23103

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DOC No. RC5035 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 B inside containment has been redesigned & reanalyzed in conjunction with the replacement of steam generator "B".

Supplement the existing calculation 2C159RC5035 REV 5, with the DCN 9704761, analyzed for the Unit-1 system. Unit-2 continues as is in the existing calculation.

Add pages 1 THRU 151 of this DCN to existing calculation.

There is only one outstanding amendment (DCN SC 163) against the design calc RC 5035. There is no impact due to this DCN which was issued only to incorporate the current revision of documents.

Additionally, DCN No. 9800359 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

DESIGN ENG. 16-19-98 DATE REVIEWER 17/21/98 DATE

Calculation No. RC5035-~~P-200~~ Rev. ~~0~~ 5
QR 9-16-98
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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 B)

CALC NO RC5035-P-200 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 (WTJ1 Snubbers inactive & w/o DLF)
   Jet Impingement (WTJ2 Snubbers active & w/ DLF of 2)
   (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 ANALYSIS (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:
Static analyses as noted below are performed for Jet impingement effects identified in attachment #8 and Ref.#4.1.
Jet Impingement (JTJ1 Snubbers inactive & w/o DLF).
Jet Impingement (JTJ2 Snubbers active & w/ DLF of 2).

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

Analysis for LOCA:
Dynamic time history 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 FOR FEEDWATER "FW" SYSTEM FROM STEAM GENERATOR 1B THRU FW-1014-GA2 TO PENETRATION M-7, CALC NO. 2C159RC5035 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-02 (DCN# 9606448).
4.13 Drawing # ST401541-01-00044-AB6: Typical thermal wrap Insulation Details for piping (Transco Drawing EW-7756-SK1)
4.14 Westinghouse Calc. Note NEE-98-019-C0, Rev. 0, "Evaluation of South Texas 1 RSG Main/Auxiliary Feedwater Nozzle Loads," R.C.Johnson, 2/20/98.
4.15 UFSAR Section 6.6 - STP

5.0 DESIGN INPUT

5.1 PIPING DATA

Line #	16" FW-1014-GA2 Nozzle	16" FW-1014-GA2 Spool @ noz	16" FW-1014-GA2 Noz-top elb	16" FW-1014-GA2 top elb-red	18" FW-1014-GA2 Red-Pen M7
Material	SA508 CL.3A	SA508 GR.2, CL.2	SA336 GR.F22, CL.3	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 a straight pipe 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-1014-GA2 & 18"-FW-1014-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
001	SGR 1R121NSG101B	dX	-0.637"
		dY	1.971"
		dZ	-1.956"
		ROT-X	-0.000345 rad
		ROT-Y	-0.000620 rad
		ROT-Z	0.000042 rad

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

b) CONTAINMENT PENETRATION MOVEMENTS

NODE	EQIP. ID.#	DIR	Thermal movts.
110	M-7 (EL. 47.5' AZ. 277.67 deg)	dX	0.03901"
		dY	-0.06168"
		dZ	0.005251"

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-7	dX	-0.26854"
	(EL. 47.5'	dY	0.2352"
	AZ. 277.67 deg)	dZ	-0.036149"

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-7)

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	0.2200"	0.0091"	0.2291"
(SAM1)	Y	0.0160	0.0010	0.0170
	Z	0.2330	0.0186	0.2516
SSE	X	0.3460	0.0127	0.3587
(SAM2)	Y	0.0500	0.0019	0.0519
	Z	0.3800	0.0258	0.4058

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 3 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	0.927	0.000	-0.375	1997	0	New
009	HL5015	Spring	0.000	1.000	0.000	-	50	New
011	HL5014	Rigid	-1.000	0.000	0.000	1049	902	New
011	HL5014	Rigid	-0.602	0.000	-0.799	1478		New
014	HL5013	Rigid	-0.975	0.000	-0.223	3208	1133	New
014	HL5013	Rigid	-0.540	0.000	-0.842	1484		New
027	HL5012	Snubber	-0.580	0.000	0.815	752.5	355	
040	SH0001	Spring	0.000	1.000	0.000	--	48	
042	HL5009	Snubber	0.000	1.000	0.000	897.6	879	
13	HL5008	Spring	0.000	1.000	0.000	-	105	
050	HL5001	Snubber	1.000	0.000	0.000	813.5	988	
055	HL5002	Snubber	0.298	0.000	-0.954	1151	879	
080	HL5003	Snubber	0.000	0.000	1.000	1402	730	
085	HL5006	Rigid	0.000	1.000	0.000	1353	0	
095	SH0004	Spring	0.000	1.000	0.000	-	92	
95B	HL5004	Rigid	1.000	0.000	0.000	852.8	0	
10A	HL5011	Rigid	0.000	0.000	1.000	1554	470	
110	PEN M7	Anchor				**	--	

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

** Fluedhead Penetration M7 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

*** Prefix for pipe support tag# : FW-1014- & FW-9014-
(Ref. 4.1 & Attach. #4)

[The differences between as designed stiffness vs as analyzed are not significant- 007:2010 vs 1997 K/in; 011:1040 vs 1049K/in ; 014:1444 vs 1484 K/in; 085:1351 vs 1353 K/in]

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	0.2290	0.3590	SG
								DY	0.0170	0.0520	SG
								DZ	0.2516	0.4058	SG
007	HL5016	Rigid	RCB INT		IS830B	IS83SS	2				
009	HL5015	Spring	---		----	-	-	-----		-	
011	HL5014	Rigid	RCB INT		IS830B	IS83SS	2				
011	HL5014	Rigid	RCB INT		I6830B	IS83SS	2				
014	HL5013	Rigid	RCB INT		INTOBE	INTSSE	3				
014	HL5013	Rigid	RCB INT		INTOBE	INTSSE	3				
027	HL5012	Snubber	RCB INT		INTOBE	INTSSE	3				
040	SH0001	Spring	---		---	---					
042	HL5009	Snubber	RCB INT		INTOBE	INTSSE	3				
13	HL5008	Spring	---		--	--	-				
050	HL5001	Snubber	RCB INT		INTOBE	INTSSE	3				
055	HL5002	Snubber	RCB INT		INTOBE	INTSSE	3				
080	HL5003	Snubber	RCB INT		INTOBE	INTSSE	3				
085	HL5006	Rigid	RCB INT		INTOBE	INTSSE	3				
095	SH0004	Spring	---		---	---					
95B	HL5004	Rigid	RCB INT		INTOBE	INTSSE	3				
10A	HL5011	Rigid	RCB INT		INTOBE	INTSSE	3				
110	PEN M7	Anchor	CMT SHL		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' ; IS830B/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-1014-
(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-7	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	2.0	
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. The weight, thermal, seismic, SAM cases were based on LR elbow at node 010 & spring hanger (HL5015) at node 009 located at 2'-4" NE of node 010. The elbow @ node 010 is actually a SR elbow & the spring hanger HL5015 (node 009) is located 2'-0" NE of node 010. The impact is judged to be insignificant. There exist adequate margins in stressses, SGR nozzle, Fluedhead penetration, & support loads.

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-7 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)

4 new supports were added on the new section of the pipe (3 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
008 E	EQUATION 8	6770.	15000.	.451	O.K.
110	EQUATION 9B (UPSET)	8047.	18000.	.447	O.K.
010 E	EQUATION 9D (FAULTED w/ SSE)	8962.	36000.	.249	O.K.
008 B	EQUATION 9D (FAULTED w/wat. hammer	34888.	36000.	.969	O.K.
95B	EQUATION 9D (FAULTED JET)	10298.	36000.	.286	O.K.
007	EQUATION 9D (FAULTED LOCA)	11431.	36000.	.318	O.K.
100 E	EQUATION 10/11	19849.	22500.	.882	O.K.

8.15 Penetration Load Summary

SECTION 8.15 PENETRATION LOAD SUMMARY

NODE NUMBER : 110
EQUIPMENT I.D: PEN M-7
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	-46.	-2414.	-18.	4814.	26.	-7955.
THRM1	-38500.	1482.	18808.	-2333.	-51333.	25639.
THRM2	-27547.	380.	13572.	-8225.	-36536.	16397.
THRM3	-12428.	-1141.	6344.	-16361.	-16111.	3639.
THRM4	-3193.	-2071.	1929.	-21339.	-3635.	-4155.
THRM5	-39914.	1624.	19484.	-1576.	-53243.	26831.
THRM6	-24882.	112.	12298.	-9655.	-32936.	14149.
THRM7	2898.	-2683.	-983.	-24611.	4594.	-9293.
THRM8	18082.	-859.	-5378.	-7963.	-1465.	-15275.
THRMP	2898.	1624.	19484.	0.	4594.	26831.
THRMN	-39914.	-2683.	-983.	-24611.	-53243.	-9293.
SAM1	3464.	65.	2893.	960.	23347.	674.
SAM2	6202.	122.	4972.	1943.	40052.	1263.
SEISA1	1457.	2149.	493.	5388.	808.	21565.
SEISA2	2799.	3132.	1038.	10668.	1698.	30664.
TIME1	266118.	5338.	19121.	78442.	35190.	34042.
JET	3969.	157.	278.	2013.	1009.	1107.
LOCA	684.	1193.	429.	3856.	713.	5134.

SECTION 8.16 EQUIPMENT NOZZLE LOAD SUMMARY

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

LOAD CASE	NOZZLE FORCE (LBS) FA	FB	FC	NOZZLE MOMENT (FT-LBS) MA	MB	MC
WT1	87.	656.	-153.	-433.	838.	2887.
THRMP	9353.	0.	0.	0.	49926.	0.
THRMN	0.	-5178.	-13987.	-110138.	-10920.	-115257.
C5	4218.	7038.	5875.	29961.	27694.	30386.
C6	6716.	14401.	9386.	47808.	44397.	58356.
TIME1	21346.	139632.	17476.	48993.	92391.	487536.
JET	121.	779.	74.	112.	1072.	3174.
LOCA	11317.	16018.	22620.	17886.	77972.	45238.

LOAD CASE	ALLOWABLE FORCE (LBS) FA	FB	FC	ALLOWABLE MOMENT (FT-LBS) MA	MB	MC
WT1	6000.	16800.	16800.	30000.	57000.	57000.
THRMP	10000.	50000.	10000.	125000.	159083.	291667.
THRMN	10000.	50000.	10000.	125000.	159083.	291667.
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	0.015	0.039	0.009	0.014	0.015	0.051	OK
THRMP	0.935	0	0	0	0.314	0	OK
THRMN	0	0.104	*1.399	0.881	0.069	0.395	*
C5	0.088	0.196	0.163	0.272	0.192	0.211	OK
C6	0.073	0.171	0.112	0.281	0.222	0.292	OK
TIME1	0.042	0.390	0.049	0.045	0.143	0.756	OK
RUPTURE	0.327	0.646	0.873	0.152	0.265	0.162	OK

NOTES: C5 - SRSS OF OBEI & OBESAM; C6 - SRSS OF SSEI & SSESAM
TIME1 - WATER HAMMER ; RUPTURE = JET+ LOCA
* - OK PER REF. #4.14 ✓ (WESTINGHOUSE'S REVIEW & ACCEPTANCE)

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

SECTION 8.17 MOVEMENTS FOR SMALL PIPE CONNECTIONS & PENETRATIONS

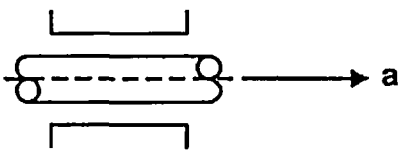
MFID : RN0321

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

* ISO. NO.	NODE NO.	LOAD CASE	BRANCH NO./ PENET. NO.	DX (IN)	DY (IN)	DZ (IN)	RX (RAD)	RY (RAD)	RZ (RAD)
	060A	WT1		.001	-.043	.016	.00016	-.00008	-.00030
	060A	THRMP		.000	.526	.129	.00013	.00000	.00503
	060A	THRMN		-.265	.000	-.794	-.00285	-.00262	-.00042
	060A	C5		.027	.066	.026	.00051	.00028	.00050
	060A	C6		.051	.134	.053	.00102	.00059	.00102
	065	WT1	SLEEVE#245	.001	-.038	.014	.00015	-.00008	-.00033
	065	THRMP	SLEEVE#245	.000	.439	.122	.00003	.00000	.00498
	065	THRMN	SLEEVE#245	-.329	.000	-.839	-.00271	-.00251	-.00022
	065	C5	SLEEVE#245	.027	.057	.021	.00051	.00028	.00054
	065	C6	SLEEVE#245	.051	.116	.043	.00100	.00057	.00110
	070	WT1		.001	-.026	.011	.00013	-.00008	-.00037
	070	THRMP		.000	.271	.107	.00000	.00000	.00481
	070	THRMN		-.455	.000	-.920	-.00243	-.00213	.00000
	070	C5		.027	.037	.012	.00049	.00025	.00060
	070	C6		.051	.076	.024	.00096	.00051	.00122
	086A	WT1		.001	.013	.003	.00008	-.00007	-.00032
	086A	THRMP		.000	.000	.060	.00000	.00038	.00369
	086A	THRMN		-.848	-.187	-1.035	-.00154	-.00037	.00000
	086A	C5		.027	.031	.008	.00047	.00012	.00063
	086A	C6		.051	.064	.015	.00086	.00022	.00128
	087	WT1	SLEEVE#243	.001	.017	.002	.00007	-.00007	-.00031
	087	THRMP	SLEEVE#243	.000	.000	.055	.00000	.00084	.00356
	087	THRMN	SLEEVE#243	-.898	-.235	-1.027	-.00143	-.00033	.00000
	087	C5	SLEEVE#243	.027	.040	.010	.00047	.00011	.00062
	087	C6	SLEEVE#243	.051	.081	.018	.00085	.00021	.00125
	090 B	WT1		.001	.020	.001	.00007	-.00006	-.00031
	090 B	THRMP		.000	.000	.052	.00000	.00117	.00347
	090 B	THRMN		-.931	-.267	-1.018	-.00136	-.00031	.00000
	090 B	C5		.027	.045	.011	.00047	.00011	.00061
	090 B	C6		.051	.092	.020	.00084	.00020	.00123
	035	WT1	1.5FW1073GA2	.009	-.020	-.009	.00013	-.00004	.00006
	035	THRMP	1.5FW1073GA2	.422	1.726	.000	.00330	.00154	.00575
	035	THRMN	1.5FW1073GA2	.000	-.345	-.321	.00000	-.00200	.00000
	035	C5	1.5FW1073GA2	.034	.026	.027	.00041	.00018	.00039
	035	C6	1.5FW1073GA2	.068	.053	.056	.00082	.00036	.00082

SLEEVE #245 ; M243

8.18 Pipe Sleeve Clearance Summary



NODE	SLEEVE NO.	SLEEVE I.D.	PIPE O.D.	INSULATION(IN)	RADIAL MVNT(5)	AXIAL MVNT	CLEARANCE(1)
060A-070	245	29"	18"	2"	1.832	0.791	1.668"
086A-090B	243	36"X75"	18"	2"	1.447	1.268	*

* Movements are not significantly different from the existing analysis

NODE	GLOBAL DIR.	LOCAL DIR.	PIPE MOVEMENT (IN) WT	TH (+)	TH (-)	SEIS (4)	LOCA	OTHER(6) WH	COMBINED (3)
060A-070	X	a	0.001	0.	-0.455	0.051	0.011	0.337	0.791
	Y	b	-0.043	0.525	0.0	0.134	0.045	0.791	1.273
	Z	c	0.016	0.129	-0.920	0.053	0.024	0.414	1.318
086A-090B	X	a	0.001	0	-0.931	0.051	0.011	0.338	1.268
	Y	b	0.020	0	-0.267	0.092	0.033	0.642	0.889
	Z	c	0.003	0.060	-1.035	0.020	0.004	0.110	1.142

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= $[SSI^2+SSE(SAM)^2]^{1/2}$ 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	MFWBW.FOR	-	-	1/B
	*MFWBW7.FOR	-	-	
	7632BK4.MFL	-	-	
	(RHRBRK4)	-	-	
	7632B12.MFL	-	-	
	(RHRBRK12)	-	-	
	7632B15.MFL	-	-	
	(RHRBRK15)	-	-	
	MFWBS.INP	-	-	
	MFWBW.INP	-	-	
	MFWBJ.INP	-	-	
	MFWBL.INP	-	-	
	MFWBS.OUT	RN0321	10/27/97	
	MFWBW.OUT	HP0707	06/17/98	
	*MFWBW7.OUT	501741	11/05/97	
	MFWBJ.OUT	B04659	06/11/98	
	MFWBL.OUT	LJ3226	05/21/98	

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 FROM S.G. 1B TO PEN. # M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

ATTACHMENT 1.0 PIPE STRESS ME101 COMPUTER IMAGE		PAGES
THIS COVER SHT	(26)	: 1
WEIGHT/ THERMAL/SEISMIC/SAM	(27-40)	: 14
WATER HAMMER	(41-46)	: 6
JET	(47-52)	: 6
LOCA	(53-57)	: 5
TOTAL		: 32

BECHTEL

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____

CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

ATTACHMENT 1.0 PIPE STRESS ME101 COMPUTER IMAGE

```
**********************************************************************************
***        DATA FILE FOR UNIT-1                                                ***
**********************************************************************************
***    INPUT FILE FOR CALC REVISION DUE TO SGR REPLACEMENT :MFWBS.INP
***    DATA FILE FOR UNIT-1
***    NOTE: ABR STIFFNESS & SUPPORT RELOCATION ARE INCORPORATED
**********************************************************************************
**********************************************************************************
CTL                                                    OUTPUT=SHORT,
HED                                                    TITLE=FEEDWATER "FW" SYSTEM -
                                                       SG 1B TO M7,
                                                       PROJNO=23438100,
                                                       PROBNO=RC5035-P-200 R0,
                                                       USER=PANI,
                                                       UNITS=2,
                                                       COEF=CS4,
                                                       PER=0.02,
                                                       MODES=100,
RUN                                                    LDCASE=WT1 (N+7+I),
***RUN                                                    LDCASE=WTJ1 (O+8),
***RUN                                                    LDCASE=WTJ2 (O+9),
RUN                                                    LDCASE=THRM1 (A+N+7),
RUN                                                    LDCASE=THRM2 (B+N+7),
RUN                                                    LDCASE=THRM3 (C+N+7),
RUN                                                    LDCASE=THRM4 (D+N+7),
RUN                                                    LDCASE=THRM5 (E+N+7),
RUN                                                    LDCASE=THRM6 (F+N+7),
RUN                                                    LDCASE=THRM7 (G+N+7),
RUN                                                    LDCASE=THRM8 (H+P+7),
RUN                                                    LDCASE=SAM1 (N+X+Z+7),
RUN                                                    LDCASE=SAM2 (N+Y+Z+7),
RUN                                                    LDCASE=MRS1 (N+S+Z+7),
RUN                                                    LDCASE=MRS2 (N+T+Z+7),
***
***    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 & FAULTED 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)
***    WTJ1   --- STATIC JET IMPINGEMEMNT ANALYSIS
***    WTJ2   --- SLYNAMIC JET IMPINGEMEMNT ANALYSIS
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
ORIGINATOR PANI DATE ____ SHEET NO ____
SHEET REV ____

```
***   SAM1  --- OBE SEISMIC ANCHOR MOVEMENT ANALYSIS
***   SAM2  --- SSE SEISMIC ANCHOR MOVEMENT ANALYSIS
***   MRS1  --- OBE SEISMIC INERTIA ANALYSIS
***   MRS2  --- SSE SEISMIC INERTIA ANALYSIS
***
***
***
***   CAD. ISO. 2C369PFW433 SHT. 01 REV. 4
***
***   UNIT-1 LOOP B   MAIN FEEDWATER
***
***   SGR NOZZLE MATERIAL SA508 CL. 3A  SC=22.5 KSI; SH=22.5 KSI
***   MATL: SA-508 GR. 2 CL. 2 FOR STRAIGHT SPOOL OF BECHTEL PIPE @ NOZZLE
***   MATL: SA-336 GR.F22 CL.:16" SCH.80 PIPE UP TO & INCLUDING TOP ELB OF RISER
***   MATL: SA-333 GR.6 AFTER TOP ELB OF RISER & REST; 16" SCH. 80/ 18" SCH. 80
****
SAP   002            82.719
***      001;002,N02 ARE NODES ON SGR CL;SGR SURFACE; FW NOZ END RESPECTIVELY
***
      002
      001  7.2674              4.0284
                                          OD=199.42,THI=4.71,
                                          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
                                          SC=22500,SH=22500,
                                          E=27.8E6,
                                          LBS/FT=1.0,
                                          DPRESS=1.0,PPRESS=1.0,
                                          CODE=SC3W75,CLASS=2,
***
***   LINE NO. FW-1014-GA2
ANC   001 -0.637    1.971      -1.956                                   *N
ANC   001                                                              *H
                                    COSAX=-.8746,COSAZ=-.4848,
                                    COSCX=.4848,COSCZ=-.8746,
                                    RSNAME=SGROBE,                     *S
                                    RSNAME=SGRSSE,                     *T
                                    DTITLE=CENTER  SG,
                                    DX=.229,DY=.0170,DZ=.2516,         *X
                                    DX=.359,DY=.052,DZ=.4058,          *Y
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                                                    PHASE=SG,
                                                    ROT-X=-0.345E-3,          *N
                                                    ROT-Y=-0.620E-3,          *N
                                                    ROT-Z=0.042E-3,           *N
                                                  ETI=1R122NSG201B,
*****************
***    BEGIN    FW LINE REROUTE DUE TO SG REPLACEMENT/NEW FW NOZZLE LOCATION
*****************
   002003 -0.3440              -0.1907
                                                  OD=26.0,THICK=4.75,
                                                  LBS/FT=1176.5,
       03A -0.5860             -0.3248
                                                  OD=20.0,THICK=1.75,
                                                  LBS/FT=439.2,
       N02 -0.4490             -0.2489            SIF=1.502,
                                                  OD=16.0,THICK=.843,
                                                  LBS/FT=210.66,
                                                  DTITLE=FW NOZZLE,
                                                  DPRESS=1350,PPRESS=1360,
DLD    N02 0.8746                0.4848          TFOR= 11,MULTI=-1,
       004-1-11.551            -1-1.0600          JOINT=BTWELD,
       005-1-9                 -0-11.640    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
       007             -10-8-5/8                  SEG=2,
***                                               MAT=SA333 GR.6 (C-MN-SI)
                                                  SC=15000,SH=15000,
                                                  E=27.9E6,
                                                  OD=16.0,THICK=.843,
                                                  LBS/FT=210.66,
                                                  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
```

BECHTEL

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                                                        TEMP=70,EXP=0.,                 *H
                                                        TEMP=70.,EXP=0.,                *O
RAD   007  0.9272                  -0.3746
                                                        AA=1997E3,ETI=HL5016,
                                                        RSNAME=IS83OB,                  *S
                                                        RSNAME=IS83SS,                  *T
DLD   007            1.0                                TFOR= 10,MULTI=-1,
      008           -9-0                          S     JOINT=BTWELD,SEG=2,
      009 (1-6.624)                (0-7.2976)
          1-10.35 *                0-8.76 *             ADDWT=50,                       GB 6/10/98
SPD   009            1.0
                                                        ETI=HL5015,
DLD   009-0.9311 *                 -0.3649              TFOR=  9,MULTI=-1,
      010 (2-2.07) 1-10.35         (0-10.22) (L) S      JOINT=BTWELD,
      011           -2-10.5          0-8.76 *
                                                        ADDWT=902,
RAD   011 -1.0000
                                                        AA=1049E3,ETI=HL5014,
                                                        RSNAME=IS83OB,                  *S
                                                        RSNAME=IS83SS,                  *T
RAD   011 -0.6018                  -0.7986
                                                        AA=1478E3,ETI=HL5014,
                                                        RSNAME=IS83OB,                  *S
                                                        RSNAME=IS83SS,                  *T
      11A           -1-7.5                              DTI=PLATFRM,
      012           -5-4.5                              SEG=2,
      013           -1-5-3/16
      014           -5-10-5/16                          SEG=2,
                                                        UFL=1230,                       *2
                                                        COSFX=0.7290,                   *2
                                                        COSFY=0.0000,                   *2
                                                        COSFZ=-0.685,                   *2
                                                        UFL=2460,                       *3
                                                        COSFX=0.7290,                   *3
                                                        COSFY=0.0000,                   *3
                                                        COSFZ=-0.685,                   *3
                                                        ADDWT=1133,
RAD   014 -0.9748                  -0.2233
                                                        AA=3208E3,ETI=HL5013,
                                                        RSNAME=INTOBE,                  *S
                                                        RSNAME=INTSSE,                  *T
RAD   014 -0.5402                  -0.8415
                                                        AA=1484E3,ETI=HL5013,
                                                        RSNAME=INTOBE,                  *S
                                                        RSNAME=INTSSE,                  *T
      015           -1-7-13/16                          DTI=CUT LOCN,JOINT=BTWELD,
DLD   015            1.0                                TFOR=  8,MULTI=-1,
```

* MINOR DEVIATIONS, SEE ITEM 8.1 OF SECTION 8.0 | GB 6/10/98

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
      016            -0-7-1/2                        JOINT=RED,
***       END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION
*****************
      018            -0-7-1/2                        JOINT=BTWELD,
                                                     OD=18,THICK=.937,
                                                     LBS/FT=264.22,
      020            -0-9                            SIF=1.0,
                                                     ADDWT=25,
      021            -1-0                            SIF=1.0,
                                                     ADDWT=20,
      022            -1-0                            SIF=1.0,
                                                     ADDWT=50,
      025            -4-0                 L
                                                     JOINT=BTWELD,
      026 -3.73331             2.65883
                                                     SIF=1.0,
                                                     ADDWT=25,
                                                     UFL=1089,                    *8
                                                     COSFX=0.5801,                *8
                                                     COSFY=0.2419,                *8
                                                     COSFZ=0.8145,                *8
                                                     UFL=2179,                    *9
                                                     COSFX=0.5801,                *9
                                                     COSFY=0.2419,                *9
                                                     COSFZ=0.8145,                *9
      027 -0-2.95271           0-2.10289
                                                     DTITLE=FW9014HL5012,
                                                     ADDWT=355,
                                                     SIF=2.1,
SNB   027 -.5801               -.8145
                                                     AA=752.5E3,
                                                     RSNAME=INTOBE,               *S
                                                     RSNAME=INTSSE,               *T
      030 -0-6.8218            0-4.8584              SIF=1.0,
                                                     ADDWT=20,
      035 -0-2.44362           0-1.7403              SIF=1.0,
                                                     ADDWT=25,
                                                     DTITLE=1.5FW1073GA2,
      040 -0-8.1454            0-5.80107
                                                     DTITLE=FW9014SH0001,
                                                     ADDWT=48,
***SPD  040          1.0                                                      *I
SPR   040          1.0                             FORCE=1751.,AA=1.,           *I
DLD   040 0.8145                -0.5801            TFOR=  7,MULTI=-1,
      042 -2.71513             1.933689
                                                     DTITLE=FW9014HL5009,
                                                     SEGMNT=2,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                                                    ADDWT=879,
SNB   042            1.0
                                                    AA=897.6E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
      13  -3.4024              2.42316
                                                    DTITLE=FW9014HL5008,
                                                    SEGMNT=2,
                                                    UFL=0.000,              *2
                                                    COSFX=0.5640,           *2
                                                    COSFY=0.2350,           *2
                                                    COSFZ=0.7920,           *2
                                                    UFL=0.000,              *3
                                                    COSFX=0.5640,           *3
                                                    COSFY=0.2350,           *3
                                                    COSFZ=0.7920,           *3
                                                    ADDWT=105,
***SPD  13             1.0                                                  *I
SPR   13             1.0                            FORCE=9157.,AA=1.,      *I
      045-3.0206             2.15123    L
                                                    JOINT=BTWELD,
      050            4-7-3/8
                                                    DTITLE=FW9014HL5001,
                                                    ADDWT=988,
                                                    SIF=2.1,
SNB   050 1.0
                                                    AA=813.5E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
      055            0-11-3/8                       DTITLE=FW9014HL5002,
                                                    SEGMNT=2,
                                                    ADDWT=879,
SNB   055 0.2980             -0.9540
                                                    AA=1151.0E03,
                                                    RSNAME=INTOBE,          *S
                                                    RSNAME=INTSSE,          *T
DLD   055            -1.0                           TFOR=  6,MULTI=-1,
      060            5-7-5/8              L
                                                    JOINT=BTWELD,
      065 -5-1-3/4                                  DTITLE=SLEEVE#245,
                                                    SEGMNT=2,
      070 -2-10                                     JOINT=BTWELD,SIF=1.8,
      080 -3-10
                                                    DTITLE=FW9014HL5003,
                                                    ADDWT=730,
                                                    SIF=2.1,
SNB   080                    1.0
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
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```
                                                                  AA=1402E03,
                                                                  RSNAME=INTOBE,                  *S
                                                                  RSNAME=INTSSE,                  *T
        085 -1-0
                                                                  DTITLE=FW9014HL5006,
RAD     085             1.0000
                                                                  AA=1353E03,
                                                                  RSNAME=INTOBE,                  *S
                                                                  RSNAME=INTSSE,                  *T
DLD     085 1.0                                                   TFOR=  5,MULTI=-1,
        086 -2-11-1/4
        087 -2-3
                                                                  DTITLE=SLEEVE#243,
                                                                  SEGMNT=2,
        090 -3-0                                L
                                                                  JOINT=BTWELD,
        095                         8-10-1/2
                                                                  DTITLE=FW9014SH0004,
                                                                  SEGMNT=2,
                                                                  ADDWT=92,
***SPD  095             1.0                                                                     *I
SPR     095             1.0                                       FORCE=6756.,AA=1.,            *I
DLD     095                          -1.0                         TFOR=  4,MULTI=-1,
        95B                         0-11-1/2
                                                                  DTITLE=FW9014HL5004,
                                                                  SIF=2.1,
                                                                  ADDWT=0,
***     SSC-20-180 SUPER STIFF CLAMP
RAD     95B 1.0
                                                                  AA=852.8E03,
                                                                  RSNAME=INTOBE,                  *S
                                                                  RSNAME=INTSSE,                  *T
        100                         5-11        L
                                                                  JOINT=BTWELD,
        10A -4-6                                                  DTITLE=FW9014HL5011,
                                                                  SEGMNT=2,
                                                                  ADDWT=470,
RAD     10A                         1.0
                                                                  AA=1554E03,
                                                                  RSNAME=INTOBE,                  *S
                                                                  RSNAME=INTSSE,                  *T
DLD     10A 1.0                                                   TFOR=  2,MULTI=-1,
        105-10-6-1/2                                              SIF=1.8,
                                                                  SEGMNT=4,
        110 -0-4-5/8                                              SIF=1.9,DTITLE=PEN M-7,
ANC     110 0.03901     -0.06168    0.005251                                                    *N
ANC     110 -0.26854    0.2352      -0.036149                                                   *P
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
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ORIGINATOR PANI DATE

```
ANC   110                                                              *O
                                          COSAX=1.0,COSAZ=0,
                                          COSCX=0,COSCZ=1.0,
                                          AA=6.4E6,AB=6.4E6,AC=6.4E6,
                                          ARA=7.45E9,ARB=7.45E9,
                                          ARC=7.45E9,
                                          DX=.0268,DY=0.0034,DZ=.0351,*X
                                          DX=.0482,DY=0.0058,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,
             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,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____

CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                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
                 .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,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                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,
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,
```

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
                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,
               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,
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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
ORIGINATOR PANI DATE SHEET NO
SHEET REV

```
                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,
               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,
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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

ORIGINATOR PANI DATE ____ CALC NO RC5035-P-200 R0
SHEET NO ____
SHEET REV ____

```
              8.0000),    2.0000,   10.0000,     .1000,   11.0000,     .6000,
             20.0000),     .6000,   30.0000,     .6000,   40.0000,     .5000,
EOA
***
***ADD        MFWB-X.PRN                                                      *W
***
*****************************************************************************
CMB                                                  CO=0.*THRM1,
***CMB                                                  J1=WTJ1&WTJ2&CO,
***CMB                                                  J2=WTJ1#WTJ2#CO,
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$SAM1,
CMB                                                  A1=D3&WT1&CO,
CMB                                                  A2=D4#WT1#CO,
CMB                                                  UPSETP=A1+C5,
CMB                                                  UPSETN=A2-C5,
CMB                                                  C6=SEISA2$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+
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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438100

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

```
                                        FAULTN+D5+D6,
SLA                                     INCLUDE=WT1,
TEA                                     INCLUDE=THRM1+THRM2+THRM3+
                                        THRM4+THRM5+THRM6+THRM7+SAM1
                                        +WT1,
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                                           *** .
   3  . ************************************************************************** .
   4  . ***    INPUT FILE FOR CALC REVISION DUE TO SGR REPLACEMENT ;MFWBW.INP      .
   5  . ***    DATA FILE FOR UNIT-1                                               .
   6  . ***    NOTE: ABR STIFFNESS & SUPPORT RELOCATION ARE INCORPORATED          .
   7  . ************************************************************************** .
   8  . ************************************************************************** .
   9  . CTL                                                 OUTPUT-SHORT,        .
  10  . HED                                                 TITLE-FEEDWATER "FW" SYSTEM -  .
  11  .                                                     SG 1B TO M7,         .
  12  .                                                     PROJNO-23438001,     .
  13  .                                                     PROBNO-2C159RC5035,  .
  14  .                                                     USER-PANI,           .
  15  .                                                     UNITS-2,             .
  16  .                                                     INTG-MODAL,DAMP-0.03,  .
  17  .                                                     MODES-200,PRE-0.005,   .
  18  .                                                     TZERO-0.,TFIN-1.0,     .
  19  . RUN                                                 LDCASE-WT1(N+7+I),     .
  20  . RUN                                                 LDCASE-THRM2(B+N+7),   .
  21  . RUN                                                 LDCASE-THRM3(C+N+7),   .
  22  . RUN                                                 LDCASE-THRM6(F+N+7),   .
  23  . RUN                                                 LDCASE-TIME1(N)        .
  24  . ***                                                                        .
  25  . ***    WT1   --- NORMAL OPERATING WEIGHT ANALYSIS                          .
  26  . ***                                                                        .
  27  . ***    THRM2 --- THERMAL NORMAL OPERATING MODE                  @ 440 DEGREE  .
  28  . ***    THRM6 --- THERMAL NORMAL OPERATING MODE                  @ 390 DEGREE  .
  29  . ***    THRM3 --- THERMAL NORMAL OPERATING MODE                  @ 250 DEGREE  .
  30  . ***    TIME1 --- WATER HAMMER  ANALYSIS                                    .
  31  . ***                                                                        .
  32  . ***                                                                        .
  33  . ***                                                                        .
  34  . ***    CAD. ISO. 2C369PFW433 SHT. 01 REV. 4                                .
  35  . ***                                                                        .
  36  . ***    UNIT-1 LOOP B   MAIN FEEDWATER                                      .
  37  . ***                                                                        .
  38  . ***    SGR NOZZLE MATERIAL SA508 CL. 3A  SC-22.5 KSI; SH-22.5 KSI          .
  39  . ***    MATL: SA-508 GR. 3 CL. 2 FOR STRAIGHT SPOOL OF BECHTEL PIPE @ NOZZLE .
  40  . ***    MATL: SA-336 GR.F22 CL.:16" SCH.80 PIPE UP TO & INCLUDING TOP ELB OF RISER .
  41  . ***    MATL: SA-333 GR.6 AFTER TOP ELB OF RISER & REST; 16" SCH. 80/ 18" SCH. 80 .
  42  . ****                                                                       .
  43  . BAP    002            82.719                                               .
  44  . ***       001;002,N02 ARE NODES ON SGR CL;SGR SURFACE; FW NOZ END RESPECTIVELY .
  45  . ***                                                                        .
  46  .        002                                                                 .
  47  .        001  7.2674              4.0284                                    .
  48  .                                                     OD-199.42,THI-4.71,    .
  49  .                                                     TEMP-567,EXP-4.2766,    *A  .  TAG NOT USED - CARD IGNORED
  50  .                                                     TEMP-440,EXP-3.068,     *B  .  THRM2
  51  .                                                     TEMP-250,EXP-1.40,      *C  .  THRM3
  52  .                                                     TEMP-120,EXP-0.382,     *D  .  TAG NOT USED - CARD IGNORED
  53  .                                                     TEMP-563,EXP-4.433,     *E  .  TAG NOT USED - CARD IGNORED
  54  . ***                                                 TEMP-488,EXP-2.774,     *F  .
  55  .                                                     TEMP-390,EXP-2.612,     *F  .  THRM6
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```
 56  .                                                EXP=-0.2908,TEMP=32,          *G  .  TAG NOT USED - CARD IGNORED
 57  .                                                TEMP=70,EXP=0.,               *K  .  TAG NOT USED - CARD IGNORED
 58  .                                                TEMP=70.,EXP=0.,              *O  .  TAG NOT USED - CARD IGNORED
 59  .                                                SC=22500,SH=22500,                .
 60  .                                                E=27.8E6,                         .
 61  .                                                LBS/FT=1.0,                       .
 62  .                                                DPRESS=1.0,PPRESS=1.0,            .
 63  .                                                CODE=SC3N75,CLASS=2,              .
 64  .  ***                                                                             .
 65  .  ***   LINE NO. FW-1014-GA2                                                      .
 66  .  ANC   001 -0.637    1.971      -1.956                                  *N  .  WT1    THRM2  THRM3  THRM6  TIME1
 67  .  ANC   001                                                            *N  .  TAG NOT USED - CARD IGNORED
 68  .                                                  COSAX=-.8746,COSAZ=-.4848,      .
 69  .                                                  COSCX=.4848,COSCZ=-.8746,       .
 70  .                                                  RENAME=SCRSSE,            *S  .  TAG NOT USED - CARD IGNORED
 71  .                                                  RENAME=SGRSSE,            *T  .  TAG NOT USED - CARD IGNORED
 72  .                                                  DTITLE=CENTER  SG,              .
 73  .                                                  DX=.229,DY=.0170,DZ=.2516,*X  .  TAG NOT USED - CARD IGNORED
 74  .                                                  DX=.369,DY=.052,DZ=.4058, *Y  .  TAG NOT USED - CARD IGNORED
 75  .                                                  PHASE=SG,                       .
 76  .                                                  ROT-X=-0.345E-3,          *N  .  WT1    THRM2  THRM3  THRM6  TIME1
 77  .                                                  ROT-Y=-0.620E-3,          *N  .  WT1    THRM2  THRM3  THRM6  TIME1
 78  .                                                  ROT-Z=0.842E-3,           *N  .  WT1    THRM2  THRM3  THRM6  TIME1
 79  .                                                RTI=1R122N8U201B,                 .
 80  .  ****************                                                               .
 81  .  ***     BEGIN     FW LINE REROUTE DUE TO SG REPLACEMENT/NEW FW NOZZLE LOCATION  .
 82  .  ****************                                                               .
 83  .     002003 -0.3440              -0.1907                                        .
 84  .                                                OD=26.0,THICK=4.75,               .
 85  .                                                LBS/FT=1176.5,                    .
 86  .        03A -0.5860              -0.3248                                        .
 87  .                                                OD=20.0,THICK=1.75,               .
 88  .                                                LBS/FT=439.2,                     .
 89  .        N02 -0.4490              -0.2489          SIF=1.502,                    .
 90  .                                                DTITLE=FW NOZZLE,                 .
 91  .  DLD   N02 0.8746               0.4848           TFOR= 11;MULTI=-1,-           .
 92  .        004-1-11.551             -1-1.0600        JOINT=BTWELD,                 .
 93  .                                                OD=16.0,THICK=.843,               .
 94  .                                                LBS/FT=210.66,                    .
 95  .                                                DPRESS=1350,PPRESS=1360,          .
 96  .        005-1-9                  -0-11.640   L   JOINT=BTWELD,                   .
 97  .  ***                                           MAT=SA336 GR.F22                  .
 98  .                                                SC=18800,SH=17817,                .
 99  .                                                E=30.6E6,                         .
100  .                                                TEMP=567,EXP=4.3864,          *A  .  TAG NOT USED - CARD IGNORED
101  .                                                TEMP=440,EXP=3.160,           *B  .  THRM2
102  .                                                TEMP=250,EXP=1.45,            *C  .  THRM3
103  .                                                TEMP=120,EXP=0.378,           *D  .  TAG NOT USED - CARD IGNORED
104  .                                                TEMP=583,EXP=4.534,           *E  .  TAG NOT USED - CARD IGNORED
105  .  ***                                           TEMP=408,EXP=2.872,           *F  .
106  .                                                TEMP=390,EXP=2.710,           *F  .  THRM6
107  .                                                EXP=-0.2892,TEMP=32,          *G  .  TAG NOT USED - CARD IGNORED
108  .                                                TEMP=70,EXP=0.,               *K  .  TAG NOT USED - CARD IGNORED
109  .                                                TEMP=70.,EXP=0.,              *O  .  TAG NOT USED - CARD IGNORED
110  .        007            -10-8-5/8                SEQ=2,                            .
111  .  ***                                           MAT=SA333 GR.6 (C-MN-SI)          .
112  .                                                SC=15000,SH=15000,                .
113  .                                                E=27.9E6,                         .
114  .                                                OD=16.0,THICK=.843,               .
115  .                                                LBS/FT=210.66,                    .
116  .                                                TEMP=567,EXP=4.2766,          *A  .  TAG NOT USED - CARD IGNORED
```

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117  .                                                    TEMP-440,EXP-3.068,          *B  .  THRM2
118  .                                                    TEMP-250,EXP-1.40,           *C  .  THRM3
119  .                                                    TEMP-120,EXP-0.382,          *D  .  TAG NOT USED - CARD IGNORED
120  .                                                    TEMP-583,EXP-4.433,          *E  .  TAG NOT USED - CARD IGNORED
121  .  ***                                               TEMP-408,EXP-2.774,          *F  .
122  .                                                    TEMP-390,EXP-2.612,          *F  .  THRM6
123  .                                                    EXP=-0.2908,TEMP=32,         *G  .  TAG NOT USED - CARD IGNORED
124  .                                                    TEMP-70,EXP-0.,              *H  .  TAG NOT USED - CARD IGNORED
125  .                                                    TEMP-70.,EXP-0.,             *O  .  TAG NOT USED - CARD IGNORED
126  .  RAD   007  0.9272                -0.3746
127  .                                                    AA-1997E3,ETI-HLS016,
128  .                                                    RSNAME-IS830B,               *S  .  TAG NOT USED - CARD IGNORED
129  .                                                    RSNAME-IS835S,               *T  .  TAG NOT USED - CARD IGNORED
130  .  DLD   007              1.0
131  .        008              -0.0                       TFOR=-10,MULTI=-1,
132  .        009 1-10.35                 0-8.76         JOINT-BTWELD,SEC=2,
133  .                                                    ADDWT=50,
134  .  DLD   009-0.9311                  -0.3649        TFOR=-9,MULTI=-1,
135  .  SPD   009              1.0
136  .                                                    ETI-HLS015,
137  .  ***        010 CHANGED TO SR ELBOW
138  .        010 1-10.35                 0-8.76     S
139  .        011              -2-10.5                   JOINT-BTWELD,
140  .                                                    ADDWT-902,
141  .  RAD   011 -1.0000
142  .                                                    AA-1049E3,ETI-HLS014,
143  .                                                    RSNAME-IS830B,               *S  .  TAG NOT USED - CARD IGNORED
144  .                                                    RSNAME-IS835S,               *T  .  TAG NOT USED - CARD IGNORED
145  .  RAD   011 -0.6018                -0.7986
146  .                                                    AA-1478E3,ETI-HLS014,
147  .                                                    RSNAME-IS830B,               *S  .  TAG NOT USED - CARD IGNORED
148  .                                                    RSNAME-IS835S,               *T  .  TAG NOT USED - CARD IGNORED
149  .        11A              -1-7.5                     DTI-PLATFRM,
150  .        012              -5-4.5                     SEC-2,
151  .        013              -1-5-3/16
152  .        014              -5-10-5/16                 SEC-2,
153  .                                                    UPL-1230,                    *2  .  TAG NOT USED - CARD IGNORED
154  .                                                    COSFX-0.7290,                *2  .  TAG NOT USED - CARD IGNORED
155  .                                                    COSFY-0.0000,                *2  .  TAG NOT USED - CARD IGNORED
156  .                                                    COSFZ=-0.685,                *2  .  TAG NOT USED - CARD IGNORED
157  .                                                    UPL-2460,                    *3  .  TAG NOT USED - CARD IGNORED
158  .                                                    COSFX-0.7290,                *3  .  TAG NOT USED - CARD IGNORED
159  .                                                    COSFY-0.0000,                *3  .  TAG NOT USED - CARD IGNORED
160  .                                                    COSFZ=-0.685,                *3  .  TAG NOT USED - CARD IGNORED
161  .                                                    ADDWT-1133,
162  .  RAD   014 -0.9748                -0.2233
163  .                                                    AA-3308E3,ETI-HLS013,
164  .                                                    RSNAME-INTOSE,               *S  .  TAG NOT USED - CARD IGNORED
165  .                                                    RSNAME-INTSSE,               *T  .  TAG NOT USED - CARD IGNORED
166  .  RAD   014 -0.5402                -0.8415
167  .                                                    AA-1484E3,ETI-HLS013,
168  .                                                    RSNAME-INTOSE,               *S  .  TAG NOT USED - CARD IGNORED
169  .                                                    RSNAME-INTSSE,               *T  .  TAG NOT USED - CARD IGNORED
170  .        015              -1-7-13/16                 DTI-CUT LOCN,JOINT-BTWELD,
171  .  DLD   015               1.0                       TFOR=-8,MULTI=-1,
172  .        016              -0-7-1/2                   JOINT-RED,
173  .  ***      END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION
174  .  ****************
175  .        018              -0-7-1/2                   JOINT-BTWELD,
176  .                                                    OD-18,THICK-.937,
177  .                                                    LBS/FT-264.22,
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INPUT CARD IMAGES                                                      ME101/N4  GAEU/S4      (HP0707) 06/17/96 HP0707   PAGE     4

178  .        020            -0-9                              SIP-1.0,                  .
179  .                                                         ADDWT-25,                 .
180  .        021            -1-0                              SIP-1.0,                  .
181  .                                                         ADDWT-20,.                .
182  .        022            -1-0                              SIP-1.0,                  .
183  .                                                         ADDWT-50,                 .
184  .        025            -4-0 .                     L                                .
185  .                                                         JOINT-BTWELD,             .
186  .        026 -3.73331              2.65883                                          .
187  .                                                         SIP-1.0,                  .
188  .                                                         ADDWT-25,                 .
189  .                                                         UPL-1089,           *8  .  TAG NOT USED - CARD IGNORED
190  .                                                         COSFX-0.5801,       *8  .  TAG NOT USED - CARD IGNORED
191  .                                                         COSFY-0.2419,       *8  .  TAG NOT USED - CARD IGNORED
192  .                                                         COSFZ-0.8145,       *8  .  TAG NOT USED - CARD IGNORED
193  .                                                         UPL-2179,           *9  .  TAG NOT USED - CARD IGNORED
194  .                                                         COSFX-0.5801,       *9  .  TAG NOT USED - CARD IGNORED
195  .                                                         COSFY-0.2419,       *9  .  TAG NOT USED - CARD IGNORED
196  .                                                         COSFZ-0.8145,       *9  .  TAG NOT USED - CARD IGNORED
197  .        027 -0-2.95271            0-2.10289                                        .
198  .                                                         DTITLE-FW9014KL5012,      .
199  .                                                         ADDWT-355,                .
200  .                                                         SIP-2.1,                  .
201  .  SNB   027 -.5801                -.8145                                           .
202  .                                                         AA-752.5E3,               .
203  .                                                         RSNAME-INTOBE,      *S  .  TAG NOT USED - CARD IGNORED
204  .                                                         RSNAME-INTSSE,      *T  .  TAG NOT USED - CARD IGNORED
205  .        030 -0-6.8218             0-4.8584               SIP-1.0,                  .
206  .                                                         ADDWT-20,                 .
207  .        035 -0-2.44362            0-1.7403               SIP-1.0,                  .
208  .                                                         ADDWT-25,                 .
209  .                                                         DTITLE-1.5FW1073GA2,      .
210  .        040 -0-8.1454             0-5.80107                                        .
211  .                                                         DTITLE-FW9014SW0001,      .
212  .                                                         ADDWT-48,                 .
213  .  ***SPD  040          1.0                                                         .
214  .  SPR   040           1.0                                 FORCE-1751.,AA-1.,  *I  .  WT1
215  .  DLD   040 0.8145             -0.5801                    TFOR- 7,MULTI--1,         .
216  .        042 -2.71513              1.933689                                         .
217  .                                                         DTITLE-FW9014KL5009,      .
218  .                                                         SEGMNT-2,                 .
219  .                                                         ADDWT-879,                .
220  .  SNB   042           1.0                                                          .
221  .                                                         AA-897.6E03,              .
222  .                                                         RSNAME-INTOBE,      *S  .  TAG NOT USED - CARD IGNORED
223  .                                                         RSNAME-INTSSE,      *T  .  TAG NOT USED - CARD IGNORED
224  .        13  -3.4024               2.42316                                          .
225  .                                                         DTITLE-FW9014KL5008,      .
226  .                                                         SEGMNT-2,                 .
227  .                                                         UPL-0.000,          *2  .  TAG NOT USED - CARD IGNORED
228  .                                                         COSFX-0.5640,       *2  .  TAG NOT USED - CARD IGNORED
229  .                                                         COSFY-0.2350,       *2  .  TAG NOT USED - CARD IGNORED
230  .                                                         COSFZ-0.7920,       *2  .  TAG NOT USED - CARD IGNORED
231  .                                                         UPL-0.000,          *3  .  TAG NOT USED - CARD IGNORED
232  .                                                         COSFX-0.5640,       *3  .  TAG NOT USED - CARD IGNORED
233  .                                                         COSFY-0.2350,       *3  .  TAG NOT USED - CARD IGNORED
234  .                                                         COSFZ-0.7920,       *3  .  TAG NOT USED - CARD IGNORED
235  .                                                         ADDWT-105,                .
236  .  ***SPD   13          1.0                                                         .
237  .  SPR    13           1.0                                 FORCE-9157.,AA-1.,  *I  .  WT1
238  .        045-3.0206                2.15123     L                                   .
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INPUT CARD IMAGES

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239  .
240  .        050              4-7-3/8
241  .
242  .
243  .
244  .  SNB   050 1.0
245  .
246  .
247  .
248  .        055              0-11-3/8
249  .
250  .
251  .  SNB   055 0.2980                  -0.9540
252  .
253  .
254  .
255  .  DLD   055              -1.0 /
256  .        060              5-7-5/8                 L
257  .
258  .        065 -5-1-3/4
259  .
260  .        070 -2-10
261  .        080 -3-10
262  .
263  .
264  .
265  .  SNB   080                         1.0
266  .
267  .
268  .
269  .        085 -1-0
270  .
271  .  RAD   085            1.0000
272  .
273  .
274  .
275  .  DLD   085 1.0 /
276  .        086 -2-11-1/4
277  .        087 -2-3
278  .
279  .
280  .        090 -3-0                                L
281  .
282  .        095                         8-10-1/2
283  .
284  .
285  .
286  .  ***SPD    095           1.0
287  .  SPR   095            1.0
288  .  DLD   095                          -1.0
289  .        95B                         0-11-1/2
290  .
291  .
292  .
293  .  ***   SSC-20-180 SUPER STIFF CLAMP
294  .  RAD   95B 1.0
295  .
296  .
297  .
298  .        100                         8-11        L
299  .
```

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ME101/N4  GAEU/54     (NP0707) 06/17/98 NP0707  PAGE     5

JOINT-BIWELD,                                          .
                                                       .
DTITLE-FW9014HL5001,                                   .
ADDWT-988,                                             .
SIF-2.1,                                               .
                                                       .
AA-813.5E03,                                           .
RSNAME-INTOBE,                  *S     .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,                  *T     .  TAG NOT USED - CARD IGNORED
DTITLE-FW9014HL5002,                                   .
SEGMNT-2,                                              .
ADDWT-879,                                             .
                                                       .
AA-1151.0E03,                                          .
[illegible],                    *S     .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,                  *T     .  TAG NOT USED - CARD IGNORED
TFOR- ,5,MULTI--1,                                     .
                                                       .
JOINT-BIWELD,                                          .
DTITLE-SLEEVE#245,                                     .
SEGMNT-2,                                              .
JOINT-BIWELD,SIF-1.8,                                  .
                                                       .
DTITLE-FW9014HL5003,                                   .
ADDWT-730,                                             .
SIF-2.1,                                               .
                                                       .
AA-1402E03,                                            .
RSNAME-INTOBE,                  *S     .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,                  *T     .  TAG NOT USED - CARD IGNORED
                                                       .
DTITLE-FW9014HL5006,                                   .
                                                       .
AA-1353E03,                                            .
RSNAME-INTOBE,                  *S     .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,                  *T     .  TAG NOT USED - CARD IGNORED
TFOR- , 5,MULTI--1,                                    .
                                                       .
DTITLE-SLEEVE#243,                                     .
SEGMNT-2,                                              .
                                                       .
JOINT-BIWELD,                                          .
                                                       .
DTITLE-FW9014SH0004,                                   .
SEGMNT-2,                                              .
ADDWT-92,                                              .
                                                       .
FORCE-6756.,AA-1.,              *I     .  WT1
TFOR-  4,MULTI--1,                                     .
                                                       .
DTITLE-FW9014HL5004,                                   .
SIF-2.1,                                               .
ADDWT-0,                                               .
                                                       .
AA-852.8E03,                                           .
RSNAME-INTOBE,                  *S     .  TAG NOT USED - CARD IGNORED
RSNAME-INTSSE,                  *T     .  TAG NOT USED - CARD IGNORED
                                                       .
JOINT-BIWELD,                                          .
```

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300  .        10A -4-6                                  DTITLE-PW9014NLS011,                .
301  .                                                  SEGMNT-2,                           .
302  .                                                  ADDNT-470,                          .
303  .  RAD   10A                    1.0                                                    .
304  .                                                  AA-1554E03,                         .
305  .                                                  RSNAME-INTOBE,              *S      .  TAG NOT USED - CARD IGNORED
306  .                                                  RSNAME-INTSSE,              *T      .  TAG NOT USED - CARD IGNORED
307  .  DLD   10A 1.0                                   TFOR=  2,MULTI=-1,                  .
308  .        10$-10-6-1/2                              SIF=1.8,                            .
309  .                                                  SEGMNT-4,                           .
310  .        110 -0-4-5/8                              SIF=1.9,DTITLE=PEN M-7,             .
311  .  ANC   110 0.03901   -0.06168   0.005251                                  *N      .  WT1    THRM2  THRM3  THRM6  TIME1
312  .  ANC   110 -0.26854  0.2352     -0.036149                                 *P      .  TAG NOT USED - CARD IGNORED
313  .  ANC   110                                                                 *O      .  TAG NOT USED - CARD IGNORED
314  .                                                  COSXZ=1.0,COSYZ=0,                  .
315  .                                                  COSCX=0,COSCZ=1.0,                  .
316  .                                                  AA=6.4E6,AB=6.4E6,AC=6.4E6,         .
317  .                                                  ARA=7.45E9,ARB=7.45E9,              .
318  .                                                  ARC=7.45E9,                         .
319  .                                                  DX=-.0268,DY=0.0034,DZ=-.0351,*X    .  TAG NOT USED - CARD IGNORED
320  .                                                  DX=-.0482,DY=0.0058,DZ=-.0602,*Y    .  TAG NOT USED - CARD IGNORED
321  .                                                  PHASE=CONT,                         .
322  .                                                  RSNAME=CMTOBE,              *S      .  TAG NOT USED - CARD IGNORED
323  .                                                  RSNAME=CMTSSE,              *T      .  TAG NOT USED - CARD IGNORED
324  .  ****                ;                                                           .
325  .  ************************************************************************       .
326  .  ************************************************************************       .
327  .  ************************************************************************       .
328  .  ************************************************************************       .
****  .  ********                                                                      .
****  .  CMB                                             C0=0.*THRM2,                    .
****  .  CMB                                             SKIST=1.0*TIME1,                .
****  .  CMB                                             C1=THRM2&THRM3&THRM6            .
****  .                                                  &C0,                            .
****  .  CMB                                             C2=THRM2$THRM3$THRM6            .
****  .                                                  $C0,                            .
****  .  CMB                                             C3=WT1+C1,                      .
****  .  CMB                                             C4=WT1+C2,                      .
****  .  CMB                                             C5=C3+TIME1,                    .
****  .  CMB                                             C6=C4-TIME1,                    .
****  .  CMB                                             FAULTP=C0&C5,                   .
****  .  CMB                                             FAULTN=C0$C6,                   .
****  .  RLG                                             LIST=WT1+THRM7+TIME1+FAULTP+    .
****  .                                                  FAULTN,                         .
****  .  STD                                             LIST=NONE,                      .
****  .  SLA                                             INCLUDE=WT1,                    .
****  .  OLA                                             INCLUDE=WT1+SKIST,LEVEL=0,      .
****  .  END                                                                             .
****  .  ************************************************************************       .
****  .  ************************************************************************       .
```

Current ME101 deck contains 1 ADD FILES

FROM	TO	FILE NAME
330	33395	C:\PANI\STPSGR\MPNEW.FOR

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                                             *** .
   3  . ********************************************************************************
   4  . ***   INPUT FILE FOR CALC REVISION DUE TO SGR REPLACEMENT :NFWBJ.INP
   5  . ***   DATA FILE FOR UNIT-1
   6  . ***   NOTE: ABR STIFFNESS & SUPPORT RELOCATION ARE INCORPORATED
   7  . ********************************************************************************
   8  . ********************************************************************************
   9  . CTL                                                 OUTPUT-SHORT,
  10  . HED                                                 TITLE-FEEDWATER 'FW' SYSTEM -
  11  .                                                     SG 1B TO M7,
  12  .                                                     PROJNO-23438001,
  13  .                                                     PROBNO-2C159RCS035,
  14  .                                                     USER-PANI,
  15  .                                                     UNITS-2,
  16  . RUN                                                 LDCASE-WT1(N+1),
  17  . RUN                                                 LDCASE-THRM1(N+A),
  18  . RUN                                                 LDCASE-WTJ1(2+R+N),
  19  . RUN                                                 LDCASE-WTJ2(3+R+N),
  20  . ***
  21  . ***   WT1   --- NORMAL OPERATING WEIGHT ANALYSIS
  22  . ***   WTJ1  --- STATIC JET IMPINGEMENT ANALYSIS -W/O DLF & W/O SNB ACTIVE.
  23  . ***   WTJ2  --- EQUIV. STATIC JET IMPINGEMENT ANALYSIS -W/ DLF & W SNB ACTIVE.
  24  . ***   THRM1 --- THERMAL NORMAL OPERATING MODE (HEAT-UP,COLD DOWN) @ 567 DEGREE
  25  . ***   WTJ1 & WTJ2-- INACTIVATE SPRINGS, ADDWTS, LB/FT
  26  . ***
  27  . ***
  28  . ***
  29  . ********************************************************************************
  30  . ***
  31  . ***
  32  . ***   CAD. ISO. 2C369PFW433 SHT. 01 REV. 4
  33  . ***
  34  . ***   UNIT-1 LOOP B  MAIN FEEDWATER
  35  . ***   SGR NOZZLE MATERIAL SA508 CL. 3A  SC=22.5 KSI; SH=22.5 KSI
  36  . ***   MATL: SA-508 GR. 2 CL. 2 FOR STRAIGHT SPOOL OF BECHTEL PIPE @ NOZZLE
  37  . ***   MATL: SA-336 GR.F22 CL.:16" SCH.80 PIPE UP TO & INCLUDING TOP ELB OF RISER
  38  . ***   MATL: SA-333 GR.6 AFTER TOP ELB OF RISER & REST; 16" SCH. 80/ 18" SCH. 80
  39  . ****
  40  . SAP   002            82.719
  41  . ***      001;002,N02 ARE NODES ON SGR CL/SGR SURFACE; FW NOZ END RESPECTIVELY
  42  . ***
  43  .       002
  44  .       001  7.2674              4.0284
  45  .                                                 OD=199.42,THI=4.71,
  46  .                                                 TEMP=567,EXP=4.2766,          *A  . THRM1
  47  .                                                 TEMP=440,EXP=3.068,           *B  . TAG NOT USED - CARD IGNORED
  48  .                                                 TEMP=250,EXP=1.40,            *C  . TAG NOT USED - CARD IGNORED
  49  .                                                 TEMP=120,EXP=0.382,           *D  . TAG NOT USED - CARD IGNORED
  50  .                                                 TEMP=583,EXP=4.433,           *E  . TAG NOT USED - CARD IGNORED
  51  .                                                 TEMP=408,EXP=2.774,           *F  . TAG NOT USED - CARD IGNORED
  52  .                                                 EXP=-0.2908,TEMP=32,          *G  . TAG NOT USED - CARD IGNORED
  53  .                                                 TEMP=70,EXP=0.,               *H  . TAG NOT USED - CARD IGNORED
  54  .                                                 TEMP=70.,EXP=0.,              *O  . TAG NOT USED - CARD IGNORED
  55  .                                                 SC=22500,SH=22500,
```

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```
 .                                                   E=27.8E6,                          .
 .                                                   LBS/FT=1.0,                   *1   .  WT1
 .                                                   DPRESS=1.0,PPRESS=1.0,              .
 .                                                   CODE=SC3N75,CLASS=2.                .
 .   ***                                                                                 .
 .   ***    LINE NO. FW-1014-GA2                                                         .
 .   ANC    001 -0.637     1.971        -1.956                                     *N   .  WT1    THRM1  WTJ1   WTJ2
 .   ANC    001                                                                    *H   .  TAG NOT USED - CARD IGNORED
 .                                                     COSAX=-.8746,COSAZ=-.4848,        .
 .                                                     COSCX=.4848,COSCZ=-.8746,         .
 .                                                     RENAME=SGROBE,              *S   .  TAG NOT USED - CARD IGNORED
 .                                                     RENAME=SGRSSE,              *T   .  TAG NOT USED - CARD IGNORED
 .                                                     DTITLE=CENTER  SG,                .
 .                                                     DX=.229,DY=.0170,DZ=.2516,  *X   .  TAG NOT USED - CARD IGNORED
 .                                                     [illegible]                 *Y   .  TAG NOT USED - CARD IGNORED
 .                                                     PHASE=SG,                         .
 .                                                     ROT-X=-0.345E-3,            *N   .  WT1    THRM1  WTJ1   WTJ2
 .                                                     ROT-Y=-0.620E-3,            *N   .  WT1    THRM1  WTJ1   WTJ2
 .                                                     ROT-Z=0.042E-3,             *N   .  WT1    THRM1  WTJ1   WTJ2
 .                                                   ETI=1R122NSG201B,                   .
 .   ****************                                                                    .
 .   ***    BEGIN    FW LINE REROUTE DUE TO SG REPLACEMENT/NEW FW NOZZLE LOCATION        .
 .   ****************                                                                    .
 .      002003 -0.3440              -0.1907                                              .
 .                                                   OD=26.0,THICK=4.75,                 .
 .                                                   LBS/FT=1176.5,                *1   .  WT1
 .          03A -0.5860              -0.3248                                             .
 .                                                   OD=20.0,THICK=1.75,                 .
 .                                                   LBS/FT=439.2,                 *1   .  WT1
 .          N02 -0.4490              -0.2489         SIF=1.502,                          .
 .                                                   OD=16.0,THICK=.843,                 .
 .                                                   LBS/FT=210.66,                *1   .  WT1
 .                                                   DTITLE=FW NOZZLE,                   .
 .                                                   DPRESS=1350,PPRESS=1360,            .
 .   DLD    N02 0.8746                0.4848         TFOR= 11,MULTI=-1,                  .
 .          004-2-11.551             -2-1.0600       JOINT=BTWELD,                       .
 .          005-1-9                  -0-11.640    L  JOINT=BTWELD,                       .
 .   ***                                             MAT=SA336 GR.F22                    .
 .                                                   SC=18800,SH=17817,                  .
 .                                                   E=30.6E6,                           .
 .                                                   TEMP=567,EXP=4.3864,          *A   .  THRM1
 .                                                   TEMP=440,EXP=3.160,           *B   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=250,EXP=1.45,            *C   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=120,EXP=0.378,           *D   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=583,EXP=4.534,           *E   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=408,EXP=2.872,           *F   .  TAG NOT USED - CARD IGNORED
 .                                                   EXP=-0.2892,TEMP=32,          *G   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=70,EXP=0.,               *H   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=70.,EXP=0.,              *O   .  TAG NOT USED - CARD IGNORED
 .          007              -10-8-5/8               SEQ=2,                              .
 .   ***                                             MAT=SA333 GR.6 (C-MN-SI)            .
 .                                                   SC=15000,SH=15000,                  .
 .                                                   E=27.9E6,                           .
 .                                                   OD=16.0,THICK=.843,                 .
 .                                                   LBS/FT=210.66,                *1   .  WT1
 .                                                   TEMP=567,EXP=4.2766,          *A   .  THRM1
 .                                                   TEMP=440,EXP=3.068,           *B   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=250,EXP=1.40,            *C   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=120,EXP=0.382,           *D   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=583,EXP=4.433,           *E   .  TAG NOT USED - CARD IGNORED
 .                                                   TEMP=408,EXP=2.774,           *F   .  TAG NOT USED - CARD IGNORED
```

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```
117  .                                                    EXP=-0.2900,TEMP=32,          *G  .  TAG NOT USED - CARD IGNORED
118  .                                                    TEMP=70,EXP=0.,               *N  .  TAG NOT USED - CARD IGNORED
119  .                                                    TEMP=70.,EXP=0.,              *O  .  TAG NOT USED - CARD IGNORED
120  .  RAD   007  0.9272              -0.3746                                               .
121  .                                                    AA-1997E3,ETI-HL5016,              .
122  .                                                    RSNAME=IS830B,                *S  .  TAG NOT USED - CARD IGNORED
123  .                                                    RSNAME=IS838S,                *T  .  TAG NOT USED - CARD IGNORED
124  .  DLD   007               1.0                       TFOR= 10,MULTI=-1,                 .
125  .        008             -9-0                   S    JOINT=BTWELD,SEG=2,                .
126  .        009 1-10.35               0-8.76                                                .
127  .                                                    ADDWT=50,                     *1  .  WT1
128  .  SPD   009               1.0                                                      *1  .  WT1
129  .                                                    ETI=HL5015,                   *1  .  WT1
130  .  DLD   009-0.9311               -0.3649            TFOR=  9,MULTI=-1,                 .
131  .        010 1-10.35              0-8.76       S     JOINT=BTWELD,                      .
132  .        011             -2-10.5                                                       .
133  .                                                    ADDWT=902,                    *1  .  WT1
134  .  RAD   011 -1.0000                                                                   .
135  .                                                    AA-1049E3,ETI-HL5014,              .
136  .                                                    RSNAME=IS830B,                *S  .  TAG NOT USED - CARD IGNORED
137  .                                                    RSNAME=IS838S,                *T  .  TAG NOT USED - CARD IGNORED
138  .  RAD   011 -0.6018              -0.7986                                               .
139  .                                                    AA-1478E3,ETI-HL5014,              .
140  .                                                    RSNAME=IS830B,                *S  .  TAG NOT USED - CARD IGNORED
141  .                                                    RSNAME=IS838S,                *T  .  TAG NOT USED - CARD IGNORED
142  .        11A             -1-7.5                      DTI=PLATFRM,                       .
143  .        012             -5-4.5                      SEG=2,                             .
144  .        013             -1-5-3/16                                                      .
145  .        014             -5-10-5/16                  SEG=2,                             .
146  .  ***                                               UPL=1230,                     *2  .
147  .  ***                                               COSFX=0.7290,                 *2  .
148  .  ***                                               COSFY=0.0000,                 *2  .
149  .  ***                                               COSFZ=-0.685,                 *2  .
150  .  ***                                               UPL=2460,                     *3  .
151  .  ***                                               COSFX=0.7290,                 *3  .
152  .  ***                                               COSFY=0.0000,                 *3  .
153  .  ***                                               COSFZ=-0.685,                 *3  .
154  .                                                    ADDWT=1133,                   *1  .  WT1
155  .  RAD   014 -0.9748              -0.2233                                               .
156  .                                                    AA-3206E3,ETI-HL5013,              .
157  .                                                    RSNAME=INTOBE,                *S  .  TAG NOT USED - CARD IGNORED
158  .                                                    RSNAME=INTSSE,                *T  .  TAG NOT USED - CARD IGNORED
159  .  RAD   014 -0.5402              -0.8415                                               .
160  .                                                    AA-1484E3,ETI-HL5013,              .
161  .                                                    RSNAME=INTOBE,                *S  .  TAG NOT USED - CARD IGNORED
162  .                                                    RSNAME=INTSSE,                *T  .  TAG NOT USED - CARD IGNORED
163  .        015             -1-7-13/16                  DTI=CUT LOCN,JOINT=BTWELD,         .
164  .  DLD   015              1.0                        TFOR=  8,MULTI=-1,                 .
165  .        016             -0-7-1/2                    JOINT=RED,                         .
166  .  ***      END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION           .
167  .  ****************                                                                     .
168  .        018             -0-7-1/2                    JOINT=BTWELD,                      .
169  .                                                    OD=18,THICK=.937,                  .
170  .                                                    LBS/FT=264.22,                *1  .  WT1
171  .        020             -0-9                        SIF=1.0,                           .
172  .                                                    ADDWT=25,                     *1  .  WT1
173  .        021             -1-0                        SIF=1.0,                           .
174  .                                                    ADDWT=20,                     *1  .  WT1
175  .        022             -1-0                        SIF=1.0,                           .
176  .                                                    ADDWT=50,                          .
177  .        025             -4-0                   L                                       .
```

INPUT CARD IMAGES

```
178  .
179  .          026 -3.73331                2.65883
180  .
181  .
182  .          027 -0-2.95271              0-2.10289
183  .
184  .
185  .
186  .  RAD     027 -.5801                  -.8145
187  .  SNB     027 -.5801                  -.8145
188  .
189  .
190  .
191  .          030 -0-6.8218               0-4.8584
192  .
193  .          035 -0-2.44362              0-1.7403
194  .
195  .
196  .          040 -0-8.1454               0-5.80107
197  .
198  .
199  .  ***SPD   040              1.0
200  .  SPR     040          1.0
201  .  DLD     040 0.8145                   -0.5801
202  .          042 -2.71513                1.933689
203  .
204  .
205  .
206  .  RAD     042          1.0
207  .  SNB     042          1.0
208  .
209  .
210  .
211  .          13  -3.4024                2.42316
212  .
213  .
214  .
215  .
216  .
217  .
218  .
219  .
220  .
221  .
222  .
223  .  ***SPD   13               1.0
224  .  SPR     13           1.0
225  .          045-3.0206                  2.15123    L
226  .
227  .          050          4-7-3/8
228  .
229  .
230  .
231  .  RAD     050 1.0
232  .  SNB     050 1.0
233  .
234  .
235  .
236  .          055          0-11-3/8
237  .
238  .
```

```
JOINT-BTWELD,                          .
                                       .
SIF=1.0,                               .
ADDWT=25,                    *1        .  WT1
                                       .
DTITLE=FW9014HLS012,                   .
ADDWT=355,                   *1        .  WT1
SIF=2.1,                               .
                             *3        .  WTJ2
                                       .
AA=752.5E3,                            .
RSNAME=INTOBE,               *S        .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,               *T        .  TAG NOT USED - CARD IGNORED
SIF=1.0,                               .
ADDWT=25,                    *A        .  WT1
SIF=1.0,                               .
ADDWT=25,                    *1        .  WT1
DTITLE=1.5FW1073GA2,                   .
                                       .
DTITLE=FW9014SH0001,                   .
ADDWT=48,                    *1        .  WT1
                                       .
FORCE=1751.,AA=1.,           *1        .  WT1
TFOR=  7,MULTI=-1,                     .
                                       .
DTITLE=FW9014HLS009,                   .
SEGMNT=2,                              .
ADDWT=879,                             .
                             *3        .  WTJ2
                                       .
AA=897.6E03,                           .
RSNAME=INTOBE,               *S        .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,               *T        .  TAG NOT USED - CARD IGNORED
                                       .
DTITLE=FW9014HLS008,                   .
SEGMNT=2,                              .
UFL=0.000,                   *2        .  WTJ1
COSFX=0.5640,                *2        .  WTJ1
COSFY=0.2350,                *2        .  WTJ1
COSFZ=0.7920,                *2        .  WTJ1
UFL=0.000,                   *3        .  WTJ2
COSFX=0.5640,                *3        .  WTJ2
COSFY=0.2350,                *3        .  WTJ2
COSFZ=0.7920,                *3        .  WTJ2
ADDWT=105,                   *1        .  WT1
                                       .
FORCE=9157.,AA=1.,           *1        .  WT1
                                       .
JOINT-BTWELD,                          .
                                       .
DTITLE=FW9014HLS001,                   .
ADDWT=988,                   *1        .  WT1
SIF=2.1,                               .
                             *3        .  WTJ2
                                       .
AA=813.5E03,                           .
RSNAME=INTOBE,               *S        .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,               *T        .  TAG NOT USED - CARD IGNORED
DTITLE=FW9014HLS002,                   .
SEGMNT=2,                              .
ADDWT=879,                   *1        .  WT1
```

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```
239 .  RAD   055 0.2980                -0.9540
240 .  SNB   055 0.2980                -0.9540
241 .
242 .
243 .
244 .  DLD   055             -1.0
245 .        060             5-7-5/8                L
246 .
247 .        065 -5-1-3/4
248 .
249 .        070 -2-10
250 .        080 -3-10
251 .
252 .
253 .
254 .  RAD   080                        1.0
255 .  SNB   080                        1.0
256 .
257 .
258 .
259 .        085 -1-0
260 .
261 .  RAD   085           1.0000
262 .
263 .
264 .
265 .  DLD   085 1.0
266 .        086 -2-11-1/4
267 .        087 -2-3
268 .
269 .
270 .        090 -3-0                               L
271 .
272 .
273 .
274 .
275 .
276 .
277 .
278 .
279 .
280 .
281 .        095                       8-10-1/2
282 .
283 .
284 .
285 .  ***SPD   095           1.0
286 .  SPR   095           1.0
287 .  DLD   095                        -1.0
288 .        95B                       0-11-1/2
289 .
290 .
291 .
292 .  ***   SSC-20-180 SUPER STIFF CLAMP
293 .  RAD   95B 1.0
294 .
295 .
296 .
297 .        100                       8-11         L
298 .
299 .        10A -4-6
```

```
                                      *3  .  WTJ2
                                          .
AA=1151.0E03,                             .
RSNAME=INTOBE,                        *S  .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,                        *T  .  TAG NOT USED - CARD IGNORED
TFOR=  5,MULTI=-1,                        .
                                          .
JOINT=BTWELD,                             .
DTITLE=SLEEVE#245,                        .
SEGMNT=2,                                 .
JOINT=BTWELD,SIF=1.8,                     .
                                          .
DTITLE=FW9014HL5003,                      .
ADDWT=730,                            *1  .  WT1
SIF=2.2,                                  .
                                      *3  .  WTJ2
                                          .
AA=1402E03,                               .
RSNAME=INTOBE,                        *S  .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,                        *T  .  TAG NOT USED - CARD IGNORED
                                          .
DTITLE=FW9014HL5006,                      .
                                          .
AA=1353E03,                               .
RSNAME=INTOBE,                        *S  .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,                        *T  .  TAG NOT USED - CARD IGNORED
TFOR=  5,MULTI=-1,                        .
                                          .
DTITLE=SLEEVE#243,                        .
SEGMNT=2,                                 .
                                          .
JOINT=BTWELD,                             .
ADDWT=1133,                           *1  .  WT1
UFL=857.0,                            *2  .  WTJ1
COSFX=1.0000,                         *2  .  WTJ1
COSFY=0.0000,                         *2  .  WTJ1
COSFZ=0.0000,                         *2  .  WTJ1
UFL=1714,                             *3  .  WTJ2
COSFX=1.0000,                         *3  .  WTJ2
COSFY=0.0000,                         *3  .  WTJ2
COSFZ=0.0000,                         *3  .  WTJ2
                                          .
DTITLE=FW9014SH0004,                      .
SEGMNT=2,                                 .
ADDWT=93,                             *1  .  WT1
                                          .
FORCE=6756.,AA=1.,                    *1  .  WT1
TFOR=  4,MULTI=-1,                        .
                                          .
DTITLE=FW9014HL5004,                      .
SIF=2.3,                                  .
ADDWT=0,                                  .
                                          .
AA=852.8E03,                              .
RSNAME=INTOBE,                        *S  .  TAG NOT USED - CARD IGNORED
RSNAME=INTSSE,                        *T  .  TAG NOT USED - CARD IGNORED
                                          .
JOINT=BTWELD,                             .
DTITLE=FW9014HL5011,                      .
```

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INPUT CARD IMAGES                                        ME101/N4  GAEU/S4     (E04659) 06/11/98 E04659   PAGE    6

300  .                                                  SEGMNT=2,                       .
301  .                                                  ADDWT=470,                 *1   .  WT1
302  .                                                  UFL=0.00,                  *2   .  WTJ1
303  .                                                  COSFX=1.0000,              *2   .  WTJ1
304  .                                                  COSFY=0.0000,              *2   .  WTJ1
305  .                                                  COSFZ=0.0000,              *2   .  WTJ1
306  .                                                  UFL=0.00,                  *3   .  WTJ2
307  .                                                  COSFX=1.0000,              *3   .  WTJ2
308  .                                                  COSFY=0.0000,              *3   .  WTJ2
309  .                                                  COSFZ=0.0000,              *3   .  WTJ2
310  .  RAD   10A                    1.0                                                .
311  .                                                  AA=1554E03,                     .
312  .                                                  RENAME=INTOBE,             *S   .  TAG NOT USED - CARD IGNORED
313  .                                                  RENAME=INTSSE,             *T   .  TAG NOT USED - CARD IGNORED
314  .  DLD   10A 1.0                                   TYPE= 2,MULTI=-1,               .
315  .        105-10-6-1/2                              SIF=1.8,                        .
316  .                                                  SEGMNT=4,                       .
317  .        110 -0-4-5/8                              SIF=1.9,DTITLE=PEN H-7,         .
318  .  ANC   110 0.03901   -0.06168   0.005251                                  *N   .  WT1    THRM1  WTJ1   WTJ2
319  .  ANC   110 -0.26854  0.2352     -0.036149                                 *P   .  TAG NOT USED - CARD IGNORED
320  .  ANC   110                                                                *O   .  TAG NOT USED - CARD IGNORED
321  .                                                  COSAX=1.0,COSAZ=0,              .
322  .                                                  COSCX=0,COSCZ=1.0,              .
323  .                                                  AA=6.4E6,AB=6.4E6,AC=6.4E6,     .
324  .                                                  AXA=7.45E9,ARB=7.45E9,          .
325  .                                                  ALC=7.45E9,                     .
326  .                                                  DX=.0268,DY=0.0034,DZ=.0351,*X  .  TAG NOT USED - CARD IGNORED
327  .                                                  DX=.0482,DY=0.0058,DZ=.0602,*Y  .  TAG NOT USED - CARD IGNORED
328  .                                                  PHASE=CONT,                     .
329  .                                                  RENAME=CMTOBE,             *S   .  TAG NOT USED - CARD IGNORED
330  .                                                  RENAME=CMTSSE,             *T   .  TAG NOT USED - CARD IGNORED
331  .  ****                                                                            .
332  .  ************************************************************************       .
333  .  ***                                                                             .
334  .  ****                                                                            .
335  .  ************************************************************************       .
336  .  ****                                                                            .
337  .  ************************************************************************       .
338  .  ****                                                                            .
339  .  ***                                                                             .
340  .  STD                                             LIST=NONE,                      .
341  .  CMB                                             C0=0.00*WT1,                    .
342  .  CMB                                             SEISJ=RMAX(WTJ1,WTJ2),          .
343  .  CMB                                             JMAX=C0&WTJ1&WTJ2,              .
344  .  CMB                                             JMIN=C0$WTJ1$WTJ2,              .
345  .  CMB                                             C1=WT1+THRM1,                   .
346  .  CMB                                             C2=C1+JMAX,                     .
347  .  CMB                                             C3=C1+JMIN,                     .
348  .  CMB                                             FAULTP=C0&C2,                   .
349  .  CMB                                             FAULTN=C0$C3,                   .
350  .  RLS                                             LIST=WT1+THRM1+JMAX+JMIN+       .
351  .                                                  FAULTP+FAULTN,                  .
352  .  ***                                                                             .
353  .  SLA                                             INCLUDE=WT1,                    .
354  .  OLA                                             INCLUDE=WT1+SEISJ,LEVEL=D,      .
355  .  END                                                                             .
356  .  ***************************************************************************    .
357  .  ***************************************************************************    .
358  .  ***************************************************************************    .
```

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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                                                  ***  .
  3   .  ************************************************************************************  .
  4   .  ***    INPUT FILE FOR CALC REVISION DUE TO SGR REPLACEMENT ;MFWBL.INP                 .
  5   .  ***    DATA FILE FOR UNIT-1                                                           .
  6   .  ***    NOTE: ABR STIFFNESS & SUPPORT RELOCATION ARE INCORPORATED                      .
  7   .  ***    WESTINGHOUSE AXES: X WEST; Y VERT UP; Z NORTH                                  .
  8   .  ***    TIMEL1: LOCA DISP/ROT HISTORY RHRBRK4 FOR FW NOZZLE (W NODE 7632)               .
  9   .  ***    TIMEL2: LOCA DISP/ROT HISTORY RHRBRK15 FOR FW NOZZLE (W NODE 7632)              .
 10   .  ***    TIMEL3: LOCA DISP/ROT HISTORY RHRBRK12 FOR FW NOZZLE (W NODE 7632)              .
 11   .  ************************************************************************************  .
 12   .  ************************************************************************************  .
 13   .  CTL                                                     OUTPUT=SHORT,                 .
 14   .  HED                                                     TITLE=FEEDWATER "FW" SYSTEM - .
 15   .                                                          SG 1B TO M7,                  .
 16   .                                                          PROJNO=23438001,              .
 17   .                                                          PROBNO=2C159RC5035,           .
 18   .                                                          USER=PANI,                    .
 19   .                                                          UNITS=2,                      .
 20   .                                                          COEF=CS4,                     .
 21   .                                                          MODES=150,                    .
 22   .                                                          DAMP=.03,                     .
 23   .                                                          TPER=.0050,TZERO=0.,TFIN=.65, .
 24   .  RUN                                                     LDCASE=WT1(N+I),              .
 25   .  RUN                                                     LDCASE=TIMEL1(T),             .
 26   .  RUN                                                     LDCASE=TIMEL2(U),             .
 27   .  RUN                                                     LDCASE=TIMEL3(V),             .
 28   .  ***                                                                                    .
 29   .  ***    WT1   --- NORMAL OPERATING WEIGHT ANALYSIS                                      .
 30   .  ***                                                                                    .
 31   .  ***                                                                                    .
 32   .  ***                                                                                    .
 33   .  ***    CAD. ISO. 2C369PFW433 SHT. 01 REV. 4                                            .
 34   .  ***                                                                                    .
 35   .  ***    UNIT-1 LOOP B   MAIN FEEDWATER                                                  .
 36   .  ***                                                                                    .
 37   .  ***    SGR NOZZLE MATERIAL SA508 CL. 3A  SC=22.5 KSI; SH=22.5 KSI                      .
 38   .  ***    MATL: SA-508 GR. 2 CL. 2 FOR STRAIGHT SPOOL OF BECHTEL PIPE @ NOZZLE            .
 39   .  ***    MATL: SA-336 GR.F22 CL.;16" SCH.80 PIPE UP TO & INCLUDING TOP ELB OF RISER      .
 40   .  ***    MATL: SA-333 GR.6 AFTER TOP ELB OF RISER & REST; 16" SCH. 80/ 18" SCH. 80       .
 41   .  ****                                                                                   .
 42   .  SAP    002               82.719                                                        .
 43   .  ***       001;002,N02 ARE NODES ON SGR CL;SGR SURFACE; FW NOZ END RESPECTIVELY         .
 44   .  ***                                                                                    .
 45   .         002                                                                             .
 46   .         001  7.2674                 4.0284                                              .
 47   .                                                          OD=199.42,THI=4.71,           .
 48   .                                                          SC=22500,SH=22500,            .
 49   .                                                          E=27.8E6,                     .
 50   .                                                          LBS/FT=1.0,                   .
 51   .                                                          DPRESS=1.0,PPRESS=1.0,        .
 52   .                                                          CODE=SC3W75,CLASS=2,          .
 53   .  ***                                                                                    .
 54   .  ***    LINE NO. FW-1014-OA2                                                            .
 55   .  ANC    001                                                                         *N  .  WT1
```

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```
.                                            DTITLE=CENTER  SG,                            .
.                                              DX=.030,DY=.0300,DZ=.0300,*X   .  TAG NOT USED - CARD IGNORED
.                                              SRX=.00010,SRY=.00050,      *X   .  TAG NOT USED - CARD IGNORED
.                                              SRZ=.00010,                 *X   .  TAG NOT USED - CARD IGNORED
.                                            PHASE=SG,                     *X   .  TAG NOT USED - CARD IGNORED
.                                              DX=.009,DY=.0530,DZ=.0110,*R   .  TAG NOT USED - CARD IGNORED
.                                              SRX=.00053,SRY=.00262,      *R   .  TAG NOT USED - CARD IGNORED
.                                              SRZ=.00008,                 *R   .  TAG NOT USED - CARD IGNORED
.                                            PHASE=SG,                     *R   .  TAG NOT USED - CARD IGNORED
.                                              DX=.009,DY=.0530,DZ=.0110,*P   .  TAG NOT USED - CARD IGNORED
.                                              SRX=.00053,SRY=.00050,      *P   .  TAG NOT USED - CARD IGNORED
.                                              SRZ=.00008,                 *P   .  TAG NOT USED - CARD IGNORED
.                                            PHASE=SG,                     *P   .  TAG NOT USED - CARD IGNORED
.                                            ETI=1R122ESG201B,                  .
.   ****************                                                            .
.   ***    BEGIN    FW LINE REROUTE DUE TO SG REPLACEMENT/NEW FW NOZZLE LOCATION .
.   ****************                                                            .
.   RAD    001 1.0                           TDIS=B43,                     *T   .  TIMEL1
.   RAD    001          1.0                  TDIS=B42,                     *T   .  TIMEL1
.   RAD    001                   1.0         TDIS=B41,                     *T   .  TIMEL1
.   RAR    001 1.0                           TROT=B46,                     *T   .  TIMEL1
.   RAR    001          1.0                  TROT=B45,                     *T   .  TIMEL1
.   RAR    001                   1.0         TROT=B44,                     *T   .  TIMEL1
.  ,RAD    001 1.0                           TDIS=B53,                     *U   .  TIMEL2
.   RAD    001          1.0                  TDIS=B52,                     *U   .  TIMEL2
.   RAD    001                   1.0         TDIS=B51,                     *U   .  TIMEL2
.   RAR    001 1.0                           TROT=B56,                     *U   .  TIMEL2
.   RAR    001          1.0                  TROT=B55,                     *U   .  TIMEL2
.   RAR    001                   1.0         TROT=B54,                     *U   .  TIMEL2
.   RAD    001 1.0                           TDIS=B23,                     *V   .  TIMEL3
.   RAD    001          1.0                  TDIS=B22,                     *V   .  TIMEL3
.   RAD    001                   1.0         TDIS=B21,                     *V   .  TIMEL3
.   RAR    001 1.0                           TROT=B26,                     *V   .  TIMEL3
.   RAR    001          1.0                  TROT=B25,                     *V   .  TIMEL3
.   RAR    001                   1.0         TROT=B24,                     *V   .  TIMEL3
.       002003 -0.3440          -0.1907                                         .
.                                            OD=26.0,THICK=4.75,                .
.                                            LBS/FT=1176.5,                     .
.          03A -0.5860          -0.3248                                         .
.                                            OD=20.0,THICK=1.75,                .
.                                            LBS/FT=439.2,                      .
.          N02 -0.4490          -0.2489      SIF=1.502,                         .
.                                            OD=16.0,THICK=.843,                .
.                                            LBS/FT=210.66,                     .
.                                            DTITLE=FW NOZZLE,                  .
.                                            DPRESS=1350,PPRESS=1360,           .
.          004-1-11.551         -1-1.0600    JOINT=BTWELD,                      .
.          005-1-9              -0-11.640  L JOINT=BTWELD,                      .
.   ***                                      MAT=SA335 GR.P22                   .
.                                            SC=18800,SH=17817,                 .
.                                            E=30.6E6,                          .
.          007         -10-8-5/8      .      SEG=2,                             .
.   ***                                      MAT=SA333 GR.6 (C-MN-SI)           .
.                                            SC=15000,SH=15000,                 .
.                                            E=27.9E6,                          .
.                                            OD=16.0,THICK=.843,                .
.                                            LBS/FT=210.66,                     .
.   RAD    007  0.9272           -0.3746                                        .
.                                            AA=1997B3,ETI=EL5016,              .
.          008         -9-0             S    JOINT=BTWELD,SEG=2,                .
.   ***        SPD 009 LOCATED MIDWAY 2'-0" FROM EITHER ELBOW                   .
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```
117  .        009 1-10.35              0-8.76                   .
118  .                                                ADDWT=50,         .
119  .  SPD   009            1.0                                        .
120  .                                                ETI=HL5015,       .
121  .  ***        010 CHANGED TO SR ELBOW                              .
122  .        010 1-10.35              0-8.76       S  JOINT=BTWELD,      .
123  .        011            -2-10.5                                    .
124  .                                                ADDWT=902,        .
125  .  RAD   011 -1.0000                                               .
126  .                                                AA=1049E3,ETI=HL5014,  .
127  .  RAD   011 -0.6018              -0.7986                          .
128  .                                                AA=1478E3,ETI=HL5014,  .
129  .        11A            -1-7.5                   DTI=PLATFRM,      .
130  .        012            -5-4.5                   SEG=2,            .
131           013            [illegible]                                .
132  .        014            -5-10-5/16               SEG=2,            .
133  .                                                ADDWT=1133,       .
134  .  RAD   014 -0.9748              -0.2233                          .
135  .                                                AA=3208E3,ETI=HL5013,  .
136  .  RAD   014 -0.5402              -0.8415                          .
137  .                                                AA=1484E3,ETI=HL5013,  .
138  .        015            -1-7-13/16               DTI=CUT LOCN,JOINT=BTWELD,  .
139  .        016            -0-7-1/2                 JOINT=RED,        .
140  . ,***       END OF FW LINE REROUTE DUE TO SG REPLCEMENT/NEW FW NOZZLE LOCATION  .
141  .  ***************                                                 .
142  .        018            -0-7-1/2                 JOINT=BTWELD,     .
143  .                                                OD=18,THICK=.937, .
144  .                                                LBS/FT=264.22,    .
145  .        020            -0-9                     SIF=1.0,          .
146  .                                                ADDWT=25,         .
147  .        021            -1-0                     SIF=1.0,          .
148  .                                                ADDWT=20,         .
149  .        022            -1-0                     SIF=1.0,          .
150  .                                                ADDWT=50,         .
151  .        025            -4-0                L                       .
152  .                                                JOINT=BTWELD,     .
153  .        026 -3.73331             2.65883                          .
154  .                                                SIF=1.0,          .
155  .                                                ADDWT=25,         .
156  .        027 -0-2.95271           0-2.10289                        .
157  .                                                DTITLE=FW9014HL5012,  .
158  .                                                ADDWT=355,        .
159  .                                                SIF=2.1,          .
160  .  SNB   027 -.5801               -.8145                           .
161  .                                                AA=752.5E3,       .
162  .        030 -0-6.8218            0-4.8584        SIF=1.0,          .
163  .                                                ADDWT=20,         .
164  .        035 -0-2.44362           0-1.7403        SIF=1.0,          .
165  .                                                ADDWT=25,         .
166  .                                                DTITLE=1.5FW10730A2,  .
167  .        040 -0-8.1454            0-5.80107                        .
168  .                                                DTITLE=FW9014SH0001,  .
169  .                                                ADDWT=48,         .
170  .  ***SPD   040           1.0                                       .
171  .  SPR   040           1.0                        FORCE=1751.,AA=1.,         *I  .  WT1
172  .        042 -2.71513             1.933689                         .
173  .                                                DTITLE=FW9014HL5009,  .
174  .                                                SEGMNT=2,         .
175  .                                                ADDWT=879,        .
176  .  SNB   042           1.0                                         .
177  .                                                AA=897.6E03,      .
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```
178  .        13  -3.4024              2.42316
179  .
180  .
181  .
182  .  ***SPD   13           1.0
183  .  SPR   13           1.0
184  .        045-3.0206              2.15123    L
185  .
186  .        050            4-7-3/8
187  .
188  .
189  .
190  .  SNB   050 1.0
191  .
192  .        055            0-11-3/8
193  .
194  .
195  .  SNB   055 0.2980              -0.9540
196  .
197  .        060            5-7-5/8             L
198  .
199  .        065 -5-1-3/4
200  .
201  .        070 -2-10
202  .        080 -3-10
203  .
204  .
205  .
206  .  SNB   080                     1.0
207  .
208  .        085 -1-0
209  .
210  .  RAD   085           1.0000
211  .
212  .        086 -2-11-1/4
213  .        087 -2-3
214  .
215  .
216  .        090 -3-0                           L
217  .
218  .        095                     8-10-1/2
219  .
220  .
221  .
222  .  ***SPD   095           1.0
223  .  SPR   095           1.0
224  .        95B                     0-11-1/2
225  .
226  .
227  .
228  .  ***   SSC-20-180 SUPER STIFF CLAMP
229  .  RAD   95B 1.0
230  .
231  .        100                     5-11       L
232  .
233  .        10A -4-6
234  .
235  .
236  .  RAD   10A                     1.0
237  .
238  .        105-10-6-1/2
```

```
                                                .
                                                .
DTITLE=PW9014HL5008,                            .
SEGMNT=2,                                       .
ADDWT=105,                                      .
                                                .
FORCE=9157.,AA=1.,          *I  .  MT1          .
                                                .
JOINT=BTWELD,                                   .
                                                .
DTITLE=PW9014HL5001,                            .
ADDWT=988,                                      .
SIF=2.1,                                        .
                                                .
AA=813.8E03.                                    .
DTITLE=PW9014HL5002,                            .
SEGMNT=2,                                       .
ADDWT=879,                                      .
                                                .
AA=1151.0E03,                                   .
                                                .
JOINT=BTWELD,                                   .
DTITLE=SLEEVE#245,                              .
SEGMNT=2,                                       .
JOINT=BTWELD,SIF=1.8,                           .
                                                .
DTITLE=PW9014HL5003,                            .
ADDWT=730,                                      .
SIF=2.1,                                        .
                                                .
AA=1402E03,                                     .
                                                .
DTITLE=PW9014HL5006,                            .
                                                .
AA=1353E03,                                     .
                                                .
                                                .
DTITLE=SLEEVE#243,                              .
SEGMNT=2,                                       .
                                                .
JOINT=BTWELD,                                   .
                                                .
DTITLE=PW9014SH0004,                            .
SEGMNT=2,                                       .
ADDWT=92,                                       .
                                                .
FORCE=6756.,AA=1.,          *I  .  MT1          .
                                                .
DTITLE=PW9014HL5004,                            .
SIF=2.1,                                        .
ADDWT=0,                                        .
                                                .
                                                .
AA=852.8E03,                                    .
                                                .
JOINT=BTWELD,                                   .
DTITLE=PW9014HL5011,                            .
SEGMNT=2,                                       .
ADDWT=470,                                      .
                                                .
AA=1554E03,                                     .
SIF=1.8,                                        .
```

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```
.                                         SEGMNT=4,                          .
.         110 -0-4-5/8                    SIF=1.9,DTITLE=PEN M-7,            .
.  ANC    110                                                        *H  .  WT1
.  ANC    110                                                        *T  .  TIMEL1
.  ANC    110                                                        *U  .  TIMEL2
.  ANC    110                                                        *V  .  TIMEL3
.                                         COSAX=1.0,COSAZ=0,                 .
.                                         COSCX=0,COSCZ=1.0,                 .
.                                         AA=6.4E6,AB=6.4E6,AC=6.4E6,        .
.                                         ARA=7.45E9,ARB=7.45E9,             .
.                                         ARC=7.45E9,                        .
.  ****                                                                      .
.  ADD          7632BK4.MPL                                          *T  .  TIMEL1
.  ADD          7632B15.MPL                                          *U  .  TIMEL2
.  ADD          7632B12.MPL                                          *V  .  TIMEL3
.  ***********************************************************************  .
.  ****                                                                      .
.  ***                                                                       .
.  CMB                                    SEISL=TIMEL1|TIMEL2|TIMEL3,        .
.  CMB                                    LOCA=AMAX(TIMEL1,TIMEL2,           .
.                                         TIMEL3),                           .
.  STD                                    LIST=NONE,                         .
.  RLS                                    LIST=WT1+TIMEL1+TIMEL2+            .
.                                         TIMEL3+LOCA,                       .
.  OLA                                    INCLUD=WT1+SEISL,LEVEL=D,          .
.  ***********************************************************************  .
.  END                                                                       .
.  ************************************************************************* .
.  ************************************************************************* .
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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1B TO PEN# M7

ORIGINATOR PANI DATE

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ATTACHMENT 2.0 PIPE SUPPORT LOADS

	PAGES
This sheet (58)	1
DESIGN/FAULTED LOAD FOR LOOP B: (59-60)	2
WEIGHT/ THERMAL/SEISMIC/SAM (61-82)	22
WATER HAMMER (83-92)	10
JET (93-100)	8
LOCA (101-110)	10
TOTAL	53

Load Case Names:

WTX - Dead weight analysis
WTJx - Static Jet Impingement 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
JMAX - MAX. OF JET IMPINGEMENT
JMIN - MIN. OF JET IMPINGEMENT

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 B

SUPPORT MK #	DATA PT.	DIR.		WT.	THERMAL FAULTED **	JET LOAD	LOCA	WATER HAMMER	FAULTED LOAD WT+TH+ LOCA+JET	FAULTED LOAD WT+TH+ WH	FAULTED LOAD WT+TH+ SSE *	Design Load Exist P.S. Calc
FW-9014-HL-5012	C27	SKEW	POS	0		1442	8296	34872	9738	34872	3485	48410
		SNB	NEG			-1442	-8296	-34872	-9738	-34872	-3485	
FW-9014-SH-0001	C40	Y	POS			0	0	0	0	0	0	0
		SPD	NEG	-1751			0		-1751	-1751	-1751	
FW-9014-HL-5009	C42	Y	POS	0		3307	12892	92193	15999	92193	14478	137259
		SNB	NEG			-3307	-12892	-92193	-15999	-92193	-14478	
~~FW-9014-HL-5008~~	C43	Y	POS			0	0	0	0	0	0	0
		SPD	NEG	-9157			0		-9157	-9157	-9157	
FW-9014-HL-5001	C50	X	POS	0		8996	3960	61804	12956	61804	6074	69109
		SNB	NEG			-8996	-3960	-61804	-12956	-61804	-6074	
FW-9014-HL-5002	C55	SKEW	POS	0		1114	4016	37940	5130	37940	4979	77300
		SNB	NEG			-1114	-4016	-37940	-5130	-37940	-4979	
FW-9014-HL-5003	C60	Z	POS	0		2599	2758	60739	5357	60739	5803	68501
		SNB	NEG			-2599	-2758	-60739	-5357	-60739	-5803	
FW-9014-HL-5006	C65	SKEW	POS		7149	2677	4369	33781	14215	40910	8492	19500
		RAD	NEG	-4452	0	-2677	-4369	-33781	-11548	-38243	-8596	
FW-9014-SH-5004	C95	Y	POS			0	0	0	0	0	0	0
		SPD	NEG	-6756			0		-6756	-6756	-6756	
FW-9014-HL-5004	95B	X	POS		25492	20718	1162	53922	47372	79414	45153	72000
		RAD	NEG	-79	-1826	-20718	-1162	-53922	-23785	-55827	-26174	
FW-9014-HL-5011	10A	Z	POS	101	651	1778	1902	69053	4432	69805	10072	144070
		RAD	NEG		-10450	-1778	-1902	-69053	-14130	-79503	-17828	
FW-9014-HL-5016	C07		POS	431	14254	142	27695	33126	42522	47811	35958	N/A
		RAD	NEG		-4780	-142	-27695	-33126	-32617	-37906	-22478	N/A
FW-9014-HL-5015	C09		POS			0	0	0	0	0	0	
		SPR	NEG	-14532			0		-14532	-14532	-14532	N/A
FW-1014-HL-5014	C11	(N-S)	POS	267	9927	650	27900	15877	38744	25871	20451	N/A
		RAD	NEG		0	-650	-27900	-15877	-28550	-15877	-8838	N/A
FW-1014-HL-5014	C11	N-E	POS		15289	569	21738	41797	37596	57066	21066	N/A
		RAD	NEG	-441	0	-569	-21738	-41797	-22748	-42238	-6659	N/A
FW-1014-HL-5013 (-0.97, 0, -0.22)	C14		POS		0	2559	21255	51522	23814	51522	9068	N/A
		RAD	NEG	-16	-33842	-2559	-21255	-51522	-57872	-85380	-42981	N/A
FW-1014-HL-5013 (-0.52, 0, -0.84)	C14		POS	538	17218	3088	14214	34214	35058	51970	22908	N/A
		RAD	NEG		0	-3088	-14214	-34214	-17302	-34214	-4814	N/A

See Notes on the following sheet

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FRCM S.G. 1B TO PEN.# M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

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# RN0321 Dt. 10/27/97 for pipe displacements and individual & combined loads

3. WT+TH+LOCA + JET:
   Refer to Computer Run# BO4659 Dt. 06/11/98 for pipe displacements and individual loads (Jet)
   Refer to Computer Run# LJ3226 Dt. 05/21/98 for pipe displacements and individual loads (LOCA).

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. HL5004 node 95B, HL5016 NODE 007, HL5014 NODE 011).
   Refer to Computer Run# HP0707 Dt. 06/17/98 for pipe displacements and individual & combined loads.

:TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
:PROJECT NUMBER : 23438001
:PROBLEM NUMBER : 2C159RC5035
USER : PANI
LOAD CASE :

DATE	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
00	ANC		1R122HSG201B									
		WT1		2.	-209	174	454.	2223.	1733.	.000	.000	.000
		THRM1		5674.	-4496.	8453.	-144168.	36966.	101196.	-.637	1.971	-1.956
		THRM2		2481.	-4675.	9507.	-147815.	76939.	89723.	-.637	1.971	-1.956
		THRM3		-1932.	-4925.	10963.	-152859.	132181.	73867.	-.637	1.971	-1.956
		THRM4		-4637.	-5078.	11856.	-155951.	166025.	64153.	-.637	1.971	-1.956
		THRM5		6082.	-4473.	8318.	-143697.	31846.	102666.	-.637	1.971	-1.956
		THRM6		1708.	-4719.	9762.	-148699.	86625.	86943.	-.637	1.971	-1.956
		THRM7		-6407.	-5178.	12440.	-157975.	188198.	57789.	-.637	1.971	-1.956
		DBA		588.	686.	582.	5568.	2000.	9550.	.000	.000	.000
		SEISA1		1480.	6995.	1413.	48387.	15391.	83802.	.000	.000	.000
		SEISA2		2974.	14317.	2880.	99252.	32008.	171908.	.000	.000	.000
		SAM1		6395.	817.	7054.	34107.	84249.	28965.	.229	.017	.252
		SAM2		10077.	1635.	11138.	55723.	133164.	48763.	.359	.052	.406
07	RAD		HL5016									
		WT1		400.	0.	-161.	0.	0.	0.	.002	.002	.004
		THRM1		-3769.	0.	1519.	0.	0.	0.	-.545	1.360	-1.342
		THRM2		1498.	0.	-605.	0.	0.	0.	-.500	1.501	-1.241
		THRM3		8764.	0.	-3541.	0.	0.	0.	-.440	1.696	-1.101
		THRM4		13216.	0.	-5339.	0.	0.	0.	-.402	1.815	-1.015
		THRM5		-4432.	0.	1791.	0.	0.	0.	-.550	1.342	-1.355
		THRM6		2771.	0.	-1120.	0.	0.	0.	-.490	1.535	-1.216
		THRM7		16132.	0.	-6517.	0.	0.	0.	-.378	1.893	-.958
		DBA		978.	0.	395.	0.	0.	0.	.006	.003	.015
		SEISA1		1906.	0.	770.	0.	0.	0.	.015	.017	.036
		SEISA2		3654.	0.	1476.	0.	0.	0.	.031	.035	.075
		SAM1		10401.	0.	4202.	0.	0.	0.	.051	.025	.123
		SAM2		16407.	0.	6629.	0.	0.	0.	.081	.057	.196
09	SPD		HL5015									
		WT1		0.	-14532.	0.	0.	0.	0.	.008	.000	.005
		THRM1								-.055	1.065	-.271
		THRM2								-.049	1.313	-.219
		THRM3								-.041	1.656	-.147
		THRM4								-.036	1.866	-.104
		THRM5								-.055	1.033	-.278
		THRM6								-.048	1.373	-.207
		THRM7								-.033	2.004	-.075
		DBA								.002	.006	.020
		SEISA1								.008	.030	.022
		SEISA2								.015	.063	.046
		SAM1								.026	.023	.043
		SAM2								.041	.054	.067

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC501S
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
011	RAD		HLS014									
		WT1		-267.	0	0	0.	0.	0.	.000	-.011	.001
		THRM1		-2025.	0.	0.	0.	0.	0.	-.002	1.013	-.011
		THRM2		-4470.	0.	0.	0.	0.	0.	-.004	1.297	-.009
		THRM3		-7851.	0.	0.	0.	0.	0.	-.007	1.689	-.005
		THRM4		-9327.	0.	0.	0.	0.	0.	-.009	1.929	-.003
		THRM5		-1716.	0.	0.	0.	0.	0.	-.002	.976	-.012
		THRM6		-5060.	0.	0.	0.	0.	0.	-.005	1.366	-.008
		THRM7		-11280.	0.	0.	0.	0.	0.	-.011	2.086	-.001
		DBA		195.	0.	0.	0.	0.	0.	.000	.012	.000
		SEISA1		1062.	0.	0.	0.	0.	0.	.001	.049	.003
		SEISA2		2126.	0.	0.	0.	0.	0.	.002	.101	.005
		SAM1		5483.	0.	0.	0.	0.	0.	.005	.028	.006
		SAM2		8647.	0.	0.	0.	0.	0.	.008	.058	.009
011	RAD		HLS014									
		WT1		265.	0.	352.	0.	0.	0.	.000	-.011	.001
		THRM1		-9116.	0.	-12097.	0.	0.	0.	-.002	1.013	-.011
		THRM2		-8443.	0.	-11204.	0.	0.	0.	-.004	1.297	-.009
		THRM3		-7511.	0.	-9968.	0.	0.	0.	-.007	1.689	-.005
		THRM4		-6938.	0.	-9208.	0.	0.	0.	-.009	1.929	-.003
		THRM5		-9201.	0.	-12210.	0.	0.	0.	-.002	.976	-.012
		THRM6		-8280.	0.	-10988.	0.	0.	0.	-.005	1.366	-.008
		THRM7		-6566.	0.	-8714.	0.	0.	0.	-.011	2.086	-.001
		DBA		63.	0.	84.	0.	0.	0.	.000	.012	.000
		SEISA1		1396.	0.	1853.	0.	0.	0.	.001	.049	.003
		SEISA2		2775.	0.	3682.	0.	0.	0.	.002	.101	.005
		SAM1		1584.	0.	2102.	0.	0.	0.	.005	.028	.006
		SAM2		2511.	0.	3332.	0.	0.	0.	.008	.058	.009
014	RAD		HLS013									
		WT1		15.	0.	4.	0.	0.	0.	.000	-.012	-.001
		THRM1		32313.	0.	7402.	0.	0.	0.	.016	.401	-.024
		THRM2		27098.	0.	6208.	0.	0.	0.	.013	.857	-.019
		THRM3		19904.	0.	4559.	0.	0.	0.	.009	1.488	-.012
		THRM4		15514.	0.	3554.	0.	0.	0.	.007	1.874	-.008
		THRM5		32988.	0.	7557.	0.	0.	0.	.016	.342	-.024
		THRM6		25028.	0.	5916.	0.	0.	0.	.012	.968	-.017
		THRM7		12611.	0.	2889.	0.	0.	0.	.005	2.127	-.005
		DBA		2467.	0.	565.	0.	0.	0.	.001	.012	.001
		SEISA1		4262.	0.	976.	0.	0.	0.	.002	.050	.003
		SEISA2		8772.	0.	2009.	0.	0.	0.	.004	.103	.006
		SAM1		744.	0.	170.	0.	0.	0.	.001	.028	.002
		SAM2		1337.	0.	306.	0.	0.	0.	.001	.058	.003

2C159RC5035 RESTRAINT LOAD SUMMARY ME101/M4 GAEU/54 (RN0321) 10/27/97 RN0321 ~~PAGE 001~~

TITLE : FEEDWATER "FW" SYSTEM - SQ 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		RL5013									
		WT1		-291.	0.	-452.	0.	0.	0.	.000	.000	.000
		THRM1		-9027.	0.	-14062.	0.	0.	0.	.016	.401	-.024
		THRM2		-6911.	0.	-10765.	0.	0.	0.	.013	.857	-.019
		THRM3		-3991.	0.	-6217.	0.	0.	0.	.009	1.488	-.012
		THRM4		-2210.	0.	-3443.	0.	0.	0.	.007	1.874	-.008
		THRM5		-9301.	0.	-14489.	0.	0.	0.	.016	.342	-.024
		THRM6		-6395.	0.	-9962.	0.	0.	0.	.012	.968	-.017
		THRM7		-1032.	0.	-1607.	0.	0.	0.	.005	2.127	-.005
		DBA		162.	0.	253.	0.	0.	0.	.001	.012	.001
		$EISA1		1207.	0.	1880.	0.	0.	0.	.002	.050	.003
		$EISA2		2440.	0.	3800.	0.	0.	0.	.004	.103	.006
		$AM1		817.	0.	2273.	0.	0.	0.	.001	.028	.002
		$AM2		1339.	0.	2086.	0.	0.	0.	.001	.058	.003
040	SPR		FW9014SH0001		-1751 lb 2/20/98							
		WT1		0.		0.	0.	0.	0.	.009	-.021	-.009
		THRM1								.102	-.307	-.310
		THRM2								.190	.213	-.269
		THRM3								.311	.931	-.213
		THRM4								.385	1.370	-.179
		THRM5								.091	-.374	-.315
		THRM6								.211	.340	-.259
		THRM7								.433	1.660	-.156
		DBA								.120	.047	.090
		$EISA1								.032	.017	.027
		$EISA2								.065	.036	.057
		$AM1								.008	.010	.005
		$AM2								.016	.022	.011
13	SPR		FW9014HL5008		-9157 lb 2/20/98							
		WT1		0.		0.	0.	0.	0.	.007	-.038	-.013
		THRM1								-.258	-.503	-.265
		THRM2								-.051	-.091	-.212
		THRM3								.236	.478	-.138
		THRM4								.411	.826	-.093
		THRM5								-.285	-.556	-.272
		THRM6								.000	.009	-.199
		THRM7								.526	1.055	-.063
		DBA								.201	.077	.203
		$EISA1								.026	.044	.039
		$EISA2								.052	.090	.081
		$AM1								.009	.009	.007
		$AM2								.015	.019	.014

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
065	RAD		PW9014HL5006									
		WT1		0.	-9993.	0.	0.	0.	0.	.001	-.003	.006
		THRM1		0.	3014.	0.	0.	0.	0.	-.668	.002	-.980
		THRM2		0.	4295.	0.	0.	0.	0.	-.492	.003	-.699
		THRM3		0.	6066.	0.	0.	0.	0.	-.277	.004	-.312
		THRM4		0.	7149.	0.	0.	0.	0.	-.146	.005	-.076
		THRM5		0.	2849.	0.	0.	0.	0.	-.668	.002	-1.016
		THRM6		0.	4607.	0.	0.	0.	0.	-.454	.003	-.631
		THRM7		0.	7861.	0.	0.	0.	0.	-.059	.006	.080
		DBA		0.	1545.	0.	0.	0.	0.	.307	.001	.216
		SEISA1		0.	2829.	0.	0.	0.	0.	.025	.002	.001
		SEISA2		0.	5005.	0.	0.	0.	0.	.048	.004	.002
		SAM1		0.	566.	0.	0.	0.	0.	.010	.000	.002
		SAM2		0.	1047.	0.	0.	0.	0.	.019	.001	.003
095	SPR		PW9014SH0004									
		WT1		0.	-6756 GB 2/20/98	0.	0.	0.	0.	.000	.016	.000
		THRM1								-.089	.004	-.502
		THRM2								-.068	-.042	-.363
		THRM3								-.039	-.106	-.170
		THRM4								-.021	-.145	-.053
		THRM5								-.092	.010	-.520
		THRM6								-.063	-.054	-.329
		THRM7								-.010	-.171	.024
		DBA								.016	.133	.097
		SEISA1								.005	.041	.005
		SEISA2								.010	.064	.011
		SAM1								.002	.004	.011
		SAM2								.004	.008	.020
958	RAD		PW9014HL5004									
		WT1		-79.	0.	0.	0.	0.	0.	.000	.014	.000
		THRM1		24461.	0.	0.	0.	0.	0.	.029	.007	-.461
		THRM2		16293.	0.	0.	0.	0.	0.	.019	-.035	-.333
		THRM3		5045.	0.	0.	0.	0.	0.	.006	-.093	-.157
		THRM4		-1626.	0.	0.	0.	0.	0.	-.002	-.128	-.049
		THRM5		25492.	0.	0.	0.	0.	0.	.030	.013	-.477
		THRM6		16311.	0.	0.	0.	0.	0.	.017	-.045	-.302
		THRM7		-6356.	0.	0.	0.	0.	0.	-.007	-.151	.022
		DBA		19739.	0.	0.	0.	0.	0.	.023	.141	.097
		SEISA1		3116.	0.	0.	0.	0.	0.	.004	.041	.005
		SEISA2		5919.	0.	0.	0.	0.	0.	.007	.062	.011
		SAM1		4332.	0.	0.	0.	0.	0.	.005	.003	.011
		SAM2		7761.	0.	0.	0.	0.	0.	.009	.007	.020

: FEEDWATER "FW" SYSTEM - SG 1B TO M7
: NUMBER : 23438001
: ON NUMBER : 2C159RC5035
: PANI
: CASE :

PAGE TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
104 RAD		FW9014HL5011									
	WT1		0.	0.	101.	0.	0.	0.	.000	-.008	.000
	THRM1		0.	0.	-10023.	0.	0.	0.	.497	-.014	-.006
	THRM2		0.	0.	-6712.	0.	0.	0.	.367	-.028	-.004
	THRM3		0.	0.	-2142.	0.	0.	0.	.189	-.046	-.001
	THRM4		0.	0.	651.	0.	0.	0.	.080	-.057	.000
	THRM5		0.	0.	-10450.	0.	0.	0.	.513	-.013	-.007
	THRM6		0.	0.	-5907.	0.	0.	0.	.336	-.031	-.004
	THRM7		0.	0.	2492.	0.	0.	0.	.008	-.064	.002
	DBA		0.	0.	4912.	0.	0.	0.	.264	.207	.003
	SEISA1		0.	0.	2108.	0.	0.	0.	.000	.034	.001
	SEISA2		0.	0.	4870.	0.	0.	0.	.001	.048	.003
	SAM1		0.	0.	3312.	0.	0.	0.	.026	.004	.002
	SAM2		0.	0.	5677.	0.	0.	0.	.047	.007	.004
110 ANC		FEN M-7									
	WT1		-46.	-2414.	-18.	4814.	26.	-7955.	.000	.000	.000
	THRM1		-38500.	1483.	18008.	-2333.	-51333.	25639.	.033	-.061	.008
	THRM2		-27567.	380.	13572.	-8225.	-36536.	16397.	.035	-.062	.007
	THRM3		-12428.	-1141.	6344.	-16361.	-16111.	3619.	.037	-.062	.006
	THRM4		-3193.	-2071.	1929.	-21339.	-3635.	-4155.	.039	-.062	.006
	THRM5		-39914.	1624.	19484.	-1576.	-53243.	26831.	.033	-.061	.008
	THRM6		-24882.	112.	12298.	-9655.	-32936.	14149.	.035	-.062	.007
	THRM7		2898.	-2683.	-983.	-24611.	4594.	-9293.	.039	-.062	.005
	DBA		18082.	859.	5378.	7963.	1465.	15275.	.266	.235	.037
	SEISA1		1457.	2149.	493.	5388.	808.	21565.	.000	.000	.000
	SEISA2		2799.	3132.	1038.	10668.	1698.	30664.	.000	.000	.000
	SAM1		3464.	65.	2893.	960.	23347.	674.	.026	.003	.035
	SAM2		6202.	122.	4972.	1943.	40052.	1263.	.047	.006	.059
027 SNB		FW9014HL5012									
	WT1								.009	-.019	-.009
	THRM1								.188	-.240	-.322
	THRM2								.246	.300	-.284
	THRM3								.328	1.045	-.232
	THRM4								.377	1.501	-.201
	THRM5								.180	-.309	-.326
	THRM6								.261	.431	-.275
	THRM7								.410	1.801	-.180
	DBA								.100	.038	.062
	SEISA1		941.	0.	1321.	0.	0.	0.	.033	.027	.025
	SEISA2		1965.	0.	2759.	0.	0.	0.	.068	.057	.052
	SAM1		290.	0.	407.	0.	0.	0.	.008	.016	.006
	SAM2		477.	0.	670.	0.	0.	0.	.015	.032	.012

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS035
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
042	SNB		FW3014HL5009									
		WT1								.006	-.047	-.011
		THRM1								-.057	-.413	-.289
		THRM2								.084	.064	-.243
		THRM3								.279	.723	-.178
		THRM4								.398	1.136	-.139
		THRM5								-.075	-.475	-.295
		THRM6								.118	.180	-.231
		THRM7								.476	1.391	-.113
		DBA								.157	.062	.142
		SEISA1		0.	6652.	0.	0.	0.	0.	.029	.007	.032
		SEISA2		0.	14272.	0.	0.	0.	0.	.059	.016	.067
		SAM1		0.	1238.	0.	0.	0.	0.	.009	.001	.005
		SAM2		0.	2425.	0.	0.	0.	0.	.016	.003	.011
050	SNB		FW3014HL5001									
		WT1								-.001	-.053	.001
		THRM1								-.318	-.297	-.387
		THRM2								-.159	-.015	-.268
		THRM3								.061	.373	-.103
		THRM4								.196	.611	-.003
		THRM5								-.339	-.333	-.402
		THRM6								-.120	.053	-.239
		THRM7								.284	.760	.063
		DBA								.259	.081	.262
		SEISA1		2977.	0.	0.	0.	0.	0.	.004	.079	.010
		SEISA2		6509.	0.	0.	0.	0.	0.	.007	.162	.020
		SAM1		1493.	0.	0.	0.	0.	0.	.002	.016	.001
		SAM2		2559.	0.	0.	0.	0.	0.	.003	.036	.003
055	SNB		FW3014HL5002									
		WT1								-.002	-.053	.004
		THRM1								-.284	-.256	-.423
		THRM2								-.148	.014	-.291
		THRM3								.039	.387	-.108
		THRM4								.154	.615	.004
		THRM5								-.301	-.291	-.441
		THRM6								-.115	.079	-.259
		THRM7								.229	.765	.077
		DBA								.266	.081	.264
		SEISA1		648.	0.	2075.	0.	0.	0.	.006	.079	.003
		SEISA2		1437.	0.	4600.	0.	0.	0.	.012	.162	.007
		SAM1		204.	0.	654.	0.	0.	0.	.003	.016	.001
		SAM2		373.	0.	1193.	0.	0.	0.	.005	.036	.002

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS035
USER : PANI
LOAD CASE :

DATA TYPE PT	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
080 SNB		FW9014HLSD03									
	WT1								.001	-.000	.001
	THRM1								-.606	.009	-.966
	THRM2								-.462	.022	-.688
	THRM3								-.263	.040	-.303
	THRM4								-.142	.051	-.069
	THRM5								-.624	.007	-1.002
	THRM6								-.427	.025	-.620
	THRM7								-.062	.058	.086
	DEA								.307	.006	.225
	SEISA1		0.	0.	2581.	0.	0.	0.	.025	.008	.002
	SEISA2		0.	0.	5361.	0.	0.	0.	.048	.016	.004
	SAM1		0.	0.	1245.	0.	0.	0.	.010	.002	.001
	SAM2		0.	0.	2222.	0.	0.	0.	.019	.004	.002

2C159RC5035 RESTRAINT LOAD SUMMARY ME101/N4 GABU/S4 (RN0321) 10/27/97 RN0321 ~~PAGE 894~~

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO N7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
USER : PANI
LOAD CASE :

DATA PT	TYPE	LOAD	TITLE	FA	FB	FC	MA	MB	MC	COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
				LOCAL FORCES (LB)			LOCAL MOMENTS (FT-LB)			DIRECTION COSINES								
[illegible]	[illegible]		[illegible]															
		WT1		-87	-209	-153	432	2352	1737	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM1		-9060	-4496	-4642	77028	36966	-158401	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM2		-6779	-4675	-7113	85783	76939	-150135	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM3		-3626	-4925	-10525	97882	132181	-138713	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM4		-1693	-5078	-12617	105296	166025	-131716	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM5		-9352	-4473	-4327	75907	31846	-159459	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM6		-6227	-4719	-7711	87904	86625	-148133	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM7		-427	-5178	-13987	110152	188198	-127131	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		DBA		438	646	422	453	2000	10668	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		SEISA1		1150	6995	978	3143	15391	94073	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		SEISA2		2274	14317	2032	6538	32008	192928	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		SAM1		4100	817	5792	29794	84249	16602	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		SAM2		6443	1635	9163	47358	133164	29503	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
007	RAD		HL5016															
		WT1		431	0	0	0	0	0	.93	.00	-.37						
		THRM1		-4055	0	0	0	0	0	.93	.00	-.37						
		THRM2		1615	0	0	0	0	0	.93	.00	-.37						
		THRM3		9452	0	0	0	0	0	.93	.00	-.37						
		THRM4		14254	0	0	0	0	0	.93	.00	-.37						
		THRM5		-4780	0	0	0	0	0	.93	.00	-.37						
		THRM6		2989	0	0	0	0	0	.93	.00	-.37						
		THRM7		17398	0	0	0	0	0	.93	.00	-.37						
		DBA		1055	0	0	0	0	0	.93	.00	-.37						
		SEISA1		2056	0	0	0	0	0	.93	.00	-.37						
		SEISA2		3941	0	0	0	0	0	.93	.00	-.37						
		SAM1		11218	0	0	0	0	0	.93	.00	-.37						
		SAM2		17695	0	0	0	0	0	.93	.00	-.37						
009	SPD		HL5015															
		WT1		-14532	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1																
		SEISA2																
		SAM1																
		SAM2																

: FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS035
: PAM1
CASE :

			LOCAL FORCES(LB)			LOCAL MOMENTS (FT-LB)		DIRECTION COSINES								
:A	TYPE	LOAD TITLE	FA	FB	FC	MA	MB	MC	COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
	RAD	HLS011															
		WT1	267	0	0	0	0	0	-1.00	.00	.00						
		THRM1	2025	0	0	0	0	0	-1.00	.00	.00						
		THRM2	4470	0	0	0	0	0	-1.00	.00	.00						
		THRM3	7851	0	0	0	0	0	-1.00	.00	.00						
		THRM4	9927	0	0	0	0	0	-1.00	.00	.00						
		THRM5	1714	0	0	0	0	0	-1.00	.00	.00						
		THRM6	5060	0	0	0	0	0	-1.00	.00	.00						
		THRM7	11280 *	0	0	0	0	0	-1.00	.00	.00						
		DBA	195	0	0	0	0	0	-1.00	.00	.00						
		SEISA1	1062	0	0	0	0	0	-1.00	.00	.00						
		SEISA2	2126	0	0	0	0	0	-1.00	.00	.00						
		SAM1	5483	0	0	0	0	0	-1.00	.00	.00						
		SAM2	8647	0	0	0	0	0	-1.00	.00	.00						
011	RAD	HLS014															
		WT1	-441	0	0	0	0	0	-.60	.00	-.80						
		THRM1	15147	0	0	0	0	0	-.60	.00	-.80						
		THRM2	14029	0	0	0	0	0	-.60	.00	-.80						
		THRM3	12481	0	0	0	0	0	-.60	.00	-.80						
		THRM4	11529	0	0	0	0	0	-.60	.00	-.80						
		THRM5	15289	0	0	0	0	0	-.60	.00	-.80						
		THRM6	13759	0	0	0	0	0	-.60	.00	-.80						
		THRM7	10911	0	0	0	0	0	-.60	.00	-.80						
		DBA	105	0	0	0	0	0	-.60	.00	-.80						
		SEISA1	2320	0	0	0	0	0	-.60	.00	-.80						
		SEISA2	4611	0	0	0	0	0	-.60	.00	-.80						
		SAM1	2633	0	0	0	0	0	-.60	.00	-.80						
		SAM2	4172	0	0	0	0	0	-.60	.00	-.80						
014	RAD	HLS013															
		WT1	-16	0	0	0	0	0	-.97	.00	-.22						
		THRM1	-33150	0	0	0	0	0	-.97	.00	-.22						
		THRM2	-27800	0	0	0	0	0	-.97	.00	-.22						
		THRM3	-20419	0	0	0	0	0	-.97	.00	-.22						
		THRM4	-15916	0	0	0	0	0	-.97	.00	-.22						
		THRM5	-33842	0	0	0	0	0	-.97	.00	-.22						
		THRM6	-26497	0	0	0	0	0	-.97	.00	-.22						
		THRM7	-12938	0	0	0	0	0	-.97	.00	-.22						
		DBA	2531	0	0	0	0	0	-.97	.00	-.22						
		SEISA1	4372	0	0	0	0	0	-.97	.00	-.22						
		SEISA2	8999	0	0	0	0	0	-.97	.00	-.22						
		SAM1	763	0	0	0	0	0	-.97	.00	-.22						
		SAM2	1371	0	0	0	0	0	-.97	.00	-.22						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJE . NUMBER : 23438001
PROBL M NUMBER : 2C159RC5035
USER : PAMI
LOAD ASE :

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
014	RAD		HL5013															
		WT1		538	0	0	0	0	0	-.54	.00	-.84						
		THRM1		16711	0	0	0	0	0	-.54	.00	-.84						
		THRM2		12793	0	0	0	0	0	-.54	.00	-.84						
		THRM3		7388	0	0	0	0	0	-.54	.00	-.84						
		THRM4		4091	0	0	0	0	0	-.54	.00	-.84						
		THRM5		17218	0	0	0	0	0	-.54	.00	-.84						
		THRM6		11838	0	0	0	0	0	-.54	.00	-.84						
		THRM7		1910	0	0	0	0	0	-.54	.00	-.84						
		DBA		301	0	0	0	0	0	-.54	.00	-.84						
		SEISA1		2234	0	0	0	0	0	-.54	.00	-.84						
		SEISA2		4516	0	0	0	0	0	-.54	.00	-.84						
		SAM1		1513	0	0	0	0	0	-.54	.00	-.84						
		SAM2		2479	0	0	0	0	0	-.54	.00	-.84						
040	SPR		FW9014SH0001	-1752 CB 2/20/98														
		WT1			0	0	0	0	0	.00	1.00	.00						
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1																
		SEISA2																
		SAM1																
		SAM2																
13	SPR		FW9014HL5008	-9157 CB 2/20/98														
		WT1			0	0	0	0	0	.00	1.00	.00						
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1																
		SEISA2																
		SAM1																
		SAM2																

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
095	RAD		FW9014HL5006															
		WT1		-4482	0	0	0	0	0	.00	1.00	.00						
		THRM1		3014	0	0	0	0	0	.00	1.00	.00						
		THRM2		4295	0	0	0	0	0	.00	1.00	.00						
		THRM3		6066	0	0	0	0	0	.00	1.00	.00						
		THRM4		7149	0	0	0	0	0	.00	1.00	.00						
		THRM5		2849	0	0	0	0	0	.00	1.00	.00						
		THRM6		4607	0	0	0	0	0	.00	1.00	.00						
		THRM7		7861	0	0	0	0	0	.00	1.00	.00						
		DBA		1545	0	0	0	0	0	.00	1.00	.00						
		SEISA1		2829	0	0	0	0	0	.00	1.00	.00						
		SEISA2		5005	0	0	0	0	0	.00	1.00	.00						
		SAM1		566	0	0	0	0	0	.00	1.00	.00						
		SAM2		1047	0	0	0	0	0	.00	1.00	.00						
095	SPR		FW9014SH0004															
		WT1		-6756 GB 2/20/98	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1																
		SEISA2																
		SAM1																
		SAM2																
95B	RAD		FW9014HL5006															
		WT1		-79	0	0	0	0	0	1.00	.00	.00						
		THRM1		24461	0	0	0	0	0	1.00	.00	.00						
		THRM2		26293	0	0	0	0	0	1.00	.00	.00						
		THRM3		5045	0	0	0	0	0	1.00	.00	.00						
		THRM4		-1826	0	0	0	0	0	1.00	.00	.00						
		THRM5		25492	0	0	0	0	0	1.00	.00	.00						
		THRM6		14311	0	0	0	0	0	1.00	.00	.00						
		THRM7		-6356	0	0	0	0	0	1.00	.00	.00						
		DBA		19739	0	0	0	0	0	1.00	.00	.00						
		SEISA1		3116	0	0	0	0	0	1.00	.00	.00						
		SEISA2		5919	0	0	0	0	0	1.00	.00	.00						
		SAM1		4332	0	0	0	0	0	1.00	.00	.00						
		SAM2		7761	0	0	0	0	0	1.00	.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
10A	RAD		FW9014HL5011															
		WT1		101	0	0	0	0	0	.00	.00	1.00						
		THRM1		-10023	0	0	0	0	0	.00	.00	1.00						
		THRM2		-6712	0	0	0	0	0	.00	.00	1.00						
		THRM3		-2142	0	0	0	0	0	.00	.00	1.00						
		THRM4		651	0	0	0	0	0	.00	.00	1.00						
		THRM5		-10450	0	0	0	0	0	.00	.00	1.00						
		THRM6		-5907	0	0	0	0	0	.00	.00	1.00						
		THRM7		2492	0	0	0	0	0	.00	.00	1.00						
		DBA		4912	0	0	0	0	0	.00	.00	1.00						
		SEISA1		2308	0	0	0	0	0	.00	.00	1.00						
		SEISA2		4870	0	0	0	0	0	.00	.00	1.00						
		SAM1		3312	0	0	0	0	0	.00	.00	1.00						
		SAM2		5677	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-7															
		WT1		-46	-2414	-18	4814	26	-7955	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM1		-38500	1482	18808	-2333	-51333	25639	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM2		-27547	380	13572	-8226	-36536	16397	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM3		-12428	-1141	6344	-16361	-16111	3639	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM4		-3193	-2071	1929	-21339	-3635	-4155	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM5		-39914	1624	19484	-1576	-53243	26831	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM6		-24882	112	12298	-9655	-32936	14149	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM7		2896	-2683	-983	-24611	4596	-9293	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		DBA		18082	859	5378	7963	2465	15275	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SEISA1		1457	2149	493	5388	808	21565	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SEISA2		2799	3132	1038	10668	1698	30664	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SAM1		1464	65	2893	960	23347	674	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		SAM2		6202	122	4972	1943	40052	1263	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
827	SNB		FW9014HL5012															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		1622	0	0	0	0	0	-.58	.00	-.81						
		SEISA2		3387	0	0	0	0	0	-.58	.00	-.81						
		SAM1		499	0	0	0	0	0	-.58	.00	-.81						
		SAM2		822	0	0	0	0	0	-.58	.00	-.81						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
050	SNB		FW9014HL5001															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		6652	0	0	0	0	0	.00	1.00	.00						
		SEISA2		14272	0	0	0	0	0	.00	1.00	.00						
		SAM1		1238	0	0	0	0	0	.00	1.00	.00						
		SAM2		2425	0	0	0	0	0	.00	1.00	.00						
050	SNB		FW9014HL5001															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		2977	0	0	0	0	0	1.00	.00	.00						
		SEISA2		6509	0	0	0	0	0	1.00	.00	.00						
		SAM1		1493	0	0	0	0	0	1.00	.00	.00						
		SAM2		2559	0	0	0	0	0	1.00	.00	.00						
055	SNB		FW9014HL5002															
		WT1																
		THRM1																
		THRM2																
		THRM3																
		THRM4																
		THRM5																
		THRM6																
		THRM7																
		DBA																
		SEISA1		2174	0	0	0	0	0	.30	.00	-.95						
		SEISA2		4819	0	0	0	0	0	.30	.00	-.95						
		SAM1		685	0	0	0	0	0	.30	.00	-.95						
		SAM2		1250	0	0	0	0	0	.30	.00	-.95						

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TITL. : FEEDWATER "FW" SYSTEM - SG 1B TO N7
PROJ· . NUMBER : 23438001
PROB' Y NUMBER : 2C159RC5035
USER : PANI
LOAD BASE :

DATA TYPE FT	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 SNS		FW9014HL5003															
	WT1																
	THRM1																
	THRM2																
	THRM3																
	THRM4																
	THRM5																
	THRM6																
	THRM7																
	DBA																
	SEISA1		2581	0	0	0	0	0	.00	.00	1.00						
	SEISA2		5361	0	0	0	0	0	.00	.00	1.00						
	SAM1		1245	0	0	0	0	0	.00	.00	1.00						
	SAM2		2222	0	0	0	0	0	.00	.00	1.00						

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2C159RC5035 RESTRAINT LOAD SUMMARY ME101/N4 GAEU/54 (RN0321) 10/27/97 RN0321 PAGE 301

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO N7
PROJECT NUMBER : 22438001
PROBLEM NUMBER : 2C159RC5035
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
001	ANC		1R122NSG201B									
		NORMP		6004.	0.	45004.	642.	168377.	133560.	.000	1.972	.000
		NORMN		-6191.	-5287.	0.	-169266.	0.	-52777.	-.637	.000	-1.956
		UPSETP		14573.	7042.	24004.	72358.	276193.	235096.	.229	1.988	.252
		UPSETN		-13428.	-12629.	-7203.	-245187.	-85644.	-153206.	-.866	-.017	-2.208
		FAULTP		18707.	14201.	28464.	136898.	327506.	331615.	.359	2.023	.406
		FAULTN		-17305.	-19796.	-11345.	-309618.	-134605.	-249009.	-.996	-.052	-2.362
007	RAD		HL5016									
		NORMP		13616.	0.	1519.	0.	0.	0.	.002	1.817	.004
		NORMN		-3759.	0.	-5501.	0.	0.	0.	-.545	.000	-1.342
		UPSETP		27106.	0.	5630.	0.	0.	0.	.055	1.925	.132
		UPSETN		-13934.	0.	-10951.	0.	0.	0.	-.595	-.030	-1.466
		FAULTP		33340.	0.	8420.	0.	0.	0.	.088	1.962	.214
		FAULTN		-20841.	0.	-13470.	0.	0.	0.	-.635	-.065	-1.561
009	SPD		HL5015									
		NORMP		0.	-14532.	0.	0.	0.	0.	.008	1.866	.005
		NORMN		0.	-14532.	0.	0.	0.	0.	-.055	.000	-.271
		UPSETP		0.	-14532.	0.	0.	0.	0.	.035	2.042	.054
		UPSETN		0.	-14532.	0.	0.	0.	0.	-.074	-.038	-.314
		FAULTP		0.	-14532.	0.	0.	0.	0.	.052	2.087	.087
		FAULTN		0.	-14532.	0.	0.	0.	0.	-.091	-.083	-.354
011	RAD		HL5014									
		NORMP		0.	0.	0.	0.	0.	0.	.000	1.929	.001
		NORMN		-10193.	0.	0.	0.	0.	0.	-.010	-.011	-.011
		UPSETP		5585.	0.	0.	0.	0.	0.	.005	2.132	.007
		UPSETN		-17132.	0.	0.	0.	0.	0.	-.016	-.067	-.017
		FAULTP		8638.	0.	0.	0.	0.	0.	.008	2.193	.011
		FAULTN		-20451.	0.	0.	0.	0.	0.	-.019	-.128	-.021
011	RAD		HL5014									
		NORMP		265.	0.	352.	0.	0.	0.	.000	1.929	.001
		NORMN		-9116.	0.	-12097.	0.	0.	0.	-.010	-.011	-.011
		UPSETP		2377.	0.	3154.	0.	0.	0.	.005	2.132	.007
		UPSETN		-10962.	0.	-14547.	0.	0.	0.	-.016	-.067	-.017
		FAULTP		4008.	0.	5318.	0.	0.	0.	.008	2.193	.011
		FAULTN		-12678.	0.	-16824.	0.	0.	0.	-.019	-.128	-.021
014	RAD		HL5013									
		NORMP		32328.	0.	7406.	0.	0.	0.	.016	1.874	.008
		NORMN		0.	0.	0.	0.	0.	0.	.000	-.012	-.024
		UPSETP		36654.	0.	8397.	0.	0.	0.	.018	2.173	.003
		UPSETN		-4326.	0.	-991.	0.	0.	0.	-.002	-.069	-.028
		FAULTP		41877.	0.	9593.	0.	0.	0.	.021	2.234	.006
		FAULTN		-8858.	0.	-2029.	0.	0.	0.	-.004	-.130	-.031

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2C159RC5035 RESTRAINT LOAD SUMMARY ME101/M4 GAEU/54 (RN0321) 10/27/97 RN0321 PAGE ~~103~~

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		HL5013									
			[illegible]	0.	0.	0.	0.	0.	0.	.015	1.571	.000
		NORMN		-9318.	0.	-14515.	0.	0.	0.	.000	-.012	-.024
		UPSETP		1457.	0.	2270.	0.	0.	0.	.018	2.173	.003
		UPSETN		-10775.	0.	-16785.	0.	0.	0.	-.002	-.069	-.028
		FAULTP		2492.	0.	3883.	0.	0.	0.	.021	2.234	.006
		FAULTN		-12375.	0.	-19278.	0.	0.	0.	-.004	-.130	-.031
040	SPR		FW9014SH0001									
		NORMP		0.	0.	0.	0.	0.	0.	.393	1.370	.000
		NORMN		0.	-1751	0.	0.	0.	0.	.000	-.328	-.320
		UPSETP		0.	0.	0.	0.	0.	0.	.475	1.658	.028
		UPSETN		0.	-1751	0.	0.	0.	0.	-.033	-.348	-.348
		FAULTP		0.	0.	0.	0.	0.	0.	.562	1.685	.080
		FAULTN		0.	-1751	0.	0.	0.	0.	-.112	-.442	-.415
13	SPR		FW9014HL5008									
		NORMP		0.	0.	0.	0.	0.	0.	.417	.826	.000
		NORMN		0.	-9157	0.	0.	0.	0.	-.258	-.541	-.278
		UPSETP		0.	0.	0.	0.	0.	0.	.560	1.063	.039
		UPSETN		0.	-9157	0.	0.	0.	0.	-.280	-.586	-.317
		FAULTP		0.	0.	0.	0.	0.	0.	.734	1.110	.190
		FAULTN		0.	-9157	0.	0.	0.	0.	-.480	-.686	-.487
085	RAD		FW9014HL5006									
		NORMP		0.	7149.	0.	0.	0.	0.	.001	.005	.006
		NORMN		0.	-4483.	0.	0.	0.	0.	-.648	-.003	-.940
		UPSETP		0.	6264.	0.	0.	0.	0.	.028	.005	.089
		UPSETN		0.	-7367.	0.	0.	0.	0.	-.675	-.005	-.975
		FAULTP		0.	8492.	0.	0.	0.	0.	.308	.006	.303
		FAULTN		0.	-9596.	0.	0.	0.	0.	-.974	-.007	-1.225
095	SPR		FW9014SH0004									
		NORMP		0.	0.	0.	0.	0.	0.	.000	.020	.000
		NORMN		0.	-6756	0.	0.	0.	0.	-.089	-.145	-.502
		UPSETP		0.	0.	0.	0.	0.	0.	.006	.061	.037
		UPSETN		0.	-6756	0.	0.	0.	0.	-.095	-.195	-.514
		FAULTP		0.	0.	0.	0.	0.	0.	.016	.159	.122
		FAULTN		0.	-6756	0.	0.	0.	0.	-.108	-.288	-.617
95B	RAD		FW9014HL5004									
		NORMP		24441.	0.	0.	0.	0.	0.	.029	.021	.000
		NORMN		-1904.	0.	0.	0.	0.	0.	-.002	-.128	-.461
		UPSETP		29698.	0.	0.	0.	0.	0.	.035	.062	.034
		UPSETN		-11771.	0.	0.	0.	0.	0.	-.014	-.179	-.473
		FAULTP		45153.	0.	0.	0.	0.	0.	.053	.167	.119
		FAULTN		-26176.	0.	0.	0.	0.	0.	-.031	-.278	-.574

CB 2/20/98

CB 2/20/98

CB 2/20/98

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		FW9014HL5011									
		NORMP		0.	0.	752.	0.	0.	0.	.497	.000	.000
		NORMN		0.	0.	-10023.	0.	0.	0.	.000	-.063	-.006
		UPSETP		0.	0.	6629.	0.	0.	0.	.523	.034	.004
		UPSETN		0.	0.	-13958.	0.	0.	0.	-.026	-.105	-.009
		FAULTP		0.	0.	10072.	0.	0.	0.	.777	.201	.006
		FAULTN		0.	0.	-17828.	0.	0.	0.	-.264	-.277	-.011
110	ANC		PEN M-7									
		NORMP		0.	1402.	18808.	4814.	26.	25639.	.039	.000	.008
		NORMN		-38546.	-4485.	-16.	-21339.	-51333.	-12110.	.000	-.062	.000
		UPSETP		6610.	2150.	21724.	10287.	27981.	39259.	.066	.003	.043
		UPSETN		-42303.	-7248.	-3936.	-25269.	-74668.	-38824.	-.026	-.066	-.035
		FAULTP		20934.	2344.	24844.	15658.	44708.	49566.	.305	.235	.068
		FAULTN		-58042.	-8231.	-6379.	-30640.	-93306.	-47939.	-.266	-.298	-.059
027	SNB		FW9014HL5012									
		NORMP								.386	1.501	.000
		NORMN								.000	-.258	-.330
		UPSETP		985.	0.	1382.	0.	0.	0.	.451	1.814	.026
		UPSETN		-985.	0.	-1382.	0.	0.	0.	-.034	-.290	-.357
		FAULTP		2022.	0.	2839.	0.	0.	0.	.519	1.847	.053
		FAULTN		-2022.	0.	-2839.	0.	0.	0.	-.091	-.393	-.397
042	SNB		FW9014HL5009									
		NORMP								.405	1.126	.000
		NORMN								-.057	-.440	-.300
		UPSETP		0.	6766.	0.	0.	0.	0.	.514	1.371	.033
		UPSETN		0.	-6766.	0.	0.	0.	0.	-.080	-.448	-.333
		FAULTP		0.	14476.	0.	0.	0.	0.	.641	1.425	.131
		FAULTN		0.	-14476.	0.	0.	0.	0.	-.225	-.564	-.448
050	SNB		FW9014HL5001									
		NORMP								.196	.611	.001
		NORMN								-.320	-.350	-.387
		UPSETP		3331.	0.	0.	0.	0.	0.	.287	.795	.074
		UPSETN		-3331.	0.	0.	0.	0.	0.	-.324	-.431	-.395
		FAULTP		6074.	0.	0.	0.	0.	0.	.542	.810	.326
		FAULTN		-6074.	0.	0.	0.	0.	0.	-.599	-.552	-.663
055	SNB		FW9014HL5002									
		NORMP								.154	.615	.008
		NORMN								-.285	-.310	-.423
		UPSETP		680.	0.	2176.	0.	0.	0.	.235	.792	.085
		UPSETN		-680.	0.	-2176.	0.	0.	0.	-.292	-.390	-.423
		FAULTP		1485.	0.	4752.	0.	0.	0.	.493	.877	.345
		FAULTN		-1485.	0.	-4752.	0.	0.	0.	-.569	-.510	-.700

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 33438001
PROBLEM NUMBER : 2C159RC5035
USER : FAMI
LOAD CASE :

DATA TYPE PT	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
080 SNB		FW9014HL5003									
	NORMP								.001	.051	.007
	NORMN								-.606	-.008	-.966
	UPSETP		0.	0.	2865.	0.	0.	0.	.028	.058	.095
	UPSETN		0.	0.	-2865.	0.	0.	0.	-.632	-.016	-.960
	FAULTP		0.	0.	5803.	0.	0.	0.	.308	.067	.319
	FAULTN		0.	0.	-5803.	0.	0.	0.	-.930	-.025	-1.219

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		1R122NSG201B															
		NORMP		0	0	0	169726	466577	473767	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		NORMN		-9147	-5287	-12770	0	0	-158401	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		UPSETP		4259	7042	5674	140543	276193	97264	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		UPSETN		-13406	-12329	-20014	-29959	-85644	-252191	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTP		6745	14201	9233	158391	327506	196908	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTN		-16271	-19796	-23525	-47374	-134605	-352893	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
007	RAD		HLS016															
		NORMP		14685	0	0	0	0	0	.93	.00	-.37						
		NORMN		-4055	0	0	0	0	0	.93	.00	-.37						
		UPSETP		29234	0	0	0	0	0	.93	.00	-.37						
		UPSETN		-15028	0	0	0	0	0	.93	.00	-.37						
		FAULTP		35958	0	0	0	0	0	.93	.00	-.37						
		FAULTN		-22478	0	0	0	0	0	.93	.00	-.37						
009	SPD		HLS015															
		NORMP		-14532	0	0	0	0	0	.00	1.00	.00						
		NORMN		-14532	0	0	0	0	0	.00	1.00	.00						
		UPSETP		-14532	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-14532	0	0	0	0	0	.00	1.00	.00						
		FAULTP		-14532	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14532	0	0	0	0	0	.00	1.00	.00						
011	RAD		HLS014															
		NORMP		10193	0	0	0	0	0	-1.00	.00	.00						
		NORMN		0	0	0	0	0	0	-1.00	.00	.00						
		UPSETP		17132	0	0	0	0	0	-1.00	.00	.00						
		UPSETN		-5585	0	0	0	0	0	-1.00	.00	.00						
		FAULTP		20451	0	0	0	0	0	-1.00	.00	.00						
		FAULTN		-8638	0	0	0	0	0	-1.00	.00	.00						
013	RAD		HLS014															
		NORMP		15147	0	0	0	0	0	-.60	.00	-.80						
		NORMN		-441	0	0	0	0	0	-.60	.00	-.80						
		UPSETP		18215	0	0	0	0	0	-.60	.00	-.80						
		UPSETN		-3950	0	0	0	0	0	-.60	.00	-.80						
		FAULTP		21066	0	0	0	0	0	-.60	.00	-.80						
		FAULTN		-6659	0	0	0	0	0	-.60	.00	-.80						
014	RAD		HLS013															
		NORMP		0	0	0	0	0	0	-.97	.00	-.22						
		NORMN		-33166	0	0	0	0	0	-.97	.00	-.22						
		UPSETP		4438	0	0	0	0	0	-.97	.00	-.22						
		UPSETN		-37604	0	0	0	0	0	-.97	.00	-.22						
		FAULTP		9088	0	0	0	0	0	-.97	.00	-.22						
		FAULTN		-42961	0	0	0	0	0	-.97	.00	-.22						

TITLE : *FEEDWATER "FW" SYSTEM - SG 1B TO M7*
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		EL5013															
		NORMP		17249	0	0	0	0	0	-.54	.00	-.84						
		NORMN		0	0	0	0	0	0	-.54	.00	-.84						
		UPSETP		19947	0	0	0	0	0	-.54	.00	-.84						
		UPSETN		-2698	0	0	0	0	0	-.54	.00	-.84						
		FAULTP		22908	0	0	0	0	0	-.54	.00	-.84						
		FAULTN		-4614	0	0	0	0	0	-.54	.00	-.84						
040	SPR		FW9014SH0001															
		NORMP		0	0	0	0	0	0	.00	1.00	.00						
		NORMN		-1751	0	0	0	0	0	.00	1.00	.00						
		UPSETP		0	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-1751	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-1751	0	0	0	0	0	.00	1.00	.00						
11	SPR		FW9014HL5006															
		NORMP		0	0	0	0	0	0	.00	1.00	.00						
		NORMN		-9157	0	0	0	0	0	.00	1.00	.00						
		UPSETP		0	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-9157	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9157	0	0	0	0	0	.00	1.00	.00						
085	RAD		FW9014HL5006															
		NORMP		7149	0	0	0	0	0	.00	1.00	.00						
		NORMN		-4482	0	0	0	0	0	.00	1.00	.00						
		UPSETP		6264	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-7367	0	0	0	0	0	.00	1.00	.00						
		FAULTP		8492	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9596	0	0	0	0	0	.00	1.00	.00						
095	SPR		FW9014SH0004															
		NORMP		0	0	0	0	0	0	.00	1.00	.00						
		NORMN		-6756	0	0	0	0	0	.00	1.00	.00						
		UPSETP		0	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-6756	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-6756	0	0	0	0	0	.00	1.00	.00						
95B	RAD		FW9014HL5004															
		NORMP		24441	0	0	0	0	0	1.00	.00	.00						
		NORMN		-1904	0	0	0	0	0	1.00	.00	.00						
		UPSETP		29698	0	0	0	0	0	1.00	.00	.00						
		UPSETN		-11771	0	0	0	0	0	1.00	.00	.00						
		FAULTP		46153	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-26174	0	0	0	0	0	1.00	.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 33438001
PROBLEM NUMBER : 2C159RCS035
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		FW9014HLS011															
		NORMP		752	0	0	0	0	0	.00	.00	1.00						
		NORMN		-18031	0	0	0	0	0	.00	.00	1.00						
		UPSETP		6629	0	0	0	0	0	.00	.00	1.00						
		UPSETN		-13958	0	0	0	0	0	.00	.00	1.00						
		FAULTP		10072	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-17828	0	0	0	0	0	.00	.00	1.00						
110	ANC		FEN M-7															
		NORMP		0	1492	18808	4814	26	25639	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		NORMN		-38546	-4485	-18	-21339	-51333	-12110	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		UPSETP		6610	2150	21724	10287	27981	39259	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		UPSETN		-42303	-7248	-3936	-25269	-74668	-38824	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTP		20934	2344	24844	15658	44708	49566	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTN		-58042	-8231	-6379	-30640	-93306	-47939	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
827	SNB		FW9014HLS012															
		NORMP																
		NORMN																
		UPSETP		1697	0	0	0	0	0	-.58	.00	-.81						
		UPSETN		-1697	0	0	0	0	0	-.58	.00	-.81						
		FAULTP		3485	0	0	0	0	0	-.58	.00	-.81						
		FAULTN		-3485	0	0	0	0	0	-.58	.00	-.81						
842	SNB		FW9014HLS009															
		NORMP																
		NORMN																
		UPSETP		6766	0	0	0	0	0	.00	1.00	.00						
		UPSETN		-6766	0	0	0	0	0	.00	1.00	.00						
		FAULTP		14476	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14476	0	0	0	0	0	.00	1.00	.00						
850	SNB		FW9014HLS001															
		NORMP																
		NORMN																
		UPSETP		3331	0	0	0	0	0	1.00	.00	.00						
		UPSETN		-3331	0	0	0	0	0	1.00	.00	.00						
		FAULTP		6074	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-6074	0	0	0	0	0	1.00	.00	.00						
855	SNB		FW9014HLS002															
		NORMP																
		NORMN																
		UPSETP		2279	0	0	0	0	0	.30	.00	-.95						
		UPSETN		-2279	0	0	0	0	0	.30	.00	-.95						
		FAULTP		4979	0	0	0	0	0	.30	.00	-.95						
		FAULTN		-4979	0	0	0	0	0	.30	.00	-.95						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
USER : PANI
LOAD CASE :

DATA TYPE FT	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
SSS SNB	FW9014HLS003																
	NORMP																
	NORMN																
	UPSETP		2865	0	0	0	0	0	.00	.00	1.00						
	UPSETN		-2865	0	0	0	0	0	.00	.00	1.00						
	FAULTP		5803	0	0	0	0	0	.00	.00	1.00						
	FAULTN		-5803	0	0	0	0	0	.00	.00	1.00						
ME101LC	VERSION N4		STOP ON 10/27/97 AT 14:07:06,			CPU- 877961226											
ME101LC	VERSION N4		EXECUTION TIMES			CPU- 51											
ME101SA	VERSION N4		START ON 10/27/97 AT 14:07:07,			CPU- 877961227											

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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	AMB	33270.	.270	0.	.000	0.	.000	61806.	.088	0.	.000	0.	.000
		-29339.	.243	0.	.000	0.	.000	-49061.	.270	0.	.000	0.	.000
001	AMB	0.	.000	138433.	.249	0.	.000	0.	.000	232292.	.089	0.	.000
		0.	.000	-140068.	.086	0.	.000	0.	.000	-265326.	.272	0.	.000
001	AMC	0.	.000	0.	.000	17561.	.272	0.	.000	0.	.000	1834552.	.249
		0.	.000	0.	.000	-15718.	.089	0.	.000	0.	.000	-1671997.	.086
007	RAD	33126.	.317	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-30694.	.386	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
011	RAD	14303.	.243	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-15677.	.266	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
011	RAD	40838.	.262	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-41797.	.298	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
016	RAD	51522.	.320	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-50500.	.376	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
016	RAD	34214.	.277	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-31380.	.263	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
027	SNB	34872.	.295	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-29981.	.329	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
042	SNB	92193.	.328	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-63775.	.155	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
050	SNB	61804.	.236	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-61864.	.345	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
055	SNB	29522.	.251	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-37940.	.327	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
060	SNB	60739.	.238	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-56625.	.315	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
085	RAD	33761.	.442	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-33709.	.273	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
95B	RAD	53922.	.264	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-44563.	.263	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
10A	RAD	47682.	.040	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
		-55003.	.227	0.	.000	0.	.000	0.	.000	0.	.000	0.	.000
110	ANA	266118.	.213	0.	.000	0.	.000	59844.	.392	0.	.000	0.	.000
		-140216.	.239	0.	.000	0.	.000	-78442.	.326	0.	.000	0.	.000
110	ANB	0.	.000	5338.	.382	0.	.000	0.	.000	25411.	.241	0.	.000
		0.	.000	-4090.	.314	0.	.000	0.	.000	-35190.	.225	0.	.000
110	ANC	0.	.000	0.	.000	19121.	.225	0.	.000	0.	.000	34042.	.467
		0.	.000	0.	.000	-12257.	.241	0.	.000	0.	.000	-31023.	.397

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		1R122NSG201B									
		WT1		-3.	-611.	91.	-1558.	1255.	2160	.000	.000	.000
		THRM2		2371.	-4722.	9721.	-151893.	79885.	90478.	-.637	1.971	-1.956
		THRM3		-2138.	-4968.	11229.	-157285.	136637.	73941.	-.637	1.971	-1.956
		THRM6		1165.	-4788.	10132.	-153361.	95332.	85977.	-.637	1.971	-1.956
		TIME1		36176.	140068.	29583.	950472.	269324.	1661070.	.000	.000	.000
		FAULTP		40107.	139458.	42461.	948914.	403215.	1797048.	.000	1.971	.000
		FAULTM		-39441.	-145647.	-29492.	-1115060.	-264069.	-1708025.	-.637	.000	-1.956
007	RAD		HL5016									
		WT1		218.	0.	-88.	0.	0.	0.	.001	.001	.002
		THRM2		1790.	0.	-723.	0.	0.	0.	-.501	1.508	-1.242
		THRM3		9224.	0.	-3727.	0.	0.	0.	-.440	1.702	-1.102
		THRM6		3813.	0.	-1541.	0.	0.	0.	-.484	1.561	-1.204
		TIME1		30714.	0.	12409.	0.	0.	0.	.215	.269	.518
		FAULTP		40156.	0.	12321.	0.	0.	0.	.216	1.973	.520
		FAULTM		-30495.	0.	-16224.	0.	0.	0.	-.714	-.268	-1.758
009	SPD		HL5015									
		WT1		0.	-14327.	0.	0.	0.	0.	.006	.000	.003
		THRM2								-.039	1.336	-.198
		THRM3								-.035	1.678	-.135
		THRM6								-.038	1.429	-.181
		TIME1								.123	.462	.347
		FAULTP		0.	-14327.	0.	0.	0.	0.	.128	2.140	.350
		FAULTM		0.	-14327.	0.	0.	0.	0.	-.157	-.462	-.543
011	RAD		HL5014									
		WT1		-210.	0.	0.	0.	0.	0.	.000	-.007	.000
		THRM2		-4717.	0.	0.	0.	0.	0.	-.004	1.314	-.009
		THRM3		-8212.	0.	0.	0.	0.	0.	-.008	1.704	-.005
		THRM6		-5665.	0.	0.	0.	0.	0.	-.005	1.421	-.008
		TIME1		15677.	0.	0.	0.	0.	0.	.015	.701	.043
		FAULTP		15468.	0.	0.	0.	0.	0.	.015	2.398	.044
		FAULTM		-24098.	0.	0.	0.	0.	0.	-.023	-.708	-.051
011	RAD		HL5014									
		WT1		232.	0.	308.	0.	0.	0.	.000	-.007	.000
		THRM2		-8475.	0.	-11247.	0.	0.	0.	-.004	1.314	-.009
		THRM3		-7532.	0.	-9995.	0.	0.	0.	-.008	1.704	-.005
		THRM6		-8220.	0.	-10908.	0.	0.	0.	-.005	1.421	-.008
		TIME1		25156.	0.	33380.	0.	0.	0.	.015	.701	.043
		FAULTP		25387.	0.	33689.	0.	0.	0.	.015	2.398	.044
		FAULTM		-33397.	0.	-44319.	0.	0.	0.	-.023	-.708	-.051

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC503S
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
014	RAD		WL5013									
		WT1		196.	0.	45.	0.	0.	0.	.000	-.008	-.001
		THRM2		27304.	0.	4255.	0.	0.	0.	.013	.875	-.019
		THRM3		20143.	0.	4614.	0.	0.	0.	.009	1.503	-.012
		THRM6		25343.	0.	5806.	0.	0.	0.	.012	1.046	-.017
		TIME1		50221.	0.	11504.	0.	0.	0.	.024	.710	.039
		FAULTP		77721.	0.	17804.	0.	0.	0.	.038	2.206	.038
		FAULTM		-50025.	0.	-11460.	0.	0.	0.	-.024	-.718	-.058
014	RAD		WL5013									
		WT1		-285.	0.	-444.	0.	0.	0.	.000	-.008	-.001
		THRM2		-6991.	0.	-10891.	0.	0.	0.	.013	.875	-.019
		THRM3		-4075.	0.	-6347.	0.	0.	0.	.009	1.503	-.012
		THRM6		-6192.	0.	-9646.	0.	0.	0.	.012	1.046	-.017
		TIME1		18483.	0.	28792.	0.	0.	0.	.024	.710	.039
		FAULTP		18198.	0.	28348.	0.	0.	0.	.038	2.206	.038
		FAULTM		-25759.	0.	-40126.	0.	0.	0.	-.024	-.718	-.058
040	SPR		FW9014EH0001									
		WT1		0.	-1751	0.	0.	0.	0.	.008	-.019	-.011
		THRM2								.194	.227	-.269
		THRM3								.314	.964	-.213
		THRM6								.227	.422	-.254
		TIME1								.388	.289	.378
		FAULTP		0.	0.	0.	0.	0.	0.	.702	1.208	.367
		FAULTM		0.	-1751	0.	0.	0.	0.	-.372	-.302	-.658
13	SPR		FW9014HL5006									
		WT1		0.	-9157	0.	0.	0.	0.	.006	-.036	-.014
		THRM2								-.045	-.082	-.210
		THRM3								.240	.486	-.136
		THRM6								.033	.073	-.190
		TIME1								.364	.552	.665
		FAULTP		0.	0.	0.	0.	0.	0.	.610	1.002	.651
		FAULTM		0.	-9157	0.	0.	0.	0.	-.403	-.670	-.888
085	RAD		FW9014HL5006									
		WT1		0.	-4456.	0.	0.	0.	0.	.000	-.003	.006
		THRM2		0.	4363.	0.	0.	0.	0.	-.492	.003	-.698
		THRM3		0.	6129.	0.	0.	0.	0.	-.277	.005	-.311
		THRM6		0.	4844.	0.	0.	0.	0.	-.434	.004	-.592
		TIME1		0.	33761.	0.	0.	0.	0.	.338	.026	.036
		FAULTP		0.	35433.	0.	0.	0.	0.	.338	.026	.043
		FAULTM		0.	-38217.	0.	0.	0.	0.	-.829	-.028	-.728

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
095	SPR		FW9014SH0004									
		WT1		0.	-6756.	0.	0.	0.	0.	.000	.016	.000
		THRM2								-.068	-.043	-.363
		THRM3								-.039	-.107	-.170
		THRM6								-.060	-.061	-.310
		TIME1								.083	.243	.153
		FAULTP		0.	0.	0.	0.	0.	0.	.083	.259	.153
		FAULTN		0.	-6756.	0.	0.	0.	0.	-.151	-.334	-.515
95B	RAD		FW9014HL5004									
		WT1		-128.	0.	0.	0.	0.	0.	.000	.013	.000
		THRM2		16266.	0.	0.	0.	0.	0.	.019	-.036	-.333
		THRM3		5016.	0.	0.	0.	0.	0.	.006	-.093	-.157
		THRM6		13191.	0.	0.	0.	0.	0.	.015	-.051	-.285
		TIME1		53922.	0.	0.	0.	0.	0.	.063	.178	.152
		FAULTP		70060.	0.	0.	0.	0.	0.	.083	.192	.153
		FAULTN		-54050.	0.	0.	0.	0.	0.	-.063	-.258	-.485
10A	RAD		FW9014WL5011									
		WT1		0.	0.	108.	0.	0.	0.	.000	-.006	.000
		THRM2		0.	0.	-6681.	0.	0.	0.	.367	-.028	-.004
		THRM3		0.	0.	-2112.	0.	0.	0.	.189	-.046	-.001
		THRM6		0.	0.	-5432.	0.	0.	0.	.319	-.033	-.003
		TIME1		0.	0.	69053.	0.	0.	0.	.064	.077	.044
		FAULTP		0.	0.	69161.	0.	0.	0.	.431	.071	.045
		FAULTN		0.	0.	-75626.	0.	0.	0.	-.064	-.129	-.049
110	ANC		PEN M-7									
		WT1		-21.	-2421.	-20.	4781.	29.	-8013.	.000	.000	.000
		THRM2		-27549.	358.	13566.	-8483.	-36526.	16356.	.035	-.062	.007
		THRM3		-12427.	-1161.	6338.	-16592.	-16101.	3600.	.037	-.062	.006
		THRM6		-23415.	-67.	11590.	-10695.	-30942.	12870.	.035	-.062	.007
		TIME1		266118.	5338.	19121.	78442.	35190.	24042.	.042	.001	.003
		FAULTP		266097.	3276.	32666.	83223.	35218.	42385.	.079	.000	.010
		FAULTN		-293688.	-8920.	-19140.	-90253.	-71687.	-42055.	-.042	-.063	-.003
027	SNB		FW9014HL5012									
		WT1								.009	-.016	-.010
		THRM2								.250	.315	-.284
		THRM3								.331	1.058	-.232
		THRM6								.272	.518	-.270
		TIME1		20230.	0.	28404.	0.	0.	0.	.383	.415	.312
		FAULTP		20230.	0.	28404.	0.	0.	0.	.722	1.458	.302
		FAULTN		-20230.	0.	-28404.	0.	0.	0.	-.374	-.431	-.607

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
042	SNB		FW9014HL5009									
		WT1								.007	-.025	-.012
		THRM2								.089	.075	-.241
		THRM3								.283	.733	-.177
		THRM6								.142	.255	-.224
		TIME1		0.	92193.	0.	0.	0.	0.	.378	.103	.511
		FAULTP		0.	92193.	0.	0.	0.	0.	.668	.811	.499
		FAULTN		0.	-92193.	0.	0.	0.	0.	-.370	-.128	-.765
050	SNB		FW9014HL5001									
		WT1								-.002	-.052	.001
		THRM2								-.156	-.009	-.265
		THRM3								.064	.379	-.101
		THRM6								-.096	.097	-.220
		TIME1		61804.	0.	0.	0.	0.	0.	.076	.987	.170
		FAULTP		61804.	0.	0.	0.	0.	0.	.138	1.314	.170
		FAULTN		-61804.	0.	0.	0.	0.	0.	-.233	-1.047	-.434
055	SNB		FW9014HL5002									
		WT1								-.002	-.052	.004
		THRM2								-.145	.020	-.288
		THRM3								.042	.393	-.106
		THRM6								-.094	.122	-.238
		TIME1		11312.	0.	36214.	0.	0.	0.	.110	.987	.047
		FAULTP		11312.	0.	36214.	0.	0.	0.	.149	1.327	.051
		FAULTN		-11312.	0.	-36214.	0.	0.	0.	-.257	-1.039	-.333
080	SNB		FW9014HL5003									
		WT1								.000	-.008	.007
		THRM2								-.462	.022	-.686
		THRM3								-.263	.060	-.302
		THRM6								-.408	.027	-.581
		TIME1		0.	0.	60739.	0.	0.	0.	.338	.092	.043
		FAULTP		0.	0.	60739.	0.	0.	0.	.338	.124	.051
		FAULTN		0.	0.	-60739.	0.	0.	0.	-.799	-.099	-.722

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		1R122HSG201B															
		WT1		-61	-611	-61	416	1255	-2819	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM2		-6787	-4722	-7353	88984	79885	-152773	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM3		-3574	-4968	-10858	101718	136637	-140923	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM6		-5913	-4748	-8307	92458	95332	-149568	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		TIME1		29339	140068	17561	49061	268324	1871997	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTP		29297	139458	17480	150997	403215	1869178	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTN		-36167	-145647	-28500	-48842	-264069	-2027589	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
007	RAD		HL5016															
		WT1		236	0	0	0	0	0	.93	.00	-.37						
		THRM2		1931	0	0	0	0	0	.93	.00	-.37						
		THRM3		9949	0	0	0	0	0	.93	.00	-.37						
		THRM6		4112	0	0	0	0	0	.93	.00	-.37						
		TIME1		33126	0	0	0	0	0	.93	.00	-.37						
		FAULTP		43310	0	0	0	0	0	.93	.00	-.37						
		FAULTN		-32890	0	0	0	0	0	.93	.00	-.37						
009	SPD		HL5015															
		WT1		-14327	0	0	0	0	0	.00	1.00	.00						
		THRM2																
		THRM3																
		THRM6																
		TIME1																
		FAULTP		-14327	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14327	0	0	0	0	0	.00	1.00	.00						
011	RAD		HL5014															
		WT1		210	0	0	0	0	0	-1.00	.00	.00						
		THRM2		4717	0	0	0	0	0	-1.00	.00	.00						
		THRM3		8212	0	0	0	0	0	-1.00	.00	.00						
		THRM6		5665	0	0	0	0	0	-1.00	.00	.00						
		TIME1		15677	0	0	0	0	0	-1.00	.00	.00						
		FAULTP		24098	0	0	0	0	0	-1.00	.00	.00						
		FAULTN		-15468	0	0	0	0	0	-1.00	.00	.00						
011	RAD		HL5014															
		WT1		-386	0	0	0	0	0	-.60	.00	-.80						
		THRM2		14083	0	0	0	0	0	-.60	.00	-.80						
		THRM3		12515	0	0	0	0	0	-.60	.00	-.80						
		THRM6		13659	0	0	0	0	0	-.60	.00	-.80						
		TIME1		61797	0	0	0	0	0	-.60	.00	-.80						
		FAULTP		55494	0	0	0	0	0	-.60	.00	-.80						
		FAULTN		-42183	0	0	0	0	0	-.60	.00	-.80						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		HL5013															
		WT1		[illegible]	0	0	0	0	0	-.97	.00	-.22						
		THRM2		-28011	0	0	0	0	0	-.97	.00	-.22						
		THRM3		-20665	0	0	0	0	0	-.97	.00	-.22						
		THRM6		-26000	0	0	0	0	0	-.97	.00	-.22						
		TIME1		51522	0	0	0	0	0	-.97	.00	-.22						
		FAULTP		51321	0	0	0	0	0	-.97	.00	-.22						
		FAULTN		-79734	0	0	0	0	0	-.97	.00	-.22						
014	RAD		HL5013															
		WT1		528	0	0	0	0	0	-.54	.00	-.84						
		THRM2		12941	0	0	0	0	0	-.54	.00	-.84						
		THRM3		7543	0	0	0	0	0	-.54	.00	-.84						
		THRM6		11463	0	0	0	0	0	-.54	.00	-.84						
		TIME1		34214	0	0	0	0	0	-.54	.00	-.84						
		FAULTP		47682	0	0	0	0	0	-.54	.00	-.84						
		FAULTN		-33686	0	0	0	0	0	-.54	.00	-.84						
040	SPR		FW9014SH0001															
		WT1		-1751	0	0	0	0	0	.00	1.00	.00						
		THRM2																
		THRM3																
		THRM6																
		TIME1																
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-1751	0	0	0	0	0	.00	1.00	.00						
13	SPR		FW9014HL5008															
		WT1		-9157	0	0	0	0	0	.00	1.00	.00						
		THRM2																
		THRM3																
		THRM6																
		TIME1																
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9157	0	0	0	0	0	.00	1.00	.00						
085	RAD		FW9014HL5006															
		WT1		-4456	0	0	0	0	0	.00	1.00	.00						
		THRM2		4163	0	0	0	0	0	.00	1.00	.00						
		THRM3		6129	0	0	0	0	0	.00	1.00	.00						
		THRM6		4844	0	0	0	0	0	.00	1.00	.00						
		TIME1		33761	0	0	0	0	0	.00	1.00	.00						
		FAULTP		35433	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-38217	0	0	0	0	0	.00	1.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC503S
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
095	SPR		FW9014SH0004															
		WT1		-6756	0	0	0	0	0	.00	1.00	.00						
		THRM2																
		THRM3																
		THRM6																
		TIME1																
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-6756	0	0	0	0	0	.00	1.00	.00						
95B	RAD		FW9014HL5004															
		WT1		-128	0	0	0	0	0	1.00	.00	.00						
		THRM2		16256	0	0	0	0	0	1.00	.00	.00						
		THRM3		5016	0	0	0	0	0	1.00	.00	.00						
		THRM6		13191	0	0	0	0	0	1.00	.00	.00						
		TIME1		53922	0	0	0	0	0	1.00	.00	.00						
		FAULTP		70060	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-54050	0	0	0	0	0	1.00	.00	.00						
10A	RAD		FW9014HL5011															
		WT1		108	0	0	0	0	0	.00	.00	1.00						
		THRM2		-6681	0	0	0	0	0	.00	.00	1.00						
		THRM3		-2112	0	0	0	0	0	.00	.00	1.00						
		THRM6		-5432	0	0	0	0	0	.00	.00	1.00						
		TIME1		69053	0	0	0	0	0	.00	.00	1.00						
		FAULTP		69161	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-75626	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-7															
		WT1		-21	-2421	-20	4781	29	-8013	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM2		-27549	358	13566	-8483	-36526	16356	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM3		-12427	-1161	6338	-16592	-16101	3600	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM6		-23416	-57	11590	-30695	-30942	12870	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIME1		266116	5338	19121	78443	35190	34042	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTP		266097	3276	32666	83223	35218	42385	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTN		-293688	-8920	-19140	-90253	-71687	-42055	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
027	SNB		FW9014HL5012															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		34872	0	0	0	0	0	-.58	.00	-.81						
		FAULTP		34872	0	0	0	0	0	-.58	.00	-.81						
		FAULTN		-34872	0	0	0	0	0	-.58	.00	-.81						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
042	SNB		FW9014HL5009															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		92193	0	0	0	0	0	.00	1.00	.00						
		FAULTP		92193	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-92193	0	0	0	0	0	.00	1.00	.00						
050	SNB		FW9014HL5001															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		61804	0	0	0	0	0	1.00	.00	.00						
		FAULTP		61804	0	0	0	0	0	1.00	.00	.00						
		FAULTN		-61804	0	0	0	0	0	1.00	.00	.00						
055	SNB		FW9014HL5002															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		37940	0	0	0	0	0	.30	.00	-.95						
		FAULTP		37940	0	0	0	0	0	.30	.00	-.95						
		FAULTN		-37940	0	0	0	0	0	.30	.00	-.95						
080	SNB		FW9014HL5003															
		WT1																
		THRM2																
		THRM3																
		THRM6																
		TIME1		60739	0	0	0	0	0	.00	.00	1.00						
		FAULTP		60739	0	0	0	0	0	.00	.00	1.00						
		FAULTN		-60739	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		1R122WSG201B									
		WT1		11.	-564.	87.	-1682.	1161.	2254.	.000	.000	.000
		THRM1		[illegible]	[illegible]	[illegible]	-1447700.	37005.	101467.	-.637	1.971	-1.956
		JMAX		142.	0.	95.	0.	412.	9514.	.000	.000	.000
		JMIN		-30.	-779.	-70.	-6371.	0.	-54.	.000	.000	.000
		FAULTP		8038.	0.	8630.	0.	38577.	150840.	.000	1.971	.000
		FAULTN		-2314.	-5861.	0.	-151553.	0.	-37660.	-.637	.000	-1.956
007	RAD		NL5016									
		WT1		181.	0.	-73.	0.	0.	0.	.001	.001	.002
		THRM1		-3661.	0.	1479.	0.	0.	0.	-.543	1.360	-1.339
		JMAX		53.	0.	53.	0.	0.	0.	.003	.000	.007
		JMIN		-133.	0.	-21.	0.	0.	0.	.000	-.002	.000
		FAULTP		0.	0.	1459.	0.	0.	0.	.000	1.361	.000
		FAULTN		-3612.	0.	0.	0.	0.	0.	-.542	.000	-1.337
009	SPD		NL5015									
		WT1		0.	-14108.	0.	0.	0.	0.	.005	.000	.003
		THRM1								-.043	1.080	-.243
		JMAX		0.	0.	0.	0.	0.	0.	.000	.000	.007
		JMIN		0.	0.	0.	0.	0.	0.	.000	-.005	.000
		FAULTP		0.	0.	0.	0.	0.	0.	.000	1.080	.000
		FAULTN		0.	-14108.	0.	0.	0.	0.	-.037	.000	-.240
011	RAD		NL5014									
		WT1		-77.	0.	0.	0.	0.	0.	.000	-.007	.000
		THRM1		-2199.	0.	0.	0.	0.	0.	-.002	1.023	-.011
		JMAX		650.	0.	0.	0.	0.	0.	.001	.000	.001
		JMIN		-457.	0.	0.	0.	0.	0.	.000	-.008	-.001
		FAULTP		0.	0.	0.	0.	0.	0.	.000	1.016	.000
		FAULTN		-2733.	0.	0.	0.	0.	0.	-.003	.000	-.012
011	RAD		NL5014									
		WT1		165.	0.	192.	0.	0.	0.	.000	-.007	.000
		THRM1		-9020.	0.	-11969.	0.	0.	0.	-.002	1.023	-.011
		JMAX		176.	0.	233.	0.	0.	0.	.001	.000	.001
		JMIN		-342.	0.	-454.	0.	0.	0.	.000	-.008	-.001
		FAULTP		0.	0.	0.	0.	0.	0.	.000	1.016	.000
		FAULTN		-9217.	0.	-12231.	0.	0.	0.	-.003	.000	-.012
014	RAD		NL5013									
		WT1		150.	0.	34.	0.	0.	0.	.000	-.008	.000
		THRM1		32427.	0.	7428.	0.	0.	0.	.016	.411	-.024
		JMAX		1306.	0.	299.	0.	0.	0.	.001	.000	.004
		JMIN		-2495.	0.	-571.	0.	0.	0.	-.002	-.008	-.001
		FAULTP		33883.	0.	7762.	0.	0.	0.	.017	.403	.000
		FAULTN		0.	0.	0.	0.	0.	0.	.000	.000	-.025

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		HL5013									
		WT1		-217.	0.	-338.	0.	0.	0.	.000	-.008	.000
		THRM1		2225.	0.	-14191.	0.	0.	0.	.016	.411	-.024
		JMAX		1668.	0.	2599.	0.	0.	0.	.001	.000	.004
		JMIN		-315.	0.	-490.	0.	0.	0.	-.002	-.008	-.001
		FAULTP		0.	0.	0.	0.	0.	0.	.017	.403	.000
		FAULTN		-9641.	0.	-15019.	0.	0.	0.	.000	.000	-.025
040	SPR		FW9014SH0001									
		WT1		0.	-1751 ~~0~~	0.	0.	0.	0.	.008	-.010	-.002
		THRM1								.105	-.299	-.309
		JMAX		0.	0.	0.	0.	0.	0.	.044	.002	.014
		JMIN		0.	0.	0.	0.	0.	0.	-.026	-.031	.000
		FAULTP		0.	0.	0.	0.	0.	0.	.157	.000	.000
		FAULTN		0.	-1751 ~~0~~	0.	0.	0.	0.	.000	-.340	-.310
13	SPR		FW9014HL5008									
		WT1		0.	-9157 ~~0~~	0.	0.	0.	0.	.008	-.016	-.001
		THRM1								-.255	-.498	-.262
		JMAX		0.	0.	0.	0.	0.	0.	.068	.000	.047
		JMIN		0.	0.	0.	0.	0.	0.	-.039	-.049	-.004
		FAULTP		0.	0.	0.	0.	0.	0.	.000	.000	.000
		FAULTN		0.	-9157 ~~0~~	0.	0.	0.	0.	-.285	-.562	-.267
085	RAD		FW9014HL5006									
		WT1		0.	-5537.	0.	0.	0.	0.	-.001	-.004	.005
		THRM1		0.	3047.	0.	0.	0.	0.	-.648	.002	-.979
		JMAX		0.	3677.	0.	0.	0.	0.	.123	.002	.056
		JMIN		0.	-258.	0.	0.	0.	0.	.000	.000	.006
		FAULTP		0.	187.	0.	0.	0.	0.	.000	.000	.000
		FAULTN		0.	-2749.	0.	0.	0.	0.	-.649	-.002	-.974
095	SPR		FW9014SH0004									
		WT1		0.	-6756 ~~0~~	0.	0.	0.	0.	.000	.007	.000
		THRM1								-.089	.003	-.502
		JMAX		0.	0.	0.	0.	0.	0.	.031	.006	.003
		JMIN		0.	0.	0.	0.	0.	0.	.000	-.006	.000
		FAULTP		0.	0.	0.	0.	0.	0.	.000	.017	.000
		FAULTN		0.	-6756 ~~0~~	0.	0.	0.	0.	-.089	.000	-.502
95B	RAD		FW9014HL5004									
		WT1		-249.	0.	0.	0.	0.	0.	.000	.006	.000
		THRM1		24459.	0.	0.	0.	0.	0.	.029	.007	-.461
		JMAX		20718.	0.	0.	0.	0.	0.	.024	.005	.003
		JMIN		0.	0.	0.	0.	0.	0.	.000	-.006	.000
		FAULTP		44928.	0.	0.	0.	0.	0.	.053	.018	.000
		FAULTN		0.	0.	0.	0.	0.	0.	.000	.000	-.461

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
10A	RAD		FW9014HLS011									
		NT1		0.	0.	120.	0.	0.	0.	.000	-.006	.000
		THRM1		0.	0.	20000.	0.	0.	0.	.497	-.014	-.006
		JMAX		0.	0.	190.	0.	0.	0.	.001	.000	.000
		JMIN		0.	0.	-1778.	0.	0.	0.	-.001	-.002	-.001
		FAULTP		0.	0.	0.	0.	0.	0.	.498	.000	.000
		FAULTN		0.	0.	-11658.	0.	0.	0.	.000	-.022	-.008
110	ANC		FEN M-7									
		NT1		56.	-2621.	-24.	2693.	36.	-8539.	.000	.000	.000
		THRM1		-38524.	1471.	18804.	-2500.	-51326.	25657.	.033	-.061	.008
		JMAX		3969.	108.	0.	2013.	3009.	0.	.001	.000	.000
		JMIN		-3087.	-157.	-278.	-966.	0.	-1107.	.000	.000	.000
		FAULTP		0.	0.	18780.	2205.	0.	17118.	.034	.000	.008
		FAULTN		-41555.	-1307.	0.	-774.	-51290.	0.	.000	-.062	.000
027	RAD		FW9014HLS012									
		NT1								.008	-.009	-.002
		THRM1								.190	-.231	-.320
		JMAX		-837.	0.	-1175.	0.	0.	0.	.038	.003	.017
		JMIN		-837.	0.	-1175.	0.	0.	0.	-.024	-.025	.000
		FAULTP		-837.	0.	-1175.	0.	0.	0.	.236	.000	.000
		FAULTN		-837.	0.	-1175.	0.	0.	0.	.000	-.266	-.322
042	RAD		FW9014HLS009									
		NT1								.008	-.011	-.001
		THRM1								-.054	-.407	-.287
		JMAX		0.	-3307.	0.	0.	0.	0.	.055	.000	.029
		JMIN		0.	-3307.	0.	0.	0.	0.	-.032	-.040	.000
		FAULTP		0.	-3307.	0.	0.	0.	0.	.069	.000	.000
		FAULTN		0.	-3307.	0.	0.	0.	0.	-.077	-.458	-.288
050	RAD		FW9014HLS001									
		NT1								.001	-.027	.007
		THRM1								-.316	-.293	-.384
		JMAX		8996.	0.	0.	0.	0.	0.	.093	.000	.074
		JMIN		8996.	0.	0.	0.	0.	0.	.000	-.051	.000
		FAULTP		8996.	0.	0.	0.	0.	0.	.000	.000	.000
		FAULTN		8996.	0.	0.	0.	0.	0.	-.315	-.371	-.377
055	RAD		FW9014HLS002									
		NT1								.000	-.027	.008
		THRM1								-.281	-.252	-.420
		JMAX		332.	0.	-1064.	0.	0.	0.	.097	.000	.077
		JMIN		332.	0.	-1064.	0.	0.	0.	.000	-.051	.000
		FAULTP		332.	0.	-1064.	0.	0.	0.	.000	.000	.000
		FAULTN		332.	0.	-1064.	0.	0.	0.	-.281	-.331	-.412

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
080	RAD		FW9014HL5003									
		WT1								-.001	-.006	.006
		THRM1								-.605	.009	-.965
		JMAX		0.	0.	2599.	0.	0.	0.	.123	.004	.061
		JMIN		0.	0.	2599.	0.	0.	0.	.000	-.004	.000
		FAULTP		0.	0.	2599.	0.	0.	0.	.000	.007	.000
		FAULTN		0.	0.	2599.	0.	0.	0.	-.606	-.001	-.959

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RCS035
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		1R122NSG201B															
		WT1		-56	-566	-71	603	1161	-2690	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		THRM1		-9018	-4518	-4661	77365	37005	-158896	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		JMAX		11	0	74	112	412	0	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		JMIN		-121	-779	-41	0	0	-10878	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTP		0	0	0	77680	38577	0	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
		FAULTN		-9190	-5861	-4773	0	0	-172464	-.87	.00	-.48	.00	1.00	.00	.48	.00	-.87
007	RAD		NL5016															
		WT1		196	0	0	0	0	0	.93	.00	-.37						
		THRM1		-3949	0	0	0	0	0	.93	.00	-.37						
		JMAX		57	0	0	0	0	0	.93	.00	-.37						
		JMIN		-142	0	0	0	0	0	.93	.00	-.37						
		FAULTP		0	0	0	0	0	0	.93	.00	-.37						
		FAULTN		-3895	0	0	0	0	0	.93	.00	-.37						
009	SPD		NL5015															
		WT1		-14108	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		JMAX		0	0	0	0	0	0	.00	1.00	.00						
		JMIN		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-14108	0	0	0	0	0	.00	1.00	.00						
011	RAD		NL5014															
		WT1		77	0	0	0	0	0	-1.00	.00	.00						
		THRM1		2199	0	0	0	0	0	-1.00	.00	.00						
		JMAX		457	0	0	0	0	0	-1.00	.00	.00						
		JMIN		-650	0	0	0	0	0	-1.00	.00	.00						
		FAULTP		2733	0	0	0	0	0	-1.00	.00	.00						
		FAULTN		0	0	0	0	0	0	-1.00	.00	.00						
011	RAD		NL5014															
		WT1		-241	0	0	0	0	0	-.60	.00	-.80						
		THRM1		14987	0	0	0	0	0	-.60	.00	-.80						
		JMAX		569	0	0	0	0	0	-.60	.00	-.80						
		JMIN		-292	0	0	0	0	0	-.60	.00	-.80						
		FAULTP		15315	0	0	0	0	0	-.60	.00	-.80						
		FAULTN		0	0	0	0	0	0	-.60	.00	-.80						
014	RAD		NL5013															
		WT1		-154	0	0	0	0	0	-.97	.00	-.22						
		THRM1		-33367	0	0	0	0	0	-.97	.00	-.22						
		JMAX		2559	0	0	0	0	0	-.97	.00	-.22						
		JMIN		-1339	0	0	0	0	0	-.97	.00	-.22						
		FAULTP		0	0	0	0	0	0	-.97	.00	-.22						
		FAULTN		-34761	0	0	0	0	0	-.97	.00	-.22						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		KL5013															
		WT1		401	0	0	0	0	0	-.54	.00	-.84						
		THRM1		16863	0	0	0	0	0	-.54	.00	-.84						
		JMAX		583	0	0	0	0	0	-.54	.00	-.84						
		JMIN		-3088	0	0	0	0	0	-.54	.00	-.84						
		FAULTP		17847	0	0	0	0	0	-.54	.00	-.84						
		FAULTN		0	0	0	0	0	0	-.54	.00	-.84						
040	SPR		FW9014SH0001															
		WT1		-1751	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		JMAX		0	0	0	0	0	0	.00	1.00	.00						
		JMIN		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-1751	0	0	0	0	0	.00	1.00	.00						
13	SPR		FW9014HL5008															
		WT1		-9157	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		JMAX		0	0	0	0	0	0	.00	1.00	.00						
		JMIN		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-9157	0	0	0	0	0	.00	1.00	.00						
085	RAD		FW9014HL5006															
		WT1		-5537	0	0	0	0	0	.00	1.00	.00						
		THRM1		3047	0	0	0	0	0	.00	1.00	.00						
		JMAX		2677	0	0	0	0	0	.00	1.00	.00						
		JMIN		-258	0	0	0	0	0	.00	1.00	.00						
		FAULTP		187	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-2749	0	0	0	0	0	.00	1.00	.00						
095	SPR		FW9014SH0004															
		WT1		-6756	0	0	0	0	0	.00	1.00	.00						
		THRM1																
		JMAX		0	0	0	0	0	0	.00	1.00	.00						
		JMIN		0	0	0	0	0	0	.00	1.00	.00						
		FAULTP		0	0	0	0	0	0	.00	1.00	.00						
		FAULTN		-6756	0	0	0	0	0	.00	1.00	.00						
95B	RAD		FW9014HL5004															
		WT1		-249	0	0	0	0	0	1.00	.00	.00						
		THRM1		24459	0	0	0	0	0	1.00	.00	.00						
		JMAX		20718	0	0	0	0	0	1.00	.00	.00						
		JMIN		0	0	0	0	0	0	1.00	.00	.00						
		FAULTP		44928	0	0	0	0	0	1.00	.00	.00						
		FAULTN		0	0	0	0	0	0	1.00	.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		FW9014HL5011															
		WT1		222	0	0	0	0	0	.00	.00	1.00						
		THRM1		-10000	0	0	0	0	0	.00	.00	1.00						
		JMAX		190	0	0	0	0	0	.00	.00	1.00						
		JMIN		-1778	0	0	0	0	0	.00	.00	1.00						
		FAULTP		0	0	0	0	0	0	.00	.00	1.00						
		FAULTM		-11658	0	0	0	0	0	.00	.00	1.00						
110	ANC		FEW M-7															
		WT1		56	-2621	-24	2693	16	-8539	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		THRM1		-38524	1471	18804	-2500	-51326	25657	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		JMAX		3969	109	0	2013	1009	0	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		JMIN		-3087	-157	-278	-966	0	-1107	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTP		0	0	18780	2205	0	17118	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		FAULTM		-41555	-3397	0	-774	-51290	0	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
027	RAD		FW9014HL5012															
		WT1																
		THRM1																
		JMAX		1442	0	0	0	0	0	-.58	.00	-.81						
		JMIN		1442	0	0	0	0	0	-.58	.00	-.81						
		FAULTP		1442	0	0	0	0	0	-.58	.00	-.81						
		FAULTM		1442	0	0	0	0	0	-.58	.00	-.81						
042	RAD		FW9014HL5009															
		WT1																
		THRM1																
		JMAX		-3307	0	0	0	0	0	.00	1.00	.00						
		JMIN		-3307	0	0	0	0	0	.00	1.00	.00						
		FAULTP		-3307	0	0	0	0	0	.00	1.00	.00						
		FAULTM		-3307	0	0	0	0	0	.00	1.00	.00						
050	RAD		FW9014HL5001															
		WT1																
		THRM1																
		JMAX		8996	0	0	0	0	0	1.00	.00	.00						
		JMIN		8996	0	0	0	0	0	1.00	.00	.00						
		FAULTP		8996	0	0	0	0	0	1.00	.00	.00						
		FAULTM		8996	0	0	0	0	0	1.00	.00	.00						
055	RAD		FW9014HL5002															
		WT1																
		THRM1																
		JMAX		1114	0	0	0	0	0	.30	.00	-.95						
		JMIN		1114	0	0	0	0	0	.30	.00	-.95						
		FAULTP		1114	0	0	0	0	0	.30	.00	-.95						
		FAULTM		1114	0	0	0	0	0	.30	.00	-.95						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
090	RAD		FW9014NL5003															
			WALL															
			THERM1															
			JMAX	2599	0	0	0	0	0	.00	.00	1.00						
			JMIN	2599	0	0	0	0	0	.00	.00	1.00						
			FAULTP	2599	0	0	0	0	0	.00	.00	1.00						
			FAULTM	2599	0	0	0	0	0	.00	.00	1.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23638001
PROBLEM NUMBER : 2C159RC5035
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		1R122WSG201B									
		WT1		-1.	-540.	93.	-1131.	1260.	1960.	.000	.000	.000
		TIMEL1								.028	.028	.027
		TIMEL2								.032	.031	.028
		TIMEL3								.031	.030	.027
		LOCA								.032	.031	.028
007	RAD		HL5016									
		WT1		221.	0.	-89.	0.	0.	0.	.001	.001	.002
		TIMEL1		24960.	0.	10084.	0.	0.	0.	.027	.023	.040
		TIMEL2		24155.	0.	9759.	0.	0.	0.	.027	.026	.041
		TIMEL3		25679.	0.	10375.	0.	0.	0.	.028	.027	.039
		LOCA		25679.	0.	10375.	0.	0.	0.	.028	.027	.041
009	SPD		HL5015									
		WT1		0.	-14280.	0.	0.	0.	0.	.006	.000	.003
		TIMEL1								.048	.022	.032
		TIMEL2								.049	.030	.031
		TIMEL3								.047	.025	.033
		LOCA								.049	.030	.033
011	RAD		HL5014									
		WT1		-213.	0.	0.	0.	0.	0.	.000	-.007	.000
		TIMEL1		27898.	0.	0.	0.	0.	0.	.027	.028	.024
		TIMEL2		27900.	0.	0.	0.	0.	0.	.027	.039	.026
		TIMEL3		27698.	0.	0.	0.	0.	0.	.026	.032	.025
		LOCA		27900.	0.	0.	0.	0.	0.	.027	.039	.026
011	RAD		HL5014									
		WT1		233.	0.	309.	0.	0.	0.	.000	-.007	.000
		TIMEL1		12424.	0.	16487.	0.	0.	0.	.027	.028	.024
		TIMEL2		13062.	0.	17361.	0.	0.	0.	.027	.039	.026
		TIMEL3		12526.	0.	16622.	0.	0.	0.	.026	.032	.025
		LOCA		13082.	0.	17361.	0.	0.	0.	.027	.039	.026
014	RAD		HL5013									
		WT1		194.	0.	44.	0.	0.	0.	.000	-.008	-.001
		TIMEL1		20415.	0.	4677.	0.	0.	0.	.011	.029	.017
		TIMEL2		20718.	0.	4746.	0.	0.	0.	.010	.039	.017
		TIMEL3		20114.	0.	4607.	0.	0.	0.	.010	.033	.017
		LOCA		20718.	0.	4746.	0.	0.	0.	.011	.039	.017

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		HL5013									
		WT1		-285.	0.	-444.	0.	0.	0.	.008	-.008	-.001
		TIMEL1		7575.	0.	11940.	0.	0.	0.	.011	.029	.017
		TIMEL2		7575.	0.	11801.	0.	0.	0.	.010	.039	.017
		TIMEL3		7679.	0.	11962.	0.	0.	0.	.010	.033	.017
		LOCA		7679.	0.	11962.	0.	0.	0.	.011	.039	.017
040	SPR		FW9014SH0001									
		WT1		0.	-1751	0.	0.	0.	0.	.008	-.019	-.011
		TIMEL1								.017	.015	.019
		TIMEL2								.022	.017	.022
		TIMEL3								.020	.017	.021
		LOCA								.022	.017	.022
13	SPR		FW9014HL5008									
		WT1		0.	-9157	0.	0.	0.	0.	.006	-.036	-.014
		TIMEL1								.012	.026	.025
		TIMEL2								.013	.032	.036
		TIMEL3								.015	.028	.027
		LOCA								.015	.032	.034
085	RAD		FW9014HL5006									
		WT1		0.	-4457.	0.	0.	0.	0.	.000	-.003	.006
		TIMEL1		0.	4389.	0.	0.	0.	0.	.006	.003	.001
		TIMEL2		0.	4358.	0.	0.	0.	0.	.011	.003	.001
		TIMEL3		0.	4290.	0.	0.	0.	0.	.007	.003	.001
		LOCA		0.	4389.	0.	0.	0.	0.	.011	.003	.001
095	SPR		FW9014SH0004									
		WT1		0.	-6756	0.	0.	0.	0.	.008	.016	.000
		TIMEL1								.001	.009	.003
		TIMEL2								.002	.010	.004
		TIMEL3								.002	.011	.003
		LOCA								.002	.011	.004
958	RAD		FW9014HL5004									
		WT1		-127.	0.	0.	0.	0.	0.	.000	.013	.000
		TIMEL1		955.	0.	0.	0.	0.	0.	.001	.007	.003
		TIMEL2		1162.	0.	0.	0.	0.	0.	.001	.009	.004
		TIMEL3		1069.	0.	0.	0.	0.	0.	.001	.009	.003
		LOCA		1162.	0.	0.	0.	0.	0.	.001	.009	.004

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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		FW3014NLS011									
		WT1		0.	0.	108.	0.	0.	0.	.000	-.006	.000
		TIMEL1		0.	0.	1428.	0.	0.	0.	.000	.006	.001
		TIMEL2		0.	0.	1902.	0.	0.	0.	.000	.006	.001
		TIMEL3		0.	0.	1513.	0.	0.	0.	.000	.007	.001
		LOCA		0.	0.	1902.	0.	0.	0.	.000	.007	.001
110	ANC		PEN M-7									
		WT1		-21.	-2421.	-20.	4781.	29.	-8012.	.000	.000	.000
		TIMEL1		618.	1170.	357.	2983.	662.	4945.	.000	.000	.000
		TIMEL2		626.	1144.	429.	3856.	713.	4362.	.000	.000	.000
		TIMEL3		684.	1193.	367.	3433.	628.	5134.	.000	.000	.000
		LOCA		684.	1193.	429.	3856.	713.	5134.	.000	.000	.000
001	RAD		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		19146.	0.	0.	0.	0.	0.	.028	.028	.027
		TIMEL2		19298.	0.	0.	0.	0.	0.	.032	.031	.028
		TIMEL3		19079.	0.	0.	0.	0.	0.	.031	.030	.027
		LOCA		19298.	0.	0.	0.	0.	0.	.032	.031	.028
001	RAD		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	15980.	0.	0.	0.	0.	.028	.028	.027
		TIMEL2		0.	15391.	0.	0.	0.	0.	.032	.031	.028
		TIMEL3		0.	16230.	0.	0.	0.	0.	.031	.030	.027
		LOCA		0.	16230.	0.	0.	0.	0.	.032	.031	.028
001	RAD		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	0.	17459.	0.	0.	0.	.028	.028	.027
		TIMEL2		0.	0.	17806.	0.	0.	0.	.032	.031	.028
		TIMEL3		0.	0.	17476.	0.	0.	0.	.031	.030	.027
		LOCA		0.	0.	17806.	0.	0.	0.	.032	.031	.028
001	RAR		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	0.	0.	90611.	0.	0.	.028	.028	.027
		TIMEL2		0.	0.	0.	86598.	0.	0.	.032	.031	.028
		TIMEL3		0.	0.	0.	92457.	0.	0.	.031	.030	.027
		LOCA		0.	0.	0.	92457.	0.	0.	.032	.031	.028

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 21438001
PROBLEM NUMBER : 2C159RC5035
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.	303765.	0.	.028	.028	.027
		TIMEL2		0.	0.	0.	0.	300135.	0.	.032	.031	.028
		TIMEL3		0.	0.	0.	0.	305862.	0.	.031	.030	.027
		LOCA		0.	0.	0.	0.	305862.	0.	.032	.031	.028
001	RAR		CENTER SG									
		WT1								.000	.000	.000
		TIMEL1		0.	0.	0.	0.	0.	181440.	.028	.028	.027
		TIMEL2		0.	0.	0.	0.	0.	174829.	.032	.031	.028
		TIMEL3		0.	0.	0.	0.	0.	183655.	.031	.030	.027
		LOCA		0.	0.	0.	0.	0.	183655.	.032	.031	.028
027	SNB		FW9014HL5012									
		WT1								.009	-.016	-.010
		TIMEL1		4813.	0.	6758.	0.	0.	0.	.018	.019	.020
		TIMEL2		4642.	0.	6517.	0.	0.	0.	.023	.024	.020
		TIMEL3		4307.	0.	6047.	0.	0.	0.	.021	.022	.020
		LOCA		4813.	0.	6758.	0.	0.	0.	.023	.026	.020
042	SNB		FW9014HL5009									
		WT1								.007	-.025	-.012
		TIMEL1		0.	11722.	0.	0.	0.	0.	.014	.013	.020
		TIMEL2		0.	11658.	0.	0.	0.	0.	.018	.013	.027
		TIMEL3		0.	12692.	0.	0.	0.	0.	.016	.014	.023
		LOCA		0.	12692.	0.	0.	0.	0.	.018	.014	.027
050	SNB		FW9014HL5001									
		WT1								-.002	-.052	.001
		TIMEL1		3869.	0.	0.	0.	0.	0.	.005	.046	.009
		TIMEL2		3841.	0.	0.	0.	0.	0.	.005	.057	.008
		TIMEL3		3960.	0.	0.	0.	0.	0.	.005	.051	.009
		LOCA		3960.	0.	0.	0.	0.	0.	.005	.057	.009
055	SNB		FW9014HL5002									
		WT1								-.002	-.052	.004
		TIMEL1		1198.	0.	3834.	0.	0.	0.	.005	.046	.005
		TIMEL2		1120.	0.	3586.	0.	0.	0.	.005	.057	.004
		TIMEL3		1130.	0.	3619.	0.	0.	0.	.005	.051	.005
		LOCA		1198.	0.	3834.	0.	0.	0.	.005	.057	.005

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
USER : FANI
LOAD CASE :

DATA TYPE PT	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
080 SNB		FW9014KL5003									
	NT1								.000	-.000	.000
	TIMEL1		0.	0.	1925.	0.	0.	0.	.006	.006	.001
	TIMEL2		0.	0.	2758.	0.	0.	0.	.011	.006	.002
	TIMEL3		0.	0.	1973.	0.	0.	0.	.007	.008	.001
	LOCA		0.	0.	2758.	0.	0.	0.	.011	.008	.002

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23436001
PROBLEM NUMBER : 2C159RC5035
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		1R122HSG201B															
		WT1		-1	-540	93	-1331	1260	1960	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
007	RAD		HL5016															
		WT1		238	0	0	0	0	0	.93	.00	-.37						
		TIMEL1		26920	0	0	0	0	0	.93	.00	-.37						
		TIMEL2		26052	0	0	0	0	0	.93	.00	-.37						
		TIMEL3		27695	0	0	0	0	0	.93	.00	-.37						
		LOCA		27695	0	0	0	0	0	.93	.00	-.37						
009	SPD		HL5015															
		WT1		-14280	0	0	0	0	0	.00	1.00	.00						
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
011	RAD		HL5014															
		WT1		213	0	0	0	0	0	-1.00	.00	.00						
		TIMEL1		27898	0	0	0	0	0	-1.00	.00	.00						
		TIMEL2		27900	0	0	0	0	0	-1.00	.00	.00						
		TIMEL3		27698	0	0	0	0	0	-1.00	.00	.00						
		LOCA		27900	0	0	0	0	0	-1.00	.00	.00						
011	RAD		HL5014															
		WT1		-387	0	0	0	0	0	-.60	.00	-.80						
		TIMEL1		20644	0	0	0	0	0	-.60	.00	-.80						
		TIMEL2		21738	0	0	0	0	0	-.60	.00	-.80						
		TIMEL3		20813	0	0	0	0	0	-.60	.00	-.80						
		LOCA		21738	0	0	0	0	0	-.60	.00	-.80						
014	RAD		HL5013															
		WT1		-199	0	0	0	0	0	-.97	.00	-.22						
		TIMEL1		20944	0	0	0	0	0	-.97	.00	-.22						
		TIMEL2		21255	0	0	0	0	0	-.97	.00	-.22						
		TIMEL3		20635	0	0	0	0	0	-.97	.00	-.22						
		LOCA		21255	0	0	0	0	0	-.97	.00	-.22						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
014	RAD		HL5013															
		WT1		528	0	0	0	0	0	-.54	.00	-.84						
		TIMEL1		14177	0	0	0	0	0	-.54	.00	-.84						
		TIMEL2		14023	0	0	0	0	0	-.54	.00	-.84						
		TIMEL3		14214	0	0	0	0	0	-.54	.00	-.84						
		LOCA		14214	0	0	0	0	0	-.54	.00	-.84						
040	SPR		FW9014SH0001															
		WT1		-1751	0	0	0	0	0	.00	1.00	.00						
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
13	SPR		FW9014HL5008															
		WT1		-9157	0	0	0	0	0	.00	1.00	.00						
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
085	RAD		FW9014HL5006															
		WT1		-4457	0	0	0	0	0	.00	1.00	.00						
		TIMEL1		4389	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		4358	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		4290	0	0	0	0	0	.00	1.00	.00						
		LOCA		4389	0	0	0	0	0	.00	1.00	.00						
095	SPR		FW9014SH0004															
		WT1		-6756	0	0	0	0	0	.00	1.00	.00						
		TIMEL1																
		TIMEL2																
		TIMEL3																
		LOCA																
95B	RAD		FW9014HL5004															
		WT1		-127	0	0	0	0	0	1.00	.00	.00						
		TIMEL1		955	0	0	0	0	0	1.00	.00	.00						
		TIMEL2		1162	0	0	0	0	0	1.00	.00	.00						
		TIMEL3		1069	0	0	0	0	0	1.00	.00	.00						
		LOCA		1162	0	0	0	0	0	1.00	.00	.00						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1R TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
10A	RAD		FW9014HL5011															
		WT1		106	0	0	0	0	0	.00	.00	1.00						
		TIMEL1		1628	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		1902	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		1513	0	0	0	0	0	.00	.00	1.00						
		LOCA		1902	0	0	0	0	0	.00	.00	1.00						
110	ANC		PEN M-7															
		WT1		-21	-2421	-20	4781	29	-8012	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL1		618	1170	357	2983	662	4945	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL2		626	1144	429	3856	713	4362	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		TIMEL3		584	1193	367	3433	628	5134	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
		LOCA		684	1193	429	3856	713	5134	1.00	.00	.00	.00	1.00	.00	.00	.00	1.00
001	RAD		CENTER SG															
		WT1																
		TIMEL1		19146	0	0	0	0	0	1.00	.00	.00						
		TIMEL2		19298	0	0	0	0	0	1.00	.00	.00						
		TIMEL3		19079	0	0	0	0	0	1.00	.00	.00						
		LOCA		19298	0	0	0	0	0	1.00	.00	.00						
001	RAD		CENTER SG															
		WT1																
		TIMEL1		15980	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		15391	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		16230	0	0	0	0	0	.00	1.00	.00						
		LOCA		16230	0	0	0	0	0	.00	1.00	.00						
001	RAD		CENTER SG															
		WT1																
		TIMEL1		17459	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		17806	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		17476	0	0	0	0	0	.00	.00	1.00						
		LOCA		17806	0	0	0	0	0	.00	.00	1.00						
001	RAD		CENTER SG															
		WT1																
		TIMEL1		0	0	0	90611	0	0	1.00	.00	.00						
		TIMEL2		0	0	0	86598	0	0	1.00	.00	.00						
		TIMEL3		0	0	0	92457	0	0	1.00	.00	.00						
		LOCA		0	0	0	92457	0	0	1.00	.00	.00						

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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	303765	0	0	.00	1.00	.00						
		TIMEL2		0	0	0	300135	0	0	.00	1.00	.00						
		TIMEL3		0	0	0	305862	0	0	.00	1.00	.00						
		LOCA		0	0	0	305862	0	0	.00	1.00	.00						
001	RAR		CENTER SG															
		WT1																
		TIMEL1		0	0	0	181440	0	0	.00	.00	1.00						
		TIMEL2		0	0	0	174829	0	0	.00	.00	1.00						
		TIMEL3		0	0	0	183855	0	0	.00	.00	1.00						
		LOCA		0	0	0	183855	0	0	.00	.00	1.00						
027	SNB		FW9014HL5012															
		WT1																
		TIMEL1		8296	0	0	0	0	0	-.58	.00	-.81						
		TIMEL2		8001	0	0	0	0	0	-.58	.00	-.81						
		TIMEL3		7424	0	0	0	0	0	-.58	.00	-.81						
		LOCA		8296	0	0	0	0	0	-.58	.00	-.81						
042	SNB		FW9014HL5009															
		WT1																
		TIMEL1		11722	0	0	0	0	0	.00	1.00	.00						
		TIMEL2		11558	0	0	0	0	0	.00	1.00	.00						
		TIMEL3		12692	0	0	0	0	0	.00	1.00	.00						
		LOCA		12692	0	0	0	0	0	.00	1.00	.00						
050	SNB		FW9014HL5001															
		WT1																
		TIMEL1		3869	0	0	0	0	0	1.00	.00	.00						
		TIMEL2		3841	0	0	0	0	0	1.00	.00	.00						
		TIMEL3		3960	0	0	0	0	0	1.00	.00	.00						
		LOCA		3960	0	0	0	0	0	1.00	.00	.00						
055	SNB		FW9014HL5002															
		WT1																
		TIMEL1		4016	0	0	0	0	0	.30	.00	-.95						
		TIMEL2		3757	0	0	0	0	0	.30	.00	-.95						
		TIMEL3		3792	0	0	0	0	0	.30	.00	-.95						
		LOCA		4016	0	0	0	0	0	.30	.00	-.95						

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TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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
USU	SNH		FWYU1%HL5UU5															
		WT1																
		TIMEL1		1915	0	0	0	0	0	.00	.00	1.00						
		TIMEL2		2758	0	0	0	0	0	.00	.00	1.00						
		TIMEL3		1973	0	0	0	0	0	.00	.00	1.00						
		LOCA		2758	0	0	0	0	0	.00	.00	1.00						

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1B TO M7

ORIGINATOR PANI [illegible] DATE 3/1/98 CALC NO RC5035-P-200 R0
SHEET NO
CHK. WSS 3/1/98 SHEET REV

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ATTACHMENT 3.0 HELB STRESS SUMMARY TOTAL NO OF SHEETS - 6

TITLE : FEEDWATER "FW" SYSTEM - SG 1B TO M7
PROJECT NUMBER : 23438001
PROBLEM NUMBER : 2C159RC5035
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	13	17	31	48600
001		18	29	47	
002	TNOT	289	1451	1740	48600
003		270	1415	1685	
003	TNOT	992	5208	6200	48600
03A		862	4997	5859	
03A	TNOT	8040	15040	23080	48600
M02		8022	21913	29935	
M02	TNOT	8022	21913	29935	48600
004		6383	13088	19471	
004	BEND	6712	23616	30328	39468
005 M		5996	21344	27341	
005 M	BEND	5996	21344	27341	39468
005 E		6223	18189	24412	
005 E	TNOT	6022	10013	16035	32400
005A		6131	6107	12238	
005A	TNOT	6131	6107	12238	32400
007		6371	10460	16831	
007	TNOT	6371	10460	16831	32400
007A		6312	6555	12868	
007A	TNOT	6312	6555	12868	32400
008 B		6482	6197	12679	
008 B	BEND	7279	15094	22373	32400
008 M		7337	15657	22994	
008 M	BEND	7337	15657	22994	32400
008 E		7314	15326	22640	

** 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
008 E	TNOT	6502	6482	12984	32400
009		6516	6360	12877	
009	TNOT	6516	6360	12877	32400
010 B		6273	6251	12524	
010 B	BEND	6562	11280	17842	32400
010 M		6779	11469	18248	
010 M	BEND	6779	11469	18248	32400
010 E		7562	13335	20896	
010 E	TNOT	7011	7387	14398	32400
011		6977	8196	15173	
011	TNOT	6977	8196	15173	32400
011A		6496	7239	13735	
011A	TNOT	6496	7239	13735	32400
012		6209	7369	13578	
012	TNOT	6209	7369	13578	32400
013		6194	7676	13870	
013	TNOT	6194	7676	13870	32400
013A		6334	8713	15048	
013A	TNOT	6334	8713	15048	32400
014		6648	10272	16920	
014	TNOT	6648	10272	16920	32400
015		6382	8043	14425	
015	TNOT	6382	8043	14425	32400
016		6707	14432	21139	
016	TNOT	6421	10246	16666	32400
018		6062	4539	10601	
018	TNOT	6062	4539	10601	32400
020		5997	4385	10382	
020	TNOT	5997	4385	10382	32400
021		5932	4189	10121	
021	TNOT	5932	4189	10121	32400
022		5903	3998	9901	

** EXCEEDED ALLOWABLE

CODE SC3W75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
022	THGT	5903	3998	9901	32400
025 B		5944	3674	9619	
025 B	BEND	6095	6690	12785	32400
025 M		6152	8745	14897	
025 M	BEND	6152	8745	14897	32400
025 E		6198	9403	15601	
025 E	THGT	6019	5165	11184	32400
026		6244	4968	11212	
026	THGT	6244	4968	11212	32400
027		6724	10382	17106	
027	THGT	6724	10382	17106	32400
030		6395	4891	11285	
030	THGT	6395	4891	11285	32400
035		6438	4888	11326	
035	THGT	6438	4888	11326	32400
040		6602	4884	11485	
040	THGT	6602	4884	11485	32400
040A		6833	4878	11711	
040A	THGT	6833	4878	11711	32400
042		7116	4912	12028	
042	THGT	7116	4912	12028	32400
042A		6916	5402	12318	
042A	THGT	6916	5402	12318	32400
13		6870	5909	12779	
13	THGT	6870	5909	12779	32400
045 B		6294	6267	12561	
045 B	BEND	6573	11410	17982	32400
045 M		6490	11038	17528	
045 M	BEND	6490	11038	17528	32400
045 E		6858	8700	15558	
045 E	THGT	6501	4795	11288	32400
050		7212	5615	12827	

** EXCEEDED ALLOWABLE

CODE ECIM75, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
050	TNGT	7212	5615	12827	32400
050A		6597	2246	8843	
050A	TNGT	6597	2246	8843	32400
055		6602	1908	8510	
055	TNGT	6602	1908	8510	32400
060 B		6551	2557	9109	
060 B	BEND	6924	4656	11580	32400
060 M		6972	6960	13931	
060 M	BEND	6972	6960	13931	32400
060 E		7003	8159	15163	
060 E	TNGT	6609	4482	11091	32400
060A		6566	4707	11273	
060A	TNGT	6566	4707	11273	32400
065		6498	5004	11502	
065	TNGT	6498	5004	11502	32400
070		6622	10354	16976	
070	TNGT	6622	10354	16976	32400
080		7014	14797	21811	
080	TNGT	7014	14797	21811	32400
085		6612	7368	13981	
085	TNGT	6612	7368	13981	32400
086		6214	7963	14177	
086	TNGT	6214	7963	14177	32400
086A		6147	8256	14404	
086A	TNGT	6147	8256	14404	32400
087		6138	8652	14790	
087	TNGT	6138	8652	14790	32400
090 B		6161	9050	15212	
090 B	BEND	6392	16477	22869	32400
090 M		6481	17113	23594	
090 M	BEND	6481	17113	23594	32400
090 E		6505	16524	22029	

** EXCEEDED ALLOWABLE

CODE EC3M7S, CLASS 2

ELEMENT FROM TO	TYPE TITLE	EQN 9 PSI	EQN 10 PSI	SUM 9+10 PSI	ALLOW PSI
090 E	TNGT	6244	8527	14771	32400
090A		6420	6428	12848	
090A	TNGT	6420	6428	12848	32400
095		7014	4560	11574	
095	TNGT	7014	4560	11574	32400
95B		7688	8506	16194	
95B	TNGT	7688	8506	16194	32400
100 B		6348	6401	12750	
100 B	BEND	6647	11654	18302	32400
100 M		6571	18118	24689	
100 M	BEND	6571	18118	24689	32400
100 E		6490	19849	26339	
100 E	TNGT	6233	10903	17136	32400
100A		6231	10405	16636	
100A	TNGT	6231	10405	16636	32400
10A		6288	9916	16204	
10A	TNGT	6288	9916	16204	32400
10AA		6313	6607	12919	
10AA	TNGT	6313	6607	12919	32400
10AB		6454	3979	10432	
10AB	TNGT	6454	3979	10432	32400
10AC		6724	2167	8891	
10AC	TNGT	6724	2167	8891	32400
105		7797	8448	16245	
105	TNGT	7797	8448	16245	32400
110		8047	9823	17870	

** EXCEEDED ALLOWABLE

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1B To M7

ORIGINATOR PANI DATE 3/1/98 CALC NO RC5035-P-200 R0
CHK. WSS 3/1/98 SHEET NO
SHEET REV

DCP# 96-2843-2, SUPP. 0 page 100 of DCN# 9704761 Page 117 of 151

ATTACHMENT 4.0 STRESS ISOMETRICS TOTAL NO OF SHEETS - 4

LARGE DOCUMENT CROSS REFERENCE

THE FOLLOWING IMAGES(S) RELATED TO STI 30486203

PG #	DIN #
118	28927061
119	28927147
120	28927308

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. 1B TO M7

ORIGINATOR PANI TCB DATE 3/1/98 CALC NO RC5035-P-200 R0
CHK. WES 3/1/98 SHEET NO
SHEET REV

DCP# 96-2843-2, SUPP. 0 page 104 of DCN# 9704761 Page 121 of 151

ATTACHMENT 5.0 LOCAL STRESS EVALUATIONS FOR IWAs TOTAL NO OF SHEETS - 5

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-9014-HL5001 Rev. 0
Calc. No. JC-FW-9014-HL5003 Rev. 0
Calc. No. JC-FW-9014-HL5011 Rev. 5
Calc. No. JC-FW-9014-HL5012 Rev. 4
Calc. No. JC-FW-1014-HL5015 Rev. 0

I N P U T I M A G E

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

  1  STP1 SGR-IMAS MFWB;DP 10A HL5011; 027 HL5012; 050 HL5001; 080 HL5003; 009 HL5015
  2  LDC
  3  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
  4  CAS-UP,PRI-6.2880,SEC-9.9160,SH-21.625,SA-30.275,                        |
  5  P-2409.,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
  6  LDC                                                                      |
  7  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |  HL5011
  8  CAS-PA,PRI-14.740,SEC-9.9160,SH-21.625,SA-30.275,                        |
  9  P-69869,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 10  LDC                                                                      |
 11  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
 12  CAS-PS,PRI-6.2880,SEC-9.9160,SH-21.625,SA-30.275,                        |
 13  P-15969,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 14  LDC
 15  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
 16  CAS-UP,PRI-6.7240,SEC-10.382,SH-21.625,SA-30.275,                        |
 17  P-00000,VC-1622.00,VL-000.,MT-000000,MC-16980.,ML-000.00,                |
 18  LDC                                                                      |
 19  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |  HL5012
 20  CAS-PA,PRI-21.930,SEC-10.382,SH-21.625,SA-30.275,                        |
 21  P-00000,VC-45384.0,VL-000.,MT-000000,MC-475103,ML-000.00,                |
 22  LDC                                                                      |
 23  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
 24  CAS-PS,PRI-6.7240,SEC-10.382,SH-21.625,SA-30.275,                        |
 25  P-00000,VC-2121.00,VL-000.,MT-000000,MC-22204.,ML-000.00,                |
 26  LDC
 27  VD-17.063,VT-0.937,C1-10.750,C2-10.750,SHA-CIR,                          |
 28  CAS-UP,PRI-7.2120,SEC-5.6150,SH-21.625,SA-30.275,                        |
 29  P-2977.,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 30  LDC                                                                      |
 31  VD-17.063,VT-0.937,C1-10.750,C2-10.750,SHA-CIR,                          |  HL5001
 32  CAS-PA,PRI-28.620,SEC-5.6150,SH-21.625,SA-30.275,                        |
 33  P-67433,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 34  LDC                                                                      |
 35  VD-17.063,VT-0.937,C1-10.750,C2-10.750,SHA-CIR,                          |
 36  CAS-PS,PRI-7.2120,SEC-5.6150,SH-21.625,SA-30.275,                        |
 37  P-4470.,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 38  LDC
 39  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
 40  CAS-UP,PRI-7.0140,SEC-14.797,SH-21.625,SA-30.275,                        |
 41  P-2581.,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |
 42  LDC                                                                      |  HL5003
 43  VD-17.063,VT-0.937,C1-12.600,C2-12.600,SHA-CIR,                          |
 44  CAS-PA,PRI-35.886,SEC-14.797,SH-21.625,SA-30.275,                        |
 45  P-62782,VC-0000.00,VL-000.,MT-000000,MC-00000.,ML-000.00,                |

     ---------1---------2---------3---------4---------5---------6---------7---------8
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I N P U T I M A G E

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

46   LDC
47   VD=17.063,VT=0.937,C1=12.600,C2=12.600,SHA=CIR,                    HLS003
48   CAS=PS,PRI=7.0140,SEC=16.797,SH=21.625,SA=30.275,
49   P=3826.,VC=0000.00,VL=000.,MT=000000,MC=00000..ML=000.00,
50   LDC
51   VD=15.157,VT=0.843,C1=7.5785,C2=4.0000,SHA=REC,
52   CAS=UP,PRI=6.5160,SEC=6.3600,SH=21.625,SA=30.275,
53   P=22000,VC=6600.00,VL=6600,MT=000000,MC=63832..ML=63832..
54   LDC
55   VD=15.157,VT=0.843,C1=7.5785,C2=4.0000,SHA=REC,                    HLS015
56   CAS=FA,PRI=10.262,SEC=6.3600,SH=21.625,SA=30.275,
57   P=22000,VC=6600.00,VL=6600,MT=000000,MC=63832..ML=63832..
58   LDC
59   VD=15.157,VT=0.843,C1=7.5785,C2=4.0000,SHA=REC,
60   CAS=PS,PRI=6.5160,SEC=6.3600,SH=21.625,SA=30.275,
61   P=22000,VC=6600.00,VL=6600,MT=000000,MC=63832..ML=63832..

     ---------1---------2---------3---------4---------5---------6---------7---------8
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NOTE: THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN PIPING STRESSES & SUPPORT LOADS USED IN LOCAL STRESS EVALUATION & ACTUAL LOADS.

CB 6/19/98

WEF 7/21/98

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STP1 SGR-IWAS MPWB;DP 10A HL5011; 027 HL5012; 050 HL5001; 080 HL5003; 009 HL501
STP1 SGR-IWAS MPWB;DP 10A HL5011; 027 HL5012; 050 HL5001; 080 HL5003; 009 HL5015

SUMMARY TABLE
(KSI)

	CASE	PIPING PRIMARY	PIPING SECONDARY	LOCAL PRIMARY	LOCAL SECONDARY + PRIMARY	COMBINED	ALLOWABLE	MAX SHEAR	ALLOWABLE
HL5011	1	6.3	.0	.3	.0	6.6	26.0	.0	.0
	2	14.7	.0	9.1	.0	23.9	51.9	.0	.0
	3	6.3	9.9	.0	4.1	20.3	51.9	.0	.0
HL5012	4	6.7	.0	.4	.0	7.2	26.0	.0	.0
	5	21.9	.0	12.3	.0	34.3	51.9	.0	.0
	6	6.7	10.4	.0	2.2	19.3	51.9	.0	.0
HL5001	7	7.2	.0	.4	.0	7.6	26.0	.0	.0
	8	28.6	.0	9.6	.0	38.2	51.9	.0	.0
	9	7.2	5.6	.0	1.5	14.3	51.9	.0	.0
HL5003	10	7.0	.0	.1	.0	7.4	26.0	.0	.0
	11	25.9	.0	8.2	.0	34.1	51.9	.0	.0
	12	7.0	14.8	.0	1.0	22.8	51.9	.0	.0
HL5015	13	6.5	.0	8.8	.0	15.3	26.0	.0	.0
	14	10.3	.0	8.8	.0	19.1	51.9	.0	.0
	15	6.5	6.4	.0	26.9	39.8	51.9	.0	.0

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CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1B TO M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE 3/1/98

CHK. INSS 3/1/98

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.

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

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

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

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

$\frac{K_1 \cdot C_1 \cdot P_o \cdot D_o}{2 \cdot T}$ = 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}

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

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

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

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

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

$K_T := 2.0$

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

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

$S_{ALT} = \frac{K_e}{2} \cdot (S_P)$ $S_{ALT} := \frac{1.0}{2} \cdot (49798 \cdot psi)$ $S_{ALT} = 24899 \cdot psi$ < 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

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

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

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

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

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

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

$$S_n := 4985 \cdot \text{psi} + 6435 \cdot \text{psi} + 16077 \cdot \text{psi} \qquad S_n = 27497 \cdot \text{psi} \quad < 3Sm = 51900\text{psi}$$

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

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

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

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

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

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

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

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

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

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

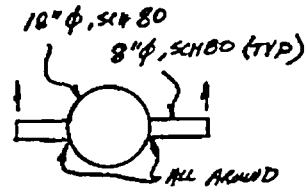
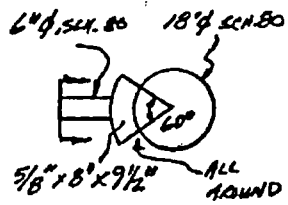
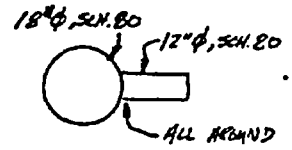
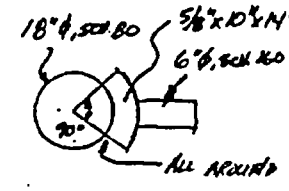
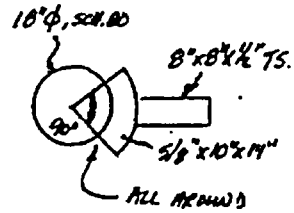
$S_p := 1172 \cdot \text{psi} + 2214 \cdot \text{psi} + 7284 \cdot \text{psi} + 2719 \cdot \text{psi} + 3204 \cdot \text{psi} + 17127 \cdot \text{psi} + 13936 \cdot \text{psi}$ $S_p = 47656 \cdot \text{psi}$

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

Usage factor < 0.635

~~DCP# 96-2843-2~~ ~~DCN#9704760~~

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

IWA#	CASE	PREVIOUS LOADS LB	NEW LOADS LB	CASE	PREVIOUS STRESS PSI	NEW STRESS PSI	COMMENT
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	

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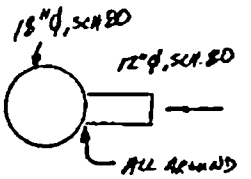
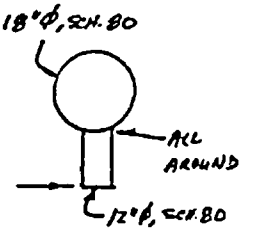
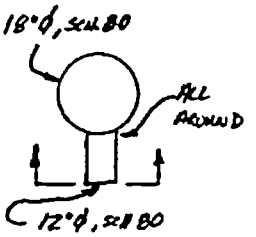
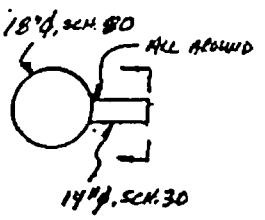
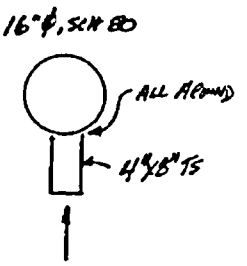
MFW SYSTEM: MFWB

IWA#	CASE	PREVIOUS LOADS	NEW LOADS	CASE	PREVIOUS STRESS	NEW STRESS	COMMENT
		LB	LB		PSI	PSI	
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)	WT		-14523	EQ.8		6328	
	THMAX			EQ.10/11		6360	
NEW IWA	THMIN						
	OBE			EQ.9B		6516	

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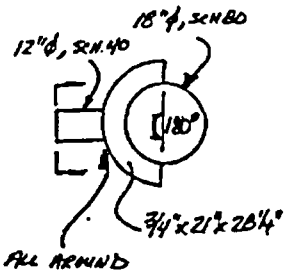
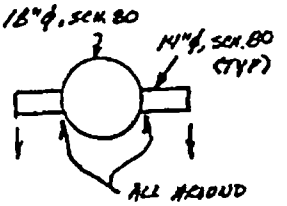
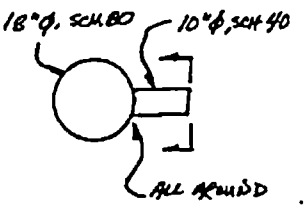
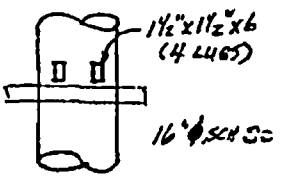
MFW SYSTEM: MFWC

IWA#	CASE	PREVIOUS LOADS LB	NEW LOADS LB	CASE	PREVIOUS STRESS PSI	NEW STRESS PSI	COMMENT
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	



~~DCP# 96-2843-2~~ ~~DCN#9704761~~

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. 1B TO M7

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

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

DCP# 96-2843-2, SUPP. 0 page 121 of DCN# 9704761 Page 138 of 151

ATTACHMENT 7.0 FLUEDHEAD PENETRATION LOADINGS AND EVALUATION TOTAL NO OF SHEETS - 4

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FRCM S.G. 1B To M7

CALC NO RC5035-P-200 R0
ORIGINATOR PANI DATE SHEET NO
SHEET REV

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

FLUED HEAD PENETRATION (M-7): (LOOP -B)
CASES WHERE ALLOWABLES ARE EXCEEDED ARE SUMMARIZED BELOW WITH JUSTIFICATION.

		ACTUAL/ ALLOWABLE	PREVIOUSLY JUSTIFIED ENVELOPED LOADINGS **	COMMENT
		(NORMAL PRIM)		
FA	LB	78/600	725	OK
V	LB	3633/7447	6302	
MA	FT LB	13677/69962*	15311	
MB	FT LB	3303/42130	25871	
		(NORM PRI+SEC)		
FA	LB	39911/42846	31298***,	OK
V	LB	20413/18263*	23609	
MA	FT LB	13677/40976	46230	
MB	FT LB	89151/260446	185309	
		(UPSET PRIM)		
FA	LB	15329/18517*	16660	OK
V	LB	10295/20458	11768	
MA	FT LB	28250/28295	30408	
MB	FT LB	51589/78058	63763	

* EXCEEDED COMPONENT
** RESULTS ACCEPTABILITY BASED ON ENVELOPED LOADINGS USED IN CALC# 2L469RC9962 REV. 2
*** SCALING THE FEA STRESS RESULTS: NORM MAX PRIM+SECY STRESS INTENSITY 18739(39911/31298)=23896 PSI < 53400 PSI ALLOWABLE.

PENETRATION LOAD SUMMARY
PENETRATION NO. M-7

LOADING	OUTSIDE CTMT LOADS							
	FA	FB	FC	MA	MB	MC		
	LB	LB	LB	FT LB	FT LB	FT LB		
DW	-32	-1219	0	8883	1	4852		
TE +	4466	122	49	0	798	0		
TE-	-431	0	-17	0	-438	-3649		
OBEI	12895	4110	1959	9165	11705	24056		
SSEI	25568	5703	3700	18766	22619	33427		
OBE SAM	124	637	1355	0	19640	8204		
BLD SETL	512	1995	898	0	26953	59538		
WAT HAM	39838	5307	2693	2810	11608	27948		
DBA	0	0	0	0	0	0		
LOCA	0	0	0	0	0	0		
WIND	899	101	5	0	90	1095		
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	-48	-2414	-18	4814	26	-7955		
TE +	2898	1624	19484	0	4594	26831		
TE-	39914	-2683	-983	-24611	-53243	-9293		
OBEI	1457	2149	493	5388	808	21585		
SSEI	2799	3132	1038	10668	1698	30664		
OBE SAM	3464	65	2693	960	23347	674		
BLD SETL	0	0	0	0	0	0		
WAT HAM	368118	5338	19121	78442	35190	34042		
DBA	18082	-859	-5378	-7963	-1465	-15275		
LOCA	684	1193	429	3856	713	5134		
WIND	0	0	0	0	0	0		
JET	3969	157	278	2013	1009	1107		
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	-78	-3633	-18	13677	27	-3303	3633	3303
TE +	7364	1746	19533	0	5392	26831	19611	27367
TE-	-40345	-2683	-1000	-24611	-53681	-12942	2883	55219
OBEI	14352	6259	2452	14573	12513	45621	6722	47306
SSEI	28367	8835	4738	29454	24317	64091	10025	68549
OBE SAM	3588	702	4248	960	42987	8878	4306	43894
BLD SETL	512	1995	898	0	26953	59538	2188	65355
WAT HAM	405956	10645	21814	81252	46798	61990	24273	77871
DBA	18082	-859	-5378	-7963	-1465	-15275	5446	15345
LOCA	684	1193	429	3856	713	5134	1268	5183
WIND	899	101	5	0	90	1095	101	1099
JET	3969	157	278	2013	1009	1107	319	1498
RUPTURE	220200	43268	43268	151400	222917	222917	61190	315252
D	-78	-3633	-18	13677	27	-3303	3633	3303
D+TEP+BS	7798	108	20413	13677	32372	83066	20413	89151
D+TEN+BS	-39911	-4321	-120	-10934	-26701	43293	4323	50865
D+OI+WND	15329	9993	2475	28250	12630	50019	10295	51589
D+OI+WND+TEP+BS	23049	6468	22870	28250	44975	129782	23767	137354
D+OI+WND+TEN+BS	55162	10681	2577	25507	39304	90009	10987	98216
D+SI+WND+WH+LO	357879	25423	32660	122289	74365	151995	41388	169212

* SEE JUSTIFICATION FOR EXCEEDANCES

PENETRATION LOAD SUMMARY
PENETRATION NO. M-7

D+SI+R	248645	55738	48024	194531	247261	290311	73572	381338
	PENETRATION ALLOWABLES							
	FAA			MAA			VA	MBA
	LB			FT-LB			LB	FT-LB
D	600			6962			7447	42130
D+TEP+BS	41846			40976			18263	260446
D+TEN+BS	41846			40976			18263	260446
D+OI+WND	8517			28295			20458	178058
D+OI+WND+TEP+BS	64839			63829			34615	406829
D+OI+WND+TEN+BS	64839			63829			34615	406829
D+SI+WND+WH+LO	188016			788831			496685	946739
D+SI+R	188016			788831			496685	946739
	ACTUAL TO ALLOWABLES RATIO							
	FA/FAA			MA/MAA			V/VA	MBR/MBA
D	0.130			* 1.965			0.488	0.078
D+TEP+BS	0.186			0.334			* 1.118	0.342
D+TEN+BS	0.954			0.267			0.237	0.195
D+OI+WND	* 1.800			0.998			0.503	0.290
D+OI+WND+TEP+BS	0.355			0.443			0.687	0.338
D+OI+WND+TEN+BS	0.851			0.400			0.317	0.241
D+SI+WND+WH+LO	0.733			0.155			0.063	0.179
D+SI+R	0.510			0.247			0.148	0.403

* SEE JUSTIFICATION FOR EXCEEDANCES

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

SUBJECT FW-PIPING FROM S.G. 1B To M7

ORIGINATOR PANI DATE 3/1/98 CALC NO RC5035-P-200 R0
SHEET NO
CHK. WES 3/1/98 SHEET REV

DCP# 96-2843-2, SUPP. 0 page 125 of DCN# 9704761 Page 142 of 151

ATTACHMENT 8.0 OTHER INFORMATION TOTAL NO OF SHEETS - 8

100% REVIEW DRAFT
CALCULATION SHEET

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

DCP 96-2843-2 Supp. 0 Page 1 of 1
DCN 9800456 Page 1 of 1

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

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

9.2 MFW, Loop B Results

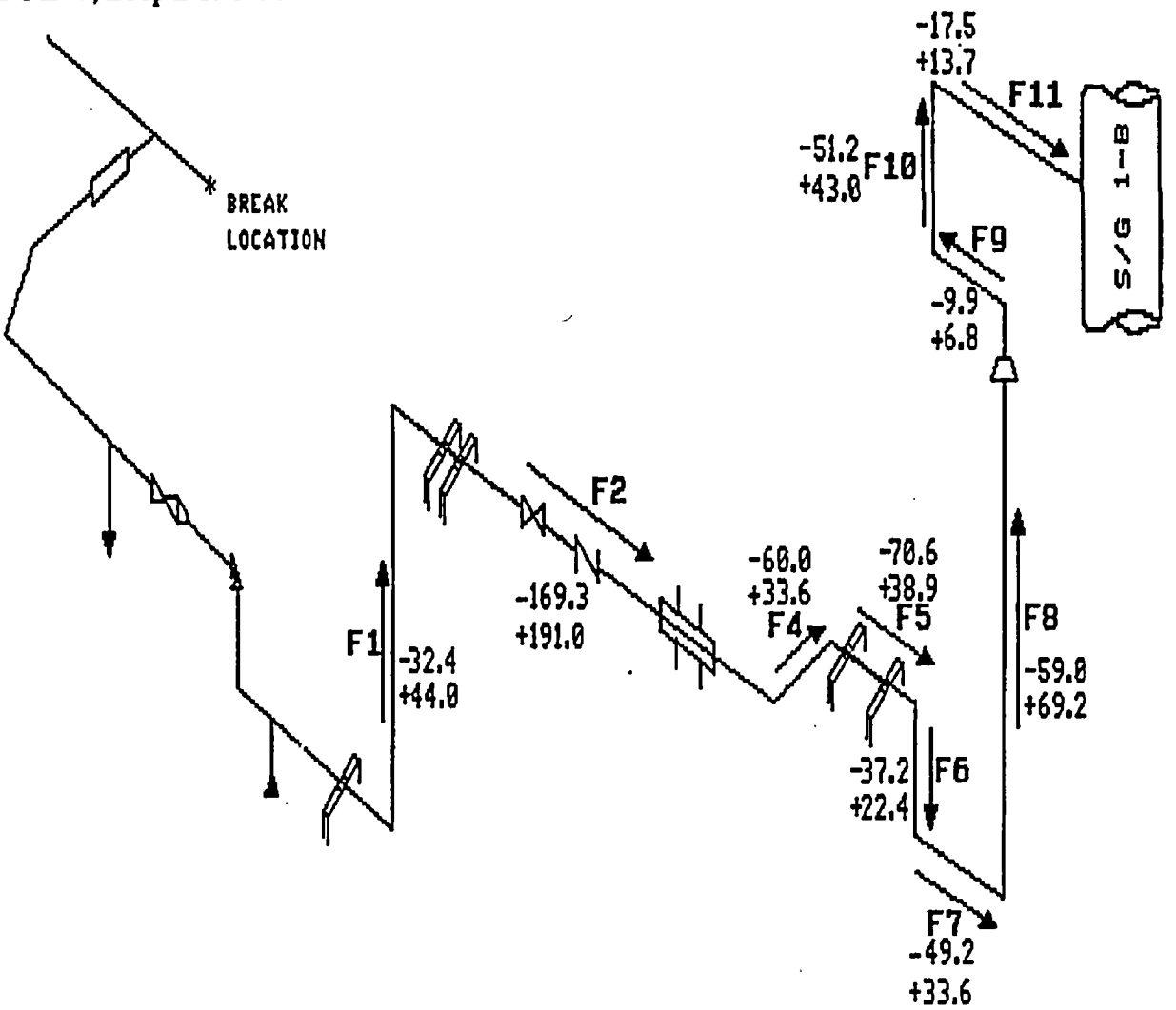


FIGURE 11-19. LOOP B REACTION FORCE DIAGRAM

Westinghouse Electric Corporation Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. Ron Beck
Project Manager, Steam Generator Replacement
Bechtel Power Corporation
5325 Spectrum Drive
1D-11-1F
Frederick, Marylanc. 21703

WP-BEC-SGR-98-023
Bechtel Job: 23438-SC-001

W File: 9.58

February 25, 1998

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION
UNIT 1 STEAM GENERATOR REPLACEMENT PROJECT
RSG Feedwater and Auxiliary Feedwater Nozzle Loads

Ref. 1.: BW-98-002, dated January 19, 1998
Ref. 2.: WP-BEC-SGR-98-008, dated January 23, 1998
Ref. 3.: Email Palm to Beck, dated February 24, 1998
Ref. 4.: Pensacola Calculation Note NEE-98-019-C0, Revision 0, "Evaluation of South Texas 1 RSG Main/Auxiliary Feedwater Nozzle Loads", R. C. Johnson, 2/20/98

Attn: Red Pernisi:

Westinghouse Pensacola has completed the evaluation of the RSG Feedwater and Auxiliary Feedwater nozzle loads provided by reference 1. Pensacola's evaluation, documented in reference 4, demonstrates that those nozzle loads are acceptable

This transmittal completes project schedule activity W1WPP2030

Please contact me directly should you require any additional information.

Sincerely,

S.A. Palm
Project Manager
SGR Installation

cc: R. Slover (Bechtel STP Site) 1L
J. Liddy (Bechtel) 1L
J. Wyble (W) 1L
F. Scapellato (W) 1L
S. Achtor (W PCI) 1L
R. Faller (W Houston Sales Office) 1L

140L:02/25/98

Bechtel

9801 Washingtonian Boulevard
Gaithersburg, Maryland 20878-5356
(301) 417-3000

January 19, 1998
BW-98-002

Mr. Steve Palm
Manager, SG Replacement Projects
Westinghouse Electric Corporation
Energy Center Site
4350 Northern Pike
Monroeville, PA 15146-2886

South Texas Project Electric Generating Station
Unit 1 Steam Generator Replacement Project
Bechtel Job Number 23438
Bechtel File Numbers 0650/SC-001, T0730

Subject: **Replacement Steam Generator Feedwater Nozzle Loads**

Dear Mr. Palm:

Enclosed with this letter are Equipment Nozzle Load Summary sheets generated for the Loop A and B Feedwater (FW) and Loop B Auxiliary Feedwater (AF) nozzles on the replacement steam generators (RSG). Each of those nozzles have calculated loads which would exceed Westinghouse's previously provided allowable values along a single axis and under a single load case. The remaining FW and AF nozzle loads meet the Westinghouse-provided RSG nozzle allowables.

Bechtel requests Westinghouse to review and provide us with written approval for the nozzle loadings tabulated in Enclosures 1, 2 and 3. A copy of the load summary sheets was faxed to Mr. F. Scapellato on January 16, 1998.

If you have any questions, please contact Mr. R. Pernisi at 301-228-6543.

Action Summary: Westinghouse is requested to review and provide written approval to Bechtel for increased RSG nozzle loads by January 23 , 1998.

Sincerely,

BECHTEL ENERGY CORPORATION

R. L. Beck
Project Manager

RLB:rah

Enclosures: 1) Calculation Sheet, Equipment Nozzle Load Summary, FW Nozzle Loop A, Jan. 5, 1998 - 1 sheet
2) Calculation Sheet, Equipment Nozzle Load Summary, FW Nozzle Loop B, Jan. 13, 1998 - 1 sheet
3) Calculation Sheet, Equipment Nozzle Load Summary, AF Nozzle Loop B, Dec. 17, 1997 - 1 sheet

cc: R. Slover, w/1
R. Pernisi, w/o
J. Liddy, w/o
T. V. Sarma, w/o

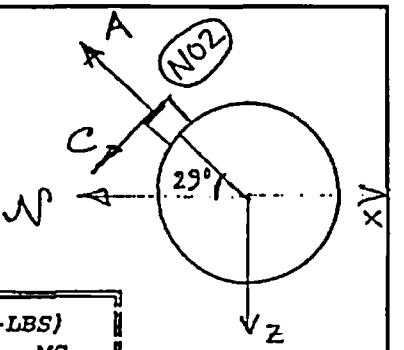
CALCULATION SHEET

PROJECT STP-1
JOB NO 23438001

SUBJECT FEEDWATER "FW" SYSTEM - SG 1B TO M7

CALC NO 2C159RC5035
SHEET NO
SHEET REV 0

ORIGINATOR PANI DATE 13-JAN-98



SECTION 4.2 EQUIPMENT NOZZLE LOAD SUMMARY

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

LOAD CASE	NOZZLE FORCE (LBS) FA	FB	FC	NOZZLE MOMENT (FT-LBS) MA	MB	MC
WEIGHT	87.	656.	-153.	-433.	838.	2887.
THRM1	9061.	-4495.	-4641.	-77008.	-8927.	-113974.
THRM7	430.	-5178.	* -13987.	-110138.	49926.	-75963.
C5	4218.	7038.	5875.	29961.	27694.	30386.
C6	6716.	14401.	9386.	47808.	44397.	58356.
JET	310.	5788.	588.	1589.	3749.	19545.
TIME1	23056.	150110.	18369.	48079.	92348.	508120.

LOAD CASE	ALLOWABLE FORCE (LBS) FA	FB	FC	ALLOWABLE MOMENT (FT-LBS) MA	MB	MC
WEIGHT	6000.	16800.	16800.	30000.	57000.	57000.
THRM1	10000.	50000.	10000.	125000.	159083.	291667.
THRM7	10000.	50000.	10000.	125000.	159083.	291667.
C5	48000.	36000.	36000.	110000.	144000.	144000.
C6	92400.	84000.	84000.	170000.	200000.	200000.
JET **	35000.	260000.	260000.	118750.	298417.	298417.
TIME1	506000.	358000.	358000.	1094000.	644900.	644900.

LOAD CASE	FORCE RATIOS FA	FB	FC	MOMENT RATIOS MA	MB	MC	REMARKS
WEIGHT	0.015	0.039	0.009	0.014	0.015	0.051	OK
THRM1	0.906	0.090	0.464	0.616	0.056	0.391	OK
THRM7	0.043	0.104	1.399 *	0.881	0.314	0.260	*
C5	0.088	0.196	0.163	0.272	0.192	0.211	OK
C6	0.073	0.171	0.112	0.281	0.222	0.292	OK
JET	0.008	0.014	0.001	0.006	0.009	0.040	OK
TIME1	0.046	0.418	0.052	0.044	0.144	0.787	OK

NOTES: C5 - SRSS OF OBEI & OBESAM; C6 - SRSS OF SSEI & SSESAM
THRM7 - THERMAL @ 32F ; THRM1 - THERMAL @ 567F
TIME1 - WATER HAMMER DUE TO PIPE BREAK
* - EXCEEDED ALLOWABLE (FOR WESTINGHOUSE REVIEW)
** FOR JET. RUPTURE ALLOWABLE WAS USE. SEE PAGE 22.

Bechtel

Interoffice Memorandum

To	P. Basavaraju	File No.	0300, T0730
Subject	Jet Load Evaluations for DCP 96-2843-2	Date	06/02/98
		From	J. A. McCombie
		Of	Mechanical
Copies To	R. E. Pernisi M. A. Silver A. Papadopoulos	At	1C8-F Ext 6504

Pani,

As per your request, the following reviews, which were performed in December 1997, are being resubmitted to you. Please note that the results from these evaluations were previously transmitted to you via fax dated December 2, 1997 and e-mails, dated December 3 and 4, 1997.

1) STP Calculation MC5360 discussed various postulated line breaks, which included Event 12"-RC-1322-10B-0034C. This event identified two impacted targets: feedwater lines 16" & 18" FW-1016-GA2. The calculation also noted that the distance between the line break and the listed targets was over 20 feet.

Calculation MC5311, Revision 2 (It is currently Revision 4), however, superseded Calculation MC5360. In Calculation MC5311 neither Event 12"-RC-1322-10B-0034C nor feedwater lines 16" & 18" FW-1016-GA2 are mentioned. Note that the criteria used in Calculation MC5311 only identified targets which were within 10 pipe diameters of the break.

Therefore, the previously identified load on feedwater lines 16" & 18" FW-1016-GA2, due to Event 12"-RC-1322-10B-0034C, are no longer applicable.

2) Loop - A: Per Calculation MC5327, Revision 3 the loads on feedwater line FW-1012-18", due to Event 18" FW-1018-110C (Forward), are still applicable.

3) Loop - B: Per Calculation MC5325, Revision 4 the loads on feedwater line 18"-FW-1014-GA2, due to Event 18" FW-1016-110C (Forward), are still applicable.

4) Loop - B: STP Calculation MC5359 discussed various postulated line breaks, which included Event 12"-RC-1221-10B-0022C. This event identified two impacted targets: feedwater lines 16" & 18" FW-1014-GA2. The calculation also noted that the distance between the line break and the listed targets was approximately 18 feet.

Calculation MC5308, Revision 2 (It is currently Revision 3), however, superseded Calculation MC5359. In Calculation MC5308 neither Event 12"-RC-1221-10B-0022C nor feedwater lines 16" & 18" FW-1014-GA2 are mentioned. Note that the criteria used in Calculation MC5308 only identified targets which were within 10 pipe diameters of the break.

Therefore, the previously identified load on feedwater lines 16" & 18" FW-1014-GA2, due to Event 12"-RC-1221-10B-0022C, are no longer applicable.

5) Loop - C: STP Calculation MC5360 discussed various postulated line breaks, which included Event 12"-RC-1322-10B-0034C. This event identified two impacted targets: feedwater lines 16' & 18" FW-1016-GA2. The calculation also noted that the distance between the line break and the listed targets was over 20 feet.

Calculation MC5311, Revision 2 (It is currently Revision 4), however, superseded Calculation MC5360. In Calculation MC5311 neither Event 12"-RC-1322-10B-0034C nor feedwater lines 16" & 18"FW-1016-GA2 are mentioned. Note that the criteria used in Calculation MC5311 only identified targets which were within 10 pipe diameters of the break.

Therefore, the previously identified loads on feedwater lines 16" & 18" FW-1016-GA2, due to Event 12"-RC-1322-10B-0034C, are no longer applicable.

FEEDWATER PIPE WATERHAMMER REANALYSIS LOAD RECONCILIATION
(BETWEEN 75% 100%)

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

LOOP B (UNIT1)

ATTACHMENT 1 (SHEET1-1)

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-9014-HL5006	085	+40.91/-38.243	+41.088/-43.987	JC-FW-9014-HL5006	3 9703746	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5011	10A	+69.805/-79.503	+/-144.07	JC-FW-9014-HL5011	8 9703745	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5012	027	+/-34.872	+/-48.41	JC-FW-9014-HL5012	8 9703749	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5009	042	+/-92.181	+/-137.259	JC-FW-9014-HL5009	4 9704688	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5001	050	+/-61.804	+/-68.109	JC-FW-9014-HL5001	7 9704689	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5002	055	+/-37.84	+/-77.3	JC-FW-9014-HL5002	4 9704690	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5003	080	+/-60.739	+/-66.501	JC-FW-9014-HL5003	5 9704691	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1014-HL5013	014	+51.522/-85.38	+69.826/-97.857	JC-FW-1014-HL5013	0	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1014-HL5013	014	+51.87/-34.214	+52.277/-38.406	JC-FW-1014-HL5013	0	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-SH0001	040	-1.751	-1.751	JC-FW-9014-SH0001	6 9704692	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5008	013	-9.157	-9.157	JC-FW-9014-HL5008	4 9704693	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-SH0004	095	-6.756	-6.756	JC-FW-9014-SH0004	2 9704694	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1014-HL5015	009	-14.532	-14.532	JC-FW-9014-HL5015	0	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-9014-HL5004	958	70.060/-54.06	+/-72.0	JC-FW-9014-HL5004	6 9703747	O.K. DESIGN LOAD > NEW FAULTED (WH) LOAD
FW-1014-HL5016	007	43.31/-32.89	45.805/-35.491	JC-FW-1014-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. RC-5035-P-200 Rev. 0
Sheet No. _____

DCP# 96-2843-2, SUPP. 0 page 1733 of ____

DCN# 9704761 page 150 of 151

CALCULATION SHEET

PROJECT STP-SGR
JOB NO 23438001

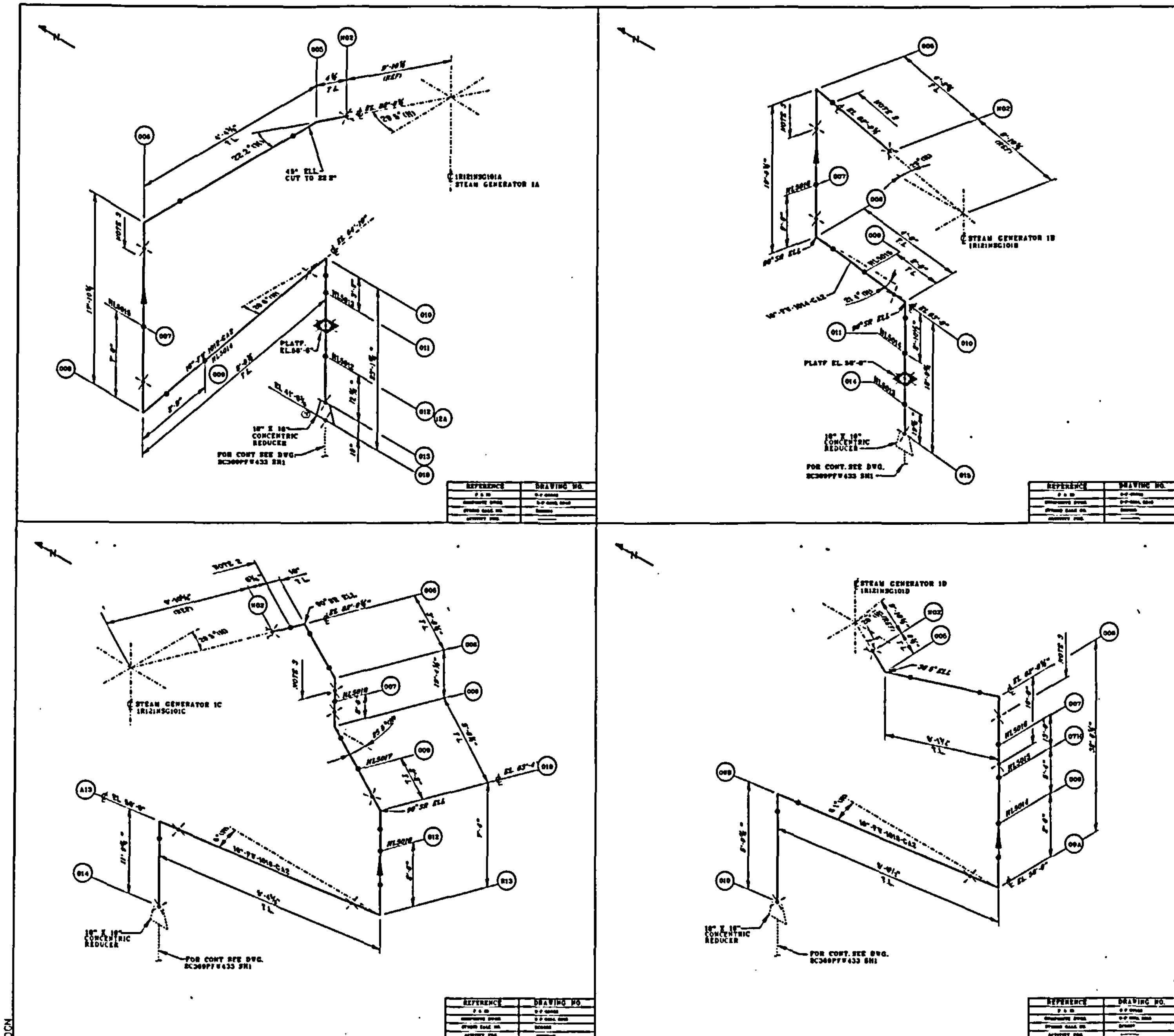
SUBJECT FW-PIPING FROM S.G. 1B TO PEN # M7

CALC NO RC5035-P-200 R0
SHEET NO
SHEET REV

ORIGINATOR PANI DATE

ATTACHMENT 16.0 MICROFICHE FILES LOG

File # 1, Computer Output: FLEXIBILITY (MFWBS)
File # 2, Computer Output: WATER HAMMER (MFWBW)
File # 3, Computer Output: JET IMPINGEMENT (MFWBJ)
File # 4, Computer Output: LOCA (MFWBL)
File # 5, Computer Output: WATER HAMMER (MFWBW7),



LEGEND:

NOTES:

1. FOR DESIGN PRESSURE AND TEMPERATURE SEE 5L019PS004 (PIPING SPECS) AND 5L229PS0001 (PIPING LINE LIST).
2. PIPING MATERIAL: SA508, GRADE 2, CLASS 2 - MAXIMIZE ALLOYS FOR EROSION/CORROSION RESISTANCE.
3. PIPING MATERIAL SA336, F22, CLASS 3, NORMALIZED AND TEMPERED WITH SIMULATED PWHT OF 1275°F ± 25°F FOR 8 HOURS.

REFERENCES			
P & ID	9 F-00062		
ISOMETRIC	9-P-5013	9-P-5018	9-P-5033
	9-P-5014	9-P-5042	9-P-5045
	9-P-5015	~~9-P-5046~~	
START UP SYSTEM NO.			
STRESS		RC5037,5038,5035,5034	

ATTACHMENT 4
TO CALC RC5037-P-400 Rev. 0

NO.	ISSUE DATE	REVISION	ORIG	CHK	RE	DV	SE
0		ISSUED AS ATTACHMENT FOR STRESS CALCULATIONS					

SOUTH TEXAS PROJECT
NUCLEAR OPERATING COMPANY

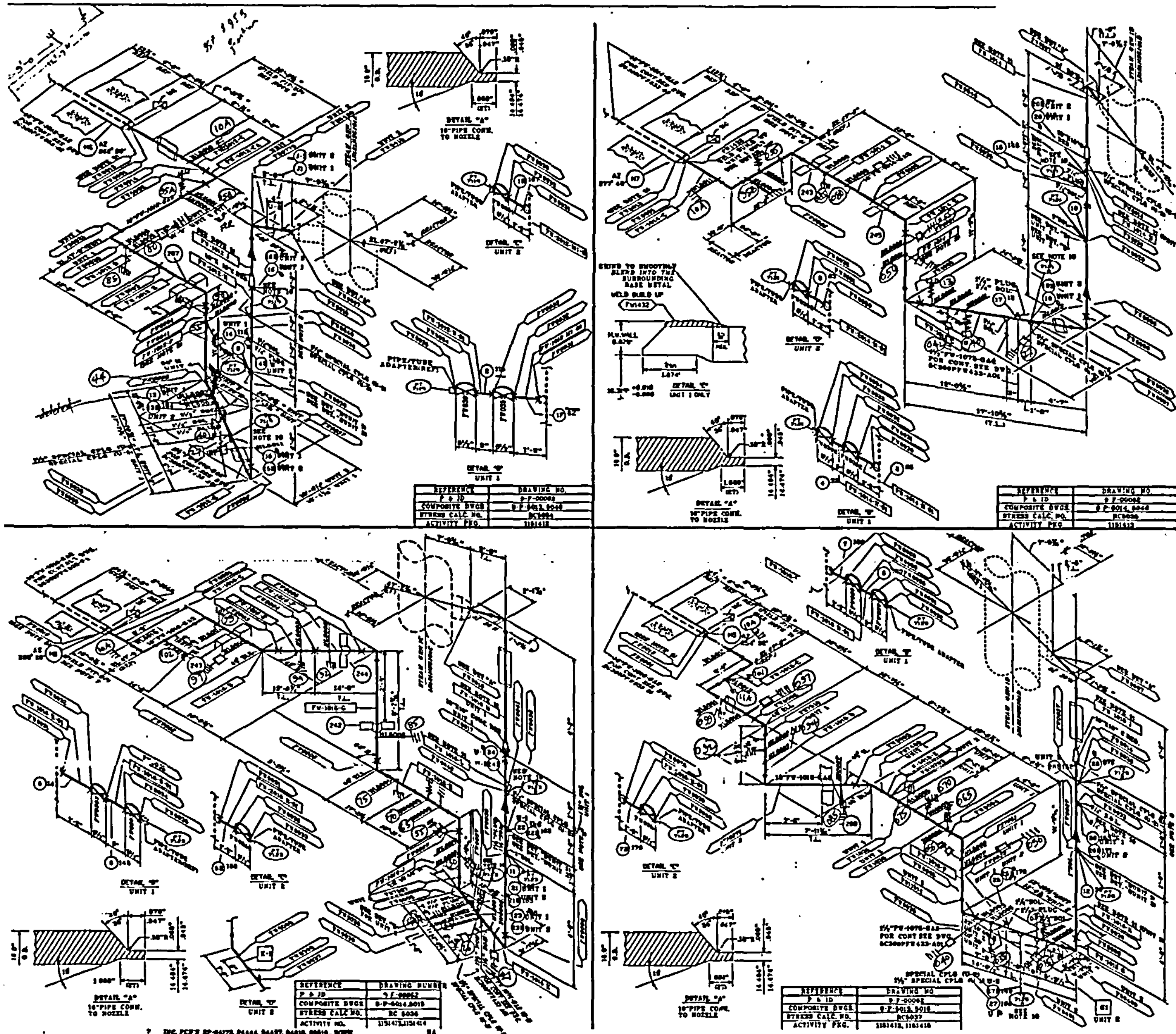
PRIORITY		DOC CTL NO	CADD FILE NO
2		D070926	STRESS18.DGN

FEEDWATER "FW"
STRESS ISOMETRIC

SPEC	SCALE	DRAWING NO	SHT	REV
GA2	NONE	ST-I-3044-2319-AH	05	0

ISO2DSFE01.DGN

STRESS18.DGN



3. 12" ADDED TO CALC DIM OF 8'-7" FOR TEMP CLEANING JUMPER TO BE CUT BACK AFTER CLEAN OUT. FOR UNIT 2 INSTALLATION OF SPOOLS ARE TO BE HELD FOR FLUSH AND CLEANLINESS INSPECTION, THEREFORE THE 12" PIECES ARE NOT REQUIRED.

4. DELETED

5. FLUED HEAD PENETRATION CLASS 2/MC WELD DOES NOT REQUIRE [illegible] WELD PREPARATION.

6. 12" ADDED TO CAL. DIM. OF 14'-4⅝".

7. 12" ADDED TO CAL. DIM. OF 4'-4⅝".

8. BASE PLATE OF SUPPORT MARK FOR FW-1012-HL8003, FW-2012-HL8003 [illegible] INSTALLATION OF PIPE SPOOLS FW-1012-F & FW-1014-F.

9. ALL UNIT 1 DESIGNATORS SHOWN ON THIS DRAWING SHALL BE INTERPRETED AS BEING UNIT 2 DESIGNATORS WHEN ERECTING UNIT 2 COMPONENTS.

10. FOR THERMOWELL DETAIL SEE INSTRUMENT INDEX [illegible].

11. STARTUP TO INSPECT SPOOLS FW-1012-J, FW-1014-J, FW-1008-M, & FW-1010-J NOTIFY FLUSHING INSPECTOR PRIOR TO INSTALLATION. FOR UNIT 2 INSTALLATION OF PIPE SPOOLS FW-2012-J, FW-2014-H & J, FW-2016-L, FW-2010-H & J IS TO BE HELD UNTIL START-UP INSPECTS FOR CLEANLINESS/FLUSH AND RELEASE.

12. THE FOLLOWING N.I. AMENDMENTS ARE LISTED AGAINST THIS DWG.:

PCN	FCR	DATE
	2P-00043	4-22-97
2P-00001		2-2-97

13. ITEM J-1 NEW SPOOL FW-2010-J 10" DIA. SCH 80, SA-106, GRADE [illegible] SEAMLESS PIPE WAS USED IN LIEU OF [illegible] GRADE B.

REFERENCE	DRAWING NUMBER
P & ID	9-F-00062
COMPOSITE DWGS	9-P-6014, 9018
STRESS CALC NO.	BC 5036
ACTIVITY NO.	1151413, 1151414

REFERENCE	DRAWING NO.
P & ID	9-F-00062
COMPOSITE DWGS.	9-P-5013, 9016
STRESS CALC. NO.	BC5037
ACTIVITY PKG.	1161412, 1161418

7 INC. PCN'S 2P-04179, 04464, 04497, 04618, 00010, [illegible] 2P-00479, 00400, 2P-00044 (U-2 DES. CHG. ONLY) — NA

6 INC. DCN 4, PCN'S 02300, 2P-04323, 2P-00200, [illegible]. PCN'S 2P-02417, 03483, 03643, 1P-06000. FOR N.I. AMENDMENTS SEE NOTE 12. — SIGNATURES ON FILE

5 ISSUED FOR CONSTRUCTION WITH CHANGES

5 INC. PCN'S 1P-03101, 1P-03276, 1P-0360, 1P-02446, 1P-02621, 1P-02790, 1P-00944, 1P-03003, 1P-03064, 1P-03033, 1P-00714 & FCR 2P-01102. — SIGNATURES ON FILE

4 INC. DCN-3 MOD. DCN-4 REV. INSUL. TYPE, THK., ADDED AZIMUTH AND ISSUED FOR SYS. START-UP/TURNOVER — SIGNATURES ON FILE

Attachment No. 4
Calc No. BC 5037 P-400 Rev 0
Sheet No.

Rev	Origin GB Date 2/20/98
	Chk'd WSS Date 2/20/98

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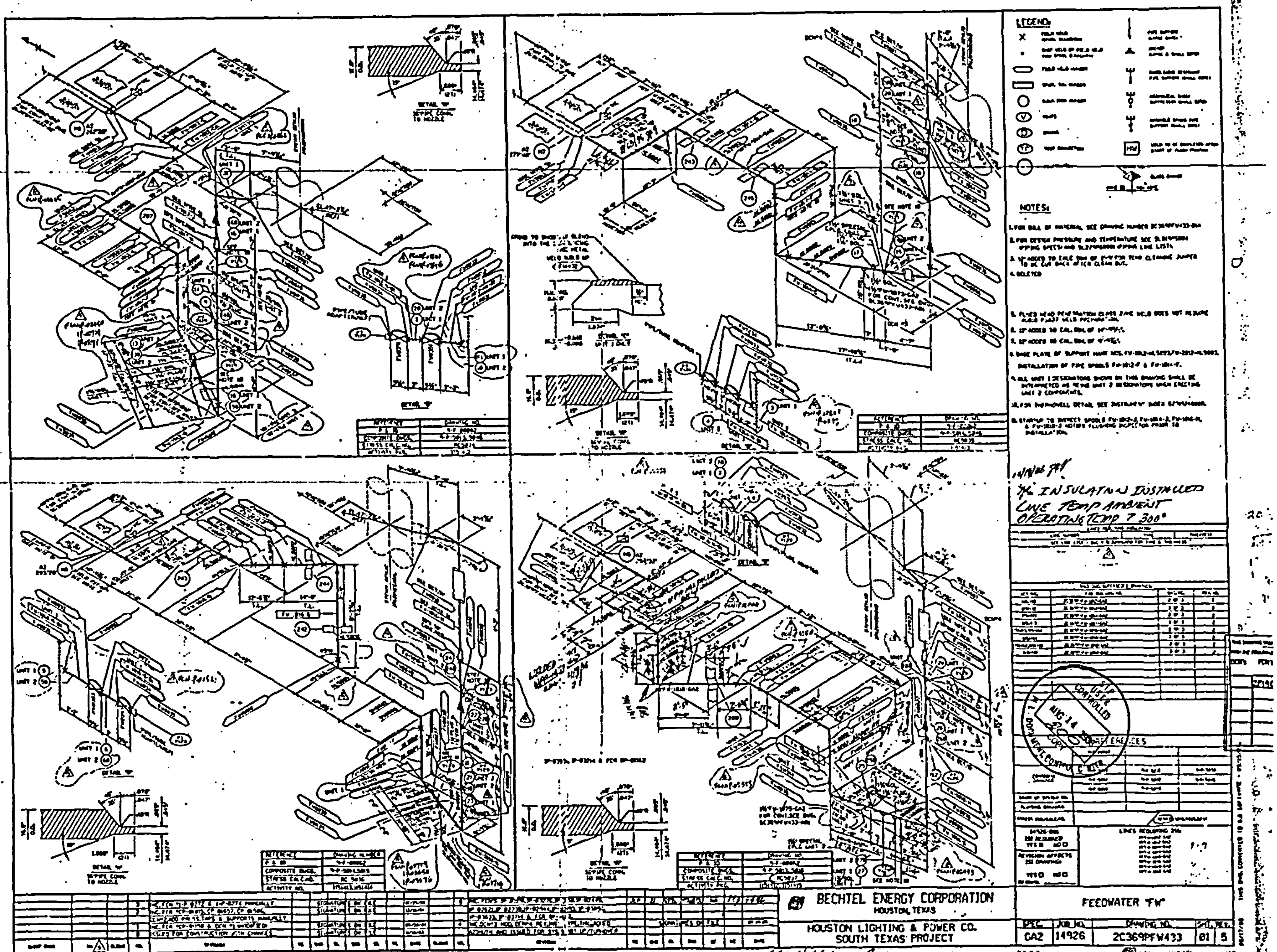
DCN # 9704763 page 103 of 134
STI: 30486219 - Att. 2

FEEDWATER "FW"

GA2 2C369PFW433 01 7



Attachment No 4
Calc. No RC 5037-P-401 Rev 0
Sheet No

Orig'n CB Date 2/30/93
Chk'd VSS Date 3/30/93

STI: 30486219 - Att. 3