

ENCLOSURE 1

REANALYSIS OF RHR LINE
WITH
ENERGY ABSORBERS
AS
REPLACEMENTS FOR HYDRAULIC SNUBBERS

FOR THE
PEACH BOTTOM ATOMIC POWER STATION

PREPARED BY
BECHTEL POWER CORPORATION
FOR
PHILADELPHIA ELECTRIC COMPANY

ENCLOSURE 1

REANALYSIS OF RHR LINE WITH ENERGY ABSORBERS AS REPLACEMENTS FOR HYDRAULIC SNUBBERS

SYSTEM DESCRIPTION

Original Configuration with Snubbers:

Isometric P-10-3 was analyzed for hydrodynamic loads. To qualify the system for the hydrodynamic loads, modifications were made to slightly reroute a 6-inch line, reinforce a tee connection, and provide pipe support modifications. The modified system was qualified for Mark I loads and requalified for seismic loads using the original plant seismic design criteria.

The attached isometric depicts the system as finally modified. It includes six snubbers, most of which are seismic supports. The snubbers are S-43 (two snubbers), S-44, S-48, S-49, and S-91. Figure 1 is a computer plot showing the relative locations of these snubbers.

Revised Configuration with Energy Absorbers:

Figure 2 is a computer plot showing the revised support system for Isometric P-10-3 using energy absorbers. It indicates that the six snubbers were replaced with energy absorbers at the same locations and orientations with the exception of snubber S-91. For S-91, the replacement energy absorber was relocated in the vicinity of spring hanger H-94A. This relocation allowed the replacement absorber to provide higher damping in the vertical direction.

ANALYSIS PERFORMED

Hydrodynamic and Thermal Analysis

The configuration modified with energy absorbers was reanalyzed for all load cases for which it had been previously qualified. For all hydrodynamic loads, the energy absorbers were modeled as linear spring elements with a stiffness equal to the elastic spring rate of energy absorbers because the resulting movements are lower than the yield displacements. For thermal analysis, all thermal modes were reanalyzed using the energy absorber elastic spring rates.

Seismic Analysis

The seismic design basis for Peach Bottom is based on an analysis for a two-directional earthquake (maximum of X+Z or Z+Y responses), 1/2% damping coefficient, SRSS modal combinations, and an application of a response spectrum curve representing the location where the majority of the system is located. This is also the basis of the system analysis of the snubber configuration. The response spectrum applied was for elevation 135'.

The seismic reanalysis of this system with energy absorbers was performed using the plant seismic design basis except that an envelope of all response spectra was used and applied to all locations at which system supports and anchors exist. This was done as an added measure of conservatism and to demonstrate the system's capability to accommodate higher seismic input motions. The spectra were thus an envelope of the levels 135' and 165' floor spectra. This represents an increase of peak accelerations at 1/2% damping by a factor of two over those in the design basis.

To demonstrate the system's capacity with energy absorbers for higher and more stringent seismic analysis rules, an additional analysis was performed with the Regulatory Guide 1.92 closely spaced modal combinations method using the enveloped spectra and assuming a concurrent X+Y+Z earthquake. This second

analysis was performed primarily to prove the added capacity of energy absorbers for controlling the system response under bigger seismic excitations. This, of course, is expected since higher seismic responses cause the energy absorbers to add yet higher damping to the system. Thus, the overall system response stabilizes and approaches asymptotic values. This cannot be achieved if the system is supported only by snubbers and rigid supports.

SUMMARY OF RESULTS

Table 1 compares the results of the safe shutdown earthquake (SSE) load case for the existing design with the results of the reanalysis using energy absorbers. The comparison shows that although the reanalysis with energy absorbers uses a more severe response spectra, virtually all of the significant results are better than for the snubber design basis.

Table 2 shows the stress summary sheet for all applicable load combinations for the existing design basis case (with snubbers). Table 3 shows the same information for the energy absorber case. Table 4 gives the snubber case support load summary. Table 5 shows the support load summary for the energy absorber case.

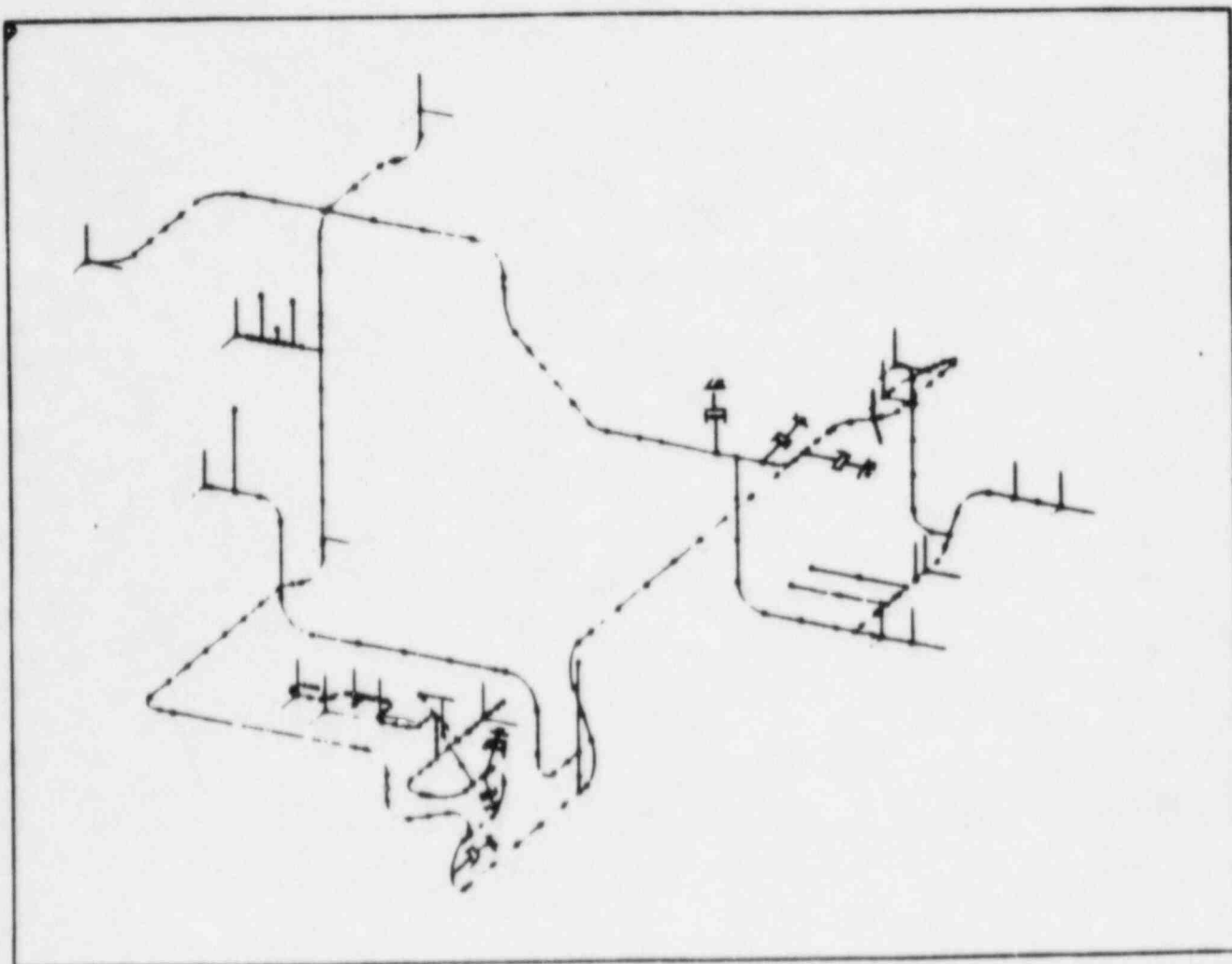


Figure 1. Computer Plot Showing Relative Locations of Snubbers

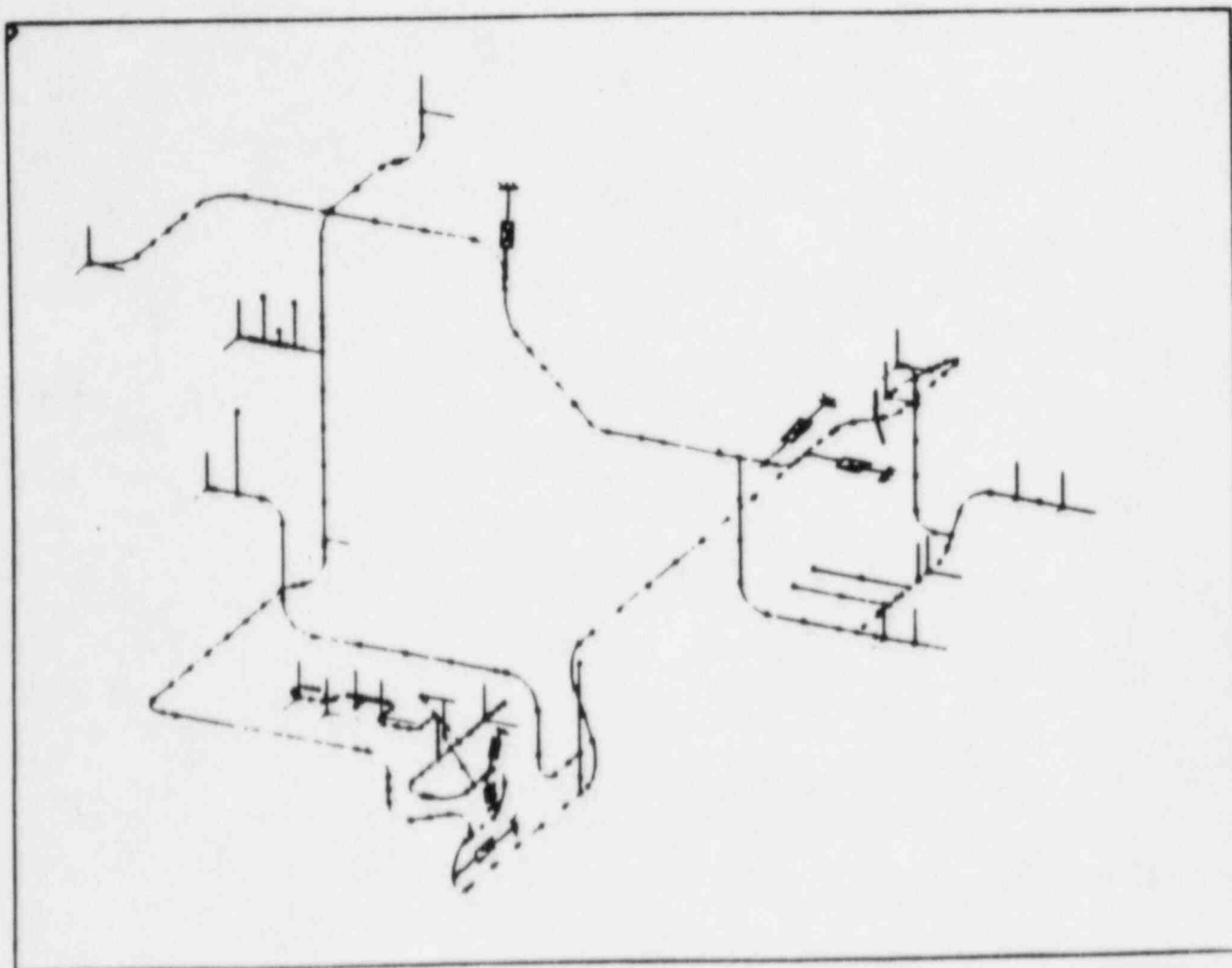


Figure 2. Computer Plot Showing Revised Support System
Using Energy Absorbers

Table 1

Load Case SSE Comparison

<u>Item Compared</u>	<u>Snubber Case (Design Basis)</u>	<u>Energy Absorber *</u> <u>Case</u>
Fundamental Frequency	1.1 Hz	1.9 Hz
Damping Ratio	0.5%	0.5% - 9%
Max. Stress (SSE)	16 ksi	12 ksi
Max. Valve Acceleration	1 G	1.1 G
Max. Nozzle Loads	1	1
Max. Displacement (Dy)	2.2 in.	1.5 in.
<u>Supports:</u>		
Total No. of Supports - (not including springs)	24	24
Total No. of Snubbers	6	0
Total No. of Energy Absorbers	0	6
Max. Support Load (SSE)	14 kips	14 kips
Max. Snubber/EA Loads	6 kips	4.4 kips
Total Load into Bldg.	111 kips	79 kips

* Based of X+Y, Y+Z earthquakes, 1/2% damping, SRSS modal combinations, and envelop of floors 135 feet, and 165 feet spectra.



MARK I PIPING STRESS SUMMARY CHECK AND COVER SHEET
ASME SECT. III, CLASSES 2 & 3 (ESSENTIAL PIPING)

PROJECT: PEACH BOTTOM ATOMIC POWER STATION - UNITS 2 AND 3NO. OF SHEETS JOB NO. 11187-015 PLANT DESIGN GROUPSYSTEM: RHRCALC. NO. ISO NO. P-10-3 REV NO.

DESIGN CONDITION AND [SECT. III PARA. REF.]	LOCATION OF MAX. PIPE STRESS	LOADING CONDITION	MAXIMUM COMPUTED STRESS (PSI)	ALLOWABLE STRESS (PSI)	PUAAG - NEDO 24583-1 OCT 1979 REF TABLE 5-2 STRESS COMB.	CHK
SUSTAINED LOADS [NC 3652.1] EQN. 8	SYSTEM	DESIGN PRESS. AT <u>430</u> PSIG	5,065	1.0 S _h	N/A	
		WEIGHT & SUSTAINED	4,387			
	MAXIMUM	SUM	9,452	15,000	W + P	
	691	PEAK PRESS. AT <u>430</u> PSIG	2,226	1.2 S _h	COLUMN 1	
OCCASIONAL LOADS [NC 3611.2 (C) (2), NC 3652.2] EQN. 9	691-691A	WEIGHT & SUSTAINED	83			
		(SRV DISCHARGE) ALL	13,152		W+P+SRV _{all}	
		SUM	15,461	18,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	1.2 S _h	N/A	
		WEIGHT & SUSTAINED	4,387			
		OBE	6,375		W + P + OBE	
	MAXIMUM	SUM	15,602	18,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	1.8 S _h	COLUMN 2	
		WEIGHT & SUSTAINED	4,387			
		(SRV DISCHARGE) ALL	13,188			
		OBE	6,375		W+P+ OBE ² + SRV _{all} ²	
	MAXIMUM	SUM	23,875	27,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	1.8 S _h	COLUMN 11	
		WEIGHT & SUSTAINED	4,387			
		(SRV DISCHARGE) ALL	13,188			
		C.O. OR CH. FROM SBA	4,816		W+P+ SRV _{all} ² + CH ²	
	MAXIMUM	SUM	23,267	27,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	2.4 S _h	COLUMN 15	
		WEIGHT & SUSTAINED	4,387			
		(SRV DISCHARGE) ALL	13,188			
		SSE	12,031		W+P+CH+ SSE ² + SRV _{all} ²	
		C.O. OR CH. FROM IBA	4,816			
	MAXIMUM	SUM	31,894	36,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	2.4 S _h	COLUMN 25	
		WEIGHT & SUSTAINED	4,387			
		(SRV DISCHARGE) ONE	6,594			
		SSE	12,031		W+P+SRV _{one} + SSE ² + PS ²	
		POOL SWELL	9,942			
	MAXIMUM	SUM	31,428	36,000		
	SYSTEM	PEAK PRESS. AT <u>430</u> PSIG	4,840	2.4 S _h	COLUMN 27	
		WEIGHT & SUSTAINED	4,387			
		(SRV DISCHARGE) ONE	-			
		SSE	12,031		W+P+ SSE ² + CO ²	
		C.O. OR CH. FROM DBA	8,894			
	MAXIMUM	SUM	24,189	36,000		

(CONTINUED ON REVERSE SIDE)

Table 2 (Continued)

MARK I PIPING STRESS SUMMARY CHECK AND COVER SHEET
ASME SECT. III, CLASSES 2 & 3 (ESSENTIAL PIPING) CONTINUED

DESIGN CONDITION AND [SECT. III PARA. REF.]	LOCATION OF MAX. PIPE STRESS	LOADING CONDITION	MAXIMUM COMPUTED STRESS (PSI)	ALLOWABLE STRESS (PSI)	PUAAG - NEDO 24583-1 OCT 1979 REF TABLE 5-2 STRESS. COMB	CHK
THERMAL EXP [NC-3611.2 (C) (2), NC-3652.3] *EQN. 10	730 728M-730	THERMAL EXPANSION	19,026	S_A	N/A	
		ANCHOR MOVEMENTS	-			
		SUM	19,026	22,500		
THERMAL EXPANSION [NC-3611.2 (C) (2), NC-3652.3] *EQN. 11		DESIGN PRESS. AT ____ PSIG		$S_A + S_h$	N/A	
		WEIGHT & SUSTAINED				
		THERMAL EXPANSION				
		ANCHOR MOVEMENTS				
		SUM				
*EITHER EQUATION 10 OR 11 MUST BE MET						
SUMMARY	NAME		SIGNATURE		DATE	
PREPARED BY						
CHECKED BY						
APPROVED BY						

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Table 3

MARK I PIPING STRESS SUMMARY CHECK AND COVER SHEET
ASME SECT. III, CLASSES 2 & 3 (ESSENTIAL PIPING)

PROJECT: PEACH BOTTOM ATOMIC POWER STATION - UNITS 2 AND 3NO. OF SHEETS JOB NO. 11187-015

PLANT DESIGN GROUP

SYSTEM: RHRCALC. NO. ISO NO. P-10-3REV NO.

DESIGN CONDITION AND [SECT. III PARA. REF.]	LOCATION OF MAX. PIPE STRESS	LOADING CONDITION	MAXIMUM COMPUTED STRESS (PSI)	ALLOWABLE STRESS (PSI)	PUAAG - NEDO 24583-1 OCT 1979 REF TABLE 5-2 STRESS COMB.	CHK
SUSTAINED LOADS [NC-3652.1] EQN. 8	SYSTEM	DESIGN PRESS. AT ⁴⁵⁰ PSIG WEIGHT & SUSTAINED	5065	1.0 S _h	N/A	
	MAXIMUM	SUM	4387		W + P	
OCCASIONAL LOADS [NC-3611.2 (C) (2), NC-3652.2] EQN. 9	691	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	2226	1.2 S _h	COLUMN 1	
	691-691 A	(SRV DISCHARGE) ALL	83		W+P+SRV _{a11}	
		SUM	13,152			
			15,461	18,000		
	SYSTEM	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	4840	1.2 S _h	N/A	
	MAXIMUM	OBE	4387			
		SUM	6423		W+P+OBE	
			15,650	18,000		
	SYSTEM	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	4840	1.8 S _h	COLUMN 2	
	MAXIMUM	(SRV DISCHARGE) ALL	4387		W+P+ √OBE ² +SRV ² _{a11}	
		OBE	13,188			
		SUM	6423			
			23,896	27,000		
	SYSTEM	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	4840	1.8 S _h	COLUMN 11	
	MAXIMUM	(SRV DISCHARGE) ALL	4387		W+P+ √SRV ² _{a11} + CH ²	
		C.O. OR CH. FROM SBA	13,188			
		SUM	4816			
			23,267	27,000		
	575	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	3655	2.4 S _h	COLUMN 15	
	570-575	(SRV DISCHARGE) ALL	1283		W+P+CH+ √SSE ² +SRV ² _{a11}	
		SSE	5016			
		C.O. OR CH. FROM IBA	18,797			
		SUM	216			
			23,509	36,000		
	575	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	3655	2.4 S _h	COLUMN 25	
	570-575	(SRV DISCHARGE) ONE	1283		W+P+PS+ √SSE ² +SRV ² _{one}	
		SSE	2508			
		POOL SWELL	18,797			
		SUM	1316			
			25,218	36,000		
	SYSTEM	PEAK PRESS. AT ⁴³⁰ PSIG WEIGHT & SUSTAINED	4840	2.4 S _h	COLUMN 27	
	MAXIMUM	(SRV DISCHARGE) ONE	4387		W+P+ √SSE ² +CO ²	
		SSE	-			
		C.O. OR CH. FROM DBA	18,797			
		SUM	8894			
			30,022	36,000		

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(CONTINUED ON REVERSE SIDE)



Table 3 (Continued)

MARK I PIPING STRESS SUMMARY CHECK AND COVER SHEET
ASME SECT. III, CLASSES 2 & 3 (ESSENTIAL PIPING) CONTINUED

DESIGN CONDITION ID [SECT. III ARA. REF.]	LOCATION OF MAX. PIPE STRESS	LOADING CONDITION	MAXIMUM COMPUTED STRESS (PSI)	ALLOWABLE STRESS (PSI)	PUAAG - NEDO 24583-1 OCT 1979 REF TABLE 5-2 STRESS. COMB	CHK
THERMAL EXP [NC-3611.2 (C) (2), NC-3652.3] *EQN. 10	730 728M-730	THERMAL EXPANSION ANCHOR MOVEMENTS	19,026	S_A	N/A	
			-			
		SUM	19,026	22,500		
THERMAL EXPANSION [NC-3611.2 (C) (2), NC-3652.3] *EQN. 11		DESIGN PRESS. AT ____ PSIG		$S_A + S_h$	N/A	
		WEIGHT & SUSTAINED				
		THERMAL EXPANSION				
		ANCHOR MOVEMENTS				
		SUM				
*EITHER EQUATION 10 OR 11 MUST BE MET						
SUMMARY	NAME		SIGNATURE		DATE	
PREPARED BY						
CHECKED BY						
APPROVED BY						

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Table 4. Snubber Support Load Summary

S-11187 D-047 REV. 2 LOADS SUMMARY 1/4 P-10-3 REV. 4 W/ADD. SUPPORT AT D.P. 69A AND VALVE MD348 BEING 45 DEGREE UP FROM HORIZONTAL PLANE									
DATA PT	WT	THOMA	DBE	SRV	PS	CO	CH		
5-ANC-FX	97.0	-229.0	-842.0	1868.0	136.0	56.0	80.0	76.0	
5-ANC-FY	-3806.0	-20.0	71.0	1684.0	123.0	124.0	165.0	104.0	
5-ANC-FZ	35.0	-12.0	-109.0	1675.0	329.0	229.0	464.0	225.0	
5-ANC-MX	-88833.0	4187.0	14757.0	305453.0	4481.0	4752.0	7737.0	3752.0	
5-ANC-MY	-15360.0	31218.0	119752.0	143335.0	9327.0	5253.0	11515.0	5959.0	
5-ANC-MZ	6541.0	2685.0	12047.0	101598.0	3003.0	3794.0	2217.0	1966.0	
20-SPR-FY	242.0	14.0	56.0	0	2.0	4.0	1.0	0	
25A-SPR-FY	949.0	26.0	93.0	0	4.0	6.0	4.0	2.0	
35-SPR-FY	279.0	18.0	84.0	0	2.0	3.0	2.0	1.0	
45-SPR-FY	77.0	23.0	108.0	0	2.0	4.0	2.0	1.0	
55-SMB-FY	0	0	0	3140.0	304.0	452.0	448.0	164.0	
70-SPR-FY	22.0	-8.0	-10.0	0	4.0	6.0	5.0	2.0	
90-RAD-FY	-3719.0	-135.0	-795.0	744.0	398.0	409.0	477.0	249.0	
90-RAD-FZ	-1884.0	4251.0	2277.0	3470.0	1026.0	533.0	976.0	522.0	
95-ANC-FX	-665.0	631.0	1584.0	3057.0	374.0	171.0	367.0	240.0	
95-ANC-FY	-458.0	383.0	544.0	488.0	146.0	251.0	202.0	85.0	
95-ANC-FZ	1279.0	-988.0	229.0	2517.0	232.0	253.0	235.0	108.0	
95-ANC-MX	-37002.0	3899.0	-291.0	7837.0	3157.0	1502.0	4711.0	2307.0	
95-ANC-MY	-12926.0	24155.0	10938.0	6638.0	5786.0	3358.0	5549.0	2923.0	
95-ANC-MZ	20336.0	1697.0	5463.0	1288.0	2328.0	2725.0	2873.0	1454.0	
110-SPR-FY	-12.0	-2.0	-1.0	0	1.0	1.0	1.0	0	
145-SPR-FY	-2.0	-3.0	-1.0	0	1.0	1.0	1.0	0	
155-RAD-FY	-1885.0	-548.0	-336.0	632.0	142.0	51.0	162.0	86.0	
160-RAD-FX	132.0	-1210.0	-1372.0	563.0	127.0	152.0	173.0	61.0	
160-RAD-FY	-2790.0	-2023.0	-982.0	546.0	191.0	54.0	230.0	122.0	
180-ANC-FX	67.0	927.0	749.0	73.0	101.0	60.0	107.0	50.0	
180-ANC-FY	276.0	-1794.0	-1631.0	210.0	62.0	56.0	37.0	31.0	
180-ANC-FZ	85.0	3128.0	2394.0	351.0	117.0	72.0	138.0	61.0	
180-ANC-MX	9784.0	25997.0	22510.0	3973.0	1066.0	1100.0	880.0	541.0	
180-ANC-MY	864.0	31770.0	24327.0	3564.0	1192.0	735.0	1402.0	619.0	
180-ANC-MZ	-2618.0	18232.0	16575.0	2131.0	627.0	564.0	381.0	316.0	
188-SPR-FY	1.0	-13.0	0	0	0	0	1.0	0	
215-SMB-FZ	0	0	0	4262.0	84.0	111.0	149.0	54.0	
245-RAD-FY	-4115.0	0	0	0	0	0	0	0	
245-RAD-FZ	235.0	181.0	314.0	4541.0	203.0	366.0	408.0	178.0	
270-SPR-FX	-7.0	10.0	36.0	0	3.0	4.0	2.0	1.0	
295-SPR-FY	-26.0	27.0	119.0	0	4.0	7.0	5.0	2.0	
300-SMB-FX	0	0	0	4995.0	151.0	208.0	205.0	88.0	
305-SPR-FY	94.0	15.0	127.0	0	7.0	20.0	5.0	2.0	
325-SPR-FY	166.0	-2.0	61.0	0	5.0	16.0	4.0	2.0	
340-SPR-FY	904.0	-177.0	-313.0	0	21.0	107.0	19.0	11.0	
375-SPR-FY	-334.0	16.0	7.0	0	15.0	36.0	21.0	11.0	
385-SPR-FY	76.0	-10.0	-38.0	0	14.0	8.0	11.0	8.0	
415-ANC-FX	215.0	-124.0	167.0	8716.0	1892.0	990.0	1524.0	1098.0	
415-ANC-FY	-12031.0	183.0	-112.0	5364.0	5499.0	2748.0	4139.0	2946.0	
415-ANC-FZ	911.0	277.0	817.0	2498.0	399.0	714.0	383.0	200.0	
415-ANC-MX	227914.0	-47062.0	-119726.0	273917.0	28466.0	68048.0	33454.0	21654.0	
415-ANC-MY	-293032.0	85075.0	-23332.0	415554.0	31888.0	58160.0	29770.0	16623.0	
415-ANC-MZ	705376.0	34912.0	4790.0	1054088.0	397270.0	218107.0	291842.0	213167.0	
445-SPR-FY	137.0	1.0	18.0	0	15.0	45.0	14.0	7.0	
480-SPR-FY	181.0	3.0	76.0	0	15.0	55.0	13.0	6.0	
485-SPR-FY	53.0	-5.0	31.0	0	9.0	85.0	8.0	4.0	
485-SPR-FZ	81.0	-34.0	-118.0	0	21.0	87.0	18.0	6.0	

Table 4 (continued)

A10-3		LOADS SUMMARY									
DATA PT		51	52	53	54	55	56	57	58	59	60
510-RAD-FZ	49 0	-54 0	-15 0	1530 0	658 0	800 0	351 0	193 0			
515-RAD-FX	212 0	27 0	91 0	693 0	731 0	731 0	811 0	374 0			
580-ANC-FX	-146 0	-112 0	-294 0	1545 0	506 0	391 0	527 0	250 0			
580-ANC-FY	-2024 0	-114 0	49 0	3354 0	492 0	359 0	260 0	133 0			
580-ANC-FZ	49 0	280 0	-14 0	780 0	565 0	722 0	421 0	113 0			
580-ANC-MX	1715 0	7176 0	2349 0	8897 0	6977 0	4874 0	8509 0	2630 0			
580-ANC-MY	-5718 0	-19904 0	397 0	57490 0	31709 0	44764 0	20420 0	4572 0			
580-ANC-MZ	13436 0	-8581 0	1120 0	236273 0	29189 0	19961 0	12175 0	5438 0			
600-SPR-FY	92 0	35 0	30 0	0	25 0	17 0	9 0	3 0			
615-SPR-FY	6 0	-5 0	0	0	1 0	1 0	2 0	1 0			
625-ANC-FX	-43 0	78 0	131 0	395 0	162 0	110 0	123 0	69 0			
625-ANC-FY	691 0	119 0	20 0	287 0	85 0	97 0	146 0	61 0			
625-ANC-FZ	-94 0	-215 0	-40 0	459 0	290 0	368 0	188 0	69 0			
625-ANC-MX	-8900 0	3220 0	1226 0	28428 0	11547 0	15114 0	8378 0	2996 0			
625-ANC-MY	-7545 0	119 0	2222 0	31755 0	7929 0	9157 0	3851 0	1451 0			
625-ANC-MZ	-11962 0	3848 0	1901 0	7273 0	7202 0	4320 0	6514 0	3362 0			
640-SPR-FY	19 0	20 0	-43 0	0	9 0	10 0	27 0	9 0			
642-SMB-FX	0	0	0	5215 0	925 0	1761 0	2105 0	769 0			
645-SMB-FX	0	0	0	2941 0	845 0	1713 0	1513 0	552 0			
685-SPR-FY	-727 0	503 0	-53 0	3109 0	2673 0	3970 0	3901 0	2508 0			
690-RAD-FY	-7308 0	-2 0	0	16 0	16 0	77 0	32 0	18 0			
69A-RAD-FX	4 0	329 0	1824 0	286 0	768 0	1395 0	827 0	499 0			
69A-RAD-FY	-283 0	-88 0	-180 0	85 0	370 0	423 0	967 0	575 0			
715-RAD-FY	-541 0	130 0	-13 0	65 0	282 0	685 0	193 0	149 0			
73A-RAD-FY	-95 0	332 0	1022 0	18 0	399 0	1110 0	121 0	92 0			
73A-RAD-FZ	-9 0	267 0	1616 0	85 0	237 0	902 0	771 0	219 0			
747-SPR-FY	586 0	-2 0	-217 0	1835 0	5 0	19 0	6 0	3 0			
750-RAD-FX	-391 0	4292 0	0	0	2560 0	4465 0	6239 0	2853 0			
760-SPR-FY	-3904 0	47 0	0	0	24 0	115 0	43 0	19 0			
435-SMB-FZ	0	0	0	5031 0	520 0	996 0	900 0	304 0			

RESTRAINT LOADS SUMMARY

DATA PT	51	52	53	54
5-ANC-FX	132	2000	676	5337
5-ANC-FY	3806	5490	4298	7991
5-ANC-FZ	35	1710	1351	4529
5-ANC-MX	68833	374286	86757	807202
5-ANC-MY	15856	159191	53164	456372
5-ANC-MZ	9226	110824	21238	266671
20-SPR-FY	256	256	264	306
25A-SPR-FY	975	975	991	1058
35-SPR-FY	297	297	305	371
45-SPR-FY	100	100	108	193
55-SMB-FY	0	3140	1216	8058
70-SPR-FY	22	22	38	38
90-RAD-FY	3854	4598	5446	7155
90-RAD-FZ	2367	5837	6471	11690
95-ANC-FX	665	3722	2161	8647
95-ANC-FY	458	946	1042	1941
95-ANC-FZ	1279	3796	2207	7845
95-ANC-MX	17032	44819	49630	62255
95-ANC-MY	12976	19564	36070	43946
95-ANC-MZ	22011	23321	11337	37057
110-SPR-FY	12	12	16	17
105-SPR-FY	4	4	8	7
145-SPR-FY	5	5	9	7

Table 4 (Continued)

A-1 LOADS SUMMARY 2/4

155-RAD-FY	2433	3065	3001	3927
160-RAD-FX	1078	1641	1586	2782
160-RAD-FY	4813	5359	5577	5411
180-ANC-FX	994	1067	1398	1306
180-ANC-FY	1588	1798	1836	2018
180-ANC-FZ	3211	3562	3679	3504
180-ANC-MX	35781	39754	40045	43280
180-ANC-MY	32634	36198	37402	35603
180-ANC-MZ	15614	17745	18122	19969
186-SPR-FY	14	14	14	2
215-SNB-FZ	0	4782	336	11552
245-RAD-FY	4115	4115	4115	4115
245-RAD-FA	426	4967	1238	11858
270-SPR-FY	7	7	19	41
295-SPR-FY	28	28	42	109
300-SNB-FA	0	4995	604	12217
305-SPR-FY	109	109	137	249
325-SPR-FY	166	166	186	247
340-SPR-FY	904	904	988	1029
375-SPR-FY	334	334	394	395
385-SPR-FY	48	46	102	131
415-ANC-FX	215	8931	7783	23725
415-ANC-FY	12031	17395	34027	40575
415-ANC-FZ	1188	3686	2784	8581
415-ANC-MX	227914	501831	341778	946497
415-ANC-MY	382107	797661	509659	1593519
415-ANC-MZ	705370	1759458	2294650	3906137
445-SPR-FY	192	192	252	252
480-SPR-FY	181	181	241	249
485-SPR-FY	58	58	94	148
495-SPR-FY	81	81	165	165
510-RAD-FZ	49	1579	2681	4830
515-RAD-FX	239	932	3163	4041
580-ANC-FX	258	1803	2282	4914
580-ANC-FY	2138	5492	4106	10528
580-ANC-FZ	309	1089	2569	3097
580-ANC-MX	8891	17788	36799	41834
580-ANC-MY	25622	83112	152458	206811
580-ANC-MZ	13436	249709	130112	606561
600-SPR-FY	127	127	227	222
615-SPR-FY	6	6	10	10
625-ANC-FX	43	438	691	1305
625-ANC-FY	800	1087	1140	1530
625-ANC-FZ	309	768	1469	1803
625-ANC-MX	8800	37228	54988	97455
625-ANC-MY	7545	39300	39261	95462
625-ANC-MZ	11962	19235	40770	49008
640-SPR-FY	39	39	75	61
642-SNB-FA	0	5215	3700	14515
645-SNB-FA	0	2941	3780	8998
680-RAD-FY	727	3836	11419	16326
685-SPR-FY	7310	7310	7374	7399
694-RAD-FX	333	619	3405	5475
694-RAD-FY	371	456	1851	2255
715-RAD-FY	541	606	1669	1842
734-RAD-FY	237	253	1811	3164
734-RAD-FZ	258	343	1206	2911
747-SPR-FY	588	586	606	609
750-RAD-FX	3901	5716	14141	14608
780-SPR-FY	3904	3904	4000	4039

Table 5. Energy Absorber Support Load Summary

P-10-3 EAD DESIGN, SUPPORT LOAD SUMMARY (X, Y, Z)	THETA	TIME	SRV	SSE	PS	CO	CH
DATA PT	WT	TIME	SRV	SSE	PS	CO	CH
5-ANC-FX	99.0	-222.0	-844.0	2092.0	4034.0	176.0	184.0
5-ANC-FY	-3806.0	23.0	75.0	1484.0	3301.0	143.0	151.0
5-ANC-FZ	35.0	-22.0	-113.0	1852.0	3745.0	435.0	472.0
5-ANC-MX	-68940.0	2593.0	10171.0	242062.0	448152.0	6943.0	5523.0
5-ANC-MY	-15429.0	32701.0	128472.0	159913.0	253084.0	12540.0	1355.0
5-ANC-MZ	6620.0	1725.0	5500.0	46655.0	85283.0	3465.0	3027.0
20-SPR-FX	242.0	7.0	27.0	330.0	594.0	4.0	2.0
25A-SPR-FY	949.0	2.0	10.0	250.0	640.0	10.0	76.0
25A-EAB-FY	280.0	30.0	153.0	2337.0	2978.0	152.0	103.0
35-SPR-FY	74.0	12.0	48.0	135.0	262.0	7.0	3.0
45-SPR-FY	23.0	22.0	86.0	139.0	288.0	6.0	3.0
70-SPR-FY	23.0	-15.0	-54.0	144.0	298.0	8.0	5.0
90-RAD-FY	-3692.0	-396.0	-2519.0	6935.0	14133.0	542.0	305.0
90-RAD-FZ	-1897.0	4278.0	2995.0	4079.0	8713.0	1400.0	813.0
95-ANC-FX	-662.0	557.0	1298.0	2305.0	5115.0	518.0	225.0
95-ANC-FY	-478.0	599.0	1894.0	4946.0	10235.0	308.0	553.0
95-ANC-FZ	1287.0	1009.0	-280.0	2924.0	6322.0	562.0	418.0
95-ANC-MX	-37253.0	2818.0	2508.0	18522.0	44469.0	3294.0	1906.0
95-ANC-MY	-13012.0	24349.0	15943.0	27976.0	60709.0	8325.0	5196.0
95-ANC-MZ	20148.0	3588.0	17760.0	47742.0	98701.0	3281.0	5447.0
110-SPR-FY	-12.0	-4.0	11.0	23.0	2.0	2.0	1.0
125-PSR-FY	-2.0	-2.0	-3.0	9.0	19.0	1.0	1.0
145-SPR-FY	-2.0	-3.0	-3.0	7.0	16.0	1.0	1.0
155-RAD-FY	-1888.0	-570.0	-389.0	333.0	694.0	164.0	112.0
160-RAD-FX	133.0	-1210.0	1422.0	674.0	1462.0	219.0	145.0
160-RAD-FY	-2792.0	-2030.0	-935.0	301.0	680.0	224.0	165.0
177-RAD-FY	-2178.0	3689.0	3217.0	1000.0	1945.0	266.0	204.0
177-RAD-FZ	-275.0	-8404.0	-4683.0	1223.0	2653.0	410.0	204.0
180-ANC-FX	68.0	922.0	700.0	204.0	458.0	142.0	49.0
180-ANC-FY	205.0	-1800.0	-1611.0	479.0	956.0	129.0	88.0
180-ANC-FZ	86.0	3127.0	2324.0	588.0	1240.0	195.0	103.0
180-ANC-MX	9831.0	25608.0	19521.0	9710.0	20280.0	1625.0	1533.0
180-ANC-MY	878.0	31772.0	23614.0	5974.0	12607.0	1978.0	1048.0
180-ANC-MZ	-2612.0	18291.0	16372.0	4877.0	9719.0	1315.0	897.0
186-SPR-FY	-1.0	-13.0	1.0	1.0	2.0	1.0	1.0
210-ANC-FX	66.0	-122.0	-3.0	45.0	102.0	179.0	69.0
210-ANC-FY	-838.0	339.0	-479.0	314.0	684.0	116.0	98.0
210-ANC-FZ	-19.0	22.0	-20.0	73.0	167.0	146.0	91.0
210-ANC-MX	-8938.0	7905.0	-1211.0	2425.0	8281.0	2385.0	1908.0
210-ANC-MY	-541.0	-297.0	-2422.0	678.0	1316.0	2758.0	1189.0
210-ANC-MZ	-3442.0	-6439.0	-6446.0	2602.0	6436.0	3634.0	1211.0
215-EAB-FZ	-4119.0	-273.0	-1692.0	3190.0	4348.0	185.0	190.0
245-RAD-FY	218.0	316.0	1214.0	2325.0	5086.0	809.0	576.0
245-RAD-FZ	218.0	-172.0	-695.0	3083.0	7712.0	311.0	391.0
270-SPR-FY	8.0	3.0	2.0	14.0	35.0	4.0	4.0
290-ANC-FX	47.0	2.0	18.0	642.0	1454.0	288.0	185.0
290-ANC-FY	-2191.0	-166.0	-645.0	727.0	1644.0	342.0	256.0
290-ANC-FZ	-481.0	-576.0	-2258.0	1205.0	3154.0	61.0	59.0
290-ANC-MX	-74528.0	-17286.0	-56495.0	30425.0	79499.0	10777.0	7353.0
290-ANC-MY	26519.0	24171.0	94911.0	51893.0	144062.0	9465.0	6574.0
290-ANC-MZ	29028.0	-8321.0	-34743.0	45456.0	103517.0	13765.0	14726.0
295-SPR-FY	26.0	18.0	72.0	105.0	240.0	8.0	11.0
300-EAB-FX	96.0	210.0	794.0	3567.0	4437.0	131.0	188.0
305-SPR-FY	167.0	47.0	215.0	382.0	823.0	27.0	6.0
325-SPR-FY	-1.0	24.0	142.0	381.0	801.0	5.0	21.0
		177.0	200.0	4064.0	8477.0	25.0	130.0

Table 5 (Continued)

375-SPR-FY	-334.0	-38.0	-104.0	1110.0	2359.0	16.0	40.0	19.0	10.0
385-SPR-FY	-12.0	-12.0	-43.0	75.0	170.0	13.0	9.0	9.0	70.0
415-ANC-FX	204.0	-160.0	249.0	7735.0	19250.0	1824.0	990.0	1225.0	1007.0
415-ANC-FY	-12024.0	146.0	-290.0	3441.0	7648.0	5109.0	2782.0	3364.0	2662.0
415-ANC-FZ	895.0	143.0	482.0	2248.0	4360.0	634.0	757.0	409.0	231.0
415-ANC-MX	230938.0	916.0	-3288.0	196976.0	442984.0	60639.0	62255.0	35956.0	25192.0
415-ANC-MY	293039.0	-38791.0	-111138.0	404465.0	774972.0	44772.0	63750.0	30002.0	18043.0
415-ANC-MZ	-705554.0	8182.0	-42094.0	780313.0	1738754.0	365005.0	221280.0	239373.0	194591.0
445-SPR-FY	-189.0	-43.0	-45.0	298.0	697.0	14.0	37.0	10.0	6.0
455-EAB-FZ	-181.0	1403.0	3694.0	3215.0	4424.0	316.0	560.0	367.0	148.0
480-SPR-FY	-55.0	-25.0	25.0	277.0	803.0	17.0	58.0	15.0	6.0
485-SPR-FY	81.0	-12.0	7.0	461.0	1715.0	16.0	100.0	7.0	4.0
495-SPR-FY	47.0	-32.0	-118.0	255.0	869.0	25.0	57.0	12.0	6.0
510-RAD-FZ	212.0	21.0	86.0	1939.0	3226.0	711.0	616.0	286.0	178.0
515-RAD-FX	147.0	-102.0	-283.0	1537.0	2844.0	371.0	534.0	620.0	341.0
580-ANC-FX	2021.0	-111.0	60.0	3104.0	5716.0	927.0	592.0	422.0	233.0
580-ANC-FY	47.0	267.0	-1.0	752.0	2086.0	427.0	592.0	324.0	157.0
580-ANC-FZ	1710.0	7204.0	2396.0	5933.0	16315.0	6324.0	4545.0	252.0	82.0
580-ANC-MX	-5823.0	-19561.0	833.0	69531.0	152165.0	27441.0	25988.0	5717.0	2136.0
580-ANC-MY	13653.0	-8265.0	2031.0	220224.0	405120.0	46525.0	40095.0	12468.0	3235.0
580-ANC-MZ	92.0	36.0	31.0	241.0	444.0	31.0	32.0	15365.0	6288.0
600-SPR-FY	6.0	-5.0	0.0	5.0	9.0	2.0	1.0	10.0	4.0
615-SPR-FY	-43.0	77.0	128.0	406.0	758.0	184.0	152.0	1.0	1.0
625-ANC-FX	681.0	120.0	22.0	281.0	511.0	100.0	116.0	116.0	69.0
625-ANC-FZ	-93.0	-219.0	-48.0	389.0	1050.0	234.0	244.0	121.0	59.0
625-ANC-MX	-8856.0	3351.0	-1063.0	28150.0	51941.0	9704.0	10441.0	132.0	58.0
625-ANC-MY	-7538.0	-11.0	10222.0	31993.0	59546.0	9889.0	7296.0	6162.0	2486.0
625-ANC-MZ	-11931.0	3731.0	1734.0	8372.0	14742.0	6292.0	4401.0	3800.0	1459.0
640-SPR-FY	27.0	14.0	-4.0	94.0	213.0	20.0	26.0	5872.0	3274.0
642-EAB-FX	0.0	223.0	365.0	2026.0	2883.0	673.0	1016.0	19.0	8.0
645-EAB-FY	-1471.0	-381.0	366.0	1661.0	2682.0	754.0	949.0	594.0	244.0
645-EAB-FZ	-1471.0	-5.0	-208.0	1465.0	2604.0	2782.0	3954.0	398.0	161.0
685-SPR-FY	-12.0	-6.0	-14.0	37.0	70.0	17.0	77.0	28.0	16.0
69A-RAD-FX	-20.0	381.0	1906.0	448.0	784.0	733.0	1372.0	809.0	497.0
69A-RAD-FY	-324.0	-109.0	-255.0	1603.0	335.0	398.0	410.0	928.0	580.0
715-RAD-FY	-530.0	130.0	-8.0	79.0	167.0	305.0	678.0	178.0	143.0
73A-RAD-FY	-91.0	334.0	1631.0	37.0	80.0	391.0	1113.0	116.0	90.0
73A-RAD-FZ	-7.0	267.0	1620.0	72.0	173.0	232.0	904.0	46.0	215.0
735-ANC-FX	20.0	-607.0	-2076.0	187.0	455.0	402.0	1425.0	325.0	96.0
735-ANC-FY	-323.0	-406.0	-1943.0	42.0	92.0	434.0	1247.0	135.0	99.0
735-ANC-FZ	9.0	-343.0	-1897.0	72.0	176.0	152.0	763.0	244.0	103.0
735-ANC-MX	-879.0	225.0	-5827.0	1765.0	4289.0	5863.0	20756.0	5800.0	2070.0
735-ANC-MY	292.0	-12719.0	-55909.0	3190.0	7704.0	6082.0	15719.0	2624.0	1740.0
735-ANC-MZ	2648.0	19455.0	74623.0	4110.0	9957.0	9379.0	38154.0	8305.0	2948.0
747-SPR-FY	-3.0	-3.0	-1.0	9.0	16.0	6.0	20.0	6.0	3.0
750-RAD-FX	-172.0	4677.0	119.0	3564.0	5486.0	2584.0	4383.0	6178.0	2845.0
760-SPR-FY	-2.0	46.0	-5.0	14.0	28.0	27.0	115.0	40.0	18.0
780-ANC-FX	42.0	-4255.0	-14.0	983.0	2156.0	2685.0	3900.0	7098.0	3958.0
780-ANC-FY	-288.0	-556.0	-63.0	529.0	1127.0	3550.0	6456.0	5188.0	3395.0
780-ANC-FZ	210.0	-488.0	245.0	2654.0	5264.0	477.0	4719.0	17143.0	9892.0
780-ANC-MX	5553.0	97293.0	25965.0	87132.0	151286.0	119147.0	380307.0	206131.0	135148.0
780-ANC-MY	-21217.0	316861.0	-1824.0	164172.0	279642.0	140886.0	236737.0	368562.0	224733.0
780-ANC-MZ	23676.0	214484.0	1469.0	153612.0	261301.0	118507.0	170216.0	127530.0	91677.0

RESTRAINT LOADS/DISPLACEMENTS

Table 5 (Continued)

DATA PT	51	52	53	54
5-ANC-FX	123	2215	827	5024
5-ANC-FY	3806	5290	4378	7307
5-ANC-FZ	35	1887	1775	4679
5-ANC-MX	68940	311002	96712	526405
5-ANC-MY	17272	177185	67432	374233
5-ANC-MZ	8345	55000	22205	102229
20-SPR-FY	249	579	261	867
25A-SPR-FY	951	1201	991	1643
25A-EAB-FY	30	2367	639	3389
35-SPR-FY	292	427	320	598
45-SPR-FY	100	239	124	462
70-SPR-FY	23	167	55	345
90-RAD-FY	4088	10923	6256	21250
90-RAD-FZ	2381	6390	7981	12716
95-ANC-FX	662	2967	2734	6363
95-ANC-FY	478	5424	1710	12278
95-ANC-FZ	2296	5220	4544	8168
95-ANC-MX	37253	55775	50429	85607
95-ANC-MY	13012	40988	46312	84871
95-ANC-MZ	23736	71478	36860	142819
110-SPR-FY	12	23	20	42
125-PSR-FY	4	13	8	26
145-SPR-FY	5	12	9	23
155-RAD-FY	2458	2789	3112	3297
160-RAD-FX	1077	1751	1953	3043
160-RAD-FY	4822	5123	5718	4943
177-RAD-FY	2178	3178	3242	4467
177-RAD-FZ	6679	7902	8319	8189
180-ANC-FX	990	1194	1558	1549
180-ANC-FY	1595	2074	2111	2523
180-ANC-FZ	3213	3801	3493	3931
180-ANC-MX	35439	45149	41939	51577
180-ANC-MY	32650	38624	40562	39948
180-ANC-MZ	15679	20551	20939	25121
186-SPR-FY	14	15	18	6
210-ANC-FX	66	111	782	863
210-ANC-FY	838	1152	1302	2208
210-ANC-FZ	19	92	603	743
210-ANC-MX	8938	12363	18478	24703
210-ANC-MY	838	1516	11862	15347
210-ANC-MZ	9881	12483	24417	27319
215-EAB-FZ	273	3463	1013	6265
245-RAD-FY	4119	8444	7715	10830
245-RAD-FX	218	3301	1462	8644
270-SPR-FY	8	22	24	48
290-ANC-FX	49	691	1201	2044
290-ANC-FY	2357	3084	3725	5123
290-ANC-FZ	1057	2262	1301	5960
290-ANC-MX	91814	122239	134922	226242
290-ANC-MY	50690	102583	88550	274673
290-ANC-MZ	37349	82805	92409	186735
295-SPR-FY	26	131	58	299
300-EAB-FX	210	3773	734	5446
305-SPR-FY	143	525	175	1151
315-SPR-FY	191	572	211	1120
625340-SPR-FY	908	972	6008	8436
625388-SPR-FY	372	1482	436	2829
625389-SPR-FY	48	123	100	315
625390-SPR-FY	204	7939	7500	22046

Table 5 (Continued)

415-ANC-FY	12024	15465	32460	36796
415-ANC-FZ	1038	3286	3574	6750
415-ANC-MX	231854	428830	474410	761173
415-ANC-MY	331830	736295	510918	1254430
415-ANC-MZ	705554	1485667	2165574	3212685
445-SPR-FY	232	530	288	960
455-EAB-FZ	1403	4618	2667	8779
480-SPR-FY	206	483	274	1021
485-SPR-FY	67	528	131	1806
495-SPR-FY	81	336	181	1002
510-RAD-FZ	47	1986	2891	4528
515-RAD-FX	233	874	3409	4046
580-ANC-FX	249	1786	1733	3871
580-ANC-FY	2132	5236	5840	8985
580-ANC-FZ	314	1066	2022	2825
580-ANC-MX	8914	14847	34210	36343
580-ANC-FY	25384	94915	135148	196681
580-ANC-MZ	13653	233877	199753	475457
600-SPR-FY	128	369	252	607
615-SPR-FY	6	11	14	19
625-ANC-FX	43	449	779	1211
625-ANC-FY	801	1084	1201	1411
625-ANC-FZ	312	701	1248	1606
625-ANC-MX	8856	37006	47672	77247
625-ANC-MY	7549	39542	47105	80484
625-ANC-MZ	11931	20303	37099	44373
640-SPR-FY	41	135	121	272
642-EAB-FX	223	2249	2915	4664
645-EAB-FX	381	2042	3197	4563
660-RAD-FY	1476	2941	12604	15653
685-SPR-FY	18	55	86	170
69A-RAD-FX	361	809	3293	5418
69A-RAD-FY	433	593	2025	2608
715-RAD-FY	530	609	1750	1912
73A-RAD-FY	243	280	1807	3187
73A-RAD-FZ	260	332	1188	2883
735-ANC-FX	587	774	2195	4273
735-ANC-FY	729	771	2465	4097
735-ANC-FZ	334	406	942	2957
735-ANC-MX	879	2644	24331	36662
735-ANC-MY	12427	15617	36755	84462
735-ANC-MZ	22103	26213	59613	133199
747-SPR-FY	3	12	27	40
750-RAD-FX	4505	8069	14841	14719
760-SPR-FY	44	58	152	173
780-ANC-FX	4213	5196	14952	13644
780-ANC-FY	844	1373	15044	16078
780-ANC-FZ	278	2932	19386	27236
780-ANC-MX	102846	189978	679434	846690
780-ANC-MY	338078	502257	901622	876886
780-ANC-MZ	190808	344420	664836	656630