIP	47.865	37.668	-2.650
	562B	TNP	48.926	36.607	-2.650
	555A	TNP	49.675	35.858	-2.650
	555	TIP	50.334	35.199	-2.650
	555B	TNP	51.266	35.199	-2.650
	553		57.984	35.199	-2.650
	R553	REF	60.667	33.116	-8.233
	545A	TNP	57.834	35.199	-2.650
	545	TIP	60.184	35.199	-2.650
	5450	TNP	60.284	32.949	-2.650
	54[illegible]		60.284	31.699	-2.650
	53[illegible]		61.284	28.669	-2.650
	R536	REF	65.934	28.669	-4.233
RUN5					
	5F[illegible]	PRP	47.865	37.668	7.000
	56[illegible]C		46.8[illegible]	37.668	7.500
	7[illegible]1		45.615	37.668	7.[illegible]
	7[illegible]4		38.885	37.668	7.000
	7[illegible]6		34.215	37.668	7.[illegible]
	7[illegible]8		29.[illegible]25	37.668	7.[illegible]
	R7[illegible]R	REF	31.775	4[illegible].388	2.[illegible]
	71[illegible]A		28.213	37.668	7.[illegible]
	716		28.1[illegible]	37.668	7.[illegible]
	712A	TNP	24.44[illegible]	37.668	7.[illegible]
	712	TIP	23.[illegible]	37.668	7.[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. EW-04

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN5 (CONTD.)					
	710B	TNP	23.190	36.418	7.000
	736		23.190	35.168	7.000
	739		23.190	31.458	7.000
MISC. NODES					
	86	MND	11.652	32.408	0.000
	851	MND	17.477	32.458	0.000
	896	MND	13.111	31.958	-2.000
	886	MND	19.531	32.208	-2.000
	842	MND	21.322	35.208	0.000
	878	MND	21.701	31.958	-2.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

COMPONENT PROPERTIES

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAM TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
STRP	10SCH80S									
			NAME	10.750	.500	0.000	0.000			DS,TS,DK,TK
			NAME**	10.750	.500	10.750	.500			DS,TS,DK,TK
			XDIM**	0.000	.438	0.000				DDIF/T,TM,A
			MASS	5.752	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	5.752	0.000	0.000	30.000	88.338		UWC,UWF,UWI,MAXF,MAXD
STRP	10SCH80									
			NAME	10.750	.593	0.000	0.000			DS,TS,DK,TK
			NAME**	10.750	.593	10.750	.593			DS,TS,DK,TK
			XDIM**	0.000	.519	0.000				DDIF/T,TM,A
			MASS	8.684	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	8.684	0.000	0.000	30.000	82.613		UWC,UWF,UWI,MAXF,MAXD
STRP	4SCH80S									
			NAME	4.500	.337	0.000	0.000			DS,TS,DK,TK
			NAME**	4.500	.337	4.500	.337			DS,TS,DK,TK
			XDIM**	0.000	.295	0.000				DDIF/T,TM,A
			MASS	2.040	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	2.040	0.000	0.000	30.000	52.818		UWC,UWF,UWI,MAXF,MAXD
STRP	2SCH80S									
			NAME	2.375	.218	0.000	0.000			DS,TS,DK,TK
			NAME**	2.375	.218	2.375	.218			DS,TS,DK,TK
			XDIM**	0.000	.191	0.000				DDIF/T,TM,A
			MASS	.786	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	.786	0.000	0.000	30.000	36.698		UWC,UWF,UWI,MAXF,MAXD
STRP	18SCH80									
			NAME	18.000	.937	0.000	0.000			DS,TS,DK,TK
			NAME**	18.000	.937	18.000	.937			DS,TS,DK,TK
			XDIM**	0.000	.820	0.000				DDIF/T,TM,A
			MASS	22.760	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	22.760	0.000	0.000	30.000	107.406		UWC,UWF,UWI,MAXF,MAXD
BTEE	18X18X1									
			NAME	18.000	.937	10.750	.593			DPS,TPS,DRS,TRS
			XDIM**	18.000	.937	10.750	.593	8.532	5.479	DPK,TPK,DRK,TRK,RMP,RMR
			MASS	22.760	8.684	0.000	0.000	0.000	0.000	UWCP,UWCR,UWFP,UWFR,UWIP,UWIR
BRED	18X10RED									
			NAME	18.000	.937	11.750	.593	0.000		P1,T1,P2,T2,ALPH
			XDIM**	14.375	.765	1.000	0.000	0.000	0.000	DK,TK,L1,L2,P1,P2
			MASS	22.760	0.000	0.000				UWC,UWF,UWI

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ION
CALCULATION NO. EW-04

COMPONENT PROPERTIES (CONTD.)

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAM TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
VALV	1RINVALV									
			NAME	11.940	1.186	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	11.940	1.186	11.940	1.186	9.560	1.186	DS,TS,DK,TK,DP,TP
VALV	8INVALV									
			NAME	9.620	1.000	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	9.620	1.000	9.620	1.000	7.620	1.000	DS,TS,DK,TK,DP,TP
BRED	10X8RED									
			NAME	10.750	.593	8.620	.500	0.000		D1,T1,D2,T2,ALPH
			XDIM**	9.685	.547	0.000	0.000	0.000	0.000	DK,TK,L1,L2,R1,R2
			MASS	8.684	0.000	0.000				UWC,UWF,UWI
BELB	1RINELB									
			NAME	10.750	.593	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	10.750	.593	10.750	.593	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.519	0.000				DDIF/T,TM,A
			MASS	8.864	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	8.864	0.000	0.000	30.000	82.190		UWC,UWF,UWI,MAXF,MAXD
BELB	1RINELB									
			NAME	18.000	.937	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	18.000	.937	18.000	.937	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.820	0.000				DDIF/T,TM,A
			MASS	22.760	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	22.760	0.000	0.000	30.000	107.406		UWC,UWF,UWI,MAXF,MAXD
BELB	4INELB									
			NAME	4.500	.337	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	4.500	.337	4.500	.337	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.295	0.000				DDIF/T,TM,A
			MASS	2.740	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	2.040	0.000	0.000	30.000	50.818		UWC,UWF,UWI,MAXF,MAXD
SELB	2INELB									
			NAME	2.379	.218	0.000	0.000	0.000		DS,TS,DK,TK,PM
			NAME**	2.379	.218	3.242	.654	1.376		DS,TS,DK,TK,PM
			MASS	.786	0.000	0.000				UWC,UWF,UWI
VALV	4INVALV									
			NAME	5.176	.674	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	5.176	.674	5.176	.674	3.928	.674	DS,TS,DK,TK,DP,TP

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. FW-04

COMPONENT PROPERTIES (CONTD.)

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAN TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
VALV	2INVALV									
			NAME	2.806	.436	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	2.806	.436	2.806	.436	1.934	.436	DS,TS,DK,TK,DP,TP
VLOP	VLOP									
			NAME	.300E+02	.100E+02					DK,TK

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]TION
CALCULATION NO. EW-04

MATERIAL PROPERTIES, AS STORED

TEMP SCALE = F, MODULUS AND STRESS UNITS = LB/SQ.IN

MATERIAL NAME	DATA TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8
SA106 B									STANDARD MATERIAL
	TEMP**	70.	100.	200.	300.	400.	500.	600.	650.
	YMOD**	27900000.	27900000.	27700000.	27400000.	27000000.	26400000.	25700000.	25300000.
	ALPH**	.560E-05	.583E-05	.655E-05	.718E-05	.773E-05	.818E-05	.855E-05	.870E-05
	CL2S**	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00
	CL1S**	20000.00	20000.00	20000.00	20000.00	20000.00	18900.00	17300.00	17000.00
	YLDS**	35000.00	35000.00	31900.00	31000.00	30000.00	28300.00	25900.00	25400.00
	TEMP**	700.	750.	800.	850.	900.	950.	1000.	
	YMOD**	24800000.	0.	0.	0.	0.	0.	0.	
	ALPH**	.883E-05	.894E-05	.902E-05	0.	0.	0.	0.	
	CL2S**	14300.00	0.00	0.00	0.00	0.00	0.00	0.00	
	CL1S**	16800.00	0.00	0.00	0.00	0.00	0.00	0.00	
	YLDS**	25200.00	24400.00	23300.00	22500.00	22200.00	21400.00	19500.00	
	NCYC**	.100E+02	.200E+02	.500E+02	.100E+03	.200E+03	.500E+03	.100E+04	.200E+04
	FTGS**	580000.00	410000.00	275000.00	205000.00	155000.00	105000.00	83000.00	64000.00
	NCYC**	.500E+04	.100E+05	.200E+05	.500E+05	.100E+06	.200E+06	.500E+06	.100E+07
	FTGS**	48000.00	38000.00	31000.00	23000.00	20000.00	16500.00	13500.00	12500.00

FATG. PARAM. M = 3.00, N = .20 (DEFAULT) C0 = 1.1 (DEFAUL

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

MISCELLANEOUS MEMBERS, GROUP NO. 1 (VLOP) RIGID VALVE OPERATOR

MEMB NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	NODE I	NODE J	POINT K	LENGTH (FT)	POINT L	POINT M	END RELEASE CODES ---I---	END RELEASE CODES ---J---
F1	VLOP	VLOP	SA106 B	859	860		.95				
F2	VLOP	VLOP	SA106 B	849	850		1.00				
F3	VLOP	VLOP	SA106 B	895	896		.50				
F4	VLOP	VLOP	SA106 B	885	886		.75				
F5	VLOP	VLOP	SA106 B	841	842		3.75				
F6	VLOP	VLOP	SA106 B	877	878		.50				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-64

COMPONENT ALIGNMENT SUMMARY. PIPE RUN NO. 1 RUN NAME = RUN1

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT								22.61				
		PC3C											
				A1	STRP	10SCH80S	SA106 B			4.25	0		
		PEZZ											
				A1	STRP	10SCH80S	SA106 B			2.50	0		
		834											
				A1	STRP	10SCH80S	SA106 B			1.50	0		
		848											
				A1	STRP	10SCH80S	SA106 B			1.51	0		
		866											
				A2	VALV	10INVALV	SA106 B			1.29	0		
		859											
				A2	VALV	10INVALV	SA106 B			1.29	0		
		S858											
				A2	VALV	10INVALV	SA106 B			2.58	0		
		856											
				A3	STRP	10SCHP0	SA106 B			1.30	0		
		854A											
				A3	BPED-R	10X8RED	SA106 B			.58	0		
		852											
				A4	VALV	8INVALV	SA106 B			.97	0		
		849											
				A4	VALV	8INVALV	SA106 B			.97	0		
		848											
				A5	BPED-E	10X8RED	SA106 B			.58	0		
		846											
				A6	STRP	10SCH80	SA106 B			.50	0		
		S845											
				A6	STRP	10SCH80	SA106 B			.50	0		
		844											
				A7	VALV	10INVALV	SA106 B			1.29	0		
		P41											
				A7	VALV	10INVALV	SA106 B			1.29	0		
		P43											
				A7A	STRP	10SCH80	SA106 B			.00	0		
2	CURV	R38A	TNP						1.96			1.25	9[illegible]
				A8	PELB	10INELB	SA106 B			.98	0		
		S838											
				A8	PELB	10INELB	SA106 B			.98	0		
3	STRT	R38B	TNP						3.71				
				A9	STRP	10SCHP0	SA106 B			2.46	0		
		836											
				A9	STRP	10SCH80	SA106 B			1.25			

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 1 (CONTD.) RUN NAME = RUN1

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
4	CURV	B12A	TNP						1.96			1.25	9[illegible]
				A10	BELB	10INELB	SA106 B			.98	0		
		B12C	BRP										
				A10	BELB	10INELB	SA106 B			.98	0		
5	STRT	B12P	TNP						22.75				
				A11	STRP	10SCH80	SA106 B			3.71	[illegible]		
		B13											
				A11	STRP	10SCH80	SA106 B			.96	[illegible]		
		B10A											
				A11	STRP	10SCH80	SA106 B			1.06	0		
		[illegible]											
				A11	STRP	10SCH80	SA106 B			5.10	[illegible]		
		B06											
				A11	STRP	10SCH80	SA106 B			4.67	0		
		B04											
				A11	STRP	10SCH80	SA106 B			5.83	0		
		B02											
				A11	STRP	10SCH80	SA106 B			.06	0		
		B02A											
				A11	STRP	10SCH80	SA106 B			1.16	0		
		565											
				A12	BTEE-B	10X10X10	SA106 B			1.01	0		
		565T	BRP					90.00					

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 2 RUN NAME = RUN2

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	B12C	BRP					157.50	14.89				
				B1	STRP	2SCH80S	SA106 B			2.37	[illegible]		
		B91											
				B1	STRP	2SCH80S	SA106 B			5.60	1		
		B13											
				B1	STRP	2SCH80S	SA106 B			5.69	1		
		B14											
				B1	STRP	2SCH80S	SA106 B			.17	[illegible]		
		B16											
				B1	STRP	2SCH80S	SA106 B			1.67	[illegible]		

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]TION
CALCULATION NO. EW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 2 (CONTD.) RUN NAME = RUN2

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
2	CURV	B19A	TNP						.39			.25	90.00
				B2	SELB	2INELB	SA106 B			.39	0		
3	STRT	B18B	TNP						3.80				
				B3	STRP	2SCH80S	SA106 B			1.07	0		
		B20											
				B4	VALV	2INVALV	SA106 B			.35	0		
		B20A											
				B4	VALV	2INVALV	SA106 B			.35	0		
		B20B											
				B5	STRP	2SCH80S	SA106 B			2.03	0		
4	CURV	B24A	TNP						.39			.25	91.00
				B6	SELB	2INELB	SA106 B			.39	0		
5	STRT	B24B	TNP						1.83				
				B7	STRP	2SCH80S	SA106 B			.08	0		
		B25											
				B7	STRP	2SCH80S	SA106 B			.92	0		
		B26											
				B8	VALV	2INVALV	SA106 B			.67	0		
		B28											
				B9	STRP	2SCH80S	SA106 B			.06	0		
		B30											
				B9	STRP	2SCH80S	SA106 B			.10	0		
6	CURV	B30B	TNP						.39			.25	89.73
				B10	SELB	2INELB	SA106 B			.39	0		
7	STRT	B30C	TNP						1.29				
				B12	STRP	2SCH80S	SA106 B			.10	0		
		B32											
				B12	STRP	2SCH80S	SA106 B			1.19	0		
		B34											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
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COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 3 RUN NAME = RUN3

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	836							1.50				
				C1	STRP	4SCH80S	SA106 B			1.50	0		
2	CURV	872A	TNP						.79			.50	90.00
				C2	ELB	4INELB	SA106 B			.79	0		
3	STRT	872B	TNP						2.71				
				C3	STRP	4SCH80S	SA106 B			2.71	0		
4	CURV	874A	TNP						.79			.50	90.00
				C4	ELB	4INELB	SA106 B			.79	0		
5	STRT	874B	TNP						14.61				
				C5	STRP	4SCH80S	SA106 B			.87	0		
		876											
				C6	VALV	4INVALV	SA106 B			.71	0		
		877											
				C6	VALV	4INVALV	SA106 B			.71	0		
		881											
				C7	STRP	4SCH80S	SA106 B			.46	0		
		882											
				C7	STRP	4SCH80S	SA106 B			.37	0		
		884											
				C8	VALV	4INVALV	SA106 B			.71	0		
		885											
				C8	VALV	4INVALV	SA106 B			.71	0		
		888											
				C9	STRP	4SCH80S	SA106 B			6.29	1		
		890											
				C9	STRP	4SCH80S	SA106 B			.29	0		
		892											
				C10	VALV	4INVALV	SA106 B			1.42	0		
		894											
				C10	VALV	4INVALV	SA106 B			.71	0		
		895											
				C10	VALV	4INVALV	SA106 B			.71	0		
		897											
				C11	STRP	4SCH80S	SA106 B			.32	0		
		898											
				C11	STRP	4SCH80S	SA106 B			.33	0		
6	CURV	900A	TNP						.79			.50	90.00
				C12	ELB	4INELB	SA106 B			.79	0		
7	STRT	900B	TNP						1.50				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 3 (CONTD.) RUN NAME = RUN3

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
				C13	STRP	4SCH80S	SA106 B			1.50	1		
		868											

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 4 RUN NAME = RUN4

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	595							13.67				
				D1	STRP	18SCH80	SA106 B			1.67	0		
		585A		D2	BRED-C	18X10RED	SA106 B			1.25	0		
		585		D3	STRP	18SCH80	SA106 B			.88	0		
		586B		D4	BTEE-R	18X18X10	SA106 B			1.13	0		
		586	BRP	D4	BTEE-R	18X18X10	SA106 B			1.13	0		
		586A		D5	STRP	18SCH80	SA106 B			3.13	0		
		575		D5	STRP	18SCH80	SA106 B			.75	0		
		574		D5	STRP	18SCH80	SA106 B			.88	0		
		565B		D6	BTEE-R	18X18X10	SA106 B			1.13	0		
		565T	BRP	D6	BTEE-R	18X18X10	SA106 B			1.13	0		
		565C		D7	STRP	18SCH80	SA106 B			.03	0		
2	CURV	560A	TNP	D8	BELB	1PINELB	SA106 B		2.36	2.36	0	1.50	90.00
3	STRT	560B	TNP	D9	STRP	18SCH80	SA106 B		1.66	1.66	0		
4	CURV	555A	TNP	D10	BELB	1RINELB	SA106 B		1.77	1.77	0	2.25	45.00
5	STRT	555B	TNP						6.57				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 4 (CONTD.) RUN NAME = RUN4

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
		555		D11	STRP	18SCH80	SA106 B			5.82	0		
				D11	STRP	18SCH80	SA106 B			.75	0		
6	CURV	545A	TNP						3.53			2.25	90.00
				D12	RELP	18INELB	SA106 B			3.53	0		
7	STRT	545B	TNP						4.28				
				D13	STRP	18SCH80	SA106 B			1.25	0		
		548											
				D13	STRP	18SCH80	SA106 B			3.03	0		
		536											

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 5 RUN NAME = RUN5

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	580	PRF					90.00	23.43				
				E1	BTEE-B	1PX18X10	SA106 B			1.01	0		
		580C		E2	STRP	10SCH80	SA106 B			1.24	0		
		701		E2	STRP	10SCH80	SA106 B			6.73	0		
		704		E2	STRP	10SCH80	SA106 B			4.67	0		
		706		E2	STRP	10SCH80	SA106 B			5.19	0		
		708		E2	STRP	10SCH80	SA106 B			.01	0		
		710A		E2	STRP	10SCH80	SA106 B			.06	0		
		710		E2	STRP	10SCH80	SA106 B			3.71	0		
2	CURV	712A	TNP						1.96			1.25	90.00
				E3	RELB	10INELB	SA106 B			1.96	0		
3	STRT	712B	TNP						4.96				
				E4	STRP	10SCH80	SA106 B			1.25	0		
		736											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 5 (CONTD.) RUN NAME = RUN5

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM. LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
				E4	STRP	10SCH80	SA106 B			3.71	0		
		73º											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

LUMPED WEIGHTS (LB)

NAME	LOCN	WEIGHT
W1	866	283.6[illegible]
W2	868	1134.0[illegible]
W3	S858	638.0[illegible]
W4	856	355.0[illegible]
W5	852	264.0[illegible]
W6	852	1059.[illegible]
W7	849	264.000
W8	844	849.[illegible]
W9	842	330.0[illegible]
W10	840	849.000
W11	81[illegible]	188.[illegible]
W12	81[illegible]A	188.[illegible]
W13	8[illegible]2A	188.[illegible]
W14	802	188.[illegible]
W15	71[illegible]	188.[illegible]
W16	71JA	188.[illegible]
W17	82[illegible]	30.[illegible]
W18	82[illegible]B	30.[illegible]
W19	826	17.[illegible]
W2[illegible]	828	19.[illegible]
W21	83[illegible]	58.5[illegible]
W22	832	39.[illegible]
W23	87[illegible]	97.[illegible]
W24	84[illegible]	49.[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

LUMPED WEIGHTS (LB) (CONTD.)

NAME	LOCN	WEIGHT
W25	878	137.000
W26	886	269.000
W27	884	67.000
W28	888	67.000
W29	892	81.500
W30	894	129.000
W31	896	197.000
W32	897	49.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FP-04

SUPPORT LOCATIONS AND PROPERTIES

SUPP NAME	SUPP LOCN	SUPP TYPE	PARTICIPATION CODES THRM	GRAV	STAT	DYN	TRANSLATIONAL STIFFNESS (LB/IN)	ROTATIONAL STIFFNESS (LB.IN/RAD)	EFFECTIVE WEIGHT (LB)	ANCHOR CODE	DIRN CODE	POINT J	POINT K
PENC	PC3C	ANCH	T	G	S	D	RIGID	RIGID	0.000	SSSSSS			
859Y	S858	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
858Z	S858	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
839Y	S838	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
S816	R16	CONE		G			RIGID	ZERO	0.000		Y		
P39Z	S838	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
S83B	R 8	SNUB				D	RIGID	ZERO	0.000		INCL	R8?9	
804Y	P84	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
S814	R14	SNUB				D	RIGID	ZERO	0.000		INCL	R814	
S540	540	CONE		G			RIGID	ZERO	0.000		Y		
813Y	R13	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
55?S	55?	SNUB				D	RIGID	ZERO	0.000		INCL	R55?	
813Z	R13	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
899Y	899	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
89?Z	89?	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
882Y	R82	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
882Z	R82	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
595X	595	SNUB				D	RIGID	ZERO	0.000		Y		
536S	536	SNUB				D	RIGID	ZERO	0.000		INCL	R536	
S?6B	7?B	SNUB				D	RIGID	ZERO	0.000		INCL	R7?B	
739Y	739	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
739Z	739	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

OUTPUT POINT SPECIFICATION

NO OUTPUT POINT SPECIFICATION

PROPERTIES AT STRESS OUTPUT POINTS

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN1															
1	PC3C	A1	STRP	10SCH80S	10.750	.500	1.00	2	MEZZ	A1	STRP	10SCH80S	10.750	.500	1.00
3	B34	A1	STRP	10SCH80S	10.750	.500	1.00	4	B68	A1	STRP	10SCH80S	10.750	.500	1.00
5L	B66	A1	STRP	10SCH80S	10.750	.500	1.00	5R	B66	A2	VALV	10INVALV			N/A
6	B59	A2	VALV	10INVALV			N/A	7	SB58	A2	VALV	10INVALV			N/A
PL	B56	A2	VALV	10INVALV			N/A	8R	B56	A3	STRP	10SCH80	10.750	.593	1.00
9L	B54A	A3	STRP	10SCH80	10.750	.593	1.00	9R	B54A	A3	BRED-R	10X8RED	10.750	.593	2.00
10L	B52	A3	BRED-R	10X8RED	8.620	.500	2.00	10R	B52	A4	VALV	8INVALV			N/A
11	B49	A4	VALV	8INVALV			N/A	12L	B48	A4	VALV	8INVALV			N/A
12R	B48	A5	BRED-E	10X8RED	8.620	.500	2.00	13L	B46	A5	BRED-E	10X8RED	10.750	.593	2.00
13R	B46	A6	STRP	10SCH80	10.750	.593	1.00	14	SB45	A6	STRP	10SCH80	10.750	.593	1.00
15L	B44	A6	STRP	10SCH80	10.750	.593	1.00	15R	B44	A7	VALV	10INVALV			N/A
16	B41	A7	VALV	10INVALV			N/A	17L	B40	A7	VALV	10INVALV			N/A
17R	B40	A7A	STRP	10SCH80	10.750	.593	1.00	18L	B38A	A7A	STRP	10SCH80	10.750	.593	1.00
18R	P38A	AB	BELB	10INELB	10.750	.593	1.83	19	SB39	AB	BELB	10INELB	10.750	.593	1.83
20L	B38B	AB	BELB	10INELB	10.750	.593	1.83	20R	B38B	A9	STRP	10SCH80	10.750	.593	1.00
21	B36	A9	STRP	10SCH80	10.750	.593	1.00	22L	B12A	A9	STRP	10SCH80	10.750	.593	1.00
22R	B12A	A10	BELB	10INELB	10.750	.593	1.83	23	B12C	A10	BELB	10INELB	10.750	.593	1.83
24L	B12B	A10	BELB	10INELB	10.750	.593	1.83	24R	B12B	A11	STRP	10SCH80	10.750	.593	1.00
25	B10	A11	STRP	10SCH80	10.750	.593	1.00	26	B10A	A11	STRP	10SCH80	10.750	.593	1.00
27	B08	A11	STRP	10SCH80	10.750	.593	1.00	28	B06	A11	STRP	10SCH80	10.750	.593	1.00
29	B04	A11	STRP	10SCH80	10.750	.593	1.00	30	B02	A11	STRP	10SCH80	10.750	.593	1.00
31	B02A	A11	STRP	10SCH80	10.750	.593	1.00	32L	565	A11	STRP	10SCH80	10.750	.593	1.00
32R	565	A12	RTEE-R	18X18X10			N/A	33	565T	A12	BTEE-B	18X18X10	10.750	.867	1.46
RUN NAME = RUN2															
34	B12C	B1	STRP	2SCH80S	2.375	.218	1.00	35	991	B1	STRP	2SCH80S	2.375	.218	1.00
36	B13	B1	STRP	2SCH80S	2.375	.218	1.00	37	B14	B1	STRP	2SCH80S	2.375	.218	1.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-04

PROPERTIES AT STRESS OUTPUT POINTS (CONTD.)

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN2 (CONTD.)															
38	816	B1	STRP	2SCH80S	2.370	.218	1.00	39L	818A	B1	STRP	2SCH80S	2.370	.218	1.00
39R	818A	B2	SELB	2INELB	2.370	.218	1.78	40L	818B	B2	SELB	2INELB	2.370	.218	1.78
40R	818B	B3	STRP	2SCH80S	2.370	.218	1.00	41L	820	B3	STRP	2SCH80S	2.370	.218	1.00
41R	820	B4	VALV	2INVALV			N/A	42	820A	B4	VALV	2INVALV			N/A
43L	820B	B4	VALV	2INVALV			N/A	43R	820B	B5	STRP	2SCH80S	2.370	.218	1.00
44L	824A	B5	STRP	2SCH80S	2.370	.218	1.00	44R	824A	B6	SELB	2INELB	2.370	.218	1.78
45L	824B	B6	SELB	2INELB	2.370	.218	1.78	45R	824B	B7	STRP	2SCH80S	2.370	.218	1.00
46	825	B7	STRP	2SCH80S	2.370	.218	1.00	47L	826	B7	STRP	2SCH80S	2.370	.218	1.00
47R	826	B8	VALV	2INVALV			N/A	48L	828	B8	VALV	2INVALV			N/A
48R	828	B9	STRP	2SCH80S	2.370	.218	1.00	49	830	B9	STRP	2SCH80S	2.370	.218	1.00
50L	830B	B9	STRP	2SCH80S	2.370	.218	1.00	50R	830R	B10	SELB	2INELB	2.370	.218	1.78
51L	830C	B10	SELB	2INELB	2.370	.218	1.78	51R	830C	B12	STRP	2SCH80S	2.370	.218	1.00
52	832	B12	STRP	2SCH80S	2.370	.218	1.00	53	834	B12	STRP	2SCH80S	2.370	.218	1.00
RUN NAME = RUN3															
54	836	C1	STRP	4SCH80S	4.500	.337	1.00	55L	872A	C1	STRP	4SCH80S	4.500	.337	1.00
55R	872A	C2	BELB	4INELB	4.500	.337	1.50	56L	872B	C2	BELB	4INELB	4.500	.337	1.50
56R	872B	C3	STRP	4SCH80S	4.500	.337	1.00	57L	874A	C3	STRP	4SCH80S	4.500	.337	1.00
57R	874A	C4	BELB	4INELB	4.500	.337	1.50	58L	874B	C4	BELB	4INELB	4.500	.337	1.50
58R	874B	C5	STRP	4SCH80S	4.500	.337	1.00	59L	876	C5	STRP	4SCH80S	4.500	.337	1.00
59R	876	C6	VALV	4INVALV			N/A	60	877	C6	VALV	4INVALV			N/A
61L	880	C6	VALV	4INVALV			N/A	61R	880	C7	STRP	4SCH80S	4.500	.337	1.00
62	882	C7	STRP	4SCH80S	4.500	.337	1.00	63L	884	C7	STRP	4SCH80S	4.500	.337	1.00
63R	884	C8	VALV	4INVALV			N/A	64	885	C8	VALV	4INVALV			N/A
65L	888	C8	VALV	4INVALV			N/A	65R	888	C9	STRP	4SCH80S	4.500	.337	1.00
66	891	C9	STRP	4SCH80S	4.500	.337	1.00	67L	892	C9	STRP	4SCH80S	4.500	.337	1.00
67R	892	C10	VALV	4INVALV			N/A	68	894	C10	VALV	4INVALV			N/A
69	895	C10	VALV	4INVALV			N/A	70L	897	C10	VALV	4INVALV			N/A
70R	897	C11	STRP	4SCH80S	4.500	.337	1.00	71	898	C11	STRP	4SCH80S	4.500	.337	1.00
72L	900A	C11	STRP	4SCH80S	4.500	.337	1.00	72R	900A	C12	BELB	4INELB	4.500	.337	1.50
73L	900B	C12	BELB	4INELB	4.500	.337	1.50	73R	900B	C13	STRP	4SCH80S	4.500	.337	1.00
74	868	C13	STRP	4SCH80S	4.500	.337	1.00								

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

PROPERTIES AT STRESS OUTPUT POINTS (CONTD.)

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN4															
75	585	D1	STRP	10SCH80	10.750	.593	1.00	76L	585A	D1	STRP	10SCH80	10.750	.593	1.00
76R	585A	D2	BRED-E	10X10RED	10.750	.593	2.00	77L	585	D2	BRED-E	10X10RED	10.000	.937	2.00
77R	585	D3	STRP	10SCH80	10.000	.937	1.00	78L	580B	D3	STRP	10SCH80	10.000	.937	1.00
78R	580B	D4	BTEE-R	10X10X10			N/A	79B	580	D4	BTEE-R	10X10X10	10.000	.937	1.46
79L	580A	D4	BTEE-R	10X10X10			N/A	80R	580A	D5	STRP	10SCH80	10.000	.937	1.00
81	575	D5	STRP	10SCH80	10.000	.937	1.00	82	570	D5	STRP	10SCH80	10.000	.937	1.00
83L	565B	D5	STRP	10SCH80	10.000	.937	1.00	83R	565B	D6	BTEE-R	10X10X10			N/A
84R	565T	D6	BTEE-R	10X10X10	10.000	.937	1.46	85L	565C	D6	BTEE-R	10X10X10			N/A
85R	565C	D7	STRP	10SCH80	10.000	.937	1.00	86L	560A	D7	STRP	10SCH80	10.000	.937	1.00
86R	560A	D8	BELB	10INELB	10.000	.937	2.39	87L	560B	D8	BELB	10INELB	10.000	.937	2.39
87R	560B	D9	STRP	10SCH80	10.000	.937	1.00	88L	555A	D9	STRP	10SCH80	10.000	.937	1.00
88R	555A	D10	BELB	10INELB	10.000	.937	1.82	89L	555B	D10	BELB	10INELB	10.000	.937	1.82
89R	555B	D11	STRP	10SCH80	10.000	.937	1.00	90	550	D11	STRP	10SCH80	10.000	.937	1.00
91L	545A	D11	STRP	10SCH80	10.000	.937	1.00	91R	545A	D12	BELB	10INELB	10.000	.937	1.82
92L	545B	D12	BELB	10INELB	10.000	.937	1.82	92R	545B	D13	STRP	10SCH80	10.000	.937	1.00
93	540	D13	STRP	10SCH80	10.000	.937	1.00	94	536	D13	STRP	10SCH80	10.000	.937	1.00
RUN NAME = RUN5															
95	581	E1	BTEE-R	10X10X10	10.750	.867	1.46	96L	580C	E1	BTEE-R	10X10X10			N/A
96R	580C	E2	STRP	10SCH80	10.750	.593	1.00	97	701	E2	STRP	10SCH80	10.750	.593	1.00
98	704	E2	STRP	10SCH80	10.750	.593	1.00	99	706	E2	STRP	10SCH80	10.750	.593	1.00
100	708	E2	STRP	10SCH80	10.750	.593	1.00	101	710A	E2	STRP	10SCH80	10.750	.593	1.00
102	710	E2	STRP	10SCH80	10.750	.593	1.00	103L	712A	E2	STRP	10SCH80	10.750	.593	1.00
103R	712A	E3	BELB	10INELB	10.750	.593	1.83	104L	712B	E3	BELB	10INELB	10.750	.593	1.83
104R	712B	E4	STRP	10SCH80	10.750	.593	1.00	105	736	E4	STRP	10SCH80	10.750	.593	1.00
106	736	E4	STRP	10SCH80	10.750	.593	1.00								

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

NODE RENUMBERING INFORMATION

(1) STATIC CASE

NUMBER OF NODES IN SYSTEM	=	106
STIFFNESS MATRIX LENGTH BEFORE RENUMBERING	=	29550
STIFFNESS MATRIX LENGTH AFTER RENUMBERING	=	11442

(2) DYNAMIC CASE

NUMBER OF NODES IN SYSTEM	=	109
STIFFNESS MATRIX LENGTH BEFORE RENUMBERING	=	30585
STIFFNESS MATRIX LENGTH AFTER RENUMBERING	=	12009

APPROXIMATE FIELD LENGTH REQUIREMENTS (OCTAL) FOR THIS GEOMETRY

GEOMETRY INPUT PHASE	=	164000
STATIC ANALYSIS PHASE	=	163000
DYNAMIC PROPERTIES PHASE	=	143000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EH-04

STATIC ANALYSIS NO. 1 GRAVITY ANALYSIS

RESULTS SET NAME = GRAV
LOADING TYPE = GRAV

AUTE, TEME, YMOD, MASS AND FFPR DATA

CARD TYPE	RUN OR GROUP	FIRST DCP,MMB	LAST DCP,MMB	ITEM 1	ITEM 2	ITEM 3	ITEM LIST
TEME				420.00	70.00		T(HOT),T(COLD)

LOAD CARDS

LOAD TYPE	RUN OR GROUP	HIGH TEMP	LOW TEMP	PRESS (PSI)	GRAV FACTOR	FIRST POINT	LAST POINT	GRAV DIRN	POINT NAMES	SUPPT NAMES	LOADS (LB) OR DISPLACEMENTS (IN) X-AXIS	Y-AXIS	Z-AXIS
GRAV					1.000			-Y					

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-14

ELEMENT PROPERTIES FOR CURRENT STIFFNESS

RUN GROUP	CR ELEM NO.	NODE I	NODE J	NO. SUB	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN1														
	1	EC3C	MEZZ	1	A1	STRP	10SCH80S	SA106 B	26880000.	1.038	0.00000000	5.75	293.25	1.000
	2	MEZZ	834	1	A1	STRP	10SCH80S	SA106 B	26880000.	1.038	0.00000000	5.75	172.50	1.000
	3	834	868	1	A1	STRP	10SCH80S	SA106 B	26880000.	1.038	0.00000000	5.75	103.50	1.000
	4	868	866	1	A1	STRP	10SCH80S	SA106 B	26880000.	1.038	0.00000000	5.75	184.33	1.000
	5	866	859	1	A2	VALV	10INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	6	859	S858	1	A2	VALV	10INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	7	S858	858	1	A2	VALV	10INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	8	856	854A	1	A3	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	184.21	1.000
	9	854A	852	1	A3	BRED-R	10X8RED	SA106 B	26880000.	1.038	0.00000000	8.68	60.44	1.000
	10	852	849	1	A4	VALV	8INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	11	849	848	1	A4	VALV	8INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	12	848	846	1	A5	BRED-E	10X8RED	SA106 B	26880000.	1.038	0.00000000	8.68	60.44	1.000
	13	846	S845	1	A6	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	52.10	1.000
	14	S845	844	1	A6	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	52.10	1.000
	15	844	841	1	A7	VALV	10INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	16	841	840	1	A7	VALV	10INVALV	SA106 B	26880000.	1.038	0.00000000	0.00	0.00	1.000
	17	841	E7PA	1	A7A	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	.21	1.000
	18	838A	S838	1	A8	BELB	10INELB	SA106 B	26880000.	1.038	0.00000000	8.86	104.43	4.784
	19	S838	838B	1	A8	BELB	10INELB	SA106 B	26880000.	1.038	0.00000000	8.86	104.43	4.784
	20	838B	836	1	A9	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	256.35	1.000
	21	836	812A	1	A9	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	139.26	1.000
	22	812A	812C	1	A10	BELB	10INELB	SA106 B	26880000.	1.038	0.00000000	8.86	104.43	4.784
	23	812C	812B	1	A10	BELB	10INELB	SA106 B	26880000.	1.038	0.00000000	8.86	104.43	4.784
	24	812B	811	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	396.61	1.000
	25	811	811A	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	6.51	1.000
	26	811A	808	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	110.72	1.000
	27	808	816	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	540.58	1.000
	28	816	804	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	486.34	1.000
	29	814	802	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	607.85	1.000
	30	802	802A	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	6.51	1.000
	31	802A	565	1	A11	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	123.46	1.000
	32	565	S65T	1	A12	RTEE-B	10X10X10	SA106 B	26880000.	1.038	0.00000000	8.68	115.29	1.000
RUN2														
	33	812C	P01	1	P1	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	22.30	1.000
	34	P01	P13	1	P1	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	47.16	1.000
	35	P13	P14	1	P1	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	53.67	1.000
	36	P14	P16	1	P1	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	1.57	1.000
	37	P16	B18A	1	P1	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	15.75	1.000
	38	B18A	B18B	1	P2	SELB	2INELB	SA106 B	26880000.	1.038	0.00000000	.79	3.73	1.000
	39	B18B	P23	1	P2	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	15.09	1.000
	40	P23	P23A	1	P4	VALV	2INVALV	SA106 B	26880000.	1.038	0.00000000	.79	3.73	1.000
	41	P23A	P23B	1	P4	VALV	2INVALV	SA106 B	26880000.	1.038	0.00000000	.79	3.73	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. SUB	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN2 (CONTD.)														
	42	B24B	B24A	1	B5	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	19.18	1.000
	43	B24A	B24B	1	B6	SELB	2INELB	SA106 B	26880000.	1.038	0.00000000	.79	3.76	1.000
	44	B24B	B25	1	B7	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	.75	1.000
	45	B25	B26	1	B8	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	8.68	1.000
	46	B26	B28	1	B8	VALV	2INVALV	SA106 B	26880000.	1.038	0.00000000	.79	1.00	1.000
	47	B28	B30	1	B9	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	.57	1.000
	48	B30	B30B	1	B9	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	.95	1.000
	49	B30B	B30C	1	B10	SELB	2INELB	SA106 B	26880000.	1.038	0.00000000	.79	3.69	1.000
	50	B30C	B32	1	B12	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	.95	1.000
	51	B32	B34	1	B13	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	11.22	1.000
RUN3														
	52	B36	B72A	1	C1	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	26.72	1.000
	53	B72A	B72B	1	C2	BELB	4INELB	SA106 B	26880000.	1.038	0.00000000	2.04	19.27	3.536
	54	B72B	B74A	1	C3	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	66.34	1.000
	55	B74A	B74B	1	C4	BELB	4INELB	SA106 B	26880000.	1.038	0.00000000	2.04	19.23	3.536
	56	B74B	B76	1	C5	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	21.37	1.000
	57	B76	B77	1	C6	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	1.99	9.84	1.000
	58	B77	B80	1	C6	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.93	1.000
	59	B80	B82	1	C7	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	11.26	1.000
	60	B82	B84	1	C7	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	9.86	1.000
	61	B84	B85	1	C8	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.89	1.000
	62	B85	B88	1	C8	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.89	1.000
	63	B88	B90	1	C9	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	153.98	1.000
	64	B90	B92	1	C9	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	7.17	1.000
	65	B92	B94	1	C10	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.91	1.000
	66	B94	B95	1	C10	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.89	1.000
	67	B95	B97	1	C11	VALV	4INVALV	SA106 B	26880000.	1.038	0.00000000	2.00	9.89	1.000
	68	B97	B98	1	C11	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	7.76	1.000
	69	B98	B98A	1	C11	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	8.16	1.000
	70	B98A	B98B	1	C12	BELB	4INELB	SA106 B	26880000.	1.038	0.00000000	2.04	19.22	3.536
	71	B98B	B68	1	C13	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	16.73	1.000
RUN4														
	72	585	585A	1	D1	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	174.65	1.000
	73	585A	585	1	D2	RPED-E	16X10RED	SA106 B	26880000.	1.038	0.00000000	22.76	341.40	1.000
	74	585	58 B	1	D3	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	239.00	1.000
	75	58 B	58C	1	D4	BIFE-R	10X10X10	SA106 B	26880000.	1.038	0.00000000	22.76	367.26	1.000
	76	58C	58 A	1	D4	BIFE-R	10X10X10	SA106 B	26880000.	1.038	0.00000000	22.76	367.26	1.000
	77	58A	575	1	D5	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	853.50	1.000
	78	575	57A	1	D5	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	274.84	1.000
	79	57A	565B	1	D5	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	239.00	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ION
CALCULATION NO. EW-04

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. SUB	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN4 (CONTD.)														
	80	565B	565T	1	D6	BTEE-R	18X18X10	SA106 B	26880000.	1.038	0.00000000	22.76	387.26	1.000
	81	565T	565C	1	D6	BTEE-R	18X18X10	SA106 B	26880000.	1.038	0.00000000	22.76	387.26	1.000
	82	565C	564A	1	D7	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	6.83	1.000
	83	564A	563B	1	D8	BELB	18INELB	SA106 B	26880000.	1.038	0.00000000	22.76	643.52	7.121
	84	563B	555A	1	D9	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	289.35	1.000
	85	555A	555B	1	D10	BELB	18INELB	SA106 B	26880000.	1.038	0.00000000	22.76	402.64	4.747
	86	555B	554	1	D11	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	1599.52	1.000
	87	554	545A	1	D11	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	284.84	1.000
	88	545A	545B	1	D12	BELB	18INELB	SA106 B	26880000.	1.038	0.00000000	22.76	965.09	4.747
	89	545B	545	1	D13	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	341.40	1.000
	9	545	546	1	D13	STRP	18SCH80	SA106 B	26880000.	1.038	0.00000000	22.76	827.55	1.000
RUN5														
	91	580	580C	1	E1	BTEE-B	18X18X10	SA106 B	26880000.	1.038	0.00000000	8.68	125.29	1.000
	92	580C	701	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	129.18	1.000
	93	701	704	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	711.32	1.000
	94	704	706	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	486.65	1.000
	95	706	710	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	540.84	1.000
	96	710	710A	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	84.67	1.000
	97	710A	710	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	6.51	1.000
	98	710	712A	1	E2	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	386.61	1.000
	99	712A	712B	1	E3	BELB	10INELB	SA106 B	26880000.	1.038	0.00000000	8.86	208.85	4.784
	100	712B	736	1	E4	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	139.26	1.000
	101	736	739	1	E4	STRP	10SCH80	SA106 B	26880000.	1.038	0.00000000	8.68	386.61	1.000
VLOP														
	112	859	861	1	F1	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000
	113	949	853	1	F2	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000
	114	895	896	1	F3	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000
	115	885	886	1	F4	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000
	196	841	842	1	F5	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000
	197	877	878	1	F6	VLOP	VLOP	SA106 B	27900000.	1.000	0.00000000	0.00	0.00	1.000

TOTAL DISTRIBUTED WEIGHT = 16596.41

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-04

STATIC ANALYSIS NO. 1 (GRAV), FORCES AND MOMENTS IN LOCAL COORDINATES (MISC. MEMB. ONLY)

RUN GROUP	SOF NME	DCP NAME	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	XX MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)
VLOP								
	F1	859	1134.00	.00	0.00	0.00	-.00	-.00
		860	1134.00	.00	0.00	0.00	-.00	0.00
	F2	849	1959.00	.00	-.00	0.00	.00	.00
		850	1959.00	.00	-.00	0.00	-.00	-.00
	F3	895	197.00	-.00	-.00	0.00	0.00	0.00
		896	197.00	-.00	-.00	0.00	-.00	-.00
	F4	885	269.00	-.00	-.00	0.00	.00	-.00
		886	269.00	-.00	-.00	0.00	-.00	.00
	F5	841	396.00	-.00	-.00	0.00	-.00	.00
		842	396.00	-.00	-.00	0.00	-.00	0.00
	F6	877	197.00	0.00	-.00	0.00	0.00	0.00
		878	197.00	0.00	-.00	0.00	-.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS

RUN NAME	DOF NO.	DOF NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN1								
	1	PC3C	-.000	-.000	.000	.00000	-.00000	.00000
	2	MEZZ	-.000	.001	.001	.00208	-.00003	.00004
	3	834	-.000	.002	.002	.00330	-.00003	.00003
	4	868	.000	.003	.003	.00405	-.00002	.00000
	5	866	-.000	.003	.002	.00489	.00005	-.00005
	6	859	-.000	.002	.001	.00503	.00008	-.00009
	7	S858	-.000	-.000	-.000	.00526	.00011	-.00015
	8	856	-.000	-.007	-.004	.00573	.00017	-.00025
	9	854A	-.000	-.010	-.007	.00616	.00022	-.00024
	10	852	-.000	-.012	-.008	.00653	.00026	-.00020
	11	849	-.000	-.014	-.012	.00694	.00030	-.00013
	12	848	-.000	-.015	-.015	.00734	.00034	-.00003
	13	846	-.000	-.015	-.018	.00771	.00037	.00007
	14	S845	-.000	-.014	-.020	.00793	.00039	.00013
	15	844	-.000	-.013	-.022	.00814	.00040	.00019
	16	841	-.000	-.010	-.029	.00838	.00042	.00026
	17	840	-.000	-.005	-.035	.00861	.00044	.00031
	18	838A	-.000	-.005	-.035	.00861	.00044	.00031
	19	S838	-.003	-.000	.000	.00921	.00017	.00062
	20	838B	-.011	.003	.105	.01055	-.00015	.00086
	21	836	-.037	.003	.428	.01137	-.00008	.00092
	22	812A	-.051	.003	.663	.01190	-.00009	.00094
	23	812C	-.062	.007	.740	.01363	-.00056	.00101
	24	812D	-.066	.018	.810	.01441	-.00097	.00104
	25	810	-.066	.062	.851	.01643	-.00084	.00087
	26	810A	-.066	.063	.851	.01646	-.00084	.00086
	27	808	-.066	.074	.862	.01704	-.00078	.00074
	28	806	-.066	.087	.898	.01986	-.00035	-.00054
	29	804	-.066	-.000	.902	.02240	.00025	-.00284
	30	802	-.066	-.286	.851	.02557	.00127	-.00459
	31	802A	-.066	-.289	.850	.02560	.00128	-.00459
	32	565	-.066	-.353	.831	.02623	.00152	-.00459
	33	565T	-.066	-.407	.812	.02637	.00157	-.00446
RUN2								
	34	812C	-.062	.007	.740	.01363	-.00056	.00101
	35	991	-.062	-.014	.597	.01144	-.00852	.00043
	36	813	-.[illegible]62	-.[illegible]	.[illegible]	.00[illegible]81	-.01725	-.00833
	37	814	-.[illegible]61	.[illegible]1	-.1[illegible]2	.00154	.00229	.00[illegible]24
	38	816	-.[illegible]61	.[illegible]	-.[illegible]97	.00139	.00249	.00[illegible]
	39	818A	-.061	-.01[illegible]	-.042	-.00616	.00286	.00120
	40	818B	-.[illegible]58	-.[illegible]17	-.033	-.00521	.00285	.00126
	41	82[illegible]	-.[illegible]37	-.[illegible]17	-.027	-.00[illegible]47	.00269	.00[illegible]
	42	82[illegible]A	-.[illegible]29	-.[illegible]17	-.[illegible]24	-.00[illegible]69	.00267	.00181
	43	82[illegible]B	-.[illegible]22	-.[illegible]17	-.[illegible]21	-.00[illegible]7[illegible]	.00265	.00179

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV). GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN2 (CONTD.)								
	44	824A	.006	-.016	-.011	.00010	.00235	.00005
	45	824B	.006	-.016	-.004	.00016	.00235	-.00005
	46	825	.006	-.016	-.002	.00025	.00233	-.00016
	47	826	.006	-.009	.022	.00127	.00196	-.00090
	48	828	.006	-.002	.038	.00154	.00179	-.00088
	49	830	.006	-.001	.039	.00161	.00174	-.00085
	50	830B	.006	-.000	.041	.00172	.00166	-.00078
	51	830C	.004	.002	.041	.00179	.00158	-.00072
	52	832	.003	.002	.038	.00188	.00146	-.00062
	53	834	-.000	.002	.002	.00330	-.00003	.00053
RUN3								
	54	836	-.037	.003	.428	.01137	-.00008	.00092
	55	872A	-.044	.181	.428	.00919	.00054	.00052
	56	872B	-.045	.235	.374	.00911	.00042	.00041
	57	874A	-.011	.234	.076	.00905	-.00034	.00237
	58	874B	.012	.205	.025	.00866	-.00054	.00605
	59	876	.012	.177	.013	.00833	-.00061	.00643
	60	877	.012	.083	.008	.00823	-.00060	.00628
	61	880	.012	.030	.003	.00812	-.00057	.00588
	62	882	.012	.000	.000	.00795	-.00047	.00492
	63	884	.011	-.020	-.002	.00781	-.00037	.00406
	64	885	.011	-.052	-.005	.00770	-.00031	.00344
	65	888	.011	-.079	-.007	.00769	-.00026	.00286
	66	890	.011	-.000	.000	.00520	.00020	-.00238
	67	892	.011	.008	.001	.00509	.00018	-.00227
	68	894	.011	.045	.003	.00488	.00013	-.00209
	69	895	.011	.063	.004	.00478	.00009	-.00202
	70	897	.011	.079	.005	.00467	.00003	-.00194
	71	898	.011	.087	.005	.00455	-.00003	-.00183
	72	9.0A	.011	.094	.005	.00443	-.00011	-.00169
	73	9.0B	.010	.076	.007	.00420	-.00057	-.00097
	74	568	.010	.033	.003	.00405	-.00002	.00000
RUN4								
	75	595	.180	-4.201	.812	.02656	.00178	-.00486
	76	585A	.144	-3.669	.812	.02655	.00179	-.00486
	77	585	.117	-3.271	.812	.02655	.00178	-.00486
	78	580B	.099	-2.992	.812	.02655	.00178	-.00486
	79	580	.075	-2.634	.812	.02654	.00178	-.00486
	80	580A	.051	-2.275	.812	.02654	.00175	-.00479
	81	575	-.013	-1.280	.812	.02649	.00166	-.00462
	82	570	-.028	-1.042	.812	.02647	.00163	-.00458
	83	565B	-.045	-.764	.812	.02643	.00161	-.00453

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV... ION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV). GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN4 (CONTD.)								
	84	565T	-.266	-.407	.812	.02637	.00157	-.00446
	85	565C	-.288	-.651	.812	.02638	.00157	-.00436
	86	565A	-.308	-.243	.812	.02638	.00157	-.00435
	87	564B	-.166	.382	.456	.02661	.00135	-.00363
	88	555A	-.198	.350	.205	.02661	.00135	-.00355
	89	555B	-.225	.288	-.032	.02661	.00135	-.00297
	9...	55...	-.225	.093	-.126	.02661	.00135	-.00268
	91	547A	-.225	.069	-.139	.02661	.00135	-.00266
	92	545B	-.293	-.060	-.893	.02661	.00135	-.00256
	93	543	-.359	-.068	-1.292	.02661	.00135	-.00256
	94	536	-.421	-.109	-2.269	.02661	.00135	-.00250
RUN5								
	95	58...	.075	-2.634	.812	.02654	.00178	-.00486
	96	58.C	.075	-2.575	.833	.02652	.00184	-.00495
	97	7.1	.075	-2.498	.863	.02644	.00209	-.00538
	98	7.4	.075	-1.962	1.081	.02595	.00324	-.00793
	99	7.6	.075	-1.469	1.279	.02561	.00380	-.00963
	1..	7.8	.075	-.818	1.529	.02524	.00419	-.01115
	1.1	71.A	.075	-.798	1.575	.02518	.00423	-.01133
	1.2	711	.075	-.790	1.574	.02518	.00423	-.01135
	1.3	712A	.075	-.180	1.765	.02491	.00433	-.01186
	1.4	712B	-.196	-....	1.469	.02460	.00448	-.01206
	1.5	776	-.287	-.506	1.091	.02455	.00448	-.01206
	1.6	739	-.824	-....	-.000	.02449	.00448	-.01206
MISC. NODES								
	1.7	86..	....	....	.059	.00503	.00008	-.00059
	1.8	85..	....	-....	.072	.00694	.00036	-.00013
	1.9	896	.123	.363	.033	.00478	.00029	-.00202
	11.	886	-....	-.952	.965	.00779	-.00031	.00744
	111	842	-.112	-....	.348	.00838	.00142	.00026
	11.	87.	-.326	.883	.057	....	-.00060	.00628

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U...
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-P4

STATIC ANALYSIS NO. 1 (OPAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS

RUN NAME	SUP NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	B1/2 (PSI)	B2/2 (PSI)
RUN1											
	1	PC3C	STRT	.00	139.33	-112.48	-178633.10	6469.65	-2936.35	4533.67	4533.67
	2	ME2Z	STRT	.00	-153.92	-112.48	-178633.10	733.18	-2564.25	4533.59	4533.59
	3L	834	STRT	.00	-326.42	-112.48	-178633.10	-2641.21	4640.88	4532.11	4532.11
	3R	834	STRT	-97.09	-632.53	-170.91	-181356.15	-781.60	4256.00	4612.45	4612.45
	4L	868	STRT	-97.09	-736.03	-170.91	-181356.15	-3858.02	16573.20	4619.35	4619.35
	4R	868	STRT	804.17	-1045.47	-263.15	-181875.82	-19794.30	5981.02	4641.97	4641.97
	5L	866	STRT	804.17	-1149.80	-263.15	-181875.82	-24568.62	25816.49	4701.04	4736.34
	5R	866	VALV	804.17	-1432.80	-263.15	-181875.82	-24568.62	25816.49	N/A	
	6	859	VALV	804.17	-1432.80	-263.15	-181875.82	-28642.28	47996.28	N/A	
	7	SP58	VALV	804.17	-2566.80	-263.15	-181875.82	-32715.78	87730.23	N/A	
	8L	856	VALV	804.17	2570.61	152.77	-181875.82	-27986.00	8144.04	N/A	
	8R	856	STRT	804.17	2215.61	152.77	-181875.82	-27986.00	8144.04	4043.63	4043.63
	9L	854A	STRT	804.17	2111.41	152.77	-181875.82	-26152.75	-17818.07	4052.67	4052.67
	9R	854A	BREC-R	804.17	2111.41	152.77	-181875.82	-26152.75	-17818.07	4052.67	8105.34
	10L	852	BREC-R	804.17	2050.96	152.77	-181875.82	-25089.46	-32393.11	7614.20	15228.40
	10R	852	VALV	804.17	1786.96	152.77	-181875.82	-25089.46	-32393.11	N/A	
	11	849	VALV	804.17	1786.96	152.77	-181875.82	-23302.04	-53219.60	N/A	
	12L	848	VALV	804.17	727.96	152.77	-181875.82	-21514.62	-61727.78	N/A	
	12R	848	BREC-E	804.17	463.96	152.77	-181875.82	-21514.62	-61727.78	7893.92	15787.84
	13L	846	BREC-E	804.17	403.52	152.77	-181875.82	-20451.34	-64746.64	4261.85	8523.70
	13R	846	STRT	804.17	403.52	152.77	-181875.82	-20451.34	-64746.64	4261.85	4261.85
	14	SP45	STRT	804.17	351.42	152.77	-181875.82	-19534.71	-67911.47	4276.62	4276.62
	15L	844	STRT	804.17	299.32	152.77	-181875.82	-18618.09	-68963.68	4289.59	4289.59
	15R	844	VALV	804.17	-549.68	152.77	-181875.82	-18618.09	-68963.68	N/A	
	16	841	VALV	804.17	-549.68	152.77	-181875.82	-16253.19	-60454.57	N/A	
	17L	840	VALV	804.17	-849.68	152.77	-181875.82	-13888.30	-47301.46	N/A	
	17R	840	STRT	804.17	-1698.68	152.77	-181875.82	-13888.30	-47301.46	4136.75	4136.75
	18L	838A	STRT	804.17	-1698.89	152.77	-181875.82	-13884.63	-47263.69	4136.52	4136.52
	18R	838A	BELR	804.17	1698.89	-152.77	-181875.82	13884.63	47263.69	4136.52	7573.71
	19L	S93P	BELB	-716.51	1843.77	-152.77	-137752.36	-120459.09	25154.39	4054.23	7419.41
	19R	S83B	BELP	2189.74	-1052.48	-9.16	-137752.36	-120438.09	25154.39	4054.23	7419.41
	2 L	93PB	BELP	2188.17	804.17	-9.16	-12223.99	-182644.21	26467.83	4061.31	7437.53
	2 R	83BB	STRP	2188.17	804.17	-9.16	-12223.99	-182644.21	26467.83	4061.31	4061.31
	21L	836	STRT	1931.82	804.17	-9.16	-12223.99	-182814.74	2728.86	4024.89	4024.89
	21R	836	STRT	-534.70	-97.09	250.37	4740.31	-236246.37	7248.43	5189.75	5189.75
	22L	812A	STRP	-664.96	-97.09	250.37	4740.31	-232498.76	8784.82	5198.46	5198.46
	22R	812A	BELB	-664.96	97.09	-250.37	4740.31	232498.76	-8784.82	5198.46	9348.68
	23L	812C	BELP	-612.69	-475.38	-250.37	-159947.89	165892.98	-6583.85	5146.22	9238.46
	23R	812C	BELB	-562.78	-562.78	-408.39	-167092.94	159887.95	-6831.14	5279.15	9295.04
	24L	812B	BELP	.00	-899.33	-408.39	-229415.53	-9427.61	2153.85	5243.78	9224.84
	24R	812B	STRP	.00	-899.33	-408.39	-229415.53	-9427.61	2153.85	5243.78	5243.78
	25L	810	STRP	.00	-1285.94	-408.39	-229415.53	-27608.72	52797.84	5193.78	5193.78
	25R	810	STRT	.00	-1473.94	-408.39	-229415.53	-27608.72	52797.84	5193.78	5193.78
	26L	810A	STRT	.00	-1485.45	-408.39	-229415.53	-27915.41	51935.74	5199.84	5199.84

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SQF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN1 (CONTD.)											
	26R	R19A	STRT	.03	-1668.45	-408.39	-229415.53	-27915.01	51985.74	5199.84	5199.84
	27	R38	STRT	.00	-1779.17	-408.39	-229415.53	-33122.04	73884.34	5340.78	5340.78
	28	R36	STRT	.00	-2319.75	-408.39	-229415.53	-58544.58	201463.33	6824.68	6824.68
	29L	R34	STRT	.01	-2806.09	-408.39	-229415.53	-81416.28	344997.13	9269.25	9269.25
	29R	R34	STRT	.00	5361.37	-408.39	-229415.53	-81416.28	344997.13	9269.25	9269.25
	3 L	R32	STRT	.00	4753.53	-408.39	-229415.53	-110002.24	-9004.03	5588.83	5588.83
	3 R	R32	STRT	.00	4565.53	-408.39	-229415.53	-110002.24	-9004.03	5588.83	5588.83
	31L	R32A	STRT	.00	4559.01	-408.39	-229415.53	-110308.53	-12425.73	5594.99	5594.99
	31R	R32A	STRT	.00	4371.01	-408.39	-229415.53	-110308.53	-12425.73	5594.99	5594.99
	32L	565	STRT	.00	4250.55	-408.39	-229415.53	-115973.78	-72224.88	5861.76	5861.76
	32R	565	BTEE-B	.01	4250.55	-408.39	-229415.53	-115973.78	-72224.88	N/A	
	33	565T	BTEE-B	.00	4145.26	-408.39	-229415.53	-120925.48	-123123.61	4989.14	5974.92
RUN2											
	34	R12C	STRT	97.99	25.52	-158.02	-1374.63	8735.65	-247.29	12162.36	12162.36
	35	991	STRT	97.99	3.20	-158.02	-1374.63	4298.96	-654.94	6225.27	6225.27
	36L	R13	STRT	97.99	-43.96	-158.02	-1374.63	-5232.24	567.94	7478.29	7478.29
	36R	R13	STRT	97.99	28.84	58.43	-1374.63	-5232.24	567.94	7478.29	7478.29
	37	R14	STRT	97.99	-24.83	58.43	-1374.63	-1242.46	430.95	2615.47	2615.47
	38L	R16	STRT	97.99	-26.40	58.43	-1374.63	-1125.60	482.18	2534.94	2534.94
	38R	R16	STRT	97.99	-51.85	58.43	-1374.63	-1125.60	482.18	2534.94	2534.94
	39L	R18A	STRT	97.99	-67.61	58.43	-1374.63	45.39	1679.15	2984.96	2984.96
	39R	R18A	SELB	97.99	-67.61	58.43	-1374.63	45.39	1679.15	2984.96	5323.14
	4 L	R18B	SELB	71.31	97.99	58.43	-220.69	-1199.33	1596.24	2761.64	4923.59
	4 R	R18B	STRT	71.31	-97.99	-58.43	-220.69	1199.33	-1596.24	2761.64	2761.64
	41L	R20	STRT	71.49	-97.99	-58.43	-220.69	449.06	-349.54	839.12	839.12
	41R	R20	VALV	111.49	-97.99	-58.43	-220.69	449.06	-349.54	N/A	
	42	R20A	VALV	111.49	-97.99	-58.43	-220.69	203.64	58.26	N/A	
	43L	R20B	VALV	111.49	-97.99	-58.43	-220.69	-41.77	466.05	N/A	
	43R	R20B	STRT	141.49	-97.99	-58.43	-220.69	-41.77	466.05	711.26	711.26
	44L	R24A	STRT	169.59	-97.99	-58.43	-220.69	-1467.93	2035.83	4431.55	4431.55
	44R	R24A	SELB	169.59	-97.99	-58.43	-220.69	-1467.93	2035.83	4431.55	7845.51
	45L	R24B	SELB	97.99	164.29	-58.43	1643.22	-305.99	2639.86	4339.43	7683.26
	45R	R24B	STRT	97.99	-164.29	58.43	1643.22	305.99	-2639.86	4339.43	4339.43
	46	R25	STRT	97.99	-165.04	58.43	1643.22	452.98	-2481.72	4138.94	4138.94
	47L	R26	STRT	97.99	-173.72	58.43	1643.22	1897.18	-611.74	2843.63	2843.63
	47R	R26	VALV	97.99	-192.72	58.43	1643.22	1897.18	-611.74	N/A	
	48L	R28	VALV	97.99	-192.72	58.43	1643.22	1566.96	937.73	N/A	
	48R	R28	STRT	97.99	-211.72	58.43	1643.22	1566.98	937.73	1377.36	1377.36
	49L	R30	STRT	97.99	-212.29	58.43	1643.22	1619.15	1[illegible].38	3499.18	3499.18
	49R	R30	STRT	97.99	-259.79	58.43	1643.22	1619.15	139[illegible].38	3499.18	3499.18
	5 L	R3 P	STRT	97.99	-251.74	58.43	1643.22	1680.[illegible]	1795.48	3757.51	3757.51
	5 R	R3 P	SELB	97.99	-251.74	58.43	1643.22	1680.[illegible]	1795.48	3757.51	6699.17

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-14

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOP NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IN/Z (PSI)
RUN2 (CONTD.)											
	51L	83.C	SELB	255.89	95.88	58.43	-1846.60	1826.52	1866.34	4397.88	7839.34
	51R	83.C	STRE	254.28	-100.08	-58.43	-1876.49	-1795.87	-1866.34	4397.08	4397. 8
	52L	832	STRE	255.23	-100.16	-58.43	-1876.49	-1866.76	-1744.79	4358.44	4358.44
	52R	832	STRP	255.48	95.27	58.43	-1842.77	1960.05	1744.79	4358.44	4358.44
	53	834	STRE	3.6.71	95.20	58.43	-1842.77	2734.47	3P4.79	4564.11	4564.11
RUN3											
	54	836	STRE	-259.54	2466.52	901.26	-4519.53	-16964.39	53331.63	13145.07	13145.07
	55L	872A	STRP	-259.54	2429.80	901.26	-4519.53	-741.61	9264.78	2419.62	2419.62
	55R	872A	BELB	-259.54	2429.80	901.26	-4519.53	-741.61	9264.78	2419.62	3619.42
	56L	872B	BELB	-2414.57	-259.54	901.26	-4665.95	888.03	-3699.10	1409.45	21 8.34
	56R	872B	STRE	-2414.57	901.26	259.54	-4665.95	-3699.10	-888.03	1409.45	1409.45
	57L	874A	STRP	-2344.23	901.26	259.54	-4665.95	4741.09	-30197.02	7239.20	7239.20
	57R	874A	BELP	-2344.23	901.26	259.54	-4665.95	4741.09	-30197.02	7239.20	10838.04
	58L	874B	BELB	-901.26	-2325.00	259.54	-6298.32	-3108.72	-21596.87	5316.92	7952.37
	58R	874B	STRE	-901.26	2325.00	-259.54	-6298.32	3108.72	21596.87	5316.92	5316.92
	59L	876	STRE	-901.26	2303.63	-259.54	-6298.32	389.79	-2647.93	1602.17	1602.17
	59R	876	VALV	-901.26	2254.63	-259.54	-6298.32	389.79	-2647.93	N/A	
	6.	877	VALV	-901.26	2254.63	-259.54	-6298.32	-1821.48	-21857.41	N/A	
	60L	88.	VALV	-901.26	2157.63	-259.54	-6298.32	-4032.75	-39388.45	N/A	
	60R	88.	STRE	-901.26	2008.63	-259.54	-6298.32	-4032.75	-39388.45	9386.34	9386.34
	62L	882	STRE	-901.26	1997.37	-259.54	-6298.32	-5465.40	-50445.03	11971.42	11971.42
	62R	882	STRE	-901.26	-192.60	66.22	-6298.32	-5465.40	-50445.03	11971.42	11971.42
	63L	884	STRE	-901.26	-261.66	66.22	-6298.32	-5171.36	-49569.76	11761.01	11761.01
	63R	884	VALV	-901.26	-268.66	66.22	-6298.32	-5171.36	-49569.76	N/A	
	64	885	VALV	-901.26	-268.66	66.22	-6298.32	-4607.13	-47288.77	N/A	
	65L	888	VALV	-901.26	-537.66	66.22	-6298.32	-4042.89	-42688.88	N/A	
	65R	888	STRP	-901.26	-604.66	66.22	-6298.32	-4042.89	-42688.88	10149.26	10149.26
	66L	89.	STRP	-901.26	-758.64	66.22	-6298.32	955.76	8751.66	2534.15	2534.15
	66R	89.	STRE	-901.26	224.53	92.24	-6298.32	955.76	8751.66	2534.15	2534.15
	67L	892	STRE	-901.26	217.43	92.24	-6298.32	1276.76	7982.85	2399.15	2399.15
	67R	892	VALV	-901.26	137.43	92.24	-6298.32	1276.76	7982.85	N/A	
	68	894	VALV	-901.26	137.43	92.24	-6298.32	2848.51	5647.27	N/A	
	69	895	VALV	-901.26	8.43	92.24	-6298.32	3634.39	5568.46	N/A	
	7.	897	VALV	-901.26	-188.57	92.24	-6298.32	4425.26	7175.49	N/A	
	70R	897	STRE	-901.26	-237.57	92.24	-6298.32	4426.26	7175.39	2463.14	2463.14
	71	898	STRP	-901.26	-245.33	92.24	-6298.32	4771.14	8297.57	2648.12	2648.12
	72L	9.0A	STRP	-901.26	-253.49	92.24	-6298.32	5148.20	9896.96	2855.24	2855.24
	72R	9.0A	BELP	-901.26	92.24	253.49	-6298.32	5297.96	-5148.20	2855.24	4271.14
	73L	9.0B	BELB	-92.69	-901.21	272.71	-10671.92	-4715.18	-288.58	2732.34	4 87.2
	73R	9.0B	STRE	-92.69	-272.71	-901.21	-10671.92	288.58	-4715.18	2732.34	2732.34
	74	868	STRE	-92.69	-309.44	-961.21	-10671.92	-15935.98	525.71	4491.92	4491.92

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	II/Z (PSI)
RUN4											
	75	595	STRP	0.00	.00	-.00	0.00	.00	.00	.00	.00
	76L	585A	STRP	0.00	-174.03	-.00	0.00	-.00	1743.75	38.28	38.28
	76P	585A	BPEP-E	0.00	-174.03	-.00	0.00	.00	1743.75	38.28	76.56
	77L	585	BPEP-E	0.00	-515.43	-.00	0.00	-.00	6914.66	33.94	67.88
	77R	585	STRP	-.00	-515.43	-.00	.00	.00	6914.66	33.94	33.94
	78L	580B	STRP	-.00	-754.41	-.00	.00	-.00	13581.30	66.67	66.67
	78R	580B	BTEE-R	-.00	-754.41	-.00	.00	-.00	13581.30	N/A	
	79BL	58[illegible]	BTEE-R	-.00	-1061.67	-.00	.00	-.00	25838.80	126.94	185.38
	79BP	58[illegible]	BTEE-R	-408.39	-1823.16	.00	178317.27	120925.48	-4593.72	1957.84	1546.94
	80L	580A	BTEE-R	-408.39	-2130.42	.00	178317.27	120925.48	22092.96	N/A	
	80P	580A	STRP	-408.39	-2130.42	.00	178317.27	120925.48	22092.96	1963.15	1963.15
	81	575	STRP	-408.39	-2903.92	.00	178317.27	120925.48	117986.00	1285.85	1285.85
	82	570	STRP	-408.39	-3198.76	.00	178317.27	120925.48	145763.98	1276.91	1276.91
	83L	565B	STRP	-408.39	-3427.74	.00	178317.27	120925.48	186501.62	1379.78	1379.71
	83P	565B	BTEE-R	-408.39	-3427.74	.00	178317.27	120925.48	186501.62	N/A	
	84BL	565T	BTEE-R	-408.39	-3735.00	.00	178317.27	120925.48	228849.14	1542.87	2254.91
	84BP	565T	BTEE-R	.00	410.25	.00	301440.88	-.00	-566.49	1479.69	2162.57
	85L	565C	BTEE-R	.00	102.99	.00	301440.88	-.00	-4030.84	N/A	
	85P	565C	STRP	.00	102.99	.00	301440.88	-.00	-4030.84	1479.82	1479.82
	86L	560A	STRP	.00	96.17	.00	301440.88	-.00	-4066.71	1479.83	1479.83
	86R	560A	BELB	-.00	68.00	68.00	301440.88	2871.36	-2871.36	1479.83	3537.32
	87L	560B	BELB	387.04	-.00	-387.04	.00	298569.53	-.00	1465.60	3406.38
	87R	560B	STRP	387.04	-387.04	.00	.00	-.00	-298569.53	1465.60	1465.60
	88L	555A	STRP	591.64	-591.64	.00	.00	-.00	-292348.46	1435.06	1435.06
	88R	555A	BELB	591.64	591.64	-.00	.00	.00	292348.46	1435.06	2612.64
	89L	555B	BELB	.00	1319.35	-.00	-.00	.00	271766.84	1334.03	2428.78
	89P	555B	STRP	.00	-1319.35	.00	-.00	-.00	-271766.84	1334.03	1334.03
	90	550	STRP	.00	-2908.37	.00	-.00	-.00	-124185.29	609.59	609.59
	91L	545A	STRP	0.00	-3113.21	.00	-.00	-.00	-97187.99	476.58	476.58
	91R	545A	BELB	.00	-3113.21	.00	-.00	-.00	-97187.99	476.58	967.65
	92L	545B	BELB	4078.49	.00	.00	.00	-.00	.00	.00	.00
	92R	545B	STRP	4078.49	-.00	.00	0.00	-.00	-.00	.00	.00
	93L	540	STRP	4410.99	-.00	.00	0.00	-.00	.00	.00	.00
	93P	54[illegible]	STRP	-827.55	-.00	-.00	0.00	.00	-.00	.00	.00
	94	536	STRP	.00	-.00	-.00	0.00	.00	.00	.00	.00
RUN5											
	95	58[illegible]	BTEE-B	.00	761.49	408.39	-30433.52	-122925.48	-178317.27	7198.62	4528.63
	96L	58[illegible]	BTEE-B	.00	656.26	408.39	-30433.52	-115973.78	-186811.82	N/A	
	96P	58[illegible]	STRP	.00	656.26	408.39	-30433.52	-115973.78	-186811.82	4874.91	4874.91
	97	7[illegible]1	STRP	.00	527.03	408.39	-30433.52	-109898.84	-195712.3[illegible]	4972.55	4972.55
	98	7[illegible]4	STRP	.00	-174.29	408.39	-30433.52	-76916.93	-206851.65	4957.93	4957.93
	99	7[illegible]6	STRP	.00	-661.94	408.39	-30433.52	-54132.57	-186852.27	4315.68	4315.68
	1[illegible]	7[illegible]8	STRP	.00	-1211.78	408.39	-30433.52	-28595.75	-128546.87	2967.14	2967.14

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EV-54

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOP NO.	DOP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUNS (CONTD.)											
1 1L	713A	STRP		.00	-1286.45	408.39	-30433.52	-24613.91	-116416.71	2696.25	2696.25
1 1P	713A	STRP		.00	-1474.45	408.39	-30433.52	-24613.91	-116416.71	2696.25	2696.25
1 2L	713	STRP		.00	-1480.97	408.39	-30433.52	-24307.61	-115308.43	2671.85	2671.85
1 2P	713	STRP		.00	-1668.97	408.39	-30433.52	-24307.61	-115308.43	2671.85	2671.85
1 3L	712A	STRP		.00	-2055.58	408.39	-30433.52	-6125.91	-32480.07	985.36	985.36
1 3P	712A	RELP		-.00	-2055.58	408.39	-30433.52	-6125.91	-32480.07	985.36	1802.71
1 4L	712B	RELP		2264.43	-.00	408.39	-.00	-24307.61	-.00	533.62	976.55
1 4R	712B	STRP		2264.43	.00	-408.39	.00	24307.61	.00	533.62	533.62
1 5	736	STRP		2394.69	.00	-408.39	.00	18181.70	.00	399.14	399.14
1 6	739	STRP		2781.30	0.00	-408.39	.00	-.00	-.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ION
CALCULATION NO. FW-C4

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS

SUPP. NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
PENC	PC7C	ANCH	GLOP							
				FORC	(LB)	GLBL	-.00	-139.33	112.48	
				DISP	(IN)	GLBL	-.000	-.000	.000	
				MOMT	(LB.IN)	GLBL	178633.10	-6469.65	2936.35	
				ROTN	(RAD)	GLBL	.0000	-.0000	.0000	
B58Y	SB5B	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-5775.41	0.00	
				DISP	(IN)	GLBL	-.000	-.000	-.000	
B58Z	SB5B	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	-415.92	
				DISP	(IN)	GLBL	-.000	-.000	-.000	
B39Y	SB7B	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-4095.92	0.00	
				DISP	(IN)	GLBL	-.003	-.000	.000	
SB16	B16	CONF	Y							
				FORC	(LB)	GLBL	0.00	25.45	0.00	
				DISP	(IN)	GLBL	-.061	.000	-.097	
B39Z	SB3B	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	143.61	
				DISP	(IN)	GLBL	-.003	-.000	.000	
SP1B	P1B	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-.672	.416	.357	
B04Y	B 4	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-8167.46	0.00	
				DISP	(IN)	GLBL	-.066	-.000	.002	
SB14	B14	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	.003	-.046	-.061	
SB4[redacted]	B4[redacted]	CONF	Y							
				FORC	(LB)	GLBL	[redacted].00	-5247.45	[redacted].01	
				DISP	(IN)	GLBL	-.[redacted]30	-.[redacted]00	+1.292	
B13Y	B13	SNGL	Y							
				FORC	(LB)	GLBL	[redacted].[redacted]8	-72.81	[redacted].[redacted]	
				DISP	(IN)	GLBL	-.[redacted]62	-.[redacted]21	.[redacted]	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
813Y (CONTD.)										
55cS	55?	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-.042	.084	-.257	
8137	813	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	216.45	
				DISP	(IN)	GLBL	-.062	-.000	.000	
89?Y	89?	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-983.17	0.00	
				DISP	(IN)	GLBL	.011	-.000	.000	
89?Z	89?	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	26.01	
				DISP	(IN)	GLBL	.011	-.000	.000	
882Y	882	SNGL	Y							
				FORC	(LB)	GLBL	0.00	2189.98	0.00	
				DISP	(IN)	GLBL	.012	.000	.000	
8827	882	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	325.76	
				DISP	(IN)	GLBL	.012	.000	.000	
595X	595	SNUB	X							INACTIVE
				DISP	(IN)	GLBL	.180	-4.201	.012	
536S	536	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	.194	-.000	-2.298	
S7?8	7?8	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-1.529	-.177	.002	
739Y	739	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-2781.39	0.00	
				DISP	(IN)	GLBL	-.824	-.000	-.000	
73?Z	739	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	-428.39	
				DISP	(IN)	GLBL	-.824	-.000	-.000	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL TION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
7392 (CONTD.)									

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ION
CALCULATION NO. EW-[illegible]4

DYNAMIC PROPERTIES CONTROL INFORMATION

PROPERTIES NAME = DYNP
PROPERTIES TITLE =

MAX. NO. OF MODES REQUIRED = 0
CUT-OFF FREQUENCY = 33.

NO. OF SUPPORT LEVELS = 0

PRINT CODE = PRNT (FREQUENCIES ONLY)

MASS REDISTRIBUTION CODE = (NO REDISTRIBUTION - SUBSPACE ITERATION WILL BE USED)

MINIMUM SUBSPACE SIZE = 7

PROPERTY MODIFICATION CODE = PMOD (PROPERTIES TO BE MODIFIED)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-54

PROPERTY MODIFICATION DATA

CARD TYPE	RUN OR GROUP	FIRST DCP,NME	LAST DCP,NME	ITEM 1	ITEM 2	ITEM 3	ITEM LIST
TEME				420.00			T(HOT)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-54

ELEMENT PROPERTIES FOR CURRENT STIFFNESS

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. OF SUBELS	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN1												
	1	PC3C	MEZZ	1	A1	STRP	10SCH80S	SA106 B	26880000.	5.75	293.25	1.000
	2	MEZZ	834	1	A1	STRP	10SCH80S	SA106 B	26880000.	5.75	172.50	1.000
	3	834	86A	1	A1	STRP	10SCH80S	SA106 B	26880000.	5.75	103.50	1.000
	4	86P	P46	1	A1	STRP	10SCH80S	SA106 B	26880000.	5.75	174.33	1.000
	5	866	859	1	A2	VALV	10INVALV	SA106 B	26880000.	0.00	0.00	1.000
	6	859	SR5A	1	A2	VALV	10INVALV	SA106 B	26880000.	0.00	0.00	1.000
	7	SR5A	856	1	A2	VALV	10INVALV	SA106 B	26880000.	0.00	0.00	1.000
	8	856	854A	1	A3	STRP	10SCH80	SA106 B	26880000.	8.68	104.21	1.000
	9	854A	852	1	A3	BRED-R	10X8RED	SA106 B	26880000.	8.68	60.44	1.000
	10	852	849	1	A4	VALV	8INVALV	SA106 B	26880000.	0.00	0.00	1.000
	11	849	848	1	A4	VALV	8INVALV	SA106 B	26880000.	0.00	0.00	1.000
	12	846	846	1	A5	BRED-E	10X8RED	SA106 B	26880000.	8.68	60.44	1.000
	13	846	SR45	1	A6	STRP	10SCH80	SA106 B	26880000.	8.68	52.10	1.000
	14	SR45	844	1	A6	STRP	10SCH80	SA106 B	26880000.	8.68	52.10	1.000
	15	844	841	1	A7	VALV	10INVALV	SA106 B	26880000.	0.00	0.00	1.000
	16	841	840	1	A7	VALV	10INVALV	SA106 B	26880000.	0.00	0.00	1.000
	17	840	838A	1	A7A	STRP	10SCH80	SA106 B	26880000.	8.68	.21	1.000
	18	838A	SR3B	1	A8	BELB	10INELB	SA106 B	26880000.	8.86	104.43	4.784
	19	SR3B	838B	1	A8	BELB	10INELB	SA106 B	26880000.	8.86	104.43	4.784
	20	838B	836	1	A9	STRP	10SCH80	SA106 B	26880000.	8.68	256.35	1.000
	21	836	812A	1	A9	STRP	10SCH80	SA106 B	26880000.	8.68	139.26	1.000
	22	812A	812C	1	A10	BELB	10INELB	SA106 B	26880000.	8.86	104.43	4.784
	23	812C	812B	1	A10	BELB	10INELB	SA106 B	26880000.	8.86	104.43	4.784
	24	812D	P10	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	386.61	1.000
	25	P10	P10A	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	6.51	1.000
	26	P10A	808	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	110.72	1.000
	27	808	806	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	543.58	1.000
	28	806	804	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	486.34	1.000
	29	804	802	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	607.85	1.000
	30	802	802A	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	6.51	1.000
	31	802A	565	1	A11	STRP	10SCH80	SA106 B	26880000.	8.68	120.46	1.000
	32	565	565I	1	A12	BTEE-R	18X18X10	SA106 B	26880000.	8.68	175.29	1.000
RUN2												
	33	R12C	991	1	B1	STRP	2SCH80S	SA106 B	26880000.	.79	22.32	1.000
	34	991	P13	2	B1	STRP	2SCH80S	SA106 B	26880000.	.79	47.16	1.000
	36	P13	P14	2	B1	STRP	2SCH80S	SA106 B	26880000.	.79	53.67	1.000
	38	P14	R16	1	B1	STRP	2SCH80S	SA106 B	26880000.	.79	1.57	1.000
	39	R16	R16A	1	B1	STRP	2SCH80S	SA106 B	26880000.	.79	15.75	1.000
	40	R16A	R16B	1	B2	SELB	2INELB	SA106 B	26880000.	.79	3.78	1.000
	41	R16B	P2U	1	B2	STRP	2SCH80S	SA106 B	26880000.	.79	17.39	1.000
	42	P2	P2-A	1	B4	VALV	2INVALV	SA106 B	26880000.	0.00	0.00	1.000
	43	P2-A	P2-B	1	B4	VALV	2INVALV	SA106 B	26880000.	0.00	0.00	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. FW-04

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. OF SUBELS	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN2 (CONTD.)												
	44	B2 B	B24A	1	B5	STRP	2SCH80S	SA106 B	26880000.	.79	19.18	1.000
	45	B24A	B24B	1	B6	SELB	2INELB	SA106 B	26880000.	.79	[illegible]	1.[illegible]
	46	B24B	B25	1	B7	STRP	2SCH80S	SA106 B	26880000.	.79	.75	1.000
	47	B25	B26	1	B7	STRP	2SCH80S	SA106 B	26880000.	.79	8.68	1.000
	48	B26	B28	1	B9	VALV	2INVALV	SA106 B	26880000.	0.00	[illegible]	1.000
	49	B28	B30	1	B9	STRP	2SCH80S	SA106 B	26880000.	.79	.57	1.000
	50	B30	B30B	1	B9	STRP	2SCH80S	SA106 B	26880000.	.79	.95	1.000
	51	B30B	B30C	1	B10	SELB	2INELB	SA106 B	26880000.	.79	3.69	1.000
	52	B30C	B32	1	B12	STRP	2SCH80S	SA106 B	26880000.	.79	.95	1.000
	53	B32	B34	1	B12	STRP	2SCH80S	SA106 B	26880000.	.79	11.22	1.000
RUN3												
	54	B36	B72A	1	C1	STRP	4SCH80S	SA106 B	26880000.	2.04	36.72	1.000
	55	B72A	B72B	1	C2	BELB	4INELB	SA106 B	26880000.	2.04	19.23	3.536
	56	B72B	B74A	1	C3	STRP	4SCH80S	SA106 B	26880000.	2.04	66.34	1.000
	57	B74A	B74B	1	C4	BELB	4INELB	SA106 B	26880000.	2.04	19.23	3.536
	58	B74B	B76	1	C5	STRP	4SCH80S	SA106 B	26880000.	2.04	21.37	1.000
	59	B76	B77	1	C6	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	60	B77	B80	1	C6	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	61	B80	B82	1	C7	STRP	4SCH80S	SA106 B	26880000.	2.04	11.26	1.000
	62	B82	B84	1	C7	STRP	4SCH80S	SA106 B	26880000.	2.04	9.06	1.000
	63	B84	B85	1	C8	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	64	B85	B88	1	C8	VALV	4INVALV	SA106 B	26880000.	0.00	[illegible]	1.000
	65	B88	B90	2	C9	STRP	4SCH80S	SA106 B	26880000.	2.04	153.98	1.000
	67	B90	B92	1	C9	STRP	4SCH80S	SA106 B	26880000.	2.04	7.10	1.000
	68	B92	B94	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	69	B94	B95	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	[illegible]	1.000
	70	B95	B97	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	[illegible]	1.000
	71	B97	B98	1	C11	STRP	4SCH80S	SA106 B	26880000.	2.04	7.76	1.000
	72	B98	B98A	1	C11	STRP	4SCH80S	SA106 B	26880000.	2.04	8.16	1.000
	73	B98A	B98B	1	C12	BELB	4INELB	SA106 B	26880000.	2.04	19.22	3.536
	74	B98B	B68	1	C13	STRP	4SCH80S	SA106 B	26880000.	2.04	36.73	1.000
RUN4												
	75	585	585A	1	D1	STRP	18SCH80	SA106 B	26880000.	8.68	174.13	1.000
	76	585A	585	1	D2	BRED-E	18X10RED	SA106 B	26880000.	22.76	341.40	1.000
	77	585	585B	1	D3	STRP	18SCH80	SA106 B	26880000.	22.76	238.98	1.000
	78	585B	585	1	D4	BTEE-R	18X18X10	SA106 B	26880000.	22.76	307.26	1.000
	79	585	585A	1	D4	BTEE-R	18X18X10	SA106 B	26880000.	22.76	307.26	1.000
	80	585A	575	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	853.50	1.000
	81	575	575	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	204.84	1.000
	82	57[illegible]	57[illegible]B	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	370.98	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ION
CALCULATION NO. EW-34

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. OF SUBELS	COMP NAME	COMP. TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN4 (CONTD.)												
	83	565B	565T	1	D6	BTEE-R	18X18X10	SA106 B	26880000.	22.76	307.26	1.000
	84	565T	565C	1	D6	BTEE-R	18X18X10	SA106 B	26880000.	22.76	307.26	1.000
	85	565C	566A	1	D7	STRP	18SCH80	SA106 B	26880000.	22.76	6.83	1.000
	86	566A	566B	1	D8	BELB	18INELB	SA106 B	26880000.	22.76	643.52	7.121
	87	566B	555A	1	D9	STRP	18SCH80	SA106 B	26880000.	22.76	282.35	1.000
	88	555A	555B	1	D10	BELB	18INELB	SA106 B	26880000.	22.76	492.64	4.747
	89	555B	550	1	D11	STRP	18SCH80	SA106 B	26880000.	22.76	1589.02	1.000
	90	550	545A	1	D11	STRP	18SCH80	SA106 B	26880000.	22.76	204.84	1.000
	91	545A	545B	1	D12	BELB	18INELB	SA106 B	26880000.	22.76	965.29	4.747
	92	545B	540	1	D13	STRP	18SCH80	SA106 B	26880000.	22.76	341.40	1.000
	93	540	576	1	D13	STRP	18SCH80	SA106 B	26880000.	22.76	827.55	1.000
RUN5												
	94	580	580C	1	E1	BTEE-B	18X18X10	SA106 B	26880000.	8.68	195.29	1.000
	95	580C	701	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	129.18	1.000
	96	701	704	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	721.32	1.000
	97	704	706	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	486.65	1.000
	98	706	708	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	540.84	1.000
	99	708	710A	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	84.67	1.000
	100	710A	710	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	6.51	1.000
	101	710	712A	1	E2	STRP	10SCH80	SA106 B	26880000.	8.68	386.61	1.000
	102	712A	712B	1	E3	BELB	10INELB	SA106 B	26880000.	8.86	238.85	4.784
	103	712B	736	1	E4	STRP	10SCH80	SA106 B	26880000.	8.68	130.26	1.000
	104	736	739	1	E4	STRP	10SCH80	SA106 B	26880000.	8.68	386.61	1.000
VLOP												
	105	859	860	1	F1	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000
	106	849	850	1	F2	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000
	107	835	836	1	F3	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000
	108	825	826	1	F4	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000
	109	841	842	1	F5	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000
	110	877	878	1	F6	VLOP	VLOP	SA106 B	27900000.	0.00	0.00	1.000

TOTAL DISTRIBUTED WEIGHT = 16526.41

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

NO. OF MODES BELOW CUT-OFF = 20
NO. OF MODES TO BE FOUND = 20

REQUIRED FIELD LENGTH (OCTAL) = 0146722
AVAILABLE FIELD LENGTH (OCTAL) = 0377000
SUBSPACE SIZE = 3

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

NATURAL MODE FREQUENCIES

MODE NO.	1	2	3	4	5	6	7	8	9	10
FREQUENCY (CPS)	2.805	3.900	5.586	6.639	10.840	15.303	16.124	17.794	18.627	19.723
PERIOD (SEC)	.3565	.2564	.1790	.1506	.0923	.0653	.0620	.0562	.0537	.0507

MODE NO.	11	12	13	14	15	16	17	18	19	20
FREQUENCY (CPS)	22.639	23.149	24.146	26.146	26.803	27.393	27.827	28.511	29.268	31.159
PERIOD (SEC)	.0442	.0432	.0414	.0382	.0373	.0365	.0359	.0351	.0342	.0321

ORTHOGONALITY CHECK

MAX. DIAGONAL TERM = .1[illegible]E+01
MIN. DIAGONAL TERM = .1[illegible]E+01
MAX. OFF-DIAGONAL TERM = .9[illegible]E-07

MASS PARTICIPATION

MODE NO.	MASS PARTICIPATION FACTORS X-AXIS	Y-AXIS	Z-AXIS	EFFECTIVE WEIGHT RATIOS X-AXIS	Y-AXIS	Z-AXIS
1	.[illegible]489	-.1317	.0751	.0368	.2671	.0868
2	.[illegible]496	.[illegible]168	.0853	.0746	.0043	.1122
3	-.[illegible]2[illegible]8	.[illegible]658	.0792	.0067	.[illegible]668	.0958
4	-.1381	-.[illegible]619	-.[illegible]190	.2938	.0574	.0056
5	-.[illegible]3145	-.[illegible]323	-.[illegible]086	.0033	.0161	.0011
6	.[illegible]0[illegible]02	-.0161	-.0242	.0000	.0040	.0090
7	-.[illegible]185	-.[illegible]026	-.[illegible]561	.0052	.[illegible]001	.0484
8	-.[illegible]615	.[illegible]027	.[illegible]415	.0060	.0051	.0265
9	.[illegible]067	-.[illegible]288	-.[illegible]516	.0067	.0128	.0410
10	-.[illegible]136	.[illegible]032	.[illegible]492	.0025	.0002	.0374
11	.[illegible]253	-.1167	-.[illegible]693	.0099	.0043	.0013
12	-.[illegible]7[illegible]9	-.[illegible]343	.[illegible]219	.0775	.0003	.0101
13	-.[illegible]559	-.[illegible]159	.[illegible]617	.0482	.0005	.0587
14	.[illegible]231	-.[illegible]642	-.[illegible]296	.0082	.0635	.0066
15	-.[illegible]198	-.0211	-.[illegible]219	.0060	.0069	.0067
16	-.[illegible]016	-.[illegible]037	.[illegible]029	.0000	.0002	.0001
17	.[illegible]03	-.[illegible]477	-.[illegible]134	.0013	.[illegible]359	.0027
18	.[illegible]145	-.[illegible]26[illegible]	.[illegible]783	.0033	.0104	.0231
19	.[illegible]032	.[illegible]893	.[illegible]195	.0002	.0013	.0058
20	.[illegible]5[illegible]5	-.[illegible]24[illegible]	-.[illegible]766	.0394	.[illegible]089	.0307

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

MASS PARTICIPATION (CONTD.)

MODE NO.	MASS PARTICIPATION FACTORS X-AXIS	Y-AXIS	Z-AXIS	EFFECTIVE WEIGHT RATIOS X-AXIS	Y-AXIS	Z-AXIS
ACCUMULATED EFFECTIVE WEIGHT RATIOS				.6174	.5603	.5706

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. EV-04

ACCELERATION SPECTRUM NO. 1

SPECTRUM NAME = HORZ
SPECTRUM TITLE = HORIZONTAL RESPONSE SPECTRA OF FEEDWATER LINE PEN AT EL. 31'

PERIOD/FREQUENCY CODE = F (FREQUENCIES SPECIFIED)
UNITS CODE = G (MULTIPLES OF GRAVITY)

INTERPOLATION TYPE = LOGARITHMIC

FREQUENCY	ACCELERATION
100.[illegible]	.670
60.[illegible]	.670
2[illegible]	.900
8.5[illegible]	.900
5.[illegible]	1.900
4.7[illegible]	3.350
3.[illegible]	3.350
2.[illegible]	1.900
1.[illegible]	1.130
.2[illegible]	.350

ACCELERATION SPECTRUM NO. 2

SPECTRUM NAME = VERT
SPECTRUM TITLE = VERICAL RESPONSE SPECTRA OF FEED WATER LINE PEN AT EL. 31'

PERIOD/FREQUENCY CODE = F (FREQUENCIES SPECIFIED)
UNITS CODE = G (MULTIPLES OF GRAVITY)

INTERPOLATION TYPE = LOGARITHMIC

FREQUENCY	ACCELERATION
100.[illegible]	.670
16.[illegible]	.700
5.[illegible]	1.850
4.6[illegible]	2.890
3.2[illegible]	2.890
2.[illegible]	1.600
1.[illegible]	.710
.2[illegible]	.210

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

SPECTRAL ACCELERATIONS (MULTIPLES OF GRAVITY) AT MODE FREQUENCIES

MODE NUMBER	1	2	3	4	5	6	7	8	9	1
FREQUENCY	2.805	3.900	5.586	6.639	10.840	15.303	16.124	17.794	18.627	19.723
SPECTRUM 1	3.116	3.359	1.691	1.366	.900	.900	.900	.900	.900	.900
SPECTRUM 2	2.521	2.886	1.624	1.350	.699	.694	.694	.692	.692	.691

MODE NUMBER	11	12	13	14	15	16	17	18	19	2
FREQUENCY	22.639	23.149	24.146	26.146	26.803	27.393	27.827	28.511	29.268	31.159
SPECTRUM 1	.874	.869	.861	.844	.839	.834	.831	.826	.826	.817
SPECTRUM 2	.689	.689	.689	.687	.687	.687	.687	.686	.686	.685

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 SEISMIC ANALYSIS

RESULTS SET NAME (INERTIA ONLY) = SEIS

EXCITATION OPTION = DFLT (SIMPLE EXCITATION)

RESULTS SET NAME (INERT + ANCH) = (NO ANCHOR MOVEMENTS)

MISSING MASS OPTION = MISM (CORRECTION APPLIED)

MODE COMBINATION OPTION = GRUP (GROUPING METHOD)

CLOSE MODE FACTOR (PERCENT) = 10.0 (STANDARD VALUE)

ACCELERATIONS CODE = ACCN (POINTS TO BE SPECIFIED)
ACCELERATION CUT-OFF (G) = 0.00

NO. OF NEW SUPPORT LEVELS = 0

POINTS FOR WHICH ACCELERATIONS ARE REQUIRED

OPTION	RUN	LIST OR RANGE											
LIST		866	860	S858	856	852	850	848	844	842	840		
LIST		802A	802	710	710A	820	820B	826	828	835	832	876	883
LIST		878	886	884	888	892	894	896	897	810	810A		

RESPONSE SPECTRA

X SPECTRUM	Y SPECTRUM	Z SPECTRUM	SCALE FACTOR
HORZ	VERT	HORZ	1.000

CLOSE MODE GROUPINGS

GROUP NO.	FIRST MODE	LAST MODE
1	6	7

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS)

CLOSE MODE GROUPINGS (CONTD.)

GROUP NO.	FIRST MODE	LAST MODE
2	8	9
3	11	13
4	14	18
5	19	24

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), FORCES AND MOMENTS IN LOCAL COORDINATES (MISC. MEMB. ONLY)

RUN GROUP	SOP MMB	DCP NAME	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	XX MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)
VLOP								
	F1	859	912.53	879.19	836.83	0.00	9539.82	10022.82
		860	912.53	879.19	836.83	0.00	.00	.00
	F2	849	646.48	823.10	835.43	0.00	10025.11	9877.18
		85[illegible]	646.48	823.10	835.43	0.00	.00	.00
	F3	895	198.39	211.97	187.97	0.00	1127.84	1271.83
		896	198.39	211.97	187.97	0.00	.00	.00
	F4	885	198.20	307.54	385.86	0.00	3472.72	2767.85
		886	198.20	307.54	385.86	0.00	.00	.00
	F5	841	163.76	302.52	380.90	0.00	17140.62	13613.36
		842	163.76	302.52	380.90	0.00	.00	.00
	F6	877	139.78	217.98	170.48	0.00	1022.85	1307.91
		878	139.78	217.98	170.48	0.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]TION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS

RUN NAME	DOP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN1								
	1	DC3C	.000	.000	.000	.00000	.00000	.00000
	2	MEZZ	.004	.023	.005	.00116	.00013	.00060
	3	834	.006	.039	.008	.00184	.00006	.00039
	4	868	.007	.041	.008	.00226	.00011	.00016
	5	856	.008	.033	.006	.00266	.00016	.00082
	6	859	.009	.019	.003	.00279	.00020	.00108
	7	SP58	.009	.000	.000	.00291	.00025	.00138
	8	856	.010	.051	.009	.00315	.00030	.00174
	9	854A	.011	.073	.013	.00338	.00029	.00170
	10	852	.011	.086	.015	.00358	.00026	.00151
	11	849	.012	.102	.017	.00379	.00022	.00115
	12	848	.012	.113	.019	.00400	.00020	.00063
	13	846	.012	.116	.020	.00419	.00023	.00009
	14	S845	.013	.115	.020	.00431	.00027	.00049
	15	844	.013	.111	.019	.00442	.00033	.00098
	16	841	.013	.092	.019	.00454	.00040	.00160
	17	840	.014	.062	.020	.00465	.00050	.00237
	18	838A	.014	.062	.023	.00465	.00050	.00237
	19	SP38	.047	.000	.000	.00491	.00137	.00977
	20	838B	.189	.053	.055	.00562	.00176	.01598
	21	836	.696	.053	.220	.00626	.00245	.01678
	22	812A	.943	.052	.325	.00687	.00286	.01575
	23	812C	1.076	.102	.409	.00941	.00292	.00885
	24	812B	1.153	.152	.461	.01082	.00361	.00269
	25	810	1.106	.161	.563	.01461	.00422	.00408
	26	810A	1.106	.161	.565	.01468	.00424	.00410
	27	808	1.107	.176	.608	.01582	.00497	.00419
	28	806	1.110	.261	.894	.02139	.00585	.00174
	29	804	1.113	.000	1.227	.02652	.00641	.01013
	30	802	1.117	1.102	1.682	.03297	.00686	.01816
	31	802A	1.117	1.116	1.687	.03304	.00687	.01816
	32	565	1.117	1.369	1.780	.03433	.00712	.01777
	33	565T	1.117	1.582	1.861	.03462	.00725	.01760
RUN2								
	34	812C	1.076	.102	.409	.00941	.00292	.00885
	35	801	1.076	.089	.342	.00753	.00419	.00441
	36	813	1.075	.000	.000	.00398	.00555	.00797
	37	814	1.075	.547	.240	.00355	.00279	.00149
	38	816	1.075	.546	.242	.00363	.00287	.00175
	39	818A	1.074	.424	.259	.00462	.00293	.01261
	40	818B	1.036	.387	.249	.00466	.00287	.01319
	41	820	.822	.388	.2[illegible]	.00478	.00195	.01965
	42	82[illegible]A	.730	.388	.187	.00476	.00188	.02112
	43	82[illegible]B	.653	.388	.168	.00473	.00181	.02044

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOF NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN2 (CONTD.)								
	44	B24A	.168	.388	.093	.00343	.00253	.01693
	45	B24B	.118	.338	.079	.00333	.00259	.01652
	46	B25	.118	.322	.077	.00321	.00263	.01606
	47	B26	.118	.172	.049	.00208	.00278	.01132
	48	B28	.118	.086	.031	.00178	.00265	.01026
	49	B30	.118	.079	.030	.00173	.00259	.01002
	50	B30B	.118	.067	.027	.00167	.00249	.00962
	51	B30C	.089	.039	.020	.00164	.00238	.00933
	52	B32	.078	.039	.019	.00158	.00226	.00885
	53	B34	.066	.039	.008	.00184	.00006	.00030
RUN3								
	54	B56	.693	.053	.228	.00626	.00245	.01678
	55	B72A	.685	.053	.228	.00408	.00230	.01720
	56	B72B	.573	.074	.204	.00454	.00190	.01703
	57	B74A	.664	.074	.059	.00504	.00112	.01143
	58	B74B	.642	.081	.038	.00505	.00114	.00188
	59	B76	.642	.063	.026	.00491	.00118	.00253
	60	B77	.642	.039	.016	.00486	.00116	.00279
	61	B81	.642	.015	.006	.00482	.00111	.00278
	62	B82	.642	.006	.000	.00475	.00097	.00234
	63	B84	.642	.009	.004	.00469	.00083	.00187
	64	B85	.642	.024	.011	.00465	.00071	.00155
	65	B88	.642	.036	.016	.00459	.00059	.00126
	66	B89	.642	.048	.008	.00328	.00042	.00088
	67	B92	.642	.063	.001	.00322	.00045	.00082
	68	B94	.642	.016	.008	.00311	.00028	.00072
	69	B95	.642	.022	.010	.00305	.00019	.00066
	70	B97	.642	.027	.011	.00299	.00014	.00061
	71	B98	.642	.029	.011	.00292	.00027	.00056
	72	B98A	.642	.031	.010	.00285	.00047	.00050
	73	B98B	.642	.024	.008	.00260	.00176	.00028
	74	B98	.642	.041	.008	.00224	.00011	.00016
RUN4								
	75	505	.168	6.249	1.861	.03454	.01849	.01711
	76	505A	.168	5.567	1.861	.03452	.00826	.01711
	77	505	.291	5.159	1.861	.03454	.00857	.01711
	78	505B	.376	4.735	1.861	.03449	.00852	.01711
	79	506	.484	4.251	1.861	.03446	.00793	.01711
	80	506A	.598	3.845	1.861	.03458	.00791	.01719
	81	575	.876	2.569	1.861	.03473	.00747	.01741
	82	577	.941	2.285	1.861	.03472	.00739	.01746
	83	506B	1.128	1.965	1.861	.03469	.00737	.01752

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOF NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN4 (CONTD.)								
	84	565I	1.117	1.582	1.861	.03462	.00720	.01769
	85	565C	1.215	1.861	1.861	.03465	.00711	.01748
	86	565A	1.217	1.255	1.861	.03465	.00711	.01747
	87	56 B	1.132	1.176	1.643	.03525	.00595	.01689
	88	555A	.958	1.308	1.505	.03532	.00586	.01684
	89	555B	.885	1.577	1.430	.02550	.00624	.01650
	90	550	.887	2.637	1.519	.03595	.00647	.01576
	91	545A	.687	2.772	1.538	.03600	.00646	.01566
	92	545B	.625	3.137	1.238	.03656	.00634	.01258
	93	540	.548	3.137	1.337	.03659	.00634	.01245
	94	536	.618	3.137	2.215	.03663	.00634	.01232
RUN5								
	95	580	.484	4.251	1.861	.03446	.00793	.01711
	96	58JC	.484	4.059	1.771	.03407	.00798	.01702
	97	7 1	.484	3.826	1.654	.03224	.00828	.01664
	98	7 4	.485	2.591	.942	.02228	.00992	.01544
	99	726	.485	1.753	.522	.01540	.00916	.01483
	100	7.8	.486	.872	.427	.00786	.00615	.01329
	101	719A	.486	.745	.437	.00671	.00565	.01297
	102	719	.486	.735	.437	.00662	.00562	.01295
	103	712A	.486	.181	.496	.00234	.00473	.01220
	104	712B	.444	.000	.448	.00602	.00487	.01216
	105	736	.475	.000	.350	.00696	.00487	.01219
	106	739	.841	.000	.000	.00818	.00487	.01222
MISC. NODES								
	107	R69	.324	.819	.832	.00279	.00023	.00158
	108	R5	.103	.102	.047	.00379	.00022	.00115
	109	R96	.241	.022	.024	.00305	.00019	.00066
	110	R86	.234	.024	.041	.00465	.00071	.00155
	111	R42	.185	.002	.193	.00454	.00040	.00160
	112	R78	.232	.239	.237	.00486	.00116	.00279

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-L4

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), ABSOLUTE GLOBAL ACCELERATIONS (MULTIPLES OF GRAVITY)

POINT NAME	X ACCEL	Y ACCEL	Z ACCEL	Y-Z ACCEL	X-Y-Z ACCEL
866	.796	.728	.851	1.165	1.374
S85B	.796	.684	.795	1.125	1.317
856	.796	.740	.889	1.193	1.415
852	.796	.853	1.033	1.280	1.538
848	.796	.892	1.048	1.316	1.587
844	.796	.826	.966	1.252	1.500
840	.796	.698	.813	1.138	1.335
81[illegible]	1.6[illegible]2	1.132	1.122	1.956	2.260
81[illegible]A	1.6[illegible]2	1.137	1.121	1.955	2.262
802	1.611	1.407	1.948	2.528	2.893
802A	1.611	1.418	1.951	2.530	2.900
823	1.662	2.137	2.861	3.257	3.895
823B	1.744	2.137	2.[illegible]16	3.389	4.007
826	1.147	1.222	1.985	2.293	2.598
828	1.147	.827	1.344	1.767	1.951
83[illegible]	1.147	.8[illegible]6	1.295	1.730	1.909
832	.959	.755	.996	1.382	1.575
876	1.347	.769	1.529	2.038	2.178
88[illegible]	1.347	.69[illegible]	.852	1.504	1.737
884	1.346	.688	.826	1.579	1.722
888	1.344	.745	1.208	1.807	1.955
892	1.319	.686	.797	1.541	1.687
894	1.316	.759	.84[illegible]	1.561	1.732
897	1.313	.865	.805	1.583	1.804
71[illegible]A	1.[illegible]62	1.160	1.[illegible]46	1.490	1.889
71[illegible]	1.[illegible]62	1.151	1.[illegible]47	1.491	1.884
86[illegible]	.8[illegible]1	.698	.829	1.153	1.348
856	.796	.887	1.120	1.374	1.635
896	1.324	.805	.65[illegible]	1.507	1.780
886	1.327	.7[illegible]9	1.544	2.[illegible]75	2.193
842	.939	.75[illegible]	1.406	1.691	1.850
878	1.359	.719	.899	1.629	1.781

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]TION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SFIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS

RUN NAME	SOI NO.	UCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN1											
	1	PC3C	STRF	31278.90	3042.07	849.29	99420.73	35318.33	144238.95	4532.80	4532.80
	2L	ME77	STRF	31278.90	3042.07	849.29	99420.73	9141.48	11787.82	2549.27	2549.27
	2R	ME77	STRP	31246.28	3012.84	728.64	99420.73	9141.48	11787.82	2549.27	2549.27
	3L	834	STRP	31246.28	3012.84	728.64	99420.73	29872.91	101176.43	3676.16	3676.16
	3R	834	STRF	30620.86	3187.97	618.43	102699.02	30989.94	118745.92	4058.28	4058.23
	4L	868	STRF	30620.86	3187.97	618.43	102699.02	40535.32	175676.90	5261.92	5261.92
	4R	868	STRF	28348.71	3314.47	621.72	97126.56	42954.67	177163.87	5238.23	5238.23
	5L	866	STRP	28348.71	3314.47	621.72	97126.56	48739.23	236538.77	6601.31	6601.31
	5R	866	VALV	28300.37	3343.53	835.37	97126.56	48739.23	236538.77	N/A	
	6	859	VALV	28300.37	3343.53	835.37	97126.56	54710.70	287257.60	N/A	
	7	5858	VALV	28167.24	3684.01	1582.45	96455.33	66764.42	338782.38	N/A	
	8L	856	VALV	28095.96	9872.74	1987.04	96455.33	24616.48	35885.35	N/A	
	8R	856	STRF	28054.62	9829.57	1834.14	96455.33	24616.48	35885.35	2322.99	2322.99
	9L	854A	STRF	28054.62	9829.57	1834.14	96455.33	32770.18	86347.65	2931.62	2931.62
	9R	854A	BRED-R	28046.64	9819.20	1801.79	96455.33	32770.18	86347.65	2931.62	5863.23
	10L	852	BRED-R	28046.64	9819.20	1801.79	96455.33	42166.36	154128.20	7623.54	15247.09
	10R	852	VALV	28019.13	9779.74	1689.40	96455.33	42166.36	154128.20	N/A	
	11	849	VALV	28015.13	9779.74	1689.40	96455.33	59107.66	268191.04	N/A	
	12L	848	VALV	27946.30	9643.95	1449.32	95362.56	71057.05	385518.56	N/A	
	12R	848	BRED-E	27928.97	9610.48	1438.07	95362.56	71057.05	385518.56	16283.54	32567.09
	13L	846	BRED-E	27928.97	9610.48	1438.07	95362.56	78272.06	447120.60	10182.34	20364.68
	13R	846	STRF	27925.46	9604.27	1441.01	95362.56	78272.06	447120.60	10182.34	10182.34
	14L	SR45	STRP	27925.46	9604.27	1441.01	95362.56	84841.67	504545.35	11425.12	11425.12
	14R	SR45	STRF	27922.25	9598.61	1444.13	95362.56	84841.67	504545.35	11425.12	11425.12
	15L	844	STRF	27922.25	9598.61	1444.13	95362.56	91672.02	561965.46	12673.87	12673.87
	15R	844	VALV	27876.64	9518.86	1607.20	95362.56	91672.02	561965.46	N/A	
	16	841	VALV	27876.64	9519.86	1607.20	95362.56	108192.02	708481.57	N/A	
	17L	840	VALV	27844.11	9590.79	1661.00	91876.59	126402.45	857621.39	N/A	
	17R	840	STRF	27820.13	9486.91	1854.24	91876.59	126402.45	857621.39	19850.78	19850.78
	18L	838A	STRF	27820.13	9486.91	1854.24	91876.59	126431.98	853847.15	19955.75	19955.75
	18R	838A	BELB	27819.15	9486.97	1872.83	91876.59	126431.98	853847.15	19955.75	34872.79
	19L	S838	BELB	26323.11	13078.52	1872.83	125499.22	110814.14	832084.72	18632.67	34690.53
	19R	S838	BELB	28056.71	12116.74	5905.18	120499.22	110814.14	832084.72	18632.67	34690.53
	20L	838B	BELB	12661.61	27814.07	5905.18	120588.97	125269.66	586626.17	13431.89	24580.9[illegible]
	20R	838B	STRF	12661.24	27780.80	5898.47	120588.97	125269.66	586626.17	13431.89	13431.89
	21L	836	STRF	12661.24	27780.80	5898.47	120588.97	278177.08	246674.17	8580.49	8580.49
	21R	836	STRF	15462.59	29813.96	5853.21	144709.63	313751.51	251140.71	9364.12	9364.12
	22L	812A	STRF	15462.59	29813.96	5853.21	144709.83	392199.58	691638.19	17740.18	17740.18
	22R	812A	BELB	15465.38	29706.64	5856.42	144709.63	392199.58	691638.19	17740.18	32465.24
	23L	812C	BELB	31571.57	11290.72	5856.42	354468.54	305994.20	940582.49	27065.85	42211.44
	23R	812C	BELB	31712.72	11442.49	5814.91	357775.77	304287.44	937682.86	27022.64	42132.37
	24L	812B	BELB	29909.72	15470.77	5814.91	474671.70	114138.20	913910.56	22746.11	41625.11
	24R	812B	STRF	29707.63	15459.46	5847.40	474671.75	114138.20	913915.56	22746.11	22746.11
	25L	81[illegible]	STRF	29707.63	15459.46	5847.40	474671.79	278821.60	353979.77	14707.87	14707.87

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCF NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IN/Z (PSI)
RUN1 (CONTD.)											
	25P	P1C	STRT	29299.51	15441.70	5868.91	474671.70	278821.60	353979.77	14367.87	14367.87
	26L	810A	STRP	29299.51	15441.70	5868.91	474671.70	282867.93	348392.10	14346.14	14346.14
	26R	P1JA	STRP	29040.02	15434.90	5894.44	474671.70	282867.93	348392.10	14340.14	14340.14
	27L	808	STRP	29040.02	15434.90	5894.44	474671.70	353346.25	307897.53	14643.81	14643.81
	27R	808	STRT	27777.07	13567.95	3635.96	474671.70	353346.25	307897.53	14643.81	14643.81
	28L	806	STRT	27777.07	13567.95	3635.96	474671.70	174215.64	836801.62	21463.29	21463.29
	28R	806	STRP	27207.07	13502.97	3467.61	474671.70	174215.64	836801.62	21463.29	21463.29
	29L	804	STRP	27207.07	13502.97	3467.61	474671.70	174908.11	1563886.50	36783.11	36783.11
	29R	804	STRP	26676.15	23218.82	3278.14	474671.70	174908.11	1563886.50	36783.11	36783.11
	30L	802	STRT	26676.15	23218.82	3278.14	474671.70	356034.10	253027.04	14160.76	14160.76
	30R	802	STRP	26068.05	22711.11	3197.30	474671.70	356034.10	253027.04	14160.76	14160.76
	31L	802A	STRP	26068.05	22711.11	3197.30	474671.70	358147.40	258773.36	14236.29	14236.29
	31R	802A	STRT	25797.68	22452.30	3248.62	474671.70	358147.40	258773.36	14236.29	14236.29
	32L	565	STRT	25797.68	22452.30	3248.62	474671.70	396833.00	471557.78	17877.47	17877.47
	32R	565	BTEE-B	25676.91	22311.99	3296.38	474671.70	396833.00	471557.78	N/A	
	33	565T	BTEE-B	25676.91	22311.99	3296.38	474671.70	431463.84	717284.41	13703.27	21927.34
RUN2											
	34	P12C	STRT	418.03	58.61	77.38	1251.50	4838.53	3562.33	8437.74	8437.74
	35L	991	STRP	418.33	58.61	77.38	1251.50	2888.46	4051.40	7053.60	7053.60
	35R	991	STRP	435.55	39.68	83.31	1251.50	2888.46	4051.40	7053.60	7053.60
	36L	P13	STRP	455.43	39.87	91.47	1251.50	2439.23	5518.66	8459.32	8459.32
	36R	P13	STRT	477.32	245.39	72.41	1251.50	2439.23	5518.66	8459.32	8459.32
	37L	814	STRT	502.47	239.92	53.15	1251.50	3062.41	10607.03	15275.42	15275.42
	37R	814	STRT	516.30	268.24	173.04	1251.50	3062.41	10607.03	15275.42	15275.42
	38L	816	STRP	516.30	268.24	173.04	1251.50	2748.57	11093.46	15806.42	15806.42
	38R	816	STRP	524.99	266.71	172.56	1251.50	2748.57	11093.46	15806.42	15806.42
	39L	818A	STRT	524.99	266.71	172.56	1251.50	1551.94	16061.29	22250.61	22250.61
	39R	818A	SELB	534.69	262.15	156.51	1251.50	1551.94	16061.29	22250.61	33660.48
	40L	818B	SELB	262.15	534.69	156.51	1873.28	1113.94	15248.90	21177.31	37755.96
	40R	818B	STRP	259.57	541.28	144.04	1873.28	1113.94	15248.90	21177.31	21177.31
	41L	820	STRP	259.57	541.28	144.04	1873.28	2005.90	8617.92	12434.39	12434.39
	41R	820	VALV	258.22	565.17	84.37	1873.28	2005.90	8617.92	N/A	
	42	820A	VALV	258.22	565.17	84.37	1873.28	2153.86	6418.29	N/A	
	43L	820B	VALV	258.22	565.17	84.37	1873.28	2348.17	4402.39	N/A	
	43R	820B	STRP	270.92	589.06	106.48	1873.28	2348.17	4402.39	7327.10	7327.10
	44L	824A	STRP	270.92	589.06	106.48	1873.28	2398.54	10097.16	15687.89	15687.89
	44R	824A	SELP	279.31	591.03	126.59	1873.28	2398.54	10097.16	15687.89	27967.72
	45L	824B	SELP	591.03	298.30	126.59	2563.17	1525.19	11974.78	16965.97	34247.77
	45R	824B	STRT	591.33	292.34	130.71	2563.17	1525.19	11974.78	16965.97	16965.97
	46L	825	STRP	591.33	292.34	130.71	2563.17	1412.86	11738.83	16632.62	16632.62
	46R	825	STRP	591.97	296.72	140.12	2563.17	1412.86	11738.83	16632.62	16632.62
	47L	826	STRT	591.97	296.72	140.12	2563.17	703.31	9222.86	13195.67	13195.67

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. EW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	MZ (PSI)	IMZ (PSI)
RUN2 (CONTD.)											
	47P	B26	VALV	595.83	309.76	172.54	2563.17	793.31	9222.86	N/A	
	48L	B28	VALV	595.83	309.76	172.54	2563.17	1755.24	7825.61	N/A	
	48R	B28	STRT	599.85	314.71	188.60	2563.17	1755.24	7825.01	11574.64	11574.64
	49L	B3[illegible]	STRT	599.85	314.71	188.60	2563.17	1879.73	7729.24	11489.65	11489.65
	49R	B3[illegible]	STRT	611.17	326.60	222.75	2563.17	1879.73	7729.24	11489.65	11489.65
	5.L	B30B	STRT	611.17	326.60	222.75	2563.17	2121.41	7589.26	11392.41	11392.41
	5.R	B30B	SELB	613.87	327.29	224.65	2563.17	2121.41	7589.26	11392.41	2[illegible]96
	51L	B30C	SELB	329.01	609.95	224.65	2739.28	2743.70	8969.43	13433.91	2395[illegible]
	51R	B30C	STRT	323.56	613.68	225.79	2764.79	2717.87	8969.43	13433.86	13433.86
	52L	B32	STRT	323.56	613.68	225.79	2764.79	2828.53	9659.[illegible]	14349.59	14349.59
	52R	B32	STRT	341.22	621.79	248.34	2732.46	2859.87	9659.08	14349.63	14349.63
	53	B34	STRT	341.22	621.79	248.34	2732.46	5403.95	18194.07	26362.34	26362.34
RUN3											
	54	B36	STRT	335.83	3087.46	2191.49	6480.26	46089.79	62284.07	18213.51	18213.51
	55L	B72A	STRT	335.83	3087.46	2191.49	6480.20	7885.27	7416.93	2953.81	2953.81
	55R	B72A	BELB	338.49	3087.55	2211.10	6480.20	7885.27	7416.93	2953.81	4418.49
	56L	B72B	BELB	3087.55	338.49	2211.10	8237.47	9639.87	10421.10	3842.58	5747.97
	56R	B72B	STRT	3088.95	2236.08	342.64	8237.47	10421.10	9639.87	3842.58	3842.58
	57L	B74A	STRT	3088.95	2236.08	342.64	8237.47	2570.76	81385.81	19168.78	19168.78
	57R	B74A	BELB	3390.75	2237.83	339.49	8237.47	2570.76	81385.81	19168.78	28661.87
	58L	B74B	BELB	2237.83	3090.75	339.49	3858.06	6479.77	76386.04	17977.37	26881.17
	58R	B74B	STRT	2237.94	3092.23	345.99	3858.06	6479.77	76386.04	17977.37	17977.37
	59L	B76	STRT	2237.94	3092.23	345.99	3858.06	3971.04	44484.68	10495.37	10495.37
	59R	B76	VALV	2239.69	3096.21	376.57	3858.06	3971.04	44484.68	N/A	
	60	B77	VALV	2239.69	3096.21	376.57	3858.06	3761.55	19736.50	N/A	
	61L	B8[illegible]	VALV	2255.44	3100.72	466.24	3722.47	6319.98	13842.44	N/A	
	61R	B8[illegible]	STRT	2264.13	3111.76	496.33	3722.47	6319.98	13842.44	3666.77	3666.77
	62L	B82	STRT	2264.13	3111.76	496.33	3722.47	8699.15	28563.47	7544.63	7544.63
	62R	B82	STRT	2265.91	454.56	440.40	3722.47	8699.15	28563.47	7544.63	7544.63
	63L	B84	STRT	2265.91	454.56	440.40	3722.47	8821.95	26937.78	6693.22	6693.22
	63R	B84	VALV	2279.88	426.75	395.75	3722.47	8821.95	26937.78	N/A	
	64	B85	VALV	2279.88	426.75	395.75	3722.47	10364.99	23955.12	N/A	
	65L	B88	VALV	2356.36	367.80	112.80	3598.50	9437.66	28956.46	N/A	
	65R	B88	STRT	2355.55	371.64	153.31	3598.50	9437.66	28956.46	5446.15	5446.15
	66L	B9[illegible]	STRT	2426.71	384.05	222.74	3598.50	5268.79	8281.34	2424.97	2424.97
	66R	B9[illegible]	STRT	2444.44	385.72	442.16	3598.50	5268.79	8281.34	2424.97	2424.97
	67L	B92	STRT	2444.44	385.72	442.16	3598.50	4799.12	7578.28	2262.[illegible]	2262.[illegible]
	67R	B92	VALV	2481.69	255.85	407.26	3598.50	4799.12	7578.28	N/A	
	68	B94	VALV	2481.69	255.85	407.26	3598.50	7823.63	6174.62	N/A	
	69	B95	VALV	2543.67	165.97	361.44	3598.50	10459.21	5819.85	N/A	
	7.L	B97	VALV	2541.32	157.17	342.97	3898.31	12685.82	4781.41	N/A	
	7.R	B97	STRT	2681.55	187.28	361.78	3898.31	12685.82	4781.41	3321.51	3321.51

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-84

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOP NO.	DCP NAME	CONF TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	N/Z (PSI)	IN/Z (PSI)
RUN3 (CONTD.)											
	71L	898	STRP	2681.55	197.00	361.78	3898.31	13701.71	4279.65	3482.39	3482.39
	71R	898	STRP	2686.16	204.11	365.49	3898.31	13701.71	4279.65	3482.39	3482.39
	72L	903A	STRP	2686.16	204.11	365.49	3898.31	14855.60	3826.86	3735.67	3735.67
	72P	903A	BELB	2694.11	372.50	217.16	3898.31	3826.86	14855.60	3735.67	5543.17
	72L	903B	BELB	373.60	2693.95	217.16	3401.03	4434.46	931.01	1326.41	1994.12
	72R	903B	STRP	391.33	243.56	2705.60	3401.03	931.01	4434.46	1326.41	1326.41
	74	868	STRP	391.33	243.56	2705.60	3401.03	40194.84	7634.79	11451.75	11451.75
RUN4											
	75	595	STRP	164.72	547.77	9659.87	0.00	.00	.00	.00	.00
	76L	585A	STRP	164.72	547.77	9659.87	0.00	193583.74	10977.48	4256.53	4256.53
	76R	585A	BRED-E	652.69	1968.32	9604.93	0.00	193583.74	10977.48	4256.53	8513.06
	77L	585	BREE-E	652.69	1968.32	9604.93	0.00	337649.29	40499.12	1669.31	3338.62
	77P	585	STRP	1231.94	3399.51	9506.65	.00	337649.29	40499.12	1669.31	1669.31
	78L	580B	STRP	1231.94	3399.51	9506.65	.00	437450.90	76186.73	2179.65	2179.65
	78R	580B	BTEE-R	1718.96	4636.67	9391.86	.00	437450.90	76186.73	N/A	
	79BL	580	BTEE-R	1718.96	4636.67	9391.86	.00	564198.26	138766.95	2952.83	4168.25
	79BR	580	BTEE-R	5358.37	7884.99	11981.43	403966.65	565672.82	497877.00	4177.14	6174.89
	80L	580A	BTEE-R	5358.37	7884.99	11981.43	403966.65	530439.94	388887.46	N/A	
	80R	580A	STRP	5802.45	9921.28	11848.99	403966.65	530439.94	388887.46	3788.92	3788.92
	81L	575	STRP	5802.45	9921.28	11848.99	403966.65	657026.53	118410.29	3834.36	3834.36
	81P	575	STRP	6347.35	11061.17	11698.69	403966.65	657026.53	118411.29	3834.36	3834.36
	82L	573	STRP	6347.35	11061.17	11698.69	403966.65	721842.93	154925.58	4131.36	4131.36
	82P	570	STRP	6607.72	11472.35	11640.74	403966.65	721842.93	154925.58	4131.36	4131.36
	83L	565B	STRP	6607.72	11472.35	11640.74	403966.65	806454.52	249945.08	4594.40	4594.40
	83R	565B	BTEE-R	6949.63	11881.27	11573.44	403966.65	806454.52	249945.08	N/A	
	84BL	565T	BTEE-R	6949.63	11881.27	11573.44	403966.65	924785.87	398178.19	5325.38	7793.15
	84BR	565T	BTEE-R	13887.74	16725.25	27118.21	438560.49	785653.58	239507.19	4571.53	6679.83
	85L	565C	BTEE-R	13887.74	16725.25	27118.21	438560.49	1030247.24	283991.78	N/A	
	85R	565C	STRP	14277.63	16528.27	26933.16	438560.49	1030247.24	283991.78	5670.37	5670.37
	86L	560A	STRP	14277.63	16528.27	26933.16	438560.49	1036459.17	286898.39	5701.98	5701.98
	86P	560A	BELP	17686.38	29991.88	8091.19	439560.49	611445.64	884722.37	5211.18	13611.82
	87L	560B	BELP	29991.88	17686.38	8091.19	728496.58	432554.38	1160961.83	7754.99	16834.67
	87P	560B	STRP	29183.48	7949.49	11403.51	728496.58	1160961.83	432554.38	7754.99	7754.99
	88L	555A	STRP	29183.48	7949.49	11403.51	728496.58	1025095.74	451544.73	6557.37	6557.37
	88R	555A	BELP	28516.52	7934.49	12051.38	728496.58	1025095.74	451544.73	6557.37	11938.20
	89L	555B	BELP	25641.56	14788.76	12751.38	332286.92	976882.57	482172.72	5591.79	11178.47
	89R	555B	STRP	24719.26	12996.03	13819.51	332286.92	976882.57	482172.72	5591.79	5591.79
	90L	550	STRP	24719.26	12996.03	13819.54	332286.92	165998.34	1178457.73	5598.41	5598.41
	90R	550	STRP	16674.26	6491.53	4624.66	332286.92	165998.34	1178457.73	5598.41	5598.41
	91L	545A	STRP	16674.26	6491.53	4624.66	332286.92	124312.01	1135539.97	5839.77	5839.77
	91P	545A	BELP	16371.81	4888.05	4604.15	332286.92	124312.01	1135539.97	5839.77	11631.76
	92L	545B	BELP	4888.05	16371.81	4604.15	.00	218642.56	923128.41	4183.15	7961.29

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]TION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN4 (CONTD.)											
	92P	545B	STRT	2954.46	16145.23	4349.36	0.00	218642.56	823528.40	4183.15	4183.15
	92L	540	STRT	2954.46	16145.23	4349.36	0.00	155780.60	580981.16	2952.62	2952.62
	93P	541	STRT	1224.64	15978.58	4284.40	0.00	155780.68	580981.16	2952.62	2952.62
	94	536	STRT	1224.64	15978.58	4284.40	0.00	.00	.00	.00	.00
RUN5											
	95	500	BTEE-B	7604.35	2049.71	5126.57	626091.85	666623.17	403966.65	14237.42	[illegible]
	95L	500C	BTEE-B	7604.35	2049.71	5126.57	626091.85	606773.62	396250.87	N/A	
	96P	500C	STRT	7568.56	1676.42	5162.60	626091.85	606773.62	396251.07	21024.87	21024.87
	97L	701	STRT	7568.56	1676.42	5162.60	626091.85	533878.96	387318.89	19953.79	19953.79
	97P	701	STRP	7448.23	1119.95	5349.11	626091.85	533878.96	387319.89	19953.79	19953.79
	98L	704	STRP	7448.23	1119.95	5349.11	626091.85	162297.56	316755.63	15816.76	15816.76
	98P	704	STRT	7292.60	2238.39	5467.75	626091.85	162297.56	316755.63	15816.76	15816.76
	99L	706	STRP	7292.60	2238.39	5467.75	626091.85	257376.99	256452.38	15891.19	15891.19
	99R	706	STRP	7175.18	3184.67	5431.84	626091.85	257376.99	256452.38	15891.19	15891.19
	100L	708	STRT	7175.18	3184.67	5431.84	626091.85	570273.08	283989.67	19608.80	19608.80
	100R	708	STRT	1165.77	4407.18	7904.10	626091.85	570273.08	283989.67	19608.80	19608.80
	101L	710A	STRT	1165.77	4407.18	7904.10	626091.85	493376.97	242076.44	18288.31	18288.31
	101R	710A	STRP	1017.89	4272.13	7995.16	626091.85	493376.97	242076.44	18288.31	18288.31
	102L	710	STRP	1017.89	4272.13	7995.16	626091.85	487387.15	238939.32	18199.76	18199.76
	102R	710	STRT	791.03	4072.61	8156.03	626091.85	487387.15	238939.32	18199.76	18199.76
	103L	712A	STRT	791.03	4072.61	8156.03	626091.85	124359.83	65189.29	14085.86	14085.86
	103R	712A	BELB	659.61	4043.07	8293.66	626091.85	124359.83	65189.29	14085.86	25777.69
	104L	712B	PELB	4043.07	659.61	8293.66	.00	501833.38	24489.81	11329.75	21184.89
	104R	712B	STRP	4058.78	567.31	8362.94	.00	501833.38	24489.81	11329.75	11329.75
	105L	736	STRT	4058.78	567.31	8362.94	.00	376428.91	16110.13	8271.23	8271.23
	105R	736	STRT	4068.84	361.86	8455.28	.00	376428.91	16110.13	8271.23	8271.23
	106	738	STRP	4068.84	361.86	8455.28	.00	.00	.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. EW-84

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), SUPPORT FORCES AND DEFORMATIONS

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
PENC	PC3C	ANCH	GLOB							
				FORC	(LB)	GLBL	31299.68	3056.26	908.28	
				DISP	(IN)	GLBL	.000	.000	.000	
				MOMT	(LB.IN)	GLBL	99420.73	35318.33	144238.95	
				ROTN	(RAD)	GLBL	.0000	.0000	.0000	
858Y	S85B	SNGL	Y							
				FORC	(LB)	GLBL	0.00	13357.11	0.00	
				DISP	(IN)	GLBL	.009	.000	.000	
858Z	S85B	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	3484.72	
				DISP	(IN)	GLBL	.009	.000	.000	
839Y	S83B	SNGL	Y							
				FORC	(LB)	GLBL	0.00	6670.50	0.00	
				DISP	(IN)	GLBL	.047	.000	.000	
S816	816	CONE	Y							INACTIVE
				DISP	(IN)	GLBL	1.075	.546	.242	
839Z	S83B	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	7130.65	
				DISP	(IN)	GLBL	.047	.000	.000	
SP08	8[illegible]8	SNUB	INCL							
				FORC	(LB)	LOCL	11715.30			
				FORC	(LB)	GLBL	5056.91	5209.54	9194.38	
				DISP	(IN)	LOCL	.000	.196	1.260	
864Y	864	SNGL	Y							
				FORC	(LB)	GLBL	0.00	36483.11	0.00	
				DISP	(IN)	GLBL	1.113	.000	1.227	
S814	814	SNUB	INCL							
				FORC	(LB)	LOCL	233.47			
				FORC	(LB)	GLBL	0.00	93.82	213.78	
				DISP	(IN)	LOCL	.000	.597	1.075	
S54[illegible]	54[illegible]	CONE	Y							INACTIVE
				DISP	(IN)	GLBL	.549	3.137	1.337	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ION
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
S54S (CONTD.)									
R13Y	R13	SNGL	Y						
				FORC	(LB)	GLBL	0.00	271.58	0.00
				DISP	(IN)	GLBL	1.075	.000	.000
550S	550	SNUB	INCL						
				FORC	(LB)	LOCL	20106.02		
				FORC	(LB)	GLBL	18360.71	6023.27	16143.97
				DISP	(IN)	LOCL	.000	2.764	1.552
R13Z	R13	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	139.80
				DISP	(IN)	GLBL	1.075	.000	.000
R9GY	R9G	SNGL	Y						
				FORC	(LB)	GLBL	0.00	599.23	0.00
				DISP	(IN)	GLBL	.040	.000	.000
R9JZ	R9J	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	545.18
				DISP	(IN)	GLBL	.040	.000	.000
RR2Y	RR2	SNGL	Y						
				FORC	(LB)	GLBL	0.00	3480.82	0.00
				DISP	(IN)	GLBL	.042	.000	.000
RR2Z	RR2	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	687.08
				DISP	(IN)	GLBL	.042	.000	.000
595X	595	SNUB	X						
				FORC	(LB)	GLBL	9662.16	0.00	0.00
				DISP	(IN)	GLBL	.001	6.249	1.841
536S	536	SNUB	INCL						
				FORC	(LB)	LOCL	16475.81		
				FORC	(LB)	GLBL	15084.05	3.33	4372.95
				DISP	(IN)	LOCL	.00[illegible]	3.137	2.297

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]TION
CALCULATION NO. FW-P4

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
536S (CONTD.)									
S79B	7CB	SNUB	INCL						
				FORC	(LB)	LOCL	16555.86		
				FORC	(LB)	GLBL	7292.23	7123.66	13094.96
				DISP	(IN)	LOCL	.006	.966	.495
739Y	739	SNGL	Y						
				FORC	(LB)	GLBL	0.00	4887.24	0.00
				DISP	(IN)	GLBL	.841	.000	.000
739Z	739	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	8457.85
				DISP	(IN)	GLBL	.841	.000	.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

CLASS 2 AND 3 STRESS SUMMARY

D E S I G N

V E R I F I C A T I O N

CLIENT SCE/SONGS-1

JOB NO. 0310-022-1352

CALC./PROB. NO. FW-04

PREPARED BY: Kim Noary DATE: 12/7/83

CHECKED BY: Ronald J Soles DATE: 12/9/83

CLASS 2 AND 3 STRESS SUMMARY

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

CLASS 2 STRESS CHECKING, TYPE CL2A — STRESS CHECK SUMMARY

CHECKING REGION INDICATOR	=	(ALL CLASS 2 RUNS)
OUTPUT DETAIL INDICATOR	=	(MAXIMUM AT EACH SOP)
COMMENTARY INDICATOR	=	(NO COMMENTARY)
LOAD CASE INDICATOR	= NEWC	(NEW CASES TO BE SPECIFIED)
PRESSURE DISTRIBUTION INDICATOR	= NEWP	(NEW DISTRIBUTIONS TO BE SPECIFIED)
TEMPERATURE DISTRIBUTION INDICATOR	= NEWT	(NEW DISTRIBUTIONS TO BE SPECIFIED)
SECTION MODULUS INDICATOR	=	(AT SECTION MIDTHICKNESS)
PRESSURE TERM INDICATOR	=	(USE P*DI**2/(DO**2-DI**2))
LUG STRESS INDICATOR	=	(NO LUG STRESS SUMMARY)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]M
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]TION
CALCULATION NO. FW-04

LOAD CASE SPECIFICATION

CASE NAME	LOAD TYPE	COMB TYPE	RESULTS SET	SCALE FACTOR	DATE IDENT.	TIME IDENT.	TITLE
GRAV			GRAV-1	1.000	83/12/07.	04.52.56.	GRAVITY ANALYSIS
SEIS			SEIS-1	1.000	83/12/07.	04.52.56.	SEISMIC ANALYSIS (INERTIA)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ION
CALCULATION NO. FW-04

PRESSURE DISTRIBUTIONS FOR PRESSURE STRESSES

DISTRIBUTION NAME	RUN NAME	FIRST DCP	LAST DCP	PRESSURE (PSI)	DISTRIBUTION TITLE
PRES	ALL RUNS			1210.000	MAXIMUM PRESSURE

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

TEMPERATURE DISTRIBUTIONS FOR ALLOWABLE STRESSES

DISTRIBUTION NAME	RUN NAME	FIRST DCP	LAST DCP	TEMPERATURE (F)	DISTRIBUTION TITLE
TEMP	ALL RUNS			420.000	MAXIMUM TEMPERATURE

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. EW-04

LOAD SET SPECIFICATION, NON-DEFAULT OPTION

LOAD SET NAME	MA CASE	MB CASE	MC,D CASE	EQN. CODE	PRESSURE SET	TEMP SET FOR SH	TEMP SET FOR SC	SA FACTOR	STRESS FACTOR	TITLE
EQ9F	GRAV	SEIS		EQ9F	PRES	TEMP			3.953	FUNCTIONALITY STRESS CHECK

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1														
	1	PC3C	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	14275.59	.241
	2	ME77	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	12377.64	.209
	3	834	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	13456.12	.227
	4	868	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	15055.10	.254
	5L	866	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16412.36	.277
	5R	866	A2	VALV	10INVALV	SA106 B	N/A							
	6	859	A2	VALV	10INVALV	SA106 B	N/A							
	7	S858	A2	VALV	10INVALV	SA106 B	N/A							
	8L	856	A2	VALV	10INVALV	SA106 B	N/A							
	8R	856	A3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10629.85	.179
	9L	854A	A3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11215.44	.189
	9R	854A	A3	BRED-R	10X8RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	14526.10	.245
	10L	852	A3	BRED-R	10X8RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	25938.69	.437
	10R	852	A4	VALV	8INVALV	SA106 B	N/A							
	11	849	A4	VALV	8INVALV	SA106 B	N/A							
	12L	848	A4	VALV	8INVALV	SA106 B	N/A							
	12P	848	A5	BRED-E	10X8RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	38618.35	.651
	13L	846	A5	BRED-E	10X8RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	25174.92	.424
	13R	846	A6	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18287.66	.308
	14	S845	A6	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19487.09	.329
	15L	844	A6	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	20676.27	.349

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD. SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1 (CONTD.)														
	15R	844	A7	VALV	10INVALV	SA106 B	N/A							
	16	841	A7	VALV	10INVALV	SA106 B	N/A							
	17L	841	A7	VALV	10INVALV	SA106 B	N/A							
	17R	840	A7A	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	26577.55	.448
	18L	838A	A7A	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	26581.54	.448
	18R	838A	A8	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	34772.59	.586
	19	838B	A8	BELB	10INELB	SA106 B	~~1.830~~ 3.7	EQ9F	1210.00	420.0		59295.00	~~34114.99~~ 61971 *	~~.575~~ * 1.08 (due to very conservative SIF. This SIF is calculated by considering it's a reinforced fabricated tee) Note that this data point is out of SS piping region.
	20L	838B	A8	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	27355.44	.461
	20R	838B	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	21177.54	.357
	21L	836	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	16544.56	.279
	21R	836	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	18391.04	.310
	22L	812A	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	26255.76	.443
	22R	812A	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	34325.44	.579
	23	812C	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	41177.24	.694
	24L	812B	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	40751.16	.687
	24R	812B	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	30937.41	.522
	25	810	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23139.50	.390
	26	810A	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23118.96	.390
	27	808	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23540.47	.397
	28	806	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	31412.56	.530
	29	804	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	47591.[illegible]	.8[illegible]

* GRAV + SEISMIC = 21507 PSI (with $Z = \pi R^2 t$)

EQ9F = 4575 + .75 X 3.7 X 21507 = 64257. PSI

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. EW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS, ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1 (CONTD.)														
	3[illegible]	[illegible]2	A11	STRP	1[illegible]SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23317.68	.393
	31	562A	A11	STRP	1[illegible]SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23395.54	.395
	32L	565	A11	STRP	1[illegible]SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	26341.64	.444
	32R	565	A12	RTEE-B	18X18X10	SA106 B	N/A							
	33	565T	A12	RTEE-B	18X18X10	SA106 B	1.462	E09F	1210.00	420.0		59295.00	24095.55	.406
					MAXIMUM STRESS RATIO FOR THIS RUN = .803 AT SOP NO. 29									
RUN2														
	34	912C	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21397.98	.359
	35	991	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	14574.61	.246
	36	B13	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	17031.92	.287
	37	B14	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18823.66	.317
	38	B16	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19233.29	.324
	39L	B18A	B1	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	25547.44	.431
	39R	B18A	B2	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	33364.79	.563
	4[illegible]L	B18P	B2	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	31775.37	.536
	4[illegible]P	B18P	B3	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24371.83	.411
	41L	92[illegible]	B3	STRP	2SCH80S	SA106 B	1.[illegible]	E09F	1210.00	420.0		59295.00	14597.96	.246
	41R	B2[illegible]	B4	VALV	2INVALV	SA106 B	N/A							
	42	B2 A	B4	VALV	2INVALV	SA106 B	N/A							
	43L	B2 P	B4	VALV	2INVALV	SA106 B	N/A							

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible] 1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]TION
CALCULATION NO. FU-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN2 (CONTD.)														
	47P	B2 P	B5	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9785.66	.165
	44L	B24A	B5	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	20838.88	.351
	44R	B24A	B6	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	27851.33	.469
	45L	B24P	B6	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	28540.25	.481
	45R	B24B	B7	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21928.46	.370
	46	B25	B7	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21466.27	.362
	47L	B26	B7	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	17125.21	.289
	47R	B26	B8	VALV	2INVALV	SA106 B	N/A							
	48L	B28	B8	VALV	2INVALV	SA106 B	N/A							
	48R	B28	B9	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16127.78	.272
	49	B30	B9	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16161.56	.273
	50L	B30B	B9	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16309.34	.275
	50R	B30B	B10	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	21084.72	.354
	51L	B30C	B10	SELB	2INELB	SA106 B	1.783	E09F	1210.00	420.0		59295.00	24283.32	.410
	51R	B30C	B12	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18768.72	.317
	52	B32	B12	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19573.32	.330
	53	B34	B12	STRP	2SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	30781.72	.519

MAXIMUM STRESS RATIO FOR THIS RUN = .563 AT SOP NO. 35P

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]TION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN3														
	54	836	C1	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	32347.26	.546
	55L	872A	C1	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8159.90	.138
	55R	872A	C2	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	8769.82	.148
	56L	872B	C2	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	8642.99	.146
	56F	872B	C3	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8046.85	.136
	57L	874A	C3	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	27739.26	.468
	57R	874A	C4	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	30735.83	.518
	58L	874B	C4	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	27484.17	.464
	58R	874B	C5	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24843.81	.419
	59L	876	C5	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	14432.94	.243
	59R	876	C6	VALV	4INVALV	SA106 B	N/A							
	60	877	C6	VALV	4INVALV	SA106 B	N/A							
	61L	88[illegible]	C6	VALV	4INVALV	SA106 B	N/A							
	61R	880	C7	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	15311.02	.258
	62	882	C7	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	20862.62	.352
	63L	884	C7	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24346.40	.343
	63R	884	C8	VALV	4INVALV	SA106 B	N/A							
	64	885	C8	VALV	4INVALV	SA106 B	N/A							
	65L	886	C8	VALV	4INVALV	SA106 B	N/A							
	65F	888	C9	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	17678.22	.298
	66	891	C9	STRP	4SCHB0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	7774.11	.131

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA TION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN3 (CONTD.)														
	67L	B92	C9	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	7496.69	.126
	67R	B92	C10	VALV	4INVALV	SA106 B	N/A							
	68	B94	C10	VALV	4INVALV	SA106 B	N/A							
	69	B95	C1	VALV	4INVALV	SA106 B	N/A							
	70L	B97	C10	VALV	4INVALV	SA106 B	N/A							
	70R	B97	C11	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8524.20	.144
	71	B98	C11	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8864.87	.150
	72L	98JA	C11	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9265.65	.156
	72R	98JA	C12	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	14910.35	.169
	73L	98JB	C12	BELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	7396.49	.125
	73R	98JB	C13	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	6935.71	.117
	74	B68	C13	STRP	4SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18062.63	.304
					MAXIMUM STRESS RATIO FOR THIS RUN = .546 AT SOP NO. 54									
RUN4														
	75	595	D1	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	4593.93	.077
	76L	585A	D1	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8665.66	.146
	76R	585A	D2	BRED-E	10X1"RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	13771.52	.232
	77L	585	D2	BRED-E	10X1"RED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	7349.45	.124
	77R	585	D3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	6539.47	.110
	78L	58 B	D3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	7 56.12	.119

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]1
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]TION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCF NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN4 (CONTD.)														
	78R	580B	D4	BTEE-R	18X18X10	SA106 B	N/A							
	79BL	580	D4	BTEE-R	18X18X10	SA106 B	1.462	E09F	1210.00	420.0		59295.00	8024.79	.135
	79BR	580	D4	BTEE-R	18X18X10	SA106 B	1.462	E09F	1210.00	420.0		59295.00	16376.10	.175
	P3L	58 A	D4	BTEE-R	18X18X10	SA106 B	N/A							
	R3R	58 A	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9533.57	.161
	81	575	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9708.61	.164
	82	575	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10862.12	.183
	83L	565B	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10608.43	.179
	83R	565B	D6	BTEE-R	18X18X10	SA106 B	N/A							
	84BL	565T	D6	BTEE-R	18X18X10	SA106 B	1.462	E09F	1210.00	420.0		59295.00	12078.30	.204
	84BR	565T	D6	BTEE-R	18X18X10	SA106 B	1.462	E09F	1210.00	420.0		59295.00	11225.75	.189
	85L	565C	D6	BTEE-R	18X18X10	SA106 B	N/A							
	85R	565C	D7	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11718.64	.198
	86L	563A	D7	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11747.84	.198
	86R	563A	D8	BELB	18INELB	SA106 B	2.386	E09F	1210.00	420.0		59295.00	17136.54	.289
	87L	563P	D9	BELB	18INELB	SA106 B	2.386	E09F	1210.00	420.0		59295.00	19415.45	.327
	87R	563B	D9	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	13021.61	.220
	88L	555A	D9	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	12519.44	.211
	88R	555A	D10	BELB	18INELB	SA106 B	1.921	E09F	1210.00	420.0		59295.00	15296.44	.258
	89L	555P	D10	BELB	18INELB	SA106 B	1.921	E09F	1210.00	420.0		59295.00	13917.41	.235
	89R	555B	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11504.35	.194

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN4 (CONTD.)														
	9[illegible]	55[illegible]	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10922.80	.183
	91L	545A	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10925.82	.184
	91R	545A	D12	BELB	18INELB	SA106 B	1.021	E09F	1210.00	420.0		59295.00	13120.46	.221
	92L	545B	D12	BELB	18INELB	SA106 B	1.021	E09F	1210.00	420.0		59295.00	10347.13	.175
	92R	545B	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	8994.71	.152
	93	54[illegible]	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	7727.57	.130
	94	536	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	4928.21	.083
					MAXIMUM STRESS RATIO FOR THIS RUN = .327 AT SOP NO. 87L									
RUN5														
	95	58[illegible]	E1	BTEE-B	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	23596.41	.398
	96L	58[illegible]C	E1	BTEE-B	18X18X18	SA106 B	N/A							
	96R	58[illegible]C	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	28147.66	.474
	97	7[illegible]1	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	28025.54	.472
	98	7[illegible]4	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24079.30	.406
	99	7[illegible]6	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23751.23	.401
	100	7[illegible]8	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	25997.22	.438
	101	71[illegible]A	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24408.51	.412
	102	71[illegible]	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24172.89	.411
	103L	712A	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18682.[illegible]4	.315
	103R	712A	E3	BELB	18INELB	SA106 B	1.03[illegible]	E09F	1210.00	420.0		59295.00	24234.79	.4[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE ...
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV... ...ION
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN5 (CONTD.)														
	104L	712B	E3	BELB	10INELB	SA106 B	1.830	E09F	1210.00	420.0		59295.00	19640.63	.331
	104R	712B	E4	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	15556.67	.262
	105	736	E4	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	12813.94	.216
	106	739	E4	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	4593.93	.077

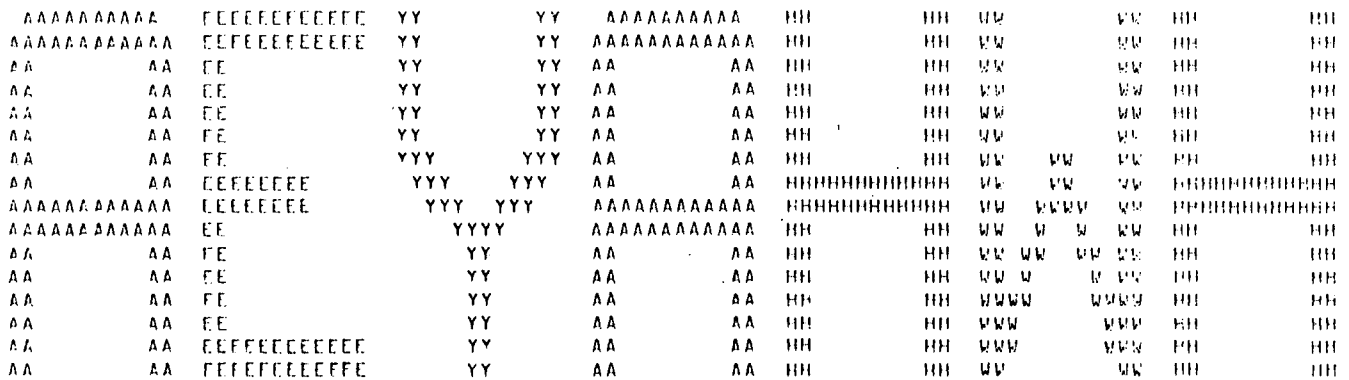
MAXIMUM STRESS RATIO FOR THIS RUN = .492 AT SOP NO. 96B

MAXIMUM STRESS RATIOS FOR SYSTEM

STRESS RATIO	SOP NO.	LOAD SET
.493	29	E09F

OPERATING SYSTE
JOB ORIGIN = REN

USER NUMBER = SC
JOBCARD NAME = JOB



83/12/08. 15.45.57.

FW-04

W/ SUPPORT STAFFING 3

EDS NUC[illegible] INC
PROGRAM [illegible]PIPE
VERSION: 15C DATE: [illegible]/82 SYSTEM: EDS - NOS

SUPERPIPE IS A COMPREHENSIVE COMPUTER PROGRAM FOR THE STRUCTURAL ANALYSIS AND CODE COMPLIANCE VERIFICATION OF PIPING SYSTEMS, WITH PARTICULAR EMPHASIS ON NUCLEAR POWER PIPING DESIGNED TO MEET THE REQUIREMENTS OF THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, FOR CLASS 1, 2 AND 3 NUCLEAR PIPING SYSTEMS. THE PROGRAM HAS THE FOLLOWING MAJOR FEATURES....

- ** SPECIFICATION AND PLOT OF SYSTEM GEOMETRY.
- ** STATIC AND THERMAL LOAD ANALYSIS.
- ** DETERMINATION OF DYNAMIC PROPERTIES.
- ** RESPONSE SPECTRUM ANALYSIS.
- ** FORCE AND EARTHQUAKE TIME-HISTORY ANALYSIS.
- ** CODE COMPLIANCE CHECKS FOR ASME SECTION III.
- ** PIPE BREAK LOCATION DETERMINATION.
- ** PIPE SUPPORT LOADS AND DISPLACEMENT SUMMARIES.

****

SUPERPIPE INCLUDES MANY USER ORIENTED OPTIONS SUCH AS...

- ** COMPLETE PIPING ANALYSIS IN A SINGLE COMPUTER RUN OR IN DISCRETE PHASES OVER A PERIOD OF TIME.
- ** STORAGE OF DATA RESULTS AND RECALL FOR SUBSEQUENT USE.
- ** EXTENSIVE COORDINATE GENERATION CAPABILITY FOR MODEL GEOMETRY.
- ** LARGE LIBRARY OF STANDARD MATERIAL PROPERTIES,PIPING CROSS SECTIONS, AND FLEXIBILITY AND STRESS INTENSIFICATION FACTORS FOR COMPONENTS.
- ** EXTENSIVE ERROR AND WARNING MESSAGES TO AID DATA CHECKING.
- ** MULTIPLE LOAD CASES FOR THERMAL EXPANSION AND STATIC ANALYSIS.
- ** CAPABILITY TO EVALUATE STRESSES AND SUPPORT LOADS DUE TO INTERNAL PRESSURE LOADINGS.
- ** VARIOUS RESPONSE SPECTRUM ANALYSIS OPTIONS FOR MODAL AND DIRECTIONAL COMBINATIONS AND MULTIPLE RESPONSE SPECTRA INPUT EXCITATION AT DIFFERENT SUPPORTS.
- ** AUTOMATIC GENERATION OF MASS POINTS FOR DYNAMIC ANALYSIS TO OBTAIN THE DESIRED ACCURACY IN DYNAMIC CHARACTERISTICS.
- ** OPTION TO ADD EXTRA DATA POINTS FOR CODE COMPLIANCE CHECKS WITHOUT REANALYSIS.
- ** OUTPUT OF RESULTS IN A FORMAT APPROPRIATE TO STRESS REPORTS.

****

SUPERPIPE HAS BEEN DEVELOPED, DOCUMENTED AND VERIFIED FOR PRINCIPAL USE ON ANALYSES RELATING TO NUCLEAR SAFETY.

SUPERPIPE IS A CONTROLLED PROGRAM AVAILABLE FOR USE EXCLUSIVELY THROUGH EDS NUCLEAR INC. FOR INFORMATION CONTACT....DIVISION MANAGER, ENGINEERING SERVICES DEVELOPMENT DIVISION. TELEPHONE (415) [illegible].

*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*SUPERPIPE*

UPDATED : 06/28/82

****
SUPERPIPE VERSION 15C 06/28/82 PROGRAM RELEASE
****

SUPERPIPE VERSION 15C 06/28/82 IS RELEASED FOR PRODUCTION USE. THIS VERSION CORRECTS THREE ERRORS RECENTLY IDENTIFIED IN THE 11/15/79 AND 15B 01/31/82 VERSIONS. THESE ERRORS ARE :

- MODE SHAPE PLOTTING ERROR
- SUPPORT PLOTTING ERROR (VERSION 15B 01/31/82 ONLY)
- CALCULATION OF AVERAGE YOUNGS MODULUS IN CLASS 1 FATIGUE CALCULATIONS

THE PLOTTING ERRORS DO NOT AFFECT ANALYSIS RESULTS. THE CALCULATION OF THE AVERAGE YOUNGS MODULUS VALUE (EAB) IN CLASS1 FATIGUE STRESS ANALYSES MAY, IN CERTAIN CASES, AFFECT ANALYSIS RESULTS. USERS SHOULD REVIEW THE ERROR IMPACT EVALUATION REPORT ISSUED 07/26/82 DISCUSSING POSSIBLE EFFECTS OF THIS ERROR.

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

DESIGN VERIFICATION

CLIENT SCE / SONGS-1

JOB NO. 0310-022-1352

CALC./PROB. NO. FW-04

PREPARED BY: Kim Noang DATE: 12/8/83

CHECKED BY: Ronald J. Sobie DATE: 12/9/83

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                        INPUT
         1             2             3             4             5             6             7             8     CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  SEQUENCE

 SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UNIT 1                                          1
 SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION                                        2
*CALCULATION NO. FW-04                                                                          3
 NOFL                                                                                           4
 EXEC STAT DYNP SPEC DESC                                                                       5
    F    FT    IN    IN LBIN LBIN LBIN LBIN                                                     6
 GEOM     5     1                                                                               7
 RUN1 CLS2              10"PIPING FROM PEN C-3C TO SUPPORTS AT 535 & 595                       8
 PC3C                    DIR   .0         31.458     0.0                                        9
 MEZZ                    OFF   4.25                            PC3C                            10
  834                    OFF   2.500                           MEZZ                            11
  868                    OFF   1.5                              834                            12
  866                    OFF   1.512                            868                            13
  859                    OFF   1.29                             866                            14
 S858                    OFF   1.29                             859                            15
  856                    OFF   2.58                            S858                            16
 854A                    OFF   1.5                              856                            17
  852                    OFF    .58                            854A                            18
  849                    OFF    .975                            852                            19
  848                    OFF    .975                            849                            20
  846                    OFF    .58                             848                            21
 S845                    OFF    .5                              846                            22
  844                    OFF    .5                             S845                            23
  841                    OFF   1.29                             844                            24
  840                    OFF   1.29                             841                            25
 839A  TNP               TAN                                                                   26
 S838                    CVA   45.0                                                            27
  838  TIP   1.25        OFF   2.542                            841                            28
 839B  TNP               TAN                                                                   29
  836                    OFF              3.71                  838                            30
 812A  TNP               TAN                                                                   31
 812C  BRP               CVA   45.0                                                            32
  812  TIP   1.25        OFF              2.5                   836                            33
 812B  TNP               TAN                                                                   34
  815                    OFF   4.96                             812                            35
 810A                    OFF   0.0625                           815                            36
  808                    OFF   1.0625                          810A                            37
 RB08  RFP               OFF   2.75       2.833     -5.0        808                            38
  806                    OFF   5.1875                          RB08                            39
  804                    OFF   4.667                            806                            40
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

COLUMN 1	2	3	4	5	6	7	8	INPUT CARD SEQUENCE
1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	1234567890	
B-2		OFF 5.833			B04			41
B-2A		OFF -.5625			B02			42
B65		OFF 1.156			B02A			43
*565T PRP		OFF 1.0104			565			44
RUN? CLS2		2"PIPING FROM DATA POINT B12C TO B36						45
B12C PRP		DUP						46
B91		OFF -2.7661			B12C			47
B13		-5.5			991			48
B14		-5.69			B13			49
B14 PRP			1.83	-4.17	B14			50
B16		-.16667			B14			51
B16A TNP		TAN						52
B18 TIP .25		-1.92			B16			53
B18B TNP		TAN						54
B2.			-1.32		B1B			55
B20A			-.35		B20			56
B20C			-.35		B20A			57
B24A TNP		TAN						58
B24 TIP .25			-2.6339		B20A			59
B24B TNP		TAN						60
B25		-.33			B24			61
B26		-.92			B25			62
B26		-.67			B26			63
B28		-.06			B28			64
B30 TNP		TAN						65
B30A TIP .25		OFF -.35			B30			66
B30C TNP		TAN						67
B32			-.35		B30A			68
* B34		DUP						69
RUN? CLS2		4"PIPING FROM DATA POINT B36 TO B68						70
B36		DUP						71
B72A TNP								72
B72 TIP .5				-2.0	B36			73
B72B TNP								74
B74A TNP								75
B74 TIP .5			-.71		B72			76
B74B TNP								77
B76		-1.373			B74			78
B77		-.71			B76			79
B8?		-.71			B77			80

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. EW-[redacted]4

ECHO PRINT OF INPUT DATA

COLUMN 1	2	3	4	5	6	7	8	INPUT CARD SEQUENCE
12345678901234567890123456789012345678901234567890123456789012345678901234567890								
BP2		-0.46			880			81
BP4		-0.37			882			82
B85		-0.71			884			83
B9[redacted]		-0.71			885			84
B9		-0.29			88P			85
B92		-0.29			89[redacted]			86
B94		-1.42			892			87
B95		-0.71			894			88
B97		-0.71			895			89
[redacted]98		-0.317			897			90
S[redacted]A TNP	TAN							91
S[redacted]B TIP 0.5		-1.06			895			92
S[redacted]C TNP	TAN							93
*B6[redacted]	DUP							94
RUN4 CLS2	32S-18"-EG PIPING							95
595				2.92	585			96
595A				1.25	585			97
585				2.0	580			98
58CB				1.125	580			99
58 BRP				4.25	575			100
56 A				-1.125	5P0			101
575				.75	57[redacted]			102
57				2.0	565T			103
565B				1.125	565T			104
565T BRP	DUP							105
56[redacted]C				-1.125	565T			106
56 A TNP								107
[redacted]C TIP 1.5				-2.650	565T			108
5[redacted]B TNP								109
55[redacted]A TNP								110
5[redacted]5 TIP 2.25		2.4[redacted]P8	-2.4[redacted]P8		569			111
555B TNP								112
55[redacted]		5.75			555			113
B5[redacted] PEP		3.5[redacted]3	-2.5P3	-5.5P3	550			114
54[redacted]A TNP								115
545 TIP 2.256		3.9			552			116
545B TNP								117
54[redacted]			-3.5		545			118
55[redacted]			-3.[redacted]3		541			119
*B5[redacted]6 PEP		5.7[redacted]		-1.5P3	536			120

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

COLUMN 1	2	3	4	5	6	7	8	INPUT CARD SEQUENCE
12345678901	12345678901	12345678901	12345678901	12345678901	12345678901	12345678901	12345678901	
RUNS CLSC		1=PIPING FROM DATA POINT 580 TO 739						121
56 PRI		DUP						122
5[illegible]C		-1.[illegible]104			580			123
7[illegible]1		-2.25			580			124
7 4		-6.73			701			125
7 6		-4.67			704			126
7 8		-5.19			706			127
R7[illegible]8 REP		2.75	2.72	-5.0	798			128
71[illegible]A		-0.8125			708			129
71		-[illegible].0625			719A			130
712A TNP								131
712 TIP 1.25		-4.96			710			132
712B TNP								133
736			-2.5		712			134
* 739			-3.71		736			135
86 MND			0.95		859			136
85[illegible] MND			1.0		849			137
896 MND			0.5		895			138
886 MND			0.75		885			139
842 MND			3.75		841			140
* 878 MND			.500		877			141
STRP 10SCH80S		10.75	0.5					142
MASS	5.75							143
STRP 10SCH8[illegible]		10.75	0.593					144
MASS	8.684							145
STRP 4SCH80S		4.5	0.337					146
MASS	2.[illegible]4							147
STRP 2SCH80S		2.37	0.218					148
MASS	[illegible].786							149
STRP 18SCH80		18.0	0.937					150
MASS	22.76							151
PTEE 18X18X10		18.[illegible]	0.937	10.75	0.593			152
MASS	22.76		8.684					153
PRED 18X10RED		18.0	0.937	10.75	0.593			154
MASS	22.76							155
VALV 10INVALV		11.[illegible]4	1.186					156
VALV 8INVALV		9.62	1.0[illegible]					157
PRED 10X8RED		10.75	0.593	8.62	[illegible].56			158
MASS	8.684							159
PELB 10INELB		10.75	0.593					160

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                   INPUT
         1         2         3         4         5         6         7         8          CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890  SEQUENCE

                MASS    8.864                                                              161
 BELB   18INELB       18.0        0.937                                                    162
                MASS   22.76                                                               163
 BELB   4INELB         4.5        0.337                                                    164
                MASS    2.64                                                               165
 SELB   2INELB         2.37       0.219                                                    166
                MASS    1.786                                                              167
 VALV   4INVALV        5.176      0.674                                                    168
 VALV   2INVALV        2.856      0.436                                                    169
*VLOP   VLOP          33.0      10.0                                                       170
*SA106 B                                                                                   171
   A1 STRP   18SCHB0S SA106 B           866                                                172
   A2 VALV   18INVALV SA106 B           856                                                173
   A3 STRP   18SCHB0S SA106 B           854A                                               174
   A3 PREDR  18X8RED  SA106 B           852                                                175
   A4 VALV   8INVALV  SA106 B           848                                                176
   A5 PREDE  18X8RED                    846                                                177
   A6 STRP                              844                                                178
   A7 VALV   18INVALV                   840                                                179
  A7A STRP                              838A                                               180
   A8 BELB   18INELB  SA106 B           838B                                               181
   A9 STRP   18SCHB0S                   812A                                               182
  A10 BELB   18INELB                    812B                                               183
  A11 STRP   18SCHB0S                   565                                                184
* A12 BTEEB  18X18X18 SA106 B           565T                                               185
   B1 STRP   2SCH80S                    818A                                               186
   B2 SELB   2INELB   SA106 B           818B                                               187
   B3 STRP   2SCH80S                    820                                                188
   B4 VALV   2INVALV  SA106 B           820B                                               189
   B5 STRP   2SCH80S                    824A                                               190
   B6 SELB   2INELB                     824B                                               191
   B7 STRP   2SCH80S                    826                                                192
   B8 VALV   2INVALV  SA106 B           828                                                193
   B9 STRP   2SCH80S                    830B                                               194
  B10 SELB                              830C                                               195
* B12 STRP   2SCH80S                    834                                                196
   C1 STRP   4SCH80S  SA106 B           872A                                               197
   C2 BELB   4INELB                     872B                                               198
   C3 STRP   4SCH80S  SA106 B           874A                                               199
   C4 BELB   4INELB                     874B                                               200
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-14

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                     INPUT
          1         2         3         4         5         6         7         8          CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678890 SEQUENCE

    C5 STRP                          876                                                  201
    C6 VALV  4INVALV  SA106 B        880                                                  202
    C7 STRP                          884                                                  203
    C8 VALV  4INVALV                 888                                                  204
    C9 STRP                          892                                                  205
   C10 VALV                          897                                                  206
   C11 STRP                         900A                                                  207
   C12 BELB                         900B                                                  208
 * C13 STRP                          868                                                  209
    D1 STRP  18SCH80  SA106 B       585A                                                  210
    D2 BREDC 18X12RED SA106 B        585                                                  211
    D3 STRP  18SCH80  SA106 B       586B                                                  212
    D4 BTEER 18X18X12 SA106 B       586A                                                  213
    D5 STRP                         565B                                                  214
    D6 BTEER 18X18X12               565C                                                  215
    D7 STRP                         566A                                                  216
    D8 BELB  18INELB  SA106 B       566B                                                  217
    D9 STRP                         555A                                                  218
   D10 BELB                         555B                                                  219
   D11 STRP                         545A                                                  220
   D12 BELB                         545B                                                  221
 * D13 STRP                          536                                                  222
    E1 BTEER 18X18X18 SA106 B       589C                                                  223
    E2 STRP  18SCH80                712A                                                  224
    E3 BELB  1 INELB                712B                                                  225
 *  E4 STRP  1 SCH80                 739                                                  226
  VLOP                RIGID VALVE OPERATOR                                                227
    F1 VLOP  VLOF     SA106 B        859  860                                             228
    F2 VLOP  VLOF     SA106 B        849  850                                             229
    F3 VLOP  VLOF     SA106 B        895  896                                             230
    F4 VLOP  VLOF     SA106 B        885  886                                             231
    F5 VLOP  VLOF     SA106 B        841  842                                             232
 *  F6 VLOP  VLOF     SA106 B        877  878                                             233
    W1   866     283.                                                                     234
    W2   86[illegible]    1134.                                                                     235
    W3  585B     628.                                                                     236
    W4   856     755.                                                                     237
    W5   852    264.                                                                      238
    W6   85[illegible]    1059.                                                                     239
    W7   848     264.                                                                     240
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-54

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                   INPUT
         1         2         3         4         5         6         7         8        CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789012   SEQUENCE

   W8   844     849.                                                                   241
   W9   842      210.                                                                  242
   W10  843     849.                                                                   243
   W11  810     188.                                                                   244
   W12  810A    188.                                                                   245
   W13  812A    188.                                                                   246
   W14  812     188.                                                                   247
   W15  710    188.                                                                    248
   W16  710A   188.                                                                    249
   W17  826     30.                                                                    250
   W18  828B    30.                                                                    251
   W19  826     15.                                                                    252
   W20  828     15.                                                                    253
   W21  834     38.5                                                                   254
   W22  832     38.5                                                                   255
   W23  876     49.                                                                    256
   W24  88       49.                                                                   257
   W25  878    197.                                                                    258
   W26  886    269.                                                                    259
   W27  884     67.                                                                    260
   W28  888     67.                                                                    261
   W29  892     95.                                                                    262
   W30  894    129.                                                                    263
   W31  896    197.                                                                    264
 * W32  897     49.                                                                    265
  PENC EC3C ANCH                                                                       266
  S816  816 CONF                                                  Y                    267
  858Y S858 SNGL          13000.                                  Y                    268
  858Z S858 SNGL           8500.                                  Z                    269
  839Y S838 SNGL          13000.                                  Y                    270
  839Z S838 SNGL           8500.                                  Z                    271
  S848  848 SNUB                                              INCL P848                272
  S545  545 CONF                                                  Y                    273
  8?4Y  8?4 SNGL                                                  Y                    274
  S550  550 SNUB                                              INCL P550                275
  S814  814 SNUB                                              INCL P814                276
  813Y  813 SNGL                                                  Y                    277
  813Z  813 SNGL                                                  Z                    278
  89?Y  89? SNGL          14??.                                   Y                    279
  89?Z  89? SNGL           85??.                                  Z                    280
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. FW-54

ECHO PRINT OF INPUT DATA

```
COLUMN                                                                                         INPUT
         1         2         3         4         5         6         7         8              CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   SEQUENCE

 882Y  882 SNGL       14000.                                   Y                          281
 882Z  882 SNGL        8560.                                   Z                          282
 595X  595 SNUB                                                X                          283
 536S  536 SNUB                                              INCL R536                    284
 S708  708 SNUB                                              INCL R708                    285
 739Y  739 SNGL       10000.                                   Y                          286
*739Z  739 SNGL        8560.                                   Z                          287
*                                                                                         288
*GRAV GRAV                                        GRAVITY ANALYSIS                        289
 TEMP         428.                                                                        290
*GRAV                                                                                     291
 DYNP         33.            PRN1        PMOD                                             292
*TEMP         428.                                                                        293
 HORZ  F G  LOG  HORIZONTAL RESPONSE SPECTRA OF FEEDWATER LINE PEN AT EL. 31'             294
    100.      .67       60.      .67       20.       .9       8.5      .9                 295
    5.0       1.9       4.7      3.35      3.0      3.35      2.9      1.9                296
*   1.0       1.1       .20      .3                                                       297
*VERT  F G  LOG  VERICAL    RESPONSE SPECTRA OF FEED WATER LINE PEN AT EL. 31'            298
   100.       .67       10.      .7        5.0      1.80      4.6      2.88               299
*   3.2       2.88      2.       1.6       1.0      .7        .2       .21                300
*SEIS                                    ACCN             SEISMIC  ANALYSIS               301
 LIST                 866  864 SR58  856  852  850  848  844  842  840                    302
 LIST                 812A  812  710 710A  820 820B  826  828  830  832  876  880         303
*LIST                 878  886  884  888  892  894  896  897  810 810A                    304
 HORZ VERT HORZ                                                                           305
 CL2A                NEWC NEWP NEWT                 STRESS CHECK SUMMARY                  306
 GRAV                     GRAV                                                            307
*SEIS                     SEIS                                                            308
*PRES               MAXIMUM PRESSURE                                                      309
*                  1210.                                                                  310
*TEMP               MAXIMUM TEMPERATURE                                                   311
*                  428.                                                                   312
*EQ9F GRAV SEIS      EQ9F PRES TEMP          3.953FUNCTIONALITY STRESS CHECK              313
*SUPP                NEWC NEWP NEWT                 SUPPORT LOAD SUMMARY                  314
 GRAV                     GRAV                                                            315
*SEIS                     SEIS                                                            316
*PRES               MAXIMUM PRESSURE                                                      317
*                  1210.                                                                  318
*TEMP               MAXIMUM TEMPERATURE                                                   319
```

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. FW-04

DATA STORAGE INDICATORS

DATA FILL = NOFL (NO FILE)

REMAINING INDICATORS IGNORED

ANALYSIS CONTROL INDICATORS

DATA EXECUTION = EXEC (EXECUTION REQUIRED)

ANALYSES TO BE EXECUTED

STAT (STATIC LOAD ANALYSIS)
DYNP (COMPUTE DYNAMIC PROPERTIES)
SPLC (RESPONSE SPECTRUM ANALYSIS)
DESC (CODE COMPLIANCE CHECKING)

UNITS SPECIFICATION

TEMPERATURE SCALE	= F
COORDINATE INPUT	= FT
COMPONENT DIMENSIONS	= IN
DISPLACEMENTS, ETC.	= IN
SUPPORT, ETC. STIFFNESSES	= LBIN
FORCES AND MOMENTS	= LBIN
COMPONENT WTS, UNIF LOADS	= LBIN
STRESSES, MODULI, PRESSURES	= LBIN

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

GEOMETRY DATA CONTROL INFORMATION

DATA NAME = GEOM
DATA TITLE =

NO. OF PIPE RUNS = 5
NO. OF MISC. MEMBER GROUPS = 1

ASME CODE EDITION = (BLANK - DEFAULTS TO E-80)

COORDINATE CODE = (BLANK - NO COORDINATE TRANSFORMATION)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. EW-04

CONTROL POINT COORDINATES, AS COMPUTED AND STORED

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN1					
	PC3C		[illegible]	31.458	0.000
	MEZZ		4.250	31.458	0.000
	834		6.75[illegible]	31.458	0.000
	868		8.250	31.458	0.000
	866		9.762	31.458	0.000
	850		11.052	31.458	0.000
	585B		12.342	31.458	0.000
	856		14.522	31.458	0.000
	854A		15.522	31.458	0.000
	852		16.532	31.458	0.000
	849		17.477	31.458	0.000
	848		18.452	31.458	0.000
	846		19.432	31.458	0.000
	SP45		19.532	31.458	0.000
	844		20.[illegible]32	31.458	0.000
	841		21.322	31.458	0.000
	843		22.612	31.458	0.000
	83PA	TNP	22.614	31.458	0.000
	SP38		23.498	31.824	0.000
	838	TIP	23.864	31.458	0.000
	838B	TNP	23.864	32.728	0.000
	836		23.864	35.168	0.000
	812A	TNP	23.864	36.418	0.000
	812C	BRP	24.234	37.302	0.000
	812	TIP	23.864	37.668	0.000
	812B	TNP	25.114	37.668	0.000
	P1		28.924	37.668	0.000
	P1 A		28.807	37.668	0.000
	P.8		29.949	37.668	0.000
	RR P	PEP	32.699	40.591	-5.000
	P.6		35.137	37.668	0.000
	P.4		39.854	37.668	0.000
	P.2		45.[illegible]34	37.668	0.000
	P.2A		45.699	37.668	0.000
	565		46.[illegible]55	37.668	0.000
	VEST	PRP	47.865	37.668	0.000
RUN2					
	812C	BRP	24.23[illegible]	37.3[illegible]2	[illegible]
	891		21.864	37.302	[illegible]
	813		16.864	37.302	[illegible]
	814		11.174	37.302	[illegible]
	P814	REF	11.174	39.132	-4.17[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. EW-84

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN2 (CONTD.)					
	B16		11.067	37.302	0.000
	B16A	TNP	9.737	37.302	0.000
	B16	TIP	9.687	37.302	0.000
	B16B	TNP	9.687	37.052	0.000
	B2[illegible]		9.[illegible]87	35.982	0.000
	B2[illegible]A		9.687	35.632	0.000
	B2[illegible]B		9.687	35.282	0.000
	B24A	TNP	9.687	33.248	0.000
	B24	TIP	9.687	32.998	0.000
	B24B	TNP	8.837	32.998	0.000
	B25		8.757	32.998	0.000
	B2[illegible]		7.837	32.998	0.000
	B2[illegible]		7.167	32.998	0.000
	B3[illegible]		7.117	32.998	0.000
	B3[illegible]B	TNP	7.[illegible]06	32.998	0.000
	B3[illegible]A	TIP	6.757	32.998	0.000
	B3[illegible]C	TNP	6.756	32.749	0.000
	B32		6.757	32.648	0.000
	B34		6.756	31.458	0.000
RUN3					
	B36		23.864	35.168	0.000
	B72A	TNP	23.864	35.168	-1.590
	B72	TIP	23.864	35.168	-2.000
	B72B	TNP	23.864	34.668	-2.000
	B74A	TNP	23.864	31.958	-2.[illegible]
	B74	TIP	23.864	31.458	-2.000
	B74B	TNP	23.764	31.458	-2.000
	B7[illegible]		22.491	31.458	-2.000
	B77		21.781	31.458	-2.000
	B7[illegible]		21.671	31.458	-2.000
	B8[illegible]		21.611	31.458	-2.[illegible]
	B84		21.241	31.458	-2.000
	B8[illegible]		19.571	31.458	-2.000
	B8[illegible]		18.921	31.458	-2.000
	B9[illegible]		12.531	31.458	-2.000
	B9[illegible]		12.241	31.458	-2.000
	B9[illegible]		11.821	31.458	-2.000
	B9[illegible]		11.111	31.458	-2.000
	B97		9.41[illegible]	31.458	-2.000
	B9[illegible]		9.[illegible]84	31.458	-2.000
	B[illegible]A	TNP	8.751	31.458	-2.000
	B[illegible]	TIP	8.251	31.458	-2.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. FW-04

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN3 (CONTD.)					
	[illegible]B	TNP	8.251	31.458	-1.500
	R6B		8.251	31.458	0.000
RUN4					
	595		47.865	37.668	11.920
	595A		47.865	37.668	10.250
	595		47.865	37.668	9.000
	58:B		47.865	37.668	8.125
	588	BRP	47.865	37.668	7.000
	58:A		47.865	37.668	5.875
	575		47.865	37.668	2.750
	57[illegible]		47.865	37.668	2.000
	565B		47.865	37.668	1.125
	565T	BRP	47.865	37.668	0.000
	565C		47.865	37.668	-1.125
	56:A	TNP	47.865	37.668	-1.150
	562	TIP	47.865	37.668	-2.650
	561B	TNP	48.926	36.607	-2.650
	555A	TNP	49.675	35.858	-2.650
	555	TIP	50.334	35.199	-2.650
	555B	TNP	51.266	35.199	-2.650
	55[illegible]		57.884	35.199	-2.650
	R55[illegible]	REP	60.667	33.116	-8.233
	545A	TNP	57.834	35.199	-2.650
	545	TIP	62.684	35.199	-2.650
	5456	TNP	57.784	32.949	-2.650
	54[illegible]		57.784	31.699	-2.650
	R536		60.784	28.669	-2.650
	R536	REP	65.834	28.669	-4.233
RUN5					
	58	BRP	47.865	37.668	7.000
	58:C		46.855	37.668	7.000
	7.1		45.615	37.668	7.[illegible]
	704		30.885	37.668	7.[illegible]
	706		34.215	37.668	7.000
	7[illegible]		29.[illegible]	37.668	7.[illegible]
	67[illegible]	REP	31.775	40.[illegible]	2.[illegible]
	71[illegible]		28.213	37.668	7.[illegible]
	71[illegible]		28.15[illegible]	37.668	7.[illegible]
	71[illegible]	TNP	24.44[illegible]	37.668	7.[illegible]
	71[illegible]	TIP	23.19[illegible]	37.668	7.[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ON
CALCULATION NO. FW-24

CONTROL POINT COORDINATES, AS COMPUTED AND STORED (CONTD.)

RUN NAME	POINT NAME	POINT TYPE	GLOBAL COORDINATES X (FT)	Y (FT)	Z (FT)
RUN5 (CONTD.)					
	712B	TNP	23.190	36.41P	7.000
	736		23.190	35.168	7.000
	739		23.190	31.458	7.000
MISC. NODES					
	85	MND	11.052	32.438	0.000
	85	MND	17.477	32.458	0.000
	896	MND	10.111	31.958	-2.000
	886	MND	19.531	32.208	-2.000
	842	MND	21.322	35.208	0.000
	879	MND	21.791	31.958	-2.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

COMPONENT PROPERTIES

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAM TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
STRP	1 SCHB S									
			NAME	10.750	.500	0.000	0.000			DS,TS,DK,TK
			NAME**	10.750	.500	10.750	.500			DS,TS,DK,TK
			XDIM**	0.000	.438	0.000				DDIF/T,TM,A
			MASS	5.750	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	5.750	0.000	0.000	30.000	88.338		UWC,UWF,UWI,MAXF,MAXD
STRP	1 SCH8									
			NAME	10.750	.593	0.000	0.000			DS,TS,DK,TK
			NAME**	10.750	.593	10.750	.593			DS,TS,DK,TK
			XDIM**	0.000	.519	0.000				DDIF/T,TM,A
			MASS	8.684	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	8.684	0.000	0.000	30.000	82.613		UWC,UWF,UWI,MAXF,MAXD
STRP	4SCH8 S									
			NAME	4.500	.337	0.000	0.000			DS,TS,DK,TK
			NAME**	4.500	.337	4.500	.337			DS,TS,DK,TK
			XDIM**	0.000	.295	0.000				DDIF/T,TM,A
			MASS	2.640	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	2.640	0.000	0.000	30.000	52.818		UWC,UWF,UWI,MAXF,MAXD
STRP	2SCH8 S									
			NAME	2.370	.218	0.000	0.000			DS,TS,DK,TK
			NAME**	2.370	.218	2.370	.218			DS,TS,DK,TK
			XDIM**	0.000	.191	0.000				DDIF/T,TM,A
			MASS	.786	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	.786	0.000	0.000	30.000	36.688		UWC,UWF,UWI,MAXF,MAXD
STRP	18SCH8									
			NAME	18.000	.937	0.000	0.000			DS,TS,DK,TK
			NAME**	18.000	.937	18.000	.937			DS,TS,DK,TK
			XDIM**	0.000	.820	0.000				DDIF/T,TM,A
			MASS	22.763	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	22.763	0.000	0.000	30.000	157.496		UWC,UWF,UWI,MAXF,MAXD
BTEE	18X18X18									
			NAME	18.000	.937	18.750	.593			DBS,IRS,DBS,IRS
			XDIM**	18.150	.937	18.750	.593	8.532	5.479	DBK,IRK,DBK,IRK,RMR,RMR
			MASS	22.763	0.684	0.000	0.000	0.000	0.000	UWCR,UWCP,UWFR,UWFR,UWIR,UWIR
BRED	18X18RED									
			NAME	18.000	.937	14.750	.593	0.000		D1,T1,D2,T2,ALPH
			XDIM**	14.375	.765	0.000	0.000	0.000		DK,TK,L1,L2,R1,R2
			MASS	22.76	0.000	0.000				UWC,UWF,UWI

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. FW-04

COMPONENT PROPERTIES (CONTD.)

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAM TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
VALV	10INVALV									
			NAME	11.940	1.186	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	11.940	1.186	11.940	1.186	9.568	1.186	DS,TS,DK,TK,DP,TP
VALV	8INVALV									
			NAME	9.620	1.000	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	9.620	1.000	9.620	1.000	7.620	1.000	DS,TS,DK,TK,DP,TP
BRED	10XPRED									
			NAME	10.750	.593	8.620	.500	0.000		D1,T1,D2,T2,ALPH
			XDIM**	0.685	.547	0.000	0.000	0.000	0.000	DK,TK,L1,L2,R1,R2
			MASS	8.684	0.000	0.000				UWC,UWF,UWI
BELB	10INELB									
			NAME	10.750	.593	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	10.750	.593	10.750	.593	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.519	0.000				DDIF/T,TM,A
			MASS	0.864	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	0.864	0.000	0.000	30.600	82.190		UWC,UWF,UWI,MAXF,MAXD
BELB	18INELB									
			NAME	18.000	.937	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	18.000	.937	18.000	.937	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.820	0.000				DDIF/T,TM,A
			MASS	22.760	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	22.760	0.000	0.000	30.000	107.456		UWC,UWF,UWI,MAXF,MAXD
BELB	4INELB									
			NAME	4.500	.337	0.000	0.000	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			NAME**	4.500	.337	4.500	.337	0.000	0.000	DS,TS,DK,TK,R/DN,DN
			XDIM**	0.000	.295	0.000				DDIF/T,TM,A
			MASS	2.[illegible]	0.000	0.000	0.000	0.000		UWC,UWF,UWI,MAXF,MAXD
			MASS**	2.[illegible]	0.000	0.000	30.000	52.810		UWC,UWF,UWI,MAXF,MAXD
SELB	2INELB									
			NAME	2.379	.218	0.000	0.309	0.000		DS,TS,DK,TK,PM
			NAME**	2.37	.218	2.242	.654	1.176		DS,TS,DK,TK,SM
			MASS	.786	0.000	0.000				UWC,UWF,UWI
VALV	4IDVALV									
			NAME	5.176	.674	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	5.176	.674	5.176	.674	3.928	.674	DS,TS,DK,TK,DP,TP

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-P4

COMPONENT PROPERTIES (CONTD.)

LENGTH UNIT = IN , WEIGHT UNIT = LB/IN OR LB

COMP TYPE	SECTION NAME	SEAM TYPE	CARD TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM LIST
VALV	2INVALV									
			NAME	2.806	.436	0.000	0.000	0.000	0.000	DS,TS,DK,TK,DP,TP
			NAME**	2.806	.436	2.806	.436	1.934	.436	DS,TS,DK,TK,DP,TP
VLOP	VLOP									
			NAME	.360E+02	.100E+02					DK,TK

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. FW-04

MATERIAL PROPERTIES. AS STORED

TEMP SCALE = F. MODULUS AND STRESS UNITS = LB/SQ.IN

MATERIAL NAME	DATA TYPE	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8
SA106 B									STANDARD MATERIAL
	TEMP**	7[illegible].	100.	200.	300.	400.	500.	600.	650.
	YMOD**	279[illegible].	27900000.	27700000.	27400000.	27000000.	26400000.	25700000.	25300000.
	ALPH**	.560E-05	.583E-05	.655E-05	.718E-05	.773E-05	.818E-05	.855E-05	.87[illegible]E-05
	CL2S**	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00
	CL1S**	20000.00	20000.00	20000.00	20000.00	20000.00	19930.00	17350.00	17000.00
	YLDS**	35000.00	35000.00	31900.00	31300.00	30000.00	28360.00	25900.00	25400.00
	TEMP**	7[illegible].	750.	800.	850.	900.	950.	1000.	
	YMOD**	24[illegible].	0.	0.	0.	0.	0.	0.	
	ALPH**	.88[illegible]E-05	.894E-05	.902E-05	0.	0.	0.	0.	
	CL2S**	14[illegible]	0.00	0.00	0.00	0.00	0.00	0.00	
	CL1S**	16[illegible]	0.00	0.00	0.00	0.00	0.00	0.00	
	YLDS**	25[illegible]	24400.00	23300.00	22500.00	22200.00	21400.00	19500.00	
	NCYC**	.1[illegible]E+02	.200E+02	.500E+02	.100E+03	.200E+03	.500E+03	.100E+04	.200E+04
	FTGS**	58[illegible]	410000.00	275000.00	205000.00	155000.00	105000.00	82000.00	64000.00
	NCYC**	.500E+04	.100E+05	.200E+05	.500E+05	.100E+06	.200E+06	.500E+06	.100E+07
	FTGS**	48[illegible]	38000.00	31000.00	23000.00	20000.00	16500.00	13500.00	12500.00

FATG. PARAM. M = 3.00, N = .20 (DEFAULT) C4 = 1.1 (DEFAUL

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. EW-34

MISCELLANEOUS MEMBERS, GROUP NO. 1 (VLOP) RIGID VALVE OPERATOR

MEMB NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	NODE I	NODE J	POINT K	LENGTH (FT)	POINT L	POINT M	END RELEASE CODES ---I---	END RELEASE CODES ---J---
F1	VLOP	VLOP	SA106 B	859	860		.95				
F2	VLOP	VLOP	SA106 B	849	850		1.00				
F3	VLOP	VLOP	SA106 B	895	896		.50				
F4	VLOP	VLOP	SA106 B	885	886		.75				
F5	VLOP	VLOP	SA106 B	841	842		3.75				
F6	VLOP	VLOP	SA106 B	877	878		.50				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV ON
CALCULATION NO. EW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 1 RUN NAME = RUN1

SEGM NO.	SEGM TYPE	DCP LIST	DCF TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT								22.61				
		FC3C											
				A1	STRP	10SCH80S	SA106 B			4.25	0		
		MEZZ											
				A1	STRP	10SCH80S	SA106 B			2.50	0		
		B34											
				A1	STRP	10SCH80S	SA106 B			1.50	0		
		B58											
				A1	STRP	10SCH80S	SA106 B			1.51	0		
		B66											
				A2	VALV	10INVALV	SA106 B			1.29	0		
		P59											
				A2	VALV	10INVALV	SA106 B			1.29	0		
		585B											
				A2	VALV	10INVALV	SA106 B			2.58	0		
		P56											
				A3	STRP	10SCH80	SA106 B			1.00	0		
		B54A											
				A3	RRED-R	10X8RED	SA106 B			.58	0		
		B52											
				A4	VALV	8INVALV	SA106 B			.97	0		
		B49											
				A4	VALV	8INVALV	SA106 B			.97	0		
		B48											
				A5	RRED-E	10X8RED	SA106 B			.58	0		
		B46											
				A6	STRP	10SCH80	SA106 B			.58	0		
		5845											
				A6	STRP	10SCH80	SA106 B			.58	0		
		P44											
				A7	VALV	10INVALV	SA106 B			1.29	0		
		B41											
				A7	VALV	10INVALV	SA106 B			1.29	0		
		B4:											
				A7A	STRP	10SCH80	SA106 B			.58	0		
2	CURV	B38A	TNF						1.96			1.25	91.00
				A8	RELB	10INELB	SA106 B			.98	0		
		SP3B											
				A8	RELB	10INELB	SA106 B			.98	0		
3	STRT	B34B	TNF						7.71				
				A9	STRT	10SCH80	SA106 B			2.46	0		
		B5A											
				A9	STRP	10SCH80	SA106 B			1.25	0		

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-34

COMPONENT ALIGNMENT SUMMARY. PIPE RUN NO. 1 (CONTD.) RUN NAME = RUN1

SEGM NO.	SEGM TYPE	DCF LIST	DCF TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
4	CURV	P12A	TNP						1.96			1.25	90.00
		P12C	PRP	A10	BELB	10INELB	SA106 B			.98	0		
				A10	BELB	10INELB	SA106 B			.98	0		
5	STRT	P12B	TNP						22.75				
				A11	STRP	10SCH80	SA106 B			3.71	0		
		B1[illegible]		A11	STRP	10SCH80	SA106 B			.06	0		
		513A											
				A11	STRP	10SCH80	SA106 B			1.06	0		
		P3B		A11	STRP	10SCH80	SA106 B			5.19	0		
		B06											
		B04		A11	STRP	10SCH80	SA106 B			4.67	0		
	P1[illegible]	188.03[illegible]		A11	STRP	10SCH80	SA106 B						
W12	B13A	188.03[illegible]											
W13	B[illegible]A	188.[illegible]											
W14	P[illegible]2	188.[illegible]											
W15	713	188.[illegible]											
W16	713A	188.[illegible]											
W17	B2[illegible]	3[illegible]											
W18	B2[illegible]B	3.[illegible]											
W19	B26	19.[illegible]											
W20	B2B	19.[illegible]											
W21	B2	28.5[illegible]											
W22	B32	28.5[illegible]											
W23	P76	49.[illegible]											
W24	P[illegible]	49.[illegible]											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]ON
CALCULATION NO. FU-14

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 2 (CONTD.) RUN NAME = RUN2

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
2	CURV	P19A	TNP						.39			.25	9.94
				P2	SELB	2INELB	SA106 B			.39	0		
3	STR1	P19B	TNP						3.89				
				P3	STRP	2SCH80S	SA106 B			1.07	0		
		P2											
				P4	VALV	2INVALV	SA106 B			.75	0		
		P23A											
				P4	VALV	2INVALV	SA106 B			.75	0		
		P23B											
				P5	STRP	2SCH80S	SA106 B			2.03	0		
4	CURV	P24A	TNP						.39			.25	91.91
				P6	SELB	2INELB	SA106 B			.39	0		
5	STR1	P24B	TNP						1.83				
				P7	STRP	2SCH80S	SA106 B			.99	0		
		P25											
				P7	STRP	2SCH80S	SA106 B			.92	0		
		P26											
				P8	VALV	2INVALV	SA106 B			.67	0		
		P2P											
				P9	STRP	2SCH80S	SA106 B			.96	0		
		P3											
				P9	STRP	2SCH80S	SA106 B			.10	0		
6	CURV	P31B	TNP						.39			.25	90.73
				P10	SELB	2INELB	SA106 B			.39	0		
7	STR1	P3 C	TNP						1.29				
				P12	STRP	2SCH80S	SA106 B			.10	0		
		P33											
				P12	STRP	2SCH80S	SA106 B			1.19	0		
		P34											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALU[illegible]N
CALCULATION NO. FU-64

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 3 RUN NAME = RUN3

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	836							1.50				
				C1	STRP	4SCH80S	SA106 B			1.50	[illegible]		
2	CURV	872A	TNF						.79			.5[illegible]	[illegible]
				C2	BELB	4INELB	SA106 B			.79	0		
3	STRT	872B	TNF						2.71				
				C3	STRP	4SCH80S	SA106 B			2.71	0		
4	CURV	874A	TNF						.79			.50	[illegible]
				C4	BELB	4INELB	SA106 B			.79	0		
5	STRT	874B	TNF						14.61				
				C5	STRP	4SCH80S	SA106 B			.87	0		
		876											
				C6	VALV	4INVALV	SA106 B			.71	0		
		877											
				C6	VALV	4INVALV	SA106 B			.71	0		
		88											
				C7	STRP	4SCH80S	SA106 B			.46	0		
		882											
				C7	STRP	4SCH80S	SA106 B			.37	0		
		884											
				C8	VALV	4INVALV	SA106 B			.71	0		
		885											
				C8	VALV	4INVALV	SA106 B			.71	0		
		888											
				C9	STRP	4SCH80S	SA106 B			6.29	1		
		89[illegible]											
				C9	STRP	4SCH80S	SA106 B			.29	0		
		892											
				C10	VALV	4INVALV	SA106 B			1.42	[illegible]		
		894											
				C10	VALV	4INVALV	SA106 B			.71	[illegible]		
		895											
				C1[illegible]	VALV	4INVALV	SA106 B			.71	[illegible]		
		897											
				C11	STRP	4SCH80S	SA106 B			.32	0		
		898											
				C11	STRP	4SCH80S	SA106 B			.33	1		
6	CURV	9[illegible]A	TNF						.79			.5[illegible]	89.97
				C12	BELB	4INELB	SA106 B			.79	[illegible]		
7	STRT	[illegible]	TNF						1.5[illegible]				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ON
CALCULATION NO. EW-P4

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 3 (CONTD.) RUN NAME = RUN3

SEGM NO.	SEGM TYPE	DCF LIST	DCF TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
				C13	STRP	4SCH80S	SA106 B			1.50	0		
		REP											

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 4 RUN NAME = RUN4

SEGM NO.	SEGM TYPE	DCF LIST	DCF TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	595							13.67				
				D1	STRP	10SCH80	SA106 B			1.67	3		
		585A		D2	REED-E	10X10RED	SA106 B			1.25	0		
		585		D3	STRP	10SCH80	SA106 B			.88	0		
		583B		D4	RTEE-R	10X10X10	SA106 B			1.13	5		
		58[illegible]	PRP	D4	RTEE-R	10X10X10	SA106 B			1.13	0		
		575A		D5	STRP	10SCH80	SA106 B			3.13	0		
		575		D5	STRP	10SCH80	SA106 B			.75	3		
		57[illegible]		D5	STRP	10SCH80	SA106 B			.88	0		
		565B		D6	RTEE-R	10X10X10	SA106 B			1.13	0		
		[illegible]65[illegible]	PRP	D6	RTEE-R	10X10X10	SA106 B			1.13	0		
		565C		D7	STRP	10SCH80	SA106 B			.[illegible]3	0		
2	CURV	56[illegible]A	TNP	D8	BELB	10INELB	SA106 B		2.36	2.36	1	1.50	9[illegible]
3	STRT	56[illegible]B	TNP	D9	STRP	10SCH80	SA106 B		1.96	1.96	1		
4	CURV	555A	TNP	D10	BELB	10INELB	SA106 B		1.77	1.77	0	2.25	45.
5	STRT	555B	TNP						6.57				

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ION
CALCULATION NO. FW-04

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 4 (CONTD.)   RUN NAME = RUN4

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
				D11	STRP	18SCH80	SA106 B			5.82	0		
		55											
				D11	STRP	18SCH80	SA106 B			.75	0		
6	CURV	545A	TNP						3.53			2.25	90.00
				D12	BELB	18INELB	SA106 B			3.53	0		
7	STRT	545B	TNP						4.28				
				D13	STRP	18SCH80	SA106 B			1.25	0		
		54											
				D13	STRP	18SCH80	SA106 B			3.03	0		
		536											

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 5   RUN NAME = RUN5

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
1	STRT	583	PRF					90.00	23.43				
				E1	BTEE-B	18X18X10	SA106 B			1.01	0		
		580											
				E2	STRP	10SCH80	SA106 B			1.24	0		
		701											
				E2	STRP	10SCH80	SA106 B			6.73	0		
		7 4											
				E2	STRP	10SCH80	SA106 B			4.67	0		
		706											
				E2	STRP	10SCH80	SA106 B			5.19	0		
		708											
				E2	STRP	10SCH80	SA106 B			.81	0		
		710A											
				E2	STRP	10SCH80	SA106 B			.96	0		
		711											
				E2	STRP	10SCH80	SA106 B			3.71	0		
2	CURV	712A	TNP						1.96			1.25	[illegible]
				E3	BELB	10INELB	SA106 B			1.96	0		
3	STRT	712B	TNP						4.96				
				E4	STRP	10SCH80	SA106 B			1.25	0		
		736											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-24

COMPONENT ALIGNMENT SUMMARY, PIPE RUN NO. 5 (CONTD.) RUN NAME = RUN5

SEGM NO.	SEGM TYPE	DCP LIST	DCP TYPE	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	BRANCH ANGLE (DEG)	SEGM LENGTH (FT)	COMP LENGTH (FT)	EXTRA MASSES	CURVE RADIUS (FT)	CURVE ANGLE (DEG)
				E4	STRP	10SCH80	SA106 B			3.71	[illegible]		
		739											

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. EW-04

LUMPED WEIGHTS (LB)

NAME	LOCN	WEIGHT
W1	866	293.5
W2	861	1134.62
W3	859	638.8
W4	856	395.0
W5	852	264.
W6	85	1159.
W7	848	264.
W8	844	849.
W9	842	305.
W10	841	849.
W11	817	188.
W12	813A	188.
W13	802A	188.
W14	802	188.
W15	71	188.
W16	71'A	188.
W17	82	36.
W18	821P	30.
W19	826	19.
W20	820	19.
W21	83	38.
W22	830	38.
W23	824	49.
W24	880	49.

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

LUMPED WEIGHTS (LB) (CONTD.)

NAME	LOCN	WEIGHT
W25	878	137.00[illegible]
W26	886	269.[illegible]
W27	884	67.[illegible]
W28	888	67.[illegible]
W29	892	81.00[illegible]
W30	894	129.0[illegible]
W31	896	197.30[illegible]
W32	897	49.03[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. EM-04

LUMPED WEIGHTS (LB) (CONTD.)

NAME	LOCN	WEIGHT
W25	878	197.5
W26	886	268.
W27	884	67.
W28	890	67.
W29	892	89.
W3	834	128.
W31	896	197.
W32	897	49.

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UNI
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FU-04

SUPPORT LOCATIONS AND PROPERTIES

SUPP NAME	SUPP LOCN	SUPP TYPE	PARTICIPATION CODES THERM	GRAV	STAT	DYN	TRANSLATIONAL STIFFNESS (LB/IN)	ROTATIONAL STIFFNESS (LB.IN/RAD)	EFFECTIVE WEIGHT (LB)	ANCHOR CODE	DIRN CODE	POINT J	POINT K
PENC	PC3C	ANCH	T	G	S	D	RIGID	RIGID	0.000	SSSSSS			
S816	B16	CONE		G			RIGID	ZERO	0.000		Y		
B5BY	S85[illegible]	SNGL	T	G	S	D	.15000E+05	ZERO	0.000		Y		
B58Z	S858	SNGL	T	G	S	D	.85000E+04	ZERO	0.000		Z		
B39Y	S[illegible]39	SNGL	T	G	S	D	.10000E+05	ZERO	0.000		Y		
B39Z	SP38	SNGL	T	G	S	D	.85000E+04	ZERO	0.000		Z		
S806	8[illegible]	SNUB				D	RIGID	ZERO	0.000		INCL	B81P	
S54[illegible]	54	CONE		G			RIGID	ZERO	0.000		Y		
B[illegible]4Y	B 4	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
55[illegible]S	55[illegible]	SNUB				D	RIGID	ZERO	0.000		INCL	P55[illegible]	
S814	B14	SNUB				D	RIGID	ZERO	0.000		INCL	P814	
B13Y	P13	SNGL	T	G	S	D	RIGID	ZERO	0.000		Y		
B13Z	P13	SNGL	T	G	S	D	RIGID	ZERO	0.000		Z		
B9[illegible]Y	B9[illegible]	SNGL	T	G	S	D	.14000E+05	ZERO	0.000		Y		
B9[illegible]Z	B9	SNGL	T	G	S	D	.85000E+04	ZERO	0.000		Z		
B82Y	B82	SNGL	T	G	S	D	.14000E+05	ZERO	0.000		Y		
B82Z	B82	SNGL	T	G	S	D	.85000E+04	ZERO	0.000		Z		
595X	59[illegible]	SNUB				D	RIGID	ZERO	0.000		Y		
536S	536	SNUB				D	RIGID	ZERO	0.000		INCL	P536	
S7[illegible]P	7 P	SNUB				D	RIGID	ZERO	0.000		INCL	P7[illegible]P	
739Y	73[illegible]	SNGL	T	G	S	D	.14000E+05	ZERO	0.000		Y		
739Z	73[illegible]	SNGL	T	G	S	D	.85000E+04	ZERO	0.000		Z		

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. EW-[illegible]

OUTPUT POINT SPECIFICATION

NO OUTPUT POINT SPECIFICATION

PROPERTIES AT STRESS OUTPUT POINTS

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN1							
1	PC3C	A1	STRP	1[illegible]SCH80S	10.750	.500	1.[illegible]
3	834	A1	STRP	1[illegible]SCH80S	10.750	.500	1.00
5L	866	A1	STRP	1[illegible]SCH80S	10.750	.500	1.00
6	859	A2	VALV	1[illegible]INVALV			N/A
6L	856	A2	VALV	1[illegible]INVALV			N/A
8L	854A	A3	STRP	1[illegible]SCH80	10.750	.593	1.00
10L	852	A3	BRED-E	1[illegible]XBRED	8.620	.500	2.00
11	849	A4	VALV	8INVALV			N/A
12R	84P	A5	BRED-E	1[illegible]XBRED	8.620	.500	2.00
13R	846	A6	STRP	10SCH80	10.750	.593	1.00
15L	844	A6	STRP	1[illegible]SCH80	10.750	.593	1.00
16	841	A7	VALV	1[illegible]INVALV			N/A
17R	84[illegible]	A7A	STRP	10SCH80	10.750	.593	1.00
18R	83RA	A8	BELB	1[illegible]INELB	10.750	.593	1.83
20L	83[illegible]B	A8	BELB	10INELB	10.750	.593	1.83
21	836	A9	STRP	1[illegible]SCH80	10.750	.593	1.00
22R	812A	A1[illegible]	BELB	1[illegible]INELB	10.750	.593	1.83
24L	812P	A1[illegible]	BELB	1[illegible]INELB	10.750	.593	1.83
25	81[illegible]	A11	STRP	1[illegible]SCH80	10.750	.593	1.00
27	830	A11	STRP	1[illegible]SCH80	10.750	.593	1.00
29	8[illegible]4	A11	STRP	1[illegible]SCH80	10.750	.593	1.00
31	820A	A11	STRP	1[illegible]SCH80	10.750	.593	1.00
32R	565	A12	RTEE-P	10X10X10			N/A
RUN NAME = RUN2							
34	812C	B1	STRP	2SCH80S	2.375	.218	1.00
36	813	B1	STRP	2SCH80S	2.375	.218	1.00

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
2	MEZZ	A1	STRP	1[illegible]SCH80S	10.750	.500	1.00
4	868	A1	STRP	10SCH80S	10.750	.500	1.00
5R	866	A2	VALV	1[illegible]INVALV			N/A
7	S858	A2	VALV	1[illegible]INVALV			N/A
8R	856	A3	STRP	10SCH80	10.750	.593	1.00
9R	854A	A3	BRED-R	10XBRED	10.750	.593	2.00
10P	852	A4	VALV	8INVALV			N/A
12L	848	A4	VALV	8INVALV			N/A
13L	846	A5	BRED-E	10XBRED	10.750	.593	2.00
14	S845	A6	STRP	10SCH80	10.750	.593	1.00
15R	844	A7	VALV	1[illegible]INVALV			N/A
17L	840	A7	VALV	1[illegible]INVALV			N/A
18L	P38A	A7A	STRP	10SCH80	10.750	.593	1.00
19	S83B	A8	BELB	1[illegible]INELB	10.750	.593	1.83
20R	83PB	A9	STRP	10SCH80	10.750	.593	1.00
22L	812A	A9	STRP	10SCH80	10.750	.593	1.00
23	812C	A10	BELB	1[illegible]INELB	10.750	.593	1.83
24R	812B	A11	STRP	10SCH80	10.750	.593	1.00
26	810A	A11	STRP	10SCH80	10.750	.593	1.00
28	826	A11	STRP	10SCH80	10.750	.593	1.00
30	832	A11	STRP	10SCH80	10.750	.593	1.00
32L	565	A11	STRP	10SCH80	10.750	.593	1.00
33	565T	A12	RTEE-P	10X10X10	10.750	.867	1.46
35	881	B1	STRP	2SCH80S	2.375	.218	1.00
37	814	B1	STRP	2SCH80S	2.375	.218	1.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ON
CALCULATION NO. EV-C4

PROPERTIES AT STRESS OUTPUT POINTS (CONTD.)

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN2 (CONTD.)															
38	B16	B1	STRP	2SCHBOS	2.370	.218	1.00	39L	B18A	B1	STRP	2SCHBOS	2.37[illegible]	.218	1.00
39R	B18A	B2	SELB	2INELB	2.375	.218	1.78	40L	B18B	B2	SELB	2INELB	2.37[illegible]	.218	1.78
40R	B18B	B3	STRP	2SCHBOS	2.370	.218	1.00	41L	B20	B3	STRP	2SCHBOS	2.37[illegible]	.218	1.00
41R	B2[illegible]	B4	VALV	2INVALV			N/A	42	B23A	B4	VALV	2INVALV			N/A
43L	B23B	B4	VALV	2INVALV			N/A	43R	B23B	B5	STRP	2SCHBOS	2.37[illegible]	.218	1.00
44L	B24A	B5	STRP	2SCHBOS	2.370	.218	1.00	44R	B24A	B6	SELB	2INELB	2.37[illegible]	.218	1.78
45L	B24B	B6	SELB	2INELB	2.370	.218	1.78	45R	B24B	B7	STRP	2SCHBOS	2.370	.218	1.00
46	B2[illegible]	B7	STRP	2SCHBOS	2.370	.218	1.00	47L	B26	B7	STRP	2SCHBOS	2.370	.218	1.00
47R	B2[illegible]	B8	VALV	2INVALV			N/A	48L	B28	B8	VALV	2INVALV			N/A
48R	B28	B9	STRP	2SCHBOS	2.370	.218	1.00	49	B30	B9	STRP	2SCHBOS	2.370	.218	1.00
50L	B30B	B9	STRP	2SCHBOS	2.370	.218	1.00	50R	B30B	B10	SELB	2INELB	2.370	.218	1.78
51L	B30C	B12	SELB	2INELB	2.370	.218	1.78	51R	B30C	B12	STRP	2SCHBOS	2.370	.218	1.00
52	B32	B12	STRP	2SCHBOS	2.370	.218	1.00	53	B34	B12	STRP	2SCHBOS	2.370	.218	1.00
RUN NAME = RUN1															
54	B36	C1	STRP	4SCHBOS	4.500	.337	1.00	55L	B72A	C1	STRP	4SCHBOS	4.500	.337	1.00
55R	B72A	C2	BELB	4INELB	4.500	.337	1.50	56L	B72B	C2	BELB	4INELB	4.500	.337	1.50
56R	B72B	C3	STRP	4SCHBOS	4.500	.337	1.00	57L	B74A	C3	STRP	4SCHBOS	4.500	.337	1.00
57R	B74A	C4	BELB	4INELB	4.500	.337	1.50	58L	B74B	C4	BELB	4INELB	4.500	.337	1.50
58R	B74B	C5	STRP	4SCHBOS	4.500	.337	1.00	59L	B76	C5	STRP	4SCHBOS	4.500	.337	1.00
59R	B76	C6	VALV	4INVALV			N/A	60	B77	C6	VALV	4INVALV			N/A
61L	B80	C6	VALV	4INVALV			N/A	61R	B80	C7	STRP	4SCHBOS	4.500	.337	1.00
62	B82	C7	STRP	4SCHBOS	4.500	.337	1.00	63L	B84	C7	STRP	4SCHBOS	4.500	.337	1.00
63R	B84	C8	VALV	4INVALV			N/A	64	B85	C8	VALV	4INVALV			N/A
65L	B86	C8	VALV	4INVALV			N/A	65R	B88	C9	STRP	4SCHBOS	4.500	.337	1.00
66	B9	C9	STRP	4SCHBOS	4.500	.337	1.00	67L	B92	C9	STRP	4SCHBOS	4.500	.337	1.00
67R	B92	C1[illegible]	VALV	4INVALV			N/A	68	B94	C10	VALV	4INVALV			N/A
69	B95	C1[illegible]	VALV	4INVALV			N/A	70L	B97	C10	VALV	4INVALV			N/A
70R	B97	C11	STRP	4SCHBOS	4.500	.337	1.00	71	B98	C11	STRP	4SCHBOS	4.500	.337	1.00
72L	99A	C11	STRP	4SCHBOS	4.500	.337	1.00	72R	99A	C12	BELB	4INELB	4.500	.337	1.50
73L	99B	C12	BELB	4INELB	4.500	.337	1.50	73R	99B	C13	STRP	4SCHBOS	4.500	.337	1.00
74	B68	C1[illegible]	STRP	4SCHBOS	4.500	.337	1.00								

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. EQ-

PROPERTIES AT STRESS OUTPUT POINTS (CONTD.)

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
RUN NAME = RUN4							
75	595	D1	STRP	10SCHP0	10.750	.593	1.00
76P	585A	D2	BRED-F	10X10RED	10.750	.593	2.00
77R	585	D2	STRP	10SCHP0	10.000	.937	1.50
78R	580B	D4	BTEE-R	10X10X10			N/A
80L	580A	D4	BTEE-P	10X10X10			N/A
81	575	D5	STRP	10SCHP0	10.000	.937	1.00
83L	565B	D5	STRP	10SCHP0	10.000	.937	1.50
84B	565T	D6	BTEE-P	10X10X10	10.000	.937	1.46
85R	565C	D7	STRP	10SCHP0	10.000	.937	1.00
86R	565A	D8	BELP	10INELB	10.000	.937	2.39
87R	560B	D8	STRP	10SCHP0	10.000	.937	1.00
88R	555A	D10	BELB	10INELB	10.000	.937	1.92
89R	555B	D11	STRP	10SCHP0	10.000	.937	1.00
91L	545A	D11	STRP	10SCHP0	10.000	.937	1.00
92L	545B	D12	BELB	10INELB	10.000	.937	1.92
93	540	D13	STRP	10SCHP0	10.000	.937	1.00
RUN NAME = RUN5							
95	580	E1	BTEE-P	10X10X10	10.750	.867	1.46
96R	580C	E2	STRP	10SCHP0	10.750	.593	1.00
98	714	E2	STRP	10SCHP0	10.750	.593	1.00
100	709	E2	STRP	10SCHP0	10.750	.593	1.00
102	710	E2	STRP	10SCHP0	10.750	.593	1.00
103R	712A	E3	BELB	10INELB	10.750	.593	1.03
104P	712B	E4	STRP	10SCHP0	10.750	.593	1.00
106	739	E4	STRP	10SCHP0	10.750	.593	1.00

SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	OUTSIDE DIAM (IN)	WALL THCKNS (IN)	SIF
76L	595A	D1	STRP	10SCHP0	10.750	.593	1.00
77L	585	D2	BRED-E	10X10RED	10.000	.937	2.00
78L	580B	D3	STRP	10SCHP0	10.000	.937	1.50
79R	580	D4	BTEE-R	10X10X10	10.000	.937	1.46
80R	580A	D5	STRP	10SCHP0	10.000	.937	1.00
82	570	D5	STRP	10SCHP0	10.000	.937	1.00
83R	565B	D6	BTEE-R	10X10X10			N/A
85L	565C	D6	BTEE-R	10X10X10			N/A
86L	560A	D7	STRP	10SCHP0	10.000	.937	1.00
87L	560B	D8	BELB	10INELB	10.000	.937	2.39
88L	555A	D9	STRP	10SCHP0	10.000	.937	1.00
89L	555B	D10	BELB	10INELB	10.000	.937	1.92
90	550	D11	STRP	10SCHP0	10.000	.937	1.00
91R	545A	D12	BELB	10INELB	10.000	.937	1.92
92P	545B	D13	STRP	10SCHP0	10.000	.937	1.00
94	536	D13	STRP	10SCHP0	10.000	.937	1.00
96L	580C	E1	BTEE-P	10X10X10			N/A
97	701	E2	STRP	10SCHP0	10.750	.593	1.00
99	716	E2	STRP	10SCHP0	10.750	.593	1.00
101	710A	E2	STRP	10SCHP0	10.750	.593	1.00
103L	712A	E2	STRP	10SCHP0	10.750	.593	1.00
104L	712B	E3	BELB	10INELB	10.750	.593	1.03
105	736	E4	STRP	10SCHP0	10.750	.593	1.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U...
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA...ON
CALCULATION NO. FW-04

NODE RENUMBERING INFORMATION

(1) STATIC CASE

NUMBER OF NODES IN SYSTEM	=	106
STIFFNESS MATRIX LENGTH BEFORE RENUMBERING	=	29550
STIFFNESS MATRIX LENGTH AFTER RENUMBERING	=	11442

(2) DYNAMIC CASE

NUMBER OF NODES IN SYSTEM	=	109
STIFFNESS MATRIX LENGTH BEFORE RENUMBERING	=	30585
STIFFNESS MATRIX LENGTH AFTER RENUMBERING	=	12009

APPROXIMATE FIELD LENGTH REQUIREMENTS (OCTAL) FOR THIS GEOMETRY

GEOMETRY INPUT PHASE	=	164000
STATIC ANALYSIS PHASE	=	163000
DYNAMIC PROPERTIES PHASE	=	143000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 GRAVITY ANALYSIS

RESULTS SET NAME = GRAV
LOADING TYPE = GRAV

AUTE, TEME, YMOD, MASS AND ERPR DATA

CARD TYPE	RUN OR GROUP	FIRST DCP,MNB	LAST DCP,MNB	ITEM 1	ITEM 2	ITEM 3	ITEM LIST
TEME				420.00	70.00		T(HOT),T(COLD)

LOAD CARDS

LOAD TYPE	RUN OR GROUP	HIGH TEMP	LOW TEMP	PRESS (PSI)	GRAV FACTOR	FIRST POINT	LAST POINT	GRAV DIRN	POINT NAMES	SUPPT NAMES	LOADS (LB) OR DISPLACEMENTS (IN) X-AXIS	Y-AXIS	Z-AXIS
GRAV					1.000			-Y					

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]M
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ION
CALCULATION NO. FW-24

ELEMENT PROPERTIES FOR CURRENT STIFFNESS

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. SUB	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN1														
	1	PC3C	MEZZ	1	A1	STRP	10SCHB0S	SA106 B	26800000.	1.038	0.00000000	5.75	993.25	1.000
	2	MEZZ	R34	1	A1	STRP	10SCHB0S	SA106 B	26800000.	1.038	0.00000000	5.75	172.5	1.000
	3	P34	R4P	1	A1	STRP	10SCHB0S	SA106 B	26800000.	1.038	0.00000000	5.75	103.50	1.000
	4	R68	R66	1	A1	STRP	10SCHB0S	SA106 B	26800000.	1.038	0.00000000	5.75	104.33	1.000
	5	R66	R59	1	A2	VALV	10INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	0.00	1.000
	6	R59	S858	1	A2	VALV	10INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	0.00	1.000
	7	S858	R56	1	A2	VALV	10INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	0.00	1.000
	8	R56	R54A	1	A3	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	104.21	1.000
	9	R54A	R52	1	A3	RRED-R	10XRRED	SA106 B	26800000.	1.038	0.00000000	8.68	69.44	1.000
	10	R52	R49	1	A4	VALV	8INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	1.00	1.000
	11	R49	R48	1	A4	VALV	8INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	1.00	1.000
	12	R48	R46	1	A5	BRED-E	10XBRED	SA106 B	26800000.	1.038	0.00000000	8.68	61.44	1.000
	13	R46	S845	1	A6	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	52.10	1.000
	14	S845	R44	1	A6	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	52.10	1.000
	15	R44	R41	1	A7	VALV	10INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	1.00	1.000
	16	R41	R40	1	A7	VALV	10INVALV	SA106 B	26800000.	1.038	0.00000000	1.00	1.00	1.000
	17	R40	R38A	1	A7A	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	.21	1.000
	18	P36A	S839	1	A8	BELB	10INELB	SA106 B	26800000.	1.038	0.00000000	8.86	104.43	4.784
	19	S838	R38B	1	A8	BELB	10INELB	SA106 B	26800000.	1.038	0.00000000	8.86	104.43	4.784
	20	R38B	R36	1	A9	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	956.35	1.000
	21	P36	R12A	1	A9	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	139.26	1.000
	22	R12A	R12C	1	A10	BELB	10INELB	SA106 B	26800000.	1.038	0.00000000	8.86	104.43	4.784
	23	R12C	R12B	1	A10	BELB	10INELB	SA106 B	26800000.	1.038	0.00000000	8.86	104.43	4.784
	24	R12B	R10	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	3P6.61	1.000
	25	R10	R10A	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	6.51	1.000
	26	R10A	R08	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	113.72	1.000
	27	R08	R06	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	545.58	1.000
	28	R06	R04	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	496.74	1.000
	29	R04	R02	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	617.85	1.000
	30	R02	R02A	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	6.51	1.000
	31	R02A	S65	1	A11	STRP	10SCHB0	SA106 B	26800000.	1.038	0.00000000	8.68	121.46	1.000
	32	S65	S65I	1	A12	RTEE-D	18X18X10	SA106 B	26800000.	1.038	0.00000000	8.68	1 5.29	1.000
RUN2														
	33	R12C	R01	1	B1	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	22.32	1.000
	34	R01	R14	1	B1	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	47.16	1.000
	35	P14	R16	1	B1	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	53.67	1.000
	36	R14	R16	1	B1	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	1.57	1.000
	37	R16	R18A	1	B1	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	15.75	1.000
	38	R18A	R18B	1	B2	ELB	2INELB	SA106 B	26800000.	1.038	0.00000000	.79	3.7	1.000
	39	R18B	R20	1	B2	STRP	2SCHB0S	SA106 B	26800000.	1.038	0.00000000	.79	12.60	1.000
	40	R20	R20A	1	B4	VALV	2INVALV	SA106 B	26800000.	1.038	0.00000000	.00	.00	1.000
	41	R0 A	R2 B	1	B4	VALV	2INVALV	SA106 B	26800000.	1.038	0.00000000	.00	.00	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. SUP	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN2 (CONTD.)														
	42	820B	824A	1	B5	STRP	2SCH80S	SA106 B	26880000.	1.038	0.00000000	.79	19.18	1.000
	43	824A	824B	1	B6	SELB	2INELB	SA106 B	26880000.	1.038	[illegible]	.79	3.71	1.000
	44	824B	825	1	B7	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	.75	1.000
	45	825	826	1	B7	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	8.68	1.000
	46	826	828	1	B8	VALV	2INVALV	SA106 B	26880000.	1.038	0.00000000	[illegible]	[illegible]	1.000
	47	828	830	1	B9	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	.57	1.000
	48	830	830B	1	B9	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	.95	1.000
	49	830B	830C	1	B11	SELB	2INELB	SA106 B	26880000.	1.038	[illegible]	.79	3.69	1.000
	50	830C	832	1	B12	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	.95	1.000
	51	832	834	1	B12	STRP	2SCH80S	SA106 B	26880000.	1.038	[illegible]	.79	11.22	1.000
RUN3														
	52	836	872A	1	C1	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	36.72	1.000
	53	872A	872B	1	C2	BELB	4INELB	SA106 B	26880000.	1.038	[illegible]	2.14	19.23	3.536
	54	872B	874A	1	C3	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	66.39	1.000
	55	874A	874B	1	C4	BELB	4INELB	SA106 B	26880000.	1.038	0.00000000	2.04	19.23	3.536
	56	874B	876	1	C5	STRP	4SCH80S	SA106 B	26880000.	1.038	0.00000000	2.04	21.37	1.000
	57	876	877	1	C6	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	58	877	885	1	C6	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	59	880	882	1	C7	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	11.26	1.000
	60	882	884	1	C7	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	[illegible]	1.000
	61	884	885	1	C8	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	62	885	888	1	C8	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	63	888	890	1	C9	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	157.98	1.000
	64	890	892	1	C9	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	7.1[illegible]	1.000
	65	892	894	1	C10	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	66	894	895	1	C10	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	67	895	897	1	C10	VALV	4INVALV	SA106 B	26880000.	1.038	[illegible]	[illegible]	[illegible]	1.000
	68	897	898	1	C11	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	7.76	1.000
	69	898	9[illegible]A	1	C11	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	9.16	1.000
	70	9[illegible]A	9[illegible]B	1	C12	BELB	4INELB	SA106 B	26880000.	1.038	[illegible]	2.04	19.22	3.576
	71	9[illegible]B	868	1	C12	STRP	4SCH80S	SA106 B	26880000.	1.038	[illegible]	2.04	36.73	1.000
RUN4														
	72	595	585A	1	D1	STRP	18SCH80	SA106 B	26880000.	1.038	[illegible]	8.68	174.03	1.000
	73	585A	585	1	D2	PRED-E	18X16RED	SA106 B	26880000.	1.038	[illegible]	22.76	341.4[illegible]	1.000
	74	585	585B	1	D3	STRP	18SCH80	SA106 B	26880000.	1.038	[illegible]	22.76	238.98	1.000
	75	585B	58[illegible]	1	D4	BTEE-R	18X18X16	SA106 B	26880000.	1.038	[illegible]	22.76	377.26	1.000
	76	58[illegible]	59[illegible]A	1	D4	BTEE-R	18X18X16	SA106 B	26880000.	1.038	[illegible]	22.76	377.26	1.000
	77	59[illegible]A	575	1	D5	STRP	18SCH80	SA106 B	26880000.	1.038	[illegible]	22.76	853.5	1.000
	78	575	57[illegible]	1	D5	STRP	18SCH80	SA106 B	26880000.	1.038	[illegible]	22.76	2[illegible]4.84	1.000
	79	57[illegible]	565B	1	D5	STRP	18SCH80	SA106 B	26880000.	1.038	[illegible]	22.76	238.98	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ION
CALCULATION NO. FW-04

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. SUB	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	RATIO EC/EH	EXPANSION COEFF	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN4 (CONTD.)														
	8[illegible]	565B	565T	1	D6	BTEE-R	18X18X10	SA106 B	26880[illegible]0.	1.038	0.[illegible]	22.76	[illegible]7.26	1.[illegible]
	81	565T	565C	1	D6	BTEE-R	18X18X10	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	[illegible]7.26	1.[illegible]
	82	565C	56[illegible]A	1	D7	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	6.83	1.[illegible]
	83	56[illegible]A	569B	1	D8	BELB	18INELB	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	643.52	7.121
	84	569B	555A	1	D9	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	289.35	1.[illegible]
	85	555A	555D	1	D10	BELB	18INELB	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	492.64	4.747
	86	555B	55[illegible]	1	D11	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	1589.12	1.[illegible]
	87	55[illegible]	545A	1	D11	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	214.84	1.[illegible]
	88	545A	545P	1	D12	BELB	18INELB	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	965.29	4.747
	89	545P	54[illegible]	1	D13	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	341.43	1.[illegible]
	9[illegible]	54[illegible]	536	1	D13	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	22.76	807.55	1.[illegible]
RUN5														
	91	58[illegible]	5[illegible]C	1	E1	BTEE-B	18X18X10	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	105.29	1.[illegible]
	92	5[illegible]C	7[illegible]1	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	129.18	1.[illegible]
	93	7[illegible]1	7[illegible]4	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	761.32	1.[illegible]
	94	7[illegible]4	7[illegible]6	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	486.65	1.[illegible]
	95	7[illegible]6	7[illegible]8	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	54[illegible].84	1.[illegible]
	96	7[illegible]8	71[illegible]A	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	84.67	1.[illegible]
	97	71[illegible]A	71[illegible]	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	6.51	1.[illegible]
	98	71[illegible]	712A	1	E2	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	786.61	1.[illegible]
	99	712A	712B	1	E3	BELB	18INELB	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.86	278.85	4.784
	10[illegible]	712B	736	1	E4	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	134.26	1.[illegible]
	1[illegible]1	736	739	1	E4	STRP	18SCH80	SA106 B	2688[illegible]00.	1.038	0.[illegible]	8.68	386.61	1.[illegible]
VLOP														
	1[illegible]2	859	86[illegible]	1	F1	VLOP	VLOP	SA106 B	2798[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]
	1[illegible]3	849	85[illegible]	1	F2	VLOP	VLOP	SA106 B	2796[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]
	1[illegible]4	85[illegible]	896	1	F3	VLOP	VLOP	SA106 B	2798[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]
	1[illegible]5	885	886	1	F4	VLOP	VLOP	SA106 B	2798[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]
	1[illegible]6	841	840	1	F5	VLOP	VLOP	SA106 B	2798[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]
	1[illegible]7	877	878	1	F6	VLOP	VLOP	SA106 B	2798[illegible]00.	1.[illegible]	0.[illegible]	[illegible].[illegible]	[illegible].[illegible]	1.[illegible]

TOTAL DISTRIBUTED WEIGHT = 16596.41

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. EW-[illegible]

STATIC ANALYSIS NO. 1 (GRAV), FORCES AND MOMENTS IN LOCAL COORDINATES (MISC. MEMB. ONLY)

RUN GROUP	SOR MMB	DCR NAME	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	XX MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)
VLOP								
	F1	[illegible]	1134.[illegible]	.00	-.00	0.00	-.00	0.00
		[illegible]	1134.[illegible]	.00	-.00	0.00	-.00	-.00
	F2	849	1[illegible]59.[illegible]	0.00	-.00	0.00	.00	.00
		851	1[illegible]59.[illegible]	0.00	-.00	0.00	-.00	0.00
	F3	695	197.[illegible]	.00	-.00	0.00	0.00	0.00
		[illegible]96	197.[illegible]	.00	-.00	0.00	-.00	-.00
	F4	885	269.00	-.00	-.00	0.00	.00	-.00
		[illegible]P6	269.00	-.00	-.00	0.00	0.00	.00
	F5	641	300.00	-.00	-.00	0.00	-.00	.00
		842	300.00	-.00	-.00	0.00	0.00	.00
	F6	877	197.[illegible]	-.00	-.00	0.00	0.00	.00
		878	197.00	-.00	-.00	0.00	-.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. EW-C4

STATIC ANALYSIS NO. 1 (GRAV), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS

RUN NAME	DOF NO.	DOF NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN1								
	1	PC3C	-.000	-.000	-.000	.00000	.00000	-.00000
	2	MEZZ	-.[illegible]	-.[illegible]41	-.[illegible]02	.[illegible]0252	.[illegible]0005	-.[illegible]0136
	3	P34	-.[illegible]	-.[illegible]88	-.[illegible]03	.[illegible]0400	.[illegible]0007	-.[illegible]0164
	4	P68	.000	-.118	-.005	.00490	.00007	-.[illegible]0165
	5	866	-.[illegible]00	-.[illegible]76	.[illegible]0580	.[illegible]0090	-.00156	
	6	P59	-.000	-.172	-.008	.[illegible]0608	.00009	-.[illegible]0150
	7	S[illegible]5P	-.[illegible]	-.195	-.[illegible]09	.[illegible]0635	.[illegible]0010	-.00143
	8	P56	-.[illegible]	-.236	-.012	.[illegible]0691	.[illegible]0011	-.00124
	9	P54A	-.[illegible]	-.250	-.014	.[illegible]0742	.00012	-.00101
	10	P52	-.000	-.257	-.015	.[illegible]0787	.00012	-.[illegible]0080
	11	P49	-.[illegible]	-.264	-.016	.00835	.00013	-.00055
	12	P48	-.[illegible]	-.269	-.018	.[illegible]0883	.[illegible]0013	-.00029
	13	P46	-.000	-.270	-.019	.00928	.00013	-.00006
	14	SP45	-.[illegible]	-.270	-.019	.00954	.00014	.00007
	15	P44	-.000	-.270	-.020	.[illegible]0979	.[illegible]0014	.00020
	16	P41	-.[illegible]	-.265	-.022	.[illegible]1007	.[illegible]0014	.00032
	17	P4[illegible]	-.[illegible]	-.260	-.024	.[illegible]1035	.00014	.00041
	18	P38A	-.[illegible]	-.260	-.024	.[illegible]1035	.00014	.00041
	19	SP3P	-.[illegible]	-.252	.023	.[illegible]1110	-.[illegible]0031	.00100
	20	P38B	-.017	-.247	.152	.[illegible]1272	-.[illegible]0074	.00144
	21	P36	-.063	-.247	.541	.[illegible]1368	-.[illegible]0075	.00165
	22	P12A	-.[illegible]	-.247	.750	.[illegible]1423	-.[illegible]0077	.[illegible]0176
	23	P12C	-.[illegible]	-.238	.915	.[illegible]1590	-.[illegible]0124	.00214
	24	P12B	-.119	-.213	1.002	.[illegible]1668	-.[illegible]0164	.[illegible]0247
	25	P1C	-.119	-.[illegible]	1.073	.[illegible]1866	-.[illegible]0152	.[illegible]0240
	26	P1 A	-.119	-.[illegible]	1.074	.[illegible]1870	-.[illegible]0152	.[illegible]0240
	27	P 8	-.119	-.[illegible]	1.093	.[illegible]1927	-.[illegible]0146	.[illegible]0227
	28	P 6	-.119	-.[illegible]	1.173	.[illegible]2255	-.[illegible]0105	.[illegible]0071
	29	P 4	-.119	-.[illegible]	1.217	.[illegible]2455	-.[illegible]0049	-.[illegible]0220
	30	P 2	-.119	-.270	1.219	.[illegible]2768	.[illegible]0047	-.[illegible]0469
	31	P.2A	-.119	-.273	1.219	.[illegible]2771	.[illegible]0049	-.[illegible]0469
	32	565	-.119	-.339	1.211	.[illegible]2833	.[illegible]0071	-.[illegible]0476
	33	[illegible]65T	-.119	-.396	1.202	.[illegible]2847	.[illegible]0076	-.[illegible]0468
RUN2								
	34	P12C	-.119	-.238	.915	.[illegible]1590	-.[illegible]0124	.00214
	35	991	-.[illegible]	-.231	.731	.[illegible]1333	-.[illegible]0[illegible]	-.[illegible]0205
	36	913	-.[illegible]	-.[illegible]60	.[illegible]03	.[illegible]0791	-.[illegible]0085	-.[illegible]0314
	37	P14	-.[illegible]	.[illegible]06	-.[illegible]35	.[illegible]0177	.[illegible]0268	.[illegible]0272
	38	P16	-.[illegible]	-.[illegible]	-.124	.[illegible]0155	.[illegible]0281	.[illegible]0289
	39	P18A	-.[illegible]	-.[illegible]68	-.16[illegible]	-.[illegible]0027	.[illegible]0329	.[illegible]0355
	40	P18B	-.[illegible]98	-.[illegible]79	-.[illegible]49	-.[illegible]0133	.[illegible]0338	.[illegible]0346
	41	P20	-.[illegible]54	-.[illegible]78	-.[illegible]41	-.[illegible]0086	.[illegible]0322	.[illegible]0285
	42	P2[illegible]A	-.[illegible]46	-.[illegible]75	-.[illegible]37	-.[illegible]0[illegible]98	.[illegible]0321	.[illegible]0277
	43	P2 B	-.[illegible]39	-.[illegible]79	-.[illegible]33	-.[illegible]0[illegible]89	.[illegible]0318	.[illegible]0268

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-54

STATIC ANALYSIS NO. 1 (GRAV). GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOF NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN2 (CONTD.)								
	44	824A	.013	-.079	-.020	.00010	.00286	.00116
	45	824B	.016	-.082	-.012	.00018	.00286	.00110
	46	825	.016	-.083	-.009	.00029	.00284	.00173
	47	826	.016	-.09[illegible]	.021	.00153	.00241	.00012
	48	828	.016	-.090	.039	.00186	.00221	-.00013
	49	830	.016	-.090	.041	.00194	.00216	-.00020
	50	830B	.016	-.089	.043	.00208	.00205	-.00030
	51	830C	.015	-.088	.043	.00216	.00197	-.00037
	52	832	.015	-.088	.04[illegible]	.00228	.00182	-.00047
	53	834	-.006	-.088	-.003	.00400	.00007	-.00164
RUN3								
	54	836	-.063	-.247	.541	.01368	-.00075	.00165
	55	872A	-.052	-.011	.541	.01273	-.00054	.00132
	56	872B	-.042	.064	.468	.01198	-.00044	.00116
	57	874A	-.007	.063	.098	.01125	-.00052	.00126
	58	874B	.002	.053	.021	.01065	-.00036	.00193
	59	876	.002	.032	.017	.01027	-.00035	.00198
	60	877	.002	.015	.014	.01015	-.00034	.00194
	61	880	.002	-.001	.012	.01003	-.00032	.00186
	62	882	.002	-.011	.010	.00984	-.00029	.00169
	63	884	.002	-.018	.009	.00968	-.00025	.00153
	64	885	.002	-.030	.007	.00956	-.00023	.00149
	65	888	.002	-.042	.005	.00944	-.00021	.00124
	66	890	.002	-.039	-.001	.00673	-.00004	-.00071
	67	892	.002	-.037	-.002	.00661	[illegible]	-.00071
	68	894	.002	-.024	-.002	.00637	-.00005	-.00078
	69	895	.002	-.018	-.003	.00625	-.00006	-.00084
	70	897	.002	-.015	-.003	.00613	-.00007	-.00091
	71	898	.002	-.006	-.004	.00600	-.00008	-.00097
	72	900A	.002	-.092	-.004	.00585	-.00009	-.001[illegible]2
	73	900B	.001	-.128	-.005	.00529	-.00012	-.00145
	74	968	.001	-.118	-.005	.00490	.00007	-.00165
RUN4								
	75	505	.017	-4.491	1.202	.02866	.00096	-.0057[illegible]
	76	505A	-.079	-3.917	1.202	.02866	.00096	-.0057[illegible]
	77	565	-.024	-3.487	1.202	.02866	.00096	-.005[illegible]
	78	[illegible]	-.074	-3.186	1.202	.02866	.00096	-.0056[illegible]
	79	[illegible]	-.147	-2.799	1.202	.02865	.00096	-.005[illegible]
	80	5[illegible]A	-.159	-2.412	1.202	.02865	.00093	-.00495
	81	575	-.192	-1.778	1.202	.02859	.00084	-.00481
	82	576	-.1[illegible]	-1.[illegible]91	1.202	.02857	.00082	-.00477
	83	[illegible]	-.1[illegible]	-.781	1.202	.02853	.0008[illegible]	-.00473

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. EW-04

STATIC ANALYSIS NO. 1 (GRAV), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN4 (CONTD.)								
	84	565T	-.119	-.396	1.202	.02847	.00076	-.00468
	85	565C	-.129	-.812	1.202	.02847	.00076	-.00469
	86	565A	-.129	-.803	1.202	.02847	.00076	-.00469
	87	565B	-.197	.455	.830	.02864	.00059	-.00403
	88	555A	-.233	.419	.567	.02864	.00059	-.00397
	89	555B	-.263	.348	.329	.02864	.00059	-.00350
	90	554	-.263	.114	.288	.02864	.00059	-.00325
	91	545A	-.263	.085	.283	.02864	.00059	-.00323
	92	545B	-.347	-.000	-.506	.02864	.00059	-.00310
	93	546	-.394	-.000	-.936	.02864	.00059	-.00310
	94	536	-.576	-.[illegible]90	-1.977	.02864	.00059	-.00310
RUN5								
	95	58[illegible]	-.147	-2.799	1.202	.02865	.00096	-.00500
	96	58[illegible]C	-.147	-2.739	1.213	.02863	.00101	-.00507
	97	7.1	-.147	-2.661	1.230	.02855	.00125	-.00543
	98	7.4	-.147	-2.135	1.378	.02809	.00234	-.00764
	99	7.6	-.147	-1.662	1.525	.02777	.00286	-.00919
	100	7.8	-.147	-1.043	1.716	.02742	.00323	-.01060
	101	710A	-.147	-.939	1.748	.02736	.00327	-.01077
	102	710	-.147	-.931	1.750	.02736	.00327	-.01078
	103	712A	-.147	-.438	1.899	.02710	.00337	-.01126
	104	712B	-.218	-.267	1.546	.02681	.00351	-.01145
	105	736	-.[illegible]89	-.267	1.144	.02677	.00351	-.01145
	106	739	-.900	-.266	-.045	.02671	.00351	-.01145
MISC. NODES								
	107	86[illegible]	.017	-.172	.062	.00608	.00289	-.00150
	108	85[illegible]	.017	-.264	.084	.00835	.00013	-.00055
	109	856	.007	-.818	.035	.00625	-.00026	-.00004
	11	886	-.211	-.[illegible]38	.093	.00956	-.00023	.00140
	111	842	-.[illegible]14	-.265	.431	.01947	.00014	.00032
	112	878	-.[illegible]13	.315	.075	.01815	-.00034	.00194

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS

RUN NAME	SOE NO.	UCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN1											
	1	PC3C	STRF	.00	2694.14	62.16	-216322.74	-7499.31	218419.89	7798.23	7798.23
	2	ME77	STRF	.00	2460.89	62.16	-216322.74	-4329.03	88496.45	5928.21	5928.21
	3L	834	STRF	.00	2228.39	62.16	-216322.74	-2464.17	19557.97	5587.49	5587.49
	3R	834	STRF	-12.34	2116.23	-7.84	-219619.15	-271.26	21051.85	5595.82	5595.82
	4L	868	STRF	-12.34	2012.73	-7.84	-219619.15	-412.31	-16189.57	5584.46	5584.46
	4R	868	STRF	222.48	1791.28	-17.98	-217203.71	-5265.69	-13838.94	5521.01	5521.01
	5L	866	STRF	222.48	1686.95	-17.98	-217203.71	-5591.96	-45393.40	5629.02	5629.02
	5R	866	VALV	222.48	1463.95	-17.98	-217203.71	-5591.96	-45393.40	N/A	
	6	859	VALV	222.48	1463.95	-17.98	-217203.71	-5874.32	-67126.56	N/A	
	7	SR58	VALV	222.48	269.95	-17.98	-217203.71	-6148.69	-71365.40	N/A	
	8L	856	VALV	222.48	1577.07	59.24	-217203.71	-4314.47	-120131.40	N/A	
	8R	856	STRP	222.48	1222.07	59.24	-217203.71	-4314.47	-120131.40	5443.76	5443.76
	9L	854A	STRP	222.48	1117.86	59.24	-217203.71	-3603.54	-134170.96	5605.16	5605.16
	9R	854A	BRED-R	222.48	1117.86	59.24	-217203.71	-3603.54	-134170.96	5605.16	11210.31
	10L	852	BRED-R	222.48	1057.42	59.24	-217203.71	-3191.20	-141740.92	10594.31	21188.62
	10R	852	VALV	222.48	793.42	59.24	-217203.71	-3191.20	-141740.92	N/A	
	11	849	VALV	222.48	793.42	59.24	-217203.71	-2498.03	-151023.92	N/A	
	12L	848	VALV	222.48	-265.58	59.24	-217203.71	-1804.87	-147916.62	N/A	
	12R	848	BRED-E	222.48	-529.58	59.24	-217203.71	-1804.87	-147916.62	10733.69	21467.38
	13L	846	BRED-E	222.48	-590.82	59.24	-217203.71	-1392.53	-144028.40	5721.27	11442.54
	13R	846	STRF	222.48	-590.82	59.24	-217203.71	-1392.53	-144028.40	5721.27	5721.27
	14	SR45	STRP	222.48	-642.13	59.24	-217203.71	-1037.06	-140327.95	5676.80	5676.80
	15L	844	STRF	222.48	-694.23	59.24	-217203.71	-681.59	-136314.89	5629.51	5629.51
	15R	844	VALV	222.48	-1543.23	59.24	-217203.71	-681.59	-136314.89	N/A	
	16	841	VALV	222.48	-1543.23	59.24	-217203.71	235.51	-112425.68	N/A	
	17L	84[illegible]	VALV	222.48	-1843.23	59.24	-217203.71	1152.62	-83892.48	N/A	
	17R	84[illegible]	STRP	222.48	-2692.23	59.24	-217203.71	1152.62	-83892.48	5111.59	5111.59
	18L	838A	STRP	222.48	-2692.44	59.24	-217203.71	1154.04	-87827.87	5111.58	5111.58
	18R	838A	BELB	222.48	2692.44	-59.24	-217203.71	-1154.04	87827.87	5111.58	8353.49
	19L	SR38	BELB	-1821.36	2135.00	-59.24	-152509.90	-155031.63	53738.99	4917.70	8909.59
	19R	SR39	BELB	-40.56	354.70	136.88	-152509.90	-155030.63	53738.99	4917.70	8909.59
	20L	838B	BELB	-383.56	222.48	136.88	1181.07	-216012.20	49923.47	4867.14	8867.26
	20R	838B	STRF	-383.56	222.48	136.88	1181.07	-216012.20	49923.47	4867.14	4867.14
	21L	836	STRF	-619.92	222.48	136.88	1181.07	-211971.60	43355.83	4749.78	4749.78
	21R	836	STRF	-1209.38	-12.34	198.32	6348.16	-231330.48	46972.69	5183.99	5183.99
	22L	812A	STRF	-1419.64	-12.34	198.32	6348.16	-228361.63	47157.85	5120.85	5120.85
	22R	812A	BELB	-1419.64	12.34	-198.32	6348.16	228361.63	-47157.85	5120.85	9371.36
	23L	812C	BELB	-1[illegible]6.41	-1068.95	-198.32	-156115.92	163861.35	-41022.54	5140.67	9239.19
	23R	812C	BELB	-1[illegible]47.38	-1947.38	-386.08	-164534.81	157722.66	-45125.64	5140.67	9334.16
	24L	812B	BELB	.[illegible]	-1585.64	-386.28	-226174.24	-8911.91	-28865.59	5109.24	9167.11
	24R	812B	STRF	.[illegible]	-1585.64	-386.08	-226174.24	-8911.91	-28865.59	5109.24	5109.24
	25L	81[illegible]	STRF	.[illegible]	-1972.25	-386.08	-226174.24	-26101.19	57338.10	5119.81	5119.81
	25R	81	STRF	.[illegible]	-2161.25	-386.08	-226174.24	-26101.19	57338.10	5119.81	5119.81
	26L	81[illegible]A	STRF	.[illegible]	-2166.76	-386.08	-226174.24	-26309.75	51961.72	5127.33	5127.33

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	P/Z (PSI)	IP/Z (PSI)
RUN1 (CONTD.)											
	26R	R14A	STRT	.29	-2354.76	-386.08	-226174.24	-26385.75	51960.72	5127.33	5127.33
	27	R26	STRT	.09	-2465.49	-386.08	-226174.24	-31312.27	82685.82	5331.09	5331.09
	28	R66	STRT	.38	-3006.06	-386.08	-226174.24	-55345.74	252991.84	7548.15	7548.15
	29L	R14	STRT	.[illegible]	-3402.40	-386.08	-226174.24	-76967.76	434961.95	10894.22	10894.22
	29R	R14	STRT	.83	5946.11	-386.08	-226174.24	-76967.76	434961.95	10894.22	10894.22
	30L	R02	STRT	.[illegible]	5338.26	-386.08	-226174.24	-103991.81	40831.75	5535.05	5535.05
	30R	R62	STRT	.69	5150.26	-386.08	-226174.24	-103991.81	40831.75	5535.05	5535.05
	31L	R62A	STRT	.69	5143.75	-386.08	-226174.24	-104281.37	36171.49	5524.86	5524.86
	31R	R62A	STRT	.69	4955.75	-386.08	-226174.24	-104281.37	36171.49	5524.86	5524.86
	32L	565	STRT	.69	4835.28	-386.08	-226174.24	-108637.07	-31739.69	5561.58	5561.58
	32R	565	BTEE-R	.69	4835.28	-386.08	-226174.24	-108637.07	-31739.69	N/A	
	33	565T	BTEE-B	.69	4729.99	-386.08	-226174.24	-114318.21	-89727.60	3828.41	5595.22
RUN2											
	34	R12C	STRT	12.34	-42.85	-187.76	-1612.34	10293.76	-4302.78	15497.81	15497.81
	35	991	STRT	12.34	-65.17	-187.76	-1612.34	4962.74	-2769.13	8121.41	8121.41
	36L	R13	STRT	12.34	-112.33	-187.76	-1612.34	-6302.67	2555.98	9609.53	9609.53
	36R	R13	STRT	12.34	34.56	70.00	-1612.34	-6302.67	2555.98	9609.53	9609.53
	37	R14	STRT	12.34	-19.11	70.00	-1612.34	-1523.18	2028.74	4132.54	4132.54
	38L	R16	STRT	12.34	-29.68	70.00	-1612.34	-1383.18	2068.54	4076.46	4076.46
	38R	R16	STRT	12.34	142.89	70.00	-1612.34	-1383.18	2068.54	4076.46	4076.46
	39L	R18A	STRT	12.34	126.34	70.00	-1612.34	19.59	-621.19	2375.63	2375.63
	39R	R18A	SELB	12.34	126.34	70.00	-1612.34	19.59	-621.19	2375.63	4235.39
	40L	R18B	SELB	-122.64	12.34	70.00	-229.58	-1482.35	-1031.60	2414.21	4394.17
	40R	R18B	STRT	-122.64	-12.34	-70.00	-229.58	1482.35	1031.60	2414.21	2414.21
	41L	R2[illegible]	STRT	-112.55	-12.34	-70.00	-229.58	563.57	1196.19	1814.53	1814.53
	41R	R2	VALV	-82.55	-12.34	-70.00	-229.58	563.57	1196.19	N/A	
	42	R24A	VALV	-82.55	-12.34	-70.00	-229.58	259.57	1242.34	N/A	
	43L	R24B	VALV	-82.55	-12.34	-70.00	-229.58	-84.42	1293.89	N/A	
	43R	R24B	STRT	-82.55	-12.34	-70.00	-229.58	-84.42	1293.89	1813.35	1813.35
	44L	R24A	STRT	-83.36	-12.34	-70.00	-229.58	-1782.86	1595.17	3314.28	3314.28
	44R	R24A	SELB	-83.36	-12.34	-70.00	-229.58	-1782.86	1595.17	3314.28	5918.86
	45L	R24B	SELB	12.34	-29.66	-70.00	2302.85	-439.58	1726.73	3685.46	6571.63
	45R	R24B	STRT	12.34	29.66	70.00	2302.85	439.58	-1726.73	3685.46	3685.46
	46	R25	STRT	12.34	28.96	70.00	2302.85	516.77	-1754.84	3726.64	3726.64
	47L	R26	STRT	12.34	27.23	70.00	2302.85	1279.56	-2126.64	4293.69	4293.69
	47R	R26	VALV	12.34	1.23	70.00	2302.85	1279.56	-2126.64	N/A	
	48L	R26	VALV	12.34	1.23	70.00	2302.85	1842.34	-2635.88	N/A	
	48R	R2[illegible]	STRT	12.34	-17.77	70.00	2302.85	1842.34	-2635.88	4672.42	4672.42
	49L	R3[illegible]	STRT	12.34	-18.34	70.00	2302.85	1892.74	-2622.88	4699.74	4699.74
	49R	R3[illegible]	STRT	12.34	-56.84	70.00	2302.85	1892.74	-2622.88	4699.74	4699.74
	50L	R34B	STRT	12.34	-57.79	70.00	2302.85	1977.74	-1957.29	4711.24	4711.24
	50R	R34B	SELB	12.34	-57.79	70.00	2302.85	1977.74	-1957.29	4711.24	8397.64

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-64

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOI NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN2 (CONTD.)											
	51L	P30C	SELB	61.55	12.05	70.00	-2177.16	2222.26	-1811.23	4949.11	8823.51
	51R	P30C	STRP	61.34	-13.66	-70.00	-2213.53	-2186.04	1811.23	4949.11	4949.11
	52L	P32	STRP	62.29	-13.08	-70.00	-2213.53	-2271.04	1827.13	5031.79	5031.79
	52R	P32	STRF	191.32	11.72	70.00	-2172.52	2310.78	-1827.13	5031.79	5031.79
	53	P34	STRF	112.24	11.65	70.00	-2172.52	3306.89	-1093.98	6094.46	6094.46
RUN3											
	54	P36	STRF	-61.45	609.07	234.83	-3616.86	-5167.69	10364.88	4768.10	4768.10
	55L	P72A	STRF	-61.45	612.75	234.83	-3616.86	-946.24	8804.98	2368.29	2368.29
	55R	P72A	BELP	-61.45	612.75	234.83	-3616.86	-946.24	8804.98	2368.29	3393.87
	56L	P72B	BELB	-593.52	-61.45	234.83	-468.71	-2207.91	4754.87	1232.26	1843.29
	56R	P72B	STRP	-593.52	234.83	61.45	-468.71	4754.87	2207.91	1232.26	1232.26
	57L	P74A	STRP	-527.18	234.83	61.45	-468.71	6753.18	-5428.69	2031.58	2031.58
	57R	P74A	BELP	-527.18	234.83	61.45	-468.71	6753.18	-5428.40	2031.58	3438.84
	58L	P74B	BELB	-234.83	-597.95	61.45	-7121.77	-188.04	-3732.16	1882.57	2816.36
	58R	P74B	STRF	-234.83	597.95	-61.45	-7121.77	188.04	3732.16	1882.57	1882.57
	59L	P76	STRP	-234.83	486.58	-61.45	-7121.77	-543.67	-1477.20	1797.58	1797.58
	59R	P76	VALV	-234.83	437.58	-61.45	-7121.77	-543.67	-1477.20	N/A	
	60	P77	VALV	-234.83	437.58	-61.45	-7121.77	-1467.20	-5285.38	N/A	
	61L	P80	VALV	-234.83	240.58	-61.45	-7121.77	-1598.72	-7255.13	N/A	
	61R	P81	STRF	-234.83	191.58	-61.45	-7121.77	-1598.72	-7255.13	2409.12	2409.12
	62L	P82	STRP	-234.83	180.32	-61.45	-7121.77	-1929.98	-8281.57	2596.81	2596.81
	62R	P82	STRP	-234.83	329.12	22.60	-7121.77	-1929.98	-8281.57	2596.81	2596.81
	63L	P84	STRP	-234.83	320.06	22.60	-7121.77	-1829.57	-8722.76	2853.94	2853.94
	63R	P84	VALV	-234.83	253.06	22.60	-7121.77	-1829.57	-8722.76	N/A	
	64	P85	VALV	-234.83	253.06	22.60	-7121.77	-1637.03	-11878.85	N/A	
	65L	P88	VALV	-234.83	-15.94	22.60	-7121.77	-1444.49	-11743.97	N/A	
	65R	P88	STRP	-234.83	-82.94	22.60	-7121.77	-1444.49	-11743.97	3233.10	3833.10
	66L	P90	STRF	-234.83	-236.92	22.60	-7121.77	261.20	328.23	1671.23	1671.23
	66R	P9[illegible]	STRF	-234.83	312.51	10.15	-7121.77	261.20	328.23	1671.23	1671.23
	67L	P92	STRF	-234.83	305.41	10.15	-7121.77	296.51	-746.97	1677.93	1677.93
	67R	P92	VALV	-234.83	225.41	10.15	-7121.77	296.51	-746.97	N/A	
	68	P94	VALV	-234.83	225.41	10.15	-7121.77	469.49	-4598.[illegible]	N/A	
	69	P95	VALV	-234.83	96.41	10.15	-7121.77	555.85	-5439.48	N/A	
	70L	P97	VALV	-234.83	-106.59	10.15	-7121.77	642.29	-4552.50	N/A	
	70R	P97	STRF	-234.83	-149.59	10.15	-7121.77	642.29	-4552.50	1984.67	1984.67
	71	P98	STRF	-234.83	-157.35	10.15	-7121.77	685.89	-3968.71	1915.48	1915.48
	72L	P[illegible]A	STRF	-234.83	-165.51	10.15	-7121.77	721.46	-3323.18	1947.67	1947.67
	72R	P[illegible]A	BELB	-234.83	10.15	165.51	-7121.77	-3323.18	-721.46	1847.67	2763.86
	73L	P[illegible]B	BELB	-1[illegible].26	-234.82	184.72	2269.46	-6372.75	625.91	1524.84	2284.95
	73R	P[illegible]B	STRP	-1[illegible].26	-184.72	-234.82	2269.46	-625.91	-6372.75	1524.84	1524.84
	74	P[illegible]	STRF	-1[illegible].26	-221.45	-234.82	2269.46	-4983.37	-2416.58	1376.95	1376.95

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. FV-04

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOP NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	9/Z (PSI)	IP/Z (PSI)
RUN4											
	75	595	STRP	0.00	.00	-.00	0.00	-.00	.00	.00	.00
	76L	585A	STRP	0.00	-174.03	-.00	0.00	0.00	1743.75	39.28	39.28
	76R	585A	BRED-E	0.00	-174.03	.00	0.00	0.00	1743.75	39.28	76.56
	77L	585	BRED-E	0.00	-515.43	.00	0.00	.00	6914.66	33.94	67.88
	77R	585	STRP	-.00	-515.43	-.00	.00	.00	6914.66	33.94	33.94
	78L	580B	STRP	-.00	-754.41	-.00	.00	-.00	13581.30	66.67	66.67
	78R	580B	BTEE-R	-.00	-754.41	.00	.00	.00	13581.30	N/A	
	79BL	580	BTEE-R	-.00	-1061.67	.00	.00	.00	25839.80	126.84	195.30
	79BR	580	BTEE-R	-386.08	-1941.39	-.00	143311.03	114318.21	-2930.85	899.99	1315.34
	80L	580A	BTEE-R	-386.08	-2248.65	-.00	143311.03	114318.21	25351.86	N/A	
	80R	580A	STRP	-386.08	-2248.65	-.00	143311.03	114318.21	25351.86	918.44	918.44
	81	575	STRP	-386.08	-3102.15	-.00	143311.03	114318.21	125679.21	1091.04	1091.04
	82	570	STRP	-386.08	-3306.99	-.00	143311.03	114318.21	154520.30	1176.99	1176.99
	83L	565B	STRP	-386.08	-3545.97	-.00	143311.03	114318.21	190498.30	1297.77	1297.77
	83R	565B	BTEE-R	-386.08	-3545.97	-.00	143311.03	114318.21	190498.30	N/A	
	84BL	565T	BTEE-R	-386.08	-3853.23	-.00	143311.03	114318.21	240442.85	1484.10	2149.14
	84BR	565T	BTEE-R	.00	876.76	.00	233038.63	-.00	14268.61	1146.07	1674.98
	85L	565C	BTEE-R	.00	569.50	.00	233038.63	-.00	4506.29	N/A	
	85R	565C	STRP	.00	569.50	.00	233038.63	-.00	4506.29	1144.14	1144.14
	86L	560A	STRP	.00	562.68	.00	233038.63	-.00	4336.46	1144.12	1144.12
	86R	560A	BELB	.00	397.87	397.87	233038.63	-3966.34	3966.34	1144.12	2729.46
	87L	560B	BELB	57.17	.00	-57.17	-.00	236104.97	-.00	1158.98	2764.89
	87R	560B	STRP	57.17	-57.17	-.00	-.00	-.00	-236104.97	1158.98	1158.98
	88L	555A	STRP	261.77	-261.77	-.00	-.00	-.00	-234077.62	1149.92	1149.92
	88R	555A	BELB	261.77	261.77	-.00	-.00	.00	234077.62	1149.92	2991.89
	89L	555B	BELB	.00	852.84	-.00	-.00	.00	222402.54	1091.71	1987.55
	89R	555B	STRP	.00	-852.84	.00	-.00	-.00	-222402.54	1091.71	1091.71
	90	550	STRP	.00	-2441.86	.00	-.00	-.00	-107390.75	527.15	527.15
	91L	545A	STRP	-.00	-2646.70	.00	-.00	-.00	-84492.23	414.75	414.75
	91R	545A	BELB	.00	-2646.70	.00	-.00	-.00	-84492.23	414.75	755.98
	92L	545B	BELB	3611.98	.00	.00	.00	-.00	.00	.00	.00
	92R	545B	STRP	3611.98	-.00	-.00	0.00	-.00	-.00	.00	.00
	93L	540	STRP	3953.38	-.00	-.00	0.00	-.00	.00	.00	.00
	93R	540	STRP	-827.55	0.00	-.00	0.00	.00	-.00	.00	.00
	94	536	STRP	.00	0.00	-.00	0.00	.00	-.	.	.
RUN5											
	95	58	BTEE-B	-.00	879.72	386.08	-28770.66	-114318.21	-143311.03	2642.54	3862.08
	96L	590C	BTEE-B	-.00	774.43	386.08	-28770.66	-109637.37	-153339.12	N/A	
	96R	590C	STRP	-.00	774.43	386.08	-28770.66	-109637.37	-153339.12	4186.08	4186.08
	97	701	STRP	-.00	645.25	386.08	-28770.66	-103894.06	-163858.12	4306.57	4306.57
	98	704	STRP	-.00	-56.17	386.08	-28770.66	-72714.26	-187689.27	4463.62	4463.62
	99	706	STRP	-.00	-542.72	386.08	-28770.66	-51070.35	-171911.19	3966.56	3966.56
	100	708	STRP	-.00	-1083.56	386.08	-28770.66	-27733.33	-120268.89	2778.84	2778.84

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-34

STATIC ANALYSIS NO. 1 (GRAV). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IN/Z (PSI)
RUN5 (CONTD.)											
	101L	710A	STRT	-.00	-1168.23	386.08	-28770.66	-23269.03	-109291.33	2533.03	2533.[illegible]
	1 1R	710A	STRP	-.00	-1356.23	386.08	-28770.66	-23269.03	-109291.33	2533.03	2533.[illegible]
	102L	71[illegible]	STRP	-.[illegible]	-1362.74	386.08	-28770.66	-22979.47	-108271.72	2513.56	2513.56
	102R	71[illegible]	STRP	-.00	-1550.74	386.08	-28770.66	-22979.47	-108271.72	2513.56	2513.56
	103L	712A	STRT	-.00	-1937.35	386.08	-28770.66	-5791.20	-30626.70	931.19	931.19
	103R	712A	BELP	-.00	-1937.35	386.08	-28770.66	-5791.20	-30626.70	931.19	1704.12
	104L	712B	BELP	2146.21	-.00	386.08	-.00	-22979.47	-.00	534.46	923.19
	1 4R	712B	STRP	2146.21	.00	-386.08	.00	22979.47	.00	534.46	534.46
	105	736	STRT	2276.47	.00	-386.08	.00	17108.27	.00	377.33	377.33
	106	739	STRT	2663.68	-.00	-386.08	.00	-.00	-.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
PENC	PC3C	ANCH	GLOB							
				FORC	(LB)	GLBL	-.00	-2694.14	-62.16	
				DISP	(IN)	GLBL	-.000	-.000	-.000	
				MOMT	(LB.IN)	GLBL	216322.74	7499.31	-218419.89	
				ROTN	(RAD)	GLBL	.0000	.0000	-.0000	
S816	816	CONF	Y							
				FORC	(LB)	GLBL	0.00	-162.78	0.00	
				DISP	(IN)	GLBL	-.109	-.000	-.124	
858Y	5858	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-1945.12	0.00	
				DISP	(IN)	GLBL	-.000	-.195	-.009	
85AZ	S858	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	-77.23	
				DISP	(IN)	GLBL	-.009	-.195	-.009	
839Y	S838	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-2517.73	0.00	
				DISP	(IN)	GLBL	-.004	-.252	.023	
8397	S839	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	196.12	
				DISP	(IN)	GLBL	-.004	-.252	.023	
SP 8	8 8	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-.940	.389	.423	
S546	54	CONF	Y							
				FORC	(LB)	GLBL	0.00	-4780.94	0.00	
				DISP	(IN)	GLBL	-.394	-.000	-.936	
894Y	894	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-9438.51	0.00	
				DISP	(IN)	GLBL	-.119	-.000	1.217	
55.S	55.	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-.401	-.047	-.066	
S814	814	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	.121	-.547	-.1[illegible]	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-54

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
SP14 (CONTD.)										
813Y	813	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-146.89	0.00	
				DISP	(IN)	GLBL	-.109	-.000	.000	
813Z	813	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	257.76	
				DISP	(IN)	GLBL	-.109	-.000	.000	
890Y	890	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-549.43	0.00	
				DISP	(IN)	GLBL	.002	-.039	-.001	
890Z	890	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	-12.45	
				DISP	(IN)	GLBL	.002	-.039	-.001	
882Y	882	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-148.80	0.00	
				DISP	(IN)	GLBL	.002	-.011	.010	
882Z	882	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	84.24	
				DISP	(IN)	GLBL	.002	-.011	.010	
595X	595	SNUB	X							INACTIVE
				DISP	(IN)	GLBL	.010	-4.491	1.282	
536S	536	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	.037	-.208	-2.041	
572B	728	SNUB	INCL							INACTIVE
				DISP	(IN)	LOCL	-1.827	-.285	.786	
739Y	739	SNGL	Y							
				FORC	(LB)	GLBL	0.00	-2663.18	0.00	
				DISP	(IN)	GLBL	-.224	-.266	-.345	
739Z	739	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	-896.08	
				DISP	(IN)	GLBL	-.224	-.266	-.345	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]TION
CALCULATION NO. FW-04

STATIC ANALYSIS NO. 1 (GRAV), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
7392 (CONTD.)									

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ION
CALCULATION NO. EW-04

DYNAMIC PROPERTIES CONTROL INFORMATION

PROPERTIES NAME	= DYNP	
PROPERTIES TITLE	=	
MAX. NO. OF MODES REQUIRED	= 0	
CUT-OFF FREQUENCY	= 33.	
NO. OF SUPPORT LEVELS	= 0	
PRINT CODE	= PRN1	(FREQUENCIES ONLY)
MASS REDISTRIBUTION CODE	=	(NO REDISTRIBUTION - SUBSPACE ITERATION WILL BE USED)
MINIMUM SUBSPACE SIZE	= 3	
PROPERTY MODIFICATION CODE	= PMOD	(PROPERTIES TO BE MODIFIED)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVALUATION
CALCULATION NO. FW-04

PROPERTY MODIFICATION DATA

CARD TYPE	RUN GROUP	OP	FIRST DCP,MME	LAST DCP,MNB	ITEM 1	ITEM 2	ITEM 3	ITEM LIST
TEME					420.00			T(HOT)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ON
CALCULATION NO. EW-[illegible]

ELEMENT PROPERTIES FOR CURRENT STIFFNESS

RUN OR GROUP	ELEM NO.	NODE 1	NODE 2	NO. OF SUBELS	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN1												
	1	[illegible]	ME2Z	1	A1	STRP	10SCH80S	SA106 B	26800000.	5.75	293.25	1.000
	2	ME2Z	934	1	A1	STRP	10SCH80S	SA106 B	26800000.	5.75	172.50	1.000
	3	934	868	1	A1	STRP	10SCH80S	SA106 B	26800000.	5.75	103.50	1.000
	4	868	866	1	A1	STRP	10SCH80S	SA106 B	26800000.	5.75	184.37	1.000
	5	866	859	1	A2	VALV	10INVALV	SA106 B	26800000.	9.00	9.00	1.000
	6	859	S8F8	1	A2	VALV	10INVALV	SA106 B	26800000.	9.00	9.00	1.000
	7	S858	856	1	A2	VALV	10INVALV	SA106 B	26800000.	9.00	5.00	1.000
	8	856	854A	1	A3	STRP	10SCH80	SA106 B	26800000.	8.68	184.21	1.000
	9	854A	852	1	A3	BRED-R	10X8RED	SA106 B	26800000.	8.68	61.44	1.000
	10	852	849	1	A4	VALV	8INVALV	SA106 B	26800000.	8.00	1.00	1.000
	11	849	848	1	A4	VALV	8INVALV	SA106 B	26800000.	6.00	6.00	1.000
	12	846	846	1	A5	BRED-E	10X8RED	SA106 B	26800000.	8.68	61.44	1.000
	13	846	S845	1	A6	STRP	10SCH80	SA106 B	26800000.	8.68	52.10	1.000
	14	S845	844	1	A6	STRP	10SCH80	SA106 B	26800000.	8.68	52.10	1.000
	15	844	841	1	A7	VALV	10INVALV	SA106 B	26800000.	9.00	9.00	1.000
	16	841	840	1	A7	VALV	10INVALV	SA106 B	26800000.	9.00	9.00	1.000
	17	840	838A	1	A7A	STRP	10SCH80	SA106 B	26800000.	8.68	.21	1.000
	18	838A	S838	1	A8	BELB	10INELB	SA106 B	26800000.	8.86	104.43	4.784
	19	S838	838B	1	A8	BELB	10INELB	SA106 B	26800000.	8.86	104.43	4.784
	20	838B	836	1	A9	STRP	10SCH80	SA106 B	26800000.	8.68	256.35	1.000
	21	836	812A	1	A9	STRP	10SCH80	SA106 B	26800000.	8.68	139.26	1.000
	22	812A	812C	1	A10	BELB	10INELB	SA106 B	26800000.	8.86	104.43	4.784
	23	812C	P12B	1	A10	BELB	10INELB	SA106 B	26800000.	8.86	104.43	4.784
	24	P12B	811	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	306.61	1.000
	25	811	811A	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	6.51	1.000
	26	P11A	P8B	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	117.72	1.000
	27	8[illegible]9	806	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	540.58	1.000
	28	8[illegible]6	804	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	406.74	1.000
	29	804	802	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	697.85	1.000
	30	802	P02A	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	6.51	1.000
	31	P02A	565	1	A11	STRP	10SCH80	SA106 B	26800000.	8.68	120.46	1.000
	32	565	5651	1	A12	RTEE-B	10X10X10	SA106 B	26800000.	8.68	105.28	1.000
P1IN2												
	33	812C	851	1	P1	STRP	2SCH80S	SA106 B	26800000.	.79	22.32	1.000
	34	851	P13	2	P1	STRP	2SCH80S	SA106 B	26800000.	.79	87.16	1.000
	35	P13	P14	2	P1	STRP	2SCH80S	SA106 B	26800000.	.79	87.67	1.000
	36	P14	P16	1	P1	STRP	2SCH80S	SA106 B	26800000.	.79	1.57	1.000
	37	P16	P18A	1	P1	STRP	2SCH80S	SA106 B	26800000.	.79	15.75	1.000
	40	P18A	P18B	1	P2	SELB	2INELB	SA106 B	26800000.	.79	7.71	1.000
	41	P18B	P21	1	P3	STRP	2SCH80S	SA106 B	26800000.	.79	11.09	1.000
	42	P21	P21A	1	P4	VALV	2INVALV	SA106 B	26800000.	0.00	.71	1.000
	43	P21A	P21B	1	P4	VALV	2INVALV	SA106 B	26800000.	0.00	.71	1.000

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. FW-54

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. OF SUBELS	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN2 (CONTD.)												
	44	820B	824A	1	B5	STRP	2SCH80S	SA106 B	26880000.	.79	19.18	1.000
	45	824A	824B	1	B6	SELB	2INELB	SA106 B	26880000.	.79	3.70	1.[illegible]
	46	824B	825	1	B7	STRP	2SCH80S	SA106 B	26880000.	.79	.75	1.[illegible]
	47	825	826	1	B7	STRP	2SCH80S	SA106 B	26880000.	.79	8.68	1.[illegible]
	48	826	828	1	B8	VALV	2INVALV	SA106 B	26880000.	0.00	[illegible]	1.[illegible]
	49	828	830	1	B9	STRP	2SCH80S	SA106 B	26880000.	.79	.57	1.[illegible]
	50	830	830B	1	B9	STRP	2SCH80S	SA106 B	26880000.	.79	.95	1.[illegible]
	51	830B	830C	1	B10	SELB	2INELB	SA106 B	26880000.	.79	3.69	1.[illegible]
	52	830C	832	1	B12	STRP	2SCH80S	SA106 B	26880000.	.79	.95	1.[illegible]
	53	832	834	1	B12	STRP	2SCH80S	SA106 B	26880000.	.79	11.22	1.[illegible]
RUN3												
	54	836	872A	1	C1	STRP	4SCH80S	SA106 B	26880000.	2.04	36.72	1.000
	55	872A	872B	1	C2	BELB	4INELB	SA106 B	26880000.	2.04	19.23	3.536
	56	872B	874A	1	C3	STRP	4SCH80S	SA106 B	26880000.	2.04	66.34	1.000
	57	874A	874B	1	C4	BELB	4INELB	SA106 B	26880000.	2.04	19.23	3.536
	58	874B	876	1	C5	STRP	4SCH80S	SA106 B	26880000.	2.04	21.37	1.000
	59	876	877	1	C6	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	60	877	880	1	C6	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	61	880	882	1	C7	STRP	4SCH80S	SA106 B	26880000.	2.04	11.26	1.000
	62	882	884	1	C7	STRP	4SCH80S	SA106 B	26880000.	2.04	9.96	1.000
	63	884	885	1	C8	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	64	885	888	1	C8	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	65	888	890	2	C9	STRP	4SCH80S	SA106 B	26880000.	2.04	153.98	1.000
	67	890	892	1	C9	STRP	4SCH80S	SA106 B	26880000.	2.04	7.19	1.000
	68	892	894	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	69	894	895	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	70	895	897	1	C10	VALV	4INVALV	SA106 B	26880000.	0.00	0.00	1.000
	71	897	898	1	C11	STRP	4SCH80S	SA106 B	26880000.	2.04	7.76	1.000
	72	898	900A	1	C11	STRP	4SCH80S	SA106 B	26880000.	2.04	8.16	1.000
	73	900A	900B	1	C12	BELB	4INELB	SA106 B	26880000.	2.04	19.22	3.536
	74	900B	[illegible]	1	C13	STRP	4SCH80S	SA106 B	26880000.	2.04	36.73	1.000
RUN4												
	75	595	588A	1	D1	STRP	18SCH80	SA106 B	26880000.	8.68	174.03	1.000
	76	588A	585	1	D2	BRED-E	18X18RED	SA106 B	26880000.	22.76	341.49	1.[illegible]
	77	585	585B	1	D3	STRP	18SCH80	SA106 B	26880000.	22.76	238.98	1.[illegible]
	78	585B	580	1	D4	BTEE-R	18X18X18	SA106 B	26880000.	22.76	3[illegible]7.26	1.[illegible]
	79	580	580A	1	D4	BTEE-R	18X18X10	SA106 B	26880000.	22.76	3[illegible]7.26	1.[illegible]
	80	580A	575	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	853.5[illegible]	1.[illegible]
	81	575	570	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	2[illegible]4.84	1.[illegible]
	82	570	565B	1	D5	STRP	18SCH80	SA106 B	26880000.	22.76	23[illegible].98	1.[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[illegible]ON
CALCULATION NO. FH-14

ELEMENT PROPERTIES FOR CURRENT STIFFNESS (CONTD.)

RUN OR GROUP	ELEM NO.	NODE I	NODE J	NO. OF SUBELS	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	HOT MODULUS	UNIT WEIGHT	TOTAL WEIGHT	FLEX FACTOR
RUN4 (CONTD.)												
	83	565B	565T	1	D6	BTEE-R	18X18X10	SA106 B	26[illegible].	22.76	367.26	1.[illegible]
	84	565T	566C	1	D6	BTEE-R	18X18X1[illegible]	SA106 B	26[illegible].	22.76	367.26	1.[illegible]
	85	566C	566A	1	D7	STRP	18SCH80	SA106 B	26[illegible].	22.76	6.87	1.[illegible]
	86	566A	566B	1	D8	BELB	18INELB	SA106 B	26[illegible].	22.76	643.52	7.121
	87	566B	555A	1	D9	STRP	18SCH80	SA106 B	26[illegible].	22.76	289.35	1.[illegible]
	88	555A	555B	1	D10	BELB	18INELB	SA106 B	26[illegible].	22.76	482.64	4.747
	89	555B	554	1	D11	STRP	18SCH80	SA106 B	26[illegible].	22.76	1599.62	1.[illegible]
	90	554	545A	1	D11	STRP	18SCH80	SA106 B	26[illegible].	22.76	294.84	1.[illegible]
	91	545A	545B	1	D12	BELB	18INELB	SA106 B	26[illegible].	22.76	965.29	4.747
	92	545B	540	1	D13	STRP	18SCH80	SA106 B	26[illegible].	22.76	341.48	1.[illegible]
	93	540	536	1	D13	STRP	18SCH80	SA106 B	26[illegible].	22.76	827.55	1.[illegible]
RUN5												
	94	580	580C	1	E1	BTEE-B	18X18X10	SA106 B	26[illegible].	8.68	185.29	1.[illegible]
	95	580C	701	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	129.18	1.[illegible]
	96	701	704	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	791.32	1.[illegible]
	97	704	716	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	486.65	1.[illegible]
	98	716	718	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	541.84	1.[illegible]
	99	718	718A	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	84.67	1.[illegible]
	100	718A	719	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	6.51	1.[illegible]
	101	719	712A	1	E2	STRP	18SCH80	SA106 B	26[illegible].	8.68	386.61	1.[illegible]
	102	712A	712B	1	E3	BELB	18INELB	SA106 B	26[illegible].	8.86	209.85	4.784
	103	712B	736	1	E4	STRP	18SCH80	SA106 B	26[illegible].	8.68	130.26	1.[illegible]
	104	736	739	1	E4	STRP	18SCH80	SA106 B	26[illegible].	8.68	386.61	1.[illegible]
VLOP												
	105	859	860	1	F1	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.000
	106	849	850	1	F2	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.000
	107	895	896	1	F3	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.000
	108	885	886	1	F4	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.[illegible]
	109	841	842	1	F5	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.[illegible]
	110	877	878	1	F6	VLOP	VLOP	SA106 B	27[illegible].	0.00	0.00	1.[illegible]

TOTAL DISTRIBUTED WEIGHT = 16596.41

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-04

NO. OF MODES BELOW CUT-OFF = 27
NO. OF MODES TO BE FOUND = 27

REQUIRED FIELD LENGTH (OCTAL) = 0146731
AVAILABLE FIELD LENGTH (OCTAL) = 0377000
SUBSPACE SIZE = 3

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

NATURAL MODE FREQUENCIES

MODE NO.	1	2	3	4	5	6	7	8	9	10
FREQUENCY (CPS)	2.588	3.622	5.450	6.063	6.561	7.354	7.553	12.775	13.282	13.584
PERIOD (SEC)	.3863	.2761	.1835	.1649	.1524	.1360	.1324	.0783	.0753	.0736

MODE NO.	11	12	13	14	15	16	17	18	19	20
FREQUENCY (CPS)	15.269	15.922	16.489	17.010	17.352	18.285	20.473	20.628	23.849	24.250
PERIOD (SEC)	.0655	.0628	.0606	.0588	.0576	.0547	.0488	.0485	.0419	.0412

MODE NO.	21	22	23	24	25	26	27
FREQUENCY (CPS)	24.694	24.938	26.788	27.568	29.227	29.548	31.109
PERIOD (SEC)	.0405	.0401	.0373	.0363	.0342	.0338	.0321

ORTHOGONALITY CHECK

MAX. DIAGONAL TERM = .1000E+01
MIN. DIAGONAL TERM = .1000E+01
MAX. OFF-DIAGONAL TERM = .1184E-06

MASS PARTICIPATION

MODE NO.	MASS PARTICIPATION FACTORS X-AXIS	Y-AXIS	Z-AXIS	EFFECTIVE WEIGHT RATIOS X-AXIS	Y-AXIS	Z-AXIS
1	[illegible]	.1106	-.0654	.0235	.1886	.0650
2	-.0766	-.0078	-.1066	.0904	.0009	.1752
3	.0216	-.0624	-.0487	.0072	.0606	.0366
4	.1081	-.0699	-.0426	.1799	.0753	.0280
5	-.0722	-.1073	-.1046	.0803	.1775	.1686
6	.0063	.0344	-.0974	.0066	.0182	.1462
7	-.0455	-.1410	.0411	.0319	.3062	.0261
8	-.0037	.0088	-.0350	.0002	.0012	.0139
9	-.0139	.0033	.0100	.0030	.0002	.0015
10	.0161	-.0319	.0059	.0040	.0156	.0005
11	-.0067	-.0046	-.0481	.0007	.0003	.0756
12	[illegible]	.0162	-.0299	.0012	.0041	.0138
13	-.0187	.0165	-.0426	.0054	.0042	.0271
14	-.0113	-.0255	.0258	.0020	.0108	.0103
15	[illegible]	-.0281	-.0142	.0031	.0122	.0031
16	[illegible]	.0064	.0164	.0032	[illegible]	[illegible]
17	-.0222	-.1034	[illegible]	.0076	[illegible]	.0075

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA ON
CALCULATION NO. FW-64

MASS PARTICIPATION (CONTD.)

MODE NO.	MASS PARTICIPATION FACTORS X-AXIS	Y-AXIS	Z-AXIS	EFFECTIVE WEIGHT RATIOS X-AXIS	Y-AXIS	Z-AXIS
18	-.0371	.0025	.0056	.0212	.0001	.0005
19	-.0649	.0024	.0194	.0649	.0001	.0058
20	.0136	-.0132	-.0279	.0026	.0027	.0120
21	-.0439	.0174	.0326	.0297	.0069	.0163
22	.0203	-.0134	-.0134	.0123	.0028	.0028
23	-.0329	-.0312	-.0251	.0081	.0150	.0097
24	-.0071	-.0014	.0002	.0008	.0000	.0000
25	.0045	-.0058	-.0113	.0003	.0005	.0016
26	.0189	-.0238	.0212	.0055	.0081	.0069
27	-.0482	.0259	.0123	.0358	.0104	.0023
ACCUMULATED EFFECTIVE WEIGHT RATIOS				.6113	.9074	.8174

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[redacted]ON
CALCULATION NO. FW-04

ACCELERATION SPECTRUM NO. 1

SPECTRUM NAME = HORZ
SPECTRUM TITLE = HORIZONTAL RESPONSE SPECTRA OF FEEDWATER LINE PEN AT EL. 31'

PERIOD/FREQUENCY CODE = F (FREQUENCIES SPECIFIED)
UNITS CODE = G (MULTIPLES OF GRAVITY)

INTERPOLATION TYPE = LOGARITHMIC

FREQUENCY	ACCELERATION
100[illegible]	.6700
6[illegible]	.6700
2[illegible]	.9000
[illegible]	[illegible]
[illegible]	1.9000
[illegible]	3.3500
[illegible]	3.3500
[illegible]	1.9000
[illegible]	1.1000
[illegible]	[illegible]

ACCELERATION SPECTRUM NO. 2

SPECTRUM NAME = VERT
SPECTRUM TITLE = VERICAL RESPONSE SPECTRA OF FEED WATER LINE PEN AT EL. 31'

PERIOD/FREQUENCY CODE = F (FREQUENCIES SPECIFIED)
UNITS CODE = G (MULTIPLES OF GRAVITY)

INTERPOLATION TYPE = LOGARITHMIC

FREQUENCY	ACCELERATION
100.[illegible]	.6700
16.[illegible]	.7900
5.[illegible]	1.[illegible]
4.[illegible]	[illegible]
3.2[illegible]	[illegible]
[illegible]	1.6[illegible]
1.[illegible]	.7[illegible]
.2[illegible]	.21[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-?4

SPECTRAL ACCELERATIONS (MULTIPLES OF GRAVITY) AT MODE FREQUENCIES

MODE NUMBER	1	2	3	4	5	6	7	8	9	10
FREQUENCY	2.588	3.622	5.459	6.063	6.561	7.354	7.553	12.779	13.282	13.584
SPECTRUM 1	2.822	3.350	1.738	1.537	1.388	1.173	1.123	.9[illegible]	.960	.9[illegible]
SPECTRUM 2	2.3[illegible]2	2.889	1.663	1.494	1.369	1.188	1.145	.697	.696	.696

MODE NUMBER	11	12	13	14	15	16	17	18	19	20
FREQUENCY	15.269	15.922	16.489	17.019	17.352	18.285	20.473	2?.628	23.849	24.25?
SPECTRUM 1	.9[illegible]	.900	.960	.900	.900	.900	.895	.894	.863	.86?
SPECTRUM 2	.694	.694	.693	.693	.693	.692	.691	.691	.689	.688

MODE NUMBER	21	22	23	24	25	26	27
FREQUENCY	24.694	24.938	26.788	27.568	29.227	29.548	31.109
SPECTRUM 1	.856	.854	.839	.833	.821	.818	.808
SPECTRUM 2	.688	.688	.687	.687	.686	.686	.685

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 SEISMIC ANALYSIS

RESULTS SET NAME (INERTIA ONLY) = SEIS

EXCITATION OPTION = DFLT (SIMPLE EXCITATION)

RESULTS SET NAME (INERT + ANCH) = (NO ANCHOR MOVEMENTS)

MISSING MASS OPTION = MISM (CORRECTION APPLIED)

MODE COMBINATION OPTION = GRUP (GROUPING METHOD)

CLOSE MODE FACTOR (PERCENT) = 10.0 (STANDARD VALUE)

ACCELERATIONS CODE = ACCN (POINTS TO BE SPECIFIED)
ACCELERATION CUT-OFF (G) = 0.00

NO. OF NEW SUPPORT LEVELS = 0

POINTS FOR WHICH ACCELERATIONS ARE REQUIRED

OPTION	RUN	LIST OR RANGE											
LIST		866	860	SP58	856	852	850	848	844	842	840		
LIST		842A	862	710	710A	820	820B	826	828	830	832	874	881
LIST		878	886	884	888	892	894	896	897	810	810A		

RESPONSE SPECTRA

X SPECTRUM	Y SPECTRUM	Z SPECTRUM	SCALE FACTOR
HORZ	VERT	HORZ	1.000

CLOSE MODE GROUPINGS

GROUP NO.	FIRST MODE	LAST MODE
1	4	5

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ION
CALCULATION NO. EU-'4

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS)

CLOSE MODE GROUPINGS (CONTD.)

GROUP NO.	FIRST MODE	LAST MODE
2	6	7
3	8	10
4	11	13
5	14	16
6	17	18
7	19	22
8	23	25
9	26	27

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL
CALCULATION NO. FW-09

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), FORCES AND MOMENTS IN LOCAL COORDINATES (MISC. MEMB. ONLY)

RUN GROUP	SOP MBL	DCP NAME	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	XX MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)
VLOP								
	F1	859	1216.43	909.80	1396.69	0.00	15921.22	10371.75
		860	1216.43	909.80	1396.60	0.00	.00	.00
	F2	949	1873.37	822.93	1965.35	0.00	23584.21	9875.16
		950	1873.37	822.93	1965.35	0.00	.00	.00
	F3	895	185.18	179.61	199.99	0.00	1199.42	1077.64
		896	185.18	179.61	199.99	0.00	.00	.00
	F4	885	279.96	276.97	319.57	0.00	2876.12	2492.77
		886	279.96	276.97	319.57	0.00	.00	.00
	F5	841	579.25	231.53	512.63	0.00	23068.30	10418.97
		842	579.25	231.53	512.63	0.00	.00	.00
	F6	877	277.38	192.79	259.83	0.00	1559.01	1156.77
		878	277.38	192.79	259.83	0.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. FW-84

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS

RUN NAME	DCP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN1								
	1	PC3C	.000	.000	.000	.00000	.00000	.00000
	2	ME27	.003	.073	.059	.00161	.00285	.00253
	3	834	.005	.163	.132	.00256	.00277	.00335
	4	868	.006	.227	.185	.00314	.00306	.00367
	5	866	.007	.297	.242	.00378	.00329	.00392
	6	859	.007	.358	.293	.00398	.00334	.00394
	7	S858	.008	.418	.344	.00418	.00336	.00391
	8	856	.008	.536	.446	.00459	.00333	.00364
	9	854A	.009	.577	.484	.00497	.00323	.00318
	10	852	.009	.597	.505	.00530	.00313	.00275
	11	849	.010	.624	.538	.00565	.00303	.00231
	12	848	.010	.642	.568	.00603	.00295	.00204
	13	846	.010	.649	.585	.00638	.00291	.00212
	14	S845	.011	.651	.598	.00658	.00290	.00243
	15	844	.011	.659	.611	.00678	.00290	.00283
	16	841	.011	.644	.644	.00700	.00293	.00334
	17	840	.012	.633	.677	.00723	.00296	.00396
	18	838A	.012	.633	.677	.00723	.00296	.00396
	19	S838	.047	.607	.674	.00784	.00310	.01014
	20	838B	.188	.588	.622	.00917	.00306	.01540
	21	836	.667	.589	.494	.01013	.00328	.01613
	22	812A	.908	.589	.484	.01089	.00346	.01531
	23	812C	1.046	.570	.517	.01375	.00322	.00961
	24	812B	1.078	.547	.555	.01526	.00347	.00343
	25	817	1.086	.488	.651	.01899	.00381	.00290
	26	817A	1.081	.487	.653	.01906	.00382	.00291
	27	815	1.081	.469	.688	.02015	.00396	.00321
	28	856	1.084	.344	.904	.02557	.00488	.00485
	29	814	1.087	.000	1.158	.03054	.00517	.01028
	30	812	1.090	1.316	1.524	.03679	.00606	.01634
	31	812A	1.093	1.318	1.529	.03686	.00608	.01633
	32	565	1.099	1.240	1.607	.03816	.00663	.01565
	33	S651	1.091	1.427	1.679	.03838	.00677	.01551
RUN2								
	34	812C	1.046	.570	.517	.01375	.00322	.00961
	35	881	1.045	.546	.417	.01193	.00575	.00642
	36	813	1.045	.518	.369	.00835	.00560	.01017
	37	814	1.044	.416	.182	.00544	.00332	.00469
	38	815	1.044	.409	.184	.00540	.00344	.00526
	39	819A	1.044	.266	.211	.00517	.00354	.01441
	40	819B	1.044	.238	.208	.00517	.00347	.01495
	41	826	.772	.238	.184	.00564	.00249	.00321
	42	827A	.607	.238	.178	.00501	.00241	.00558
	43	827B	.601	.238	.175	.00496	.00233	.00776

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]N
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOF NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN2 (CONTD.)								
	44	824A	.128	.238	.181	.00396	.00282	.01618
	45	824B	.084	.203	.177	.00393	.00287	.01577
	46	825	.084	.193	.175	.00381	.00292	.01529
	47	826	.084	.134	.147	.00299	.00326	.01025
	48	828	.084	.145	.126	.00284	.00324	.00902
	49	830	.084	.147	.124	.00281	.00323	.00872
	50	83[illegible]B	.083	.151	.121	.00276	.00319	.00822
	51	83[illegible]C	.061	.163	.116	.00273	.00315	.00705
	52	832	.052	.163	.117	.00268	.00308	.00726
	53	834	.005	.163	.132	.00256	.00277	.00335
RUN3								
	54	836	.667	.589	.494	.01013	.00328	.01613
	55	872A	.676	.644	.494	.00645	.00334	.01672
	56	872B	.576	.660	.492	.00454	.00352	.01662
	57	874A	.103	.659	.413	.00494	.00474	.01139
	58	874B	.069	.630	.368	.00486	.00545	.00886
	59	876	.069	.535	.311	.00456	.00549	.01057
	60	877	.069	.451	.266	.00447	.00539	.01016
	61	88[illegible]	.069	.368	.223	.00438	.00516	.00989
	62	882	.069	.317	.197	.00422	.00459	.00891
	63	884	.068	.282	.180	.00410	.00408	.00798
	64	885	.068	.221	.159	.00402	.00373	.00732
	65	888	.068	.167	.125	.00392	.00346	.00671
	66	89[illegible]	.067	.085	.102	.00220	.00295	.00324
	67	892	.067	.095	.108	.00216	.00219	.00352
	68	894	.067	.153	.140	.00210	.00225	.00375
	69	895	.067	.183	.157	.00209	.00216	.00366
	70	897	.067	.213	.172	.00211	.00201	.00345
	71	899	.067	.226	.179	.00213	.00181	.00311
	72	[illegible]A	.066	.237	.194	.00217	.00163	.00269
	73	[illegible]B	.056	.241	.185	.00258	.00272	.00461
	74	868	.0[illegible]6	.227	.185	.00314	.00326	.00767
RUN4								
	75	595	.[illegible]	6.440	1.679	.03833	.00839	.01531
	76	585A	.168	5.606	1.679	.03831	.00809	.01531
	77	585	.269	5.125	1.679	.03829	.00796	.01531
	78	58[illegible]B	.372	4.734	1.679	.03828	.00782	.01531
	79	58[illegible]	.477	4.234	1.679	.03825	.00769	.01531
	80	5[illegible]A	.581	3.739	1.679	.03835	.00759	.01533
	81	575	.859	2.4[illegible]7	1.679	.03848	.00721	.01541
	82	57[illegible]	.924	2.159	1.679	.03847	.0071[illegible]	.01544
	83	565B	.998	1.784	1.679	.03845	.00696	.01546

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. FW-64

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). GLOBAL DISPLACEMENTS AT DISPLACEMENT OUTPUT POINTS (CONTD.)

RUN NAME	DOP NO.	DCP NAME	X DISPL (IN)	Y DISPL (IN)	Z DISPL (IN)	XX ROTN (RAD)	YY ROTN (RAD)	ZZ ROTN (RAD)
RUN4 (CONTD.)								
	84	565T	1.091	1.427	1.679	.03838	.00677	.01550
	85	565C	1.102	1.196	1.679	.03841	.00663	.01537
	86	56[illegible]A	1.104	1.193	1.679	.03841	.00663	.01536
	87	56[illegible]B	1.135	1.312	1.525	.03832	.00484	.01480
	88	555A	1.027	1.480	1.470	.03837	.00485	.01475
	89	555B	.956	1.605	1.469	.03832	.00529	.01443
	9[illegible]	55[illegible]	.958	2.449	1.458	.03863	.00569	.01393
	91	545A	.958	2.560	1.462	.03867	.00566	.01379
	92	545B	.784	2.856	1.555	.03905	.00547	.01169
	93	546	.747	2.856	1.868	.03907	.00547	.01163
	94	536	.823	2.856	2.989	.03909	.00547	.01157
RUN5								
	95	5[illegible]	.477	4.234	1.679	.03825	.00769	.01531
	96	5[illegible]C	.477	4.074	1.599	.03792	.00760	.01528
	97	7[illegible]1	.477	3.877	1.498	.03636	.00738	.01523
	98	7[illegible]4	.478	2.732	.961	.02789	.00870	.01593
	99	7[illegible]6	.478	1.877	.589	.02204	.00859	.01643
	10[illegible]	7[illegible]8	.478	.956	.585	.01559	.00632	.01582
	101	71[illegible]A	.478	.830	.642	.01459	.00589	.01562
	102	710	.478	.821	.603	.01452	.00586	.01569
	103	712A	.478	.477	.691	.01004	.00497	.01517
	104	712B	.508	.527	.776	.00551	.00452	.01531
	105	736	.[illegible]26	.527	.805	.00496	.00452	.01534
	106	739	1.19[illegible]	.524	.880	.00442	.00452	.01538
MISC. NODES								
	107	86[illegible]	.044	.358	.278	.00798	.00334	.00394
	108	85[illegible]	.027	.624	.498	.00565	.00303	.00231
	109	896	.082	.183	.152	.00209	.00216	.00366
	110	896	.073	.221	.173	.00402	.00373	.00732
	111	842	.16[illegible]	.644	.493	.00700	.00293	.00334
	112	878	.171	.451	.281	.00447	.00539	.01016

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), ABSOLUTE GLOBAL ACCELERATIONS (MULTIPLES OF GRAVITY)

POINT NAME	X ACCEL	Y ACCEL	Z ACCEL	Y-Z ACCEL	X-Y-Z ACCEL
866	.795	1.144	1.364	1.579	1.950
S858	.795	1.434	1.627	1.811	2.291
856	.795	1.673	1.894	2.054	2.649
852	.796	1.822	2.040	2.190	2.849
848	.796	1.95[illegible]	2.17[illegible]	2.311	3.024
844	.796	2.011	2.237	2.374	3.111
840	.796	2.087	2.332	2.464	3.229
810	1.783	1.683	1.260	2.103	2.757
810A	1.783	1.677	1.259	2.103	2.753
842	1.79[illegible]	1.464	1.682	2.456	2.859
842A	1.79[illegible]	1.474	1.684	2.458	2.866
820	1.553	2.166	2.739	3.148	3.821
P820	1.54[illegible]	2.166	2.659	3.072	3.758
826	1.[illegible]86	1.273	1.540	1.885	2.275
828	1.[illegible]86	.916	1.221	1.634	1.873
836	1.[illegible]86	.[illegible]92	1.197	1.616	1.851
832	.916	.875	1.363	1.403	1.653
876	1.235	1.756	2.088	2.426	2.995
88[illegible]	1.235	1.481	1.382	1.853	2.323
884	1.234	1.287	1.184	1.711	2.141
888	1.233	1.237	1.332	1.815	2.196
892	1.212	1.141	1.385	1.845	2.167
894	1.213	1.156	1.256	1.744	2.092
897	1.2[illegible]7	1.161	1.218	1.714	2.[illegible]70
719A	1.12[illegible]	2.472	1.638	1.984	3.176
719	1.12[illegible]	2.472	1.644	1.989	3.173
86[illegible]	.8[illegible]6	1.272	1.466	1.673	2.101
858	.894	1.894	2.014	2.168	2.879
896	1.2[illegible]8	1.162	1.255	1.742	2.094
886	1.25[illegible]	1.245	1.417	1.[illegible]22	2.29[illegible]
842	.931	2.[illegible]48	1.875	2.094	2.929
878	1.26[illegible]	1.559	1.54[illegible]	1.989	2.527

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]N
CALCULATION NO. FW-64

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS

RUN NAME	SOE NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN1											
	1	PC3C	STRP	26648.32	3295.22	2831.36	138767.06	293093.85	363939.91	12361.74	12361.74
	2L	8E22	STRP	26648.32	3295.22	2831.36	138767.06	172195.08	203373.49	7619.25	7619.25
	2R	8E22	STRP	26609.46	3258.33	2754.52	138767.06	172195.08	203373.49	7619.25	7619.25
	3L	834	STRP	26609.46	3258.33	2754.52	138767.06	127131.28	119804.81	5657.66	5657.66
	3R	834	STRP	26028.77	3563.42	2560.09	140283.25	127486.94	131587.38	5851.87	5851.87
	4L	862	STRP	26028.77	3563.42	2560.09	140283.25	121054.34	93787.72	5266.63	5266.63
	4R	868	STRP	23610.81	4003.13	2828.43	155574.72	126977.33	126802.88	6022.91	6022.91
	5L	866	STRP	23610.81	4003.13	2828.43	155574.72	125075.92	92945.18	5584.11	5584.11
	5R	866	VALV	23553.43	3790.83	2481.59	155574.72	125075.92	92945.18	N/A	
	6	859	VALV	23553.43	3790.83	2481.59	155574.72	134489.58	197892.53	N/A	
	7	SE59	VALV	23403.06	3111.07	1278.32	160592.49	142276.97	136088.89	N/A	
	8L	856	VALV	23319.46	6614.81	3173.71	160592.49	179493.25	296761.47	N/A	
	8R	856	STRP	23271.09	6277.33	2548.14	160592.49	179493.25	296761.47	8390.31	8390.31
	9L	854A	STRP	23271.09	6277.33	2548.14	160592.49	197633.01	365953.43	9771.16	9771.16
	9R	854A	BRLD-R	23261.78	6209.65	2415.79	160592.49	197633.01	365953.43	9771.16	19542.31
	10L	852	BRLD-R	23261.78	6209.65	2415.79	160592.49	208537.44	405657.74	19730.55	39461.1[illegible]
	10R	852	VALV	23229.81	5979.29	1943.00	160592.49	208537.44	405657.74	N/A	
	11	849	VALV	23229.81	5979.29	1943.60	160592.49	222492.38	471774.55	N/A	
	12L	849	VALV	23127.47	5465.79	1134.27	171950.25	216199.75	530137.62	N/A	
	12R	848	BRED-E	23105.35	5403.44	1397.03	171950.25	216199.75	530137.62	24416.63	48833.26
	13L	846	BRED-E	23105.35	5403.44	1397.03	171950.25	208943.47	564714.63	13746.65	27493.29
	13R	846	STRP	23101.35	5401.93	1468.29	171950.25	208943.47	564714.63	13746.65	13746.65
	14L	S845	STRP	23101.35	5401.93	1468.29	171950.25	202220.56	594619.65	14294.97	14294.97
	14R	S845	STRP	23097.79	5402.68	1537.63	171950.25	202220.56	594619.65	14294.97	14294.97
	15L	844	STRP	23097.79	5402.68	1537.63	171950.25	195087.43	624591.59	14852.50	14852.50
	15R	844	VALV	23046.61	5684.02	3051.94	171950.25	195087.43	624591.59	N/A	
	16	841	VALV	23046.61	5684.02	3051.94	171950.25	152163.46	696882.12	N/A	
	17L	840	VALV	22983.81	5896.35	3479.34	182554.33	106466.20	767926.94	N/A	
	17R	840	STRP	22956.71	6775.37	5186.20	182554.33	106466.20	767926.94	17465.81	17465.81
	18L	839A	STRP	22956.71	6775.37	5186.20	182554.33	106367.70	767135.86	17467.82	17467.82
	18R	838A	BELL	22955.70	6839.28	5294.58	182554.33	106367.70	767135.86	17467.82	31966.82
	19L	SE38	BELL	19862.34	13592.02	5294.58	129947.32	131776.25	715183.92	16217.44	29678.57
	19R	SE38	BELL	21688.32	11153.41	4088.65	129947.32	131776.25	715183.92	16217.44	29678.57
	20L	S38B	BELP	8248.43	22949.62	4088.65	64528.05	191274.26	505183.59	11942.82	21855.82
	20R	838B	STRP	8246.25	22911.49	4136.06	64528.05	191274.26	505183.59	11942.82	11942.82
	21L	836	STRP	8243.25	22911.49	4136.06	64528.05	277396.09	185935.21	7466.67	7466.67
	21R	836	STRP	11377.44	25951.20	4527.92	97548.96	344703.67	192023.38	8922.92	8922.92
	22L	812A	STRP	11377.44	25951.20	4527.92	97548.96	398661.86	554338.14	15141.66	15141.66
	22R	812A	BELP	11354.34	24936.85	4534.71	97548.96	398661.86	554338.14	15141.66	277[illegible]9.85
	23L	812C	BELP	25232.58	10681.25	4534.71	297637.20	336184.76	772946.09	19623.56	35911.99
	23R	812C	BELL	25474.74	10742.41	4509.39	300282.26	335956.51	765179.87	19484.62	35657.65
	24L	812B	BELL	25124.78	11426.64	4509.39	456949.76	101279.29	766997.73	19725.12	36097.76
	24R	812B	STRP	24954.75	11411.96	4529.12	456949.76	101275.29	766997.73	19725.12	19725.12
	25L	81[illegible]	STRP	24854.75	11411.96	4525.12	456949.76	257161.96	399218.51	14467.39	14467.38

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]N
CALCULATION NO. FW-14

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOE NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN1 (CONTD.)											
	25R	[illegible]	STRT	24421.56	11399.31	4521.48	456949.76	257161.96	399218.51	14467.38	14467.38
	26L	812A	STRT	24421.56	11399.31	4521.48	456949.76	260320.88	395535.00	14445.84	14445.84
	26R	812A	STRT	24147.93	11408.78	4538.09	456949.76	260320.88	395535.00	14445.84	14445.84
	27L	808	STRT	24147.93	11408.78	4538.09	456949.76	314692.84	357205.57	14486.02	14486.02
	27R	808	STRT	24626.65	11725.90	3808.59	456949.76	314692.84	357205.57	14486.02	14486.02
	28L	806	STRT	24626.65	11725.90	3808.59	456949.76	137886.94	657899.25	17843.27	17843.27
	28R	806	STRT	24079.62	11733.08	3804.98	456949.76	137886.94	657899.25	17843.27	17843.27
	29L	804	STRT	24079.62	11733.08	3804.98	456949.76	208173.13	1261287.22	29802.35	29802.35
	29R	804	STRT	23499.15	19939.14	3793.22	456949.76	208173.13	1261287.22	29802.35	29802.35
	30L	802	STRT	23499.15	19939.04	3793.22	456949.76	446001.33	378197.58	16291.78	16291.78
	30R	802	STRT	22976.39	19450.65	3887.28	456949.76	446001.33	378197.58	16291.78	16291.78
	31L	802A	STRT	22976.39	19450.65	3887.28	456949.76	448757.99	385922.33	16415.09	16415.09
	31R	802A	STRT	22713.05	19203.46	3989.67	456949.76	448757.99	385922.33	16415.09	16415.09
	32L	565	STRT	22713.05	19203.46	3989.67	456949.76	500593.10	574807.79	19560.60	19560.60
	32R	565	BTEE-B	22595.09	19072.64	4053.15	456949.76	500593.10	574807.79	N/A	
	33	565T	BTEE-B	22595.09	19072.64	4053.15	456949.76	546841.01	776214.96	15995.66	21935.78
RUN2											
	34	812C	STRT	384.28	138.27	92.54	1263.58	5775.83	10751.95	16869.33	16869.33
	35L	891	STRT	384.28	138.27	92.54	1263.58	3272.16	7179.05	10984.89	10984.89
	35R	891	STRT	402.96	169.58	108.53	1263.58	3272.16	7179.05	10984.89	10984.89
	36L	813	STRT	421.25	186.77	119.94	1263.58	3589.43	5948.66	9708.42	9708.42
	36R	813	STRT	443.79	194.17	63.78	1263.58	3589.43	5948.66	9708.42	9708.42
	37L	814	STRT	479.75	184.13	58.71	1263.58	2548.99	9983.63	14271.96	14271.96
	37R	814	STRT	485.83	213.91	171.19	1263.58	2548.99	9983.63	14271.96	14271.96
	38L	816	STRT	485.83	213.91	171.19	1263.58	2231.69	10320.81	14620.60	14620.60
	38R	816	STRT	495.28	217.30	164.71	1263.58	2231.69	10320.81	14620.60	14620.60
	39L	818A	STRT	495.28	217.30	164.71	1263.58	1668.42	13875.67	19292.12	19292.12
	39R	818A	SELB	[illegible]	223.04	143.57	1263.58	1668.42	13875.67	19292.12	34394.04
	40L	818B	SELB	223.04	506.13	143.57	2021.52	1174.55	12963.58	18139.82	32287.67
	40R	818B	STRT	228.42	513.38	127.73	2021.52	1174.55	12963.58	18139.82	18139.82
	41L	820	STRT	228.42	513.38	127.73	2021.52	1997.88	6764.54	12087.46	12087.46
	41R	822	VALV	266.35	538.04	64.74	2021.52	1997.88	6764.54	N/A	
	42	822A	VALV	266.35	538.04	64.74	2021.52	2091.63	4775.01	N/A	
	43L	822B	VALV	266.35	538.34	64.74	2021.52	2212.29	3314.73	N/A	
	43R	822B	STRT	323.99	558.59	95.97	2021.52	2212.29	3314.73	6143.42	6143.42
	44L	824A	STRT	323.99	558.59	95.97	2021.52	1994.50	12118.69	16978.35	16978.35
	44R	824A	SELB	342.45	558.61	111.05	2021.52	1994.50	12118.69	16978.35	[illegible]
	45L	824B	SELB	558.61	342.45	111.05	2145.76	1758.93	12939.18	18193.23	32435.78
	45R	824B	STRT	558.57	345.88	113.93	2145.76	1758.93	12939.18	18193.23	18193.23
	46L	825	STRT	558.57	345.88	113.93	2145.76	1676.53	12718.55	17891.83	17891.83
	46R	825	STRT	558.53	353.91	120.16	2145.76	1676.53	12718.55	17891.83	17891.83
	47L	826	STRT	558.53	353.91	120.16	2145.76	[illegible]	[illegible]	14959.92	14959.92

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. EW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOF NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN2 (CONTD.)											
	47P	R26	VALV	558.92	372.73	144.68	2145.76	1079.53	10613.04	N/A	
	48L	R28	VALV	558.92	372.73	144.68	2145.76	1533.85	9836.96	N/A	
	48R	R2P	STRP	559.97	378.49	159.17	2145.76	1533.85	9836.96	14061.61	14061.61
	49L	R30	STRP	559.97	378.49	159.17	2145.76	1612.97	9808.85	13981.13	13981.13
	49R	R30	STRP	564.13	388.89	189.20	2145.76	1612.97	9808.85	13981.13	13981.13
	5.L	R30B	STRP	564.13	388.89	189.20	2145.76	1781.32	9776.72	13977.22	13977.22
	5 R	R30B	SELE	564.45	389.35	190.91	2145.76	1781.32	9776.72	13977.22	24919.28
	51L	R30C	SELB	392.59	563.60	190.91	2243.46	2260.04	11224.31	16041.27	28597.78
	51R	R3.C	STRE	386.38	566.83	192.09	2271.11	2232.32	11224.31	16041.28	16041.28
	52L	R32	STRE	386.38	566.83	192.09	2271.11	2334.66	11825.80	16863.55	16863.55
	52R	R32	STRE	392.43	570.58	214.43	2237.54	2366.73	11825.80	16863.51	16863.51
	53	R34	STRE	392.43	570.58	214.43	2237.54	4493.89	19424.05	27576.41	27576.41
RUN3											
	54	R36	STRE	917.44	3614.66	2541.38	9783.95	52648.38	84831.47	23328.41	23328.41
	55L	R72A	STRE	967.44	3614.66	2541.38	9783.95	12712.94	38207.85	9761.64	9761.64
	55R	R72A	BELB	938.05	3643.02	2555.68	9783.95	12712.94	38207.85	9761.64	14512.31
	56L	R72B	BELB	3643.02	938.05	2555.68	15116.35	10531.14	33096.94	8868.51	13265.31
	56R	R72B	STRP	3687.76	2573.86	985.46	15116.35	33096.04	10531.14	8868.51	8868.51
	57L	R74A	STRE	3687.76	2573.86	985.46	15116.35	4129.31	92354.57	21931.00	21931.00
	57R	R74A	BELE	3773.91	2575.87	1020.98	15116.35	4129.31	92354.57	21931.00	32885.74
	58L	R74B	BELB	2575.87	3733.91	1020.98	6577.77	10034.80	86494.58	29443.94	29581.31
	58R	R74B	STRE	2576.87	3755.17	1038.46	6577.77	10034.80	86494.58	29443.94	29443.94
	59L	R76	STRP	2576.87	3755.17	1038.46	6577.77	7508.78	51974.60	12391.51	12391.51
	59R	R76	VALV	2580.62	3808.76	1089.76	6577.77	7508.78	51974.60	N/A	
	6[illegible]	R77	VALV	2580.62	3808.76	1089.76	6577.77	14088.60	32076.47	N/A	
	61L	R80	VALV	2587.94	3965.26	1262.51	6954.47	23732.36	40311.30	N/A	
	61R	R8[illegible]	STRE	2596.32	4002.12	1304.86	6954.47	23732.36	40311.30	11972.10	11972.11
	62L	R82	STRE	2596.32	4002.12	1304.86	6954.47	30555.02	57057.77	15245.45	15245.45
	62R	R82	STRE	2597.63	683.08	514.83	6954.47	30555.02	57057.77	15241.45	15241.45
	63L	R84	STRE	2597.63	683.08	514.83	6954.47	29135.30	54590.20	14578.12	14578.12
	63R	R84	VALV	2609.90	619.13	471.23	6954.47	29135.30	54590.20	N/A	
	64	R85	VALV	2609.90	619.13	471.23	6954.47	26961.53	50311.40	N/A	
	65L	R88	VALV	2685.[illegible]4	453.53	234.74	7731.15	25293.61	47075.04	N/A	
	65R	R88	STRE	2685.85	435.44	214.49	7731.15	25290.61	47075.04	12641.23	12641.23
	66L	R9[illegible]	STRE	2716.15	451.52	258.04	7731.15	12537.42	24997.05	6792.91	6792.91
	66R	R9[illegible]	STRE	2723.76	1278.17	932.57	7731.15	12537.42	24997.05	6792.91	6792.91
	67L	R92	STRE	2723.76	1278.17	932.57	7731.15	9913.46	20697.49	5669.23	5669.23
	67P	R92	VALV	2752.35	1257.36	893.27	7731.15	9913.46	20697.49	N/A	
	68	R94	VALV	2752.35	1257.30	893.27	7731.15	9876.45	5757.21	N/A	
	69	R95	VALV	2795.85	1216.52	827.38	7731.15	15[illegible]1.92	12[illegible]4.71	N/A	
	7L	R97	VALV	2804.33	1165.55	746.55	8245.97	21453.85	21782.52	N/A	
	7 P	R97	STRE	2[illegible]7.25	1156.58	725.61	8245.97	21453.85	21782.50	7413.64	7413.64

SUPERPIPE [illegible]RS. 15C [illegible]6/[illegible]8/82; SYSTEM EDS - NOS
PAGE [illegible]
83/12/[illegible]8, 14.46.5[illegible]

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA[illegible]ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SGP NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	M/Z (PSI)	IM/Z (PSI)
RUN3 (CONTD.)											
	71L	898	STRF	29[illegible]7.25	1150.58	725.60	8245.97	23970.52	25932.69	8499.12	8499.12
	71R	898	STRF	291[illegible].74	1148.58	722.34	8245.97	23970.52	25932.69	8499.12	8499.12
	72L	9[illegible]8A	STRF	2910.74	1148.58	722.34	8245.97	26649.04	30346.38	965[illegible].34	965[illegible].34
	72R	9[illegible]8A	BELB	2916.77	716.36	1144.83	8245.97	30346.38	26649.04	9651.34	14435.57
	73L	9[illegible]8B	BELB	717.12	2916.58	1144.83	37012.81	5619.81	23181.32	10388.96	1542[illegible].78
	73R	9[illegible]8B	STRF	7[illegible]4.98	1135.74	2925.70	37012.81	23181.32	5619.81	10388.96	10388.96
	74	869	STRF	7[illegible]4.98	1135.74	2925.70	37012.81	54885.56	21942.62	16327.77	16327.77
RUN4											
	75	595	STRF	136.88	522.76	12355.18	0.00	.00	.00	.00	.00
	76L	585A	STRF	136.88	522.76	12355.18	0.00	247597.75	10476.20	5440.32	5440.32
	76R	585A	BRED-E	542.30	1858.85	12293.55	0.00	247597.75	10476.20	5440.32	10883.65
	77L	585	BRED-E	542.30	1858.85	12293.55	0.00	431994.34	38354.91	2128.89	4257.77
	77R	585	STRF	998.79	3186.69	12181.28	.00	431994.34	38354.91	2128.89	2128.89
	78L	580B	STRF	998.79	3186.69	12181.28	.00	559882.94	71885.58	277[illegible].82	277[illegible].82
	78R	580B	BTEE-R	1428.43	4321.52	12049.06	.00	559882.94	71885.58	N/A	
	79BL	58[illegible]	BTEE-R	1428.43	4321.52	12049.06	.00	722510.02	130124.87	36[illegible]3.67	5266.76
	79BR	58[illegible]	BTEE-R	6133.17	6703.03	14336.80	527347.61	483622.74	410242.98	4948.69	5917.17
	80L	580A	BTEE-R	6133.17	6703.03	14336.80	527347.61	479429.29	324917.07	N/A	
	80R	580A	STRF	6573.49	8423.43	14060.90	527347.61	479429.29	324917.07	3818.09	3818.09
	81L	575	STRF	6573.49	8423.43	14060.90	527347.61	745618.39	103498.65	4511.64	4511.64
	81R	575	STRF	7053.23	9283.64	13710.31	527347.61	745618.39	103498.65	4511.64	4511.64
	82L	570	STRF	7053.23	9283.64	13710.31	527347.61	843137.40	136790.18	4927.56	4927.56
	82R	570	STRF	7273.07	9581.67	13560.68	527347.61	843137.40	136790.18	4927.56	4927.56
	83L	565B	STRF	7273.07	9581.67	13560.68	527347.61	962008.28	216125.00	5488.71	5488.71
	83R	565B	BTEE-R	7556.84	9860.37	13383.63	527347.61	962008.28	216125.00	N/A	
	84BL	565T	BTEE-R	7556.84	9860.37	13383.63	527347.61	1118958.33	338247.78	6295.[illegible]	92[illegible].15
	84BR	565T	BTEE-R	11567.93	18081.38	29223.32	549510.99	77[illegible]968.75	247156.49	4803.17	7019.78
	85L	565C	BTEE-R	11567.93	18081.38	29223.32	549510.99	1078640.08	255417.83	N/A	
	85R	565C	STRF	11728.21	17865.50	29036.51	549510.99	1078640.08	255417.83	6073.98	6073.[illegible]8
	86L	560A	STRF	11728.21	17865.50	29036.51	549510.99	1096581.24	258525.56	6128.11	6128.11
	86R	560A	BELB	12969.18	32259.14	8970.04	549510.99	672283.81	896410.44	6126.[illegible]5	14614.51
	87L	560B	BELB	32259.14	12969.18	8970.04	815390.56	576438.04	1205168.44	7682.71	18320.13
	87R	560B	STRF	31376.11	8765.17	12731.97	815390.56	1205168.44	576438.04	7682.71	7682.71
	88L	555A	STRF	31376.11	8765.17	12731.97	815390.56	1050253.57	610110.30	7181.07	7181.07
	88R	555A	BELB	30646.99	8722.64	13364.13	815390.56	1050253.57	610110.30	7181.07	17073.69
	89L	555B	BELB	27675.31	1581[illegible].85	13364.13	329774.98	1035054.99	64[illegible]511.27	6190.35	1127[illegible].[illegible]0
	89R	555B	STRF	26713.1[illegible]	13812.75	15193.38	329774.98	1035054.99	64[illegible]511.27	619[illegible].35	619[illegible].35
	90L	55[illegible]	STRF	26713.1[illegible]	13812.75	15193.38	329774.98	172936.10	116[illegible]638.23	5983.3[illegible]	5983.3[illegible]
	90R	55[illegible]	STRF	17317.71	6234.50	5[illegible]62.92	329774.98	172936.10	116[illegible]638.23	5983.3[illegible]	5983.3[illegible]
	91L	545A	STRF	17317.71	6234.50	5[illegible]62.92	329774.98	128[illegible]4.37	1214846.29	6211.[illegible]7	6211.[illegible]7
	91R	545A	BELB	17196.14	4636.97	4744.61	329774.98	128[illegible]4.37	1214846.29	6211.[illegible]7	113[illegible]7.74
	92L	545B	BELB	4636.97	17196.14	4744.61	.[illegible]	2148[illegible].36	872211.63	44[illegible]9.42	8[illegible]27.69

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVA N
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). FORCES, MOMENTS AND STRESSES ALONG PIPE RUNS (CONTD.)

RUN NAME	SOP NO.	DCP NAME	COMP TYPE	AXIAL FORCE (LB)	Y FORCE (LB)	Z FORCE (LB)	TORS MOMENT (LB.IN)	YY MOMENT (LB.IN)	ZZ MOMENT (LB.IN)	B/Z (PSI)	IP/Z (PSI)
RUN4 (CONTD.)											
	92R	545R	STRP	2812.70	17075.70	4285.81	0.00	214840.36	872211.63	4419.42	4419.42
	93L	546	STRP	2812.70	17075.70	4285.81	0.00	153661.92	616256.47	3117.66	3117.66
	93R	546	STRP	1161.74	16948.75	4226.13	0.00	153661.92	616256.47	3117.66	3117.66
	94	536	STRP	1161.74	16948.75	4226.13	0.00	.00	.00	.00	.00
RUN5											
	95	58J	BTEE-B	6276.46	2386.81	5585.61	534736.08	805683.18	527347.61	15695.03	22923.67
	96L	58JC	BTEE-B	6276.46	2386.81	5585.61	534736.08	739416.24	517484.56	N/A	
	96R	58JC	STRP	6251.67	2296.51	5574.38	534736.08	739416.24	517484.56	23029.19	23029.19
	97L	701	STRP	6251.67	2296.51	5574.38	534736.08	658448.41	503407.55	21653.47	21653.47
	97R	701	STRP	6174.53	2507.64	5593.50	534736.08	658448.41	503407.55	21653.47	21653.47
	98L	704	STRP	6174.53	2507.64	5593.50	534736.08	236950.66	380803.19	15321.43	15321.43
	98R	704	STRP	6090.40	3183.09	5566.60	534736.08	236950.66	380803.19	15321.43	15321.43
	99L	706	STRP	6090.40	3183.09	5566.60	534736.08	178429.23	276068.39	13779.52	13779.52
	99R	706	STRP	6046.16	3843.05	5444.66	534736.08	178429.23	276068.39	13779.52	13779.52
	100L	708	STRP	6046.16	3843.05	5444.66	534736.08	474636.39	246945.29	16606.31	16606.31
	100R	708	STRP	1430.90	3223.67	6579.46	534736.08	474636.39	246945.29	16606.31	16606.31
	101L	710A	STRP	1430.90	3223.67	6579.46	534736.08	411228.54	219576.55	15573.57	15573.57
	101R	710A	STRP	1267.05	3304.34	6642.54	534736.08	411228.54	219576.55	15573.57	15573.57
	102L	71	STRP	1267.05	3304.34	6642.54	534736.08	406275.97	217290.05	15495.29	15495.29
	102R	71	STRP	1015.01	3628.51	6790.35	534736.08	406275.97	217290.05	15495.29	15495.29
	103L	712A	STRP	1015.01	3628.51	6790.35	534736.08	104250.58	68145.91	12853.16	12853.16
	103R	712A	BELP	945.32	4085.60	6950.04	534736.08	104250.58	68145.91	12853.16	22857.76
	104L	712B	BELP	4085.60	845.32	6950.04	.00	439778.23	304590.19	9480.39	17340.59
	104R	712B	STRP	4389.86	718.66	7075.36	.00	439778.23	304590.19	9480.39	9480.39
	105L	736	STRP	4389.86	718.66	7075.36	.00	324767.26	197895.58	7142.77	7142.77
	105R	736	STRP	4880.23	444.51	7294.86	.00	324767.26	197895.58	7142.77	7142.77
	106	739	STRP	4880.23	444.51	7294.86	.00	.00	.00	.00	.00

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS). SUPPORT FORCES AND DEFORMATIONS

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS	
PENC	PC3C	ANCH	GLOB							
				FORC	(LB)	GLBL	26672.71	3309.93	2841.92	
				DISP	(IN)	GLBL	.000	.000	.000	
				MOMT	(LB.IN)	GLBL	138767.06	293093.85	363939.91	
				ROTN	(RAD)	GLBL	.0000	.0000	.0000	
S816	816	CONE	Y							INACTIVE
				DISP	(IN)	GLBL	1.044	.409	.184	
858Y	S85R	SNGL	Y							
				FORC	(LB)	GLBL	0.00	4182.00	0.00	
				DISP	(IN)	GLBL	.068	.418	.344	
858Z	S85R	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	2921.74	
				DISP	(IN)	GLBL	.338	.418	.344	
839Y	S838	SNGL	Y							
				FORC	(LB)	GLBL	0.00	6074.23	0.00	
				DISP	(IN)	GLBL	.047	.607	.674	
8397	S83R	SNGL	Z							
				FORC	(LB)	GLBL	0.00	0.00	5727.25	
				DISP	(IN)	GLBL	.047	.607	.674	
S83R	83B	SNUB	INCL							
				FORC	(LB)	LOCL	10348.85			
				FORC	(LB)	GLBL	4467.08	4601.90	8121.96	
				DISP	(IN)	LOCL	.000	.524	1.257	
S54)	54[illegible]	CONE	Y							INACTIVE
				DISP	(IN)	GLBL	.747	2.856	1.868	
84Y	84	SNGL	Y							
				FORC	(LB)	GLBL	0.00	30793.28	0.00	
				DISP	(IN)	GLBL	1.587	.000	1.158	
553S	55	SNUB	INCL							
				FORC	(LB)	LOCL	23532.43			
				FORC	(LB)	GLBL	12126.36	7649.74	18895.19	
				DISP	(IN)	LOCL	.000	2.567	1.566	

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
55JS (CONTD.)									
SR14	814	SNUB	INCL						
				FORC	(LB)	LOCL	225.32		
				FORC	(LB)	GLBL	0.00	99.55	296.33
				DISP	(IN)	LOCL	.306	.454	1.344
R13Y	813	SNGL	Y						
				FORC	(LB)	GLBL	0.00	279.86	0.00
				DISP	(IN)	GLBL	1.345	.000	.000
R13Z	813	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	170.59
				DISP	(IN)	GLBL	1.345	.000	.000
R89Y	891	SNGL	Y						
				FORC	(LB)	GLBL	0.00	1193.12	0.00
				DISP	(IN)	GLBL	.067	.085	.192
R89Z	898	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	867.79
				DISP	(IN)	GLBL	.067	.085	.192
R82Y	882	SNGL	Y						
				FORC	(LB)	GLBL	0.10	4440.23	0.00
				DISP	(IN)	GLBL	.069	.317	.197
R82Z	882	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	1676.69
				DISP	(IN)	GLBL	.069	.317	.197
595X	595	SNUB	X						
				FORC	(LB)	GLBL	12357.09	0.00	0.00
				DISP	(IN)	GLBL	.308	6.449	1.679
536S	536	SNUB	INCL						
				FORC	(LB)	LOCL	17387.86		
				FORC	(LB)	GLBL	16764.17	0.00	4615.25
				DISP	(IN)	LOCL	.[illegible]	2.856	3.178

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. FW-04

RESPONSE SPECTRUM ANALYSIS NO. 1 (SEIS), SUPPORT FORCES AND DEFORMATIONS (CONTD.)

SUPP NAME	SUPP LOCN	SUPP TYPE	DIRN CODE	RESULT TYPE	RESULT UNIT	AXIS TYPE	X-AXIS	Y-AXIS	Z-AXIS
536S (CONTD.)									
S708	708	SNUB	INCL						
				FORC	(LB)	LOCL	14826.57		
				FORC	(LB)	GLBL	6449.94	6379.58	11727.17
				DISP	(IN)	LOCL	.000	1.059	.602
739Y	739	SNGL	Y						
				FORC	(LB)	GLBL	0.00	5264.90	0.00
				DISP	(IN)	GLBL	1.195	.526	.880
739Z	739	SNGL	Z						
				FORC	(LB)	GLBL	0.00	0.00	7478.45
				DISP	(IN)	GLBL	1.195	.526	.880

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]N
CALCULATION NO. FW-P4

CLASS 2 AND 3 STRESS SUMMARY

DESIGN VERIFICATION

CLIENT SCE/SONGS-1

JOB NO. 0310-022-1352

CALC./PROB. NO. FW-04

PREPARED BY: [signature] DATE: 12/8/83

CHECKED BY: [signature] DATE: 12/9/83

CLASS 2 AND 3 STRESS SUMMARY

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. EW-C4

CLASS 2 STRESS CHECKING, TYPE CL2A STRESS CHECK SUMMARY

CHECKING REGION INDICATOR	=	(ALL CLASS 2 RUNS)
OUTPUT DETAIL INDICATOR	=	(MAXIMUM AT EACH SOP)
COMMENTARY INDICATOR	=	(NO COMMENTARY)
LOAD CASE INDICATOR	= NEWC	(NEW CASES TO BE SPECIFIED)
PRESSURE DISTRIBUTION INDICATOR	= NEWP	(NEW DISTRIBUTIONS TO BE SPECIFIED)
TEMPERATURE DISTRIBUTION INDICATOR	= NEWT	(NEW DISTRIBUTIONS TO BE SPECIFIED)
SECTION MODULUS INDICATOR	=	(AT SECTION MIDTHICKNESS)
PRESSURE TERM INDICATOR	=	(USE P*DI**2/(DO**2-DI**2))
LUG STRESS INDICATOR	=	(NO LUG STRESS SUMMARY)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN...
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL...N
CALCULATION NO. FW-04

LOAD CASE SPECIFICATION

CASE NAME	LOAD TYPE	COMB TYPE	RESULTS SET	SCALE FACTOR	DATE IDENT.	TIME IDENT.	TITLE	
GRAV			GRAV-1	1.000	03/12/08.	14.46.50.	GRAVITY ANALYSIS	
SEIS			SEIS-1	1.000	03/12/08.	14.46.50.	SEISMIC ANALYSIS	(INERTIA)

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. EW-04

PRESSURE DISTRIBUTIONS FOR PRESSURE STRESSES

DISTRIBUTION NAME	RUN NAME	FIRST OCP	LAST OCP	PRESSURE (PSI)	DISTRIBUTION TITLE
PRES	ALL RUNS			1210.000	MAXIMUM PRESSURE

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]N
CALCULATION NO. FW-04

TEMPERATURE DISTRIBUTIONS FOR ALLOWABLE STRESSES

DISTRIBUTION NAME	RUN NAME	FIRST OCP	LAST OCP	TEMPERATURE (F)	DISTRIBUTION TITLE
TEMP	ALL RUNS			420.000	MAXIMUM TEMPERATURE

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. FV-P4

LOAD SET SPECIFICATION, NON-DEFAULT OPTION

LOAD SET NAME	MA CASE	ME CASE	MC,D CASE	EQN. CODE	PRESSURE SET	TEMP SET FOR SH	TEMP SET FOR SC	SA FACTOR	STRESS FACTOR	TITLE
EQ9F	GRAV	SEIS		EQ9F	PRES	TEMP			3.953	FUNCTIONALITY STRESS CHECK

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]ON
CALCULATION NO. FW-84

STRESSES FOR EQUATION 9F FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1														
	1	PC3C	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	24875.44	.421
	2	ME77	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	18559.09	.313
	3	R74	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16282.18	.275
	4L	R68	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	15982.81	.270
	4R	R6P	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16644.19	.281
	5L	R65	A1	STRP	10SCH80S	SA106 B	1.000	E09F	1210.00	421.0		59295.00	16328.04	.275
	5R	R66	A2	VALV	10INVALV	SA106 B	N/A							
	6	859	A2	VALV	10INVALV	SA106 B	N/A							
	7	S858	A2	VALV	10INVALV	SA106 B	N/A							
	8L	856	A2	VALV	10INVALV	SA106 B	N/A							
	8R	R56	A3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	17715.11	.299
	9L	R54A	A3	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19171.56	.323
	9R	R54A	A7	RED-R	10XRED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	26460.38	.446
	10L	R57	A3	RED-R	10XRED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	47337.51	.798
	10R	852	A4	VALV	8INVALV	SA106 B	N/A							
	11	R4P	A4	VALV	8INVALV	SA106 B	N/A							
	12L	R4P	A4	VALV	8INVALV	SA106 B	N/A							
	12R	R4P	A5	RED-E	10XRED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	54101.71	.914
	13L	R46	A5	RED-E	10XRED	SA106 B	2.000	E09F	1210.00	420.0		59295.00	32279.30	.544
	13R	R46	A6	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23050.64	.389
	14	SR45	A6	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	27520.32	.464

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]ON
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS, ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1 (CONTD.)														
	15L	844	A6	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	24012.54	.4?5
	15R	844	A7	VALV	10INVALV	SA106 B	N/A							
	16	841	A7	VALV	10INVALV	SA106 B	N/A							
	17L	840	A7	VALV	10INVALV	SA106 B	N/A							
	17R	840	A7A	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	25998.61	.438
	18L	838A	A7A	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	2[illegible]	.438
	18R	838A	A8	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	33974.46	.573
	19	8?7B	A8	BELB	10INELB	SA106 B	~~1.830~~ 3.7	EQ9F	1210.00	420.0		59295.00	~~32095.70~~ *	~~.541~~ * 1.01
	20L	838B	A8	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	26467.67	.446
	20R	838B	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	20530.73	.346
	21L	836	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	16175.83	.273
	21R	836	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	17968.[illegible]	.3?3
	22L	812A	A9	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23853.96	.4?1
	22R	812A	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	30960.28	.522
	23	812C	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	36698.31	.619
	24L	812D	A10	BELB	10INELB	SA106 B	1.830	EQ9F	1210.00	420.0		59295.00	36779.21	.62?
	24R	812D	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	28?43.53	.473
	25	810	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23162.77	.391
	26	81?A	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23150.47	.39?
	27	[illegible]	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	23381.69	.394
	28	[illegible]	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	28666.46	.483

1.01 (due to very conservative SIF. This SIF is calculated by considering it's a reinforced fabricated Tee) Note that this point is not in Safe Shutdown region.

* GRAV + SEIS = 20035 PSI ($Z = \pi R^2 t$)

EQ9F = 45751 + .75 × 3.7 × 20035 = 1.01

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]N
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN1 (CONTD.)														
	29	8?4	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	43176.63	.728
	3?	8?2	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	25287.?2	.426
	31	8?2A	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	25394.27	.428
	32L	565	A11	STRP	10SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	28?62.86	.478
	32R	565	A12	BTEE-B	18X18X10	SA106 B	N/A							
	33	565T	A12	BTEE-B	18X18X10	SA106 B	1.462	EQ9F	1210.00	420.0		59295.00	25230.43	.426

MAXIMUM STRESS RATIO FOR THIS RUN = .914 AT SOP NO. 12R

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN2														
	34	812C	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	32103.30	.541
	35	991	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19978.66	.336
	36	813	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	20132.82	.340
	37	814	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19294.88	.325
	38	816	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19563.2?	.33?
	39L	818A	B1	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	22280.77	.376
	39R	818A	B2	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	28989.50	.489
	40L	818B	B2	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	27586.61	.465
	40R	818B	B3	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	21229.15	.358
	41L	82?	B3	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	1732?.72	.29?
	41R	822	B4	VALV	2INVALV	SA106 B	N/A							
	42	82?A	B4	VALV	2INVALV	SA106 B	N/A							

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL ON
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN2 (CONTD.)														
	43L	B2?B	B4	VALV	2INVALV	SA106 B	N/A							
	43R	B2 B	B5	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	9708.96	.164
	44L	B24A	B5	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	21026.92	.355
	44F	B24A	B6	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	27382.77	.462
	45L	B24B	B6	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	29248.24	.493
	45R	B24B	B7	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	22491.87	.379
	46	B25	B7	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	22233.96	.375
	47L	B26	B7	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	20073.72	.339
	47R	B26	B8	VALV	2INVALV	SA106 B	N/A							
	48L	B28	B8	VALV	2INVALV	SA106 B	N/A							
	48R	B28	B9	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19542.13	.330
	49	B29	B9	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19548.41	.330
	5?L	B3?B?	B9	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19554.45	.330
	50F	B30B	B10	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	25333.87	.427
	51L	B31C	B11	SELB	2INELB	SA106 B	1.783	EQ9F	1210.00	420.0		59295.00	28157.41	.475
	51R	B31C	B12	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	21666.17	.365
	52	B32	B12	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	22497.15	.379
	53	B34	B12	STRP	2SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	33299.25	.562

MAXIMUM STRESS RATIO FOR THIS RUN = .562 AT SOP NO. 53

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL N
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN3														
	54	R76	C1	STRP	4SCHP0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23319.03	.494
	55L	R72A	C1	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	14116.15	.238
	55P	R72A	C2	RELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	15452.11	.261
	56L	R72B	C2	RELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	13707.85	.231
	56P	R72B	C3	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	12561.41	.212
	57L	R74A	C3	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	25469.55	.430
	57P	R74A	C4	RELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	28189.44	.475
	58L	R74B	C4	RELB	4INELB	SA106 B	1.496	E09F	1210.00	420.0		59295.00	26480.36	.447
	58R	R74B	C5	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23946.16	.404
	59L	R76	C5	STRP	4SCHP0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16204.07	.275
	59R	R76	C6	VALV	4INVALV	SA106 B	N/A							
	60	R77	C6	VALV	4INVALV	SA106 B	N/A							
	61L	R80	C6	VALV	4INVALV	SA106 B	N/A							
	61R	R80	C7	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	15709.66	.265
	62	R82	C7	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19765.88	.333
	63L	R84	C7	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	19388.50	.327
	63R	R84	C8	VALV	4INVALV	SA106 B	N/A							
	64	R85	C8	VALV	4INVALV	SA106 B	N/A							
	65L	R88	C8	VALV	4INVALV	SA106 B	N/A							
	65R	R89	C9	STRP	4SCHP0S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	17938.16	.302
	66	R90	C9	STRP	4SCH0*S	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11136.95	.188

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE UN[illegible]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[illegible]
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	UCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN3 (CONTD.)														
	67L	892	C9	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	9997.78	.169
	67R	892	C10	VALV	4INVALV	SA106 B	N/A							
	68	894	C10	VALV	4INVALV	SA106 B	N/A							
	69	895	C10	VALV	4INVALV	SA106 B	N/A							
	70L	897	C10	VALV	4INVALV	SA106 B	N/A							
	70R	897	C11	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	11907.69	.201
	71	898	C11	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	12845.65	.217
	72L	9[illegible]A	C11	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	13862.94	.234
	72R	9[illegible]A	C12	BELB	4INELB	SA106 B	1.496	EQ9F	1210.00	420.0		59295.00	15168.[illegible]4	.256
	73L	9[illegible]B	C12	BELB	4INELB	SA106 B	1.496	EQ9F	1210.00	420.0		59295.00	15518.84	.262
	73R	9[illegible]B	C13	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	14175.63	.239
	74	868	C13	STRP	4SCH80S	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	19641.63	.331

MAXIMUM STRESS RATIO FOR THIS RUN = .494 AT SOP NO. 54

RUN NAME	SOP NO.	UCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN4														
	75	585	D1	STRP	18SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	4593.93	.[illegible]77
	76L	585A	D1	STRP	18SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	9787.96	.165
	76R	585A	D2	BRED-F	18X16RED	SA106 B	2.[illegible]	EQ9F	1210.00	420.0		59295.00	12[illegible]84.98	.2[illegible]
	77L	585	D2	BRED-F	18X16RED	SA106 B	2.09[illegible]	EQ9F	1210.00	420.0		59295.00	[illegible]4.85	.13[illegible]
	77R	585	D3	STRP	18SCH80	SA106 B	1.000	EQ9F	1210.00	420.0		59295.00	6976.63	.118
	78L	58[illegible]B	D3	STRP	18SCH80	SA106 B	1.[illegible]	EQ9F	1210.00	420.0		59295.00	7619.11	.129

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE U[redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL[redacted]ON
CALCULATION NO. FW-P4

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOR NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN4 (CONTD.)														
	78R	565P	D4	BTEE-R	18X18X18	SA106 B	N/A							
	79RL	56[illegible]	D4	BTEE-R	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	8808.14	.149
	79RR	565	D4	BTEE-R	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	10077.73	.170
	80L	56[illegible]A	D4	BTEE-R	18X18X18	SA106 B	N/A							
	80R	565A	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9414.13	.159
	81	575	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10247.25	.173
	82	576	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	10724.35	.181
	83L	565B	D5	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11372.81	.192
	P3R	565B	D6	BTEE-R	18X18X18	SA106 B	N/A							
	84RL	565T	D6	BTEE-R	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	13027.68	.220
	84RR	565T	D6	BTEE-R	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	11129.46	.188
	85L	565C	D6	BTEE-R	18X18X18	SA106 B	N/A							
	P5R	565C	D7	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11782.37	.199
	86L	56[illegible]A	D7	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11815.65	.199
	86R	56[illegible]A	D8	BELB	18INELB	SA106 B	2.386	E09F	1210.00	420.0		59295.00	17288.23	.292
	87L	56[illegible]B	D8	BELB	18INELB	SA106 B	2.386	E09F	1210.00	420.0		59295.00	19861.69	.337
	P7P	56[illegible]B	D9	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	13326.91	.225
	88L	555A	D9	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	12849.49	.217
	88R	555A	D10	BELB	18INELB	SA106 B	1.821	E09F	1210.00	420.0		59295.00	15734.82	.265
	P9L	555B	D10	BELB	18INELB	SA106 B	1.821	E09F	1210.00	420.0		59295.00	14374.20	.242
	89R	555P	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11044.11	.186

SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EVAL...N
CALCULATION NO. FW-94

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN4 (CONTD.)														
	9	55.	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11119.37	.187
	91L	545A	D11	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	11220.96	.189
	91P	545A	D12	BELB	18INELB	SA106 B	1.021	E09F	1210.00	420.0		59295.00	13522.24	.228
	92L	545B	D12	BELB	18INELB	SA106 B	1.021	E09F	1210.00	420.0		59295.00	11644.77	.196
	92P	545B	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	9112.78	.154
	93	546	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	7884.49	.133
	94	536	D13	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	4523.21	.076
					MAXIMUM STRESS RATIO FOR THIS RUN = .337 AT SOP NO. 87L									
RUN5														
	95	58.	E1	BTEE-B	18X18X18	SA106 B	1.462	E09F	1210.00	420.0		59295.00	24683.24	.416
	96L	58.C	E1	BTEE-B	18X18X18	SA106 B	N/A							
	96P	58.C	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	30395.58	.513
	97	7.1	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	29205.54	.493
	98	7.4	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	23351.28	.394
	99	7.6	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21418.24	.361
	100	7.8	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	22971.09	.387
	101	71.A	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21761.54	.367
	102	71	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	21664.52	.365
	103L	712A	E2	STRP	18SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	16993.84	.286
	103P	712A	E3	BELB	18INELB	SA106 B	1.021	E09F	1210.00	420.0		59295.00	21499.66	.362

SOUTHERN CALIFORNIA EDISON COMPANY SAN ONOFRE [redacted]
SAFE SHUTDOWN PIPING FUNCTIONALITY CRITERIA EV[redacted]ON
CALCULATION NO. FW-04

STRESSES FOR EQUATION 9F (CONTD.) FAULTED CONDITIONS. ALLOWABLE STRESS = 2.4SH UNLESS MODIFIED

RUN NAME	SOP NO.	DCP NAME	COMP NAME	COMP TYPE	SECTION NAME	MATERIAL NAME	SIF	LOAD SET	PRESS (PSI)	SH TEMP	SC TEMP	ALLOW. STRESS (PSI)	COMPUTED STRESS (PSI)	STRESS RATIO
RUN5 (CONTD.)														
	104L	712R	E3	BELB	10INELB	SA106 B	1.030	E09F	1210.00	420.0		59295.00	17506.61	.297
	104R	712R	E4	STRP	10SCH80	SA106 B	1.000	E09F	1210.00	420.0		59295.00	14060.15	.237
	105	736	E4	STRP	10SCH80	SA106 B	1.060	E09F	1210.00	420.0		59295.00	11723.42	.198
	10E	739	E4	STRP	10SCH80	SA106 B	1.060	E09F	1210.00	420.0		59295.00	4593.93	.077

MAXIMUM STRESS RATIO FOR THIS RUN = .513 AT SOP NO. 96R

MAXIMUM STRESS RATIOS FOR SYSTEM

STRESS RATIO	SOP NO.	LOAD SET
.914	12R	E09F