



ENERGY
SERVICES

101 California Street, Suite 1000, San Francisco, CA 94111-5894

415 397-5600

June 20, 1984
84042.019

Mrs. Juanita Ellis
President, CASE
1426 S. Polk
Dallas, Texas 75224

Subject: Gibbs & Hill Responses to Pipe Stress Questions
Comanche Peak Steam Electric Station
Independent Assessment Program - Phase 3
Texas Utilities Generating Company
Job. No. 84042

Dear Mrs. Ellis:

Enclosed please find four more Gibbs & Hill responses to Cygna pipe stress questions.

Feel free to call me if you have any questions or wish to discuss the enclosed documents.

Very truly yours,

N. H. Williams
Project Manager

NHW:jw
Attachments

cc: Mr. S. Treby, U.S.N.R.C., w/attachments
Mr. D. Wade, TUGCO, w/o attachments
Mr. G. Grace, TUGCO, w/o attachments
Mr. D. Pigott, Orrick, Herrington & Sutcliffe, w/o attachments

54-445, 446

2222 - Per S. Bunnell
1/1 See Attached

San Francisco Boston Chicago Richland

8411060406 840620
PDR ADOCK 05000445
A PDR



Mrs. Juanita Ellis
President, CASE

June 20, 1984
Page 2

ATTACHMENTS

Gibbs & Hill letter from R. E. Ballard to J. B. George, GTN-69116, June 14, 1984; Texas Utilities Generating Company, Comanche Peak Steam Electric Station, G&H Project No. 2323, Follow-up Information from G&H, Ref.: Cygna Communications Report of 5/24/84.

Gibbs & Hill letter from R. E. Ballard to J. B. George, GTN-69071, June 5, 1984; Texas Utilities Generating Company, Comanche Peak Steam Electric Station, G&H Project No. 2323, Follow-up Information from G&H, Ref.: Cygna Communications Report of 5/24/84.

Gibbs & Hill letter from R. E. Ballard to J. B. George, GTN-69105, June 12, 1984; Texas Utilities Generating Company, Comanche Peak Steam Electric Station, G&H Project No. 2323, Follow-up Information from G&H, Ref.: Cygna Communications Report of 5/24/84.

Gibbs & Hill letter from R. E. Ballard to J. B. George, GTN-69087, June 6, 1984; Texas Utilities Generating Company, Comanche Peak Steam Electric Station, G&H Project No. 2323, Follow-up Information from G&H, Ref.: Cygna Communications Report of 5/24/84.

Gibbs & Hill, Inc.

11 Penn Plaza
New York, New York 10001
212 760-
Telex: 4438
Domestic: 127636/968694
International: 428813/234475
A Dravo Company

June 12, 1984

GTN- 69105

Texas Utilities Generating Company
Post Office Box 1002
Glen Rose, Texas 76043

Attention: Mr. J. B. George
Vice President/Project Gen. Manager

Gentlemen:

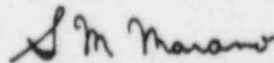
TEXAS UTILITIES GENERATING COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
G&H PROJECT NO. 2323
FOLLOWUP INFORMATION FROM G&H
REF: CYGNA COMMUNICATIONS OF 5/24/84

By copy of this letter to Nancy Williams of CYGNA enclosed please find the supplemental response to Item 1 of their Communications Report, Job No. 84042 of May 24, 1984, transmitting a copy of the "office copy signoff sheet" for Qualification Report FQP-5A-1.

Should you have any questions contact Henry W. Mentel

Very truly yours,

GIBBS & HILL, INC.



Robert E. Ballard, Jr.
Project Manager

~~gac~~
REBa-HWMe:sce
1 Letter

cc: ARMS (B&R Site) OL
N. Williams (CYGNA, Calif.) 1L, 1A
L. Weingart (CYGNA, Calif.) 1L
G. Grace (CPPE Site) 1L, 1A
D. Wade (TUSI Site) 1L

FISHER CONTROL CO.

REPORT # FQP-1

APPROVED
FOR ARRANGEMENT ONLY
PROCEED WITH FABRICATION
SUBJECT TO COMPLIANCE WITH
ALL CONTRACT REQUIREMENTS,
DRAWINGS, AND SPECIFICATIONS.

JAN 29 1980

Report is Approved
based on the Attached

TEXAS UTILITIES SERVICES, INC.
COMANCHE PEAK STEAM ELECTRIC STATION
G & H JOB NO. 2323A

GIBBS & HILL, INC. Fisher Letter CVN98M
ENGINEERS, DESIGNERS, CONSTRUCTORS
NEW YORK 12-6-79.

UNIT # 12

OFFICE COPY CP-0078

UNIT NO.	DRAWING NUMBER	REV. NO.	TITLE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	X FQA-SA-1	(G&H)	SEISMIC QUALIFICATION REPORT

STATUS OF PREVIOUS ISSUE REVIEWED BY G&H AEN 11-19-79	DEPARTMENT	MECHANICAL			NUCLEAR		ELECT	STRUCTURAL		ARCH	SPRNG STRESS
		CHEN	HYAC	I & C	MECH	P & D		CONC	SHIELD		
	DATE				1-18						
	RETURNED FOR CORRECTION DO NOT FABRICATE	/									
	APPROVED EXCEPT AS NOTED PROCEED WITH FABRICATION										
	APPROVED PROCEED WITH FABRICATION										
	FOR INFORMATION ONLY				DATE						
SPECIALIST ENGINEER				DATE							
DEPARTMENT ENGINEER											

REC'D BY EXPEDITOR

NO. OF APERTURE CARDS
REQUIRED _____

JAN 21 1980

PROJECT SIGNOFF A. M. Mans... DATE 1/21/80

Gibbs & Hill, Inc.

11 Penn Plaza
New York, New York 10001
212 760- 4438
Telex:
Domestic: 127636/968694
International: 428813/234475
A Dravo Company

June 6, 1984

GTN-69087

Texas Utilities Generating Company
Post Office Box 1002
Glen Rose, Texas 76043

Attention: Mr. J. B. George
Vice President/Project Gen. Mgr.

Gentlemen:

TEXAS UTILITIES GENERATING COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
G&H PROJECT NO. 2323
FOLLOWUP INFORMATION FROM G&H
REF: CYGNA COMMUNICATIONS OF 5/24/84

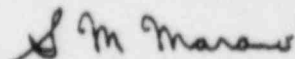
By copy of this letter to Nancy Williams of CYGNA enclosed please find the response to Item 8 of their Communications Report, Job No. 84042 of May 24, 1984.

In addition find a copy of the welded attachment calculation log to facilitate CYGNA in their further reviews. This item was requested verbally by Mr. Lee Weingart of CYGNA in a telephone call on June 4, 1984.

Should you have any questions contact Henry W. Mentel.

Very truly yours,

GIBBS & HILL, Inc.



Robert E. Ballard, Jr.
Project Manager

REBa-HWMe:lc
1 Letter

CC: ARMS (B&R Site) OL
N. Williams (CYGNA, Calif.) 1L 1A
~~L. Weingart (CYGNA, Calif.) 1L~~
G. Grace (CPPE Site) 1L 1A
D. Wade (TUSI Site) 1L

WELDED ATTACHEME. LOG BOOK

FILE NO. 1-WA-?	PROB NO. AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
1	62E	CC-1-948-700-AT3R	PBB/VIB	1-25-82	2-3-82	2400	ELBOW TRUNNION UNI-DIRECTIONAL SMOOTHER	6"	0.280	TRUNNION (1)	4"	WAS READY SOONER BUT FINAL RELEASE HOLD UP BY SWA & FA. THAT WERE RIGHT NEXT
2	62E	CC-1-007-031-AS3S	PBB/SG	1-25-82	1-29-82	4455	SPRING HANG ON RISER - DOUBLE TRUNN.	6"	0.280	TRUNNION (2)	3" SCH 40 X 4.75 ARM	
3	2-108	N.A.	PBB/VIB	1-26-82	2-1-82	8192	TRUNNION + 2 P ON ELBOW	30"	0.375	TRUNNION + 2 R (1)	SEB DRAWING	① TOTAL SPREAD 0.1A 408 + 0.7
4	2-112 2-113	N.A.	PBB/VIB	1-26-82	2-4-82	2077 5468	SADDLE BRACK. TRUNNION BRACKET	30"	0.375	TRUNNION (1) SADDLE TRUNNION (1) TRUNNION + 3 R - 0.1	PIPE X 4" BOX PIPE X 3" L R 982	AS WITH SWA BUT AS ONLY DOT SPECIAL REQUEST FROM STRUCT.-ENTR. UNID-TURB
5	62F	CC-1-011-032-A63R	PBB/SG	1-29-82	2-11-82	6428	ELBOW TRUNNION WITH SMOOTHER	6"	0.28"	TRUNNION (1)	2" O.P.	FOR POINT OUT See: 401 WA. 7NA
6	62F	CC-1-026-A63R	PBB/SG	1-29-82	2-11-82	15,377	LATERAL SMOOTHER	6"	0.28"	TRUNNION (1)	3" O.P. X 3.867 ARM	
7	62F	CC-1-011-03A-A63X	PBB/SG	1-29-82	2-11-82	6193	INCLINED (+S) SMOOTHER	6"	0.28"	TRUNNION (1)	3" O.P. X 3.187 ARM	
8	62F	CC-1-042-AT3R 8041	PBB/SG	1-29-82	2-11-82	2234	LATERAL SMOOTHER	6"	0.28"	TRUNNION PSP(CECT)	10 1/2" X 10 3/4" TAP	
9	63D	CC-X-038-001-FBS 4034	PBB/SG	2-1-82	2-18-82	2483	SPRING HANGERS	12"	1406	4 LUGS (2 ARMED) WITH SEB	1.5 X 1.5	
10A	63D	NOT USED										
11A	63D	NOT USED										
12	63B	CC-1-158-705-A44K		2-1-82	2-18-82							
13	63C	CC-1-166-004-A43R	PBB/SG	2-15-82	2-26-82	4978	ELBOW TRUNN.	4"	0.037	TRUNNION (1)	2" HANGERS 2.375 O.D.	
14	63C	CC-1-159-017-553K	TPP/SG		3-1-82	648	DOUBLE TRUNN.	10"	0.375	TRUNNION (1)	12" X 12" SB. (BEING PAD)	

WELDED ATTACHMENT LOG BOOK

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS ²	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
16	64A	CC-1-148-004-541A " OOR "	PBB/SG		3-22-82	3679	SANDBAR	4"	.237	4 LUGS	3" x 1" LUGS	
17	95	DD-1-008-003-443K 006-1533	PBB/SG		3-28-82			100% INITIAL AM-WA-16		TO } 16 }		
18A	95 NCA	DD-1-006-131-445A	PBB/SG		3-25-82	N/A	SINGLE TRUNN PBB ANCHOR	4"	0.237		PBB 7/4.5"	
19	068Y	SW-1-132-024-543R	PBB/SG		3-22-82	1687	SNOBBEER	10"	.365	2 LUGS	6" DIA LUG	
20A	68Y 1-68Y	SW-HD-721-737A	PBB/SG		4-1-82	N/A	DOUBLE SYM TRUNN ANCHOR	6"	.365	2 TRUNN WITH PBE	9.375 x 1.375"	
21	67T	SW-1-173-042-41R	PBB/SG		4-2-82	1326	ELBOW STRAIT	10"	.365	1 TRUNN 6"		
22	97A	DD-1-012-066-443E	PBB/CEM		4-8-82	3703	ELBOW SNOBBEER	4.5" O.D.	.237	1 TRUNN 3.5" O.D.	3.5" O.D.	
23	97A	DD-1-012-042-433R DD-1-012-034-443E	PBB/CEM		4-8-82	3679	RIGID w/ LUGS	4.5" O.D.	.237	8 LUGS	3/4" x 1" x 1/4" LUGS	FOR COMPUTER PRINTOUT SEE AM-WA-K-VA
24A	97A 1-97A	DD-1-012-033-433A	PBB/CEM		4-8-82	N/A	ANCHOR	4.5" O.D.	.237	1 TRUNN w/ PAD	4.5 x 7.5 PAD	
25	150 G	CS-1-299-700-453K	PBB/SG		4-9-82	2315 ² / 4532.5	RIGID 4 LUGS.	3.5" O.D.	0.216	8 LUGS.	LUG SIZE 3/4" x 1" x 1/4"	
26	150 H	CS-1-300-001-453K	PBB/SG		4-9-82	1913 ² / 1965.5		"	"	"	LUG SIZE 3/4" x 1" x 1/4"	
27	150 F	CS-1-298-001-453R	PBB		4-13-82							FOR PRINT-OUT SEE AM-WA-26 BY CORRELATION TO 150 G PBB PRINT-OUT SEE AM-WA-26
28	150 J	CS-1-302-700-453R	PBB		4-15-82							
29A	167T	SW-1-173-720-543B	SG/ABB		4-20-82	N/A	ANCHOR 670/67T	10"	.365	2 TRUNN WITH PBB		

WELDED ATTACHMENT LOG BOOK

NODE

LE NO. WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
31	67U	SW-1-100-001-533R	S.G.		4-20-81	⁶⁵⁶ 1326	ELBOW TRUNN.			ELBOW TRUNN. 6		BY CORREL TO 1-67T, 173-042-A33R WA-A-31
32	65	CC-X-006-002-A43R	S.G.		4-22-82	¹⁴⁰⁰ 3037	ELBOW -TRUNN.	6"	0.28"	3" DIA. TRUNN.		SEE AM-WA-21 FOR PRINT-OUT
33	65	CC-X-013-009-A43R	S.G.		4-22-82	¹⁴⁰⁰ 3037	ELBOW -TRUNN.	6"	0.28"			
34	65	CC-X-025-003-A43S	S.G.		4-21-82	¹⁰⁵⁴ 2115	ELBOW -TRUNN.	6"	0.28"	5" DIA TRUNN.		FOR PRINT-OUT SEE AM-WA-32
35	65	CC-X-005-002-A43S	S.G.		4-22-82	¹⁹⁶⁵ 4176	ELBOW- TRUNN.	4"	0.237"	2 1/2" DIA.		FOR PRINT-OUT SEE AM-WA-32
36	65	CC-X-005-009-A43R	S.G.		4-22-82	¹⁹⁶⁵ 4176	ELBOW -TRUNN.	4"	0.237"	3" DIA.		
37	65	CC-1-123-001-A43R	S.G.		4-22-82	¹⁴²⁹ 3007	8 LUGS	6"	0.28"	1 1/4" x 1 1/4" x 1"		FOR PRINT-OUT SEE AM-WA-32
38	65	CC-1-120-001-A43R	S.G.		4-22-82	¹⁴²⁹ 3007	8 LUGS	6"	0.28"	1 1/4" x 1 1/4" x 1 1/4"		
39	65	CC-X-024-003-A43S	P.B.		4-27-82	³⁸⁰³	ELBOW LUGS.	4"	0.237"	3 1/2" x 1 1/2" x 1 1/2"		
40	68X	SW-1-132-061-A43R	CEM		4-27-82	1326	ELBOW TRUNN.	10"	.365	6" DIA. TRUNN.		BY CORRELATION 1-67T, WA-A-21 SW-1-173-042-A33R
41	68X	SW-1-132-723-A33R	CEM		4-27-82	⁵⁷⁸ 1543	2 TRUNN.	10"	.365	4" φ DIA		
42	68X	SW-1-132-046-A43R	CEM		4-27-82	⁸⁷⁷ 2184	2 TRUNN.	10"	.365	5" φ DIA		
43A	^{1-68X} 1-68X	SW-1-132-720-543R	CEM	1857	4-27-82		2 TRUNN.					
44	10V	AF-1-035-026-533R	S.G.		4-28-82	⁷³⁹ 1949	2 TRUNN.	8"	0.322	6" DIA	6" SCH. 10	

WELDED ATTACHMENT LOG BOOK

FILE NO. AM-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	NODE		MAXIMUM UNIT LOAD STRESS ²	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
				DATE RECEIVED	DATE RELEASED							
46	062A	CC-1-030-010-533R	S.G.			574 / 977	SNUB.	18"	0.375"	1 TRUNN	12" x H 40	FOR PRINT-OUT SEE AM-AW-48
47	062A	CC-1-030-009-333R	S.G.			568 / 1199	SNUB.	18"	0.375"	1 TRUNN. ON BLOW	8" SCH 40	FOR PRINT-OUT SEE AM-AW-48
48	062A	CC-1-033-007-533K	S.G.			1785 / 5191	SNUB.	18"	0.375"	2 TRUNN.	6" SCH 40	
49	021	SW-2-026-001-J03R	S.G.			1965 / 4176	SNUB.	4"	0.237"	ELB/TRUNN	2 1/2" x H 40	
50	021	SW-1-026-007-J03R	S.G.			1751 / 3674	SNUB.	4"	0.237"	ELB / TRUNN.	3" SCH 40	FOR PRINT-OUT SEE AM-AW.
51A	1-6A 1-56A	CC-1-202-001-553A	CEM			144 POC 72 67	SQ. TUBING TO CONCRETE WALL	8"	0.322	3 TRUNN. w/PAD	4X2X1 1/2	SPECIAL LU ON HAND. WATSPUMP.
52	SUPER SEDED 5628	FW-1-017-700-CH2K -017-709-C72K -020-700-CH2K	ASAD VIB AM-WA-668 AM-WA-652			5-5-82	SNUB ON BEAMS	18"	.937	4 LUGS	4X2X1 1/2	
53A	1-62C 1-62G	CC-1-035-D18-A33A	CEM			5-6-82	RIGID	6"	0.28	1 TRUNN. w/PAD	5" SCH 40 4 1/2" LONG	
54	64F	CC-1-116-010-F33R	VIB			5.6.82	STRUT	12"	.375	TRUNN, CIRC V _L , M _L	6" SCH 40 3.63" LONG	
55	64F	CC-1-116-011-F43R	VIB			5.6.82	STRUT	12"	.375	1 TRUNN, CIRC P	8" SCH 40	
56	64F	CC-1-116-002-F33R -009-F33R	VIB			5.6.82	STRUT	12"	.375	TRUNN, CIRC V _L , M _L	8" SCH 40 3.63" LONG	
57	64F	CC-1-116-023-F43R	VIB			5.6.82	STRUT	12"	.375	4 LUGS V _L , M _L	1 1/2" x 1 3/4" x 1 3/4"	
58A	021	SW-2-005-003-J03R	CEM			736	SQ. TUBING TO CONCRETE WALL	4"	.237	1 STANCHION	3" SCH 40	
		...	CEM			136	TRUNNION TO CONCRETE WALL	4"	.237	1 STANCHION	4" SCH. 40	
		...	CEM			5-11-82	TRUNN. TO	4"	.237	1 STANCH.	3" SCH 40	

WELDED ATTACHMENT LOG BOOK

DATA POINT

FILE NO. WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
61A	021	SW-2-026-0025-032	CEM	400	5-11-82	N/A	TRUNN. TO CONG. WALL	4"	.237	1 STANCH.	3" SCH. 40	
62A	167A	DO-1-021-007-552A	SC	115	5-11-82	N/A	ANCHOR	24"	0.375	UNREGD LBS. POINT TRUNNION PIPING	6" SCH 40	STRUDL RUN
63A	167B	DO-1-022-006-553A	SC	115	5-11-82	N/A	"	"	"	"	"	STRUDL RUN
64	072	RH-1-013-003-532E	CEM		5-12-82	2488/ 6284		3"	.216	2 LUGS	3/4" x 1 1/2" LUGS	
65	68U	SW-1-129-021-542R	AJBH		5-12-82	342/702	RK610	10"	.365	4 LUGS	2X1 1/2X4" LUGS	
66A	167B	DO-1-022-006-553A	SAM.	115	5-13-82	-	-	24"	0.375			STRUDL RUN
67A	167A	DO-1-021-007-553A	SAM.	1042	5-13-82	-	-	24"	0.375			STRUDL RUN
68A	1640	CC-1-320-001-553A	VAL	1812	5-14-82	-	-	4"	0.531			
69	167F	DO-1-090-002-565S	GEM		5-14-82	642/1323	-	42"	0.135	1 TRUNNION	16" TRUNNION	✓
70	167F	DO-1-071-008-553K	CEM/VB		5-14-82	398/570	-	42"	0.375	1 TRUNNION	24" TRUNNION	
71	167F	DO-1-071-001-563K	CEM/VB		5-14-82	145/617	-	42"	0.375	2 TRUNNION	24" TRUNNION	
72	167F	DO-1-071-003-563K	CEM/VB		5-14-82	108/368	-	42"	0.375	1 TRUNNION	24" TRUNNION	
73	167F	DO-1-090-001-565K	CEM/VB		5/14/82	254/962	-	42"	0.375	2 TRUNNION	16" TRUNNION	
74	167F	DO-1-070-003-563K	CEM/VB		5/14/82	123/520	-	42"	0.375	2 TRUNNION	24" TRUNNION	

WELDED ATTACHMENT LOG BOOK

LE NO. -WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
76	167F	DO-1-058-001-953K DO-1-058-002-553R	CEM		5-17-82			26"	.375	2 TRUNN	16"φ	COMMON ATTACH
77	167F	DO-1-070-001-553K DO-1-070-002-553K	CEM/SG		5-17-82			26"	.375	2 TRUNN	16"φ	COMMON ATTACH
78	167F	DO-1-071-005-553K DO-1-071-006-553K	CEM/SG		5-17-82			42"	.375	2 TRUNN		COMMON ATTACH OVERSTRESS
79	158A	CC-2-144-709-A33R	J.C		5/18/82	2869/ 13293		4.5"	0.237	4 LUGS	3/4" x 1 x 1 1/2	
80	150I	CC-1-301-700-A33R	J.C		5/17/82	2815/ 3408	-	3.5"	0.216	4 LUGS	1 1/4" x 1" Attach.	
81	158A	CC-2-144-721-A33R	J.C		5/19/82	281/ 826	-	4.5"	.237	2 TRUNNION + P.S.C.	8" x 2.25" Pod.	
82	061A	CC-1-028-113-A33R	J.C		5/17/82	121/ 307	-	24"	.375	2 TRUNN	16" TRUNN.	
83	061A	CC-1-028-007-A33R	J.C		5/17/82	121/ 307	-	24"	.375	2 TRUNN	14" TRUNN	
84	097D	DD-1-12-712-A33R	SAM		5/19/82	1597/ 8539	-	4"	0.237"	4 LUGS	4" x 1"	FICTITIOUS RAD. USED = 6.7"
85A	1-97C 1-97D	DD-1-012-707-A33A	SAM	1160	5/20/82	-	-	4"	0.237"		R.F.C. TRUNN 3.75" x 6"	FICTITIOUS RAD USED = 6"
86A	1-97C 1-97B	DD-1-012-767-533A	SAM	G501	5/10/82	-	-	4"	0.237"		R.F.C. TRUNN 2.25" x 3"	FICTITIOUS RAD USED = 6.35"
87	157B	CC-1-139-701-E62R	J.C		5/21/82	289/ 15511	-	4.5"	0.237"	4 LUGS	3/4" x 1 1/4"	
88	11B	AF-1-002-033-133K	AJB		5/20/82	202/ 605	SNUBBERS	10"	0.365	2 TRUNN WITH PROS	8 x 9.3" x 10"	FICTITIOUS R _{max} = 10.8"
89	64B	CC-1-156-004-A63R	CEM/VB		5/24/82			10"	.365	LUGS	1 1/2" x 1 3/4" x 3 1/2"	LUGS

WELDED ATTACHMENT LOG BOOK

NO. 5

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
91A REV. 2	1-157B 1-157A	CC-1-116-037-F43A	CEM/VB	1016	5-24-82		ANCHOR	12"	.375"	1 TRUNN w/PAD	12"	AD PIPE LOADS WAS REDUCED, STRESSES O.K.
92A	1-157B 1-157A	CC-X-101-029-A65A w/NOHGEAPH	CEM/VB	256	5-24-82		VOID - SEE	SEE	AM-W	A-762		NEW O ANALYSIS NOT FOR AVAILER DISPENSE-PAPER PAD NO NO NOT ONE PISANO-PARTIAL PACKAGE KROD
93A	1-157B 1-157A	CO-1-042-071- Y35A	VC	1480	5-24-82							
94A	1-157B 1-157A	CC-1-139-716-A63A	VC	4871	5-25-82		ANCHOR	4.5"	.237	DOUBLE TRUNN w/PAD	2 1/8 x 8" MD	
95A	167D	DO-1-053-007-553A	VC		5-25-82		ANCHOR	2 1/2"	0.375	2 ABACH.		SEE PROB. AS-1-167B
96	167D	DO-1-053-001-50R	VC		5-25-82	635/ 1605	ATTACH	2 1/2"	0.375	ELBOW TRUNN	8"	
97A	167E 567A	DO-1-056-006-553A	VC	2157	5-25-82		ANCHOR	2 1/2"	0.375	2 ABACH.		SEE PROB AS-1-167B
98	567A	FW-1-17-023-C72K -18-05-C52K -14-WA-G57-D718	AY-WA-G64 VB AY-WA-G57-D718		5-25-82	212 73	SUB (ATTCH)	18"	.937	8 LUGS 2 ADS	1 1/2 x 1 1/2 x 3 1/2 x 1 1/2 x 6	
99A	167E 68V	SW-1-129-721-Y85A	CEM/VB	1340	5-27-82		RIGID	10"	.365	2 TRUNN. w/PAD	6" φ. TRUNN.	USE PAPER BY EMERA PROSSIN
100	172	FW-1-112-001-562S	SG			N/A 1665 psi	PLATE LUG	3"	0.438	1 R LUG 3" WIDE		
101	172	FW-1-103-011-562R	SG			952/ 2142	ELBOW TRUNN	3"	0.438	1 TRUNN	2" ?	
102	170	FW-1-114-011-562R	S.G.			752/ 2142	ELBOW TRUNN	3"	0.438	1 TRUNN	2"	
103	170	FW-1-105-012-562R	S.G.			1142/ 1142	STUD.	3"	0.438	4 LUGS.	3 1/2 x 1 1/2"	
104	169	FW-1-106-011-562R	VC		5-27-82	1584/ 3693	ELBOW TRUNN	3"	0.3	1 TRUNN	2"	

WELDED ATTACHMENT LOG BOOK

NOTE

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
106	169	FW-1-111-001-S625	UC		5-27-82	1696/259	LUGS	3"	0.3	LUGS	2 x 3/4	
107	071B	SI-1-038-010-S22R	UC		5-27-82	1182/2422	ELBOW TRUNN	6"	4	TRUNN	Ø 4	
108	170	FW-1-114-001-S625	SG		5-27-82	2905	SNUB	3"	0.3	1 PL LUG	-	
109	171	FW-1-104-007-S62R	AJB		5-27-82	955/2169	ELBOW TRUNN	3	.438	TRUN	2" SCH 40	
110	171	FW-1-113-001-S62S	AJB		5-27-82	N/A/2905	ELBOW/PL	3	.3	Ø	1" x 3" 2 (ASSEMBLED)	COILINGS' 1797R NO CYLINDZ
111A	071B	SI-1-038-012-S22A	CEM		6-2-82		TRUNN. TO CONCRETE WALL	6"	.28	(1) 6" Ø TRUNN.	FAD 9" x 6.64"	M-LINE ANCHOR
112	62X	CC-1-041-727-A63A	VIB		6-2-82		ANCHOR	8"	.322	2 PADS 5 1/2" x 8"		
113	62X	CC-1-41-724-E63R CC-1-41-712-E63R	VIB		6-2-82	2869/13293		4"	.237			COLLAPSE AT-1-WA-79
114	68T	SW-1-129-001-A138P	UC		6-3-82	693/1446	ELBOW	10"	0.365	1 ATTACH.	3.312	
115	68T	SW-1-129-736-A432R	UC		6-3-82	532/2416	LUGS	10"	0.365	4 LUGS	1.25/3.25	
116	68T	SW-1-129-045-A432R	UC		6-3-82	1790/4782	ATTACH	10"	0.365	2 TRUNN	5"	
117	68T	SW-1-129-043-A432R	UC		6-3-82	664/1654	TRUNN	10"	0.365	2 TRUNN	5"	
118A	68T	SW-1-129-720-S63A	UC	1272	6-4-82		2 TRUNN	10"	0.365	2 TRUNN	9.187/19	
119A	68T	CS-1-242-700-S17A	SG	2599	6-4-82		ANCHOR	3"	0.216	1 TRUNN.	Ø = 1.75" Ø = 4"	FICTITIOUS PAD = 8"

WELDED ATTACHMENT LOG BOOK

NDD E

LE NO. WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
12/A	90A 920	DR-1-016-005-553A	S.C.	1573	6-4-82		ANCHOR	4"		1 TRUNN.		NOT REALIZED DUE TO LACK OF INFO.
22	66C	CC-2-011-005-A7ER	CEM		6-8-82			6"	.28	1 TRUNN	3	
23	12A	AF-1-030-005-S33E	AJB		6-8-82			3"	.438	ELBOW	1.5"	
24	12A	AF-1-009-027-S33E AF-1-036-017-S33R	AJB		6-8-82			6"	.562	ELBOW	3.5"	
25	524	CS-1-158-023-S43R CS-1-158-037-S43E CS-1-160-011-S52R	CEM		6-8-82			3"	.216	ELBOW	2"	
26	154 155 156 155	FW-1-097-705-C62K FW-1-098-703 FW-1-099-704 FW-1-101-702								8 LUGS 8 LUGS TR-N/A TR-YO		
	152 153 153 153	FW-1-095-710 FW-1-098-813 FW-1-096-013 FW-1-100-808								8 LUGS TR-N/A TR-YO 8 LUGS		
	152 153 152	FW-1-099-704 FW-1-098-813 FW-1-095-702								8 LUGS PAD-N/A TR-6"Ø		
27	46B	CS-1-014-027-S52K	AJB		6-10-82			3"	.216	FLANGE	2"	
28	11C	AF-1-052-001-S33E AF-1-012-003-S33E AF-1-098-001-S33S	UC		6-10-82	1183/2425	ATTACH	6"	0.280	ELBOW	5"	
29	11C	AF-1-012-001-S33S	UC		6-10-82	1429/3602	ATTACH	6"	0.280	TRUNN	1.25/1.25	
30A	90A 920	AF-1-084-001-S33A	UC	181	6-11-82		ANCHOR	10"	0.365	3 TRUNN		STRUOLT CYLIND
31	51C	CS-1-074-043-S42R CS-1-074-043-S42E	CEM		6-16-82	1482/1573	ATTACH	3"	.438	LUGS	3/4 x 3/4 x 1 1 x 1 x 3/4	← ANALYSIS
32A	90A 920	CC-1-173-012-S33A	UC	2835	6-16-82		ANCHOR	4.5"	0.252	TRUNN	8.5/4.5	

WELDED ATTACHMENT LOG BOOK

NODE

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
149	153 154	FW-1-096-75-662K FW-1-097-701-5621	VB		6/21/82		ATTC	6"	0.432"		4x3/4x4 in 3/4x2	CORRELATION
150A	1-11C 1-11B	AF-1-004-005-553A	J.H.C.	1623	6/22/82		ANCH.	6"	0.280"		3/8"x9/16" PAD	
151	66A	CC-1-012-702A43R	J.H.C.		6/22/82	685/1065	ATTC	10"	0.365"	LUGS	1"x2 1/2"x2"	
152	66A	CC-1-031-005-A43R	J.H.C.		6/22/82	2110/5172	ATTC	4"	0.237"	LUGS	3/8"x3/4"x1"	
153 154	66A	CC-1-008-001-A43R	J.H.C.		6/22/82	1733/3621	ATTC.	4"	0.237"	ELBOW	OD=3.5"	
154	81	MS-1-415-001-533S	J.H.C.		6/23/82	1192/2917	ATTC	8"	0.327"	FL BOW	3.5	
155	81	MS-1-416-012-543P	J.H.C.		6/23/82	150/550	ATTC	16"	0.375"	27 RUNN	5.375	
156	67Y	SW-1-101-102-533R	J.H.C.		6/24/82	804/2038	ATTC	10"	0.365"	LUGS	3/8"x4"x5"	
157A	1-67Y 1-67Z	SW-1-102-721-533A	J.H.C.	449	6/24/82	—	ANCH	10"	0.365"	2 TRUNN		
158A	1-67Y 1-11C	SW-1-101-751-533A	J.H.C.	2177 1111	6/23/82	—	ANCH	10"	0.365"	2 TRUNN		
159	80C	MS-1-028-002-533K	J.H.C.		6/24/82	2347/6327	ATTC	4"	0.237"	17 RUNN	2"	
160	64B	CC-1-116-030-A43R	VB		6-29-82	454/1265	ATTCH	6"	0.375"	TRANSION ECC. LOADS	4"	
161	FW	VOID per VB	VB		6-29-82	640/1403	ATTACH	6"	0.432"	TRANSION	4"	
162	62Z	CC-2-035-709-1955	S.G.			8241/23492	ATTACH	6"	0.28"	2-TRUNN.	2" SCH 80	

WELDED ATTACHMENT LOG BOOK

NODE

LE NO. WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
164	2-674	SW-2-102-020-MSB	J.ch	"	7/01/82	650/1324	ELBOW	10"	0.365	1 TRUNK	6	
165	1-808	MS-1-029-004-S33R	J.ch		7/01/82	495/1115	ATTCH	4"	0.337	LUGS	1 1/2" x 1 1/4" x 2"	
166	1-808B	MS-1-029-030-S33K	J.ch		7/01/82	742/1242	ATTCH	4"	0.337	LUGS	3/2" x 1" x 2"	
167	1-012B	AF-1-088-002-S33R	AJB		7/6/82	712/946	ATTCH	6"	0.562	LUGS	1" x 1 1/4" x 1 1/4"	
168	1-012B	AF-1-097-022-S33R	AJB		7/6/82	825/1663	ATTCH	4"	0.438	ELBOW	2.5" OD	
169A	1-808 1-808C	MS-1-028-045-S33A	J.ch	1659	7/6/82		ANCHOR	4.5"	0.337	1 TRUNK		
170	1-11A	AF-1-006-004-S33S AF-1-006-009-S33R	J.ch		7/7/82	981/2093	ATTCH	8"	0.322	ELBOW	4.5 OD	
171	1-11A	AF-1-001-021-J33A	J.ch		7/7/82	346/884	ATTCH	10	0.365	2 TRUNK	3.312	
172	1-11A	AF-1-001-017-S33K	J.ch		7/7/82	299/784	ATTCH	10	0.365	2 TRUNK	3.312	
173	1-11A	AF-1-001-020-J33A	J.ch		7/7/82	807/1786	ATTCH	10	0.365	1 TRUNK	3.312	
74A	1-11C 1-11A	AF-1-006-013-S33A	J.ch	1122	7/8/82		ANCH.	8	0.322	2 TRUNK	3.73/632	
75A	1-80D 1-80C	MS-1-028-043-S33A	J.ch	1629	7/13/82		ANCH.	4.5	0.337	2 TRUNK	4.08/11	
76	1-23B 1-23A	MS-1-146-700-571R MS-1-147-700-571R	J.ch		7/13/82	526/1403	ATTCH	8"	0.322	2 TRUNK		
77	7-24	SI-029-048-J32110	J.ch		7/13/82	222/222	ATTCH	24	0.375	1 TRUNK		

WELDED ATTACHMENT LOG BOOK

NODE

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
179	AB-1-24	SI-1-029-054-S32R	vd		7/13/82	265/839	ATTACH	24	0.375	2 TRUNN		
180	AB-1-24	SI-1-029-052-J32R	vd		7/13/82	259/1055	- " -	"	"	"		
181	AB-1-24	SI-1-029-050-J32R	vd		7/13/82	258/1056	- " -	- " -	- " -	- " -		
182	AB-1-24	SI-1-029-700-S32R	vd		7/13/82	510/794	- " -	- " -	- " -	1 TRUNN		
183	AB-1-24	SI-1-029-053-J32R	vd		7/13/82	206/310	- " -	- " -	- " -	2 TRUNN		
183-1	AB-1-23A	MS-1-001-005-S72R - 003 - - 004 -	vd		7/15/82	97/335	ATTACH	32	1.265	PAD		
184	AB-1-23A	MSI-257-001-S72R	vd		7/15/82	456/1247	ATTACH	8	0.500	2 TRUNN	2.25	
185	AB-1-23A	MSI-257-002-S72R	vd		7/15/82	540/1542	ATTACH	8	0.500	1 TRUNN	2.25	
186A	1-80A 1-80B	MS-1-027-051-S53A	vd	5565	7/20/82		ANCH.	4.5	0.337	1 TRUNN		
187	AB-1-570	CC-1-217-013-CS3K	S.G.		7/21/82	964/2482	WELD ATT.	3"	0.438"	ELBOW TRUNN.	2" SCR. SU.	Fictitious rad. = 3"
188	MS-1-52X	CC-1-215-015-CS3S CC-1-217-001-CS3S	S.G.		7/21/82	634/847	WELD ATT.	3"	0.438	C1=0.25" C2=1"	4 LUGS. 1" x 1/2" x 2"	Fictitious rad. = 5"
189A	1-67Y 1-67X	SW-1-102-770-543A	S.G.	520	7/21/82		ANCHOR					
190	MS-1-67X	SW-1-102-735-A43R	S.G.		7/21/82	364/847	WELD ATT.	10"	0.365	C1=1.25 C2=1.88	4 LUGS. 1 1/4" x 2 1/2" x 3 1/4"	No. FICTITIOUS RAD.
191	AB-1-81A	CC-1-031-013-543S CC-1-077-013-543S	S.G.		7/21/82	667/1334	WELD ATT.	18"	0.375"	C1=1" C2=1"	4 LUGS. 1 1/2" x 2" x 0'-2"	
192	220	MS-1-002-004-S72R	vd		7/21/82	241						

WELDED ATTACHMENT LOG BOOK

N D D E

FILE NO. -WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGR	DATE RECEIVED	DATE RECEIVED	MAXIMUM UNIT LOAD STAGGS #	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
193	23B	MS-1-210-001-522K	Jch		7/22/82	563/1541	ATTACH	8"	0.500	27 RUNN		
194	23B	MS-1-210-002-504	Jch		7/22/82	540/1548	ATTACH	8"	0.500	17 RUNN		
195	57	CC-1-195-017-552K			7/24/82	2110	"	4"	0.237	4ugs		
196	57	CC-1-197-030-422P	AJBL		7/24/82	5325	"	4"	0.237	1		
197	157A	CC-1-195-006-542P			7/24/82	2110	"	4"	0.237	1		
198	157A	CC-1-197-010-412P	AJBL		7/24/82	521A	"	4"	0.237	1		
199	2-150I	CC-2-139-705-443K	Jch	3938	7/27/82	848	ATTACH	4	0.237	4LWS		
200	2-150J	CC-2-139-711A	Jch		7/27/82	1085L	ANCH	4	0.237	17 RUNN		
201	2-62D	CS-2-301-001-155K	S.G.		7/27/82	2315		3"				CORRELATED TO PROB. OF MEMO # 15
202	2-62D	CS-2-302-001-155K	S.G.		7/27/82	1323		3"				CORRELATED TO PROB. OF MEMO # 16
203	1-76B	CC-2-007-004-173I	Jch		7/27/82	1572/1736		6	0.280	17 BOW		
204	1-76B	CC-2-007-010-163K	Jch		7/27/82	1192/1364		6	0.280	27 RUNN		
205	1-76B	MS-1-151-016-552P	Jch		7/29/82	1101/3082		4	0.339	27 RUNN		
206	1-76B	MS-1-151-031-552P	Jch		7/29/82	1202/3726		4	0.339	27 RUNN		27 RUNN. IN CROSS
207	1-76B	MS-1-151-055-552P	Jch		7/29/82	1112/1644		4	0.339	17 ROMK		
208	1-76B	MS-1-151-017-552P	Jch		7/28/82	697/3782		4	0.339	27 RUNN		
209	1-76B	MS-1-151-007-552P	Jch		7/28/82	1202		4	0.339	27 RUNN		

WELDED ATTACHMENT LOG BOOK

11016

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
208	1-76B	MS-1-151-008-C52R MS-1-151-034-C52R MS-1-151-008-C52R	J.Ch		7/27/82	1202/3706		4	0.365	2 TRUNN		2 TRUNN 10" CROSS
209A	1-81 INSTR	MS-1-417-001- 533A	DMJ		7/29	N/A	ANG	4	0.237	1TR 180° PAD		CONCRETE TO 1-97TR ANG NO-240
210	2-68X	SW2-132-006-A3R	AJBL		7/30	783/1003		10"	0.365	Aug.		
211	2-68X	SW-2-132-021-M3R	S.G.		8-1-82	636/1569	ATTCH.	10"	0.365	2 TRUNN	6"	Fictional Pgm WCD = 5.87
212	1-65											
213A	1-64A	CC-1-109-008-A43A	J.Ch	1750	8-05-82	-	ANCH	10"	0.365	2 TRUNN		INCREASED THICK
214A	1-78A	AF-1-009-015-539A	S.G.	1355	8-1-82		ANCH	6"	0.562	1 TRUNN	G1=3.315" G2=6"	FICTITIOUS Rm = 12"
215A	1-72A	AF-1-010-004-533A	S.G.	3771	8-4-82		ANCH	6"	0.562	2 TRUNN	G1=2.87" G2=6"	FICTITIOUS Rm = 12"
216	1-63A	CCY-070-008-A6R	J.Ch		8-3-82	457/1071	ATTACH	10"	0.365	2 LICS	G1=0.025" G2=1.5"	
217	1-63A	CCY-066-014-A7R	J.Ch		8-09-82	2565/685	ATTACH	10"	0.365	2 TRUNN	6-0.225	
218	1-63A	CCY-066-017-A7R	J.Ch		8-09-82	923/2493	ATTACH	10"	0.365	-	-	
219	1-63A	CCY-066-024-A7R	J.Ch		8-09-82	2167/5707	ATTACH	10"	0.365	17 TRUNN	-	
220	1-63A	CCY-066-027-A7R	J.Ch		8-09-82	457/1071	ATTACH	10"	0.365	2 LICS	G1=0.025" G2=1.5"	
221	1-70	RH-1-016-700-STEEL ASAN	ASAN		8-11-82	322/800	ATTACH	10"	0.365	2 TRUNN	G1=0.025" G2=1.5"	FICTITIOUS Rm = 5.85"

WELDED ATTACHMENT LOG BOOK

INDEX

FILE NO. AM-WA-?	PROB NO. AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
223	070	SM-1-065-009-522R	J. d.		8-12-82	1328/3929	ATTCH	8"	0.322"	1 TRUNN	3"	
224	070	RH-1-010-002-522S	J. d.		8-12-82	911/2093	ELBOW	8"	0.522"	1 TRUNN	4"	
225	070	AM-1-063-004-522A	J. d.		8-12-82	962/1570	- "	- "	- "	- "	6"	
226	070	RH-1-016-001-522R	J. d.		8-12-82	618/1503	- "	10"	0.365"	- "	6"	
227	070	BL-1-032-003-521A	J. d.		8-12-82	1455/5138	ATTCH	8"	0.322"	2 TRUNN	6"	
228	059B	ACC-1-20-003-001 ACC-1-20-003-002 ACC-1-20-003-003	V. d.		8-12-82	2915/5844	2 LUGS	2"				
229	46A	CS-1-910-001-521S	J. d.		8-12-82	2500/5382	ELBOW	3"				STRUD
230	46A	CS-1-911-001-522X	J. d.		8-12-82	2707/7776	ATTCH	3"				
231A	70	SI-1-070-522A	V. d.		9-6-82		ANCH	6"	6"	0.28	2 TRUNN	
232A	70	SI-1-038-003-522A	C. J. G.		8-13-82		ANCH	6"	6"	- "	1 TRUNN	PAD
233A	70	SI-1-037-005-522A	C. E. M. / V. B.		8-13-82		ANCH	8"	8"	.322	2 TRUNN	
234	47B	SI-1-031-709-032R	A. J. B.		8-16-82		ATT.		12"	.375	2 PADS	2 TRUNN
235	47B	SI-1-031-700-522R	A. J. B.		8-16-82		2 PADS		12"	.375	2 PADS	PAD
236	47B	SI-1-031-071-522A	A. S. A. D.		8-16-82		ATT.		12"	.375	2 TRUNN	8"

WELDED ATTACHMENT LOG BOOK

110 LF

FILE NO. M-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
238	2	MS-1-02-004-C72K -006- -013-	VIB	8-16-82	8-17-82			32"	1.25"			
239	3	MS-1-03-005-C72K -007- -009- -010- -014-	VIB	8-16-82	8-17-82			32"	1.25"			
240	23C → 23D →	MS-1-274-001-572K MS-1-223-001-572K	S.G.	8-17-82				8"				CORRELATED TO MEMO # 193
241	23C → 23D →	MS-1-145-700-575R MS-1-MB-700-575R	S.G.	8-17-82				8"				CORRELATED TO MEMO # 176
242	2	MS-1-02-008-C72K MS-1-02-009-C72K	VIB	8-16-82	8-18-82			32"	1.25"			
243A	59B 59C	CC-1-215-034-C53A	ASAN ₆	152	8-19-82		ANCHOR	3"	0.438"	1-TRUN.	RET. PAD	FICTITIOUS RM
244A	70 46A	H-RH-1-SB-010-052	vd	1376	8-19-82		- 11 -	2.375"	0.154	- 11 -		
245A	46A 46B	CS-1-014-030-S62A	vd	871	8-19-82		- 11 -					
246A	62Y 62X	CC-2-041-708-A63A	S.G.	1666	8-19-82		ANCHOR	4"		2-TRUN. WITH TAPS		CORRELATED TO CC-1-041-727-A63A OF PROB. # AB-1-62K MEMO # 112A
247	-23D → -23C →	MS-1-274-002-572K MS-1-223-002-572K	S.G.		8-20-82	540 psi 1548 psi		8"				CORRELATED TO MS-1-257-002-572K OF PROB. # 1-23A MEMO # 185
248	AB-1-23D AB-1-23C	MS-1-004-001-572R -003- -004- -005- MS-1-003-002-572R -003- -004- -005-	S.G.		8-20-82	97 psi total 335 psi		32"				CORRELATED TO MS-1-001-003-572F OF PROB. AB-1-23A REFER. TO MEMO. # 183

WELDED ATTACHMENT LOG BOOK

FILE NO. -WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
249	69	RH-1-007-001-522R	ASAD ₇		8-24-82	255/611	ATTACH.	16"	0.5"	CIRC TROD 2	10"	FICTITIOUS R _H =9.5"
250	69	RH-1-004-001-512S	ASAD ₈		8-25-82	788/1784	ATTACH	12"	0.375	CIRC TROD 1	6"	
251	69	SI-1-011-002-532K	ASAD ₉		8-25-82	432/949	ATTACH	14	0.5	CIRC TROD 1	8"	FICTITIOUS R _H =7.6
252	69	SI-1-072-003-532K	ASAD ₄₅		8-25-82	432/949	ATTACH	14	0.5	CIRC TROD 1	8"	FICT. R _H =7.6 [SAME AS: AM-WA-25]
253	55D	CC-1 - 271-004-C53R	UCL		8-25-82	2500/5382	ELBOW	3.5"	0.216			
254	55D	H-CC-1-RB-009-004-S	UCL		8-25-82	4329/13945	LUCS	2"	0.154	4 LUCS	5" x 3/4" x 1/2"	
255	55D	CC-1-247-00C-C53R	UCL		8-25-82	703/1476	LUCS	4.5"	0.239	4 LUCS	1" x 1/2" x 3/8"	
256	55D	CC-1-227-012-C53R	UCL		8-25-82	2315/8899	LUCS	3.5"	0.216	4 LUCS	1" x 1/2" x 1"	
257	69	SI-1-116-004-532R	ASAD ₁₀		8-26-82	762/1566	ATTACH.	14"	0.375	2 LUCS	C ₁ =1.5" C ₂ =0.815"	
258	69	RH-1-003-002-547R	ASAD ₁₁		8-26-82	333/824	ATTACH	12"	0.375	2 LUCS	C ₁ =1.0 C ₂ =2.0	
259	69	RH-1-004-002-547R	ASAD _{11b}		8-26-82	381/1255	ATTACH	12"	0.375	2 LUCS	C ₁ =0.625 C ₂ =1.75	
260	69	RH-1-003-004-532S	ASAD ₁₂		8-27-82	526/1025	ELBOW	12"	0.375	CIRC TROD 1	8"	FICTITIOUS R _H =7.6
261	69	RH-1-004-004-532S	ASAD _{12b}		do	do	do	do	do	do	do	FICTITIOUS R _H =7.6 [SAME AS: AM-WA-26]
262	69	SI-1-071-001-532S	ASAD ₁₃		8-27-82	349/697	ELBOW	14"	0.5	CIRC TROD 1	8"	FICTITIOUS R _H =7.6

WELDED ATTACHMENT LOG BOOK

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS %	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS	
264	058	CC-1-191-013-C52K	API		8-27-82	2110 / 5326	NON. ANCH.	4"	0.237"	8 LUGS C1=0.25 C2=0.5	LUG SIZE 1" x 2" x 1/4"		
265	666	CC-2-15-701A13	V.D.		8/21/82	333 / 1047	LUGS	2 1/2"	0.375"				
266	660	CC-2-08-711A13X	V.D.		8/21/82	257 / 643	- " -	- " -	- " -				
267	660	CC-2-46-701A13	V.D.		8/31/82	448 / 1290	TRUNN	"	"				
268	6613	CC-2-156-701A13R	V.D.		8/31/82	211 / 935	TRUNN	10"	0.365"				
269	666	CC-2-08-702-A13R	V.D.		8/31/82	809 / 2101	11 TRUNN	24"	0.375"				
270	666	CC-2-10-705-A13R	V.D.		8/31/82	505 / 969	PAD	24"	0.375"				
271	666	CC-2-08-709-A13X	V.D.		8/31/82	563 / 568	ELBOW	24"	0.375"				
272	666	CC-2-012-703-A13	V.D.		8/31/82	53 / 164	2 TRUNN	24"	0.375"				
273	55C	CC-1-272-011-C535	ASAP 14		8-31-82	2232 / 4738	ELBOW	3"	0.216	CIRC. TRUNN. 1	2 1/2"	FICTITIOUS RM = 2.55"	
274		CC-1-218-005-C53K	ASAP 15a		}	754 / 2363	ATTACH	3"	0.438	CIRC. TRUNN. 1	2 1/2"	FICTITIOUS RM = 2.55"	
275		CC-1-218-007-C53K	ASAP 15b			do	do	do	do	do	do	do	SAME AS AM-WA-274
276		CC-1-218-016-C53K	ASAP 15c			do	do	do	do	do	do	do	SAME AS AM-WA-274
277		CC-1-208-011-C53R	ASAP 16a			1543 / 3132	ATTACH	3"	0.216	2 LUGS	C1=0.375 C2=0.75	LUGS 3/4" x 3/4" x 1/2" SAME AS	

WELDED ATTACHMENT LOG BOOK

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE + NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
279	55C	CC-1-211-004-C53K	ASAD _{17a}		8-31-82	2315/2967	ATTACH.	3"	0.216	2 LUGS	C ₁ =0.25 C ₂ =0.5	LUGS 1/2 x 1/2 x 1
280	55C	CC-1-272-003-C53R	ASAD _{17b}		8-31-82	do	do	do	do	do	do	SAME AS AM-WA-279
281	55C	CC-1-245-025-C53R	ASAD ₁₈		8-31-82	3256/12,894	ATTACH	4"	0.237	2 LUGS	C ₁ =0.5 C ₂ =0.5	LUGS 1 x 1 x 2 1/2
282	52V	CS-1-155-042-S42R			8-31-82	2315/6437	4	3"	0.216	4 LUGS	C ₁ =1.25 C ₂ =0.5	LUGS 1/4 x 1/4 x 1
283	10A	AF-1-078-002-S33R	Jch		3/01/82	833/1910	- " -	3"	0.438	ELBOW		
284	10A	AF-1-076-002-S33R	Jch		2/01/82	581/1573	- " -	3"	- " -	2 RUNN		
285	10A	AF-1-092-020-S33R	Jch		2/01/82	1089/3371	- " -	2"	- " -	- " -		
286	10A	AF-1-041-041-S33R	Jch		9-1-82	197/414	- " -	8"	0.718"	2 RUNN		
287	10A	AF-1-076-003-S33R	Jch		9-1-82	257/2495	- " -	3"	0.438"	1 RUNN		
288	79E	SB-1-060-020-S55K	ASAD _{19a}		9-1-82	667/1566	ATTACH.	8"	0.5	2 LUGS	C ₁ =0.5 C ₂ =0.75	LUGS 1 x 1/2 x 1/2
289	79E	SB-1-060-028-S55K	ASAD _{19b}		9-1-82	do	do	do	do	do	do	SAME AS AM-WA-288
290	79E	SB-1-060-064-T55R	ASAD ₂₀		9-1-82	630/2594	do	8"	0.5	1 LUG	C ₁ =1.0 C ₂ =1.5	LUG 3/4 x 3 x 2
291	52Y	N-CS-1-SB-050B-4002	AJBL		9-1-82	972/1557	do	2"	0.343	4 LUGS	C ₁ =3.75 C ₂ =7.5	
292	92B	BR-X-106-064-S43R	AJBL		9-1-82	2346/6324	dob.	4"	0.237			
293	55B	CC-1-239-006-C53R	S.G.		9-2-82	1944/11001	ATTCH.	4"	0.237	ELBOW	2 1/2" SCH. 40	

WELDED ATTACHMENT LOG BOOK

NODE

FILE NO. M-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE + NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
294	55B	CC-1-246-005-553K	S.G.		9-2-82	595/813	ATTACH.	6"	0.28"	BLUGS.	C1=0.5" C2=1.5"	
295	55B	CC-1-246-015-653R	S.G.		9-2-82	1191/2393	"	6"	0.28"	BLUGS.	C1=0.375" C2=0.75"	
296	55B	CC-1-237-008-653R	S.G.		9-2-82	2315/5933	"	3"	0.216"	BLUGS.	C1=0.25" C2=0.5"	
297A	10A 10D	AF-1-085-023-533A	vd	1654	9/3/82	-	ANCH	8"	0.322	2TRUNN		STRUDL
298A	10A 12A	AF-1-085-029-533A	vd	1611	9/3/82	-	ANCH	4"	0.287	2TRUNN		
299A	92B IN LINE	BR-X-106-059-553A	SYG	599	9/3/82	-	ANCH	4"	0.237	1TRUNN		
300A	92B 92A	BR-1-016-005-553A	SYC	1573	9/3/82	-	ANCH.	4"	0.237	1TRUNN		
302	93A	BR-X-044-705-A33R -046-	CEM/VIB				ATTACH	4"	.237	8 LUGS	3/4 x 1 x 1	
301	93A	BR-X-046-706-A33R	CEM/VIB					4"	.237	4 LUGS	3/4 x 1/2 x 2	
303A	52V 52U	CS-1-159-004-542A	vdh.	3039	9/9/82	-	ANCH.	3"	0.216	2TRUNN		
304	90	BR-X-044-706-A33R	AJBL		9/13/82	11184/10768	Tension	4"	0.237	Tension		
305	19B	SI-I-039-012-542R	AJBL		9/14/82	1050/2306	"	4"	.337	.		
306	19B	SI-I-039-012-542R SI-E-039-026-532R SI-I-039-013-542R	"		9/14/82	14511/2019	Lugs	4"	.337	Lug	3/4 x 1 x 1	
307	19B 55B	SI-I-045-021-522R	"		9/15/82	1171/2703	Tension	4"	.337	Tension		

WELDED ATTACHMENT LOG BOOK

NOTE

FILE NO. 1-WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
309A	03A 90	DE-X-044-719-A33A	CEM/	1772	9-17-82		RIGID SUPPORT	4.5" OD	.237	SQUARE TUBE/PAD	4.347" x 10" PAD	
10	4	MS-1-04-005-C72K	VIB/ ASAD		9-17-82		ATTACH.	32"	FICTIT. 1.419"	1 TRUSS	PAD 22" x 22"	C1 = 9.77 FICTIT. C2 = 11" Rm = 5.6
311	↓	MS-1-004-007-C72K	↓		↓		ATTACH.	↓	FICTIT. 1.483"	↓	PAD 27" x 26"	FICTIT. Rm = 30.2" C1 = 11.54" C2 = 13"
312	do	MS-1-04-008-C72K	do		do		ATTACH.	do	FICTIT. 1.391"	do	PAD 24" x 48"	FICTIT. Rm = 23.8" C1 = 10.6" C2 = 24"
313	4	MS-1-04-009-C72K	VIB/ ASAD		9-17-82		ATTACH.	32"	FICTIT. 1.483"	1 TRUSS	PAD 26" x 26"	FICTIT. Rm = 30.2" C1 = 11.54" C2 = 13"
314A	2A 69	SI-1-030-003-S32M	S.G.	549			ANCHOR	18"	0.375"			STRUPL WAS RUN. FICTITIOUS PAD. USED = 20" INCHES
315	151C	SF-X-001-011-F53S	AKM		9/20/82		RIGID SUPPORT	12"	.375"	RECT. LUGS	1 1/4" x 1 3/4" x 1/4" (A)	C1 = .824 C2 = .825
316	37Y	CF-1-053-422-C52R	ASAD 22		9-21-82	1418 3856	ATTACH	3"	0.216	RECT. LUGS.	(A) 1" x 1/2" x 2"	FICT. Rm = 2.0"
317	↓	↓ -429- ↓	↓ 23		↓	1447 4300	↓	↓	↓	RECT. LUGS.	(B) 1/2" x 1" x 2"	FICT. Rm = 2.0" FICT. C2 = 0.8"
318	↓	↓ -435- ↓	↓ 24		↓	2563 6163	↓	↓	↓	1 TRUSS	2 1/2" φ	FICT. Rm = 2.55"
319	do	do -437- do	do 24		do	2563 6163	do	do	do	do	do	SAME AS AM-WA-318
320	37Y	CF-1-053-436-C52R	ASAD 25		9-21-82	2756 6929	ATTACH	3"	0.216	1 TRUSS	2" φ	FICT. Rm = 2.1"
321	79F	SB-1-060-042-T5ER	ASAD 26		9-22-82	477 1137	ATTACH.	8"	0.5"	1 TRUSS	6" φ	FICTITIOUS Rm = 5.8"
322	79F	SB-1-060-051-T45R	ASAD 27		9-22-82	667 700	ATTACH.	8"	0.5"	RECT. LUGS.	(B) 1/2" x 1/2" x 1/2"	

WELDED ATTACHMENT LOG BOOK

NODE

FILE NO. -WA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS $\frac{P}{A}$	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
324	2-68T	SW-2-129-004-A33K	AJRB		9-22-82		ATTACH	10"	0.365"			
325	1-62B	CC-1-008-001-A43R CC-1-043-030-A33R	SG.		9-23-82	559 / 1856	R	24"	0.375"	ATTCH. 8 LUGS	13" x 1" x 5"	C ₁ = 0.875" C ₂ = 2.5"
326	1-62B	CC-1-008-018-A33R	SG		9-23-82	564 / 2309	R	24"	0.375"	ATTCH. 2-TRUNN.	12" φ	R _m = 11.82"
327	1-62B	CC-1-008-022-A33R	SG.		9-23-82	481 / 1379	R	24"	0.375"	ATTCH. 2-TRUNN.	6" φ	R _m = 11.82"
328	1-62B	CC-1-008-026-A33R	SG		9-23-82	180 / 546	R	24"	0.375"	ATTCH. 2-TRUNN.	10" φ	R _m = 11.82"
329	1-62B	CC-1-043-016-A43R CC-1-043-019-A43R	SG		9-23-82	809 / 2102	R	24"	0.375"	ATTCH. 1-TRUNN.	6" φ	R _m = 11.82"
330	1-62B	CC-1-043-039-A43R	SG		9-23-82	121 / 306	K	24"	0.375"	ATTCH. 2-TRUNN.	14" φ	Fictitious R _m = 12.25"
331	1-62B	CC-1-066-013-S33K	SG		9-23-82	297 / 874	K	18"	0.375"	ATTCH. 2-TRUNN.	8" φ	R _m = 8.82"
332	1-62B	CC-X-079-001-A43S	SG		9-23-82	395 / 668	S	24"	0.375"	ATTCH. ELBOW- 1-TRUNN.	14" φ	Fictitious R _m = 12.25"
333	1-62B	CC-1-043-024-A33K	SG		9-23-82	790 / 2131	K	24"	0.375"	ATTCH. ELBOW. 1-TRUNN.	10" φ	R _m = 11.82" SKEW SNUGGER
334	1-62B	CC-1-047-001-A43S CC-1-016-700-A43S	SG.		9-23-82	416 / 704	S	24" / 20"	0.375"	ATTCH. REDUCER ELBOW 1-TRUNN.	14" φ	FICTITIOUS R _m = 12.25"
335A	79F	SB-1-060-033-T35A	ASAD ₂₈	683	9-23-82	-	ANCHOR	8"	0.5	2-TRUNN.	RECT. PAD	FICTIT. R _m = 14.0
336A	79F IN LINE	SB-1-060-057-T35A	ASAD ₂₉	714	9-24-82	-	ANCHOR	8"	0.5	1-TRUNN.	RECT. PAD	FICTIT. R _m = 14.0
337A	79F	CC-1-008-029-S33A	S.G.	178			ANCHOR	24"	0.375"	2-TRUNN.		NO STRAPLE GEN. CONSERVATIVE CASE
338	1-15ID	SF-X-23-021-F43R	AKM		9/21/82	1055 / 1102	R	4"	0.37	RECT.	8-3/4" x 2"	

WELDED ATTACHMENT LOG BOOK

NO. A-?	PROB NO AB-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED TO HANG	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THKK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
339	1-151 D	SF-X-23-027-F43K	AKM	1	9/29/82	1557/4039	K	4"	.237	2-TRUNN	2" φ	R _m = 2.132
40A	1-161 K	CC-1-009-016-A43A	ASAN ³⁰	149	9-27-82	—	ANCHOR	10"	0.365	1-TRUNN	CIRC. PAD R _o = 6.313	FICT. R _m = 11.1"
41	1-71A	RH-1-009-003-5225	ASAN ^{31a}		9-29-82	982/2094	ATTACH.	8"	0.322	ELBOW CIRC TRUNN	4" d	
42		RH-1-027-002-532K	31b			982/2094		do	do		do	SAME AM-WA-341
43		RH-1-024-006-522K	32			549/1062		10"	0.365		8" d	FICTIT. R _m = 7.6
44		RH-1-028-004-532K	33a			762/1510		8"	0.322		6" d	FICTIT. R _m = 5.8
45		RH-1-063-006-522K	33b			762/1510		do	do		do	SAME AM-WA-344
46		SI-1-078-004-5425	34a			641/1282		10"	0.365	ELBOW CIRC TRUNN	6" φ	FICTIT. R _m = 5.8
47		SI-1-078-009-5325	34b			641/1282		do	do		do	SAME AM-WA-346
48		SI-1-211-002-522K	35			1035/2070		6"	0.280	ELBOW CIRC TRUNN	5" φ	FICTIT. R _m = 4.9
49		RH-1-015-001-532R	36			365/591		10"	0.365	LUGS	(4) 1" x 1 3/4" x 1 3/4"	
50		SI-1-093-002-522R	37			783/2036		10"	0.365	LUGS	(4) 1 1/2" x 1 3/4" x 1 1/2"	
51	90	SI-1-095-003-542R	38		do	167/167	φ	10"	1.0	LUGS	(4) 1" x 1 3/4" x 3"	FICTIT. R _m = 5.0
52	1-71A	RH-1-024-012-522K	ASAN ³⁹		9-29-82	496/2540	ATTACH.	10"	0.365	2-TRUNN	4" φ	
53A	1-161 N	CC-1-012-006-A43A	50	647			ANCHOR	9 1/2"	0.375	2-TRUNN	2 1/2" φ	STRUPL. FICTITIOUS

WELDED ATTACHMENT LOG BOOK

NO. 1-?	PROB NO AB 1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
54	04SS	H-66-1-RB-040-005-2	AKM		9/29/82	2165/4857	RIGID	2"	.154	4-RECT. LUGS	3/4" x 1 1/2"	INCREASED R _m = 1.5
55	2-067T	SH-2-173-001-A33 K	AKM		9/29/82	472/1175	SN.	10"	.365	CIRC. TRUNNION	5" φ	
56	2-067T	SH-2-173-022-A43 R	AKM		9/29/82	732/1824	RIGID	10"	.365	CIRC. TRUNNION	5" φ	
57	55A	H-CC-1-RB-001-003 H-CC-1-RB-033-008	VB		9-29-82	972/2279	SNUBBER	2"	0.343	RECT. TRN.	C ₁ = 0.375 C ₂ = 0.75	
58	55A	CC-1-264-008-C53S	VB		9-29-82	3202/12802	S	3"	0.216	PLATE	C ₁ = 0.575" C ₂ = 0.8"	
59	55A	CC-1-264-007-C53K	VB		9-29-82	2525/4509	K	3"	0.216	ELBOW TRUNN.	2" φ	
60	55A	CC-1-260-004-C53R	VB		9-29-82	2315/8802	R	3"	0.216	RECT. TRUNK	C ₁ = 0.25 C ₂ = 0.5	
61	55A	CC-1-257-004-C53R	VB		9-29-82	1055/2567	R	4"	0.237	RECT. TRUNK	C ₁ = 0.5 C ₂ = 1.5	
62	1-155	FW-1-098-010-C62K	NJPBk		9-30-82	692/1817		6"	.432			
63	1-155	FW-1-098-017-C62S	NJPBk		9-30-82	413/428		6"	.432			
64	1-155	FW-1-098-003-C62R FW-1-098-013-C62K	NJPBk		9-30-82	772/958		6"	.432			
65	1-155	FW-1-102-004-C62S FW-1-102-005-C62K	NJPBk		9-30-82	731/2197		6"	.432			
66	1-155	FW-1-098-006-C62S	NJPBk		9-30-82	691/1814		6"	.432			
67	1-155	FW-1-098-015-C62R	NJPBk		9-30-82	651/1803		6"	.432			
668	1-155	FW-1-098-007-C52R	CEM		9-30-82	783/2107		6"	.117	PLATE		

WELDED ATTACHMENT LOG BOOK

NODE

NO. A-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THK. K.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
84A	55A 55B	66-1-246-012-C53A	S.G.	34			ANCHOR	6"	0.28			
85	1-1	MS-1-01-003-C72K	VIB / KSAH		10-8-82	50 / 127	ATTACH	32"	1.25	1-TR.	PAD	FIELD R.H. 22.7
86	1-1	MS-1-01-005-C72K	VIB / KSAH		10-8-82	33 / 77	ATTACH	32"	1.25	TRUP / ELBOW	24"φ	FIELD R.H. 31.9
87	154	FW-1-097-042-C62S	S.G.		10-8-82		ATTACH	6"				
88												
89												
90												
91												
92												
93												
94												
95		FW-1-097-020-C62R				262 / 714						
96	154	FW-1-97-034-C62R	S.G.		10-8-82		ATTCH.	6"				
97	87X	CT-1-135-417-C72R CT-1-135-418-C92R CT-1-135-419-C92K	J.O.L.		10/12/82	595 / 735	ATTCH	6"	0.28	LUGS	141x3	

84A
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97

WELDED ATTACHMENT LOG BOOK

NODE

NO. / A-?	PROB NO. / AB-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #/sq in	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
398	60	CC-1-050-004-A43K	SG			276 / 1073	R	24"	0.375"			
399		CC-1-050-001-A43S	↑			333 / 676	S					
400		CC-2-050-001-A43S				267 / 402	S					
401		CC-1-019-009-A43R				667 / 1176	R					
402		CC-1-019-003-A33R				421 / 622	R					
403		CC-1-050-700-A43K CC-1-050-007-A43K				416 / 704	K K					
404		CC-1-019-010-A43K				395 / 668	K					
405		CC-2-050-702-A43K CC-2-019-710-A43K CC-2-050-701-A43S				395 / 668	K K S					
406		CC-2-019-705-A41R				689 / 1467	R					
407		CC-2-019-706-A43R				180 / 546	R					
408		CC-2-050-700-A43K		↓		197 / 467	K					
409	60	CC-2-019-713-A43S	SG		270 / 819	S	24"	0.375"				
410A	63A 64B	CC-X-07B-016-A75A	A.SAN ₂₉	38885 3888	10-15-82	—	ANCHOR	10"	0.365	2-TRUDD PAD		FIG. 17. RM-15.3
411A	64B 63A	CC-X-07B-007-A65A	A.SAN ₅₀	8875 38875	10-15-82	—	ANCHOR	10"	0.365	1-TRUDD PAD		FIG. 17. RM-15.3
412A	63A 64B			1831		—						

WELDED ATTACHMENT LOG BOOK

NODE

E NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
13	1-19A	SI-I-044-039-542R	AJBL		10-14-82	1184 psi / 2019 psi	Lugs	4"	0.337		3/4 x 1 x 1"	
14	1-19A	SI-I-044-034-542R	AJBL		10-14-82	1171 / 2703	Truss	4"	0.337		2"	
15	1-19A/B	H-SI-1-SB-023A-005-2	CEM		10-14-82			1 1/2"	.2			
16	1-151A	SX-X-003-006-F43K SX-X-004-006-F43K SX-X-007-011-F43R	AJBL		10-15-82	641 / 1282	Truss	10"	.365		6"	
17	1-61B	CC-1-087-001-A33R	ASAD 21		10-18-82	346 / 544	ATTACH.	24"	0.375	CIRC. TRUSS ELBOW	20"	FICT. R _n = 17.6
18	1-61B	CC-1-017-010-A33K	ASAD 52		10-18-82	208 / 668	ATTACH	24"	0.375	2-CIRC. TRUSS	18"	FICT. R _n = 15.0
19	1-61B	CC-1-070-002-A33R	ASAD 53		10-18-82	275 / 908	ATTACH	24"	0.375	2 LUGS	2 x 2 x 5	
Rev 2 20A	64F / 66B	CC-2-116-006-F43A	VMC	1608	5809		ANCH					
21A	62B / 66B	CC-X-079-006-A43A	VMC	6272			ANCH					
22A	66B / 66A	CC-2-109-000-A43A	VMC	1000			ANCH					
23A	61B / 61A	CC-1-087-004-A33A	VMC	114			ANCHOR					
24A	61B / 66B	CC-2-045-007-A43A	ASAD 57	193	10-20-82	—	ANCHOR	10"	0.365	FIXED 2-TRUSS	PAD	FICT. R _n = 15.4"
25A	61B / 63B	CC-1-070-006-A43A	VMC	312	10/21/82	—	ANCH	24"	0.375			STRUOL
26A	61B / 62B	CC-1-045-005-A43A		153								
27A	1-35B			3611				2"				FICT. R _n = 11.1"

WELDED ATTACHMENT LOG BOOK

NO.	PROB NO.	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
27	1-035B	CT-1-038-424-C52R	AJTBK		10-20-82	2315 / 2966	Lugs	3"	.216	Lugs	1/2 x 1/2"	
28	"	CT-1-038-425-C52R	"		"	2548 / 6066	Transition	3"	.216			
29	"	CT-1-038-427-C62R	"		"	2752 / 6909	"	3"	.216			
30	1-167C	DO-1-038-004-S63S	SG				S	42"	0.375"			
31	↑	DO-1-038-003-S63K	↑				K	42"				
32		DO-1-089-003-S65S					S	42"				
33		DO-1-089-004-S65K					K	42"				
34		DO-1-038-005-S53K					K	42"				
35		DO-1-033-002-S43R					R	26"				
36	↓	DO-1-033-001-S53K	↓				K	26"				
37	1-167C	DO-1-029-001-S53K	S.G.				K	26"	0.375"			
38	1-151B	SF-X-031-011-F53K SF-X-002-002-F53S	AJTBK				Lugs	12"	0.375		1 1/2 x 1 1/2 x 3/4	
39	1-135D	SA-X-18-731-A85K	JHC		10/21/82	5235 / 12933	TRUNN	6	0.283		Ø 3.5	
40	1-135H	SA-X-017-039-E33P	J.H.C.		2/21/80	175 / 564	LUGS	10	0.363	4 LUGS		
41	1-135A	CA-X-017-039-E33P	J.H.C.		10/21/82	271 / 272	TRUNN	1	0.363	2 LUGS	2 x 2"	

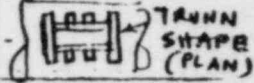
WELDED ATTACHMENT LOG BOOK

NODE

NO. A-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
42	1-135A	SA-X-019 024-ASTP 042-E35T 047-E31P	J.M.C.		10/21/82	807/1789	TRUNK	10	0.28		3.312	
43A	35D IN LINE	CT-1-039-423-C42A	J.M.C.	2851	10/21/82							
44	029K	CT-1-029-014-C92	J.M.C.		10/25/82	455/3250	TRUNK	6	0.28		3	
45	029K	CT-1-029-015-C92	J.M.C.		10/25/82	1200/2175	TRUNK	6	0.28		3	
46	029K	CT-1-029-017-C92	AJBL		10-25-82	3111/7733	TRUNK	6	0.28		3	
47	029K	CT-1-029-023-C92	AJBL		10-25-82	4980/14174	TRUNK	6	0.28		2	
48	1-31	CT-1-007-007-S22K	ASAD 58		10-26-82	635/1313	TRUNK ELBOW	12"	0.375	1-CIRC.	6" φ	
49		CT-1-121-001-S22S				526/1037	TRUNK ELBOW	16"	0.375	1-CIRC.	8" φ	
50		CT-1-002-001-S32S				590/1414	LUGS	16"	0.375	LUGS.	1 1/2 x 2 x 3/4	
51		CT-1-002-003-S32K	61			444/1266		16"	0.375	LUGS	1 x 1 1/2 x 3	
52		CT-1-007-004-S22S	62			444/1248		12"	0.375	LUGS	3/4 x 1 1/2 x 3	
53	00	CT-1-008-001-S22S	63		00	889/2502	00	12"	0.375	LUGS	1 1/4 x 1 1/2 x 1/2	
54	1-31	CT-1-008-003-S22K	ASAD 64		10-26-82	889/2506	LUGS		0.375	LUGS.	1 1/2 x 1 1/4 x 1/2	
55	1-35B	CT-1-038-426-C52R	AJBL		"	2458/6066						Co-related to Spec No. 428
56	1-35C	CT-1-124-412-C72K CT-1-124-415-C72K	AJBL		"	893/...	LUGS	16"	0.375	1	3/4 x 1 1/2 x 3/4	

WELDED ATTACHMENT LOG BOOK

NODE

NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
57A	1-350	SA-X-018-735-E33A	MVC	3913	10/28/82		TRUNK	6	0.28	2 TRUNK		
		RH-1-005-007-C42R										
58	1-429B	RH-1-005-008-C42R	ATP		10/28/82		LUGS	3"	0.216	2 LUGS	2" x 4"	
59A	1-31	CT-1-004-009-S32A	VAL.	1464	10/29/82		ANCHOR					
	1-24											
60	1-8711	SF-X-006-025-F43R	ATP		10/29/82		TRUNK	10"	0.365	6 TRUNK		
61A	37X IN LINE	CT-1-135-401-C72A	S.G.	555	10/29/82		ANCHOR	6"	0.28			 TRUNNION SHAPE (PLAN)
62	1-37Z	CT-1-054-413-C42R	ASAD		11-1-82	770 / 1938	LUGS	4"	0.237	LUGS	1" x 1" x 3"	
63	1-37Z	CT-1-054-424-C42R	ASAD		11-1-82	770 / 1938	LUGS	4"	0.237	LUGS	1" x 1" x 3"	SAME AS AH-WA-46Z
		CT-1-054-433-C42R										
64	1-29L	CT-1-044-014-C92S	ATP		11-1-82			6"	0.28			
65	1-29L	CT-1-044-015-C92S	"		"			6"	0.28			
66	1-29L	CT-1-044-022-C92S	"		"			6"	0.28			
67	1-29L	CT-1-044-023-C92S	"		"			6"	0.28			
68	1-10B	AF-1-102-035-553R	ASAD		11-2-82	726 / 1675	ELBOW	4"	0.438	CIRC. TRUNNION	3" φ	
69		AF-1-103-030-553K			11-2-82	951 / 2184	ELBOW	4"	0.438	CIRC. TRUNNION	2" φ	
70		AF-1-102-002-543K			11-2-82	813 / 2737	TRUNNION	4"	0.438	CIRC.	2" φ	
71						731		"			2" φ	

WELDED ATTACHMENT LOG BOOK

NO. A-7	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
172	1-10B	AF-1-103-022-533R	Ashwjo		11-2-82	1142 4072	LUGS	4"	0.438	LUGS	1x1 3/4"	
173	1-12D	AF-1-096-707-562K	AJPLh		11-2-82	579 724	"	6"	0.432	"	3/4 x 1 1/2"	
174	1-12D	AF-1-099-032-543R	"		11-2-82	808 2637	Transmission	4"	0.438	Transmission	2"	
175	1-35A	CT-1-076-407-C82R CT-1-076-408-C82R	Uch		11-2-82	1157/2009	"	8"	0.322	"	4"	
176	1-35A	CT-1-076-403-C82R CT-1-076-409-C82R	Uch		11-2-82	1054/2342	"	8"	"	"	5"	
177	1-35A	CT-1-013-406-C82R CT-1-013-420-C82R CT-1-013-421-C82R	Uch		11-2-82	665/1407	"	16"	0.375	"	9 1/2 / 10	
178	1-35A	CT-1-013-411-C52R CT-1-013-427-C51R	Uch		11-2-82	684/1463	"	"	"	"	9 1/2 / 10	
179	1-35A	CT-1-076-404-C82R	Uch		11-2-82	776/12598	LUGS	8"	0.322	LUGS	1x2x2	
180	1-35A	CT-1-013-419-C82R	Uch		11-2-82	587/1291	TRUNN	16"	0.375	TRUNN	9.95 / 14	
181	1-35A	CT-1-013-414-C82R	Uch		11-2-82	444/937	LUGS	16"	0.375	LUGS	1 1/2 x 1 1/2 x 3	
182	1-35A	CT-1-013-415-C62R	Uch		11-2-82	333/550	"	"	"	"	1 1/2 x 1 1/2 x 4	
183	1-35A	CT-1-013-416-C52R CT-1-013-418-C82R CT-1-013-401-C52S	Uch		11-2-82	667/1005	"	"	"	"	1 1/2 x 1 1/2 x 2	
184	1-35A	CT-1-013-405-C82S CT-1-013-403-C72S CT-1-013-404-C52S	Uch		11-2-82	889/1640	"	"	"	"	1 x 3/4 x 1 1/2	
185	1-35A	CT-1-039-443-C82	Uch		11-2-82	2110/3243	"	4"	0.239	"	3/4 x 5 1/2 x 1	
186	1-35A	CT-1-076-402-C82K	Uch		11-2-82	776/1295	"	8"	0.322	"	1 x 1 x 2	

WELDED ATTACHMENT LOG BOOK

NO. A-7	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
187	1-35A	CT-1-076-402-C62R		Uch	11-2-82	1553 / 384	LUGS	8	0.322	LUGS	1x1/2x1	
188	1-35A	CT-1-077-401-C62R CT-1-077-402-C62R		Uch	11-2-82	1786 / 4260	"	6	0.28	"	- " -	
189	1-35A	CT-1-078-407-C62R	K	Uch	11-2-82	1786 / 2873	"	"	"	"	3/4x3/4x1	IN ORIGINAL O.K.
190	1-35A	CT-1-082-405-C62R		Uch	11-2-82	595 / 813	"	"	"	"	1x1x3	
191	1-35A	CT-1-093-401-C62R		Uch	11-2-82	2110 / 5328	"	4	0.237	"	1x1/2x1	
192	1-35A	CT-1-088-441-C62R CF-1-088-441-C62R CF-1-088-441-C62R		Uch	11-2-82	2115 / 5933	"	3	0.216	"	"	
193	1-153	FW-1-096-034-C62R		ASAP	11-3-82	738 / 1700	ELBOW	6"	0.432	CIRC. TRUMP	3"	
194		FW-1-096-034-C62R				731 / 2198	TRUMP.			ONE CIRC.	3"	
195		FW-1400-004-C62R				731 / 2198	do			do	do	SAME AS AM-WA-494 FICT.
196		FW-1-096-022-C62R				1023 / 3101	LUGS			2 LUGS	3x1x3	RM=3.40
197		FW-1-100-003-C62R				1023 / 3101	LUGS			do	do	SAME AS AM-WA-496 FICT.
198		FW-1-096-001-C62R				386 / 581	LUGS			4 LUGS	1x1x3	RM=3.40
199		FW-1-100-006-C52R				386 / 581	do			do	do	SAME AS AM-WA-498
200	50	FW-1-096-015-C62R		do	do	907 / 4809	TRUMP.	do	do	STIFF. TSB7.	WT4x8.5	FICT. RH=3.4
201	1-153	FW-1-096-015-C62R		do	11-2-82	907 / 4809	do	do	do	do	do	SAME AS AM-WA-494

WELDED ATTACHMENT LOG BOOK

NOPE

NO. IA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
502	1-153	FW-1-096-020-C62R	ASAD _{75C}		11-3-82	907 / 4809	TRUNN	6"	0.432	STIFF T-SECT.	WT4x8.5	SAME AS AM-WA-500
503	do.	FW-1-096-021-C62R	do _{75D}		do	907 / 4809	do	do	do	do	do	do
504	1-153	FW-1-100-002-C62R	ASAD _{75E}		11-3-82	/	do	6"	0.432	do	do	do
505	1-153	FW-1-096-700-C62k	DHF		11-3-82	511 / 1310	TRUNN.	6"	0.432			fictitious R _m = 3.91
506	1-153	FW-1-096-701-C62k	DHF		11-3-82	1205 / 3086	TRUNN.	6"	0.432			" "
507	1-153	FW-1-096-702-C62k	DHF		11-3-82	579 / 734	LUGS	6"	0.432			identical to FW-1-096-705-C62k of same prob
508	1-153	FW-1-096-704-C62k	DHF		11-3-82	719 / 1842	TRUNN.	6"	.432			fictitious R _m = 3.94"
509	1-153	FW-1-096-705-C62k	DHF		11/3/82	579 / 734	LUGS	6"	.432			
510	1-153	FW-1-096-706-C62k	DHF		11/3/82	579 / 579	LUGS	6"	.432			
511	1-153	FW-1-100-701-C52k	DHF		11/3/82	636 / 1393	E. Lbow	6"	.432			fictitious R _m = 3.94"
512	1-153	FW-1-100-702-C52k	DHF		11/3/82	305 / 305	LUGS	6"	.432			fictitious R _m = 4.4"
513	1-10C	AF-1-096-049-553K	NJPB		11/4/82	1112 / 1278	LUGS	4"	.438			
514	1-10C	AF-1-096-052-563R	NJPB		11/4/82	1668 / 1301	LUGS	4"	.438			Thickness of pipe used is .374"
515A	372 INLINE	CT-1-054-431-C42A	ASAD ₇₆	276	11-4-82	—	ANCHOR	4"	0.237	TRUNN	C1 = 2.1 C2 = 2688	FICT. R _m = 5.9
516	1-035A	CT-1-038-446C62R	UCL		11-04-82	685 / 876	LUGS	3"	0.216	LUGS	1/2 x 1/2 x 1	

WELDED ATTACHMENT LOG BOOK

NODE

E NO.	PROB NO	HANGER MARK	RESP	DATE	DATE	MAXIMUM	SUPPORT	PIPE	PIPE	ATT. TYPE	ATTACHMENT	COMMENTS
1A-?	AB-1-?	NO.	ENGN	RECEIVED	RELEASED	UNIT LOAD	TYPE	SIZE	THICK.	# NUMBER OF	SIZE	
						STRESS*				ATTACHMENTS		
517A	10B 1-12B	AF-1-103-024-S332A	vch	151	11-05-82	—	ANCHOR	4	0.438	TRUNN	4.5" x 4"	
518A	10A 10B	AF-1-102-024-S332A	vch	3319	11-05	—	"	4	"	"	1.5" x 24"	
519	1-297	CT-1-031-012-C92S	vch		11-08	3639/9278	ATTACH	6	0.28	"	1.75"	PIPE ELBOW
520	1-297	CT-1-031-011-C92B	vch		11-08	1259/2605	"	"	"	"	"	"
521	1-297	CT-1-031-019-C92C	vch		11-08	1215/2176	"	"	"	"	"	"
522	1-297	CT-1-031-010-C92S	vch		11-08	1490/3510	"	"	"	"	"	"
523A	35C 35A	CT-1-124-410-CT2A ASAD 77			11-5-82	—	ANCHOR	6"	0.28	SPECIAL GRILLAGE	Box R's & STIFF.	SAME AS AM-WA-461
524	1-297	CT-1-031-018-C92K	vch		11-08	3805/9705	ATTACH	6	0.28	TRUNN	1.75	PIPE ELBOW
525	1-10C	AF-1-17-002-S62R	DHF		11-8-82		TRUNN.	4"	0.337			
526	1-10C	AF-1-96-13-S33K	DHF		11-8-82		Lugs	4"	0.438			fictitious Rm = 6.7"
527	1-10C	AF-1-96-32-S43S	DHF		11-8-82		Lugs	4"	0.438			fictitious Rm = 2.2"
528	1-10C	AF-1-96-41-S43K	DHF		11-8-82		TRUNN.	4"	0.438			fictitious Rm = 3.07"
529	1-10C	AF-1-97-43-S63K	DHF		11-8-82		"	"	"			"
530	1-10C	AF-1-97-44-S53K	DHF		11-8-82		"	"	"			fictitious Rm = 3.94"
531	1-10C	AF-1-97-45-S53K	DHF		11-8-82		"	"	"			fictitious Rm = 3.94"

WELDED ATTACHMENT LOG BOOK

NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS #	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
32A	1-12E	AF-1-100-021-533A	A5AD 70	525	11-7-82	—	Anchor	4"φ	0.438	1 TRUSS	1/2" Plat	Fict. RH
33A	1-12B	AF-1-101-023-533A	A5AD 71	2709	11-15-82	—	Anchor	4"φ	0.438	2 TRUSS		STRUDEL
34	1-165B	4-20-1-26-0030-0030	1/2" PL		11-9-82	2165 / 5003	Lugs	2"	0.154		3/4" x 1 1/2"	
35	1-180	VA-1-005-002-C725	A7BK		11-10-82	1553 / 2684	Lugs	8"	0.322		1" x 1/2"	
36	1-180	VA-1-005-004-C005	A7BK		"	776 / 1299	Lugs	8"	0.322		1" x 1/2"	
37	1-180	VA-1-005-030-C72K	A7BK		"	514 / 661	Lugs	8"	0.322		1" x 1/2"	
38	1-180	VA-1-006-011-C02R	A7BK		"	344 / 751	Lugs	10"	0.365		2" x 1" x 4"	
39	1-180	VA-1-06-021-C52R	A7BK		"	457 / 1168	Lugs	10"	0.365		1" x 2" x 3"	
40	1-180	VA-1-06-023-C62R	A7BK		"	457 / 731	Lugs	10"	0.365		1" x 1 1/4" x 3"	
41	1-42B	HCS-1-EB-060	VDR		11-10-82	—	TRUNK	2	0.154	17 PUMP		
42	1-12D	AF-1-098-019-S33A	DHF		11-11-82	—	Anchor	4"	0.438	1 TRUSS	Plat Rect	fict. Em.
43	1-36	CT-1-024-005-C02R	A7BK		11-11-82	1814 / 4542	Truss	4"	0.322	2		
44	1-36	CT-1-034-016-C02R	A7BK		"	887 / 3140	Lugs	8"	0.322		2 1/2" x 1 1/2"	
45	1-36	CT-1-034-019-C02K	A7BK		"	1242 / 1975	"	8"	0.322		1" x 1 1/4" x 1 1/4"	
46	1-36	CT-1-034-020-C02K	A7BK		"	1157 / 407	Truss	8"	0.322	1 TRUSS		MTG.

WELDED ATTACHMENT LOG BOOK

E NO. NA-?	PROB NO AB-?	HANGER MARK NO.	RESP ENGR	DATE RELEASED TO ANALYST	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
547	1-12D	AF-1-061-001-S33A	DHF		11-12-82	-	Anchor	4"	0.438	2 TRUNN	PAD ALL AROUND PIPE	fict. em
548A	10A 10C	AF-1-096-030-S34	vch	1150	11-12-82	-	"	"	"	"		
549A	12B 10C	AF-1-097-007-S3B	vch	247 647	11-12-82	-	"	"	"	"		
550A	36 29Y	CT-1-034-444-C92A	vch	989	11-12-82	-	"	8"	0.378	"		
551A	36 29M	CT-1-031-403-C82A	vch	1093	11-12-82	-	"	6"	0.28	"		
552A	36 29X	CT-1-029-403-C82A	vch	1058	11-12-82	-	"	"	"	"		
553A	29M 29U	CT-1-031-414-C92A	VIB-	989	11-12-82	-	"	"	"	1 TRUNN		
54	1-180	VA-1-005-005-C925	DHF		11-16-82		Trunnion	8"	0.322	1 TRUNN.		
55	1-180	VA-1-005-006-C925	DHF		11-16-82		"	"	"	"		
56	1-180	VA-1-005-007-C925	DHF		11-16-82		"	"	"	"		
557	1-180	VA-1-005-009-C92R	DHF		11-16-82		"	"	"	"		
558	1-180	VA-1-06-003-C52R	DHF		11-16-82		"	10"	0.365	"		
559A	29X 29S	CT-1-029-415-C92A	S.G.	989	11-16-82		ANCHOR	6"	0.28"	2 TRUNN	RECT. PAD C1 = 2.6" C2 = 3.0"	FICTITIOUS PAD. WELD = 8.5"
560	1-86A	SF-X-005-006-F53K	ASBL		11-16-82	891 727 1122	Lugs	10"	0.365	8 Lugs	2" x 1 3/4" x 3 1/2"	

WELED ATTACHMENT LOG BOOK

NAME

NO.	PROB NO - ? AB-1-?	HANGER MARK N.O.	RESP ENGN	DATE RELEASED 10-2-82	DATE RELEASED 10-2-82	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
62	1-86A	SF-X-005-015-F435 SF-X-005-019-F438	B181	11-16-82	11-16-82	348 858	ANCH	10"	.365	TRUNN	6"	
63	1-87C	SF-X-034-14-F524	DMF	11-16-82	11-16-82	790 1714	"	10"	.365	"	6"	
64	1-87D	CS-1-057-021-A33A	UD	11-18-82	11-18-82	+	ANCH	24	0.371	27 TRUNN	12x11	
65	1-51A	CS-1-346-702-A425 CS-1-076-703-A425	MI	12-14-82	11-18-82	511/1593	TRUNN	4"	.531	"		
66	1-51A	CS-1-085-004-A424	MI	12-14-82	11-18-82	581/2199	TRUNN	4"	.531	"		
67	1-51A	SI-1-001-017-512R	MI	12-14-82	11-18-82	550/1792	TRUNN	4"	.531	"		
68	1-29N	CT-1-044-010-C925	DF	12-14-82	11-18-82	1482 3308	ANCH	6"	.28	TRUNN		
69	1-29N	CT-1-046-010-C925	AT81	12-14-82	11-18-82	1231 2431	TRUNN	6"	.28			
70	1-29N	CT-1-046-011-C925		12-14-82	11-18-82	3862 9511	"	6"	.28			
71	1-29N	CT-1-046-012-C925		12-14-82	11-18-82	1129 2101	"	6"	.28			
72	1-29N	CT-1-046-016-C82K		12-14-82	11-18-82	1527 3908	TRUNN	6"	.28		1" x 1/4 x 1/2"	
73	1-29N	CT-1-046-019-C92K		12-14-82	11-18-82	1000 2101	TRUNN	6"	.28			
74	1-61F	DO-1-058-003-553R	T7K	12-15-82	11-18-82	1000 2101	1 Lug	26.0	.375		16"	
75	1-61E	CC-1-040-019-E335	T7K	12-15-82	11-18-82	1478.17 2138.34	2 Lug	6"	.18			
76	1-61E	CC-1-048-019-A33P	T7K	12-15-82	11-18-82	3887 866.30	2 Lug	9.00	.322			

UNIT LOAD STRESS ONLY BORING AND ...

WELDED ATTACHMENT LOG BOOK

NO. AB-1-?	FROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RELEASED FOR ANALYSIS	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
77	1-378	CT-1-046-006-C01	TJF	12-15-82	11/15/82	$\frac{1,017.68}{3,456.00}$	circ. lug	6.0"	0.18	pipe	5.5"	
78	1-378	CT-1-048-008-C01	TJF		11/18/82	$\frac{1,219.73}{5,560.00}$? lugs	6.0"	0.28	lugs	2" x 6 1/2"	
79	1-378	CT-1-040-040, -048-001-C02.5	TJF		11/15/82	$\frac{1,785.21}{8,447.8}$	4 lugs	6.0"	0.28	lugs	3 7/8" x 1 1/4"	
80	1-378	CT-1-044-006-C02F CT-1-048-007-C01F	TJF		11/15/82	$\frac{1,401.55}{3,456.00}$	5" (C), A770C.	6.0"	0.18		O.D. = 3.5	
81	1-178B	VA-X-02-III-A12F	AJPL		11/23/82	$\frac{821}{1353}$	4 lugs	12"	0.406	lugs	1 1/4" x 1/2" x 1/2"	
82	1-087B	SF-X-006-002-F01	TJF	12-15-82	11/22/82	$\frac{790.0}{1,714.17}$	Circular	10"	0.305		6.0" ID	
83	1-165A	H20-IG-001A-004.3	AJPL		11/22/82	$\frac{916.5}{2,003}$	lug	2"	0.1571	4 lugs	1 1/2" x 1 1/2"	
84	1-86B	SF-X-005-030-F02	TJF		11/23/82	$\frac{776.09}{2,244.24}$	lugs	1.0"	0.365	2 lugs	1 1/2" x 6"	
85	1-178A	VA-X-05-716-A731	TJF		11/23/82	$\frac{94.58}{2,333.1}$	lug	12.0"	0.375	2 lugs	5" x 1 1/4" x 1 1/2"	
86	1-088E	H-SF-X-AB-044A-005.5	RJB	12-15-82	11/23/82	$\frac{8450}{21050}$	LUGS	3/4"	0.13	2 LUGS	1/4" x 1/2" x 1/2"	
87	1-088E	H-SF-X-AB-044A-003.5 H-SF-X-AB-044A-006.5	RJB	12-15-82	11/23/82	$\frac{2164}{4856}$	LUGS	2"	0.154	2 LUGS	3/4" x 1" x 1 1/2"	
88	1-33	CT-1-014-003-S425	DHF		11-23-82	$\frac{414}{1644}$	lugs	16"	0.375	4 lugs	1 1/2" x 2 3/4"	
89	1-33	CT-1-014-005-S325	DHF		11-23-82	$\frac{417}{726}$	TENON	16"	0.375	Pipe	10"	
89	1-33	CT-1-014-008-S42K	DHF		11-23-82	$\frac{667}{667}$	lugs	16"	0.375	4 lugs	3/4" x 2"	
89	1-33	CT-1-014-010-S42K	DHF		11-23-82	$\frac{356}{763}$	lugs	16"	0.375	4 lugs	1 1/4" x 1 3/4" x 3 1/4"	

UNIT LOAD STRESS ONLY APPLIES TO NON-ANCHOR ATTACHMENTS. THIS COLUMN OF UNIT LOAD STRESS APPLIES TO ANCHOR ATTACHMENTS.

WELDED ATTACHMENT LOG BOOK

NODE

NO. 1-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RELEASED TR ANALYST	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
12	1-33	CT-1-014-016-S32K			11-23-82	611 / 1764	TRUNN	16"	.375	2 TRUNN	6" φ	
593	1-33	CT-1-014-018-S32R			11-23-82	462 / 822	TRUNN	16"	.375	PIPE	10"	
94	1-33	CT-1-014-025-S32K			11-23-82	133 / 357	TRUNN	16"	.375	20 PIPES	12"	
95A	37B / 29N	CT-1-048-403-C82A	vdh	1092	11-24-82	-	ANCH	6	0.28	2 TRUNN	3	
96A	37B / 29P	CT-1-048-403-C82B	vdh	1132	11-24-82	-	" -	6	0.28	"	3	
97A	37B / 29L	CT-1-048-403-C82C	vdh	60	11-24-82	-	" -	6	0.28	"	3	
98	1-61D	CC-2-009-007-A33R	NJBK		11-24-82	365 / 412	Lugs	10"	.365	1/4 x 2 1/2 x 3/4		
99	1-94	BR-X-178-706-R33R	NJBK		11-30-82	1055 / 1055	Lugs	4"	.237	8 Lugs	3/4 x 1 1/2 x 2"	
100	1-94	BR-X-178-720-R33K	NJBK		1-30-82	1055 / 1273	Lugs	4"	.237	8 Lugs	3/4 x 3/4 x 2"	
101												
102	1-165A	410-129-008-0003	NTPK		12-17-82	2165 / 4857	Lugs	2"	.154	4 Lugs	1 1/2 x 1 3/4	
103A	29P / 29T	CT-1-048-411-C82A	vdh	989	12-1-82	-	ANCH	6	0.28	1 TRUNN		
104A	35A IN LINE	CT-1-039-404-C42A	ASAD ec	2333	12-2-82	-	ANCHOR	4"	0.237	1 TRUNN	4 1/2 x 8 x 8 1/2	FICTITIOUS RM = 8.2
105A	35A / 35B	CT-1-038-447-C62A	ASAD 21	1324	12-2-82	-	ANCHOR	3"	0.216	1 TRUNN	4 3/8 x 5 1/2 x 8	FICTITIOUS RM = 8.2
106A	35A / 35C	CT-1-124-401-C72A	ASAD / RIB ec	515	12-3-82	-	ANCHOR	6"	0.280	1 TRUNN	4 1/2 x 8 x 10	FICTITIOUS RM = 10.5

UNIT LOAD STRESS ONLY APPLIES TO NON-ANCHOR ATTACHMENTS FOR ANCHORS. THIS COLUMN REPRESENTS ACTUAL MAXIMUM STRESS

WELDED ATTACHMENT LOG BOOK

NOTE

NO. PROB NO	HANGER MARK NO.	RESP ENGN	DATE TO RELEASED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	PIPE ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
07A	7-1-039-413-C42A	ASAP/JMC	2542	12-2-82	—	Anchor	4"	0.237	Circ Truss	R=4.125	Fix Truss RM=7.5
08A	7-1-026-401-C82A	ASAP/JY	1032	12-3-82	—	Anchor	12"	0.375	2 Truss	R=6.16	Fix Truss RM=16.2
09	CT-1-033-032-C92A	VIB		12-2-82	7925/3285	SP	6"	.28	1 Tr	3"	
010	CT-1-033-032-C92A	VIB	12-22-82	12-2-82	3811/1745	SP	6"	.28	2 Tr	3"	
011	CT-1-048-032-C92A	PBB	12-22-82	12-2-82	7925/3285	SP	6"	.28	1 Tr	3"	
012	CT-1-048-032-C92A	PBB	12-22-82	12-2-82	3811/1745	SP	6"	.28	2 Tr	3"	
013	SI-1-045-048-542R	RJB		12-3-82	1196/2792	TRUSS	4"	.337	1 PIPE	2 1/2"	
014	CT-1-046-510-C92A	VCL	989	12-3-82	—	ANCH	6"	0.28			
015	SI-1-045-044-542K	RJB		12-3-82	1334/3087	TRUSS	4"	.337	1 PIPE	2"	
016	SI-1-060-009-542S	RJB	12-22-82	12-3-82	741/1809	TRUSS	4"	.531	1 PIPE	2"	
017A	5F-X-021-704-ASSA	RJB	38	12-6-82	ANCHOR	* SEE NEW CALC FOR PROPSAL			FOR FOUNDATION		
018A	CC-2-045-007-A43A	M. NYER	193	12-7-82	ANCHOR	Anchor	2"	0.344	(FIXED) 2 TRUSS	1 1/2"	Fix Truss RM=2.35
019A	H-2S-1AB-006B-008-2	ASAP	1585	12-7-82	—	Anchor	2"				Fix Truss RM=2.35
020A	H-2S-1-5B-030-013-2	ASAP	1782	12-8-82	—	Anchor	2"	0.154	SPECIAL 1 TRUSS	GI=1.188 CI=0.45	Fix Truss RM=2.4
021A	ER-1-114-715-110	VCL	128	12-7	—	ANCHOR					

WELDED ATTACHMENT LOG BOOK

DATE

NO. PROB NO AB-1-?	HANGER MARK NO.	RESP ENGI	DATE TO RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
22 1-61D	CC-2-009-007-A33R	ARBL		12-8-82	365 / 112	Legs	10"	.365	8 Legs	1 1/4 x 2 1/2	
23 1-57A	CC-1-215-010-C53R	ARBL		12-8-82	582 / 137	Legs	8"	.438	4 "	1 x 1/2 x 2"	
24 1-135C	SA-X-019-703-B35X	ARBL		12-8-82	190 / 1714	Trunn	10"	.365	3 Trunn		
25 32	ST-1-013-013-S32K	RJB	12-23-82	12-8-82	526 / 1037	TRUNN.	16"	.375	1 TRUNN.	8"	
26 32	CT-1-013-023-S42K	RJB	12-23-82	12-8-82	158 / 463	TRUNN	16"	.375	2 TRUNN.	10"	
27 32	CT-1-013-004-S32S	RJB	12-23-82	12-8-82	455 / 1299	TRUNN.	16"	.375	2 TRUNN	8"	
28A 1-50B	SI-1-045-030-S24	TJE	1161	12-8-82	3570 / 9506	TRUNN	4.5"	0.337	1 TRUNN	4.5 x 10	
29A 1-50B	SI-1-300-003-S22A	TJE	1194	12-8-82	4577 / 15,517	TRUNN	4.5"	0.337	2 TRUNN	8.5 x 4.5	
30A 1-59A	SA-X-019-701-E35A	RJB	1417	12-9-82	—	ANCHOR	10"	0.365	2 TRON	SADDLE PL	
31A 1-59B	CC-1-215-006-C53A	TJE	91	12-9-82	11,869 / 26,260	TRUNN	3.5"	0.438	PIPE	2.5 x 4.0	
32A 1-59A	CC-1-198-002-C53A	TJE	42	11-9-82	13,731 / 19,196	TRUNN	4.5"	0.531	TRUNN	2.5 x 6	
33A 1-59A	CC-2-007-005-A33A	UCL	150	12-10-82	—	ANCH					
34A 1-59A	CC-2-009-708-B33A	ASAD BE	12-14-82	12-13-82	—	ADJUSTER	10"	0.365	2 TRUNN	FULL PL	"STRUD"
35 1-86C	SF-X-033-010-F58	ARBL		12-11-82	976 / 2254	Legs	10"	.365	8 Legs	1 x 3 x 6"	
36 1-165B	H-DO-I-DG-CONA-CON-3	ARBL		12-11-82	2165 / 5003	Legs	2"	.154	4 Legs	1 1/2 x 1 1/2"	

WELDED ATTACHMENT LOG BOOK

NO. 1

NO. 1-7	PROB NO AB-1-7	HANGER MARK NO.	RESP ENGN	DATE RELEASED	DATE RELEASED	MAXIMUM UNIT STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
137	163	CT-1-128-001-142L	SP	12/15/82	12-15-82	348/858	TRUNNION	10"	.365	6" TRUNNION		
138	1-30	CT-1-006-006-S21H	TJF	12/14/82	12-15-82	525/1020	PIPE	12.75	0.375	PIPE	O.D. = 8.625"	
139	1-30	CT-1-001-003-S21E	TJF	12/15/82	12-15-82	345/1194.0	LUGS	16.0	0.375	LUG	2" x 1 1/2"	
140	1-30	CT-1-006-700-S21S	TJF	12/15/82	12-15-82	414.5/1019.	LUGS	12.75	0.375	LUG	1" x 3" x 1"	SUPPLT ECLAIR NAYE D. ANALYSIS HAS BEEN MADE
141	1-30	CT-1-005-700-S21S	TJF	12/15/82	12-15-82	257/392.	PIPE	12.75	0.375	PIPE	O.D. 8.625"	
142	1-135E	SA-1-003-001-T34S	VNC	12-14-82	12-15-82	2185/3689	ATTACH	6	0.28	ELBOW LUG	L = 2.5	HAND CALCULATED ENERGY ALLOW
143	1-135E	ELIMINATE SA-X-019-055-T35R	VNC	12-14-82	12-15-82	396/997	-	10	0.365	2 TRUNN	6 = 3.312"	
144	1-135E	SA-1-001-001-T34S	VNC	12-14-82	12-15-82	1387/2805	-	3	0.300	ELBOW	6 = 1.437"	
145	1-135E	SA-1-003-002-T34S	VNC	12-14-82	12-15-82	1441/3319	-	6	0.28	1 TRUNN	6 = 2.156"	
146	1-135E	ELIMINATE SA-X-019-055-T35R	VNC	12-14-82	12-15-82	478/1954	-	10	0.365	2 TRUNN	G = 5.395" C2 = 5.5"	
147	1-135E	MS-1-034-002-T44S MS-1-034-008-T34S	VNC	12-14-82	12-15-82	1667/1978	-	3	0.300	4 LUGS	3/4" x 1"	
148	1-135E	SA-X-002-001-T34S	VNC	12-14-82	12-15-82	1067/2025	-	14	0.375	-	1 1/2" x 1 1/4"	
149	1-135E	SA-X-011-001-T35S	VNC	12-14-82	12-15-82	1035/1522	-	8	0.322	-	1 1/2" x 1 1/2"	
150	1-135E	SA-1-009-001-T35S	VNC	12-14-82	12-15-82	1096/1560	-	10	0.365	-	1 1/2" x 1 1/4"	
151	1-135E	SA-X-084-001-T35S	VNC	12-14-82	12-15-82	429/2401	-	6	0.28	-	1 1/2" x 1 1/4"	

WELDED ATTACHMENT LOG BOOK

NODE

E. NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE TO RECEIVED ANALYST	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS.
652	1-8	FW-1-020-701 ^{700} -C42K	ASAD 89	12-17-82	12-17-82	92 97 99 105	ATTACH.	18"	0.937	4 LUGS	1 1/2 x 1 1/2 x 9	NORMAL/PAIR OF SUBBEK?
653	1-8	FW-1-020-704-C42K	90a	12-17-82	12-17-82	114 237				ELBOW CIRC. TR.	12" φ	FICTITIOUS R _m = 11.2"
654	1-8	FW-1-020-705-C42K	91a	12-17-82	12-17-82	91 223				TWO CIRC. TR.	12" φ	FICTITIOUS R _m = 11.2"
655	1-6	FW-1-018-003-C62S	92a	12-23-82	12-20-82	133 67				4 LUGS	1 1/2 x 1 1/2 x 4	
656		FW-1-018-009-C72S	92b			133 167				do	do	SAME AS AM-WA-655
657		FW-1-018-016-C52K	96			40 146				2 TUBES	1 1/8" x 1/2"	FICTITIOUS R _m = 17.5
658		FW-1-018-703-C52R	91b	00		91 223				TWO CIRC. TR.	12" φ	SAME AS AM-WA-654
659		FW-1-018-704-C72K	90b	12-23-82		114 237				ELBOW CIRC. TR.	12" φ	SAME AS AM-WA-653
660		FW-1-018-706-C72K	91c	12-29-82		73 178				TWO CIRC. TR.	12" φ	FICTITIOUS R _m = 12.1"
661	00	FW-1-018-708-C72K	91d	12-29-82	00	65 158				TWO CIRC. TR.	12" φ	FICTITIOUS R _m = 12.1"
662	1-6	FW-1-018-709-C72K	91e	12-23-82	12-20-82	91 223				TWO CIRC. TR.	12" φ	SAME AS AM-WA-654
663	1-7	FW-1-017-008-C72S	92c	12-27-82	12-20-82	133 167				4 LUGS	1 1/2 x 1 1/2 x 4	SAME AS AM-WA-655
664		FW-1-017-023-C72K	93			178 254				4 LUGS	1 1/2 x 1 1/2 x 3	
665	00	FW-1-017-700-C42K	00 94	00	00	108 124	00	00	00	4 LUGS ELBOW	1 1/2 x 1 1/4 x 5	SAME AS

WELDED AT TACHMEN, LOG BOOK

NOTE

NO. 1-7	PROB NO AB-1-7	HANGER MARK NO.	RESP ENGN	DATE TO RELEASED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	PIPE TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
67	1-7	FW-1-017-107-C72K	ASAD	12-27-82	12-20-82	91 / 223	ATTACH.	13"	0.937	TWO CIRC TR.	12" φ	SAME AS AM-WA-654
68		FW-1-017-109-C73K				107 / 123				4 LUGS	1 1/2 x 1 1/4 x 5	SAME AS AM-WA-654
69	do	FW-1-017-112-C72K	do	do	do	91 / 223	do	do	do	TWO CIRC.	12" φ	SAME AS AM-WA-654
70	1-7	FW-1-017-117-C52S	ASAD	12-27-82	12-20-82	133 / 167	ATTACH.	18"	0.937	4 LUGS	1 1/2 x 1 1/4 x 4	SAME AS AM-WA-654
71	1-76A	MS-1-101-002-C52R	ASBK		12-16-82	1137 / 1194	LUG	4"	0.327		WT 4 x 8.5 x 2"	Plot things
72A		C-1-002-0103-092A	TVK	1132	11-75-82	11916 / 15170	TWO THRU	6.6M	0.78		0.226 x 9	
73	1-93B	MS-1-206-700-ASB	ATK		12-21-82	1055 / 2536	LUG	4"	0.237		1 1/2 x 3/4 x 2	
74	1-5	FW-1-019-701-C42K	ASAD	12-30-82	12-21-82	65.76 / 158.79	ATTACH.	18"	0.937	2 CIRC. TROND.	12" φ	FICTITIOUS RM=11.2
75	1-165F	DO-1-047-012-580	TVK		12-1-82	9570 / 7602	LUG	3.5"	0.916	1 Re Jony LUG	1/2 x 1 x 1/2	
76												
77	1-078	MS-1-345-013-C52R	ATK		12-27-82	1842 / 9348	Plate	3"	0.3			
78	1-078	MS-1-345-003-C52K MS-1-345-002-C52S	ASBK		12/27/82	1822 / 9310	Plate	3"	0.3			
79	1-28	CT-1-012-004-S22K	ASAD	12-30-82	12-29-82	865 / 2066	ATTACH.	10"	0.365	ELBOW CIRC TRUD	4" φ	FICTITIOUS
80	do	CT-1-012-005-S22K	do	do	do	641 / 1282	do	10"	0.365	ELBOW CIRC TRUD	6" φ	FICTITIOUS RM=5.8
						2182				ELBOW		

WELDED ATTACHMENT LOG BOOK

NOTE

E NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE TO RECEIVED ANALYSIS	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
682	1-28	CT-1-021-003-S22R	ASAD 101	12-30-82	12-29-82	1735 3621	ATTACH.	4"	0.237	ELBOW CIRC TRUD	3"φ	FICTITIOUS RM=3.1"
683		CT-1-056-008-S35K				1379 2958		6"	0.280	ELBOW CIRC TRUD	3"φ	
684		CT-1-012-006-S22R				490 2021		10"	0.365	TWO CIRC TRUD	6"φ	FICTITIOUS RM=5.9"
685		CT-1-012-007-S22K				442 1108		10"	0.365	TWO CIRC TRUD	6"φ	FICTITIOUS RM=5.9"
686		CT-1-021-004-S22K				2634 6559		4"	0.237	TWO CIRC TRUD	3"φ	FICTITIOUS RM=3.2"
687		CT-1-025-007-S22K				318 919		16"	0.375	TWO CIRC TRUD	6"φ	
688	CO	CT-1-056-014-S35K	CO 107	CO	CO	1759 5302	CO	6"	0.280	ONE CIRC. TR.	2 1/2"φ	
689	1-28	CT-1-020-006-S22R	ASAD 106	12-30-82	12-29-82	2446 6935	ATTACH.	4"	0.237	TWO LUGS	1"×1"×2"	
690A	91 94	BR-X-001-720-A53A	RJB	1405	12-28-82	-	ANCHOR					
691A	928 91	BR-X-056-726-A53A	RJE	1536	12-28-82	-	ANCHOR					
692A	928 928	BR-X-056-723-A53A	MI	5270	12-28-82	-	ANCHOR	4"	0.237	1	Pad	
693	1-27	CT-1-22-003-S35K	AJBL		12-29-82	2153 3689	Plate	6"	0.28	1		
694	1-27	CT-1-009-004-S22K	AJBL		12-29-82	602 1500	Trunn	10"	0.365	2	4" Trunn	
695	1-27	CT-1-019-00E-S32K	AJBL		12-29-82	2031 H716 942	"	4"	0.237	1	3" "	

WELDED ATTACHMENT LOG BOOK

NO. AB-1-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
97	1-27	CT-1024-004-522K	AJAL		12-29-82	574/977	Tension	16"	0.375	1	12"	
98	1-27	CT-1-057-13-535R	AJAL		"	1557/3749	"	6"	0.280	1	3"	
99	1-75	MS-1-74-010-054K	AJAL		"	1492/5120	"	3"	0.3	1		
00	2-63B	CT-2-158-407-A43K	TJE		12-29-82	1730/921.0	Tension	16"	0.375	2	8x8x1/2	
01	2-63B	CT-2-176-404-A43K	TJE		12-29-82	1034/2681.0	1165	12"	0.375	2	6.0 PIPE	
02	2-63B	CT-2-164-403-A43K	TJE		12-29-82	901.0/2776.0	Tension	10"	0.365	1	1x1x1	
03	2-63B	CT-2-158-408-A43K	TJE		12-29-82	3550/1011.0	Tension	16"	0.375	2	8x10x3/4	
04	2-63B	CT-2-158-411-A43K	TJE		12-29-82	603/1735.0	Tension	16"	0.375	1	1/2x16x11	
705	1-76A	MS-1-151-048-050K	FA		12-30-82	ANCHOR		4"	0.337	TWO TRON	8x6x1/2	FICTITIOUS Rm = 12.5
706	37W	CT-1-014-415-072R CT-1-014-416-072R	vch		12-29-82	833/2211	ATCH	16	0.375	17 RUNN		
707	37W	CT-1-014-413-082R CT-1-014-414-082R	vch		12-29-82	670/1454	- 11 -	"	"			
708	37W	CT-1-097-411-C425	vch		12-29-82	2185/4865	- 11 -	4	0.237			
709	37W	CT-1-014-412-072R	vch		12-29-82	113/335	- 11 -	16	0.375			
710	37W	CT-1-049-008-052K CT-1-049-413-052K	vch		12-29-82	113/2801	- 11 -	8	0.322			
711	37W	CT-1-016-001-052K	vch		12-29-82	6251	- 11 -	"	"			

WELDED ATTACHMENT LOG BOOK

NO.	PROB NO	HANGER MARK NO.	RESP ENGN	DATE RECEIVED	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
712	37W	CT-1-049-006-085	vdh		12-29-81	1750/4909	ARCH	8	.322			
713	- 11 -	CT-1-014-407-085	vdh		12-29-81	288/288	- 11 -	16	.375	LUCS		
714	- 11 -	CT-1-014-431-0812	vdh		11-29-81	288/502	- 11 -	- 11 -	- 11 -	- 11 -		
715	- 11 -	CT-1-014-402-0812 - 403-0812 - 404-0812 - 405-0812	vdh		12-29-81	296/481	- 11 -	- 11 -	- 11 -	- 11 -		
716	- 11 -	CT-1-049-432-0812 - 433-0812 - 434-0812 - 435-0812	vdh		12-29-81	418/458	- 11 -	8	0.377	- 11 -		
717	- 11 -	CT-1-049-417-0812	vdh		12-29-81	635/1719	- 11 -	- 11 -	- 11 -	- 11 -		
718	- 11 -	CT-1-049-010-0812	vdh		12-29-81	731/1589	- 11 -	- 11 -	- 11 -	- 11 -		
719	- 11 -	CT-1-014-410-0812	vdh		12-29-81	956/1556	- 11 -	- 11 -	- 11 -	- 11 -		
720	- 11 -	CT-1-051-415-0812 - 417	vdh		12-29-81	714/767	- 11 -	6	0.20	- 11 -		
721	- 11 -	CT-1-051-416-0812 - 418	vdh		12-29-81	1300/1582	- 11 -	- 11 -	- 11 -	- 11 -		
722	- 11 -	CT-1-075-406-0812 - 407-0812 - 408-0812	vdh		12-29-81	514/572	- 11 -	- 11 -	- 11 -	- 11 -		
723	- 11 -	CT-1-097-415-0812	vdh		12-29-81	603/734	- 11 -	4	0.237	- 11 -		
724	- 11 -	CT-1-097-403-0812	vdh		12-29-81	603/603	- 11 -	- 11 -	- 11 -	- 11 -		
725	- 11 -	CT-1-014-414-0812	vdh		12-29-81	889/1715	- 11 -	- 11 -	- 11 -	- 11 -		
726	- 11 -	CT-1-014-415-0812 CT-1-014-412-0812 CT-1-014-413-0812	vdh		12-29-81	1600/1600	- 11 -	3	0.216	- 11 -		

WELDED ATTACHMENT LOG BOOK

NO. / PROB NO	HANGER MARK NO.	RESP ENGN	DATE TO RECORDED / RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THCK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
727A / 34B / 34A	CT-1-088-700-533H	RJB	780 / 1-5-83		TRUN	3.5"	0.216	1	3/4 x 4 3/4 x 9"	Anchor 11 of
728A / 151D / 88C	SF-X-021-705-A55L	RJB	394 / 1-5-83		ANCHOR					
729 / 1-77	MS-1-150-002-C52R MS-1-150-004-C52R MS-1-150-002-C52R MS-1-150-005-C52R	SP	1-3-83	1484 / 2832	ATTACH	4"	0.337	RECT LUGS	(4) 1 1/2 x 1"	
730 / 1-77	MS-1-150-031-C52R	SP	1-3-83	1625 / 4492	ATTACH	4"	0.337	RECT LUGS	(2) 1 x 4 x 6	
731 / 1-77	MS-1-150-003-C52R MS-1-150-009-C52R MS-1-150-014-C52R MS-1-150-015-C52R	RJB	1-3-83	1437 / 7194		4"	0.337	WT	WT 4 x 8.5 x 12" x 2 RS 2 1/4 x 3/8 x 4 1/2"	
732 / 1-77	MS-1-150-029-C52R	RJB	1-3-83	1204 / 3536	TRUN	4"	0.337	2 TRUN	2 1/2" φ	
733 / 1-77	MS-1-150-056-C52R	RJB	12-30-83	2501 / 13,267	CIRC TRUN	4"	0.337	2 TRUN	2 1/2" φ	
734 / 1-77	MS-1-150-005-C52R	RJB	1-6-83 / 1-6-83	1437 / 7194	ATTACH.	4"	0.337	STIFF. WT	2R 1 1/2 x 3" WT 4 x 8.5	FICTITIOUS RM = 3.5
735 / 1-77	MS-1-150-010-C52R	RJB	1-6-83 / 1-6-83	1437 / 7194		do	do	do	do	do
736 / 1-77	MS-1-150-013-C52R	RJB	1-6-83 / 1-6-83	1437 / 7194		4"	0.337	STIFF. WT	2R 1 1/2 x 3" WT 4 x 8.5	FICTITIOUS RM = 3.5
737 / 1-77	MS-1-150-039-C52R	ASAD 109	1-11-83 / 1-4-83	2505 / 10,438				1 CIRC. TRUN	2 1/2" φ	FICTITIOUS RM = 2.6"
738 / 1-77	MS-1-150-040-C52R	110		2533 / 10,582				1 CIRC. TRUN	2 1/2" φ	FICTITIOUS RM = 2.6"
739 / 1-77	MS-1-150-020-C52R	111		1482 / 6499				STIFF. SEAT	RS 1 1/2 x 3" R 1/2 x 12"	
740 / 1-77	MS-1-150-052-C52R	do 112a	do	742 / 1022		do	do	4 LUGS	3/4 x 1 x 2	FICTITIOUS RM = 2.2"
741 / 1-77	MS-1-150-051-C52R	AC 111/111	1-11-83 / 1-11-83	989 / 1387	ATTACH	4"	0.337	1 LUGS	1 x 1 x 1	

WELDED ATTACHMENT LOG BOOK

110DF

NO.	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE TO RELEASE 2 HOURS	DATE RELEASED	MAXIMUM UNIT LOAD STRESS	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
742	1-77	MS-1-150-035-52K	ASAD 114	1-11-83	1-11-83	989 / 1231	ATTACH	4"	0.337	1 LOGS	3/4 x 1 x 1	
743	1-77	MS-1-150-033-52K	ASAD 116	do	do	742 / 1022	ATTACH	do	do	do	do	SAME AS AM-WA-740
744	1-77	MS-1-150-067-52R	ASAN 115	1-11-83	1-11-83	668 / 2078	ATTACH	4"	0.337	4 LOGS	3/4 x 3/4 x 1	SKWED SLEEPERS
745A	1-37W 1-37X	CT-1-009-700-53W	V.C.L.	680	1-6-83	/	ANCH	3"	0.216	1 ATTA		
746A	1-37W 1-37Y	CT-1-054-447-62A	ASAD 116	226	1-14-83	—	ANCHOR	4"	0.237	1 TRUNN	PAD R 3/8 x 6 x 6	FICTITIOUS RM = 10.2"
747A	1-37W 1-37Y	CT-1-053-404-62A	ASAN 117	345	1-14-83	—	ANCHOR	3"	0.216	1 TRUNN	PAD R 1/2 x 4"	FICTITIOUS RM = 8.2"
748A	1-37W 1-37X	CT-1-042-401-68A	V.C.L.	1036	1-14-83	—	" - "	10"	0.365	2 TRUNN	4.56" 5.25"	
749A	1-37W 1-37X	CT-1-127-403-67A	V.C.L.	525	1-14-83	—	" - "	8"	0.322	2 TRUNN	4.20" 5.25"	
750A	1-37W 292	CT-1-049-415-67A	V.C.L.	889	1-14-83	—	" - "	8"	0.322	1 TRUNN	3.262" 4.812"	
751A	1-37W 1-135E	SA-x-008-736-63W	V.C.L.	1144	1-21-83	—	" - "	6"	0.280	2 TRUNN	3.057" 5.187"	
752A	1-37W 1-107	SA-1-007-023-134A	V.C.L.	1305	1-21-83	—	" - "	" - "	" - "	1 TRUNN	3.312" 4.5"	
753	1-30	CT-1-120-007-52W	T.J.K.	2-8-83	2-8-83	—	" - "	" - "	" - "	" - "		
754A	1-30 1-30	CC-x-010-700-177A	V.C.L.	22,870	1-24-85	—	" - "	10 - "	0.365	2 TRUNN		
755	1-45T	H-CS-1-28-004-072 H-CS-1-28-004-042	V.M.C.	3-1-83	3-1-83	4507 / 1117	ATTACH	3 3/4"	0.218	4 LUGS	4 x 1/2 x 1/2	
756A	1-30 1-04	CT-1-003-015-531A	T.J.K.	1406	3-1-83	—	" - "	1"	0.374			

WELDED ATTACHMENT LOG BOOK

NOTE

IE NO. VIA-?	PROB NO AB-1-?	HANGER MARK NO.	RESP ENGN	DATE TO RECEIVED A VALUE	DATE RELEASED	MAXIMUM UNIT LOAD STRESS*	SUPPORT TYPE	PIPE SIZE	PIPE THICK.	ATT. TYPE & NUMBER OF ATTACHMENTS	ATTACHMENT SIZE	COMMENTS
757A	B2B AST	H-CS-1-RB-009- 001-2	VTC	523	3/10/83	-	ANCHOR	2 3/8"	0.154	2 TRUNN	-	
758A	1-45T 1-45B	H-CS-1-RB-009B- 003-2	VTC	1406	3/10/83	-	" "	" "	" "	" "		
759A	1-51A 1-51B	H-CS-1-RB-118-003-2	VTC	1203 8050	3/22/83	-	" "	" "	0.256"	" "		
760A	1-86A NCA	SF-X-011-02B-F45A	ASAD 118	410	5-6-83	5-2-83	ANCHOR	4"	0.237	1 TRUND	C1=2.25 C2=3.75	FICTITIOUS RM=7.6
761A	1-87A NCA	SF-X-010-031-F45A	ASAD 119	34	5-6-83	5-2-83	ANCHOR	4"	0.237	1 TRUND	C1=2.25 C2=5.0	FICTITIOUS RM=10.2
762A	1-64B NCA	CC-X-109-029-A65A	ASAD 120	256	5-17-83	5-11-83	ANCHOR	4"	0.237	1 TRUND	C1=2.25 C2=3.75	FICTITIOUS RM=7.6
763A	1-92U NO-17	CS-1-454-012-552A	ASAD 121	1200	5-16-83	5-11-83	ANCHOR	3.5"	0.216	1 TRUND	C1=1.75 C2=4.0	FICTITIOUS RM=8.2
764A	1-90 NO-17	BR-X-075-712-A53A	ASAD 122	1749 675	5-16-83	5-12-83	ANCHOR	3.5"	0.216	1 TRUND	C1=1.75 C2=4.0	FICTITIOUS RM=8.2
765A	1-45T NO-120	CS-1-597-006-C47A	ASAD 123	3961	5-20-83	5-18-83	ANCHOR	3.5"	0.216	1 TRUND	C1=1.69 C2=3.5	FICTITIOUS RM=7.2
766A	1-88B NCA	SF-1-016-016-C56A	ASAD 124	10	5-20-83	5-19-83	ANCHOR	4"	0.237	1 TRUND	C1=2.24 C2=5.0	FICTITIOUS RM=10.2
767A	2-63B 2 GSC	CC-2-159-413-A43A	SG	1803			ANCHOR	12"	0.375"	2 TRUND	C1=5.15 C2=8 RM=6.19	FICTITIOUS RM=20
768	1-6,7	17-707-C72K 17-712-C72K 18-703-C72K 18-706-C72K	VIB			5-27-83	ATTCH	18"		2 TRUND 17" H: 1/2		ANSYS ANALYSIS
769A	1-65D NO-30B	DO-1-023-011-Y33A	S.G			5-27-83	ANCHOR	3"	.216	2 TRUND	C1=1.72 C2=2.00	FICTITIOUS RM=5.0
770A	1-165H 1-16-21	DO-1-067-023-1-33A	ASAD	122		5-21-83	ANCHOR	3"	0.216	2 TRUND	C1=1.97 C2=3.0	FICTITIOUS RM=6.2
771A	1-165C 1-16-21A	DO-1-024-011-Y33A	SG			5-24-83	ANCHOR	3"	0.216	2 TRUND	C1=1.723 C2=2.75	FICTITIOUS RM=5.5

UNIT # 2

Gibbs & Hill, Inc.

11 Penn Plaza
New York, New York 10001
212 760- 4438
Telex:
Domestic: 127636/968694
International: 428813/234475

A Dravo Company

June 14, 1984

GTN- 69116

Texas Utilities Generating Company
Post Office Box 1002
Glen Rose, Texas 76043

Attention: Mr. J. B. George
Vice President/Project Gen. Manager

Gentlemen:

TEXAS UTILITIES GENERATING COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
G&H PROJECT NO. 2323
FOLLOWUP INFORMATION FROM G&H
REF: CYGNA COMMUNICATIONS REPORT OF 5-24-84

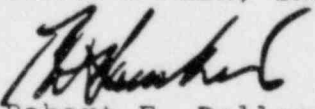
By copy of this letter to Nancy Williams of CYGNA enclosed please find the responses to the following items:

<u>Item</u>	<u>Description</u>
32	Plot regarding G&H mass point study
34	Plot regarding Relap/Ansys match-up.

Should you have any questions, please contact Henry W. Mentel.

Very truly yours,

GIBBS & HILL, INC.


Robert E. Ballard, Jr.
Project Manager

~~435~~
REBa-HWMe:sce
1 Letter

cc: ARMS (B&R Site) OL
N. Williams (CYGNA, Calif) 1L, 1A (Response to Item 34 only)
L. Weingart (CYGNA, Calif) 1L 1A
G. Grace (CPPE Site) 1L, 1A 1A (Response to Item 34 only)
D. Wade (TUSI Site) 1L

Dravo

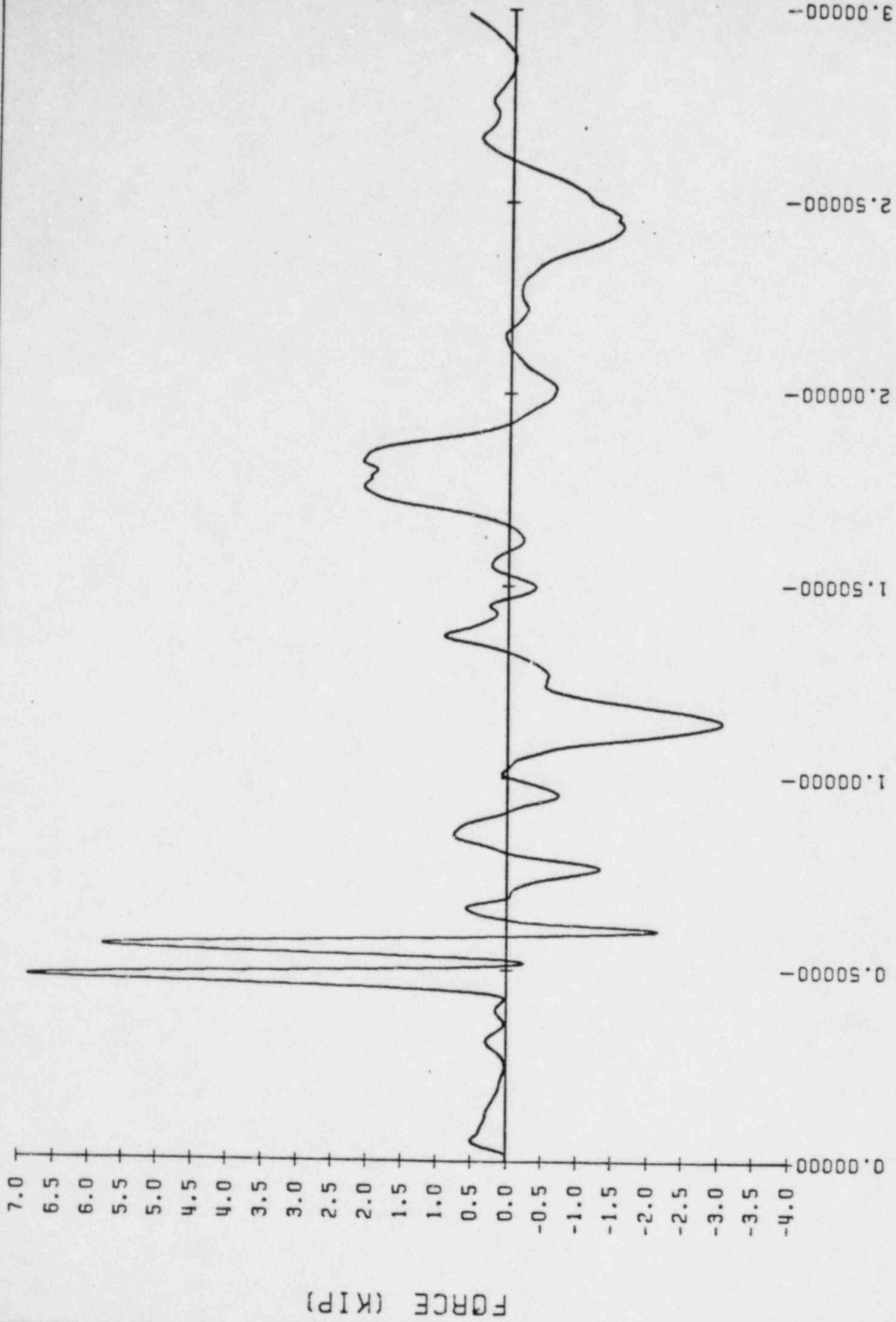
Attachment to GTN- 69116

Item 32 -

Attached is a geometry plot of the main steam loop for which a time step and mass point sensitivity study was performed. The additional degrees of freedom are marked in red.

Item 34 - Plots of axial forces on supports.

Attached are plots of steamhammer forces on axial restraints for main steam loops 1 thru 4. Also included are the plots of the net unbalanced forces for the associated legs.



TIME (SEC)

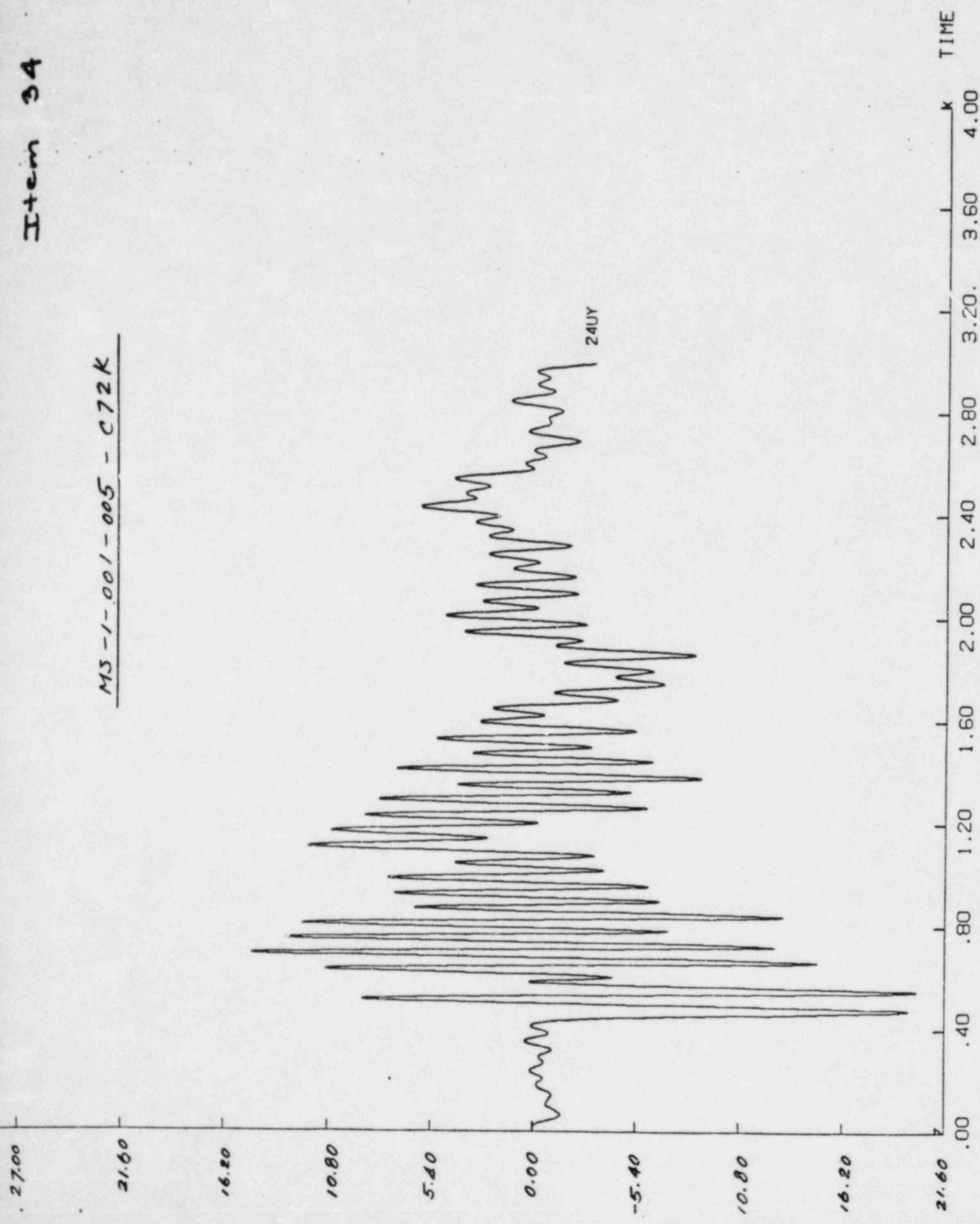
TUSI-S .FORCING FUNCTION LOOP 1 (INSIDE CONTAIN 'T)

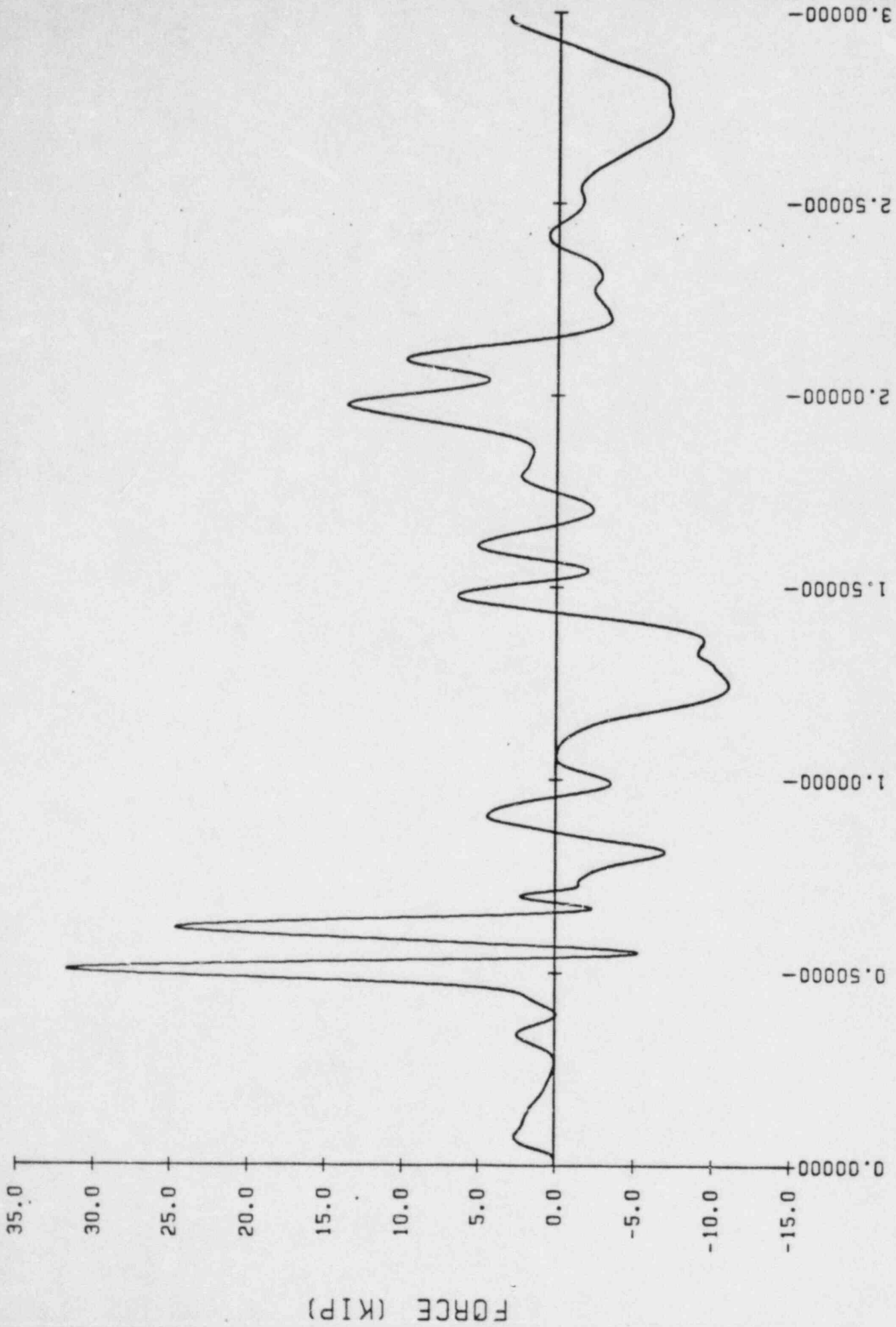
FORCING FUNCTION = 4

FORCE (KIP)

Item 34

MS-1-001-005 - C72K

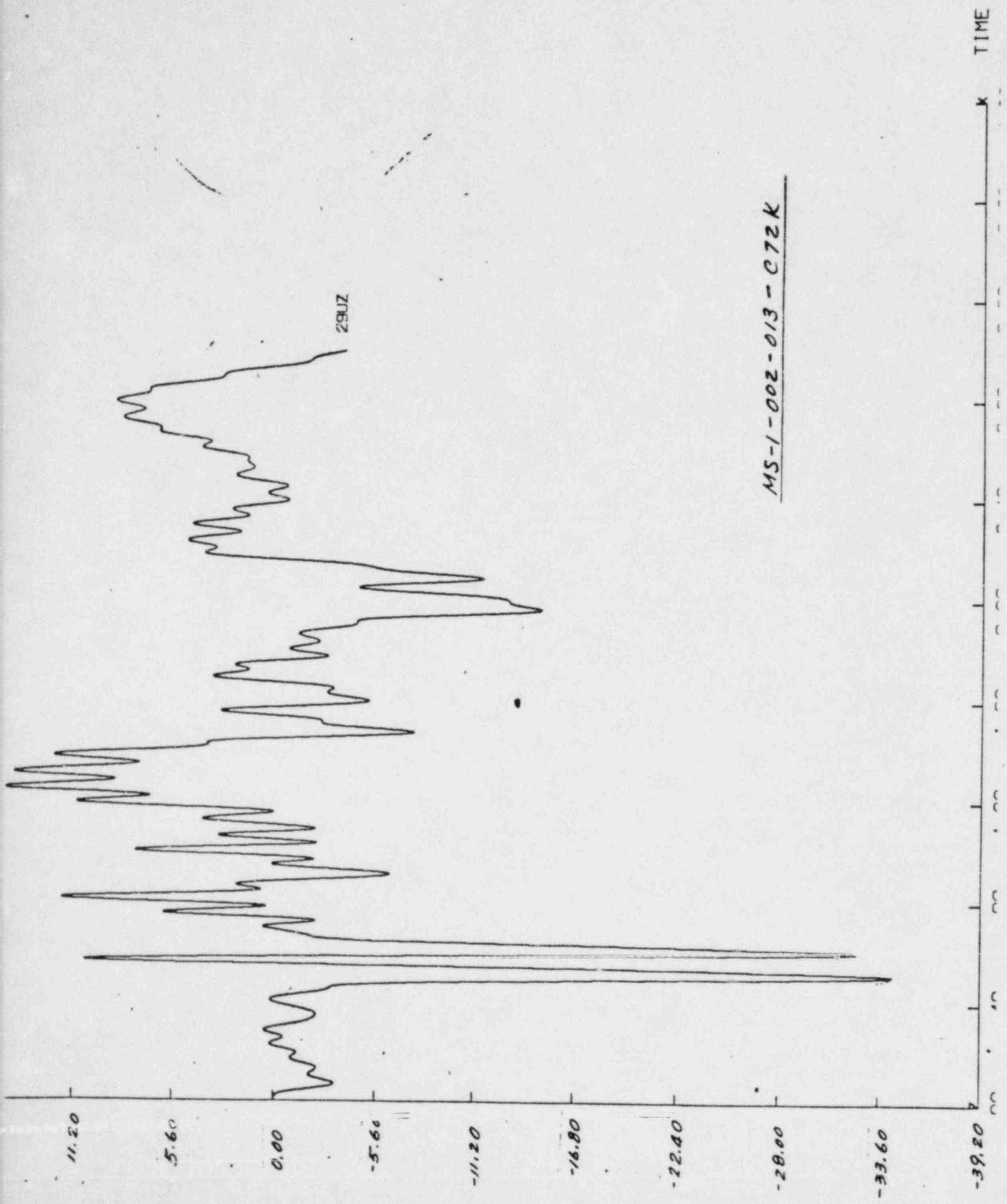




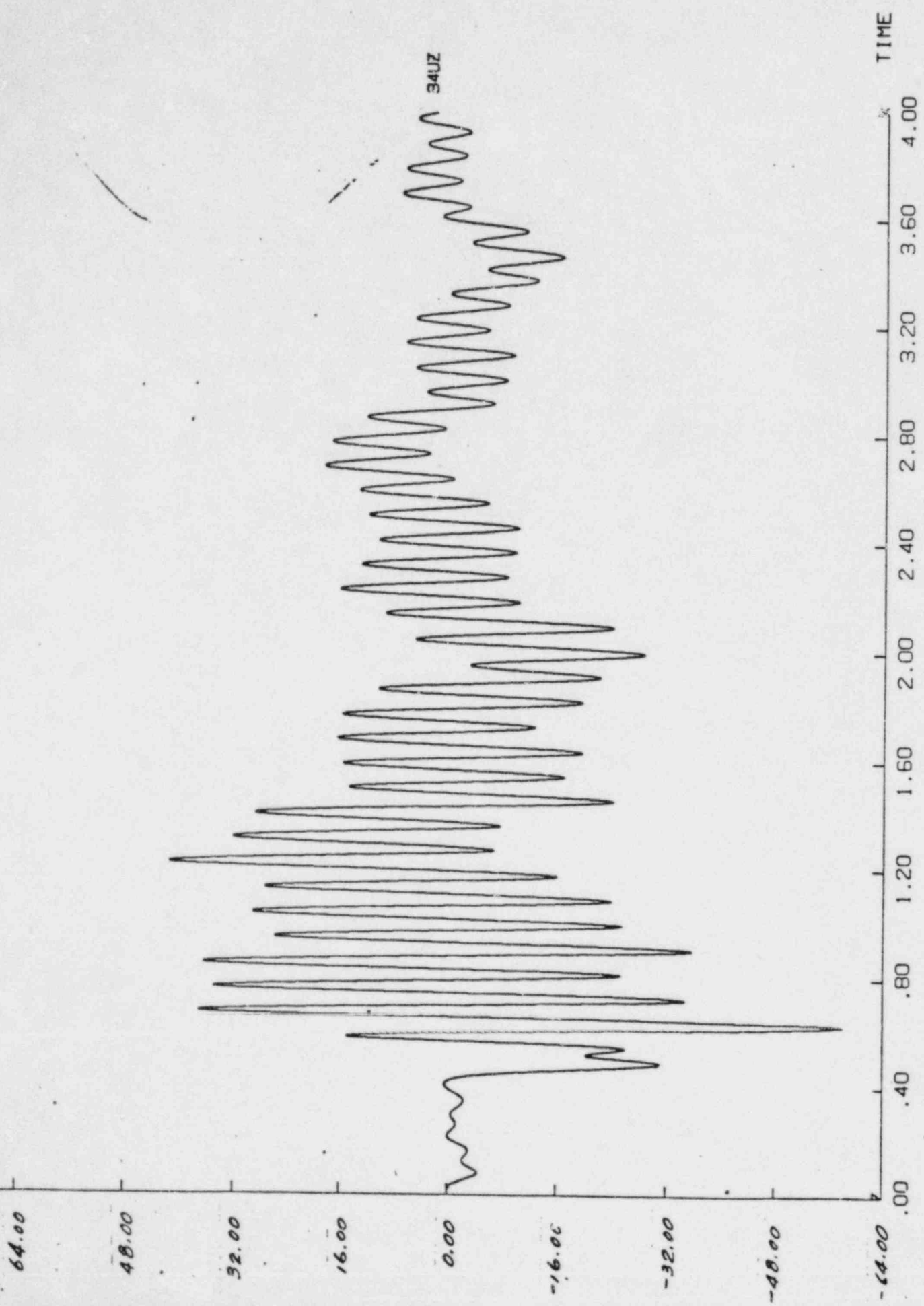
TIME (SEC)

FORCING FUNCTION = 4

TUSI-S.H. FORCING FUNCTION LOOP 2 (INSIDE CONTAINMENT)

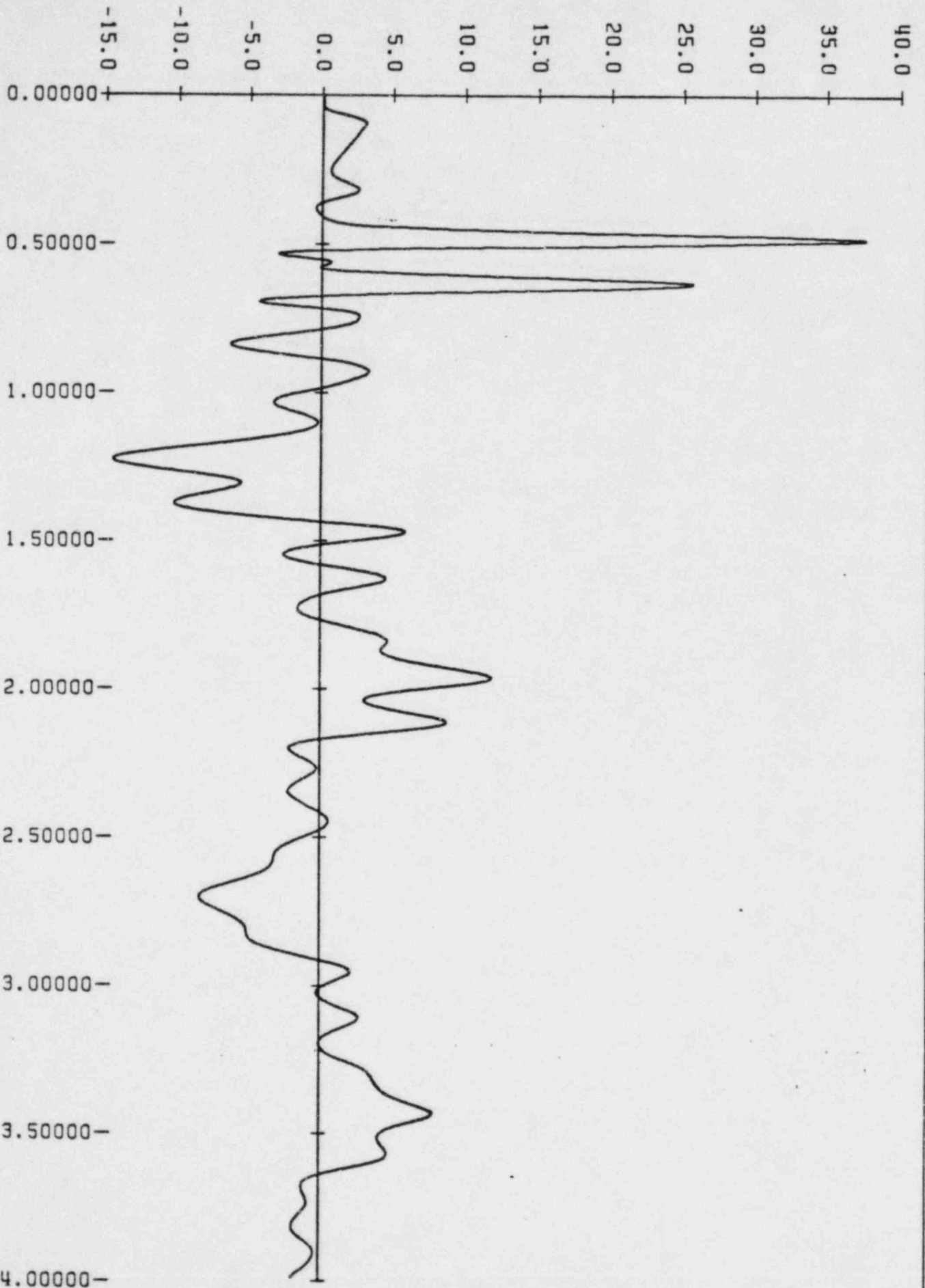


M3-1-003-010-C72K



MAIN STEAM LOOP 3 SYSTEM, PROBLEM NO.1-3 ISSUE NO.2A

FORCE (KIP)



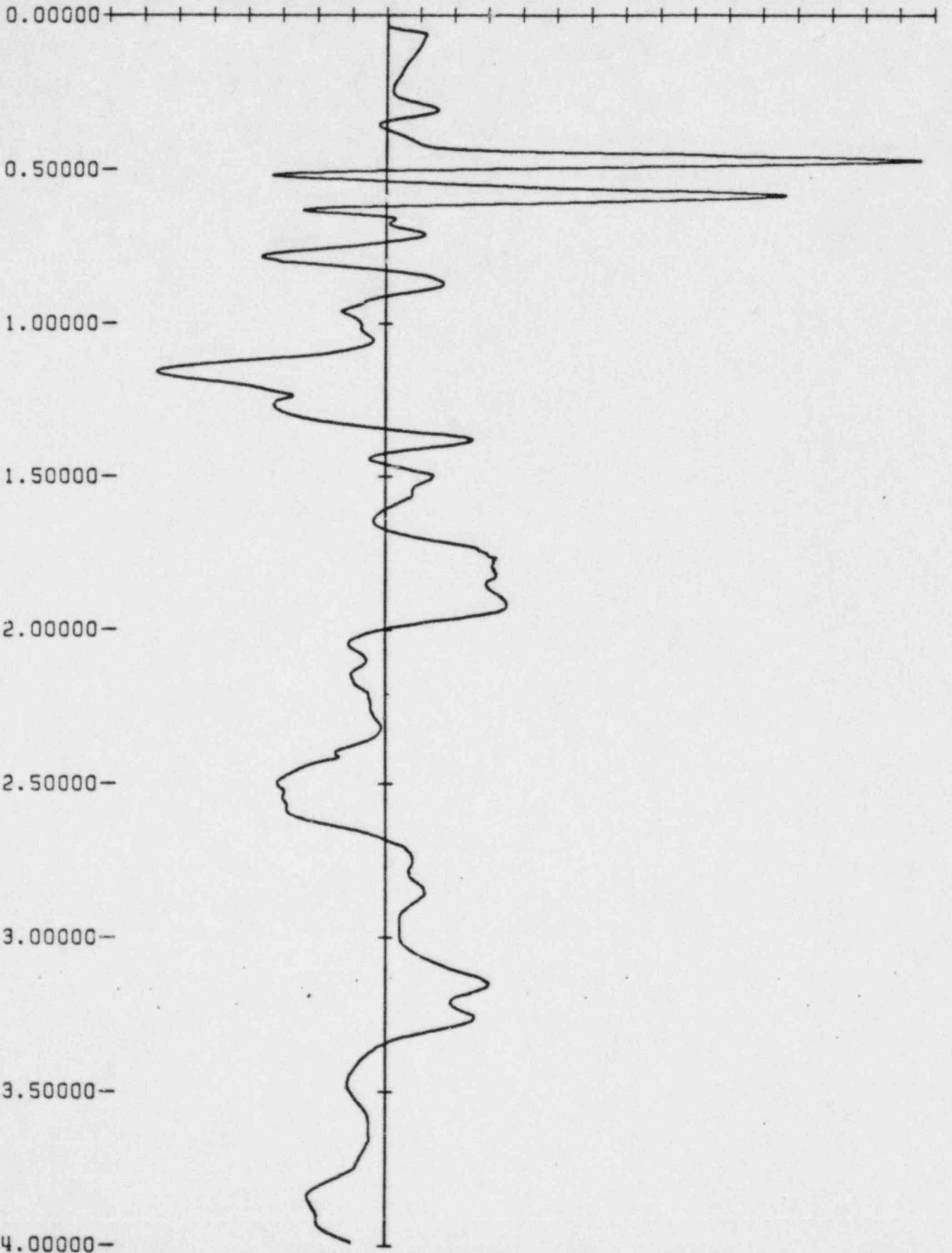
FORCING FUNCTION = 6

TUSI-S.H.FORCING FUNCTION LOOP 3 (INSIDE CONTAINMENT)

TIME (SEC)

FORCE (KIP)

8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0

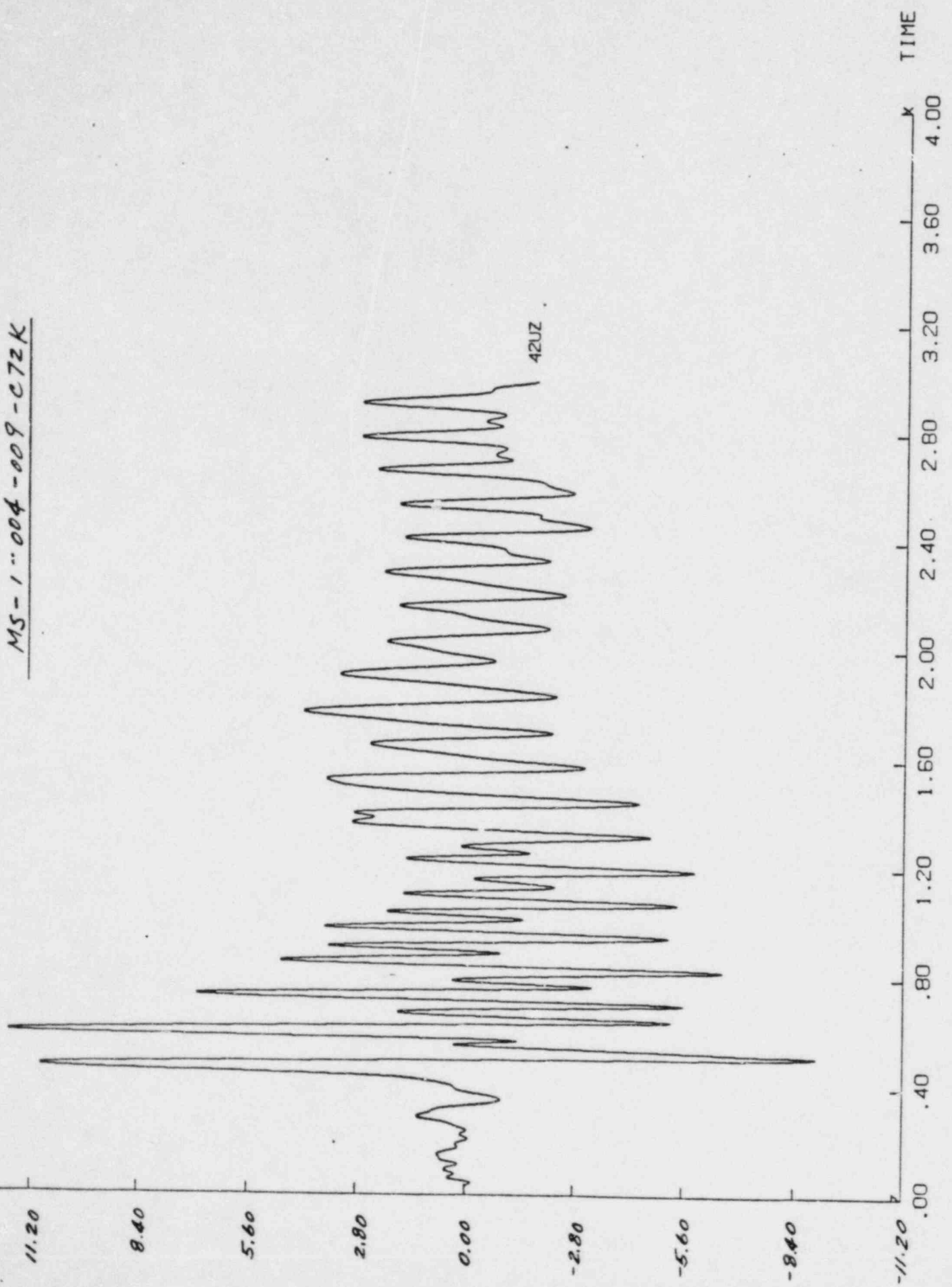


FORCING FUNCTION = 6

TUSI-S.H. FORCING FUNCTION LOOP 4 (INSIDE CONTAINMENT)

TIME (SEC)

MS-11-004-009-C72K



Gibbs & Hill, Inc.

11 Penn Plaza
New York, New York 10001
212 760- 4438
Telex:
Domestic: 127636/968694
International: 428813/234475
A Dravo Company

NOTED JUN 14 1984 N.WILLIAMS

June 5, 1984

GTN-69071

Texas Utilities Generating Company
Post Office Box 1002
Glen Rose, Texas 76043

Attention: Mr. J. B. George
Vice President/Project Gen. Mgr.

Gentlemen:

TEXAS UTILITIES GENERATING COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
G&H PROJECT NO. 2323
FOLLOWUP INFORMATION FROM G&H
REF: CYGNA COMMUNICATIONS OF 5/24/84

By copy of this letter to Nancy Williams of CYGNA enclosed please find responses to Items 1, 2, 6, 10, 14, 19, 21, 23, 29 and 33 of their Communications Report, Job No. 84042 of May 24, 1984.

Should you have any questions contact Henry W. Mentel.

Very truly yours,

GIBBS & HILL, Inc.

S. M. Mariano

Robert E. Ballard, Jr.
Project Manager

REBA
REBA-HWMe:lc
1 Letter

CC: ARMS (B&R Site) OL
N. Williams (CYGNA, Calif.) 1L
G. Grace (CPPE Site) 1L 1A 1L 1A
D. Wade (TUSI Site) 1L

Attachments in 84042
Tech. F. etc.

ITEM 1.

CYGNA	
JOB NO.:	84042
DATE LOGGED:	6/7/84
LOG NO.:	#112
FILE:	111 Sub. files
CROSS REF. FILE	111 Sub. files log (+ Mc. 60 (20))

RECEIVED

JUN 7 1984

CYGNA - SAN FRANCISCO

AUG 25, 1978

105201420

FISHER CONTROLS COMPANY

MARSHALL TOWN, IOWA

GTT-2633

ATT: LARRY BOHNSACK / ROY BRODIN

CC - Roy Brodin
1-63500
DESK

SUB: TUGCO PURCHASE ORDER CP-0078

RESTRAINT LOADS

CONFIRMING A PREVIOUS TELECON, THE FOLLOWING ARE THE LOADS
AND DIRECTION OF LOADS IMPOSED ON THE MAIN STEAM RELIEF VALVES
BY RESTRAINTS:

FX=212 LBS. (PARALLEL TO THE PIPE)

FZ=25 LBS. (LATERAL TO THE PIPE)

IF YOU HAVE ANY FURTHER QUESTIONS, PLEASE DO NOT
HESITATE TO CONTACT US.

H R ROCK/EH/DMK/MG/WRH

GIBBSHILL NY

CC: BY TELEX TUSI JOBSITE ATT: R T WOTANTEJUS

CONTROL ASSOCIATES - ATT: MR JOHN DINZIK

FISH CON MT

FISHER CONTROLS COMPANY

MARSHALLTOWN, IOWA 50158

AUTOMATIC CONTROL EQUIPMENT
SINCE 1880

Reply to: FISHER CONTROLS COMPANY, E. A. Engel Technical Center, P.O. Box 11, Marshalltown, Iowa 50158

September 15, 1978

Gibbs & Hill, Inc.
393 7th Avenue
New York, New York 10001

Attn: Mr. H. R. Rock
Project Manager

Ref: Texas Utilities/Comanche Peak ⁰
Project 2323, P. O. CP-0600 & CP-0678

Subject: Snubber Loads

Dear Mr. Rock:

We have some questions regarding the snubber loads that G & H has furnished. The loads given are:

<u>Specimen</u>	<u>Load</u>
II*	580 lb. (parallel & perpendicular to pipe)
III*	950 lb. " " " "
V*	2350 lb. " " " "
XIA	212 lb. (parallel to pipe)
	425 lb. (perpendicular to pipe)
XII*	3600 lb. (parallel & perpendicular to pipe)

*Telecon with Ed DeFlorio (9/11/78)
A G & H Telex GTT-2633 (8/25/78)

We would like confirmation as to the meaning of these loads. Are they due to relative motion between the wall and valve assembly, seismic motion of the valve assembly, or both?

In our seismic analysis we input the snubber loads due to relative motion between the wall and valve assembly as a constant force. The snubber loads due to seismic inputs are determined by the computer program. Then, the resultant loads are determined and snubber size selected accordingly.

Gibbs & Holl, Inc.

Attn: Mr. E. R. Rock

Subject: Snubber Loads (continued)

Please confirm the meaning of these loads. If they are not due only to relative motion then please furnish such values.

We are at a standstill on Specimen's II, III, V, and XII until we receive the information.

Yours truly,

FISHER CONTROLS COMPANY

Roy R. Brodin

Roy R. Brodin
Sr. Engineer

RRB/sa

cc: Larry Bohnsack
Pin Chang
Herb Rich

FISHER CONTROLS COMPANY

MARSHALLTOWN, IOWA 50558

AUTOMATIC CONTROL EQUIPMENT
SINCE 1880

October 11, 1978

(CVN 58M)

Gibbs & Hill, Inc.
393 Seventh Avenue
New York, N. Y. 10001

Attn: Mr. H. R. Rock
Project Manager

SUBJECT: Submittal of September 25 and 26, 1978 Meeting Minutes for
Your Approval.

REFERENCE: Texas Utilities Services, Inc.
Comanche Peak Units 1 & 2
Gibbs & Hill Specification 2323-MS-600 & 2323-MS-78
Nuclear Safety Related Control Valves
Fisher Order Series 1-63900; 1-63902 & 1-63500

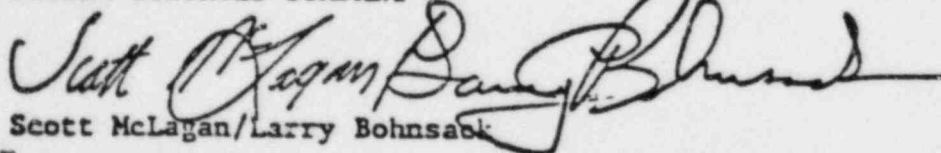
Gentlemen:

Attached is a copy of the meeting minutes from the September 25th and 26th meeting at Fisher - Marshalltown. Also attached is a copy of Herb Rich's September 25th letter that was intended to be submitted at the meeting.

If there are any comments or questions as to the contents of these minutes, please do not hesitate to contact us.

Sincerely,

FISHER CONTROLS COMPANY


Scott McLagan/Larry Bohnsack

SL/LB:nr

Encl.

cc - Control Associates

Attn: John Dinzik (1L)

Fisher Controls Co.

Attn: Chuck Colwell (1L)

Herb Rich (1L, 1E)

Dan Dombrosky (1L, 1E)

Roy Brodin (1L, 1E)

Dick Baumann (1L, 1E)

Larry Fleetwood (1L, 1E)

Jim Coulter (1L, 1E)

Jim Ricks (1L, 1E)

Ron Schwarz (1L, 1E)

Addressee (4L, 4E)

Texas Utilities Services, Inc. (3L, 4E)

Attn: Mr. J. B. George

Project Manager - Nuclear Plants

Brown & Root Inc. (2L)

Attn: Mr. L. A. Ashley

Texas Utilities Services, Inc. (2L, 1E)

Attn: Mr. J. T. Merritt

Carroll Graves (1L, 1E)

Ed Gibson (1L, 1E)

Richard Wolantejus (1L, 1E)

B. J. Murray (1L, 1E)

Texas Utilities Generating Company (1L, 1E)

Attn: Mr. J. C. Kuykendall

Gibbs & Hill, Inc.

Attn: Ed Deflorio (1L, 1E)

Arnaldo Adorno (1L, 1E)

S. T. Cheu (1L, 1E)

Fisher Continental

Attn: Nick Lagios (1L, 1E)

Minutes of meeting held at Fisher Controls in Marshalltown, Iowa between representatives of Fisher Controls, Texas Utilities, and Gibbs & Hill on September 25th and 26th.

ATTENDEES:

September 25

Dan Dombrosky - Fisher
Scott McLagan - Fisher
Roy Brodin - Fisher
Larry Bohnsack - Fisher
Dick Baumann - Fisher
Larry Fleetwood - Fisher
Carroll Graves - TUSI
Ed Gibson - TUSI
Richard Wolantejus - TUSI
Ed Deflorio - G & H
Arnaldo Adorno - G & H
John Dinzik - Control Assoc.

September 26

Dan Dombrosky - Fisher
Scott McLagan - Fisher
Larry Bohnsack - Fisher
Jim Coulter - Fisher
Jim Ricks - Fisher
Ron Schwarz - Fisher
Carroll Graves - TUSI
Ed Gibson - TUSI
Richard Wolantejus - TUSI
Ed Deflorio - G & H
Arnaldo Adorno - G & H
John Dinzik - Control Assoc.

September 25

A. Roy Brodin requested clarification of the snubber loads given to him previously by Gibbs & Hill. Roy and Ed Deflorio took this up with the applied mechanics people in New York and came up with an answer sufficient for Roy to proceed. Roy will follow-up with a letter confirming the decisions arrived at on the phone. Ltr 10/4

B. The use of 10 Mrad also prompted a discussion of the appropriate design life of elastomeric components on control valves. It was stated by Rich that Fisher's understanding of the location of all valves outside containment were either in the safeguards or auxiliary buildings other than in one high radiation zone and, therefore, the 40 Mrad normal and accident specification was an integrated dose. G & H indicated that this was not previously made clear and that, presumably, 40 Mrad could be accumulated rapidly. It was decided that Fisher would request a deviation to clarify the issue suggesting that 10 Mrad is the maximum recommended for most elastomers. Ltr 11/10/78

Footnote - A letter is attached clarifying the separation of the above issue from the NAMCO-ASCO qualification.

C. Herb Rich explained the problem of sealing of conduit in the NAMCO test program. This was the last open item before acceptance of the ASCO-NAMCO reports. Arnaldo stated that this seemed to be a generic problem with electrical conduit and he felt Gibbs & Hill had a tentative solution. He agreed that this problem was not Fisher's and therefore the ASCO-NAMCO reports were acceptable. Fisher requested written acknowledgment of the acceptance of the ASCO-NAMCO reports.

See G & H Minutes,
Item 2.A.8 on
page 3.

D. Fisher questioned the required action of the passive valves inside containment with Limitorque operators in case of an accident. Gibbs & Hill stated that any valve with a required function in an accident would be active and therefore passive valves had no required function during or after an accident.

E. Gibbs & Hill expressed concern over the variability of the snubber attachments Fisher might come up with. The concern stemmed from the fact that the snubber designed for may not be the one used in actuality.

Fisher agreed to attempt to design attachment with the capability of adapting to both the design size snubber and the next size smaller. Fisher will also try to design the attachment hardware such that snubber attachment points exist on all four sides of the actuator. TUSI indicated that the snubber attachment on the valve would not fall under ASME Section III, subsection NF.

F. TUSI expressed concern over the orientation of the actuator on top of the valve. Fisher explained that the only thing that might change if the actuator was rotated in the axis of orientation. It was agreed that Fisher would define the y & x axis as thru the yoke legs and perpendicular to the yoke legs respectively, rather than parallel and perpendicular to the pipe.

G. TUSI agreed to procure the snubbers for use in the test program. Fisher will inform TUSI of the requirements as quickly as possible to expedite the procurement time. TWX 10/12/77

H. Dan Dombrosky clarified Fisher's Quality Assurance Program indicating that Fisher had recently had some isolated problems in this area. TUSI agreed that this was a very legitimate concern and proceeded to setup a QA-audit for mid-October. Fisher reiterated that this was merely a clarification and should not be a concern and should be viewed that way.

September 26

Gibbs & Hill and TUSI stated that because delivery is very critical, Fisher should ship valves regardless of whether seismic testing is complete or not. They also stated that they would assume any financial risk arising from the shipment of valves before testing is complete.

Carroll Graves stressed that the control valves were now in the critical path in the construction of the plant. This being the case, any delivery delays could directly affect the scheduled start-up date.

- I. There were several open items to be resolved in the manufacturing area.
 - a. Fishers' concerns in the areas of magnetic particle acceptance criteria and hysteresis testing were answered in a wire from Gibbs & Hill prior to the 9/26 meeting.
 - b. Gibbs & Hill and TUSI approved Fisher's method of packaging valves 2" and smaller. NHS 164 was revised accordingly and signed off.
 - c. Fisher's concerns over the wording in the sequential marking requirements were clarified by TUSI. NHS 164 was revised accordingly and signed off.
 - d. Gibbs & Hill agreed to change the specification to eliminate PT of prod burns resulting from Magnetic Particle testing. NHS 164 was revised accordingly and signed off.
 - e. Fisher requested clarification of the witness and hold points required and also the notification time. TUSI agreed to investigate and inform Fisher.

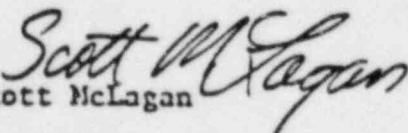
- II. Dan Dombrosky expressed concern over the commercial aspects of the seismic testing program. Dan explained the new nuclear line of actuators and the fact that if time was not the most important variable, Fisher would probably elect to go to this new equipment to meet the specifications. The point was also mentioned that Fisher had stated in its original proposal that the equipment quoted was untested and any resulting equipment upgrading costs to meet the specification would be negotiated. TUSI was receptive to Fisher's comments and Dan stated that Fisher would arrive at a commercial proposal in the next several weeks and present it to TUSI and Gibbs & Hill.

Production

TUSI outlined the super-critical delivery items to Fisher, stating a drop-dead date of 12/31/78. Fisher gave the current status of these items and committed to do everything possible to make these dates.

TUSI got a commitment from Fisher management to do everything possible to make the dates required by TUSI.

Ron Schwarz promised to check the projected items to see if parts could be switched from less critical constructions. He stated that he would do this right away and let TUSI know any improvements.


Scott McLagan

SM/cgd

ITEM 2.

CYGNA		113
JOB NO :	240112	
DATE LOGGED :	6/7/84	
LOG NO. :	1113	
FILE :	11.1 Tech files	
CROSS REF. FILE	11.1 Tech Files log	
	2.1.1 mc. CR # 20	

RECEIVED

JUN 7 1984

CYGNA - SAN FRANCISCO

Incoming CPPA SM Marano/MS-20B, J Irons, K Schlask, MS-604,
TEXAS UTILITIES SERVICES INC J Calamito, A. Adorno
P. O. BOX 1002 - GLEN ROSE, TEXAS 76043

K. Bandyopadhyay

CPPA #19,525

RECEIVED
JUN 7 1982
GIBBS & HILL, INC.

May 25, 1982

Action: KSch, AA,
KKB

Mr. R. E. Ballard
Gibbs & Hill, Inc.
393 Seventh Avenue
New York, N. Y. 10001

KKB - Please supply
necessary information

COMANCHE PEAK STEAM ELECTRIC STATION
ITT-G RESONANT SEARCH TEST PROCEDURE
NUMBER NSC/RS-001
CP-020B and CP-604

to prepare DEC D's

024B/M1355
024B/I0334

Dear Mr. Ballard:

On May 10, 1982, Mr. Seb Marano and Mr. Kamal Bandyopadhyay of G & H and Mr. Harlan R. Deem of TUSI held a telephone conference to discuss the test results on the subject ITT-Grinnell valves. The resonant search test performed by ITT-G. failed for both the air operated and motor operated valves. The valves were to have been designed for 33hz. and the test indicated that the air operated valves could only reach 20 hz. and the motor operated valves 27 hz.

The following is a list of valves which ITT-Grinnell has yet to qualify:

1-HV-5157	Air Operated	20 hz.
1-HV-5158	Air Operated	20 hz.
2-HV-5157	Air Operated	20 hz.
2-HV-5158	Air Operated	20 hz.
1-CT-135	Motor Operated	27 hz.
1-CT-136	Motor Operated	27 hz.
2-CT-135	Motor Operated	27 hz.
2-CT-136	Motor Operated	27 hz.

Based on the resonant search test results, Kamel suggested that we look at three options. Option number 1 was to have ITT-Grinnell put gusset plates on the valves to increase the frequency to 33 hz. Option number 2 was for the site to add external bracing by means of valve supports and clamps. Option number 3 was for the stress analyst to review the valves with their given frequency and determine if the stress analysis would still be acceptable. It was mutually agreed upon that Option number 3 would be tried first.

TS/SSAG has reviewed the stress analysis reports for 1-HV-5157 and 5158 and have found them to be acceptable as is. The 1-CT-135 and 136 valves by comparison should be all right, however; we have not actually verified them at this time. The valves and piping are currently being rerouted and once the new routing is complete, SSAG will verify their acceptability.

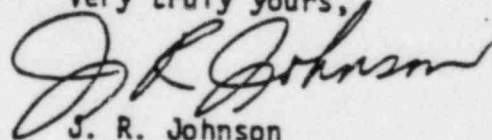
TUSI recommends that G & H proceed with obtaining necessary information from ITT-G in order to obtain final approval. TUSI will provide to G & H the loads which are applied to valves by stress analysis. The loads for 1-HV-5157 and 5158 are between 2G and 3G. We do not have the loads for 1-CT-135 and 136 valves at this time.

G & H will review the loads from SSAG for ITT-G valves and verify that the valve design parameters are still valid. G & H will then prepare a DECD to amend specifications MS-020B and MS-604.

TUSI will issue DCA to specification MS-020B and MS-604 when we have reviewed and accepted G & H's DECD.

It is imperative that the remaining work to qualify these valves be accomplished in a timely manner. The valves are waiting on shipment to the site and need the DCA to the specification before they can be released.

Very truly yours,



J. R. Johnson
Project Mechanical Engineering

not filed
JRJ:HAH:HRD:ery

cc: ARMS
M. R. McBay
J. T. Merritt
W. O. Hendley
G. Krishnan
D. Hicks

cc: E. Bond, A. Rutkowski, H.W. Mentel, K. Schlask, S. Marano
FILE: ECM/AM

Gibbs & Hill, Inc.

Interoffice Memorandum

SPECIAL ANALYSIS G&H
TO: Kamal Bandyopadhyay DATE: February 17, 1983
APPLIED MECHANICS G&H
FROM: S. Lim JOB NO: 11-2323-030
SUBJECT: "g" Loads on Flexible REF. NO: AM-M-4379
Valves

Please find attached the "g" loads for the following four valves identified by ITT Grinnell with first natural frequencies less than 33 hz:

- a. 1-HV-5157
- b. 1-HV-5158
- c. 1-CT-135
- d. 1-CT-136

The results indicate that the above mentioned valves are subjected to less than 3 "g" horizontally and less than 2 "g" vertically.


SL:ecm



Gibbs & Hill, Inc. Job No. 11-2323-030 Client TUST-CPSES

Subject FLEXIBLE VALVE "g" LOADS

Calculation Number

Sheet No.

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #										
Preparer	<i>MD</i>	2/16/83								
Checker	<i>MD</i>	2/16/83								

FLEXIBLE VALVE "g" LOADS:

	1-HV-5157		1-HV-5158		1-CT-135		1-CT-136	
	1/2 SSE "g"	SSE "g"	1/2 SSE "g"	SSE "g"	1/2 SSE "g"	SSE "g"	1/2 SSE "g"	SSE "g"
X-dir	2	2.9	1	1.5	2.25	2.75	1.5	1.75
Y-dir	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5
Z-dir	2.25	2.75	0.75	1.25	1.25	1.25	1.75	2.0

NOTE:

Coordinate System Used:



FLEXIBLE VALVE IDENTIFICATION:

G&H Valve Tag. No.	1-HV-5157	1-HV-5158	1-CT-135	1-CT-136
ITT Grinnell Valve Dwg. No.	SD-C-105925	SD-C-105925	SD-C-105690 Rev. A	SD-C-105690 Rev. A
Description	4" diaphragm valve	4" diaphragm valve	3" diaphragm valve	3" diaphragm valve
Test Report No.	3433/0	3433/0	3416/0	3415/0
G&H Stress Pb. No.	1-174	1-175	1-34A	1-34A
System	Cont. Spray	Cont. Spray	Vents & Drain	Vents & Drain

REBallard/MS-20B, OUTGOING, MSMiller, AKiwi/860.2716,
XOMoore, KKBandyopadhyay, KSchlask, EJBond

A LITKO Company

May 3, 1983

GTN- 65374

Texas Utilities Generating Company
Post Office Box 1002
Glen Rose, Texas 76043

Attention: Mr. J. B. George
Vice President/Project Gen. Mgr.

Gentlemen:

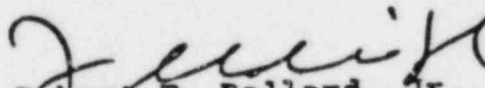
TEXAS UTILITIES GENERATING COMPANY
COMANCHE PEAK STEAM ELECTRIC STATION
G&H PROJECT NO. 2323
09410 DEVIATION REQUESTS
DE/CD S-2716, Rev.1
SPECIFICATION 2323-MS-20B

Enclosed for your review is a copy of Design Engineering
Change Deviation Request number S-2716, R.1. Please
inform us of your disposition of this request.

All recipients of this letter are advised that authorization
from TUSI is required before proceeding with the action noted
herein.

Very truly yours,

GIBBS & HILL, Inc.


Robert E. Ballard, Jr.
Project Manager

REBa- *le*
KKM:lc
1 Letter + 1 Attachment
CC: ARMS (B&R Site) OL + OA

DESIGN/ENGINEERING
CHANGE/DEVIATION REQUEST

NUCLEAR SAFETY-RELATED

NON-NUCLEAR SAFETY RELATED -
QA PROGRAM APPLICABLE

NON-NUCLEAR SAFETY RELATED

G&H Job. No. 11-2323-056

DE/CD Request No. S-2716

Rev. 1

Requested By: G&H Client Field Vendor FROM _____

CPPA-19525 (JRJohnson)

Reference Document AM Memo AM M-4379 Rev. - Date 2/17/83

Documents Affected: G&H Specification 2323-MS-20B, Rev. 1 & Addendum 1

DESCRIPTION OF CHANGE/DEVIATION REQUESTED:

See attached

ENGINEERING JUSTIFICATION FOR ABOVE:

The motor-operated valves have a resonance frequency below 33 Hertz.

REQUEST PREPARED BY: K.K. Bandyopadhyay Title Sr. Eng'r Date 4/27/83

INTERDISCIPLINE REVIEWS

	Initials	Date
Structural		
Mechanical	<u>KSch</u>	<u>4/27/83</u>
Electrical	<u>Prac</u>	<u>4/28/83</u>
QA		
AM	<u>AM</u>	<u>4-27-83</u>
RWHS	<u>Da</u>	<u>4-28-83</u>

Design Reviewer/Engineer Completes This Section

1. Is this a significant deviation or error? YES NO
2. Is this a recurring deviation or error? YES NO

Design Reviewer Completes This Section

Design Verification: Approved Not Approved

Design Review Eng. R. Manojan Date 4/27/83

Job Engineer Completes this Section

1. Is change potentially reportable under 10CFR21? YES NO
2. Is change in compliance with BTP-ETSB 11-17 YES NO NA
3. Applicable DCRP _____ Date _____

CHANGE/DEVIATION REQUEST:

Approved Not Approved

Approved Not Approved

J. E. [Signature] Date 4/27/83

Project Manager [Signature] Date _____

Description of Change/Deviation Requested

Revise G&H Specification 2323-MS-20B, Rev. 1 and Add. 1, as follows:

Revision 1 - Page 3-31, Paragraph 3.7.9.3.c (Addendum 1, page 5 of 7, Item 13, Renumbered Paragraph 3.7.9.4.b) - Rewrite the entire paragraph as follows:

If the valve assembly has a fundamental natural frequency of 33 Hertz or greater, the manual, motor-operated and self-actuated Saunders patent type steel valves shall be designed to withstand seismic forces resulting from accelerations of 3g in each of the two horizontal directions and 2g in the vertical direction caused by the Safe Shutdown Earthquake (SSE). The corresponding Operating Basis Earthquake (OBE) g-values shall be 2.25g and 1.5g. If the fundamental natural frequency of the valve assembly is less than 33 Hertz, the Seller shall provide all natural frequencies below 33 Hertz and applicable mass and stiffness data. This data will be incorporated in the supporting pipe system analysis, and the above mentioned g-values will be verified (by others). If the resulting acceleration levels exceed the g-values mentioned above, the Seller will be so notified, and the Seller shall qualify the equipment for the new g-values, otherwise, above listed g-values shall be used for qualification of the equipment. In all cases, the two (2) horizontal and vertical seismic accelerations shall be assumed to act simultaneously, with the resulting stresses, deflections, etc., obtained by the (SRSS) square root of the sum of the squares technique. The equipment function shall not be impaired by the SSE.

Revision 1 - Page 3-31, Paragraph 3.7.9.3.f (Addendum 1, page 6 of 7, Item 14, Renumbered Paragraph 3.7.9.4.e) -

Delete the entire paragraph.

2d. Documentation or a stress run for the 8-inch relief valve lifting only, does not exist. Upon reviewing the analysis, it shows that the thrust force of the relief valve is divided based on the stiffnesses of the support and of the pipe. The residual internal force in the pipe reacts at the penetration anchor in addition to the residual internal force from the safety load.

CYGNA		102
B NO :	84042	
TE LOGGED:	6/7/84	
G NO.:	H114	
LE:	11.1 Tech. Files	
	11.1 Tech. Files 109	
	2.1.1 Int. (11.1.10)	

REVISED G & H RESPONSE
 RE ~~MSRV~~ MSRV RESTRAINT
 LOAD.

JUN 7 1984

CYGNA - SAN FRANCISCO

ITEM 10

CYGNA

JOB NO :

84002

115

DATE LOGGED:

6/7/84

LOG NO. :

#115

DESIGN REVIEW FILE:

11-1-1 Tech Files

RECORD FORM CROSS REF. FILE

11-1 Tech Files log

Texas Utilities Services, Inc.

Comanche Peak S.E.S.

2222

CLIENT

PROJECT

Gen Job No.

Title: Seismic Relative Displacement for Main Steam Lines

Drawing

Calculation

Specification

DRB-1C, set 3
DOCUMENT NO.

0
REVISION NO.

2/11/83
DATE

RS

COMMENTS ARE AS NOTED ON DOCUMENT SHEETS LISTED BELOW EXCEPT AS STATED HEREIN:

REQUIRED ACTION

NO ACTION REQUIRED

Frank Kodak
DESIGN REVIEW ENGINEER

2-11-83
REVIEW DATE

REQUIRED ACTION SATISFACTORILY COMPLETED

YES NO

COMMENTS

RECEIVED

JUN 7 1984

DESIGN REVIEW ENGINEER

REVIEW DATE

CYGNA - SAN FRANCISCO

DESIGN REVIEW PROCEDURE

SPECIAL ANALYSIS CHECKLIST-CALCULATIONS

JOB NO. 2323 CALC. NO. DRB-1C, Set 3 REV. NO. 0

TITLE Seismic Relative Displacements for Main Steam Lines

<u>ITEM</u>	<u>CONSIDERATION</u>
1. USNRC "Current Events-Power Reactors" and "Operating Experience" records have been considered, where applicable (Ref. Job Engr.)	✓
2. Scope: covers all intended work, no interface gaps, no overlaps (Ref. Project Guide)	✓
3. Assumptions are listed, clearly defined and reasonable	✓
4. Items to be re-verified, later in design, identified	NA
5. References, including other calculations and sources, are listed	✓
6. A description of the appropriate methods of analysis and design is included (Ref. FSAR)	NA
7. Formulae and equations are applicable and defined <i>FSAR SECT 3.7B.2.5</i>	✓
8. Mathematical check indicates satisfactory solution	✓
9. Conforms to applicable specification	NA
10. Loads and load combinations are correct (Ref. FSAR) (including Environmental Considerations)	NA
11. Deflections and displacements are suitable and reasonable (Interface with other disciplines)	✓
12. Compatible with equipment information (Loads, Dimensions)	NA
13. Description of materials included (Ref. FSAR)	NA
14. Compatible with soil properties (Ref. FSAR and Soils Report) <i>FSAR SECT 3.7B.1.1</i>	✓
15. Compatible with related drawings	✓
16. Conforms to FSAR	✓
17. Specific references to codes and standards are included and conforms thereto (Ref. FSAR and Project Guide)	NA
18. Conforms to Structural Design Criteria	NA
19. Interface with other disciplines has been accomplished	✓
20. Properly indexed and filed	✓
21. Additional for Computerized Calculations:	
a. Proper Computer Program (Ref. FSAR) has been approved for use	NA
b. Data Input, Assumptions and Model are listed, defined and are satisfactory	NA
c. Interpretation of Output is included	NA
d. Check results for reasonableness; preferably verified by simplified parallel check (Ref. FSAR)	NA

NOTE: Design reviewer's signature confirms that design reviewer has considered each item on the checklist.

✓ Signifies design reviewer's completion of review

NA Not Applicable

Design Reviewer's Signature Frank Korah Date 2/11/83

Design Reviewer's Name FRANK KORAH

Calculation Cover Sheet

G&H Job No. 2323

Client TUSI

Calculation Number DRB-1C; set 3

Number of Sheets in Original Issue 9

Subject seismic relative Displacements for Main Steam Lines

- Nuclear Safety Related
- Non-Nuclear Safety Related—QA Program Applicable
- Non-Nuclear Safety Related

	Sheets Deleted	Sheets Added	Sheets Revised	Job Engineer	
				Signature	Date
Original	 	 	 	<i>[Signature]</i>	5/1/81
Revision					

Gibbs & Hill, Inc. Job No. 2323 Client TUCI
 Subject Seismic Relative Displacements for Main Steam Lines
 Calculation Number DRB-1C, Set 3 Sheet No. 1

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1									
Preparer	WT	2/9/83								
Checker	RDP	2-11-83								

Introduction

Seismic relative displacements for the main steam lines were requested by Applied Mechanics (see memo AM-M-4347 dated 2/8/83) for the piping analysis.

The main steam lines run between the Containment Bldg. and the R.B. Internal structure. To calculate less conservative relative displacements between these two structures, modal displacements obtained from the seismic analysis must be considered. The calculation is shown on the following pages.

Gibbs & Hill, Inc. Job No. 2320 Client TUSI
 Subject Seismic Relative Displacements for Main Steam Lines
 Calculation Number DRB-1C, Set 3 Sheet No. 2

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1									
Preparer	WT	2/9/83								
Checker	EDP	2-10-83								

References :

1. Computer output files DRB-12 P, Rev. 0 ($\frac{k}{4}$, Cracked Model)
2. " " " DRB-13 P, Rev. 0 ($\frac{k}{4}$, Uncracked)
3. " " " DRB-14 P, Rev. 0 (k, Cracked)
4. " " " DRB-15 P, Rev. 0 (k, Uncracked)
5. " " " DRB-16 P, Rev. 0 (2k, Cracked)
6. " " " DRB-17 P, Rev. 0 (2k, Uncracked)
7. Reactor building Seismic Analysis, calculation Book no DRB-1C, Set 1, Rev. 0
8. Relative Displacements for TUSI Buildings, G+H report dated Sept. 1975

From memo AM-M-4367 dated 2/8/83

Main steam line	Loop 1 & 4	EL. 877'-5"	Cent. Bldg.
		EL. 890'	Inter. str.
	Loop 2 & 3	EL. 877'-5"	Cent. Bldg.
		EL. 893'-9"	Inter. str.

Gibbs & Hill, Inc. Job No. 2323 Client TUSI

Subject Seismic Relative Displacements for Main Steam Lines

Calculation Number 02B-1C, set 3 Sheet No. 3

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1									
Preparer	WT	2/10/83								
Checker	RDP	2-10-83								

Model	Earthquake Direction	Dominating Mode	Modal Displacements (feet)				Relative Displ. (feet)
			EI. 893.25' Mass 4 (1)*	EI. 834.75' Mass 5 (2)*	EI. 877.42' Interpolated (3)*	EI. 895.33' Mass 6 (4)*	
1/4 Cracked Model (Ref. 1)	X	2	0.03229	0.01182	0.02675	0.01527	0.01348
	Z	1	0.03235	0.01185	0.02680	0.01369	0.01311
1/4 Un-cracked Model (Ref. 2)	Y	5	0.00065	0.00049	0.00061	0.00082	+ 0.00021
	X	6	0.00749	0.00546	0.00694	0.00443	0.00251
	Y	2	0.02833	0.01189	0.02368	0.01836	0.00552
	Z	1	0.02845	0.01195	0.02399	0.01928	0.00471
	Y	4	0.00350	0.00300	0.00336	0.00370	+ 0.00034
		5	0.00320	0.00274	0.00308	0.00217	0.00091
							$\Sigma = 0.00272$
							$\Sigma = 0.00125$

* (1), (2) and (4) are taken from the references
 (3) is interpolated between (1) and (2)
 (5) = absolute value of (3) - (4)

Checking Method #

1 Line-by-line checking
 2 Alternative Calculation Results compared
 3 Identical Calculation Results compared
 4 Compare inputs and results of computer with corresponding inputs and results of similar codes

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1									
Preparer	WT	2/10/83								
Checker	A-D P	2-10-83								

Model	Earthquake Direction	Dominating Mode	Modal Displacements (feet)				Relative Displ. (feet)
			El. 893.25' Mass 4 (1)	El. 834.75' Mass 5 (2)	El. 877.42' Interpolated (3)	El. 895.33' Mass 6 (4)	
10k Cracked Model (Ref. 3)	X	2	0.02206	0.00651	0.01785	0.00300	0.01485
	Z	1	0.02208	0.00652	0.01787	0.00312	0.01475
	Y	8	0.00373	0.00167	0.00317	0.00059	0.00258
		12	0.00017	0.00043	0.00024	0.00107	+0.00083 Σ=0.00341
20k Cracked Model (Ref. 5)	X	2	0.02024	0.00565	0.01644 ²⁹	0.00144	0.01497 ²⁵
	Z	1	0.02025	0.00566	0.01650	0.00150	0.01480
	Y	8	0.00291	0.00113	0.00243	0.00021	0.00222
		16	0.00008	0.00009	0.00009	0.00048	+0.00039 Σ=0.00261

Results for model k, uncracked and 2k, uncracked are not critical
 Columns (1) to (5) are explained on page 3

Checking Method #

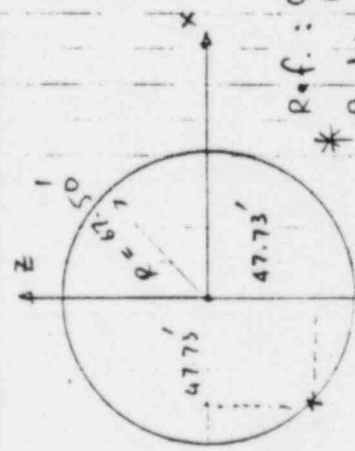
- 1 Line-by-line checking
- 2 Alternative Calculation Results compared
- 3 Identical Calculation Results compared
- 4 Compare inputs and results of computer with corresponding inputs and results of similar codes

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #										
Preparer	WT	2-11-83								
Checker	EOP	2-11-83								

Calculation of vertical displacements due to rockings

Model	Earthquake Direction	Distributing Mode	Modal Displacements (Rocking)				Relative Modal Displ (5)	Vertical Disp. (feet) (6)
			(1)	(2)	(3)	(4)		
1/4 Cracked Model (Ref. 1)	X	2	EI 893.25' Mass 4 -0.000248	EI 834.75' Mass 5 -0.000157	EI 877.42' Interpolated -0.000223	EI 893.33' Mass 6 -0.000103	0.000120	0.00573
		5	≈ 0	≈ 0	≈ 0	-0.000058	0.000058	0.00277
1/4 Cracked Model (Ref. 1)	Z	1	0.000249	0.000157	0.000224	0.000103	0.000121	0.00578
		4	≈ 0	≈ 0	≈ 0	0.000060	0.000060	0.00286
1/4 Cracked Model (Ref. 2)	X	2	-0.000218	-0.000162	-0.000203	-0.000140	0.000063	0.00301
		4	≈ 0	≈ 0	≈ 0	-0.000020	0.000020	-0.00045
1/4 Cracked Model (Ref. 2)	Z	1	0.000219	0.000163	0.000204	0.000142	0.000062	0.00296
		3	≈ 0	≈ 0	≈ 0	0.000040	0.000040	0.00191

Columns (1) to (5) are explained on page 3
 Column (6) = Column (5) × 47.73 *



Ref.: Calculation book no. DRB-10, set 1
 Rev. 0, page 1/13
 * Packing arm = 47.73'

Note: The other Modal Results are not significant

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #										
Preparer	WT	2/19/83								
Checker	RDP	2-10-83								

Summary of the results

Max. relative displacement due to x-EQK = 0.01485' (in x-direction)

z-EQK = 0.01480 (in z-direction)

Assuming that the contribution due to other 2 earthquakes and their coupling effects is 80% (a very conservative number)

$$\text{Total rel. displ. in x-direction} = [0.01485^2 + (0.80 \times 0.01485)^2]^{1/2} = 0.01902'$$

$$\text{z-direction} = [0.01480^2 + (0.80 \times 0.01480)^2]^{1/2} = 0.01895'$$

$$\text{Max. relative displacement in y-direction} = [0.00341^2 + 0.00850^2 + 0.00864^2]^{1/2} = 0.01260'$$

\downarrow \downarrow \downarrow
 y-EQK x-EQK z-EQK

Assuming that the coupling effects due to the other earthquakes is 50% (very conservative).

$$\text{Total rel. displ. in y-direction} = [(0.01260)^2 + (0.50 \times 0.01260)^2]^{1/2} = 0.01409'$$

Final relative displacements

In both x and z-direction = 0.01902' = 0.23" use 0.26"

In y-direction = 0.01409' = 0.1691" use 0.17"

Gibbs & Hill, Inc. Job No. 2323 Client TUSI
 Subject seismic Relative Displacements for Main Steam Lines
 Calculation Number DRB-1C, set 3 Sheet No. 7

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1	 		 		 		 		
Preparer	WT	2/10/83								
Checker	RDP	2-10-83								

Comparison of results

From the report on Relative Displacements of TUSI structures (Ref. 8), calculate relative displacements at elevation 877.42' for Containment bldg. and elev. 895.35' for R.B. Internal Str.

Reactor Building Internal Structure

From Ref. 8 pages 9, 10, 11 (elev. 895.35') (elev. 797.75')

Due to X-EOK; SSE	X =	0.248" -	0.057"	=	0.191
	Y =	0.123	-	0.096"	= 0.027
	Z =	0.038	-	0.012	= 0.026
Due to Y-EOK; SSE	X =	0.015	-	0.002	= 0.013
	Y =	0.078	-	0.064	= 0.014
	Z =	0.027	-	0.004	= 0.023
Due to Z-EOK; SSE	X =	0.056	-	0.011	= 0.045
	Y =	0.118	-	0.099	= 0.019
	Z =	0.278	-	0.056	= 0.222

SRSS's values

$$\begin{aligned}
 X &= [0.191^2 + 0.013^2 + 0.045^2]^{1/2} = 0.1965" \\
 Y &= [0.027^2 + 0.014^2 + 0.019^2]^{1/2} = 0.0359" \\
 Z &= [0.026^2 + 0.023^2 + 0.222^2]^{1/2} = 0.2247"
 \end{aligned}$$

Gibbs & Hill, Inc. Job No. 2323 Client TUSI
 Subject Seismic Relative Displacements for Main Steam Lines
 Calculation Number DMI-1C, set 3 Sheet No. 9

Revision	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date
Checking Method #	1									
Preparer	WT	2/11/83								
Checker	RDP	2-11-83								

The seismic relative displacements were issued to Applied Mechanics via memo nr. SA-T-426 dated 2/11/83. The $\frac{1}{2}$ SSE's values are taken as 0.60 of the SSE's values as per reference 8.

ITEM 19

JUN 7 1984

CYGNA - SAN FRANCISCO

Call by: A. Rutkowski of Gibbs & Hill, Inc.
(Name) (Company)

Answer by: Doug Frazer of Westinghouse
(Name) (Company)

Contract No: 11-2323-001

Subject discussed: Stress Analysis of the branch piping
connected to RCL and subjected to the nozzle
movements resulting from the LOCA event.

SUMMARY OF DISCUSSION, DECISIONS AND COMMITMENTS.

D. Frazer stated that RCL movement due to the LOCA event is a result of dynamic response of the system and it will introduce the primary stress in the branch piping.

- a) For Class 1 and portions of Class 2 piping up to the penetration, W will use either time history or static equivalent displacements type of analysis. The allowable stress values for faulted operating conditions will be used.
- b) For Class 2 piping (Main Steam, Feed Water, Feed Water By-pass) the displacements in each of the six principal directions shall be analyzed separately. The resultant moments and forces have to be combined as a sum of the absolute values for each direction.

Then this resultant response have to be combined with SSE response by SRSS method. W feels that the allowable stress values for faulted conditions have to be used to verify the stress level in the piping.

ARu:ecm

CYGNA		100
JOB NO :	<u>84060</u>	
DATE LOGGED:	<u>6/17/84</u>	
LOG NO. :	<u>#117</u>	
FILE:	<u>11.1 Tech. files</u>	
CROSS REF. FILE	<u>11.1 Tech. files log</u>	
	<u>2-1-17-84 CR (#20)</u>	

Telephone Conversation Record
CIC, ANJB, JDL, DCME, ECM/AM, 048, B, VORTGOING

Date: 3/20/79 118

Time: 3:00PM
TC-1576

GTN- 36115 (4/24/79) JUN 7 1984

MRK

Call by: A. RUTKOWSKI (Name) CYGNA - SAN FRANCISCO (Company) GIBBS & HILL, N.Y. (Company)

Answer by: ROBERT KELLY (Name) of WESTINGHOUSE (Company)

Contract No: TEXAS UTILITIES GENERATING COMPANY G&H 2323

Subject discussed: STEAM GENERATOR NOZZLE ALLOWABLE LOADS FOR
STEAM HAMMER TRANSIENT LOADING DUE TO THE
MS TURBINE TRIP-OUT (FAST CLOSURE OF THE
STOP VALVE)

SUMMARY OF DISCUSSION, DECISIONS AND COMMITMENTS.

Bob Kelly stated that the allowable nozzle loads can be obtained by adding allowables for Pressure, Thermal, Deadweight and 1/2 SSE. The resultant allowable values should be compared with the sum of actual loads due to Pressure, Thermal, Deadweight and Steam Hammer loadings.

ARu:ajv R S Ballard

- cc: J. T. Merritt (TUSI Site)
- R. E. Holloway (G&H Dallas)
- A. T. Parker (WNES, Pitts.)
- R. Kelly (WNES, Pitts.)

CYGNA	
JOB NO :	84042
DATE LOGGED:	6/7/84
LOG NO: :	#118
FILE:	11.1 Tech. Files
CROSS REF. FILE	11.1 Tech. Files J.T.I. 8/24/84 (ARU)

ATTACHMENT "A"

Printing Code ~~2323-200~~ 1-4-2

Sheet No. 4 of 22

G & H Job No. 2323

McGinn

Telephone Conversation Record

Ref. Dwg./Spec. No. _____

Date: 11-2-79

REBa/MS46A, MS46A.1 PRR, EH, ARu/AJJB, ADL
IS, GSi, B, 048 OUTGOING

Time: 10:30A.M.

GTN- 41464

Date: 11/8/79

Call by: ISRAEL STEIN of G&H, Inc.
(Name) (Company)

Answer by: R. KELLY of WNES
(Name) (Company)

Contract No: 11-2323-001

Subject discussed: Nozzle Loads on Main Steam Generator

SUMMARY OF DISCUSSION, DECISIONS AND COMMITMENTS.

Questions

1. Can we combine allowable thermal and deadweight for normal condition.
2. Thermal and deadweight and seismic (obe) for upset condition.
3. Thermal and deadweight and seismic (sse) for faulted condition.

Answer

G&H can combine loads as asked and also combine srss Fy & Fz as resultant shear force, and srss My & Mz as combined bending moment.

ARU
ARU/HRR/IS:110

Paul K. Kelly

ITEM 23

Conservatism Built in the Welding Procedure

1. In The Equations of Acceptance of the Welding Attachment Procedure there are two set of terms. First set of terms represent the stress level obtained from the piping analysis computer output (ADLPIPE) for different load conditions. The second set of terms represent the local stress due to the attachment, from Cylnoz computer output, for the corresponding load conditions.

The Cylnoz program is based on Bijlaard analysis which applies to a simply supported cylindrical shell, and therefore a portion of the resulting stress and deformations is due to the beam-type action of the shell(Ref). Since the beam-type stress are already considered in the piping analysis (ADLPIPE), there is a significant degree of conservatism.

2. The normal direct stress from piping analysis (ADLPIPE) is added colinearly to the maximum stress intensity out of the eight points analyzed in Cylnoz, regardless of direction.

Reference: W.G. Dodge - "Secondary Stress Indices for Integral Structural Attachments to Straight Pipe" - WRC Bulletin No. 198, Sept. 1974.

RECEIVED

JUN 7 1984

CYGNA - SAN FRANCISCO

CYGNA		100
JOB NO :	84042	
DATE LOGGED:	6/7/84	
LOG NO. :	H119	
FILE:	11.1 Tech. Files	
CROSS REF. FILE	11.1 Tech. Files 109	

Loading Conditions	Equations of Acceptance	Stress Limits
Sustained Loads	(8') $S_{SL} + S'_{SL}$	S_h
Sustained and occasional loads (upset condition)	(9') $S_{OL} + S'_{OL}$ $S_{OL} + S'_{OL} + S''_{OL}$	$1.5 S_h$ $1.8 S_h$
Sustained and occasional loads (emergency condition)	(9'e) $S_{OLE} + S'_{OLE}$	$2.16 S_h$
Sustained loads, thermal expansion and anchor movements	(11') $S_{SL} + S_{TE} + S'_{SL} + S'_{TE}$	$S_A + S_h$

Where:

S_{SL} , S_{OL} , S_{OLE} and S_{TE} is as defined previously on page 1 (ADDITIVE)

S'_{SL} = The primary localized membrane stress due to sustained loads.

S'_{OL} = The primary localized membrane stress due to sustained and occasional loads such as earthquake (OBE).

S'_{OLE} = The primary localized membrane stress due to sustained and occasional loads such as earthquake (SSE).

S''_{OL} = The localized bending stress due to sustained and occasional loads such as earthquake (OBE).

S'_{TE} = The localized secondary stresses from expansion loads and anchor movements.

ITEM 29

G-H RESPONSE RE PENETRATION DESIGN LOAD

Regarding G&H response to CYGNA question 3a -
(Telecopied questions dated March 21, 1984 - 8:30AM)

The G&H response states that "the penetrations were qualified to a maximum of 1200.8 kips." The subsequent CYGNA question is in regards to the source of this number (1200.8 kips) since the G&H specification no. 2323-MS-74 (for mechanical penetrations) states otherwise (in the order of 822 kips).

In response to CYGNA's subsequent question, the discrepancy observed is due to the fact that MS-74 has not been updated to reflect as-built loads. As part of the as-built program it was the responsibility of G&H to verify the penetration design for the as-built loading conditions. This was done by the preparation of design calculations. The calculations are completed, checked and design reviewed but as of the present time have not been issued to TUSI.

The following action items are pending:

- a) Issue of design calculations to TUSI.
- b) Issue a DCA on MS-74 appending the as-built load used in the calculation.

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ITEM 33

G&H RESPONSE RE COMBINATION OF LOADS
AT ANCHORS

For the anchor connecting stress problems 1-61A and 1-61B, support number CC-1-087-004-A33A, loads coming into the anchor from adjacent sides of the pipe are added algebraically to satisfy static equilibrium. For seismic the loads are conservatively added absolutely and for thermal, loads are ranged to meet the intent of equation 11. General membrane stress however is averaged from the two connecting problems. This is the approach taken in WCR-Bulleting 198. See paper "Secondary Stress Indices for Integral Structural Attachments to Straight Pipe" by W.G. Dodge.

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