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DOC No. RC5037 SHT. REV. 5

KEY DRAWING: YES [ ] NO [X] INCORPORATION REQUIRED: YES [X] NO [ ]

DESCRIPTION OF CHANGE AFFECTED UNIT [ ] 0 [X] 1 [ ] 2 [ ] Both

The existing feedwater line for loop D inside containment has been redesigned & reanalyzed in conjunction with the replacement of steam generator "D".

Supplement the existing calculation 2C159RC5037 REV 5, with the DCN 9704763, analyzed for the Unit-1 system. Unit-2 continues as is in the existing calculation.

Add pages 1 thru 134 of this DCN to existing calculation.

There is only one outstand ng amendment (DCN SC 165) against the design calc RC 5037. There is no impact due to this DCN which was issued only to incorporate the current revision of documents.

Additionally, DCN No. 9800861 directing the use of water hammer results of Calc. # CC06436 Rev. 0 applies to the existing (Pre-SGR) configurations of Units 1 & 2..

STATE OF TEXAS
ANESTIS PAPADOPOULOS
83146
REGISTERED PROFESSIONAL ENGINEER

A. Papadopoulos 8-25-98

C. Basavaraju 7-14-98
DESIGN ENG. DATE

REVIEWER 7/21/98
DATE

Calculation No. RC5037-~~P-400~~ Rev. ~~0~~ 5
QR 9-1698
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* affected By DCN 9704763

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438-100

SUBJECT EVALUATION OF MFW PIPING SYSTEM DUE TO SGR (UNIT 1 LOOP D)

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

TABLE OF CONTENTS

1.0 OBJECTIVE / SCOPE

The purpose of this calculation is to evaluate the revised piping and support configuration associated with the replacement of the steam generators for unit 1. Changes to the pipe routing are required due to the relocation of the steam generator feedwater nozzle.

2.0 SUMMARY OF RESULTS

The rerouted feedwater piping system due to steam generator replacement was stress analyzed, meets the ASME Code and other requirements and is acceptable.

3.0 METHOD OF ANALYSIS

3.1 The analysis was based on Isometric drawings of Attach # 4. ME101 computer program was utilized. The piping model incorporated the applicable as-built information (support orientations, support stiffnesses, insulation, etc.). The time history forcing functions for water hammer analysis, due to a pipe break outside containment in nonseismic portion, are based on RELAP thermal hydraulic analysis. Thermal, seismic, and LOCA movements for the replacement generator are based on Westinghouse input.

3.2 Acceptance criteria
ASME B&PV Code Section III 1974 Edition thru W75 Addenda

3.3 The following load cases are included in the analysis.

1. DEAD WEIGHT (WT1)
2. THERMAL (THRM1, THRM2, THRM3, THRM4, THRM5, THRM6, THRM7)
3. OBEI (MRS1) Operating Basis Earthquake Inertia
4. SSEI (MRS2) Safe Shutdown Earthquake Inertia
5. SAM (SAM1) OBE Seismic Anchor Movement
6. SAM (SAM2) SSE Seismic Anchor Movement
7. DBA (THRM8) Design Basis Accident Anchor Movement
8. JI Jet Impingement (N/A) (REF # 4.1 & 4.12)
9. OTHER Water hammer due to pipe break (TIME1)
10. LOCA LOCA MOVEMENTS (TIMEL1, TIMEL2, TIMEL3)- see section 5.6

3.0 METHOD OF ANAIYSIS (Cont)

Seismic Analysis:
The seismic analysis is based on piping models which are terminated at the steam generator centerline without any RSG stick model included. The response spectra used for the steam generator nozzle considered the flexibility and mass distribution of the RSG (Ref 4.9). Multiple response spectra (ISM) based on Reg. Guide 1.61 damping values are utilized.

Jet Impingement (JI) Analysis:
None (Ref.# 4.1)

Analysis for Water Hammer:
Dynamic time histcry analysis was performed for waterhammer transient effects using RELAP generated forcing functions as input (Ref. # 4.2)

Analysis for LOCA:
Dynamic time histcry analysis was performed using displacement time histories provided by Westinghouse (Ref# 4.8c) for RHRBRK15 , RHRBRK4, & RHRBRK12. The input time histories included 3 translations as well as 3 rotations.

4.0 REFERENCES

4.1 STRESS ANALYSIS OF FEED WATER "FW" SYSTEM FROM STEAM GENERATOR 1D THRU FW-1018-GA2 TO PENETRATION M-5, CALC NO. 2C159RC5037 REV. 5

4.2 HYDRAULIC TRANSIENT ANALYSIS OF FEEDWATER LINE BREAK IN CONJUNCTION WITH CHECK VALVE SLAM, CALC.# 5S139MC5668 REV. 2 (DCN # 9800456)

4.3 ME101 Linear Elastic Analysis of Piping---------- Version N4

4.4A ASME B&PV CODE , SECTION III, DIV. 1, 1974 INCLUDING W75 ADDENDA

4.4B ASME B&PV CODE , SECTION III, DIV. 1, 1980 INCLUDING W81 ADDENDA

4.4C ASME B&PV CODE , SECTION XI, 1983 INCLUDING S83 ADDENDA

4.5 RE-EVALUATION OF PENETRATIONS M5 THRU M8, CALC. NO. 2L469RC9962 REV. 2

4.6 RCB Digitized Response Spectrum, Bechtel Calc. # RC1425 Rev. 2

4.7 Seismic Analysis of RCB, Brown & Root Calc. # C040-9A

4.8 Westinghouse Input Information

a) Feedwater Nozzle Design Loads (MFW nozzle)
Westinghouse Design Specification #413A42 Rev. 0 p. 77 of 103

b) Loop branch nozzle displacements for OBE, SSE, Deadweight, LOCA, Thermal,
Westinghouse Calculation # W-SMT-97-027-14
(RCS loop analysis -Displacements for D.W., Thermal, seismic, LOCA
Westinghouse letter #WP-BEC-SGR-97-051 from S.A.Palm to R. Beck, 6/27/97)

c) TGX Time history displacements at the intersection of the main feedwater and auxiliary feedwater and steam generator center line for RHR breaks nodes 4, 15, and 12; Westinghouse Calculation # W-SMT-97-027-030 Rev. 1
(Reactor Coolant Loop Reconciliation Results, RSG MFW & AFW Nozzle Disp.
Westinghouse letter #WP-BEC-SGR-98-046 from S.A.Palm to R.Beck, 4/21/98;
Westinghouse letter #WP-BEC-SGR-98-056 from S.A.Palm to R.Beck, 5/18/98;
RCL Supplemental Information, Westinghouse letter #WP-BEC-SGR-98-055
from S.A.Palm to R.Beck, 5/5/1998)

4.9 Bechtel Calc. No. CC06415 Rev. 0, DT. 07/25/97 -
Reconciliation of reactor Building Seismic Analysis Due to Steam Generator Replacement.

4.10 Piping Isometrics
Design Iso (existing portion) 2C369PFW433 -01 -7
ABR Iso (existing portion)
Stress Iso (new piping)

4.11 Piping Stress Analysis Criteria, 5L010RQ1002 Rev. 8
Guidelines for Pipe Stress Analysis and Support Design, PED-023 Rev. 4

4.12 Hazard Analysis, Prob. # FW-04 (DCN# 9606450).

4.13 Drawing # ST401541-01-00044-AB6: Typical thermal wrap Insulation Details for piping (Transco Drawing EW-7756-SK1)

4.14 UFSAR Section 6.6 - STP

5.0 DESIGN INPUT

5.1 PIPING DATA

Line #	16" FW-1018-GA2 Nozzle	16" FW-1018-GA2 Spool @ noz N/A *	16" FW-1018-GA2 Noz-top elb	16" FW-1018-GA2 top elb-red	18" FW-1018-GA2 Red-Pen M5
Material	SA508 CL.3A	SA508 CL.3A	SA336 F22	SA333 GR. 6	SA333 GR 6
Ec psi	27.8 E6	27.8 E6	30.6 E6	27.9 E6	27.9 E6
Sc psi	22500	22500	18800	15000	15000
Sh psi	22500	22500	17817	15000	15000
OD in	16" sch 80	16" sch 80	16" sch 80	16" sch 80	18" sch 80
Wall thick in	0.843"	0.843"	0.843"	0.843"	0.937"
Pipe Wt lb/ft	136.46	136.46	136.46	136.46	170.75
contents lb/ft	69.70	69.70	69.70	69.70	88.50
Insul. lb/ft	4.50	4.50	4.50	4.50	4.95
Total wt lb/ft	210.66	210.66	210.66	210.66	264.20
Insul thick in	2.00	2.00	2.00	2.00	2.00

Ref. 4.8, 4.4A, 4.4B, 4.13

Notes:1) * There is no straight spool @ nozzle.

2) The new designation for SA508 CL.3A (originally introduced in S80 addenda) is SA508 Gr. 3, CL. 2
The new designation for SA508 CL.2A (originally introduced in W75 addenda) is SA508 Gr. 2, CL. 2
The new designation for SA336 CL.F22 is SA336 Gr. F22, CL. 3

3) Per Ref. 4.13, the insulation weights used in analysis for new piping are conservative.

5.2 SYSTEM OPERATING MODES

FW Lines 16"-FW-1018-GA2 & 18"-Fw-1018-GA2

Mode	Temperature F	Pressure psig	Load case	Remark
1	567	1345	THRM1	Normal operating (Heatup & cooldown)
2	440	1345	THRM2	Normal Loading & Unloading
3	250	1345	THRM3	Normal Loading & Unloading
4	120	1345	THRM4	Normal operating
5	583	1345	THRM5	Emergency & Faulted
6	408	1345	THRM6	Faulted
7	32	1345	THRM7	Minimum temperature

Ref. 4.1

Notes: Design pressure 1350 psig
Peak pressure 1360 psig during upset, emergency & faulted condition
For coefficient of thermal expansion values, see ME101 input.

5.3 THERMAL ANCHOR MOVEMENTS

a) EQUIPMENT NOZZLE MOVEMENTS

NODE	EQIP. ID.#	DIR	Thermal movts/ rotations
C01	SGR 1R121NSG101D	dX	0.832"
		dY	1.980"
		dZ	1.893"
		ROT-X	0.000313 rad
		ROT-Y	0.000332 rad
		ROT-Z	-0.000165 rad

Ref. 4.8 (Applied to all 7 thermal modes)
(Conservatively max. of movements from Ref. 4.8 used)

b) CONTAINMENT PENETRATION MOVEMENTS

NODE	EQIP. ID.#	DIR	Thermal movts.
110	M-5	dX	0.0379"
	(EL. 47.5'	dY	-0.06168"
	AZ. 254.55 deg)	dZ	-0.01050"

Coordinate system: Global X - South
Global Y - Vert. Up
Global Z - West
Ref. 4.1 (Applied to all 7 thermal modes)

5.4 DESIGN BASIS ACCIDENT (DBA) MOVEMENTS

CONTAINMENT PENETRATION MOVEMENTS

NODE	EQIP. ID.#	DIR	Thermal movts.
110	M-5	dX	-0.26115"
	(EL. 47.5'	dY	0.2352"
	AZ. 254.55 deg)	dZ	0.07226"

Coordinate system: Global X - South
Global Y - Vert. Up
Global Z - West

Ref. 4.1
(Applied to DBA identified as THRM8 load case)

5.5 SEISMIC ANCHOR MOVEMENTS

a) RCB & RCB Internal Structures (Applied at Penetration M-5)

LDCASE	DIR.	RCB CTMT EL 47.5'	RCB INT ST EL 72'	RELATIVE MOVT (TOTAL)
OBE	X	0.0177"	0.0091"	0.0268"
(SAM1)	Y	0.0024	0.0010	0.0034
	Z	0.0165	0.0186	0.0351
SSE	X	0.0355	0.0127	0.0482
(SAM2)	Y	0.0039	0.0019	0.0058
	Z	0.0344	0.0258	0.0602

Ref. 4.7

b) SG Nozzle & RCB Internal Structures (Applied at SGR CL)

LDCASE	DIR.	SGR CL EL 82.7'	RCB INT ST EL 72'	RELATIVE MOVT (TOTAL)
OBE	X	0.2900"	0.0091"	0.2991"
(SAM1)	Y	0.0140	0.0010	0.0150
	Z	0.3140	0.0186	0.3326
SSE	X	0.4750	0.0127	0.4877
(SAM2)	Y	0.0290	0.0019	0.0309
	Z	0.5110	0.0258	0.5368

Ref. 4.7, 4.8

5.6 SGR Feedwater Nozzle Movements due to LOCA

Displacement time histories were provided by Westinghouse (Ref# 4.8c), for RHRBRK15, RHRBRK4, & RHRBRK12. These were utilized and dynamic time history analysis was performed. THE DISPLACEMENTS AND ROTATIONS FROM THE ABOVE BREAKS ENVELOPE THE DISPLACEMENTS AND ROTATIONS DUE TO SECONDARY LINE BREAKS FROM THE OTHER 2 LOOPS LISTED IN REF. # 4.8b.

5.7 PIPE SUPPORT DATA SUMMARY

Node	Tag# ***	Support Type	DIRECTION COSINES W/X	W/Y	W/Z	Stiffness Kips/in	Sup Comp Wt. (LB)	
001	SGR CL	Anchor				*	---	
007	HL5016	Rigid	0.848	0.000	-0.530	715	274	New
07H	HL5015	Rigid	-0.707	0.000	-0.707	2367	0	New
07H	HL5015	Rigid	-0.707	0.000	0.707	1451	0	New
009	HL5014	Spring	0.000	1.000	0.000	-	450	New
015	SS0001	Snubber	0.380	0.000	0.925	632.37	550	
030	SH0001	Spring	0.000	1.000	0.000	-	116	
035	HL5009	Snubber	0.000	1.000	0.000	1301.5	935	
040	HL5004	Snubber	0.380	0.000	0.925	708.56	527	
050	HL5007	Snubber	0.000	0.000	1.000	1520.64	794	
055	HL5008	Snubber	1.000	0.000	0.000	541	888	
065	SS0006	Snubber	0.000	1.000	0.000	502	496	
070	SH0002	Spring	0.008	1.000	0.000	-	146	
075	HL5005	Rigid	0.000	1.000	0.000	876.84	413	
085	SS0007	Snubber	-0.707	0.000	-0.707	931.62	870	
094	HL5002	Rigid	0.000	1.000	0.000	1285	266	
092	HL5003	Snubber	-0.707	0.000	0.707	490.87	507	
097	HL5006	Snubber	0.000	0.000	1.000	614	832	
099	HL5001	Rigid	0.000	1.000	0.000	532.8	344	
101	HL5013	Rigid	0.888	0.461	0.000	3620	865	
11A	HL5013	Rigid	0.809	-.588	0.000	798	865	
10A	HL5012	Rigid	0.000	0.000	1.000	1128.4	465	
110	PEN M5	Anchor				**	--	

Notes: * SGR CL modeled as rigid anchor (SG center line)

** Fluedhead Penetration M5 modeled as anchor with the following translational & rotational stiffnesses. (Ref. 4.1)
AA=6.4E6 lb/in; AB=6.4E6 lb/in; AC=6.4E6 lb/in
ARA=7.45E9 in-lb/rad; ARB=7.45E9 in-lb/rad; ARC=7.45E9 in-lb/rad

[The differences between as designed stiffness vs as analyzed are not significant- 007:721 vs 715 K/in; 07H:2363.24 vs 2367K/in ; 07H:1459.93 vs 1451 K/in; 035:1301 vs 1301.5 K/in; 065:507 vs 502 K/in]

*** Prefix for Pipe Support tag# : FW-1018-, or FW-9018 (Ref. 4.1 & Attach. 4)

5.8 RESPONSE SPECTRA & SAM MOVEMENT INPUT

Node	Tag# ***	Support Type	Bldg.	Elev	SPECTRA (OBE) MRS1	SPECTRA (SSE) MRS2	MRS Grp#	SAM Movt. (in) Dir	OBE	SSE	Phase
001	SGR CL	Anchor	RCB INT		SGROBE	SGRSSE	1	DX	0.2991	0.4877	SG
								DY	0.0150	0.0309	SG
								DZ	0.3326	0.5368	SG
007	HL5016	Rigid	RCB INT		IS83OB	IS83SS	2				
07H	HL5015	Rigid	RCB INT		IS83OB	IS83SS	2	-----		-	
07H	HL5015	Rigid	RCB INT		IS83OB	IS83SS	2				
009	HL5014	Spring	RCB INT		------	------	-				
015	SS0001	Snubber	RCB INT		INTOBE	INTSSE	3				
030	SH0001	Spring	RCB INT		------	------	-				
035	HL5009	Snubber	RCB INT		INTOBE	INTSSE	3				
040	HL5004	Snubber	RCB INT		INTOBE	INTSSE	3				
050	HL5007	Snubber	RCB INT		INTOBE	INTSSE	3				
055	HL5008	Snubber	RCB INT		INTOBE	INTSSE	3				
065	SS0006	Snubber	RCB INT		INTOBE	INTSSE	3				
070	SH0002	Spring	RCB INT		------	------	-				
075	HL5005	Rigid	RCB INT		INTOBE	INTSSE	3				
085	SS0007	Snubber	RCB INT		INTOBE	INTSSE	3				
094	HL5002	Rigid	RCB INT		INTOBE	INTSSE	3				
092	HL5003	Snubber	RCB INT		INTOBE	INTSSE	3				
097	HL5006	Snubber	RCB INT		INTOBE	INTSSE	3				
099	HL5001	Rigid	RCB INT		INTOBE	INTSSE	3				
101	HL5013	Rigid	RCB INT		INTOBE	INTSSE	3				
11A	HL5013	Rigid	RCB INT		INTOBE	INTSSE	3				
10A	HL5012	Rigid	RCB INT		INTOBE	INTSSE	3				
110	PEN M5	Anchor	CMT		CMTOBE	CMTSSE	4	DX	0.0268	0.0482	CONT
								DY	0.0034	0.0058	CONT
								DZ	0.0351	0.0602	CONT

Notes: 1) Spectra Damping - 2% for OBE; 3% for SSE

2) Spectra (Ref. 4.1, 4.6, 4.9)
SGROBE/SGRSSE - Elev. 91.38' ; IS83OB/IS83SS - Int Str Elev. 83'
INTOBE/INTSSE-Int Str Elev. 37'-52'; CMTOBE/CMTSSE -CMT SHL EL.37'-68'
The effect of flexibility & mass distribution of RSG is reconciled in Ref. 4.9.

3) For SAM movements (see sht. 11)
*** Prefix for Pipe Support tag# : FW-1018-, or FW-9018 (Ref. 4.1 & Attach. 4)

5.9 STRESS INTENSIFICATION FACTORS

DESCRIPTION	SIF	COMMENT
TTJ @ SG NOZ	1.502	BASED ON 1/32" MISMATCH (DELTA) $i = 1.3 + 0.0036(16/0.843) + [3.6(1/32)(1/0.843)] = 1.502$
TTJ @ PEN M-5	1.9	
BUTTWELDS	1.8	1.0 CAN BE USED FOR 16" & 18" THK PIPES W/ MISMATCH 1/32" AS t > 3/16" & DELTA/t < 0.1 [t=0.843" FOR 16" PIPE] AS t > 3/16" & DELTA/t < 0.1 [t=0.937" FOR 18" PIPE]
18X16 RED	2.0	
@ SMALL HALF CPLGS/SOL	1.0	
WELDED ATTACH	2.1	

Ref. 4.1, 4.4A

6.0 ASSUMPTIONS / OPEN ITEMS

None

7.0 CALCULATIONS

None

8.0 CALCULATION RESULTS AND CONCLUSIONS

8.1 ME101 Input Listing:
Attachment #1 contains the input listings for the me101 analysis.

8.2 Piping Stresses:
All stresses are within the code allowables. (See Section 8.14).

8.3 Fluedhead Penetration loads:
The revised loadings on fluedhead penetration M-5 are summarized on section 8.15. These loadings are reviewed, evaluated and found to be acceptable (See attachment #7).

8.4 Equipment Nozzle Loads
The loads imposed by the piping on the replacement steam generator feedwater nozzle are summarized and compared with the allowable nozzle loads. (see section 8.16). The nozzle loadings are submitted to Westinghouse for acceptance. (See Attachment# 8).

8.5 Floor and Wall penetrations:
The displacements at floor and wall penetrations are summarized, evaluated against the available clearances, and are acceptable. (See section 8.18).

8.6 Branch connections:
The piping movements for the small pipe connections are summarized (See section 8.17).

8.7 Valve Acceleration and End Loads:
There are no valves within the boundaries of this stress problem.

8.8 Support Information:
Pipe support loads and other information were provided to the pipe support group for design, evaluation, and any modification. (Attach.#2)

3 new supports were added on the new section of the pipe (2 rigids, & 1 spring hanger).

8.0 CALCULATION RESULTS AND CONCLUSIONS (cont'd.)

8.9 Welded Attachments:
The local stresses at welded attachments are evaluated and found to be acceptable. (See attachment #5). The impact of revised loads on the generic IWA calculation is evaluated (see attachment #6).

8.10 Flanges:
There are no flanges in this stress problem.

8.11 HELB Criteria:
The combined eq. 9-B and eq. 10 stresses meet the high energy piping criteria. No intermediate pipe break locations are identified. (See Attachment #3)

8.12 Functional Capability:
Per reference # 4.11, this system is not an essential system and therefore does not require functional capability evaluation.

8.13 Conclusion:
As shown by the stress analysis evaluation, the revised feedwater piping system due to the steam generator replacement is acceptable.

8.14 Pipe Stress Summary

STRESS SUMMARY

ASME-SEC 111-74

NODE POINT	STRESS EQUATION	CALCULATED STRESS (PSI)	ALLOWABLE STRESS (PSI)	STRESS RATIO	REMARKS
110	EQUATION 8	7424.	15000.	.495	O.K.
110	EQUATION 9B (UPSET)	8190.	18000.	.455	O.K.
050	EQUATION 9D (FAULTED w/ SSE)	9327.	36000.	.259	O.K.
050	EQUATION 9D (FAULTED w/WAT HAMMER):	31258.	36000.	.868	O.K.
N02	EQUATION 9D (FAULTED w/LOCA):	10568.	42761.	.247	O.K.
102 E	EQUATION 10/11	16168.	22500.	.719	O.K.

8.15 Penetration Load Summary

SECTION 8.15 PENETRATION LOAD SUMMARY

NODE NUMBER : 110
EQUIPMENT ID: PEN M-5
COSAX, COSAY, COSAZ : 1.000 .000 .000
COSBX, COSBY, COSBZ : .000 1.000 .000
COSCX, COSCY, COSCZ : .000 .000 1.000

LOAD CASE	NOZZLE FORCE (LBS) FA	FB	FC	NOZZLE MOMENT (FT-LBS) MA	MB	MC
WT1	-827.	-3080.	-52.	-8789.	-10.	-22590.
THRM1	-26296.	8424.	-20367.	-7735.	-13145.	68232.
THRM2	-19567.	7118.	-14346.	-5822.	-13340.	59833.
THRM3	-10277.	5315.	-6035.	-3182.	-13609.	48239.
THRM4	-4603.	4214.	-959.	-1570.	-13773.	41156.
THRM5	-27165.	8593.	-21144.	-7982.	-13120.	69315.
THRM6	-17930.	6800.	-12881.	-5356.	-13387.	57790.
THRM7	-861.	3487.	2389.	-506.	-13882.	36486.
THRM8	21341.	-14280.	-5511.	32563.	95328.	-112846.
THRMP	0.	8593.	2389.	0.	0.	69315.
THRMN	-27165.	0.	-21144.	-7982.	-13882.	0.
SAM1	4266.	242.	9148.	724.	46224.	2251.
SAM2	7617.	423.	15704.	1254.	79280.	3949.
SEISA1	1001.	350.	169.	5081.	1581.	7366.
SEISA2	2408.	762.	414.	11223.	3305.	16297.
TIME1	271747.	7862.	20442.	36556.	64210.	63793.
LOCA	466.	78.	64.	1761.	346.	1814.

SECTION 8.16 EQUIPMENT NOZZLE LOAD SUMMARY

NODE NUMBER : N02 EQUIPMENT ID. : FW NOZZLE
COSAX, COSAY, COSAZ : .875 .000 .485
COSBX, COSBY, COSBZ : .485 .000 -.875
COSCX, COSCY, COSCZ : .000 1.000 .000

LOAD CASE	NOZZLE FORCE (LBS) FA	FB	FC	NOZZLE MOMENT (FT-LBS) MA	MB	MC
WT1	10.	-54.	753.	131.	-849.	143.
THRMP	7162.	218.	2113.	0.	0.	0.
THRMN	-603.	-8400.	-30.	-56131.	-77533.	-47848.
C5	3947.	6647.	4714.	24001.	17112.	19925.
C6	6890.	11080.	10540.	40658.	37184.	36158.
TIME1	25664.	24060.	82123.	157872.	232870.	78464.
LOCA	10294.	14552.	10066	21700.	29834.	29194.

LOAD CASE	ALLOWABLE FORCE (LBS) FA	FB	FC	ALLOWABLE MOMENT (FT-LBS) MA	MB	MC
WT1	6000.	16800.	16800.	30000.	57000.	57000.
THRMP	10000.	10000.	50000.	125000.	291667.	159083.
THRMN	10000.	10000.	50000.	125000.	291667.	159083.
C5	48000.	36000.	36000.	110000.	144000.	144000.
C6	92400.	84000.	84000.	170000.	200000.	200000.
TIME1	506000.	358000.	358000.	1094000.	644900.	644900.
RUPTURE	35000.	26000.	26000.	118750.	298417.	298417.

LOAD CASE	FORCE RATIOS FA	FB	FC	MOMENT RATIOS MA	MB	MC	REMARKS
WT1	0.002	0.003	0.045	0.004	0.015	0.003	OK
THRMP	0.716	0.022	0.042	0	0	0	OK
THRMN	0.060	0.840	0.001	0.449	0.266	0.301	OK
C5	0.082	0.185	0.131	0.218	0.119	0.138	OK
C6	0.075	0.132	0.125	0.239	0.186	0.181	OK
TIME1	0.051	0.067	0.229	0.144	0.361	0.122	OK
RUPTURE	0.294	0.560	0.387	0.183	0.100	0.098	OK

NOTES: C5 - SRSS OF OBEI & OBESAM; C6 - SRSS OF SSEI & SSESAM
TIME1 - WATER HAMMER ; RUPTURE = LOCA

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

SECTION 8.17 MOVEMENTS FOR SMALL PIPE CONNECTIONS & PENETRATIONS

*FOR ISO. NO., SEE ATTACH. 4.

MFID : SO3406

ISO. NO.*	NODE NO.	LOAD CASE	BRANCH NO./ PENET. NO.	DX (IN)	DY (IN)	DZ (IN)	RX (RAD)	RY (RAD)	RZ (RAD)
	086	WT1		.037	.001	-.061	-.00036	.00002	-.00006
	086	THRMP		.000	.005	4.141	.00189	.00190	.00047
	086	THRMN		-.148	-.093	-.167	.00000	.00000	-.00033
	086	C5		.026	.018	.031	.00069	.00022	.00014
	086	C6		.061	.039	.073	.00153	.00051	.00030
	087	WT1	SLEEVE#280	.038	.015	-.060	-.00041	.00004	-.00009
	087	THRMP	SLEEVE#280	.000	.000	4.295	.00189	.00095	.00018
	087	THRMN	SLEEVE#280	-.214	-.158	-.156	.00000	.00000	-.00014
	087	C5	SLEEVE#280	.031	.042	.026	.00072	.00020	.00013
	087	C6	SLEEVE#280	.074	.093	.062	.00159	.00047	.00028
	028	WT1	1.5FW1075GA2	.024	-.028	-.026	.00010	-.00014	.00022
	028	THRMP	1.5FW1075GA2	.653	1.625	.149	.00545	.01178	.00409
	028	THRMN	1.5FW1075GA2	.000	-.751	-1.231	.00000	.00000	.00000
	028	C5	1.5FW1075GA2	.048	.024	.020	.00036	.00010	.00050
	028	C6	1.5FW1075GA2	.106	.052	.044	.00072	.00021	.00112

SOUTH TEXAS PROJECT
JOBNO. 23438
CALCULATION SHEET

CALC. NO. RC 5037-P-400 R0

SUBJECT: MFW System -SG 1D To PEN. # M5

SHEET NO.

REV.	ORIGINATOR	DATE	CHECKER	DATE	REV.	ORIGINATOR	DATE	CHECKER	DATE

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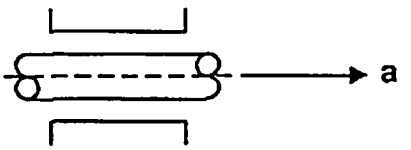
DCN# 9704763 PAGE 24 OF 134

SLEEVE #280

8.18 Pipe Sleeve Clearance Summary



NODE	SLEEVE NO.	SLEEVE I.D.	PIPE O.D.	INSULATION(IN)	RADIAL MVNT(5)	AXIAL MVNT	CLEARANCE(1)
086-087	280	29"	18"	2	3.705	3.678	-0.205"

Axial movt= (DX+DZ) cos15 ; Radial Movt = SRSS of axial and Y
+ AS-BUILT CLEARANCE=4.625"

NODE	GLOBAL DIR.	LOCAL DIR.	PIPE MOVEMENT (IN) WT	TH (+)	TH (-)	SEIS (4)	LOCA	OTHER(6) WH	COMBINED (3)
086-087	X	SKEW	0.038	0	-0.214	0.074	0.021	0.368	0.544
	Y	LAT(b)	0.015	0.005	-0.158	0.093	0.010	0.307	0.450
	Z	SKEW	-0.061	4.295	-0.167	0.073	0.022	0.423	4.657
	X								
	Y								
	Z								
	X								
	Y								
	Z								

NOTES :1. CLEARANCE = ½ (SLEEVE ID - PIPE OD) -(INSULATION+RADIALMOVEMENT).

2. RADIAL MOVEMENT = $(\Delta x^2+\Delta y^2)^{1/2}$ or $(\Delta x^2+\Delta z^2)^{1/2}$ or $(\Delta y^2+\Delta z^2)^{1/2}$

3. PIPING MOVEMENT SHALL BE COMBINED IN ACCORDANCE WITH TABLE 4 OF RQ-1002.

4A. SEISM= $[SSE^2+SSE(SAM)^2]^{1/2}$ FOR SYSTEM REQUIRING FUNCTIONAL CAPABILITY EVALUATION.
4B. SEISM= $[OBE^2+OBE(SAM)^2]^{1/2}$ FOR SYSTEM NOT INCLUDED IN NOTE 4A.

5. IF RADIAL MOVEMENT IS GREATER THAN 3/16", FURTHER EVALUATION PER PED-023 SHOULD BE PERFORMED
6. PIPING MOVEMENTS DUE TO JET IMPINGEMENT NEED NOT BE CONSIDERED

9.0 COMPUTER ANALYSIS

ME101 Computer program Version N4 / PC Version was utilized. The results of ME101 are fully verified against the results of bench mark problems. In addition, the results are also benchmarked with the existing analysis (ref 4.1) results.
The ME101 PC Program software is fully controlled by an authorization code and security key for an assigned PC machine.

Program	File Name	MFID	Run Date	UNIT/ LOOP
ME101	MFWDW.FOR	-	-	1/D
	*MFWDW7.FOR	-	-	
	7632BK4.MFL	-	-	
	(RHRBRK4)	-	-	
	7632B12.MFL	-	-	
	(RHRBRK12)	-	-	
	7632B15.MFL	-	-	
	(RHRBRK15)	-	-	
	MFWDS.INP	-	-	
	MFWDW.INP	-	-	
	MFWDL.INP	-	-	
	MFWDS.OUT	SO3406	10/28/97	
	MFWDW.OUT	8K1703	07/08/98	
	*MFWDW7.OUT	5P3018	11/05/97	
	MFWDL.OUT	MG4946	05/22/98	

Note: Computer input, forcing function, and LOCA time history input files are provided in the attached diskettes.

* Water hammer files from 75% draft package

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FRCM S.G. 1D To M5

ORIGINATOR PANI CB DATE 3/1/98 CALC NO RC5037-P-400 R0
CHK. WSS: 3/1/98 SHEET NO
SHEET REV

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ATTACHMENT 1.0 PIPE STRESS ME101 COMPUTER IMAGE	PAGES
COVER SHEET. (26)	1
WEIGHT/ THERMAL/SEISMIC/SAM (27-39)	13
WATER HAMMER (40-45)	6
LOCA (46-50)	5
TOTAL PAGES: 25	

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE ____ CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

ATTACHMENT 1.0 PIPE STRESS ME101 COMPUTER IMAGE

```
**********************************************************************************
***    DATA FILE FOR UNIT-1                                    MFWDS.INP
**********************************************************************************
CTL                                                            OUTPUT=SHORT,
HED                                                            TITLE=FEEDWATER "FW" SYSTEM -
                                                               SG 1D TO M5,
                                                               PROJNO=23438100,
                                                               PROBNO=RC5037-P-400 R0,
                                                               USER=PANI,
                                                               UNITS=2,
                                                               MODES=100,
                                                               COEF=CS4,PER=0.02,
RUN                                                            LDCASE=WT1(N),
RUN                                                            LDCASE=THRM1(A+N),
RUN                                                            LDCASE=THRM2(B+N),
RUN                                                            LDCASE=THRM3(C+N),
RUN                                                            LDCASE=THRM4(D+N),
RUN                                                            LDCASE=THRM5(E+N),
RUN                                                            LDCASE=THRM6(F+N),
RUN                                                            LDCASE=THRM7(G+N),
RUN                                                            LDCASE=THRM8(H+P+O),
RUN                                                            LDCASE=SAM1(R+X),
RUN                                                            LDCASE=SAM2(R+Y),
RUN                                                            LDCASE=MRS1(S+R),
RUN                                                            LDCASE=MRS2(T+R),
***
***    WT1    --- NORMAL OPERATING WEIGHT ANALYSIS
***    THRM1  --- THERMAL NORMAL OPERATING MODE (HEAT-UP,COLD DOWN) @ 567 DEGREE
***    THRM2  --- THERMAL NORMAL OPERATING MODE (LOADING,UNLOADING) @ 440 DEGREE
***    THRM3  --- THERMAL NORMAL OPERATING MODE (LOADING,UNLOADING) @ 250 DEGREE
***    THRM4  --- THERMAL NORMAL OPERATING MODE @ 120 DEGREE
***    THRM5  --- THERMAL EMERGENCY OPERATING MODE @ 583 DEGREE
***    THRM6  --- THERMAL FAULTED OPERATING MODE @ 408 DEGREE
***    THRM7  --- THERMAL MINIMUM TEMPERATURE @ 32 DEGREE
***    THRM8  --- POST-LOCA THERMAL ANALYSIS (DESIGN BASE ACCIDENT ANALYSIS)
***    SAM1   --- OBE SEISMIC ANCHOR MOVEMENT ANALYSIS
***    SAM2   --- SSE SEISMIC ANCHOR MOVEMENT ANALYSIS
***    MRS1   --- OBE SEISMIC INERTIA ANALYSIS
***    MRS2   --- SSE SEISMIC INERTIA ANALYSIS
***
***    CAD. ISO.  3?369PFW433 SHT.01 REV. 4
***
***    MATL:SA-508 CL. 3A  FOR SGR NOZZLE
***    MATL:SA-508 GR.2 CL.2  FOR  ( IF ANY) ST SPOOL NEAR NOZZLE
***    MATL:SA-336 GR.F22 CL.3-PIPE 16" SCH.80 FROM SGR NOZ THRU TOP ELB OF RISER
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE ____

CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

```
***   MATL:SA-333 GR.6 AFTER TOP ELBOW OF RISER & REST: 16" SCH 80/ 18" SCH 80
***
***
***   MODEL STEAM GENERATOR LOOP D
****
SAP   002            82.719
***      001;002,N02 ARE NODES ON SGR CL;SGR SURFACE; FW NOZ END RESPECTIVELY
***
      002
      001 -7-3.208            -4-0.340          OD=199.42,THI=4.71,
                                                LBS/FT=1.00,
                                                E=27.8E6,
                                                CODE=SC3W75,CLASS=2,
***     nozzle material                         MAT=SA508-CL. 3A,
                                                SC=22500,SH=22500,
                                                DPRESS=1.0,PPRESS=1.0,
                                                TEMP=567,EXP=4.2766,      *A
                                                TEMP=440,EXP=3.068,       *B
                                                TEMP=250,EXP=1.40,        *C
                                                TEMP=120,EXP=0.382,       *D
                                                TEMP=583,EXP=4.433,       *E
                                                TEMP=408,EXP=2.774,       *F
                                                EXP=-0.2908,TEMP=32,      *G
                                                TEMP=70,EXP=0.,           *H
                                                TEMP=70.,EXP=0.,          *O
***
***   LINE NO. 18"FW-1014-GA2
ANC   001 0.832     1.980      1.893                                      *N
ANC   001                                                                *O
ANC   001                                                                *R
                                                COSAX=0.8746,COSAZ=0.4848,
                                                COSCX=-.4848,COSCZ=0.8746,
                                                RSNAME=SGROBE,            *S
                                                RSNAME=SGRSSE,            *T
                                                DTITLE=CENTER  SG,
                                                DX=.299,DY=.0150,DZ=.333, *X
                                                DX=.488,DY=.031,DZ=.537,  *Y
                                                PHASE=SG,
                                                ROT-X=0.313E-3,           *N
                                                ROT-Y=0.332E-3,           *N
                                                ROT-Z=-0.165E-3,          *N
                                                ETI=1R121NSG101D,
*****************
***    BEGIN    FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION
*****************
   002N02  1.3790            0.7644           SIF=1.502,
                                               OD=16.0,THICK=.843,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

```
                                                    LBS/FT=210.66,
                                                    DTITLE=FW NOZZLE,
                                                    DPRESS=1350,PPRESS=1360,
DLD   N02 0.8746                  0.4848            TFOR= 15,MULTI=1.,
      005 0-7.325                 0-4.061      L    JOINT=BTWELD,
***                                                 MAT=SA336-GR.F22,
                                                    SC=18800,SH=17817,
                                                    E=30.6E6,
                                                    TEMP=567,EXP=4.3864,        *A
                                                    TEMP=440,EXP=3.160,         *B
                                                    TEMP=250,EXP=1.45,          *C
                                                    TEMP=120,EXP=0.378,         *D
                                                    TEMP=583,EXP=4.534,         *E
                                                    TEMP=408,EXP=2.872,         *F
                                                    EXP=-0.2892,TEMP=32,        *G
                                                    TEMP=70,EXP=0.,             *H
                                                    TEMP=70.,EXP=0.,            *O
      006 5-0.904                 -0-10.192    L    JOINT=BTWELD,
***     SA333-GR.6
DLD   006 0.9863                  -0.1651           TFOR= 14,MULTI=1.,
      007           -11-10-5/8                      SEG=2,
                                                    SC=15000,SH=15000,
                                                    E=27.9E6,
                                                    TEMP=567,EXP=4.2766,        *A
                                                    TEMP=440,EXP=3.068,         *B
                                                    TEMP=250,EXP=1.40,          *C
                                                    TEMP=120,EXP=0.382,         *D
                                                    TEMP=583,EXP=4.433,         *E
                                                    TEMP=408,EXP=2.774,         *F
                                                    EXP=-0.2908,TEMP=32,        *G
                                                    TEMP=70,EXP=0.,             *H
                                                    TEMP=70.,EXP=0.,            *O
                                                    OD=16.0,THICK=.843,
                                                    LBS/FT=210.66,
                                                    ADDWT=274,
RAD   007 .8480                   -.5299
                                                    AA=715E3,ETI=HL5016,
                                                    RSNAME=IS83OB,              *S
                                                    RSNAME=IS83SS,              *T
DLD   007             -1.0                          TFOR= 13,MULTI=1.,
      07G           -4-1-3/8                        JOINT=BTWELD,
      07H           -8-10-5/8                       SEG=2,
RAD   07H  -0.707                 0.707
                                                    AA=1451E3,ETI=HL5015,
                                                    RSNAME=IS83OB,              *S
                                                    RSNAME=IS83SS,              *T
RAD   07H -0.707                  -0.707
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE ____ CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

```
                                                        AA=2367E3,ETI=HL5015,
                                                        RSNAME=IS83OB,          *S
                                                        RSNAME=IS83SS,          *T
      009           -5-4
                                                        ADDWT=450,
SPD   009            1.0
                                                        ETI=HL5014,
      09A           -2-6                        L     JOINT=BTWELD,
      09B  -5-9.11               0-7.386       L     JOINT=BTWELD,
DLD   09B  -0.9943               0.1063              TFOR= 12,MULTI=1.,
      09C           -5-0                              JOINT=BTWELD,
      010           -0-9-3/16                         JOINT=RED,
                                                        DTI=CUT LOCN,
***      END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION
*****************
      011           -1-3                              JOINT=BTWELD,
                                                        OD=18.0,THICK=0.937,
                                                        LBS/FT=264.2,
***                                                     LBS/FT=272.95,
      012           -0-7                              SIF=1.0,
                                                        ADDWT=25,
      12A           -1-0                              SIF=1.0,
                                                        ADDWT=25,
DLD   12A           -1.0                              TFOR= 11,MULTI=1.,
      013           -1-0                              SIF=1.0,
                                                        ADDWT=50,
      014           -4-0                      L
                                                        JOINT=BTWELD,
      015 -2.732                 1.1211              DTITLE=FW9018SS0001,
                                                        ADDWT=550,
SNB   015 0.3796                 0.9251              AA=632.37E03,
                                                        RSNAME=INTOBE,          *S
                                                        RSNAME=INTSSE,          *T
      030 -1.1564                0.4745              DTITLE=FW9018SH0001,
                                                        ADDWT=116,
***SPD   030           1.0
SPR   030           1.0                              FORCE=8136.,AA=1.,
      028 -1.007                 0.41325
                                                        DTITLE=1.5FW1075GA2,
                                                        SIF=1.0,ADDWT=25,
      029 -0.9254                0.3746              SIF=1.0,ADDWT=25,
      032 -1.3877                0.5695              SIF=1.0,
                                                        ADDWT=25,
      035 -0.8866                0.3638
                                                        DTITLE=FW9018HL5009,
                                                        ADDWT=935,
SNB   035           1.0                              AA=1301.5E03,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
                                                                    RSNAME=INTOBE,                  *S
                                                                    RSNAME=INTSSE,                  *T
DLD   035  -0.9251                  0.3796                          TFOR= 10,MULTI=1.,
      040 -0.62635                  0.2570
                                                                    DTITLE=FW9018HL5004,
                                                                    SEGMNT=2,
                                                                    ADDWT=527,
SNB   040 0.3796                    0.9251                          AA=708.56E03,
                                                                    RSNAME=INTOBE,                  *S
                                                                    RSNAME=INTSSE,                  *T
      045 -4.96297                  2.03659     L
                                                                    JOINT=BTWELD,
      050             6-1-13/16
                                                                    DTITLE=FW9018HL5007,
                                                                    ADDWT=794,
                                                                    SIF=2.1,
SNB   050                           1.0                             AA=1520.64E03,
                                                                    RSNAME=INTOBE,                  *S
                                                                    RSNAME=INTSSE,                  *T
DLD   050             1.0                                           TFOR=  9,MULTI=1.,
      055             2-0
                                                                    DTITLE=FW9018HL5008,
                                                                    SEGMNT=2,
                                                                    ADDWT=888,
SNB   055 1.0                                                       AA=541E03,
                                                                    RSNAME=INTOBE,                  *S
                                                                    RSNAME=INTSSE,                  *T
      060             3-2                         L
                                                                    JOINT=BTWELD,
      065 -2-8-1/4                                                  DTITLE=FW9018SS0006,
                                                                    ADDWT=496,
SNB   065             1.0                                           AA=502.00E03,
                                                                    RSNAME=INTOBE,                  *S
                                                                    RSNAME=INTSSE,                  *T
      067 -1-3                                                      JOINT=BTWELD,
      070 -1-0
                                                                    DTITLE=FW9018SH0002,
                                                                    SEGMNT=2,
                                                                    ADDWT=146,
***SPD   070              1.0
SPR   070             1.0                                           FORCE=9636.,AA=1.,
      071 -3-3-3/8                                                  JOINT=BTWELD,
      072 -8-11-5/8                                                 JOINT=BTWELD,SEG=2,
DLD   072 -1.0                                                      TFOR=  8,MULTI=1.,
      075 -7-4
                                                                    DTITLE=FW9018HL5005,
                                                                    SEGMNT=2,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE ____

CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

```
                                                    ADDWT=413,
RAD   075          1.0                              AA=876.84E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
      080 -3-2-3/4                          L
                                                    JOINT=BTWELD,
      085 -0.9023              0.9023               DTITLE=FW9018SS0007,
                                                    ADDWT=870,
SNB   085 -0.7071              -0.7071              AA=931.62E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
DLD   085  -0.7071              0.7071              TFOR=  7,MULTI=1.,
      086 -0.4971              0.4971
      087 -2.4749              2.4749               DTITLE=SLEEVE#280,
                                                    SEGMNT=2,
      090 -1.76777             1.76777    L
                                                    JOINT=BTWELD,
      094 -7.4614              -7.4614
                                                    DTITLE=FW9018HL5002,
                                                    SEGMNT=2,
                                                    ADDWT=266,
RAD   094          1.0                              AA=1285E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
DLD   094  -0.7071              -0.7071             TFOR=  6,MULTI=1.,
      092 -1.04593             -1.04593             DTITLE=FW9018HL5003,
                                                    ADDWT=507,
                                                    SEGMNT=2,
SNB   092 -0.7071              0.7071               AA=490.87E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
      095 -10.09837            -10.09837  L        SEGMNT=2,
                                                    JOINT=BTWELD,
      097 -4-6                                      DTITLE=FW9018HL5006,
                                                    ADDWT=832,
                                                    SIF=2.1,
SNB   097                      1.0                  AA=614E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
DLD   097 -1.0                                      TFOR=  5,MULTI=1.,
      099 -7-0                                      SEG=2,
                                                    DTITLE=FW1018HL5001,
                                                    ADDWT=344,
RAD   099          1.0                              AA=532.80E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
      100 -3-9                              L
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
                                                    JOINT=BTWELD,
      101                        -3-1-5/8           DTITLE=FW9018HL5013,
                                                    ADDWT=865,
RAD   101 0.8875      0.4608                        AA=3620.0E03,
                                                    RSNAME=INTOBE,                *S
                                                    RSNAME=INTSSE,                *T
      11A                        -0-10              DTITLE=FW9018HL5013,
                                                    ADDWT=865,
RAD   11A 0.8090      -0.5878                       AA=798.00E03,
                                                    RSNAME=INTOBE,                *S
                                                    RSNAME=INTSSE,                *T
DLD   11A                        -1.0               TFOR=  4,MULTI=1.,
      11B                        -1-7               DTITLE=ABAND STANCH,
                                                    ADDWT=244,
      102                        -3-2-3/8   L
                                                    JOINT=BTWELD,
      10A -4-1-1/2                                  DTITLE=FW9018HL5012,
                                                    ADDWT=465,
RAD   10A                        1.0                AA=1128.4E03,,
                                                    RSNAME=INTOBE,                *S
                                                    RSNAME=INTSSE,                *T
DLD   10A -1.0                                      TFOR=  2,MULTI=1.,
      105 -5-9                                      SIF=1.9,
      110 -0-4-5/8                                  SIF=1.9,DTITLE=PEN M-5,
ANC   110 .037895   -.06168    -.01050                                            *N
ANC   110 -.26115   .2352      .07226                                             *P
ANC   110                                                                         *R
                                                    COSAX=1,COSAZ=0,
                                                    COSCX=0,COSCZ=1,
                                                    AA=6.4E6,AB=6.4E6,AC=6.4E6,
                                                    ARA=7.45E9,ARB=7.45E9,
                                                    ARC=7.45E9,
                                                    DX=.0268,DY=.00337,DZ=.0351,*X
                                                    DX=.0482,DY=.00577,DZ=.0602,*Y
                                                    PHASE=CONT,
                                                    RSNAME=CMTOBE,                *S
                                                    RSNAME=CMTSSE,                *T
****
********
ACE                                                 TITLE= OBE 2%D CNT SHELL EL.
ACE                                                 37'TO 68',
ACE                                                 RSNAME=CMTOBE,
ACE                                                 TYP=3,POI=24,
ACE                                                 DIR=X
            .5000,     .0750,     .8000,     .1500,     .9000,     .2000,
           1.0000,     .2300,    1.1000,     .3000,    1.1800,     .3300,
           1.8700,     .3300,    2.5000,     .2000,    3.3000,     .2000,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

```
                3.8000,    .6700,    5.0000,    .6700,    5.5000,    .6000,
                6.5000,    .2550,    7.4000,    .2550,    7.5000,    .2432,
                8.2000,    .1742,    8.9000,    .1650,    9.4000,    .2321,
               11.0000,    .5400,   13.5000,    .5400,   16.3500,    .1600,
               20.0000,    .1050,   35.0000,    .1050,   35.0010,    .1050,
ACE                                                DIR=Y
                 .8500,    .1000,    1.0000,    .1000,    2.6000,    .2300,
                4.4700,    .2750,    5.4700,    .2750,   10.0000,    .2800,
               11.0000,    .5250,   13.3000,    .5250,   14.0000,    .3625,
               15.0000,    .2532,   15.5000,    .2500,   16.0000,    .1730,
               18.4000,    .1200,   22.0000,    .1000,   35.0000,    .1000,
               35.0010,    .1000,   35.0020,    .1000,   35.0030,    .1000,
               35.0040,    .1000,   35.0050,    .1000,   35.0060,    .1000,
               35.0070,    .1000,   35.0080,    .1000,   35.0090,    .1000,
ACE                                                DIR=Z
                 .5000,    .0800,     .6000,    .0800,     .7900,    .1500,
                 .9000,    .2000,    1.0000,    .2500,    1.3000,    .3300,
                1.8600,    .3300,    2.0000,    .2900,    3.0000,    .1700,
                3.5000,    .2600,    4.6000,    .2600,    4.7000,    .2368,
                5.0000,    .1905,    5.2000,    .1800,    7.5000,    .1800,
                8.0000,    .1700,    8.4000,    .1700,    8.8000,    .2286,
               10.1000,    .4316,   10.1500,    .6500,   14.0000,    .6500,
               17.0000,    .1350,   25.0000,    .0800,   35.0000,    .0800,
EOA
ACE                                                TITLE= SSE 3%D CNT SHELL EL.
ACE                                                37' TO 68',
ACE                                                RSNAME=CMTSSE,
ACE                                                TYP=3,POI=23,
ACE                                                DIR=X
                 .3000,    .0700,     .6000,    .1950,     .7700,    .2965,
                1.0000,    .4500,    1.2000,    .5900,    1.8500,    .5900,
                2.5000,    .4000,    2.6000,    .4200,    3.0000,    .5000,
                3.5000,    .6800,    4.0000,   1.7000,    5.0000,   1.7000,
                5.5000,    .9890,    6.0000,    .3500,    7.3000,    .3500,
                9.5000,    .3952,   10.0000,    .5467,   10.7000,    .7600,
               13.5000,    .7600,   15.7000,    .3079,   16.6000,    .2470,
               20.0000,    .1775,   35.0000,    .1700,
ACE                                                DIR=Y
                1.0000,    .1800,    2.7000,    .4100,    4.8000,    .4800,
                8.0500,    .4850,   10.8000,    .6080,   13.5000,    .6080,
               15.8000,    .2750,   21.5000,    .1600,   35.0000,    .1600,
               35.0010,    .1600,   35.0020,    .1600,   35.0030,    .1600,
               35.0040,    .1600,   35.0050,    .1600,   35.0060,    .1600,
               35.0070,    .1600,   35.0080,    .1600,   35.0090,    .1600,
               35.0100,    .1600,   35.0110,    .1600,   35.0120,    .1600,
               35.0130,    .1600,   35.0140,    .1600,
ACE                                                DIR=Z
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO MS

ORIGINATOR PANI DATE ____

CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

```
                .3000,    .0700,    .5000,    .1653,    .6000,    .2010,
                .7700,    .3209,   1.0000,    .5000,   1.2000,    .5500,
               1.8000,    .5500,   2.1000,    .4600,   2.4000,    .3900,
               3.0000,    .5000,   3.9000,    .9400,   6.9000,    .9400,
               8.0000,    .4000,  10.5000,   1.1250,  18.0000,   1.1250,
              22.0000,    .4800,  27.0000,    .2700,  35.0000,    .2500,
              35.0010,    .2500,  35.0020,    .2500,  35.0030,    .2500,
              35.0040,    .2500,  35.0050,    .2500,
EOA
ACE                                          TITLE= OBE 2%D INT STR EL 37'
ACE                                          TO 52',
ACE                                          RSNAME=INTOBE,
ACE                                          TYP=3,POI=26,
ACE                                          DIR=X
                .4000,    .0800,    .5000,    .0800,    .7000,    .1480,
                .9100,    .2200,   1.0000,    .2405,   1.1000,    .2700,
               1.2000,    .2800,   1.9000,    .2800,   2.0500,    .2579,
               3.0000,    .1975,   3.8000,    .2448,   4.0000,    .2600,
               4.4000,    .2600,   5.0000,    .3600,   5.4000,    .3600,
               6.1000,    .6400,   7.8000,    .6400,   7.9000,    .5400,
               9.0000,    .5400,  11.0000,    .2200,  16.0000,    .1100,
              24.0000,    .1100,  25.0000,    .0976,  26.5000,    .0900,
              35.0000,    .0900,  35.0010,    .0900,
ACE                                          DIR=Y
               1.0000,    .0900,   2.6000,    .2125,   4.0000,    .2450,
               4.4000,    .2500,   5.3000,    .2500,   5.8000,    .2450,
               7.9000,    .1875,   9.9000,    .1730,  12.0000,    .1383,
              13.0000,    .1300,  16.0000,    .1300,  16.5000,    .1600,
              21.0000,    .1600,  22.0000,    .1170,  25.5000,    .1170,
              27.0000,    .1100,  33.0000,    .0750,  35.0000,    .0750,
              35.0010,    .0750,  35.0020,    .0750,  35.0030,    .0750,
              35.0040,    .0750,  35.0050,    .0750,  35.0060,    .0750,
              35.0070,    .0750,  35.0080,    .0750,
ACE                                          DIR=Z
                .4000,    .0800,    .5000,    .0800,    .6000,    .1010,
                .7000,    .1283,    .9100,    .2200,   1.1000,    .2700,
               1.2000,    .2800,   1.9000,    .2800,   2.4000,    .2235,
               3.0500,    .1757,   3.3000,    .1641,   3.4000,    .1687,
               4.2000,    .2300,   4.4000,    .2587,   4.9000,    .3579,
               5.0000,    .3800,   5.4000,    .4200,   5.5000,    .5080,
               7.0200,    .5080,   7.7000,    .2500,   8.1000,    .3750,
              10.0000,    .3750,  12.0000,    .1600,  15.0000,    .1350,
              20.0000,    .1100,  35.0000,    .1100,
EOA
ACE                                          TITLE= SSE 3%D INT STR EL 37'
ACE                                          TO 52',
ACE                                          RSNAME=INTSSE,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
ACE                                                  TYP=3,POI=20,
ACE                                                  DIR=X
                .5000,     .1600,    1.1000,     .5800,    1.8500,     .5800,
               1.9000,     .5673,    3.0000,     .3957,    4.0000,     .3979,
               4.0500,     .4000,    4.8000,     .4280,    5.0000,    1.5000,
               5.8000,    1.5000,    6.1000,    1.3900,    7.1000,    1.9200,
               8.3000,    1.9200,    9.0000,    1.3600,   10.0500,     .4700,
              11.0000,     .4700,   15.0000,     .2281,   17.0000,     .1900,
              24.0000,     .1900,   40.0000,     .1800,
ACE                                                  DIR=Y
               1.0000,     .1650,    2.6000,     .3750,    4.5000,     .4250,
               5.6000,     .4250,    9.1000,     .3400,   12.0000,     .2400,
              20.0000,     .2400,   35.0000,     .1108,   40.0000,     .1000,
              40.0010,     .1000,   40.0020,     .1000,   40.0030,     .1000,
              40.0040,     .1000,   40.0050,     .1000,   40.0060,     .1000,
              40.0070,     .1000,   40.0080,     .1000,   40.0090,     .1000,
              40.0100,     .1000,   40.0110,     .1000,
ACE                                                  DIR=Z
               .5000,     .1600,    1.1000,     .5800,    1.8000,     .5800,
              4.0000,     .7700,    5.1000,    1.0500,    6.9000,    1.0500,
              8.0000,    1.2300,   14.0000,    1.2300,   20.0000,     .3500,
             30.0000,     .2600,   40.0000,     .2600,   40.0010,     .2600,
             40.0020,     .2600,   40.0030,     .2600,   40.0040,     .2600,
             40.0050,     .2600,   40.0060,     .2600,   40.0070,     .2600,
             40.0080,     .2600,   40.0090,     .2600,
EOA
ACE                                                  TITLE= OBE 2%D INT STRUC EL.
ACE                                                  83',
ACE                                                  RSNAME=IS83OB,
ACE                                                  TYP=3,POI=24,
ACE                                                  DIR=X
               .4100,     .1900,     .5000,     .1900,    1.1000,     .4000,
              2.0000,     .4000,    3.4000,     .2800,    5.7000,    1.1000,
              9.8000,    1.1000,   10.1000,     .9000,   12.0000,     .9000,
             13.5000,     .8000,   15.0000,     .3500,   25.0000,     .3500,
             36.0000,     .1900,   50.0000,     .1900,
ACE                                                  DIR=Y
               .9000,     .0800,    2.6000,     .2200,    3.4000,     .2800,
              5.0000,     .2800,    8.0000,     .2000,   10.4000,     .1650,
             11.0000,     .1980,   14.5000,     .1980,   15.0000,     .2300,
             20.5000,     .2300,   22.0000,     .1900,   28.0000,     .1900,
             35.0000,     .0850,   60.0000,     .0850,
ACE                                                  DIR=Z
               .4100,     .1900,     .5000,     .1900,    1.1000,     .4000,
              2.0000,     .4000,    3.4000,     .2800,    5.7000,    1.1000,
              9.8000,    1.1000,   10.1000,     .9000,   12.0000,     .9000,
             13.5000,     .8000,   15.0000,     .3500,   25.0000,     .3500,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

ORIGINATOR PANI DATE ____

CALC NO RC5037-P-400 R0
SHEET NO ____
SHEET REV ____

```
            36.0000,     .1900,    50.0000,     .1900,
EOA
ACE                                                    TITLE= SSE 3%D INT STRUCT EL.
ACE                                                    83',
ACE                                                    RSNAME=IS83SS,
ACE                                                    TYP=3,POI=15,
***                      ****************************
********** NO DIGITIZED DATA AVAILABLE - READ FROM GRAPH ******
***                      ****************************
ACE                                                    DIR=X
              .4200,     .3000,     .8000,     .5000,    1.0500,     .7000,
             2.0000,     .7000,    3.0200,     .5000,    4.1000,    1.2000,
             7.0000,    2.0500,   10.0000,    2.0500,   12.0000,    1.6000,
            14.0000,    1.6000,   18.0000,     .8800,   21.0000,     .6600,
            26.0000,     .4200,   31.0000,     .3300,   40.0000,     .3300,
ACE                                                    DIR=Y
             1.0000,     .1750,    2.0000,     .4000,    3.3000,     .4750,
             5.0000,     .4750,    8.0000,     .3800,   12.0000,     .3000,
            13.0000,     .3400,   21.0000,     .3400,   22.0000,     .2900,
            27.0000,     .2900,   38.0000,     .1400,   40.0000,     .1400,
            45.0000,     .1400,   50.0000,     .1400,   60.0000,     .1400,
ACE                                                    DIR=Z
              .4200,     .3000,     .8000,     .5000,    1.0500,     .7000,
             2.0000,     .7000,    3.0200,     .5000,    4.1000,    1.2000,
             7.0000,    2.0500,   10.0000,    2.0500,   12.0000,    1.6000,
            14.0000,    1.6000,   18.0000,     .8800,   21.0000,     .6600,
            26.0000,     .4200,   31.0000,     .3300,   40.0000,     .3300,
EOA
ACE                                                    TITLE= OBE 2%D SGR SPECT EL.
ACE                                                    91.38,
ACE                                                    RSNAME=SGROBE,
ACE                                                    TYP=3,POI=15,
ACE                                                    DIR=X
             1.0000,     .2500,    2.0000,     .4000,    3.0000,     .2500,
             4.0000,     .7500,    5.0000,    4.0500,    7.0000,    4.0500,
             8.0000,     .8000,   10.0000,     .5100,   20.0000,     .4000,
            30.0000,     .3500,   40.0000,     .3500,
ACE                                                    DIR=Y
             0.7000,     .0600,    1.0000,     .1000,    2.0000,     .2000,
             3.5000,     .3100,    5.0000,     .3100,    7.0000,     .3600,
             8.5000,     .3800,   10.0000,     .6800,   17.0000,     .6800,
            18.0000,     .2000,   20.0000,     .1800,   30.0000,     .1200,
            40.0000,     .1000,
ACE                                                    DIR=Z
             1.0000,     .2500,    2.0000,     .4000,    3.5000,     .2500,
             4.0000,     .7500,    5.0000,    3.2000,    7.0000,    3.2000,
             8.0000,    1.0000,   10.0000,     .5000,   11.0000,     .3000,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
                20.0000,     .3000,    30.0000,     .2500,    40.0000,     .2500,
EOA
ACE                                                  TITLE= SSE 3%D SGR SPECT EL.
ACE                                                  91.38,
ACE                                                  RSNAME=SGRSSE,
ACE                                                  TYP=3,POI=12,
ACE                                                  DIR=X
                 1.0000,     .5000,    2.0000,     .7000,    3.0000,     .5000,
                 4.0000,    1.5000,    5.0000,    6.4000,    7.0000,    6.4000,
                 8.0000,    1.6000,   10.0000,.    1.0200,   20.0000,     .8000,
                30.0000,     .7000,   40.0000,     .7000,
ACE                                                  DIR=Y
                 0.7000,     .1200,    1.0000,     .1800,    2.0000,     .3600,
                 3.5000,     .5000,    5.0000,     .5000,    8.0000,     .6400,
                 9.0000,    1.1000,   17.0000,    1.1000,   18.0000,     .4000,
                20.0000,     .3600,   30.0000,     .2400,   40.0000,     .2000,
ACE                                                  DIR=Z
                 1.0000,     .5000,    2.0000,     .8000,    3.5000,     .5000,
                 4.0000,    1.5000,    5.0000,    4.8000,    7.0000,    4.8000,
                 8.0000,    2.0000,   10.0000,     .1000,   11.0000,     .6000,
                20.0000,     .6000,   30.0000,     .6000,   40.0000,     .5000,
EOA
CMB                                                  CO=0.*THRM1,
CMB                                                  C1=THRM1&THRM2&THRM3&THRM4
                                                     &CO,
CMB                                                  C2=THRM1#THRM2#THRM3#THRM4
                                                     #CO,
CMB                                                  C3=WT1+C1,
CMB                                                  C4=WT1+C2,
CMB                                                  D1=C1&THRM7,
CMB                                                  D2=C2#THRM7,
CMB                                                  D3=WT1+D1,
CMB                                                  D4=WT1+D2,
CMB                                                  SEISA1=1.*MRS1,
CMB                                                  SEISA2=1.*MRS2,
CMB                                                  DBA=ABS(THRM8),
CMB                                                  THRMP=D1&THRM5&THRM6,
CMB                                                  THRMN=D2#THRM5#THRM6,
CMB                                                  D5=WT1+THRMP+CO,
CMB                                                  D6=WT1+THRMN+CO,
CMB                                                  NORMP=C3&C1&CO,
CMB                                                  NORMN=C4#C2#CO,
CMB                                                  C5=SEISA1$SAM1,
CMB                                                  A1=D3&WT1&CO,
CMB                                                  A2=D4#WT1#CO,
CMB                                                  UPSETP=A1+C5,
CMB                                                  UPSETN=A2-C5,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
CMB     C6=SEISA2$SAM2,
CMB     A3=D5+DBA,
CMB     A4=D5+C6,
CMB     FAULTP=A3&CO&A4,
CMB     A5=D6-DBA,
CMB     A6=D6-C6,
CMB     FAULTN=A5#CO#A6,
RLS     LIST=WT1+THRM1+THRM2+THRM3+
        THRM4+THRM5+THRM6+THRM7+DBA+
        SEISA1+SEISA2+SAM1+SAM2,
RLS     LIST=NORMP+NORMN+UPSETP+
        UPSETN+FAULTP+FAULTN,
STD     LIST=THRMP+THRMN+FAULTP+
        FAULTN+D5+D6,
SLA     INCLUDE=WT1,
TEA     INCLUDE=WT1+THRM1+THRM2+THRM3+
        THRM4+THRM5+THRM6+THRM7+SAM1,
OLA     INCLUDE=WT1+SEISA1,LEVEL=B,
OLA     INCLUDE=WT1+SEISA2,LEVEL=D,
PBA     INCLUDE=WT1+THRM1+THRM2+
        THRM3+THRM4+THRM5+THRM6+
        THRM7+SAM1+SEISA1,
        FPB=0.8,
END
```

ME101

I N P U T C A R D I M A G E S

```
INPUT
CARD     1         11        21        31        41        51        61        71        80
 SEQ  .  +         +         +         +         +         +         +         +         +  .  LOAD CASE(S)
   1  .  ********************************************************************************  .
   2  .  ***    DATA FILE FOR UNIT-1                        MFWDN.INP                     .
   3  .  ********************************************************************************  .
   4  .  CTL                                                OUTPUT=SHORT,                 .
   5  .  HED                                                TITLE=FEEDWATER "FW" SYSTEM -  .
   6  .                                                     SG 1D TO M5,                  .
   7  .                                                     PROJNO=23438001,              .
   8  .                                                     PROBNO=2C159RCS037,           .
   9  .                                                     USER=PANI,                    .
  10  .                                                     UNITS=2,                      .
  11  .                                                     INTG=MODAL,DAMP=0.03,         .
  12  .                                                     MODES=200,TOL=.005,           .
  13  .                                                     TZERO=0.,TFIN=1.,             .
  14  .  RUN                                                LDCASE=WT1(N),                .
  15  .  RUN                                                LDCASE=THRM2(B+N),            .
  16  .  RUN                                                LDCASE=THRM3(C+N),            .
  17  .  RUN                                                LDCASE=THRM6(F+N),            .
  18  .  RUN                                                LDCASE=TIME1(N)               .
  19  .  ***                                                                              .
  20  .  ***    WT1   --- NORMAL OPERATING WEIGHT ANALYSIS                                .
  21  .  ***    THRM2 --- THERMAL NORMAL OPERATING MODE                  @ 440 DEGREE     .
  22  .  ***.   THRM6 --- THERMAL NORMAL OPERATING MODE                  @ 390 DEGREE     .
  23  .  ***    THRM3 --- THERMAL NORMAL OPERATING MODE                  @ 250 DEGREE     .
  24  .  ***    TIME1 --- WATER HAMMER                                                    .
  25  .  ***                                                                              .
  26  .  ***    CAD. ISO.  3C369PFW433 SHT.01 REV. 4                                      .
  27  .  ***                                                                              .
  28  .  ***                                                                              .
  29  .  ***    MATL:SA-508 CL. 3A  FOR SGR NOZZLE                                        .
  30  .  ***    MATL:SA-508 GR.2 CL.2  FOR  ( IF ANY) ST SPOOL NEAR NOZZLE                .
  31  .  ***    MATL:SA-336 GR.F22 CL.3-PIPE 16" SCH.80 FROM SGR NOZ THRU TOP ELB OF RISER .
  32  .  ***    MATL:SA-333 GR.6 AFTER TOP ELBOW OF RISER & REST: 16" SCH 80/ 18" SCH 80   .
  33  .  ***                                                                              .
  34  .  ***                                                                              .
  35  .  ***    MODEL STEAM GENERATOR LOOP D                                              .
  36  .  ****                                                                             .
  37  .  SAP    002           82.719                                                      .
  38  .  ***       001;002,N02 ARE NODES ON SGR CL;SGR SURFACE; FW NOZ END RESPECTIVELY   .
  39  .  ***                                                                              .
  40  .         002                                                                       .
  41  .         001 -7-3.208            -4-0.340          OD=199.42,THI=4.71,           .
  42  .                                                   LBS/FT=1.00,                  .
  43  .                                                   E=27.8E6,                     .
  44  .                                                   CODE=SC3N75,CLASS=2,          .
  45  .  ***      NOZZLE MATERIAL                         MAT=SA508-CL. 3A,             .
  46  .                                                   SC=22500,SH=22500,            .
  47  .                                                   DPRESS=1.0,PPRESS=1.0,        .
  48  .                                                   TEMP=567,EXP=4.2766,      *A  .  TAG NOT USED - CARD IGNORED
  49  .                                                   TEMP=440,EXP=3.068,       *B  .  THRM2
  50  .                                                   TEMP=250,EXP=1.40,        *C  .  THRM3
  51  .                                                   TEMP=120,EXP=0.362,       *D  .  TAG NOT USED - CARD IGNORED
  52  .                                                   TEMP=583,EXP=4.433,       *E  .  TAG NOT USED - CARD IGNORED
  53  .  ***                                              TEMP=408,EXP=2.774,       *F  .
  54  .                                                   TEMP=390,EXP=2.612,       *F  .  THRM6
  55  .                                                   EXP=-0.2908,TEMP=32,      *G  .  TAG NOT USED - CARD IGNORED
```

```
  56  .                                                  TEMP=70,EXP=0.,              *N  .  TAG NOT USED - CARD IGNORED
  57  .                                                  TEMP=70.,EXP=0.,             *O  .  TAG NOT USED - CARD IGNORED
  58  .  ***                                                                                .
  59  .  ***    LINE NO. 18'FW-1014-GA2                                                     .
  60  .  ANC    001 0.832      1.980       1.893                                      *N  .  WT1     THRM2  THRM3  THRM6  TIME1
  61  .  ANC    001                                                                   *O  .  TAG NOT USED - CARD IGNORED
  62  .  ANC    001                                                                   *R  .  TAG NOT USED - CARD IGNORED
  63  .                                                  COSAX=0.8746,COSAZ=0.4848,                .
  64  .                                                  COSCX=-.4848,COSCZ=0.8746,                .
  65  .                                                  RSNAME=SGROBE,               *S  .  TAG NOT USED - CARD IGNORED
  66  .                                                  RSNAME=SGRESE,               *T  .  TAG NOT USED - CARD IGNORED
  67  .                                                  DTITLE=CENTER  SG,                        .
  68  .                                                  DX=.299,DY=.0150,DZ=.333,    *X  .  TAG NOT USED - CARD IGNORED
  69  .                                                  DX=.488,DY=.031,DZ=.537.     *Y  .  TAG NOT USED - CARD IGNORED
  70  .                                                  PHASE=SG,                                 .
  71  .                                                  ROT-X=0.313E-3,              *N  .  WT1     THRM2  THRM3  THRM6  TIME1
  72  .                                                  ROT-Y=0.332E-3,              *N  .  WT1     THRM2  THRM3  THRM6  TIME1
  73  .                                                  ROT-Z=-0.165E-3,             *N  .  WT1     THRM2  THRM3  THRM6  TIME1
  74  .                                                  RTI-1R121NSG101D,                         .
  75  .  ****************                                                                    .
  76  .  ***     BEGIN     FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION      .
  77  .  ****************                                                                    .
  78  .     002N02  1.3790              0.7644           SIF=1.502,                       .
  79  .                                                  OD=16.0,THICK=.843,              .
  80  .                                                  LBS/FT=210.66,                   .
  81  .                                                  DTITLE=FW NOZZLE,                .
  82  .                                                  DPRESS=1350,PPRESS=1360,         .
  83  .  DLD.   N02 0.8746                  0.4848      TFOR= 15,MULTI=1.,               .
  84  .         005 0-7.325                 0-4.061   L  JOINT=BTWELD,                    .
  85  .  ***                                           MAT=SA336-GR.F22,                .
  86  .                                                SC=18800,SH=17817,               .
  87  .                                                E=30.6E6,                        .
  88  .                                                TEMP=567,EXP=4.3864,         *A  .  TAG NOT USED - CARD IGNORED
  89  .                                                TEMP=440,EXP=3.160,          *B  .  THRM2
  90  .                                                TEMP=250,EXP=1.45,           *C  .  THRM3
  91  .                                                TEMP=120,EXP=0.378,          *D  .  TAG NOT USED - CARD IGNORED
  92  .                                                TEMP=583,EXP=4.534,          *E  .  TAG NOT USED - CARD IGNORED
  93  .  ***                                           TEMP=408,EXP=2.872,          *F  .
  94  .                                                TEMP=390,EXP=2.710,          *F  .  THRM6
  95  .                                                EXP=-0.2892,TEMP=32,         *G  .  TAG NOT USED - CARD IGNORED
  96  .                                                TEMP=70,EXP=0.,              *H  .  TAG NOT USED - CARD IGNORED
  97  .                                                TEMP=70.,EXP=0.,             *O  .  TAG NOT USED - CARD IGNORED
  98  .         006 S-0.904                 -0-10.192   L  JOINT=BTWELD,                    .
  99  .  ***       SA333-GR.6                                                               .
 100  .  DLD    006 0.9863                   -0.1651       TFOR= 14,MULTI=1.,               .
 101  .         007              -11-10-5/8                SEQ=2,                           .
 102  .                                                SC=15000,SH=15000,               .
 103  .                                                E=27.9E6,                        .
 104  .                                                TEMP=567,EXP=4.2766,         *A  .  TAG NOT USED - CARD IGNORED
 105  .                                                TEMP=440,EXP=3.068,          *B  .  THRM2
 106  .                                                TEMP=250,EXP=1.40,           *C  .  THRM3
 107  .                                                TEMP=120,EXP=0.382,          *D  .  TAG NOT USED - CARD IGNORED
 108  .                                                TEMP=583,EXP=4.433,          *E  .  TAG NOT USED - CARD IGNORED
 109  .  ***                                           TEMP=408,EXP=2.774,          *F  .
 110  .                                                TEMP=390,EXP=2.612,          *F  .  THRM6
 111  .                                                EXP=-0.2908,TEMP=32,         *G  .  TAG NOT USED - CARD IGNORED
 112  .                                                TEMP=70,EXP=0.,              *H  .  TAG NOT USED - CARD IGNORED
 113  .                                                TEMP=70.,EXP=0.,             *O  .  TAG NOT USED - CARD IGNORED
 114  .                                                OD=16.0,THICK=.843,              .
 115  .                                                LBS/FT=210.66,                   .
 116  .                                                ADDWT=274,                       .
```

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117 . RAD   007 .8480                  -.5299                         AA-715E3,ETI-HL5016,            .
118 .                                                                 AA-715E3,ETI-HL5016,            .
119 .                                                                 RSNAME-IS830E,            *S . TAG NOT USED - CARD IGNORED
120 .                                                                 RSNAME-IS838S,            *T . TAG NOT USED - CARD IGNORED
121 . DLD   007              -1.0                                     TFOR= 13,MULTI=1.,              .
122 .       07G              -4-1-3/8                                 JOINT=BTWELD,                   .
123 .       07H              -8-10-5/8                                SEG=2,                          .
124 . RAD   07H  -0.707                  0.707                                                        .
125 .                                                                 AA=1451E3,ETI=HL5015,           .
126 .                                                                 RSNAME=IS830E,            *S . TAG NOT USED - CARD IGNORED
127 .                                                                 RSNAME=IS838S,            *T . TAG NOT USED - CARD IGNORED
128 . RAD   07K -0.707                   -0.707                                                       .
129 .                                                                 AA-2367E3,ETI-HL5015,           .
130 .                                                                 RSNAME-IS830E.            *S . TAG NOT USED - CARD IGNORED
131 .                                                                 RSNAME-IS838S,            *T . TAG NOT USED - CARD IGNORED
132 .       009              -5-4                                                                     .
133 .                                                                 ADDWT-450,                      .
134 . SPD   009               1.0                                                                     .
135 .                                                                 ETI-HL5014,                     .
136 .       09A              -2-6                              L      JOINT-BTWELD,                   .
137 .       09B  -5-9.11                 0-7.386               L      JOINT-BTWELD,                   .
138 . DLD   09B  -0.9943                 0.1063                       TFOR= 12,MULTI=1.,              .
139 .       09C              -5-0                                     JOINT=BTWELD,                   .
140 .       010              -0-9-3/16                                JOINT=RED,                      .
141 .                                                                 DTI-CUT LOCN,                   .
142 . ***      END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION                     .
143 . ****************                                                                                .
144 .     . 011              -1-3                                     JOINT=BTWELD,                   .
145 .                                                                 OD=18.0,THICK=0.937,            .
146 .                                                                 LBS/FT-264.2,                   .
147 . ***                                                             LBS/FT-272.95,                  .
148 .       012              -0-7                                     SIF-1.0,                        .
149 .                                                                 ADDWT-25,                       .
150 .       12A              -1-0                                     SIF-1.0,                        .
151 .                                                                 ADDWT-25,                       .
152 . DLD   12A              -1.0                                     TFOR= 11,MULTI-1.,              .
153 .       013              -1-0                                     SIF-1.0,                        .
154 .                                                                 ADDWT-50,                       .
155 .       014              -4-0                           L                                         .
156 .                                                                 JOINT-BTWELD,                   .
157 .       015 -2.732                   1.1211                       DTITLE-FW9018SS0001,            .
158 .                                                                 ADDWT-550,                      .
159 . SNB   015 0.3796                   0.9251                       AA-632.37E03,                   .
160 .                                                                 RSNAME-INTOBE,            *S . TAG NOT USED - CARD IGNORED
161 .                                                                 RSNAME-INTSSE,            *T . TAG NOT USED - CARD IGNORED
162 .       030 -1.1564                  0.4745                       DTITLE-FW9018SH0001,            .
163 .                                                                 ADDWT-116,                      .
164 . ***SPD   030              1.0                                                                   .
165 . SPR   030              1.0                                      FORCE-8136.,AA-1.,              .
166 .       028 -1.007                   0.42325                                                      .
167 .                                                                 DTITLE-1.SFW1075GA2,            .
168 .                                                                 SIF-1.0,ADDWT-25,               .
169 .       029 -0.9254                  0.3746                       SIF-1.0,ADDWT-25,               .
170 .       032 -1.3877                  0.5695                       SIF-1.0,                        .
171 .                                                                 ADDWT-25,                       .
172 .       035 -0.8866                  0.3638                                                       .
173 .                                                                 DTITLE-FW9018HL5009,            .
174 .                                                                 ADDWT-935,                      .
175 . SNB   035              1.0                                      AA-1301.5E03,                   .
176 .                                                                 RSNAME-INTOBE,            *S . TAG NOT USED - CARD IGNORED
177 .                                                                 RSNAME-INTSSE,            *T . TAG NOT USED - CARD IGNORED
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```
178  .  DLD   035  -0.9251              0.3796
179  .        040 -0.62639              0.2570
180  .
181  .
182  .
183  .  SNB   040 0.3796                0.9251
184  .
185  .
186  .        045 -4.96297              2.03659    L
187  .
188  .        050           6-1-13/16
189  .
190  .                                    .
191  .
192  .  SNB   050                       1.0
193  .
194  .
195  .  DLD   050           1.0
196  .        055           2-0
197  .
198  .
199  .
200  .  SNB   055 1.0
201  .
202  .
203  .        060           3-2                    L
204  .
205  .     .  065 -2-8-1/4
206  .
207  .  SNB   065           1.0
208  .
209  .
210  .        067 -1-3
211  .        070 -1-0
212  .
213  .
214  .
215  .  ***EPD   070             1.0
216  .  EPR   070           1.0
217  .        071 -3-3-3/8
218  .        072 -8-11-5/8
219  .  DLD   072 -1.0
220  .        075 -7-4
221  .
222  .
223  .
224  .  RAD   075           1.0
225  .
226  .
227  .        080 -3-2-3/4                           L
228  .
229  .        085 -0.9023               0.9023
230  .
231  .  SNB   085 -0.7071               -0.7071
232  .
233  .
234  .  DLD   085  -0.7071              0.7071
235  .        086 -0.4971              0.4971
236  .        087 -2.4749              2.4749
237  .
238  .        090 -1.76777              1.76777    L
```

```
TFOR- 10,MULTI-1.,                    .
                                      .
DTITLE-FW9018HL5004,                  .
SEGMNT-2,                             .
ADDWT-527,                            .
AA-708.56E03,                         .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
                                      .
JOINT-BTWELD,                         .
                                      .
DTITLE-FW9018HL5007,                  .
ADDWT-794,                            .
SIF-2.1,                              .
AA-1520.64E03,                        .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
TFOR-  9,MULTI-1.,                    .
                                      .
DTITLE-FW9018HL5008,                  .
SEGMNT-2,                             .
ADDWT-888,                            .
AA-561E03,                            .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
                                      .
JOINT-BTWELD,                         .
DTITLE-FW9018SS0006,                  .
ADDWT-496,                            .
AA-502.00E03,                         .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
JOINT-BTWELD,                         .
                                      .
DTITLE-FW9018SH0002,                  .
SEGMNT-2,                             .
ADDWT-146,                            .
                                      .
FORCE-9636.,AA-1.,                    .
JOINT-BTWELD,                         .
JOINT-BTWELD,SEG-2,                   .
TFOR-  8,MULTI-1.,                    .
                                      .
DTITLE-FW9018HL5005,                  .
SEGMNT-2,                             .
ADDWT-413,                            .
AA-876.84E03,                         .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
                                      .
JOINT-BTWELD,                         .
DTITLE-FW9018SS0007,                  .
ADDWT-870,                            .
AA-931.62E03,                         .
RSNAME-INTOBE,              *S  .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,              *T  .  TAG NOT USED - CARD IGNORED
TFOR-  7,MULTI-1.,                    .
                                      .
DTITLE-SLEEVE8280,                    .
SEGMNT-2,                             .
                                      .
```

```
  .                                              JOINT=BTWELD,                     .
  .        094 -7.4614              -7.4614                                        .
  .                                              DTITLE=FW9018HL5002,              .
  .                                              SEGMNT=2,                         .
  .                                              ADDWT=266,                        .
  . RAD    094             1.0                   AA=1285E03,                       .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  . DLD    094  -0.7071             -0.7071      TFOR=  6,MULTI=1.,                .
  .        092 -1.04593             -1.04593     DTITLE=FW9018HL5003,              .
  .                                              ADDWT=507,                        .
  .                                              SEGMNT=2,                         .
  . SNB    092 -0.7071              0.7071       AA=490.87E03,                     .
  .                                              RSNAME=INTOBE.               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  .        095 -10.09837            -10.09837  L SEGMNT=2,                         .
  .                                              JOINT=BTWELD,                     .
  .        097 -4-6                              DTITLE=FW9018HL5006,              .
  .                                              ADDWT=832,                        .
  .                                              SIF=2.1,                          .
  . SNB    097                      1.0          AA=614E03,                        .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  . DLD    097 -1.0                              TFOR=  5,MULTI=1.,                .
  .        099 -7-0                              SEG=2,                            .
  .                                              DTITLE=FW1018HL5001,              .
  .                                              ADDWT=344,                        .
  . RAD.   099             1.0                   AA=532.80E03,                     .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  .        100 -3-9                            L                                   .
  .                                              JOINT=BTWELD,                     .
  .        101                      -3-1-5/8     DTITLE=FW9018HL5013,              .
  .                                              ADDWT=865,                        .
  . RAD    101 0.8875        0.4608              AA=3620.0E03,                     .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  .        11A                      -0-10        DTITLE=FW9018HL5013,              .
  .                                              ADDWT=865,                        .
  . RAD    11A 0.8090        -0.5878             AA=798.00E03,                     .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  . DLD    11A                      -1.0         TFOR=  4,MULTI=1.,                .
  .        11B                      -1-7         DTITLE=ABAND STANCH,              .
  .                                              ADDWT=244,                        .
  .        102                      -3-2-3/8   L                                   .
  .                                              JOINT=BTWELD,                     .
  .        10A -4-1-1/2                          DTITLE=FW9018HL5012,              .
  .                                              ADDWT=465,                        .
  . RAD    10A                      1.0          AA=1128.4E03,,                    .
  .                                              RSNAME=INTOBE,               *S   .  TAG NOT USED - CARD IGNORED
  .                                              RSNAME=INTSSE,               *T   .  TAG NOT USED - CARD IGNORED
  . DLD    10A -1.0                              TFOR=  2,MULTI=1.,                .
  .        105 -5-9                              SIF=1.9,                          .
  .        110 -0-4-5/8                          SIF=1.9,DTITLE=PEN M-5,           .
  . ANC    110 .037895   -.06168    -.01050                                   *N   .  WT1    THRM2  THRM3  THRM6  TIME1
  . ANC    110 -.26115   .2352      .07226                                    *P   .  TAG NOT USED - CARD IGNORED
  . ANC    110                                                                *R   .  TAG NOT USED - CARD IGNORED
  .                                              COSAX=1,COSAZ=0,                  .
  .                                              COSCX=0,COSCZ=1,                  .
  .                                              AA=6.4E6,AB=6.4E6,AC=6.4E6,       .
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INPUT CARD IMAGES                                              ME101/N4  OAEU/S4     (EK1703) 07/08/98 EK1703  PAGE    6

 300  .                                                ARA=7.45E9,ARB=7.45E9,            .
 301  .                                                ARC=7.45E9,                       .
 302  .                                                DX=.0268,DY=.00337,DZ=.0351,*X    .  TAG NOT USED - CARD IGNORED
 303  .                                                DX=.0482,DY=.00577,DZ=.0602,*Y    .  TAG NOT USED - CARD IGNORED
 304  .                                                PHASE=CONT,                       .
 305  .                                                RENAME=CMTONE,                *S  .  TAG NOT USED - CARD IGNORED
 306  .                                                RENAME=CMTSSE,                *T  .  TAG NOT USED - CARD IGNORED
 307  .  ****                                                                            .
 308  .  ****                                                                            .
 309  .  ********                                                                        .
 310  .  ****                                                                            .
 311  .  ****                                                                            .
****  .  ********                                                                        .
****  .  CMB                                           C0=0.*TERM2.
****  .  CMB                                           SEIST=1.0*TIME1,                  .
****  .  CMB                                           C1=TERM2&TERM3&TERM6              .
****  .                                                &C0,                              .
****  .  CMB                                           C2=TERM2#TERM3#TERM6              .
****  .                                                #C0,                              .
****  .  CMB                                           C3=WT1+C1,                        .
****  .  CMB                                           C4=WT1+C2,                        .
****  .  CMB                                           C5=C3+TIME1,                      .
****  .  CMB                                           C6=C4-TIME1,                      .
****  .  CMB                                           FAULTP=C0&C5,                     .
****  .  CMB                                           FAULTN=C0#C6,                     .
****  .  RLS                                           LIST=WT1+TERM7+TIME1+FAULTP+      .
****  .                                                FAULTN,                           .
****  .  STD.                                          LIST=NONE,                        .
****  .  SLA                                           INCLUDE=WT1,                      .
****  .  OLA                                           INCLUDE=WT1+SEIST,LEVEL=D,        .
****  .  END                                                                             .
****  .  *********************************************************************         .
```

ADD MFWDW.FOR

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ME101

I N P U T C A R D I M A G E S

```
INPUT
CARD     1         11        21        31        41        51        61        71      80
 SEQ  .  +         +         +         +         +         +         +         +       +  .  LOAD CASE(S)
   1  .  ************************************************************************** .
   2  .  ***    DATA FILE FOR UNIT-1                                 MFWDL.INP       .
   3  .  ***   WESTINGHOUSE AXES: X WEST; Y VERT UP; Z NORTH                        .
   4  .  ***   TIMEL1: LOCA DISP/ROT HISTORY RHRBRK4 FOR FW NOZZLE (W NODE 7632)    .
   5  .  ***   TIMEL2: LOCA DISP/ROT HISTORY RHRBRK15 FOR FW NOZZLE (W NODE 7632)   .
   6  .  ***   TIMEL3: LOCA DISP/ROT HISTORY RHRBRK12 FOR FW NOZZLE (W NODE 7632)   .
   7  .  ************************************************************************** .
   8  .  CTL                                              OUTPUT-SHORT.             .
   9  .  NED                                              TITLE-FEEDWATER "FW" SYSTEM - .
  10  .                                                   SG 3D TO M5,              .
  11  .                                                   PROJNO-23438001,          .
  12  .                                                   PROBNO-2C159RC5037,       .
  13  .                                                   USER-FANI,                .
  14  .                                                   UNITS-2,                  .
  15  .                                                   COEF-CS4,                 .
  16  .                                                   MODES-150,                .
  17  .                                                   DAMP=.03,                 .
  18  .                                                   TPER=.0050,TZERO=0.,TFIN=.65, \ .
  19  .  RUN                                              LDCASE-WT1(N),            .
  20  . ,RUN                                              LDCASE-TIMEL1(T),         .
  21  .  RUN                                              LDCASE-TIMEL2(U),         .
  22  .  RUN                                              LDCASE-TIMEL3(V),         .
  23  .  ***                                                                        .
  24  .  ***   WT1   --- NORMAL OPERATING WEIGHT ANALYSIS                           .
  25  .  ***                                                                        .
  26  .  ***   CAD. ISO.  3CJ69PFW433 SHT.01 REV. 4                                 .
  27  .  ***                                                                        .
  28  .  ***   MATL:SA-508 CL. 3A  FOR SGR NOZZLE                                   .
  29  .  ***   MATL:SA-508 GR.2 CL.2  FOR  ( IF ANY) ST SPOOL NEAR NOZZLE           .
  30  .  ***   MATL:SA-336 GR.F22 CL.3-PIPE 16" SCH.80 FROM SGR NOZ THRU TOP ELB OF RISER .
  31  .  ***   MATL:SA-333 GR.6 AFTER TOP ELBOW OF RISER & REST: 16" SCH 80/ 18" SCH 80 .
  32  .  ***                                                                        .
  33  .  ***                                                                        .
  34  .  ***   MODEL STEAM GENERATOR LOOP D                                         .
  35  .  ****                                                                       .
  36  .  $AP   002            82.719                                               .
  37  .  ***      001,002,NO2 ARE NODES ON SGR CL,SGR SURFACE; FW NOZ END RESPECTIVELY .
  38  .  ***                                                                        .
  39  .        002                                                                 .
  40  .        001 -7-3.208             -4-0.340          OD=199.42,THI=4.71,       .
  41  .                                                   LBS/FT=1.00,              .
  42  .                                                   E=27.6E6,                 .
  43  .                                                   CODE=SCJN75,CLASS=2,      .
  44  .  ***     NOZZLE MATERIAL                          MAT=SA508-CL. 3A,         .
  45  .                                                   SC=22500,SH=22500,        .
  46  .                                                   DPRESS=1.0,PPRESS=1.0,    .
  47  .  ***                                                                        .
  48  .  ***   LINE NO. 18"FW-1014-GA2                                              .
  49  .  ANC   001                                                          *N  .  WT1
  50  .                                                   DTITLE=CENTER  SG,        .
  51  .                                                   PHASE=SG,             *X  .  TAG NOT USED - CARD IGNORED
  52  .                                                   DX=.030,DY=.0300,DZ=.030, *X  .  TAG NOT USED - CARD IGNORED
  53  .                                                   SRX=.00010,SRY=.00050,    *X  .  TAG NOT USED - CARD IGNORED
  54  .                                                   SRZ=.00010,               *X  .  TAG NOT USED - CARD IGNORED
  55  .                                                   PHASE=SG,             *R  .  TAG NOT USED - CARD IGNORED
```

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 56  .                                                    DX=.009,DY=.0530,DZ=.011,    *R  .  TAG NOT USED - CARD IGNORED
 57  .                                                    SRX=.00053,SRY=.00262,       *R  .  TAG NOT USED - CARD IGNORED
 58  .                                                    SRZ=.00008,                  *R  .  TAG NOT USED - CARD IGNORED
 59  .                                                    PHASE=SG,                    *P  .  TAG NOT USED - CARD IGNORED
 60  .                                                    DX=.009,DY=.0530,DZ=.011,    *P  .  TAG NOT USED - CARD IGNORED
 61  .                                                    SRX=.00053,SRY=.00050,       *P  .  TAG NOT USED - CARD IGNORED
 62  .                                                    SRZ=.00008,                  *P  .  TAG NOT USED - CARD IGNORED
 63  .                                                    RTI=1R121NSG101D,                .
 64  .  ****************                                                                     .
 65  .  ***    BEGIN    FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION        .
 66  .  ****************                                                                     .
 67  .  RAD   001 1.0                                     TDIS=B43,                    *T  .  TIMEL1
 68  .  RAD   001              1.0                         TDIS=B42,                    *T  .  TIMEL1
 69  .  RAD   001                        1.0               TDIS=B41,                    *T  .  TIMEL1
 70  .  RAR   001 1.0                                      TROT=B46,                    *T  .  TIMEL1
 71  .  RAR   001              1.0                         TROT=B45,                    *T  .  TIMEL1
 72  .  RAR   001                        1.0               TROT=B44,                    *T  .  TIMEL1
 73  .  RAD   001 1.0                                      TDIS=B53,                    *U  .  TIMEL2
 74  .  RAD   001              1.0                         TDIS=B52,                    *U  .  TIMEL2
 75  .  RAD   001                        1.0               TDIS=B51,                    *U  .  TIMEL2
 76  .  RAR   001 1.0                                      TROT=B56,                    *U  .  TIMEL2
 77  .  RAR   001              1.0                         TROT=B55,                    *U  .  TIMEL2
 78  .  RAR   001                        1.0               TROT=B54,                    *U  .  TIMEL2
 79  .  RAD   001 1.0                                      TDIS=B23,                    *V  .  TIMEL3
 80  .  RAD   001              1.0                         TDIS=B22,                    *V  .  TIMEL3
 81  .  RAD   001                        1.0               TDIS=B21,                    *V  .  TIMEL3
 82  .  RAR   001 1.0                                      TROT=B26,                    *V  .  TIMEL3
 83  .  RAR.  001              1.0                         TROT=B25,                    *V  .  TIMEL3
 84  .  RAR   001                        1.0               TROT=B24,                    *V  .  TIMEL3
 85  .     002N02  1.3790                0.7644            SIF=1.502,                       .
 86  .                                                    OD=16.0,THICK=.843,              .
 87  .                                                    LBS/FT=210.66,                   .
 88  .                                                    DTITLE=FW NOZZLE,                .
 89  .                                                    DPRESS=1350,PPRESS=1360,         .
 90  .        005 0-7.325                 0-4.061     L   JOINT=BTWELD,                    .
 91  .  ***                                               MAT=SA336-GR.F22,                .
 92  .                                                    SC=18800,SH=17817,               .
 93  .                                                    E=30.6E6,                        .
 94  .        006 5-0.906                 -0-10.192   L   JOINT=BTWELD,                    .
 95  .  ***      SA333-GR.6                                                                 .
 96  .        007             -11-10-5/8                  SEG=2,                           .
 97  .                                                    SC=15000,SH=15000,               .
 98  .                                                    E=27.9E6,                        .
 99  .                                                    OD=16.0,THICK=.843,              .
100  .                                                    LBS/FT=210.66,                   .
101  .                                                    ADDWT=274,                       .
102  .  RAD   007 .8480                   -.5299                                           .
103  .                                                    AA=715E3,RTI=NLS016,             .
104  .        07G             -4-1-3/8                    JOINT=BTWELD,                    .
105  .        07H             -8-10-5/8                   SEG=2,                           .
106  .  RAD   07H  -0.707                  0.707                                          .
107  .                                                    AA=1451E3,RTI=NLS015,            .
108  .  RAD   07H -0.707                   -0.707                                         .
109  .                                                    AA=2367E3,RTI=NLS015,            .
110  .        009             -5-4                        ADDWT=450,                       .
111  .                                                                                     .
112  .  SPD   009              1.0                        RTI=NLS014,                      .
113  .                                                                                     .
114  .        09A             -2-6                    L   JOINT=BTWELD,                    .
115  .        09B  -5-9.11                0-7.386     L   JOINT=BTWELD,                    .
116  .        09C             -5-0                        JOINT=BTWELD,                    .
```

```
117  .        010            -0-9-3/16                      JOINT=RED,                              .
118  .                                                      DTI-CUT LOCN,                           .
119  .  ***       END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION                 .
120  .  ****************                                                                            .
121  .        011            -1-3                           JOINT=BTWELD,                           .
122  .                                                      OD=18.0,THICK=0.937,                    .
123  .                                                      LBS/FT=264.2,                           .
124  .  ***                                                 LBS/FT=272.95,                          .
125  .        012            -0-7                           SIF=1.0,                                .
126  .                                                      ADDWT=25,                               .
127  .        12A            -1-0                           SIF=1.0,                                .
128  .                                                      ADDWT=25,                               .
129  .        013            -1-0                           SIF=1.0,                                .
130  .                                                      ADDWT=50,                               .
131  .        014            -4-0                    L                                              .
132  .                                                      JOINT=BTWELD,                           .
133  .        015 -2.732                1.1211               DTITLE=FW9018SS0001,                    .
134  .                                                      ADDWT=550,                              .
135  .  SNB   015 0.3796               0.9251               AA=632.37E03,                           .
136  .        030 -1.1564               0.4745               DTITLE=FW9018SK0001,                    .
137  .                                                      ADDWT=116,                              .
138  .  ***SPD   030           1.0                                                                  .
139  .  SPR   030           1.0                             FORCE=8136.,AA=1.,                      .
140  .        028 -1.007                0.41325                                                     .
141  .                                                      DTITLE=1.5FW1075GA2,                    .
142  .                                                      SIF=1.0,ADDWT=25,                       .
143  .        029 -0.9254               0.3746               SIF=1.0,ADDWT=25,                       .
144  .        032 -1.3877               0.5695               SIF=1.0,                                .
145  .                                                      ADDWT=25,                               .
146  .        035 -0.8866               0.3638                                                       .
147  .                                                      DTITLE=FW9018HL5009,                    .
148  .                                                      ADDWT=935,                              .
149  .  SNB   035           1.0                             AA=1301.5E03,                           .
150  .        040 -0.62639              0.2570                                                       .
151  .                                                      DTITLE=FW9018HL5004,                    .
152  .                                                      SEGMENT=2,                              .
153  .                                                      ADDWT=527,                              .
154  .  SNB   040 0.3796               0.9251               AA=708.56E03,                           .
155  .        045 -4.96297              2.03659    L                                                .
156  .                                                      JOINT=BTWELD,                           .
157  .        050            6-1-13/16                                                              .
158  .                                                      DTITLE=FW9018HL5007,                    .
159  .                                                      ADDWT=794,                              .
160  .                                                      SIF=2.1,                                .
161  .  SNB   050                       1.0                 AA=1520.64E03,                          .
162  .        055            2-0                                                                    .
163  .                                                      DTITLE=FW9018HL5008,                    .
164  .                                                      SEGMENT=2,                              .
165  .                                                      ADDWT=889,                              .
166  .  SNB   055 1.0                                       AA=541E03,                              .
167  .        060            3-2                     L                                              .
168  .                                                      JOINT=BTWELD,                           .
169  .        065 -2-8-1/4                                  DTITLE=FW9018SS0006,                    .
170  .                                                      ADDWT=496,                              .
171  .  SNB   065           1.0                             AA=502.00E03,                           .
172  .        067 -1-3                                      JOINT=BTWELD,                           .
173  .        070 -1-0                                                                              .
174  .                                                      DTITLE=FW9018SK0002,                    .
175  .                                                      SEGMENT=2,                              .
176  .                                                      ADDWT=146,                              .
177  .  ***SPD   070           1.0                                                                  .
```

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178  .  SPR   070            1.0
179  .       071 -3-3-3/8
180  .       072 -8-11-5/8
181  .       075 -7-4
182  .
183  .
184  .
185  .  RAD   075            1.0
186  .       080 -3-2-3/4                              L
187  .
188  .       085 -0.9023                0.9023
189  .
190  .  SNB   085 -0.7071               -0.7071
191  .       086 -0.4971                0.4971
192  .       087 -2.4749                2.4749
193  .
194  .       090 -1.76777               1.76777        L
195  .
196  .       094 -7.4614                -7.4614
197  .
198  .
199  .
200  .  RAD   094            1.0
201  .       092 -1.04593               -1.04593
202  .
203  .
204  .  SNB   092 -0.7071               0.7071
205  .       095 -10.09837              -10.09837      L
206  .
207  .       097 -4-6
208  .
209  .
210  .  SNB   097                       1.0
211  .       099 -7-0
212  .
213  .
214  .  RAD   099            1.0
215  .       100 -3-9                                  L
216  .
217  .       101                        -3-1-5/8
218  .
219  .  RAD   101 0.8875       0.4608
220  .       11A                        -0-10
221  .
222  .  RAD   11A 0.8090       -0.5878
223  .       11B                        -1-7
224  .
225  .       102                        -3-2-3/8       L
226  .
227  .       10A -4-1-1/2
228  .
229  .  RAD   10A                        1.0
230  .       105 -5-9
231  .       110 -0-4-5/8
232  .  ANC   110 .037695    -.06168    -.01050
233  .  ANC   110
234  .  ANC   110
235  .  ANC   110
236  .
237  .
238  .
```

```
FORCE=9636.,AA=1.,                                  .
JOINT=BTWELD,                                       .
JOINT=BTWELD,SEG=2,                                 .
                                                    .
DTITLE=FW9018HL5005,                                .
SEGMNT=2,                                           .
ADDWT=413,                                          .
AA=876.86E03,                                       .
                                                    .
JOINT=BTWELD,                                       .
DTITLE=FW9018SS0007,                                .
ADDWT=870,                                          .
AA=931.62E03,                                       .
                                                    .
DTITLE=SLEEVE#280,                                  .
SEGMNT=2,                                           .
                                                    .
JOINT=BTWELD,                                       .
                                                    .
DTITLE=FW9018HL5002,                                .
SEGMNT=2,                                           .
ADDWT=266,                                          .
AA=1265E03,                                         .
DTITLE=FW9018HL5003,                                .
ADDWT=507,                                          .
SEGMNT=2,                                           .
AA=490.87E03,                                       .
SEGMNT=2,                                           .
JOINT=BTWELD,                                       .
DTITLE=FW9018HL5006,                                .
ADDWT=832,                                          .
SIF=2.1,                                            .
AA=614E03,                                          .
SEG=2,                                              .
DTITLE=FW1018HL5001,                                .
ADDWT=344,                                          .
AA=532.80E03,                                       .
                                                    .
JOINT=BTWELD,                                       .
DTITLE=FW9018HL5013,                                .
ADDWT=865,                                          .
AA=3620.0E03,                                       .
DTITLE=FW9018HL5013,                                .
ADDWT=865,                                          .
AA=798.06E03,                                       .
DTITLE=ABAND STANCH,                                .
ADDWT=244,                                          .
                                                    .
JOINT=BTWELD,                                       .
DTITLE=FW9018HL5012,                                .
ADDWT=465,                                          .
AA=1128.4E03,,                                      .
SIF=1.9,                                            .
SIF=1.9,DTITLE=PEN M-5,                             .
                                          *N  .  NT1
                                          *T  .  TIMEL1
                                          *U  .  TIMEL2
                                          *V  .  TIMEL3
COSAX=1,COSAZ=0,                                    .
COSCX=0,COSCZ=1,                                    .
AA=6.4E6,AB=6.4E6,AC=6.4E6,                         .
```

```
239  .                                          ARA=7.45E9,ARB=7.45E9,
240  .                                          ARC=7.45E9,
241  .  ****
242  .  *****
243  .  ADD       7632BK4.MFL                                          *T  .  TIMEL1
244  .  ADD       7632B15.MFL                                          *U  .  TIMEL2
245  .  ADD       7632B12.MFL                                          *V  .  TIMEL3
246  .  ***       +-------------------------+-----------+-------------+      ***
247  .  CMB                                  SEISL=TIMEL1!TIMEL2!TIMEL3,
248  .  CMB                                  LOCA=AMAX(TIMEL1,TIMEL2,
249  .                                       TIMEL3),
250  .  STD                                  LIST=NONE,
251  .  RLB                                  LIST=WT1+TIMEL1+TIMEL2+
252  .                                       TIMEL3+LOCA,
253  .  OLA                                  INCLUD=WT1+SEISL,LEVEL=D,
254  .  ***
255  .  END
256  .  ********************************************************************************
257  .  ********************************************************************************
258  .  ********************************************************************************
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D TO PEN.# M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

ATTACHMENT 2.0 PIPE SUPPORT LOADS

TOTAL NO OF SHEETS

This sheet (51)	1
DESIGN/FAULTED LOAD FOR LOOP D (52-53)	2
WEIGHT/ THERMAL/SEISMIC/SAM (54-77)	24
WATER HAMMER (78-89)	12
LOCA (90-99)	10
TOTAL	49

Load Case Names:

WTX - Dead weight analysis
THRMxx - Thermal expansion/anchor movement analysis.
TIMEx - Time history analysis
SAMx - Seismic anchor movement analysis
SEISAX - Seismic inertia analysis
DBA - Design Basis Accident
LOCA - LOCA Analysis

NORMP - Normal Positive
NORMN - Normal Negative
UPSETP - Upset Positive
UPSETN - Upset Negative
FAULTP - Faulted Positive
FAULTN - Faulted Negative

Support Types:

RAD - Rigid translational restraint
RAR - Rigid rotational restraint
SPR/SPD - Spring hanger
SNB - Snubber
ANC - Anchor (may be specified as RAD and RAR in each of the three translational and rotational directions).

Co-ordinates: North = -X (Global)

Note: Spring settings are based on Normal operating (THRM2) case and verified for topping or bottoming out due to movements from all other load cases. Snubbers are set so that thermal movements are not restricted and reserve travel checked for max thermal movements.

DESIGN/FAULTED LOAD FOR LOOP D

SUPPORT MK #	DATA PT.	DIR.		WT.	THERMAL FAULTED **	JET LOAD (N/A)	LOCA	WATER HAMMER	FAULTED LOAD WT+TH+ LOCA	FAULTED LOAD WT+TH+ WH	FAULTED LOAD WT+TH+ SSE*	Design Load Exist P.S. Calc
FW-9018-SS-0001	015	LAT	POS	0	0		5468	17688	5468	17688	6074	24592
		SNB	NEG				-5468	-18086	-5468	-18086	-6074	
FW-9018-SH-0001	030	Y	POS		0			0	0	0	0	
		SPD	NEG	-8136					-8136	-8136	-8136	-8136
FW-9018-HL-5009	035	Y	POS	0	0		10880	75210	10880	75210	14237	51300
		SNB	NEG				-10880	-72456	-10880	-72456	-14237	
FW-9018-HL-5004	040	LAT	POS	0	0		6107	48236	6107	48236	5600	40690
		SNB	NEG				-6107	-52932	-6107	-52932	-5600	
FW-9018-HL-5007	050	Z	POS	0	0		5703	91399	5703	91399	9899	116000
		SNB	NEG				-5703	-89530	-5703	-89530	-9899	
FW-9018-HL-5008	055	X	POS	0	0		8422	108633	8422	108633	19624	143300
		SNB	NEG				-8422	-103548	-8422	-103548	-19624	
FW-9018-SS-0006	065	Y	POS	0	0		8632	67679	8632	67679	10105	33000
		SNB	NEG				-8632	-75981	-8632	-75981	-10105	
FW-9018-SH-0002	070	Y	POS		0			0	0	0	0	
		SPD	NEG	-9636					-9636	-9636	-9636	-8497
FW-9018-HL-5005	075	Y	POS		5799		1134	21131	6933	26930	4064	20525
		RIGID	NEG	-5341	-1213		-1134	-23795	-7688	-30349	-9000	
FW-9018-SS-0007	085	LAT	POS	0	0		3198	65625	3198	65625	12265	101500
		SNB	NEG				-3198	-56691	-3198	-56691	-12265	
FW-9018-HL-5002	094	Y	POS		607		1077	25549	1584	26056	0	48026
		RIGID	NEG	-8351	-5402		-1077	-23100	-14830	-36853	-17149	
FW-9018-HL-5003	092	LAT	POS	0	0		1833	52338	1833	52338	4421	64660
		SNB	NEG				-1833	-39175	-1833	-39175	-4421	
FW-9018-HL-5006	097	Z	POS	0	0		1182	33280	1182	33280	6700	104130
		SNB	NEG				-1182	-37673	-1182	-37673	-6700	
FW-9018-HL-5001	099	Y	POS		9133		605	24471	9738	33604	12774	36200
		RIGID	NEG	-5627	0		-605	-18759	-5232	-24386	-14895	
FW-9018-HL-5013	101	X,+Y	POS		0		1231	87605	1231	87605	5341	178720
		RIGID	NEG	-2396	-4658		-1231	-76222	-8285	-83276	-15111	
FW-9018-HL-5012	10A	Z	POS	59	20097		330	61340	20486	81496	36227	71860
		RIGID	NEG		0		-330	-57358	-330	-57358	-18391	
FW-9018-HL-5013	101	X,-Y	POS	3894	26863		840	40055	31597	70812	65609	118800
	(11A)	RIGID	NEG		0		-840	-44549	-840	-44549	-30959	
FW-1018-HL-5016	007		POS		454		8080	28144	8534	28598	20215	N/A
		RIGID	NEG	-262	-12239		-8080	-24219	-20581	-36720	-34587	N/A
FW-1018-HL-5016	07H	N-W	POS		0		7225	45957	7225	45957	8480	N/A
		RIGID	NEG	-72	-6557		-7225	-38248	-13854	-44877	-15181	N/A
FW-1018-HL-5015	07H	N-E	POS	62	0		19688	36562	19750	35624	5386	N/A
		RIGID	NEG		-13019		-19688	-29972	-32707	-42991	-18282	N/A
FW-1018-HL-5014	009		POS		0			0	0	0	0	N/A
		SPD	NEG	-9528					-9528	-9528	-9528	N/A

See Notes on the following sheet

NOTES for faulted loads on EXCEL sheet:

1. The positive faulted loads (with water hammer combination & with LOCA+Jet combination) conservatively did not include dead weight. If required, dead weight can be included to reduce conservatism.

2. WT+TH+SSE* : Higher of WT+TH+SRSS(SSEI &SSESAM) or WT+TH+DBA. Refer to Computer Run# S03406 Dt. 10/28/97 for pipe displacements and individual & combined loads

3. WT+TH+LOCA + JET:
Refer to Computer Run# MG4946 Dt. 05/22/98 for pipe displacements and individual loads

4. WT+TH+WH : This faulted combination with Water Hammer conservatively included THRM1 thru THRM6(**). If required, the conservatism can be reduced by including only those Thermals (THRM2, or THRM3, or THRM6) which could be concurrent with Water Hammer. (ex. HL5012 node 10A) Refer to Computer Run# 8K1703 Dt. 07/08/98 for pipe displacements and individual & combined loads.

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PAMI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
001	ANC		1R121MSG101D									
		WT1		18.	-1085.	-52.	5371.	588	-8940	000	.000	.000
		THRM1		-6019.	-41.	-3400.	64230.	47918.	-52469.	.832	1.980	1.893
		THRM2		-3220.	-589.	-4361.	69202.	66147.	-47656.	.832	1.980	1.893
		THRM3		661.	-1346.	-5697.	76100.	91520.	-40953.	.832	1.980	1.893
		THRM4		3058.	-1805.	-6529.	80368.	107350.	-36764.	.832	1.980	1.893
		THRM5		-6370.	29.	-3282.	63610.	45696.	-53053.	.832	1.980	1.893
		THRM6		-2549.	-722.	-4589.	70391.	70455.	-46522.	.832	1.980	1.893
		THRM7		4600.	-2113.	-7054.	83103.	117306.	-34139.	.832	1.980	1.893
		DBA		129.	89.	210.	1066.	1660.	991.	.000	.000	.000
		SEISA1		1966.	4219.	1931.	33094.	22542.	51864.	.000	.000	.000
		SEISA2		4645.	9955.	4610.	78126.	54438.	122756.	.000	.000	.000
		SAM1		6353.	2117.	7461.	28399.	81615.	26197.	.299	.015	.333
		SAM2		10337.	3506.	12129.	46564.	132510.	43455.	.488	.031	.537
007	RAD		HL5016									
		WT1		-222.	0.	139.	0.	0.	0.	-.001	-.001	-.001
		THRM1		-9.	0.	6.	0.	0.	0.	.680	1.280	1.089
		THRM2		-3199.	0.	1999.	0.	0.	0.	.649	1.454	1.048
		THRM3		-7629.	0.	4767.	0.	0.	0.	.605	1.694	.992
		THRM4		-10379.	0.	6486.	0.	0.	0.	.578	1.842	.958
		THRM5		385.	0.	-241.	0.	0.	0.	.684	1.258	1.094
		THRM6		-3958.	0.	2474.	0.	0.	0.	.641	1.496	1.039
		THRM7		-12129.	0.	7579.	0.	0.	0.	.561	1.938	.935
		DBA		1002.	0.	626.	0.	0.	0.	.002	.000	.001
		SEISA1		1501.	0.	938.	0.	0.	0.	.026	.031	.040
		SEISA2		3435.	0.	2147.	0.	0.	0.	.062	.075	.095
		SAM1		10228.	0.	6391.	0.	0.	0.	.090	.052	.142
		SAM2		16629.	0.	10391.	0.	0.	0.	.146	.085	.230
07H	RAD		HL5015									
		WT1		51.	0.	-51.	0.	0.	0.	.000	.000	.000
		THRM1		4613.	0.	-4613.	0.	0.	0.	.007	.724	.001
		THRM2		4471.	0.	-4471.	0.	0.	0.	.006	1.055	.000
		THRM3		4283.	0.	-4283.	0.	0.	0.	.005	1.512	-.001
		THRM4		4183.	0.	-4183.	0.	0.	0.	.005	1.792	-.001
		THRM5		4636.	0.	-4636.	0.	0.	0.	.007	.682	.001
		THRM6		4431.	0.	-4431.	0.	0.	0.	.006	1.135	.000
		THRM7		4096.	0.	-4096.	0.	0.	0.	.004	1.976	-.001
		DBA		1306.	0.	1306.	0.	0.	0.	.001	.000	.001
		SEISA1		1702.	0.	1702.	0.	0.	0.	.001	.032	.001
		SEISA2		3769.	0.	3769.	0.	0.	0.	.001	.076	.003
		SAM1		2905.	0.	2905.	0.	0.	0.	.002	.051	.002
		SAM2		4729.	0.	4729.	0.	0.	0.	.004	.085	.003

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
07H	RAD		HL5015									
		WT1		-44.	0.	-44.	0.	0.	0.	.000	.000	.000
		THRM1		9019.	0.	9019.	0.	0.	0.	.007	.724	.001
		THRM2		7574.	0.	7574.	0.	0.	0.	.006	1.055	.000
		THRM3		5581.	0.	5581.	0.	0.	0.	.005	1.512	-.001
		THRM4		4367.	0.	4367.	0.	0.	0.	.005	1.792	-.001
		THRM5		9206.	0.	9206.	0.	0.	0.	.007	.682	.001
		THRM6		7222.	0.	7222.	0.	0.	0.	.006	1.135	.000
		THRM7		3562.	0.	3562.	0.	0.	0.	.004	1.976	-.001
		DBA		595.	0.	595.	0.	0.	0.	.001	.000	.001
		SEISA1		1349.	0.	1349.	0.	0.	0.	.001	.032	.001
		SEISA2		3132.	0.	3132.	0.	0.	0.	.003	.076	.003
		SAM1		1292.	0.	1292.	0.	0.	0.	.002	.051	.002
		SAM2		2090.	0.	2090.	0.	0.	0.	.004	.085	.003
009	SPD		HL5014									
		WT1		0.	-9528.	0.	0.	0.	0.	.005	.000	-.001
		THRM1								-.067	.496	-.420
		THRM2								-.097	.891	-.407
		THRM3								-.138	1.437	-.391
		THRM4								-.163	1.772	-.380
		THRM5								-.063	.445	-.421
		THRM6								-.104	.987	-.405
		THRM7								-.179	1.991	-.374
		DBA								.022	.000	.007
		SEISA1								.028	.032	.026
		SEISA2								.067	.076	.061
		SAM1								.027	.051	.038
		SAM2								.044	.085	.062
030	SPR		FW9018SH0001									
		WT1		0.	-8136 GB 2/20/98	0.	0.	0.	0.	.025	-.025	-.024
		THRM1		0.	-1.	0.	0.	0.	0.	.627	-.631	-.053
		THRM2		0.	0.	0.	0.	0.	0.	.531	-.014	-.370
		THRM3		0.	1.	0.	0.	0.	0.	.399	.838	-.807
		THRM4		0.	1.	0.	0.	0.	0.	.319	1.359	-1.074
		THRM5		0.	-1.	0.	0.	0.	0.	.639	-.710	-.012
		THRM6		0.	0.	0.	0.	0.	0.	.508	.136	-.447
		THRM7		0.	2.	0.	0.	0.	0.	.266	1.701	-1.251
		DBA		0.	0.	0.	0.	0.	0.	.147	.068	.121
		SEISA1		0.	0.	0.	0.	0.	0.	.047	.024	.019
		SEISA2		0.	0.	0.	0.	0.	0.	.105	.058	.043
		SAM1		0.	0.	0.	0.	0.	0.	.011	.020	.004
		SAM2		0.	0.	0.	0.	0.	0.	.019	.033	.006

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
070	SPR		FW9018SH0002									
		WT1		0.	9636a CB 2/20/98	0.	0.	0.	0.	.037	-.032	-.050
		THRM1		0.	0.	0.	0.	0.	0.	.849	-.304	2.371
		THRM2		0.	0.	0.	0.	0.	0.	.583	-.039	1.637
		THRM3		0.	0.	0.	0.	0.	0.	.216	.327	.624
		THRM4		0.	1.	0.	0.	0.	0.	-.009	.551	.005
		THRM5		0.	0.	0.	0.	0.	0.	.884	-.338	2.465
		THRM6		0.	0.	0.	0.	0.	0.	.518	.025	1.458
		THRM7		0.	1.	0.	0.	0.	0.	-.157	.698	-.403
		DBA		0.	0.	0.	0.	0.	0.	.169	.060	.237
		SEISA1		0.	0.	0.	0.	0.	0.	.022	.008	.034
		SEISA2		0.	0.	0.	0.	0.	0.	.051	.017	.077
		SAM1		0.	0.	0.	0.	0.	0.	.002	.004	.006
		SAM2		0.	0.	0.	0.	0.	0.	.003	.006	.010
075	RAD		FW9018HL5005									
		WT1		0.	-5341.	0.	0.	0.	0.	.037	-.006	-.061
		THRM1		0.	-944.	0.	0.	0.	0.	.013	-.001	1.754
		THRM2		0.	1146.	0.	0.	0.	0.	-.017	.001	2.707
		THRM3		0.	4033.	0.	0.	0.	0.	-.058	.005	1.263
		THRM4		0.	5799.	0.	0.	0.	0.	-.084	.007	.381
		THRM5		0.	-1213.	0.	0.	0.	0.	.017	-.001	3.889
		THRM6		0.	1653.	0.	0.	0.	0.	-.024	.002	2.452
		THRM7		0.	6960.	0.	0.	0.	0.	-.100	.008	-.202
		DBA		0.	315.	0.	0.	0.	0.	.169	.000	.412
		SEISA1		0.	1192.	0.	0.	0.	0.	.022	.001	.043
		SEISA2		0.	2437.	0.	0.	0.	0.	.053	.003	.102
		SAM1		0.	123.	0.	0.	0.	0.	.002	.000	.003
		SAM2		0.	203.	0.	0.	0.	0.	.003	.000	.005
094	RAD		FW9018HL5002									
		WT1		0.	-8351.	0.	0.	0.	0.	.027	-.006	-.045
		THRM1		0.	280.	0.	0.	0.	0.	-.189	.000	3.456
		THRM2		0.	-1481.	0.	0.	0.	0.	-.151	-.001	2.516
		THRM3		0.	-3914.	0.	0.	0.	0.	-.098	-.003	1.218
		THRM4		0.	-5402.	0.	0.	0.	0.	-.066	-.004	.426
		THRM5		0.	507.	0.	0.	0.	0.	-.194	.000	3.578
		THRM6		0.	-1909.	0.	0.	0.	0.	-.141	-.001	2.387
		THRM7		0.	-6381.	0.	0.	0.	0.	-.045	-.005	-.097
		DBA		0.	243.	0.	0.	0.	0.	.160	.000	.487
		SEISA1		0.	1140.	0.	0.	0.	0.	.012	.001	.005
		SEISA2		0.	2416.	0.	0.	0.	0.	.028	.002	.013
		SAM1		0.	54.	0.	0.	0.	0.	.005	.000	.005
		SAM2		0.	90.	0.	0.	0.	0.	.008	.000	.009

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
099	RAD		FW101SHL5001									
		WT1		0.	-5627.	0.	0.	0.	0.	.003	-.011	-.004
		THRM1		0.	8966.	0.	0.	0.	0.	-.163	.017	.908
		THRM2		0.	7673.	0.	0.	0.	0.	-.122	.014	.662
		THRM3		0.	5888.	0.	0.	0.	0.	-.065	.011	.321
		THRM4		0.	4798.	0.	0.	0.	0.	-.030	.009	.114
		THRM5		0.	9133.	0.	0.	0.	0.	-.169	.017	.940
		THRM6		0.	7358.	0.	0.	0.	0.	-.112	.014	.602
		THRM7		0.	4079.	0.	0.	0.	0.	-.007	.006	-.023
		DBA		0.	9268.	0.	0.	0.	0.	.123	.017	.222
		SEISA1		0.	1843.	0.	0.	0.	0.	.005	.003	.003
		SEISA2		0.	4101.	0.	0.	0.	0.	.011	.008	.007
		SAM1		0.	164.	0.	0.	0.	0.	.008	.000	.010
		SAM2		0.	282.	0.	0.	0.	0.	.015	.001	.018
101	RAD		FW901SHL5013									
		WT1		-2126.	-1104.	0.	0.	0.	0.	.001	-.003	.000
		THRM1		-2491.	-1293.	0.	0.	0.	0.	-.017	.031	.414
		THRM2		-3000.	-1558.	0.	0.	0.	0.	-.012	.020	.301
		THRM3		-3704.	-1923.	0.	0.	0.	0.	-.004	.005	.145
		THRM4		-4134.	-2147.	0.	0.	0.	0.	.001	-.004	.050
		THRM5		-2425.	-1259.	0.	0.	0.	0.	-.018	.032	.428
		THRM6		-3125.	-1622.	0.	0.	0.	0.	-.010	.018	.274
		THRM7		-4418.	-2294.	0.	0.	0.	0.	.004	-.010	-.012
		DBA		5864.	3045.	0.	0.	0.	0.	.002	.008	.109
		SEISA1		2084.	1082.	0.	0.	0.	0.	.002	.003	.004
		SEISA2		5018.	2605.	0.	0.	0.	0.	.005	.007	.007
		SAM1		2631.	1366.	0.	0.	0.	0.	.001	.001	.009
		SAM2		4688.	2434.	0.	0.	0.	0.	.001	.001	.017
11A	RAD		FW901SHL5013									
		WT1		3150.	-2289.	0.	0.	0.	0.	.000	-.008	.000
		THRM1		21184.	-15392.	0.	0.	0.	0.	.064	.033	.378
		THRM2		16942.	-12309.	0.	0.	0.	0.	.048	.022	.275
		THRM3		11085.	-8054.	0.	0.	0.	0.	.026	.007	.134
		THRM4		7508.	-5455.	0.	0.	0.	0.	.013	-.002	.047
		THRM5		21732.	-15790.	0.	0.	0.	0.	.066	.034	.391
		THRM6		15909.	-11559.	0.	0.	0.	0.	.044	.019	.250
		THRM7		5149.	-3741.	0.	0.	0.	0.	.004	-.008	-.010
		DBA		28196.	20486.	0.	0.	0.	0.	.040	.019	.109
		SEISA1		1232.	895.	0.	0.	0.	0.	.001	.002	.004
		SEISA2		2935.	2133.	0.	0.	0.	0.	.003	.004	.007
		SAM1		2047.	1487.	0.	0.	0.	0.	.004	.001	.010
		SAM2		3664.	2662.	0.	0.	0.	0.	.008	.002	.017

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
10A	RAD		FW9018HL5012									
		WT1		0.	0.	59.	0.	0.	0.	.000	-.015	.000
		THRM1		0.	0.	19355.	0.	0.	0.	.295	-.018	.017
		THRM2		0.	0.	13604.	0.	0.	0.	.222	-.023	.012
		THRM3		0.	0.	5667.	0.	0.	0.	.122	-.030	.005
		THRM4		0.	0.	819.	0.	0.	0.	.060	-.036	.001
		THRM5		0.	0.	20097.	0.	0.	0.	.304	-.017	.018
		THRM6		0.	0.	12205.	0.	0.	0.	.204	-.024	.011
		THRM7		0.	0.	-2379.	0.	0.	0.	.020	-.037	-.002
		DBA		0.	0.	5806.	0.	0.	0.	.257	.163	.005
		SEISA1		0.	0.	1503.	0.	0.	0.	.000	.005	.001
		SEISA2		0.	0.	3140.	0.	0.	0.	.001	.012	.003
		SAM1		0.	0.	9190.	0.	0.	0.	.026	.003	.008
		SAM2		0.	0.	15761.	0.	0.	0.	.047	.005	.014
110	ANC		PEN M-5									
		WT1		-827.	-3080.	-52.	-8789.	-10.	-22590.	.000	.000	.000
		THRM1		-26296.	8624.	-20367.	-7735.	-13145.	68232.	.034	-.060	-.014
		THRM2		-19567.	7118.	-14346.	-5822.	-13340.	59833.	.035	-.061	-.013
		THRM3		-10277.	5315.	-6035.	-3182.	-13609.	48239.	.036	-.061	-.011
		THRM4		-4603.	4214.	-959.	-1570.	-13773.	41156.	.037	-.061	-.011
		THRM5		-27165.	8593.	-21164.	-7982.	-13120.	69315.	.034	-.060	-.014
		THRM6		-17930.	6800.	-12881.	-5356.	-13387.	57790.	.035	-.061	-.013
		THRM7		-861.	3487.	2389.	-506.	-13882.	36486.	.038	-.061	-.010
		DBA		21341.	14280.	5511.	32563.	95328.	112846.	.258	.233	.071
		SEISA1		1001.	350.	169.	5081.	1581.	7366.	.000	.000	.000
		SEISA2		2408.	762.	414.	11223.	3305.	16297.	.000	.000	.000
		SAM1		4266.	242.	9148.	724.	46224.	2251.	.026	.003	.034
		SAM2		7617.	423.	15704.	1254.	79280.	3949.	.047	.006	.058
015	SNB		FW9018SS0001									
		WT1								.026	-.023	-.022
		THRM1								.611	-.580	-.232
		THRM2								.516	.046	-.508
		THRM3								.385	.911	-.888
		THRM4								.305	1.440	-1.120
		THRM5								.623	-.661	-.196
		THRM6								.493	.198	-.575
		THRM7								.252	1.788	-1.274
		DBA								.150	.063	.113
		SEISA1		897.	0.	2187.	0.	0.	0.	.047	.031	.020
		SEISA2		2087.	0.	5086.	0.	0.	0.	.105	.074	.044
		SAM1		604.	0.	1471.	0.	0.	0.	.012	.025	.003
		SAM2		980.	0.	2389.	0.	0.	0.	.019	.041	.006

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
035	SNB		FW9018NL5009									
		WT1								.022	-.040	-.031
		THRM1								.683	-.789	.598
		THRM2								.585	-.215	.130
		THRM3								.450	.577	-.515
		THRM4								.368	1.062	-.908
		THRM5								.696	-.863	.658
		THRM6								.561	-.076	.016
		THRM7								.314	1.381	-1.168
		DBA								.135	.090	.151
		SEISA1		0.	5078.	0.	0.	0.	0.	.047	.004	.019
		SEISA2		0.	12096.	0.	0.	0.	0.	.105	.009	.042
		SAM1		0.	4532.	0.	0.	0.	0.	.010	.003	.005
		SAM2		0.	7508.	0.	0.	0.	0.	.018	.006	.009
040	SNB		FW9018NL5004									
		WT1								.022	-.042	-.032
		THRM1								.691	-.809	.694
		THRM2								.593	-.243	.204
		THRM3								.458	.539	-.471
		THRM4								.376	1.018	-.883
		THRM5								.704	-.882	.757
		THRM6								.569	-.105	.085
		THRM7								.321	1.332	-1.156
		DBA								.133	.081	.155
		SEISA1		891.	0.	2172.	0.	0.	0.	.047	.003	.019
		SEISA2		1990.	0.	4850.	0.	0.	0.	.105	.006	.042
		SAM1		458.	0.	1115.	0.	0.	0.	.010	.002	.006
		SAM2		748.	0.	1822.	0.	0.	0.	.017	.003	.010
050	SNB		FW9018NL5007									
		WT1								.023	-.054	-.041
		THRM1								.899	-.649	1.696
		THRM2								.681	-.229	1.056
		THRM3								.380	.350	.172
		THRM4								.196	.704	-.368
		THRM5								.927	-.703	1.779
		THRM6								.628	-.128	.900
		THRM7								.075	.937	-.724
		DBA								.143	.082	.192
		SEISA1		0.	0.	4187.	0.	0.	0.	.020	.010	.003
		SEISA2		0.	0.	9893.	0.	0.	0.	.048	.024	.007
		SAM1		0.	0.	207.	0.	0.	0.	.003	.007	.000
		SAM2		0.	0.	362.	0.	0.	0.	.005	.012	.000

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
055	SNB		FW9018HL5008									
		WT1								.027	-.054	-.042
		THRM1								.963	-.564	1.779
		THRM2								.702	-.168	1.144
		THRM3								.343	.378	.268
		THRM4								.123	.712	-.267
		THRM5								.897	-.614	1.861
		THRM6								.639	-.072	.990
		THRM7								-.022	.932	-.620
		DBA								.153	.082	.192
		SEISA1		8097.	0.	0.	0.	0.	0.	.015	.010	.009
		SEISA2		19581.	0.	0.	0.	0.	0.	.036	.024	.021
		SAM1		779.	0.	0.	0.	0.	0.	.001	.007	.003
		SAM2		1305.	0.	0.	0.	0.	0.	.002	.012	.005
065	SNB		FW9018SS0006									
		WT1								.037	-.042	-.048
		THRM1								.945	-.355	2.168
		THRM2								.652	-.050	1.480
		THRM3								.247	.371	.532
		THRM4								.000	.629	-.047
		THRM5								.983	-.395	2.257
		THRM6								.581	.024	1.313
		THRM7								-.164	.798	-.429
		DBA								.169	.070	.217
		SEISA1		0.	3975.	0.	0.	0.	0.	.022	.008	.028
		SEISA2		0.	9201.	0.	0.	0.	0.	.051	.018	.063
		SAM1		0.	2523.	0.	0.	0.	0.	.002	.005	.007
		SAM2		0.	4178.	0.	0.	0.	0.	.003	.008	.011
085	SNB		FW9018SS0007									
		WT1								.037	-.002	-.061
		THRM1								-.136	.009	3.966
		THRM2								-.121	-.014	2.872
		THRM3								-.101	-.046	1.362
		THRM4								-.089	-.066	.440
		THRM5								-.138	.013	4.107
		THRM6								-.118	-.020	2.606
		THRM7								-.081	-.079	-.169
		DBA								.164	.004	.442
		SEISA1		3614.	0.	3614.	0.	0.	0.	.025	.013	.032
		SEISA2		8643.	0.	8643.	0.	0.	0.	.058	.028	.076
		SAM1		400.	0.	400.	0.	0.	0.	.002	.001	.002
		SAM2		715.	0.	715.	0.	0.	0.	.004	.001	.003

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
092	SNB		FW9018HL5003									
		WT1								.024	-.016	-.049
		THRM1								-.151	.006	3.329
		THRM2								-.123	.008	2.424
		THRM3								-.084	.012	1.175
		THRM4								-.061	.014	.412
		THRM5								-.155	.005	3.446
		THRM6								-.116	.009	2.204
		THRM7								-.045	.016	-.091
		DBA								.161	.001	.487
		SEISA1		1328.	0.	1328.	0.	0.	0.	.009	.009	.007
		SEISA2		3113.	0.	3113.	0.	0.	0.	.022	.020	.016
		SAM1		165.	0.	165.	0.	0.	0.	.005	.001	.005
		SAM2		281.	0.	281.	0.	0.	0.	.009	.001	.009
097	SNB		FW9018HL5006									
		WT1								.003	-.077	-.014
		THRM1								.135	.028	1.566
		THRM2								.092	.040	1.144
		THRM3								.033	.057	.561
		THRM4								-.004	.068	.205
		THRM5								.141	.027	1.620
		THRM6								.082	.043	1.041
		THRM7								-.028	.074	-.030
		DBA								.123	.000	.376
		SEISA1		0.	0.	2590.	0.	0.	0.	.005	.047	.004
		SEISA2		0.	0.	6205.	0.	0.	0.	.011	.104	.010
		SAM1		0.	0.	1409.	0.	0.	0.	.008	.003	.002
		SAM2		0.	0.	2527.	0.	0.	0.	.015	.005	.004

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
001	ANC	1R121NSG101D																
		WT1		-10	-1085	-54	-131	388	-11315	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM1		-6913	-41	-55	30739	47918	-77030	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM2		-4930	-589	-2253	37421	66147	-75231	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM3		-2184	-1346	-5303	46704	91520	-72712	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM4		-491	-1809	-7193	52468	107350	-71118	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM5		-7162	29	218	29914	45696	-77240	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM6		-4454	-722	-2778	39011	70455	-74815	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM7		603	-2113	-8400	56133	117306	-70148	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		DBA		22	89	228	853	1660	661	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		SEISA1		1479	4219	1388	7172	22542	55323	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		SEISA2		3449	9955	3359	16838	54438	131131	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		SAM1		3660	2117	6502	22904	81615	17257	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		SAM2		5965	3506	10561	37097	132510	29121	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
007	RAD	MLS016																
		WT1		-262	0	0	0	0	0	.85	.00	-.53						
		THRM1		-11	0	0	0	0	0	.85	.00	-.53						
		THRM2		-3772	0	0	0	0	0	.85	.00	-.53						
		THRM3		-8996	0	0	0	0	0	.85	.00	-.53						
		THRM4		-12239	0	0	0	0	0	.85	.00	-.53						
		THRM5		454	0	0	0	0	0	.85	.00	-.53						
		THRM6		-4668	0	0	0	0	0	.85	.00	-.53						
		THRM7		-14302	0	0	0	0	0	.85	.00	-.53						
		DBA		1181	0	0	0	0	0	.85	.00	-.53						
		SEISA1		1770	0	0	0	0	0	.85	.00	-.53						
		SEISA2		4051	0	0	0	0	0	.85	.00	-.53						
		SAM1		12060	0	0	0	0	0	.85	.00	-.53						
		SAM2		19609	0	0	0	0	0	.85	.00	-.53						
07H	RAD	MLS015																
		WT1		-72	0	0	0	0	0	-.71	.00	.71						
		THRM1		-6523	0	0	0	0	0	-.71	.00	.71						
		THRM2		-6322	0	0	0	0	0	-.71	.00	.71						
		THRM3		-6058	0	0	0	0	0	-.71	.00	.71						
		THRM4		-5916	0	0	0	0	0	-.71	.00	.71						
		THRM5		-6557	0	0	0	0	0	-.71	.00	.71						
		THRM6		-6266	0	0	0	0	0	-.71	.00	.71						
		THRM7		-5793	0	0	0	0	0	-.71	.00	.71						
		DBA		1847	0	0	0	0	0	-.71	.00	.71						
		SEISA1		2407	0	0	0	0	0	-.71	.00	.71						
		SEISA2		5331	0	0	0	0	0	-.71	.00	.71						
		SAM1		4108	0	0	0	0	0	-.71	.00	.71						
		SAM2		6688	0	0	0	0	0	-.71	.00	.71						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
07H	RAD		HLS015															
		WT1		62	0	0	0	0	0	-.71	.00	-.71						
		THRM1		-12754	0	0	0	0	0	-.71	.00	-.71						
		THRM2		-10711	0	0	0	0	0	-.71	.00	-.71						
		THRM3		-7893	0	0	0	0	0	-.71	.00	-.71						
		THRM4		-6175	0	0	0	0	0	-.71	.00	-.71						
		THRM5		-13019	0	0	0	0	0	-.71	.00	-.71						
		THRM6		-10213	0	0	0	0	0	-.71	.00	-.71						
		THRM7		-5037	0	0	0	0	0	-.71	.00	-.71						
		DBA		842	0	0	0	0	0	-.71	.00	-.71						
		SEISA1		1906	0	0	0	0	0	-.71	.00	-.71						
		SEISA2		4429	0	0	0	0	0	-.71	.00	-.71						
		SAM1		1827	0	0	0	0	0	-.71	.00	-.71						
		SAM2		2955	0	0	0	0	0	-.71	.00	-.71						
009	SPD		HLS014															
		WT1		-9528	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1																
		SEISA2																
		SAM1																
		SAM2																
030	SPR		FW901SSH0001															
		WT1		-8136	0	0	0	0	0	.00	1.00	.00						
		THRM1		-1	0	0	0	0	0	.00	1.00	.00						
		THRM2		0	0	0	0	0	0	.00	1.00	.00						
		THRM3		1	0	0	0	0	0	.00	1.00	.00						
		THRM4		1	0	0	0	0	0	.00	1.00	.00						
		THRM5		-1	0	0	0	0	0	.00	1.00	.00						
		THRM6		0	0	0	0	0	0	.00	1.00	.00						
		THRM7		2	0	0	0	0	0	.00	1.00	.00						
		DBA		0	0	0	0	0	0	.00	1.00	.00						
		SEISA1		0	0	0	0	0	0	.00	1.00	.00						
		SEISA2		0	0	0	0	0	0	.00	1.00	.00						
		SAM1		0	0	0	0	0	0	.00	1.00	.00						
		SAM2		0	0	0	0	0	0	.00	1.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
070	SPR		FW9018SH0002															
		WT1		-4636	0	0	0	0	0	.00	1.00	.00						
		THRM1		0	0	0	0	0	0	.00	1.00	.00						
		THRM2		0	0	0	0	0	0	.00	1.00	.00						
		THRM3		0	0	0	0	0	0	.00	1.00	.00						
		THRM4		1	0	0	0	0	0	.00	1.00	.00						
		THRM5		0	0	0	0	0	0	.00	1.00	.00						
		THRM6		0	0	0	0	0	0	.00	1.00	.00						
		THRM7		1	0	0	0	0	0	.00	1.00	.00						
		DBA		0	0	0	0	0	0	.00	1.00	.00						
		SEISA1		0	0	0	0	0	0	.00	1.00	.00						
		SEISA2		0	0	0	0	0	0	.00	1.00	.00						
		SAM1		0	0	0	0	0	0	.00	1.00	.00						
		SAM2		0	0	0	0	0	0	.00	1.00	.00						
075	RAD		FW9018HL5005															
		WT1		-5341	0	0	0	0	0	.00	1.00	.00						
		THRM1		-944	0	0	0	0	0	.00	1.00	.00						
		THRM2		1146	0	0	0	0	0	.00	1.00	.00						
		THRM3		4033	0	0	0	0	0	.00	1.00	.00						
		THRM4		5799	0	0	0	0	0	.00	1.00	.00						
		THRM5		-1213	0	0	0	0	0	.00	1.00	.00						
		THRM6		1653	0	0	0	0	0	.00	1.00	.00						
		THRM7		6960	0	0	0	0	0	.00	1.00	.00						
		DBA		315	0	0	0	0	0	.00	1.00	.00						
		SEISA1		1192	0	0	0	0	0	.00	1.00	.00						
		SEISA2		2437	0	0	0	0	0	.00	1.00	.00						
		SAM1		123	0	0	0	0	0	.00	1.00	.00						
		SAM2		203	0	0	0	0	0	.00	1.00	.00						
094	RAD		FW9018HL5002															
		WT1		-8351	0	0	0	0	0	.00	1.00	.00						
		THRM1		280	0	0	0	0	0	.00	1.00	.00						
		THRM2		-1481	0	0	0	0	0	.00	1.00	.00						
		THRM3		-3914	0	0	0	0	0	.00	1.00	.00						
		THRM4		-5402	0	0	0	0	0	.00	1.00	.00						
		THRM5		507	0	0	0	0	0	.00	1.00	.00						
		THRM6		-1909	0	0	0	0	0	.00	1.00	.00						
		THRM7		-6381	0	0	0	0	0	.00	1.00	.00						
		DBA		243	0	0	0	0	0	.00	1.00	.00						
		SEISA1		1140	0	0	0	0	0	.00	1.00	.00						
		SEISA2		2416	0	0	0	0	0	.00	1.00	.00						
		SAM1		54	0	0	0	0	0	.00	1.00	.00						
		SAM2		90	0	0	0	0	0	.00	1.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
099	RAD		FW1018HL5001															
		WT1		-5627	0	0	0	0	0	.00	1.00	.00						
		THRM1		8966	0	0	0	0	0	.00	1.00	.00						
		THRM2		7673	0	0	0	0	0	.00	1.00	.00						
		THRM3		5888	0	0	0	0	0	.00	1.00	.00						
		THRM4		4798	0	0	0	0	0	.00	1.00	.00						
		THRM5		9133	0	0	0	0	0	.00	1.00	.00						
		THRM6		7358	0	0	0	0	0	.00	1.00	.00						
		THRM7		4079	0	0	0	0	0	.00	1.00	.00						
		DBA		9268	0	0	0	0	0	.00	1.00	.00						
		SEISA1		1843	0	0	0	0	0	.00	1.00	.00						
		SEISA2		4101	0	0	0	0	0	.00	1.00	.00						
		SAM1		164	0	0	0	0	0	.00	1.00	.00						
		SAM2		282	0	0	0	0	0	.00	1.00	.00						
101	RAD		FW9018HL5013															
		WT1		-2396	0	0	0	0	0	.89	.46	.00						
		THRM1		-2806	0	0	0	0	0	.89	.46	.00						
		THRM2		-3381	0	0	0	0	0	.89	.46	.00						
		THRM3		-4174	0	0	0	0	0	.89	.46	.00						
		THRM4		-4658	0	0	0	0	0	.89	.46	.00						
		THRM5		-2732	0	0	0	0	0	.89	.46	.00						
		THRM6		-3521	0	0	0	0	0	.89	.46	.00						
		THRM7		-4978	0	0	0	0	0	.89	.46	.00						
		DBA		6607	0	0	0	0	0	.89	.46	.00						
		SEISA1		2348	0	0	0	0	0	.89	.46	.00						
		SEISA2		5654	0	0	0	0	0	.89	.46	.00						
		SAM1		2965	0	0	0	0	0	.89	.46	.00						
		SAM2		5282	0	0	0	0	0	.89	.46	.00						
11A	RAD		FW9018HL5013															
		WT1		3894	0	0	0	0	0	.81	-.59	.00						
		THRM1		26186	0	0	0	0	0	.81	-.59	.00						
		THRM2		20961	0	0	0	0	0	.81	-.59	.00						
		THRM3		13702	0	0	0	0	0	.81	-.59	.00						
		THRM4		9281	0	0	0	0	0	.81	-.59	.00						
		THRM5		26863	0	0	0	0	0	.81	-.59	.00						
		THRM6		19665	0	0	0	0	0	.81	-.59	.00						
		THRM7		6364	0	0	0	0	0	.81	-.59	.00						
		DBA		34852	0	0	0	0	0	.81	-.59	.00						
		SEISA1		1522	0	0	0	0	0	.81	-.59	.00						
		SEISA2		3628	0	0	0	0	0	.81	-.59	.00						
		SAM1		2531	0	0	0	0	0	.81	-.59	.00						
		SAM2		4529	0	0	0	0	0	.81	-.59	.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
10A	RAD		FW9018HL5012															
		WT1		59	0	0	0	0	0	.00	.00	1.00						
		THRM1		19355	0	0	0	0	0	.00	.00	1.00						
		THRM2		13604	0	0	0	0	0	.00	.00	1.00						
		THRM3		5667	0	0	0	0	0	.00	.00	1.00						
		THRM4		819	0	0	0	0	0	.00	.00	1.00						
		THRM5		20097	0	0	0	0	0	.00	.00	1.00						
		THRM6		12205	0	0	0	0	0	.00	.00	1.00						
		THRM7		-2379	0	0	0	0	0	.00	.00	1.00						
		DBA		5806	0	0	0	0	0	.00	.00	1.00						
		SEISA1		1503	0	0	0	0	0	.00	.00	1.00						
		SEISA2		3140	0	0	0	0	0	.00	.00	1.00						
		SAM1		9190	0	0	0	0	0	.00	.00	1.00						
		SAM2		15761	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-5															
		WT1		-827	-3080	-52	-8789	-10	-22590	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM1		-26296	8424	-20367	-7735	-13145	68232	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM2		-19567	7116	-14346	-5822	-13340	59833	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM3		-10277	5315	-6035	-3182	-13609	48239	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM4		-4603	4214	-959	-1570	-13773	41156	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM5		-27165	8593	-21144	-7982	-13120	69315	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM6		-17930	6800	-12881	-5356	-13387	57790	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM7		-861	3487	2389	-506	-13882	36486	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		DBA		21341	14280	5511	32563	95328	112846	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SEISA1		1001	350	169	5981	1581	7366	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SEISA2		2408	762	414	11223	3305	16297	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SAM1		4266	242	9148	724	46224	3251	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SAM2		7617	423	15704	1254	79280	3949	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
015	SNB		FW9018SS0001															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		2364	0	0	0	0	0	.38	.00	.93						
		SEISA2		5497	0	0	0	0	0	.38	.00	.93						
		SAM1		1590	0	0	0	0	0	.38	.00	.93						
		SAM2		2582	0	0	0	0	0	.38	.00	.93						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 21438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES (LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
035	SNB		FW9018HL5009															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		5078	0	0	0	0	0	.00	1.00	.00						
		SEISA2		12096	0	0	0	0	0	.00	1.00	.00						
		SAM1		4532	0	0	0	0	0	.00	1.00	.00						
		SAM2		7508	0	0	0	0	0	.00	1.00	.00						
040	SNB		FW9018HL5004															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		2348	0	0	0	0	0	.38	.00	.93						
		SEISA2		5242	0	0	0	0	0	.38	.00	.93						
		SAM1		1206	0	0	0	0	0	.38	.00	.93						
		SAM2		1970	0	0	0	0	0	.38	.00	.93						
050	SNB		FW9018HL5007															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		4187	0	0	0	0	0	.00	.00	1.00						
		SEISA2		9893	0	0	0	0	0	.00	.00	1.00						
		SAM1		207	0	0	0	0	0	.00	.00	1.00						
		SAM2		362	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO N5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
055	SNB		FW9018NL5006															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		8097	0	0	0	0	0	1.00	.00	.00						
		SEISA2		19581	0	0	0	0	0	1.00	.00	.00						
		SAM1		779	0	0	0	0	0	1.00	.00	.00						
		SAM2		1305	0	0	0	0	0	1.00	.00	.00						
065	SNB		FW9018SS0006															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		3975	0	0	0	0	0	.00	1.00	.00						
		SEISA2		9201	0	0	0	0	0	.00	1.00	.00						
		SAM1		2521	0	0	0	0	0	.00	1.00	.00						
		SAM2		4178	0	0	0	0	0	.00	1.00	.00						
085	SNB		FW9018SS0007															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		5121	0	0	0	0	0	-.71	.00	-.71						
		SEISA2		12323	0	0	0	0	0	-.71	.00	-.71						
		SAM1		566	0	0	0	0	0	-.71	.00	-.71						
		SAM2		1011	0	0	0	0	0	-.71	.00	-.71						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PAM1
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
092	SNB		FW9018HL5003															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		1879	0	0	0	0	0	-.71	.00	.71						
		SEISA2		4403	0	0	0	0	0	-.71	.00	.71						
		SAM1		233	0	0	0	0	0	-.71	.00	.71						
		SAM2		397	0	0	0	0	0	-.71	.00	.71						
097	SNB		FW9018HL5006															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		2590	0	0	0	0	0	.00	.00	1.00						
		SEISA2		6205	0	0	0	0	0	.00	.00	1.00						
		SAM1		1409	0	0	0	0	0	.00	.00	1.00						
		SAM2		2527	0	0	0	0	0	.00	.00	1.00						

2C159RC5037 RESTRAINT LOAD SUMMARY ME101/N4 OAEU/54 (S03406) 10/28/97 S03406 ~~PAGE 22~~

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
001	ANC	1R121NSG101D									
		NORMP	3513.	0.	0.	88720.	107739.	25437	.832	1.880	1.993
		NORMN	-6054.	-2894.	-9694.	-115.	0.	-77331.	.000	.000	.000
		UPSETP	11293.	4720.	8016.	140898.	203366.	89472.	1.131	1.995	2.226
		UPSETN	-12730.	-7918.	-18478.	-49202.	-84671.	-139653.	-.299	-.015	-.333
		FAULTP	16017.	9499.	13465.	192594.	260951.	154449.	1.320	2.011	2.430
		FAULTN	-17751.	-13753.	-23904.	-95312.	-142868.	-214710.	-.488	-.031	-.537
007	RAD	HL5016									
		NORMP	0.	0.	6624.	0.	0.	0.	.680	1.842	1.089
		NORMN	-10601.	0.	0.	0.	0.	0.	-.001	-.001	-.001
		UPSETP	10337.	0.	14178.	0.	0.	0.	.773	1.997	1.236
		UPSETN	-22688.	0.	-6460.	0.	0.	0.	-.094	-.061	-.148
		FAULTP	17143.	0.	18329.	0.	0.	0.	.842	2.051	1.342
		FAULTN	-29331.	0.	-10712.	0.	0.	0.	-.359	-.115	-.250
07H	RAD	HL5015									
		NORMP	4664.	0.	0.	0.	0.	0.	.007	1.792	.001
		NORMN	0.	0.	-4664.	0.	0.	0.	.000	.000	-.001
		UPSETP	8031.	0.	3367.	0.	0.	0.	.010	2.035	.003
		UPSETN	-3367.	0.	-8031.	0.	0.	0.	-.003	-.061	-.004
		FAULTP	10735.	0.	5996.	0.	0.	0.	.012	2.089	.005
		FAULTN	-5996.	0.	-10735.	0.	0.	0.	-.005	-.114	-.006
07H	RAD	HL5015									
		NORMP	9019.	0.	9019.	0.	0.	0.	.007	1.792	.001
		NORMN	-44.	0.	-44.	0.	0.	0.	.000	.000	-.001
		UPSETP	10843.	0.	10843.	0.	0.	0.	.010	2.035	.003
		UPSETN	-1911.	0.	-1911.	0.	0.	0.	-.003	-.061	-.004
		FAULTP	12927.	0.	12927.	0.	0.	0.	.012	2.089	.005
		FAULTN	-3808.	0.	-3808.	0.	0.	0.	-.005	-.114	-.006
009	SPD	HL5014									
		NORMP	0.	-9528.	0.	0.	0.	0.	.005	1.772	.000
		NORMN	0.	-9528.	0.	0.	0.	0.	-.163	.000	-.420
		UPSETP	0.	-9528.	0.	0.	0.	0.	.045	2.051	.047
		UPSETN	0.	-9528.	0.	0.	0.	0.	-.214	-.060	-.467
		FAULTP	0.	-9528.	0.	0.	0.	0.	.085	2.105	.087
		FAULTN	0.	-9528.	0.	0.	0.	0.	-.254	-.114	-.509
030	SPR	FW9018SH0001									
		NORMP	0.	1.	0.	0.	0.	0.	.652	1.359	.000
		NORMN	0.	~~-1.~~ -8136	0.	0.	0.	0.	.000	-.656	-1.098
		UPSETP	0.	1.	0.	0.	0.	0.	.700	1.707	.020
		UPSETN	0.	~~-1.~~ -8136	0.	0.	0.	0.	-.048	-.688	-1.294
		FAULTP	0.	1.	0.	0.	0.	0.	.812	1.744	.097
		FAULTN	0.	~~-1.~~ -8136	0.	0.	0.	0.	-.122	-.803	-1.395

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
070	SPR		FW9018SH0002									
		NORMP		0.	1.	0.	0.	0.	0.	.887	.551	2.771
		NORMN		0.	-9636.	0.	0.	0.	0.	-.009	-.336	-.050
		UPSETP		0.	1.	0.	0.	0.	0.	.908	.674	2.355
		UPSETN		0.	-9636.	0.	0.	0.	0.	-.342	-.345	-.487
		FAULTP		0.	1.	0.	0.	0.	0.	1.090	.726	2.653
		FAULTN		0.	-9636.	0.	0.	0.	0.	-.289	-.430	-.690
075	RAD		FW9018HL5005									
		NORMP		0.	5799.	0.	0.	0.	0.	.050	.007	3.754
		NORMN		0.	-6285.	0.	0.	0.	0.	-.084	-.007	-.061
		UPSETP		0.	2817.	0.	0.	0.	0.	.073	.003	3.736
		UPSETN		0.	-7484.	0.	0.	0.	0.	-.086	-.003	-.305
		FAULTP		0.	4064.	0.	0.	0.	0.	.223	.005	4.241
		FAULTN		0.	-9000.	0.	0.	0.	0.	-.232	-.010	-.674
094	RAD		FW9018HL5002									
		NORMP		0.	280.	0.	0.	0.	0.	.027	.000	3.456
		NORMN		0.	-13753.	0.	0.	0.	0.	-.189	-.011	-.065
		UPSETP		0.	1142.	0.	0.	0.	0.	.040	.001	3.419
		UPSETN		0.	-15873.	0.	0.	0.	0.	-.175	-.012	-.350
		FAULTP		0.	0.	0.	0.	0.	0.	.187	.000	4.019
		FAULTN		0.	-17149.	0.	0.	0.	0.	-.327	-.013	-.629
099	RAD		FW1018HL5001									
		NORMP		0.	8966.	0.	0.	0.	0.	.003	.017	.908
		NORMN		0.	-5627.	0.	0.	0.	0.	-.163	-.011	-.004
		UPSETP		0.	5189.	0.	0.	0.	0.	.012	.010	.915
		UPSETN		0.	-7477.	0.	0.	0.	0.	-.170	-.014	-.037
		FAULTP		0.	12774.	0.	0.	0.	0.	.126	.024	1.159
		FAULTN		0.	-14895.	0.	0.	0.	0.	-.289	-.028	-.250
101	RAD		FW9018HL5013									
		NORMP		0.	0.	0.	0.	0.	0.	.001	.031	.414
		NORMN		-6261.	-3251.	0.	0.	0.	0.	-.017	-.007	.000
		UPSETP		3356.	1743.	0.	0.	0.	0.	.006	.031	.424
		UPSETN		-9300.	-5140.	0.	0.	0.	0.	-.018	-.016	-.022
		FAULTP		4740.	2461.	0.	0.	0.	0.	.009	.038	.538
		FAULTN		-13411.	-6963.	0.	0.	0.	0.	-.022	-.021	-.121
11A	RAD		FW9018HL5013									
		NORMP		24334.	0.	0.	0.	0.	0.	.064	.033	.378
		NORMN		0.	-17681.	0.	0.	0.	0.	.000	-.010	.000
		UPSETP		26724.	1736.	0.	0.	0.	0.	.069	.027	.389
		UPSETN		-2389.	-19417.	0.	0.	0.	0.	-.005	-.018	-.020
		FAULTP		53078.	18198.	0.	0.	0.	0.	.107	.045	.501
		FAULTN		-25046.	-38565.	0.	0.	0.	0.	-.040	-.035	-.118

CB 2/20/98

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
10A	RAD		FW9018HL5012									
		NORMP		0.	0.	19414.	0.	0.	0.	.000	.000	.017
		NORMN		0.	0.	0.	0.	0.	0.	.000	-.049	.000
		UPSETP		0.	0.	28725.	0.	0.	0.	.321	.006	.025
		UPSETN		0.	0.	-11632.	0.	0.	0.	-.026	-.058	-.010
		FAULTP		0.	0.	36227.	0.	0.	0.	.561	.148	.032
		FAULTN		0.	0.	-18391.	0.	0.	0.	-.257	-.214	-.016
110	ANC		PEN M-5									
		NORMP		0.	8424.	0.	0.	0.	68232.	.037	.000	.000
		NORMN		-27123.	-3080.	-20418.	-16523.	-11783.	-22590.	.000	-.062	-.014
		UPSETP		4381.	5770.	11487.	5132.	46251.	53364.	.064	.003	.034
		UPSETN		-31505.	-3505.	-29568.	-21656.	-60142.	-30292.	-.026	-.065	-.047
		FAULTP		20514.	19793.	18047.	23775.	95318.	159571.	.295	.232	.071
		FAULTN		-49332.	-17360.	-36905.	-49334.	-109220.	-135435.	-.258	-.295	-.085
015	SNB		FW9018SS0001									
		NORMP								.637	1.440	.000
		NORMN								.000	-.603	-1.142
		UPSETP		1082.	0.	2636.	0.	0.	0.	.685	1.805	.020
		UPSETN		-1082.	0.	-2636.	0.	0.	0.	-.048	-.642	-1.316
		FAULTP		2306.	0.	5619.	0.	0.	0.	.800	1.850	.091
		FAULTN		-2306.	0.	-5619.	0.	0.	0.	-.125	-.768	-1.408
035	SNB		FW9018HL5009									
		NORMP								.705	1.062	.598
		NORMN								.000	-.829	-.938
		UPSETP		0.	5806.	0.	0.	0.	0.	.753	1.346	.586
		UPSETN		0.	-5806.	0.	0.	0.	0.	-.048	-.834	-1.219
		FAULTP		0.	14237.	0.	0.	0.	0.	.853	1.421	.778
		FAULTN		0.	-14237.	0.	0.	0.	0.	-.213	-.983	-1.350
040	SNB		FW9018HL5004									
		NORMP								.713	1.018	.694
		NORMN								.000	-.851	-.916
		UPSETP		1002.	0.	2442.	0.	0.	0.	.761	1.294	.681
		UPSETN		-1002.	0.	-2442.	0.	0.	0.	-.048	-.854	-1.208
		FAULTP		2126.	0.	5181.	0.	0.	0.	.859	1.372	.880
		FAULTN		-2126.	0.	-5181.	0.	0.	0.	-.111	-1.005	-1.343
050	SNB		FW9018HL5007									
		NORMP								.922	.704	1.696
		NORMN								.000	-.703	-.409
		UPSETP		0.	0.	4192.	0.	0.	0.	.943	.896	1.658
		UPSETN		0.	0.	-4192.	0.	0.	0.	-.021	-.715	-.768
		FAULTP		0.	0.	9899.	0.	0.	0.	1.093	.966	1.930
		FAULTN		0.	0.	-9899.	0.	0.	0.	-.120	-.839	-.957

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
055	SNB		FW9018HL5008									
		NORMP								.000	.712	1.778
		NORMN								.000	-.617	-.309
		UPSETP		8134.	0.	0.	0.	0.	0.	1.005	.830	1.747
		UPSETN		-8134.	0.	0.	0.	0.	0.	-.015	-.630	-.672
		FAULTP		19624.	0.	0.	0.	0.	0.	1.176	.960	2.012
		FAULTN		-19624.	0.	0.	0.	0.	0.	-.148	-.751	-.854
065	SNB		FW9018SS0006									
		NORMP								.983	.629	2.168
		NORMN								.000	-.397	-.095
		UPSETP		0.	4708.	0.	0.	0.	0.	1.004	.766	2.149
		UPSETN		0.	-4708.	0.	0.	0.	0.	-.148	-.406	-.506
		FAULTP		0.	10105.	0.	0.	0.	0.	1.190	.826	2.426
		FAULTN		0.	-10105.	0.	0.	0.	0.	-.295	-.506	-.694
085	SNB		FW9018SS0007									
		NORMP								.037	.009	3.966
		NORMN								-.136	-.068	-.061
		UPSETP		3636.	0.	3636.	0.	0.	0.	.062	.021	3.938
		UPSETN		-3636.	0.	-3636.	0.	0.	0.	-.124	-.093	-.262
		FAULTP		8672.	0.	8672.	0.	0.	0.	.201	.039	4.489
		FAULTN		-8672.	0.	-8672.	0.	0.	0.	-.264	-.109	-.672
092	SNB		FW9018HL5003									
		NORMP								.026	.014	3.329
		NORMN								-.151	-.016	-.043
		UPSETP		1338.	0.	1338.	0.	0.	0.	.035	.009	3.295
		UPSETN		-1338.	0.	-1338.	0.	0.	0.	-.137	-.025	-.142
		FAULTP		3126.	0.	3126.	0.	0.	0.	.186	.020	3.891
		FAULTN		-3126.	0.	-3126.	0.	0.	0.	-.291	-.035	-.621
097	SNB		FW9018HL5006									
		NORMP								.138	.068	1.566
		NORMN								-.004	-.077	-.014
		UPSETP		0.	0.	2948.	0.	0.	0.	.148	.047	1.557
		UPSETN		0.	0.	-2948.	0.	0.	0.	-.034	-.125	-.049
		FAULTP		0.	0.	6700.	0.	0.	0.	.267	.101	1.983
		FAULTN		0.	0.	-6700.	0.	0.	0.	-.148	-.181	-.420

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
001	ANC	1R121WSG101D																
		NORMP		0	0	0	52468	107739	0	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		NORMN		-6922	-2894	-7247	-121	0	-88344	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		UPSETP		4541	4720	6648	80002	202366	57952	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		UPSETN		-10869	-7918	-15102	-24132	-84671	-146296	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		FAULTP		7484	9499	11247	96659	260951	123011	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		FAULTN		-14062	-13753	-19536	-40789	-142868	-222880	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
007	RAD	HL5016																
		NORMP		0	0	0	0	0	0	.85	.00	-.53						
		NORMN		-12501	0	0	0	0	0	.85	.00	-.53						
		UPSETP		12189	0	0	0	0	0	.85	.00	-.53						
		UPSETN		-26754	0	0	0	0	0	.85	.00	-.53						
		FAULTP		20215	0	0	0	0	0	.85	.00	-.53						
		FAULTN		-34587	0	0	0	0	0	.85	.00	-.53						
07H	RAD	HL5015																
		NORMP		0	0	0	0	0	0	-.71	.00	.71						
		NORMN		-6596	0	0	0	0	0	-.71	.00	.71						
		UPSETP		4761	0	0	0	0	0	-.71	.00	.71						
		UPSETN		-11357	0	0	0	0	0	-.71	.00	.71						
		FAULTP		8480	0	0	0	0	0	-.71	.00	.71						
		FAULTN		-15181	0	0	0	0	0	-.71	.00	.71						
07H	RAD	HL5015																
		NORMP		62	0	0	0	0	0	-.71	.00	-.71						
		NORMN		-12754	0	0	0	0	0	-.71	.00	-.71						
		UPSETP		2703	0	0	0	0	0	-.71	.00	-.71						
		UPSETN		-15334	0	0	0	0	0	-.71	.00	-.71						
		FAULTP		5386	0	0	0	0	0	-.71	.00	-.71						
		FAULTN		-18282	0	0	0	0	0	-.71	.00	-.71						
009	SPD	HL5014																
		NORMP		-9528	0	0	0	0	0	.00	1.00	.00						
		NORMN		-9528	0	0	0	0	0	.00	1.00	.00						
		UPSETP		-9528	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-9528	0	0	0	0	0	.00	1.00	.00						
		FAULTP		-9528	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9528	0	0	0	0	0	.00	1.00	.00						
030	SPR	FW9018SH0001																
		NORMP	1		0	0	0	0	0	.00	1.00	.00						
		NORMN	-8136 1/2		0	0	0	0	0	.00	1.00	.00						
		UPSETP	2		0	0	0	0	0	.00	1.00	.00						
		UPSETN	-8136 1/2		0	0	0	0	0	.00	1.00	.00						
		FAULTP	2		0	0	0	0	0	.00	1.00	.00						
		FAULTN	-8136 1/2		0	0	0	0	0	.00	1.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
070	SPR	FW9018SH0002																
		NORMP		-9636 1	0	0	0	0	0	.00	1.00	.00						
		NORMN			0	0	0	0	0	.00	1.00	.00						
		UPSETP		1	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-9636 2	0	0	0	0	0	.00	1.00	.00						
		FAULTP		1	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9636 2	0	0	0	0	0	.00	1.00	.00						
075	RAD	FW9018HL5005																
		NORMP		5799	0	0	0	0	0	.00	1.00	.00						
		NORMN		-6285	0	0	0	0	0	.00	1.00	.00						
		UPSETP		2817	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-7484	0	0	0	0	0	.00	1.00	.00						
		FAULTP		4064	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9000	0	0	0	0	0	.00	1.00	.00						
096	RAD	FW9018HL5002																
		NORMP		280	0	0	0	0	0	.00	1.00	.00						
		NORMN		-13753	0	0	0	0	0	.00	1.00	.00						
		UPSETP		1142	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-15873	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-17149	0	0	0	0	0	.00	1.00	.00						
099	RAD	FW1018HL5001																
		NORMP		8966	0	0	0	0	0	.00	1.00	.00						
		NORMN		-5627	0	0	0	0	0	.00	1.00	.00						
		UPSETP		5169	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-7477	0	0	0	0	0	.00	1.00	.00						
		FAULTP		12774	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14895	0	0	0	0	0	.00	1.00	.00						
101	RAD	FW9018HL5013																
		NORMP		0	0	0	0	0	0	.89	.46	.00						
		NORMN		-7054	0	0	0	0	0	.89	.46	.00						
		UPSETP		3782	0	0	0	0	0	.89	.46	.00						
		UPSETN		-11155	0	0	0	0	0	.89	.46	.00						
		FAULTP		5341	0	0	0	0	0	.89	.46	.00						
		FAULTN		-15111	0	0	0	0	0	.89	.46	.00						
11A	RAD	FW9018HL5013																
		NORMP		30079	0	0	0	0	0	.81	-.59	.00						
		NORMN		0	0	0	0	0	0	.81	-.59	.00						
		UPSETP		33033	0	0	0	0	0	.81	-.59	.00						
		UPSETN		-2953	0	0	0	0	0	.81	-.59	.00						
		FAULTP		65609	0	0	0	0	0	.81	-.59	.00						
		FAULTN		-30959	0	0	0	0	0	.81	-.59	.00						

-9636 1 -9636 2 -9636 2 EB 2/24/98

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
10A	RAD		FW9018HL5012															
		NORMP		19414	0	0	0	0	0	.00	.00	1.00						
		NORMN		0	0	0	0	0	0	.00	.00	1.00						
		UPSETP		28725	0	0	0	0	0	.00	.00	1.00						
		UPSETN		-11632	0	0	0	0	0	.00	.00	1.00						
		FAULTP		36227	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-18391	0	0	0	0	0	.00	.00	1.00						
310	ANC		FEN M-5															
		NORMP		0	8424	0	0	0	68232	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		NORMN		-27123	-3080	-20418	-16523	-13783	-22590	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		UPSETP		4381	5770	11487	5132	46251	53344	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		UPSETN		-31505	-3505	-29568	-21656	-60142	-30292	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTP		20514	19793	18047	23775	95318	159571	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTN		-49332	-17360	-36905	-49334	-109220	-135435	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
015	SNB		FW9018SS0001															
		NORMP																
		NORMN																
		UPSETP		2849	0	0	0	0	0	.38	.00	.93						
		UPSETN		-2849	0	0	0	0	0	.38	.00	.93						
		FAULTP		6074	0	0	0	0	0	.38	.00	.93						
		FAULTN		-6074	0	0	0	0	0	.38	.00	.93						
035	SNB		FW9018HL5009															
		NORMP																
		NORMN																
		UPSETP		6806	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-6806	0	0	0	0	0	.00	1.00	.00						
		FAULTP		14237	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14237	0	0	0	0	0	.00	1.00	.00						
040	SNB		FW9018HL5004															
		NORMP																
		NORMN																
		UPSETP		2639	0	0	0	0	0	.38	.00	.93						
		UPSETN		-2639	0	0	0	0	0	.38	.00	.93						
		FAULTP		5600	0	0	0	0	0	.38	.00	.93						
		FAULTN		-5600	0	0	0	0	0	.38	.00	.93						
050	SNB		FW9018HL5007															
		NORMP																
		NORMN																
		UPSETP		4192	0	0	0	0	0	.00	.00	1.00						
		UPSETN		-4192	0	0	0	0	0	.00	.00	1.00						
		FAULTP		9899	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-9899	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
055	SNB		FW9018HL5008															
		NORMP																
		NORMN																
		UPSETP		8134	0	0	0	0	0	1.00	.00	.00						
		UPSETN		-8134	0	0	0	0	0	1.00	.00	.00						
		FAULTP		19624	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-19624	0	0	0	0	0	1.00	.00	.00						
065	SNB		FW9018SS0006															
		NORMP																
		NORMN																
		UPSETP		4708	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-4708	0	0	0	0	0	.00	1.00	.00						
		FAULTP		10105	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-10105	0	0	0	0	0	.00	1.00	.00						
085	SNB		FW9018SS0007															
		NORMP																
		NORMN																
		UPSETP		5143	0	0	0	0	0	-.71	.00	-.71						
		UPSETN		-5143	0	0	0	0	0	-.71	.00	-.71						
		FAULTP		12265	0	0	0	0	0	-.71	.00	-.71						
		FAULTN		-12265	0	0	0	0	0	-.71	.00	-.71						
092	SNB		FW9018HL5003															
		NORMP																
		NORMN																
		UPSETP		1893	0	0	0	0	0	-.71	.00	.71						
		UPSETN		-1893	0	0	0	0	0	-.71	.00	.71						
		FAULTP		4421	0	0	0	0	0	-.71	.00	.71						
		FAULTN		-4421	0	0	0	0	0	-.71	.00	.71						
097	SNB		FW9018HL5006															
		NORMP																
		NORMN																
		UPSETP		2948	0	0	0	0	0	.00	.00	1.00						
		UPSETN		-2948	0	0	0	0	0	.00	.00	1.00						
		FAULTP		6700	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-6700	0	0	0	0	0	.00	.00	1.00						

ME101LC VERSION M4 STOP ON 10/28/97 AT 15:38:11, CPU- 878053091
ME101LC VERSION M4 EXECUTION TIME$ CPU- 55
ME101SA VERSION M4 START ON 10/28/97 AT 15:38:12, CPU- 878053092

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE : TIME1

DATA PT	TYPE	LOCAL FORCES (LB) FA MAX/MIN	FA TIME	FB MAX/MIN	FB TIME	FC MAX/MIN	FC TIME	LOCAL MOMENTS (FT-LB) MA MAX/MIN	MA TIME	MB MAX/MIN	MB TIME	MC MAX/MIN	MC TIME
001	ANA	26978.	.362	0.	.000	0.	.000	154610.	.270	0.	.000	0.	.000
		-34979.	.361	0.	.000	0.	.000	-157861.	.369	0.	.000	0.	.000
001	ANB	0.	.000	82362.	.270	0.	.000	0.	.000	240021.	.100	0.	.000
		0.	.000	-89513.	.370	0.	.000	0.	.000	-269181.	.261	0.	.000
001	ANC	0.	.000	0.	.000	24208.	.261	0.	.000	0.	.000	1045986.	.270
		0.	.000	0.	.000	-20950.	.180	0.	.000	0.	.000	-1007973.	.370
007	RAD	28144.	.425	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-24219.	.325	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
07N	RAD	45957.	.352	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-38248.	.450	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
07N	RAD	35562.	.351	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-29972.	.446	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
015	SNB	17688.	.221	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-18086.	.160	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
030	SPR	0.	.238	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		0.	.386	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
035	SNB	75210.	.265	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-72456.	.383	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
040	SNB	48236.	.477	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-52932.	.506	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
050	SNB	91399.	.504	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-89530.	.474	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
055	SNB	108633.	.442	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-103548.	.343	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
065	SNB	67679.	.385	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-75981.	.285	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000

DATA PT	TYPE	LOCAL FORCES (LB) FA MAX/MIN	FA TIME	FB MAX/MIN	FB TIME	FC MAX/MIN	FC TIME	LOCAL MOMENTS (FT-LB) MA MAX/MIN	MA TIME	MB MAX/MIN	MB TIME	MC MAX/MIN	MC TIME
070	SPR	0.	.568	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		0.	.286	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
075	RAD	21131.	.444	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-23795.	.564	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
085	SNB	65625.	.256	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-66491.	.288	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
094	RAD	25549.	.542	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-23100.	.510	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
092	SNB	52338.	.408	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-39175.	.507	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
097	SNB	33280.	.238	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-37673.	.384	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
099	RAD	24471.	.328	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-18759.	.503	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
101	RAD	87605.	.227	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-76222.	.325	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
11A	RAD	40055.	.353	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-44549.	.327	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
10A	RAD	61340.	.426	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-57358.	.447	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
110	ANA	271747.	.216	0.	.000	0.	.000	25034.	.546	0.	.000	0.	.000
		-101197.	.011	0.	.000	0.	.000	-36556.	.377	0.	.000	0.	.000
110	ANB	0.	.000	7633.	.084	0.	.000	0.	.000	62312.	.241	0.	.000
		0.	.000	-7862.	.099	0.	.000	0.	.000	-64210.	.426	0.	.000
110	ANC	0.	.000	0.	.000	16120.	.237	0.	.000	0.	.000	63793.	.450
		0.	.000	0.	.000	-20442.	.224	0.	.000	0.	.000	-60397.	.504

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
001	ANC		1R121NSQ101D									
		WT1		18.	-1085.	-52.	5371.	188.	-4960	.000	.000	.000
		THRM2		-3220.	-589.	-4361.	69202.	66147.	-47656.	.832	1.980	1.893
		THRM3		661.	-1346.	-5697.	76100.	91520.	-40953.	.832	1.980	1.893
		THRM6		-2176.	-796.	-4715.	71052.	72870.	-45885.	.832	1.980	1.893
		TIME1		42330.	82262.	38131.	645173.	269181.	991372.	.000	.000	.000
		FAULTP		44918.	81176.	38079.	727864.	361089.	1004055.	.832	1.980	1.893
		FAULTN		-46624.	-84692.	-45211.	-639802.	-268792.	-1067130.	.000	.000	.000
007	RAD		HL5016									
		WT1		-222.	0.	139.	0.	0.	0.	-.001	-.001	-.001
		THRM2		-3199.	0.	1999.	0.	0.	0.	.649	1.454	1.048
		THRM3		-7629.	0.	4767.	0.	0.	0.	.605	1.694	.992
		THRM6		-4382.	0.	2738.	0.	0.	0.	.637	1.519	1.033
		TIME1		23867.	0.	14914.	0.	0.	0.	.169	.553	.281
		FAULTP		21645.	0.	19821.	0.	0.	0.	.817	2.246	1.328
		FAULTN		-31719.	0.	-14776.	0.	0.	0.	-.170	-.554	-.281
07H	RAD		HL5015									
		WT1		51.	0.	-51.	0.	0.	0.	.000	.000	.000
		THRM2		4471.	0.	-4471.	0.	0.	0.	.006	1.055	.000
		THRM3		4283.	0.	-4283.	0.	0.	0.	.005	1.512	-.001
		THRM6		4411.	0.	-4411.	0.	0.	0.	.006	1.179	.000
		TIME1		32497.	0.	32497.	0.	0.	0.	.033	.554	.013
		FAULTP		37018.	0.	32445.	0.	0.	0.	.039	2.066	.013
		FAULTN		-32445.	0.	-37018.	0.	0.	0.	-.033	-.555	-.014
07H	RAD		HL5015									
		WT1		-44.	0.	-44.	0.	0.	0.	.000	.000	.000
		THRM2		7574.	0.	7574.	0.	0.	0.	.006	1.055	.000
		THRM3		5581.	0.	5581.	0.	0.	0.	.005	1.512	-.001
		THRM6		7028.	0.	7028.	0.	0.	0.	.006	1.179	.000
		TIME1		25146.	0.	25146.	0.	0.	0.	.033	.554	.013
		FAULTP		32677.	0.	32677.	0.	0.	0.	.039	2.066	.013
		FAULTN		-25190.	0.	-25190.	0.	0.	0.	-.033	-.555	-.014
009	SPD		HL5014									
		WT1		0.	-9528.	0.	0.	0.	0.	.005	.000	-.001
		THRM2								-.097	.891	-.407
		THRM3								-.138	1.437	-.391
		THRM6								-.108	1.040	-.403
		TIME1								.400	.554	.182
		FAULTP		0.	-9528.	0.	0.	0.	0.	.405	1.991	.182
		FAULTN		0.	-9528.	0.	0.	0.	0.	-.532	-.554	-.591

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
030	SPR		FW9018SH0001									
		WT1		0.	-8136.	0.	0.	0.	0.	.496	-.496	-.014
		THRM2		0.	0.	0.	0.	0.	0.	.531	-.014	-.370
		THRM3		0.	1.	0.	0.	0.	0.	.399	.838	-.807
		THRM6		0.	0.	0.	0.	0.	0.	.495	.218	-.490
		TIME1		0.	0.	0.	0.	0.	0.	.453	.338	.189
		FAULTP		0.	1.	0.	0.	0.	0.	1.009	1.151	.165
		FAULTN		0.	-8136.	0.	0.	0.	0.	-.428	-.378	-1.021
070	SPR		FW9018SH0002									
		WT1		0.	-9636.	0.	0.	0.	0.	.037	-.032	-.050
		THRM2		0.	0.	0.	0.	0.	0.	.583	-.039	1.637
		THRM3		0.	0.	0.	0.	0.	0.	.216	.327	.624
		THRM6		0.	0.	0.	0.	0.	0.	.483	.061	1.359
		TIME1		0.	0.	0.	0.	0.	0.	.394	.146	.579
		FAULTP		0.	0.	0.	0.	0.	0.	1.015	.461	2.166
		FAULTN		0.	-9636.	0.	0.	0.	0.	-.357	-.217	-.629
075	RAD		FW9018HL5005									
		WT1		0.	-5341.	0.	0.	0.	0.	.037	-.006	-.061
		THRM2		0.	1166.	0.	0.	0.	0.	-.017	.001	2.707
		THRM3		0.	4033.	0.	0.	0.	0.	-.058	.005	1.263
		THRM6		0.	1933.	0.	0.	0.	0.	-.028	.002	2.312
		TIME1		0.	23795.	0.	0.	0.	0.	.402	.027	.327
		FAULTP		0.	22486.	0.	0.	0.	0.	.439	.026	2.973
		FAULTN		0.	-29136.	0.	0.	0.	0.	-.423	-.033	-.387
094	RAD		FW9018HL5002									
		WT1		0.	-8351.	0.	0.	0.	0.	.027	-.006	-.045
		THRM2		0.	-1481.	0.	0.	0.	0.	-.151	-.001	2.516
		THRM3		0.	-3914.	0.	0.	0.	0.	-.098	-.003	1.218
		THRM6		0.	-2145.	0.	0.	0.	0.	-.136	-.002	2.161
		TIME1		0.	25549.	0.	0.	0.	0.	.241	.020	.208
		FAULTP		0.	17198.	0.	0.	0.	0.	.168	.013	2.679
		FAULTN		0.	-37813.	0.	0.	0.	0.	-.265	-.029	-.252
099	RAD		FW1018HL5001									
		WT1		0.	-5627.	0.	0.	0.	0.	.003	-.011	-.004
		THRM2		0.	7673.	0.	0.	0.	0.	-.122	.014	.662
		THRM3		0.	5888.	0.	0.	0.	0.	-.065	.011	.321
		THRM6		0.	7185.	0.	0.	0.	0.	-.107	.013	.569
		TIME1		0.	24471.	0.	0.	0.	0.	.269	.046	.080
		FAULTP		0.	26517.	0.	0.	0.	0.	.172	.050	.738
		FAULTN		0.	-30098.	0.	0.	0.	0.	-.288	-.056	-.084

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
101	RAD		FW9018HL5013									
		WT1		-2126.	-1104.	0.	0.	0.	0.	.001	-.001	.000
		THRM2		-3000.	-1558.	0.	0.	0.	0.	-.012	.020	.301
		THRM3		-3704.	-1923.	0.	0.	0.	0.	-.004	.005	.145
		THRM6		-3193.	-1658.	0.	0.	0.	0.	-.009	.016	.258
		TIME1		77750.	40369.	0.	0.	0.	0.	.050	.057	.142
		FAULTP		75624.	39265.	0.	0.	0.	0.	.051	.075	.443
		FAULTN		-83581.	-43396.	0.	0.	0.	0.	-.061	-.060	-.141
11A	RAD		FW9018HL5013									
		WT1		3150.	-2289.	0.	0.	0.	0.	.000	-.008	.000
		THRM2		16942.	-12309.	0.	0.	0.	0.	.048	.021	.275
		THRM3		11085.	-8054.	0.	0.	0.	0.	.026	.007	.134
		THRM6		15340.	-11146.	0.	0.	0.	0.	.042	.018	.237
		TIME1		36041.	26186.	0.	0.	0.	0.	.036	.059	.141
		FAULTP		56132.	23898.	0.	0.	0.	0.	.084	.073	.417
		FAULTN		-32891.	-40784.	0.	0.	0.	0.	-.035	-.067	-.141
10A	RAD		FW9018HL5012									
		WT1		0.	0.	59.	0.	0.	0.	.000	-.015	.000
		THRM2		0.	0.	13604.	0.	0.	0.	.222	-.023	.012
		THRM3		0.	0.	5667.	0.	0.	0.	.122	-.030	.005
		THRM6		0.	0.	11434.	0.	0.	0.	.195	-.025	.010
		TIME1		0.	0.	61340.	0.	0.	0.	.056	.042	.054
		FAULTP		0.	0.	75004.	0.	0.	0.	.277	.028	.066
		FAULTN		0.	0.	-61281.	0.	0.	0.	-.056	-.087	-.054
110	ANC		FEN M-S									
		WT1		-827.	-3080.	-52.	-8789.	-10.	-22590.	.000	.000	.000
		THRM2		-19567.	7118.	-14346.	-5822.	-13340.	59833.	.035	-.061	-.013
		THRM3		-10277.	5315.	-6035.	-3182.	-13609.	48239.	.036	-.061	-.011
		THRM6		-17027.	6625.	-12074.	-5099.	-13413.	56664.	.035	-.061	-.012
		TIME1		271747.	7862.	20442.	36556.	64210.	63793.	.042	.001	.003
		FAULTP		270920.	11901.	20390.	27767.	64200.	101036.	.079	.001	.003
		FAULTN		-292140.	-10942.	-34839.	-51167.	-77828.	-86383.	-.043	-.063	-.016
015	SNB		FW9018SS0001									
		WT1								.026	-.023	-.022
		THRM2								.516	.046	-.508
		THRM3								.385	.911	-.888
		THRM6								.480	.282	-.612
		TIME1		6866.	0.	16732.	0.	0.	0.	.452	.426	.193
		FAULTP		6866.	0.	16732.	0.	0.	0.	.994	1.315	.171
		FAULTN		-6866.	0.	-16732.	0.	0.	0.	-.426	-.449	-1.103

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
035	SNB		FW9018HL5003									
		WT1								.022	-.040	.021
		THRM2								.585	-.215	.130
		THRM3								.450	.577	-.515
		THRM6								.548	.001	-.046
		TIME1		0.	75210.	0.	0.	0.	0.	.456	.058	.206
		FAULTP		0.	75210.	0.	0.	0.	0.	1.063	.595	.305
		FAULTN		0.	-75210.	0.	0.	0.	0.	-.434	-.313	-.752
040	SNB		FW9018HL5004									
		WT1								.022	-.042	-.032
		THRM2								.593	-.243	.204
		THRM3								.458	.539	-.471
		THRM6								.556	-.029	.019
		TIME1		20094.	0.	48969.	0.	0.	0.	.457	.043	.213
		FAULTP		20094.	0.	48969.	0.	0.	0.	1.071	.561	.385
		FAULTN		-20094.	0.	-48969.	0.	0.	0.	-.435	-.328	-.717
050	SNB		FW9018HL5007									
		WT1								.023	-.054	-.041
		THRM2								.681	-.229	1.056
		THRM3								.380	.350	.172
		THRM6								.599	-.071	.814
		TIME1		0.	0.	91399.	0.	0.	0.	.221	.196	.060
		FAULTP		0.	0.	91399.	0.	0.	0.	.925	.492	1.075
		FAULTN		0.	0.	-91399.	0.	0.	0.	-.199	-.479	-.101
055	SNB		FW9018HL5008									
		WT1								.027	-.054	-.042
		THRM2								.702	-.168	1.144
		THRM3								.343	.378	.268
		THRM6								.604	-.019	.904
		TIME1		108633.	0.	0.	0.	0.	0.	.201	.196	.213
		FAULTP		108633.	0.	0.	0.	0.	0.	.930	.520	1.315
		FAULTN		-108633.	0.	0.	0.	0.	0.	-.174	-.418	-.255
065	SNB		FW9018SS0006									
		WT1								.037	-.042	-.048
		THRM2								.652	-.050	1.480
		THRM3								.247	.371	.532
		THRM6								.541	.065	1.221
		TIME1		0.	75981.	0.	0.	0.	0.	.393	.151	.541
		FAULTP		0.	75981.	0.	0.	0.	0.	1.082	.681	1.974
		FAULTN		0.	-75981.	0.	0.	0.	0.	-.356	-.263	-.588

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO N5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
085	SNB		FW9018SS0007									
		WT1								.017	-.002	.051
		THRM2								-.121	-.014	2.872
		THRM3								-.101	-.046	1.362
		THRM6								-.116	-.023	2.459
		TIME1		46404.	0.	46404.	0.	0.	0.	.377	.110	.386
		FAULTP		46404.	0.	46404.	0.	0.	0.	.415	.103	3.197
		FAULTN		-46404.	0.	-46404.	0.	0.	0.	-.461	-.158	-.446
092	SNB		FW9018NL5003									
		WT1								.024	-.016	-.043
		THRM2								-.123	.008	2.424
		THRM3								-.084	.012	1.175
		THRM6								-.112	.009	2.083
		TIME1		37009.	0.	37009.	0.	0.	0.	.138	.052	.198
		FAULTP		37009.	0.	37009.	0.	0.	0.	.162	.049	2.580
		FAULTN		-37009.	0.	-37009.	0.	0.	0.	-.236	-.068	-.241
097	SNB		FW9018NL5006									
		WT1								.003	-.077	-.014
		THRM2								.092	.040	1.144
		THRM3								.033	.057	.561
		THRM6								.076	.045	.984
		TIME1		0.	0.	37673.	0.	0.	0.	.173	.315	.061
		FAULTP		0.	0.	37673.	0.	0.	0.	.268	.295	1.191
		FAULTN		0.	0.	-37673.	0.	0.	0.	-.170	-.393	-.075

TITLE : FEEDWATER "FW" SYSTEM - SG ID TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
001	ANC		1R121N5G101D															
		WT1		-10	-1085	-54	-131	388	-11315	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM2		-4930	-589	-2253	37421	66147	-75231	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM3		-2184	-1346	-5303	46704	91520	-72712	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		THRM6		-4150	-796	-3069	39858	72170	-76579	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		TIME1		34979	82262	24208	157861	269181	1045986	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		FAULTP		34970	81176	24154	206434	361089	1036671	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
		FAULTN		-39919	-84692	-29564	-357993	-268792	-1132531	.87	.00	.48	.00	1.00	.00	-.48	.00	.87
007	RAD		HL5016															
		WT1		-262	0	0	0	0	0	.85	.00	-.53						
		THRM2		-3772	0	0	0	0	0	.85	.00	-.53						
		THRM3		-8996	0	0	0	0	0	.85	.00	-.53						
		THRM6		-5167	0	0	0	0	0	.85	.00	-.53						
		TIME1		28146	0	0	0	0	0	.85	.00	-.53						
		FAULTP		27882	0	0	0	0	0	.85	.00	-.53						
		FAULTN		-37403	0	0	0	0	0	.85	.00	-.53						
07H	RAD		HL5015															
		WT1		-72	0	0	0	0	0	-.71	.00	.71						
		THRM2		-6322	0	0	0	0	0	-.71	.00	.71						
		THRM3		-6058	0	0	0	0	0	-.71	.00	.71						
		THRM6		-6237	0	0	0	0	0	-.71	.00	.71						
		TIME1		45987	0	0	0	0	0	-.71	.00	.71						
		FAULTP		45885	0	0	0	0	0	-.71	.00	.71						
		FAULTN		-52352	0	0	0	0	0	-.71	.00	.71						
07H	RAD		HL5015															
		WT1		62	0	0	0	0	0	-.71	.00	-.71						
		THRM2		-10711	0	0	0	0	0	-.71	.00	-.71						
		THRM3		-7893	0	0	0	0	0	-.71	.00	-.71						
		THRM6		-9939	0	0	0	0	0	-.71	.00	-.71						
		TIME1		35562	0	0	0	0	0	-.71	.00	-.71						
		FAULTP		35624	0	0	0	0	0	-.71	.00	-.71						
		FAULTN		-46212	0	0	0	0	0	-.71	.00	-.71						
009	SPD		HL5014															
		WT1		-9528	0	0	0	0	0	.00	1.00	.00						
		THRM2																
		THRM3																
		THRM6																
		TIME1																
		FAULTP		-9528	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9528	0	0	0	0	0	.00	1.00	.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
030	SPR		FW9018EH0001															
		WT1		-8136	0	0	0	0	0	.00	1.00	.00						
		THRM2		0	0	0	0	0	0	.00	1.00	.00						
		THRM3		1	0	0	0	0	0	.00	1.00	.00						
		THRM6		0	0	0	0	0	0	.00	1.00	.00						
		TIME1		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		1	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-8136	0	0	0	0	0	.00	1.00	.00						
070	SPR		FW9018EH0002															
		WT1		-9636	0	0	0	0	0	.00	1.00	.00						
		THRM2		0	0	0	0	0	0	.00	1.00	.00						
		THRM3		0	0	0	0	0	0	.00	1.00	.00						
		THRM6		0	0	0	0	0	0	.00	1.00	.00						
		TIME1		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9636	0	0	0	0	0	.00	1.00	.00						
075	RAD		FW9018HL5005															
		WT1		-5341	0	0	0	0	0	.00	1.00	.00						
		THRM2		1146	0	0	0	0	0	.00	1.00	.00						
		THRM3		4033	0	0	0	0	0	.00	1.00	.00						
		THRM6		1933	0	0	0	0	0	.00	1.00	.00						
		TIME1		23795	0	0	0	0	0	.00	1.00	.00						
		FAULTP		22486	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-29136	0	0	0	0	0	.00	1.00	.00						
094	RAD		FW9018HL5002															
		WT1		-8351	0	0	0	0	0	.00	1.00	.00						
		THRM2		-1481	0	0	0	0	0	.00	1.00	.00						
		THRM3		-3914	0	0	0	0	0	.00	1.00	.00						
		THRM6		-2145	0	0	0	0	0	.00	1.00	.00						
		TIME1		25549	0	0	0	0	0	.00	1.00	.00						
		FAULTP		17198	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-37813	0	0	0	0	0	.00	1.00	.00						
099	RAD		FW1018HL5001															
		WT1		-5627	0	0	0	0	0	.00	1.00	.00						
		THRM2		7673	0	0	0	0	0	.00	1.00	.00						
		THRM3		5888	0	0	0	0	0	.00	1.00	.00						
		THRM6		7185	0	0	0	0	0	.00	1.00	.00						
		TIME1		24471	0	0	0	0	0	.00	1.00	.00						
		FAULTP		26517	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-30098	0	0	0	0	0	.00	1.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
101	RAD		FW9018HL5013															
		WT1		-2396	0	0	0	0	0	.89	.46	.00						
		THRM2		-3381	0	0	0	0	0	.89	.46	.00						
		THRM3		-4174	0	0	0	0	0	.89	.46	.00						
		THRM6		-3598	0	0	0	0	0	.89	.46	.00						
		TIME1		87605	0	0	0	0	0	.89	.46	.00						
		FAULTP		85209	0	0	0	0	0	.89	.46	.00						
		FAULTM		-96175	0	0	0	0	0	.89	.46	.00						
11A	RAD		FW9018HL5013															
		WT1		3894	0	0	0	0	0	.81	-.59	.00						
		THRM2		20941	0	0	0	0	0	.81	-.59	.00						
		THRM3		13702	0	0	0	0	0	.81	-.59	.00						
		THRM6		18962	0	0	0	0	0	.81	-.59	.00						
		TIME1		44549	0	0	0	0	0	.81	-.59	.00						
		FAULTP		69384	0	0	0	0	0	.81	-.59	.00						
		FAULTM		-40656	0	0	0	0	0	.81	-.59	.00						
10A	RAD		FW9018HL5012															
		WT1		59	0	0	0	0	0	.00	.00	1.00						
		THRM2		13604	0	0	0	0	0	.00	.00	1.00						
		THRM3		5667	0	0	0	0	0	.00	.00	1.00						
		THRM6		11434	0	0	0	0	0	.00	.00	1.00						
		TIME1		61340	0	0	0	0	0	.00	.00	1.00						
		FAULTP		75004	0	0	0	0	0	.00	.00	1.00						
		FAULTM		-61281	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-5															
		WT1		-827	-3080	-52	-8789	-10	-22590	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM2		-19567	7118	-14346	-5822	-13340	59833	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM3		-10277	5315	-6035	-3182	-13609	48239	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM6		-17027	6625	-12074	-5099	-13413	56664	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIME1		271747	7862	20442	36556	64210	63793	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTP		270920	11901	20390	27767	64200	101036	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTM		-292140	-10942	-34839	-51167	-77828	-86383	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
015	SNB		FW9018SS0001															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		18086	0	0	0	0	0	.38	.00	.93						
		FAULTP		18086	0	0	0	0	0	.38	.00	.93						
		FAULTM		-18086	0	0	0	0	0	.38	.00	.93						

TITLE : FEEDWATER "FW" SYSTEM - 8G 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
035	SNB		FW9018HL5009															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		75210	0	0	0	0	0	.00	1.00	.00						
		FAULTP		75210	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-75210	0	0	0	0	0	.00	1.00	.00						
040	SNB		FW9018HL5004															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		52932	0	0	0	0	0	.38	.00	.93						
		FAULTP		52932	0	0	0	0	0	.38	.00	.93						
		FAULTN		-52932	0	0	0	0	0	.38	.00	.93						
050	SNB		FW9018HL5007															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		91399	0	0	0	0	0	.00	.00	1.00						
		FAULTP		91399	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-91399	0	0	0	0	0	.00	.00	1.00						
055	SNB		FW9018HL5008															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		108633	0	0	0	0	0	1.00	.00	.00						
		FAULTP		108633	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-108633	0	0	0	0	0	1.00	.00	.00						
065	SNB		FW9018SS0006															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		75981	0	0	0	0	0	.00	1.00	.00						
		FAULTP		75981	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-75981	0	0	0	0	0	.00	1.00	.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
085	SNB		FW9018SS0007															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		65625	0	0	0	0	0	-.71	.00	-.71						
		FAULTP		65625	0	0	0	0	0	-.71	.00	-.71						
		FAULTM		-65625	0	0	0	0	0	-.71	.00	-.71						
092	SNB		FW9018HLS003															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		52338	0	0	0	0	0	-.71	.00	.71						
		FAULTP		52338	0	0	0	0	0	-.71	.00	.71						
		FAULTM		-52338	0	0	0	0	0	-.71	.00	.71						
097	SNB		FW9018HLS006															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		37673	0	0	0	0	0	.00	.00	1.00						
		FAULTP		37673	0	0	0	0	0	.00	.00	1.00						
		FAULTM		-37673	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
001	ANC		1R121HSG101D									
		WT1		18.	-1085.	-52.	5371.	388.	-9960.	.000	.000	.000
		TIMEL1								.028	.028	.027
		TIMEL2								.032	.031	.028
		TIMEL3								.031	.030	.027
		LOCA								.032	.031	.028
007	RAD		HL5016									
		WT1		-222.	0.	139.	0.	0.	0.	-.001	-.001	-.001
		TIMEL1		6589.	0.	4117.	0.	0.	0.	.056	.068	.095
		TIMEL2		6852.	0.	4282.	0.	0.	0.	.056	.084	.096
		TIMEL3		6454.	0.	4033.	0.	0.	0.	.045	.069	.076
		LOCA		6852.	0.	4282.	0.	0.	0.	.056	.084	.096
07H	RAD		HL5015									
		WT1		51.	0.	-51.	0.	0.	0.	.000	.000	.000
		TIMEL1		5002.	0.	5002.	0.	0.	0.	.006	.068	.007
		TIMEL2		4999.	0.	4999.	0.	0.	0.	.006	.084	.007
		TIMEL3		5109.	0.	5109.	0.	0.	0.	.006	.069	.007
		LOCA		5109.	0.	5109.	0.	0.	0.	.006	.084	.007
07H	RAD		HL5015									
		WT1		-44.	0.	-44.	0.	0.	0.	.000	.000	.000
		TIMEL1		13732.	0.	13732.	0.	0.	0.	.006	.068	.007
		TIMEL2		13633.	0.	13633.	0.	0.	0.	.006	.084	.007
		TIMEL3		13921.	0.	13921.	0.	0.	0.	.006	.069	.007
		LOCA		13921.	0.	13921.	0.	0.	0.	.006	.084	.007
009	SPD		HL5014									
		WT1		0.	-9528.	0.	0.	0.	0.	.005	.000	-.001
		TIMEL1								.039	.068	.060
		TIMEL2								.036	.084	.068
		TIMEL3								.031	.069	.049
		LOCA								.039	.084	.068
030	SPR		FW9018HX0001		-8136 GS 6/25/98							
		WT1		0.	0.	0.	0.	0.	0.	.025	-.025	-.024
		TIMEL1		0.	0.	0.	0.	0.	0.	.031	.045	.014
		TIMEL2		0.	0.	0.	0.	0.	0.	.037	.053	.016
		TIMEL3		0.	0.	0.	0.	0.	0.	.029	.042	.014
		LOCA		0.	0.	0.	0.	0.	0.	.037	.053	.016

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
070	SPR		FW9018SH0002		-9636.							
		WT1		0.		0.	0.	0.	0.	.017	-.032	-.050
		TIMEL1		0.	0.	0.	0.	0.	0.	.018	.011	.027
		TIMEL2		0.	0.	0.	0.	0.	0.	.021	.012	.036
		TIMEL3		0.	0.	0.	0.	0.	0.	.015	.009	.023
		LOCA		0.	0.	0.	0.	0.	0.	.021	.012	.036
075	RAD		FW9018HL5005									
		WT1		0.	-5341.	0.	0.	0.	0.	.017	-.006	-.061
		TIMEL1		0.	1027.	0.	0.	0.	0.	.018	.001	.017
		TIMEL2		0.	1134.	0.	0.	0.	0.	.022	.001	.021
		TIMEL3		0.	969.	0.	0.	0.	0.	.015	.001	.016
		LOCA		0.	1134.	0.	0.	0.	0.	.022	.001	.021
094	RAD		FW9018HL5002									
		WT1		0.	-8351.	0.	0.	0.	0.	.027	-.006	-.045
		TIMEL1		0.	825.	0.	0.	0.	0.	.005	.001	.004
		TIMEL2		0.	1077.	0.	0.	0.	0.	.006	.001	.005
		TIMEL3		0.	701.	0.	0.	0.	0.	.005	.001	.004
		LOCA		0.	1077.	0.	0.	0.	0.	.006	.001	.005
099	RAD		FW1018HL5001									
		WT1		0.	-5627.	0.	0.	0.	0.	.003	-.011	-.004
		TIMEL1		0.	505.	0.	0.	0.	0.	.002	.001	.001
		TIMEL2		0.	605.	0.	0.	0.	0.	.003	.001	.001
		TIMEL3		0.	493.	0.	0.	0.	0.	.002	.001	.001
		LOCA		0.	605.	0.	0.	0.	0.	.003	.001	.001
101	RAD		FW9018HL5013									
		WT1		-2126.	-1104.	0.	0.	0.	0.	.001	-.003	.000
		TIMEL1		898.	466.	0.	0.	0.	0.	.001	.001	.001
		TIMEL2		1092.	567.	0.	0.	0.	0.	.001	.002	.001
		TIMEL3		807.	419.	0.	0.	0.	0.	.001	.001	.001
		LOCA		1092.	567.	0.	0.	0.	0.	.001	.002	.001
11A	RAD		FW9018HL5013									
		WT1		3150.	-2289.	0.	0.	0.	0.	.000	-.008	.000
		TIMEL1		496.	360.	0.	0.	0.	0.	.001	.001	.001
		TIMEL2		679.	494.	0.	0.	0.	0.	.001	.001	.001
		TIMEL3		484.	352.	0.	0.	0.	0.	.001	.001	.001
		LOCA		679.	494.	0.	0.	0.	0.	.001	.001	.001

6/25/98

TITLE : FEEDWATER "PW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
10A	RAD	PW9018HL5012									
		WT1	0.	0.	-59.	0.	0.	0.	.000	-.015	.000
		TIMEL1	0.	0.	255.	0.	0.	0.	.000	.001	.000
		TIMEL2	0.	0.	330.	0.	0.	0.	.000	.001	.000
		TIMEL3	0.	0.	245.	0.	0.	0.	.000	.001	.000
		LOCA	0.	0.	330.	0.	0.	0.	.000	.001	.000
210	ANC	PEW M-S									
		WT1	-827.	-3080.	-52.	-8769.	-10.	-22590.	.000	.000	.000
		TIMEL1	377.	69.	64.	1306.	267.	1472.	.000	.000	.000
		TIMEL2	466.	78.	63.	1761.	346.	1814.	.000	.000	.000
		TIMEL3	339.	68.	64.	1213.	260.	1523.	.000	.000	.000
		LOCA	466.	78.	64.	1761.	346.	1814.	.000	.000	.000
001	RAD	CENTER SG									
		WT1							.000	.000	.000
		TIMEL1	13772.	0.	0.	0.	0.	0.	.028	.028	.027
		TIMEL2	13874.	0.	0.	0.	0.	0.	.032	.031	.028
		TIMEL3	13692.	0.	0.	0.	0.	0.	.031	.030	.027
		LOCA	13874.	0.	0.	0.	0.	0.	.032	.031	.028
001	RAD	CENTER SG									
		WT1							.000	.000	.000
		TIMEL1	0.	8950.	0.	0.	0.	0.	.028	.028	.027
		TIMEL2	0.	10074.	0.	0.	0.	0.	.032	.031	.028
		TIMEL3	0.	7617.	0.	0.	0.	0.	.031	.030	.027
		LOCA	0.	10074.	0.	0.	0.	0.	.032	.031	.028
001	RAD	CENTER SG									
		WT1							.000	.000	.000
		TIMEL1	0.	0.	11232.	0.	0.	0.	.028	.028	.027
		TIMEL2	0.	0.	11313.	0.	0.	0.	.032	.031	.028
		TIMEL3	0.	0.	11169.	0.	0.	0.	.031	.030	.027
		LOCA	0.	0.	11313.	0.	0.	0.	.032	.031	.028
001	RAR	CENTER SG									
		WT1							.000	.000	.000
		TIMEL1	0.	0.	0.	44015.	0.	0.	.028	.028	.027
		TIMEL2	0.	0.	0.	51645.	0.	0.	.032	.031	.028
		TIMEL3	0.	0.	0.	38570.	0.	0.	.031	.030	.027
		LOCA	0.	0.	0.	51645.	0.	0.	.032	.031	.028

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO N5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
001	RAR		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	0.	0.	0.	178613.	0.	.028	.028	.027
		TIMEL2		0.	0.	0.	0.	179871.	0.	.032	.031	.028
		TIMEL3		0.	0.	0.	0.	177613.	0.	.031	.030	.027
		LOCA		0.	0.	0.	0.	179871.	0.	.032	.031	.028
001	RAR		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	0.	0.	0.	0.	106569.	.028	.028	.027
		TIMEL2		0.	0.	0.	0.	0.	119225.	.032	.031	.028
		TIMEL3		0.	0.	0.	0.	0.	89895.	.031	.030	.027
		LOCA		0.	0.	0.	0.	0.	119225.	.032	.031	.028
015	SNB		FW9018SS0001									
		WT1								.026	-.023	-.022
		TIMEL1		1900.	0.	4630.	0.	0.	0.	.032	.056	.017
		TIMEL2		2075.	0.	5057.	0.	0.	0.	.037	.067	.016
		TIMEL3		1618.	0.	3942.	0.	0.	0.	.029	.053	.014
		LOCA		2075.	0.	5057.	0.	0.	0.	.037	.067	.017
035	SNB		FW9018RL5009									
		WT1								.022	-.040	-.031
		TIMEL1		0.	9274.	0.	0.	0.	0.	.029	.007	.015
		TIMEL2		0.	10880.	0.	0.	0.	0.	.035	.008	.018
		TIMEL3		0.	9280.	0.	0.	0.	0.	.027	.007	.014
		LOCA		0.	10880.	0.	0.	0.	0.	.035	.008	.018
040	SNB		FW9018RL5004									
		WT1								.022	-.042	-.032
		TIMEL1		1866.	0.	4548.	0.	0.	0.	.029	.005	.016
		TIMEL2		2318.	0.	5650.	0.	0.	0.	.034	.005	.019
		TIMEL3		1697.	0.	4134.	0.	0.	0.	.027	.005	.015
		LOCA		2318.	0.	5650.	0.	0.	0.	.034	.005	.019
050	SNB		FW9018RL5007									
		WT1								.023	-.054	-.041
		TIMEL1		0.	0.	4397.	0.	0.	0.	.012	.022	.003
		TIMEL2		0.	0.	5703.	0.	0.	0.	.014	.025	.004
		TIMEL3		0.	0.	3655.	0.	0.	0.	.011	.020	.003
		LOCA		0.	0.	5703.	0.	0.	0.	.014	.025	.004

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
055	SNB		FW9018HL5008									
		WT1								.027	-.054	-.042
		TIMEL1		5189.	0.	0.	0.	0.	0.	.010	.022	.012
		TIMEL2		6422.	0.	0.	0.	0.	0.	.012	.025	.015
		TIMEL3		4524.	0.	0.	0.	0.	0.	.008	.020	.010
		LOCA		6422.	0.	0.	0.	0.	0.	.012	.025	.016
065	SNB		FW9018SG0006									
		WT1								.037	-.042	-.048
		TIMEL1		0.	7609.	0.	0.	0.	0.	.018	.015	.027
		TIMEL2		0.	8632.	0.	0.	0.	0.	.021	.017	.035
		TIMEL3		0.	6919.	0.	0.	0.	0.	.015	.014	.023
		LOCA		0.	8632.	0.	0.	0.	0.	.021	.017	.035
085	SNB		FW9018SG0007									
		WT1								.037	-.002	-.061
		TIMEL1		2040.	0.	2040.	0.	0.	0.	.017	.002	.018
		TIMEL2		2261.	0.	2261.	0.	0.	0.	.021	.001	.022
		TIMEL3		1969.	0.	1969.	0.	0.	0.	.015	.002	.016
		LOCA		2261.	0.	2261.	0.	0.	0.	.021	.003	.022
092	SNB		FW9018HL5003									
		WT1								.024	-.016	-.043
		TIMEL1		1102.	0.	1102.	0.	0.	0.	.004	.002	.003
		TIMEL2		1296.	0.	1296.	0.	0.	0.	.005	.003	.004
		TIMEL3		928.	0.	928.	0.	0.	0.	.004	.002	.003
		LOCA		1296.	0.	1296.	0.	0.	0.	.005	.003	.004
097	SNB		FW9018HL5006									
		WT1								.003	-.077	-.014
		TIMEL1		0.	0.	1001.	0.	0.	0.	.002	.012	.002
		TIMEL2		0.	0.	1182.	0.	0.	0.	.003	.016	.002
		TIMEL3		0.	0.	968.	0.	0.	0.	.002	.011	.002
		LOCA		0.	0.	1182.	0.	0.	0.	.003	.016	.002

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23436001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
001	ANC		1R121NSG101D															
		WT1		18	-1085	-52	5371	388	-9960	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
007	RAD		NL5016															
		WT1		-262	0	0	0	0	0	.85	.00	-.53						
		TIMEL1		7770	0	0	0	0	0	.85	.00	-.53						
		TIMEL2		8060	0	0	0	0	0	.85	.00	-.53						
		TIMEL3		7610	0	0	0	0	0	.85	.00	-.53						
		LOCA		8080	0	0	0	0	0	.85	.00	-.53						
07H	RAD		NL5015															
		WT1		-72	0	0	0	0	0	-.71	.00	.71						
		TIMEL1		7074	0	0	0	0	0	-.71	.00	.71						
		TIMEL2		7070	0	0	0	0	0	-.71	.00	.71						
		TIMEL3		7225	0	0	0	0	0	-.71	.00	.71						
		LOCA		7225	0	0	0	0	0	-.71	.00	.71						
07H	RAD		NL5015															
		WT1		62	0	0	0	0	0	-.71	.00	-.71						
		TIMEL1		19419	0	0	0	0	0	-.71	.00	-.71						
		TIMEL2		19280	0	0	0	0	0	-.71	.00	-.71						
		TIMEL3		19688	0	0	0	0	0	-.71	.00	-.71						
		LOCA		19688	0	0	0	0	0	-.71	.00	-.71						
009	SPD		NL5014															
		WT1		-9528	0	0	0	0	0	.00	1.00	.00						
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
030	SPR		FW901SSH0001															
		WT1		-8136	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		0	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		0	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		0	0	0	0	0	0	.00	1.00	.00						
		LOCA		0	0	0	0	0	0	.00	1.00	.00						

GK 6/25/98

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : FANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
070	SPR		FW9018SH0002															
		WT1		-9636	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		0	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		0	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		0	0	0	0	0	0	.00	1.00	.00						
		LOCA		0	0	0	0	0	0	.00	1.00	.00						
075	RAD		FW9018HL5005															
		WT1		-5341	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		1027	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		1134	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		969	0	0	0	0	0	.00	1.00	.00						
		LOCA		1134	0	0	0	0	0	.00	1.00	.00						
094	RAD		FW9018HL5002															
		WT1		-8351	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		825	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		1077	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		701	0	0	0	0	0	.00	1.00	.00						
		LOCA		1077	0	0	0	0	0	.00	1.00	.00						
099	RAD		FW1018HL5001															
		WT1		-5627	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		505	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		605	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		493	0	0	0	0	0	.00	1.00	.00						
		LOCA		605	0	0	0	0	0	.00	1.00	.00						
101	RAD		FW9018HL5013															
		WT1		-2396	0	0	0	0	0	.89	.46	.00						
		TIMEL1		1011	0	0	0	0	0	.89	.46	.00						
		TIMEL2		1231	0	0	0	0	0	.89	.46	.00						
		TIMEL3		909	0	0	0	0	0	.89	.46	.00						
		LOCA		1231	0	0	0	0	0	.89	.46	.00						
11A	RAD		FW9018HL5013															
		WT1		3894	0	0	0	0	0	.81	-.59	.00						
		TIMEL1		613	0	0	0	0	0	.81	-.59	.00						
		TIMEL2		840	0	0	0	0	0	.81	-.59	.00						
		TIMEL3		599	0	0	0	0	0	.81	-.59	.00						
		LOCA		840	0	0	0	0	0	.81	-.59	.00						

-9636 lb
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TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO MS
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
10A	RAD		FW9018HL5012															
		WT1		59	0	0	0	0	0	.00	.00	1.00						
		TIMEL1		255	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		330	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		245	0	0	0	0	0	.00	.00	1.00						
		LOCA		330	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-5															
		WT1		-827	-3080	-52	-8769	-10	-22590	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL1		377	69	64	1306	267	1472	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL2		466	78	63	1761	366	1814	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL3		339	68	64	1213	260	1523	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		LOCA		466	78	64	1761	366	1814	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
001	RAD		CENTER SG															
		WT1																
		TIMEL1		13772	0	0	0	0	0	1.00	.00	.00						
		TIMEL2		13874	0	0	0	0	0	1.00	.00	.00						
		TIMEL3		13692	0	0	0	0	0	1.00	.00	.00						
		LOCA		13874	0	0	0	0	0	1.00	.00	.00						
001	RAD		CENTER SG															
		WT1																
		TIMEL1		8950	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		10074	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		7617	0	0	0	0	0	.00	1.00	.00						
		LOCA		10074	0	0	0	0	0	.00	1.00	.00						
001	RAD		CENTER SG															
		WT1																
		TIMEL1		11232	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		11313	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		11169	0	0	0	0	0	.00	.00	1.00						
		LOCA		11313	0	0	0	0	0	.00	.00	1.00						
001	RAR		CENTER SG															
		WT1																
		TIMEL1		0	0	0	44015	0	0	1.00	.00	.00						
		TIMEL2		0	0	0	51645	0	0	1.00	.00	.00						
		TIMEL3		0	0	0	38570	0	0	1.00	.00	.00						
		LOCA		0	0	0	51645	0	0	1.00	.00	.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
001	RAR		CENTER SG															
		WT1																
		TIMEL1		0	0	0	178613	0	0	.00	1.00	.00						
		TIMEL2		0	0	0	179871	0	0	.00	1.00	.00						
		TIMEL3		0	0	0	177613	0	0	.00	1.00	.00						
		LOCA		0	0	0	179871	0	0	.00	1.00	.00						
001	RAR		CENTER SG															
		WT1																
		TIMEL1		0	0	0	106569	0	0	.00	.00	1.00						
		TIMEL2		0	0	0	119225	0	0	.00	.00	1.00						
		TIMEL3		0	0	0	89895	0	0	.00	.00	1.00						
		LOCA		0	0	0	119225	0	0	.00	.00	1.00						
015	SNB		FW9018SS0001															
		WT1																
		TIMEL1		5004	0	0	0	0	0	.38	.00	.93						
		TIMEL2		5466	0	0	0	0	0	.38	.00	.93						
		TIMEL3		4261	0	0	0	0	0	.38	.00	.93						
		LOCA		5466	0	0	0	0	0	.38	.00	.93						
035	SNB		FW9018NL5009															
		WT1																
		TIMEL1		9274	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		10880	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		9280	0	0	0	0	0	.00	1.00	.00						
		LOCA		10880	0	0	0	0	0	.00	1.00	.00						
040	SNB		FW9018NL5004															
		WT1																
		TIMEL1		4916	0	0	0	0	0	.38	.00	.93						
		TIMEL2		6107	0	0	0	0	0	.38	.00	.93						
		TIMEL3		4469	0	0	0	0	0	.38	.00	.93						
		LOCA		6107	0	0	0	0	0	.38	.00	.93						
050	SNB		FW9018NL5007															
		WT1																
		TIMEL1		4397	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		5703	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		3855	0	0	0	0	0	.00	.00	1.00						
		LOCA		5703	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PAMI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
055	SNB		FW9018HL5008															
		WT1																
		TIMEL1		5189	0	0	0	0	0	1.00	.00	.00						
		TIMEL2		6422	0	0	0	0	0	1.00	.00	.00						
		TIMEL3		4524	0	0	0	0	0	1.00	.00	.00						
		LOCA		6422	0	0	0	0	0	1.00	.00	.00						
065	SNB		FW9018SS0006															
		WT1																
		TIMEL1		7609	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		8632	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		6919	0	0	0	0	0	.00	1.00	.00						
		LOCA		8632	0	0	0	0	0	.00	1.00	.00						
085	SNB		FW9018SS0007															
		WT1																
		TIMEL1		2885	0	0	0	0	0	-.71	.00	-.71						
		TIMEL2		3198	0	0	0	0	0	-.71	.00	-.71						
		TIMEL3		2784	0	0	0	0	0	-.71	.00	-.71						
		LOCA		3198	0	0	0	0	0	-.71	.00	-.71						
092	SNB		FW9018HL5003															
		WT1																
		TIMEL1		1559	0	0	0	0	0	-.71	.00	.71						
		TIMEL2		1833	0	0	0	0	0	-.71	.00	.71						
		TIMEL3		1312	0	0	0	0	0	-.71	.00	.71						
		LOCA		1833	0	0	0	0	0	-.71	.00	.71						
097	SNB		FW9018HL5006															
		WT1																
		TIMEL1		1001	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		1182	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		968	0	0	0	0	0	.00	.00	1.00						
		LOCA		1182	0	0	0	0	0	.00	.00	1.00						

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. ID TO MS

ORIGINATOR PANI DATE 3/1/98 CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

CHK. WSS 3/1/98

DCP# 96-2843-2, SUPP. 0 page 175 of DCN# 9704763 Page 100 of 134

ATTACHMENT 3.0 HELB STRESS SUMMARY

TOTAL NO OF SHEETS

7

TITLE : FEEDWATER "FW" SYSTEM - SG 1D TO M5
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5037
USER : PANI
LOAD CASE : ALL

CODE SC3W75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
002	TNOT	12	11	23	48600
001		16	20	36	
002	TNOT	7563	9928	17491	48600
N02		7149	14378	21527	
N02	BEND	7490	17273	24763	39468
005 M		7159	17626	24785	
005 M	BEND	7159	17626	24785	39468
005 E		6824	17405	24229	
005 E	TNOT	6466	9646	16112	39468
006 B		5873	9304	15177	
006 B	BEND	6022	16788	22810	39468
006 M		6205	15568	21773	
006 M	BEND	6205	15568	21773	39468
006 E		6314	13223	19537	
006 E	TNOT	6089	7405	13494	32400
006A		6174	5153	11327	
006A	TNOT	6174	5153	11327	32400
007		6420	11672	18092	
007	TNOT	6420	11672	18092	32400
07G		6358	9282	15640	
07G	TNOT	6358	9282	15640	32400
07GA		6349	7465	13814	
07GA	TNOT	6349	7465	13814	32400
07H		6565	9085	15650	
07H	TNOT	6565	9085	15650	32400
009		6157	5914	12071	

** EXCEEDED ALLOWABLE

CODE SC3W75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
008	TNGT	6157	5914	12071	32400
09A B		6193	5638	11831	
09A B	BEND	6454	10227	16681	32400
09A M		6489	8662	15152	
09A M	BEND	6489	8662	15152	32400
09A E		6361	7674	14036	
09A E	TNGT	6124	4253	10377	32400
09B B		6225	4063	10288	
09B B	BEND	6498	7331	13829	32400
09B M		6680	6465	13145	
09B M	BEND	6680	6465	13145	32400
09B E		6753	5258	12011	
09B E	TNGT	6415	2912	9327	32400
09C		6332	2889	9221	
09C	TNGT	6332	2889	9221	32400
010		6726	6428	13154	
010	TNGT	6435	4563	10998	32400
011		6094	2719	8812	
011	TNGT	6094	2719	8812	32400
012		6074	2951	9025	
012	TNGT	6074	2951	9025	32400
12A		6041	3380	9421	
12A	TNGT	6041	3380	9421	32400
013		6016	3828	9844	
013	TNGT	6016	3828	9844	32400
014 B		5990	4633	10623	
014 B	BEND	6161	8429	14590	32400
014 M		6134	9528	15662	
014 M	BEND	6134	9528	15662	32400
014 E		6393	9397	15790	
014 E	TNGT	6162	5162	11324	32400
015		6279	5053	11332	

** EXCEEDED ALLOWABLE

CODE SC3W75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
015	TNGT	6279	5053	11332	32400
030		6571	4977	11548	
030	TNGT	6571	4977	11548	32400
028		6420	4965	11385	
028	TNGT	6420	4965	11385	32400
029		6332	4974	11306	
029	TNGT	6332	4973	11305	32400
032		6281	5002	11283	
032	TNGT	6281	5002	11283	32400
035		6549	5033	11582	
035	TNGT	6549	5033	11582	32400
035A		6551	4974	11525	
035A	TNGT	6551	4974	11525	32400
040		6555	4918	11473	
040	TNGT	6555	4918	11473	32400
045 B		6539	4490	11029	
045 B	BEND	6908	8174	15081	32400
045 M		6981	7826	14807	
045 M	BEND	6981	7826	14807	32400
045 E		6897	6916	13813	
045 E	TNGT	6530	3796	10326	32400
050		7483	5841	13324	
050	TNGT	7483	5841	13324	32400
050A		6826	2636	9462	
050A	TNGT	6826	2636	9462	32400
055		6937	2547	9485	
055	TNGT	6937	2547	9485	32400
060 B		6738	2554	9292	
060 B	BEND	7180	4649	11829	32400
060 M		6673	5041	11714	
060 M	BEND	6673	5041	11714	32400
060 E		6446	5364	11810	

** EXCEEDED ALLOWABLE

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CODE SC3W7S, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
060 E	TNGT	6201	2946	9147	32400
065		6299	3016	9315	
065	TNGT	6299	3016	9315	32400
067		6695	3158	9853	
067	TNGT	6695	3158	9853	32400
067A		6873	3217	10091	
067A	TNGT	6873	3217	10091	32400
070		7060	3277	10337	
070	TNGT	7060	3277	10337	32400
071		6702	3672	10374	
071	TNGT	6702	3672	10374	32400
071A		6473	4222	10694	
071A	TNGT	6473	4222	10694	32400
072		6432	4779	11212	
072	TNGT	6432	4779	11212	32400
072A		6328	5240	11568	
072A	TNGT	6328	5240	11568	32400
075		6403	5710	12112	
075	TNGT	6403	5710	12112	32400
080 B		6001	5255	11256	
080 B	BEND	6174	9567	15741	32400
080 M		6183	9406	15589	
080 M	BEND	6183	9406	15589	32400
080 E		6371	9507	15878	
080 E	TNGT	6146	5222	11368	32400
085		6223	5274	11497	
085	TNGT	6223	5274	11497	32400
086		6207	5376	11583	
086	TNGT	6207	5376	11583	32400
086A		6160	5703	11863	
086A	TNGT	6160	5703	11863	32400
087		6130	6178	12308	

** EXCEEDED ALLOWABLE

CODE 5C3N75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
087	TNGT	6130	6178	12308	32400
090 B		6127	6258	12385	
090 B	BEND	6345	11394	17739	32400
090 M		6334	12100	18435	
090 M	BEND	6334	12100	18435	32400
090 E		6324	11728	18053	
090 E	TNGT	6112	6442	12554	32400
090A		6362	5273	11635	
090A	TNGT	6362	5273	11635	32400
094		7245	4209	11454	
094	TNGT	7245	4209	11454	32400
094A		7100	4014	11113	
094A	TNGT	7100	4014	11113	32400
092		6970	3819	10790	
092	TNGT	6970	3819	10790	32400
092A		6450	2098	8549	
092A	TNGT	6450	2098	8549	32400
095 B		6785	882	7666	
095 B	BEND	7243	1605	8848	32400
095 M		7206	1612	8818	
095 M	BEND	7206	1612	8818	32400
095 E		7142	1574	8716	
095 E	TNGT	6711	864	7575	32400
097		7211	1445	8656	
097	TNGT	7211	1445	8656	32400
097A		6197	682	6879	
097A	TNGT	6197	682	6879	32400
099		6670	1024	7694	
099	TNGT	6670	1024	7694	32400
100 B		6552	964	7515	
100 B	BEND	6925	1755	8679	32400
100 M		6801	2111	8912	

** EXCEEDED ALLOWABLE

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CODE SC3W75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI	
100 M	BEND	6801	2111	8912	32400	
100 E		6833	3237	10070		
100 E	TNGT	6484	1778	8262	32400	
101		6535	2271	8806		
101	TNGT	6535	2271	8806	32400	
11A		6573	2629	9202		
11A	TNGT	6573	2629	9202	32400	
11B		6590	4001	10591		
11B	TNGT	6590	4001	10591	32400	
102 B		6592	5408	12000		
102 B	BEND	6980	9845	16826	32400	
102 M		6968	14473	21441		
102 M	BEND	6968	14473	21441	32400	*
102 E		6979	16168	23148		
102 E	TNGT	6591	8881	15472	32400	
10A		6679	8714	15393		
10A	TNGT	6679	8714	15393	32400	
105		8098	9992	18090		
105	TNGT	8098	9992	18090	32400	
110		8190	9936	18126		

** EXCEEDED ALLOWABLE

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D TO MS

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI · DATE
CHK. WSS 3/1/98

DCP# 96-2843-2, SUPP. 0 page 182 of DCN# 9704763 Page 107 of 134

ATTACHMENT 4.0 STRESS ISOMETRICS

TOTAL NO OF SHEETS

4

LARGE DOCUMENT CROSS REFERENCE

THE FOLLOWING IMAGES(S) RELATED TO STI 30486219

PG #	DIN #
108	28928834
109	28929062
110	28929222

DIN # already in Oracle 5-9-00

WILL BE AVAILABLE IN HARDCOPY UNTIL IMAGE LOCATION IS UPDATED ON ORACLE.

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. ID TO MS

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI GB DATE 3/1/98

CHK. MEK 3/4/98

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ATTACHMENT 5.0 LOCAL STRESS EVALUATIONS FOR IWAs TOTAL NO OF SHEETS

4

NOTES FOR LOCAL STRESS EVALUATIONS AT INTEGRAL WELDED ATTACHMENTS (IWAs):

1. THE FOLLOWING 3 CASES APPLY FOR EACH IWA EVALUATION

DESCRIPTION	LOADINGS CONSIDERED	ALLOWABLE STRESS
CASE 1 (PRIMARY UPSET)	WT + OBEI	1.5 Sm
CASE 2 (PRIMARY FLTD.)	WT + HIGHER OF (SSEI; LOCA; JET; DBA; WAT. HAMMER)	3.0 Sm
CASE 3 (PRIM. + SECY. UPSET)	WT + THRM + OBEI + OBESAM	3.0 Sm

2. REDUCED PIPE WALL THICKNESS TO CORRESPOND TO Dm/(2T) = 5 USED CONSERVATIVELY IF Dm/(2T) IS LESS THAN 5.

3. REDUCED ATTACHMENT DIAMETER USED CONSERVATIVELY FOR CIRCULAR ATTACHMENTS TO CORRESPOND TO do/Do = 0.7 IF ACTUAL do/Do > 0.7

   REDUCED ATTACHMENT DIMENSIONS USED CONSERVATIVELY FOR SQUARE ATTACHMENTS TO CORRESPOND TO C1/Dm OR C2/Dm = 0.7 IF THE ACTUAL RATIOS ARE > 0.7

   REDUCED ATTACHMENT DIMENSIONS USED CONSERVATIVELY FOR RECTANGULAR ATTACHMENTS TO CORRESPOND TO C1/Dm OR C2/Dm = 0.5 IF THE ACTUAL RATIOS ARE > 0.5

4. FOR IWAs WITH WRAPPER PLATES, EVALUATIONS ARE MADE FOR PIPE-PAD INTERFACE AS WELL AS PAD-ATTACHMENT INTERFACE.

5. THE SH AND SA VALUES ARE ADJUSTED FOR ME101LS PROGRAM PURPOSES ONLY TO CORRESPOND WITH THE USE OF 1.5Sm FOR PRIMARY UPSET & 3Sm FOR PRIMARY FAULTED AS WELL AS PRIMARY PLUS SECONDARY UPSET.
   SH=1.5Sm/1.2 ; SA=3Sm-(1.5/1.2)Sm=1.75Sm.

REF: Calc. No. JC-FW-9018-HL5006 Rev. 3
Calc. No. JC-FW-9018-HL5007 Rev. 1
Calc. No. JC-FW-1018-HL5014 Rev. 0

I N P U T I M A G E

```
    ---------1---------2---------3---------4---------5---------6---------7---------8

 1  STP1 SGR-IWAS MFWD:DP 050 HL5007; 097 HL5006; 009 HL5014
 2  LDC
 3  VD=17.063,VT=0.937,C1=12.600,C2=12.600,SHA=CIR,
 4  CAS=UP,PRI=7.4830,SEC=5.8410,SH=21.625,SA=30.275,
 5  P=0000.,VC=2094.00,VL=000.,MT=000000,MC=24539.,ML=000.00,
 6  LDC
 7  VD=17.063,VT=0.937,C1=12.600,C2=12.600,SHA=CIR,
 8  CAS=PA,PRI=31.088,SEC=5.8410,SH=21.625,SA=30.275,
 9  P=0000.,VC=45453.0,VL=000.,MT=000000,MC=532993,ML=000.00,
10  LDC
11  VD=17.063,VT=0.937,C1=12.600,C2=12.600,SHA=CIR,
12  CAS=PS,PRI=7.4830,SEC=5.8410,SH=21.625,SA=30.275,
13  P=0000.,VC=2197.00,VL=000.,MT=000000,MC=25746.,ML=000.00,
14  LDC
15  VD=17.063,VT=0.937,C1=10.750,C2=10.750,SHA=CIR,
16  CAS=UP,PRI=7.2110,SEC=1.4450,SH=21.625,SA=30.275,
17  P=2590.,VC=0000.00,VL=000.,MT=000000,MC=00000.,ML=000.00,
18  LDC
19  VD=17.063,VT=0.937,C1=10.750,C2=10.750,SHA=CIR,
20  CAS=PA,PRI=15.726,SEC=1.4450,SH=21.625,SA=30.275,
21  P=37949,VC=0000.00,VL=000.,MT=000000,MC=00000.,ML=000.00,
22  LDC
23  VD=17.063,VT=0.937,C1=10.750,C2=10.750,SHA=CIR,
24  CAS=PS,PRI=7.2110,SEC=1.4450,SH=21.625,SA=30.275,
25  P=3999.,VC=0000.00,VL=000.,MT=000000,MC=00000.,ML=000.00,
26  LDC
27  VD=15.157,VT=0.843,C1=1.5000,C2=6.0000,SHA=REC,
28  CAS=UP,PRI=6.1570,SEC=5.9140,SH=21.625,SA=30.275,
29  P=00000,VC=0000.00,VL=6700,MT=000000,MC=00000.,ML=10050.,
30  LDC
31  VD=15.157,VT=0.843,C1=1.5000,C2=6.0000,SHA=REC,
32  CAS=PA,PRI=13.488,SEC=5.9140,SH=21.625,SA=30.275,
33  P=00000,VC=0000.00,VL=6700,MT=000000,MC=00000.,ML=10050.,
34  LDC
35  VD=15.157,VT=0.843,C1=1.5000,C2=6.0000,SHA=REC,
36  CAS=PS,PRI=6.1570,SEC=5.9140,SH=21.625,SA=30.275,
37  P=00000,VC=0000.00,VL=6700,MT=000000,MC=00000.,ML=10050.,

    ---------1---------2---------3---------4---------5---------6---------7---------8
```

HL5007 (050)

HL5006 (097)

HL5014 (009)

NOTE: LOADS & GENERAL PIPING STRESSES USED IN LOCAL STRESS ANALYSIS VS- ACTUAL VALUES ARE NOT SIGNIFICANTLY DIFFERENT.
∴ NO IMPACT.

CBasavaraju 7/14/98

AWilliamson 7/21/98

SUMMARY TABLE
(KSI)

CASE	PIPING PRIMARY	PIPING SECONDARY	LOCAL PRIMARY	LOCAL SECONDARY + PRIMARY	COMBINED	ALLOWABLE	MAX SHEAR	ALLOWABLE	
1	7.5	.0	.6	.0	8.1	26.0	.0	.0	HL5007 (050)
2	31.1	.0	13.8	.0	44.9	51.9	.0	.0	
3	7.5	5.8	.0	2.5	15.8	51.9	.0	.0	
4	7.2	.0	.4	.0	7.6	26.0	.0	.0	HL5006 (037)
5	15.7	.0	5.4	.0	21.1	51.9	.0	.0	
6	7.2	3.4	.0	1.3	10.0	51.9	.0	.0	
7	6.2	.0	1.3	.0	7.5	26.0	.0	.0	HL5014 (009)
8	13.5	.0	1.3	.0	14.8	51.9	.0	.0	
9	6.2	5.9	.0	2.9	14.9	51.9	.0	.0	

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D TO MS

ORIGINATOR PANI JB DATE 3/1/98 CALC NO RC5037-P-400 R0
CHK. LKSS 3/4/98 SHEET NO
SHEET REV

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ATTACHMENT 6.0 EVALUATION OF GENERIC IWA CALCULATION

TOTAL NO OF SHEETS

12

Attachment 6

Title: EVALUATION OF GENERIC IWA CALCULATION

This evaluation is to assess the fatigue effects on new and existing IWAs for the main feedwater (MFW) lines (4 loops). The pipe stress calculation revision is due to the SGR pipe modifications and the evaluation is in accordance with the commitments and requirements of reference 2.

The fatigue effects on piping systems are evaluated with EQ10 and EQ11 of ASME Section III NB3600 (see reference 2, 3 & 4) based on thermal range and OBE range loads. (BELOW)

Based on a review of all the supports with IWAs (see attached tables) and a comparison of thermal/ OBE loads and stresses between:

a. the existing analysis (pre-SGR)
b. the new analysis (post-SGR)
c. the loads for feedwater support FW-9012-HL5010 selected in reference 1 for fatigue evaluation (see reference 1);

the following two supports of Loop A are selected for evaluation: HL5001 and HL5006.

Based on the results of this evaluation, it is concluded that the modifications made to the MFW (4 loops) due to the SGR modifications have no significant impact on the generic calculation (reference 1) performed to comply with the commitment made in reference 2, in regard to the elimination of arbitrary intermediate breaks.

Note: The evaluation for design loads (weight, SSE, water hammer, etc.) has been performed for all supports with IWAs. See attachment 5, "Local Stress Evaluation for IWAs".

References:

1. Calculation 2L029RC-9585, Rev 0; Fatigue Analysis for ASME 2/3 Piping with Integral Attachments.
2. SER NUREG 0781.
3. ASME B&PV Code Case N-122, 1983.
4. ASME B&PV Code Case N-391, 1983.
5. ASME B&PV Code Case N-318-4, 1989.
6. ASME B&PV Code Case N-392-1, 1989.

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5006 (Data Point 85)
Code Case N-391 Methodology

Pipe/ Stanchion Properties

$D_o := 18.0 \cdot in$ $T := 0.937 \cdot in$ Pipe OD & thickness

$d_o := 8.625 \cdot in$ $t := 0.5 \cdot in$ Stanchion OD & thickness

$h := 8.968 \cdot in$ Moment arm length

$r_o := \frac{d_o}{2}$ $r_i := \frac{d_o - 2 \cdot t}{2}$ Stanchion outside & Inside radius

$A_T := \frac{\pi}{2} \cdot (r_o^2 - r_i^2)$ $A_T = 6.381 \cdot in^2$

$Z_T := \frac{\pi}{4} \cdot \frac{(r_o^4 - r_i^4)}{r_o}$ $Z_T = 24.5 \cdot in^3$

Calculate C_N coefficent

$\gamma := \frac{D_o}{2 \cdot T}$ $\gamma = 9.605$ $\tau := \frac{t}{T}$ $\tau = 0.534$ $\beta := \frac{d_o}{D_o}$ $\beta = 0.479$

$A_{op} := 0.51$ $n_1 := 1.01$ $n_2 := 0.79$ $n_3 := 0.89$ Run pipe properties

$C_{Npipe} := A_{op} \cdot (2 \cdot \gamma)^{n_1} \cdot \beta^{n_2} \cdot \tau^{n_3}$ $C_{Npipe} = 3.227$

$A_{oa} := 0.84$ $n_1 := 0.85$ $n_2 := 0.80$ $n_3 := 0.54$ Stanchion properties

$C_{Natt} := A_{oa} \cdot (2 \cdot \gamma)^{n_1} \cdot \beta^{n_2} \cdot \tau^{n_3}$ $C_{Natt} = 4.096$

$C_N := 4.096$ Maximum of 2 values

Based on Reanalysis

Support Loads

$R_1 := 7725 \cdot lbf$ Thermal positive load

$R_2 := -11909 \cdot lbf$ Thermal negative load

$R_{obe} := 1833 \cdot lbf$ OBE load

$R_{sam} := 328 \cdot lbf$ SAM load

Pipe Stresses

$S_{10} := 8840 \cdot psi$ $\left(i \cdot \frac{M}{Z}\right)$ Thermal + SAM range (EQ10 with SIF=1.0)

$S_{th} := 6856 \cdot psi$ $\left(i \cdot \frac{M}{Z}\right)$ Thermal Normal (with SIF=1.0)

$S_9 := 1062 \cdot psi$ $\left(i \cdot \frac{2 \cdot M}{Z}\right)$ OBE range (with SIF=1.0)

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5006 (Data Point 85)
Code Case N-391 Methodology

EQ10: Reference 1, page 152 &153
Reference 4

$$S_n = \frac{C_1 \cdot P_o \cdot D_o}{2 \cdot T} + C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i + S_{NT}$$

$$S_{NT} = \frac{Q_1}{A_T} + \frac{C_N \cdot M_N}{Z_T} + 1.7 \cdot E \cdot \alpha \cdot |T_T - T_w|$$

$\frac{C_1 \cdot P_o \cdot D_o}{2 \cdot T}$ = 4985psi Not affected, use same value

$1.7 \cdot E \cdot \alpha \cdot (T_T - T_w)$ = 32071psi Conservative, use same value

$C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = $S_{10} + S_9$ = 8840psi + 1062psi = 9902psi

$Q_1 := \left[\frac{(R_1 - R_2) + 2 \cdot (R_{obe} + R_{sam})}{2} \right]$ $Q_1 = 11978 \cdot lbf$

$M_N := Q_1 \cdot h$ $M_N = 107419 \cdot in \cdot lbf$

$\frac{Q_1}{A_T} = 1877 \cdot psi$

$\frac{C_N \cdot M_N}{Z_T} = 17948 \cdot psi$

$S_n := 4985 \cdot psi + 32071 \cdot psi + 9902 \cdot psi + 1877 \cdot psi + 17948 \cdot psi$ $S_n = 66783 \cdot psi$ > 3Sm = 51900psi

EQ12:

$C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = S_{10} = 8840psi < 3Sm - O.K.

EQ13:

$\frac{C_1 \cdot P_o \cdot D_o}{2 \cdot T} + C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = 4985psi + S_9 = 4985psi + 1062psi = 6047psi < 3Sm - O.K.

$\Delta T \leq \frac{y \cdot S_y}{0.7 \cdot E \cdot \alpha} \cdot C_u$ Check for ratcheting

$164.7 \leq \frac{0.8 \cdot 29000}{0.7 \cdot 28 \cdot 6.07} \cdot 1.1$ = 214.5 - O.K.

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5006 (Data Point 85)
Code Case N-391 Methodology

EQ11 (Calculated for load pair 2:4, Highest usage factor)
Reference 1, page 153 - 155
Reference 4

$$S_P = \frac{K_1 \cdot C_1 \cdot P_o \cdot D_o}{2 \cdot T} + \left(K_2 \cdot C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i\right) + \frac{1}{2 \cdot (1 - \nu)} \cdot K_3 \cdot E\alpha \cdot \left|\Delta T_1\right| + \frac{1}{1 - \nu} \cdot E \cdot \alpha \cdot \left|\Delta T_2\right| + S_{PT}$$

$$S_{NT} = \frac{Q_1}{A} + \frac{C_N M_N}{Z_T} + 1.7 \cdot E \cdot \alpha \cdot \left|T_T - T_w\right|$$

$S_{PT} = K_T S_{NT}$

$\frac{K_1 \cdot C_1 \cdot P_o \cdot D_o}{2 \cdot T}$ = 1172psi Not affected, use same value

$\frac{1}{2 \cdot (1 - \nu)} \cdot K_3 \cdot E\alpha \cdot \left|\Delta T_1\right|$ = 7284psi Conservative, use same value

$\frac{1}{1 - \nu} \cdot E \cdot \alpha \cdot \left|\Delta T_2\right|$ = 2719psi Conservative, use same value

$1.7 \cdot E \cdot \alpha \cdot (T_T - T_w)$ = 11846psi Conservative, use same value

$K_2 \cdot C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = $0.76 S_{th}$ = 0.76(6856psi) = 5211psi

{0.76 = [(440 - 300)/(440 - 70)]^2 : load factor for transient for pair 2:4}

$Q_1 := 0.76 \cdot \frac{R_1}{2}$ $Q_1 = 2936 \cdot lbf$

$M_N := Q_1 \cdot h$ $M_N = 26326 \cdot in \cdot lbf$

$\frac{Q_1}{A_T} = 460 \cdot psi$

$\frac{C_N M_N}{Z_T} = 4399 \cdot psi$

$S_{NT} = \frac{Q_1}{A_T} + \frac{C_N M_N}{Z_T} + 1.7 \cdot E \cdot \alpha \cdot (T_T - T_w)$ = 460psi + 4399psi + 11846psi = 16705psi

$K_T := 2.0$

$S_{PT} = K_T S_{NT}$ $S_{PT} = 2.0 \cdot 16706 \cdot psi$ $S_{PT} = 33412 \cdot psi$

$S_P := 1172 \cdot psi + 7284 \cdot psi + 2719 \cdot psi + 5211 \cdot psi + 33412 \cdot psi$ $S_P = 49798 \cdot psi$

$S_{ALT} = \frac{K_e}{2} \cdot (S_P)$ $S_{ALT} := \frac{1.0}{2} \cdot (49798 \cdot psi)$ $S_{ALT} = 24899 \cdot psi$ < 30809psi from Ref 1, sheet 155

Usage factor < 0.635

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5001 (Data Point 95B)
Code Case N-122 Methodology

Pipe/ Rectangular Attachment Properties

$D_o := 18.0 \cdot in$ $t := 0.937 \cdot in$ Pipe OD & thickness

$r := \frac{D_o - t}{2}$ $r = 8.532 \cdot in$ Mean pipe radius

$L_1 := \frac{9.5}{2} \cdot in$ $L_1 = 4.75 \cdot in$

$L_2 := \frac{8}{2} \cdot in$ $L_2 = 4 \cdot in$ Dimensions for 5/8" x 8" x 9.5" Wrapper Plate

Calculate C_T coefficent

$\gamma := \frac{r}{t}$ $\gamma = 9.105$ $\beta_2 := \frac{L_2}{r}$ $\beta_2 = 0.469$ $\beta_1 := \frac{L_1}{r}$ $\beta_1 = 0.557$

$\beta_1 \cdot \beta_2 = 0.261 > 0.075$ $\beta_1 x \beta_2 < 0.075$: Calculate reduced L_1, L_2

$\beta_1 := \sqrt{0.075}$ $\beta_1 = 0.274$ $\beta_2 := \beta_1$

$L_1 := \beta_1 \cdot r$ $L_1 = 2.336 \cdot in$ $L_2 := \beta_2 \cdot r$ $L_2 = 2.336 \cdot in$

$A_o := 2.2$ $\theta := 40 \cdot deg$ $X_o := 0$ $Y_o := 0.05$ Thrust load constants

$Y_1 := Y_o + \log(\beta_2)$ $Y_1 = -0.512$

$X_1 := X_o + \log(\beta_1)$ $X_1 = -0.562$

$\eta := -\left(X_1 \cdot \cos(\theta) + Y_1 \cdot \sin(\theta)\right) - \frac{1}{A_o} \cdot \left(X_1 \cdot \sin(\theta) - Y_1 \cdot \cos(\theta)\right)^2$ $\eta = 0.76$

$C_T := 7.64 \cdot \gamma^{1.64} \cdot \beta_1 \cdot \beta_2 \cdot \eta^{1.54}$ $C_T = 14.051$

$A_1 := 4 \cdot L_1 \cdot L_2$ $A_1 = 21.836 \cdot in^2$

Based on Reanalysis

Support Loads

$R_1 := 17511 \cdot lbf$ Thermal maximum load

$R_2 := 8418 \cdot lbf$ Thermal minimum load

$R_{obe} := 3702 \cdot lbf$ OBE load

$R_{sam} := 4244 \cdot lbf$ SAM load

Pipe Stresses

$S_{10} := 5549 \cdot psi$ $\left(i \cdot \frac{M}{Z}\right)$ Thermal + SAM range (EQ10 with SIF=1.0)

$S_{th} := 2913 \cdot psi$ $\left(i \cdot \frac{M}{Z}\right)$ Thermal Normal (with SIF=1.0)

$S_9 := 886 \cdot psi$ $\left(i \cdot \frac{2 \cdot M}{Z}\right)$ OBE range (with SIF=1.0)

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5001 (Data Point 95B)
Code Case N-122 Methodology

EQ10: Reference 1, page 152, 153 & 161, 162
Reference 3

$$S_n = \frac{C_1 \cdot P_o \cdot D_o}{2 \cdot T} + C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i + S_{nl}$$

$$S_{nl} = \frac{C_T \cdot W}{A_1}$$

$\frac{C_1 \cdot P_o \cdot D_o}{2 \cdot T}$ = 4985psi Not affected, use same value

$C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = $S_{10} + S_9$ = 5549psi + 886psi = 6435psi

$W := [(R_1 - R_2) + 2 \cdot (R_{obe} + R_{sam})]$ $W = 24985 \cdot lbf$

$S_{nl} = \frac{C_T \cdot W}{A_1} = 16077 \cdot psi$

$S_n := 4985 \cdot psi + 6435 \cdot psi - 16077 \cdot psi$ $S_n = 27497 \cdot psi$ < 3Sm = 51900psi

O.K.

EVALUATION OF GENERIC IWA CALCULATION
Support No.: HL5001 (Data Point 95B)
Code Case N-122 Methodology

EQ11 (Calculated for load pair 2:4, Highest usage factor)
Reference 1, page 152, 153 & 161, 162
Reference 3

$$S_p = \frac{K_1 \cdot C_1 \cdot P_o \cdot D_o}{2 \cdot T} + \left(K_2 \cdot C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i\right) + \frac{1}{2 \cdot (1 - \nu)} \cdot K_3 \cdot E\alpha \cdot |\Delta T_1| + \frac{1}{1 - \nu} \cdot E \cdot \alpha \cdot |\Delta T_2| + S_{pl}$$

$$S_{pl} = \left[K_1 \cdot \left(1.5 + 0.537 \cdot \beta_1 \cdot \beta_2 \cdot \gamma\right) - 1\right] \cdot P_o \cdot \frac{D_o}{2 \cdot t} + K_1 \cdot (S_{nl}) + K_1 \cdot E \cdot \alpha \cdot |T_1 - T_w|$$

$\frac{K_1 \cdot C_1 \cdot P_o \cdot D_o}{2 \cdot T}$ = 1172psi Not effected, use same value

$\frac{1}{2 \cdot (1 - \nu)} \cdot K_3 \cdot E\alpha \cdot |\Delta T_1|$ = 7284psi Conservative, use same value

$\frac{1}{1 - \nu} \cdot E \cdot \alpha \cdot |\Delta T_2|$ = 2719psi Conservative, use same value

$E \cdot \alpha \cdot |T_1 - T_w|$ = $\frac{11846\text{psi}}{1.7}$ = 6968psi Conservative, use same value

$K_2 \cdot C_2 \cdot \frac{D_o}{2 \cdot I} \cdot M_i$ = $0.76 S_{th}$ = 0.76(2913psi) = 2214psi

{0.76 = [(440 - 300)/(440 - 70)]*2 : load factor for transient for pair 2:4}

$K_1 := 2.0$ for fillet weld on four sides (as-welded)

$\left[K_1 \cdot \left(1.5 + 0.537 \cdot \beta_1 \cdot \beta_2 \cdot \gamma\right) - 1\right] \cdot P_o \cdot \frac{D_o}{2 \cdot t}$

$\left[K_1 \cdot \left(1.5 + 0.537 \cdot \beta_1 \cdot \beta_2 \cdot \gamma\right) - 1\right] \cdot 1172 \cdot \text{psi} = 3204 \cdot \text{psi}$

$W := 0.76 \cdot R_1$ $W = 13308 \cdot \text{lbf}$

$S_{nl} = \frac{C_T \cdot W}{A_1} = 8564 \cdot \text{psi}$

$K_1 \cdot \frac{C_T \cdot W}{A_1} = 17127 \cdot \text{psi}$

$K_1 \cdot E \cdot \alpha \cdot |T_1 - T_w|$ = 2 x 6968psi = 13936psi

$S_p := 1172 \cdot \text{psi} + 2214 \cdot \text{psi} + 7284 \cdot \text{psi} + 2719 \cdot \text{psi} + 3204 \cdot \text{psi} + 17127 \cdot \text{psi} + 13936 \cdot \text{psi}$ $S_p = 47656 \cdot \text{psi}$

$S_{ALT} = \frac{K_e}{2} \cdot (S_p)$ $S_{ALT} := \frac{1.0}{2} \cdot (47656 \cdot \text{psi})$ $S_{ALT} = 23828 \cdot \text{psi}$ < 30809psi from Ref 1, sheet 155

Usage factor < 0.635

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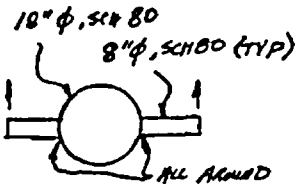
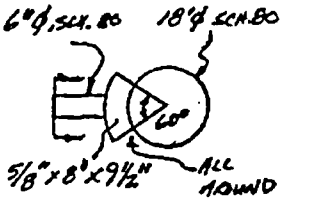
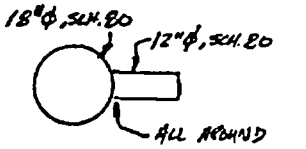
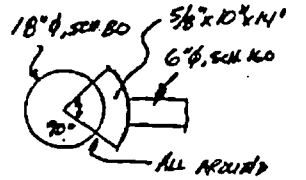
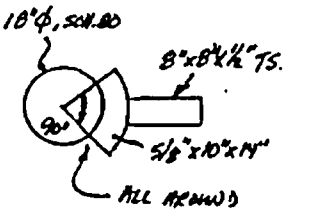
STP-1 SGR ASSESSMENT OF IMPACT ON IWA GENERIC CALC. # RC9585
MFW SYSTEM: MFWA

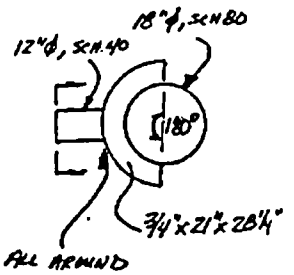
IWA#	CASE	PREVIOUS LOADS	NEW LOADS	CASE	PREVIOUS STRESS	NEW STRESS	COMMENT
		LB	LB		PSI	PSI	
HL5006 (85 Y RGD)	WT	-4364	-5824	EQ.8		6413	
	THMAX	1612	7725*	EQ.10/11	14712	18563*	
	THMIN	1475	-11909*				
	OBESAM	419	328				
	OBE	1594	1833	EQ.9B	6531	7202	
HL5001 (95B X RGD)	WT	-595	-976	EQ.8		5765	
	THMAX	11745	17511*	EQ.10/11	6906	11652	
	THMIN	-6186	8418*				
	OBESAM	4173	4244				
	OBE	3971	3702	EQ.9B	7680	6926	
HL5010 (10A ZRGD)	WT	-224	-276	EQ.8		6292	
	THMAX	11289	5714	EQ.10/11	19617	20608	
	THMIN	1808	1336				
	OBESAM	2902	3600				
	OBE	2914	3008	EQ.9B	6563	6938	
HL5002 (50 X SNB)	WT			EQ.8		5687	
	THMAX			EQ.10/11	7061	12202*	
	THMIN						
	OBESAM	1569	1380				
	OBE	1561	2110	EQ.9B	6523	6310	
HL5005 (80 Z SNB) INCLUDED IN GENERIC STUDY CALC# RC9585	WT			EQ.8		6140	
	THMAX			EQ.10/11	13882	16371	
	THMIN						
	OBESAM	1668	1257				
	OBE	2974	2634	EQ.9B	6531	7014	

MFW SYSTEM: MFWB

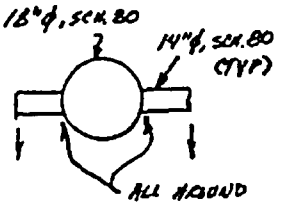
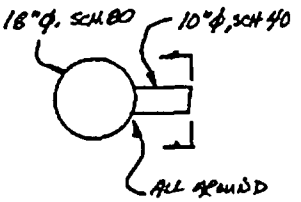
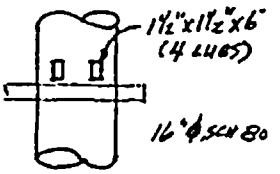
IWA#	CASE	PREVIOUS LOADS LB	NEW LOADS LB	CASE	PREVIOUS STRESS PSI	NEW STRESS PSI	COMMENT
HL5011 (10A Z RGD)	WT	-211	101	EQ.8		5798	
	THMAX	-1599	651	EQ.10/11	9500	9916	
	THMIN	-9213	-10023				
	OBESAM	2085	3312				
	OBE	2415	2308	EQ.9B	6096	6288	
HL5012 (027 SK SNB)	WT			EQ.8		5650	
	THMAX			EQ.10/11	11254	10382	
	THMIN						
	OBESAM	756	499				
	OBE	1003	1622	EQ.9B	6364	6724	
HL5001 (050 X SNB)	WT			EQ.8		6022	
	THMAX			EQ.10/11	5404	5615	
	THMIN						
	OBESAM	1516	1493				
	OBE	1957	2977	EQ.9B	6594	7212	
HL5003 (080 Z SNB)	WT			EQ.8		5781	
	THMAX			EQ.10/11	13775	14797	
	THMIN						
	OBESAM	1222	1245				
	OBE	2951	2581	EQ.9B	6643	7014	
HL5014 (009 Y SPD) NEW IWA	WT		-14523	EQ.8		6328	
	THMAX			EQ.10/11		6360	
	THMIN						
	OBE			EQ.9B		6516	

MFW SYSTEM: MFWC

IWA#	CASE	PREVIOUS LOADS	NEW LOADS	CASE	PREVIOUS STRESS	NEW STRESS	COMMENT
		LB	LB		PSI	PSI	
HL5012 (102 X RGD)	WT	155	773	EQ.8		6290	
	THMAX	23809	18872	EQ.10/11	3031	2850	
	THMIN	7315	3136				
	OBESAM	4075	3820				
	OBE	2463	2523	EQ.9B	6485	6719	



MFW SYSTEM: MFWD

IWA#	CASE	PREVIOUS LOADS	NEW LOADS	CASE	PREVIOUS STRESS	NEW STRESS	COMMENT
		LB	LB		PSI	PSI	
HL5007 (050 Z SNB)	WT			EQ.8		6106	
	THMAX THMIN			EQ.10/11	2442	5841*	
	OBESAM	693	207				
	OBE	2015	4187*	EQ.9B	6523	7483	
HL5006 (097 Z SNB)	WT			EQ.8		6469	
	THMAX THMIN			EQ.10/11	2396	1445	
	OBESAM	2318	1409				
	OBE	2084	2590	EQ.9B	6506	7211	
HL5014 (009 Y SPD)	WT		-9528	EQ.8		5689	
	THMAX			EQ.10/11		5914	
NEW IWA	THMIN						
	OBE			EQ.9B		6157	

* : INCREASES
THMAX & THMIN : MAX. OR MIN. OF NORMAL & UPSET THERMALS ONLY (THRM1,2,3,4,&7)

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D TO M5

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE
CHK. LVSS 3/1/98

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ATTACHMENT 7.0 FLUEDHEAD PENETRATION LOADINGS AND EVALUATION

TOTAL NO OF SHEETS

4

ASSESSMENT OF IMPACT OF SGR MODIFICATION ON FLUED HEAD PENETRATION LOADS:

FLUED HEAD PENETRATION (M-5): (LOOP -D)
CASES WHERE ALLOWABLES ARE EXCEEDED ARE SUMMARIZED BELOW WITH JUSTIFICATION.

	ACTUAL/ ALLOWABLE	PREVIOUSLY JUSTIFIED ENVELOPED LOADINGS **	COMMENT
	(NORMAL PRIM)		
FA LB	856/600*	725 ***	OK
V LB	5065/7447	6302	
MA FT LB	336/6962*	15311	
MB FT LB	11594/42130	25871	
	(NORM PRI+SEC		
FA LB	28029/41846	31298	OK
V LB	20660/18263*	23609	
MA FT LB	8318/40976	46230	
MB FT LB	115090/260446	185309	
	(UPSET PRIM)		
FA LB	16025/8517*	16660	OK
V LB	8445/20458	11768	
MA FT LB	13887/28295	30408	
MB FT LB	39417/178058	63763	

* EXCEEDED COMPONENT
** RESULTS ACCEPTABILITY BASED ON ENVELOPED LOADINGS USED IN CALC# 2L469RC9962 REV. 2
*** SCALING THE FEA STRESS RESULTS: NORMAL PRIMARY MAX STRESS INTENSITY 12166(856/725)= 14364 PSI < 17800 PSI ALLOWABLE

PENETRATION LOAD SUMMARY
PENETRATION NO. M-5

LOADING	OUTSIDE CTMT LOADS							
	FA	FB	FC	MA	MB	MC		
	LB	LB	LB	FT LB	FT LB	FT LB		
DW	-29	-1985	0	8453	-5	10996		
TE +	3002	108	134	0	2757	0		
TE-	-278	0	0	0	0	-3292		
OBEI	13264	2834	1576	8470	10942	18349		
SSEI	26299	4314	3139	16052	21248	27963		
OBE SAM	50	445	1122	0	17128	7138		
BLD SETL	270	1784	798	0	24412	54120		
WAT HAM	39832	5307	2693	2210	11608	27948		
DBA	0	0	0	0	0	0		
LOCA	0	0	0	0	0	0		
WIND	904	2	4	0	76	35		
JET	0	0	0	0	0	0		
RUPTURE	220200	43268	43268	151400	222917	222917		
	INSIDE CTMT LOADS							
	FA	FB	FC	MA	MB	MC		
	LB	LB	LB	FT LB	FT LB	FT LB		
DW	-827	-3080	-52	-8789	-10	-22590		
TE +	0	6593	2389	0	0	69315		
TE-	-27165	0	-21144	-7982	-13882	0		
OBEI	1001	350	169	5081	1581	7368		
SSEI	2408	762	414	11223	3305	16297		
OBE SAM	4266	242	9148	724	46224	2251		
BLD SETL	0	0	0	0	0	0		
WAT HAM	271747	7862	20442	36556	64210	63793		
DBA	21341	-14280	-5511	32563	95328	-112846		
LOCA	466	78	64	1761	346	1814		
WIND	0	0	0	0	0	0		
JET	0	0	0	0	0	0		
RUPTURE	0	0	0	0	0	0		
	INSIDE+OUTSIDE LOADS							
	FA	FB	FC	MA	MB	MC	V	MBR
	LB	LB	LB	FT LB	FT LB	FT LB	LB	FT LB
DW	-856	-5065	-52	-336	-15	-11594	5065	11594
TE +	3002	8701	2523	0	2757	69315	9059	69370
TE-	-27443	0	-21144	-7982	-13882	-3292	21144	14267
OBEI	14265	3184	1745	13551	12523	25715	3631	28602
SSEI	28707	5076	3553	27275	24553	44260	6196	50614
OBE SAM	4316	687	10270	724	63352	9389	10293	64044
BLD SETL	270	1784	798	0	24412	54120	1954	59371
WAT HAM	311579	13169	23135	38766	75818	91741	26620	119016
DBA	21341	-14280	-5511	32563	95328	-112846	15307	147722
LOCA	466	78	64	1761	346	1814	101	1847
WIND	904	2	4	0	76	35	4	84
JET	0	0	0	0	0	0	0	0
RUPTURE	220200	43268	43268	151400	222917	222917	61190	315252
D	-856	-5065	-52	-336	-15	-11594	5065	11594
D+TEP+BS	2416	5420	3269	-336	27154	111841	6330	115090
D+TEN+BS	-23029	-3281	-20398	-8318	10515	39234	20660	40619
D+OI+WND	13025	8251	1801	13887	12814	37344	8445	39417
D+OI+WND+TEP+BS	17585	8606	5018	13887	39753	137591	9962	143219
D+OI+WND+TEN+BS	43198	6467	22147	21869	23114	64984	23072	68972
D+SI+WND+WH+LO	362141	37670	32319	100029	196106	262290	49634	327496

* SEE JUSTIFICATION FOR EXCEEDANCES

PENETRATION LOAD SUMMARY
PENETRATION NO. M-5

D+SI+R	2[illegible]9763	53409	46873	179011	247485	278771	71061	372776
	PENETRATION ALLOWABLES							
	FAA			MAA			VA	MBA
	LB			FT-LB			LB	FT-LB
D	600			6962			7447	42130
D+TEP+BS	[illegible]1846			40976			18263	260446
D+TEN+BS	[illegible]1846			40976			18263	260446
D+OI+WND	8517			28295			20458	178058
D+OI+WND+TEP+BS	[illegible]4839			63829			34815	406829
D+OI+WND+TEN+BS	[illegible]4839			63829			34815	406829
D+SI+WND+WH+LO	4[illegible]8016			786831			496685	946739
D+SI+R	4[illegible]8016			786831			496685	946739
	ACTUAL TO ALLOWABLES RATIO							
	FA/FAA			MA/MAA			V/VA	MBR/MBA
D	* 1.427			0.048			0.680	0.275
D+TEP+BS	[illegible].058			0.008			0.347	0.442
D+TEN+BS	[illegible].670			0.203			* 1.131	0.156
D+OI+WND	* 1.882			0.491			0.413	0.221
D+OI+WND+TEP+BS	[illegible].271			0.218			0.288	0.352
D+OI+WND+TEN+BS	[illegible].668			0.343			0.667	0.170
D+SI+WND+WH+LO	[illegible].742			0.127			0.100	0.346
D+SI+R	[illegible].512			0.228			0.143	0.394

* SEE JUSTIFICATION FOR EXCEEDANCES

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D TO MS

ORIGINATOR PANI DATE 3/1/98 CALC NO RC5037-P-400 R0
CHK. WSS 3/1/98 SHEET NO
SHEET REV

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ATTACHMENT 8.0 OTHER INFORMATION

TOTAL NO OF SHEETS
1

100% REVIEW DRAFT
CALCULATION SHEET

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DCN 9800456 Page — of —

PROJECT South Texas Project SGRP
JOB NUMBER 23438-100
CALC NO. 5S139MC5668
SHEET NO.
SHEET REV.

SUBJECT Hydraulic Transient Analysis of Feedwater Line Break in Conjunction with Check Valve Slam

BY J. M. Gilmer DATE 7/17/98

9.4 MFW, Loop D Results

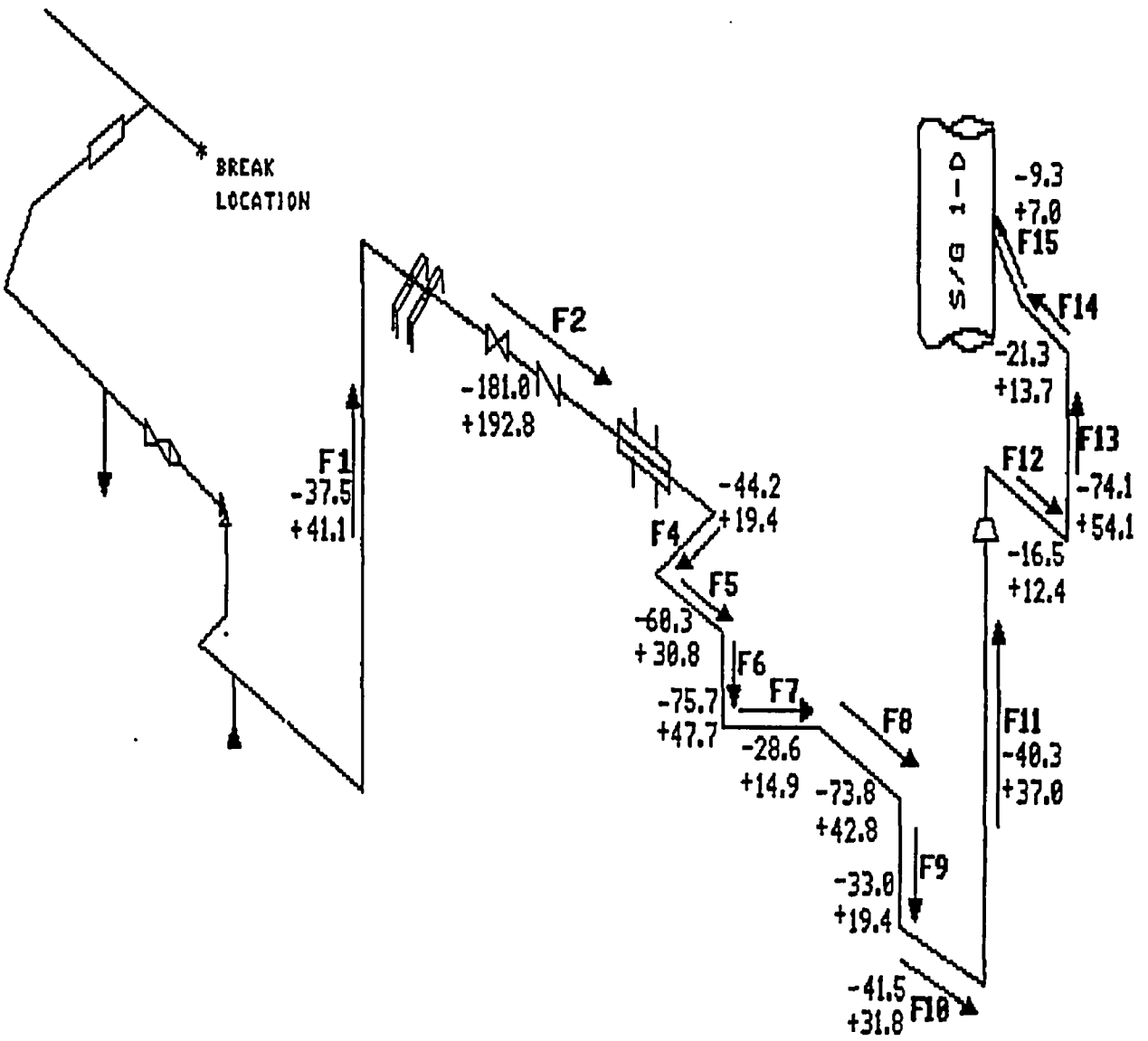

FIGURE 11-49. LOOP D REACTION FORCE DIAGRAM

NOT TO SCALE
FORCE IN KIPS

FEEDWATER PIPE WATERHAMMER REANALYSIS LOAD RECONCILIATION
(BETWEEN 75% AND 100%)
ATTACHMENT 1 (SHEET1-1)

BY: H. Sign Date: 7-17-98
CHK'D: [illegible] Date: 7.17.98

LOOP D (UNIT1)

SUPPORT MK #	DATA PT.	NEW FAULTED LOAD (K) (DW+THERM+WH)	DESIGN LOAD (K) (EXIST P. S. CALC.) (SEE NOTE 2)	REF. PIPE SUPPORT CALC NO.	REV. NO. DCN	COMMENTS
FW-9018-HL5002	O94	+26.056/-36.853	+/-48.026	JC-FW-9018-HL5002	6 9704712	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5001	O99	33.804/ -24.366	+/-36.2	JC-FW-9018-HL5001	4 9704713	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5013 (LOWER STRUT)	11A	+70.812/-44.549	+/-118.8	JC-FW-9018-HL5013	6 9704715	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5013 (UPPER STRUT)	101	+87.605 / -83.276	+/-178.72	JC-FW-9018-HL5013	6 9704715	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-SS0001	O15	+/- 18.066	+/-24.592	JC-FW-9018-SS0001	3 9704717	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5009	O35	+/- 75.21	+/-78.096	JC-FW-9018-HL5009	3 9704718	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5007	O50	+91.399/- 89.53	+/-118	JC-FW-9018-HL5007	5 9704720	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5006	O55	+/- 106.633	+/-143.3	JC-FW-9018-HL5006	4 9704721	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-SS0006	O65	+/- 75.981	+/-77.41	JC-FW-9018-SS0006	4 9704722	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-SS0007	O85	+/- 85.825	+/-101.5	JC-FW-9018-SS0007	6 9704723	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5003	O92	+/- 52.336	+/-64.66	JC-FW-9018-HL5003	4 9704724	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-HL5008	097	+/- 37.873	+/-104.129	JC-FW-9018-HL5008	5 9704725	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1018-HL5014	009	-9.528	-9.528	JC-FW-1018-HL5014	0	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-SH0001	030	-8.136	-8.136	JC-FW-9018-SH0001	3 9704726	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9018-SH0002	070	-8.836	-8.836	JC-FW-9018-SH0002	3 9704727	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1018-HL5016	007	+28.6/-36.7	+/-36.779	JC-FW-1018-HL5016	0	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD

NOTES:

1. CHANGE IN MOVEMENTS DUE TO REVISED WATER HAMMER TRANSIENT ANALYSIS FROM 75% TO 100% IS NEGLIGIBLE AND DOES NOT IMPACT THE EXISTING PIPE SUPPORT DESIGN.

2. MAXIMUM LOAD FOR WHICH THE PIPE SUPPORT IS QUALIFIED IS LISTED. IT IS EITHER THE LOAD FOR WHICH THE SUPPORT WAS QUALIFIED PRIOR TO SGR OR THE 75% ANALYSIS LOAD WHICH WAS USED TO REVISE THE CALCULATION.

3. SUPPORTS NOT LISTED ABOVE HAVE BEEN REVISED TO INCORPORATE THE 100% ANALYSIS LOADS.

Attachment No. 9
Calc. No. RC5037-P-400 Rev. 0
Sheet No. _____

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1D

ORIGINATOR PANI DATE

CALC NO RC5037-P-400 R0
SHEET NO
SHEET REV

ATTACHMENT 10.0 MICROFICHE FILES LOG

File # 1, Computer Output: FLEXIBILITY (MFWDS)
File # 2, Computer Output: WATER HAMMER (MFWDW)
File # 3, Computer Output: LOCA (MFWDL)
File # 4, Computer Output: WATER HAMMER (MFWDW7)