Category II AP13 Item 13

TEXAS UTILITIES SERVICES INC.	INSTRUCTION	REVISION	ISSUE DATE	PAGE
CONTROLLED COPY NO. 1-F002	CP-EI-4.0-30	0	6-4-82	1 of 4
REVIEW OF PIPE SUPPORT REQUIRED PRIOR TO SYSTEM OPERATION	PREPARED BY Baker H. Hanson APPROVED BY M.R. McKay			

1.0 REFERENCES

1-A CP-EP-4.0 Design Control

NOT APPLICABLE TO FLUSHING

2.0 GENERAL

2.1 PURPOSE

To establish a method for evaluating piping support systems required for system operation and testing. These measures are established to assure supports "as installed" are adequate per the provisions of Ref 1-A to prevent piping system over-stress during systems operation.

2.2 SCOPE

This instruction shall apply to systems that have incomplete permanent dead weight and thermal supports.

2.3 RESPONSIBILITIES

The CP Project Mechanical and Pipe Support Engineers are responsible for providing technical direction and administrative guidance to their respective organizations.

The Technical Services Supervisor has been delegated the responsibility for the general implementation of this instruction within Mechanical Engineering Technical Services (TS) organization. It shall be the responsibility of the CP Project Pipe Support Engineer to evaluate the adequacy of temporary supports.

Where specific individuals are designated by title in this instruction it shall be understood that designees may be delegated to act in that capacity.

3.0 INSTRUCTIONS

3.1 TEST SCHEDULE

System boundaries will be defined by Completions. Where there are deviations from the schedule, Start-up shall notify TS in writing at least 3 weeks prior of intent to perform the tests.

484
M485

3.2 TECHNICAL SERVICES REVIEW

A review will be performed using "as-built" information to identify permanent supports which are installed and temporary supports which are required. If "as built" information is not available, TS shall initiate a walk down by QA personnel to verify support installation. Walk-down packages will be prepared by TS Drafting as required.

TS will transmit (per Attachment 1) to Pipe Support Engineering (PSE) a list of temporary supports required to allow system operation to proceed. The list will include information such as line number, support number and dead weight and thermal loading conditions. Loads which are not shown on the support drawing shall be obtained from the appropiate analysis organization by TS.

3.3 PSE REVIEW

Upon receipt, PSE will assure that temporary supports are adequate for the specified loads, and initiate and monitor installation activities of temporary supports.

Upon completion of temporary support installation, PSE will notify appropriate organizations per Attachment 2, that supports "as-installed" are adequate to proceed with system operation testing.

3.4 EXCEPTIONS

Snubbers will not be installed for initial system operation. All spacers shall remain in place, unless testing is conducted at elevated temperatures, to maintain C-C dimensions between brackets and clamps.

3.5 DOCUMENTATION

A documentation package will be maintained in PSE containing calculations, sketches, transmittals, etc., generated during the activities described herein.

ATTACHMENT 1

CPP-_____

To: J.C. Finneran
Glen Rose, Texas

Subject: COMANCHE PEAK STEAM ELECTRIC STATION
SYSTEM OPERATION
RE: (1) CP-EI-4.0-30

(TYPICAL)

In accordance with Reference (1), Technical Services is providing the below listing of temporary supports, which need to be installed to ensure piping lines are adequately supported for system operation.

LINE NUMBER	SUPPORT NUMBER	LOADS (DW + TH.)	REMARKS

H.A. Harrison
Technical Service Supervisor

HAH:HRD:DMH:ery
cc: M.R. McBay
J.R. Johnson

ATTACHMENT 2

CPPA-_____

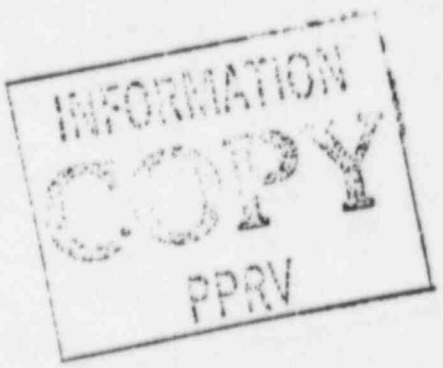
To: R.E. Camp Glen Rose, Texas
Subject: COMANCHE PEAK STEAM ELECTRIC STATION
SYSTEM OPERATION
RE: (1) CP-EI-4.0-30

(TYPICAL)

Pipe Support Engineering has performed an evaluation per reference 1 of the supports installed in sub system number _____ on _____ to assure the adequacy of supports, including temporary supports, for the safe operation of the system. Provided none of these temporary supports have been removed and all adjustable supports have been properly set, the support system is acceptable "as-installed".

_____
J.C. Finneran
Project Pipe Support Engineering

JCF:ery
cc: M.R. McBay
R.G. Tolson
H.A. Harrison



Category 11 AP13 item 14

Loop 4

ARMS
INDEXED

L 17.134.12
MS-1-RB-01 FW-5

DATE:

ATTACHMENT 10

DOCUMENTATION CHECK LIST

PACKAGE MARK NO. MS-1-RB-001

NUMBER OF PAGES	TYPE OF DOCUMENT
1. N/A	Manufacturing Record Sheet (MRS)
2. 1	Weld Data Card (WDC) Weld No(s). FW-5
3. 1	Weld Filler Material Log (WFML)
4. NA	Material Identification Log (MIL)
5. N/A	Non-Destructive Examination Report (NDER)
6. 3	Inspection Report (IR)
7. NA	Nonconformance Report (NCR)
8. NA	Vendor Documentation
9. N/A	Repair Process Sheet (RPS) Weld No(s). N/A
10. NA	Operation Traveler (OT)
11. NA	Drawing (Including CMC)
12. NA	Material Requisition (MR)
13. 3	Miscellaneous (Describe Below)

DOCUMENTATION ON T-FW5

The contents of this package as listed above have been reviewed per the requirements of CP-QAP-18.2 and are acceptable.

QC Superintendent Allen D Alle

Date 6-5-82

ORG Representative

Date

8 Total Number of Pages in Package

ANI NA

DATE NA

Standard-Single Weld

BROWN & ROOT, INC.
CPSES JOB # 35-1195

WELD DATA CARD

WDC Serial No. _____

Drawing No. NS-1-RB-01-2

Weld No. FW 5

INSTALLATION IN ACCORDANCE WITH PROCEDURES REFERENCED IN CPM-6.11

LINE #	WPS #	REV#/ICN#	FABRICATION CODE & CLASS/ACC. STD.
	1CWP	5/0	ASME III-1
	1	5/2	
	3	3/1	

BASE MATERIAL
HT # NA to HT# NA
PC #NS-1-RB-01-1 to PC# NS-1-RB-01-2
P # 1 to P # 1

POSTWELD HEAT TREATMENT
TIME NA Hrs., TEMP. NA °F
HEATING RATE NA °/Hr. NA

~~NDEP/REV~~ QI GAP/REV	VT/~~200~~ 11-Y-26 D-8 10.2-7	PT/~~300~~ 10.2-1	MT/400 10.2-2	RT/~~101~~ 23 10.2-3	UT

MR#(S)	M.&T.E.	CALIB. DUE DATE	QC	WELD FILLER MATERIAL REQUIRED
QC VERIF.	1-82	5 May 82	[illegible] 4/24/82	ROOT CLASS E 308-2
DATE:				FILL CLASS E 308-2
ITT-2 1.5??				CLASS
ITT-1 1.20?				CLASS

NOTES: (1) Applicable QC/ANI hold points shall be indicated by checkmark ✓.
(2) ANI inspection points indicated by (X).
(3) Denote Satisfactory inspection by an "S"; Unsatisfactory inspections by a "U".

PRODUCTION RELEASE

OPER. NO.	OPERATION	HOLD POINTS WT	QC	ANI	CON	SAT. or UNSAT.	INSPECTION RESULTS (SIGN AND DATE) QC or WT	NDE CERT. LEVEL	ANI
1	Cleanliness	NA	✓	NC		SAT	J. Goode 4/22/82	II	
2	Fitup	NA	✓			SAT	J. Goode 4/23/82	II	
3	Preheat	NA	✓			SAT	J. Goode 4/22/82	II	
4	Final VT	NA	✓	NC		SAT	Johnny Blackmon 5/10/82	II	
5	FINAL RT	NA	✓	✓		Sat	Walter 5-14-82	II	MR 82-524-82 ✓
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	R. Wade 9/27/79 N.R.	[illegible]	9-27-79
Final	Acceptance								

INFORMATION

Mary Dunby WE MAY 2 7 1982 QC ANI [illegible] 4/27/82

Approval signatures shall be affixed on the line immediately below the last step in each sequence.

RT 26688

REVERIFIED FIT-UP AND PREHEAT 4/24/82 J. Goode
4/26/82 J. Goode

REPAIR PROCESS SHEET

WDC Serial No. _____

Drawing No. _____

Weld No. _____

DESCRIPTION OF DEFECT (SKETCH)

OPER. NO.	OPERATION	HOLD POINTS WT	QC	ANI	CON.	"S" or "m"	INSPECTION RESULTS (SIGN AND DATE) QC or WT	NDE CERT LEVEL	ANI
A	Notify ANI	X	NA						
B	Excavate	X	NA						
C	Info PT	X	NA						
D	Evaluate	X	NA						
	Final Penetrate 9/24/24								

WE	QC	ANI	G&H

Approval signatures shall be affixed on line immediately below the last step in each repair sequence.
Base Metal Repair - WE, QC, G&H, ANI
Weld Metal Repair - WE, QC, ANI

Brown & Root, Inc.

Post Office Box 1001, Glen Rose, Texas 76043

QUALITY ASSURANCE DEPARTMENT
VISUAL EXAMINATION CHECKLIST

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
2323-1-RB-001	3400	1 ☐ 2 ☒ 3 ☐ OTHER
WELD/ITEM NUMBER	**LOCATION**	
FW 5	905 RB #1	

Enter NA adjacent to attribute when not applicable. Enter Sat./Unsat. or NA above results in each section 1 through 4 as applicable.

NOT A QC INFORMATION

WDC# 33105

SKETCH AND REMARKS (IF CHECK LIST

QI-QAP-~~10.2-7~~ Rev. 8

1. FITUP (Prior and During) 1426 JGB 4/23/82

Base Material	
Joint Design	
Cleanliness	
Cold Spring	
Joint Fitup	
Joint Alignment	
Socket Engagement	N/A
Socket End Gap	N/A
Inservice Inspection Stamp	
PURGE	N/A
Orientation/Direction of Flow	

SAT

Results

J Goode II — Inspector — Level — 4/23/82 DATE

2. AFTER WELDING OF ROOT

QI-QAP-~~10.2-7~~ Rev. 8

1426 JGB 4/23/82

External Surface	
Internal Surface	

Results N/A

J Goode II — Inspector — Level — 4/23/82 DATE

3. COMPLETION OF WELD (ID)

QI-QAP-~~10.2-7~~ Rev. 8

11.1-26 JGB 4/23/82

Surface	
Reinforcement	
Concavity	
Oxidation	
Crater Pits	
Unconsumed Insert	
Inc. Fusion (Inc. Penetration)	
Burn-Through	
Undercut	

N/A

Results

J Goode II — Inspector — Level — 4/23/82 DATE

4. COMPLETION OF WELD (OD)

QI-QAP-~~10.2-7~~ Rev. 8

11.1-26 JGB 4/23/82

Surface	
Reinforcement	
Undercut	
Fillet Size	N/A
Blending of Surface	
Joint/Weldor Ingent.	
Suitability of Surface for NDE	
Removal of Temp. Attachments	N/A
Surface free from Arc Strikes	
Weld Spatter, etc.	
Purge Dam Removed	N/A

SAT

Results

J Blanscet II — Inspector — Level — 5/10/82 Date

QC Supervision — Date

NDE PROCEDURE QI-QAP-10.2-7 Rev. — CERTIFICATION LEVEL

NO-190/2-1 (1/30/78) QA-10-2-1

BROWN & ROOT INC.
QUALITY ASSURANCE DEPARTMENT
NDE RADIOGRAPHIC REPORT

SERIAL NUMBER RT
No. 26688

PROJECT COMANCHE PEAK JOB NO 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING BRPMS 1-RB 001	SYSTEM 3400	CLASS 1 ☐ 2 ☑ 3 ☐ OTHER
WELD/ITEM NUMBER FW-5	LOCATION 905'EL Comp #4 RB #1	

MTL. TYPE P1	MTL. THICK. 1.285"	DIA./LENGTH (PIPE) DIA. 32"	(PLATE - LONG SEAM) LENGTH N/A
STAGE OF MFG. ☐ REPAIR	ROOT ☐ INTERMEDIATE ☐	FINAL ☑	JOINT DESIGN BRN. BKS. ☐ OPEN BUTT ✓

X-RAY MAKE N/A	ISOTOPE FW5-14-32 IRIDIUM 192 ☒ COBALT 60 ☑	LEAD SCREENS FRONT / CENTER / BACK
KVP. N/A M.A. N/A	SIZE DIA. .13 LENGTH .13	.005 ☐ ☐ .005
FOCAL SPOT SIZE N/A	CURIES 33	.010 ☑ ☑ .010
FILM MFG. EKC ASTM CLASS 1 ☑ 2 ☐	LOADED 1 ☐ 2 ☑ OTHER ☐	TECHNIQUE T 3C (if not standard, attach sketch)
FFD. 32"	EXPOSURE TIME MIN. 0 SEC. 40	UNSHARPNESS $Ug = \frac{Ft}{d}$
PENETRAMETER SIZE 25 MTL. 55 ASTM ☑ ASME ☐		F = ___" t = ___" d = ___" Ug = .4
PENETRAMETER SOURCE SIDE ☐ FILM SIDE ☑		
SHIM MTL. 55 THICK .120"	NDE PROCEDURE CP-QI-QAP 10.2-3 R3	

RADIOGRAPHER J. PARKER	CERTIFICATION LEVEL II	RT COMPANY B&R

VIEWING SINGLE ☑ COMPOSITE ☐ RT DATE 5/11/82 ACCEPTANCE STANDARD CP-QI-QAP 10.2-3 R3

LOCATION MARKERS	DENSITY: SENSITIVITY	DENSITY: WELD	DENSITY: PENETRAMETER	ACCEPT	REJECT	DISCONTINUITIES: CRACK	ROOT CONCAVITY	ROOT CONVEXITY	ROOT CREASE	MELT THROUGH	CRATER PIT/CRACK	ROOT UNDERCUT	POROSITY	SLAG INCL	TUNGSTEN	INCOMPLETE PENET.	INCOMPLETE FUSION	UNDERCUT	BURN-THRU	SURFACE DEFECTS	UNCOM. INSERT	REMARKS
C-2	2T	2.83	3.16	✓			✓		✓			✓										
2-4	2T	2.64	2.70	✓			✓					✓										
4-6	2T	2.79	2.97	✓			✓															
6-8	2T	2.76	2.67	✓			✓															
8-10	2T	2.84	3.03	✓			✓							✓								
10-12	2T	2.84	2.96	✓			✓					✓										
12-14	2T	2.63	2.74	✓			✓															
14-0	2T	3.22	3.30	✓			✓															

INTERPRETATION
REJECTS (1) FILM
ACCEPTED

B&R INTERPRETER REWalters		CERTIFICATION LEVEL II	
FILM EVALUATION DATE 5/14/82	COMMENTS Repairs 5-12-82, 5-13-82		
IF APPLICABLE CLIENT REP A.R. Barker	DATE 5/24/82	IF APPLICABLE A.I. M.R. McMillan	DATE 5 May 82

CP-QA-501-0

11010
11011
99026

WDC Serial No. _____

Drawing No. MS-1-RB-001-2

WELD FILLER MATERIAL LOG Weld No. FW 5

WELD NO.	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN =	HEAT/LOT # or CODE =	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
FW 5	4/23/82	3/32	ARM	11010	87401	20	20	R-025
		E-705-2		5-0				
FW 5	4/23/82	1/8	ARM	11010	87401	20	20	R-032
		E-705-2		5-0				
FW 5	4/23/82	3/32	AVC	11010	87401	20	20	R-025
		E-705-2		5-0				
FW 5	4/23/82	1/8	AVC	11010	87401	20	20	R-032
		E-705-2		5-0				
FW 5	4/24/82	3/32	ARM	11010	87401	25	25	R048
		E-705-2		5-0				
FW 5	4/24/82	3/32	AFC-AVC	11010	87401	25	25	R376
		E-705-2		5-0				
FW 5	4/26/82	3/32	ARM	11010	87401	20	0	R1018
		E-705-2		5-0				
FW 5	4/26/82	1/8	ARM	11010	87401	20	12	R475
		E-705-2		5-0				
FW 5	4/26/82	3/32	AVC	11010	87401	20	0	
		E-705-2		5-0				
FW 5	4/26/82	1/8	AVC	11010	87401	20	11	
		E-705-2		5-0				
FW 5	4/26/82	3/32	FCM	11010	87401			
		E-7018		5-0				
FW 5	4/26/82	3/32	AVC	11010	87401		28	P-173
		E-7018		5-0				
FW 5	4/27/82	3/32	ARM	11010	87401			P-171
		E-7018		5-0				
FW 5	4/27/82	1/8	ARM	11010	53133	60	4	P-191
		E-7018		5-0				
FW 5	4/27/82	3/32	AVC	11010				
		E-7018		5-0				
FW 5	4/27/82	1/8	AVC	11010	87401	60	8	P-190
		E-7018		5-0				

INFORMATION

WELD FILLER MATERIAL LOG

WELD NO.	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN #	HEAT/LOT # or CODE #	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
FW 5	4/29/82	1/8 E-7018	AFG	11010 5-0	53122 026B226	120	0	Donald Welder P-142
FW 5	4/29/82	1/8 E-7018	AFP	11010 5-0	53122 026B226	120	0	Donald Welder P-110
FW 5	4/29/82	1/8 E7018	AFP	11010 5-0	53122 026B226	20	7	Donald Allen P-110
FW 5	4/29/82	1/8 E7018	AFG	11010 5-0	53122 026B226	20	7	Donald Allen P-110
FW 5	4/30/82	1/8 E7018	AFP	11010 5-0	53122 026B226	120	0	Donald Allen P154
FW 5	4/30/82	1/8 E7018	AEG	11010 5-0	53122 026B226	120	0	Donald Allen P-142 156
FW 5	4/30/82	1/8 E7018	AFP	11010 5-0	53122 026B226	50	24	Donald Allen P-154
FW 5	4/30/82	1/8 E7018	AFG	11010 5-0	53122 026B226	50	24	Donald Allen P-154
FW 5	5/1/82	1/8 E-7018	AFG	11010 5-0	53122 026B226	75	9	Donald Welder P-142

BROWN & ROOT, INC.
CPSES JOB # 35-1195

WELD DATA CARD

WDC Serial No. 53962
Drawing No. MS-1-RB-001-2
Weld No. FW-T5

INSTALLATION IN ACCORDANCE WITH PROCEDURES REFERENCED IN CP-6.11

LINE #	WPS #	REV#/ICN#	FABRICATION CODE & CLASS/ACC. STD. ASME III
32"-MS-1-04-1303-2	1127	4/0	
	1132	5/4	
	9A026	1/4	2

BASE MATERIAL
HT # NA to HT# NA
PC # 1-SA-312 to PC# 1-SA-312
P # 1 to P # 1

POSTWELD HEAT TREATMENT
TIME NA Hrs., TEMP. NA °F
HEATING RATE NA °/Hr. NA

~~NDEP/REV~~ NE-QAP/REV	11.1-26 R8 ~~VT/200~~	E-8 ~~PT/300~~	~~MT/400~~	~~RT/101~~	UT
	10.2-7	10.2-1	10.2-2	10.2-3	

MR#(S)	M.&T.E.	CALIB. DUE DATE	QC	WELD FILLER MATERIAL REQUIRED
QC VERIF. DATE:				ROOT CLASS E70S-2
				FILL CLASS E70S-2
				CLASS E7018
				CLASS

NOTES: (1) Applicable QC/ANI hold points shall be indicated by checkmark ✓.
(2) ANI inspection points indicated by (X).
(3) Denote Satisfactory inspection by an "S"; Unsatisfactory inspections by a "U".

PRODUCTION RELEASE

OPER. NO.	OPERATION	HOLD POINTS WT	HOLD POINTS QC	HOLD POINTS ANI	CON	SAT. or UNSAT.	INSPECTION RESULTS (SIGN AND DATE) QC or WT	NDE CERT. LEVEL	ANI
1	* Cleanliness	NA	✓	NC		SAT	JSB 6/26/80	II	
3/26/80 Dan ~~2~~	~~Fitup~~	~~NA~~	~~✓~~	~~NC~~					
3/26/80 Dan ~~3~~	~~Preheat~~	~~NA~~	~~✓~~	~~NC~~					
4	Final VT	X	NA	NC		S	RE 7/3/82		
5	Verify cut after grind	X	NA	NC		S	RH 4-14-82		
Review Radiograph Dan		3-17-80	R.I. 3/17/80				ANI/NA		
3	Preheat	NA	✓	NC		SAT	JSB 6/26/80	II	
	Reviewed: R Evans		4/25/80						ANI 4/28/80
6	Final Acceptance	NA	✓	NC		SAT	J. Brooks 4/28/82	II	PT RPT # 2557
Reviewed QA				4-15-82					ANI 4/15/82
Final	Acceptance								
Mary Turner	WE APR 27 1982		QC				ANI.		

INFORMATION COPY

Approval signatures shall be affixed on the line immediately below the last step in each sequence.

REF:
* IM.18813 * Verification of Material Compatibility 3/26/80 Dan

Ref NCR 2690 RS 4/2/80 Dan

Brown & Root, Inc.

2559

QUALITY ASSURANCE DEPARTMENT

MT/PT REPORT

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

MT ☐ PT ☒

WDC/Traveler # 58962

Drawing MS-1-RB-001 System 3400 Class 2

Welds/Item # FW T-5 END PREP (TT-2 Location 40.5° RB-1 Conf #4

Mfg Stage REPAIR NDE Procedure No GTG-PT-2-1 Rev. 1

Equip/Mat'ls Mfg. SPOTCHECK MAGNAFLUX Acceptance Std. ASME SEC III

Penetrant Batch # 7GH133 Cleaner Batch # 81K154 Developer Batch # 80K023

AC Yoke ☐ DC Prods ☐ NA Model # NA M&TE IRC # NA

Mat'l Type P-1 Mat'l Thickness 1.250" MIN. Diameter ☐ Length ☒ 32"

Sketch & Comments ID ☐ OD ☒

LIQUID PENETRANT TEST ON TT-2
WELD END PREP FOUND SATISFACTORY.
NO RELECTABLE INDICATIONS NOTED.

Inspector	Certification Level	Date	Results
J Goode	II	4/27/87	Accept ☒ Reject ☐

WPS
11010 99026
11011

WDC Serial No. _____

Drawing No. MS-1-RB-001-2

WELD FILLER MATERIAL LOG Weld No. FW-T5

WELD NO.	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN #	HEAT/LOT # or CODE #	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
					643515			
				4.0	026B607		0	P-157
FW T-5	2/27	3/32 E-7018	BBN	11010 4/0	643875 026B607	100	0	Shed P157
FW T-5	2/27	1/8 E-7018	BBN	11010 4.0	A82394 026B204	30	14	Shed P157
FW T-5	4/30/80	1/8 E-7018	BBN	11010 4/0	A82394 026B204	120	13	Con Industry P156
FW T-5	7/3/80	1/8 E-7018	BBN	11010 4/0	A82394 026B204	120	55	Offset Overall P192

Category 11 AP13, Item 15

Loop 1

ARMS INDEXED

DATE:

ATTACHMENT 10

DOCUMENTATION CHECK LIST

FILM PUT RECORD

L 171342

PACKAGE MARK NO. MS-1-RB-002

NUMBER OF PAGES	TYPE OF DOCUMENT
1. N/A	Manufacturing Record Sheet (MRS)
2. 2	Weld Data Card (WDC) Weld No(s). FW-5 T-FW-5
3. 2	Weld Filler Material Log (WFML)
4. NA	Material Identification Log (MIL)
5. 1	Non-Destructive Examination Report (NDER)
6. 9	Inspection Report (IR)
7. NA	Nonconformance Report (NCR)
8. NA	Vendor Documentation
9. N/A	Repair Process Sheet (RPS) Weld No(s). N/A
10. NA	Operation Traveler (OT)
11. NA	Drawing (Including CMC)
12. NA	Material Requisition (MR)
13. N/A	Miscellaneous (Describe below)

INFORMATION COPY PPRV

The contents of this package as listed above have been reviewed per the requirements of CP-QAP-18.2 and are acceptable.

QC Superintendent Albert Adkins

Date 6-12-82

DRG Representative Ralph Woodall

Date 6/15/82

14 Total Number of Pages in Package

ANI NA

DATE NA

484

M4

BROWN & ROOT, INC.
~~CPSES JOB # 35-1195~~

INSTALLATION TO BE IN ACCORDANCE WITH PROCEDURES REFERENCED IN CPM-6.11

WELD DATA CARD

WDC Serial No. _____

Drawing No. MS-1-PB-02-2

Weld No. FW-5

LINE #		WPS #	REV#/ICN#	FABRICATION CODE & CLASS/ACC. STD.
[illegible]		99027	4~~3~~/0	~~3-1-82~~ ASME III
			~~3~~ 4/NC	
			~~3~~ 4/NC	

BASE MATERIAL
HT # NA to HT# NA
PC # MS-1-PB-02-1 to PC# MS-1-PB-02-2
P # _____ to P # _____

POSTWELD HEAT TREATMENT
TIME NA Hrs., TEMP. NA °F
HEATING RATE NA °/Hr. NA

~~NDEP/REV~~ GI-GAP/REV	VT/~~200~~ 10.1-26 AB	PT/~~300~~ 10.2-1	MT/~~400~~ 10.2-2	RT/~~101~~ R3 10.2-3	UT
	~~4.2.4~~				

MR#(S)	M.&T.E.	CALIB. DUE DATE	QC	WELD FILLER MATERIAL REQUIRED
QC VERIF.	1872	5 May 82	4/29/82	ROOT CLASS E7018
DATE:	2472	3 May 82	4/29/82	FILL CLASS E7018
				CLASS E7018
				CLASS

PT-1 = 1.245 SEE NDE-3964
PT-2 = 1.482

NOTES: (1) Applicable QC/ANI hold points shall be indicated by checkmark ✓.
(2) ANI inspection points indicated by (X).
(3) Denote Satisfactory inspection by an "S"; Unsatisfactory inspections by a "U".

PRODUCTION RELEASE

OPER. NO.	OPERATION	HOLD POINTS WT	QC	ANI	CON	SAT. or UNSAT.	INSPECTION RESULTS (SIGN AND DATE) QC or WT	NDE CERT. LEVEL	ANI
1	Cleanliness	NA	✓	NC		S	J Hyatt 4/29/82	II	
2	Fitup	NA	✓			SAT	John W Blansett 5-6-82	II	
3	Preheat	NA	✓			SAT	John W Blansett 5-6-82	II	
4	Final VT	NA	✓	NC		SAT	John W Blansett 5-24-82	II	
5	Final RT	NA	✓	✓		Sat	Richeltes 6/5/82	II	Cecil 6/7/82
Release Documents	9-7-75	NA	Schuler 9-7-75	NA		SAT	SAT 9-7-75		
Final Acceptance									

INFORMATION COPY PPRV

Mary Dunlap WE JUN 8 1982 QC ANI 7/7/82

Approval signatures shall be affixed on the line immediately below the last step in each sequence.

RT 26974

& CLEANLINESS REVERIFIED DWB 5-5-82

INSTALLATION TO BE IN ACCORDANCE WITH PROCEDURES REFERENCED IN CPM-6.11

REPAIR PROCESS SHEET

WDC Serial No. 18891
Drawing No. MS-1-RB-002
Weld No. EWS
Q ITT-1

R-1 4-29-82 DESCRIPTION OF DEFECT (SKETCH)

NDER- A 3969

* Repair Area Dims 13½" Length
2" Width

CO BUILDUP NOT TO .156

OPER. NO.	OPERATION	HOLD POINTS WT	HOLD POINTS QC	HOLD POINTS ANI	CON.	"S" or "U"	INSPECTION RESULTS QC or NT	INSPECTION RESULTS NDE CERT LEVEL	(SIGN AND DATE) ANI
A	Notify ANI	X	NA						
B	Excavate	X	NA						
C	Info PT	X	NA						
D	Evaluate	X	NA						
DCN-1-79									
R-1	BASE METAL REPAIR								
A	LAYOUT	X	NA	NC		S	DAS 5-17-82		
B	CLEAN	NA	✓	NC		S	John M Blanset II 5-17-82		
C	PREHEAT	NA	✓	NC		S	John M Blanset II 5-17-82		
D	WELD: 1101D 5/0	NA	NA	NC					
* E	RECORD DIM'S OF REPAIR AREA	NA	✓	NC		S	John M Blanset II 5-17-82		
F	GRIND & BLEND	NA	NA	NC					
G	FINAL VT	NA	✓	NC		S	John M Blanset II 5-24-82		
H	FINAL PT	NA	✓	NC		S	John M Blanset II 5-24-82		
I	FINAL UT	NA	✓	NC		S	John M Blanset II 5-24-82		
J	FINAL RT	NA	✓			Sat	F Walters 6/5/82 II	Chas 6/7/82	
	PREP: L. Campbell				4-29-82				
	REVIEW: BW	4-29-82							
Final	Acceptance								

INFORMATION COPY

ANI 4/29/82

KT 26974 GI APP102-3E3

Mary Kelley WE	JUN 8 1982	QI-QAP-10.3-1 R-1 QI-QAP-10.2-4A R-2 QCQI-QAP-11.1-26 R-8	ANI	PPRV GWH

Approval signatures shall be affixed on line immediately below the last step in each repair sequence.
Base Metal Repair - WE, QC, CSH, ANI
Weld Metal Repair - WE, QC, ANI

P.T. Report # 2393
U.T. Report # A2303

Approval to use 37½° to J-bevel joint design.

PWE WE Eblin Owner/Engr Mark Blanset 4/30/82

Brown & Root, Inc.

QUALITY ASSURANCE DEPARTMENT
NDE REPORT

SERIAL NUMBER NDER-3969

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
MS-1-RB-002	3400	1☐ 2☒ 3☐ OTHER
WELD/ITEM NUMBER	**LOCATION**	
FW 5 , TT-1	905 RB #4	

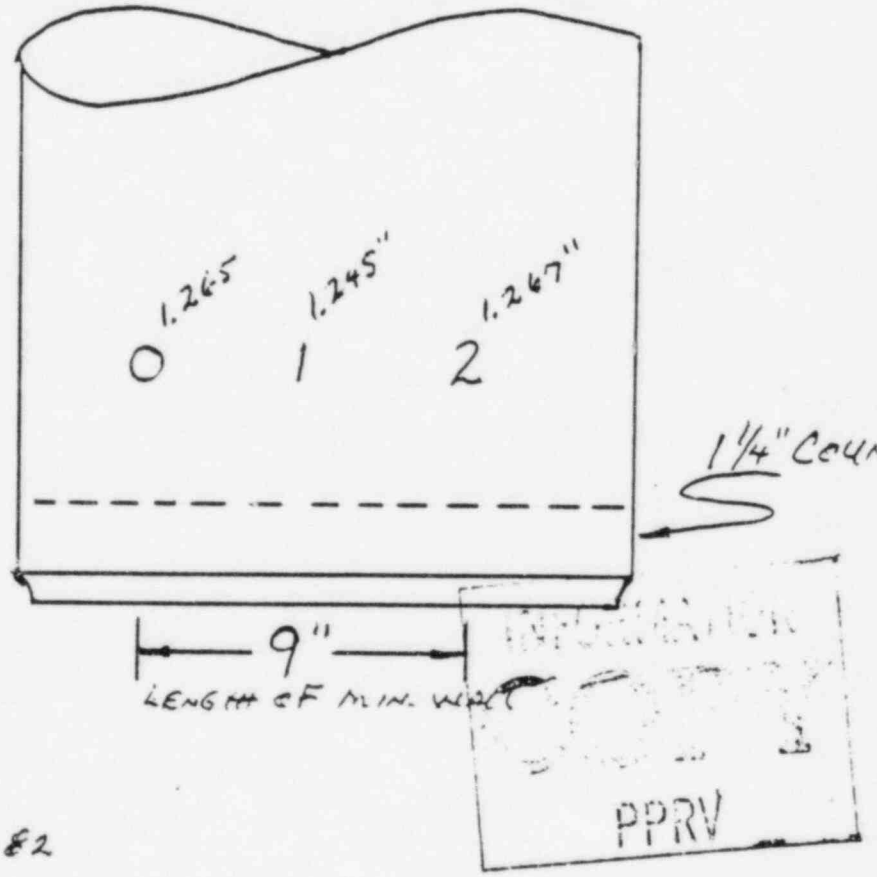
MTL. TYPE	MTL. THICK	DIA/LENGTH
1	1.270"	9"

STAGE OF MFG. BASE MATL ☐ REPAIR ☐ ROOT ☐ INTERMEDIATE ☐ FINAL

JOINT DESIGN ☐ BRN ☐ BKS ☐ INS ☒ OPEN BUTT ☐ OTHER

DESCRIPTION (S) AND INSPECTION REMARKS (S)

MINIMUM WALL VIOLATION REVEALED:



MTE 1872
DUE DATE 5 MAY 82
WDC # 1EE21

ACCEPTANCE STD		DATE
ASME SEC III	ACCEPT ☐ REJECT ☒	4/29/82

INSPECTOR J T Goode

NDE PROCEDURE DEQAP 16.1-2 R3 CERTIFICATION LEVEL II

QA-502 0

Brown & Root, Inc.

Post Office Box 1001, Glen Rose, Texas 76043

QUALITY ASSURANCE DEPARTMENT
VISUAL EXAMINATION CHECKLIST

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
1175-1-RB-002	3400	1 ☐ 2 ☒ 3 ☐ OTHER
WELD/ITEM NUMBER FW-5	**LOCATION** 905' RB#1	

Enter NA adjacent to attribute when not applicable. Enter Sat./Unsat. or NA above results in each section 1 through 4 as applicable.

WDC# 10931

SKETCH AND REMARKS (S)

QI-QAP-~~10.2-7~~ Rev. 8
11.1-26 4/29/82

CHECK LIST

1. FITUP (Prior and During)

FOR FW-5

Base Material	
Joint Design	
Cleanliness	
Gouging	
Joint Fitup	
Joint Alignment	
Socket Engagement	N/A
Socket End Gap	N/A
Inservice Inspection Stamp	
PURGE Orientation/Direction of Flow	N/A

SAT
Results

[signature] Level 5-6-82
Inspector DATE

QI-QAP-10.2-7 Rev. ___

2. AFTER WELDING OF ROOT

External Surface	
Internal Surface	

Results N/A

Inspector Level DATE

QI-QAP-10.2-7 Rev. ___

3. COMPLETION OF WELD (ID)

Surface	
Reinforcement	
Concavity	
Oxidation	
Crater Pits	
Unconsumed Insert	
Inc. Fusion (Inc. Penetration)	
Burn-Through	
Undercut	

N/A
Results

Inspector Level DATE

QI-QAP-~~10.2-7~~ Rev. 8
11.1-26
5-6-82

4. COMPLETION OF WELD (OD)

Surface	
Reinforcement	
Undercut	
Fillet Size	N/A
Blending of Surface	
Joint/Welder Ident.	
Suitability of Surface for NDT	
Removal of Temp. Attachments	
Surface free from Arc Strikes	
Weld Splatter, etc.	
Purge Dam Removed	N/A

SAT
Results

PPRV

[signature] Level 5-12-82
(Inspector) Date

QC Supervision	Date
NDE PROCEDURE QI-QAP-10.2-7 Rev.	CERTIFICATION LEVEL

Brown & Root Inc.

Post Office Box 1001, Glen Rose, Texas 76043

QUALITY ASSURANCE DEPARTMENT
VISUAL EXAMINATION CHECKLIST

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
MS-1-RB-CC2	MS	1 ☐ 2 ☑ 3 ☐ OTHER
WELD/ITEM NUMBER	**LOCATION**	
FW5 @ ITT-1	905 ELE RB #1 COMP. 1	

Enter NA adjacent to attribute when not applicable. Enter Sat./Unsat. or NA above results in each section 1 through 4 as applicable.

WDC# 18231

SKETCH AND REMARKS (S)

QI-QAP-10.2-7 Rev. 8
11.1-26
JMB 5-17-82

WELD BUILD UP TO COVER MIN. WALL AREA RPS NOER 3969

CHECK LIST

1. FITUP (Prior and During)

Base Material	
Joint Design	N/A
Cleanliness	
Cold Spring	N/A
Joint Fitup	N/A
Joint Alignment	N/A
Socket Engagement	N/A
Socket End Gap	N/A
Inservice Inspection Stamp	N/A
PURGE	N/A
Orientation/Direction of Flow	N/A

SAT
Results

[signature] Blansett II 5-17-82
Inspector Level DATE

QI-QAP-10.2-7 Rev. ___
Results N/A
Inspector Level DATE

2. AFTER WELDING OF ROOT

External Surface	
Internal Surface	

QI-QAP-10.2-7 Rev. ___

3. COMPLETION OF WELD (ID)

Surface	
Reinforcement	
Concavity	
Oxidation	
Crater Pits	
Unconsumed Insert	
Inc. Fusion (Inc. Penetration)	
Burn-Through	
Undercut	

N/A
Results

Inspector Level DATE
QI-QAP-10.2-7 Rev. ___

4. COMPLETION OF WELD (OD)

Surface	
Reinforcement	
Undercut	
Fillet Size	N/A
Blending of Surface	
Joint/Welder Ident.	
Suitability of Surface for NDT	
Removal of Temp. Attachments	N/A
Surface free from Arc Strikes	
Weld Splatter, etc.	
Purge Dam Removed	N/A

QI-QAP-10.2-7 Rev. 8
11.1-26
JMB 5-17-82

SAT
Results

PPRV

[signature] [illegible] Blansett II 5-17-82
Inspector Level Date

QC Supervision Date

NDE PROCEDURE QI-QAP-10.2-7 Rev. CERTIFICATION LEVEL

Brown & Root, Inc.

2393

QUALITY ASSURANCE DEPARTMENT
MT/PT REPORT

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

MT ☐ PT ☑

WDC/~~Traveler~~ # 18831

Drawing MS-1-RR-QC.2 System MS Class 2

Welds/Item # FW-5EITT-1 Location [illegible]

Mfg Stage FINAL NDE Procedure No. GE-[illegible] Rev. 1

Equip/Mat'ls Mfg. MAG-[illegible] Acceptance Std. ASME [illegible]

Penetrant Batch # 79H133 Cleaner Batch # SD DEVG Developer Batch # SMC27

AC Yoke ☐ DC Prods ☐ N/A Model # N/A M&TE IRC # N/A

Mat'l Type P-1 Mat'l Thickness 1.250 MIN. Diameter ☐ Length ☑ 32"

Sketch & Comments ID ☐ OD ☑ BASE MATERIAL

P.T. AREA OF WELD BUILD UP.

REF: NDER 3969

SATISFACTORY - NO INDICATIONS NOTED

PPRV

Inspector [signature] Certification Level II Date 5-24-83 Results Accept ☑ Reject ☐

Bennett Form # BR-J96

Brown & Root, Inc.

QUALITY ASSURANCE DEPARTMENT
UT THICKNESS REPORT

SERIAL NUMBER
No A 2303

PROJECT CPSES JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING MS-1-RB-002	SYSTEM MS	CLASS 1 ☐ 2 ☑ 3 ☐ OTHER
WELD/ITEM NUMBER FWS@ ITT-1	LOCATION 905' ELE RB ONE COMP. ENE	

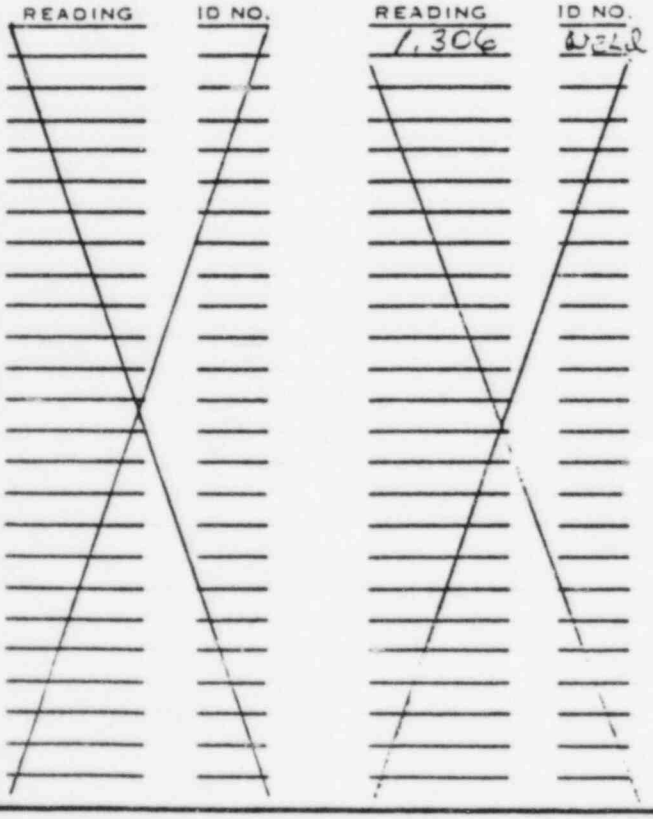
MTL TYPE [illegible]	MTL. THICK. [illegible]	DIA./LENGTH (PIPE) DIA. 32	(PLATE - LONG SEAM) LENGTH
STAGE OF MFG. REPAIR ☐ ROOT ☐ INTERMEDIATE ☐ FINAL ☑		JOINT DESIGN BRN. ☐ BKS. ☐	OPEN BUTT ☐

INSTRUMENT MAKE KRAUTKRAMER		MODEL KIT 1241		SERIAL NO. MTE 1995 THICKNESS GAUGE
TRANSDUCER MAKE [illegible]	MODEL [illegible]	SIZE [illegible]	MHZ [illegible]	SERIAL NO. [illegible]
CALIBRATION BLOCK(S) MTE 1561 Due 22 JUN '82				
COUPLANT Glycerine		OPERATION LINE VOLTAGE ☐		BATTERY POWER ☑

PULSE RATE	N/A	REJECT	N/A	DELAY	N/A
GAIN		FILTER		DAMPING	
RANGE		MATERIAL CAL.			

READINGS AND SKETCH

READING	ID NO.	READING	ID NO.
		1.306	WELD Build up AREA ITT-1



U.T. FOR MIN. WALL ON Weld Build up AREA

REF: NDER 3969

Lowest Reading Recorded

B&R INSPECTOR [signature]		CERTIFICATION LEVEL II
EXAMINATION DATE 5/24/82	COMMENTS	
NDE PROCEDURE QI-QAP 10.24A Rev-2	ACCEPT ☑	REJECT ☐

Brown & Root, Inc.
QUALITY ASSURANCE DEPARTMENT
NDE RADIOGRAPHIC REPORT

SERIAL NUMBER RT No. 26974

PROJECT COMANCHE PEAK | JOB NO 35-1195 | UNIT 1 | PAGE 1 OF 1

DRAWING 2BP-MS-1-RB-002	SYSTEM 3400	CLASS 1 ☐ 2 ☑ 3 ☐ OTHER	
WELD/ITEM NUMBER FW 5	LOCATION 905'EL RB#1 COMP #1		

ET-1 NDER 396

MTL. TYPE CL	MTL. THICK. 1.25"	DIA./LENGTH (PIPE) DIA. 32"	(PLATE - LONG SEAM) LENGTH N/A
STAGE OF MFG. REPAIR ☐ ROOT ☐ INTERMEDIATE ☐ FINAL ☑		JOINT DESIGN BRN ☐ BKS ☐	OPEN BUTT ☑

X-RAY	ISOTOPE	LEAD SCREENS
MAKE N/A	IRIDIUM 192 ☐ COBALT 60 ☑	FRONT / CENTER / BACK
KVP N/A M.A. N/A	SIZE DIA. .130 LENGTH .130	.005 ☐ ☐ .005
FOCAL SPOT SIZE N/A	CURIES 34	.010 ☑ ☐ .010
FILM MFG. EKC ASTM CLASS 1 ☑ 2 ☐	LOADED 1 ☐ 2 ☑ OTHER ☐	TECHNIQUE T 3C (if not standard, attach sketch)
FFD. 32"	EXPOSURE TIME MIN. 45 SEC. 0	UNSHARPNESS
PENETRAMETER SIZE 2.5 MTL. SS ASTM ☑ ASME ☐		$Ug = \frac{Ft}{d}$
PENETRAMETER SOURCE SIDE ☐ FILM SIDE ☑		F = ___" t = ___" d = ___" Ug = ✓
SHIM MTL. SS THICK .090"	NDE PROCEDURE CP-GI-QAP 10.2-3 R3	

RADIOGRAPHER	CERTIFICATION LEVEL	RT COMPANY
E. RZEPYCKI	II	B&R

VIEWING SINGLE ☑ COMPOSITE ☐ | RT DATE 5/24/82 | ACCEPTANCE STANDARD CP-GI-QAP 10.2-3 R3

LOCATION MARKERS	SENSITIVITY	WELD	PENETRAMETER	DENSITY ACCEPT	DENSITY REJECT	DISCONTINUITIES CRACK	ROOT CONCAVITY	ROOT CONVEXITY	ROOT CREASE	MELT THROUGH	CRATER PIT/CRACK	ROOT UNDERCUT	POROSITY	SLAG INCL	TUNGSTEN	INCOMPLETE PENET.	INCOMPLETE FUSION	UNDERCUT	BURN-THRU	SURFACE DEFECTS	CUSCOM INSERT	REMARKS
0-2	2T	2.45	3.09	✓			✓															
2-4	2T	3.20	3.43	✓			✓															
4-6	2T	2.40	2.14	✓			✓															
6-8	2T	2.48	2.42	✓			✓															
8-10	2T	3.15	3.10	✓			✓															
10-12	2T	2.67	2.45	✓			✓		✓													
12-14	2T	3.13	3.24	✓			✓		✓													ARTIFACTS
14-0	2T	3.10	3.13	✓			✓		✓													
0-2	2T	3.37	3.64	✓																		NOZZ ZONE
2-4	2T	3.45	3.41	✓																		NOZZ ZONE

ACCEPTED

CP-GI-QAP 10.2-3 R3 INFORMATION

REPAIRED

B&R INTERPRETER RE Walters		CERTIFICATION LEVEL II	
FILM EVALUATION DATE 6/5/82	COMMENTS 14-0 RESHOT 6-4-82		
IF APPLICABLE CLIENT REP	DATE / /	IF APPLICABLE A.I.	DATE 6/7/82

CP-QA-501-0

(1831) ?

99-27
11010
11011

WDC Serial No. _____

Drawing No. [illegible]

WELD FILLER MATERIAL LOG Weld No. FW-5

WELD NO.	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN #	HEAT/LOT # or CODE #	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	97401	20	20	[illegible] R-475
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	97401	20	20	[illegible] R-535
FW 5	5/6/82	3/32 E-705-2	AYC	11010 5-0	87401	20	0	[illegible] R-049
FW 5	5/6/82	1/8 E-705-2	AYC	11010 5-0	97401	20	20	[illegible] R-026
FW 5	5/6/82	3/32 E-705-2	ARM	11010 5-0	87401	20	0	[illegible] R-042
FW 5	5/6/82	1/8 E-705-2	ARM	11010 5-0	97401	20	17	[illegible] R-027
FW 5	5/10/82	3/32 E-705-2	ARM	11010 5-0	87401	20	0	[illegible] R-276
FW 5	5/10/82	1/8 E-705-2	AYC	11010 5-0	97401	20	10	[illegible] R-249
FW 5	5/10/82	3/32 E-7018	ARM	11010 5-0	412P5132 026B637	50	30	[illegible] P266
FW 5	5/10/82	1/8 E-7018	ARM	11010 5-0	53122 026B226	60	57	[illegible] P-265
FW 5	5/10/82	3/32 E-7018	AYC	11010 5-0	412P5132 026B637	50	30	[illegible] P266
FW 5	5/10/82	1/8 E-7018	AYC	11010 5-0	53122 026B226	60	57	[illegible] P-265
F.W. 5	5/12/82	E-7018 1/8	ARM	11010 5-0	53122 026B226	120	0	[illegible] P-154
F.W. 5	5/12/82	E-7018 1/8	AYC	11010 5-0	53122 026B226	170	0	[illegible] P-278
FW 5	5/12/82	1/8 E70A	AYC	11010 5-0	53122 026B226	40	7	[illegible] P-279 154
FW 5	5/12/82	1/8 E7018	ARM	11010 5-0	53122 026B226	40	7	[illegible] P-154

WELD FILLER MATERIAL LOG

WELD NO	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN #	HEAT/LOT # or CODE #	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
FW 5	5/13/82	1/8 E7018	AYC	11010 5-0	53122 026B226	120	0	P284
FW 5	5/11/82	1/8 E7018	ARM	5-0	53122 026B226	120	0	P188
FW 5	5/13/82	1/8 E-7018	ARM	11010 5-0	53122 026B226	50	11	
FW 5	5/13/82	1/8 E-7018	AYC ~~ARM~~	11010 5-0	53122 026B226	50	10	P-284
FW 5	5/14/82	E-7018 1/8	ARM	11010 5-0	53122 026B226	120	0	P-280
FW 5	5/14/82	E-7018 1/8	~~ARM~~ AYC	11010 5-0	53122 026B226	120	0	P-176
FW 5	5/14/82	1/8 E-7018	AYC	11010 5-0	53122 026B226	50	29	
FW 5	5/14/82	1/8 E-7018	ARM	11010 5-0	53122 026B226	50	29	P-175
FW 5	5/13/82	E-7018 1/8	ARM	11010 5-0	53122 026B226	60	0	P-182
FW 5	5/15/82	E-7018 1/8	AYC	11010 5-0	53122 026B226	100	64	P-272
FW 5	5/17/82	1/8 E7018	AYC	11010 5-0	53122 026B226	50	26	P-159

(076274)

CMC LOG	

INSTALLATION TO BE IN ACCORDANCE WITH PROCEDURES REFERENCED IN GPM 6.11

MULTIPLE WELD DATA CARD

WDC SERIAL # _____

DRAWING # MS-1-RB-W-2-3

LINE # 32"MS-1-61-12[illegible]-2

ITEM NO.	APS NO.	REV.	ICN	WELD FILLER MATERIAL	WELD NOS.	P NO.	FABRICATION CODE & CLASS/ ACC STD
	11010	5	C	E7018-S-	1-FW-5 Pressure Assurance 12-00, 3-00, 6-00, 9-00	1-1	ASME III-2
	11032	8	0	E7018			

NOTES: 1. APPLICABLE QC/ANI HOLD POINTS SHALL BE INDICATED BY CHECKMARK ✓.
2. ANI INSPECTION POINTS INDICATED BY (X).
3. DENOTE SATISFACTORY INSPECTIONS BY AN "S"; UNSATISFACTORY INSPECTIONS BY A "U".

OPERATION #	OPERATIONS ITT 1		OPERATIONS ITT 2
1	CLEANLINESS	7	CLEANLINESS
2	PREHEAT	8	PREHEAT
3	VISUAL REMOVAL	9	VISUAL REMOVAL
4	FINAL VT	10	FINAL VT
5	(X) MD AREA of REMOVAL	11	(X) MD AREA of REMOVAL
6	FINAL PT	12	FINAL PT

PRODUCTION RELEASE DMB 5-6-82

WELD NO	OPERATION	HOLDPOINTS WT	HOLDPOINTS QC	HOLDPOINTS ANI	CONST	SAT OR UNSAT	INSPECTION RESULTS (SIGN & DATE) QC OR WT	NDE CERT. LEVEL	ANI	NDE REV.	MT&E # CALIB DUE DATE
12:00	1	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	2	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	3	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	4	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	5	NA	✓	NC		SAT	[illegible] 5-17-82	II		2	
	6	NA	✓	NC		SAT	[illegible] 5-17-82	II		1	
	7	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	8	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	9	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	10	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	11	NA	✓	NC		SAT	[illegible] 5-17-82	II		2	
	12	NA	✓	NC		SAT	[illegible] 5-17-82	II		1	
3:00	1	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	2	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	3	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	4	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	5	NA	✓	NC		SAT	[illegible] 5-17-82	II		2	
	6	NA	✓	NC		SAT	[illegible] 5-17-82	II		1	
	7	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	8	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	9	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	10	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	11	NA	✓	NC		SAT	[illegible] 5-17-82	II		2	
	12	NA	✓	NC		SAT	[illegible] 5-17-82	II		1	
6:00	1	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	2	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	3	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	4	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	5	NA	✓	NC		SAT	[illegible] 5-17-82	II		2	
	6	NA	✓	NC		SAT	[illegible] 5-17-82	II		1	
	7	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	8	NA	✓	NC		SAT	[illegible] 4/29/82	II		8	
	9	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	
	10	NA	✓	NC		SAT	[illegible] 5-17-82	II		8	

Positions of 12, 3, 6 & 9 are located when looking into ITT-2. [illegible] 5-24-82

WE QC ANI

APPROVAL SIGNATURES SHALL BE AFFIXED IN THE LINE IMMEDIATELY BELOW THE LAST STEP IN EACH SEQUENCE.

QI-QAP-10.2-1 R1
QI-QAP-10.2-4A R2
QI-QAP-11.1-26 R8

★ Reverified Cleanliness & Preheat on ITT-1 DMB 5-6-82

P.T. Report # 5959 DMB 5-17-82

U.T. Report # A 2302

PRODUCTION RELEASE

Dwg S-645

WELD NO	OPERATION	HOLD POINTS WT	HOLD POINTS QC	HOLD POINTS ANI	CONST	SAT OR UNSAT	INSPECTION RESULTS (SIGN & DATE) QC OR WT	NDE CERT. LEVEL	ANI	REV.	MTSE CALIB DUE DATE
6 00	11	NA	✓	NC		SAT	[signature] 5-26-82	II		2	
	12	NA	✓	NC		SAT	[signature] 5-17-82	II		1	
* 9 00	1	NA	✓	NC		SAT	[signature] 4/29/82	II		8	
*	2	NA	✓	NC		SAT	[signature] 4/29/82	II		8	
	3	NA	✓	NC		SAT	[signature] 5-17-82	II		8	
							[illegible]				
	5	NA	✓	NC		SAT	[signature] 5-26-82	II		2	
	6	NA	✓	NC		SAT	[signature] 5-17-82	II		1	
	7	NA	✓	NC		SAT	[signature]	II		8	
	8	NA	✓	NC		SAT	[signature]	II		8	
	9	NA	✓	NC		SAT	[signature] 5-17-82	II		8	
	10	NA	✓	NC		SAT	[signature] 5-17-82	II		2	
	11	NA	✓	NC		SAT	[signature] 5-26-82	II		2	
	12	NA	✓	NC		SAT	[signature] 5-17-82	II		1	
Removed for Final Acceptance					4:00 PM				[signature] 4-22-82		

[signature] WE MAY 2 6 1982 QC ANI

MANUFACTURING RECORD SHEET
BILL OF MATERIALS - SPOOL NO. _____

ITEM	QUANTITY/ LENGTH	SCHEDULE/ RATING	MATERIAL SPEC	TYPE/ GRADE	HEAT/CODE NUMBER	END PREP	APPLICABLE WELD NUMBERS	INSPECTOR INITIALS AND DATE

NO.	OPERATION	B&R QC	ANI	B&R QC INIT	DATE	ANI INIT	DATE
1	DESIGN TRACEABILITY						
2	FINAL DIM'S/SURFACE COND. IDENT. REV						
ACCEPTANCE							

B&R QA SIG. & DATE ANI SIG. & DATE

Brown & Root Inc.

Post Office Box 1001, Glen Rose, Texas 76043

QUALITY ASSURANCE DEPARTMENT
VISUAL EXAMINATION CHECKLIST

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
MS-1-RB-062	3400	1 ☐ 2 ☒ 3 ☐ OTHER
WELD/ITEM NUMBER	**LOCATION**	
TEMP LUGS ITT-2	905 RB-1	

Enter NA adjacent to attribute when not applicable. Enter Sat./Unsat. or NA above results in each section 1 through 4 as applicable.

TEMP. LUGS WDC# [illegible]

SKETCH AND REMARKS (S)

CHECK LIST ITT-2

QI-QAP 11.1-26 Rev. E

1. FITUP (Prior and During)

Base Material	
Joint Design	
Cleanliness	
Cold Spring	N/A
Joint Fitup	N/A
Joint Alignment	N/A
Socket Engagement	N/A
Socket End Gap	N/A
Inservice Inspection Stamp	N/A
PURGE Orientation/Direction of Flow	N/A

SAT

Results

Inspector Level 4/28/82 DATE

2. AFTER WELDING OF ROOT

N/A

QI-QAP 11.1-26 Rev. ___

External Surface	
Internal Surface	

Results

Inspector Level DATE

3. COMPLETION OF WELD (ID)

N/A

QI-QAP 11.1-26 Rev. ___

Surface	
Reinforcement	
Concavity	
Oxidation	
Crater Pits	
Unconsumed Insert	
Ins. Fusion (Ins. Penetration)	
Burn-Through	
Undercut	

Results

Inspector Level DATE

4. COMPLETION OF WELD (OD)

QI-QAP 11.1-26 Rev. B

FINAL V.T. AFTER REMOVAL OF TEMPORARY LUGS. OPERATION # 10 NCA-6-1052

Surface	
Reinforcement	N/A
Undercut	
Fillet Size	N/A
Blending of Surface	
Joint/Weldor Ident.	N/A
Suitability of Surface for NDT	
Removal of Temp. Attachments	
Surface free from Arc Strikes	
Weld Splatter, etc.	
Purge Dam Removed	N/A

SAT

Results

[signature] 5-24-82

Inspector Level Date

QC Supervision Date

NDE PROCEDURE QI-QAP 11.1-26 Rev. CERTIFICATION LEVEL

Brown & Root Inc.

Post Office Box 1001, Glen Rose, Texas 76043

QUALITY ASSURANCE DEPARTMENT
VISUAL EXAMINATION CHECKLIST

PROJECT: COMANCHE PEAK JOB NO. 33-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
7115-1-RB-002	3400	1 ☐ 2 ☒ 3 ☐ OTHER
WELD/ITEM NUMBER FIG 5	LOCATION 905 RB#1	

Enter NA adjacent to attribute when not applicable. Enter Sat./Unsat. or NA above results in each section 1 through 4 as applicable.

Temp Lugs WDC# 67622-C

SKETCH AND REMARKS (S)

CHECK LIST ITT-1

QI-QAP 11.1-26 Rev. 8

1. FITUP (Prior and During)

Base Material	
Joint Design	
Cleanliness	
Cold Spring	N/A
Joint Fitup	N/A
Joint Alignment	N/A
Socket Engagement	N/A
Socket End Gap	N/A
Inservice Inspection Stamp	N/A
PURGE	N/A
Orientation/Direction of Flow	N/A

Results SAT

Inspector Level Grade II DATE 4/29/82

2. AFTER WELDING OF ROOT N/A

External Surface	
Internal Surface	

QI-QAP 11.1-26 Rev. ___

Results

Inspector Level DATE

3. COMPLETION OF WELD (ID) N/A

Surface	
Reinforcement	
Concavity	
Oxidation	
Crater Pits	
Unacceptable Insert	
Ins. Fusion (Ins. Penetration)	
Burn-Through	
Undercut	

QI-QAP 11.1-26 Rev. ___

Results

Inspector Level DATE

4. COMPLETION OF WELD (OD)

Surface	
Reinforcement	N/A
Undercut	
Fillet Size	N/A
Blending of Surface	
Joint/Weldor Ident.	N/A
Suitability of Surface for NDT	
Removal of Temp. Attachments	
Surface free from Arc Strikes	
Weld Splatter, etc.	
Purge Dam Removed	N/A

QI-QAP 11.1-26 Rev. 8

FINAL V.T. AFTER REMOVAL OF TEMPORARY LUGS OPERATION #4

Results SAT

John W Blount II 5-24-82

Inspector Level Date

QC Supervision Date

NDE PROCEDURE QI-QAP 11.1-26 Rev. CERTIFICATION LEVEL

NO-200/2-2

12/30/76 QA-406-2

5959

Brown & Root, Inc.

QUALITY ASSURANCE DEPARTMENT

MT/PT REPORT

PROJECT: COMANCHE PEAK JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

MT ☐ PT ☑

WDC/~~Traveler~~ # 676274

Drawing MS-1-RB-002 System MS Class 2

Welds/Item # T-FW-5 Location 905' ELE R8°, COMP. 1

Mfg Stage FINAL NDE Procedure No. QI-QAP 10.3-1 Rev. 1

Equip/Mat'ls Mfg. MAGNAFLUX Acceptance Std ASME SEC III

Penetrant Batch # 79H133 Cleaner Batch # 820006 Developer Batch # 81M027

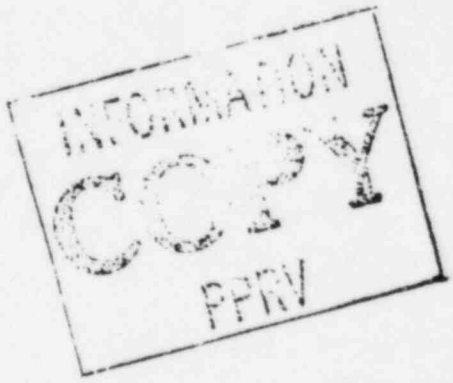
AC Yoke ☐ DC Prods ☐ N/A Model # N/A M&TE IRC # N/A

Mat'l Type P-1 Mat'l Thickness 1.250 MIN. Diameter ☑ Length ☐ 32"

Sketch & Comments ID ☐ OD ☑ BASE METAL

P.T. AREAS OF TEMPORARY ATTACHMENT REMOVAL ON BOTH ITT-1 & ITT-2 AT ALL POSITIONS.

SATISFACTORY - NO INDICATIONS NOTED



Inspector	Certification Level	Date	Results
[signature]	II	5-17-83	Accept ☑ Reject ☐

Bennett Form # BR-

Brown & Root, Inc.
QUALITY ASSURANCE DEPARTMENT
UT THICKNESS REPORT

SERIAL NUMBER
No A 2302

PROJECT CPSES JOB NO. 35-1195 UNIT 1 PAGE 1 OF 1

DRAWING	SYSTEM	CLASS
MS-1-RR-002	MS	1 ☐ 2 ☒ 3 ☐ OTHER
WELD/ITEM NUMBER: TEW-5	LOCATION: 905' ELE RB #1 COMP 1	

MTL. TYPE	MTL. THICK.	DIA./LENGTH	
P-1	1.050 MIN	(PIPE) DIA. 32	(PLATE - LONG SEAM) LENGTH

STAGE OF MFG.: REPAIR ☐ ROOT ☐ INTERMEDIATE ☐ FINAL ☑
JOINT DESIGN: BRN. ☐ BKS. ☐ OPEN BUTT ☐

INSTRUMENT MAKE	MODEL	SERIAL NO.
NORTEC	NDT 24 D	NTE 1005 Due 22 JUN 82

TRANSDUCER MAKE	MODEL	SIZE	MHZ	SERIAL NO.
NORTEC	ESM	5/16	5	811473

CALIBRATION BLOCK(S): NTE 1561 Due 22 JUN 82

COUPLANT: Glycerine

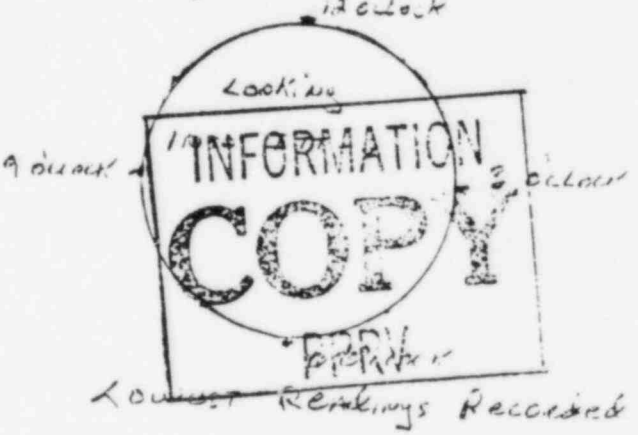
OPERATION: LINE VOLTAGE ☐ BATTERY POWER ☑

PULSE RATE	REJECT	DELAY
GAIN N/A	FILTER N/A	DAMPING N/A
RANGE	MATERIAL CAL	

READINGS AND SKETCH

READING	ID NO.	READING	ID NO.	
		1.326	ITT-1	12 O'CLOCK
		1.750	ITT-2	" " "
		1.309	ITT-1	3 O'CLOCK
		1.578	ITT-2	" "
		1.323	ITT-1	6 O'CLOCK
		1.650	ITT-2	" " "
		1.329	ITT-1	9 O'CLOCK
		1.619	ITT-2	" " "

U.T. AREAS OF TEMPORARY LUG REMOVAL FOR MIN. WALL.



Lowest Readings Recorded

B & R INSPECTOR	CERTIFICATION LEVEL
EXAMINATION DATE 5/24/82	COMMENTS
NDE PROCEDURE QI-QAP-10.2-4A R-2	ACCEPT ☑ REJECT ☐

WPS #
-11010
11032

WDC Serial No. 4.7.4.27.1

Drawing No. MS-1-RR-002-5

WELD FILLER MATERIAL LOG Weld No. T-FW5

WELD NO.	DATE	SIZE/CLASS	WELDER SYMBOL	WPS/ICN #	HEAT/LOT # or CODE #	AMT. ISS.	AMT. RT'D.	ISSUANCE APPROVAL
TFW 5	4/23/82	3/32 E-7018	ARN	11032				Appr. 4/24/82
TFW 5	4/24/82	3/32 E-7018	AYC	11032 8/2	412P5132 0260637	100	100	P 273
TFW 5	4/28/82	3/32 E-7018	AFC	11032 8-0	412P5132 0268637	50	23	P - 271
TFW 5	4/29/82	3/32 E-7018	AXA	11032 8-0	412P5132 0268637	60	60	P - 180
TFW 5	4/30/82	3/32 E7018	AXA	11032 -8-0	412P5132 0263637	60	55	P170
TFW 5	5/6/82	3/32 E-7018	ARM	11032 8/0	412P5132 0263637	30	10	R-173

Category 11 AP13 item 18

TEXAS UTILITIES SERVICES INC.	INSTRUCTION	REVISION	ISSUE DATE	PAGE
CONTROLLED COPY NO. 26	CP-EI-4.0-30	1	12/6/82	1 of 4
REVIEW OF PIPE SUPPORT REQUIRED PRIOR TO SYSTEM OPERATION	PREPARED BY B Dale Leach APPROVED BY J. L. C. Finneran			

1.0 REFERENCES

1-A CP-EP-4.0 Design Control

NOT APPLICABLE TO FLUSHING

2.0 GENERAL

2.1 PURPOSE

To establish a method for evaluating piping support systems required for [redacted]. These measures are established to assure supports "as installed" are adequate per the provisions of Ref 1-A to prevent piping system over-stress during systems operation.

2.2 SCOPE

This instruction shall apply to systems that have incomplete permanent dead weight and thermal supports.

2.3 RESPONSIBILITIES

The CP Project Mechanical and Pipe Support Engineers are responsible for providing technical direction and administrative guidance to their respective organizations.

The Technical Services Supervisor has been delegated the responsibility for the general implementation of this instruction within Mechanical Engineering Technical Services (TS) organization. It shall be the responsibility of the CP Project Pipe Support Engineer to evaluate the adequacy of temporary supports.

Where specific individuals are designated by title in this instruction it shall be understood that designees may be delegated to act in that capacity.

3.0 INSTRUCTIONS

3.1 TEST SCHEDULE

FOR 85.50

System boundaries will be defined by Completions. Where there are deviations from the schedule, Start-up shall notify TS in writing at least 3 weeks prior of intent to perform the tests.

8666180455
58pp.

487
M488

3.2 TECHNICAL SERVICES REVIEW

A review will be performed using "as-built" information to identify permanent supports which are installed and temporary supports which are required. If "as built" information is not available, TS shall initiate a walk down by QA personnel to verify support installation. Walk-down packages will be prepared by TS Drafting as required.

TS will transmit (per Attachment 1) to Pipe Support Engineering (PSE) a list of temporary supports required to allow system operation to proceed. The list will include information such as line number, support number and dead weight and thermal loading conditions. Loads which are not shown on the support drawing shall be obtained from the appropiate analysis organization by TS.

3.3 PSE REVIEW

Upon receipt, PSE will assure that temporary supports are adequate for the specified loads, and initiate and verify installation activities of temporary supports.

Upon completion of temporary support installation, PSE will notify appropriate organizations per Attachment 2, that supports "as-installed" are adequate to proceed with system operation testing.

3.4 EXCEPTIONS

Snubbers will not be installed for initial system operation. All spacers shall remain in place, unless testing is conducted at elevated temperatures, to maintain C-C dimensions between brackets and clamps.

3.5 DOCUMENTATION

A documentation package will be maintained in PSE containing calculations, sketches, transmittals, etc., generated during the activities described herein.

ATTACHMENT 1

CPP-_____

To: J.C. Finneran
Subject:

Glen Rose, Texas

COMANCHE PEAK STEAM ELECTRIC STATION
SYSTEM OPERATION
RE: (1) CP-EI-4.0-30

(TYPICAL)

In accordance with Reference (1), Technical Services is providing the below listing of temporary supports, which need to be installed to ensure piping lines are adequately supported for system operation.

LINE NUMBER	SUPPORT NUMBER	LOADS (DW + TH.)	REMARKS

_____
H.A. Harrison
Technical Service Supervisor

HAH:HRD:DMH:ery
cc: M.R. McBay
J.R. Johnson

ATTACHMENT 2

CPPA-_____

To: R.E. Camp Glen Rose, Texas
Subject: COMANCHE PEAK STEAM ELECTRIC STATION
SYSTEM OPERATION
RE: (1) CP-EI-4.0-30

(TYPICAL)

Pipe Support Engineering has performed an evaluation per reference 1 of the supports installed in sub system number_____ on _____ to assure the adequacy of supports, including temporary supports, for the safe operation of the system. Provided none of these temporary supports have been removed and all adjustable supports have been properly set, the support system is acceptable "as-installed".

_____
J.C. Finneran
Project Pipe Support Engineering

JCF:ery
cc: M.R. McBay
R.G. Tolson
H.A. Harrison

Category II APR Item 2C

TEXAS UTILITIES SERVICES INC.

OFFICE MEMORANDUM

To Jim Keller Glen Rose, Texas 2-4-83

Subject COMANCHE PEAK STEAM ELECTRIC STATION

On January 16, 1982, the polar crane was used to lift spool MS-1-RB-02-2. A 100,000# dynamometer was used at all times. We attempted to use the main polar crane but we had to switch to the 20-ton auxiliary crane because it could be controlled more accurately. For calibration purposes, a record was kept of the maximum lift which the dynamometer was used for. The maximum lift recorded was 31,250#.

The lift was made in order to move the pipe as close as possible to where we expected it to be when the permanent hangers were loaded. Spools 2 and 3 were chained together to simulate the lifting effect of both hangers MS-1-001-001 and MS-1-001-002 with the single lift that we were making. An additional load was also included in the lift to offset the weight of the temporary flushing line which was attached in place of spool #1.

TMC:WGR:ch

T. Mark Commons
Field Mechanical Engineering

Warren G. Ryan
Warren G. Ryan
Field Mechanical Engineering

FUR 85-56

M489

ISSUE RECORD
CT AND M&TE

100,000# DYNAMOMETER — DESCRIPTION OF M&TE
MTE-357 — SERIAL NO
16 JAN 1982 — DATE ISSUED
16 JAN 1982 — DATE RETURNED
FIELD — INTENDED USE
RIG — DEPT
OPELA — FOREMAN/SUPT
— CAL CHECK — INIT
☒ DAY ☐ NIGHT ☐ LONG TERM
PHONE EXT: —
2163 — BADGE #
Jimmy L. Opela — SIGNATURE

RECORD ALL USE OF THIS M&TE (CT) BELOW - ITEMS INSTALLED, TESTED OR INSPECTED.

DATE	ITEM INSTALLED, TESTED OR INSPECTED	VALUE
1-16-82	MAIN STEAM PIPE EL 900 RB#1	31,250
	312-145-1-RB-002 TAK	
	LOOP #1	
1-16-82	MAIN STEAM PIPE EL. 900 RB#1	17,750#
	BRD-MS-1-RB-EL LINK.	
	LOOP #4	

Category 11 AF 13 Item 11

TC

2/15/83. [redacted]

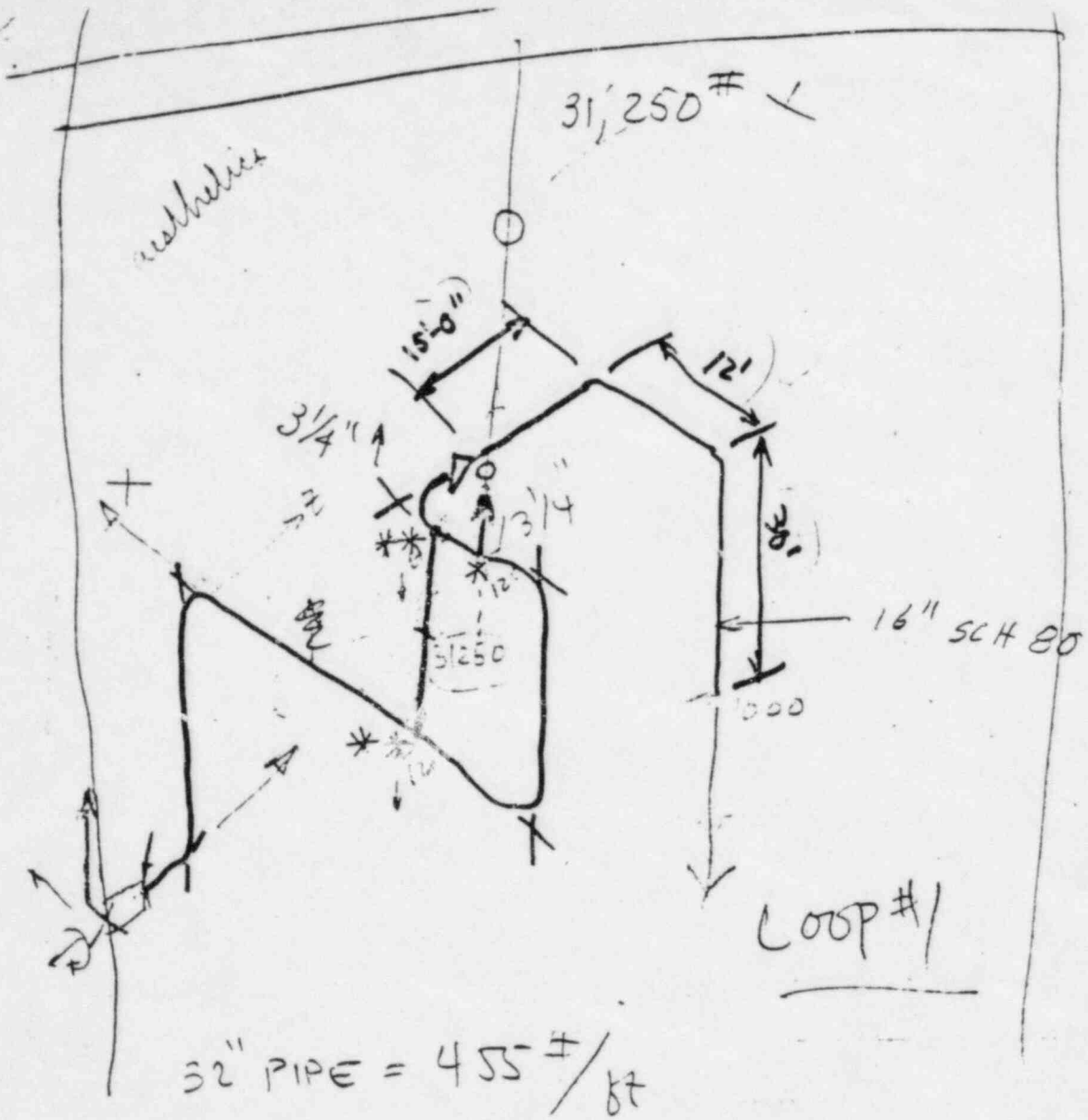
Per Jim Keller reanalysis is required to assure that no extra stresses were induced during lifting of FW-loop 1 half by polar crane around 1/15/82.

Allegation was apparently made by someone from craft to NRC.

TUGCO QA is following up this item with FME.

FOIA-85-58

M490



32" PIPE = 455# / ft

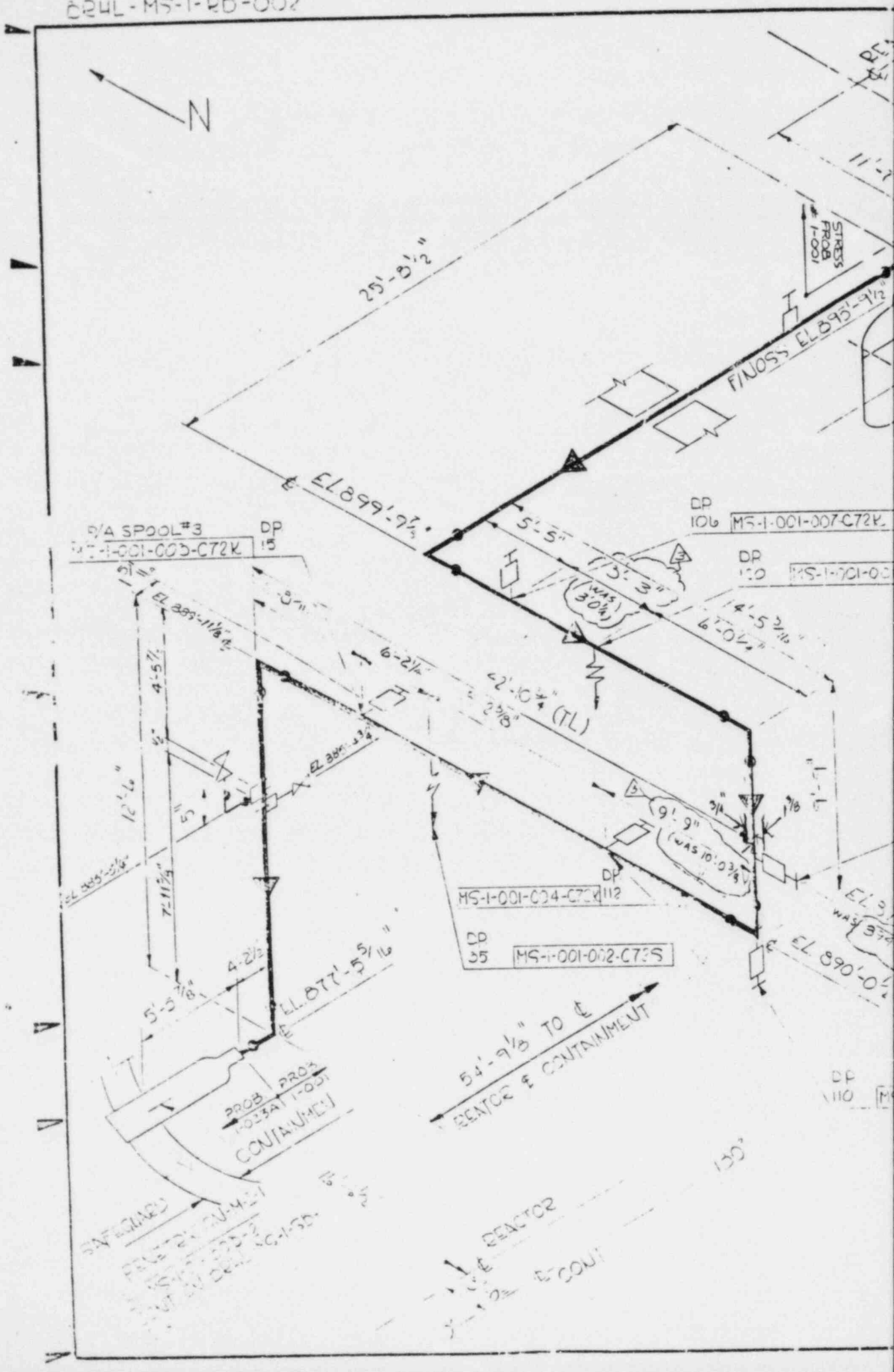
899' - 9 7/8'
899' - 6 5/8
3 2/8 = 3 1/4"

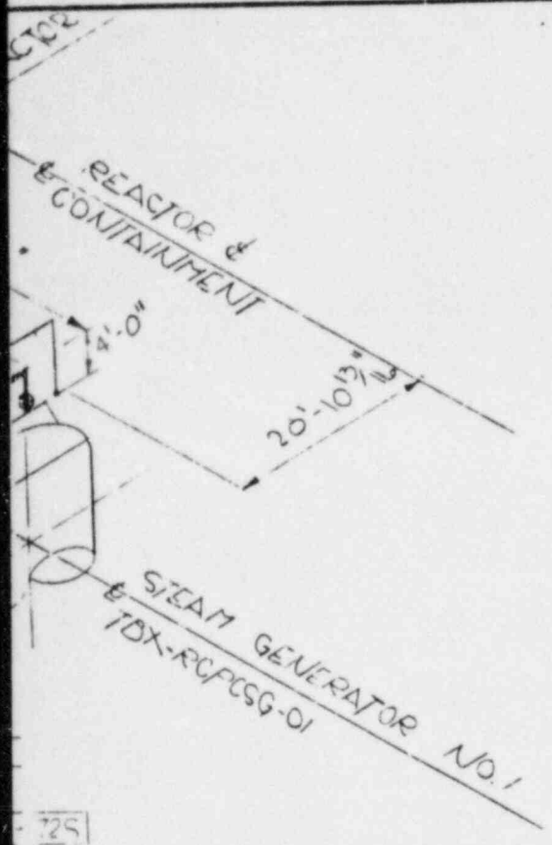
R.0	12-21-84
LIFT	1-15-82
R 2,3,4	2-20-82

* PIPING WAS PULLED BY POLAR CRANE AT THIS POINT (WHICH IS THE LOCATION OF THE PRESENT SUPPORT.), BY 31,250 # ~~FORCE~~.

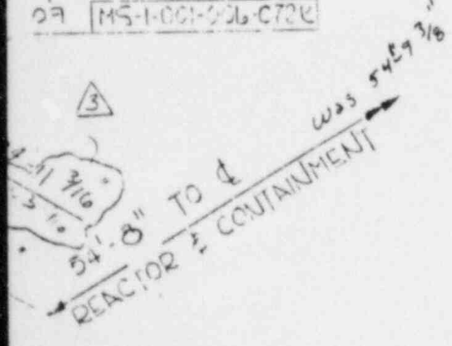
** ~~THESE~~ TWO POINTS WERE CONNECTED BY A ~~CHAIN~~ LINK. THAT ELBOW MOVED UP BY ~~BY~~ 3 1/4"

0241-MS-1-RB-002





DP 09 MS-1-001-006-C72K



BILL OF MATERIAL

PC NO	REQ	HEAT NO	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE

REV	DATE	DESCRIPTION	DWN	CKD	APPD
0		ISSUED FOR VENDOR IDENTIFICATION AND ACCOUNTABILITY ONLY			
A		REVISED PER VENDOR COMMENTS FOR STRESS ANALYSIS			
B		VERIFIED FOR STRESS PRINT 1-001.			

WELD NO.																			
RT																			
MT																			
LP																			
UT																			

COST CODE	PAINT	INSUL.	CL.	THERM.
FLOW DIAG.	COMPOSITE	SPEC.	DESIGN CAT./CL.	

NOTES

FOR OFFICE AND ENGINEERING USE ONLY

TEXAS UTILITIES SERVICES INC
C P S E S 35-1195 GLEN ROSE, TEXAS

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

DRAWING TITLE
MAIN STEAM REHEAT AND STEAM DUMP

3

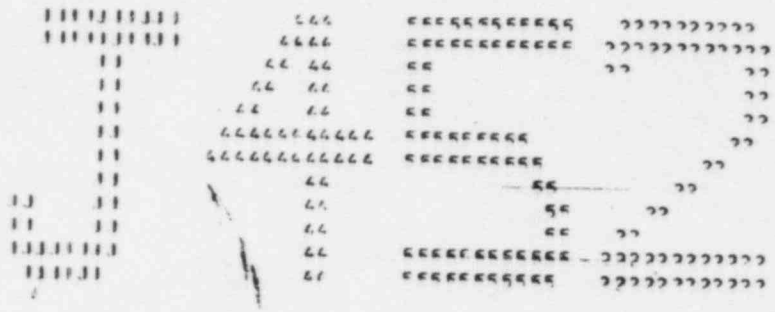
Category II API3 item 25

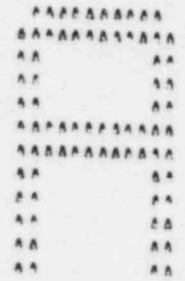
TI APERTURE CARD

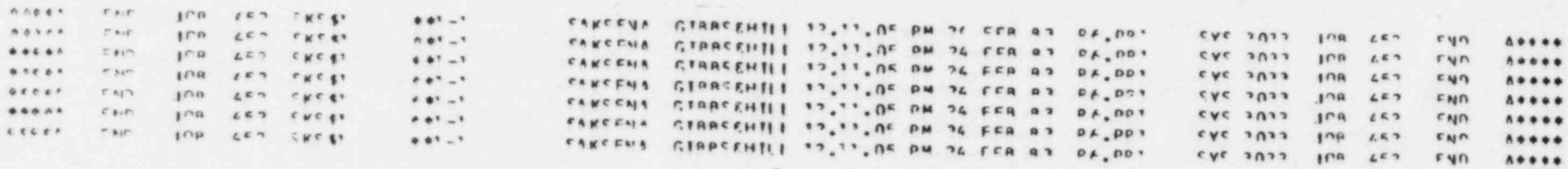
Also Available On Aperture Card

8606120432-01

Category 11 AP13 Item 22







MAIN STEAM (INSIDE CONTAINMENT)

" "

LIFT

M/491

SUMMARY OF MARK COMMONS

FISH LINE AND SINKER SUPPLIED BY ADAMS/M

Figure 6. Hall, Inc.
Effect of Process Conditions and Ingredient Variables on Cake Quality Characteristics
Main Effects Plot for Volume
Fitted Means
Data Means

ANOVA FOR VOLUME AS AFFECTED BY MAIN EFFECTS

SUMMARY OF CERTAIN TEST STATISTICS AND STATISTICS

SOURCE	DF	SEQ SS	ADJ SS	ADJ MS	F	P
MAIN EFFECTS	3	0.1	0.1	0.1	0.0	0.0
2-WAY INTERACTIONS	3	0.0	0.0	0.0	0.0	0.0
3-WAY INTERACTIONS	1	0.0	0.0	0.0	0.0	0.0
RESIDUAL ERROR	0	0.0				
TOTAL	7	0.1				

ANOVA FOR VOLUME AS AFFECTED BY MAIN EFFECTS

MULTIPLE INFORMATION

GIBBS & HILL, INC.
TIGHT FORCED DISPLACEMENT ON 12"SCH-80 INPUT IN CASE 5,SOLENOID(MODIFIED)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-142
FINISH LINE ENDS P 1-5 & ENDS SUPPLIED BY MARK CUMMINS
STRESS SUMMARY

SUMMARY OF CERTAIN LIKE PIPES & STRESSES

ELEM. NO.	NODE NO.	ELEM. A (PSI)	ELEM. B (PSI)	ELEM. C (PSI)	ELEM. D (PSI)	ANNOTATIONAL INFORMATION
4	2 14 BEG	0.	27584.	0.	0.	
4	2 15 END	0.	27642.	0.	0.	
7	2 200 BEG	0.	0.	0.	0.	
7	2 210 END	0.	0.	0.	0.	
8	1 210 BEG	0.	0.	0.	0.	
8	1 214 END	0.	0.	0.	0.	
9	2 214 BEG	0.	0.	0.	0.	
8	2 220 END	0.	0.	0.	0.	
9	1 220 BEG	0.	0.	0.	0.	
9	1 224 END	0.	0.	0.	0.	
8	2 220 BEG	0.	0.	0.	0.	
8	2 224 END	0.	0.	0.	0.	
10	1 14 BEG	0.	27642.	0.	0.	
10	1 15 END	0.	27584.	0.	0.	
10	2 14 BEG	0.	27584.	0.	0.	
10	2 15 END	0.	27584.	0.	0.	
10	2 14 BEG	0.	27584.	0.	0.	
11	2 16 END	0.	27642.	0.	0.	
10	4 14 BEG	0.	47037.	0.	0.	
10	4 17 END	0.	47374.	0.	0.	
10	5 14 BEG	0.	29011.	0.	0.	
10	5 17 END	0.	29011.	0.	0.	
10	4003 BEG	0.	29011.	0.	0.	
10	4 19 END	0.	29011.	0.	0.	
10	7 14 BEG	0.	29011.	0.	0.	
10	7 19 END	0.	29011.	0.	0.	
10	8 14 BEG	0.	29011.	0.	0.	
10	8 19 END	0.	29011.	0.	0.	
10	9 14 BEG	0.	47374.	0.	0.	
10	9 19 END	0.	47037.	0.	0.	

CLARK E HILL, INC.
FIRST FORCE MONITORED NO 111333-010 INPUT IN CMCS$.ANSIDATA1(MCPIII.MAP)
MAIN STREAM 0.0-0 , PERFORATED 0.0-0.0 @ 0.0-0.0
CLOSED LOOP , W/CONTRACTOR & LOADS SUPPLIED BY MARK COMMONS
STRESS SUMMARY

SUMMARY OF SECTION III PLATE 2 STRESSES

SEC	NEW SEQ	PLATE	FOR. 0 (PSI)	FOR. 90 (PSI)	FOR. 11 (PSI)	ADDITIONAL INFORMATION
2	1	4 BEG	0.	0.	0.	
2	1	104 END	0.	27560.	0.	
2	2	104 BEG	0.	27560.	0.	
2	2	110 END	0.	27108.	0.	
2	1	110 BEG	0.	33088.	0.	
2	1	7 END	0.	33541.	0.	
2	7	7 BEG	0.	33541.	0.	
2	7	8 END	0.	33503.	0.	
2	8	8 BEG	0.	42962.	0.	
2	8	9 END	0.	42315.	0.	
2	9	9 BEG	0.	35603.	0.	
2	4	109 END	0.	35603.	0.	
5	1	109 BEG	0.	35603.	0.	
5	1	10 END	0.	35603.	0.	
5	4	10 BEG	0.	35603.	0.	
5	4	113 END	0.	35603.	0.	
5	1	113 BEG	0.	42315.	0.	
5	1	11 END	0.	42734.	0.	
5	11	11 BEG	0.	27543.	0.	
5	11	111 END	0.	27541.	0.	
4	111	111 BEG	0.	27541.	0.	
4	111	112 END	0.	27580.	0.	
4	112	112 BEG	0.	27580.	0.	
4	2	112 END	0.	27564.	0.	
4	1	12 BEG	0.	27564.	0.	
4	1	12 END	0.	28021.	0.	
4	1	12 BEG	0.	28021.	0.	
4	1	26 END	0.	28012.	0.	
4	2	35 BEG	0.	28012.	0.	
4	2	14 END	0.	27588.	0.	

SUMMARY OF SECTION III CLASS 2 STRESSES

SEC NUM	SEC DESC	EQN. 9 (PSI)	EQN. 10 (PSI)	EQN. 11 (PSI)	ADDITIONAL INFORMATION
1	11000 BEG	0.	0.	0.	
1	11010 END	0.	0.	0.	
1	11010 BEG	0.	0.	0.	
1	11020 END	0.	0.	0.	
1	11020 BEG	0.	0.	0.	
1	11025 END	0.	0.	0.	
1	11025 BEG	0.	0.	0.	
1	11030 END	0.	0.	0.	
1	11030 BEG	678.	0.	0.	
1	11032 END	1078.	0.	0.	
1	11032 BEG	1078.	0.	0.	
1	11035 END	1210.	0.	0.	
1	11040 BEG	4578.	0.	0.	
1	11040 END	5003.	0.	0.	
1	11042 BEG	4324.	0.	0.	
1	11042 END	4988.	0.	0.	
1	11042 BEG	4988.	0.	0.	
1	11045 END	4343.	0.	0.	
1	11045 BEG	4343.	0.	0.	
1	11050 END	4320.	0.	0.	
1	11050 BEG	12470.	0.	0.	
1	11055 END	12324.	0.	0.	
1	11055 BEG	5003.	0.	0.	
1	1 END	10070.	0.	0.	
1	4 BEG	4111.	0.	0.	
1	4 END	4524.	0.	0.	

TEST CASES PROJECT NO 113333-01G INPUT IN SYS$.ADLDATA(MSPIK1MP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
STRESS SUMMARY

ANALYSIS WAS NOT PERFORMED AT THE FOLLOWING POINTS BECAUSE THEY ARE THE LOCATIONS OF RIGID BODIES OR BEAMS

CONDITION	FILE	SECTION	MEMBER	FROM	TO	POSITION
	14	7	1	15	300	BEG
	14	7	1	15	300	END

GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 02/24/83 11 46 49

TEST CASES PROJECT NO 111333-010 INPUT IN SKS$:ADLDATA1(NSPIRE).MP1

MAIN STEAM P 1-1 , FEEDWATER P 1-5 E P 1-152

FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

EXECUTION STRESS SUMMARY

CLASS	*	2.	*	1974.	*	*	*	*
ED	0	*	14.	*	*	*	*	*
END		*		*	*	*	*	*

GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 02/24/87 11:45:29
TURK CROSS PROJECT NO 113333-010 INPUT IN SKS$:ADLDATA1(MCPHILLMR)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE LOOP ' W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

JOBNAME - SKS$1

RUN DATE - 02/24/87

RUN TIME - 11:44:48

GIBBS & HILL, INC.
11 PENN PLAZA
NEW YORK, NY 10001

TEL (212) 760-4000

APPLIED MECHANICS DEPARTMENT

GIBBS & HILL, INC.
TIKI FORCE PROJECT NO 11333-010 INPUT IN CKS$.ANSIDATA(INSPIRE1MG)
MAIN STREAM P 1-1 , FEEDWATER P 1-5 & P 1-142
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK CUMMINGS

****
VERSION - ANSI PIPE (CASE) ECN 1977 REVISION 12
DERIVED FM ANSI PIPE MANUAL DATED APRIL 1977
****

****
ANSI PIPE
STRESS OF
****

1. ACME SECTION III , CLASS 1 STRESS ANALYSIS AND STRESS REPORT PER NP 7000
   (WINTER 1974 ADDENDA 1974)
2. ACME SECTION III , CLASS 2 PIPING FABRICATION
3. ACME SECTION III , CLASS 2 PIPE STRESS ANALYSIS AND STRESS REPORT PER NC 7000
   (WINTER 1974 ADDENDA) AND 1974
4. ANSI B31.1, 1967 AND ANSI B31.1A, 1973 STRESS ANALYSIS AND REPORT
5. ANSI B31.7, 1973 AND ANSI B31.4, 1973 STRESS ANALYSIS AND REPORT
6. TEMPERATURE DUE WITH FREQUENCY NUMBERS
7. TEMPERATURE DUE WITH DIMENSIONS
8. PIPE AND FITTING DRAWINGS WITH DIMENSIONS
9. NEW NOZZLE LOAD USED AS A MEMBER MODIFIED SPECIFIED WELD NOZZLE, VALVE, AND REDUCER CONE ANGLE
10. BEAM ELEMENT
11. PIPING BODY ELEMENT
12. ANSI 1 USED
13. SPECIFIED FLANGE
14. FLEX FACTORS
15. STRESS INTENSIFICATION
16. WELD STRESS FACTORS
17. INSULATION STARTER - DISCRIBE, DEADWEIGHT, THERMAL, STARTS ACCELERATION, DISPLACEMENTS, WIND
18. INSULATION DYNAMIC - SIMPLY SUPPORTED RESPONSE ANALYSIS AND TIME HISTORY ANALYSIS
19. INSULATION - TIME DEPENDENT THERMAL TRANSIENT

END SUPPORTED INFORMATION ON COMPONENT CONTOUR
1. VALID TECHNICAL SERVICE REPRESENTATIVE
2. J. W. NICHOLS
   ADDRESS 1 LITTLE, INC
   ARDEN PARK
   CAMBRIDGE, MASS 02140
   TEL (617) 864-5770 TELEX 021434

GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 07/24/87 11:45:29

THIS STRESS PROJECT NO 123333-010 INPUT IN SKS$.ADLDATA[ENSOUL1M0]

MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?

FLUSH LINE LOOP * W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

EXTERNAL POLAR CRANE PULL

CONDITION 14

LOADS

ACCELERATION

EXTERNAL

CLASS 2 SUMMARY OF 10 HIGHEST STRESSES FOR EACH EQUATION

	***** EQUATION 9 *****				
	SEC	MEM	SEQ	POS	STRESS (PSI)
1.	1	12	1055	END	13724.
2.	1	12	1050	BEG	13479.
3.	1	13	5	END	10970.
4.	1	13	1055	BEG	9803.
5.	1	11	1050	END	8320.
6.	3	3	0	END	6316.
7.	3	3	110	BEG	6315.
8.	1	10	1045	END	6253.
9.	1	11	1045	BEG	6252.
10.	10	9	20	END	6187.

THIS GIBBS PROJECT NO 112323-010 INPUT IN SKS$.ADLDATA1(MSPULLHR)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FINISH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SEC	NEW SEC	POS	TYPE	EQ.	PRESSURE	MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (.75iT)	TERM (T)
10	10	20	REG PIP	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	3519.6	0.0	3519.6	0.168	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	2000	END	PIP	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	3847.1	0.0	3847.1	0.183	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 02/24/83 11 45 39

THIS CASE3 PROJECT NO 112333-010 INPUT IN SKS$.ADLDATA1(MSPIRLMR)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 E P 1-152
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

CKT	MEM	SEQ	DOF	TYPE	EQ.	PRESSURE MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (I)	TERM (I)
10	A01	10	BEG	PIP	P	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		10	END	PIP	P	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
10	7	10	BEG	PIP	P	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		010	END	PIP	P	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
10	A01	10	BEG	PIP	P	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		10	END	PIP	P	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					Q	0.0	0.0	280'.0	0.0	280'.0	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
10	0	10	BEG	FLG	P	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					Q	0.0	0.0	4033.7	0.0	4033.7	0.234	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344
		20	END	FLG	P	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					Q	0.0	0.0	6'86.3	0.0	6'86.9	0.396	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344

THIS CASE'S PROJECT NO 132373-0*0 INPUT IN CASE$.ADLDATA1(MSPULLMP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE LOOP * W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SET	NEW SEG	POS	TYPE	EQ.	RESSIPE MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (.75it)	TERM (i)
10	3 151	REC	PIP	8	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2728.1	0.0	2728.1	0.130	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		153	END	PIP	8	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2728.0	0.0	2728.0	0.130	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
10	3 153	REC	PIP	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2728.0	0.0	2728.0	0.130	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		16A	END	PIP	8	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2732.6	0.0	2732.6	0.130	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
10	4 16A	REC	FI	8	0.0	0.0	0.0	0.0	0.0	0.0	1.750	
				9	0.0	0.0	4803.4	0.0	4803.4	0.229	1.750	
				10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.750	2.344
		17	END	FI	8	0.0	0.0	0.0	0.0	0.0	1.750	
				9	0.0	0.0	4933.7	0.0	4933.7	0.234	1.750	
				10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.750	2.344
10	5 17	REC	PIP	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2801.0	0.0	2801.0	0.133	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		917D	END	PIP	8	0.0	0.0	0.0	0.0	0.0	1.000	
				9	0.0	0.0	2801.0	0.0	2801.0	0.133	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

FIRST CROSS REFERENCE NO 1137373-0130 IMPUT IN CRC$.ANLYSTAT(MCPHILLMS)
MAIN CREAM P 1-1 . RECOVERED P 1-4 E P 1-163
FINISH LINE LOOP 1 W/CENMCTRY & LOANS SUPPLIES BY MARK CUMMINS
EXTERNAL POLAR FRAMES PLOT

CONDITION 14
LOANS
PREPAYMENT
EXTERNAL
CREDIT UNITED/SO INS

ACME CERTIFICATE III PLACE 3 CREDIT SUMMARY
********** 1974 YEARLING **********

CER MEM CEN PRC TYPE EQ.	DESCRIPTOR NUMBER (A) NUMBER (B) AMOUNT (C)	TOTAL	ALLOWABLE	TOTAL / FROM (.7691)	INTERNSIFICATION FACTORS FROM (1)
0 1 113 REC PU 9	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.0	1.000	1.000
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
0 1 113 REC PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
133 END PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
0 2 135 REC PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
135 END PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
0 1 113 REC PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
133 END PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
0 2 135 REC PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
135 END PU 8	0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.000	1.000	1.000
9	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
10	0.0 0.0 0.0 0.0 0.0 0.0	0.0			
11	0.0 0.0 0.0 0.0 0.0 0.0	0.0			

TEST CASES PROJECT NO 113333-010 INPUT IN <SYS$.ADLDATA>EMSPUR.MPI
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE LOOP ' W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL DEAD FRAME PIPE!

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SEC	MEM	SEQ	POS	TYPE	EQ.	DEFICIENT MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (.75iB)	TERM (i)
6	2	35	REG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2812.4	0.0	2812.4	0.134	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		36	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2788.3	0.0	2788.3	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
6	3	36	REG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2788.3	0.0	2788.3	0.133	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		46	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2761.8	0.0	2761.8	0.132	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
7	1	46	REG	PIPID									
		300	END	PIPID									
7	2	300	REG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		310	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
8	1	310	REG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		315	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

TEST PROBLEM PROJECT NO 111333-010 INPUT IN SYS$.ADLDATA1:[MSPIKE.MP]
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-19?
FLUSH LINE LOOP * W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS INTENSIFICATION FAC

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SEC	NEW	SEG	POS	TYPE	EQ.	PRESSURE	MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (.75*I)	TERM (I)
4	1	111	BEG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3241.1	0.0	3241.1	0.154	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		111	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2779.8	0.0	2779.8	0.132	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
4	2	111	BEG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2779.8	0.0	2779.8	0.132	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		12	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2755.5	0.0	2755.5	0.131	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
5	1	12	BEG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2755.5	0.0	2755.5	0.131	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		17	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2821.3	0.0	2821.3	0.134	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
6	1	17	BEG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2821.3	0.0	2821.3	0.134	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		35	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	2812.4	0.0	2812.4	0.134	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

THIS CROSS PROJECT HAS 111333-010 INPUT IN CRCS$.ADLDATA(MSPIN1.MP1
MAIN STREAM P 1-1 , FEEDWATER P 1-2 E P 1-152
FINISH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL PIPER CRANE HILL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SEC	MEM	SEC	POS	TYPE	EQ.	PRESSURE	MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (.75if)	TERM (i)
2	2	100	BEG	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3593.7	0.0	3593.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
			10	END	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3593.7	0.0	3593.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
2	4	10	BEG	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3593.7	0.0	3593.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
			110	END	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3593.7	0.0	3593.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
2	7	110	BEG	FI	9	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					9	0.0	0.0	6315.3	0.0	6315.3	0.301	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344
			11	END	FI	9	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					9	0.0	0.0	5735.7	0.0	5735.7	0.273	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344
3	0	11	BEG	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3242.9	0.0	3242.9	0.155	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
			111	END	BII	9	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3241.1	0.0	3241.1	0.154	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

TEST CASES PROJECT NO 333333-010 INPUT IN SYS$.ADLDATA(MSPULMR)
MAIN STEAM @ 1-1 , FEEDWATER @ 1-5 & @ 1-152
FLUSH LINE LOOP * W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL MAIN CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SEC	NOM	SEQ	POS	TYPE	EQ.	PRESSURE	MOMENT (I)	MOMENT (J)	MOMENT (K)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (I)	TERM (J)
2	1	120	BEG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3307.8	0.0	3307.8	0.158	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		7	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3360.5	0.0	3360.5	0.160	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
2	2	7	BEG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3360.5	0.0	3360.5	0.160	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		8	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3391.7	0.0	3391.7	0.162	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
2	3	8	BEG	FLG	8	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					9	0.0	0.0	5963.0	0.0	5963.0	0.284	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344
		9	END	FLG	8	0.0	0.0	0.0	0.0	0.0	0.0	1.758	
					9	0.0	0.0	6315.3	0.0	6315.3	0.301	1.758	
					10	0.0	0.0	0.0	0.0	0.0	0.0		2.344
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.758	2.344
2	4	9	BEG	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3592.7	0.0	3592.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
		100	END	PIPE	8	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
					9	0.0	0.0	3592.7	0.0	3592.7	0.171	1.000	
					10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
					11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

TURKEY POINT UNIT 3&4 PROJECT NO 11223-010 INPUT IN SKCS$.ANSDATA(WSPIN,WS)
MAIN STREAM P 1-1 , SECONDARY P 1-5 & P 1-142
FLUSH LINE LOOP ' W/GEOMETRY & LOADS SUPPLIED BY MARK CUMMINS
EXTERNAL PIPING FROM OHI

CONDITION 14
LOADS
SPECIFICATION
EXTERNAL
STRESS UNITS(LB/SQ IN)

ACME CERTIFIED III GRADE B STEEL SEAMLESS
********** 1974 VERSION **********

SEC	NEW SEQ	PNT	TYPE	CO.	PRESSURE	MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS
											I-FOR (.75i+1) I-FOR (i)
1	1	10	ELBOW	BW	0.0	0.0	0.0	0.0	0.0	0.0	1.000 1.000
		20			0.0	0.0	0.0	0.0	0.0	0.0	
		30			0.0	0.0	0.0	0.0	0.0	0.0	
		40			0.0	0.0	0.0	0.0	0.0	0.0	

TIKI CREEK PROJECT NO 123123-010 INPUT IN CRSS.ADLDATA(NSPIRLMB)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152
FLUSH LINE LOOP * W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL PULLED CRANE PIPE

CONDITION 14
LOADS
OCCASIONAL
EXTERNAL
STRESS UNITS(LB/SQ IN)

ASME SECTION III CLASS 2 STRESS SUMMARY
********** TOTAL ABOVE SECTION **********

SET	NEW SET	ADS TYPE	FD.	PRESSURE MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL / ALLOWABLE	INTENSIFICATION FACTORS TERM (I)	TERM (I)
*	01040	REG	PI	R 0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	4325.6	0.0	4325.6	0.208	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1043	END	PI	R 0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	4987.9	0.0	4987.9	0.238	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
*	01043	REG	PI	R 0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	4987.9	0.0	4987.9	0.238	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1045	END	PI	R 0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	6252.9	0.0	6252.9	0.298	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
*	11045	REG	PI	R 0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	6252.9	0.0	6252.9	0.298	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1050	END	PI	R 0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q 0.0	0.0	8319.8	0.0	8319.8	0.398	1.000	
				10 0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
*	11050	REG	PO	R 0.0	0.0	0.0	0.0	0.0	0.0	1.500	
				Q 0.0	0.0	12470.4	0.0	12470.4	0.594	1.500	
				10 0.0	0.0	0.0	0.0	0.0	0.0		2.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.500	2.000
	1055	END	PO	R 0.0	0.0	0.0	0.0	0.0	0.0	1.500	
				Q 0.0	0.0	13723.5	0.0	13723.5	0.654	1.500	
				10 0.0	0.0	0.0	0.0	0.0	0.0		2.000
				11 0.0	0.0	0.0	0.0	0.0	0.0	1.500	2.000

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 ANSYS STRESS ANALYSIS EXAMPLE (WORKSHOP 1 MOD)
 SAMPLE PROBLEM FOR USER TRAINING
 ELEMENT TYPE 1 IS SOLID45 3-D BRICK
 MATERIAL PROPERTY SET 1 IS STEEL
 REAL CONSTANT SET 1 IS BLANK
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PRINT ELEMENT SOLUTION PER ELEMENT

***** POST1 ELEMENT NODAL STRESS LISTING *****

ELEM	NODE	SX	SY	SZ	SXY	SYZ	SXZ	PRIN 1	PRIN 2	PRIN 3	INTENSITY	EQV STRESS
1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	678.3	0.0	0.0	678.3	0.0	-678.3	1356.6	1174.9
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	1928.0	0.0	0.0	1928.0	0.0	-1928.0	3856.0	3339.5
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3	0.0	0.0	0.0	1028.0	0.0	0.0	1028.0	0.0	-1028.0	2056.0	1780.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	2318.0	0.0	0.0	2318.0	0.0	-2318.0	4636.0	4013.8
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	0.0	0.0	0.0	4628.7	0.0	0.0	4628.7	0.0	-4628.7	9257.4	8014.1
	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	9	0.0	0.0	0.0	5001.4	0.0	0.0	5001.4	0.0	-5001.4	10002.8	8661.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST CASES PROJECT NO 113333-010 INPUT IN CASE$.ANLDATA1(MSPIRLIMP)
MAIN STREAM P 1-1 , REFORMATTED P 1-5 E P 1-153
FLUSH : INF LOOP : W/REFORMETRY E LOADS SUPPLIED BY MARK COMMONS
EXTERNAL LOADS FRAME PULL

CONDITION 14
LOADS
ALLEVIATION
EXTERNAL
STRESS INTENSIFIED/SO IN

ASME SECTION III CLASS 2 STRESS SUMMARY
********** 1974 VERSION **********

SET	NEW SEQ	POC	TYPE	FO.	PRESSURE	MOMENT (A)	MOMENT (B)	MOMENT (C)	TOTAL	TOTAL/ ALLOWABLE	INTENSIFICATION FACTORS TERM (I-TEST)	TERM (I)
1	11000	REG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1010	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
1	21010	REG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1015	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
1	31015	REG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1020	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
1	41020	REG	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000
	1025	END	PIP	A	0.0	0.0	0.0	0.0	0.0	0.0	1.000	
				Q	0.0	0.0	0.0	0.0	0.0	0.000	1.000	
				10	0.0	0.0	0.0	0.0	0.0	0.0		1.000
				11	0.0	0.0	0.0	0.0	0.0	0.0	1.000	1.000

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                    Gipac & Hill, Inc.
                First recce pavilion No 112223-010 Input in SKS$.ADLDATA(MKSPIL1A01)
                Main stream p 1-1 , ffffdwater p 1-3 f  p 1-153
                Finish line loop  , w/fcnwetay & loads Supplied by mark commands
            External pylab frame pill
Construction
Loads
Modification
Internal
External
*********Continents of load set filename 143

Construction  14 labels     5          11:20.                24 pg

                First recce pavilion No 112223-010 Input in SKS$.ADLDATA(MKSPIL1A01)
                Main stream p 1-1 , ffffdwater p 1-3 f  p 1-153
                Finish line loop  , w/fcnwetay & loads Supplied by mark commands
            External pylab frame pill
```

GIBBS & HILL, INC. 09/26/89 11 45 29

TIME FORCE DOMIFFF NO ######-010 INPUT IN CRC$.ANCDATA(INSPIN1MD)

MAIN STREAM P 1-1 , FEEDWATER P 1-1E P 1-1E3

FINISH LINE LOOP , W/CONNECTED LOADS SUPPLIED BY MARK CUMMINS

EXTERNAL POINT LOAD SUMMARY

CONDITION 14

LOADS

APPLICABILITY

EXTERNAL

SOURCE AND MOMENTS ACT ON THE PIPING

NOT OF SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)
1 1000	0.	-0.	-0.	0.	0.	-0.	0.8404	-5.6739	-4.5424	1.0670	0.0338	0.0887
2 6	0.	0.	-0.	0.	-0.	0.	0.1537	-1.0000	2.0121	0.7233	0.0338	-0.2494
3 100	0.	0.	0.	0.	0.	0.	0.1537	-0.7401	2.0518	0.7374	0.0338	-0.2431
4 111	-0.	0.	0.	0.	-0.	0.	-0.0785	-0.4704	0.7043	0.4708	0.0338	0.0221
5 12	0.	0.	0.	0.	-0.	0.	-0.0785	-0.4163	0.7621	0.4707	0.0338	0.0207
6 13	0.	0.	-0.	0.	0.	0.	-0.0785	-0.3703	0.6761	0.4108	0.0338	0.0485
7 14	-0.	0.	-0.	0.	0.	0.	-0.0785	-0.3084	0.6003	0.3615	0.0338	0.0501
8 210	-0.	0.	0.	0.	0.	-0.	-0.0414	-0.3015	0.6003	0.3615	0.0338	0.0501
9 200	0.	-0.	-0.	0.	-0.	-0.	-0.0901	-0.3015	0.7758	0.3615	0.0338	0.0501
10 300	0.	-0.	-0.	0.	-0.	-0.	-0.0337	-0.3015	0.6769	0.3615	0.0338	0.0501
11 2000	0.	16762.	-0.	-2923282.	0.	-481113.	0.0000	0.0000	-0.0000	0.0000	-0.0000	0.0000

GIBBS & HILL, INC. ANLPIPE STRESS ANALYSIS 07/24/87 11:45:29

TIKI CREEK PROJECT NO 113333-010 INPUT IN SKS$:ANLDATA[MSPHILMR]

MAIN STEAM P.1-1 , FEEDWATER P.1-5 & P.1-15?

FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

EXTERNAL POLAR CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

SPRING/HANGER SUMMARY
FORCES AND MOMENTS ACT ON THE PIPING

SEC	MEM	SEQ	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)

THIS SYSTEM CONTAINS NO SPRINGS/HANGERS

THIS CROSS PROJECT NO 113333-010 INPUT IN SKSS.ADLDATA(MSPIN1MP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 E P 1-153
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL PIPE CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

INTERNAL LOADS IN THE PIPING
FORCES AND MOMENTS ACT ON THE PIPING

SEQ LOC	TYPE	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)
13 END	PI-PI	-0.079	-0.330	0.476	0.420	0.034	0.048	0.	-447.	-0.	-202936.	0.	54302.
13 REC	PI-PI	-0.079	-0.330	0.476	0.420	0.034	0.048	-0.	447.	0.	202936.	-0.	-54302.
35 END	PI-PI	-0.079	-0.281	0.444	0.395	0.034	0.054	0.	1619.	-0.	-202936.	0.	51457.
14 END	PI-PI	-0.079	-0.263	0.430	0.377	0.034	0.057	0.	3132.	-0.	-202936.	0.	43834.
15 END	PI-PI	-0.079	-0.209	0.400	0.361	0.034	0.059	0.	4401.	-0.	-202936.	0.	33749.
15 REC	PI-PI	-0.079	-0.209	0.400	0.361	0.034	0.059	0.	0.	-0.	-0.	0.	0.
300 END	PI-PI	-0.080	-0.310	0.400	0.361	0.034	0.059	-0.	-0.	0.	0.	-0.	-0.
310 END	PI-PI	-0.081	-0.302	0.400	0.361	0.034	0.059	-0.	-0.	0.	-0.	0.	-0.
310 REC	PI-PI	-0.081	-0.302	0.400	0.361	0.034	0.059	-0.	0.	0.	0.	0.	0.
315 END	PI-PI	-0.076	-0.302	0.488	0.361	0.034	0.059	0.	-0.	-0.	-0.	-0.	-0.
320 END	PI-PI	-0.090	-0.302	0.776	0.361	0.034	0.059	0.	-0.	-0.	-0.	-0.	-0.
310 REC	PI-PI	-0.081	-0.302	0.400	0.361	0.034	0.059	-0.	0.	0.	0.	0.	-0.
325 END	PI-PI	-0.067	-0.302	0.513	0.361	0.034	0.059	0.	-0.	-0.	-0.	-0.	0.
330 END	PI-PI	-0.033	-0.302	0.425	0.361	0.034	0.059	0.	-0.	-0.	-0.	-0.	-0.
15 REC	PI-PI	-0.079	-0.209	0.400	0.361	0.034	0.059	-0.	-4401.	0.	202936.	-0.	-33749.
151 END	PI-PI	-0.079	-0.151	0.560	0.337	0.034	0.061	0.	4445.	-0.	-202936.	0.	8000.
152 END	PI-PI	-0.079	-0.110	0.551	0.333	0.034	0.061	0.	7592.	-0.	-202936.	0.	-8703.
16 END	PI-PI	-0.079	-0.109	0.555	0.330	0.034	0.061	0.	7938.	-0.	-202936.	0.	-14696.
17 END	FI-FI	-0.063	-0.067	0.310	0.317	-0.011	0.031	0.	10618.	-0.	-202936.	0.	-48113.
0170 END	PI-PI	-0.079	-0.067	0.295	0.314	-0.011	0.030	0.	10959.	-0.	-202936.	0.	-48113.
18 END	PI-PI	-0.078	-0.067	0.209	0.307	-0.011	0.030	0.	11756.	-0.	-202936.	0.	-48113.
0181 END	PI-PI	-0.025	-0.067	0.198	0.305	-0.011	0.028	0.	11971.	-0.	-202936.	0.	-48113.
19 END	PI-PI	-0.014	-0.067	0.194	0.304	-0.011	0.026	0.	12874.	-0.	-202936.	0.	-48113.
20 END	FI-FI	-0.000	-0.002	0.000	0.000	-0.000	0.002	0.	15555.	-0.	-357617.	0.	-48113.
2000 END	PI-PI	0.000	0.300	-0.000	0.000	-0.000	0.000	0.	16263.	-0.	-383383.	0.	-48113.

THIS CASE3 PROJECT ID 123333-010 INPUT IN CASE3.ADLDATA(MSPIPE1A01)
MAIN STEAM 2-1 , FEEDWATER B 1-5 E B 1-153
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

INTERNAL LOADS IN THE PIPING
FORCES AND MOMENTS ACT ON THE PIPING

CED LAY	TYPE	DX (IN)	DY (IN)	DZ (IN)	RX (DEG)	RY (DEG)	RZ (DEG)	FX (LB)	FY (LB)	FZ (LB)	MX (FT-LB)	MY (FT-LB)	MZ (FT-LB)
1000 BEG	PI-PI	0.870	-5.574	-4.544	1.357	0.034	0.089	0.	-0.	-0.	0.	0.	-0.
1010 END	PI-PI	0.768	-5.674	-3.114	1.057	0.034	0.089	-0.	1110.	0.	-0.	-0.	0.
1015 END	PI-PI	0.563	-5.674	-0.000	1.057	0.034	0.089	-0.	2826.	0.	-0.	-0.	0.
1020 END	PI-PI	0.378	-5.673	1.313	1.057	0.034	0.089	-0.	4534.	0.	-0.	-0.	0.
1025 END	PI-PI	0.356	-5.673	1.570	1.057	0.034	0.089	-0.	4739.	0.	-0.	-0.	0.
1030 END	FI-FI	0.313	-5.633	2.041	1.057	0.034	0.078	-0.	5342.	0.	-0.	-0.	-11526.
1033 END	PI-PI	0.313	-5.575	2.034	1.057	0.034	0.064	-0.	5983.	0.	-0.	-0.	-32760.
1035 END	PI-PI	0.313	-5.533	2.008	1.057	0.034	0.038	-0.	6423.	0.	-0.	-0.	-58395.
1040 END	FI-FI	0.307	-5.056	1.993	1.003	0.034	-0.076	-0.	7226.	0.	-15766.	-0.	-71789.
1043 END	PI-PI	0.260	-4.767	1.993	0.984	0.034	-0.134	-0.	7888.	0.	-45050.	-0.	-71789.
1045 END	PI-PI	0.260	-3.639	1.993	0.944	0.034	-0.195	-0.	8578.	0.	-78328.	-0.	-71789.
1050 END	PI-PI	0.204	-3.508	1.993	0.864	0.034	-0.268	-0.	9404.	0.	-121781.	-0.	-71789.
1055 END	PE-PE	0.194	-2.208	1.993	0.847	0.034	-0.281	-0.	9935.	0.	-137801.	-0.	-71789.
5 END	PE-PE	0.180	-1.854	1.993	0.841	0.034	-0.285	-0.	10835.	0.	-158652.	-0.	-71789.
A DIS	FI-FI	0.154	-1.000	2.018	0.763	0.034	-0.269	0.	-20000.	-0.	0.	0.	0.
A END	FI-FI	0.154	-1.000	2.018	0.763	0.034	-0.269	-0.	33516.	0.	-202936.	-0.	-24758.
A BEG	PI-PI	0.154	-1.000	2.018	0.763	0.034	-0.269	0.	-33516.	-0.	202936.	0.	24758.
104 END	PI-PI	0.154	-0.934	2.030	0.756	0.034	-0.268	-0.	34279.	0.	-202936.	-0.	32087.
120 DIS	PI-PI	0.154	-0.760	2.052	0.737	0.034	-0.263	0.	31250.	-0.	0.	0.	-0.
120 END	PI-PI	0.154	-0.760	2.052	0.737	0.034	-0.263	-0.	4427.	0.	-202936.	-0.	139574.
120 BEG	PI-PI	0.154	-0.760	2.052	0.737	0.034	-0.263	0.	-4427.	-0.	202936.	0.	-139574.
7 END	PI-PI	0.154	-0.643	2.062	0.730	0.034	-0.250	-0.	5080.	0.	-202936.	-0.	146400.
8 END	PI-PI	0.154	-0.531	2.067	0.724	0.034	-0.237	-0.	5420.	0.	-202936.	-0.	150317.
9 END	FI-FI	0.020	-0.458	1.575	0.434	0.078	-0.117	0.	8100.	0.	-202936.	0.	174294.
100 END	PI-PI	0.031	-0.458	1.471	0.430	0.078	-0.114	0.	8483.	0.	-202936.	0.	174294.
10 END	PI-PI	-0.034	-0.458	1.276	0.414	0.078	-0.100	0.	9150.	0.	-202936.	0.	174294.
110 END	PI-PI	-0.034	-0.458	1.276	0.414	0.078	-0.100	0.	9150.	0.	-202936.	0.	174294.
11 END	FI-FI	-0.070	-0.573	0.794	0.511	0.034	0.024	0.	11831.	0.	-202936.	0.	133582.
111 END	PI-PI	-0.070	-0.571	0.794	0.511	0.034	0.027	0.	11944.	0.	-202936.	0.	130610.
111 BEG	PI-PI	-0.070	-0.571	0.794	0.511	0.034	0.027	-0.	-11944.	0.	202936.	-0.	-130610.
112 END	PI-PI	-0.070	-0.631	0.767	0.474	0.034	0.030	0.	14085.	-0.	-202936.	0.	40660.
112 DIS	PI-PI	-0.070	-0.615	0.743	0.471	0.034	0.040	-0.	20000.	0.	0.	-0.	-0.
12 END	PI-PI	-0.070	-0.615	0.743	0.471	0.034	0.040	0.	-4703.	-0.	-202936.	0.	30338.
12 BEG	PI-PI	-0.070	-0.615	0.743	0.471	0.034	0.040	-0.	4703.	0.	202936.	-0.	-30338.

TIKI CREEK PROJECT NO 113333-010 INPUT IN SKS$.ADLDATA1(MSPHIMO)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE 1000 ' W/CRIMETOY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

MEMBER LOADS
(NEW ENTRIES ARE MADE WHEN LOADS CHANGE)

CODE CLASS 2,1974

REF	MEM FROM	TO	PRESS PSI	UNIT WEIGHT LB/FT	CONC WEIGHT LB	TEMP CHANGE DEG F	FX LB	FY LB	FZ LB	MX FT-LB	MY FT-LB	MZ FT-LB
1	1 1000	1010	0.0	170.76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	12 1050	1055	0.0	313.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	13 1055	5	0.0	455.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	14 5	6	0.0	455.04	0.0	0.0	0.0	-20000.00	0.0	0.0	0.0	0.0
2	1 6	106	0.0	455.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2 106	120	0.0	455.04	0.0	0.0	0.0	31250.00	0.0	0.0	0.0	0.0
2	3 120	7	0.0	455.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	2 112	12	0.0	455.04	0.0	0.0	0.0	20000.00	0.0	0.0	0.0	0.0
5	1 12	13	0.0	455.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1 15	300	0.0	0.01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1 15	151	0.0	455.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

STIFFNESS MATRIX STORAGE REQUIRED 1104 LOCATIONS OUT OF A TOTAL OF 20000

TEST CASES PROJECT NO 112323-010 INPUT IN SKS$.ADLDATA1(MSPIULMP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 E P 1-152
FLUSH LINE LOOP ' W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL PIPER FRAME PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

PIPING CONNECTIVITY BY SEQUENCE NUMBER

SECTION														
1	1000-	1310-	1015-	1020-	1025-	1030-	1032-	1035-	1040-	1042-	1045-	1050-	1055-	5- 6-
2	6-	106-	120-											
3	120-	7-	8-	9-	109-	10-	110-	11-	111-					
4	111-	112-	12-											
5	12-	13-												
6	13-	35-	14-	15-										
7	15-	300-	310-											
8	310-	315-	320-											
9	320-	325-	330-											
10	15-	151-	152-	16-	17-	9170-	18-	9181-	19-	20-	2000-			

GIBBS & HILL, INC. AD_PIPE STRESS ANALYSIS 02/24/83 11 45 29

THIS CASE'S PROJECT NO 112323-010 INPUT IN SYS$.ADLDATA1(MSPULLMR)

MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152

FINISH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

EXTERNAL POLAR CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

MEMBER MATERIAL PROPERTY DATA
(NEW DATA ENTRIES ARE MADE WHEN ONE OR MORE PROPERTIES CHANGE)

CODE CLASS 2,1974

SET	MEM	TYPE	FROM	TO	E HOT PSI *10**6	E COLD PSI *10**6	EXPANSION HOT	EXPANSION COLD	POISSON'S RATIO	SH PSI	SC PSI	F	DELTA/T IN/IN
							---IN/(IN DEG F)*10**-6---						
1	1	PU/3U	1000	1010	27.90	0.0	0.0	0.0	0.30	17500.	17500.	1.0000	0.0

ADLPIPE PAGE 9 GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 02/24/83 11 45 20

TEST CASES PROJECT NO 112323-010 INPUT IN SKS$:ADLDATA(MSPIN1.MR)

MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152

FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MAPK COMMONS

EXTERNAL POLAR CRANE PIPE

CONDITION 14

LOADS

ACCELERATION

EXTERNAL

PIPE SYSTEM GEOMETRY

NUMBER OF NETWORK POINTS = 11 NUMBER OF MEMBERS = 46

NUMBER OF SECTIONS = 10 ORDER OF REDUCED STIFFNESS MATRIX = 60

MAX ORDER REDUCED STIFFNESS MATRIX = 480

NETWORK POINT RESTRAINTS AND COORDINATES

		TRANSLATION			ROTATION			OVERALL COORDINATES (FT)		
NETWORK PT.	SEQ	X	Y	Z	X	Y	Z	X	Y	Z
1	1000	FREE	FREE	FREE	FREE	FREE	FREE	0.0	0.0	0.0
2	4	FREE	FREE	FREE	FREE	FREE	FREE	8.250	30.000	-22.417
3	120	FREE	FREE	FREE	FREE	FREE	FREE	3.500	30.000	-22.417
4	111	FREE	FREE	FREE	FREE	FREE	FREE	1.568	30.193	-22.417
5	12	FREE	FREE	FREE	FREE	FREE	FREE	8.937	30.193	-22.417
6	13	FREE	FREE	FREE	FREE	FREE	FREE	18.356	30.193	-22.417
7	14	FREE	FREE	FREE	FREE	FREE	FREE	28.944	30.193	-22.417
8	330	FREE	FREE	FREE	FREE	FREE	FREE	28.944	30.193	-30.001
9	320	FREE	FREE	FREE	FREE	FREE	FREE	28.944	22.511	-30.001
10	330	FREE	FREE	FREE	FREE	FREE	FREE	28.944	17.875	-30.001
11	2000	RST	RST	RST	RST	RST	RST	40.465	7.736	-27.736

NETWORK POINT MOVEMENTS

		TRANSLATION			ROTATION		
NETWORK PT.	SEQ	X	Y	Z	X	Y	Z
			(INCHES)			(RADIANS)	

NO MOVEMENTS

GIBBS & HILL, INC. ADLPIPE STRESS ANALYSIS 07/24/87 11:45:29

THIS CASE PROJECT NO 111333-010 INPUT IN SKS$.ADLDATA1(MSPHILMR)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PHIL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

PIPE ELEMENT GEOMETRY

MEM	TYPE	FROM	TO	ELEM	END WELD	LONG WELD	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
							----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
8	PH/PH	9181	19	PIPE	BUTT	NONE	0.0	-1.98	0.0	1.98		32.000	1.250	32.000	1.250	0.0
9	FI/FI	19	20	FI	BUTT	NONE	0.0	-3.75	-3.75	3.75	90.00	32.000	1.250	32.000	1.250	0.0
10	PH/PH	20	2000	PIPE	BUTT	NONE	0.0	0.0	-1.56	1.56		32.000	1.250	32.000	1.250	0.0

FIRST CREEK PROJECT NO 112323-010 INPUT IN CKS$.ADLDATA1(MSPIKELMP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PIPE

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

PIPE ELEMENT GEOMETRY

SECTION 2 CONNECTS SEQUENCE POINTS 15 AND 300 AND HAS 2 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE (FEET)	ELBOW ANGLE (DEGREES)	PIPE OD (IN)	PIPE T (IN)	FITTING OD (IN)	FITTING T (IN)	CORR. ALLOW.
						----------FEET----------									
1	RIGID	15	300	RIGID	NONE	0.0	0.0	1.33	1.33						
2	PIPE	300	310	PIPE	BUTT	0.0	0.0	1.08	1.08		14.000	0.750	14.000	0.750	0.0

SECTION 8 CONNECTS SEQUENCE POINTS 310 AND 320 AND HAS 2 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE (FEET)	ELBOW ANGLE (DEGREES)	PIPE OD (IN)	PIPE T (IN)	FITTING OD (IN)	FITTING T (IN)	CORR. ALLOW.
						----------FEET----------									
1	PIPE	310	315	PIPE	BUTT	NONE	0.0	1.16	0.0	1.16		14.000	0.750	14.000	0.750	0.0
2	PIPE	315	320	PIPE	BUTT	NONE	0.0	1.16	0.0	1.16		14.000	0.750	14.000	0.750	0.0

SECTION 9 CONNECTS SEQUENCE POINTS 310 AND 330 AND HAS 2 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE (FEET)	ELBOW ANGLE (DEGREES)	PIPE OD (IN)	PIPE T (IN)	FITTING OD (IN)	FITTING T (IN)	CORR. ALLOW.
						----------FEET----------									
1	PIPE	310	325	PIPE	BUTT	NONE	0.0	-1.16	0.0	1.16		14.000	0.750	14.000	0.750	0.0
2	PIPE	325	330	PIPE	BUTT	NONE	0.0	-1.16	0.0	1.16		14.000	0.750	14.000	0.750	0.0

SECTION 10 CONNECTS SEQUENCE POINTS 15 AND 2000 AND HAS 10 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE (FEET)	ELBOW ANGLE (DEGREES)	PIPE OD (IN)	PIPE T (IN)	FITTING OD (IN)	FITTING T (IN)	CORR. ALLOW.
						----------FEET----------									
1	PIPE	15	151	PIPE	BUTT	NONE	4.49	0.0	0.0	4.49		32.000	1.250	32.000	1.250	0.0
2	PIPE	151	152	PIPE	BUTT	NONE	2.53	0.0	0.0	2.53		32.000	1.250	32.000	1.250	0.0
3	PIPE	152	16	PIPE	BUTT	NONE	0.76	0.0	0.0	0.76		32.000	1.250	32.000	1.250	0.0
4	ELBOW	16	17	EL	BUTT	NONE	3.75	-3.75	0.0	3.75	90.00	32.000	1.250	32.000	1.250	0.0
5	PIPE	17	0170	PIPE	BUTT	NONE	0.0	-0.75	0.0	0.75		32.000	1.250	32.000	1.250	0.0
6	PIPE	0170	18	PIPE	BUTT	NONE	0.0	-1.75	0.0	1.75		32.000	1.250	32.000	1.250	0.0
7	PIPE	18	0181	PIPE	BUTT	NONE	0.0	-0.47	0.0	0.47		32.000	1.250	32.000	1.250	0.0

TEST CASE PROJECT NO 112333-010 INPUT IN SKS$.ADLDATA[MSPIL]MR1
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

PIPE ELEMENT GEOMETRY

MEM TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
						----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
6 PIPE	10	110	PIPE	BUTT	NONE	0.0	-0.00	0.0	0.00		32.000	1.250	32.000	1.250	0.0
7 ELBOW	110	11	EL	BUTT	NONE	3.75	-3.75	0.0	3.75	90.00	32.000	1.250	32.000	1.250	0.0
8 PIPE	11	111	PIPE	BUTT	NONE	0.25	0.0	0.0	0.25		32.000	1.250	32.000	1.250	0.0

SECTION 4 CONNECTS SEQUENCE POINTS 111 AND 12 AND HAS 3 MEMBERS.

MEM TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
						----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1 PIPE	111	112	PIPE	BUTT	NONE	6.68	0.0	0.0	6.68		32.000	1.250	32.000	1.250	0.0
2 PIPE	112	12	PIPE	BUTT	NONE	0.69	0.0	0.0	0.69		32.000	1.250	32.000	1.250	0.0

SECTION 5 CONNECTS SEQUENCE POINTS 12 AND 13 AND HAS 1 MEMBERS.

MEM TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
						----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1 PIPE	12	13	PIPE	BUTT	NONE	0.33	0.0	0.0	0.33		32.000	1.250	32.000	1.250	0.0

SECTION 6 CONNECTS SEQUENCE POINTS 13 AND 15 AND HAS 3 MEMBERS.

MEM TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
						----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1 PIPE	13	35	PIPE	BUTT	NONE	4.67	0.0	0.0	4.67		32.000	1.250	32.000	1.250	0.0
2 PIPE	35	14	PIPE	BUTT	NONE	3.30	0.0	0.0	3.30		32.000	1.250	32.000	1.250	0.0
3 PIPE	14	15	PIPE	BUTT	NONE	2.81	0.0	0.0	2.81		32.000	1.250	32.000	1.250	0.0

FIRST CROSS PROJECT NO 112323-010 INPUT IN SKS$:ADLDATA1(MSPIRE1.MP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-152
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
EXTERNAL POLAR CRANE PULL

CONDITION 14
LOADS
ACCELERATION
EXTERNAL

PIPE ELEMENT GEOMETRY

SECTION 1 CONNECTS SEQUENCE POINTS 1000 AND A AND HAS 14 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
							----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1	PIPE	1000	1010	PIPE	BUTT	NONE	0.0	6.55	0.0	6.55		18.000	0.938	18.000	0.938	0.0
2	PIPE	1010	1015	PIPE	BUTT	NONE	0.0	10.00	0.0	10.00		18.000	0.938	18.000	0.938	0.0
3	PIPE	1015	1030	PIPE	BUTT	NONE	0.0	10.00	0.0	10.00		18.000	0.938	18.000	0.938	0.0
4	PIPE	1030	1035	PIPE	BUTT	NONE	0.0	1.20	0.0	1.20		18.000	0.938	18.000	0.938	0.0
5	ELBOW	1035	1030	EL	BUTT	NONE	2.25	2.25	0.0	2.25	90.00	18.000	0.938	18.000	0.938	0.0
6	PIPE	1030	1032	PIPE	BUTT	NONE	3.75	0.0	0.0	3.75		18.000	0.938	18.000	0.938	0.0
7	PIPE	1032	1035	PIPE	BUTT	NONE	3.75	0.0	0.0	3.75		18.000	0.938	18.000	0.938	0.0
8	ELBOW	1035	1040	EL	BUTT	NONE	2.25	0.0	-2.25	2.25	90.00	18.000	0.938	18.000	0.938	0.0
9	PIPE	1040	1042	PIPE	BUTT	NONE	0.0	0.0	-3.88	3.88		18.000	0.938	18.000	0.938	0.0
10	PIPE	1042	1045	PIPE	BUTT	NONE	0.0	0.0	-4.04	4.04		18.000	0.938	18.000	0.938	0.0
11	PIPE	1045	1050	PIPE	BUTT	NONE	0.0	0.0	-4.83	4.83		18.000	0.938	18.000	0.938	0.0
12	REDUC	1050	1055	RED	BUTT	NONE	0.0	0.0	-1.67	1.67		18.000	0.938	24.000	0.688	0.0
13	REDUC	1055	A	RED	BUTT	NONE	0.0	0.0	-2.00	2.00		24.000	0.688	32.000	1.250	0.0
14	ELBOW	A	A	EL	BUTT	NONE	-3.75	0.0	-3.75	3.75	90.00	32.000	1.250	32.000	1.250	0.0

SECTION 2 CONNECTS SEQUENCE POINTS A AND 120 AND HAS 2 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
							----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1	PIPE	A	10A	PIPE	BUTT	NONE	-1.68	0.0	0.0	1.68		32.000	1.250	32.000	1.250	0.0
2	PIPE	10A	120	PIPE	BUTT	NONE	-3.07	0.0	0.0	3.07		32.000	1.250	32.000	1.250	0.0

SECTION 3 CONNECTS SEQUENCE POINTS 120 AND 111 AND HAS 8 MEMBERS.

MEM	TYPE	FROM	TO	ELEM WELD	END WELD	LONG	COORDINATE CHANGE DX	DY	DZ	LENGTH(PIPE) RADIUS OF CURVATURE	ELBOW ANGLE	PIPE OD	PIPE T	FITTING OD	FITTING T	CORR. ALLOW.
							----------FEET----------			(FEET)	(DEGREES)	(IN)	(IN)	(IN)	(IN)	
1	PIPE	120	7	PIPE	BUTT	NONE	-1.44	0.0	0.0	1.44		32.000	1.250	32.000	1.250	0.0
2	PIPE	7	8	PIPE	BUTT	NONE	-0.75	0.0	0.0	0.75		32.000	1.250	32.000	1.250	0.0
3	ELBOW	8	9	EL	BUTT	NONE	-3.75	-3.75	0.0	3.75	90.00	32.000	1.250	32.000	1.250	0.0
4	PIPE	9	100	PIPE	BUTT	NONE	0.0	-0.80	0.0	0.80		32.000	1.250	32.000	1.250	0.0
5	PIPE	100	10	PIPE	BUTT	NONE	0.0	-1.51	0.0	1.51		32.000	1.250	32.000	1.250	0.0

TEST CASES PROJECT NO 112323-010 INPUT IN CKS$.ADLDATA1(MSPIKEMP)
MAIN STEAM P 1-1 , FEEDWATER P 1-5 & P 1-15?
FLUSH LINE LOOP 1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS

EXECUTION	EXTERNAL POLAR CRANE PULL											
NOTE	DEADWEIGHT RUN WITH A WAY ANCHOR AT 2000.NO OTHER SUPPORTS.											
CLASS		*	2.	*	1974.	*	*	*	*	*	*	*
CONDITION	2	1*	14.	*		*	*	17500.	*	17500.	* 1.	*
EXTERNAL		*		*		*	*		*		*	*
ACCELERA		*		*	-1.	*	*		*		*	*
NOTE	LOADS SUPPLIED BY MARK COMMONS											
NOTE	EXTERNAL FORCE AT 120 31250. LB UP											
NOTE	EXTERNAL FORCE AT 6 20000. LB DOWN											
NOTE	EXTERNAL FORCE AT 120 20000. LB UP											
FO	6	6*		*	-20000.	*	*		*		*	*
FO	106	120*		*	31250.	*	*		*		*	*
FO	112	12*		*	20000.	*	*		*		*	*
END		*		*		*	*		*		*	*

SEQUENCE NUMBERS GREATER THAN 2000 NOT CHECKED FOR DUPLICATE

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PIPE          100    10*            *    -1.500 *           *          *          *          *
PIPE           10   110*            *    -3.751 *           *          *          *          *
NOTE     ************ MK. NO. MS-1-01-005-C72K ************
NOTEREF       10   110                1350000.
ELL          110   111*            *           *           *   45.    *          *          *
PIPE          11   111*    4.000   *           *           *          *          *          *
SE                  *     *       *           *           *          *          *          *
PIPE         111   112*    6.683   *           *           *          *          *          *
NOTE     ************ MK. NO. MS-1-01-004-C72K ************
NOTEREF      111   112                1350000.
PIPE         112    12*     .587   *           *           *          *          *          *
PIPE          12   13*     9.319   *           *           *          *          *          *
SECTION             *     *       *           *           *          *          *          *
PIPE          13    35*    4.573   *           *           *          *          *          *
NOTEPOT       13    35                5000000.
PIPE          35    14*    3.304   *           *           *          *          *          *
PIPE          14    15*    3.811   *           *           *          *          *          *
NOTE     ************ MK. NO. MS-1-01-003-C72K ************
NOTE     ENTIBREPS HAS BEEN MODELED AS DESIGNED AND LOCATED AT NODE POINT
NOTE     300 AND 330
SECTION             *     *       *           *           *          *          *          *
BEND          15   300*    *       *           *   1.333   *          *          *          *
PIPE          15   300*    *       *           *           *          *          *    0.00  *
PIPE          15   300*    *       *           *           *          *          *          *
BEND         300   310*    *       *           *   1.083   *          *          *          *
PIPE         300   310*   14.0     *    0.75   *           *          *          *          *
SECTION             *     *       *           *           *          *          *          *
PIPE         310   315*    *       *    1.150  *           *          *          *          *
PIPE         315   320*    *       *    1.150  *           *          *          *          *
NOTE     ************ MK. NO. MS-1-01-003-C72K ************
NOTEREF      315   320                1350000.
SECTION             *     *       *           *           *          *          *          *
PIPE         310   325*    *       *   -1.150  *           *          *          *          *
PIPE         325   330*    *       *   -1.150  *           *          *          *          *
NOTE     ************ MK. NO. MS-1-01-003-C72K ************
NOTEREF      325   330                1350000.
SECTION             *     *       *           *           *          *          *          *
PIPE          15   151*    4.49    *           *           *          *          *          *
PIPE          15   151*   32.00    *    1.25   *           *          *          *   32.92  *
PIPE         151   152*    3.531   *           *           *          *          *          *
PIPE         152    16*    4.51    *           *           *          *          *          *
ELL           16    17*    *       *           *           *   45.    *          *          *
PIPE          17  0170*    *       *   -4.500  *           *          *          *          *
PIPE        0170    18*    *       *   -1.750  *           *          *          *          *
PIPE          18  0181*    *       *   -0.474  *           *          *          *          *
PIPE        0181    19*    *       *   -5.734  *           *          *          *          *
ELL           19    20*    *       *           *           *   45.    *          *          *
PIPE          20 20000*    *       *           *   -5.207  *          *          *          *
END                 *     *       *           *           *          *          *          *
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GEOMETRY    THIS CROSS PROJECT NO 112323-010 INPUT IN CASE$.ADLDATA1(MSPIN1MR)
GEOMETRY    MAIN STEAM P 1-1 , FEEDWATER  P 1-5 &  P 1-153
GEOMETRY    FINISH LINE LOAD    W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
NOTE        LOADS AT 120,A AND 12 SUPPLIED BY MARK COMMONS
NOTE*       POLAR CRANE PIPE AT 120   FORCE UP 312500. LB
NOTE*       CHAIN LINK AT A(110)   FORCE DOWN 20000. LB
NOTE*       CHAIN LINK AT 120(BOTTOM)   FORCE UP 20000. LB
NOTE        MAIN STEAM P 1-1   GEOMETRY RECEIVED FROM GVF/JJR
NOTE        FEED WATER P 1-5   GEOMETRY RECEIVED FROM TST
NOTE        FEED WATER P 1-153 GEOMETRY RECEIVED FROM INPUT TAPE
AN*1          1000*          *          *          *          *          *          *
AN*1          2000*          *          *          *          *          *          *
NOTE          2000
RE*1          2000*    1.    *    1.    *    1.    *    1.    *    1.    *    1.    *
PI              A*          *          *          *          *          *          *
PI            120*          *          *          *          *          *          *
PI             12*          *          *          *          *          *          *
PI            210*          *          *          *          *          *          *
NOTE    ********************************************************************
NOTE    ********** P 1-1 ***************************************************
CE-1            *          *          *          *          *          *          *
PIPE-1A    1000 1010*   18.0   *    0.938 *   27.9   *          *          *  14.23   *
PII        1000 1010*          *    6.553*          *          *          *          *
PII        1010 1015*          *   10.0   *          *          *          *          *
NOTE7-TEMP 1010 1015    5.0E06                 5.0E06
PII        1015 1020*          *   10.0   *          *          *          *          *
PII        1020 1025*          *    3.449*          *          *          *          *
EL         1025 1030*          *          *          *   27.0   *          *          *
PII*3      1030 1032*    6.0   *          *          *          *          *          *
NOTE-TEMP  1030 1032                5.0E06
PII*1      1032 1035*    6.0   *          *          *          *          *          *
EL         1035 1040*          *          *          *   27.0   *          *          *
PII        1040 1042*          *          *  -6.125  *          *          *          *
NOTE-TEMP  1040 1042    5.0E06
PII        1042 1045*          *          *  -4.042  *          *          *          *
PII        1045 1050*          *          *  -4.833  *          *          *          *
RD1BX24    1050 1055*          *          *  -5.667  *   24.0   *  0.688   *  37.92   *
RD24X33    1055    5*          *          *  -2.0    *   33.0   *  1.25    *  37.92   *
TAN           5    6*          *          *  -3.75   *          *          *          *
EL            6    7*          *          *          *   45.    *          *          *
PIIN          6 1106*  -5.833  *          *          *          *          *          *
NOTE    ********** MK. NO. MS-1-01-003-C33K **********
NOTEREB       6  106          1250000.
PIIN       106  120*  -3.833  *          *          *          *          *          *
NOTE    ********** MK. NO. MS-1-01-001-C32S **********
NOTEDBT    106  120           5000000.
CE              *          *          *          *          *          *          *
PIIN       120    7*  -5.634  *          *          *          *          *          *
PIIN         7    8*  -4.609  *          *          *          *          *          *
EL           8    9*          *          *          *   45.    *          *          *
PIIN         9 1109*          *  -4.567  *          *          *          *          *
NOTE    ********** MK. NO. MS-1-01-004-C33K **********
NOTEREB      9  109          1250000.
```

JOBNAME - CKS$1

RUN DATE - 07/26/93

RUN TIME - 11 45 20

CLARK E HILL, INC.
11 PENN PLAZA
NEW YORK, NY 10001
TEL (212) 760-4000
APPLIED MECHANICS DEPARTMENT

MULTIPLE STOCKS ANALYSIS

FIRST BOSTON CORPORATION (NYSE-FBC) INDUST PA CKS$.ANALYSTS(NYSE1,WSE)
MAIN STREET P.O. , FREEMONTED P.O. 0-152
FINISH LINE LOAD , W/GEORGETOWN & LOANS SUPPLIED BY MARK CUMMINGS

****
VERSION - ANALYSIS FOR YOUR REVISION 12
REPORT TO ANALYSTS MANUAL DATED APRIL 1972
****

****
FRATTMORE NE ANALYSIS
****

1. ACME CERTAIN III , PLACE 1 STOCKS ANALYSIS AND STOCKS REPORT PER HR 7400
   NORTH 1000 AND 1074 (WINTER WORKING 1074)

2. ACME CERTAIN III , PLACE 1 LOANS FARTOR FAIRIN ATION

3. ACME CERTAIN III , PLACE 2 AND 3 STOCKS ANALYSIS AND STOCKS REPORT PER NR 7400
   NORTH 1000 (INPUTING WINTER 1972 WORKING) AND 1074

4. AVGI 931.0, 1047 AND AVGI 831.18, 1072 STOCKS ANALYSIS AND REPORT

5. AVGI 931.0, 1072 AND 1NGI 831.4, 1072 STOCKS ANALYSIS AND REPORT

6. ICONSTRUCTION PLOT WITH CONSTANCE NUMBERS

7. ICONSTRUCTION PLOTTING WITH DIMENSIONS

8. IN AN AND ELEVATION DRAWING WITH DIMENSIONS

9. NEW OFFICE PARK USED AS A MEMBER MONITORED SPECIFIED WEIR OFFICE, OVALETTA, AND REVISED CHAR ANALYSIS

10. LOANING STATES - DIRECTOR, DEPARTMENT, TREASURY, STATES APPROPRIATION, DISCRIMINATORY

11. LOANING CHANGE CHARGE - CHART CHARGE DESCRIPTION AND TIME HISTORY ANALYSIS

12. LOANING STOCKS - TIME DEPENDENT TRANSFORM

13. LOANING STOCKS - TIME DEPENDENT TRANSFORM

14. MAIN FILEMENT

15. MAIN LOANS

16. CONSTRUCTION PLANS

17. CONSTRUCTION PLOT

18. MAIN FILEMENT

19. MAIN LOANS

20. CONSTRUCTION PLANS

21. CONSTRUCTION PLOT

END FILE=THE INFORMATION ON COMMENT CONTRACT
1. MAIN TERMINAL SERVICE REPRESENTATIVE
2. M. DUNCAN
ADAMS D. 1221 E. INC
BROWN PARK
CAMBRIDGE, MASS 02140
781 XX 0214?4

```
NOTE     ************ MK. NO. MS-1-01-004-C22K ************
INTERFACE      111   112                          1350000.
BIM            111   12       .687
BIM             12   13     9.310
SECTION
BIM             13   35     4.533
INTERFACE       13   35                  5000000.
BIM             35   14     3.304
BIM             14   15     3.811
NOTE     ************ MK. NO. MS-1-01-003-C22K ************
NOTE     SNUBBERS HAS BEEN MODELED AS DESIGNED AND LOCATED AT NODE POINT
NOTE     320 AND 330
SECTION
BIM             15  300                          1.333
RH              15  300                                                  0.001
RR              15  300
BIM            300  310                          1.083
RH             300  310    14.0       0.75
SECTION
BIM            310  315                 1.150
BIM            315  320                 1.150
NOTE     ************ MK. NO. MS-1-01-003-C22K ************
INTERFACE      315  320                          1350000.
SECTION
BIM            310  325                -1.150
BIM            325  330                -1.150
NOTE     ************ MK. NO. MS-1-01-003-C22K ************
INTERFACE      325  330                          1350000.
SECTION
BIM             15  151     4.49
RH              15  151    32.00       1.25                              37.92
BIM            151  152     3.521
BIM            152   16     4.51
RIGID           16   17                                    45.
BIM             17 9170                -4.500
BIM           9170   18                -1.750
BIM             18 9181                -0.474
BIM           9181   19                -5.776
RIGID           19   20                                    45.
BIM             20 2000                          -5.307
END
EXECUTION  EXTERNAL POLAR CRANE PULL
NOTE       DEADWEIGHT RUN WITH 6 WAY ANCHOR AT 2000.NO OTHER SUPPORTS.
CLASS                  2.      1974.
CONDITION      2     1   16.                              17500.     17500.     1.
EXTERNAL
ACCLERA
NODEFOR
NOTE       LOADS SUGGESTED BY HARRIS CUMMINS
NOTE       EXTERNAL FORCE AT 120   31250. FX UP
NOTE       EXTERNAL FORCE AT       20000. FX DOWN
NOTE       EXTERNAL FORCE AT       20000.
FX            106  120             31250.
FX            112  112             20000.
END
EXECUTION  STRESS SUMMARY
CLASS                  2.      1974.
FX             2     16.
END
```

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```
GEOMETRY       THSI CREEP PROJECT NO 113323-010 INPUT IN SKS$.ADLDATA(MSPULLMP)
GEOMETRY       MAIN STEAM P 1-1 , FEEDWATER  P 1-5 & P 1-152
GEOMETRY       FLUSH LINE LOOP   1 W/GEOMETRY & LOADS SUPPLIED BY MARK COMMONS
NOTE           LOADS AT 120,6 AND 12 SUPPLIED BY MARK COMMONS
NOTE*          POLAR CRANE PULL AT 120   FORCE UP 33250. LB
NOTE*          CHAIN LINK AT 6(UP)   FORCE DOWN 20000. LB
NOTE*          CHAIN LINK AT 12(BOTTOM)   FORCE UP 20000. LB
NOTE           MAIN STEAM P 1-1   GEOMETRY RECEIVED FROM GVF/JJB
NOTE           FEED WATER P 1-5   GEOMETRY RECEIVED FROM IST
NOTE           FEED WATER P 1-152 GEOMETRY RECEIVED FROM INPUT TAPE
ANC1            1000
ANC1            2000
NOTE            2000
REST            2000    1.        1.        1.        1.        1.        1.
JU                 6
JU               120
JU                12
JU               310
NOTE       ****************************************************************
NOTE       ********** P 1-1 ***********************************************
SE-1
PIPE-18     1000 1010    18.0       0.938    27.0                          14.73
RU          1000 1010               6.552✓
RU          1010 1015               10.0✓
NOTEZ-TEMP  1010 1015    5.0E06               5.0E06
RU          1015 1020               10.0✓
RU          1020 1025               3.448✓
EL          1025 1030                                   27.0✓
RU*3        1030 1033    6.0✓
NOTE-TEMP   1030 1033               5.0E06
RU*3        1033 1035    6.0✓
EL          1035 1040                                   27.0✓
RU          1040 1042                         -6.125✓
NOTE-TEMP   1040 1042    5.0E06
RU          1042 1045                         -4.042✓
RU          1045 1050                         -4.833✓
RD18X24     1052 1055                         -1.667    24.0      0.688     37.92
RD24X33     1055    5                         -2.0      33.0      1.25      37.92
TAN            5    6                         -3.75
ELL            5    6                                   45.✓
RUN            6  106    -5.423.
NOTE      ************* MK. NO. MS-1-01-007-C33K ************
NOTEBRS2       6  106               1350000.
RUN          106  120    -3.073.
NOTE      ************* MK. NO. MS-1-01-001-C33S ************
NOTEFRCT     106  120               5000000.
SE
RUN          120    7    -1.436
RUN            7    8    -4.496
ELL            8    9                                   45.
RUN            9  109               -4.547
NOTE      ************* MK. NO. MS-1-01-006-C33K ************
NOTEBRS2       9  109   1350000.
RUN          109   10               -1.509
RUN           10  110               -3.751
NOTE      ************* MK. NO. MS-1-01-005-C33K ************
NOTEBRS2      10  110               1350000.
ELL          110   11                                   45.
RUN           11  111    6.000
SE
RUN          111  112    6.682
```

NO STEP	CORE REGN	PAGES IN	PAGES OUT	TOTAL SYSTN	JOB CLASS	PRTY	PK
A	524K	26	53	0	C	0	0

FEB 26, 1983

GIBBS AND HILL
MVS RELEASE 3.8

```
IEF236I   ANYDATA.USED                                KEPT
IEF236I   VOL SER NOS= D33506.
IEF236I   SYS17G.ASASOA1                              KEPT
IEF236I   VOL SER NOS= SYSDA1.
IEF285I   JES2.JOB00453.SOURCE                        SYSOUT
IEF285I   SYS83055.T114515.RA000.SK5$1.VECTA1         PASSED
IEF236I   VOL SER NOS= WORK0A.
IEF285I   SYS83055.T114515.RA000.SK5$1.VECTB1         PASSED
IEF236I   VOL SER NOS= WORK0T.
IEF285I   PLOT.TEKVTEC.PARM                           KEPT
IEF236I   VOL SER NOS= D33506.
IEF285I   SYS17G.VPPDATA                              KEPT
IEF236I   VOL SER NOS= PPDATA.
IEF373I STEP /ANY      / START 83055.1145
IEF374I STEP /ANY      / STOP  83055.1147 CPU    0MIN 06.05SEC SRB    0MIN 00.74SEC VIRT   524K SYS   240K
   ********************************************************************************************************************
   *  STEP  STEPNAME  PGM NAME     STEP       STEP      CPU TIME  PRTY  CORE  PAGES  PAGES  SYSIN              RETURN  *
   *  NO                           UNIT       TIME      MM SS.TH  ABSA  USED    IN     OUT   COUNT              CODE    *
   *   2    ANY       XBEDITB    11 45 19   0 01 47   0 06.05  5040K  524K    21     53      0                    0    *
   ********************************************************************************************************************
   *     DEV   EXCPS      *     424       24     *     740        0     *     825        3     *     000        0     *
   *     000        0      *     533       50     *     824       50     *     330        5     *     424      144     *
   *     74A       70      *     43B      404     *     423        7     *     824      372     *     533        5     *
   *     74B       51      *     824        0     *     43B        5     *     824        5     *     000        0     *
   *     533       33      *     852        4     *     254        0     *     000        0     *     000        0     *
   *     000        0      *     424        0     *     825        0     *     436        0     *     436        0     *
   *     TOT    1336       *                      *                      *                      *                      *
   ********************************************************************************************************************
IEF203I SK5$1 PLOT - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SK5$1 PLOT - STEP WAS NOT EXECUTED.
IEF373I STEP /PLOT     / START 83055.1147
IEF374I STEP /PLOT     / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT      0K SYS      0K
IEF203I SK5$1 PLTTEK - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SK5$1 PLTTEK - STEP WAS NOT EXECUTED.
IEF373I STEP /PLTTEK   / START 83055.1147
IEF374I STEP /PLTTEK   / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT      0K SYS      0K
IEF203I SK5$1 - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SK5$1 - STEP WAS NOT EXECUTED.
IEF373I STEP /         / START 83055.1147
IEF374I STEP /         / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT      0K SYS      0K
IEF237I A3E  ALLOCATED TO SYS00001
IEF285I   SYS83055.T114707.RA000.SK5$1.R0000000       KEPT
IEF236I   VOL SER NOS= WORK0T.
IEF285I   SYS83055.T114515.RA000.SK5$1.DATA           DELETED
IEF236I   VOL SER NOS= WORK0T.
IEF237I A3E  ALLOCATED TO SYS00002
IEF285I   SYS83055.T114707.RA000.SK5$1.R0000002       KEPT
IEF236I   VOL SER NOS= WORK0A.
IEF285I   SYS83055.T114515.RA000.SK5$1.VECTB1         DELETED
IEF236I   VOL SER NOS= WORK0T.
IEF237I A3E  ALLOCATED TO SYS00003
IEF285I   SYS83055.T114707.RA000.SK5$1.R0000003       KEPT
IEF236I   VOL SER NOS= WORK0T.
IEF285I   SYS83055.T114515.RA000.SK5$1.VECTA1         DELETED
IEF236I   VOL SER NOS= WORK0T.
IEF373I JOB /SK5$1     / START 83055.1145
IEF374I JOB /SK5$1     / STOP  83055.1147 CPU    0MIN 07.47SEC SRB    0MIN 00.75SEC

                    ********************************************************************************
                    *  JOB NAME   JOB UNIT   JOB TIME   CPU TIME   JOB READ   JOB TIME   TOTAL IO  *
                    *                        HH MM SS   MM SS.TH   HH MM SS   MM SS.TH             *
                    *  SK5$1      11 45 15   0 01 53   0 07.47   11 45 14   0 00.01        1348  *
```

```
IEF285I   ADLPIPE.USER                                   KEPT
IEF285I   VOL SER NOS= D33506.
IEF285I   SYS27119.T114515.RA000.SKS$1.VECTR1            KEPT
IEF285I   VOL SER NOS= SYSDA1.
IEF285I   JES2.JOB00452.S00105                           SYSOUT
IEF285I   SYS83055.T114515.RA000.SKS$1.VECTR1            PASSED
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS83055.T114515.RA000.SKS$1.VECTR2            PASSED
IEF285I   VOL SER NOS= WORK07.
IEF285I   PLOT.TEKVTEC.PARM                              KEPT
IEF285I   VOL SER NOS= D33504.
IEF285I   SYS27119.VPPPARK                               KEPT
IEF285I   VOL SER NOS= PPPARK.
IEF373I STEP /ADL      / START 83055.1145
IEF374I STEP /ADL      / STOP  83055.1147 CPU    0MIN 06.05SEC SRB    0MIN 00.74SEC VIRT   324K SYS   240K
   ********************************************************************************************************
   *  STEP  STEPNAME  PGM NAME     STEP       STEP     CPU TIME  PRIV  CORE  PAGES  PAGES  SYSIN            RETURN  *
   *  NO                           INIT       TIME     MM SS.TH  AREA  USED    IN     OUT  COUNT             CODE   *
   *  2     ADL       XBLOCK    11 45 19    0 01 47    0 06.05  504K  324K    21     53                       0    *
   ********************************************************************************************************
   *     DEV   EXCPS     *     426       26     *     740       0     *     825       3     *     000        0     *
   *     000       0     *     533       50     *     824       50    *     330       5     *     424        144   *
   *     748       70    *     438       404    *     423       7     *     824       372   *     533        5     *
   *     748       51    *     824       0      *     438       5     *     824       5     *     000        0     *
   *     533       33    *     822       4      *     254       0     *     000       0     *     000        0     *
   *     000       0     *     824       0      *     825       0     *     426       0     *     426        0     *
   *     TOT    1335     *                      *                     *                     *                      *
   ********************************************************************************************************
IEF203I SKS$1 PLOT - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SKS$1 PLOT - STEP WAS NOT EXECUTED.
IEF373I STEP /PLOT     / START 83055.1147
IEF374I STEP /PLOT     / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT     0K SYS     0K
IEF203I SKS$1 PLTTLR - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SKS$1 PLTTLR - STEP WAS NOT EXECUTED.
IEF373I STEP /PLTTLR   / START 83055.1147
IEF374I STEP /PLTTLR   / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT     0K SYS     0K
IEF203I SKS$1 - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I SKS$1 - STEP WAS NOT EXECUTED.
IEF373I STEP /         / START 83055.1147
IEF374I STEP /         / STOP  83055.1147 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT     0K SYS     0K
IEF237I A25  ALLOCATED TO SYS00001
IEF285I   SYS83055.T114707.RA000.SKS$1.R0000001          KEPT
IEF285I   VOL SER NOS= WORK07.
IEF285I   SYS83055.T114515.RA000.SKS$1.DATA              DELETED
IEF285I   VOL SER NOS= WORK07.
IEF237I A24  ALLOCATED TO SYS00003
IEF285I   SYS83055.T114707.RA000.SKS$1.R0000003          KEPT
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS83055.T114515.RA000.SKS$1.VECTR1            DELETED
IEF285I   VOL SER NOS= WORK06.
IEF237I A25  ALLOCATED TO SYS00005
IEF285I   SYS83055.T114707.RA000.SKS$1.R0000005          KEPT
IEF285I   VOL SER NOS= WORK07.
IEF285I   SYS83055.T114515.RA000.SKS$1.VECTR2            DELETED
IEF285I   VOL SER NOS= WORK07.
IEF373I JOB /SKS$1     / START 83055.1145
IEF374I JOB /SKS$1     / STOP  83055.1147 CPU    0MIN 07.49SEC SRB    0MIN 00.75SEC
                       ********************************************************************************
                       *  JOB NAME   JOB INIT   JOB TIME   CPU TIME   JOB READ   JOB TIME   TOTAL IO   *
                       *             HH MM SS   HH MM SS   MM SS.TH   HH MM SS   MM SS.TH               *
                       *  SKS$1      11 45 15    0 01 52    0 06.74   11 45 16    0 00.01       1248   *
```

```
IEF237I 432  ALLOCATED TO FT11F001
IEF237I 434  ALLOCATED TO FT12F001
IEF237I 330  ALLOCATED TO FT13F001
IEF237I 434  ALLOCATED TO FT14F001
IEF237I 248  ALLOCATED TO FT15F001
IEF237I 438  ALLOCATED TO FT16F001
IEF237I 433  ALLOCATED TO FT17F001
IEF237I 434  ALLOCATED TO FT18F001
IEF237I 432  ALLOCATED TO FT19F001
IEF237I 248  ALLOCATED TO FT20F001
IEF237I 434  ALLOCATED TO FT23F001
IEF237I 438  ALLOCATED TO FT24F001
IEF237I 434  ALLOCATED TO FT25F001
IEF237I DMY  ALLOCATED TO FT26F001
IEF237I 432  ALLOCATED TO FT27F001
IEF237I 832  ALLOCATED TO FT56F001
IEF237I 354  ALLOCATED TO SYS00034
IEF237I DMY  ALLOCATED TO SYSPOUT
IEF237I DMY  ALLOCATED TO SYSVECTR
IEF237I JES2 ALLOCATED TO PLOTLOG
IEF237I 434  ALLOCATED TO VECTR1
IEF237I 435  ALLOCATED TO VECTR2
IEF237I 436  ALLOCATED TO PLOTPARM
IEF237I 436  ALLOCATED TO SYS00096
IEF142I SKS$1 ADL - STEP WAS EXECUTED - COND CODE 0000
IEF285I   LIBR.ENGR29.LOADMOD                             KEPT
IEF285I   VOL SER NOS= D33504.
IEF285I   SYSCTLG.VSYS080                                 KEPT
IEF285I   VOL SER NOS= SYS080.
IEF285I   SYS82055.T114515.RA000.SKS$1.DATA               PASSED
IEF285I   VOL SER NOS= WORK07.
IEF285I   JES2.JOB00452.S00103                            SYSOUT
IEF285I   JES2.JOB00452.S00104                            SYSOUT
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000001           DELETED
IEF285I   VOL SER NOS= WORK02.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000002           DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000003           DELETED
IEF285I   VOL SER NOS= WORK09.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000004           DELETED
IEF285I   VOL SER NOS= WORK10.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000005           DELETED
IEF285I   VOL SER NOS= WORK01.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000006           DELETED
IEF285I   VOL SER NOS= WORK01.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000007           DELETED
IEF285I   VOL SER NOS= WORK03.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000008           DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000009           DELETED
IEF285I   VOL SER NOS= WORK02.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000010           DELETED
IEF285I   VOL SER NOS= WORK01.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000011           DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000012           DELETED
IEF285I   VOL SER NOS= WORK01.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000013           DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   SYS82055.T114515.RA000.SKS$1.R0000014           DELETED
IEF285I   VOL SER NOS= WORK02.
```

```
 STMT NO. MESSAGE
-
   12      IEFACT31 SUBSTITUTION JCL - PGM=XAED17A,TIME=120,PERFORM=7ARK,COND=(8,LT,FREE)
   15      IEFACT31 SUBSTITUTION JCL - SYSOUT=A,OUTLIM=0.
   33      IEFACT31 SUBSTITUTION JCL - DSN=ADLPIPE.ISFDB(GH),DISP=SHR,LABEL=(,,,IN)
   38      IEFACT31 SUBSTITUTION JCL - DSN=PLOT.TEKUTEC.PARM(HOME),DISP=SHR
   44      IEFACT31 SUBSTITUTION JCL - SYSOUT=X,DEST=RO
   45      IEFACT31 SUBSTITUTION JCL - SYSOUT=X,DEST=RO
   51      IEFACT31 SUBSTITUTION JCL - DSN=PLOT.TEKUTEC.PARM(HOME),DISP=SHR
   57      IEFACT31 SUBSTITUTION JCL - SYSOUT=X,DEST=RO
   58      IEFACT31 SUBSTITUTION JCL - SYSOUT=X,DEST=RO
   74      IEFA470I INVALID DISP FIELD- PASS SUBSTITUTED
IEF236I ALLOC. FOR SKS$1 FORT
IEF237I 47A  ALLOCATED TO STEPLIB
IEF237I 740  ALLOCATED TO SYS00000
IEF237I 83E  ALLOCATED TO FT01F001
IEF237I 1CC3 ALLOCATED TO FT06F001
IEF237I A23  ALLOCATED TO FT05F001
IEF142I SKS$1 FORT - STEP WAS EXECUTED - COND CODE 0000
IEF285I   LIB.ENGR20.LOADMOD                          KEPT
IEF285I   VOL SER NOS= D33504.
IEF285I   SYS1.LIB.SYS00A0                            KEPT
IEF285I   VOL SER NOS= SYS00A0.
IEF285I   SYS03055.T114515.RA000.SKS$1.DATA           PASSED
IEF285I   VOL SER NOS= WORK07.
IEF285I   IEC2.JOB00452.S00101                        SYSOUT
IEF285I   SKS$.ADLDATA                                KEPT
IEF285I   VOL SER NOS= WORK05.
IEF373I STEP /FORT  / START 83055.1145
IEF374I STEP /FORT  / STOP  83055.1145 CPU    0MIN 00.36SEC SRB    0MIN 00.01SEC VIRT    76K SYS   172K
   ********************************************************************************************************
   *  STEP  STEPNAME  PGM NAME     STEP       STEP     CPU TIME  PRIV  CODE  PAGES  PAGES  SYSIN            RETURN  *
   *   NO                          INIT       TIME     MM SS.TH  AREA  USED      IN    OUT  COUNT             CODE   *
   *    1    FORT      XAED017I   11 45 15   0 00 03   0 00.36  504DK   76K       3      0      0                0   *
   ********************************************************************************************************
   *      DEV   EXCPS      *      47A        1      *      740        0      *      83E        5      *      000       0      *
   *      1CC3        4      *      A23        10      *                        *                        *                        *
   ********************************************************************************************************
IEF236I ALLOC. FOR SKS$1 ATSP
IEF237I 83E  ALLOCATED TO IN
IEF237I 1CC3 ALLOCATED TO OUT
**** 00010 RECORDS MOVED - END OF JOB
IEF142I SKS$1 ATSP - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS03055.T114515.RA000.SKS$1.DATA           PASSED
IEF285I   VOL SER NOS= WORK07.
IEF285I   IEC2.JOB00452.S00102                        SYSOUT
IEF373I STEP /ATSP  / START 83055.1145
IEF374I STEP /ATSP  / STOP  83055.1145 CPU    0MIN 00.05SEC SRB    0MIN 00.00SEC VIRT    4BK SYS   180K
   ********************************************************************************************************
   *  STEP  STEPNAME  PGM NAME     STEP       STEP     CPU TIME  PRIV  CODE  PAGES  PAGES  SYSIN            RETURN  *
   *   NO                          INIT       TIME     MM SS.TH  AREA  USED      IN    OUT  COUNT             CODE   *
   *    2    ATSP      ATSPRINT   11 45 19   0 00 00   0 00.05  504DK   4BK       0      0      0                0   *
   ********************************************************************************************************
   *      DEV   EXCPS      *      A23        3      *      000        0      *      1CC        3      *                        *
   ********************************************************************************************************
IEF236I ALLOC. FOR SKS$1 ADL
IEF237I 47A  ALLOCATED TO STEPLIB
IEF237I 740  ALLOCATED TO SYS00002
IEF237I A23  ALLOCATED TO FT05F001
IEF237I 1CC3 ALLOCATED TO FT06F001
IEF237I 1CC3 ALLOCATED TO FT07F001
```

```
```

```
//SAMPLE   JOB (0540,'SYSPROG','SYSTEM DEVELOPMENT',MSGLEVEL=(1,1),
//             MSGCLASS=X,CLASS=D,NOTIFY=&SYS,TIME=(,30)
***SCRATCH PRINT DA
*** JOBPARM O=F,LOADFCB=1
***SCRATCH PRINT DA
***  THIS JCL IS FOR PLANNING AND PAGE PROGRAM ***
//          EXEC ANDPAGE
***  ENTER DATA SET AFTER DSN=                          ***
XXADPLIB  DD DSN=SYS2.PLIBASE.DA,DISP=SHR,
XX             DCB=BLKSIZE=6160,
***
*****************************************************************
***  THIS DECK EXECUTES PGM ANDPAGE VERSION 12-5J. (PGM   5011) *
***  PGM HAS BEEN MODIFIED.                                     *
***  REFER ANY QUESTIONS TO B.C. FOLEY.          MAY 1/19/82    *
*****************************************************************
***                 ANDPAGE VERSION   NEW. 4                   ***
*****************************************************************
***
XXEXEC   EXEC PGM=XXFOLEY
XXSTEPLIB  DD   DSN=SYS2.LINKLIB,DISP=SHR
XXSYSPRINT DD   DSN=&&PRINT,UNIT=SYSDA,SPACE=(TRK,(1,1)),
XX         DISP=(NEW,PASS),
XX         DCB=(RECFM=FBA,LRECL=90,BLKSIZE=9180)
XXSYSOUT001 DD  SYSOUT=A,
XX              DCB=(RECFM=FBA,LRECL=133,BLKSIZE=9576)
//FT05F001 DD DISP=SHR,LABEL=(,,,IN),DSN=SYS$.ADM.DATA(MSPIN(KP)
XXFT06F001 DD   DDNAME=SYSIN
XXSYSIN   DD    DSN=*.EXEC.DATA,DISP=(OLD,PASS)
XXPRINT   DD    SYSOUT=A,
XX  DCB=(RECFM=FBA,LRECL=90,BLKSIZE=9180)
***      ADVANCE VERSION 12
XXADV    EXEC PGM=XAFOLEY,TIME=1,REGION=74K,COND=(9,LT,EXEC)
XXSTEPLIB  DD   DSN=SYS2.LINKLIB,DISP=SHR
XXFT05F001 DD   DSNAME=&&DATA,DISP=OLD
XXFT06F001 DD   SYSOUT=(*,SYSOUT,,UNIT=2),
XX              DCB=(RECFM=FBA,LRECL=133,BLKSIZE=9576)
XXFT07F001 DD   SYSOUT=B
XXFT11F001 DD   SPACE=(CYL,2),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT12F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT13F001 DD   SPACE=(CYL,(1,1,1)),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT14F001 DD   UNIT=SYSDA,SPACE=(CYL,(1,1)),
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=4352)
XXFT15F001 DD   UNIT=SYSDA,SPACE=(CYL,(1,1)),
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=4352)
XXFT16F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT17F001 DD   UNIT=SYSDA,SPACE=(CYL,(1,1)),
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=4352)
XXFT18F001 DD   UNIT=SYSDA,SPACE=(CYL,(1,1)),
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=4352)
XXFT19F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT20F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT21F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT22F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT23F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT24F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT25F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT26F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT27F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT28F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT29F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT30F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT31F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT32F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT33F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT34F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT35F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT36F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT37F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT38F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT39F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT40F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT41F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT44F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT46F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT50F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT51F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT52F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT53F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT55F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT57F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT58F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT59F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT60F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT61F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT62F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT63F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT64F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT65F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
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XXFT73F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT74F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
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XXFT84F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
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XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT89F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT90F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT91F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT92F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT93F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT94F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT95F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT96F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT97F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT98F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
XXFT99F001 DD   SPACE=(CYL,1),UNIT=SYSDA,
XX              DCB=(RECFM=VBA,LRECL=7476,BLKSIZE=7484)
```
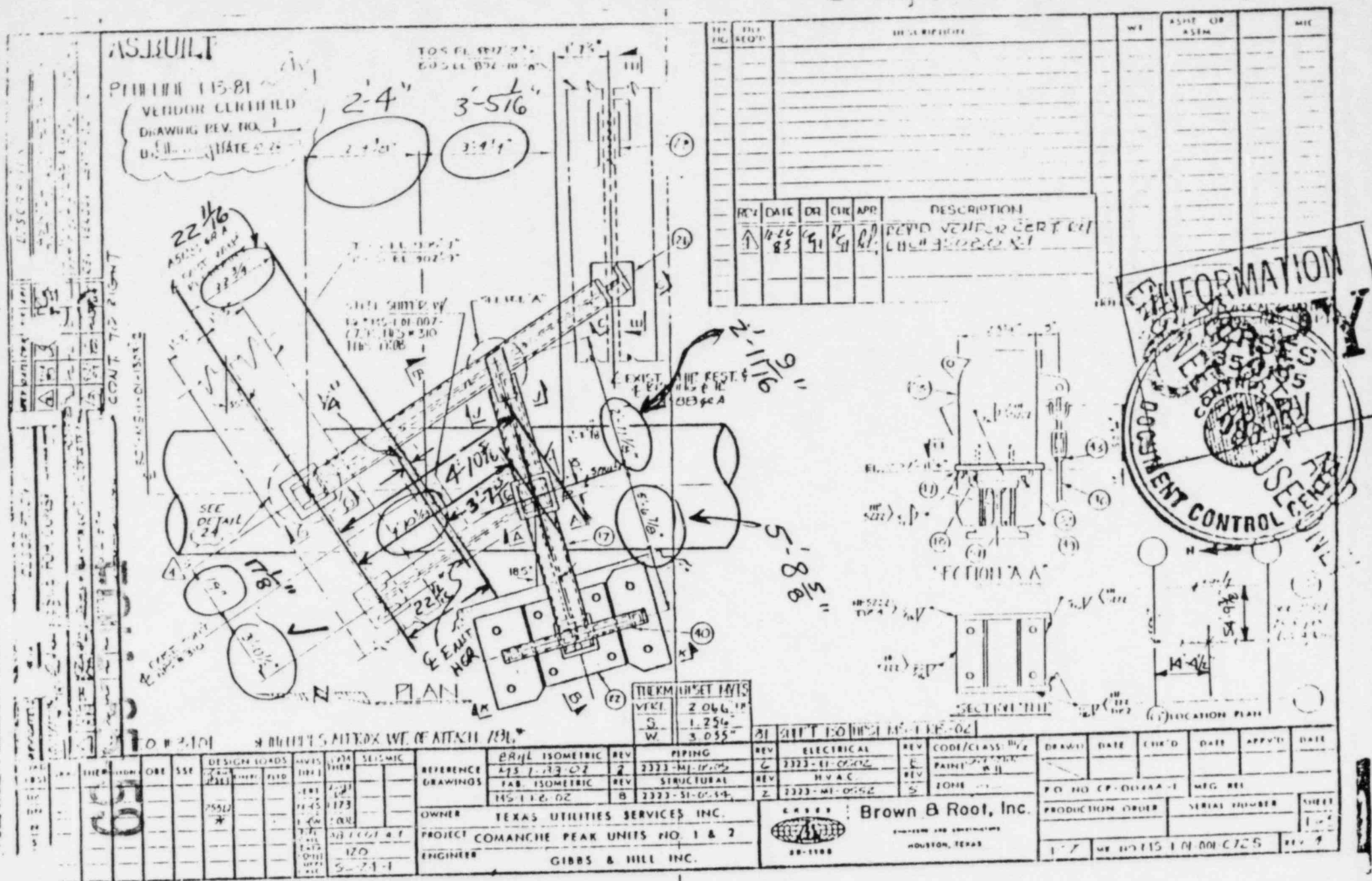

```
J E C T   J O B   I N F O

11.42.24 JOB 543  IEF403I TEST PROGRAM HAS BEEN VERIFIED AND IS ACCEPTABLE FOR
11.42.24 JOB 543  IEF404I USE IN ENGINEERING CALCULATIONS.
11.42.24 JOB 543  IEF033I ALL CALCULATIONS HAVE BEEN VERIFIED AND IS ACCEPTABLE FOR USE IN ENGINEERING CALCULATIONS.
11.42.24 JOB 543  IEF033I THIS PROGRAM HAS BEEN VERIFIED AND IS ACCEPTABLE FOR USE IN ENGINEERING CALCULATIONS.
11.42.24 JOB 543  IEF033I MACHINE RECOGNIZED AND JOB CHKS$1'    ICCIJEN
11.42.24 JOB 543  $HASP373 CHKS$1 - STARTED - INIT 01 - CL SCC U - SYS SOL33
11.42.24 JOB 543  IEF403I CHKS$1 - STARTED - TIME=11.42.24
11.42.24 JOB 543  ##### NOD'TO DEFRONT WINDOW - CHKS DE JOB
11.42.24 JOB 543  IEF404I CHKS$1 - ENDED - TIME=11.42.24
11.42.24 JOB 543  $HASP395 CHKS$1    ENDED

------ JES2 JOB STATISTICS ------

74 CARD RECORDS READ

   11 PRINT LINES

    0 SYSOUT PUNCH RECORDS

2,112 SYSOUT PRINT RECORDS

    0 SYSOUT HOLD RECORDS

JOB TIME 11.42.24
```

ΔY (VP)
ΔX
NOZZLE
Z

END OF SUBR.

Category II Area Item 33



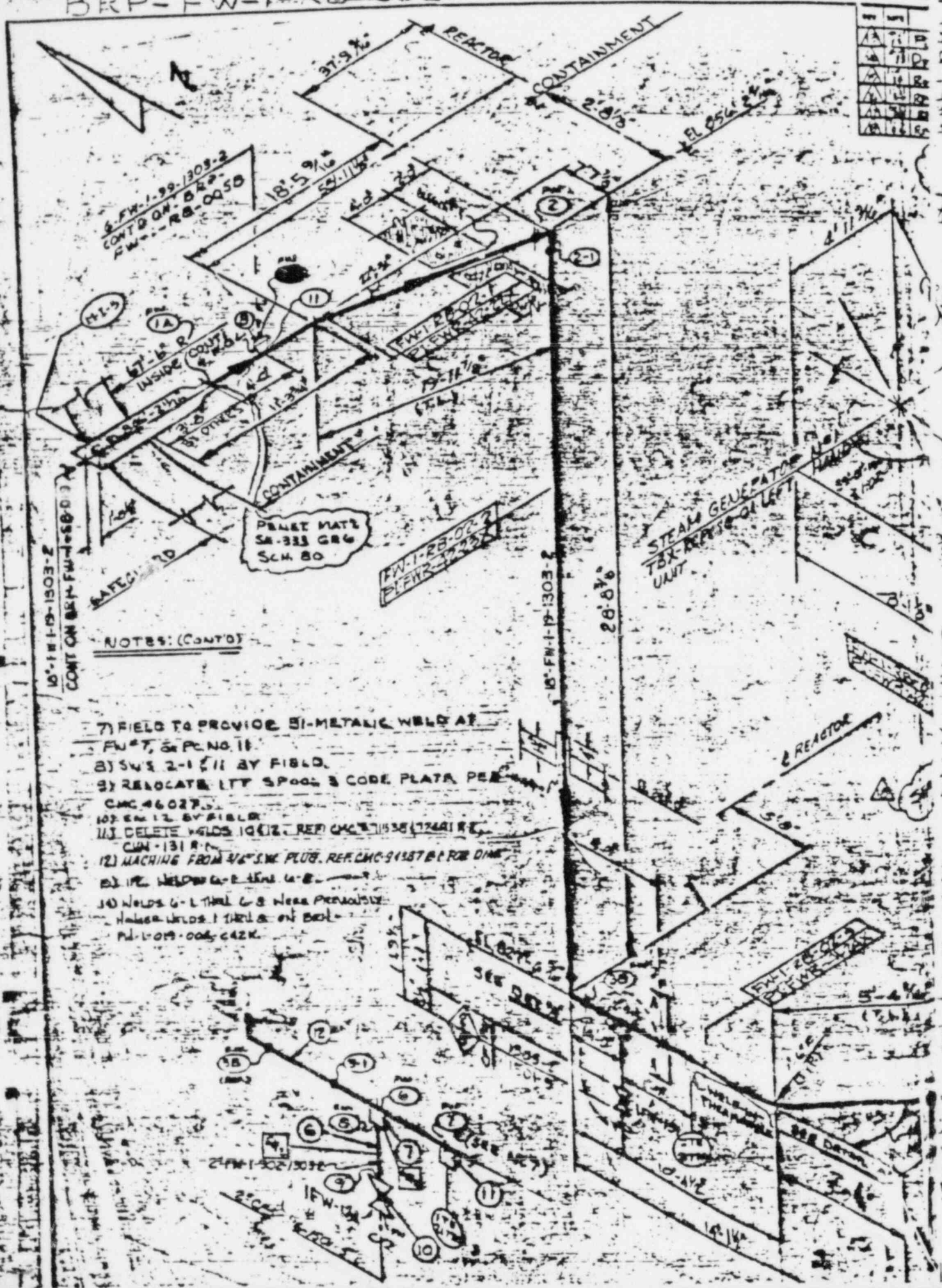
AS-BUILT 11-2-83

CREW

PC D DOGGETT
R RUSSUM
H BEAUMONT

mh84

BRP-FW-1-RB-002

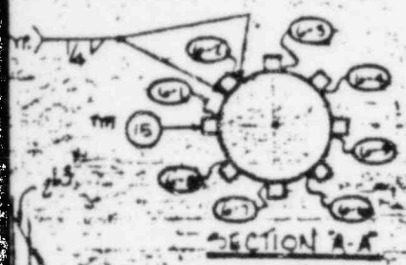


NOTES: (CONT'D)

7) FIELD TO PROVIDE BI-METALIC WELD AT FW-1-T, SEE PL NO. 11.
8) SWS 2-1 & 11 BY FIELD.
9) RELOCATE LTT SPOOL 3 CODE PLATE PER CMC-46027.
10) SW 12 BY FIELD.
11) DELETE WELDS 10 & 12. REF CMC-11538 & 17461 R-E. CWN-131 R-1.
12) MACHINE FROM 1/4" S.W. PLUG. REF. CMC-91187 B & P&B DWG.
13) IPL WELDOR 6-E THRU 6-B.
14) WELDS 6-L THRU 6-S WERE PREVIOUSLY MARKED WELDS 1 THRU 8 ON BRP-FW-1-009-006-C42K.

DESCRIPTION	DWR.	CKD.	APPD.
ISSUE; SEE NT. 13			
UED; N-5 ISSUE			
TO: REF ECR# 859, SEE NOTE 13			
92 N-5 ISSUE			
N-5 ISSUE; SEE NT. 14			
92 N-5 ISSUE			

N-5 ISSUE

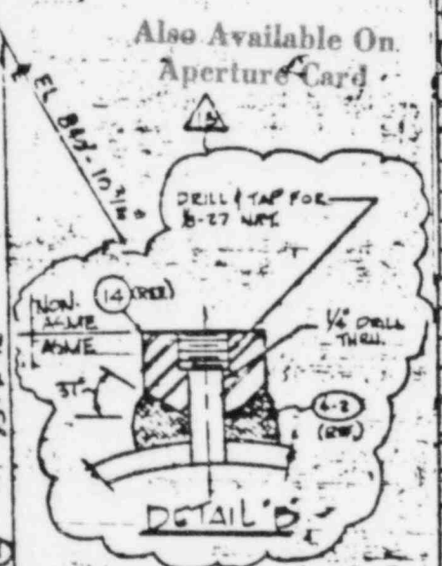


SECTION A-A

NOZZLE MATL SA-508 CL 2

16" ø NOZZLE SCH. 10 W/ BEVELED ENDS

16" FWL-1-75-1303-2



VALVE WT.'S	
PT. NO	WT
10	23.23

MAIN WELD VIOLATIONS
WELD NO.
N/A

BILL OF MATERIAL

ITEM	QUANTITY	DESCRIPTION	ORDER NUMBER	WGT. CHG IN MATL
1	68'-4 3/8"	18" - SCH. 80, C.S. SMLS. PIPE TO ASME SA 333 GR 6	P1-23	
2	1	18" - SCH. 80, C.S. SMLS. 90° L.R. M.E. TO ASME SA 420 GR WPL-6	P1-2092	
3	1	18"x16" DO 90° L.R. W RED ELL TO ——DO——		

CK NO.	REQ'D	CLASS CODE	DESCRIPTION	ASME/ASTM	GRADE	COLOR CODE
6	1	2	2" 3/80 PIPE 0'-3 11/16" F.T.L.G.	SA 333	6	GR 1
7	1	-do-	2" 3000# SW S.O.L.	SA 350	LF 2	-do-
8	1	-do-	6" 3/80 BW W.O.L.	SA 420	WPL 6	GR 1
10	1	2	2" TB-307B SJMA CP.20A.1 NT 2.25	SA 105	—	—
11	1		1-TW 2177A CP-0622	SA 479	TP316	—
12	1		18" 4/80 PIPE 1'-7 7/8" LG.	SA 333	6	GR 1
13	1		18" 4/80 PIPE 1'-9 1/4" LG.	SA 333	6	GR 1
14	1		PRESSURE TRANSDUCER ADAPTER (SEE NT. 2)	SA 350	LF 2	—
15	8	2	FD 1 1/2"x1 1/2" x 2" LUGS	SA 105	—	—

FOR OFFICE AND ENGINEERING USE ONLY

MK	UNITS	DESCRIPTION	DWR.	CKD.	APPD.
1	7/19	F.C. WELDS 1-5; PER T.S.# 10.150.10, 51	TW	DB	JR
2	7/19	ADDED PREHEAT REQUIREMENT FOR WPS	PL	DH	JR
3	7/19	FOR WPS: ADDED NOTE 4	PL	DH	JR
4	11/19	F.C. WELDS 6-12 & REV'D. AS NOTED. REF. (SEE NT. 5)	EMT	TS	JR
5	12/19	REV. AS NOTED & CMC 12561	EEL	LEE	JR
6	2/20	REV. AS NOTED	LEE	MJ	JR
7	11-30 21	REV. AS NOTED, PER CMC'S 35070, 40362 & SEE NT 9	TRW	CMC	CMC
8	11-21 21	REV. AS NOTED, PER CMC'S 40362 E.C.I., 49370, 48346 & PDN 2013	TRW	CMC	CMC
9	4-22 22	AS BUILT VERIFIED FOR STRESS PROB.: MOOPC. SEE NT. 11	REO	FEL	
10	11-17 22	AS BUILT VERIFIED FOR STRESS PROB. MOOPC	RO	FEL	
11	6-5 23	REV. "AS-BUILT" AS NOTED PER CMC-35070	LBJ	CMC	
12	6-5 23	REV. TO "AS BUILT" AS NOTED PER CMC 30441, R-5	FEL	CMC	
13	8-3 23	REV. "AS BUILT" AS NOTED PER CMC-49881 PER SEE NT 12			

SPOOLS 1-4 BY ITT / SPOOLS 5 & 6 BY B&R

PIPING SPEC.	PIPING CLASS	MATERIAL	THICKNESS
N/A	PCP-7; SYS 2	SEE TAB	

LINE NO.	COMPOSITE	ISOMETRIC DRAWING NO.	DECIMAL EQUIV.	CAT/CL
MI-203-01	SEE NT #2	MS-4814-48		1503-2

NOTES:

1) WELD PREP PER MCP-7
2) MI-507 R 9, MI-506-01 R 8, MI-513 R 9, MI-513-01 R 9
3) INTERNAL COATING REMOVAL REQ'D PER PCP-19.

5) CHN #131, DCA #4625, PDN #709, CMC #7129, COMB MI-507 R-2, & COMB MI-513 BULLDOG D.E.E.E.)

TEXAS UTILITIES SERVICES INC.

CPSES — GLEN ROSE, TEXAS

Brown & Root, Inc.

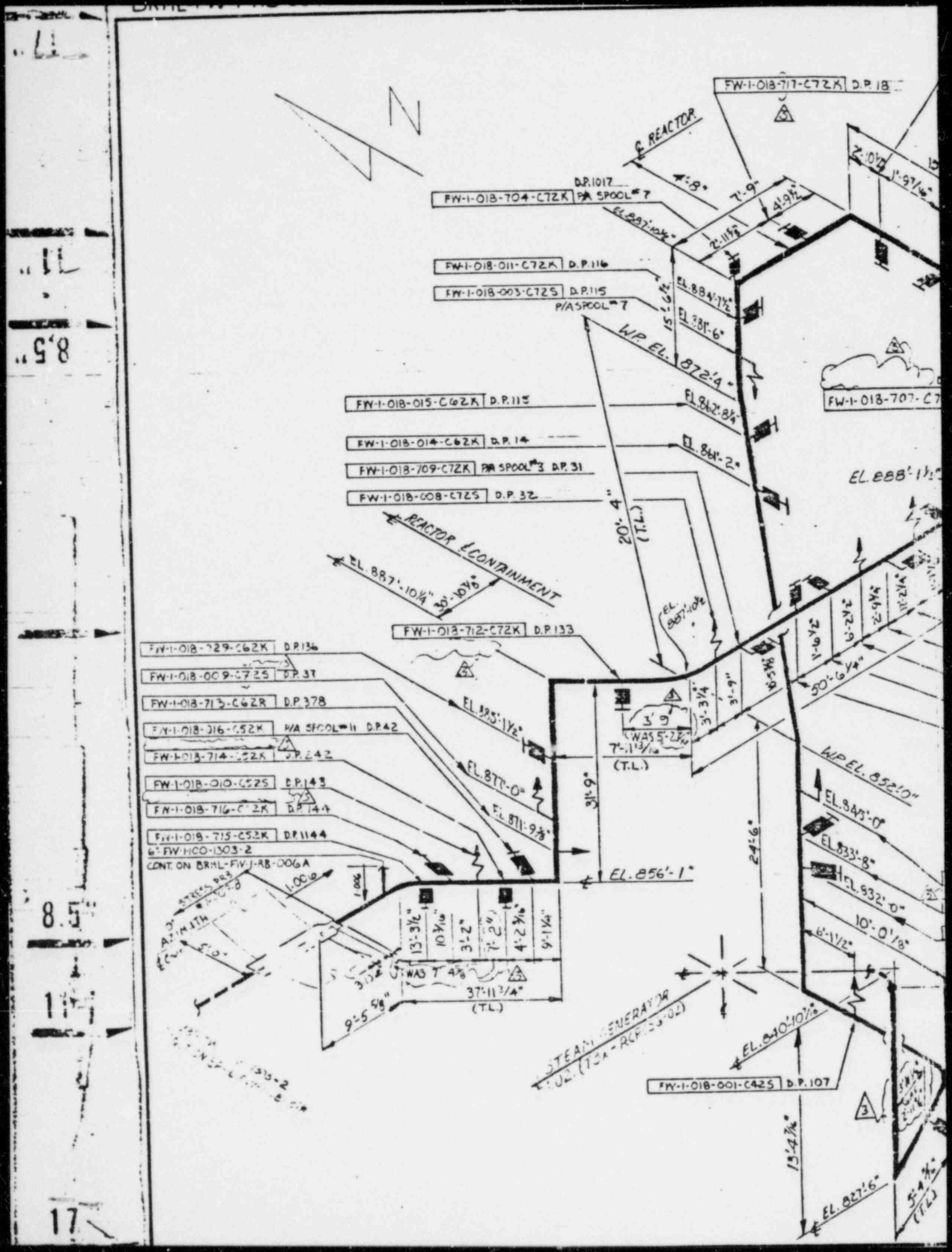
ENGINEERS AND CONSTRUCTORS

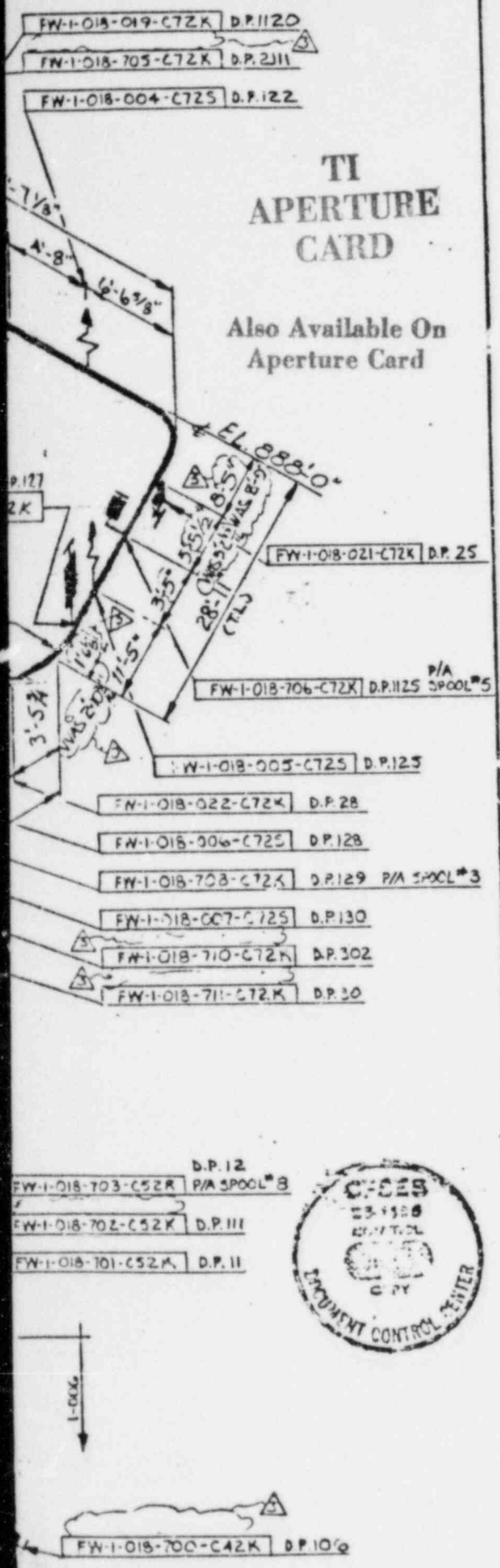
HOUSTON, TEXAS

8606120432-02

DRAWING TITLE

CTT AND CALIBRATED FEEDWATER


FW-1-018-717-C72K D.P. 18
℄ REACTOR
D.P.1017
FW-1-018-704-C72K P/A SPOOL=7
EL.887'-10¼"
FW-1-018-011-C72K D.P.116
FW-1-018-003-C72S D.P.115
P/A SPOOL=7
EL.884'-7½"
EL.881'-6"
W.P. EL. 872'-4"
FW-1-018-015-C62K D.P.115
EL.862'-8¼"
FW-1-018-014-C62K D.P. 14
EL.861'-2"
FW-1-018-709-C72K P/A SPOOL=3 D.P. 31
FW-1-018-008-C72S D.P. 32
REACTOR ℄CONTAINMENT
EL. 887'-10¼"
20'-4" (T.L.)
FW-1-018-712-C72K D.P.133
FW-1-018-029-C62K D.P.136
FW-1-018-009-C72S D.P.37
FW-1-018-713-C62R D.P.378
FW-1-018-016-C52K H/A SPOOL=11 D.P.42
FW-1-018-714-C72K D.P.242
FW-1-018-010-C52S D.P.143
FW-1-018-716-C72K D.P.144
FW-1-018-715-C52K D.P.1144
6" FW-HCO-1303-2
CONT. ON BRHL-FW-1-RB-006A
EL.885'-1½"
EL.877'-0"
EL.871'-9⅜"
EL. 856'-1"
31'-9"
24'-6"
W.P EL. 852'-10"
EL.843'-0"
EL.833'-8"
EL.832'-0"
10'-0 1/8"
6'-1½"
30'-6¼"
3'-3¼"
3'-9"
7'-11 13/16" (T.L.)
(WAS 5'-2½")
13'-3½"
10 3/16"
3'-2"
7'-2½"
4'-2 3/16"
9'-1¼"
37'-11 3/4" (T.L.)
9'-5 5/8"
STEAM GENERATOR
EL.840'-10 7/16"
FW-1-018-001-C42S D.P.107
13'-4 7/16"
EL.827'-6"
5'-4" (T.L.)



BILL OF MATERIALS

PC NO	REQ	HEAT NO	DESCRIPTION	ASME MAT'L	GRADE	COLOR CODE

FOR OFFICE AND ENGINEERING USE ONLY

REV.	DATE	DESCRIPTION	DWN.	CK'D.	APP'D.
0	1/13/83	ISSUED FOR MATERIAL IDENTIFICATION AND ACCOUNTABILITY ONLY			
1	3/8/83	REDRAWN & VERIFIED FOR STRESS PROB 1-009-B	GAP		
2	3/22/83	REV. AS NOTED, REDRAWN. VERIFIED FOR STRESS PROB. # 1-026.	TEH		
3	4/22/83	VERIFIED FOR STRESS PROB. # 1-006	PF		

WELD NO	
RT	
MT	
LP	
UT	

COST CODE	PAINT	INSUL.	CL.	THKNS
FLOW DIAG.	COMPOSITE	SPEC.	DESIGN CAT. / CL.	

NOTES

8606120432-03

TEXAS UTILITIES SERVICES INC.

C. P. S. E. S. GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS HOUSTON, TEXAS

FOIA-85-59

DRAWING TITLE

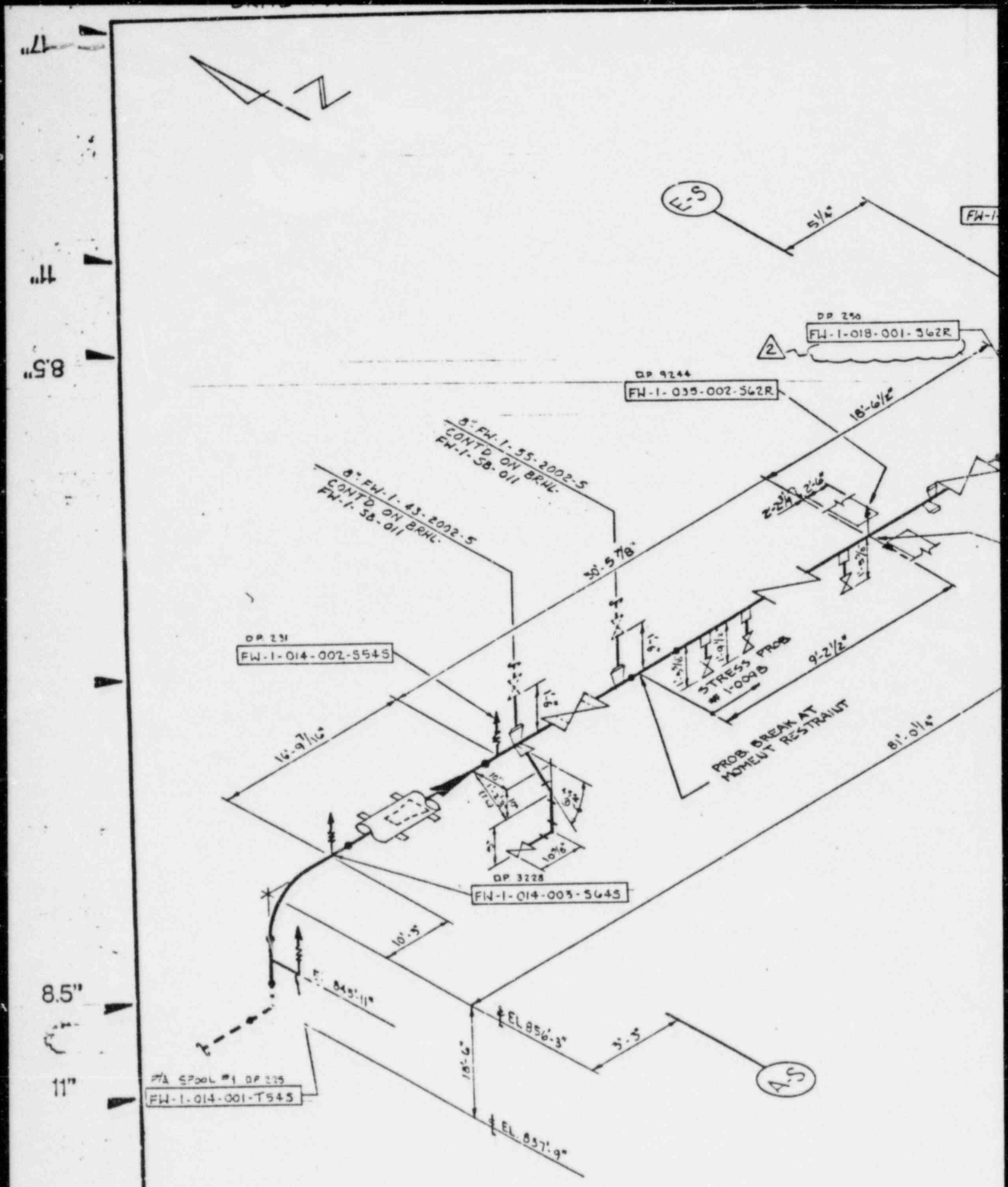
STEAM GENERATOR FEEDWATER

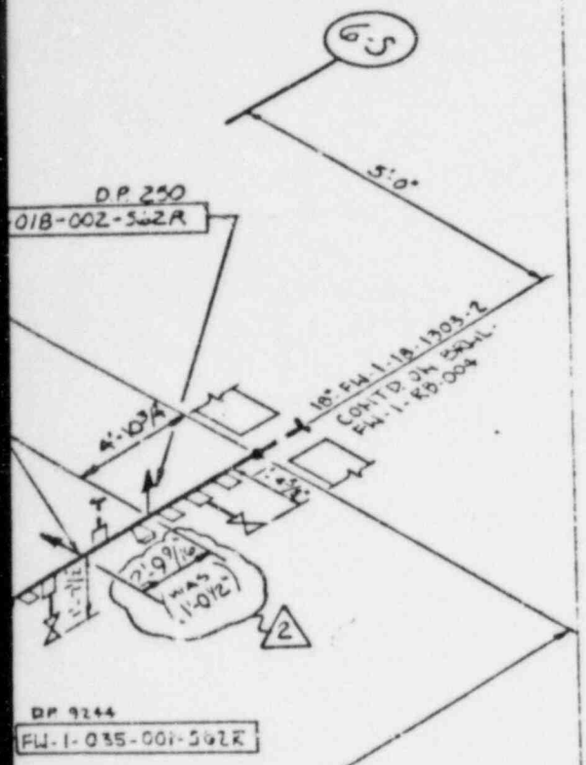
"Q"	TURNOVER NO	DWG. NO.	REV
	2ET-M-2803	2RHL-FW-1-RB-004	3

Loop 2, 2/9

Category 11 Apr 13 item 32

11


E-S
5 1/2°
FW-1
DP 230
FW-1-018-001-562R
2
DP 9244
FW-1-035-002-562R
18'-6 1/2"
8" FW-1-55-2002-S
CONT'D ON BRHL.
FW-1-38-011
8" FW-1-43-2002-S
CONT'D ON BRHL.
FW-1-38-011
30'-5 7/8"
DP 231
FW-1-014-002-554S
STRESS PROB
1-0098
9'-2 1/2"
PROB BREAK AT
MOMENT RESTRAINT
16'-9 1/16"
81'-0 1/4"
DP 3228
FW-1-014-003-564S
10'-5"
EL 849'-11"
EL 856'-3"
5'-5"
A-S
F/A SPOOL #1 DP 229
FW-1-014-001-T54S
EL 837'-9"



TI APERTURE CARD

Also Available On Aperture Card

BILL OF MATERIAL

PC NO	REQ	HEAT NO	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE

FOR OFFICE AND ENGINEERING USE ONLY

REV.	DATE	DESCRIPTION	DWN.	CK'D.	APP'D.
0	10/1	ISSUED FOR HANGER IDENTIFICATION AND ACCOUNTABILITY ONLY		MJD	
1	2/20	REVISED AS NT'D; REDRAWN; VERIFIED STR. PROB. # 1-0098	GLL		
2	6/87	VERIFIED FOR STRESS PROB. # 1-0098.	LB		

WELD NO
RT
MT
LP
UT

COST CODE	PAINT	INSUL.	CL.	THKNS
FLOW DIAG	COMPOSITE	SPEC.	DESIGN CAT. / CL.	

NOTES

8606120432-04

TEXAS UTILITIES SERVICES INC.

C P S E S — GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS

HOUSTON, TEXAS

DRAWING TITLE

FEEDWATER

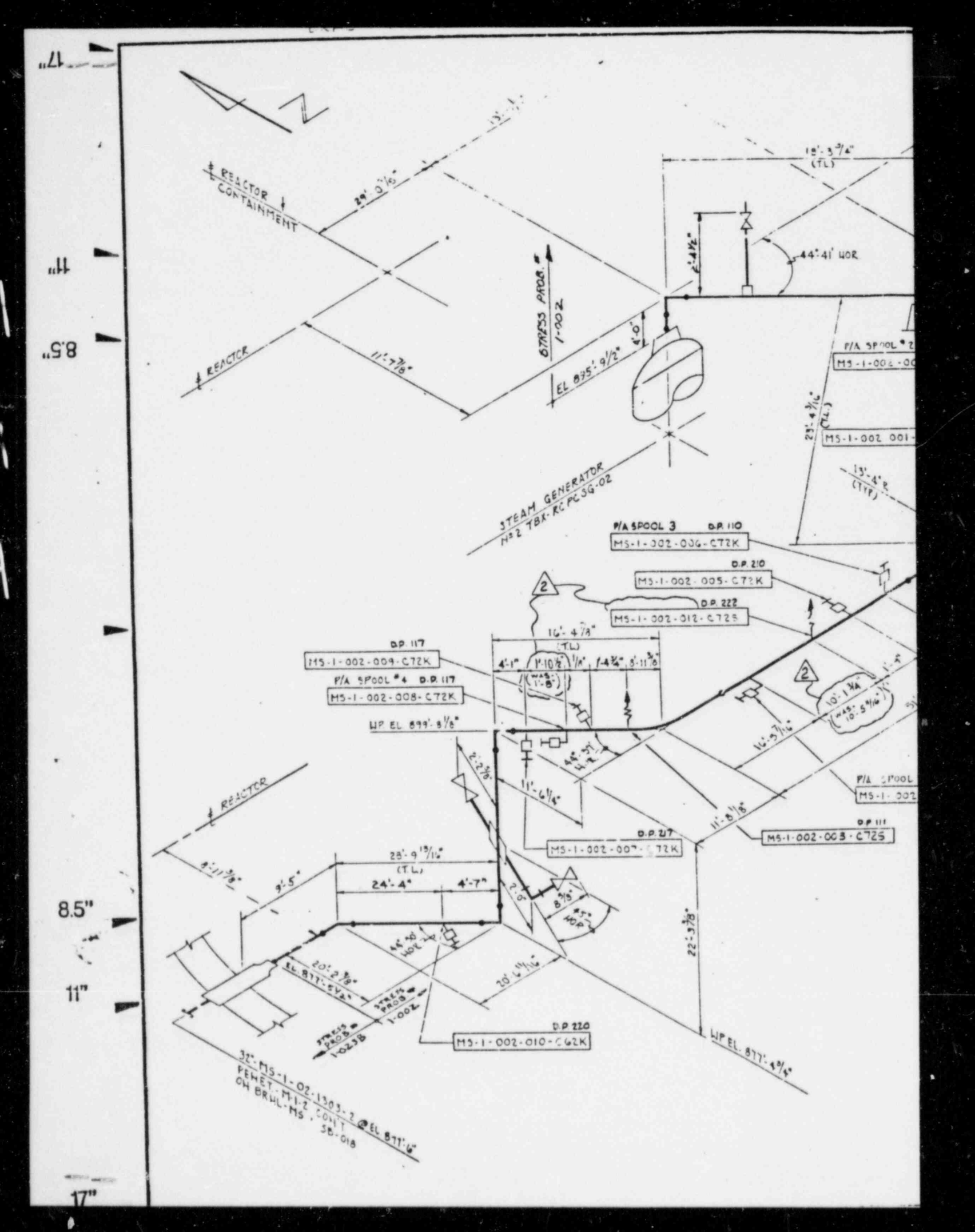
Q & NON Q	TURNOVER NO	LOG NO	REV.
Q	RFT-M-2302	BRHL-FW-1-SB-018	2

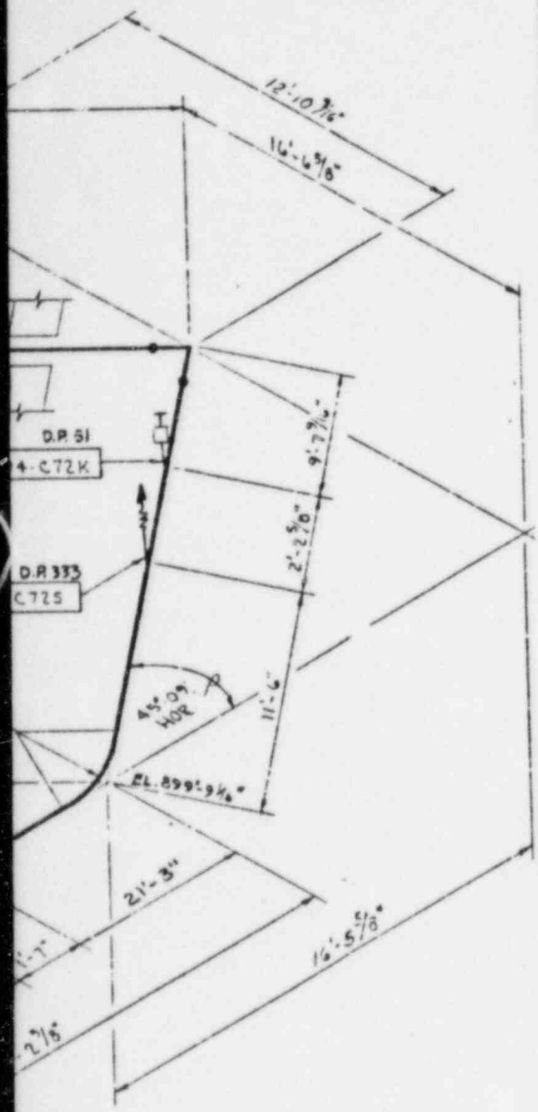
Loop 2 3/9

Category 11 AP 10 inch 29 Ea

F

1


REACTOR CONTAINMENT
REACTOR
STEAM GENERATOR N°2 TBX-RCPSG-02
EL 875'-9 1/2"
4'-0"
STRESS PROB. 1-002
44°-41' HOR
18'-3 3/4" (TL)
2'-4 1/2"
P/A SPOOL 3 D.P. 110
MS-1-002-006-C72K
D.P. 210
MS-1-002-005-C72K
D.P. 222
MS-1-002-012-C72S
D.P. 117
MS-1-002-009-C72K
P/A SPOOL 4 D.P. 117
MS-1-002-008-C72K
16'-4 7/8" (TL)
4'-1"
1'-10 1/2"
1/4"
1'-4 3/4"
3'-11 3/8"
WP EL 899'-8 1/8"
11'-6 1/4"
11'-8 1/8"
D.P. 217
MS-1-002-007-C72K
D.P. 111
MS-1-002-003-C72S
28'-9 13/16" (T.L.)
24'-4"
4'-7"
8'-11 3/8"
9'-5"
2'-0"
8 3/8"
45° HOR
44°-45' HOR
20'-2 3/8"
EL. 877'-5 1/2"
20'-6 11/16"
22'-3 7/8"
STRESS PROB 1-002
STRESS PROB 1-023B
D.P. 220
MS-1-002-010-C62K
WP EL. 877'-4 3/4"
32"-MS-1-02-1303-2 @EL 877'-6"
PENET. M-1-2, CONT. SB-018
CH BRWL-MS



TI APERTURE CARD

Also Available On Aperture Card

BILL OF MATERIAL

PC NO	REQ	M.T.O	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE

REV	DATE	DESCRIPTION	DWN.	CK'D.	APP'D
0	1-14-82	ISSUED FOR HANGER IDENTIFICATION & I.B. ACCOUNTABILITY ONLY	G.L.		
1	3-11-82	REVISED AS NOTED, REDRAWN. VERIFIED FOR STRESS PROB.# 1-0238	GLL		
2	5-25-82	VERIFIED FOR STRESS PROB.# 1-002.	L-BW		

WELD NO	
RT	
MT	
LP	
UT	

FOR OFFICE AND ENGINEERING USE ONLY

COST CODE	PAINT	INSUL.	CL.	THKNS
FLOW DIAG	COMPOSITE	SPEC.	DESIGN CAT. / CL.	

NOTES

8206120432-05

TEXAS UTILITIES SERVICES INC.

C. P. S. E. S. GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS

HOUSTON, TEXAS

DRAWING TITLE

MAIN STEAM REHEAT AND STEAM DUMP

	DRAWING NO	UNIT NO	REV
Q	RFT-M-3-100	BRWL-MS-1-PB-004	2

17"

11"

8.5"

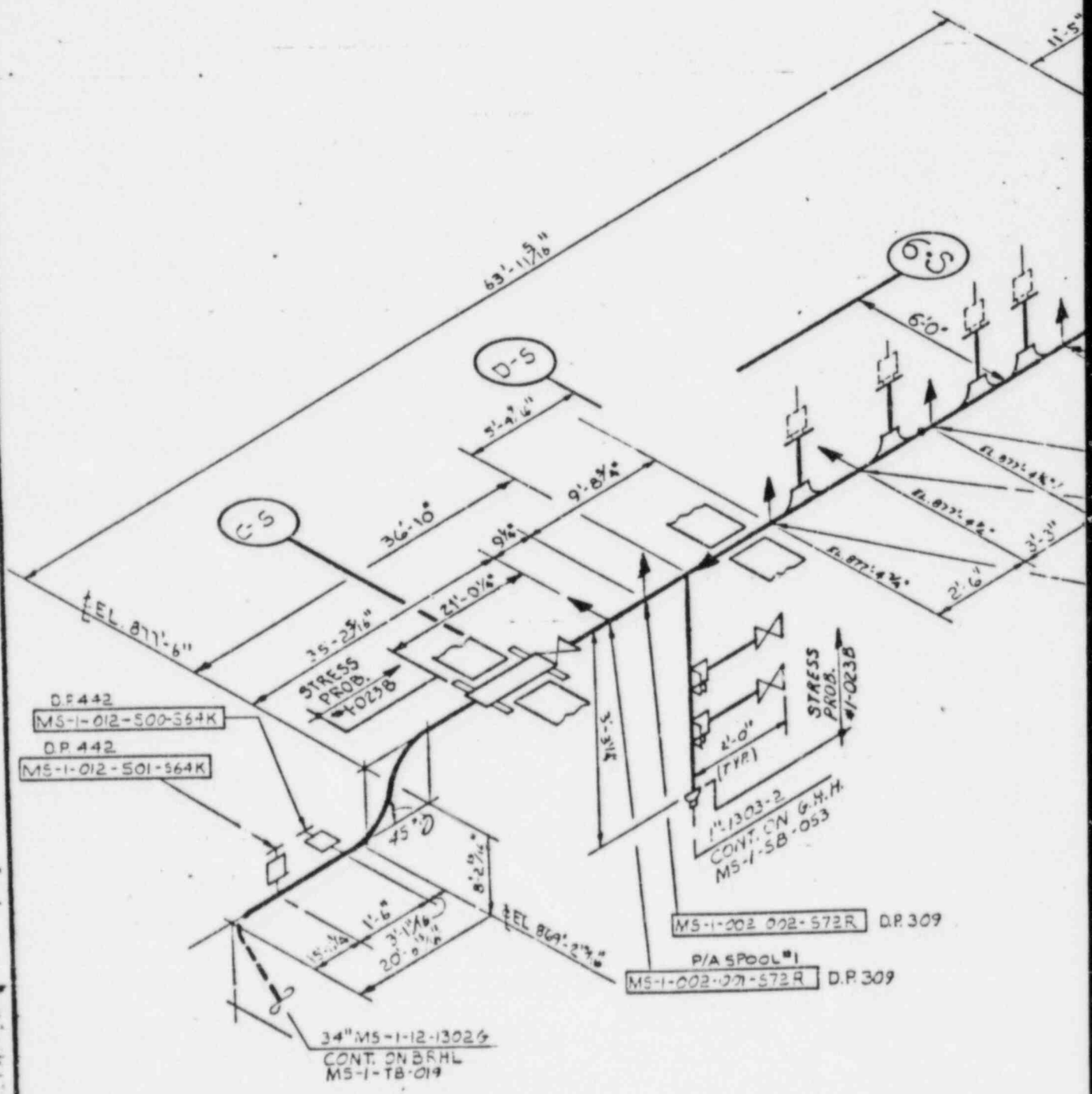
Loop 2, 4/9

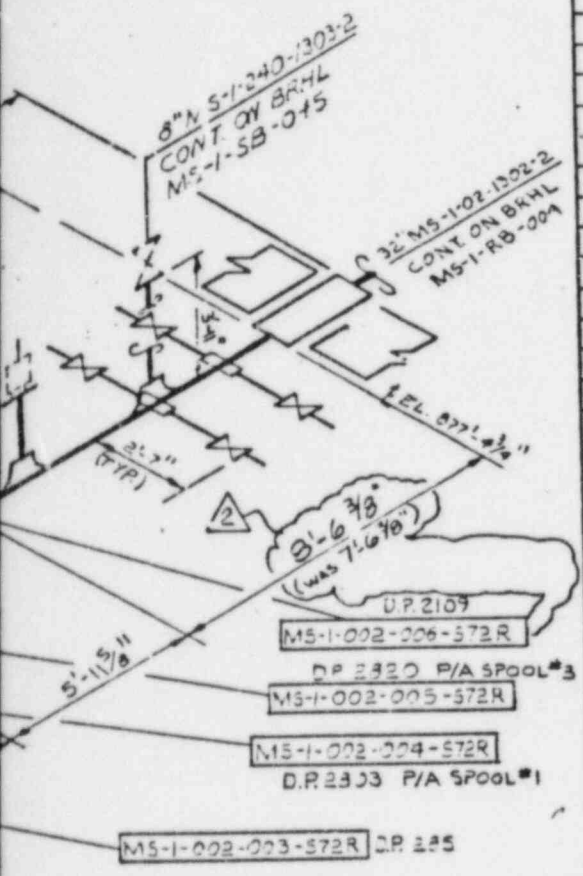
8.5"

11"

17"

BRHL-MS-1-SB-018





BILL OF MATERIAL

PC NO.	REQ.	HEAT NO.	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE

FOR OFFICE AND ENGINEERING USE ONLY

REV.	DATE	DESCRIPTION	DWN.	CK'D.	APP'D.
2	5-9-82	ISSUED FOR HANGER IDENTIFICATION AND ACCOUNTABILITY ONLY & REVISED FOR STRESS PROBLEM 1128	W.S.	DB	
1	4-23-82	REV. AS NOTED.	TEH	MRS	
2	9-13-82	VERIFIED FOR STRESS PROB # 1-0238	LBJ		

WELD NO.												
RT												
MT												
LP												
UT												

COST CODE	PAINT	INSUL.	CL.	THERM.
FLOW DIAG.	COMPOSITE	SPEC.	DESIGN CAT. / CL.	

NOTES

TI APERTURE CARD

Also Available On Aperture Card

8606120432-06

TEXAS UTILITIES SERVICES INC.

C. P. S. E. S. 35-1195 GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS

HOUSTON, TEXAS

DRAWING TITLE

MAIN STEAM

"Q" & NON "Q"	PURCHASE NO. RFFM-3401	DWG. NO. BRHL-MSV-SB-018	REV. 2

CPSES 35-1195 CONTROL COPY DOCUMENT CONTROL

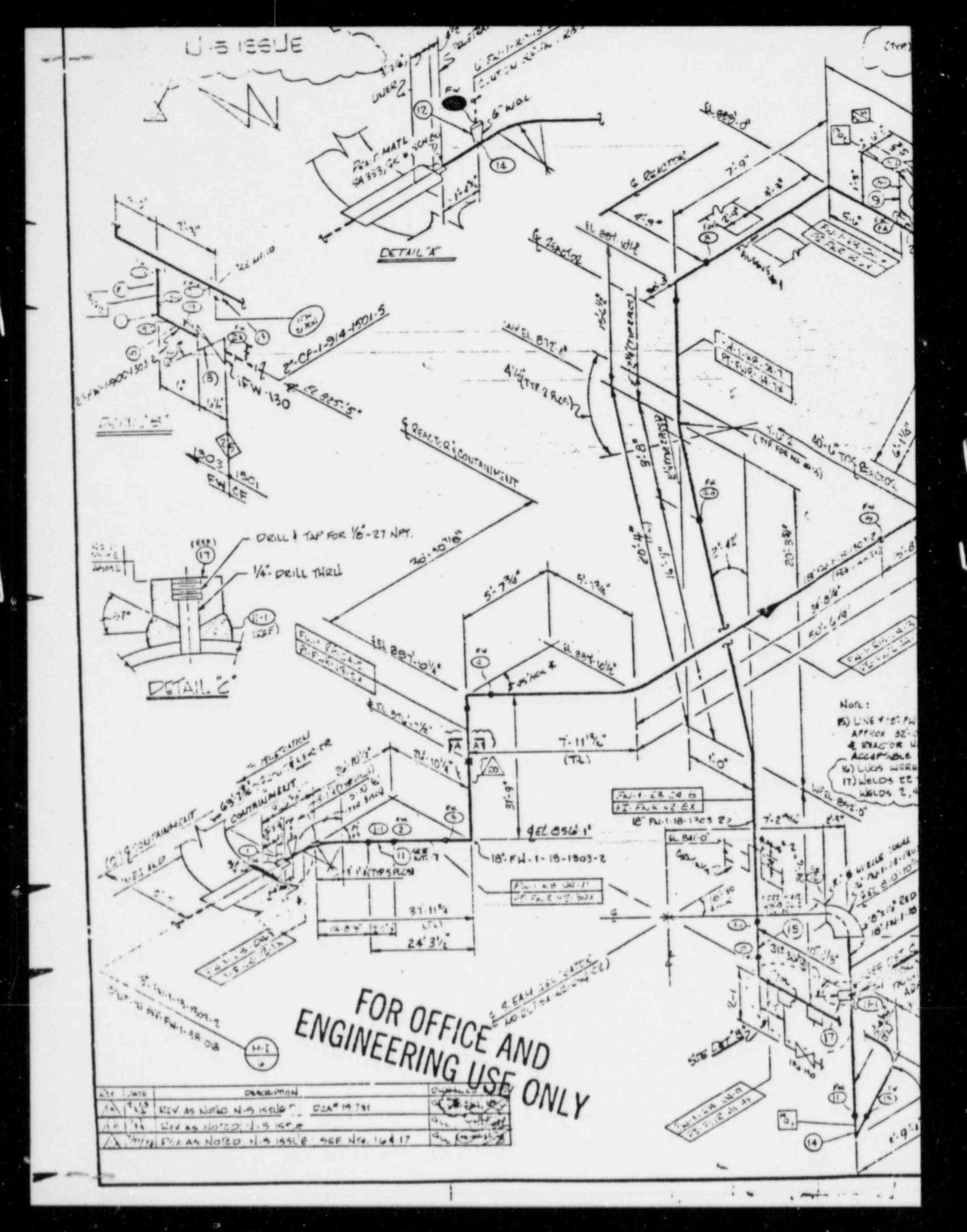
8.5" Loop 2, sh 9

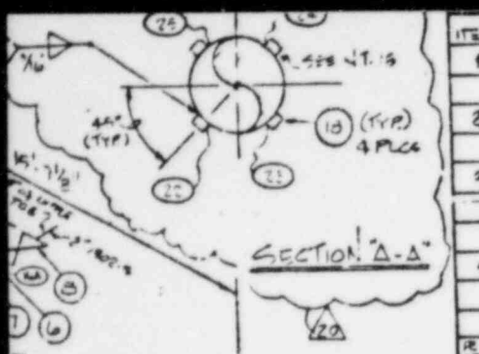
11"

8.5"

11"

17"


U-5 ISSUE
DETAIL "A"
DETAIL "C"
DRILL & TAP FOR 1/8"-27 NPT.
1/4" DRILL THRU
FOR OFFICE AND ENGINEERING USE ONLY



ITEM	QUANTITY	DESCRIPTION	CHARGE NUMBER	COLOR CODE
1	20'-1 3/16"	18" SCH 80 C.S. SMLS PIPE TO	P1-23	
		ASME SA 333 GR 6		
2	5	18"-SCH 80, C.S. SMLS., 90° L.R. WE.	P1-2092	
		TO ASME SA 420 GR. WPL-6		
3	1	18" x 16"-00-90° LR. N. REDD	P1 2206	
—	—	ELL-TO-DO		
5	2	18" x 2"-3000# C.S. FRGD., RO'.	P1-3041	
		TO ASME SA 350 GR. LF2		

ITEM NO	REQD	CHARGE CODE	DESCRIPTION	MAT'L MATRIX	GRADE	SPECIAL CODE
6	1	2	2" ϕ S/80 PIPE 0'-5" EST. LG.	SA 333	6	GR GR/
7	2		2" ϕ 3000# SW 90° ELL	SA 350	LF2	GR GR/
8	2		2" TB 307 3-SJMA CP20A.1 UT3 2,25	SA 376	—	—
9	1		2" ϕ SCH 80 PIPE 0'-3 3/16" EST. LG.	SA 333	GR6	GR GR/
10	1		2" ϕ SCH 80 PIPE 0'-5" EST. LG.	"	do-	do
11	1		18" S/80 PIPE 2'-1 7/8" LG.	A 53	GR6	GR GR/
12	1		6" S/80 BW W.O.L.	SA 420	WPL 6	GR GR/
13	1		ITW-2178A CP-0622	SA 479	316	
14	1		18" S/80 90° ELL BW	SA 420	WPL 6	
15	1		18" S/80 PIPE 1'-6" LG.	SA 333	6	
16	1		2" ϕ S/80 PIPE 1'-1 5/8" EST. LG.	SA 333	6	GR GR/
17	1		3/4" PRESSURE TRANSDUCER ADAPTER SEE NT. 3	SA 479	6	—
18	4	2	FB 1 1/2" x 1 1/2" x 4"	SA 516	70	—
—	—	—		—	—	—

REV.	DATE	DESCRIPTION	DWN.	CK'D.	APPR.
A	4-10-80	REV. TO "AS BUILT" REF. CMC 45434			
B	5-29-80	REV AS BUILT" AS NOTED PER CMC 50782 & 50811 R.2			
C	6-27-80	"AS BUILT" VERIFIED PER 51284, 50068 REF. CMC 74261 R.1 CHN 1312-1	RS.		
D	11-26-80	"AS BUILT" VERIFIED FOR STRESS PROB" 1.000			
E	2-23-83	REV. AS BUILT AS NOTED.			
F	8-5-83	REV TO AS BUILT AS NOTED. REF CMC 90442 R.3			
G	10-17-83	REV TO "AS-BUILT" AS NOTED; REF CMC-34389 R-1			
H	10-20-83	FROZEN ISSUE, SEE NOTE 16			
J	11-29-83	REVD AS NTD. N-E ISSUE	NM		

SPOOLS 1-11 EV ITT; SPOOLS 12-16 BY B&R

COST CODE	PAINT	INSUL.	CL.	THENS
N/A	PCP 7-4-13-2	CS-3	7.3	
FLOW DIAG.	COMPOSITE	SPEC.	DESIGN CAT./CL.	
M1-203	NOTE 2		FCS-2	

WORK

1.) WELD END PREP PER MEP7
2.) M1-513-01, 2.0, M1507 2.0, M1-506 L6; M1-513, R10
3.) INTERNAL COATING REMOVAL PER PCP-19

7.) PC 11 CUT FROM WEST END OF SPOOL FW-1-28 CA-1
8.) CUT-ED TO ELEVATED FROM WELD "C" CHN #1312-1

9.) REF CMC'S 1580, 5364, 5366 R1 7129; PDW. 704, CHN. 131
COMP M1-507 2.11, (2" NE 8-2) COMP M1-513 2.11 (ZONE D-1)
10.) FIELD TO PROVIDE EL-METALIC HT FW 21, FC NO. 13
11.) REF. CMC 35068 & NARC # 6181
12.) DELETE WELD 17
13.) MACHINE FROM 3/4" S.W. PLUG FOR DIM, REF CMC 94389 R-1.

TEXAS UTILITIES SERVICES INC.

C. P. S. E. S. 35-1195 GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS

HOUSTON, TEXAS

DRAWING TITLE

STEAM GENERATOR FEEDWATER

2" SIGN O	TURNOVER NO. WFT-M2903	DRG NO. EEP-FW-1-28-002	REV. 20

Loop 2, 6/9
Category II AP 5 Item 5b

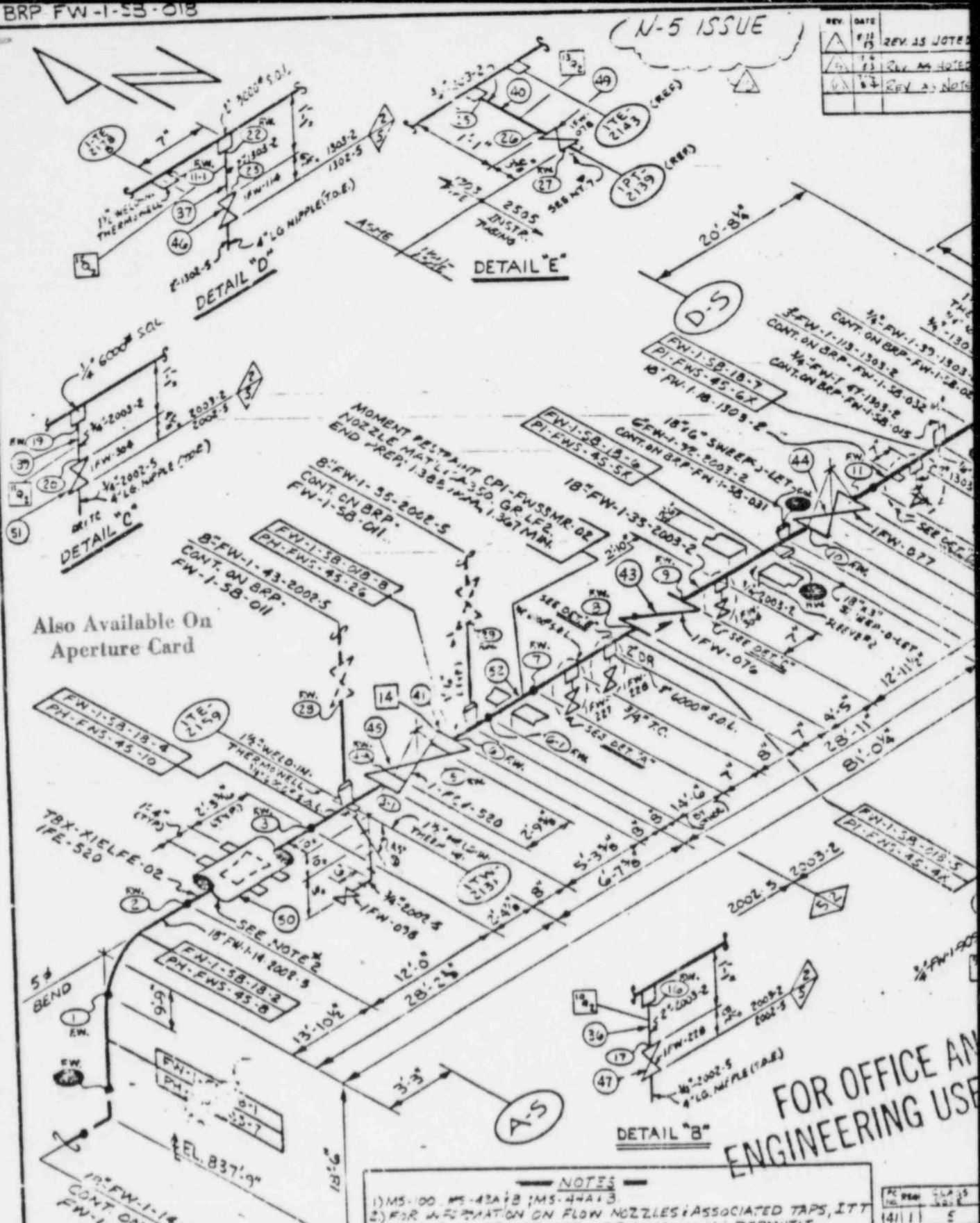
8.5"
11"
8.5"
11"
17"

8606120432-07

BRP-FW-1-SB-018

N-5 ISSUE

REV.	DATE	
		REV. AS NOTED
		REV. AS NOTED
		REV. AS NOTED



NOTES

1) MS-100 MS-42A & B; MS-44A & B.
2) FOR INFORMATION ON FLOW NOZZLES & ASSOCIATED TAPS, ITT SPOOL FW-1-SB-18-3 SEE NT. 7 ON MI-0601 & PERMUTIT, DWG. 55-30807.
3) REF. DCP M-173, IT IS FOR GEN. VALVE INFO ON VALVE TAG NO'S IFW-227-228 & -304
4) NEW CONFIGURATION PER MI-0601 R6 & MI-0601-01 R7.
5) MANUF. INTERIOR COATING REM'L REQ'D. PER CP-CPM-6.9 SEC. 3.6.1.
6) REMOVE & SCRAP 7' OF PIPE FROM SPOOL 4, PER DMC-34201 R-2.
7) SWAGE ¾" MPW x ⅜" O.D. TUBE CONNECTOR, ASME SA 403 TYPE WP 316 CAT NO. 55-6600-1-12-MPW.
8) TRIM 1½ FROM FW1 END OF SPOOL 6.

PC NO.	REQ.	SLA 25
41	1	5
43	1	2
44	1	1
45	1	5
46	1	2
47	1	4
48	1	1
49	1	2
50	1	5
51	1	2
52	1	2

DESCRIPTION	DWN.	CK'D.	APP'D.
COL. WELDS 8.21.74 U-5 ISSUE			
N-5 ISSUE			
N-5 ISSUE			

ITEM	QUANTITY	DESCRIPTION	ORDER NUMBER	NET CHG. IN MATL
1	7'-5 3/4"	18" SCH 20 SMLS STL PIPE TO ASME SA 333 GR 6	FI 23	
2	46'-5 1/8"	18" SCH 140 SMLS STL PIPE TO ASME SA 106 GR B	PH 25	
3	1	1 1/2" WELD-IN THERMOWELL ITE 203	~	
4	1	1 1/2" WELD-IN THERMOWELL ITE 215	~	
5	1	1 1/2" —DO— ITW 2131	~	
6	1	1 1/2" WELD-IN THERMOWELL ITE 217	~	
7	15'-9 1/2"	18" SCH 140 SMLS STL PIPE TO ASME SA 333 GR 6	PI-71	
8	1	18"x3" SCH. 80 FS S.W.O.L. TO ASME SA 350 LF2	PI-3065	
9	1	18" SCH 140 x 6" SCH 120 FS S.W.O.L. TO ASME SA 350, LF-2	PI-4066	
10	1	18" SCH 140 x 3" SCH 160 —DO—	PI-4067	
11	2	18"x 3/4" 6000# FS SOL —DO—	PI-3056	
12	3 1/4"	8" S. 120 SMLS STL PIPE TO ASME SA 333 GR 6	PI-77	
13	1	18" SCH 140 x 8" SCH 120 F.S. S.W.O.L. TO ASTM SA 350 LF2	PI 4068	
14	1	18"x2" 6000# FS SOL TO ASME SA 350 LF2	PI-3062	
15	1	18" x 2" 3000# FS SOL TO -DO-	PI-3041	
16	3	18" x 3/4" —— DO ——	PI-3075	
17	0'-6"	8" SCH 120 SMLS STL PIPE TO ASME SA 106 GR B	PH 30	
18	1	18" SCH 140 x 8" SCH 120 FS W.O.L. TO ASTM A 105	PH 4061	
19	1	18" x 3/4" 6000# FS SOL TO ASTM A 105	STK	
20	1	18" X 16" SCH 140 CONC W FEDA TO ASTM A or SA 234 WPB(W) or A105	PH 2280	
22	1'-8"	18" S/140 SMLS STL. PIPE TO ASME SA 333 GR 6	PI-71	

PC NO.	REQ.	CLASS CODE	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE
36	1	2	2" S/160 PIPE 0'-3 9/16" EST. LG.	SA 333	6	GR PD
37	1	2	2" S/80 PIPE 0'-3 11/16" EST. LG.	SA 333	6	GR PD
39	2	2	3/4" S/160 PIPE 0'-3 1/2" EST. LG.	SA 333	6	GR PD
40	1	2	3/4 S/80 PIPE 0'-3 7/16" EST. LG.	SA 333	6	GR PD

REV.	DATE	DESCRIPTION	DWN.	CK'D.	APP'D.
5	4-4-75	REV. TO "AS BUILT" AS NOTED REF: CMC 90432-11	WES		
6	4-8-75	REV TO AS BUILT, AS NOTED REF PCN 2012	TT		
7	10-2-75	AS-BUILT "VERIFIED FOR STRESS PROB. I-0018	RS.		
8	12-8-75	REV. "AS-BUILT" AS NOTED	WK		
9	2-16-76	REVISED "AS-BUILT" AS NOTED	LJS		
10	5-25-76	REV. TO "AS-BUILT" AS NOTED REF CMC 90446.21	GLC		
11	8-24-76	REV. TO "AS-BUILT" AS NOTED. REF CMC-90446 R-3			
12	10-14-76	REV TO "AS-BUILT" AS NOTED; REF CMC-90446 R-6			
13	01-04-77	FROZEN ISSUE; SEE NT. "9			

SPOOLS 1,2,4-6 B.W ITT / SPOOLS 3 - 11 B.W B&R

COST CODE	PROJECT CP-CPPI-0019	MATL.	CL.
N/A	3e" 3/4/19 5+3.2	SEE TAB.	
FLOW DIAG.	COMPOSITE PT.	SPEC.	DESIGN CAT./CL.
MI-0203-01	PII-001-01	Set N+1	2003-2, 1303-2, 1302-5

TEXAS UTILITIES SERVICES INC.

C P S E S. GLEN ROSE, TEXAS

Brown & Root, Inc.

ENGINEERS AND CONSTRUCTORS

HOUSTON, TEXAS

DRAWING TITLE

FEEDWATER

8606120432-08

'Q' & Non 'Q'	APPROVED FOR RFT-M-2802	DRP. FW-1-SB-018	11

DESCRIPTION	ASME ASTM	GRADE	COLOR CODE
16"x16" S/140 B.W CONC. RED	SA 234	WPB	—
18" CB 308 BN CP 208.2 Nr. 2	SA 234	WCB	—
18" GB 208 BN PO CP 208.1 Nr. 2	SA 234	—	—
16" FA 37 RG CP.001 S/o 220	SA 182	LCB	—
2" TB 307B SJ MA CP 20A.1 Nr. 2	SA 105	—	—
2" TB 309 SO MA CP 20A.1 Nr. 2	"	—	—
3/4 TB 309 SO MA CP 20A.1 Nr. 21.25	"	—	—
1 1/2 TB 307 SJ MA CP 20A.1 Nr. 2	SA 105	—	—
TEX-ALEITE-02 (IFE 5-20) CP-001, S/o 325	SA 105	B	—
3/4" TB 309B SO MA CP 20A.1 Nr. 21.25	SA 105	—	—
1 CMI-FW-5 SMA-3/4 CP-2095	SA 105	LF 21	—

VALVE WEIGHTS	
PC NO.	WT. LBS.
33	2250
44	6420
45	6420
46	11.25
47	1.25
48	1.25
49	2.5
50	2.5
51	14

MIN. WALL VIOLATIONS
WELD NO.
N/A

LINE NO.	
18"-FW-1-1-2003-2	3-4
18"-FW-1-1-2003-3	3-4
18"-FW-1-1-1303-2	3-4
18"-FW-1-1-1302-5	3-4

DETAIL "A" ONLY

PENETRATION MT-6 MAT'L SA-350 GR. LF2

18"FW-1-1B-1303-2 CONT. ON BRP-FW-1-RB-004

3"FW-1-1104-2003-2 CONT. ON BPP-FW-1-SB-032

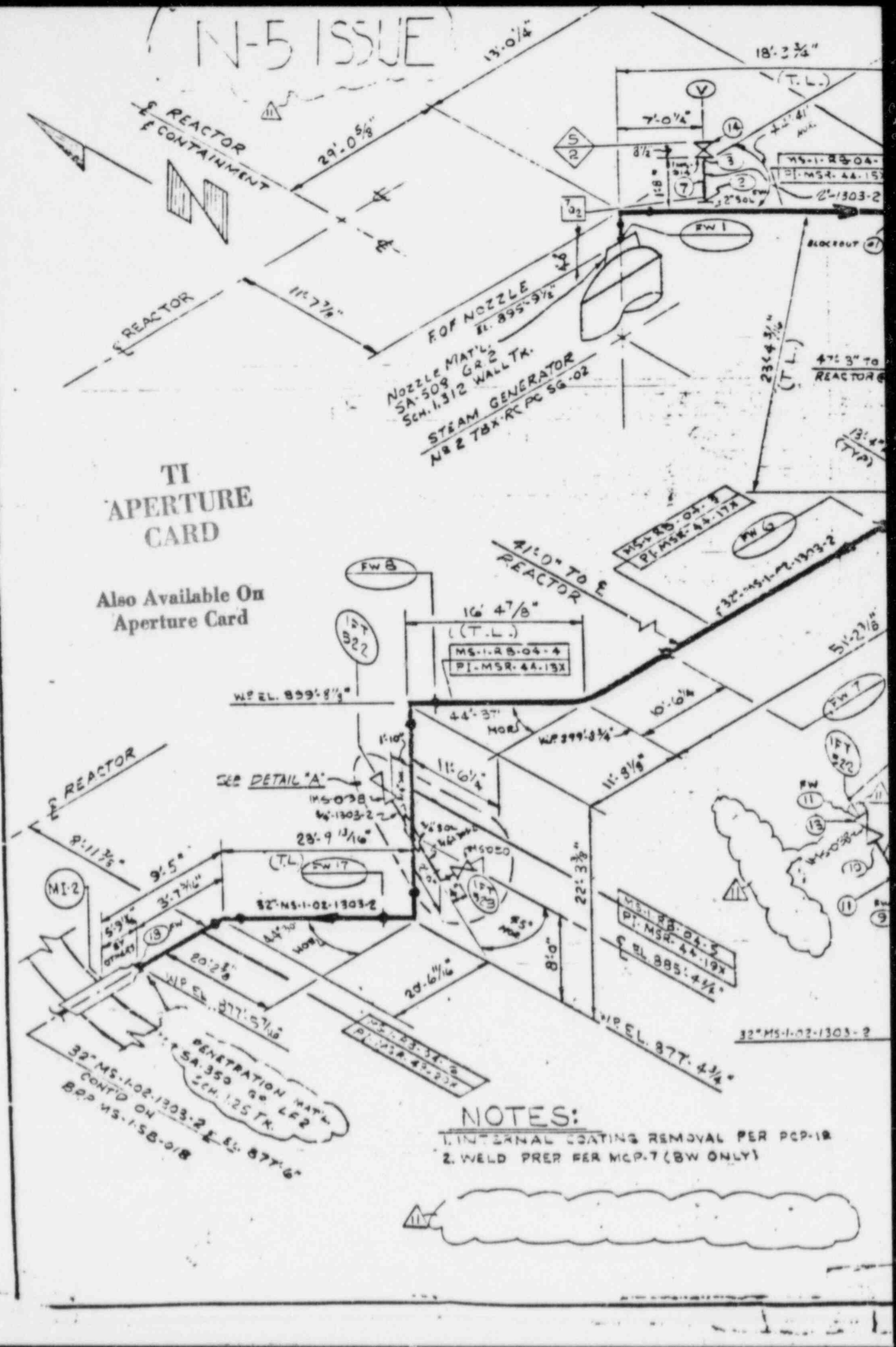
SLEEVE* ①

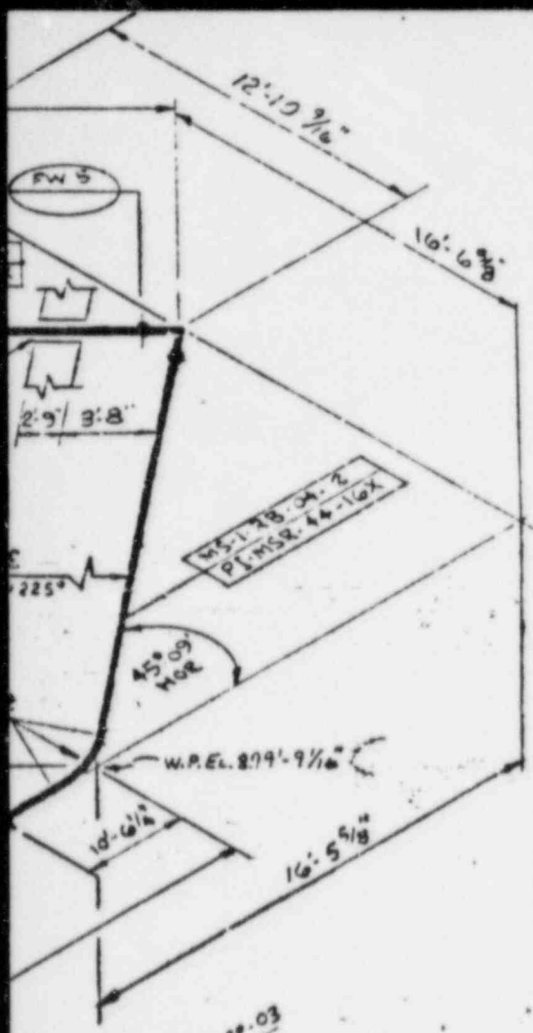
F.L. 856'-1 1/2"

CPSES

Loop 2, Category II AP13 item 5D

8.5" 11" 8.5" 17"


N-5 ISSUE
TI APERTURE CARD
Also Available On Aperture Card
NOTES:
1. INTERNAL COATING REMOVAL PER PCP-12
2. WELD PREP PER MCP-7 (BW ONLY)



ITEM	QUANTITY	DESCRIPTION	SPEC'S N-M-SERIES	MAT. CODE N-MAT'L
1	135'-1 5/8	32" ϕ 1.250" MIN. WALL C.S. W. PIPE TO	P1-22	
		ASME SA-155 CLASS 1 GR. KCF-70		
2	4	32" 1.250" M.W. C.S. 30° L.R. W.E. TO ASME	P1-2090	
		SA234-WPB(W) CODE CLASS 1571		
		(CENTER TO FACE 3'-7")		
3	1	32" 1.250" M.W. C.S. 45° L.R. W.E. TO. — DO —	P1-2091	
4	2	32" x 3/4" - 3000# FRG'D. C.S. SOL TO ASME	P1-3019	
		SA 350, GR. LF2		
5	1'-1"	3/4" ϕ SCH. 80 C.S. SMLS PIPE TO ASME	P1-7644	
		SA333 GR. 6		
6	1	32" x 2" 3000# C.S. FRG'D. SOL TO ASME	P1-3042	
		SA 350 GR. LF 2		

PC MK NO	QTY	CLASS CODE		ASME ASTM	GRADE	COATING CODE
7	1	2	2" SCH 80 PIPE 0'-3 11/16 EST LG.	SA 333	6	GR 22.1
9	1	2	3/4" SCH 80 PIPE 0'-6 9/16" LG	SA 333	6	GR 22.1
10	1		3/4" — DO — 0'-3 5/8" LG	DO	6	
11	1		3/4" SCH 80 PIPE 0'-5 13/16" LG	SA 333	6	
12	1		3/4" 3000# SW 90° ELL	SA 350	LF2	GR 22.1
13	2		3/4" TB 309 SOMA CP-20A.1 NT. 2.25	SA 105	—	—
14	1	2	2" TB 309 S SOMA CP-20A.1 NT. 2.25	SA 105	—	—

FOR OFFICE AND
ENGINEERING USE ONLY

REV	DATE	DESCRIPTION	DWN	CHK	APPD
0	7/16	IFC WELDS 6-16 PER TGH-10392	EEH		
1	7/16	IFC WELDS 3,4,17&18. REV'D AS NOTED	EMT	TS	
2	11/17	REV. AS NOTED. REF. CMC #9436.R-1.	EMT	TS	
3	7/21	REV. AS NOTED. REF: PDN #893.	EMT	TS	
4	12/6/21	REV. AS NOTED.	FT		
5	9/9/22	REV. AS NOTED; REF. CMC 12300			
6	3/1/23	REV AS NOTED REF. CMC's 60990, 63998 & PDN-2012	EMT		
7	6/5/23	AS BUILT VERIFIED; STRESS PROB 1-0223719-14			
8	8/2/23	REV. TO AS BUILT AS NOTED. REF. CMC 87496			
9	8/25/83	FROZEN ISSUE			
10	10/3/83	REV AS NOTED; DELETE WELD #4; NS ISSUE			
11	9/10/86	REV. AS NOTED. N-S ISSUE			

SPOOLS 1-6 BY ITT, 7-9 BY B&R

COST CODE	PAINT	INSUL.	EL.	THKNS
N/A	PCP-5, SYS. 1	SEE TAB.		

FLOW DIAG.	COMPOSITE	SPEC NUMBER	DESIGN CAT./CL.
M-202	M1-509, R6, SOM	MS-43-M8	1903-2

TEXAS UTILITIES SERVICES INC.
C P S E S
GLEN ROSE, TEXAS

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

DRAWING TITLE
MAIN STEAM, REHEAT AND STEAM DUMP

DRAWING NO.	FURNISHED AS	DWG NO.	REV.
"D"	RFTM 3432	BRP-MS-1-RB-004	11

DETAIL "A"

VALVE WEIGHT	
ITEM NO.	WT. #
13	15
14	18

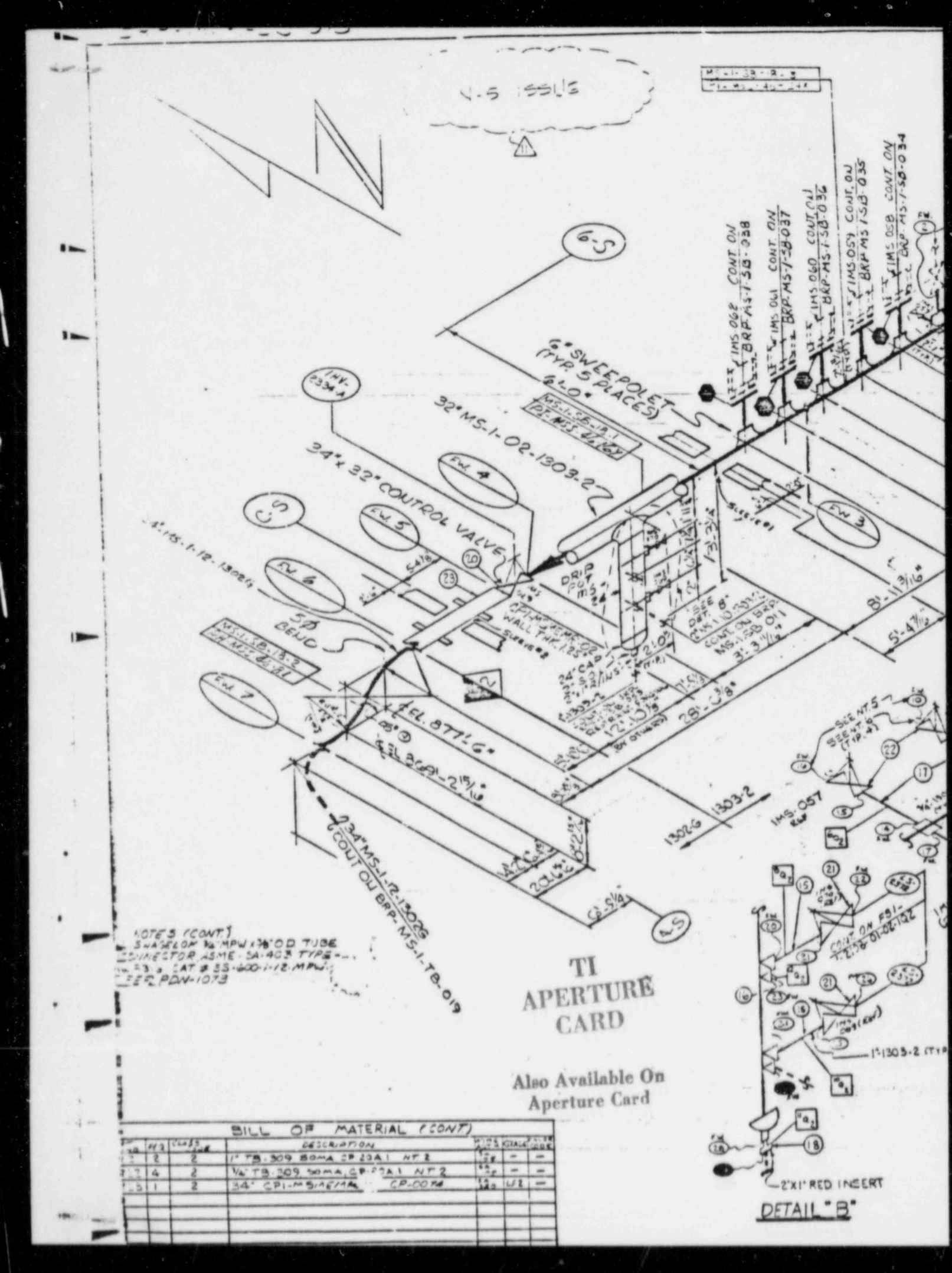
MIN. WALL VIOLATIONS	
WELD NO.	
N/A	

LINE NO.	INSP'D

Loop 2, 8/9
Category II AP13 item 52

8.5"
11"
8.5"
11"
17"

8606120432-09



NOTES (CONT.)
3 WALFLOW No. MPW x 78" OD TUBE CONNECTOR ASME SA-403 TYPE -- ... CAT # 35-600-1-12-MPW ... SEE PDN-1073

TI APERTURE CARD

Also Available On Aperture Card

BILL OF MATERIAL (CONT.)

ITEM	NO.	CLASS	DESCRIPTION	WEIGHT	SCALE	SPEC CODE
1	2	2	1" TB-309 SOMA CP-23A1 NT 2		-	-
2	4	2	1/4" TB-309 SOMA CP-23A1 NT 2		-	-
3	1	2	34" CPI-MS-1-REFAB CP-0078		WE	-

BILL OF MATERIAL

ITEM	QUANTITY	DESCRIPTION	SPEC NUMBER	NOTES
	30'-5 3/16"	32" O.D. x 1.250" MIN. WALL WLD'D	PI-22	
		C.S. PIPE TO ASME SA-155 KCF 70		
		CLASS I		
2	1'-6 1/2"	24" SCH. 100 SMLS STL PIPE TO ASME	PI-72	
		SA-333 GR. 6		
3	2'-4"	8" SCH. 80 ——— do ———		
4	1	24" SCH. 80 b.e. CAP TO ASME SA-420 WPL6	PI-7253	
5	3	6" 1500# F.S. R.F. W.N. FLANGE (SCH. 160	PI-1053	
		BORE) TO ASME SA-350 LF-2		COLOR CODE
6	5	6" 1500# x 1/8" THK. FLEX GASKETS	PI-7965	32 28
7	1	32" (1.250" M.W.) x 24" SCH. 80 F.S. SWEE-	PI-4050	
		POLET TO ASME SA-350 LF-2		
8	3	32" (1.250" M.W.) x 6" SCH. 160 do	PI-4051	
9	1	32" (1.250" M.W.) x 8" SCH. 160 do	PI-4052	
		(W/SCH. 80 WELDED END)		
10	4	32" x 3/4" 3000# FS S.O.L. TO ASME	PI-3019	
		SA-350 LF-2		
11	1	24" x 2" ——— do ———	PI-3057	
12	3	24" x 1" ——— do ———	PI-3058	
13	1	2" ——— do ——— FLAT S.O.L. TO ——— do ———	PI-3059	
14	22'-9 1/2"	34.00 x 1.25 MIN WALL WLD'D & S.O. PIPE TO ASTM SA-155 KCF 70 CLASS 1	PI-53	

PC NO.	CLASS CODE	DESCRIPTION	ASME ASTM	GRADE	COLOR CODE
15	2	1" S/80 PIPE 0'-6 1/2" EST. LG'S	SA 333	6	GR/ GR/
16	1	1" 3000# PLUG	SA 350	LF-2	
17	4	1/4" S/80 PIPE 0'-4 3/16" EST. LG'S	SA 333	6	
18	1	2"x1" 3000# RED. INSERT	SA 350	LF2	GR/
20	1	2 32" TB-308 BX CP-76 NT. 2,4	SA B16	WCC	~

REV.	DATE	DESCRIPTION	DWN.	CHD.
A	1/74	I.F.C. WELDS 1-28	RCH	MA
1	9/74	REV'D. AS NOTED. REMD. F.W. 27. REF: PDN# 801		TS
2	7/75	REV. AS NOTED. REF: CMC# 34195.		
3	1/76	REV. AS NOTED, AS "BUILT"		
4	11/76	REV "AS BUILT" AS NOTED REF: CMCS &		
5	4/78	REV. "AS-BUILT" AS NOTED. REF: PDN-2012.		
6	4/78			
7	5/78	AS BUILT REVISED FOR STRESS PROB. 10238		
8	6/78	REV "AS-BUILT" AS NOTED		
9	8/83	FROZEN ISSUE		
10	8/83	REV AS NOTED; N-5 ISSUE		
11	7/84	REV AS NOTED; N-5 ISSUE		

SPOOLS 1-3 BY ITT & SPOOLS 4-8 & 10-12 BY B&R

COST CODE N/A | PAINT CP-CPM-6.9 SEC. 3.6.1 & 3 | ANSI SEE TAB | CL. | THREAD

FLOW DIAG. M1-0202 | COMMODITY/MECH-01 R.6 M1-0400 R.5 | SPEC. SEE NOTE 1 | DESIGN EAT/CL. 1303-2, 13026

NOTES

1) MS-100, MS-43 A & B, MS-44 A.
2) REF. DCA-2616 FOR PIPE SCHEDULE OF DRIP POT MS-24.
3) MANUFACTURER'S INTERIOR COATING REMOVAL REQ'D PER CP CPM-6.9 SEC. 3.6.1.
4) NOTE WALL THICKNESS DIFFERENCE AT WELD NO. 6.
5) FIELD TO PROVIDE BI-METALLIC WELDS AT F.W.'S 10, 13, 16 & 19 (PC. NO. 22)

TEXAS UTILITIES SERVICES INC.
C P S E S. GLEN ROSE, TEXAS

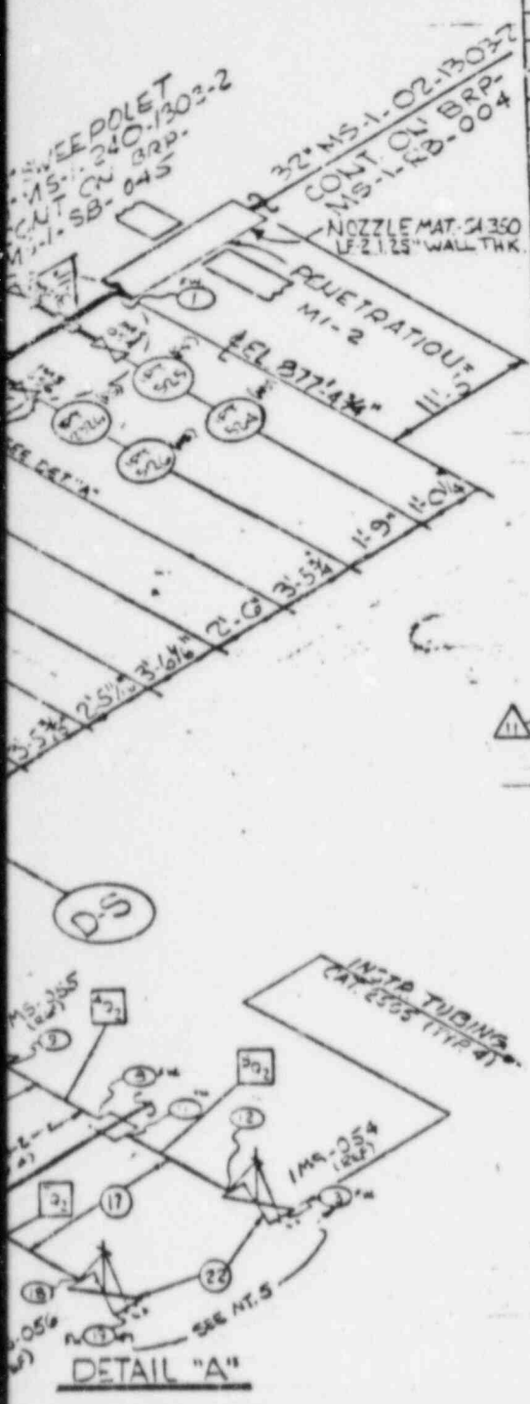
Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

DRAWING TITLE

MAIN STEAM

8606120432-10

'Q' & NON 'Q'	PURCHASE NO. RFT-M-3401	JOB NO. BRP-MS-1-SB-018	REV. 11



DETAIL "A"

FOR OFFICE AND ENGINEERING USE ONLY

MIN. WALL VIOLATIONS	
WELD NO.	
N/A	

VALVE WEIGHTS	
PC. NO.	WT.
22	38.000
21	20.6
23	13.3

LINE NO.	INSUL.
1" MS-1-202-1303-2	1.0
4" MS-1-212-1302-2	2.5
8" MS-1-242-1303-2	2.5

Category II AP 13 Item 5.5 Loop 2, 9, 19

11" 8.5" 8.5" 11" 17"

FOR OFFICE AND ENGINEERING USE ONLY

Category 11 AP13
item 63

AS-BUILT
DATELINE 1-13-81
VENDOR CERTIFIED
DRAWING REV. NO. 5
BY _____ DATE 11-6-83

ITEM NO	NO REQ'D	DESCRIPTION	WT.	ASME OR ASTM	MTC

REV	DATE	DR	CHK	APP	DESCRIPTION
4	11-6-83	KJ		RJ	REVD VENDOR CERT. REF. CHC #95080 R-1
3	11-6-83	KJ	CC	RJ	REVD VENDOR CERT.

☆ CHANGE NOT MADE BY C.I.C.

NOTES:
1) PROVIDE TEMPORARY SUPPORT DURING HYDRO TEST (BY FIELD)
2)

PLAN

SECTION "A-A"

SECTION "N-N"

SEE DETAIL 24

SEE DRWG FOR WELD LOCATION

LOCATION PLAN

TOS EL 897'-2 3/4"
BOS EL 892'-10 7/8"

TOS EL 905'-7"
BOS EL 902'-4"

STEEL SUPPLD W/ MK# MS-1-01-007-C72K, WS = 310 THIS PROB.

EXIST. WHIP REST. E DRWG. P-2 A-88 #4 A

EXIST. WHIP RESTRAINT E DRWG. P-2 A-88 #4 A

SEE DET. 'A'

12" - MS-1-01-13912

CONT. TO 8" LINE

DESCRIPTION	BY	APP
ISSUED FOR CONST.		
ISSUED FOR CONST.		

THERM. OFFSET INTS	
VERT.	2.066"
S	1.254"
W	3.055"

T.O. # 3-191 * INCLUDES APPROX. WT. OF ATTACH. 786

LOAD (LBS)	DRAW	OTHER	WIND	OBE	SSE	DESIGN LOADS			MVTS (IN.)	VIBRATION	SEISMIC
						OPER.	SHEET	FIELD			
UP											
DN						255 LBS			VERT.		
N						*			N-S		
S									E-W		
E									TORS.		
W									SUPP. TYPE		
K									SUPP. SIZE		

REFERENCE DRAWINGS	ISOMETRIC	REV	PIPING	REV	ELECTRICAL	REV
	MS-1-RB-02	3	2323-M1-P-X-	2	2323-E1-0552	3
	PAR. ISOMETRIC	REV	STRUCTURAL	REV	H.V.A.C.	REV
	MS-1-RB-02	3	2323-S1-0554	2	2323-M1-0552	5

OWNER	TEXAS UTILITIES SERVICES INC.
PROJECT	COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER	GIBBS & HILL INC.

CODE/CLASS: III/2
PAINT: OUTSIDE W.P.
ZONE

Brown & Root, Inc.
HOUSTON, TEXAS

DRAWN	DATE	CHK'D	DATE	APP'D	DATE

P.O. NO. CP-0046A-4 MFGR REF.

PRODUCTION ORDER	SERIAL NUMBER	SHEET
		1 of 5

137 MK. NO. MS-1-01-001-C72S REV. 5

25567
15931
41498

Category II AP13 item 41

7.4 ADJUSTMENT OF HANGERS

7.4.1 Adjustment Prior to Pipe Rigging

After erection of a system of hangers, the Contractor shall adjust all supports to the design elevation of the supports in the cold position indicated on the drawings after making any necessary corrections for deviation of supporting steel and equipment connections from the design elevations. All constant and variable spring supports shall be securely blocked out with factory supplied travel stops, and all attachment welding and supplementary steel connections shall be inspected for completion and adequacy prior to rigging piping into the hangers.

7.4.2 Adjustment Prior to Testing and Flushing

Prior to hydrostatic testing, the Contractor shall inspect all installed permanent hangers for design offset, adequacy of clearance for piping and supports in the hot and cold position, and freedom of rods to swing and guides to permit movement without binding, and adequacy of all anchors.

All threaded components shall be inspected to assure full thread engagement and proper erection of thread locking devices or upsetting of hanger rod threads. If the permanent hangers are not available for installation, the contractor shall be responsible for providing adequate temporary support during the test. Hanger installation and adjustment requirements for testing are as follows:

a. [redacted]

For steam as the blowout medium at normal operating temperature or less, the deadweight supports (spring and rigid hangers) are required to be in place with all spring hangers in the unlocked and cold set positions. Thermal restraints (rigid and guide) and moment restraint supporting structures are required to be in place.

ii. For demineralized water as the flushing or test medium at ambient temperature, the deadweight supports are required to be in place with all spring hangers in the locked position. The moment restraint supporting structure is not required if it is substituted by a temporary rigid support.

M494

iii. For air as the blowout medium at ambient temperature, the deadweight supports (spring hangers and rigids) are required to be in place with all spring hangers in the unlocked position. The moment restraint supporting structure is not necessary if substituted by a rigid support.

b. Pneumatic Testing and Blowout of Air and Gas Lines

Air and gas lines shall be pneumatically tested and blown out with clean dry air only. This is to be done at or near ambient temperature. The deadweight supports (spring hangers and rigids) are required to be in place. The moment restraint supporting structure is not required if it is substituted by a temporary rigid support.

c. Flushing and Hydro-Testing of Water Lines

For air or gas as the medium, the deadweight supports are required to be in place with all springs locked at the cold set position. For water (at or near ambient temperatures) as the medium, the deadweight supports are required to be in place with the springs either locked or unlocked at the cold set position.

7

7.4.3 Hanger Adjustment for Pipe System Operation

7.4.3.1

The Owner's procedure on removal of hanger travel stops, hanger adjustments for the design cold load, and other steps to place completed systems into operation shall be followed by the Contractor as directed by the Owner. The Work requirement of this specification covers up to the accepta pipe hydrostatic tests. The subsequent application of insulation and finish painting or coating shall be performed by the Contractor according to separate specifications.

7.4.3.2

All temporary attachments and devices used in installing the Work shall be removed from the work areas prior to pipe system turnover to the Owner.

7.5 [redacted]

To minimize risk of personnel injury or equipment damage, all piping shall be erected in its permanent hangers. If permanent hangers are not installed, temporary hangers may be used. Piping may be temporarily supported from other piping provided that the contractor takes adequate precautions to assure that the supporting piping is not damaged. Piping shall not be supported from valves or equipment.

7.6 SUPPORT GUIDELINES FOR PLUMBING

7.6.1

Plumbing hanger Work by the Contractor shall be as shown on drawings and as described in this Section. Seismic supports will be supplied by others and erected by the Contractor in accordance with supplier's instruction.

7.6.2

For permanent hanger installation, the Contractor shall use available, existing embedded inserts or plates or, if not available, core drilled anchor bolts, plates, or similar devices for hanger attachments as shown on drawings. Unless shown otherwise on drawings, attachments to concrete surfaces shall be Richmond screw anchors, Hilti Kwik Bolts, or Engineer approved equal. No cinch anchors shall be used for seismic category piping without prior approval of the Owner.

7.6.3

Hanger attachments shall be accurately located wth relation to building column center lines, equipment locations, and the necessary hanger offset indicated on the drawings, when applicable. In all instances where equipment location or attachment steel deviates from the design tolerances, the Contractor shall notify the Owner and take all necessary measurements to determine the proper attachment location. Attachments for sliding supports, anchor bases, and floor stands shall be accurately shimmed and leveled to a true plane surface. Where attachments are anchored to masonry floors or walls, the attachment plate shall be firmly grouted within 1/8 inch to 12 inch tolerance (i.e., 1/8 inch vertical maximum deviation in 12 inch horizontal length).