

NO. 2000-757

IGNACIO SERAFIN, ET AL	§	IN THE COUNTY COURT
	§	
VS.	§	AT LAW NO. 3
	§	
CHEVRON U.S.A. INC.	§	EL PASO COUNTY, TEXAS

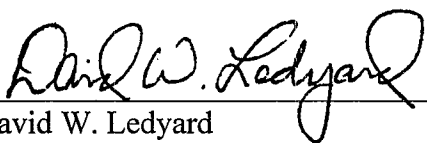
**CHEVRON U.S.A. INC.'S SUPPLEMENTAL RESPONSES
TO PLAINTIFF'S REQUEST FOR PRODUCTION**

TO: IGNACIO SERAFIN, by and through his attorney of record, Stephanie Finch,
BARON & BUDD, 3102 Oak Lawn Avenue, Suite 1100, Dallas, Texas 75219-4281.

NOW COMES CHEVRON U.S.A. INC., Defendant herein, and makes and files this its
Supplemental Response to Plaintiff's Request for Production.

Respectfully submitted,

STRONG, PIPKIN, NELSON,
BISSELL & LEDYARD, L.L.P.



David W. Ledyard
State Bar No. 12109400

Michael T. Bridwell
State Bar No. 02979600
14th Floor, San Jacinto Building
Beaumont, Texas 77701-3255
(409)981-1000
FAX(409)981-1010

ATTORNEYS FOR DEFENDANT,
CHEVRON U.S.A. INC.

James and Luther
CHEVRON U.S.A. INC.
ENGINEERING DEPARTMENT - EL PASO, TEXAS

SPECIFICATION NO. EP-418-Q
January 12, 1981
Appendix I
Page 1 of 1

A.1 STANDARD SPECIFICATIONS

<u>Number</u>	<u>Title</u>
EG-850C	Placing and Curing Concrete
EG-851	Concrete Proportioning
EG-1048A	Small Tools
EG-1049C	Supplies
EG-516C	Reinforcing Steel
EG-398H	Steel Fabrication
EG-581	Clearing Grading and Earthwork

A.2 REFINERY AND ENGINEERING INSTRUCTIONS

1404 General Instructions to Contractors Working Within the Refinery

A.3 CONSTRUCTION DRAWINGS

PC-38-32224	Foundation - Fuel Gas Knock Out Drum
PD-13-29921	Sheet No. 15-110 # Steam Supports
PA-38-22096	Concrete Foundation Location Plan
PA-38-22001	Plot Plan - Plant 38
PA-13-23083	Overhead Pipeway
PD-13-32212	Plot Plan - Widen Pipeway

A.4 MISCELLANEOUS

EP-2200 Qualification of Welders

Robert R. Lugin Jan 19, 1981
Engineer

Don W. [Signature] 1/19/81
Lead Engineer

BILL OF MATERIAL

JOB 16-484

DATE 2/12/81

DRG. No. PD-16-Z9953 SHEET 17

ORDER No. BM-9019

NL301-2116-14-270

APPRO. JOB No. _____

ENG: GLJ (X259)

MATERIAL REQ'D AT DEST'N BY 3/2/81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(4)	LF	SEAMLESS PIPE CS SCH 40 2"	SKOP
2	(1)	EA	ELBOW 90° LR STD Wt CS 2"	STOCK
3	(2)	EA	ELBOW 45° LR, STD Wt, CS, 2"	
4	(1)	EA	REDUCER, CONC, BW, CS, STD. Wt 3" X 2"	
5	(10)	LF	PROCEDURE SEAMLESS PIPE, CS, SCH 40, 3"	SKOP
6	(1)	EA	150# FS BLIND FLANGE, 1/16" RF, 3"	STOCK
7	(1)	EA	STAND. PIPE SHOE, TYPE I, 3" X 12"	
8	(1)	EA	150# 1/16" THK. ASB COMP. GASKET 3"	
9	(4)	EA	STUD BOLT B7 W/2 NUTS 5/8" X 3 1/2"	

END USE: FOUL STEAM TO D-1524 MOD.

PD-16-Z9953-O SH 17

[Signature]

[Signature] 2/23/81

[Signature] 2/23

SHEET 1 OF 1 SHEETS

1 BILL OF MATERIAL

JOB 16-484

DATE 2/12/81

DRG. NO. PD-16-29953 SHEET 21

ORDER NO. BM-9023

APPRO. JOB NO. N6JDI-2116-14-52

MATERIAL REQ'D AT DEST'N BY 3/2/81

GLT

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(14)	LF	SEAMLESS PIPE, CS, SCH 40 2"	SNOP
2	1	EA	REDUCER, ECC, 4" X 2", CS BW, STD Wt.	RIBM 80752 X 90.0 Kaman
3	(1)	EA	150# FS BLIND FLANGE, 1/16" RF, 4" CS,	STOCK
4	(1)	EA	150# FS BLIND FLANGE, 1/16" RF, 1" CS,	
5	(1)	EA	ELBOW, 90° LR, BW, STD Wt, 2" CS,	
6	(2)	EA	150# FS, W/N, FLG 1/16" RF, CS, SCH 40 2"	
2	1	EA	PLUG, CS, SCH 40, 1 1/4"	
7	(1)	EA	GASKET, SPIRAL WIND, ASB/304 4"	
8	(1)	EA	GASKET, SPIRAL WIND, ASB/304 1"	
9	(2)	EA	GASKET, SPIRAL WIND, ASB/304 2"	
10	(8)	EA	Stud Bolt w/nuts B-7 5/8" X 2 3/4"	

END USE: MURKIN MUDS.

SHEET 21 OF 21 SHEETS

DATE 3/27/81

ORDER NO. BM 9190

APPRO. JOB NO. E1627-2116-14

360

MATERIAL REQ'D AT DEST'N BY 4/3/81

DATE

QUANTITY	UNIT	DESCRIPTION	REMARKS
12	ft	4" PIPE SMLS SCH 40 CS BFW	
4	ea	4" ELBOW STD WT CS BW 90-DEG LR	
1	ea	4" TEE STD WT CS BW	
1	ea	4" FLANGE 150# CS RF WN BORE SCH 40	
		void-----void-----	
		void-----void-----	
	ea	4" CHECK VLV 150# CS RF 120R SWING	
	ea	4" GASKET 150# 304/ASB SPIRAL WND	
		void-----void-----	
2	ea	5/8"x3 1/2" STUD BOLD B-7 W/2 HEXNUTS	
	ea	6"x4" WELDOLET STD. WT. CS. BW.	
	ea	4" STANDARD PIPE CLAMP	
	ea	6" STANDARD PIPE CLAMP	
	ft	7/8"Ø EYE ROD W/4 NUTS	
	ft	3"x3"x3/8" ANGLE IRON	
	ea	2" FLANGE 150# CS RF WN BORE SCH 80	
	ft	2" PIPE SMLS SCH 80 CS BFW	
	ea	5/8"x3" STUD BOLT B-7 W/2 HEX NUTS	
	ea	2" GASKET 150# 304/ASB SPIRAL WND	
		void-----void-----	
	ea	2" ELBOW XS CS BW 90-DEG LR	
	ea	3/4"x1 1/2" STANDARD PIPE THERMOWELL	
		PER STD. DWG. GC-J78660	
		- 1/2" -	

CHEV B8 5846

SHEET 1 OF 2 SHEETS

MFG. 334 (25M 2-53)
PRINTED IN U.S.A.16490 // Debotleneck
Compressors K-1601

BILL OF MATERIAL

JOB 16-494

DATE 3/30/81

DRG. No. _____ SHEET _____

ORDER No. ~~4~~ EM 9229

#6 S/D Hold Interim Storage #6 S/D

APPRO. JOB NO. Sm400-2116-14

EBW X-225

MATERIAL REQ'D AT DEST'N BY 4/8/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	25	ft	3/4" SMLS STL PIPE SCH 80	
2	2	ea	3/4" 800# STL SW GATE VLV BLT BNT.	
3	2	ea	3/4" 800# STL SW GLOBE VLV BLT BNT	STEEL
4	2	ea	3/4" 800# STL SCG GATE VLV BLT BNT.	STEEL TRIM
5	11	ea	3/4" 3000# FS SW 90-DEG ELBOW	
6	7	ea	3/4" 3000# FS SW TEE	
7	4	ea	3/4"x $\frac{1}{2}$ " STL CONC SWAGED SCH80 TSE	/
8	4	ea	3/4" 600# FS WN FLG $\frac{1}{2}$ " RF SCH 80	
9	8	ea	3/4" 150# FS WN FLG 1/16" RF SCH 80	
10	2	ea	3/4" 800# STL SW GATE VLV BLT BNT	STEEL Trim /
12	2	ea	($\frac{1}{2}$ " YARWAY STL TRAP 720 W/STRAINER,	
12	void		# THREADED)	
13	1	ea	3/4" 6000# STL WELD BOSS SW	
14	4	ea	3/4" 150#x1/16" THK. ASB. COMP. GASKET	
15	2	ea	3/4" 600# SPIRAL WOUND GASKET	
16	8	ea	5/8" ϕ x3 $\frac{1}{4}$ " STUD BOLT GR B7 w/2 HEX NUTS	
17	16	ea	$\frac{3}{4}$ " ϕ x2 $\frac{1}{4}$ " STUD BOLD GR B7 w/2 Hex Nuts	
18	2	ea	3/4" SCG STL BAR STOCK PLUG RD. HD.	
19	2	ea	3/4"xCL SMLS STL PIPE NIPPLE TOE &	
			POE SCH 80	
			JTG 3/30/81	
			End Use: Relocation of 400" STM valves	CHEV B8 5847

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB 16-493 BM-9157 DATE 3/18/81

DRG. No. #6 3/4 SHEET Hold #6 3/4 Interior Storage ORDER No. BM-9157

APPRO. JOB No. By pass - 2116-14-360

EBW X-225

MATERIAL REQ'D AT DEST'N BY 3/27/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	35'	3"	PIPE SMLS SCH 40 CS BW	
2	5	3"	ELBOW STD WT CS BW 90 DEG LR	
3	1	3"	TEE STD WT CS BW	
4			VOID	
5	2	3"	FLANGE 150 LB CS RF WN BORE SCH 40	
6			VOID	
7	1	3"	GATE VALVE 150 LB CS RF 12 CRTR	
8	2	3"	GASKET 150 LB ASB COMP RF RING	
9	8	3-1/2" x 5/8"	MACH BOLT MILD STL w/2 HEX NUTS	
10	4'	7/8" dia.	DOUBLE EYE ROD	
11	10'	7/8" dia.	EYE ROD w/2 NUTS	
12	3	3"	STANDARD PIPE CLAMP	
13	1	8"	STANDARD PIPE CLAMP	
14	1 PR.	3"	ORIF. FLANGES 300 LB CS RF WN BORE SCH 40	
15			VOID	
16	2	3"	GASKET 300 LB ASB COMP RF RING	
17	8	3/4" x 5"	MACH BOLT MILD STL w/2 HEX NUTS	
18	1	4" x 4"	STD PIPE SHOE	
19	2	1/2"	GATE VALVE 800 LB MALE NPT FEMALE NPT	
20	2	1/2"	PLUG CS SCRD	
21	1	3/4"	BOSS 6000 LB CS SCRD	
22	1	3/4"	PLUG CS SCRD	
23	1	8" x 3"	ELBOW 3000 LB CS CS	

CHEV B8 5848

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LIST OF MATERIALS

Job No. 16-493List No. BM-9157Accounting Charge No. Bypas-2116-14-Draftsman JOSE L. REYES @ 388DATE REQUIRED: _____ Date 3/16/91Engineer: EBWLead Engr: JWJ

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L1IEA2A	35'	3"	PIPE SMLS. SCH. 40 CS BFW.		
2	L50MAIBC	5	3"	ELBOW STD. WT. C.S. BW 90 DEG. L.R.		
3	L51MAI	1	3"	TEE STD. WT. CS. BW.		
4						
5	L40BA3D	2	3"	FLANGE 150 LB. CS. RF WN.		
6				BORE SCH. 40.		
7	L20BA3CAI	1	3"	GATE VALVE 150 LB. CS. RF 12CR TR.		
8	LGIBTA	2	3"	GASKET 150 LB. ASB. COMP. RF RING		
9	LG20AN	8	3 1/2" x 3"	MACH. BOLT MILD STL. W/2 HEX NUTS		
10		4	1/8" DIA	DOUBLE EYE ROD		
11		10'	1/8" DIA	EYE ROD W/2 NUTS.		
12		3	3"	STANDARD PIPE CLAMP		
13		1	8"	STANDARD PIPE CLAMP		
14	L42FA3DIPR	3"	3"	ORIF FLGS. 300 LB. CS. RF WN.		
15				BORE SCH. 40		
16	LGIFTA	2	3"	GASKET 300 LB. ASB. COMP. RF RING		
17	LG20AN	8	3/4" x 5"	MACH. BOLT MILD STL. W/2 Hex Nuts		
18		1	4" x 4" Lg	STD. PIPE SHOE		
19	L20KA8HD	2	1/2"	GATE VALVE 800 LB. MALE NPT FEMALE NPT		
20	L370ABW	2	1/2"	PLUG CS. SCRD		
21	L36VBAS	1	3/4"	BOSS 6000 LB. CS. SCRD.		
22	L370ABW	1	3/4"	PLUG CS. SCRD		
23	L36SBAU	1	6" x 3"	ELBOLET 3000 LB CS. S.W.		
24						
25						
26						
27				End Year F 21013 Bypas		
28						
29						
30						
31						
32						

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LIST OF MATERIALS

Job No. 16-438List No. BM 9173Accounting Charge No. FUEL S-2116-14-570Draftsman G.T.A. Ph. 388DATE REQUIRED: 4/10/81 Date 3-7-81Engineer: EBW X225

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM N.O.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L11EA1A	150#	2"	Sm/s. STL. Pipe Sch 40		
2						
3	L20KAE7	2	3/4"	600# STL. Gate Valve 03" end Male S.W. 80# end Female N.P.T. Bit Bolt		
4	L20BA3CA	2	2"	150# 45 Flg. 1/16" R.F. Gate Valve Bit Bolt		
5	L21BA3DA	1	2"	" " Globe " "		
6	L36VB45	1	3/4"	600# STL. Weld Boss, threaded		
7	L36VBDS	7	3/4"	" " " S.W.I		
8	L40BA3DE	10	2"	150# F.S. W.N. Flg. 1/16" R.F. Sch 40		
9	L40FA3DG	2	1 1/2"	300# " " Sch 80		
10	L40BA3DG	12	3/4"	150# " " " "		
11						
12	L50MA1B	9	2"	STL. 90° B.W. Elbow LR. Sta. Wf.		
13	L55NBAB	2	2 x 1 1/2"	STL. Ecc. Red. B.W. X.S.		
14	L370AEV1	—	—	Secd STL Bar Stock Plug Rd Hd.		
15	L370ABW	6	3/4"	" " " "		
16	L61ET4	10	2"	150# 1/16" Flk Ash Comp. Gasket		
17	L61FT4	2	1 1/2"	300# " " " "		
18	L20KA1HE	6	3/4"	800# STL. S.W. Gate Valve Bit Bolt		
19	L620BM	32	5/8" x 3"	Steel Bolt Gr B7W/2 Hex Nut		
20	L620BM	4	5/8" x 4"	" " " "		
21	L620BM	8	5/8" x 4 3/4"	" " " "		
22	L620BM	4	3/4" x 8 1/4"	" " " "		

DATE January 21, 1981

DRG. No. _____ SHEET _____

ORDER NO. B77-8775

APPRO. JOB No. 6419-XX-1

SPK (226)

MATERIAL REQ'D AT DEST'N BY February 4, 1961

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1 ft	10"	Pipe Smls Sch 160 BFW	
2	1	10"	Pipe Sch 160 CS BW	
3	1	10"	Flange 300 LB CS RF	
			WN Sch 160	
4	1	10"	300 LB Blind Flange	
			CS RF Plate	
5	5	1/2"	Boss, Standard dimension	
			CS Screws	
6	16	EA	Stud Bolts B-7 w/2 Nuts	
7	1	10"	Gasket 300 LB 304/Asb	
			Spiral Weld	
			END USE : To be used	
			as bubbler pot to determine	
			SO ₂ breakthrough with	
			a pH analyzer	
			SPT 1/30/21	
			11/20/21	



Chevron U.S.A. Inc.

Contract

Contract Number C-15-006-81

James and Luther

Chevron U.S.A. Inc. hereafter referred to as COMPANY, and the undersigned, hereafter identified as CONTRACTOR, hereby mutually agree on January 23, 1981, that CONTRACTOR shall perform for COMPANY, at or near El Paso Refinery, County of El Paso, State of Texas, the work set forth in Specification No. EP-418-Q, dated January 12, 1981 (RRK) and entitled "Foundation Work - Plant 33 Isolation". Contract Terms and Conditions (pages 1-4), Right-to-Audit Clause (page 5), Certificate of Nonsegregated Facilities (page 6), Utilization of Minority Business Enterprises (page 7), Certificate of Insurance (page 8), Exhibit-Compensation Adjustment (page 9), Exhibit-Construction Equipment (page 10), Specification No. EP-418-Q (pages A1-A10 and Appendix), as an improvement to real property of COMPANY by affixing thereto whatever materials are involved therein so as to become an integral part of such real property, under the Terms and Conditions hereof, and in accordance with the above specification, which Terms and Conditions and Specification, attached hereto, are part of this Agreement, and Refinery Instruction No. 1404 (pages B1-B16 with Appendices BI and BII), attached hereto, are part of this Agreement. COMPANY shall pay CONTRACTOR, in accordance with statements prepared by CONTRACTOR a compensation of \$5,552.00 Five thousand five hundred fifty-two and 00/100 dollars.

Contractor's Compensation Adjustment, if necessary, will be in accordance with Exhibit-Compensation Adjustment and Exhibit-Construction Equipment, attached hereto, and are also part of this Agreement.

The work shall be commenced January 26, 1981
diligently prosecuted, and completed February 6, 1981

A payment and performance bond in terms and executed by a surety company satisfactory to COMPANY shall be furnished to COMPANY in the sum of
(No bond required unless an amount is entered above.)

CONTRACTOR

Chevron U.S.A. Inc.

By _____

By _____

And _____

And _____

Witness _____

Invoices should be sent to:
Chevron U.S.A. Inc.
P. O. Box 20002
El Paso, Texas 79998
Attn: Invoice Desk, Refinery Accounting

CONTRACTOR'S State License No. _____
(Where required by State Law)

Communications to CONTRACTOR should be addressed to the attention of

Communications to COMPANY should be directed to the attention of

Mr. Dan James
James and Luther
P. O. Box 13224
El Paso, Texas 79912

Mr. L. R. Shanks
Chevron U.S.A. Inc.
P. O. Box 20002
El Paso, Texas 79998

Facility Completed

Superintendent or Foreman

Invoice No.

Date

Amount

Date Received

Charge Account No.
CON 36-6173-
01-160

Job No.
33-276

Remarks

Note: If CONTRACTOR is incorporated, execution shall be by an authorized officer of the corporation and corporate seal affixed and attested to by the Secretary. If CONTRACTOR is not incorporated, signatures should be witnessed by an employee of COMPANY, if practicable; if not, by a disinterested party.

CHEV B8 5852

GO-279-WO1 (CD-1-77)
Printed in U.S.A.

TERMS AND CONDITIONS

PERFORMANCE OF THE WORK

1.1 Definitions

- 1.11 The term "work" as used in this Agreement means, unless the context otherwise requires, all work to be performed by CONTRACTOR under this Agreement.
- 1.12 The term "Facility" as used in this Agreement means the product of the work, such as an improvement to real property, designs or data.
- 1.13 The term "material" or "materials" as used in this Agreement means all material, supplies and equipment to be incorporated into the Facility.
- 1.14 The term "affiliate" as used in this Agreement means Standard Oil Company of California or any company in which Standard Oil Company of California owns directly or indirectly at least 51 percent of the shares entitled to vote at a general election of directors.
- 1.15 The terms "indemnatee" and "indemnitees" as used in this Agreement mean respectively COMPANY, one of its affiliates or the agent or employee of COMPANY or one of its affiliates and all of them.
- 1.16 The terms "subcontractors" and "vendors" as used in this Agreement mean subcontractors or vendors of any tier.
- 1.2 Independent Contractor: CONTRACTOR shall be an independent contractor, maintaining complete control over CONTRACTOR's men and operations.
- 1.3 Specifications: CONTRACTOR shall perform the work, including the provision of materials, in accordance with the specifications and exhibits (if any) which are a part of this Agreement and such additional drawings and explanations as COMPANY may provide to CONTRACTOR from time to time to detail and illustrate the work.
- 1.4 Permits: Unless otherwise provided in this Agreement, CONTRACTOR shall secure all permits, make all cash and other deposits, provide all bonds and give all notices required by law in connection with the work.
- 1.5 Items to be Provided by CONTRACTOR: Unless otherwise provided in this Agreement, CONTRACTOR shall provide all materials, utilities, consumable supplies, tools, construction equipment, and labor, including supervision, necessary for the completion of the work.
- 1.6 Safety Measures: CONTRACTOR shall perform the work in accordance with safe practices, taking all reasonable precautions to protect the Facility and adjacent facilities, workmen and the public and providing, where reasonably necessary, barriers, guards, temporary bridges, lights and watchmen. While on the premises of COMPANY or its affiliates all of COMPANY's safety rules shall be strictly observed; in particular, smoking shall be limited to such locations and occasions as are specifically authorized in writing by COMPANY. CONTRACTOR shall not perform or permit any act on the premises of COMPANY or its affiliates which involves a fire or explosion hazard, including welding, torch cutting and disposal of debris by burning, without prior written consent of COMPANY.
- 1.7 Suppliers
 - 1.71 COMPANY may nominate bidders for the supply of certain items of material. CONTRACTOR shall request bids on these items from the nominees, and may obtain such other bids as CONTRACTOR may elect.
 - 1.72 COMPANY may have available for sale certain materials not products of COMPANY. CONTRACTOR shall purchase such materials offered by COMPANY and its designated affiliates as long as such material is suitable and is competitively priced.
 - 1.73 When the work includes purchasing certain materials, CONTRACTOR shall be fully responsible for ordering, expediting, receiving and safeguarding (subject to the provisions of Section 5.3 of these Terms and Conditions) all such materials, and for conducting all competitive bidding by and negotiations with the vendors thereof and for paying for materials and enforcing of warranties, unless otherwise provided in this Agreement.
- 1.8 Labor
 - 1.81 CONTRACTOR shall employ labor from that available in the vicinity of the work, and in accordance with the terms of employment prevailing in that vicinity, to the extent that it is practicable and consistent with the timely and efficient prosecution of the work.
 - 1.82 CONTRACTOR shall use all reasonable efforts to avoid any disturbances in the existing labor situation which will adversely affect the business of COMPANY, its affiliates or other contractors working in the area.
- 1.9 Carriers: In connection with transportation of purchased materials, CONTRACTOR shall give consideration to, but shall not be limited to, use of carriers recommended by COMPANY.

2. COMPENSATION

- 2.1 Changes: COMPANY may make "changes" by adding to, omitting or deviating from the requirements of this Agreement. In the event COMPANY issues any written directive which is not identified as a Change but which CONTRACTOR considers to be a Change, CONTRACTOR shall so notify COMPANY in writing within 10 days after receipt of such directive. If no such timely notice is given, CONTRACTOR shall proceed in accordance with such directive without any adjustment in compensation. If COMPANY originally identifies the directive as a Change, or if CONTRACTOR gives such timely notice and COMPANY agrees that such directive is a Change, CONTRACTOR shall within 10 days after giving such notice or after receipt of the directive advise COMPANY of its proposed adjustment in compensation and COMPANY and CONTRACTOR shall attempt to agree in writing on an appropriate adjustment in compensation resulting from the Change. After such agreement is reached, CONTRACTOR shall proceed with the Change. However, if such notice is given or if COMPANY originally identified the directive as a Change, and in either instance COMPANY and CONTRACTOR fail to agree on whether or not such directive is a Change or fail to agree on an appropriate adjustment in compensation, then COMPANY may issue a written request for CONTRACTOR to proceed in accordance with such directive without such agreement. CONTRACTOR shall comply with such written request, but such compliance shall not prejudice either party's claim that the directive is a Change or, as the case may be, claim for an appropriate adjustment in compensation. After the written request to proceed is issued, any adjustment which is to be made to the compensation shall be determined in accordance with the Exhibit—Compensation Adjustment.
- 2.2 Taxes: CONTRACTOR shall pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, all State, Federal and other payroll taxes, including contributions and taxes assessed against employees on wages earned in connection with the work, and CONTRACTOR shall make all reports required by governmental authorities. CONTRACTOR shall also pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, any and all other taxes now or hereafter imposed by any governmental authority upon, measured by or incident to the performance of this Agreement or the purchase, storage, use or consumption by CONTRACTOR of materials, utilities, consumable supplies, tools or construction equipment used in the performance of this Agreement, unless the applicable laws specifically provide that such tax be paid by COMPANY.
- 2.3 Acceptance of Facility: Where provision is made by law for recording Notice of Completion, COMPANY may indicate its Acceptance of the Facility by recording such Notice; otherwise Acceptance shall be on the date COMPANY gives written notice to

CONTRACTOR that it is satisfied that the Facility has been completed in accordance with all requirements contained in this Agreement. Acceptance by COMPANY or payment hereunder shall in no way relieve CONTRACTOR of any obligation or liability under this Agreement.

Terms of Payment

- 2.41 At the end of each calendar month during the progress of the work, and upon completion of the work, CONTRACTOR shall be entitled to receive 85% of the compensation provided herein for that part of the work performed, including provision of materials, during that month. CONTRACTOR shall be entitled to receive the balance 35 days after Acceptance, provided that there are no undischarged or unsecured liens, attachments or claims in connection with the work. COMPANY may require, as a condition to payment of the balance, that CONTRACTOR submit evidence by receipted bills, releases and waivers of lien rights or otherwise, that all costs incurred by CONTRACTOR and his subcontractors (if any) in connection with the work have been paid.
- 2.42 Whenever CONTRACTOR is entitled to payment as provided above, COMPANY or CONTRACTOR (as specified on the first page [facing sheet] of this Agreement) shall prepare a statement of amounts so payable. Such statement shall be itemized and in such form as COMPANY and CONTRACTOR agree provided that such statement shall show the total compensation for that part of the work performed, including provision of materials, to the date of the statement, less 15% (except in the statement of the balance) and less previous payments. COMPANY shall pay CONTRACTOR the amount so payable, subject to COMPANY's audit of the statement, and subject to the provisions of Section 2.41 of these Terms and Conditions dealing with final payment of the balance, by check mailed within 20 days after the date payable or, when statement prepared by CONTRACTOR is received after the date payable, within 20 days after receiving CONTRACTOR's statement.

DELAYS

- 3.1 Site Readiness: CONTRACTOR shall ascertain from COMPANY that the site is ready before sending materials or workmen thereto.
- 3.2 Delays, Suspensions and Extensions: COMPANY may require CONTRACTOR to suspend performance hereunder completely or partially for whatever length of time COMPANY may elect. The time for completion shall be extended by each period that CONTRACTOR is delayed by (a) COMPANY or another independent contractor who is directly responsible to COMPANY (unless such delay is due to CONTRACTOR's default, for example, as provided in Sections 4.1 and 4.2 of these Terms and Conditions); (b) an act of God or the elements; (c) any other cause beyond CONTRACTOR's reasonable control; or (d) a labor disturbance.
- 3.3 Damages Due to Delays and Suspensions: COMPANY shall not be liable for any damages, direct, consequential or otherwise, suffered by CONTRACTOR due to delays and suspensions, but where CONTRACTOR is not in default CONTRACTOR shall be entitled to reimbursement for reasonable direct costs caused by delays and suspensions to the extent such delays and suspensions are caused by COMPANY and other independent contractors who are directly responsible to COMPANY. CONTRACTOR shall be obligated to proceed with the work notwithstanding a dispute on reimbursement; such action shall not prejudice either party's claim with respect to reimbursement.

INSPECTION, CONDEMNATION, STOPPING WORK

4.1 Inspection

- 4.11 Inspection by COMPANY: COMPANY may visit and inspect the work and materials, or any part thereof, at all times, and CONTRACTOR shall provide safe and proper facilities therefor. CONTRACTOR shall at all times during working hours keep a competent man in the immediate vicinity of the work areas to receive communications from COMPANY and to supervise the performance of this Agreement. When COMPANY determines that a work area is unsafe, COMPANY may stop the part of the work affected until the unsafe condition is corrected.
- 4.12 Inspection by CONTRACTOR: Whenever any part of CONTRACTOR's work depends on existing work or work or material provided by COMPANY or others, CONTRACTOR shall inspect and measure such other work or material and promptly notify COMPANY of each defect or discrepancy in such other work or material which may render it unsuitable for proper execution of CONTRACTOR's work or proper functioning of the Facility. If CONTRACTOR fails to notify COMPANY's representative of any such defect or discrepancy before performing CONTRACTOR's dependent work, and such defect or discrepancy would have been discovered in the course of a reasonably thorough visual inspection and measurement, COMPANY may condemn the work or material involved and CONTRACTOR shall correct such defect or discrepancy on the same basis as if it were defective work by CONTRACTOR under Section 4.2 of these Terms and Conditions.

- 4.2 Condemnation: COMPANY may condemn materials provided by CONTRACTOR and all parts of CONTRACTOR's work which are unsound or defective or fail in any way to conform with the requirements of this Agreement. CONTRACTOR shall begin to remove and replace such materials or work within 24 hours after receiving notice thereof from COMPANY. CONTRACTOR shall bear all costs involved in the removal and replacement of such materials and work and in the repair and replacement of any other materials and work necessarily damaged by such removal and replacement. If CONTRACTOR is requested by COMPANY to uncover any part of the Facility for inspection, the cost of uncovering and covering any such part not specifically requiring inspection under this Agreement shall be borne by COMPANY unless the part so uncovered is not in compliance with the requirements of this Agreement.

4.3 Taking Over and Stopping Work

- 4.31 Should CONTRACTOR default in any way in the performance of this Agreement, including failing, refusing or neglecting to supply sufficient material to be supplied by CONTRACTOR hereunder, or tools, or properly skilled workmen to complete the work with reasonable diligence, for 5 days after written notice of such default to CONTRACTOR, COMPANY may, at any time thereafter, take over and complete the work. The cost to COMPANY of completing the work shall be deducted from the unpaid part of CONTRACTOR's compensation. If such cost exceeds any such amount, CONTRACTOR shall reimburse COMPANY for such excess cost. The action by COMPANY of taking over and completing the work shall not constitute a waiver of or election among any other rights or remedies that COMPANY may have against CONTRACTOR.
- 4.32 Should CONTRACTOR or its creditors seek relief under any insolvency law, or CONTRACTOR be adjudged a bankrupt, COMPANY may at any time thereafter terminate this Agreement and take over and complete the work as provided in Section 4.31 of these Terms and Conditions, except that any payments due from CONTRACTOR to subcontractors or vendors in connection with the work may be made by COMPANY to such subcontractors or vendors, and be deducted from the amounts otherwise due to CONTRACTOR.
- 4.33 COMPANY may, in its absolute discretion, stop the work at any time, but where CONTRACTOR is not in default, COMPANY shall pay CONTRACTOR for all parts of the work done, including materials provided, in conformity with the requirements of

this Agreement, plus an amount for reasonable and verified costs of CONTRACTOR incurred in preparation for the parts of the work not yet performed and in shutting down his operations hereunder, plus an amount for a reasonable part of the profit CONTRACTOR would otherwise have earned; provided, that the amounts payable under this Section 4.33 shall in no event exceed the unpaid part of CONTRACTOR's compensation.

ABILITY

- 5.1 General Liability: CONTRACTOR shall indemnify and save harmless the indemnitees from and against any and all loss, damage, injury, liability, and claims thereof for injury to or death of a person, including an employee of CONTRACTOR or an indemnitee, or for loss of or damage to property (except property subject to Sections 5.2 and 5.3 of these Terms and Conditions), resulting directly or indirectly from CONTRACTOR's performance of this Agreement, including, but not limited to, the use by CONTRACTOR of staging or other equipment provided by COMPANY or others, regardless of the negligence of, and regardless of whether liability without fault is imposed or sought to be imposed on, one or more of the indemnitees, except to the extent that such indemnity is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement and except where such loss, damage, injury, liability or claim is the result of active negligence or willful misconduct of an indemnitee and is not contributed to by any act of, or by any omission to perform some duty imposed by law or contract on, CONTRACTOR, its subcontractor or either's agent or employee.
- 5.2 Liability for Property of COMPANY and its Affiliate: CONTRACTOR shall be liable to COMPANY and its affiliates for any loss of or damage to the property of COMPANY and its affiliates (other than the property subject to Section 5.3 of these Terms and Conditions) resulting directly or indirectly from CONTRACTOR's performance of this Agreement, regardless of the negligence of COMPANY, its agents, employees, and affiliates, except to the extent that such liability is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement; provided, however, that CONTRACTOR's liability under this Section 5.2 shall be limited to the applicable insurance which CONTRACTOR carries or has others carry and which shall not be less than that provided in Section 6 of these Terms and Conditions.
- 5.3 Liability for the Facility and Materials: CONTRACTOR shall exercise due care and diligence in the performance of this Agreement and in the care and protection of the Facility and materials. At COMPANY's option, CONTRACTOR shall reconstruct, repair or replace any part of the Facility or materials lost or damaged by any cause whatsoever, including but not limited to those referred to in Section 3.2 of these Terms and Conditions, wherever said loss or damage occurs including loss or damage to materials while in transit. In such event COMPANY shall reimburse CONTRACTOR for the costs of such reconstruction, repair or replacement in excess of \$1,000 for each occurrence or in excess of the coverage of any applicable insurance which CONTRACTOR may elect to carry or have others carry, whichever is greater, except costs incurred in reconstruction, repair and replacement of work or materials subject to condemnation by COMPANY prior to loss or damage (whether or not such condemnation was effected) under Section 4.2 of these Terms and Conditions, and except costs incurred in order to meet the guarantee(s), if any, contained elsewhere in this Agreement. CONTRACTOR also shall be paid a reasonable profit on that part of such reconstruction, repair or replacement for which cost reimbursement is made. COMPANY shall not be liable for loss or damage to construction equipment, tools, temporary structures, temporary excavations or supplies owned or used by CONTRACTOR or its subcontractors.
- 5.4 Compliance with Laws and Regulations: CONTRACTOR shall comply with all laws, regulations, decrees, codes, ordinances, resolutions, and other acts of any governmental authority, including Federal and State labor and tax laws, which are applicable to this Agreement and CONTRACTOR's performance hereunder, and shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from CONTRACTOR's failure to do so.
- 5.5 Liens: CONTRACTOR shall discharge at once or bond or otherwise secure against all liens and attachments which are filed in connection with the work and shall indemnify and save COMPANY, its affiliates, and the owners of the premises on which the work is performed harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens and attachments.
- 5.6 Patent Rights: CONTRACTOR shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof for any patent infringement resulting directly or indirectly from CONTRACTOR's performance of the work, including provision of material and designs by CONTRACTOR, and use of tools and other equipment by or for CONTRACTOR in any connection therewith.
- 5.7 Costs and Attorneys' Fees: CONTRACTOR shall promptly pay (a) to any indemnitee all costs and attorneys' fees incurred by such indemnitee resulting directly or indirectly from any and all loss, damage, injury, liability and claims for which CONTRACTOR is obligated to indemnify such indemnitee pursuant to Sections 5.1, 5.4, 5.5 or 5.6 of these Terms and Conditions, and (b) to COMPANY all costs and reasonable attorneys' fees in any legal action in which COMPANY or its affiliate prevails, in whole or in part, brought against CONTRACTOR based on a breach of this Agreement.

6. INSURANCE

- 6.1 Insurance Required: Without in any way limiting CONTRACTOR's liability pursuant to Section 5 of these Terms and Conditions, CONTRACTOR shall maintain the following insurance.
 - 6.11 Worker's Compensation and Employers' Liability Insurance as prescribed by applicable law, including insurance covering liability under the Longshoremen's and Harbor Workers' Act and the Jones Act, if applicable.
 - 6.12 Without in any way affecting CONTRACTOR's obligations pursuant to Section 6.11 of these Terms and Conditions, if marine work is to be performed hereunder, Protection and Indemnity Insurance, including coverage for injuries to or death of masters, mates and crews of vessels used in the performance of this Agreement. The limits of liability of such insurance shall not be less than \$500,000 per occurrence.
 - 6.13 Comprehensive General Bodily Injury Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability. The limits of liability of such insurance shall be not less than \$500,000 per occurrence.
 - 6.14 Broad Form Property Damage Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Completed Operations, and Products Liability, and shall expressly cover property of COMPANY and its affiliates other than that referred to in Section 5.3 of these Terms and Conditions. The limits of liability of such insurance shall be not less than \$100,000 per occurrence.
 - 6.15 Automobile Bodily Injury and Property Damage Liability Insurance. Such insurance shall extend to owned, non-owned, and hired automobiles used in the performance of this Agreement. The limits of liability of such insurance shall be not less than \$250,000 per person/\$500,000 per occurrence for Bodily Injury and \$100,000 per occurrence for Property Damage.
- 6.2 Policy Endorsements: The above insurance shall include a requirement that the insurer provide COMPANY with 30 days' written notice prior to the effective date of any cancellation or material change of the insurance. The insurance specified in Section 6.11 of

these Terms and Conditions shall contain a waiver of subrogation against the indemnitees. The insurance specified in Sections 6.12, 6.13, 6.14 and 6.15 of these Terms and Conditions shall

- (a) name the indemnitees as additional insureds;
- (b) provide that said insurance is primary coverage with respect to all insureds; and
- (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clause.

6.3 Evidence of Insurance: CONTRACTOR shall—before commencing the work—provide COMPANY with certificates or other documentary evidence of the above insurance, satisfactory to COMPANY. Form GO-279-12 may be used for this purpose.

ASSIGNMENT: Neither this Agreement nor money due CONTRACTOR hereunder shall be assigned, sublet or transferred in whole or in part by CONTRACTOR, except with the prior written consent of COMPANY, and any attempt to do so without such written consent shall be void.

CONTRACTOR'S UNDERSTANDING: Subject to any express provisions elsewhere in this Agreement, it is understood that CONTRACTOR as a result of careful examination, is satisfied as to the nature and location of the work, the conformation and structure of the ground, the character, quality and quantity of the materials to be used, the character of temporary equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which could in any way affect the work under this Agreement. No representations by or oral agreement with any agent or employee of COMPANY, either before or after the execution of this Agreement, shall affect or modify any of CONTRACTOR's rights or obligations hereunder.

RENEGOTIATION ACT OF 1951: If Section 104 applies to this Agreement, this Agreement shall be deemed to contain all of the provisions required by said Section. Superseded by Right-to-Audit Clause, Page 5, attached.

RECORDS: CONTRACTOR and its subcontractors and vendors shall maintain true and correct sets of records in connection with the work and all transactions related thereto. CONTRACTOR and its subcontractors and vendors shall retain all such records for a period of not less than twenty-four (24) months after Acceptance of the Facility.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR shall give or receive any commission, fee, rebate, or gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without COMPANY's prior written agreement. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor in connection with the work and all transactions related thereto for the sole purpose of determining whether there has been compliance with this paragraph.

If CONTRACTOR's compensation under this Agreement is determined in whole or in part on a reimbursement of costs basis, the costs to be reimbursed shall be only those reasonably necessary to perform the work in an efficient manner in accordance with the time schedule required. COMPANY may from time to time and at any time after the date of this Agreement until twenty-four (24) months after Acceptance of the Facility, make an audit of all records of CONTRACTOR and its subcontractors and vendors in connection with all costs reimbursable under this Agreement. Such audit may also cover CONTRACTOR's procedures and controls with respect to the costs to be reimbursed. Upon completion of this audit COMPANY shall pay CONTRACTOR any compensation due CONTRACTOR hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR own by the audit shall be returned to COMPANY. Items not covered by reimbursement but by such compensation as fixed charges or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

HEADINGS: Headings of Sections and other parts of this Agreement are for quick reference only and are not to be construed as part of this Agreement. In some instances a Section or part contains provisions not covered by the heading thereof; in other instances, a Section or part contains provisions that are described in the heading of another Section or part.

LICENSING OF CONTRACTORS: The following applies to any person who engages in the business or acts in the capacity of a contractor within California:

Contractors are required by law to be licensed and regulated by the Contractor's State License Board. Any questions concerning a contractor may be referred to the registrar of the board whose address is:

CONTRACTOR'S STATE LICENSE BOARD
1020 N STREET
SACRAMENTO, CALIFORNIA 95814

WAIVER: The right of either party to require strict performance shall not be affected by any prior waiver or course of dealing.

CERTIFICATION: CONTRACTOR hereby certifies that it will fully comply with Executive Order 11246, as amended by Executive Order 11375, and the rules and regulations issued thereunder, which are hereby incorporated by reference as appropriate. CONTRACTOR commits itself to such compliance upon execution of this Agreement.

AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS: The regulations issued under the Rehabilitation Act of 1973 in Title 41, Chapter 60, Part 60-741 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Rehabilitation Act of 1973.

AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA: The regulations issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1974 in Title 41, Chapter 60, Part 60-250 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Vietnam Era Veterans' Readjustment Assistance Act of 1974.

Certificate of Nonsegregated Facilities Clause: The Certificate of Nonsegregated Facilities Form GO-279-2, signed by CONTRACTOR and attached hereto, is part of this Agreement.

Utilization of Minority Business Enterprises Clause: The Utilization of Minority Business Enterprises Form GO-279-5, attached hereto, is part of this Agreement.

RIGHT-TO-AUDIT CLAUSE

FOR GO-277 SERVICE ORDERS AND
GO-278, GO-279 AND PD-52 CONTRACTS

RECORDS AND AUDITS: CONTRACTOR and its subcontractors and vendors of any tier shall maintain true and correct records in connection with the work and all transactions related thereto and shall retain all such records for at least 24 months after Acceptance.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR of any tier shall give or receive any commission, fee, rebate, gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without prior written notification thereof to COMPANY. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Additionally, if any violation of this paragraph occurring prior to the date of this Agreement resulted directly or indirectly in COMPANY's consent to enter into this Agreement with CONTRACTOR, COMPANY may, at COMPANY's sole option, terminate this Agreement at any time and, notwithstanding any other provision of this Agreement, pay no compensation or reimbursement to CONTRACTOR whatsoever for any work done after the date of termination. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor for the sole purpose of determining whether there has been compliance with this paragraph.

COMPANY may from time to time and at any time after the date of this Agreement until 24 months after Acceptance make an audit of all records of CONTRACTOR and its subcontractors and vendors of any tier in connection with payments made on a cost reimbursement basis. Such audit may also cover CONTRACTOR's procedures and controls with respect to such reimbursable costs. Upon completion of this audit, COMPANY shall pay CONTRACTOR any compensation due hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR as shown by the audit shall be returned to COMPANY. Items of compensation such as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors of any tier to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

CERTIFICATE OF NONSEGREGATED FACILITIES

CONTRACTOR certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. CONTRACTOR understands that the phrase "segregated facilities" includes facilities which are in fact segregated on a basis of race, color, creed, or national origin, because of habit, local custom, or otherwise. CONTRACTOR understands and agrees that maintaining or providing segregated facilities for his employees or permitting his employees to perform their services at any locations, under his control, where segregated facilities are maintained is a violation of the Equal Opportunity Clauses required by Executive Order No. 11246 of September 24, 1965, and the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968). CONTRACTOR further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clauses; that it will retain such certifications in its files, and that it will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A Certification of Nonsegregated Facilities as required by the May 9, 1967, order on Elimination of Segregated Facilities, by the Secretary of Labor (32 F.R. 7439, May 19, 1967), and as required by the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968) and as they may be amended, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clauses. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semi-annually or annually).

DATE: _____ James and Luther
CONTRACTOR
P. O. Box 13224
ADDRESS
El Paso, Texas 79912
CITY STATE ZIP CODE
BY: _____
TITLE

UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The CONTRACTOR agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American Aleuts. CONTRACTORS may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

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Certificate of Insurance GO-279-12

Company) CHEVRON U.S.A. (Attention) _____

is to certify that the (Insurer) THE AETNA CASUALTY AND SURETY COMPANY
 issued policies of insurance as indicated below to (Contractor) JAMES AND LUTHER, INC.
 aware that said policies will apply to work performed under the Agreement between said insured and (Company) CHEVRON U.S.A.
 dated _____ 19 ____.

of Coverage	Amount of Coverage	Policy Number	Expiring
Workers' Compensation Longshoremen's and Harbor Workers' Act Seafarers Act	Statutory • \$ _____ • \$ _____	60C7208CCA	9-4-81
Employers' Liability	\$ 100,000 each person \$ 100,000 per occurrence		
Protection and Indemnity Insurance including coverage for injuries or death of masters, mates and crews. (Name of Vessel) _____	• \$ _____ per occurrence		
Comprehensive General Bodily Injury Liability insurance, including Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability.	\$ 500,000 per occurrence (Min. \$500,000)	60AL465002CCA	9-4-81
Broad Form Property Damage Liability Insurance, including Broad Form Contractual Liability, Completed Operations, and Products Liability.	\$ 250,000 per occurrence (Min. \$100,000)	60AL465002CCA	9-4-81
Automobile Liability Insurance extending to owned, non-owned, and hired automobiles.	Bodily Injury \$ 250,000 per person (Min. \$250,000) \$ 500,000 per occurrence (Min. \$500,000) Property Damage \$ 100,000 per occurrence (Min. \$100,000)	60AL465002CCA	9-4-81

I further certified that:

- (1) Each of the above policies contains a provision that the policy shall not be cancelled or materially changed without 30 days' prior notice to the holder of this certificate.
- (2) The policies listed under A above contain a waiver of subrogation against Indemnities.**
- (3) The policies listed under B, C, D and E above
 - (a) name Indemnities as additional insureds;
 - (b) provide that said insurance is primary coverage with respect to all insureds; and
 - (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clauses.

on written request by the holder of this certificate, the Insurer or his agent if indicated below will furnish a copy of any policy cited above, certified to be a
 is and complete copy of the original.

THE AETNA CASUALTY AND SURETY COMPANY
OLDFARE INSURANCE AGENCY Title AGENT
 Date 9-4- / 1, 19 80

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Do not include data for these items unless Marine work will be performed under the above mentioned Agreement.

Indemnities is defined to mean Company, one of its affiliates, or the agent, or employee of Company, or one of its affiliates and all of them.

EXHIBIT -- COMPENSATION ADJUSTMENT

Contract No. C-15-006-81

James and Luther

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If CONTRACTOR's compensation is to be adjusted in accordance with this Exhibit as provided in Section 2.1 of the Terms and Conditions, the adjustment, whether an increase or decrease, shall be the sum of the applicable items listed below. However for a decrease it may be necessary to agree on estimated and not actual changes in costs referred to below.

1. Material

1.1 The actual net change in costs (supported by Vendor's invoices) to CONTRACTOR for materials provided by CONTRACTOR occasioned by the Change, including taxes, transportation, and cancellation penalties on alternate material already ordered, if applicable, but excluding consumable construction materials and supplies, which are covered in 4.2 below.

1.2 (a) For material added, 15 % of 1.1 above, to cover all costs to CONTRACTOR associated with material procurement including amounts to be paid to CONTRACTOR's personnel engaged in procurement, expediting or inspection activities and CONTRACTOR's overhead costs and profit relating thereto.

(b) For material deleted, an amount, not to exceed the percentage set forth in 1.2 (a) above, based on an estimate and mutually agreed upon to cover costs already incurred by CONTRACTOR as of the date of the deletion for the activities, overhead costs and profit listed in 1.2 (a).

2. CONTRACTOR-Owned Construction Equipment

The aggregate amount determined in accordance with the attached Exhibit - Construction Equipment for the net change in use of each item of CONTRACTOR-owned construction equipment occasioned by the Change. "Construction equipment" as referred to herein, in the Exhibit - Construction Equipment and in the Agreement of which this Exhibit is a part does not include small tools, which are covered in 4.2 below. Unless otherwise defined in the Agreement, a "small tool" is defined as any tool whose purchase price when new did not exceed \$300.

3. Subcontracts

3.1 The actual net change in costs to subcontractor(s) actually performing the work, including purchasing materials, occasioned by the Change as determined in accordance with 1., 2. and 4. hereof, except that subcontractor shall be substituted for CONTRACTOR; plus the actual net change in rental costs charged by equipment supplier(s) furnishing construction equipment occasioned by the Change.

3.2 10 % of 3.1 above to cover all items of CONTRACTOR's and intermediate subcontractors' overhead and profit associated with administration and supervision of subcontracts.

4. Field Labor

4.1 The actual net change in all wage costs paid by CONTRACTOR for construction craft labor occasioned by the Change. "Wage costs" referred to in the preceding sentence include in addition to the wages actually paid, all costs to CONTRACTOR (a) for any and all taxes, contributions or assessments for unemployment insurance, old age benefits and all other payments required by law which are measured by or based upon said wages, but excluding contributions or assessments for Workmen's Compensation and premiums for Workmen's Compensation Insurance, and (b) for all benefits to be paid to or on behalf of the construction craft labor such as reimbursement for transportation, subsistence, health and welfare, pension, vacation, holiday, training and other funds which CONTRACTOR is required to pay in accordance with governmental regulations or union contracts with unions having jurisdiction in the specific area of the work hereunder. Construction craft labor as referred to herein and in 4.2 below shall mean only the craft labor, including construction equipment operators, directly employed in the performance of work in the field, excluding nonmanual or distributable labor such as warehousemen and toolmen and excluding all supervisory levels higher than craft general foreman.

4.2 25 % of 4.1 above to cover all costs to CONTRACTOR not specifically provided for elsewhere in this Exhibit, including but not limited to, net changes in costs to CONTRACTOR for all personnel other than construction craft labor, small tools, consumable construction material and supplies, field office overhead, contributions or assessments for Workmen's Compensation or premiums for Workmen's Compensation Insurance, liability or other insurance, and any other items of CONTRACTOR's overhead and CONTRACTOR's profit not specifically provided for elsewhere in this Exhibit.

EXHIBIT - CONSTRUCTION EQUIPMENT

James and Luther
Page 10

1. General Conditions

- 1.1 This Exhibit lists rates for CONTRACTOR-owned construction equipment and shall be used to price Charges pursuant to Item 2 of the Exhibit - Compensation Adjustment and to determine charges, with respect to such construction equipment, resulting from COMPANY delays and suspensions not due to default of CONTRACTOR.
- 1.2 The monthly rental rates include charges for depreciation, maintenance and repairs (both on and off the job site), taxes, fuel, lubricants, supplies, loss or damage to equipment, including premiums for any insurance covering such loss or damage, overhead, profit and all other charges of any nature whatsoever associated with providing operable construction equipment, excluding only direct operating labor.
- 1.3 The monthly standby rates exclude charges for fuel, lubricants, supplies, maintenance, repairs, overhead and profit.
- 1.4 The monthly rental and standby rates are based on 180 hours usage or delay in any one 30-consecutive-day period. The amount of compensation for actual hourly use or delay during such 30-day period shall be proportionate to such monthly rental or standby rate, as the case may be. However, delays or suspensions occurring during overtime, including overtime which is a part of CONTRACTOR's normal work schedule, shall not be considered in calculating the total standby charge.

2. Rates

- 2.1 The rates for construction equipment in accordance with the General Conditions in 1. above shall, except as provided in 2.2, be as listed below:

<u>EQUIPMENT</u>	<u>Monthly Rental Rate</u>	<u>Monthly Standby Rate</u>
Pickup truck (½ ton)	\$ 470.00	\$ 423.00
Backhoe	\$ 2150.00	\$ 1935.00
Welding machine(trailer type)	\$ 975.00	\$ 878.00
Air compressor-160 CFM	\$ 850.00	\$ 765.00
Jackhammer-90#	\$ 275.00	\$ 248.00
Crane-15 ton	\$ 5600.00	\$ 5040.00
Forklift	\$ 1375.00	\$ 1238.00
Concrete vibrator	\$ 350.00	\$ 315.00
Compactor	\$ 600.00	\$ 540.00
Trailer(gooseneck)	\$ 780.00	\$ 702.00

- 2.2 Rates for construction equipment in accordance with the General Conditions in 1. above for construction equipment not listed in 2.1 shall be as follows:

Monthly Rental Rate:

(Varies) % of the monthly rental rates shown in the latest edition of the "Compilation of Nationally Averaged Rental Rates for Construction Equipment" compiled by Associated Equipment Distributors.

Monthly Standby Rate:

(Varies) % of the monthly rental rates shown in the latest edition of the "Compilation of Nationally Averaged Rental Rates for Construction Equipment" compiled by Associated Equipment Distributors.

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END OF EXHIBIT

Contract No. C-15-006-81

James and Luther

CHEVRON U.S.A. INC.

ENGINEERING DEPARTMENT - EL PASO, TEXAS

SPECIFICATION NO. EP-418-Q

January 12, 1981 (RRK)

Page A1 of A10

SPECIFICATION NO. EP-418-Q
FOUNDATION WORK - PLANT 33 ISOLATION
EL PASO REFINERY

SECTION I - GENERAL REQUIREMENTS

1.0 SCOPE OF WORK

CONTRACTOR shall provide all tools, construction equipment, labor including supervision and inspection, and all items of a consumable nature that are required for construction of foundations and pipeway stanchions for the isolation of the Platformer Plant at the Chevron U.S.A. Inc. El Paso Refinery as detailed by this specification, including the drawings and other attachments listed in the appendix.

This work includes, but is not limited to;

- a. Excavation for foundations
- b. Placing of concrete forms, reinforcing steel and concrete
- c. Construction of stanchions and supports to widen an existing pipeway.

2.0 WORK, MATERIALS AND UTILITIES BY COMPANY AND OTHERS

COMPANY will provide the following material: W-shapes, angle iron, channel iron, reinforcing rods, steel plate, anchor bolts.

COMPANY will provide industrial fresh water and 80 psig air at nearest point of supply to working site. Suitable couplings and all materials for extension of service to CONTRACTOR'S work areas shall be provided by CONTRACTOR.

CONTRACTOR shall provide concrete and forms and all painting material required.

3.0 SEQUENCE OF WORK

The sequence of work shall be as mutually agreed between the COMPANY and CONTRACTOR and shall be consistent with the facing sheet of the agreement.

4.0 INTENT

The installations shall be complete in every respect, constructed in accordance with generally accepted, current good practices of the several trades involved and the detailed requirements of this specification and ready to serve in the manner expressed or implied herein, regardless of whether or not full details of such completeness or practices are contained herein.

The specifications and drawings are not complete in every detail and CONTRACTOR shall comply with their true intent taken as a whole, and not avail himself of any errors or omissions to the detriment of the work. Should any error, omission or discrepancy appear in the drawings, specifications and instructions, CONTRACTOR shall notify COMPANY at once, and COMPANY will issue instructions

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to be followed. If CONTRACTOR proceeds prior to receiving such instructions, necessary corrections shall be at CONTRACTOR'S expense. Anything not indicated on the drawings or outlined in the specification which is necessary for full and faithful construction of the installations in accordance with the true intent of this agreement or anything indicated on the drawings but not outlined, or vice versa, shall be provided and incorporated at the expense of CONTRACTOR to the same extent as though fully set forth in both the drawings and the specification.

5.0 COMPANY REVIEW AND APPROVAL

COMPANY'S review of, approval of, or agreement to the performance of certain items of work or the provisions of certain material shall in no way relieve CONTRACTOR of full responsibility for the performance of such work or for the adequacy of such material. All such reviews, approvals or agreements shall be obtained through COMPANY'S Construction representative, or in a manner previously approved in writing by COMPANY'S Construction representative.

SECTION II - GENERAL CONDITIONS AND PERFORMANCE OF WORK

6.0 PRECEDENCE

6.1 The following items shall take precedence in the order listed in the event of conflict:

- a. Facing sheet of agreement
- b. Terms and Conditions
- c. Refinery Instruction No. 1404
- d. This specification
- e. Construction drawings in Appendix A.3 attached to this specification
- f. Standard specification in Appendix A.1 attached to this specification.
- g. Reference drawings and specifications, engineering instructions, recommended practices, and refinery instructions in Appendix A.2 attached to this specification.

6.2 As used in the standard specifications attached hereto:

- a. "Purchaser" shall mean COMPANY
- b. "Supplier" or "vendor" shall mean CONTRACTOR
- c. "Purchaser's Inspector" shall mean COMPANY Construction Representative.

6.3 Unless otherwise expressly provided in this specification:

- a. Any data, specifications, material and work or any other matter which is covered by this agreement which the standard specifications require to be provided by COMPANY shall instead be provided by CONTRACTOR,
- b. Any provisions of the standard specifications requiring COMPANY to inspect certain material or work shall mean that COMPANY has an option, rather than the obligation, to so inspect such material or work,
- c. Any warranty of guarantee provisions contained in the standard specifications shall be of no effect and the warranty and guarantee provisions of this specification, if any, shall apply, and
- d. Any item of material, work, inspection or testing to be furnished at extra expense to COMPANY pursuant to the standard specifications shall be furnished under this specification at no increase in CONTRACTOR'S compensation.

All provisions in the standard specifications concerning compensation or payment to CONTRACTOR in case of delay shall be of no effect, and the provisions of the Terms and Conditions and of this specification shall apply.

In the engineering instructions, reference to COMPANY'S personnel shall be of no effect, and CONTRACTOR'S personnel shall perform all activities which are to be performed under the engineering instructions, except as otherwise provided elsewhere in this specification.

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Where standard specifications on materials contain sections covering COMPANY'S normal requirement for purchasing and field erection, these sections shall be of no effect except as otherwise expressly stated in this specification.

7.0 FIELD REPRESENTATIVES

7.1 COMPANY'S Representative

COMPANY will maintain a representative in the field pursuant to Section 4.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

Examples of his functions are to:

- a. Establish and maintain field liaison between CONTRACTOR'S Construction Representative and COMPANY.
- b. Provide materials to CONTRACTOR as provided in this specification.
- c. Review CONTRACTOR'S construction schedule.
- d. Provide drawings and specifications as required.
- f. Make such inspections as COMPANY may desire in order to check the quality and progress of the work.
- g. Review and approve field changes or material substitutions, or any other matter where COMPANY'S approval or agreement is required by this specification.
- h. Negotiate with CONTRACTOR'S Construction Representative the adjustment in compensation arising from a change.

7.2 CONTRACTOR'S Construction Representative

CONTRACTOR shall maintain a construction representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

8.0 OTHER CONTRACTS

COMPANY reserves the right to let other contracts or other services in connection with CONTRACTOR'S work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs.

9.0 WORK WEEK AND OVERTIME

CONTRACTOR shall pursue to field construction work on a 40-hour per week work schedule in accordance with Section 6.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

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10.0 PLANT REGULATIONS

Prior to the commencement of work, CONTRACTOR shall become familiar with the plant regulations specified in the attached Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery and the following regulations. CONTRACTOR shall be responsible for compliance with these regulations during the execution of his work.

10.1 Electrical Safety Requirements

CONTRACTOR shall provide and use ground fault circuit interrupters for personnel protection at all construction sites (including areas inside existing plants) on all 120 volt single phase 15 and 20 amperes receptacle outlets.

Hubbell type GFP or Porta-Power Pak Inc. Model 72 series are typical of acceptable portable receptacle units.

Ground fault circuit interrupters shall not be used in areas where flammable vapors are present.

It is essential that the polarity of the conductors in all cords, plugs and receptacles supplying single pole portable ground fault circuit interrupter units be properly maintained to insure proper operation of the units.

10.2 Work Space and Storage Area

COMPANY will assign space in the general vicinity of the CONTRACTOR's work for CONTRACTOR's office, work space and storage area.

11.0 TEMPORARY CONSTRUCTION FACILITIES

11.1 CONTRACTOR shall provide and install all necessary temporary facilities including, but not limited to, tool rooms, locker rooms, toilets, office and storehouse. All temporary installations shall be subject to approval by COMPANY prior to installation.

11.2 In addition, CONTRACTOR shall provide all necessary temporary equipment and material including, but not limited to, shoring, concrete forms, bracing, ladders, scaffolding, staging, drop cloths and tarpaulins.

11.3 CONTRACTOR shall maintain all temporary facilities, material and equipment in a safe and adequate manner and remove them immediately upon completion of the work requiring their presence.

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12.0 SURVEYING

CONTRACTOR shall perform all surveying necessary from base lines and bench marks established by COMPANY. The accuracy for all grades and elevations of any structures and location of installations described in this specification shall be the responsibility of CONTRACTOR.

13.0 EXCAVATION AND BACKFILL

Earthwork shall be in accordance with applicable paragraphs of Specification EG-581. CONTRACTOR shall haul any excess excavated material to a location designated by COMPANY'S Construction Representative.

14.0 DELIVERY AND HANDLING OF COMPANY PROVIDED MATERIALS

- 14.1 Materials furnished by COMPANY will be available to CONTRACTOR at the Refinery Storehouse. CONTRACTOR shall provide the necessary labor and equipment for handling and transporting materials.
- 14.2 CONTRACTOR shall be responsible for keeping all material in good condition until acceptance of the installations, subject to Section 5.3 of the Terms and Conditions.
- 14.3 Upon completion of the installations, CONTRACTOR shall provide COMPANY an inventory of all remaining material which was provided by COMPANY including the quantity, description, and the item number for each item. When directed by COMPANY, CONTRACTOR shall transport the remaining material to the locations on COMPANY'S premises designated by COMPANY.
- 14.4 CONTRACTOR'S requests for withdrawal of COMPANY-furnished material and equipment shall be based on quantities shown on drawings or lists of materials furnished by COMPANY. CONTRACTOR shall obtain approval from COMPANY'S Representative before materials in excess of the quantities shown on the drawings or lists of materials will be issued.
- 14.5 CONTRACTOR shall:
 - a. Be responsible for keeping all materials and equipment in good condition until the completed installations are accepted by COMPANY, including taking any necessary steps such as painting, greasing, installation of rust preventive oil, or covering, etc., to protect all equipment externally and internally from mechanical damage or damage from the elements,
 - b. Be held accountable for surplus materials furnished by COMPANY, items received from COMPANY and to be returned, and for shortages or damages to equipment and materials furnished by COMPANY.

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- 14.6 CONTRACTOR shall promptly check bills of material or drawings for any errors which would result in shortages and shall notify COMPANY in writing if there are any such errors or if the listed are insufficient to meet his anticipated needs. Delays caused by CONTRACTOR'S failure to discover and promptly report such errors or that the equipment and materials listed are insufficient to meet his anticipated needs shall not constitute a basis for extension of time of completion under Section 3.2 or a basis for reimbursement under Section 3.3 of the Terms and Conditions.

15.0 DRAWINGS AND DIMENSIONS

COMPANY will provide to CONTRACTOR two copies of all pertinent standard drawings, standard specifications, reference drawings, and construction drawings.

16.0 INSPECTION AND TESTING

16.1 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR'S employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall in no way relieve CONTRACTOR of full responsibility for the work hereunder.

16.2 Welding Inspection and Qualification

CONTRACTOR shall arrange for welding qualification tests at his expense at El Paso Testing Company, Inc., 2315 Myrtle Street, El Paso, Texas 79901, phone 532-3831, or other approved testing firm, in accordance with Engineering and Maintenance Instruction EP - 2200. Welders shall be required to pass qualification tests before performing and operation. COMPANY reserves the right to require additional qualification tests during construction if it has any doubt about the competence of welders. COMPANY shall be allowed to witness tests and to examine test coupons. If additional tests are required and passed by welders, cost of retesting will be borne by COMPANY; if failed, cost of retesting shall be borne by CONTRACTOR.

16.3 Concrete Samples

COMPANY may perform compression and slump tests on concrete. CONTRACTOR shall furnish samples taken in accordance with ASTM Specifications as may be requested for the following tests and inspections:

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- a. Compression Tests: 3 cylinders from each 10 cu. yd. of structural concrete placed each day.
- b. Slump Tests: Periodic samples daily during pouring of concrete.

17.0 CLEANING UP

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material and, at the completion of the work, the site shall be cleared of all debris, left-over tools, consumable supplies, and material which may have accumulated in the performance of the work. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work; the cost of such work shall be for CONTRACTOR'S account and may be deducted from the sums due or to become due CONTRACTOR.

18.0 COMPLETION

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this Specification.

19.0 STEEL WORK

19.1 Fabrication

Structural steel fabrication shall conform to Specification EG-398.

19.2 Erection

CONTRACTOR shall erect all steel work. All work shall comply with latest editions of the AISC Code of Standard Practice for steel building and bridges, AISC Specification for design, fabrication, and erection of structural steel for buildings and AWS Standard Code for Arc and Gas Welding in Building Construction.

19.3 Pipe Supports

CONTRACTOR shall fabricate, locate, and install all required pipe supports. Supports for small lines not shown on project drawings shall be field fabricated by CONTRACTOR.

19.4 Bolts and Clips

All bolts and clips required to fasten all pipe supports to structures shall be installed even though the attachments are not shown on the construction drawings.

19.5 Welders

Field welding on steel work shall be done by welders who are qualified as specified in Section 16.2 of this Specification.

20.0 PAINTING

All exposed metal surfaces of piping, structures, supports, drums and exchangers shall be painted as follows:

20.1 Surface Preparation

Wire brush surface to conform to Steel Structural Painting Council Standard SSPC SP#.

20.2 Primer

LZI primer - low lead, brush, roll or spray.

20.3 Paint

Aluminum paint - Hanley Sunfoe 17-010 or equal, applied according to manufacturer's recommendations.

21.0 CONCRETE WORK

21.1 Scope of Work

CONTRACTOR shall provide and be responsible for all concrete work.

21.2 Methods

Placing and curing concrete shall be in accordance with Specification EG-850.

21.3 Properties

Ready-Mix concrete shall be in accordance with ASTM Specification C-94.

In field mix concrete is used, materials to be used and the procedure to be followed in proportioning and mixing Portland Cement Concrete in the field shall conform with Specification EG-851. Consistency and workability shall be in accordance with Specification EG-851 with a minimum ultimate compressive strength of 3000 psi after 28 days of curing, maximum aggregate size 3/4 inch, slump 3 to 5 inches.

Contract No. C-15-006-81

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Method of measuring materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

21.4 Anchor Bolts

All anchor bolts securing machinery or equipment shall be provided with sleeves in accordance with Drawing GB-Q68922. After setting equipment, these sleeves shall be filled with grout. Anchor bolts shall be accurately placed and securely tied to avoid movement during concrete placement.

21.5 Special Techniques

CONTRACTOR shall consult COMPANY'S Construction Representative before using such special techniques as, for example: precasting pipeway stanchions, or pumping structural concrete.

Contract No. C-15-006-81

James and Luther

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Appendix I

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A.1 STANDARD SPECIFICATIONS

<u>Number</u>	<u>Title</u>
EG-850C	Placing and Curing Concrete
EG-851	Concrete Proportioning
EG-1048A	Small Tools
EG-1049C	Supplies
EG-516C	Reinforcing Steel
EG-398H	Steel Fabrication
EG-581	Clearing Grading and Earthwork

A.2 REFINERY AND ENGINEERING INSTRUCTIONS

1404 General Instructions to Contractors Working Within the Refinery

A.3 CONSTRUCTION DRAWINGS

PC-38-32224	Foundation - Fuel Gas Knock Out Drum
PD-13-29921	Sheet No. 15-110 # Steam Supports
PA-38-22096	Concrete Foundation Location Plan
PA-38-22001	Plot Plan - Plant 38
PA-13-23083	Overhead Pipeway
PD-13-32212	Plot Plan - Widen Pipeway

A.4 MISCELLANEOUS

EP-2200 Qualification of Welders

Richard R. Luciani - Jan 19, 1981
Engineer

Con W. Jones 1/19/81
Lead Engineer

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FOUNDATION WORK - PLANT 33 ISOLATION
EL PASO REFINERY

SECTION I - GENERAL REQUIREMENTS

1.0 SCOPE OF WORK

CONTRACTOR shall provide all tools, construction equipment, labor including supervision and inspection, and all items of a consumable nature that are required for construction of foundations and pipeway stanchions for the isolation of the Platformer Plant at the Chevron U.S.A. Inc. El Paso Refinery as detailed by this specification, including the drawings and other attachments listed in the appendix.

This work includes, but is not limited to:

- a. Excavation for foundations
- b. Placing of concrete forms, reinforcing steel and concrete
- c. Construction of stanchions and supports to widen an existing pipeway.

2.0 WORK, MATERIALS AND UTILITIES BY COMPANY AND OTHERS

COMPANY will provide the following material: W-shapes, angle iron, channel iron, reinforcing rods, steel plate, anchor bolts.

COMPANY will provide industrial fresh water and 80 psig air at nearest point of supply to working site. Suitable couplings and all materials for extension of service to CONTRACTOR'S work areas shall be provided by CONTRACTOR.

CONTRACTOR shall provide concrete and forms and all painting material required.

3.0 SEQUENCE OF WORK

The sequence of work shall be as mutually agreed between the COMPANY and CONTRACTOR and shall be consistent with the facing sheet of the agreement.

4.0 INTENT

The installations shall be complete in every respect, constructed in accordance with generally accepted, current good practices of the several trades involved and the detailed requirements of this specification and ready to serve in the manner expressed or implied herein, regardless of whether or not full details of such completeness or practices are contained herein.

The specifications and drawings are not complete in every detail and CONTRACTOR shall comply with their true intent taken as a whole, and not avail himself of any errors or omissions to the detriment of the work. Should any error, omission or discrepancy appear in the drawings, specifications and instructions, CONTRACTOR shall notify COMPANY at once, and COMPANY will issue instructions

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to be followed. If CONTRACTOR proceeds prior to receiving such instructions, necessary corrections shall be at CONTRACTOR'S expense. Anything not indicated on the drawings or outlined in the specification which is necessary for full and faithful construction of the installations in accordance with the true intent of this agreement or anything indicated on the drawings but not outlined, or vice versa, shall be provided and incorporated at the expense of CONTRACTOR to the same extent as though fully set forth in both the drawings and the specification.

5.0 COMPANY REVIEW AND APPROVAL

COMPANY'S review of, approval of, or agreement to the performance of certain items of work or the provisions of certain material shall in no way relieve CONTRACTOR of full responsibility for the performance of such work or for the adequacy of such material. All such reviews, approvals or agreements shall be obtained through COMPANY'S Construction representative, or in a manner previously approved in writing by COMPANY'S Construction representative.

SECTION II - GENERAL CONDITIONS AND PERFORMANCE OF WORK

6.0 PRECEDENCE

6.1 The following items shall take precedence in the order listed in the event of conflict:

- a. Facing sheet of agreement
- b. Terms and Conditions
- c. Refinery Instruction No. 1404
- d. This specification
- e. Construction drawings in Appendix A.3 attached to this specification
- f. Standard specification in Appendix A.1 attached to this specification.
- g. Reference drawings and specifications, engineering instructions, recommended practices, and refinery instructions in Appendix A.2 attached to this specification.

6.2 As used in the standard specifications attached hereto:

- a. "Purchaser" shall mean COMPANY
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- c. "Purchaser's Inspector" shall mean COMPANY Construction Representative.

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- a. Any data, specifications, material and work or any other matter which is covered by this agreement which the standard specifications require to be provided by COMPANY shall instead be provided by CONTRACTOR,
- b. Any provisions of the standard specifications requiring COMPANY to inspect certain material or work shall mean that COMPANY has an option, rather than the obligation, to so inspect such material or work,
- c. Any warranty of guarantee provisions contained in the standard specifications shall be of no effect and the warranty and guarantee provisions of this specification, if any, shall apply, and
- d. Any item of material, work, inspection or testing to be furnished at extra expense to COMPANY pursuant to the standard specifications shall be furnished under this specification at no increase in CONTRACTOR'S compensation.

All provisions in the standard specifications concerning compensation or payment to CONTRACTOR in case of delay shall be of no effect, and the provisions of the Terms and Conditions and of this specification shall apply.

In the engineering instructions, reference to COMPANY'S personnel shall be of no effect, and CONTRACTOR'S personnel shall perform all activities which are to be performed under the engineering instructions, except as otherwise provided elsewhere in this specification.

Where standard specifications on materials contain sections covering COMPANY'S normal requirement for purchasing and field erection, these sections shall be of no effect except as otherwise expressly stated in this specification.

7.0 FIELD REPRESENTATIVES

7.1 COMPANY'S Representative

COMPANY will maintain a representative in the field pursuant to Section 4.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

Examples of his functions are to:

- a. Establish and maintain field liaison between CONTRACTOR'S Construction Representative and COMPANY.
- b. Provide materials to CONTRACTOR as provided in this specification.
- c. Review CONTRACTOR'S construction schedule.
- d. Provide drawings and specifications as required.
- f. Make such inspections as COMPANY may desire in order to check the quality and progress of the work.
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CONTRACTOR shall maintain a construction representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

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COMPANY reserves the right to let other contracts or other services in connection with CONTRACTOR'S work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs.

9.0 WORK WEEK AND OVERTIME

CONTRACTOR shall pursue to field construction work on a 40-hour per week work schedule in accordance with Section 6.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

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10.0 PLANT REGULATIONS

Prior to the commencement of work, CONTRACTOR shall become familiar with the plant regulations specified in the attached Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery and the following regulations. CONTRACTOR shall be responsible for compliance with these regulations during the execution of his work.

10.1 Electrical Safety Requirements

CONTRACTOR shall provide and use ground fault circuit interrupters for personnel protection at all construction sites (including areas inside existing plants) on all 120 volt single phase 15 and 20 amperes receptacle outlets.

Hubbell type GFP or Porta-Power Pak Inc. Model 72 series are typical of acceptable portable receptacle units.

Ground fault circuit interrupters shall not be used in areas where flammable vapors are present.

It is essential that the polarity of the conductors in all cords, plugs and receptacles supplying single pole portable ground fault circuit interrupter units be properly maintained to insure proper operation of the units.

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COMPANY will assign space in the general vicinity of the CONTRACTOR's work for CONTRACTOR's office, work space and storage area.

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11.1 CONTRACTOR shall provide and install all necessary temporary facilities including, but not limited to, tool rooms, locker rooms, toilets, office and storehouse. All temporary installations shall be subject to approval by COMPANY prior to installation.

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12.0 SURVEYING

CONTRACTOR shall perform all surveying necessary from base lines and bench marks established by COMPANY. The accuracy for all grades and elevations of any structures and location of installations described in this specification shall be the responsibility of CONTRACTOR.

13.0 EXCAVATION AND BACKFILL

Earthwork shall be in accordance with applicable paragraphs of Specification EG-581. CONTRACTOR shall haul any excess excavated material to a location designated by COMPANY'S Construction Representative.

14.0 DELIVERY AND HANDLING OF COMPANY PROVIDED MATERIALS

- 14.1 Materials furnished by COMPANY will be available to CONTRACTOR at the Refinery Storehouse. CONTRACTOR shall provide the necessary labor and equipment for handling and transporting materials.
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- 14.5 CONTRACTOR shall:
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 - b. Be held accountable for surplus materials furnished by COMPANY, items received from COMPANY and to be returned, and for shortages or damages to equipment and materials furnished by COMPANY.

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14.6 CONTRACTOR shall promptly check bills of material or drawings for any errors which would result in shortages and shall notify COMPANY in writing if there are any such errors or if the listed are insufficient to meet his anticipated needs. Delays caused by CONTRACTOR'S failure to discover and promptly report such errors or that the equipment and materials listed are insufficient to meet his anticipated needs shall not constitute a basis for extension of time of completion under Section 3.2 or a basis for reimbursement under Section 3.3 of the Terms and Conditions.

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16.1 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR'S employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall in no way relieve CONTRACTOR of full responsibility for the work hereunder.

16.2 Welding Inspection and Qualification

CONTRACTOR shall arrange for welding qualification tests at his expense at El Paso Testing Company, Inc., 2315 Myrtle Street, El Paso, Texas 79901, phone 532-3831, or other approved testing firm, in accordance with Engineering and Maintenance Instruction EP - 2200. Welders shall be required to pass qualification tests before performing and operation. COMPANY reserves the right to require additional qualification tests during construction if it has any doubt about the competence of welders. COMPANY shall be allowed to witness tests and to examine test coupons. If additional tests are required and passed by welders, cost of retesting will be borne by COMPANY; if failed, cost of retesting shall be borne by CONTRACTOR.

16.3 Concrete Samples

COMPANY may perform compression and slump tests on concrete. CONTRACTOR shall furnish samples taken in accordance with ASTM Specifications as may be requested for the following tests and inspections:

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- a. Compression Tests: 3 cylinders from each 10 cu. yd. of structural concrete placed each day.
- b. Slump Tests: Periodic samples daily during pouring of concrete.

17.0 CLEANING UP

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material and, at the completion of the work, the site shall be cleared of all debris, left-over tools, consumable supplies, and material which may have accumulated in the performance of the work. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work; the cost of such work shall be for CONTRACTOR'S account and may be deducted from the sums due or to become due CONTRACTOR.

18.0 COMPLETION

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this Specification.

19.0 STEEL WORK

19.1 Fabrication

Structural steel fabrication shall conform to Specification EG-398.

19.2 Erection

CONTRACTOR shall erect all steel work. All work shall comply with latest editions of the AISC Code of Standard Practice for steel building and bridges, AISC Specification for design, fabrication, and erection of structural steel for buildings and AWS Standard Code for Arc and Gas Welding in Building Construction.

19.3 Pipe Supports

CONTRACTOR shall fabricate, locate, and install all required pipe supports. Supports for small lines not shown on project drawings shall be field fabricated by CONTRACTOR.

19.4 Bolts and Clips

All bolts and clips required to fasten all pipe supports to structures shall be installed even though the attachments are not shown on the construction drawings.

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19.5 Welders

Field welding on steel work shall be done by welders who are qualified as specified in Section ~~16-2~~ of this Specification.

17.2

20.0 PAINTING

All exposed metal surfaces of piping, structures, supports, drums and exchangers shall be painted as follows:

20.1 Surface Preparation

Wire brush surface to conform to Steel Structural Painting Council Standard SSPC SP#.

20.2 Primer

LZI primer - low lead, brush, roll or spray.

20.3 Paint

Aluminum paint - Hanley Sunfoe 17-010 or equal, applied according to manufacturer's recommendations.

21.0 CONCRETE WORK

21.1 Scope of Work

CONTRACTOR shall provide and be responsible for all concrete work.

21.2 Methods

Placing and curing concrete shall be in accordance with Specification EG-850.

21.3 Properties

Ready-Mix concrete shall be in accordance with ASTM Specification C-94.

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04
In field mix concrete is used, materials to be used and the procedure to be followed in proportioning and mixing Portland Cement Concrete in the field shall conform with Specification EG-851. Consistency and workability shall be in accordance with Specification EG-851 with a minimum ultimate compressive strength of 3000 psi after 28 days of curing, maximum aggregate size 3/4 inch, slump 3 to 5 inches.

CHEVRON U.S.A. INC.
ENGINEERING DEPARTMENT - EL PASO, TEXAS

SPECIFICATION NO. EP-418-Q
January 12, 1981 (RRK)
Page A10 of A10

Method of measuring materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

21.4 Anchor Bolts

All anchor bolts securing machinery or equipment shall be provided with sleeves in accordance with Drawing GB-Q68922. After setting equipment, these sleeves shall be filled with grout. Anchor bolts shall be accurately placed and securely tied to avoid movement during concrete placement.

21.5 Special Techniques

CONTRACTOR shall consult COMPANY'S Construction Representative before using such special techniques as, for example: precasting pipeway stanchions, or pumping structural concrete.

James and Luther

CHEVRON U.S.A. INC.

ENGINEERING DEPARTMENT - EL PASO, TEXAS

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Appendix I

Page 1 of 1

A.1 STANDARD SPECIFICATIONS

<u>Number</u>	<u>Title</u>
EG-850C	Placing and Curing Concrete
EG-851	Concrete Proportioning
EG-1048A	Small Tools
EG-1049C	Supplies
EG-516C	Reinforcing Steel
EG-398H	Steel Fabrication
EG-581	Clearing Grading and Earthwork

A.2 REFINERY AND ENGINEERING INSTRUCTIONS

1404	General Instructions to Contractors Working Within the Refinery
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A.3 CONSTRUCTION DRAWINGS

PA-13-23111	Alky Relief Pipeway
PG-38-32224	Foundation - Fuel Gas Knock Out Drum
PD-13-29921	Sheet No. 15-110 # Steam Supports
PA-38-22096	Concrete Foundation Location Plan
PA-38-22001	Plot Plan - Plant 38
PA-13-23083	Overhead Pipeway
PD-13-32212	Plot Plan - Widen Pipeway

A.4 MISCELLANEOUS

EP-2200	Qualification of Welders
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Randall R. Krum

Engineer

Don W. Jones

Lead Engineer



Chevron U.S.A. Inc.

Contract

Contract Number C-15-016-81

Chevron U.S.A. Inc. hereafter referred to as COMPANY, and the undersigned, hereafter identified as CONTRACTOR, hereby mutually agree on January 30, 19 81, that CONTRACTOR shall perform for COMPANY, at or near the El Paso Refinery, County of El Paso, State of Texas, the work set forth in Specification No. _____, dated _____, and entitled _____

of coating the floor and 18" on the shell of 191 Tank with fiberglass reinforced Vinyl Ester to a thickness of 125 mils per Engineering Instruction EP-2075. The Terms and Conditions (Pages 1-7), Right to Audit Clause (Page 5), Certificate of Insurance (Page 8), Refinery Instruction No. 1404 (Pages B1-B16) with Appendices BI and BII, and Engineering Instruction EP-2075, attached hereto, are part of this ~~as an improvement to real property of COMPANY by affixing thereto whatever materials are involved therein so as to become an~~ agreement. ~~integral part of such real property, under the Terms and Conditions hereof, and in accordance with the above specification, which Terms and Conditions and Specification, attached hereto, are part of this Agreement.~~

COMPANY shall pay CONTRACTOR, in accordance with statements prepared by CONTRACTOR a compensation of \$47,950.00 (Forty seven thousand, nine hundred fifty and no/100 dollars) including all applicable taxes, profit and overhead.

The work shall be commenced on or before February 14, 1981
diligently prosecuted, and completed on or before March 14, 1981

A payment and performance bond in terms and executed by a surety company satisfactory to COMPANY shall be furnished to COMPANY in the sum of
(No bond required unless an amount is entered above.)

CONTRACTOR
Timmons Construction Co. Inc.

Chevron U.S.A. Inc.

By _____

By _____

And _____

And _____

Witness _____

CONTRACTOR'S State License No. _____
(Where required by State Law)

Communications to CONTRACTOR should be addressed to the attention of Mr. G. E. Timmons
Timmons Construction Co. Inc.
P. O. Box 27169
El Paso, Texas 79926

Send invoices to:
Chevron U.S.A. Inc.
Attn: Invoice Desk-Refinery Accounting
P. O. Box 20002
El Paso, Texas 79998
Communications to COMPANY should be directed to the attention of Mr. L. R. Shanks-Chief Engineer
Chevron U.S.A. Inc.
P. O. Box 20002
El Paso, Texas 79998

Facility Completed				Superintendent or Foreman	
Invoice No.	Date	Amount	Date Received	Charge Account No.	Job No.
				2102730-A003	48113-437
Remarks					

Note: If CONTRACTOR is incorporated, execution shall be by an authorized officer of the corporation and corporate seal affixed and attested to by the Secretary. If CONTRACTOR is not incorporated, signatures should be witnessed by an employee of COMPANY, if

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TERMS AND CONDITIONS

PERFORMANCE OF THE WORK

1.1 Definitions

- 1.11 The term "work" as used in this Agreement means, unless the context otherwise requires, all work to be performed by CONTRACTOR under this Agreement.
- 1.12 The term "Facility" as used in this Agreement means the product of the work, such as an improvement to real property, designs or data.
- 1.13 The term "material" or "materials" as used in this Agreement means all material, supplies and equipment to be incorporated into the Facility.
- 1.14 The term "affiliate" as used in this Agreement means Standard Oil Company of California or any company in which Standard Oil Company of California owns directly or indirectly at least 51 percent of the shares entitled to vote at a general election of directors.
- 1.15 The terms "indemnitee" and "indemnities" as used in this Agreement mean respectively COMPANY, one of its affiliates or the agent or employee of COMPANY or one of its affiliates and all of them.
- 1.16 The terms "subcontractors" and "vendors" as used in this Agreement mean subcontractors or vendors of any tier.
- 1.2 Independent Contractor: CONTRACTOR shall be an independent contractor, maintaining complete control over CONTRACTOR's men and operations.
- 1.3 Specifications: CONTRACTOR shall perform the work, including the provision of materials, in accordance with the specifications and exhibits (if any) which are a part of this Agreement and such additional drawings and explanations as COMPANY may provide to CONTRACTOR from time to time to detail and illustrate the work.
- 1.4 Permits: Unless otherwise provided in this Agreement, CONTRACTOR shall secure all permits, make all cash and other deposits, provide all bonds and give all notices required by law in connection with the work.
- 1.5 Items to be Provided by CONTRACTOR: Unless otherwise provided in this Agreement, CONTRACTOR shall provide all materials, utilities, consumable supplies, tools, construction equipment, and labor, including supervision, necessary for the completion of the work.
- 1.6 Safety Measures: CONTRACTOR shall perform the work in accordance with safe practices, taking all reasonable precautions to protect the Facility and adjacent facilities, workmen and the public and providing, where reasonably necessary, barriers, guards, temporary bridges, lights and watchmen. While on the premises of COMPANY or its affiliates all of COMPANY's safety rules shall be strictly observed; in particular, smoking shall be limited to such locations and occasions as are specifically authorized in writing by COMPANY. CONTRACTOR shall not perform or permit any act on the premises of COMPANY or its affiliates which involves a fire or explosion hazard, including welding, torch cutting and disposal of debris by burning, without prior written consent of COMPANY.
- 1.7 Suppliers
 - 1.71 COMPANY may nominate bidders for the supply of certain items of material. CONTRACTOR shall request bids on these items from the nominees, and may obtain such other bids as CONTRACTOR may elect.
 - 1.72 COMPANY may have available for sale certain materials not products of COMPANY. CONTRACTOR shall purchase such materials offered by COMPANY and its designated affiliates as long as such material is suitable and is competitively priced.
 - 1.73 When the work includes purchasing certain materials, CONTRACTOR shall be fully responsible for ordering, expediting, receiving and safeguarding (subject to the provisions of Section 5.3 of these Terms and Conditions) all such materials, and for conducting all competitive bidding by and negotiations with the vendors thereof and for paying for materials and enforcing of warranties, unless otherwise provided in this Agreement.
- 1.8 Labor
 - 1.81 CONTRACTOR shall employ labor from that available in the vicinity of the work, and in accordance with the terms of employment prevailing in that vicinity, to the extent that it is practicable and consistent with the timely and efficient prosecution of the work.
 - 1.82 CONTRACTOR shall use all reasonable efforts to avoid any disturbances in the existing labor situation which will adversely affect the business of COMPANY, its affiliates or other contractors working in the area.
- 1.9 Carriers: In connection with transportation of purchased materials, CONTRACTOR shall give consideration to, but shall not be limited to, use of carriers recommended by COMPANY.

2. COMPENSATION

- 2.1 Changes: COMPANY may make "changes" by adding to, omitting or deviating from the requirements of this Agreement. In the event COMPANY issues any written directive which is not identified as a Change but which CONTRACTOR considers to be a Change, CONTRACTOR shall so notify COMPANY in writing within 10 days after receipt of such directive. If no such timely notice is given, CONTRACTOR shall proceed in accordance with such directive without any adjustment in compensation. If COMPANY originally identifies the directive as a Change, or if CONTRACTOR gives such timely notice and COMPANY agrees that such directive is a Change, CONTRACTOR shall within 10 days after giving such notice or after receipt of the directive advise COMPANY of its proposed adjustment in compensation and COMPANY and CONTRACTOR shall attempt to agree in writing on an appropriate adjustment in compensation resulting from the Change. After such agreement is reached, CONTRACTOR shall proceed with the Change. However, if such notice is given or if COMPANY originally identified the directive as a Change, and in either instance COMPANY and CONTRACTOR fail to agree on whether or not such directive is a Change or fail to agree on an appropriate adjustment in compensation, then COMPANY may issue a written request for CONTRACTOR to proceed in accordance with such directive without such agreement. CONTRACTOR shall comply with such written request, but such compliance shall not prejudice either party's claim that the directive is a Change or, as the case may be, claim for an appropriate adjustment in compensation. After the written request to proceed is issued, any adjustment which is to be made to the compensation shall be determined in accordance with the Exhibit--Compensation Adjustment.
- 2.2 Taxes: CONTRACTOR shall pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, all State, Federal and other payroll taxes, including contributions and taxes assessed against employees on wages earned in connection with the work, and CONTRACTOR shall make all reports required by governmental authorities. CONTRACTOR shall also pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, any and all other taxes now or hereafter imposed by any governmental authority upon, measured by or incident to the performance of this Agreement or the purchase, storage, use or consumption by CONTRACTOR of materials, utilities, consumable supplies, tools or construction equipment used in the performance of this Agreement, unless the applicable laws specifically provide that such tax be paid by COMPANY.
- 2.3 Acceptance of Facility: Where provision is made by law for recording Notice of Completion, COMPANY may indicate its Acceptance of the Facility by recording such Notice; otherwise Acceptance shall be on the date COMPANY gives written notice to

COPY

CONTRACTOR that it is satisfied that the Facility has been completed in accordance with all requirements contained in this Agreement. Acceptance by COMPANY or payment hereunder shall in no way relieve CONTRACTOR of any obligation or liability under this Agreement.

Terms of Payment

- 2.41 At the end of each calendar month during the progress of the work, and upon completion of the work, CONTRACTOR shall be entitled to receive 85% of the compensation provided herein for that part of the work performed, including provision of materials, during that month. CONTRACTOR shall be entitled to receive the balance 35 days after Acceptance, provided that there are no undischarged or unsecured liens, attachments or claims in connection with the work. COMPANY may require, as a condition to payment of the balance, that CONTRACTOR submit evidence by receipted bills, releases and waivers of lien rights or otherwise, that all costs incurred by CONTRACTOR and his subcontractors (if any) in connection with the work have been paid.
- 2.42 Whenever CONTRACTOR is entitled to payment as provided above, COMPANY or CONTRACTOR (as specified on the first page [facing sheet] of this Agreement) shall prepare a statement of amounts so payable. Such statement shall be itemized and in such form as COMPANY and CONTRACTOR agree provided that such statement shall show the total compensation for that part of the work performed, including provision of materials, to the date of the statement, less 15% (except in the statement of the balance) and less previous payments. COMPANY shall pay CONTRACTOR the amount so payable, subject to COMPANY's audit of the statement, and subject to the provisions of Section 2.41 of these Terms and Conditions dealing with final payment of the balance, by check mailed within 20 days after the date payable or, when statement prepared by CONTRACTOR is received after the date payable, within 20 days after receiving CONTRACTOR's statement.

DELAYS

- 3.1 Site Readiness: CONTRACTOR shall ascertain from COMPANY that the site is ready before sending materials or workmen thereto.
- 3.2 Delays, Suspensions and Extensions: COMPANY may require CONTRACTOR to suspend performance hereunder completely or partially for whatever length of time COMPANY may elect. The time for completion shall be extended by each period that CONTRACTOR is delayed by (a) COMPANY or another independent contractor who is directly responsible to COMPANY (unless such delay is due to CONTRACTOR's default, for example, as provided in Sections 4.1 and 4.2 of these Terms and Conditions); (b) an act of God or the elements; (c) any other cause beyond CONTRACTOR's reasonable control; or (d) a labor disturbance.
- 3.3 Damages Due to Delays and Suspensions: COMPANY shall not be liable for any damages, direct, consequential or otherwise, suffered by CONTRACTOR due to delays and suspensions, but where CONTRACTOR is not in default CONTRACTOR shall be entitled to reimbursement for reasonable direct costs caused by delays and suspensions to the extent such delays and suspensions are caused by COMPANY and other independent contractors who are directly responsible to COMPANY. CONTRACTOR shall be obligated to proceed with the work notwithstanding a dispute on reimbursement; such action shall not prejudice either party's claim with respect to reimbursement.

INSPECTION, CONDEMNATION, STOPPING WORK

4.1 Inspection

- 4.11 Inspection by COMPANY: COMPANY may visit and inspect the work and materials, or any part thereof, at all times, and CONTRACTOR shall provide safe and proper facilities therefor. CONTRACTOR shall at all times during working hours keep a competent man in the immediate vicinity of the work areas to receive communications from COMPANY and to supervise the performance of this Agreement. When COMPANY determines that a work area is unsafe, COMPANY may stop the part of the work affected until the unsafe condition is corrected.
- 4.12 Inspection by CONTRACTOR: Whenever any part of CONTRACTOR's work depends on existing work or work or material provided by COMPANY or others, CONTRACTOR shall inspect and measure such other work or material and promptly notify COMPANY of each defect or discrepancy in such other work or material which may render it unsuitable for proper execution of CONTRACTOR's work or proper functioning of the Facility. If CONTRACTOR fails to notify COMPANY's representative of any such defect or discrepancy before performing CONTRACTOR's dependent work, and such defect or discrepancy would have been discovered in the course of a reasonably thorough visual inspection and measurement, COMPANY may condemn the work or material involved and CONTRACTOR shall correct such defect or discrepancy on the same basis as if it were defective work by CONTRACTOR under Section 4.2 of these Terms and Conditions.

- 4.2 Condemnation: COMPANY may condemn materials provided by CONTRACTOR and all parts of CONTRACTOR's work which are unsound or defective or fail in any way to conform with the requirements of this Agreement. CONTRACTOR shall begin to remove and replace such materials or work within 24 hours after receiving notice thereof from COMPANY. CONTRACTOR shall bear all costs involved in the removal and replacement of such materials and work and in the repair and replacement of any other materials and work necessarily damaged by such removal and replacement. If CONTRACTOR is requested by COMPANY to uncover any part of the Facility for inspection, the cost of uncovering and covering any such part not specifically requiring inspection under this Agreement shall be borne by COMPANY unless the part so uncovered is not in compliance with the requirements of this Agreement.

4.3 Taking Over and Stopping Work

- 4.31 Should CONTRACTOR default in any way in the performance of this Agreement, including failing, refusing or neglecting to supply sufficient material to be supplied by CONTRACTOR hereunder, or tools, or properly skilled workmen to complete the work with reasonable diligence, for 5 days after written notice of such default to CONTRACTOR, COMPANY may, at any time thereafter, take over and complete the work. The cost to COMPANY of completing the work shall be deducted from the unpaid part of CONTRACTOR's compensation. If such cost exceeds any such amount, CONTRACTOR shall reimburse COMPANY for such excess cost. The action by COMPANY of taking over and completing the work shall not constitute a waiver of or election among any other rights or remedies that COMPANY may have against CONTRACTOR.
- 4.32 Should CONTRACTOR or its creditors seek relief under any insolvency law, or CONTRACTOR be adjudged a bankrupt, COMPANY may at any time thereafter terminate this Agreement and take over and complete the work as provided in Section 4.31 of these Terms and Conditions, except that any payments due from CONTRACTOR to subcontractors or vendors in connection with the work may be made by COMPANY to such subcontractors or vendors, and be deducted from the amounts otherwise due to CONTRACTOR.
- 4.33 COMPANY may, in its absolute discretion, stop the work at any time, but where CONTRACTOR is not in default, COMPANY shall pay CONTRACTOR for all parts of the work done, including materials provided, in conformity with the requirements of

this Agreement, plus an amount for reasonable and verified costs of CONTRACTOR incurred in preparation for the parts of the work not yet performed and in shutting down his operations hereunder, plus an amount for a reasonable part of the profit CONTRACTOR would otherwise have earned; provided, that the amounts payable under this Section 4.33 shall in no event exceed the unpaid part of CONTRACTOR's compensation.

5. LIABILITY

- 5.1 General Liability: CONTRACTOR shall indemnify and save harmless the indemnitees from and against any and all loss, damage, injury, liability, and claims thereof for injury to or death of a person, including an employee of CONTRACTOR or an indemnitee, or for loss of or damage to property (except property subject to Sections 5.2 and 5.3 of these Terms and Conditions), resulting directly or indirectly from CONTRACTOR's performance of this Agreement, including, but not limited to, the use by CONTRACTOR of staging or other equipment provided by COMPANY or others, regardless of the negligence of, and regardless of whether liability without fault is imposed or sought to be imposed on, one or more of the indemnitees, except to the extent that such indemnity is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement and except where such loss, damage, injury, liability or claim is the result of active negligence or willful misconduct of an indemnitee and is not contributed to by any act of, or by any omission to perform some duty imposed by law or contract on, CONTRACTOR, its subcontractor or either's agent or employee.
- 5.2 Liability for Property of COMPANY and its Affiliate: CONTRACTOR shall be liable to COMPANY and its affiliates for any loss of or damage to the property of COMPANY and its affiliates (other than the property subject to Section 5.3 of these Terms and Conditions) resulting directly or indirectly from CONTRACTOR's performance of this Agreement, regardless of the negligence of COMPANY, its agents, employees, and affiliates, except to the extent that such liability is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement; provided, however, that CONTRACTOR's liability under this Section 5.2 shall be limited to the applicable insurance which CONTRACTOR carries or has others carry and which shall not be less than that provided in Section 6 of these Terms and Conditions.
- 5.3 Liability for the Facility and Materials: CONTRACTOR shall exercise due care and diligence in the performance of this Agreement and in the care and protection of the Facility and materials. At COMPANY's option, CONTRACTOR shall reconstruct, repair or replace any part of the Facility or materials lost or damaged by any cause whatsoever, including but not limited to those referred to in Section 3.2 of these Terms and Conditions, wherever said loss or damage occurs including loss or damage to materials while in transit. In such event COMPANY shall reimburse CONTRACTOR for the costs of such reconstruction, repair or replacement in excess of \$1,000 for each occurrence or in excess of the coverage of any applicable insurance which CONTRACTOR may elect to carry or have others carry, whichever is greater, except costs incurred in reconstruction, repair and replacement of work or materials subject to condemnation by COMPANY prior to loss or damage (whether or not such condemnation was effected) under Section 4.2 of these Terms and Conditions, and except costs incurred in order to meet the guarantee(s), if any, contained elsewhere in this Agreement. CONTRACTOR also shall be paid a reasonable profit on that part of such reconstruction, repair or replacement for which cost reimbursement is made. COMPANY shall not be liable for loss or damage to construction equipment, tools, temporary structures, temporary excavations or supplies owned or used by CONTRACTOR or its subcontractors.
- 5.4 Compliance with Laws and Regulations: CONTRACTOR shall comply with all laws, regulations, decrees, codes, ordinances, resolutions, and other acts of any governmental authority, including Federal and State labor and tax laws, which are applicable to this Agreement and CONTRACTOR's performance hereunder, and shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from CONTRACTOR's failure to do so.
- 5.5 Liens: CONTRACTOR shall discharge at once or bond or otherwise secure against all liens and attachments which are filed in connection with the work and shall indemnify and save COMPANY, its affiliates, and the owners of the premises on which the work is performed harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens and attachments.
- 5.6 Patent Rights: CONTRACTOR shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof for any patent infringement resulting directly or indirectly from CONTRACTOR's performance of the work, including provision of material and designs by CONTRACTOR, and use of tools and other equipment by or for CONTRACTOR in any connection therewith.
- 5.7 Costs and Attorneys' Fees: CONTRACTOR shall promptly pay (a) to any indemnitee all costs and attorneys' fees incurred by such indemnitee resulting directly or indirectly from any and all loss, damage, injury, liability and claims for which CONTRACTOR is obligated to indemnify such indemnitee pursuant to Sections 5.1, 5.4, 5.5 or 5.6 of these Terms and Conditions, and (b) to COMPANY all costs and reasonable attorneys' fees in any legal action in which COMPANY or its affiliate prevails, in whole or in part, brought against CONTRACTOR based on a breach of this Agreement.

6. INSURANCE

- 6.1 Insurance Required: Without in any way limiting CONTRACTOR's liability pursuant to Section 5 of these Terms and Conditions, CONTRACTOR shall maintain the following insurance.
 - 6.11 Worker's Compensation and Employers' Liability Insurance as prescribed by applicable law, including insurance covering liability under the Longshoremen's and Harbor Workers' Act and the Jones Act, if applicable.
 - 6.12 Without in any way affecting CONTRACTOR's obligations pursuant to Section 6.11 of these Terms and Conditions, if marine work is to be performed hereunder, Protection and Indemnity Insurance, including coverage for injuries to or death of masters, mates and crews of vessels used in the performance of this Agreement. The limits of liability of such insurance shall not be less than \$500,000 per occurrence.
 - 6.13 Comprehensive General Bodily Injury Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability. The limits of liability of such insurance shall be not less than \$500,000 per occurrence.
 - 6.14 Broad Form Property Damage Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Completed Operations, and Products Liability, and shall expressly cover property of COMPANY and its affiliates other than that referred to in Section 5.3 of these Terms and Conditions. The limits of liability of such insurance shall be not less than \$100,000 per occurrence.
 - 6.15 Automobile Bodily Injury and Property Damage Liability Insurance. Such insurance shall extend to owned, non-owned, and hired automobiles used in the performance of this Agreement. The limits of liability of such insurance shall be not less than \$250,000 per person/\$500,000 per occurrence for Bodily Injury and \$100,000 per occurrence for Property Damage.
- 6.2 Policy Endorsements: The above insurance shall include a requirement that the insurer provide COMPANY with 30 days' written notice prior to the effective date of any cancellation or material change of the insurance. The insurance specified in Section 6.11 o

these Terms and Conditions shall contain a waiver of subrogation against the indemnitees. The insurance specified in Sections 6.12, 6.13, 6.14 and 6.15 of these Terms and Conditions shall

- (a) name the indemnitees as additional insureds;
- (b) provide that said insurance is primary coverage with respect to all insureds; and
- (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clause.

6.3 Evidence of Insurance: CONTRACTOR shall—before commencing the work—provide COMPANY with certificates or other documentary evidence of the above insurance, satisfactory to COMPANY. Form GO-279-12 may be used for this purpose.

ASSIGNMENT: Neither this Agreement nor money due CONTRACTOR hereunder shall be assigned, sublet or transferred in whole or in part by CONTRACTOR, except with the prior written consent of COMPANY, and any attempt to do so without such written consent shall be void.

CONTRACTOR'S UNDERSTANDING: Subject to any express provisions elsewhere in this Agreement, it is understood that CONTRACTOR as a result of careful examination, is satisfied as to the nature and location of the work, the conformation and structure of the ground, the character, quality and quantity of the materials to be used, the character of temporary equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which could in any way affect the work under this Agreement. No representations by or oral agreement with any agent or employee of COMPANY, either before or after the execution of this Agreement, shall affect or modify any of CONTRACTOR's rights or obligations hereunder.

RENEGOTIATION ACT OF 1951: If Section 104 applies to this Agreement, this Agreement shall be deemed to contain all of the provisions required by said Section. * Superseded by Right-to-Audit Clause, Page 5, Attached.

RECORDS: CONTRACTOR and its subcontractors and vendors shall maintain true and correct sets of records in connection with the work and all transactions related thereto. CONTRACTOR and its subcontractors and vendors shall retain all such records for a period of not less than twenty-four (24) months after Acceptance of the Facility.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR shall give or receive any commission, fee, rebate, or gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without COMPANY's prior written agreement. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor in connection with the work and all transactions related thereto for the sole purpose of determining whether there has been compliance with this paragraph.

If CONTRACTOR's compensation under this Agreement is determined in whole or in part on a reimbursement of costs basis, the costs to be reimbursed shall be only those reasonably necessary to perform the work in an efficient manner in accordance with the time schedule required. COMPANY may from time to time and at any time after the date of this Agreement until twenty-four (24) months after Acceptance of the Facility, make an audit of all records of CONTRACTOR and its subcontractors and vendors in connection with all costs reimbursable under this Agreement. Such audit may also cover CONTRACTOR's procedures and controls with respect to the costs to be reimbursed. Upon completion of this audit COMPANY shall pay CONTRACTOR any compensation due CONTRACTOR hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR shown by the audit shall be returned to COMPANY. Items not covered by reimbursement but by such compensation as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

HEADINGS: Headings of Sections and other parts of this Agreement are for quick reference only and are not to be construed as part of this Agreement. In some instances a Section or part contains provisions not covered by the heading thereof; in other instances, a Section or part contains provisions that are described in the heading of another Section or part.

LICENSING OF CONTRACTORS: The following applies to any person who engages in the business or acts in the capacity of a contractor within California:

Contractors are required by law to be licensed and regulated by the Contractor's State License Board. Any questions concerning a contractor may be referred to the registrar of the board whose address is:

CONTRACTOR'S STATE LICENSE BOARD
1020 N STREET
SACRAMENTO, CALIFORNIA 95814

WAIVER: The right of either party to require strict performance shall not be affected by any prior waiver or course of dealing.

CERTIFICATION: CONTRACTOR hereby certifies that it will fully comply with Executive Order 11246, as amended by Executive Order 11375, and the rules and regulations issued thereunder, which are hereby incorporated by reference as appropriate. CONTRACTOR commits itself to such compliance upon execution of this Agreement.

AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS: The regulations issued under the Rehabilitation Act of 1973 in Title 41, Chapter 60, Part 60-741 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Rehabilitation Act of 1973.

AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA: The regulations issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1974 in Title 41, Chapter 60, Part 60-250 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Vietnam Era Veterans' Readjustment Assistance Act of 1974.

CERTIFICATE ON NONSEGREGATED FACILITIES CLAUSE: (Page 6) The Certificate of Nonsegregated Facilities, Form GO-279-2, signed by CONTRACTOR and attached hereto, is part of this agreement

UTILIZATION OF MINORITY BUSINESS ENTERPRISES CLAUSE: (Page 7) The Utilization of Minority Business Enterprises, Form GO-279-5, attached hereto, is part of this agreement.

RIGHT-TO-AUDIT CLAUSE

EXCEEDS CONTENT IN PARAGRAPH 10 OF CONTRACT TERMS & CONDITIONS

FOR GO-277 SERVICE ORDERS AND
GO-278, GO-279 AND PD-52 CONTRACTS

RECORDS AND AUDITS: CONTRACTOR and its subcontractors and vendors of any tier shall maintain true and correct records in connection with the work of all transactions related thereto and shall retain all such records for at least 24 months after Acceptance.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR of any tier shall give or receive any commission, fee, rebate, gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without prior written notification thereof to COMPANY. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Additionally, if any violation of this paragraph occurring prior to the date of this Agreement resulted directly or indirectly in COMPANY's consent to enter into this Agreement with CONTRACTOR, COMPANY may, at COMPANY's sole option, terminate this Agreement at any time and, notwithstanding any other provision of this Agreement, pay no compensation or reimbursement to CONTRACTOR whatsoever for any work done after the date of termination. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor for the sole purpose of determining whether there has been compliance with this paragraph.

COMPANY may from time to time and at any time after the date of this Agreement until 24 months after Acceptance make an audit of all records of CONTRACTOR and its subcontractors and vendors of any tier in connection with payments made on a cost reimbursement basis. Such audit may also cover CONTRACTOR's procedures and controls with respect to such reimbursable costs. Upon completion of this audit, COMPANY shall pay CONTRACTOR any compensation due hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR as shown by the audit shall be returned to COMPANY. Items of compensation such as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors of any tier to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

CHEV B8 5890

CERTIFICATE OF NONSEGREGATED FACILITIES

CONTRACTOR certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. CONTRACTOR understands that the phrase "segregated facilities" includes facilities which are in fact segregated on a basis of race, color, creed, or national origin, because of habit, local custom, or otherwise. CONTRACTOR understands and agrees that maintaining or providing segregated facilities for his employees or permitting his employees to perform their services at any locations, under his control, where segregated facilities are maintained is a violation of the Equal Opportunity Clauses required by Executive Order No. 11246 of September 24, 1965, and the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968). CONTRACTOR further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clauses; that it will retain such certifications in its files, and that it will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A Certification of Nonsegregated Facilities as required by the May 9, 1967, order on Elimination of Segregated Facilities, by the Secretary of Labor (32 F.R. 7439, May 19, 1967), and as required by the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968) and as they may be amended, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clauses. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semi-annually or annually).

DATE: _____ TIMMONS CONSTRUCTION CO., INC.
CONTRACTOR

P. O. BOX 27169
ADDRESS

EL PASO, TEXAS 79926
CITY STATE ZIP CODE

BY: _____

TITLE

UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The CONTRACTOR agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American Aleuts. CONTRACTORS may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

RECEIVED Certificate of Insurance GO-279-1

JAN 28 1981

To: (Company) Chevron U.S.A. Inc. (Attention) Marilyn O'Keeffe

P.O. Box 20002

El Paso, Texas 79998 MARILYN O'KEEFEThis is to certify that the (Insurer) Employers Insurance of Texashas issued policies of insurance as indicated below to (Contractor) Timmons Construction Company, Inc.

and is aware that said policies will apply to work performed under the Agreement between said insured and (Company)

Chevron U.S.A., Inc.dated January 28, 1981

Type of Coverage	Amount of Coverage	Policy Number	Expiring
A. Workers' Compensation	Statutory		
Longshoremen's and Harbor Workers' Act	\$ <u>Nil</u>		
Jones Act	\$ <u>Nil</u>		
Employers' Liability	\$ <u>100,000</u> each person \$ <u>100,000</u> per occurrence	WC-78367	December 7, 1981
B. Protection and Indemnity Insurance including coverage for injuries or death of masters, mates and crews. (Name of Vessel) _____	\$ <u>Nil</u> per occurrence		
C. Comprehensive General Bodily Injury Liability Insurance, including Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability.	\$ <u>500,000</u> per occurrence (Min. \$500,000)	CGL-564248	December 7, 1981
D. Broad Form Property Damage Liability Insurance, including Broad Form Contractual Liability, Completed Operations, and Products Liability.	\$ <u>100,000</u> per occurrence (Min. \$100,000)	CGL-564248	December 7, 1981
E. Automobile Liability Insurance extending to owned, non-owned, and hired automobiles.	Bodily Injury \$ <u>250,000</u> per person (Min. \$250,000) \$ <u>500,000</u> per occurrence (Min. \$500,000) Property Damage \$ <u>100,000</u> per occurrence (Min. \$100,000)	CAF-595687	November 30, 1981

It is further certified that:

- (1) Each of the above policies contains a provision that the policy shall not be cancelled or materially changed without 30 days' prior notice to the holder this certificate.
- (2) The policies listed under A above contain a waiver of subrogation against Indemnities.**
- (3) The policies listed under B, C, D and E above
 - (a) name Indemnities as additional insureds;
 - (b) ~~provide that this insurance is primary coverage with respect to other policies, and~~
 - (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clauses.

Upon written request by the holder of this certificate, the Insurer or his agent if indicated below will furnish a copy of any policy cited above, certified to be a true and complete copy of the original.

Insurer Employers Insurance of TexasBy [Signature] Title District Manager

CHEV B8 5893

Date January 28, 1981

*Do not include data for these items unless Marine work will be performed under the above mentioned Agreement.

**Indemnities is defined to mean Company, one of its affiliates, or the agent, or employee of Company, or one of its affiliates and all of them.

negatively impact. ... as certified.

JOB 16-445

DATE

DRG. No.

SHEET

ORDER No.

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
18	4	ea	14" 150# x $\frac{1}{16}$ " Flk Ash Comp Gasket	
19	16	ea	$\frac{3}{4}$ " ϕ x $3\frac{3}{4}$ " Stud Bolt Gr B7 w/2 Hex Nuts	
20	40	ea	$\frac{3}{4}$ " ϕ x 4" Stud Bolts Gr B7 w/2 Hex Nuts	
21	36	ea	$\frac{7}{8}$ " ϕ x $4\frac{1}{2}$ " Stud Bolts Gr B7 w/2 Hex Nuts	
22	48	ea	1" ϕ x 5" Stud Bolts Gr B7 w/2 Hex Nuts	
23	2	ea	8" 150# Flg $\frac{1}{16}$ " R.F. Gate Valve Full Port Blt Bnt 12 Cr Trim, Grease Seal with Packing Injector, w/Lantern Ring (Delivery - 5/1/81 Firm)	
24	1	ea	10" Ditto Item 23	
25	1	ea	14" Ditto Item 23	

EB2/3/17/81
End Use: Isolation valves for
eductors

SHEET 3 OF 3 SHEETS

JOB 10 770

DATE

DRG. No. SHEET

ORDER No.

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
10	4	ea	14" 150 [#] FS WN Flg 1/16" R.F. Sch 40	
11	2	ea	14" 150[#] STP - ON Flg 1/16" deleted girth	
12	1	ea	8"x4" Weldolet FS Red B.W. Std Wt.	
13	1	ea	14"x10" Saddle Red C.S. Std Wt.	
14	2	ea	8"x6" C.S. Conc Red B.W. Std Wt.	
15	2	ea	6" 150 [#] x 1/16" thk Ash Comp Gasket	
16	5	ea	8" 150 [#] x 1/16" thk Ash Comp Gasket	
17	3	ea	10" 150 [#] x 1/16" thk Ash Comp Gasket	

SHEET 2 OF 3 SHEETS

MFG. 334 125M 2-531
PRINTED IN U.S.A.

CHEV B8 5895

BILL OF MATERIAL

JOB 16-445

DATE 2/17/81

DRG. NO. PD-16-29953-0 SHEET 40

ORDER NO. BM-9058

#6 S/D

APPRO. JOB NO.

ISOLA-2116-14-360

EBW - 225

*Firm 3/4/81 Except items
MATERIAL REQ'D AT DEST'N BY

23, 24, 25

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	3	ft	8" Smis C.S. Pipe Sch 40 40	
2	3	ft	10" Smis C.S. Pipe Sch 40 Sch 40	
3	3	ft	14" Smis C.S. Pipe Sch 40 Sch 40	
4	2	ea	8" C.S. 90° B.W. Elbow SR Std Wt	
5	1	ea	10" C.S. 90° B.W. Elbow LR Std Wt	
6	2	ea	14" C.S. 90° B.W. Elbow SR Std Wt	
7	2	ea	6" 150° FS WN Flg 1/4" R.F. Sch 40	
8	5	ea	8" 150° FS WN Flg 1/4" RF Sch 40 40	
9	3	ea	10" 150° FS WN Flg 1/4" RF Sch 40 40	

SHEET 1 OF 3 SHEETS

LIST OF MATERIALS

Job No. 13-334

List No. 784-641

DATE: 3-4-77

Accounting Charge No. 45400830-002

DATE REQUIRED: 3-8-77

4,388

Engineer: T H M

Lead Engr: J. B. B.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

3-7

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L 6	3ft.	6"	Smpls Stl. Pipe Sch 40	SHOP	
2	L 119	(2)	3/4"	Stl. Weld. Boss, Threaded	STOCK	
3	L 91	(2)	3/4"x3	Smpls Stl Pipe Nipple TBE Sch 80		
4	L 31	(2)	3/4"	800# Scd. Stl. Gate Valve Blt Bnt.		
5	L 77	(2)	3/4"	Scd. Stl. Bar stock, Plug Rd. Hd.		
6	L 140	(1)	10"	150# FS Blind Flg. 1/16" RF		
7	L 116	(2)	10"	Stl. Pipe Cap	V	
8	L 108	1	10"	Stl. 45° B.W. Elbow LR.	EPR 424X	
9	L 113	(4)	10"	" 90° " " STD 1-SCH 60 FROM 42-039-003 E.F.	EPR 424X	
10	L 8	(100ft.)	10"	Smpls Stl. Pipe Sch 60 3 JTS FROM 42-039-003 E.F.		
11	L 151	(3)	10"	150# x 1/16" thk. Asb Comp. Gasket	STOCK	
12	L 6	(30ft.)	10"	Smpls Stl. Pipe Sch 40	SURPLUS	
13	L 149	(2)	10"	150# FS W.N. Flg. 1/16" RF - Sch. 40	SURPLUS OLD TOOL ROOM	
14	L 205	(1)	10"	150# Spectacle Blind	THM'S B/V	
15	H 263	(12)	7/8"x5"	Stud Bolt, Gr. B7. W/Hex Nuts	STOCK	
16						
17						
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23						

J. L. Mansfield

3/7/77

1 AM

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J

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LIST OF MATERIALS

Job No. 48114-135

List No. 973-008

DATE: 4-7-76

Accounting Charge No. 45900560 - A002

DATE REQUIRED: 4-26-76

J.A. 388

Engineer: THM

Lead Engr: W.S.M.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

4-13

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L5	150 FT	8"	5 mls. Stl Pipe Sch. 30	WRAPPED EPR494	
2	L113	8	8"	Stl. 90° B.W. Elbow LR. Std Wt.	EPR64035	
3	L262	2	8"	150# FS W.N. Flg. R.F. Sch 30	EPR494X	
4	L5235	1	19"x 8"	" " Red Flg R.F. Sch. 30	1	
5	L157	(2)	8"	150# x 1/16" Asb. Comp. Full Face Gasket	stock	
6	L157	(1)	12"	" " " "	stock	
7	L121	1	8"	125# C1 Gate Valve 12BT Bit Bnt. R.F.	EPR64035	
8	H262	(16)	3/4" x 4"	Stud Bolt Gr B7 W/2 Hex Nuts	stock	
9	H263	(12)	7/8" x 4 1/2"	" " " "	stock	
10	L306	1	14"x 8"	Weldolet FS Red. B.W. Std. Wt.	EPR494X	
11		1	15 1/2" DIA	x 3/8" THK DOLLAR PATCH, ROLLED TO	EPR441	
12				14" DIA. ID (REV G1A)		
13				J.H. Mansfield		
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CHEV B8 5898

EP P & S

APR 9 1976

INDUSTRIAL MAINTENANCE CONTRACTORS

1001 WALL STREET • PHONE 778-6343
EL PASO, TEXAS 79915



October 16, 1975

Standard Oil Co.
P. O. Box 20002
El Paso, Texas 79998

Att: H. R. Feld

Re: Insulation Work - El Paso Refinery

Dear Sir:

In response to your invitation and after inspection by us together with your Mr. Jordan and schedules furnished by him, we are pleased to quote the above referenced work as follows:

SCOPE

1. 197 valves from 2" through 14"
2. 654 flanges " 2" " 14" $\div 2 = 3$
3. 270' pipe " 2" " 8"

Items 1 and 2 above will receive fiberglass blanket and poultry netting with One-Kote cement and weathercoat. Item 3 will receive 1½" calcium silicate with aluminum jacketing.

We will furnish all necessary labor, material and equipment to complete the above scope of work for the sum of \$19,994.00.

Thank you for the opportunity of submitting this quotation.

Very truly yours

Jack Whisler, Inc.

J. S. Hanawalt
J. S. Hanawalt, Pres.

jsh;ij

CHEV B8 5899

ALL TEMP INSULATION

INSULATION CONTRACTORS • COLD & HEAT
INSULATION MATERIALS • COLD & HEAT

6731-A ALAMEDA AVE.
EL PASO, TEXAS 79905
PH. 778-6948 — 542-1844

October 22, 1975

Standard Oil Company
Box 20,002
El Paso, Texas 79998

Re: Insulation of Miscellaneous Piping, Etc.

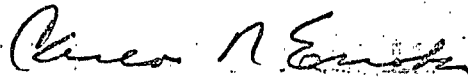
Gentlemen:

We will insulate the above referenced project applying Pabco Cal-Temp Calcium Silicate Insulation and finished with a metal jacket, for the total sum of \$26,700. We will do the same job for \$21,900; however, in lieu of Pabco Cal-Temp Insulation, we will apply Certain Teed 850 Snap*On Pipe Insulation.

If you have any questions, please call me.

Yours very truly,

ALL TEMP INSULATION



Carlos R. Escobar

ms

CHEV B8 5900

CKP

LIST OF MATERIALS

Job No. 10-267

List No. 972-057

DATE: 9-22-75

9-29

Accounting Charge No. 3-5110

DATE REQUIRED: 10-10-75

Engineer: C.R.P.

Lead Engr: W.J.M.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L 6	(20 ft)	3"	Sm. S. Stl. Pipe Sch. 40	STOCK	
2	L 6	(50 ft)	4"	" " "		
3	L 112	(1)	4"x3"	Stl. Ecc. Red B.W. Std. Wt.		
4	L 113	(1)	3"	Stl. 90° B.W. Elbow Std Wt.		
5	L 113	(1)	4"	" " "		
6	L 108	(2)	4"	" 45° " "		
7	L 149	(3)	4"	150# FS W.N. Flg 1/16" R.F. Sch. 40		
8	L 262	(1)	3"	" " P.F. "	EPR 424	
9	H 261	(8)	5/8"x3 1/2"	Stud Bolt Gr B7 W/2 Hex Nuts	STOCK	
10	L 157	(1)	3"	150# x 1/16" thk Asb Comp. Full-Face Gasket	EPR 424	
11	L 151	(2)	4"	" " Gasket	STOCK	
12	L 119	(1)	1"	Stl. Weld. Boss, Threaded		
13						
15				REPLACE ZEOLITE TREATED		
16				WATER LINE.		
17				CRP 9-26-75		
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HECTOR

Whit

J. E. BIRLER
23
1975

LIST OF MATERIALS

io. 16-422 List No. BM-8880 Accounting Charge No. hvyg1-0116-360
nan G.T.A. ph 388 DATE REQUIRED: Date 11-5-80
er: EBW x-225 Lead Engr: FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

[illegible]

CHEV B8 5902

~~422~~
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LIST OF MATERIALS

Job No. 16-422

List No. BM-8880

Accounting Charge No. hyg-0116-360

Draftsman G.T.A. ph 388

DATE REQUIRED: 11-5-80

Engineer: EBW X-225 Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	6 ft.	6"	Sm/s. Stl. Pipe Sch 40		
2	150 ft.	8"	" " " "		
3	2	6"	Stl. 90° B.W. Elbow LR Std Wt		
4	7	8"	" 90° " " "		
5	2	8"x6"	Stl. Conc. Red. B.W. Std. Wt.		
6	3	8"x6"	Weldolet FS. Red BW Std. Wt.		
7	2	6"	300# FS W.N. Flg S.G. Sch 40		
8	6	3"x1 1/2"	Std Pipe shoe Type I		
9	1	1"	Plug C.S. PE		
10	2	6"	300# Stl. Clad Asb. Gasket ST455 Hgs		
11	10	6"	300# Spiral Wound Gasket		
12	24	3/4"x5"	Stud Bolt Gr B7 W/2 Hex. Nuts		
13			" " " "		
14	8	6"	300# FS W.N. Flg. 1/16" R.F. Sch 40		
15	1	6"	300# QS. Flg. 1/16" R.F. Globe Valve B14 Bnt.		
16	3	6"	300# " Gate " "		
17	56	3/4"x1 1/4"	Stud Bolt Gr B7 W/2 Hex Nuts		
18	1	1"	Cap 6000# CS. SW		
19	2 ft.	3"	Sm/s. Stl. Pipe Sch 40		
20	2	4"x1/4"x4"	Stl. Plate		

LIST OF MATERIALS

o. 16-422

List No. BM-3882

Accounting Charge No

hvygl-0116-360

Jan G.T.A. Ph 388

DATE REQUIRED:

Date 11-12-80

REF: EBW-X-225

Lead Engr:

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

[illegible]

CHEV B8 5904

BILL OF MATERIAL

JOB _____ DATE _____

DRG. No. _____ SHEET _____ ORDER No. _____ 36

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY 1-1-55

[illegible]

SHEET OF SHEETS

BILL OF MATERIAL

JOB 16-422

DATE 12/11/80

DRG. No. PD-16-27730 SHEET 14

ORDER No. BM 8880

APPRO. JOB No. hvy gl-0118-370

* Firm

MATERIAL REQ'D AT DEST'N BY 1-5-81

DATE

ERW X 249

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	6	ea	6" Smis stl pipe Sch 40	
2	150	ft	8" Smis stl pipe sch 40	
3	2	ea	6" Stl 90° BW elbow LR std wt	
4	7	ea	8" Stl 90° BW elbow LR std wt	
5	2	ea	8" X 6" Stl Line Red BW std wt	
6	3	ea	8" X 6" weldolet FS Red P.W - std wt	
7	2	ea	6" 300° FS WN Flg Sch 40	
8	6	ea	3" X 3" X 12" L Stl pipe line type I	
9	1	ea	1" plug FS flg	
10	2	ea	6" 300° Stl End Act Gasket - T + S Flg	
11	10	ea	6" 300° Spiral Wound Gasket	
12	24	ea	3/4" X 5/8" Hex Bolt 1/2" X 1/2"	

CHEV B8 5906

SHEET 1 OF 5 SHEETS

BILL OF MATERIAL

JOB _____

DATE _____

DRG. No. _____

SHEET _____

ORDER No. _____

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY _____

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	IT	1" x 1" x 1" x 1" x 1" x 1"	20000
2	1		1" x 1" x 1" x 1" x 1" x 1"	SURPLUS BIN 12136
3	1		1" x 1" x 1" x 1" x 1" x 1"	RLBM-80753X8882
4	1		1" x 1" x 1" x 1" x 1" x 1"	1) SURPLUS, 50% JOE RLBM-80753X8882
5	1		1" x 1" x 1" x 1" x 1" x 1"	Grant
6	1		1" x 1" x 1" x 1" x 1" x 1"	Stock
7	1		1" x 1" x 1" x 1" x 1" x 1"	1
8	1		1" x 1" x 1" x 1" x 1" x 1"	RLBM-80766X8882 BOSCO C/P JOE 12/29
9	1		1" x 1" x 1" x 1" x 1" x 1"	RLBM-80752X8882 Kearney C/P Rich 12/24
10	1		1" x 1" x 1" x 1" x 1" x 1"	20000
11	1		1" x 1" x 1" x 1" x 1" x 1"	
12	1		1" x 1" x 1" x 1" x 1" x 1"	
13	1		1" x 1" x 1" x 1" x 1" x 1"	
14	1		1" x 1" x 1" x 1" x 1" x 1"	
15	1		1" x 1" x 1" x 1" x 1" x 1"	
16	1		1" x 1" x 1" x 1" x 1" x 1"	
17	1		1" x 1" x 1" x 1" x 1" x 1"	
18	1		1" x 1" x 1" x 1" x 1" x 1"	
19	1		1" x 1" x 1" x 1" x 1" x 1"	
20	1		1" x 1" x 1" x 1" x 1" x 1"	
21	1		1" x 1" x 1" x 1" x 1" x 1"	
22	1		1" x 1" x 1" x 1" x 1" x 1"	
23	1		1" x 1" x 1" x 1" x 1" x 1"	
24	1		1" x 1" x 1" x 1" x 1" x 1"	
25	1		1" x 1" x 1" x 1" x 1" x 1"	
26	1		1" x 1" x 1" x 1" x 1" x 1"	
27	1		1" x 1" x 1" x 1" x 1" x 1"	
28	1		1" x 1" x 1" x 1" x 1" x 1"	
29	1		1" x 1" x 1" x 1" x 1" x 1"	
30	1		1" x 1" x 1" x 1" x 1" x 1"	
31	1		1" x 1" x 1" x 1" x 1" x 1"	
32	1		1" x 1" x 1" x 1" x 1" x 1"	
33	1		1" x 1" x 1" x 1" x 1" x 1"	
34	1		1" x 1" x 1" x 1" x 1" x 1"	
35	1		1" x 1" x 1" x 1" x 1" x 1"	
36	1		1" x 1" x 1" x 1" x 1" x 1"	
37	1		1" x 1" x 1" x 1" x 1" x 1"	
38	1		1" x 1" x 1" x 1" x 1" x 1"	
39	1		1" x 1" x 1" x 1" x 1" x 1"	
40	1		1" x 1" x 1" x 1" x 1" x 1"	
41	1		1" x 1" x 1" x 1" x 1" x 1"	
42	1		1" x 1" x 1" x 1" x 1" x 1"	
43	1		1" x 1" x 1" x 1" x 1" x 1"	
44	1		1" x 1" x 1" x 1" x 1" x 1"	
45	1		1" x 1" x 1" x 1" x 1" x 1"	
46	1		1" x 1" x 1" x 1" x 1" x 1"	
47	1		1" x 1" x 1" x 1" x 1" x 1"	
48	1		1" x 1" x 1" x 1" x 1" x 1"	
49	1		1" x 1" x 1" x 1" x 1" x 1"	
50	1		1" x 1" x 1" x 1" x 1" x 1"	

CHEV B8 5907

SHEET OF SHEETS

EF

LIST OF MATERIALS

Job No. 41-75List No. 001DATE: 10-15-75Accounting Charge No. 7-5141DATE REQUIRED: 10-21-75

388

Engineer: EFLead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L 6	(40ft)	3"	Smls Stl Pipe Sch. 40	Stock	
2	L 113	(2)	3"	Stl. 90° B.W. Elbow L.R. Std. Wt.		
3	L 149	(3)	3"	150# FS W.N. Flg. 1/16" R.F. Sch. 40		
4	L 119	(2)	3/4"	Stl. Weld. Boss, Threaded		
5	L 77	(2)	3/4"	Std. Stl. Bar Stock, Plug Rd. Hd.		
6	L 124	(1)	3"	150# C.S. Flg Gate Valve Blt Bnt		
7	L 151	(3)	3"	150# x 1/16" thk Asb Gasket Comp.		
8	H 261	(12)	5/8" x 3/4"	Stud Bolt Gr. B7 w/ 2 Hex Nuts		
9	L 117	(2)	3"	Stl. B.W. Tee Std. Wt.		
10				C.F. 10/15/75		
11						
12				MLB 10/17		
13						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29				USE: HSR Into 3" Olefin Line		
30						
32						
33						
34						

LIST OF MATERIALS

Job No. 17-024

List No. 002

DATE: 8-11-75

Accounting Charge No. 3-5117

DATE REQUIRED: 8-29-75

Engineer: CRP

Lead Engr: WJM

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L193	2	3"x1"	Swage Nipples, Sch 80, Td.Sm. End.		
2	L205	1	3"x3/4"	Thredolet, 3000# F.S.		
3	L149	2	3"	300# F.S. WN. Flange RF. Sch 80		
4	L91	2	3/4"x2"	Sm's SH. Nipple T.B.E. Sch 80		
5	L31	1	3/4"	SCD Stl. Gate Valve		
6	L74	1	3/4"	3000# SCD F.S. 90° Elbow		
7	L152	2	3"	1/16" Asb. Gasket for 300# Flgs.		
8						
9						
10						
11						
12				CRP 8-12-75		
13						
14						
15						
16				Material to Install LC-17-304		
17				REPLACEMENT CONTROL VALVE,		
18						
19						
20						
21						
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sh Cypher

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STANDARD OIL COMPANY OF CALIFORNIA
ENGINEERING DEPARTMENT - SAN FRANCISCO

SPECIFICATION NO. EG-983-J
OCTOBER 5, 1971

SPECIFICATION NO. EG-983-J

CENTRIFUGAL PUMPS FOR REFINERY SERVICES

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INFORMATION FOR COMPANY ENGINEERS ON USE OF THIS SPECIFICATION

The information on this page is not a part of purchasing or contract specifications. Refer to the applicable references before making the decisions listed below.

Items to be specified on data sheet (EF-153) or list sheets when Specification EG-983-J is used.

		<u>References</u>			
		<u>Pump</u>			
		<u>API</u>	<u>Manual</u>		
		<u>610</u>	<u>Page</u>	<u>Other</u>	
<u>A. Purchaser's Data (On EF-153)</u>		<u>EG-983-J</u>			
1.	List operating conditions.				
2.	Horizontal centrifugal pumps handling stocks over 350°F and multi-stage pumps handling stocks over 200°F shall be centerline mounted. In-line mounted pumps are normally acceptable up to the manufacturer's allowable temperature limit. (250°F for most models - some to 500°F)		Para. 26f	2-36	
	Heavy-duty cradle or bracket-mounted pumps are acceptable for intermittent, infrequently used transfer services provided they comply in all respects with the applicable equipment specifications.				
3.	Indicate if mechanical seal is required.	3.08	Para. 24	2-48	Rec. Prac. 29
4.	Indicate if lantern ring is required.			2-58	
5.	The use of oil-mist is a project decision on a plant-wide basis.	3.074 3.075			Rec. Prac. 35 GA-G-1005
6.	Indicate if a base plate is required. If extension and drain rim are not required, cross them off data sheet.	3.10	Para. 27	2-61	
7.	Normally packing will be furnished by COMPANY.		Para. 23f	2-80	Design Prac. G-134-8
8.	List material class or itemize materials.	3.092 and 4.0			
9.	Inspection is usually required on all pumps except non-continuous, non-critical or "off the shelf" pumps.		Para. 37		
10.	Performance tests are required on all pumps except small water pumps but are to be witnessed only on large size or severe service pumps with unusual materials or high temperatures.		Para. 35		
11.	NPSH tests are not usually required unless available NPSH is within 4-ft. of required NPSH. On quotations ask for extra cost for NPSH test if NPSH is expected to be critical		Para. 36	2-19 2-20 2-21 2-22	Design Prac. G-134-7
<u>B. Notes for List Sheet</u>					
1.	State if driver horsepower for bidding shall be other than that required by the pump curve at 120% of design capacity. (Horsepower of driver actually ordered should be that required by the system and service considering the performance curve of pump selected. It may not be the motor size bid.)				Design Prac. G-134-9

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CENTRIFUGAL PUMPS FOR REFINERY SERVICES

SECTION A

TECHNICAL REQUIREMENTS

1.0 SCOPE

Section A of this specification covers requirements for horizontal and vertical pumps, including in-line pumps, in continuous-duty refinery process services. It does not cover light-duty pumps for non-critical services such as bracket-mounted pumps or horizontal integral-motor pumps for water service or pumps of a highly specialized nature such as chemical handling pumps.

2.0 STANDARD

Pumps shall conform to API Standard 610 "Centrifugal Pumps for General Refinery Services," Fifth Edition, except as modified by this specification. The API paragraphs referenced appear in increasing numerical order in both Section A and Section B. An exception to API 610 deletes the whole API paragraph.

3.0 DESIGN

3.01 General

3.011 (Exception to Paragraph 6a of API 610). Impeller diameters of pumps with constant speed drivers shall not exceed the following:

<u>Type and Size of Pump</u>	<u>% of Max. Dia. Allowed</u>
Single-stage, under 4-inch discharge	90
Single-stage, 4-inch discharge and over	95
Multi-stage, all sizes	95

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An impeller of larger diameter is acceptable if reserve head and capacity equal to that which would have been obtainable from a pump with a 90 or 95 percent impeller is available by means other than increasing impeller diameter. Such cases are:

- (a) Vertical pumps to which stages can be added. Vertical pump barrels shall provide for future stages.
 - (b) Pumps for which the rated speed can be increased (not spares for motor-driven pumps).
 - (c) Pumps for which another impeller pattern is available to provide the required reserve.
- 3.012 (Addition to Paragraph 6b of API 610). Repelling vane construction is not acceptable.
- 3.013 Deepwell pumps (bowl setting 50 ft. or over) shall be limited to 1750 RPM.
- 3.014 (Addition to Paragraph 23 of API 610)
Renewable throat bushings are required in all packed pumps. Throat bushings locked in place only by being pressed in from the low pressure side of the stuffing box are not acceptable.

3.02 Pressure Casing Design

(Additions to Paragraph 12 of API 610). Vertical multi-stage pumps shall have bolted bowls. Screwed bowls are not acceptable.

3.03 Nozzles and Miscellaneous Connections

(Additions to Paragraph 13b of API 610.)

- 3.031 Tapped connections shall be provided for completely draining horizontal pumps.
- 3.032 A tapped drain connection in the pump bracket (3/4-inch minimum, 1-inch preferred) shall be provided to remove packing drips.

3.04 Impellers

- 3.041 (Addition to Paragraph 17b of API 610). All impellers, including impellers in vertical pumps, shall be keyed to their shafts. Impellers for multi-stage pumps shall be individually secured against axial movement in either direction along the shaft.

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- 3.042 (Addition to Paragraph 17c of API 610). One and two stage pumps with enclosed impellers shall be fitted with replaceable case and impeller wearing rings on both sides of the impeller unless deleting the back wearing rings will reduce the net axial thrust on pumps with high suction pressure.

3.05 Running Clearances

(Addition to Paragraph 19b of API 610). For operating temperatures 350F and above, at least 0.002 inches shall be added to minimum diametral clearance for each 100F or fraction thereof over 350F.

3.06 Shafts and Shaft Sleeves

- 3.061 (Addition to Paragraph 20f of API 610). Total shaft deflection for conditions specified in Paragraph 20j of API 610 shall be less than one-half the minimum diametral clearance at all bushings and wear rings.

3.07 Bearings for Horizontal Pumps

- 3.071 (Addition to Paragraph 21b of API 610). Reworked or re-conditioned bearings are not acceptable.
- 3.072 (Addition to Paragraph 21e of API 610). Bearing housing incorporating cooling for the lube oil shall be provided if temperature of pumped liquid exceeds 350F or if a high thrust load exists. Cooling coils (including fittings) if furnished, shall be Admiralty or 316 Stainless, 19 BWG wall thickness with no internal joints.
- 3.073 (Additions to Paragraph 21 of API 610). Oil rings and bearing housings shall be designed so that rings will not become locked or dislocated if the pump is rolled over or held in an unnatural position while being transported.

Where practical, housings for ring-oil lubricated bearings, shall be provided with ports positioned to allow visual inspection of oil rings while the pump is running. Ports shall have spring-loading caps.

- 3.074 (Addition to Paragraph 21k of API 610). Constant level oilers shall be four ounce or larger Trico "Opto-matic" type with glass bottles. Constant level oilers shall not be provided on pumps for which "pure" mist lubrication is specified.

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- 3.075 (Addition to Paragraph 21o.1 of API 610). Oil mist inlet connection shall be in addition to inspection and fill openings.

3.08 Mechanical Shaft Seals

- 3.081 (Addition to Paragraph 20a of API 610). Sleeves shall be provided under mechanical seals if the seal includes a gasket which slides on the sleeve in normal operation. This sleeve may be a short sleeve or replaceable seal part extending under the point where the seal gasket could cause shaft wear.
- 3.082 (Exception to Paragraph 24c of API 610). Materials for mechanical seals, including the sleeve under the seal, shall be in accordance with Drawing GA-G-99876.
- 3.083 (Addition to Paragraph 24f of API 610). An internal bypass for recirculation of the pumped fluid or a tapped connection in the seal gland plate or seal chamber for recirculation or flushing shall be provided. A restriction orifice shall be located in the gland plate or seal chamber connection.

For LPG or highly toxic services, or for services over 450°F, an orifice restricting flow to the atmosphere in case of tubing failure shall be provided at the discharge or suction nozzle connection. This orifice shall be in addition to the orifice at the gland plate connection.

The recirculation or flush stream shall not erode seal parts.

Unless otherwise specified, recirculation piping shall be 3/4-inch O.D., 18-8 stainless steel tubing, 0.095-inch minimum wall thickness, with Swagelok or Parker Ridg-Lock steel fittings installed per Plan 11 illustrated in Figure C-2 of Appendix C of API 610.

- 3.084 (Addition to Paragraph 24f of API 610). Seal chamber on vertical pumps, including inline, shall be provided with a vent to insure that seal faces are submerged.

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3.085 (Addition to Paragraph 24g of API 610). Vent and drain connections (1/2-inch preferred, 3/8-inch minimum) shall be provided between the bushing and the seal faces, except that such connections are not required on pumps handling non-corrosive stocks with vapor pressure above atmospheric such as propane and butane. Pumps shall be designed to permit installation of vent or drain piping from these connections.

3.086 (Exception to Paragraph 24L of API 610). Seals shall be balanced type for all speeds and pressures.

3.09 Couplings

3.091 (Addition to Paragraph 25a and b of API 610). Horizontal pumps shall be provided with Thomas spacer-type couplings with stainless steel discs, Type SN (for speeds 3600 rpm or less) or Series 51 (for speeds over 3600 rpm). The spacer shall be Thomas' standard length for the coupling size except that spacer shall provide at least 7 inches between shaft ends for:

- a. SN couplings smaller than size No. 200; and
- b. Series 51 couplings smaller than size No. 750.

Couplings shall be dynamically balanced when recommended by coupling Vendor. "Medium" load classification shall be used for centrifugal pumps.

If a Thomas coupling is not practical, a Fasts (or equal) steel gear-type coupling is acceptable with COMPANY's prior written approval.

3.092 (Addition to Paragraph 25d of API 610). Both halves of coupling shall be bored and key-seated. Each coupling half shall be provided with its key if other than a standard square key is required.

3.093 (Addition to Paragraph 25g of API 610). Pumps driven by motors with sleeve bearings shall be provided with limited-end-float couplings in accordance with NEMA Specification MG1-14.38. (Thomas couplings provide limited-end-float without modification. Gear couplings require the addition of stops to limit axial movement.) NEMA allows the following maximum end-float:

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<u>Motor HP</u>	<u>Syn. Speed, RPM</u>	<u>Min. Motor Rotor End-Float, In.</u>	<u>Max. Coupling End-Float, In</u>
125-250 incl.	3600 and 3000	1/4	3/32
300-500	3600 and 3000	1/2	3/16
125-500	1800 and below	1/4	3/32

When gear-type, limited-end-float couplings are provided, VENDOR's installation instructions shall cover end-play settings. A special tag shall be permanently attached to the coupling or the coupling shall be die stamped to identify it as limited-end-float and to give end-play setting instructions.

3.094 (Addition to Paragraph 25h of API 610). Vertical barrel-type process pumps shall be provided with steel flanged couplings keyed to the shaft.

3.095 (Addition to Paragraph 25i of API 610). Either integral or coupled shafts are acceptable for inline, single stage pumps, but shaft deflection requirements of Paragraph 3.062 must be met without reliance on product lubricated bushings.

3.10 Base Plates

(Addition to Paragraph 26a of API 610). Adequate space shall be provided between the case drain connection and base plate for installation of drain piping of the same size as the drain connection without use of a street elbow.

3.11 Piping

(Addition to Paragraph 28k of API 610). Cooling water piping shall be 3/4-inch stainless steel tubing.

4.0 MATERIALS

4.1 General

(Addition to Paragraph 31c of API 610). Cast iron shall not be repaired by welding.

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4.2 Pump Materials

(Addition to Paragraph 32 of API 610). Refer to "Materials for Centrifugal Pumps," GA-G99876 for materials of the specified classification.

5.0 TESTS

5.1 (Addition to Paragraph 35i of API 610). COMPANY shall have the option to open and check pumps for evidence of internal rubbing after performance tests. After the cause of any rubbing is corrected, the pump shall be run again and rechecked. Pumps need not be run again if no evidence of rubbing or other defect is found on disassembly.

5.2 (Addition to Paragraph 35 of API 610). Barrel-type pumps shall be opened for inspection after performance test. All water must be fully drained and pump internals dried before reassembly.

5.3 (Addition to Paragraph 33 of API 610). If a performance test is specifically waived, the pump's head, efficiency, power and NPSHR shall fall within the specified limits of Para. 35c of API 610.

6.0 PREPARATION FOR SHIPMENT

6.1 (Addition to Paragraph 382 of API 610). Gear-type shaft couplings shall be disconnected, covered with grease, and wrapped.

Vertical drivers or right-angle gears shall be aligned and doweled to pumps unless alignment is fully maintained by machine fits.

6.2 (Exception to Paragraph 38b of API 610). After tests and inspection, all internal parts including bearings, shafts and all machined surfaces shall be flushed and coated with Chevron Rust Preventive (or equivalent approved by COMPANY) to protect equipment during shipment and 3 months outdoor storage. When specified, equipment shall be protected for 6 months storage.

6.3 (Addition to Paragraph 38d of API 610). Pumps shall be securely bolted to substantial skids.

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CENTRIFUGAL PUMPS FOR REFINERY SERVICES

SECTION B

GENERAL REQUIREMENTS

1.0 SCOPE

This Section covers general requirements related to purchasing.

2.0 PRECEDENCE

Provisions of the Pump Data Sheet and the List Sheets take precedence where contrary to this Specification.

3.0 INSTRUCTIONS TO VENDOR

- 3.1 (Addition to Paragraph 39 of API 610). If driver is a motor supplied by COMPANY, COMPANY may state the NEMA standard frame size for the motor on the order data sheet instead of providing a certified motor dimension drawing. When this is done, the certified pump dimension drawing shall be prepared by VENDOR on the basis of the NEMA dimensions. If driver is a turbine supplied by COMPANY, COMPANY will provide a certified turbine dimension drawing to VENDOR.
- 3.2 (Addition to Paragraph 42 of API 610). The quoted efficiency of the pump at its operating points shall be based upon the quoted wearing ring clearance.
- 3.3 (Addition to Paragraph 42 of API 610). For each pump with suction pressure of 500 psig or greater, VENDOR's proposal shall include calculations (showing method used in detail) of forces on the bearings and the B-10 life for the bearings proposed.

For multi-stage, horizontal pumps where the product of rated hp and rated rpm is greater than or equal to one million, VENDOR shall provide for COMPANY's review and approval an economic comparison, with VENDOR's recommendation between sleeve and antifriction radial bearings, including experience with each type.

For all multi-stage horizontal pumps a similar comparison is required for antifriction and tilting pad (Kingsbury or Waukesha) thrust bearings.

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The above economic comparisons are not required if VENDOR recommends sleeve radial bearings or tilting pad thrust bearings for the specified service.

- 3.4 VENDOR shall provide for COMPANY's review and approval seal designs and flush arrangement recommendation for mechanical seals in service above 350F.
- 3.5 (Exception to Paragraph 43 of API 610). VENDOR's proposal shall be in strict accordance with this Specification, the Pump Data Sheet and the List Sheets.

If VENDOR wishes to take exceptions or propose alternates to this Specification, the Pump Data Sheet or the List Sheets, he shall for each deviation:

- a. describe the deviation he proposed; and
- b. indicate the adjustment in his proposed price and delivery.

COMPANY may elect to accept individual deviations.

4.0 GUARANTEE

(Exception to Paragraph 46 of API 610).

Irrespective of whether designs, data or information have been provided, reviewed or approved by COMPANY, VENDOR guarantees each item as originally provided and each part of such item which is altered, repaired or replaced under this guarantee, to meet the requirements of the Agreement of which this Specification is a part and to be free of defects in design, materials and workmanship for one year after the date such item is originally placed in operation or, as the case may be, such part is placed in operation (but not longer than 18 months after the date of shipment of such item or, as the case may be, alteration, repair or replacement of such part); provided the defect was not caused by the item being subjected to conditions more severe than described in this Agreement.

VENDOR shall be notified in writing or by telephone or telex confirmed in writing whenever COMPANY believes that a breach of this guarantee exists. VENDOR shall, as promptly as possible following notification by COMPANY hereunder, propose a method to achieve a satisfactory correction of the defect with the least loss of operating time to COMPANY, provided that such method need not involve premium costs (such as premium costs of overtime labor and air freight) or transportation, insurance or installation costs, except to the extent that VENDOR was required to incur such costs for the original supply of the item involved.

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COMPANY may agree to VENDOR's proposed method or select another method. VENDOR shall perform the corrective work in accordance with the method selected by COMPANY, and COMPANY shall reimburse VENDOR for any difference in cost to VENDOR between the method selected and the method proposed by VENDOR.

The guarantee period for any item or part thereof shall be extended for the period that such item cannot be operated as a result of a defect covered by this guarantee in such item or in another item provided by VENDOR.

5.0 DRAWINGS

The following drawing is referenced in and is part of this specification:

GA-G-99876

PART	A-1			A-2			A-3			J-1			F-2		
	C1			C1			C1			J1			F-2		
	C1			C1			C1			J1			F-2		
CASE	C1			C1			C1			J1	MONEL		316 S.S.		
IMPELLER	C1			C1			C1			J1	MONEL		316 S.S.		
CASE WEARING RINGS	C1			C1			C1			J1	MONEL		STELLITE OVER 316 S.S.		
IMPELLER WEARING RINGS	C1			C1			C1			J1	MONEL		316 S.S.		
SHAFT	CARBON STEEL OR A151 WIND			CARBON STEEL OR A151 WIND			CARBON STEEL OR A151 WIND			J1	MONEL		STELLITE OVER 316 S.S.		
SHAFT SLEEVES PACKED PUMPS	12% CHR HARDENED			12% CHR HARDENED			12% CHR HARDENED			J1	MONEL		316 S.S.		
SHAFT SLEEVES PUMPS WITH MECHANICAL SEALS	10-B S.S. OR CHROME PLATED STEEL			10-B S.S. OR CHROME PLATED STEEL			10-B S.S. OR CHROME PLATED STEEL			J1	MONEL		316 S.S.		
THROAT BUSHINGS	C1			C1			C1			J1	MONEL		STELLITE OVER 316 S.S.		
INTERSTAGE SLEEVES (IF ANY)	C1			C1			C1			J1	MONEL		316 S.S.		
INTERSTAGE BUSHINGS (IF ANY)	C1			C1			C1			J1	MONEL		316 S.S.		
LANTERN RING	C1			C1			C1			J1	MONEL		316 S.S.		
GLAND WITH PACKING OR PLATE RETAINING MECHANICAL SEAL	CARBON STEEL			CARBON STEEL			C1			J1	MONEL		316 S.S.		
GLAND BOLTS	CARBON STEEL			CARBON STEEL			CARBON STEEL			J1	MONEL		316 S.S. (NOTE 5)		
CASE STUDS	CARBON STEEL			CARBON STEEL			CARBON STEEL			J1	MONEL		316 S.S. (NOTE 5)		
CASE GASKET	ASBESTOS COMPOSITION			ASBESTOS COMPOSITION			ASBESTOS COMPOSITION			J1	MONEL		ASBESTOS COMPOSITION		
MECHANICAL SEAL (IF REQ'D BY DATA SHEET)										J1	MONEL		CARBON		
SEAL RING	CARBON			CARBON			CARBON			J1	MONEL		CERAMIC		
MATING SEAL RING	TUNGSTEN CARBIDE-1			TUNGSTEN CARBIDE-1			TUNGSTEN CARBIDE-1			J1	MONEL		316 S.S.		
SPRINGS (NOTE 6)	10-B S.S.			10-B S.S.			10-B S.S.			J1	MONEL		316 S.S.		
COLLARS, CAGES, ETC.	10-B S.S.			10-B S.S.			10-B S.S.			J1	MONEL		TEFLON		
GASKET - SEAL TO SHAFT OR SLEEVE (NOTE 6)	BUNA N, NYCAR, OR VITON			TEFLON			BUNA N, NYCAR, OR VITON			J1	MONEL		TEFLON		
GASKET - STATIONARY SEAL RING	BUNA N, NYCAR, OR ASBESTOS COMPOSITION			TEFLON, OR ASBESTOS COMPOSITION			BUNA N, NYCAR, OR VITON			J1	MONEL		TEFLON, OR ASBESTOS COMPOSITION		
GASKET - GLAND PLATE	BUNA N, NYCAR, OR ASBESTOS COMPOSITION			TEFLON, OR ASBESTOS COMPOSITION (NOTE 4)			BUNA N, NYCAR, OR VITON			J1	MONEL		TEFLON, OR 316 S.S. - JACKETED ASBESTOS (NOTE 4)		
CLOSE-CLEARANCE BUSHING	BRONZE			BRONZE			BRONZE			J1	MONEL		CARBON		

MATERIAL	CASTINGS	FORGINGS
C1 (CAST IRON)	ASTM A 279	
CARBON STEEL	ASTM A 213 GR. 10A OR 10B	ASTM A105 OR A106
A151 WIND AND 8-7 ALLOY		A151 WIND PER ASTM A 237
35 CHROME	ASTM A 217 GR. C 5	ASTM A192 GR. F
12% CHROME	ASTM A 351 GR. CA 15	ASTM A 192 GR. F
BRASS	ASTM B62	
BRONZE	ASTM B51	
MONEL AND K MONEL	MONEL METAL	
10-B S.S. TYPE 304 SEE NOTE 2	ASTM A 351 GR. CF-3	ASTM A192 F304
10-B S.S. TYPE 316 SEE NOTE 2	ASTM A 351 GR. CF-3M	ASTM A192 F316
ALLOY 20	ASTM A 351 EXCEPT SEE NOTE 3	ASTM A-192 EXCEPT SEE NOTE
HASTELLOY B	ASTM A-404	ASTM A-192 EXCEPT SEE NOTE
HASTELLOY C	ASTM A-404	ASTM A-192 EXCEPT SEE NOTE

- NOTES
- MINOR MATERIALS NOT IDENTIFIED (NUTS, WASHERS, KEYS, ETC.) SHALL HAVE EQUAL CORROSION RESISTANCE TO PARTS IN THE SAME ENVIRONMENT WHICH ARE SPECIFIED.
 - WHEN 10-B S.S. IS SPECIFIED WITHOUT TYPE, ANY 10-B S.S. OR TYPE 316 MAY BE FURNISHED EXCEPT IN NITRIC ACID SERVICE WHERE TYPE 304 IS REQUIRED. WHEN MATERIAL CLASS F-1, F-2 OR G-1 IS SPECIFIED, IF PARTS MADE FROM TYPE 304 OR 316 OR ALLOY 20 ARE EXPOSED TO THE LIQUID PUMPED AND ARE TO BE FABRICATED OR HARD SURFACED BY WELDING, STABILIZED OR EXTRA LOW CARBON GRADES ARE REQUIRED.
FOR TYPE 304, USE TYPE 304L OR 347
FOR TYPE 316, USE TYPE 316L OR 318
 - ALLOY 20 PARTS SHALL HAVE THE MECHANICAL PROPERTIES AND CHEMICAL COMPOSITION STATED BY ASME CODE CASE 1189.
 - UNJACKETED TEFLON IS ACCEPTABLE ONLY IF FULLY CONFINED.
 - STUDS AND NUTS OF 10-B S.S., TYPE 316, ALLOY 20, OR HASTELLOY SHALL BE LUBRICATED WITH MOLYKOTE.
 - FOR PUMPING SULFURIC ACID SERVICE, TEFLON-GLASS FIBER REQUIRED INSTEAD OF CARBON FOR SEAL RING MATERIAL IN MECHANICAL SEAL.
 - HASTELLOY BOLTING AND FORGING MATERIALS SHALL HAVE THE MECHANICAL PROPERTIES AND CHEMICAL COMPOSITIONS SPECIFIED BY ASTM A-404.
 - WHEN METAL BELLOW SEALS ARE USED, THE BELLOW MATERIAL SHALL HAVE A CORROSION RATE LESS THAN 2 MILS/YEAR.

Chevron Company of California		MATERIALS FOR CENTRIFUGAL PUMPS	
San Francisco			
DATE 7-1-57			
APP. ENGR. J.R.H.			
APPROVED		W.D.	
R.P.H. 7/5		S.O.	
		GA-G99876-5	
STANDARD DRAWING			

SPECIFICATION NO. EG-1824-G
INDUCTION MOTORS

SECTION A

TECHNICAL REQUIREMENTS

1.0 SCOPE

This Specification covers requirements for fractional and integral horsepower induction motors.

2.0 STANDARDS

- 2.1 Motors shall be designed and fabricated in accordance with the latest edition of NEMA Publication No. MG 1, "Motors and Generators," and applicable sections of the National Electrical Code.
- 2.2 Explosion-proof motors shall comply with the requirements of the Underwriters' Laboratories for Class I, Group D hazardous locations and shall bear their label.

3.0 ENCLOSURES AND MATERIALS

- 3.1 Explosion-proof, TEFC (totally enclosed fan-cooled), TENV (totally enclosed non-ventilated), and WP-I (weather-protected Type I) and WP-II (Type II) motors shall have weather-proof gasketed cast or heavy fabricated steel terminal boxes with threaded conduit entrances, sealed leads between motor housing and terminal box and shaft slingers or rotating shaft seals to prevent entrance of dirt and moisture into bearings. Balance washers shall be of corrosion-resistant material or shall be zinc- or cadmium-plated. Rotors shall be given a corrosion-resistant coating after balancing. Motor finish and external hardware shall be resistant to salt-water washdown and corrosive atmospheres found in the petroleum industry.
- 3.2 TEFC motors shall be Severe Duty type with cast iron housings throughout including cast fan covers.

Fans shall be non-sparking inert plastic, bronze, or corrosion-resistant aluminum.

- 3.4 TEFC and TENV motors shall be provided with a tapped drain hole fitted with a pipe plug or suitable drain plug. Where drains are specified in explosion-proof motors, they shall be provided with an explosion-proof drain plug approved by Underwriters' Laboratories.
- 3.5 Where TEFC or TENV motors are mounted vertically with the shaft extension up, provisions shall be made to prevent the entrance of moisture along the shaft, at end bell fits, or at any other openings in the upper end bell. The drain hole specified in Section 3.4 shall be located at the low point of the motor as mounted.
- 3.6 WP-I and WP-II motors shall have corrosion-resistant treatment on all internal metal parts in addition to requirements of Section 3.1 of this Specification. WP-I and WP-II motors shall have stainless steel screens and moisture-sealed insulation per Section 7.0 of this Specification. WP-II motors shall have provision for future addition of filters and manometers on air inlets.
- 3.7 TEFV (totally enclosed force-ventilated) and TEWAC (totally enclosed water-air-cooled) motors shall be designed and fabricated for severe duty outdoor service.

4.0 FRAME SIZE AND DIMENSIONS

- 4.1 Motor frames for fractional and integral horsepower induction motors shall be assigned in accordance with the latest edition of NEMA Publication No. MG 1.
- 4.2 Motor terminal boxes shall be of adequate size to connect power leads to motor winding leads. On motors with voltage rating greater than 2300 volts, space shall be provided for stress cones or cable terminators. Conduit entrance shall be adequate for rigid steel conduit required for Type THW Aluminum conductor power leads sized in accordance with the National Electrical Code, but not smaller than 3/4 inch.

- 4.3 Motors for in-line pumps shall be NEMA "P" Base In-Line Pump Motors. Mounting and shaft extension dimensions and tolerances shall be in accordance with NEMA MG 1-18.625 (alternate) except as follows:
- a) Frames 254 and 256 shall have 1-5/8-inch diameter shaft extension ("U" dimension).
 - b) Base runout -- 0.004 in. TIR maximum.
 - c) Rabbet runout -- 0.004 in. TIR maximum.
 - d) Shaft runout -- 0.001 in. TIR maximum at end, with motor vertical.
 - e) Shaft end play -- 0.002 in. maximum under 50-lb. reversing thrust.
 - f) Shaft protrusion below base -- $\pm$ 0.015-in. tolerance.
 - g) Motor balance as defined by NEMA Method MG-12.06 -- 0.001 in. maximum, all speeds.

5.0 BEARINGS AND LUBRICATION

- 5.1 Grease-lubricated ball bearings shall be supplied on all motors up to 250-hp except where manufacturer's standard provides oil-lubricated sleeve bearings.
- 5.2 Oil-lubricated sleeve bearings shall be supplied on all horizontal motors larger than 250 hp. Sleeve bearings with split-type housings are preferred.
- 5.3 Ball bearings shall be vacuum-degassed steel, motor quality. Bearings shall be selected for a minimum life, as determined by AFBMA rating method B-10, of three years (25,000 hours) continuous service at rated motor load and 40°C ambient temperature.
- 5.4 Where sleeve bearings are furnished with oil-ring lubrication only each bearing housing shall have a 4-ounce or larger constant-level oiler (Trico "opto-matic") with glass bottle. Recommended oil level shall be marked on the outside of bearing housings by a cast mark or metal tag.

5.5 Where pressure lubrication is furnished, lubricating oil system shall include the following unless specified otherwise in writing:

- a) Separate motor-driven oil pump, with 230-volt, single-phase, explosion-proof motor.
- b) Oil pressure controller, and by-pass relief valve if oil pump is positive-displacement type.
- c) Oil cooler, or sufficient radiating surface on oil reservoir for adequate cooling.
- d) Duplex filters to permit changing filter element without shutting down. If oil rings and sufficient oil capacity in each bearing housing are provided to permit at least 30-minute operation at rated load with the forced-feed lubrication system inoperative, a single filter is acceptable.
- e) Oil pressure gage downstream of filter, and an indicating differential pressure switch (explosion-proof) across the filter (Barton or equal).
- f) Bearing or bearing housing oil temperature indicator for each bearing.
- g) Sight flow indicator in oil return line to reservoir from each bearing.
- h) Low oil pressure shutdown and/or alarm switch (explosion proof).
- i) All piping shall be seamless steel tubing (3/4-inch x .095-inch wall minimum) with Swagelock fittings, and shall be routed to minimize possibility of physical damage.
- j) Reservoir shall be thoroughly sandblast cleaned and coated with Chevron Rust Preventive, or equivalent as approved by COMPANY, before shipment.

5.6 Sleeve-bearing motors will be coupled to driven equipment with limited end-float couplings. Minimum rotor end-float shall be in accordance with NEMA

Standard MG 1-14.38. Rotor end-float limits shall be indicated on motor outline drawings and shall be stamped on the motor nameplate or separate metal tags permanently fastened to the motor, or marked on the motor shaft.

- 5.7 Where vertical motors are required or proposed, bearings may be ball type, either grease- or oil-lubricated. Bearings shall have adequate capacity to handle maximum expected up or down thrust and any radial load imposed by driven equipment, with bearing life per Section 5.3 of this Specification.

6.0 STARTING AND OPERATING CHARACTERISTICS

- 6.1 All polyphase motors shall be designed for full-voltage starting, unless specified otherwise in writing.
- 6.2 Explosion-proof, single-phase motors shall be designed for split-phase or capacitor-start and induction-run. All other single phase motors may be designed according to manufacturer's standard.

7.0 MOISTURE-SEALED INSULATION

Where moisture-sealed insulation is specified, the following sections shall apply.

- 7.1 Random-wound-motor sealed insulation shall be Class B and shall consist of epoxy encapsulation. Encapsulation shall completely enclose end turns and permeate slots and shall be applied by a process that insures void-free insulation.
- 7.2 All 2300-V and higher voltage motors, and all 460-V motors over 150 hp with sealed insulation, shall have form-wound coils. Form-wound motor sealed insulation shall be Class B, shall consist of epoxy-resin-impregnated tape with mica or other additional insulating tapes as required, shall have connections treated to equal coil insulation, and shall have end turns adequately braced. Silicone rubber insulation is not acceptable.
- 7.3 Completed encapsulated random-wound stators, and completed form-wound stators including all connections shall be capable of withstanding

insulation-resistance and voltage tests while immersed in water. In addition, stators shall be capable of withstanding thermal cycling and thermal shock tests.

- 7.4 Moisture-sealed insulation shall be impervious to salt water and hydrocarbons.

8.0 THERMAL DEVICES

Where thermal devices are specified, the following sections shall apply.

- 8.1 Built-in thermal protection for random-wound integral horsepower motors shall be of inherent protection type and shall consist of embedded thermal protectors for both overload and locked-rotor protection. Thermal protectors shall be of the rod-and-tube direct acting type suitable for connection in series with the motor stop button in the magnetic starter control circuit, and shall be hermetically sealed.
- 8.2 Hermetically sealed disc-type thermostats with normally closed contacts suitable for connection in the magnetic starter control circuit shall be supplied for form-wound motor or for motors too small for embedded thermal protectors.
- 8.3 Built-in thermal protection devices shall be set to prevent dangerous overheating of the motors due to overload or failure to start; but devices shall not operate below 120% of full load current for 1.15 service factor motors, or 110% full load current for 1.0 service factor motors, at an ambient temperature of 40C, unless specified otherwise in writing.
- 8.4 Winding temperature detectors, 6 per motor, shall be furnished in all 1750-hp and larger motors, and in smaller motors where specified.
- 8.5 Winding and bearing temperature detectors shall be 10-ohm resistance type, unless specified otherwise in writing. Where specified for use with Edison Omniguard equipment, winding and bearing temperature detectors shall be nickel-resistance type, 120 ohm at 32F, Edison resistance characteristic No. 7.

9.0 SPACE HEATERS

- 9.1 Space heaters shall be for 230-volt operation unless specified otherwise in writing.
- 9.2 Space heaters shall be completely wired, with leads brought to a terminal box separate from the power lead terminal box.
- 9.3 Surface temperature of space heaters shall not exceed 200C when operating at rated voltage.

10. NOISE

- 10.1 Maximum sound pressure levels 3 feet from any motor shall not exceed the following values, unless specified otherwise in writing:

<u>Octave Band Center</u> <u>Frequency, Hz</u>	<u>Maximum SPL</u> <u>dB re 0.0002 Microbar</u>
31	97
63	93
125	89
250	85
500	82
1000	82
2000	82
4000	82
8000	82

- 10.2 The sound pressure level indicated for each octave band is the maximum for any single reading (at any location 3 feet from the motor) in the octave band. Measurement procedures shall in general be guided by the provisions of ANSI S1.2 - 1962, "Physical Measurement of Sound," or IEEE No. 85, "Test Procedure for Airborne Noise Measurements on Rotating Electrical Machinery," using equipment meeting the

standards of ANSI Sl.4 - 1961 and ANSI Z24.10 - 1953 or equivalent.

- 10.3 Supplier shall provide evidence of compliance with noise limits for all motors. This requirement may be satisfied by submitting noise test data obtained on a unit of identical design and construction running under normal load conditions in an existing plant, or certified noise test data obtained at Supplier's plant. Acceptable shop test procedures are set forth below.
- 10.4 If noise test data obtained on a unit of identical design and construction, either in an existing plant or in shop tests as described herein are not available, noise tests shall be made on Supplier's shop floor, in an open area relatively free from nearby equipment. Maximum noise levels measured at any location three feet from the motor and three feet or more from the floor and any nearby reflecting surfaces shall not exceed the values listed in Subsection 10.1 above.
- 10.5 Motors under 200 hp may be tested under no-load conditions only. Motors 200 hp and larger shall be tested and shall comply with the noise levels specified above, under both no-load and loaded conditions in the same location and under the same ambient conditions. The tests must be conducted in such a way that extraneous noise does not invalidate the motor noise test. This may require acoustic isolation of the loading device (and coupling) and/or shutting down other shop facilities.
- 10.6 If shop tests are necessary to satisfy the requirements of Subsections 10.3, 10.4 and 10.5, such tests may be witnessed at COMPANY's option. Cost of such tests shall be quoted separately as required by Section B "General Requirements," Subsection 2.7. Supplier shall notify COMPANY three weeks before tests are scheduled to be made.

THIS PAGE ENDS SECTION A OF SPECIFICATION EG-1824-G

SPECIFICATION NO. EG-1824-G
INDUCTION MOTORS

SECTION B

GENERAL REQUIREMENTS

1.0 SCOPE

This Section covers general requirements relating to purchasing.

2.0 INSTRUCTIONS TO VENDOR

2.1 VENDOR'S proposal shall be in strict accordance with this Specification and the Motor Data Sheet.

IF VENDOR wishes to take exceptions or propose alternates to this Specification or the Motor Data Sheet, he shall describe the deviations he proposes and shall indicate the adjustment to his proposed price applicable to each deviation should COMPANY elect to accept individual deviations.

2.2 VENDOR shall submit a tabulation of those motor characteristics not included in the Motor Data Sheet.

2.3 VENDOR shall recommend design for motors driving centrifuges, large blowers, conveyors and other high-inertia loads. Built-in thermal protection is required for such motors.

2.4 VENDOR shall include dimension "AC" in addition to NEMA frame size with motor tabulation. For motor frames not covered by NEMA standards, VENDOR shall furnish all comparable dimensions.

2.5 VENDOR shall furnish terminal box dimensions for all motors larger than 100 hp.

2.6 VENDOR shall submit details of quality control procedure and immersion, thermal cycling and shock tests for moisture-sealed insulation systems.

2.7 VENDOR shall quote, as a separate item, the extra cost of any special test that may be required.

3.0 GUARANTEE

VENDOR guarantees that the equipment furnished hereunder meets the requirements set forth in this Specification and the Agreement to which it is attached and is free of defects in design, materials and workmanship for a period of one year after the date the equipment is placed in operation (but not more than eighteen months after date of delivery).

If any item of equipment does not meet the above guarantee or the guarantee in this paragraph and VENDOR is notified thereof, VENDOR shall, at its own expense and as promptly as possible, make such alterations, repairs and replacements as may be necessary to meet this guarantee with the least overall loss of operating time to COMPANY; provided, however, that transportation costs for and risk of loss of replacement parts shall be allocated in accordance with the same terms as set forth in the Agreement for the original equipment furnished hereunder. All such alterations, repairs and replacements shall be guaranteed for a period of one year from the date the corrected equipment is placed back in operation (but not more than eighteen months after the date of completion of corrective work). If VENDOR'S proposed method of correction is for any reason not satisfactory to COMPANY, COMPANY may at its option select another method of correction and VENDOR shall perform corrective work in accordance with COMPANY'S method; provided, however, that if the COMPANY-selected method would result in a greater cost to VENDOR than the method suggested by VENDOR to achieve a satisfactory correction with the least overall loss of operating time to COMPANY, COMPANY will pay the difference between such greater cost and the cost which would have been incurred if VENDOR-suggested method of correction had been used; and provided further that VENDOR'S obligations shall not (except as to extra cost) be changed by the fact that the COMPANY-selected method of correction was used.

The guarantee period under each paragraph above with respect to each item of equipment furnished hereunder or part thereof shall be extended by the number of days on which such item cannot be operated as a result of a failure to meet this guarantee.

BILL OF MATERIAL

JOB 19-230 400# Sm. Gens DATE 3 Sept. 70

DRG. No. _____ SHEET _____ ORDER No. _____

RMCoulter
X-225

APPRO. JOB No. 44729-003

MATERIAL REQ'D AT DEST'N BY 6 WKS ARO

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	ONE	ONLY	Hancock, 600# Forged Steel Angle body, Fl. Control Valve Size: 1" (4-V Port) Type: 5535S - Angle, Screwed Also counter check on handwheels Removable Hand faced seat Rated 600 psi @ 710°F W.S.P.	
2	ONE	ONLY	Yarway Unit-Tension Blow-off Valve Size: 2" 300# RF flanged body Fig. No.: T-3948-3928 Series 30 Press Rating: 515 psi max blow-off pressure (400 psi actual service pressure) End Conn: 300# ASA RF Flanges Assy: RIGHT HAND	
Note to P.E.S. -				
G.S. Thomas gave me following "cost-est" type prices 6/18/70				
Item 1 \$82 ⁰⁰ 3-6 wks del.				
Item 2 \$519 ⁰⁰ 3-6 wks del.				
Routed this date				
SEP 4 1970				
RMC				
A. McCoulter 9/3/70				

1/4" port, 600# Forged Steel "Flowcontrol" Valve -

ASME Sect. I.

Model 55355 Angle body (as reqd. by PG-59d3a,b)

600 psi @ 910°F Working Steam Pressure.

Renewable hard-faced seat. (Steelite or equal)

Disc - SS hardened to 500 Brinell

Screwed Ends. - Micrometer dial

Capacity is .34 #2 for Blowdowns

400# 1" size 4V-port max cap. = 19,000 lbs/hr

1/2" " " " = 50,000 lbs/hr

our cont. B/D is 10,400 lbs/hr Design $\Rightarrow$ 1" size is adequate.

Prices (6/18/70) $\rightarrow$ 1" scd \$82⁷¹

1/4" - \$243⁹⁰

(G.S. Thompson)

1/2" scd \$176⁴¹

1/4" - \$455⁶⁰

3-6 wks del.

(Appears to be very similar to what's there now on
E-190.9' except for angle construction.)

Continuous Blowdown Valve

RMC 8/21/70

SIZES 1/4" thru 2"

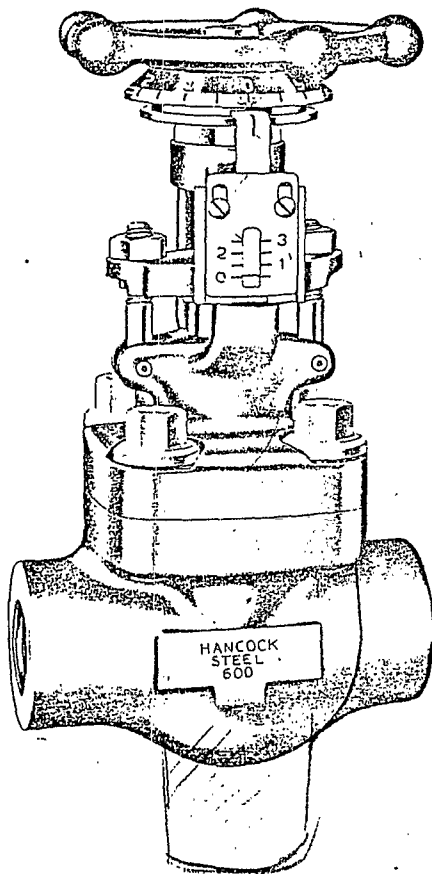
Outside Screw And Yoke

■ **GLOBE AND ANGLE**

■ **BOLTED BONNET**

Screwed and Socket Weld Valves: For all pressures up to 600 psi at 910°F. W.S.P. 2000 psi-100°F. O.W.G. Flanged Valves: For all pressures up to 600 psi at 850°F. W.S.P. 1440 psi-100°F. O.W.G.

Renewable hard faced seat.



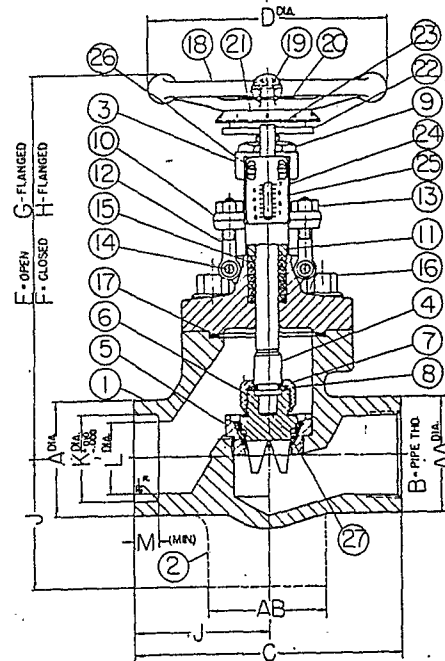
TYPE 5525 — GLOBE

ALSO FURNISHED WITH
2-V PORT DISCS

SIZES: 1/4" THROUGH 1"

TYPE 5526—GLOBE

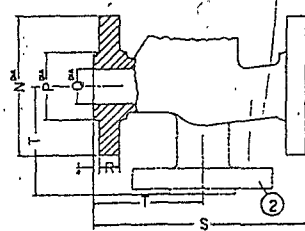
TYPE 5536—ANGLE



TYPE 5525W—GLOBE
TYPE 5535W—ANGLE
SOCKET WELD ENDS
To ASA B16.11

TYPE 5525S—GLOBE
TYPE 5535S—ANGLE
SCREWED ENDS
To ASA B2.1

1" Size



TYPE 5525F—GLOBE
TYPE 5535F—ANGLE
FLANGED ENDS
To ASA B16.5
FACE TO FACE
To ASA B16.10

Flanges drilled unless otherwise stated on order.

*Continuous Blowdown Valve
RM Colett*

SEP 3 1970

CHEV B8 5936

HANCOCK 600# FORGED STEEL FLOCONTROL VALVES

**GLOBE AND ANGLE
SCREWED, SOCKET WELD AND FLANGED ENDS**

**TYPES
5525
and
5535**

DIMENSIONS—Screwed and Socket Weld Valves—Types 5525S and 5535W

TYPE NUMBERS				A	AA	AB	B	C	D	E	F	J	K	L	M	WEIGHTS	
SCREWED ENDS		SOCKET ENDS														GLOBE	ANGLE
GLOBE	ANGLE	GLOBE	ANGLE														
5525S	5535S	5525W	5535W	7/8	15/16	15/16	1/4	35/16	3	515/16	53/4	121/32	.555	5/16	3/8	4	4
				11/32	15/16	15/16	3/8	35/16	3	515/16	53/4	121/32	.690	3/8	3/8	4	4
				15/16	15/16	15/16	1/2	35/16	3	515/16	53/4	121/32	.855	9/16	3/8	4	4
				11/2	11/2	15/8	3/4	39/16	31/2	63/8	61/8	125/32	1.065	3/4	1/2	41/2	41/2
				17/8	17/8	17/8	1	43/8	4	73/4	73/8	23/16	1.330	1	1/2	8	8
				21/4	21/4	21/4	11/4	51/4	41/2	87/8	83/8	25/8	1.675	11/4	1/2	12	12
				21/2	21/2	21/2	11/2	61/2	51/2	911/16	91/32	31/4	1.915	11/2	1/2	161/2	161/2
				31/8	33/8	31/8	2	7	61/2	111/16	105/16	31/2	2.406	115/16	5/8	25	25

DIMENSIONS—Flanged Valves—Types 5525F and 5535F

TYPE NUMBERS		D	G	H	N	P	Q	R	S	T	BOLT CIR.	HOLES		WEIGHTS	
GLOBE	ANGLE											NO.	SIZE	GLOBE	ANGLE
5525F	5535F	3 1/2	6 3/4	6 1/2	3 3/4	1 3/8	1/2	9/16	6 1/2	3 1/4	25/8	4	5/8	9	8
		4	8 5/16	7 15/16	4 9/8	1 11/16	3/4	5/8	7 1/2	3 3/4	3 1/4	4	3/4	14 1/2	13 1/2
		4 1/2	9 1/2	9	4 7/8	2	1	1 1/16	8 1/2	4 1/4	3 1/2	4	3/4	17	16
		5 1/2	11 5/16	10 9/16	5 1/4	2 1/2	1 1/4	1 3/16	9	—	3 7/8	4	3/4	34 1/2	33
		6 1/2	11 5/16	10 9/16	6 1/8	2 7/8	1 1/2	7/8	9 1/2	4 3/4	4 1/2	4	7/8	39	37
		8 1/2	13 1/16	12 1/16	6 1/2	3 5/8	2	1	11 1/2	5 3/4	5	8	3/4	55 1/2	53

MATERIAL SPECIFICATIONS—Types 5525 and 5535

NO.	PART NAME	MATERIAL
	BODY (GLOBE)	FORGED CARBON STEEL, ASTM A-105 GR. 2
	BODY (ANGLE FLANGED)	CAST STEEL, ASTM A-216 GR. WCB
	BONNET	FORGED CARBON STEEL, ASTM A-105 GR. 2
	STEM	STAINLESS STEEL, AISI 416, H. T. 300 BRINELL
	SEAT	STAINLESS STEEL, AISI 410
	DISC	STAINLESS STEEL, AISI 420, H. T. 500 BRINELL
	DISC NUT	CARBON STEEL, AISI B-1113
	LOCK RING	STAINLESS STEEL, AISI 410, H. T. 250 BRINELL
	THREAD BUSHING	STAINLESS STEEL, AISI 416, H. T. 400 BRINELL
	PACKING GLAND FLANGE	FORGED STEEL, ASTM A-105 GR. 2
	PACKING GLAND	STAINLESS STEEL, AISI 416, H. T. 400 BRINELL
	PACKING GLAND BOLTS	STAINLESS STEEL, AISI 410, H. T. 300 BRINELL
	PACKING GLAND NUTS	CARBON STEEL, CADMIUM PLATED
	PINS	STAINLESS STEEL, AISI 416
	PACKING RING	BRAIDED ASBESTOS WITH INCONEL WIRE, GRAPHITED & CORROSION INHIBITED
	BONNET BOLTS	ALLOY STEEL, ASTM A-193 GR. B-7
	GASKET	STAINLESS STEEL & ASBESTOS-SPIRAL WOUND LAMINATED
	HANDWHEEL	MALLEABLE IRON, ASTM A197
	HANDWHEEL NUT	LOCK TYPE, CARBON STEEL
	MARKER PLATE	ETCHED ALUMINUM
	DIAL	BRASS
	DIAL PLATE	BRASS
	INDICATOR	BRASS
	INDICATOR BRACKET	BRASS
	INDICATOR PLATE	ETCHED BRASS
	INDICATOR PLATE SCREWS	BRASS
	SEAT FACING	STELLITE OR EQUAL

40 for pressure and temperature ratings. See Bulletin 205 for Hancock Bronze Flocontrol Valves.

CHEV B8 5937

1500 #, 2500 #, 5000 #
STEEL VALVES

INSTRUMENT VALVES

STEEL GATE VALVES

HANCOCK 600# FLOCONTROL VALVES

CAPACITY TABLES, CORRECTION FACTORS

BRONZE VALVES

300#, 650#
STEEL VALVES

CAPACITY TABLES

600# STEEL FLOCONTROL VALVES TYPES—5525 AND 5535, SOCKET AND WELD ENDS

VALVE SIZES INCHES	FLOW COEFFICIENT CV	HANDWHEEL TURNS FULL OPEN	RELATIVE CAPACITY % OF 1" VALVE FULL OPEN	CAPACITY FULL OPEN		
				WATER G.P.H. AT 10# P.D.	STEAM LBS. PER HR. AT 100# ABS.	S. 100
1/4	.4	2.25	10	75	70	
3/8	1.0	2.25	35	180	160	
1/2	1.0	2.25	25	180	160	
3/4	2.0	3.00	60	370	350	
1	4.0	3.75	100	760	700	
1 1/4	7.0	6.00	175	1310	1220	
1 1/2	10.4	6.00	260	1950	1820	
2	14.0	6.00	350	2520	2450	

TYPES—5525-F and 5535-F

VALVE SIZES INCHES	FLOW COEFFICIENT CV	HANDWHEEL TURNS FULL OPEN	RELATIVE CAPACITY % OF 1" VALVE FULL OPEN	CAPACITY FULL OPEN		
				WATER G.P.H. AT 10# P.D.	STEAM LBS. PER HR. AT 100# ABS.	S. 10
1/4	.4	2.25	5.8	75	70	
3/8	1.0	2.25	14.5	180	160	
1/2	2.0	3.00	29	370	350	
3/4	4.0	3.75	58	750	700	
1	7.0	5.00	100	1310	1220	
1 1/4	14.0	6.00	200	2620	2450	
1 1/2	14.0	6.00	200	2620	2450	
2	25.3	6.00	360	4700	4400	

NOTE 1. Capacities are for 10 lbs. per sq. in. pressure drop across valve. For other conditions, flow is proportional to the square root of the pressure drop.

NOTE 2. Capacities are for saturated steam at 100 lbs. per sq. in. absolute pressure. For other conditions, flow is proportional to the absolute pressure.

NOTE 3. Capacities are for air at 70°F.—100 lbs. per sq. in. gauge. Air flow is proportional to the absolute pressure. For other gases, flow is inversely proportional to the square root of the specific gravity of the gas referred to air=1.00

$$Q_{\text{Gas}} = Q_{\text{Air}} \sqrt{\frac{1}{\text{Specific Grav. Gas}}}$$

NOTE 4. Cv or flow coefficient is the number of which will flow through a given valve v drop is one psi. It may be used in cor following formula for sizing Flocontrol v other non-viscous liquids.

$$\text{Flow coefficient } Cv = \frac{Q \times \sqrt{H}}{\sqrt{H}}$$

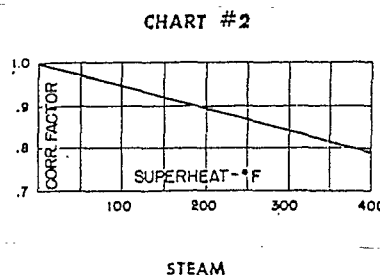
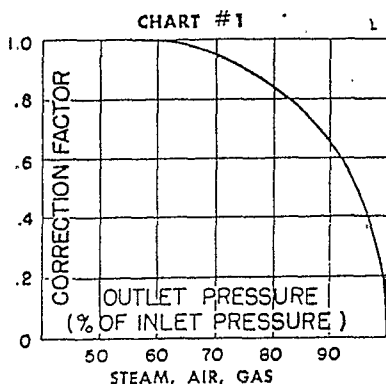
Q = G.P.M.

H = Pressure drop psi.

G = Specific gravity compared with w

CORRECTION FACTORS—STEAM FLOW

FOR FLOCONTROL AND HI-PRESSURE DROP VALVES



TYPES 53155, 5315F, 5

The four charts on the n maximum capacity for H control Valves in the sizes to of 2 1/2" to 6" valves may terminated by reading the 1" valve from the chart multiplying by the following

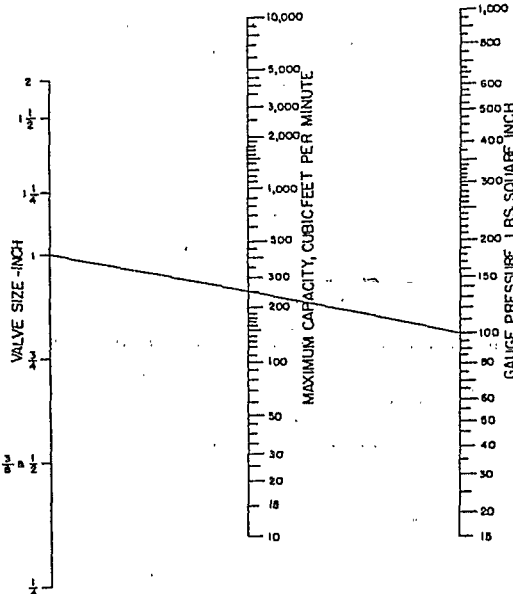
2 1/2	
3"	
4"	
5"	
6"	

HANCOCK 600# FLOCONTROL VALVES

AIR, STEAM, WATER, BLOWDOWN CHARTS

AIR FLOW CHART

600# STEEL— TYPES 5525S, 5525W, 5535S & 5535W

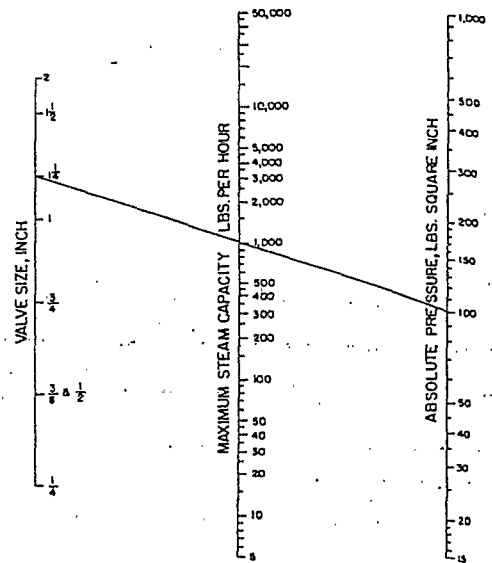


For air at 70° F. only. For other gases, divide capacity by square root of specific gravity.

Note: If outlet pressure is greater than 55% of the inlet pressure, multiply capacity by the correction factor on Page 32, Chart #1.
4 V-Port valves only. 2 V-Port valves have half capacity.

STEAM FLOW CHART

600# STEEL— TYPES 5525S, 5525W, 5535S & 5535W

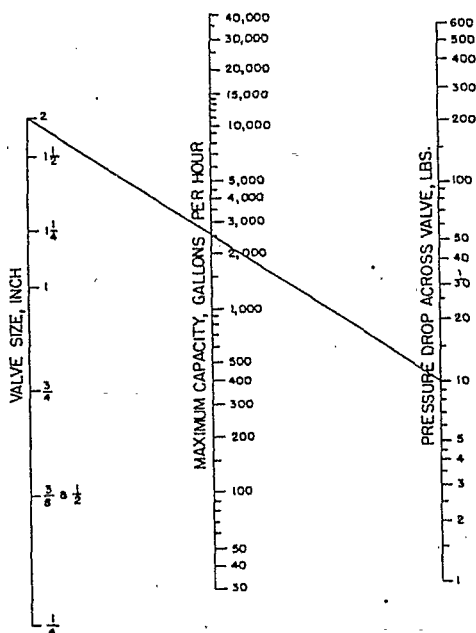


Note: If outlet pressure is greater than 55% of the inlet pressure, multiply capacity by the correction factor on Page 32, Chart #1.
For superheated steam multiply by correction factor on Page 32, Chart #2.

4 V-Port valves. 2 V-Port valves have half capacity.

WATER FLOW CHART

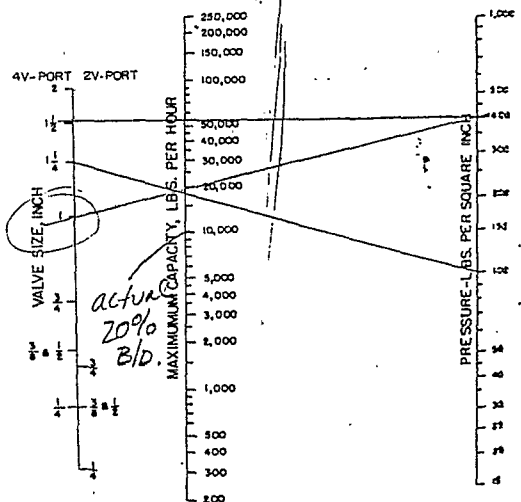
600# STEEL— TYPES 5525S, 5525W, 5535S & 5535W



4 V-Port valves. 2 V-Port valves have half capacity.

BOILER BLOWDOWN CHART

600# STEEL— TYPES 5535S & 5535W



CHEV B8 5939

Valway - Unit Tandem, Blow-off Valve

300# RF Flanged

Rated in service to 515psi Boiler Blowoff pressure.

One piece forged tandem body

Inside - hard seat blowing valve

Outside - seatless sealing valve

Fig. T-3948 - 3928 Series 30

2" - 300# flg Price = \$519⁰⁰ (GSThompson 6/18/70)

Should be cheaper than 2 - individually flanged valves which are bolted together to make a tandem unit (usually an angle to a straight way)

I have asked Bob Fiedl what he thinks about it from a maint standpoint. No answer as of 9/3/70.

Intermittent Blowdown Valve

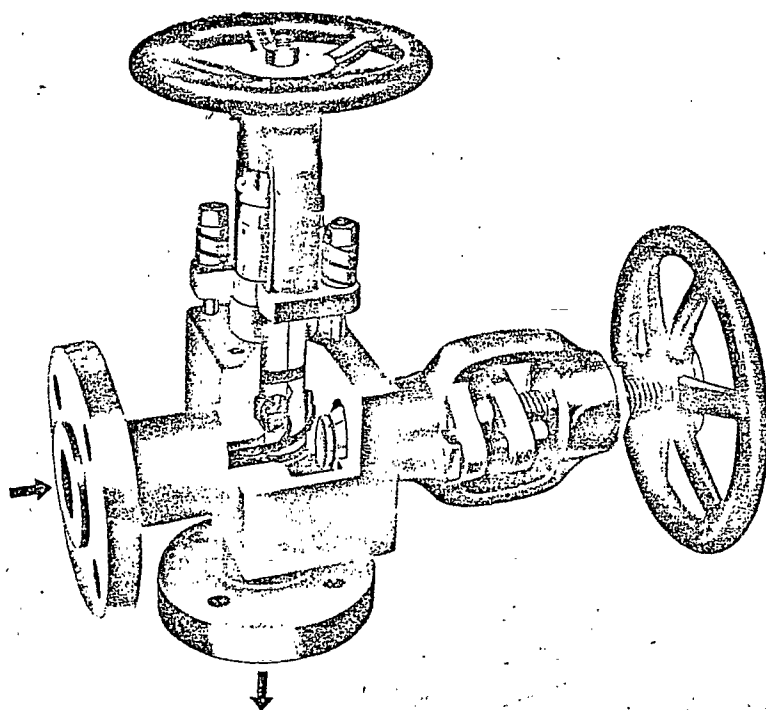
RMC 8/21/70

YARWAY®

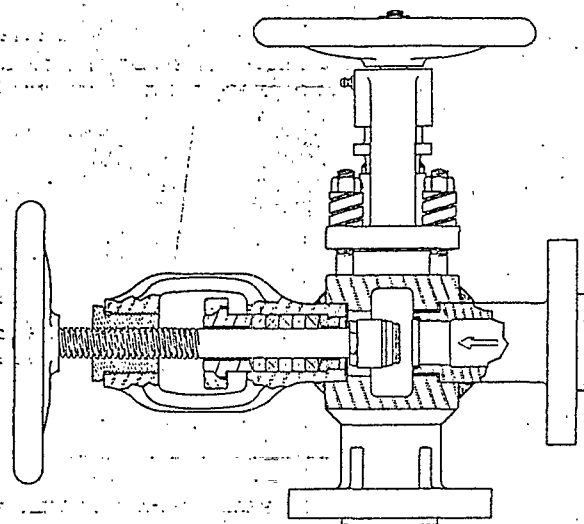
unit-tandem blow-off valves

FOR BOILER PRESSURES UP TO 335 LBS. WSP

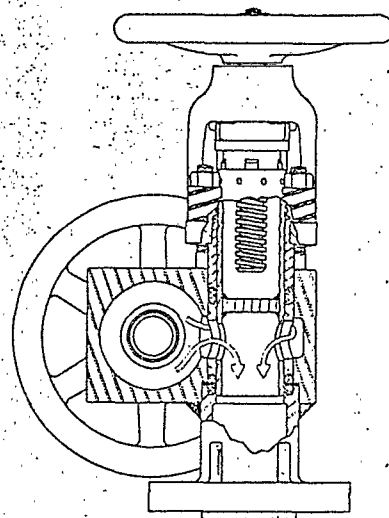
MANUFACTURED BY YARWAY CORPORATION / PHILADELPHIA, PA. 19103



HARD-SEAT—SEATLESS UNIT-TANDEM VALVE FOR BLOW-OFF PRESSURES TO 665 PSI



Section through hard-seat blowing valve, open position



Section through seatless sealing valve, open position

MEDIUM PRESSURE UNIT-TANDEM VALVE

Hard-seat—Seatless combination

Flanged ends (shown) Fig. T-3948—3928

Welding ends (not shown) Fig. T-3947—3927

The remarkable success of the Yarway Hard-seat—Seatless Unit-Tandem Blow-off Valve for high pressure boiler installations (basic pressure ratings 600 and 1500 psi, boiler blow-off pressures 970 and 1850 psi) has led to the development of a similar valve for the medium pressure field. This Yarway Hard-seat—Seatless Unit-Tandem, described in this bulletin, is built for boiler blow-off pressures 665 psi (basic pressure rating 400 psi) or 515 psi (basic pressure rating up to 300 psi).

ONE PIECE BODY

An outstanding feature of this Unit-Tandem is the one-piece forged steel block which serves as common body for both blowing and sealing valves. As shown above, the inlet valve is of hard-seat type, the discharge valve is of seatless sliding-plunger type. Inlet and outlet connections are steel nozzles welded into body; yoke of hard-seat valve is welded to body, yoke of the seatless valve is bolted.

WORKING PARTS

In this tandem are embodied the well-known advantages of Yarway hard-seat and seatless valve designs, the hard-seat section being similar to Yarway Welbond construction, the seatless section similar to the Yarway Type B Seatless Valve.

OPERATION

When valve is open, blow-down discharges through

Hard-seat inlet (blowing) valve into Seatless outlet (sealing) valve. Open yokes permit visual indication of position of Hard-seat disc and Seatless plunger. Both valves should be opened rapidly and fully to increase the life of working parts; never blow down with valves partly open. Outside seatless sealing valve is opened first and closed last; inside (next to boiler) hard-seat blowing valve is opened last and closed first.

MATERIALS

See list on opposite page.

SIZES AND PRESSURES

Five sizes, 1" through 2½"; flanged or welding end connections for basic rated pressure 400 psi (maximum boiler blow-off pressure 665 psi) or flanged for 300 psi (maximum boiler blow-off pressure 515 psi). The two valves may be assembled right hand or left hand (location of seatless sealing valve when facing handwheel of next-to-boiler blowing valve); illustration above and picture on front page show left hand and right hand assemblies respectively.

FIGURE NUMBERS

For figure numbers of flanged and socket-weld valves see "How to Order" data on back page.

PRICES

Furnished on request.

CHEV B8 5942

ADVANTAGES OF THE MEDIUM PRESSURE UNIT TANDEM



HARD SEAT BLOWING VALVE

Separately finished stellite seat

Deep integral seat of stellite, welded on seat nozzle and completely finished before nozzle is welded to body.

Stainless steel stem with self-aligning disc

Stem is Type 303 stainless steel for protection against corrosion and pitting. Stem is accurately guided and long shank extends above packing to protect threaded section. Stellite-faced disc has slight play for self-alignment, tight sealing.

Packing

Specially selected for specified blow-down service. Maintains tight seal. Stuffing box has ample space for adequate rings of packing.

Working parts are accessible

Stem, packing and disc readily removed through top of yoke for easy maintenance and convenient access to stellite seat. Gland has split bushing.

SEATLESS SEALING VALVE

Nitralloy plunger

Hollow, seatless sliding type. Smooth finish of Nitralloy surface resists erosion, corrosion, high temperatures and shocks. Top shoulder transmits closing force to

packing rings. Guide lugs insure alignment of plunger ports with ports in lower gland.

Packing rings

Seal against leakage through upper gland and valve outlet.

Glands

Compress upper packing rings. Lower gland has double ports to match plunger. Stop screw on body insures alignment of lower gland ports.

Yoke nut compression springs

Maintain continuous pressure on packing rings to keep valve tight in open position.

Non-rising stem

Valve cannot be opened or closed too quickly. No water hammer.

Acid wash

For acid wash installations, seatless valve can be fitted with special plunger, steel chromium-plated upper gland and Ni-Resist lower gland (extra cost).

Tight sealing valve

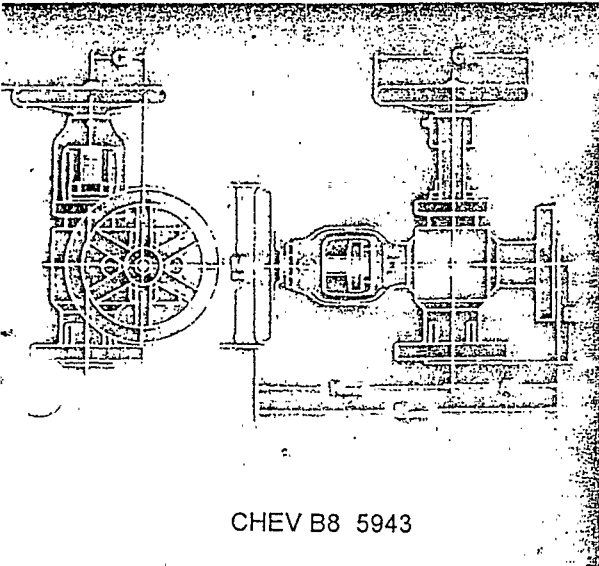
Compression springs on seatless valve maintain tightness of this sealing valve independently of seating action of hard-seat blowing valve.

MATERIALS USED IN MEDIUM PRESSURE UNIT TANDEM

Part Name	Materials
Body	Forged steel
Nozzles	Cast steel for flanged valves, forged steel for welded ends. Hard-seat inlet nozzle has integral stellite seating surface
Yokes	Cast steel
Handwheels	Cast iron
Hard-seat stem	Stainless steel
Hard-seat yoke bushing	Naval brass
Hard-seat gland	Cast steel
Hard-seat disc	Steel (stellite seating face)

Part Name	Materials
Hard-seat disc nut	Stainless steel
Seatless stem	Cold drawn steel
Seatless plunger	*Nitralloy (with Meehanite head)
Seatless upper gland	*Hard brass
Seatless lower gland	*Hard brass
Seatless upper packing ring	Fibre
Seatless lower packing ring	Fibre (with stainless steel insert)

*For acid wash installations, seatless valve can be fitted with special plunger, steel chrome-plated upper gland and Ni-Resist lower gland (extra cost).

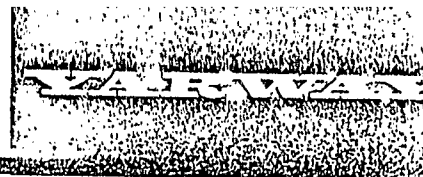


CHEV B8 5943

Size valve.	Basic rated pressure	Dimensions, inches							
		A	B	C	G	J	K (open)	L (open)	M
1"	300 psi	4 3/4	7 1/8	3	8 3/8	16 1/8	11 1/8	16 1/8	8 3/8
1 1/4"		4 13/16	7 3/8	3	8 3/8	16 13/16	11 1/8	16 1/8	8 3/8
1 1/2"		5 1/2	5 3/8	3	8 3/8	14 1/8	11 1/8	17 1/8	8 3/8
2"		5 13/16	5 3/8	3 13/16	9 3/8	16 3/8	13 1/2	19 3/8	9 3/8
2 1/2"		6 1/8	6 1/8	4 1/8	11	19 1/8	15 1/8	22 3/8	11
1"	400 psi	5	7 3/8	3	8 3/8	17 1/8	11 1/8	16 3/8	8 3/8
1 1/4"		5 1/8	7 1/2	3	8 3/8	17 1/8	11 1/8	16 13/16	8 3/8
1 1/2"		5 13/16	5 1/2	3	8 3/8	15 1/8	11 1/8	17 3/8	8 3/8
2"		6 3/8	5 13/16	3 13/16	9 3/8	16 13/16	13 1/2	19 13/16	9 3/8
2 1/2"		7 1/8	7 1/8	4 1/8	11	19 1/2	15 1/8	23	11

*Dimensions and drilling of flanges and dimensions of socket welding ends to A.S.A. Standard unless ordered otherwise. Center to face and overall dimensions of 400 psi socket end valves same as 400 psi flanged end.

HOW TO SPECIFY AND ORDER THE MEDIUM PRESSURE UNIT-TANDEM



**FIGURE NUMBERS OF
MEDIUM PRESSURE UNIT-TANDEM VALVES**

Basic rated pressure	Maximum boiler blow-off pressure	Connections	Figure Number
400 psi	665 psi	Flanged	T-3948-3928 Series 40
400 psi	665 psi	Welding ends	T-3947-3927
300 psi	515 psi	Flanged	T-3948-3928 Series 30

HOW TO SPECIFY

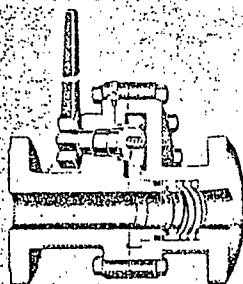
Use figure number selected from table above whenever possible. When not desiring to use name and figure number, describe as follows: Blow-off valves shall consist of one seat-and-disc type hard-seat valve and one balanced sliding plunger type seatless valve assembled in tandem arrangement in one common body to conform with requirements of A.S.M.E. Boiler Code and suitable for basic rated pressure of—psi.

HOW TO ORDER

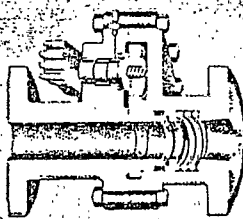
Yarway Medium Pressure Unit-tandem Valves may be ordered simply by specifying following details:

- Size.
- Figure number—see table above (valve next to boiler is named first, valve farthest from boiler is named last. Letter T in figure number indicates integral stellite seat in Hard-seat section).
- Basic pressure rating—see figure number.
- Connections—flanged or welding ends (flanges are drilled A.S.A. unless ordered otherwise; weld ends are socket type unless butt type is ordered).
- Assembly—specify location (right hand or left hand) of sealing valve when facing handwheel of next-to-boiler hard-seat blowing valve.

OTHER YARWAY BLOW-OFF VALVES—FOR PRESSURES UP TO 400 PSI



LEVER OPERATED



GEAR OPERATED



ANGLE

DOUBLE TIGHTENING

For full details see Bulletin B-427

TYPE B SEATLESS



YARWAY CORPORATION
Engineered Valves for the Power and Process Industries Since 1908
Chestnut, Pa. U.S.A.

WORK REQUISITION

TO (DISTRICT AND ZONE): MAINTENANCE PLANNER

PLANT OR SECTION: FCC Unit, Plant 19

EQUIP. NO. OR DESCRIPTION: Spool Revision CH19000-3"-D EQUIP. READY: 12/31/70

DATE OF PROCESS: 12/30/70

PRIORITY:

COMPLETION DATE: 1/4/71

REQ. No. 19-230	ENGINEER'S SERIAL No. L-11
REQ. No. 30	PLANT CLASS:
S.O. No.: 44729	
ITEM No.: -003	

INSTRUCTIONS:

Please add the valve connection to spool no.

CH19000-3"-D-N6P per attached drawing

PC-19-20790-1, sheet 97 and L/M

Note that this spool has already been fabricated and hydrotested. Please re-hydrotest this spool once valve, etc have been added.

Attachments -

PC-19-20790-1 sheet 97

L/M

Distribution

DEC 30 1970

R. M. COULTER

FRD 4/W4

JWB 1/W1

JRW 1/W1

RMC 2/W2

MLB 1/W1

-(this conn. will give us another way out if the existing blowdown arrangement looks overloaded.)

CHEV B8 5945

TYPE OF SHOP ORDER:

TOTAL AMOUNT: \$

ENGRG: \$

APPROVED:

DATE:

ENGINEER: RMCoulter PHONE: 225 LEAD ENGR: MLB DATE: 12/30/70

LIST OF MATERIALS

Job No. 19-230

List No. L-001

DATE: 12-30-70

Accounting Charge No. 44729-003

DATE REQUIRED: 12-31-70 (1-4-71 @ latest)

Engineer: RMC

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L310	1	3"	STRAIGHT RUST PIPE X 3" BUTT	<i>Deleted</i>	
2				WELDING OUTLET STOUT		
3				LATERAL FOR 45° LATERAL		
4				CANNECTION F.S.		
5	L149	1	3"	150# ASA WELD NECK FLANGE		
6				F.S. FACED & DRILLED 1/16 R.F.		
7	L140	1	3"	150# ASA BLIND FLANGE F.S.		
8				FACED & DRILLED 1/16 R.F.		
9	L159	2	3"	NOH. PIPE SIZE SPIRAL WOUND		
10				GASKET TYPE 304SS WATER		
11				PROOF LATEX TREATED ASBESTOS W/		
12				1/8" THICK INTEGRAL CENTERING		
13				RINGS FOR 150# FLANGE.		
14	H265	8	5/8" DIA.	3 1/2" LONG B7 ALLOY STUD BOLTS W/		
15				TWO CLASS 2 HEX CARBON STL NUTS		
16	L124	1	3"	150# ASA FLANGED GATE VALVE		
17				CS. 12% CH. SEATED DISC & STEM		
18				BOLT & NUT SET & Y SOLID WEDGE		
19				F&D 1/16 R.F.		
20	L6	12"	3"	SCH 40 STL SMLS PIPE		
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

LIST OF MATERIALS

Job No. 19-230

List No. L-001

DATE: 12-30-70

Accounting Charge No. 44-729-003

DATE REQUIRED: 12-31-70 (1-4-71 @ latest)

Engineer: RMC

Lead Engr. MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L310	1	3"	STRAIGHT RUN PIPE X 3" BUTT	<i>Unable to obtain. DELETED</i>	
2				WELDING OUTLET STD WIT		
3				LATROLET FOR 45° LATERAL		
4				CONNECTION F.S.		
5	L149	1	3"	150# ASA WELD NECK FLANGE		
6				F.S. FACED & DRILLED 1/16 R.F.		
7	L140	1	3"	150# ASA BLIND FLANGE F.S.		
8				FACED & DRILLED 1/16 R.F.		
9	L159	2	3"	NOM. PIPE SIZE SPIRAL WOUND		
10				GASVET TYPE 304SS WATER		
11				PROOF LATEX TREATED ASBESTOS W/		
12				1/8" THICK INTEGRAL CENTERING		
13				RING FOR 150# FLANGE.		
14	H265	8	5/8" DIA.	3 1/2" LONG B7 ALLOY STUD BOLTS W/		
15				TWO CLASS 2 HEX CARBON STL NUTS		
16	L124	1	3"	150# ASA FLANGED GATE VALVE		
17				C.S. 12% CH. SEAT & DISC & STEM		
18				BOLTED BARNET D.S. & Y SOLID WEDGE		
19				F&D 1/16 R.F.		
20	L6	12"	3"	SCH 40 STL SMLS PIPE		
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

To P/S this date
Material for valve on blowdown spec.
 DEC 30 1970

R. M. COULTER

R.M. Coulter 12/30/70

CHEV B8 5947

EPR 31962

JOB 18-101 FILE # 18-108 Control Valve DATE 8-28-70

DRG. No. _____ SHEET _____ ORDER No _____

APPRO. JOB NO. 7-5118

MATERIAL REQ'D AT DEST'N BY 9-4-70

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
Following items for 3" BS & B				
Diaphragm Control Valve, Type				
70-11-2RF, Serial 70-103016 to convert				
from parabolic to %V:				
1 only			3-in, 316 Stl: Stl Diaphragm	Approx. \$126.-
			Valve full size, & %V,	
			Part No. 70-11-1545-11	
2 only			Body Gasket, Asbestos &	Approx. \$2.30
			S. Stl, Part No. 70-11-0645-11	
P/S Note - P/S refer to 8/25/70 letter				
from W-K-M Control. - Houston -				

SHEET OF SHEETS



CHEVRON OIL COMPANY

WARD INVOICE IN QUADRUPPLICATE TO:

PURCHASE AND STORES

BOX 599

DENVER, COLORADO 80201

EPR- 31962

RESPONSE TO
BOX
CHECKED

☐ P.O. BOX 117, SALT LAKE CITY, UTAH 84110

☒ P.O. BOX 20002, EL PASO, TEXAS 79998

☐ EL PASO, TEXAS

AUGUST 31, 1970

19

ISSUING POINT

DATE

ACT INDUSTRIES, INC.

7 KENNEDY ENGINEERING COMPANY

P. O. BOX 649

ODESSA TEXAS 79760

DATE REQUIRED AT DESTINATION

SEPTEMBER 4, 1970

PREFIX AND ORDER NUMBER

ORDER NUMBERS WITH PREFIX
MUST APPEAR ON ALL PACKAGES,
SHIPPING ORDERS AND INVOICES.

VENDOR NOTE

INVOICES SENT TO OTHER THAN
ABOVE DENVER ADDRESS MAY
DELAY OUR REMITTANCE TO YOU.

W FULL
NE AND
DRESS

ITEM
NO.

QUANTITY

DESCRIPTION OF MATERIAL

TAG EACH ITEM WITH OUR ITEM NUMBER AND IDENTIFY
EACH ITEM ON YOUR INVOICE WITH OUR ITEM NUMBER.

PRICE

1 ONLY

FOLLOWING ITEMS FOR 3" BS&B DIAPHRAGM CONTROL VALVE,
TYPE 70-11-ZRY, SERIAL 70 - 103016 TO CONVERT FROM
PARABOLIC TO ZV:

3-IN. 316 STAINLESS STEEL LOWER VALVE, FULL SIZE, ZV
PART NO. 70-11-1545-11

2 ONLY

BODY GASKET, ASBESTOS AND S. STEEL, PART NO. 70-11-
0645-11.

CONFIRMING PHONE ORDER TO BILL DAY 8-28-70.
DO NOT DUPLICATE.

APPROX \$126.00
EACH

APPROX. \$2.30 EA

F.O.B. SHIPPING POINT

UP TO AND MARK
L PACKAGES AND
LS OF LADING

STANDARD OIL COMPANY OF TEXAS

EPR- 31962

ATTENTION M. L. BROWN
OF REFINERY STOREHOUSE

SHOW PREFIX AND ORDER NUMBER ON BILL OF LADING

☐ P.O. BOX 20002 ☒ 6501 TROWBRIDGE DR.

EL PASO, TEXAS 79998

☐ Prepay & charge
on invoice.

☐ CHARGES COLLECT: ENDORSE BILL OF LADING
"Collect from Chevron Oil Company, P.O.
Box 599, Denver, Colorado 80201 or at
Carrier's Option and Expense Draw Sight
Drafts on First National Bank of Denver."

VIA GREYSCORD BUS

DATE RECEIVED	INVOICE OR TRANSFER NO.
RECEIVED VIA	INVOICE DATE
DELIVERED BY	INVOICE AMOUNT
BILL DATE	FREIGHT AMOUNT
BILL NO.	REGISTER NO.
ITEM NO.	CHARGE TO
NO.	FEA EXPENSE UNIQUE JOB NO. APPROPRIATION NO. WORK LIST
PROVED	7 5118
DESCRIBE MATERIAL USE IF DING BLOCKS NOT APPLICABLE	

E. P. DURNIN

915-772-1411

238

CHEV B8 5949

BILL OF MATERIAL

JOB 16-402

DATE 12-2-80

DRG. NO. _____ SHEET _____

ORDER No. 6M 8892

APPRO. JOB No. _____

E.B. WILLIAMS -249

Jose L. Reyes - (388)

MATERIAL REQ'D AT DEST'N BY

12-29-80

FL

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
(126) L7	10 FT.	FT.	1 1/2" Smls. STL. Pipe Sch. 80	
(130) LIIGAIA	4 FT.	FT.	3/4" Smls. STL. Pipe Sch. 80	
(31) L35GDR	4	EA.	1" x 3/4" Swage Nipple Sch. 80 C.S. TLE-BSE	
(32) L40BA3DG	4	EA.	3/4" 150# F.S. Weld Neck Flg. 1/8" R.F. Sch. 80	
(33) LG1BTA	4	EA.	3/4" 150# Spiral Wound Gasket	
(34) LG20BN	16	EA.	1/2" x 2 1/4" Stud Bolt B7 W/2 Hex NUTs	
(35) 315BD	2	EA.	1" 3000# F.S. SW Tee	
(36) 370ABW	2	EA.	1" Scrd. STL. Bar Stock Plug Rd. Hd.	
(37) 20KAH	2	EA.	1" 800# STL. Scrd. Gate Valve	
			Weld Bnt. 12 CR. Trim. ^{Male NPT} _{Female NPT}	
(38) 40BA3DG	8	EA.	1" 150# F.S. WN. Flg. 1/8" R.F. Sch. 80	
(39) LG1BTA	4	EA.	1" 150# x 1/8" Thk. Asb. Comp. Gasket RF	
(40) LG20BN	16	EA.	1/2" x 2 1/4" Stud Bolt GR B7	
			W/2 Hex NUTs	
(41) 305B	6	EA.	1" 3000# F.S. Scrd. 90° Elbow	
(42) LG	20 FT.	FT.	3" Smls. STL. Pipe Sch. 40	
(43) LIIGAIA	16 FT.	FT.	1" Smls. STL. Pipe Sch. 80	
(44) LG	10	FT.	2" Smls STL. Pipe Sch. 40	
(45) LG	14	FT.	2" Smls. STL. Pipe Sch. 40	

CHEV B8 5950

BILL OF MATERIAL

JOB K-402 DATE 12-2-80
DRG. No. _____ SHEET _____ ORDER No. SHEET 3
APPRO. JOB No. B.M. 8892
16403-0116-5

E. B. WILLIAMS - 249

DATE 12-29-80 MATERIAL REQ'D AT DEST'N BY 12-29-80 F.
DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
	2	EA.	$\frac{5}{8}$ " ϕ Phillips Self Drilling Anchors	
	2	EA.	$\frac{5}{8}$ " $\phi \times 3\frac{1}{2}$ " Stud Bolt mild STL. W/I Hex Nuts	
	1	EA.	2" x $\frac{1}{4}$ " x 8" STL. Plate	
	1	EA.	6" x $\frac{1}{4}$ " x 8" STL. Plate	
	2	EA.	$\frac{1}{2}$ " $\phi \times 4$ " Lg. Machine Bolt mild STL. W/I Hex Nuts	
	6	EA.	$1\frac{1}{2}$ " 3000# F.S. Scrd. 90° Elbow	
	1	EA.	2" STD. U-bolt GB-M99G57	
	1	EA.	3" STD. U-bolt GB-M99G57	
	2	FT.	$\angle 2" \times 2" \times \frac{1}{4}"$ Angle Iron.	
			KRA $\frac{12}{18}/80$	
			END USE: CRUSTIC INJECTION PIPING/SPT. MODIFICATIONS	
				CHEV B8 5951

CHEV B8 5951

4 ft.	12x2x1/4	Angle Iron
2	2x1/4x5	Stl. Plate
1	6x1/4x8	Stl Plate
2	5/8"φ	Phillip Self Drilling Anchors
2	5/8φx3"	Stud Bolt Mild Stl. w/1 Hex Nut
D 2	1"	3000# F.S. SW TEE
BW 2	1"	SCD STL. BAR STOCK PLUG. Rd. Hd.
BHD 2	1"	800# STL. SCD GATE VALVE WELD
		BNT. 12 CR. TRIM MALE NPT FEMALE NPT.
BDG 8	1"	150# F.S. WN. FLG 1/6 R.F. SCH. 80
A 4	1"	150# x 1/6 R.F. THK ASB. COMP. GASKET
M 16	1/2φx2 1/2	STUD BOLT GR B7 W/2 HEX NUTS
LB 6	1"	3000# F.S. SCD 90° ELBOW
1A 16 ft.	1"	SMLS. STL. PIPE SCH. 80

Cd-8-16026-1"-E1-N2 ET
 G1641 & G1641A SUCTION AND D1649 OVERFLOW
 No 6 CRUDE UNIT
 PLANT 16

APPROVED 	W.O.	PD-16-29953-1 Sht. No 6
	S.O.	

CHEV B8 5952

5

6

7

8

BILL OF MATERIAL

JOB 16-402

DATE 12-2-80

DRG. NO. _____ SHEET _____

ORDER NO. 6M8892

APPRO. JOB NO. _____

E.B. WILLIAMS - 249

MATERIAL REQ'D AT DEST'N BY 12-29-80 FIX

Jose L. Reyes - (388)

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
L7	10ft.	FT.	1 1/2" Smls. STL. Pipe Sch. 80	
GAIA	4 ft.	FT.	3/4" Smls. STL. Pipe Sch. 80	
5GDR	4	EA.	1" x 3/4" Swage Nipple Sch. 80 C.S. #	TLE-BSE
3A3DG	4	EA.	3/4" 150# F.S. Weld Neck Flg. 1/8" R.F. Sch. 80	
1BTA	4	EA.	3/4" 150# Spiral Wound Gasket	
20BM	16	EA.	1/2" x 2 1/4" Stud Bolt B7 w/ 2 Hex Nuts	
1SBD	2	EA.	1" 3000# F.S. SW Tee	
0ABW	2	EA.	1" Scd. STL. Bar Stock Plug Rd. Hd.	
3-B	2	EA.	1" 800# STL. Scd. Gate Valve	
			Weld Bnt. 12 CR. Trim. ^{Male NPT} _{Female NPT}	
3A3DG	8	EA.	1" 150# F.S. WN. Flg. 1/8" R.F. Sch. 80	
1BTA	4	EA.	1" 150# x 1/8" Thk. Asb. Comp. Gasket RF	
20BM	16	EA.	1/2" x 2 1/4" Stud Bolt GR B7	
			w/ 2 Hex Nuts	
25B	6	EA.	1" 3000# F.S. Scrd. 90° Elbow	
G	20 ft.	FT.	3" Smls. STL. Pipe Sch. 40	
GAIA	16 ft.	FT.	1" Smls. STL. Pipe Sch. 80	
G	10	FT.	2" Smls STL. Pipe Sch. 40	
			3" Smls STL. Pipe Sch. 40	

CHEV B8 5953

+ BILL OF MATERIAL

JOB K-402

DATE 12-2-80

SHEET 1

ORG. No. _____ SHEET _____

ORDER No. SM 8892

APPRO. JOB NO. 16403-0116-570

E. B. WILLIAMS - 249

Jose L. Reyes - (388)

MATERIAL REQ'D AT DEST'N BY 12-29-80 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
	2	EA.	12" STD. Pipe Clamp GB-M99657	
	3 FT.	FT.	∠3"x3"x3/8" Angle Iron	
	2	EA.	1/2" ∅ x 30" Eye Bolt W/ Eye One End & 5" Threads One End, Eye Dia. for 1/2" Bolt W/ 2 Hex Nuts	
	10 FT.	FT.	∠3 1/2" x 3 1/2" x 3/8" Angle Iron	
	8 FT.	FT.	∠2 1/2" x 2 1/2" x 3/8" Angle Iron	
	3 FT.	FT.	6 x 15.3 MC Channel	
	2	EA.	6" x 6" x 3/8" STL. PLATE	
	8	EA.	1/2" ∅ x 2" Machine Bolt Mild STL. W/ 1 Hex Nut	
	2	EA.	5/8" ∅ Phillips Self Drilling Anchor	
	2	EA.	5/8" ∅ x 4" Stud Bolt Mild STL. W/ 1 Hex Nut	
	4 FT.	FT.	∠2" x 2" x 1/4" Angle Iron	
	2	EA.	2" x 1/4" x 5" STL. PLATE	
	1	EA.	6" x 1/4" x 8" STL. PLATE	
	2	EA.	5/8" ∅ Phillip Self Drilling Anchors	
	2	EA.	5/8" x 3" Stud Bolt Mild STL. W/ 1 Hex Nut	
	1	EA.	Pipe Clamp for 12" Pipe	
	2	EA.	U-bolts for 3" Pipe	
	4	FT.	∠2 x 2 x 1/4" Angle Iron	
	2	EA.	2 1/2" x 1/4" x 5 1/2" STL. PLATE	
	1	EA.	7" x 1/4" x 7" STL. PLATE	

CHEV B8 5954

SHEET 1 OF 3 SHEETS

CHEVRON U.S.A., INC.

JOB WALK - OCTOBER 23, 1980
INVITATION TO BID - SPECIFICATION E-3588-1
CONTRACT NO. ENG-1648
FOR
MODIFICATIONS TO PLANT 72 - TAIL GAS PLANT
EL PASO, TEXAS REFINERY
(RMPCo JOB NO. 5878-5)

Attending were:

Contractors

Messrs. Mike Kirkland - Bowen Industries
George Goodall - Brown-Olds Corporation
Ramon Baeza " " "
R. S. Melvin - Southwestern Industrial Contractors

Chevron U.S.A., Inc.

Messrs. Greg Hanggi
Ken Austin
Ed Zurawel

The Ralph M. Parsons Company

Messrs. Frank Cannizzo
Herman Eggherman

The following items were covered before and during the job walk:

1. Contractors were apprised of the importance of the (a) due date for proposals by November 4 (b) intention to award the proposed contract by November 10 (c) prospective mobilization by successful bidder (contractor) on or before November 17 and job completion (Phase I) on or about December 14, 1980.
2. Two sets of Technical Documents were issued to each Contractor along with the Invitation to Bid, Specification E-3588-1, and the commercial attachments noted therein (Bid Documents).
3. A general review of the bid documents and the scope of work was made to acquaint bidders with the contemplated overall work scope for Phase I and to segregate any confusion where Phase II work is shown on the Drawings, etc.

4. Under Appendix A10-2, the Annubars and Ex. Disp. Level Transmitters are to be deleted from this scope of work.
5. Proposals are to be made on the Proposal Sheet No. ENG-1648. Bidders to express mail one copy to Mr. Zurawel (Pasadena) and one copy to Mr. Hugh L. Kelley (San Francisco).
6. The Exhibit - Compensation Adjustment and Exhibit - Construction Equipment were discussed. These Exhibits will be incorporated into the resulting Contract, both for any changed, added or deleted work, as well as for purpose of performing the work on Phase II.
7. Contractors were advised that Company will unload and store all Parsons-furnished equipment and materials prior to Contractor's move-in. Contractor will unload and handle any such items delivered after his move-in including any on-site transportation to and from storage or laydown areas.
8. Parsons promised to provide Chevron with copies of its purchase orders for job materials and equipment.
9. Contractors shall furnish all anchor bolts (galvanized).
10. On ISOs for field-fabricated piping, Contractors to include for furnishing all materials except the valves. Parsons will furnish all shop fabricated piping (shown on shop ISOs).
11. Contractors to include for all incidental materials not shown as Parsons or Company-furnished, including all consumable materials.
12. Under Appendix A.09, Specification EP-310 - "Qualification of Welders" should read "EP-2200"; Refinery Instruction No. 1404 should show "Revised August 1980". Copies of both documents were handed to the Contractors.
13. For instrumentation work, the scope should include all loop testing and checkout.
14. Bidders must include in their Proposal names of their proposed instrumentation and electrical subcontractors.
15. Contractors were requested to include a "set aside" cost for furnishing and installing 100 feet of 6 ft. high vapor barrier (corrugated sheet metal, chain link and sand bags).
16. Company will make their Scott Air Packs available for this work and will provide instructions in their use. Contractor will be responsible for instructing his employees regarding Refinery work and safety rules and regulations, authorized work areas, permit requirements, etc. Daily permits for hot work will be required. All contractors present stated that they are familiar with the Refinery permit requirements based on recent work on other contracts.

17. Contractors are responsible for qualifying their welders. Welders qualified within the past six months do not have to be requalified.
18. The Invitation to Bid - Contract ENG-1648 and attachments were discussed. The Proposal shall include a percentage quotation against the proposed contract price for Bonding. This amount to be added only if Company requests that a Bond be furnished. Bidders were advised that their current insurance coverages if not on file at the Refinery, will have to be updated to show the Contract Number ENG-1648 for this work.
19. Bidders were requested to quote construction equipment rental rates, on a "maintained and operated" basis and/or inclusive of F.O.& L., wherever applicable.
20. Bidders were instructed to exclude any work shown as "hold" on the Drawings, i.e. mixing tank.
21. Contractors were advised that our current shipping promises indicate mid-November for the Decanter, pipe spools, and steam jacketed items.
22. Parsons is supplying the piping and the spray nozzles for the spargers.
23. Contractors are to be self-sufficient for all construction utilities and services except that Company will make a source location available at no cost for nonpotable water, firewater for testing, 110 volt electric power and compressed air (80 psi). Contractor to connect, extend and disconnect its own lines.
24. Broken concrete and other construction debris, spoil, etc. to be disposed of by the Contractor at an approved area inside the Plant limits.
25. Company will provide a source for any required borrow dirt for fill from an approved area inside Plant limits.
26. The steel structure beside the Decenter Vessel will be removed and disposed of, except that Contractor is free to re-use any portion for the new structure.
27. Company will make distribution of drawings, etc. issued for construction to the Contractor. Company will maintain responsibility for all construction matters as well as any changes or other matters involving the Contract with the successful bidder. Parsons' field representative will be responsible to the Company for field inspection and quality assurance.
28. Company will perform the cleaning of the sulfur basin to permit entry by Contractor.

29. Field primer or finish painting is not to be considered as part of this work scope except that if Bidders determine that they cannot meet schedule due to lack of local facilities for galvanizing, they were instructed to advise Parsons and a painting specification will be issued, if Company elects to cover this in the subject Contract.
30. Company will make area behind the old Crude Still available for Contractor's prefabrication, welding and materials storage requirements. A single work permit for this area will be ample.
31. Parsons will furnish bolts, nuts, and gaskets; Contractors to provide all test gaskets, strainers, test blinds, etc. Company will blind lines at the plot limits.
32. Bidders to include for all removal and replacement of insulation where shown and insulation of new equipment and piping as required.
33. Bidders are to include all steam tracing and steam piping, drains, including winterizing wherever shown or specified, including tubing and fittings. In case of any conflict the P&IDs will govern the scope of such work. Company will provide the steam traps required for the assemblies.
34. Bidders were cautioned that no copper-bearing materials are to be purchased for this work.
35. Parsons agreed to mark up and express mail a new set of P&IDs to accurately distinguish between Phase I and Phase II work items for bid purposes.
36. Although not covered during this meeting, Bidders are required to provide all weld rod, gasses, etc. Also, Bidders shall exclude any cost for making hot taps. Company will perform the hot tapping.



Contract

Contract Number **C-15-061-80**

JAMES & LUTHER, INC.

El Paso Refinery

County of **El Paso** State of **Texas**

the work set forth in Specification No. **EP-396-L**

dated **September 19, 1980 (RRK)** and entitled

"Various Line Relocations for Plants 22, 38 and 39." Contract Terms and Conditions (Pages 1-4), Right-to-Audit Clause (Page 5), Certificate of Nonsegregated Facilities (Page 6), Utilization of Minority Business Enterprises (Page 7), Certificate of Insurance (Page 8), Specification No. EP-396-L (Pages A1-A14, Appendices I, II, III, IV and Supplement), and Refinery Instruction No.

For information on the redemptive work of CHRIST, please contact the nearest Christian Church of the New Dispensation office or contact the Christian Church of the New Dispensation, 1000 North 1st Street, Suite 100, Minneapolis, MN 55401, USA. Tel: 612-338-1000. Fax: 612-338-1001. E-mail: ccnd@ccnd.org. Website: www.ccnd.org. The Christian Church of the New Dispensation is a non-profit organization. All contributions are tax-deductible.

1404 (Pages BI-BI6 with Appendices BI and BII), attached hereto, are part of this agreement.

COMPANY shall pay **CONTRACTOR**, in accordance with statements prepared by **CONTRACTOR**.

a compensation of

\$18,886.00 (Eighteen thousand eight hundred eighty-six and no/100 dollars)

CONTRACTOR'S Compensation Adjustment, if necessary, will be in accordance with Exhibit - Compensation Adjustment and Exhibit - Construction Equipment, attached hereto, and also part of this agreement.

The work shall be commenced **September 29, 1980**
diligently prosecuted, and completed **October 18, 1980**

A payment and performance bond in terms and executed by a surety company satisfactory to COMPANY shall be furnished to COMPANY in the sum of _____.

(No bond required unless an amount is entered above.)

CONTRACTOR JAMES & LUTHER, INC.

Chevron U.S.A. Inc.

By _____

By _____

And _____

And _____

Witness _____

Invoices should be sent to:

Chevron U.S.A. Inc.

Post Office Box 20002

El Paso, Texas 79998

Attn.: Invoice Desk, Refinery Accounting

CONTRACTOR'S State License No. _____

(Where required by State Law)

Communications to CONTRACTOR should be addressed to the attention of

Communications to COMPANY should be directed to the attention of **Mr. L. R. Shanks**

Chevron U.S.A. Inc.

Post Office Box 20002

El Paso, Texas 79998

Facility Completed				Superintendent or Foreman	
Invoice No.	Date	Amount	Date Received	Charge Account No. 6173-01-360-	Job No. 33-276
Remarks				CON12	

Note: If CONTRACTOR is incorporated, execution shall be by an authorized officer of the corporation and corporate seal affixed and attested to by the Secretary. If CONTRACTOR is not incorporated, signatures should be witnessed by an employee of COMPANY, if practicable; if not, by a disinterested party.

1. PERFORMANCE OF THE WORK

1.1 Definitions

- 1.11 The term "work" as used in this Agreement means, unless the context otherwise requires, all work to be performed by CONTRACTOR under this Agreement.
- 1.12 The term "Facility" as used in this Agreement means the product of the work, such as an improvement to real property, designs or data.
- 1.13 The term "material" or "materials" as used in this Agreement means all material, supplies and equipment to be incorporated into the Facility.
- 1.14 The term "affiliate" as used in this Agreement means Standard Oil Company of California or any company in which Standard Oil Company of California owns directly or indirectly at least 51 percent of the shares entitled to vote at a general election of directors.
- 1.15 The terms "indemnitee" and "indemnities" as used in this Agreement mean respectively COMPANY, one of its affiliates or the agent or employee of COMPANY or one of its affiliates and all of them.
- 1.16 The terms "subcontractors" and "vendors" as used in this Agreement mean subcontractors or vendors of any tier.

1.2 Independent Contractor: CONTRACTOR shall be an independent contractor, maintaining complete control over CONTRACTOR's men and operations.

1.3 Specifications: CONTRACTOR shall perform the work, including the provision of materials, in accordance with the specifications and exhibits (if any) which are a part of this Agreement and such additional drawings and explanations as COMPANY may provide to CONTRACTOR from time to time to detail and illustrate the work.

1.4 Permits: Unless otherwise provided in this Agreement, CONTRACTOR shall secure all permits, make all cash and other deposits, provide all bonds and give all notices required by law in connection with the work.

1.5 Items to be Provided by CONTRACTOR: Unless otherwise provided in this Agreement, CONTRACTOR shall provide all materials, utilities, consumable supplies, tools, construction equipment, and labor, including supervision, necessary for the completion of the work.

1.6 Safety Measures: CONTRACTOR shall perform the work in accordance with safe practices, taking all reasonable precautions to protect the Facility and adjacent facilities, workmen and the public and providing, where reasonably necessary, barriers, guards, temporary bridges, lights and watchmen. While on the premises of COMPANY or its affiliates all of COMPANY's safety rules shall be strictly observed; in particular, smoking shall be limited to such locations and occasions as are specifically authorized in writing by COMPANY. CONTRACTOR shall not perform or permit any act on the premises of COMPANY or its affiliates which involves a fire or explosion hazard, including welding, torch cutting and disposal of debris by burning, without prior written consent of COMPANY.

1.7 Suppliers

- 1.71 COMPANY may nominate bidders for the supply of certain items of material. CONTRACTOR shall request bids on these items from the nominees, and may obtain such other bids as CONTRACTOR may elect.
- 1.72 COMPANY may have available for sale certain materials not products of COMPANY. CONTRACTOR shall purchase such materials offered by COMPANY and its designated affiliates as long as such material is suitable and is competitively priced.
- 1.73 When the work includes purchasing certain materials, CONTRACTOR shall be fully responsible for ordering, expediting, receiving and safeguarding (subject to the provisions of Section 5.3 of these Terms and Conditions) all such materials, and for conducting all competitive bidding by and negotiations with the vendors thereof and for paying for materials and enforcing of warranties, unless otherwise provided in this Agreement.

1.8 Labor

- 1.81 CONTRACTOR shall employ labor from that available in the vicinity of the work, and in accordance with the terms of employment prevailing in that vicinity, to the extent that it is practicable and consistent with the timely and efficient prosecution of the work.
- 1.82 CONTRACTOR shall use all reasonable efforts to avoid any disturbances in the existing labor situation which will adversely affect the business of COMPANY, its affiliates or other contractors working in the area.

1.9 Carriers: In connection with transportation of purchased materials, CONTRACTOR shall give consideration to, but shall not be limited to, use of carriers recommended by COMPANY.

2. COMPENSATION

2.1 Changes: COMPANY may make "changes" by adding to, omitting or deviating from the requirements of this Agreement. In the event COMPANY issues any written directive which is not identified as a Change but which CONTRACTOR considers to be a Change, CONTRACTOR shall so notify COMPANY in writing within 10 days after receipt of such directive. If no such timely notice is given, CONTRACTOR shall proceed in accordance with such directive without any adjustment in compensation. If COMPANY originally identifies the directive as a Change, or if CONTRACTOR gives such timely notice and COMPANY agrees that such directive is a Change, CONTRACTOR shall within 10 days after giving such notice or after receipt of the directive advise COMPANY of its proposed adjustment in compensation and COMPANY and CONTRACTOR shall attempt to agree in writing on an appropriate adjustment in compensation resulting from the Change. After such agreement is reached, CONTRACTOR shall proceed with the Change. However, if such notice is given or if COMPANY originally identified the directive as a Change, and in either instance COMPANY and CONTRACTOR fail to agree on whether or not such directive is a Change or fail to agree on an appropriate adjustment in compensation, then COMPANY may issue a written request for CONTRACTOR to proceed in accordance with such directive without such agreement. CONTRACTOR shall comply with such written request, but such compliance shall not prejudice either party's claim that the directive is a Change or, as the case may be, claim for an appropriate adjustment in compensation. After the written request to proceed is issued, any adjustment which is to be made to the compensation shall be determined in accordance with the Exhibit-Compensation Adjustment.

2.2 Taxes: CONTRACTOR shall pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, all State, Federal and other payroll taxes, including contributions and taxes assessed against employees on wages earned in connection with the work, and CONTRACTOR shall make all reports required by governmental authorities. CONTRACTOR shall also pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, any and all other taxes now or hereafter imposed by any governmental authority upon, measured by or incident to the performance of this Agreement or the purchase, storage, use or consumption by CONTRACTOR of materials, utilities, consumable supplies, tools or construction equipment used in the performance of this Agreement, unless the applicable laws specifically provide that such tax be paid by COMPANY.

2.3 Acceptance of Facility: Where provision is made by law for recording Notice of Completion, COMPANY may indicate its Acceptance of the Facility by recording such Notice; otherwise Acceptance shall be on the date COMPANY gives written notice to

this Agreement, plus an amount for reasonable and verified costs of CONTRACTOR incurred in preparation for the part of the work not yet performed and in shutting down his operations hereunder, plus an amount for a reasonable part of the profit CONTRACTOR would otherwise have earned; provided, that the amounts payable under this Section 4.3.3 shall in no event exceed the unpaid part of CONTRACTOR's compensation.

5. LIABILITY

- 5.1 General Liability: CONTRACTOR shall indemnify and save harmless the indemnitees from and against any and all loss, damage, injury, liability, and claims thereof for injury to or death of a person, including an employee of CONTRACTOR or an indemnitee, or for loss of or damage to property (except property subject to Sections 5.2 and 5.3 of these Terms and Conditions), resulting directly or indirectly from CONTRACTOR's performance of this Agreement, including, but not limited to, the use by CONTRACTOR of staging or other equipment provided by COMPANY or others, regardless of the negligence of, and regardless of whether liability without fault is imposed or sought to be imposed on, one or more of the indemnitees, except to the extent that such indemnity is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement and except where such loss, damage, injury, liability or claim is the result of active negligence or willful misconduct of an indemnitee and is not contributed to by any act of, or by any omission to perform some duty imposed by law or contract on, CONTRACTOR, its subcontractor or either's agent or employee.
- 5.2 Liability for Property of COMPANY and its Affiliate: CONTRACTOR shall be liable to COMPANY and its affiliates for any loss of or damage to the property of COMPANY and its affiliates (other than the property subject to Section 5.3 of these Terms and Conditions) resulting directly or indirectly from CONTRACTOR's performance of this Agreement, regardless of the negligence of COMPANY, its agents, employees, and affiliates, except to the extent that such liability is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement; provided, however, that CONTRACTOR's liability under this Section 5.2 shall be limited to the applicable insurance which CONTRACTOR carries or has others carry and which shall not be less than that provided in Section 6 of these Terms and Conditions.
- 5.3 Liability for the Facility and Materials: CONTRACTOR shall exercise due care and diligence in the performance of this Agreement and in the care and protection of the Facility and materials. At COMPANY's option, CONTRACTOR shall reconstruct, repair or replace any part of the Facility or materials lost or damaged by any cause whatsoever, including but not limited to those referred to in Section 3.2 of these Terms and Conditions, wherever said loss or damage occurs including loss or damage to materials while in transit. In such event COMPANY shall reimburse CONTRACTOR for the costs of such reconstruction, repair or replacement in excess of \$1,000 for each occurrence or in excess of the coverage of any applicable insurance which CONTRACTOR may elect to carry or have others carry, whichever is greater, except costs incurred in reconstruction, repair and replacement of work or materials subject to condemnation by COMPANY prior to loss or damage (whether or not such condemnation was effected) under Section 4.2 of these Terms and Conditions, and except costs incurred in order to meet the guarantee(s), if any, contained elsewhere in this Agreement. CONTRACTOR also shall be paid a reasonable profit on that part of such reconstruction, repair or replacement for which cost reimbursement is made. COMPANY shall not be liable for loss or damage to construction equipment, tools, temporary structures, temporary excavations or supplies owned or used by CONTRACTOR or its subcontractors.
- 5.4 Compliance with Laws and Regulations: CONTRACTOR shall comply with all laws, regulations, decrees, codes, ordinances, resolutions, and other acts of any governmental authority, including Federal and State labor and tax laws, which are applicable to this Agreement and CONTRACTOR's performance hereunder, and shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from CONTRACTOR's failure to do so.
- 5.5 Liens: CONTRACTOR shall discharge at once or bond or otherwise secure against all liens and attachments which are filed in connection with the work and shall indemnify and save COMPANY, its affiliates, and the owners of the premises on which the work is performed harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens and attachments.
- 5.6 Patent Rights: CONTRACTOR shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof for any patent infringement resulting directly or indirectly from CONTRACTOR's performance of the work, including provision of material and designs by CONTRACTOR, and use of tools and other equipment by or for CONTRACTOR in any connection therewith.
- 5.7 Costs and Attorneys' Fees: CONTRACTOR shall promptly pay (a) to any indemnitee all costs and attorneys' fees incurred by such indemnitee resulting directly or indirectly from any and all loss, damage, injury, liability and claims for which CONTRACTOR is obligated to indemnify such indemnitee pursuant to Sections 5.1, 5.4, 5.5 or 5.6 of these Terms and Conditions, and (b) to COMPANY all costs and reasonable attorneys' fees in any legal action in which COMPANY or its affiliate prevails, in whole or in part, brought against CONTRACTOR based on a breach of this Agreement.

6. INSURANCE

- 6.1 Insurance Required: Without in any way limiting CONTRACTOR's liability pursuant to Section 5 of these Terms and Conditions, CONTRACTOR shall maintain the following insurance.
- 6.11 Worker's Compensation and Employers' Liability Insurance as prescribed by applicable law, including insurance covering liability under the Longshoremen's and Harbor Workers' Act and the Jones Act, if applicable.
- 6.12 Without in any way affecting CONTRACTOR's obligations pursuant to Section 6.11 of these Terms and Conditions, if marine work is to be performed hereunder, Protection and Indemnity Insurance, including coverage for injuries to or death of masters, mates and crews of vessels used in the performance of this Agreement. The limits of liability of such insurance shall not be less than \$500,000 per occurrence.
- 6.13 Comprehensive General Bodily Injury Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability. The limits of liability of such insurance shall be not less than \$500,000 per occurrence.
- 6.14 Broad Form Property Damage Liability Insurance. Such insurance shall include the following coverages: Broad Form Contractual Liability, Completed Operations, and Products Liability, and shall expressly cover property of COMPANY and its affiliates other than that referred to in Section 5.3 of these Terms and Conditions. The limits of liability of such insurance shall be not less than \$100,000 per occurrence.
- 6.15 Automobile Bodily Injury and Property Damage Liability Insurance. Such insurance shall extend to owned, non-owned, and hired automobiles used in the performance of this Agreement. The limits of liability of such insurance shall be not less than \$250,000 per person/\$500,000 per occurrence for Bodily Injury and \$100,000 per occurrence for Property Damage.
- 6.2 Policy Endorsements: The above insurance shall include a requirement that the insurer provide COMPANY with 30 days' written notice prior to the effective date of any cancellation or material change of the insurance. The insurance specified in Section 6.1.1 of

RIGHT-TO-AUDIT CLAUSEFOR GO-277 SERVICE ORDERS AND
GO-278, GO-279 AND PD-52 CONTRACTS

RECORDS AND AUDITS: CONTRACTOR and its subcontractors and vendors of any tier shall maintain true and correct records in connection with the work and all transactions related thereto and shall retain all such records for at least 24 months after Acceptance.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR of any tier shall give or receive any commission, fee, rebate, gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without prior written notification thereof to COMPANY. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Additionally, if any violation of this paragraph occurring prior to the date of this Agreement resulted directly or indirectly in COMPANY's consent to enter into this Agreement with CONTRACTOR, COMPANY may, at COMPANY's sole option, terminate this Agreement at any time and, notwithstanding any other provision of this Agreement, pay no compensation or reimbursement to CONTRACTOR whatsoever for any work done after the date of termination. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor for the sole purpose of determining whether there has been compliance with this paragraph.

COMPANY may from time to time and at any time after the date of this Agreement until 24 months after Acceptance make an audit of all records of CONTRACTOR and its subcontractors and vendors of any tier in connection with payments made on a cost reimbursement basis. Such audit may also cover CONTRACTOR's procedures and controls with respect to such reimbursable costs. Upon completion of this audit, COMPANY shall pay CONTRACTOR any compensation due hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR as shown by the audit shall be returned to COMPANY. Items of compensation such as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors of any tier to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The CONTRACTOR agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American Aleuts. CONTRACTORS may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

CHEV B8 5967

Certificate of Insurance GO-279-12

to: (Company) CHEVRON U.S.A. (Attention) _____

This is to certify that the (Insurer) THE AETNA CASUALTY AND SURETY COMPANY
 as issued policies of insurance as indicated below to (Contractor) JAMES AND LUTHER, INC.
 and is aware that said policies will apply to work performed under the Agreement between said Insured and (Company) CHEVRON U.S.A.
 dated _____ 19 ____.

Type of Coverage	Amount of Coverage	Policy Number	Expiring
Workers' Compensation	Statutory	60C7208CCA	9-4-81
Longshoremen's and Harbor Workers' Act	\$ _____		
Jones Act	\$ _____		
Employers' Liability	\$ <u>100,000</u> each person \$ <u>100,000</u> per occurrence		
Protection and Indemnity Insurance including coverage for injuries or death of masters, mates and crews. (Name of Vessel) _____	\$ _____ per occurrence		
Comprehensive General Bodily Injury Liability Insurance, including Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability.	\$ <u>500,000</u> per occurrence (Min. \$500,000)	60AL465002CCA	9-4-81
Broad Form Property Damage Liability Insurance, including Broad Form Contractual Liability, Completed Operations, and Products Liability.	\$ <u>250,000</u> per occurrence (Min. \$100,000)	60AL465002CCA	9-4-81
Automobile Liability Insurance extending to owned, non-owned, and hired automobiles.	Bodily Injury \$ <u>250,000</u> per person (Min. \$250,000) \$ <u>500,000</u> per occurrence (Min. \$500,000) Property Damage \$ <u>100,000</u> per occurrence (Min. \$100,000)	60AL465002CCA	9-4-81

I further certified that:

- (1) Each of the above policies contains a provision that the policy shall not be cancelled or materially changed without 30 days' prior notice to the holder of this certificate.
- (2) The policies listed under A above contain a waiver of subrogation against Indemnities.**
- (3) The policies listed under B, C, D and E above
 - (a) name Indemnities as additional insureds;
 - (b) provide that said insurance is primary coverage with respect to all insureds; and
 - (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clauses.

On written request by the holder of this certificate, the Insurer or his agent if indicated below will furnish a copy of any policy cited above, certified to be a true and complete copy of the original.

Insurer THE AETNA CASUALTY AND SURETY COMPANY
GOLDFARB INSURANCE AGENCY Title AGENT
 Date 9-4- / / , 19 80

CHEV B8 5968

Do not include data for these items unless Marine work will be performed under the above mentioned Agreement.

Indemnities is defined to mean Company, one of its affiliates, or the agent, or employee of Company, or one of its affiliates and all of them.

BILL OF MATERIAL

JOB 33-276

DATE 9-23-80

DRG. No. _____

SHEET _____

ORDER NO. BAI 8624

APPRO. JOB NO. 6173-01 360 Kell

* FIRM

MATERIAL REQ'D AT DEST'N BY 10-13-80

DATE

TO:
Engr: Kooiman X-334

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea.	6" 150# WN Flange RF Carbon Steel	check
2	1	ea	6" 150# Blind Flange RF Carbon Steel	check
3	8	ea	3/4" ϕ by 3 3/4" stud bolts w/2 hex nuts grade B-7	check
4	1	ea	Gasket 150# Ab comp. RF Ring, 6"	check
OK 9/23/80 ARR 9/23/80 OK 9/23/80 End use: Plant #33 south comp. relict blind				

CHEV B8 5969

SHEET 1 OF SHEETS

BILL OF MATERIAL

JOB 33-276

DATE 9-23-80

DRG. No. _____ SHEET _____

ORDER No. BM-8624

APPRO. JOB No. 6173-DI-360-Rev

* FIRM

MATERIAL REQ'D AT DEST'N BY 10-13-80

Engr: Kooiman X-334

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea.	6" 150# WN Flange RF Carbon Steel	
2	1	ea	6" 150# Blind Flange RF Carbon Steel	
3	8	ea	3/4" ϕ by 3 3/4" Stud bolts W/2 hex nuts grade B-7	
4	1	ea.	Gasket 150# Ash Comp. RF Ring, 6"	
<i>gmk 9/23/80</i>				
<i>RRK 9/23/80</i>				
End use: Plant #33 south compressor relief blind.				CHEV B8 5970

SHEET / OF SHEETS /

JOB 33-276

DATE 9-29-80

DRG. No.

SHEET

ORDER No. BM-8627

APPRO. JOB No. 6173-01-360-

- Rel 11

FIRM *
MATERIAL REQ'D AT DEST'N BY 10-13-80

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	2	ea.	8" 150# blind Flange CS RF	
2	16	ea	4 1/2" x 3/4" grade B-7 Stud bolts w/2 hex nuts	
3	2	ea	150# ASB Comp RF Ring Gasket	
4	1	ea	3/4" x 3" nipple male both ends, XS	
5	1	ea	3/4" plug CS SCRD.	
6	1	ea	L20KAOMD Gate VLV 800# CS SCRD 12CR WELD SIZE 3/4"	
7	1	ea	Boss 6000# CS SCRD	
8	1	ea	homemade clamp 3/8" x 2" strap for 8" pipe (8" FRICTION CLAMP)	
9	1	ea	angle iron 3x3x3/8 3x3x3/8: 3'6" Long	
10	1	ea	Plate 12" x 12" mild Steel 1/4"	

CHEV B8 5971

SHEET 1 OF 2 SHEETS

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

DRG. No. PD 13-29921 SHEET 19

ORDER No. BW-8931 (P1)

APPRO. JOB No. 17029-6173-14-360

Kaciman x 355

MATERIAL REQ'D AT DEST'N BY 2-16-81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	620	ft	3" Pipe Sols sch 40 CS BW	RHBM-80776X8931 Grant
			A-53 y.B. DRL	C/FW/Dave 1/27
2	2	ea	3/4" Gate VLV 800# CS one end	RHBM 80753X8931
			male one end female NPT BH Bnt	Grant
				C/FW/Dave 1/27
3	15	ea	3" Flange 150# CS RF 6W 5640 lbs	
4	(3)	ea	3" (1600) 54104 CS BW 45" LR	
				RHBM 81752X 8931
5	27	ea	3" (1600) 54104 CS BW 90" LR	Keen
				C/FW/Rick 1/20
6	11	ea	3/4" Brass 6000# CS SW	
7	2	ea	3/4" Brass 6000# CS SW	
8	2	ea	3" Gate VLV 150# CS RF 1200 lb BH Bnt	
9	1/2	ea	1/2" Gate VLV 800# CS SW 1200 lb BH Bnt	
10	1	ft	1/2" Pipe Sols sch 40 CS RF	
11	4	ea	3" Gate VLV 150# CS RF 1200 lb BH Bnt	

CHEV B8 5972

[Signature] 1/27

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

DRG. No. _____ SHEET _____

ORDER No. DA 8951 (02)

APPRO. JOB No. 9007-110-1-4

MATERIAL REQ'D AT DEST'N BY 2-16-81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
12	24	ea	5/8" ϕ x 3 1/2" Stud bolt B7 1/2 nuts	See spec
13	1	ea	4" Gasket 150# Alb comp RF ring	
14	12	ea	7/4" Ring (3 sec.)	
15	1	ea	4" x 3" Flange reducing 150# CS RF <u>WN</u> S 40 brace <u>OR SK</u>	RLBM 80752X 8931 Keenan Supply C/AW/Rick 1/22
16	1	ea	1" x 1 1/2" Swage Nipple S 80 15 BLE/TSE 1 one	
17	1	ea	3" Swage 300# CS RF WN un brace	
18	1	ea	3" Gasket 300# Alb comp RF Ring	
19	8	ea	1/2" ϕ x 4" Stud bolt B7 1/2 nuts	
			<u>Q12 4/21/81</u>	
			<u>1/2" ϕ x 4"</u>	
			<u>1/2" ϕ x 4"</u>	
			<u>1/2" ϕ x 4"</u>	
			<u>1/2" ϕ x 4"</u>	

CHEV B8 5973

SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 33-276

DATE

DRG. NO.

SHEET

ORDER No.

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	2	ea	2" (1600 S/Wt CS B4) 90° LR	RLBM 80152 X 8935 K90000 C/EW/Rick 1/26
14	1	ea	2" x 1 1/2" Reducer 5/8 X 5 CS	
			End Case	
15	1	ea	2" Flange 150# (CS RF 10N S44000	
16	1	ea	1 1/2" Flange 300# (CS RF 10N S4480	
17	1	ea	2" Gasket 150# ASB 1000 RF Ring	
18	1	ea	1 1/2" Gasket 150# ASB 1000 RF Ring	
19	4	ea	3/4" x 3" S&W Bolt D-7 1 1/2 nuts	
20	4	ea	3/4" x 3 1/2" S&W Bolt D-7 2 1/2 nuts	
21	1	ea	1 1/2" x 1" Flange 150# S4480 CS TX	
22	1	ea	1" x 1" Flange 300# (CS S&W 1"	

CHEV B8 5974

SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 33276

DATE 1-22-81 *See Below*

DRG. No. PD-13 19921 SHEET 20

ORDER No. BM 8932

APPRO. JOB No. 2030-6173-01 30-

Material X-755

MATERIAL REQ'D AT DEST'N BY 2-10-81

DATE

228

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	520	ft	2" Pipe Snds S.H 40 CS BFW	RLBM 80776 X 8932 <i>Grant</i>
			E153 in B. DRH	C/E Date 1/27
2	12	ca	2" L1620 Sdnt CS BW 90" LR	RLBM 80752 X 8932 <i>Keeney 1/29</i>
3	1	ca	2" Flange 150# CS RF W/N S.H 40 Bore	
4	4	ca	3/4" Brass 8000# CS Snd	
5	1	ca	3/4" Brass 6000# CS SW	
6	1	ca	3/4" VLV Snd# CS one not Mnt RF and not d. Fract NPT 1/11 1/2 T.C. T. in	RLBM 80753 X 8932 <i>Grant</i> C/E Date 1/27
7	1	ca	2" (Sdnt 150# ASB 1/2 RF R. 74	
8	4	ca	3/4" 2" S.H 12 H B-7 12 Hex Nuts	
9	4	ca	3/4" 1/2" CS Snd	CHEV B8 5975
10	1	ca	2" 1/2" CS 30 45" LR RLBM 12110	<i>Grant</i> C/E Date 1/27

SHEET 7 OF SHEETS

BILL OF MATERIAL

JOB 33-276

DATE _____

1. 22-81 Joe Baker

DRG. NO. 1013-27721 SHEET 16

ORDER No. 64-8728

APPRO. JOB No. 10026-6173-01-34

MATERIAL REQ'D AT DEST'N BY OK-10 8-1

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(100)	Pt	1" Pipe Sails Sh 80 C.S. PE	STOCK
2	1	CN	1" Gate VLV 800# C.S. Dr and male PE, all one end female NPT 1/4" B.T. 12' x 1" Smith-812	RIBM-80753 X 8928 Grant C/FW/Dave 1/27
3	1	CN	Boss 6000# C.S. 3 W - 1"	RIBM-80752 X 8928 Keenan
4	6	CN	1" r/haw 3000# C.S. SW 90°	C/FW/Put 1/26
5	12	Pt	1" Flange 15 # C.S. R.I (H.W.) WN Sh 80 Bolt	STOCK
6	1	CN	1" Coult 150# A/B C.S. AF Ring	
7	4	CN	1/2" D x 2" Sl d Bolt Gr BT w/ 2 hex nuts	V
			R/W 1/27/81	
			1" VLV Conn to 1" pipe	
			RPEC Keenan Valve quoted 4-5 wts	DGM 1/27

SHEET / OF / SHEETS

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81 See Below

DRG. No. PD-38-32231 SHEET 2

ORDER No. BM-8924 (p. 1)

APPRO. JOB No. FG022-6173 01360

Kooima x 355

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	80	ft	Pipe 3" SMLS Sch 40 C.S. BFW	RLBM 80776 X 8924
			A53 Gr. B.	Grant Supply
2	21 45	ft	2" Pipe SMLS Sch 40 LS BFW	C/F W/David 1/27
				RLBM-80752 X 8924
3	4	ea	2' Elbow STD WT CS BW 90° LR	Keenan Supply
				C/F W/Rick 1/26
4	9	ea	3" Elbow STD WT CS BW 90° LR	
5	(1)	ea	4" Elbow STD WT CS BW 90° LR	STOCK
				RLBM-80754 X 8924
6	1	ea	6' x 4' Red Ell STD WT CS BW 90° LR	Grant Supply
				C/F David 1/27
7	(4)	ea	3" Flange 150# CS RF WN Sch 40 BSC	STOCK
8	1	ea	4' x 3" Red Ell 150# CS RF (WN) Sch 40 BSC	SLIP-ON RLBM 80752 X 8924
9	1	ea	4' x 2" (1 1/2" Red. STD WT C.S. BW)	Keenan
			X-Strong was delivered 2/3/81	C/F W/Rick 1/26
10	(4)	ea	3" Couplet 150# ASME 100 RF Ring	STOCK
11	(2)	ea	4" Couplet 150# ASME 100 RF Ring	
12	(32)	ea	5/8" φ x 3 1/2" STD bolt BT w/2 hex nuts	

BILL OF MATERIAL

JOB 33-276

DATE See Below

DRG. NO. _____

SHEET _____

ORDER NO. PM-5924 (p 2)

APPRO. JOB NO. 10022-6113-1-1-1-1

MATERIAL REQ'D AT DEST'N BY 2-16-81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	(1)	ea	4" Flange 150# CS RF WNS 5/4 40 Bre	Shut-off 1/2"
14	(1)	ea	6" Flange 150# CS RF WNS 5/4 40 Bre	Shut-off 1/2"
15	(1)	ea	6" Flange 150# CS RF SIP ON	1
16	(1)	ea	6" Flange 150# CS RF	
17	(1)	ea	6" Coupling 150# Ab Comp RF Ring	
18	8	ea	3/4" ϕ x 3 3/4" Stud Bolt B-7 w/2 N.B.	2 1/2"
19	(1)	ea	3" Bolt YLV 150# CS RF 1200 ft	
			Hi bit	
20	(1)	ea	3/4" N.B. 12000 # CS Std	
21	(1)	ea	2" x 3/4" L.S. 1200 # CS Std 2 Bol	
22	(2)	ea	2" Pl. CS Std	

SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 33-276

DATE Feb 5 1981 See Below

DRG. No. PD 38 3216

SHEET 15

ORDER NO. RLB-8991

APPRO. JOB NO. 10042-0117 4.1

K. O. O'Hara X 355

MATERIAL REQ'D AT DEST'N BY Feb 16, 1981

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(40)	ft	1" Pipe 40 ft 40 CS BFW	SHSE Stock
2	(6)	ea	3" Elbow 5/8" 40 CS BW 11" LR	
3	(1)	ea	8" Elbow 1/2" 40 CS BW 90° LS	
4	(1)	ea	5" 2" Reducer 1/2" 40 CS BW 90° LS	
5	1	ea	4" 1/4" Reducer 1/2" 40 CS BW 90° LS	RLBM 80752X8991 Conf w/ Rick Keenan
6	(1)	ea	4" 3/4" Reducer 1/2" 40 CS BW 90° LS	2/9/81 SHSE Stock
7	(1)	ea	2" Flange 1/2" 40 CS RE W/N 5/8" 40	
8	1	ea	8" Blind Flange 1/2" 40 CS RE W/N 5/8" 40	RLBM 80752X8991 Conf w/ Rick Keenan
9	(1)	ea	2" 1/2" 40 CS 90° Elbow 1/2" 40	2/9/81 SHSE Stock
10	(1)	ea	4" 1/2" 40 CS 90° Elbow 1/2" 40	
11	(4)	ea	2" 1/2" 40 CS 90° Elbow 1/2" 40	
12	(1)	ea	11" 8" 40 CS 90° Elbow 1/2" 40	

SHEET 7 OF 2 SHEETS

JOB 33-276

DATE 1-23-81

ORG. No. PD-13-29921

SHEET 21

ORDER No. BM-8933 (p. 1)

APPRO. JOB No. 21031-673-01 20

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	550	ft	4" Pipe 3mls Sch. 40 CS BFW	RLBM 80775 x 8933 Subsides c/p Charlie 1/30
2	10	ea	4" Elbow SWWE CS BW 90° LR	STOCK
3	1	ea	4" Flange 150# CS RF W/ Sch 40 bwc	
4	8	ea	3/4" Boss 6000# CS Std.	
5	8	ea	3/4" Plug CS Std.	
6	1	ea	4" Gate VLV 150# CS RF 12 Cr Tr	
7	2	ea	4" Gasket 150# Alb Comp RF ring	
8	16	ea	5/8" Bolt B7 1-1/2 hex 1.15 9/16" x 3 1/2"	
9	1	ea	6" Flange 150# CS RF W/ Sch 40 bwc	
10	1	ea	6" Gasket 150# 1.61-2 RF ring	
11	8	ea	3/4" x 3 1/2" Stud Bolt B7 1-1/2 hex 1.15	
12	1	ea	6" x 4" Plate 150# CS Std.	

SHEET 1 OF 2 SHEETS

BILL OF MATERIAL

JOB.

DATE _____

1-23-51

DRG. NO.

SHEET

ORDER No

B4 5031 (p 2)

APPRO. JOB No

2031-6700-36

MATERIAL REQ'D AT DEST'N BY

DATE _____

[illegible]

SHEET 1 OF 2 SHEETS

CHIEV B8 5981

MFG. 334 (25M 2.53)
PRINTED IN U.S.A.

QUALIFICATION OF WELDERS

SCOPE

1.0 This instruction prescribes tests to be taken for qualification of welders for general refinery welding, pressure vessel and pressure piping code welding and boiler repair welding. The tests are detailed in the following attached appendices:

- Appendix I - Pipe Test for Qualification of Metal Arc Welders
- Appendix II - Plate Test for Qualification of Metal Arc Welders
- Appendix III - Pipe Test for Qualification of Gas, TIG or MIG Welders
- Appendix IV & V - Qualification Test for Alloy Linings Using Stick Electrodes and by MIG Welding
- Appendix VI - Groove and Fillet Welding Tests
- Appendix VII - Record of Welder or Welding Operator Qualification Form
- Appendix VIII - Company Qualified Welders Form

2.0 Qualification tests in Appendices I, II and III are patterned after the "Performance Qualification" described in Section IX, Welding Qualifications, of the ASME Code.

RESPONSIBILITIES

3.0 Responsibilities

3.1 Engineering Department and Contract Coordinator shall be responsible for informing all contractors doing business with the Company of the need to adhere to this instruction in performing all welding operations.

3.2 Maintenance Foreman is responsible for:

The technique and quality of all welding.

Insuring that only qualified Company or contract welders are used on welding jobs and if not qualified, that they be trained and qualified before allowed to weld.

Seeing that Contract and Company welders identify their weld joints by metal stamping.

3.3 Inspection Department

Shall witness and conduct all welders' qualification tests. At conclusion of each test passed or failed the Inspector will complete Form No. QW-484 (App. VII) and maintain on file.

QUALIFICATION OF WELDERS

Shall maintain an up-to-date list of qualified welders and their qualifications.

Shall perform non-destructive testing to ensure all welding meets ASME, AWS and Company quality specifications

- | | | |
|---|-----|---|
| WHO SHALL
QUALIFY | 4.0 | Before welding in the refinery, all welders, both refinery and contract personnel, must pass a welder's qualification test. This includes refinery helpers at the conclusion of their training course and contractor electrical and structural welders. This test is outlined in App. VI. |
| PRESSURE VESSEL
AND BOILER REPAIRS | 5.0 | Welders selected for pipe welding and/or the repairing of code boilers and pressure vessels up to a thickness of 3/4 inch must have passed qualification tests as set forth in Appendices I or II. For welding on boiler drums, pressure vessels and piping in excess of 3/4 inch thickness, all welders must requalify for this thickness as set forth in Appendices I or II. |
| GAS, ALLOY AND
STRUCTURAL STEEL
WELDING | 6.0 | TIG or MIG welding (or any change of weld process) requires requalification for that process. All alloy welding also requires requalification. Alloy lining or cladding of pressure vessels requires requalification per Appendices IV or V. Structural steel requires requalification per Appendix VI. (Structural steel welding is defined as welding of unistrut, brackets, braces, clips, etc., to refinery pressure vessels, pipes and pipeway support or pressure vessel structures.) |
| WELDER'S
IDENTIFICATION
STENCIL | 7.0 | Upon passing one of the qualification tests, each welder, both Company and contract, shall be assigned an identification stencil. This stencil shall thereafter be used by the welder to identify his work by stamping each completed weld. Weld stenciling will be enforced by the Inspection Department and by Maintenance Foreman. When welding on long joints, such as in vessels and tanks, the welder's stencil shall be stamped at 3 foot intervals along the joint. Welds involving two or more welders shall be stenciled by <u>all welders involved</u> . |
| PERIOD OF
EFFECTIVENESS | 8.0 | A Company welder having passed the tests described will be considered qualified except when there is evidence to show he is having difficulty making welds. When such is the case, he should be further trained and re-tested. As a guide, the failure of at least three x-rays, or leakage of three welds, or not having done any welding within the last six-month interval, shall be indicative of the need to requalify. The Lead |

QUALIFICATION OF WELDERS

Equipment Inspector shall consider all extenuating circumstances before calling for requalification. It will be the responsibility of the Lead Equipment Inspector to call for welder retesting, although any Maintenance Supervisor shall suggest retesting if he feels poor welds are being made.

CONTRACTORS

- 9.0 All contract welders must be qualified at the start of the job or employment. Qualification papers from other companies or contractors will not be acceptable. A contract welder having passed the required tests will be considered qualified for the job only for the duration of his stay on the project, provided his production work remains satisfactory.

SCOPE OF
QUALIFICATION

- 10.0 Vertical welds will be made by welding in an upward direction only unless otherwise specified by the Lead Equipment Inspector and responsible Maintenance Foreman. Vertical welds made by welding in a downward direction will require separate qualification. Downhill vertical welding is not accepted by this Company for stick electrode welding, unless the welder is qualified for this position.
- 11.0 Welders qualified for metal arc welding by the Pipe Test, Appendix I, are qualified for welding plate and pipe up to and including 3/4" thick. For any material over 3/4" thick the welder must requalify by the plate test, Appendix II.
- 12.0 Welders qualified for gas, TIG or MIG welding by the Pipe Test, Appendix III, using 3" Schedule 40 pipe, are qualified for welding pipe, tubes, or plate in the wall thickness range of 1/16" to 7/32".
- 13.0 Welders qualified for welding on alloy liners are only qualified for welding on the alloy material on which they were tested.

MATERIALS

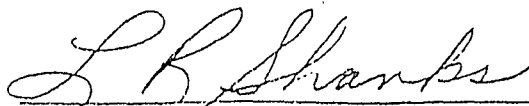
- 14.0 Schedule 80 - 6" CS pipe or Schedule 40 - 10" CS pipe will be used for all carbon steel tests. For tests involving steels over 5% chrome, Schedule 40 - 6" matching alloy pipe will be used. For tests involving other materials, electrodes and welding procedures matching job requirements will be used.

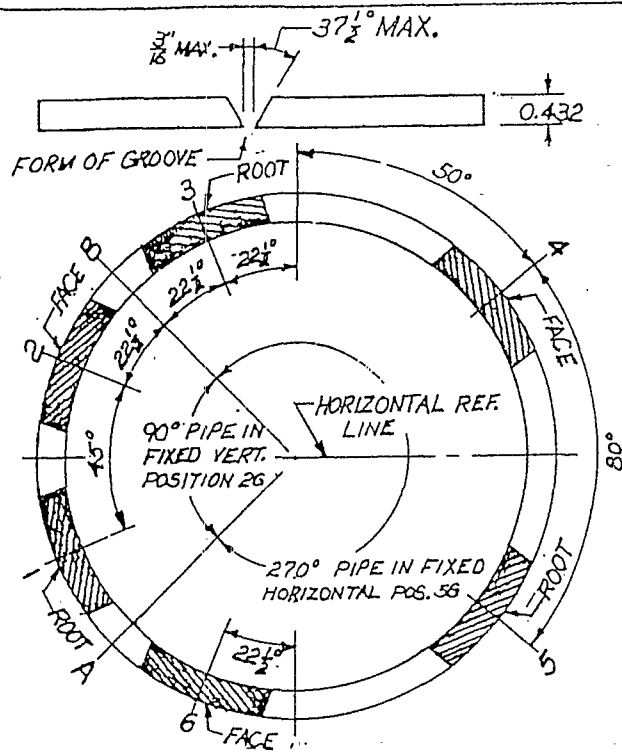
QUALIFICATION OF WELDERS

-
- | | |
|-----------------------|---|
| GUIDED BEND TEST | 15.0 The face, root and side bend specimens shall be tested in the guided bend test jig described in Figure QW-466 of the ASME Code, Section IX, Welding Qualifications. |
| SPECIMEN EXAMINATIONS | 16.0 The convex surface of the bend specimens shall be examined for cracks or other open defects. Any specimen in which a crack or open defect is present after bending, exceeding 1/8" measured in any direction, shall be considered as having failed. Cracks which originate along the edges of the specimen during testing, and that are minor in extent shall not be considered unless there is definite evidence that they result from slag inclusions or other internal defects. |
| RETESTS | 17.0 If the welder fails in one of the test positions, he may take an immediate retest by making two test pieces in the failed position. Both of the test pieces must pass the test requirements.

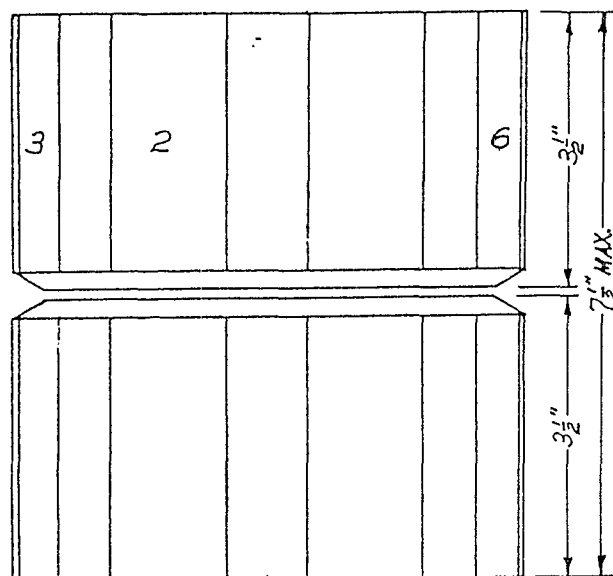
18.0 If the welder fails in <u>more than one position</u> , he shall not be allowed to take a retest until he has had additional training and practice and then a complete retest shall be made. |
| RADIOGRAPHY | 19.0 At the option of the Lead Equipment Inspector, radiography may be substituted for guided bend tests. Interpretation is per Paragraph QW 191.2.2, Section IX, ASME Code. Radiography will also be used to spot check all welders, Company and contractor, as a means of quality control. |
| DURATION OF TEST | 20.0 Each qualification test weld shall be completed in no more than <u>double</u> the time required for a production weld of the same type, or no more than one eight-hour period. Low alloy steel tests requiring pre- and post-weld heat treatment shall not be interrupted unless the preheat is maintained until welding is resumed. This is to avoid delayed cracking and hardening. Guided bend preparation and tests may be completed within a reasonable time period following the actual welding process. |
-

Original Issued 10/31/66
Revised 4/12/77 - CWW
Revised 6/19/80 - CWW

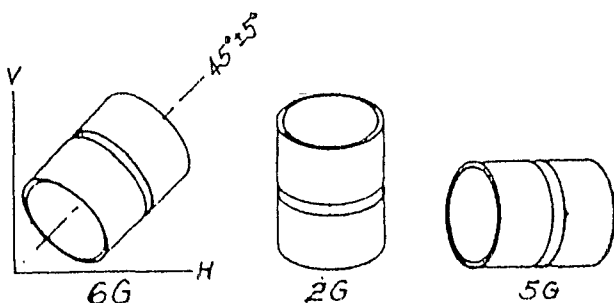

L. R. Shanks, Chief Engineer



USE 6" SCH. 80 PIPE



ASSEMBLY OF PIPE IN VERTICAL
FIXED POSITION AND LOCATION OF SPECIMENS



PIPE TEST QUALIFICATION OF METAL ARC WELDING

PREPARATION

Cut pieces from 6" Schedule 80 seamless pipe. Bevels for groove may be machined or torch cut. Tack the pieces together with four 3/4" long tack welds at locations A, B, C and D.

PROCEDURE

The method of depositing weld beads shall be consistent with regular practice. The welding speed, chipping of the weld beads, etc., shall also follow regular practice. The final reinforcing bead shall be approximately 1/16" above the parent metal.

WELDING POSITIONS

1. Position the pipe assembly with its axis fixed in the vertical position 2G. Make the root pass from A to B.
2. Position the pipe assembly with its axis fixed in the horizontal position 5G with the centerline vertical and point E at the bottom. Complete the horizontal weld.
3. Reposition the pipe assembly with its axis fixed in the vertical position 2G and complete the weld from A to B.

GENERAL INSTRUCTIONS

At the discretion of the Lead Equipment Inspector, position 6G and 2 ea. face and root bend specimens may be used in place of positions 2G and 5G. Pipe assemblies positioned for welding shall not be removed except for position change.

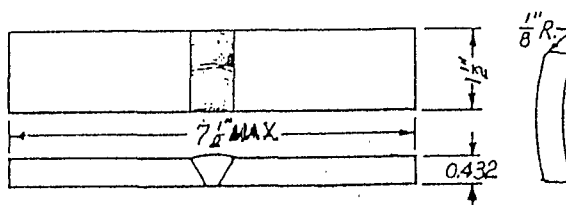
- (1) After welds are completed, lay out the torch cuts and die stamp each specimen with number indicated in sketches. Cut out the specimens and prepare and test them as detailed in sketches and supplementing notes.

Face bend specimens 2, 4 and 6
Root bend specimens 1, 3 and 5

MATERIALS

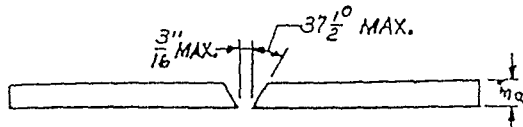
For usual qualification, welds shall be made in seamless pipe conforming to ASTM Specs. A 106 or A 153 Grade B. Weld rods shall be Type E-6010 mild steel electrodes. Qualification for welding other than carbon steel, materials for test shall be the same as the materials to be used on the job. Refer to the following Engineering Instructions for the procedures.

811 Metal Arc Welding Chrome Moly Steels
812 Metal Arc Welding 18-8 Chrome Nickel Steels
819 Welding of Monel

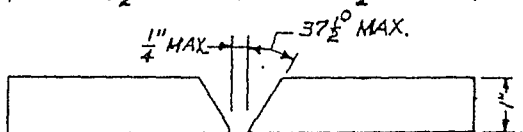
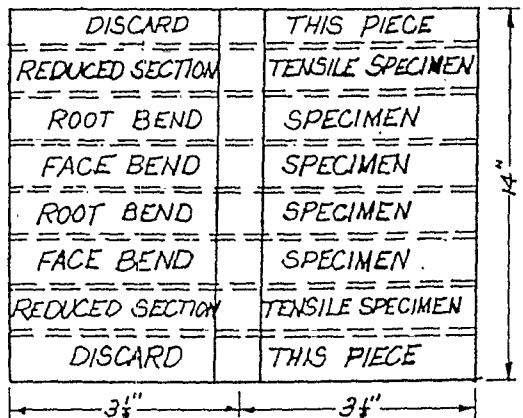


Torch cut specimens and round off corners to approximately 1/8" radius. Grind top and bottom weld surfaces flat and smooth. Specimens shall be tested in a guided bend test fig.

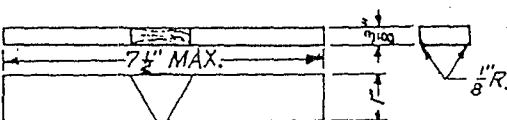
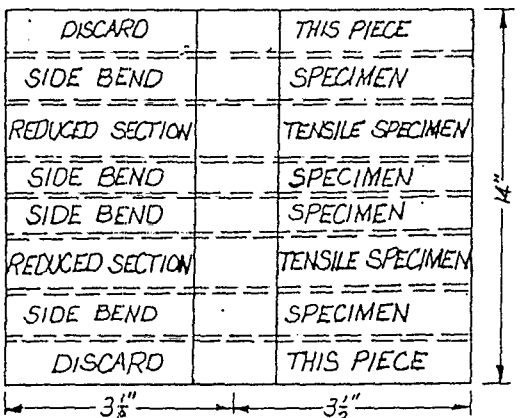
FACE AND ROOT BEND SPECIMENS



FORM OF GROOVE

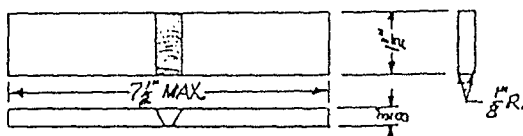


FORM OF GROOVE



Grind top and bottom weld surfaces flat and smooth. Machine sides of specimens and round off corners to approx. 1/8" radius. Specimens shall be tested in a guided bend test jig.

SIDE BEND SPECIMEN



Torch cut specimens and round off corners to approx. 1/8" radius. Grind top and bottom weld surfaces flat and smooth. Specimens shall be tested in a guided bend test jig.

FACE AND ROOT BEND SPECIMENS

PLATE TEST FOR QUALIFICATION OF METAL ARC WELDERS

PREPARATION

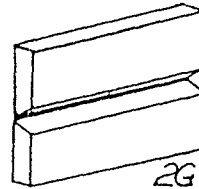
Cut pieces from plate. Bevels for groove may be machined or torch cut and chipped or ground. Tack plates together with 3/4" long tack welds. Make these complete assemblies for positions indicated below. Strongbacks may be used to hold plates in alignment.

WELDING PROCEDURE

The method of depositing weld beads shall be consistent with regular practice. The welding speed, chipping of the weld beads, etc., shall also follow regular practice. The final reinforcing bead shall be approximately 1/16" above the parent metal.

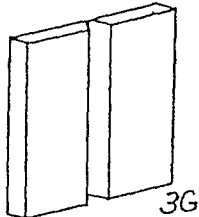
WELDING POSITIONS

HORIZONTAL WELD - Plate vertical, groove horizontal. Mark face bend and root bend specimens 1H, 2H, 3H and 4H respectively.



Position 2G

VERTICAL WELD - Plate vertical, groove vertical. Mark face bend and root bend specimens 1V, 2V, 3V and 4V respectively.



Position 3G

OVERHEAD WELD - Plate horizontal, weld groove overhead. Mark face bend and root bend specimens 1-0, 2-0, 3-0 and 4-0 respectively.



Position 4G

GENERAL INSTRUCTIONS

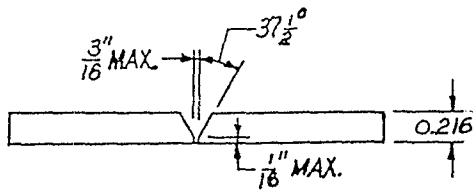
After completing welds, straighten plates. Lay out cuts and die stamp each specimen as indicated. Machine or torch cut specimens. Finish side bend specimens to 3/8" thickness. Test specimens as detailed in sketches and supplementing notes.

MATERIALS

For usual qualification, welds shall be made in firebox steel plate conforming to ASTM Spec. 285. Weld rods shall be type E-6010 mild steel electrodes.

For qualification for welding other than carbon steel, materials for test shall be the same as the materials to be used on the job. Refer to the following engineering instructions for the procedures to be followed regarding welding, preheating, heat treating, etc.

- E-811 Metal Arc Welding Chrome Moly Steels
- E-812 Metal Arc Welding 18-8 Chrome Nickels
- E-814 Welding of Monel



PIPE TEST FOR QUALIFICATION OF GAS TIG OR MIG WELDERS

PREPARATION

Cut pieces from 3" Schedule 40 seamless pipe for gas welds. Bevels for groove may be machined or torch cut and chipped or ground. Tack the pieces together with four 3/8" long tack welds at locations A, B, C and D.

PROCEDURE

The method of depositing weld beads shall be consistent with regular practice. The welding speed, chipping of the weld beads, etc., shall also follow regular practice. The final reinforcing bead shall be approximately 1/16" above the parent metal.

WELDING POSITIONS

1. Position the pipe assembly with its axis fixed in the vertical position 2G. Make the root pass from A to B.
2. Position the pipe assembly with its axis fixed in the horizontal position 5G with the centerline vertical and point E at the bottom. Complete the horizontal weld.
3. Reposition the pipe assembly with its axis fixed in the vertical position 2G. Complete the weld A to B.

GENERAL INSTRUCTIONS

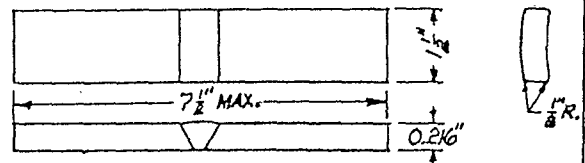
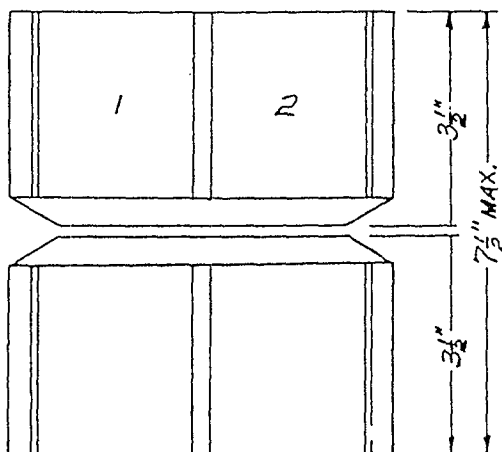
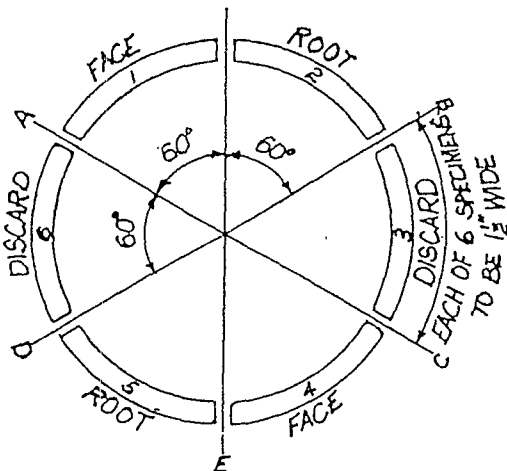
At the discretion of the Lead Equipment Inspector, position 6G and 2 ea. face and root bend specimens may be used in place of positions 2G and 5G. Pipe assemblies positioned for welding shall not be removed except for position change.

After welds are completed, lay out the torch cuts and die stamp each specimen with number indicated in sketches. Cut out the specimens and prepare and test them as detailed in sketches and supplementing notes.

Face bend specimens 1 and 4
Root bend specimens 2 and 3

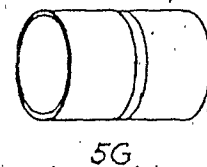
MATERIALS

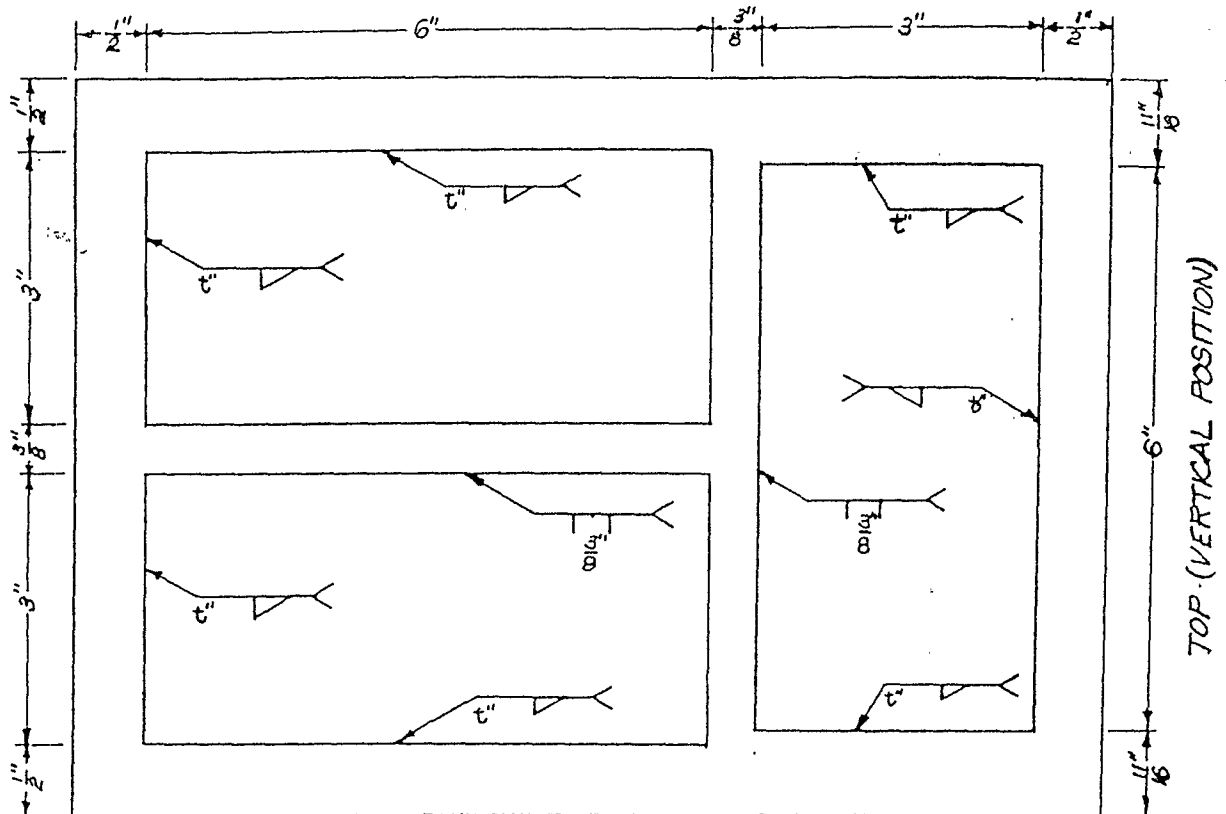
For usual qualification, welds shall be made in carbon steel seamless pipe conforming to ASTM Specs. A 106 or A 53 or API Spec. 5L. Weld rods shall be Type GA or GB gas rods for Oxy-acetylene or TIG. Weld rod shall be Linde-65 or equivalent for MIG.



Torch cut specimens and round off corners to approximately 1/8" radius. Grind top and bottom weld surfaces flat and smooth. Specimens shall be tested in a guided bend test jig.

FACE AND ROOT BEND SPECIMENS





QUALIFICATION TEST FOR ALLOY LININGS USING STICK ELECTRODES

MATERIAL

The material to be used for the test is:

One piece of carbon steel plate 7 3/8" X 10 3/8" X 1/2", grit blasted on one side.

Three pieces of alloy sheet 3" X 6". Use 13 BWG unless otherwise specified to suite a special job.

1/8" welding electrodes conforming to the specifications shown below for the alloy to be welded.

Alloy Sheet

Monel
12% Cr
18-8 Cr Ni
18-8-3 Cr Ni Mo

Weld Rod

Inconel 190
18-8 Cr Ni - AISI Type 309
25-12 Cr Ni - AISI Type 309
16-13-3 Cr Ni Mo - AISI Type 316

WELDING PROCEDURE

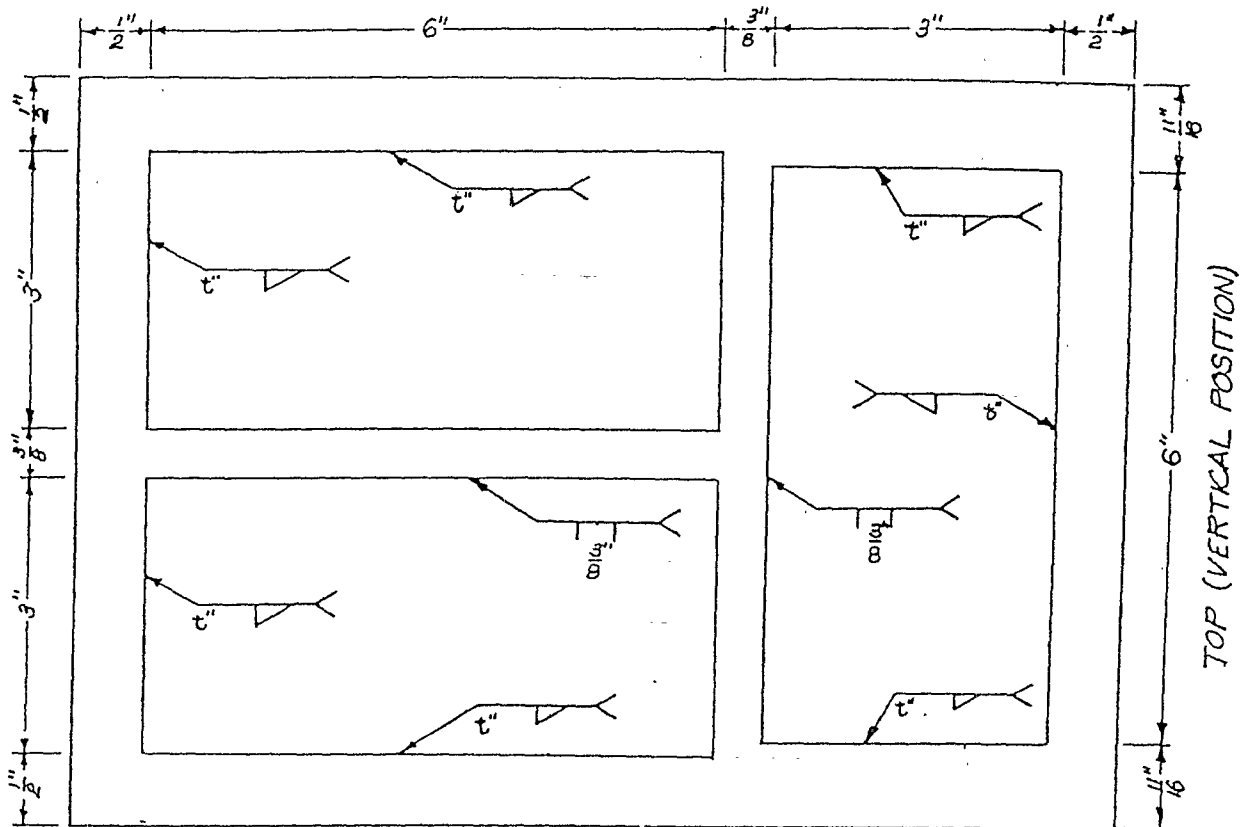
All welding shall be done at a normal pace using 1/8" welding electrodes. All vertical fillet welds are to be made downhill. Weld over the tack welds unless they appear to be cracked. If they are cracked, grind them out before welding. No other grinding or chipping will be allowed except as specifically authorized by the person witnessing the test. Avoid striking the arc or hammering directly on the alloy sheets. Arc strikes and hammer dents promote cracking and corrosion in service installations. Tack weld strips to plate and proceed with welding as follows:

1. Place the sample plate in a vertical position with the alloy pieces oriented in the positions shown in the sketch.
2. Make a single fillet weld on all sides of pieces #2 and #3. Make the vertical welds downhill. When both fillets have been put into the center groove it should be completely filled with weld metal.
3. Place the sample plate in a horizontal position with the alloy pieces on the underside.
4. Make a single fillet weld in the overhead position on all sides of piece #1. If the groove between the three pieces is not completely filled, a third pass may be used to completely fill the groove.

INSPECTION AND TEST

Upon completion of the welding, the person witnessing the test shall inspect the finished welds and supervise the preparation and test of the strips as follows:

1. Lightly grit blast all the welds to remove all slag.
2. Inspect the finished welds to see that they are neat and workmanlike. The finished welds should be approximately flush with the surface of the alloy but not more than 1/32" above it.
3. Make a Dye Check or Zygo Inspection of the welds. There shall be no cracks and not more than 2 pinholes in any single weld.



QUALIFICATION TEST FOR ALLOY LININGS USING MIG WELDING

MATERIAL

The material to be used for the test is:

One piece of carbon steel plate 7 3/8" X 10 3/8" X 1/2", grit blasted on one side.

Three pieces of alloy sheet 3" X 6". Use 13 BWG unless otherwise specified to suit a special job.

0.030" or 0.035" welding wire conforming to the specifications shown below for the alloy to be welded.

<u>Alloy Sheet</u>	<u>Welding Wire</u>	<u>Inert Gas</u>
Monel	Inco Monel 60	30 CFH Argon
11-13% Cr	25-12 Cr Ni - AISI Type 309	30 CFH 75% Argon 25% CO ₂
18-8 Cr Ni	25-12 Cr Ni - AISI Type 309	30 CFH 75% Argon 25% CO ₂
18-8-3 Cr Ni Mo	16-13-3 Cr Ni Mo - AISI Type 316	30 CFH 75% Argon 25% CO ₂

WELDING PROCEDURE

All welding shall be done at a normal pace. No grinding or chipping of the weld will be allowed except as specifically authorized by the person witnessing the test. Avoid striking the arc or hammering directly on the alloy. This promotes cracking in service installations. Assemble and weld the test sample as follows:

1. Lay out and tack the alloy samples to the steel plate as shown on the sketch. Use small tacks at the corners only.
2. Place the sample plate in a vertical position with the alloy pieces oriented as shown on the sketch and then weld as follows:
 - 2.1 Fill the center gap between pieces 2 and 3 in one pass welding downhill.
 - 2.2 Weld the horizontal gap between pieces 1 and 2 and 3 using two stringer beads.
 - 2.3 Weld a single fillet all around the outside of the alloy pieces. Make the vertical welds downhill.

INSPECTION AND TEST

Upon completion of welding the person witnessing the test shall:

1. Inspect the finished welds to see that they are neat and workmanlike. The surface of the weld shall be approximately flush with the surface of the sheet but not more than 1/32" above.
2. Make a Dye Check or Zygo inspection of the welds. There shall be no cracks and not more than 2 pinholes in any single weld.

SPECIAL GROOVE AND FILLET TEST FOR
STRUCTURAL WELDING

GENERAL

The following tests shall be used to qualify welders for structural welding only.

These tests shall be used to qualify only those welders working for contractors.

The Lead Equipment Inspector shall determine whether a groove or fillet test shall be used and if so which of the following test or tests shall be taken. He will be guided by the type of welding to be done on the job.

Use 1/4" X 2" X 9" plate to qualify on all of the following tests. Material shall be of the same composition as the material to be welded on the job. Bevel all plate to 37 degrees on the long axis for all groove welds. Use 5/32" maximum diameter electrode for groove welds. Fillet weld electrode diameter shall correspond with that used on the job. Electrode composition shall be compatible with the material being welded. Welding method for tests shall correspond with that to be used on the job (e.g., manual stick electrode, manual inert gas, etc.). Back welding shall not be required on any of these welding tests.

Evaluation of the welds shall be based on appearance and welding technique. ASME Form QW-484 shall be completed and signed by the Boiler Shop Foreman. The completed form shall state which of the following tests were taken.

Welders who pass the tests for groove welds shall also be qualified to make fillet welders in the corresponding positions. Welders who pass the tests for fillet welds shall be qualified to make fillet welds only.

TEST NO. 1 - GROOVE WELD-FLAT POSITION 1G

Plate in a horizontal plane with the weld metal deposited from above. (See Figure 1-G bottom of Page 2.)

TEST NO. 2 - GROOVE WELD-HORIZONTAL POSITION 2G

Plate in a vertical plane with the axis of the weld horizontal. (See Figure 2-G bottom of Page 2.)

TEST NO. 3 - GROOVE WELD-VERTICAL POSITION 3G

Plate in a vertical plane with the axis of the weld vertical. Deposit weld metal from bottom to top. (See Figure 3-G bottom of Page 2.)

TEST NO. 4 - GROOVE WELD-OVERHEAD POSITION 4G

Plate in a horizontal plane with the weld metal deposited from underneath. (See Figure 4-G bottom of Page 2.)

6/19/80

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SPECIAL GROOVE AND FILLET TEST FOR
STRUCTURAL WELDING

TEST NO. 5 - FILLET WELD-FLAT POSITION 1F

Plates so placed that the weld is deposited with its axis horizontal and its throat vertical. (See Figure 1-F bottom of page.)

TEST NO. 6 - FILLET WELD-HORIZONTAL POSITION 2F

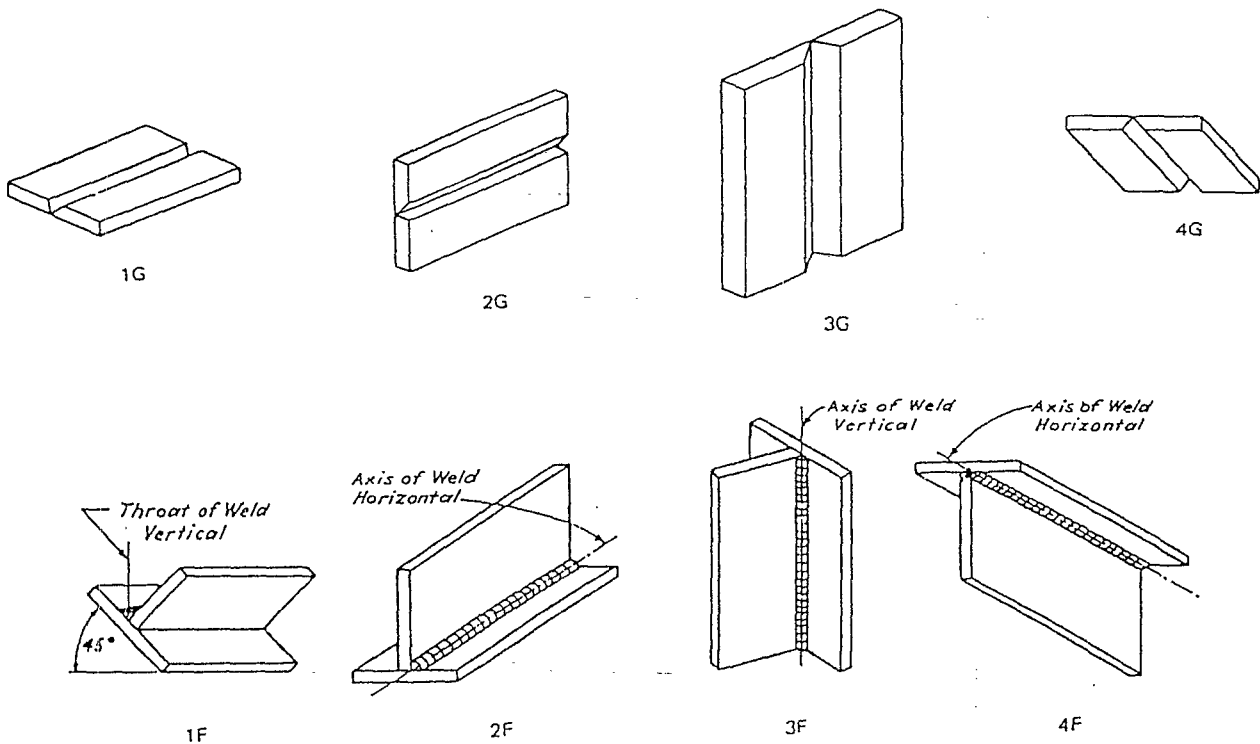
Plates so placed that the weld is deposited with its axis horizontal on the upper side of the horizontal surface and against the vertical surface. (See Figure 2-F bottom of page.)

TEST NO. 7 - FILLET WELD-VERTICAL POSITION 3F

Plates so placed that the weld is deposited with its axis vertical. Deposit weld metal from bottom to top. (See Figure 3F bottom of page.)

TEST NO. 8 - FILLET WELD-OVERHEAD POSITION 4F

Plate so placed that the weld is deposited with its axis horizontal on the underside of the horizontal surface and against the vertical surface. (See Figure 4F bottom of page.)



**QW-484 SUGGESTED FORMAT FOR MANUFACTURER'S RECORD OF WELDER OR WELDING OPERATOR
QUALIFICATION TESTS**
(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder Name _____ Check No. _____ Stamp No. _____
Welding Process _____ Type _____
In accordance with Welding Procedure Specification (WPS) _____
Backing (QW-402) _____
Material (QW-403) Spec. _____ to _____ of P-No. _____ to P-No. _____
Thickness _____ Dia. _____
Filler Metal (QW-404) Spec. No. _____ Class No. _____ F-No. _____
Other _____
Position (QW-405) (1G, 2G, 6G) _____
Gas (QW-408) Type _____ % Composition _____
Electrical Characteristics (QW-409) Current _____ Polarity _____
Weld Progression (QW-410) _____
Other _____

For Information Only

Filler Metal Diameter and Trade Name _____
Submerged Arc Flux Trade Name _____
Gas Metal Arc Welding Shield Gas Trade Name _____

Guided Bend Test Results QW-462.2(a), QW-462.3(a), QW-462.3(b)

Type and Fig. No.

Result

Radiographic Test Results (QW-304 & QW-305)

For alternative qualification of groove welds by radiography

Radiographic Results: _____

Fillet Weld Test Results [See QW-462.4(a), QW-462.4(b)]

Fracture Test (Describe the location, nature and size of any crack or tearing of the specimen) _____

Length and Per Cent of Defects _____ inches _____ %

Macro Test—Fusion _____

Appearance—Fillet Size (leg) _____ in. X _____ in. Convexity _____ in. or Concavity _____ in.

Test Conducted by _____ Laboratory—Test No. _____

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Sections IX of the ASME Code.

Date _____ Organization _____
By _____

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

NOTE: Any essential variables in addition to those above shall be recorded.

CHEV B8 5993

EL PASO REFINERY

EQUIPMENT INSPECTION SECTION

APPENDIX VIII
ENG. INSPN. EP-2200
SHEET _ OF _

CHEV B8 5994

H

J

K

LIST OF MATERIALS

8493

Job No. 11-102

Lot No. 8102-73

Accounting Charge No. 9110-22-501-11-73

Draftsman: G.T.A. P. 388

DATE REQUIRED: 7-19-80 Date 6-25-80

Engineer: K. R. A. - 225 Lead Engr: J. W. - 320

FOLLOW-UP PER ENGR. INSTR. EP-2088 (YES) (NO)

MR. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. Dtl. DA
1	L 6	70	3"	Sm. S. L. Pipe SCH 40	RLBM 80775X189	
2					C/FW/Rick 7/7	
3	L 108	1	3"	Stl. 45° B.W. Elbow L.R. Std. Wt.	RLBM 80775X189	
4	L 108	1	4"	" " " " " "	STOCK	
5	L 113	7	3"	" 90° " " " "	RLBM 80775X189	
6	L 149	5	3"	150° B.W. Flg. 1/2" RF SCH 40	STOCK	
7	L 149	1	4"	" " " " " "		
8	L 111	1	4x3"	Stl. Conc. Red. B.W. Std. Wt.		
9	L 151	3	3"	150° 1/2" Thr. Asb Comp. Gasket		
10	L 151	1	4"	" " " " " "		
11	H 261	10	5/8" x 3/4"	Stl. Hex Bolt Gr B7y. 2 Hex Nuts		
12		20	L 3x3 1/2"	Angle Iron	RLBM 1-606X189	
13		1	8x3/4"	Stl. Flute	RLBM 1-606X189	
14		1	3x3/4"	" " " " " "	C/FW/Rick 7/7	
15		2	L 5.5 x 3.5 x 1/2"	Angle Iron		
16		14	5/8" x 2"	Nut & Bolt 1/2" x 2" x 1/2" Nut	STOCK	
17						
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30						
31						
32						

M. E. SHERRILL

JUL 2 1980

8494

Accounting Charge No. 8116-620-1752

DATE REQUIRED: 2-15-80 Date 5-7-80

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
L6	150#	3"	Sm ls. stl. Pipe Sch 40	Rt. Bm 504775 x 8494	
L108	1	3"	Stl. 45° B.W. Elbow LR Std. Wt.	Sub Sales C/Fc Rt. Bm 50154 x 8494	
L111	(1)	4x3"	Stl. Conc. Red. B.W. Std Wt.	Grant C/Fc Rt. Bm 50154 x 8494	
L113	8	3"	Stl. 90° B.W. Elbow LR Std Wt.	Stock	
L149	(7)	3"	150# FS W. 4" Flg. 1/6 RF Sch 40	Rt. Bm 50154 x 8494	
L146	2	4"	" " " " " " " " " " " "	Stock	
L302	1	8x4"	Welded FS and 2x4 Std Wt.	DEL 12	
L151	(4)	3"	150# 1/6 Thk. Asb. Comp. Gasket	Stock	
L151	2	4"	" " " " " " " " " " " "	DEL 11	
H26	(20)	5/8x3/4"	Stud Bolt Gr B7 W/2 Hex Nuts	Stock	
L119	(1)	3/4"	3000# Stl. Weld. Boss, threaded		
L77	(1)	3/4"	300 Stl. Bar Stock, Plug Rd. Hd.		
L124	(1)	3"	150# FS Flg. 1/6 RF Sch 40		
L124	1	4"	" " " " " " " " " " " "	DEL 11	

T. E. SHERRILL

JUL 2 1980

● BILL OF MATERIAL ●

JOB 16-402, CAUSTIC INJECTION

DATE 5-2-80

DRG. No. _____ SHEET _____

ORDER No. RDBM-8393

APPRO. JOB No. 00010 ~~8393~~ - 8116-02-36

KEN ASTIN 356 MATERIAL REQ'D AT DEST'N BY 5-6-80 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(2)	EA.	WELDOLET, 8" RUN X 4" BRANCH, STD. WT., C.S., B.W.	5.6-80 BIS RDBM-81754x8393
2	(2)	EA.	FLANGE, 4", 150# C.S., WN, R.F., SCH. 40 BORE.	Frank Supply C/F w/ Baker 5/6
3	2	EA.	BLIND FLANGE, 4", 150# C.S., R.F.	STOCK
4	2	EA.	GATE VALVE, 4", 150# C.S., R.F., 12CR. TRIM., <u>FULL PORT</u>	STOCK
5	4	EA.	GASKET, 4", 150# ASB. COMP. R.F. RING.	STOCK
6	32	EA.	STUD BOLT, 5/8 x 3/4, B-7 w/ 2 NUTS END USE: NO. 6 C.V. CAUSTIC INJECTION FACILITY	STOCK

WMS 5/2/80

RMS 5/6/80

OF MATERIAL.

AUSTIC INJECTION DATE 4-28-80

SHEET

ORDER No. RDBM - 8374

APPRO. JOB NO. 360-8116-02-00006

APPRO. JOB NO. ³⁰⁰

Austin EX. 356

MATERIAL REQ'D AT DEST'N BY 5-30-80

DATE _____

[illegible]

SHEET OF SHEETS

LIST OF MATERIALS

Job No. 16-402

List No. BM-8361-1

Accounting Charge No. 5-30-80

Draftsman CARLOS HERMOLLO

DATE REQUIRED: 5-8-80

Engineer: KRA

Lead Engr: GMH

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

AMK NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L11GA1A	220	1/2"	PIPE 3MLS SCH 80 CS FEE	BM-8300	
2	L34GAEU	1	3/4" x 3"	WIPPLE SCH 80 CS DBE	BM-8361	
3	L20KAZ7	1	1/2"	GATE VLV 800 LB. CS M-F/SW SCRD		
4	L20KAHE	1	3/4"	GATE VLV 800 LB. CS SW 12CR RF		
5	L22JNRAF	1	3/4"	CHECK VLV 600 LB. CS SW 12CR LIFT		
6	L30SBD4	2	3/4"	ELBOW 3000 LB CS SW 45-DEG		
7	L30SBD5	4	3/4"	ELBOW 3000 LB CS SW 90-DEG		
8	L31SBD	2	3/4"	TEE 3000 LB CS SW		
9	L55NAIDB	1	3/4"	REDUCER EXTRA STRONG, CS BW ECC.		
10	L40FA3DG	1	2"	FLANGE 300 LB. CS RF WN		
11				SCH 80 BORE		
12	P319	5	1/2"	RED HEAD SELF DRILLING ANCHORS		
13		2		F12 (PHILLIPS DRILL CO.)		
14	L61FGC		3/4"	FL 6X6X1/2		
15	L61FGC	1	2"	GASKET 300 LB 304/ASB SPIRAL WND		
16	L40FA3DG		3/4"	FLANGE 300 LB CS RF WN		
17				SCH 80 BORE		
18	L34SBDH	1	3/4"	COUPLING 3000 LB CS SW		
19		1		PLATE - 3X3X1/4		
20	L370ABW	1	3/4"	PLUG CS SCRD		
21		1	3/4"	PIPE CLAM (McMASTER-CARR)		

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LIST OF MATERIALS

6-402

List No. BM-8358

Accounting Charge No. 360-8116-08-27753

NAME CARLOS HERMOSILLO Ph-389

DATE REQUIRED: 4-23-80 Date 4-17-80

er: K.R.A.

Lead Engr: G.M.H.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

[illegible]

CHEV B8 6005

END USE: #6 C.O. CRUSTIC

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LIST OF MATERIALS

060

List No. 8386

Accounting Charge No. E/38-01-570

PM

DATE REQUIRED: 5-5-80

Date 4/30/80

M. 3/2

Lead Engr: CRP

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO).

1

QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
60	3"	PIPE 3MLS CS SCH 40 BFW		
4	3"	GATE VALVE 300LB RF CS FLGD BB		
11	3"	FLANGE, WN 300LB RF FS SCH 40		
2	3"	FLANGE, BLIND 300LB FS		
2	4"	FLANGE, WN 150 LB RF FS SCH 40		
1	1 1/2"	" " 300LB " " "		
1	1 1/2"	" BLIND " " "		
2	3/4"	FLANGE WN 150LB FS RF SCH 80		
5	3"	TEE, STRGHT STD WT BW CS		
2	4X3	REDUCER CONC. BW CS STD WT		
6	3"	ELBOW 90° LRCS BW STD WT		
1	1 1/2"	ELBOW " " " " XS		
1	2"	" " " " " STD WT		
8	1"	" " " " " XS		
4	1"	TEE, STRGHT XS BW CS		
2	3/4"	PLUG RD HD FS SCRD		
16	5/8 X 3/2	STUD BOLTS B-7 ALLOY W/2 HEX NUTS		
104	3/4 X 4"	" " " " " " "		
1	3/4"	BOSS 6000 LB SW FS		
1	1 1/2"	" " " " " "		
2	3/4"	GASKET 150 LB SPRAL WND SS 304 ASB RF		
1	1 1/2"	" 300LB " " " " " "		
1	2"	" 150 LB " " " " " "		
13	3"	" 300 LB " " " " " "		
2	4"	" 150 LB " " " " " "		
5	3/4	VALVE, GATE 800LB FS MALE SW/BW FEM. SCRD		
2	1 X 3/4"	SWAGE NIPPLE CONC BBE SCH 80		
1	2 X 1	" " ECC " " "		
1	2"	FLANGE WN 150 LB RF SCH 40		
5	1"	GATE VALVE FS 800LB SW VOGT SW-13111 OR EQ.		
1	1"	GLOBE VALVE FS 800LB SW VOGT SW-12141 OR EQ.		
		PIPE 1/2" CS SCH 80 PE		

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1	4	5/8 X 3	" " " " " "	
	1	1" X 4" L ₆	NIPPLE CS SCH 80 TOE-POE	
	4	3/4 X 3 1/2	STUD BOLT B-7 ALLOY W/2 HEX NUTS	
2011	1	3/4"	ELBOLET SW SCH 80 FS	
	1	3/4"	ELBOW SW 3000 LB FS 90° LR	
2	1	1 X 3 1/4"	SWAGE NIPPLE CS SCH 80 BSE-TLE CONC <i>special</i>	
	2	0-100 #	PRESSURE INDICATOR 6" DIA	
		3'-0" L ₆	MILD STEEL ANGLE 2 X 2 X 1/4	
	1	1"	PIPE CLAMP	

CRP 7/30/80

8 P 38016 - 3" NI
D-3809 COALESCER IN TURBO-STREAM
DESULFURIZER PLANT
PLANT 38

APPROVED	L	W.O.	PD-38-32116	CHEV B8 6007
CRP 7/30/80		S.O.		

LIST OF MATERIALS

Job No. 38-060

List No. 8386

Accounting Charge No. 8138-01-570

Draftsman MPM

DATE REQUIRED: 5-5-80 Date 4/30/80

Engineer: THM 312

Lead Engr: CEP

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DATE
1	L 6	(60)	3"	PIPE 5M2S CS SCH 40 BEM	STOCK	
2	L 130	4	3"	GATE VALVE 300LB RF CS FLD BB	STOCK	
3	L 236	11	3"	FLANGE, WN 300LB RF FS SCH 40	STOCK	
4	L 143	(2)	3"	FLANGE, BLIND 300LB FS	STOCK	
5	L 149	2	4"	FLANGE, WN 150LB RF FS SCH 40	STOCK	
6	L 236	(1)	1 1/2"	" 300LB " " SCH 80	STOCK	
7	L 143	(1)	1 1/2"	" BLIND " " " "	STOCK	
8	L 149	2	3/4"	FLANGE WN 150LB FS RF SCH 80	STOCK	
9	L 117	5	3"	TEE, STRAIGHT STD WT BW CS	STOCK	
10	L 111	(2)	4X3	REDUCER CONC. BW CS STD WT	STOCK	
11	L 113	6	3"	ELBOW 90° LRC CS BW STD WT	STOCK	
12	L 114	(1)	1 1/2"	ELBOW " " " X S	STOCK	
13	L 113	(1)	2"	" " " STD WT	STOCK	
14	L 114	8	1"	" " " X S	STOCK	
15	L 105	4	1"	TEE, STRAIGHT XS BW CS	STOCK	
16	L 77	(2)	3/4"	PLUG RD HD FS SCRD	STOCK	
17	H 261	(16)	5/8 X 3 1/2	STD BOLTS B7 ALLOY W/2 HEX NUTS	STOCK	
18	H 262	(104)	3/4 X 4"	" " " "	STOCK	
19	L 120	(1)	3/4"	BOSS 6000 LB SW FS	STOCK	
20	L 120	1	1 1/2"	" " " "	STOCK	
21	L 159	(2)	3/4"	GASKET 150LB SPRAL WND 85304 A58 RF	STOCK	
22	L 160	(1)	1 1/2"	" 300LB " " " "	STOCK	

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LIST OF MATERIALS

38-060

List No. 8386

Accounting Charge No. E/3E-01-570

MPM

DATE REQUIRED: 5-5-80 Date 4/30/80

JHM 3/2

Lead Engr: CRP

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO).

ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
L 6	60	3"	PIPE SMLS CS SCH 40 BFW		
L 130	4	3"	GATE VALVE 300 LB RF CS FLGD BB		
- 236	11	3"	FLANGE, WN 300 LB RF FS SCH 40		
L 143	2	3"	FLANGE, BLIND 300 LB FS		
L 149	2	4"	FLANGE, WN 150 LB RF FS SCH 40		
- 236	1	1 1/2"	" " 300 LB " " "		
L 143	1	1 1/2"	" BLIND " " "		
L 149	2	3/4"	FLANGE WN 150 LB FS RF SCH 80		
L 117	5	3"	TEE, STRGHT STD WT BW CS		
L 111	2	4X3	REDUCER CONC. BW CS STD WT		
13	6	3"	ELBOW 90° LRCS BW STD WT		
- 114	1	1 1/2"	ELBOW " " " " XS		
- 113	1	2"	" " " " " STD WT		
- 114	8	1"	" " " " " XS		
L 105	4	1"	TEE, STRGHT XS BW CS		
L 77	2	3/4"	PLUG RD HD FS SCRD		
H 261	16	5/8 X 3/2	STUD BOLTS B-7 ALLOY W/2 HEX NUTS		
H 262	104	3/4 X 4"	" " " " " " "		
L 120	1	3/4"	BOSS 6000 LB SW FS		
- 120	1	1 1/2"	" " " " "		
L 159	2	3/4"	GASKET 150 LB SPRAL WND SS 304 ASB RF		
- 120	1	1 1/2"	" 300 LB " " " " "		
L 159	1	2"	" 150 LB " " " " "		
- 160	13	3"	" 300 LB " " " " "		
- 159	2	4"	" 150 LB " " " " "		
L 20 KAZ	5	3/4	VALVE, GATE 800 LB FS MALE SW/BW FEM. SCRD		
L 191	2	1 X 3/4"	SWAGE NIPPLE CONC BBE SCH 80		
190	1	2 X 1	" " ECC " " "		
- 149	1	2"	FLANGE WN 150 LB RF SCH 40		
- 145	5	1"	GATE VALVE FS 800 LB SW 106T SW-13111 OR EA.		
- 296	1	1"	GLOBE VALVE FS 800 LB SW 106T SW-12141 OR EA.		
-	1	1"	PIPE SMLS CS SCH 80 PE		

OB 38-061

ORG. No.

SHEET

ORDER No.

SUPPLEMENT #1

APPRO. JOB NO. 8138-02-360-0070T

305 X 386

MATERIAL REQ'D AT DEST'N BY 12-3-80

DATE

M	QUANTITY	UNIT	DESCRIPTION	REMARKS
	(15)	FT	2" PIPE SMLS C.S.	STOCK
			SCH 40 BFW	
2	(41)	FT	2" HR ITEM 1	
8	(6)	EA	2" FLANGE W.N. C.S.	
			150lb RF SCH 40	
10	(1)	EA	1" FLANGE W.N. C.S.	
			300lb RF SCH 80	
11	(2)	EA	2" GATE VALVE 150lb RF	
			C.S., 12 CR	
15	(1)	EA	2" ELBOW STD WGT C.S.	
			90° LR BFW	
14	(4)	EA	3" PER ITEM 13	
16	(1)	EA	1" X 2" SCKET x S C.S.	ALBm 80752 X 8 Keenan C/F Rirk 1 1/2"
20	(1)	EA	1" GASKET 300lb 304/ASB	
			SPIRAL WND R.F.	

SHEET 1 OF 2 SHEETS

MFG. 33
PRINT

CHEV B8 6011

BILL OF MATERIAL

JOB 356-061

DATE 11-20-80

DRG. No. _____ SHEET _____

ORDER No. BM-8780

Supplement #1

APPRO. JOB NO. ^{BOJ01/}8138-02-360

BOS X 356

MATERIAL REQ'D AT DEST'N BY 12-3-80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
32	2	EA	2" GASKET 150lb 304/304B SPRAL WND RF	Stock
24	12	CA	5/8" x 3" STUD BOLTS B-7 W/2 HEX NUTS	
33	1	EA	3/4" Thick Plate S&H per ASTM A 36 (Flange) 7" DIA	RLBm-6027x.8780 Ramsey C/E W/ Ant 11/21
34	1	EA	5 1/2" DIA 3/4" Thick Thick Steel per ASTM A-36 (Flange)	
35	1	EA	2" Tee STRAIGHT CS BW STD WT	
36	1	CA	5" x 2" Rectangular Lobe CS STD WT BW	
BOT 11/20/80 <i>[Signature]</i> END 1/25/81 <i>[Signature]</i> 10 Slip Tank				<i>[Signature]</i> 11/21

SHEET 2 OF 2 SHEETS

3. Absorber Operation

The principal factors affecting absorber performance are the quantity and temperature of the lean oil and the pressure in the tower.

Decreasing temperature and increasing oil rate enhance gas absorption and lower the content of a given constituent, propane for example, in the overhead. If a lean oil rate greater than the anticipated rate is used, the absorber should be closely watched for indication of priming. An obvious limitation on lean oil temperatures is the capacity of the lean oil coolers. The lowest temperature obtainable at a given flow is that to be had with the coolant to the lean oil coolers at maximum. Minimum lean oil cooling, then becomes a function of cooling water supply temperature to the lean oil cooler of the sponge oil absorber and the air temperatures to the lean oil cooler of the absorber. The absorber top pressure should be considered as essentially invariant, at its design value. The extent of absorption effected can be controlled to a large extent by varying the temperature of the lean oil entering the top of the tower.

4. Gasoline Stripper Operation

Combined high pressure distillate (unstable gasoline) entering the gasoline stripper is reboiled by steam in the reboiler and stripped of ethanes and lighter hydrocarbons.

The variable controlling the amount of ethanes retained in the bottom of the stripper is primarily steam to the reboiler.

5. Debutanizer Operation

The debutanizer overhead system will be operated to produce a liquid propane-butane (C_3 - C_4) product from the reflux drum. This material, which is to contain not more than 5.0 volume percent pentane flows

through the C₃-C₄ scrubber in which the hydrogen sulphide (H₂S) content is reduced to 0.1 mol. percent maximum before flowing to C₃C₄ product line.

The tower may be run for maximum overhead butane (C₄) production, in which case the temperature will be set to give minimum C₄ content in the bottoms, consistent with, minimum pentane (C₅) in the overhead, as judged by analysis. Alternately, the aim may be to keep appreciable quantities of butanes in the bottoms, in which case the debutanizer bottom temperature will probably be set according to the simple specific criterion of gasoline vapor pressure. It is expected, however, that the former operation will be the case.

Reflux rate is the main determinant of the degree of fractionation - that is, of fineness of separation between overhead and bottoms. The greater the reflux, the better will be the fractionation. As already mentioned, reflux rate should be at least as high as the designed value. In this connection, raising the reflux rate automatically increases the amount of reboil heating, so that maximum reboiler capacity is another limitation on reflux rate.

6. Gasoline Splitter Operation

Feed to the gasoline splitter is composed of butanes, pentanes, and hydrocarbons in the higher boiling range.

The tower is operated to produce a 220°F endpoint light gasoline product which will contain all the butane and pentanes in the overhead product. The primary variable for this product is the tower top temperature, which is raised or lowered for the desired endpoint.

Intermediate gasoline is withdrawn from roughly the mid-section of the tower into the intermediate gasoline product line. The temperature

of the splitter draw-off tray is raised or lowered to control the endpoint of the intermediate gasoline by increasing or decreasing product discharge rate. An increase in splitter bottom and/or top temperature will of course also affect the distillation of the intermediate product unless adjustments are made to the heat input to the stripper reboiler and/or to the product withdrawal rate from the stripper.

The intermediate gasoline will normally be run for an overpoint of not less than 215°F and an endpoint not less than 340°F.

The heavy gasoline with drawn from the bottom of the gasoline splitter shall have an over point of 335°F.

841 COKING SECTION (10)1. Coking

The reduced crude (feed) to the coking section is from an existing vacuum unit. The feed is charged to Accumulator 15-F and the excess is charged to the storage tanks 1506 and 1507. The feed is then fed from the accumulator to 11-C and 7-C heavy gas oil exchangers and then passed to fractionator 1-E. The flow is regulated by flow controller FRCa-101. Reflux (heavy gas oil recycle) drops into the feed at this point and the combined feed flows to the furnace charge pump 8-J or 8-JA through the tower bottoms line. The discharge of 8-J to the four parallel coils in furnace 1-B under control of FRC-102, 103, 104, and 105. Here the charge is heated to a coking temperature around 935°F.

The coil outlets are manifolded in an 8" line, thence to the Wilson-Snyder valve, to either of the two coke drums, 1501 or 1502, through a bottom inlet line.

After coke separation, the gases move through individual vapor lines to a common vapor line, to the fractionator below the wash baffles, thus completing the feed/coking cycle.

2. Fractionation

The ascending vapors in the fractionator are fractionated into four streams: heavy gas oil (HGO), light gas oil (LGO), lean oil, and overhead vapors.

HGO is drawn from the pan below baffle five, by intermediate reflux pump 7-J. The discharge of 7-J is split into two streams, part passing through TRCE-103, returning to the fractionator, below the HGO draw off pan, and the balance through 7-C exchanger (reduced crude to HGO), to

8-C (185 lbs steam generator). The effluent from 8-C passes through boiler feed water heater 9-C after which the stream is split. Part of the stream passes through flow controller FRCa-106, and returned to fractionator at first baffle as intermediate reflux. The balance of unstripped HGO flows through heat exchanger 11-C to air cooler 10-C, and then pumped to battery limit by HGO product pump 17-J released through level controller LC-101.

LGO is drawn from tray thirteen, through LC-103 to the top of the stripper. After stripping, the LGO flows through stripper bottoms line, to LGO product pump 6-J to air cooler 6-C, where the flow splits. Gland oil supply is released and controlled by PCV-103, to pump glands and returned to fractionator. The balance of LGO flows to battery limits as product through FRCa-109.

The lean oil is drawn from the third tray and divided, one stream passes through LV-102 to the top of the stripper. After stripping, lean oil flows through bottoms line to secondary lean oil pump 5-J then through 5-C air cooler then to absorber tower 3-E above the first tray. The second stream, unstripped, flows to top circulation pump 4-J, then to 3-C air cooler. The flow from 3-C is divided again. One stream through TRCe-104 to the first tray of the fractionator as reflux. The balance of the unstripped lean oil flows through 4-C air cooler, to primary lean oil pump 9-J. The discharge of 9-J passes to FRCa-108 where the flow is manifolded to reflux either the eighth tray or joins the stripped lean oil to the first tray of the absorber tower 8-E. Lean oil flows down the tower countercurrent to rich gas and flows back to the fractionator under pressure through LC-108, as rich oil. The rich oil combines with the normal reflux stream before entering the

the fractionator. Fractionator overhead vapors pass to air coolers 1-C (two parallel streams) and to low pressure separator 1-F. The liquid separates from the vapor and flows to L.P. distillate pump 1-J. The discharge 1-J is then released through LC-105 and enters the compressor discharge line. The combined stream flows through air cooler 2-C into high pressure separator 2-F.

3. Gas Compression

The vapors from the L.P. separator flow through and pressure controller PRC-101 (suction damper) to compressor 2-J. The discharge of compressor flows through and joints the bubble tower overhead distillate and flows through air coolers 2-C to high pressure separator 2-F. The condensed liquid from the compressor discharge and bubble tower overhead distillate combined stream flows through bottom line to gasoline product pump 3-J and LC-107 level control valve to battery limits. The gas passes from the high pressure separator to the absorber 3-E entering below tray 30 thence passes up the tower countercurrent to down flowing lean oil. The overhead of the absorber tower passes through and pressure controller PRC 102 and FR 102 to the fuel gas system.

4. Foul Condensate

Water which accumulates in the low pressure separators is released by level control valve LC-104, water accumulated in the high pressure separator is released by level control valve LC 106, and water accumulated in the bubble tower top tray draw off pot will be released into joining stream and flow through to surge drum 10-F. The bottom from the surge drum passes to the suction of foul condensate stripper feed pump 18-J and discharge through level control LC-110 to supply reflux drum.

The balance passes through to the top of 4-E foul condensate stripper. Condensate flows down through the packed section of the stripper tower countercurrent to the steam entering the bottom of the tower and passes out the bottom under level control LC-111 to sewer. Hydrogen sulfides and steam flow out the top of 4-E through pressure control valve PCV-102 to SP-6 feed heater to join the steam flow. These streams combine with water streams and flow to the surge drum 10-F where hydrogen sulfide and water vapor are released to 1-B heater and 15 flare.

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to alert operators of an impending high or low level.

A start up connection immediately down stream of the level control valve LRC-1001 is used during start up to deliver reflux to the fractionator with the low pressure distillate pump until stable top reflux flow is possible with the fractionator top circulating pump.

5. Recovery System

The gas resulting from separation in the low pressure separator leaves the top of the separator and flows into compressor suction knock out drum 118-F where entrained liquid settles out, and thence to the suction of the coker gas compressor via the "A" valve of PRC-1000.

Gas from fuel gas system is supplied to the compressor suction system for make up via the "B" valve of PRC-1000. An emergency release, PIC-1002, which releases to the relief valve discharge system has also been provided. The coker gas compressor discharge flow, splits into a kickback flow throttled by FIC-1016 and a forward flow which is joined by liquid hydrocarbon flow from the low pressure separator, liquid hydrocarbon flow from existing unit 841 and hydrocarbon vapors from gasoline stripper 204-E. The combined flow then proceeds via the compressor after condensor into high pressure separator drum 102-F. The gas and liquid separates in the high pressure separator. Any water separated here is drawn off under level control LC-1013 and passes on to the foul condensate drum 112-F along with water from low pressure separator and the fractionator tray drain.

Hydrocarbon liquid is withdrawn from the high pressure separator by high pressure distillate pump 105-J and normally discharge under cascade control (LRC-1017) resetting (FRC-1012) to gasoline stripper 204-E. The flow may also be diverted to the suction system of the

debutanizer feed pump 207-J in the event the gasoline stripper is shutdown. When this is the case, the debutanizer feed pump may flow its normal path (to the debutanizer) or be directed to offsite stablization facilities via line 0-238 and the C_3 - C_4 product line.

6. Absorber 103-E

The gas from the high pressure separator leaves the top of the separator and enters the absorber 103-E at a point below the lowest tray (tray #31). From this point it continues upward through the tower trays and down flowing lean oil, after which it leaves the top of the absorber is measured by FR-1033 and enters sponge oil absorber 104-E.

7. Sponge Oil Absorber 104-E

Gas from absorber 103-E enters the sponge oil absorber 104-E below the lowest tray (tray #16) and rises through the tower trays and down flowing lean oil to the top of the tower. It then leaves the top of the sponge oil absorber, is measured by FR-1034, and throttled by PRC-1001 to maintain the desired tower pressure. It then enters knock out drum 201-F and flows from here to fuel gas scrubber 201-E.

8. Foul Condensate System

Foul condensate from the sources (101-F, 102-F, and 101-E) previously mentioned enters the foul condensate surge drum 112-F via eductor 105-L and the "mixing tee" THIC-1017 senses the temperature down stream of the "mixing tee" and injects steam into the condensate accordingly. Condensate accumulating in the foul condensate surge drum is pumped by water pump 124-J to foul condensate stripper tower 106-E. The discharge flow of the foul water pump is throttled by LC-1007 in order to maintain a level in the foul condensate surge drum.

Condensate entering the foul condensate stripper sewer is contacted with stripping steam which enters the tower under manual control below the lowest tray. Stripped condensate is pressured out the bottom of the condensate stripper to sewer under control of LRC-1006. Overhead gases leave the tower top under control of PCV-1039 and enter the condensate surge drum via the "mixing tee." Gas (H_2S) separated from the liquid in the condensate surge drum flows to a three-way valve for divergence to either the burners in coker furnace 101-BA and 101-BB or the relief system.

GASOLINE FRACTIONATION SECTION (200)1. Fuel Gas Scrubber 201-E System

Off gas from sponge oil absorber 104-E enters the level gas scrubber 201-E via knockout drum 201-F.

The sour fuel gas stream enters the bottom of the scrubber below the packed bed.

A flow of lean DEA under control of FRCa-2007 is pumped to the top of the scrubber by lean DEA to fuel gas scrubber pump 202-J. H_2S in the upflowing fuel gas stream is contacted and removed by the lean DEA stream flowing down the packed tower.

The sweetened fuel gas leaves the top of the scrubber under control of PRCa-2003 and enters the coker fuel gas system knockout drum 107-F, where entrained liquid settles out.

Rich DEA leaves the bottom of the scrubber and flows to the DEA reactivator via LRCa-2002 which controls the bottom DEA level in the scrubber.

2. Gasoline Stripper System

Liquid hydrocarbon from the high pressure separator enters the gasoline stripper above tray number one (1) and flows downward through the tower trays counter-current to hot vapors from gasoline stripper reboiler 205-C.

Stripped vapors flow from the top of the gasoline stripper and combine with wet gas flowing through compressor after condenser 102-C to high pressure separator 102-F.

The stripped unstable gasoline flows from the bottom of the gasoline stripper to suction of debutanizer feed pump 207-J which discharges through debutanizer feed preheater 212-C to debutanizer 205-E.

Flow controller FRCa-2000 located in the debutanizer feed line automatically reset by cascade arrangement with LRCa-2010 to maintain the level in the bottom of the gasoline stripper.

3. Debutanizer System

Feed enters the debutanizer 205-E above tray number 13. As the gasoline flows down over the trays to the bottom section of the tower, it is contacted by counter-current flowing vapors from debutanizer reboiler 206-C. The vapors continue up through the trays and flow through debutanizer overhead condenser 208-C to debutanizer reflux drum 206-F. Debutanizer reflux pump 204-J takes suction from the reflux drum and discharges under flow control FRCa-2003 to the top of the debutanizer, entering above tray number 1.

Pressure controller PRCa-2001 which has its control point in the lower section of the debutanizer maintains the normal operating pressure of the tower by resetting FRCa-2016 in the heating oil to the debutanizer reboiler.

The net overhead accumulating in the debutanizer reflux drum is pumped by the debutanizer overhead cooler 209-C to C_3-C_4 absorber 202-E.

Flow controller FRCa-2002 located in the debutanizer net overhead line is automatically reset by cascade arrangement with LRCa-2013.

The debutanizer bottoms (stabilized gasoline) is pressured to gasoline splitter, E-206, entering above tray 19. The debutanizer bottoms flow may be diverted to storage via line 0-302 and intermediate gasoline product cooler 213-C when necessary. Flow controller FRCa-2001 located in the debutanizer bottoms line (feed line to gasoline splitter) is automatically reset by cascade arrangement with LRCa-2011 to maintain the level in the bottom of the debutanizer.

4. C₃-C₄ Absorber 202-E

The sour C₃-C₄ overhead stream from the debutanizer enters the bottom of the C₃-C₄ absorber. Lean DEA controlled by FRCa-2006 and pump by lean DEA to C₃-C₄ scrubber pump 201-J enters the top of the scrubber. H₂S in the upflowing C₃-C₄ stream is removed by the lean DEA flowing down the packed tower. The C₃-C₄ stream along with some entrained DEA leave the top of the tower and enter the amine separator 202-F. Here the entrained DEA is collected and let down by LC-2005 to hydrocarbon release drum 203-F. The C₃-C₄ effluent stream leaves the amine separator and flows under control of PRCa-2008 to C₃-C₄ product.

Rich DEA leaves the bottom of the C₃-C₄ absorber for the carbon release drum under control of LRCa-2003. From here it flows under control of LC-2006 to reactivator 203-E.

5. Gasoline Splitter System

Feed entering the gasoline splitter flows downward over the trays to the lower section of the tower and is contacted by counter-current flowing vapors from gasoline splitter reboiler 207-C. The vapors leave the top of the tower and flow through gasoline splitter overhead condenser 210-C to gasoline splitter reflux drum 207-F. Gasoline splitter reflux pump 205-J takes suction from the reflux drum and discharges back to the top of the gasoline splitter above the top tray.

The net overhead product is also handled by the gasoline splitter reflux pump which discharges the product through light gasoline product cooler 211-C to light coker gasoline storage.

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Heavy gasoline product pump 208-J takes suction from the bottom of the gasoline splitter and discharges through heavy gasoline product cooler 214-C to heavy gasoline storage.

Intermediate gasoline is withdrawn from tray number 9 in the gasoline splitter to intermediate gasoline stripper 207-E.

6. Intermediate Gasoline Stripper System

Draw-off flow from the gasoline splitter entering the intermediate gasoline stripper above the top tray is contacted by counter-current flowing vapors from intermediate gasoline stripper reboiler 215-C.

The vapors leave the top of the intermediate gasoline stripper and flow to the gasoline splitter above tray number 8.

The intermediate gasoline product pump 209-J takes suction from the bottom of the intermediate gasoline stripper and discharges through intermediate gasoline product cooler 213-C to intermediate gasoline storage. Flow controller FRCa-2005 throttles the flow to maintain the desired specification on the intermediate gasoline to storage.

7. The DEA System - Reactivator 203-E

Rich DEA from the fuel gas scrubber and C_3 - C_4 absorber and amine separator is pressured to the hydrocarbon release drum 203-F and then to the DEA reactivator.

The combined rich DEA stream is preheated with reactivator bottoms in rich DEA-lean solution exchanger 201-C before entering the top of the reactivator. A portion of the stream is routed through amine filter 201-L to remove solids. The rich DEA passes downward through the tower where it is heated by rising vapors from the DEA reactivator reboiler 204-C. The absorbed H_2S is removed from the DEA solution by heat. The somewhat leaner DEA enters the reboiler from the bottom

total trap-out tray and most of the remaining H_2S is removed here. The reactivated (lean) DEA leaves the bottom of the reactivator and is cooled by the feed in the rich DEA/lean solution exchanger and the air cooled DEA solution cooler 202-C. The cool, lean DEA stream is then pumped by the DEA pumps (201-J & 202-J) back to the fuel gas scrubber and the C_3-C_4 absorber. High bottom level alarm HLA-2028, alerts operating personnel to look for circulation problems in the DEA system. The DEA reactivator reboiler is heated by 125 PSIG steam which is throttled by TRCa-2004 to maintain the desired reboiler vapor outlet temperature.

H_2S gas and aqueous vapor containing a small amount of DEA pass overhead and are cooled in DEA reactivator condenser 203-C. The condensed DEA solution is collected in the DEA reactivator reflux drum 204-F and returned to the reactivator top tray. The reflux stream which is pumped by reactivator reflux pump 203-J is controlled by LC-2004 which controls the DEA level in the DEA reactivator reflux drum.

The H_2S gas leaves the DEA reactivator reflux drum and is routed to flare or offsite. The reactivator pressure is controlled by PRCa-2000 which is located in the H_2S gas line from the DEA reactivator reflux drum. The flow through this gas line is recorded by FRa-2012. The gas line is jacketed to prevent condensation and consequently corrosion of the line.

841 AND 842 DECOKING WATER FACILITIES

These facilities consist of the following systems: coke cooling water system (BW), jet water system (JW), slurry water system (SLW), and settled water system (STW).

1. Coke Cooling Water System (BW)

The water required for cooling the coke after a coke drum is taken out of service and has been steamed to blowdown is supplied from the blowdown pond by pump.

Cooling water and coke fines drained from the coke drum into the sluice-way and sump below the coke drums are removed from the sump as a slurry by the coke fines slurry pump and discharged to coke fines thickener.

2. Jet Water System (JW)

The high pressure water required for the decoking operation is supplied by the motor-driven jet water pump which takes suction from the jet water surge drum. The motor of this pump is provided with a low level trip which causes shutdown of the pump when the level in the jet water surge drum falls to the trip setting of the shutdown device. A valve assembly in the discharge of the jet water pump consists of two cam shaft driven spindle valves.

3. Coke Water Slurry System (SLW)

Coke water slurry from the sluice-way sump is pumped by coke fines slurry pump to coke fines thickener.

In the coke fines thickener, the slurry is separated in coke water slurry, scum, and clarified water.

Concentrated slurry is removed from the bottom of the coke fines thickener by eductor which discharges the slurry to a coke car for recovery of the coke fines.

4. Settled Water System (STW)

Clarified water from the coke fines thickener overflow is pumped by settled water return pump to the jet water surge tank. If the surge drum becomes full, then the clarified water is sent to the blowdown pond. The settled water return pump will also supply clarified water to the sluice-way sump.

842 DCU

WATER USAGE

Filtered Water - 2" (Phone 620 - In Emergency)

Air Conditioner & Rest Room

Drinking Water - 2" (Phone 620 - In Emergency)

All Water Fountains & Sink Behind Control Board

Cooling Water - 4" (Phone 372 - In Emergency)

105-C Sponge Oil Cooler

211-C Light Gasoline Product Cooler

209-C Debutanizer Overhead Cooler

110-CS Gas Oil Trim Cooler

Bearing Oil For Gas Compressor

Bearing Oil For 116-J Jet Water Pump

Raw Water - 6" (Phone 610 - In Emergency)

Blowdown Drum & Stack

Blowdown Pit

Overhead Sprinklers

Clean Up & Wash Up Water

Firehose on Reel West of Compressor

Jet Water Surge Tank

Cooling Water for the Following Pumps:

131J & JA, 101J & JA, 108J & JA, 114J,

111J & JA, 110J & JA, 109J & JA, 208J,

113J & JA, 107JA, 209JA

ELECTRICAL CIRCUITS - LIGHT OIL DEPT.

Unit No. - 841 DCU	Date - May 1, 1973
Main Circuit - 55 & 55C	Substation - 198 & 199
Secondary Circuit - None	Substation
Emergency Circuit - 86	Substation - 212
Possible Backup Circuit - None	Substation
Type Switch to Emergency Circuit - Automatic	
Switch located at - 402 Automatic Switch Station	

Note: 55 circuit 198 Substation furnishes the 2300 volts for 841 DCU.

55C circuit 199 Substation furnishes the 440 volts for 841 DCU.

ELECTRICAL CIRCUITS - LIGHT OIL DEPT.

Unit No. - 842 DCU	Date - May 1, 1973
Main Circuit - 86	Substation - 212
Secondary Circuit - 62	Substation - 214
Emergency Circuit - 55	Substation - 212
Possible Backup Circuit - None	Substation
Type Switch to Emergency Circuit - Automatic	
Switch located at - 402 Automatic Switch Station	

Note: 62 Circuits 440 Volt Bank serves the emergency lights, inter. comm. system and elevator light.

DECOKING PROCEDURE

- I. This revised procedure is to be followed when decoking 842 DCU. Its objective is to improve coke cutting operations and eliminate unnecessary delays.

Each man in the decoking crew is responsible to see that his part of the operation proceeds smoothly and is coordinated with the overall operation both at 842 DCU and 841 DCU.

Until all the coke has been removed from the drum, at least one man will remain in the penthouse and one man on the bottom deck (at all times). In the event decoking is delayed for any reason (equipment failure, coke spill, RR car derailment, etc.), the unit supervisor is to be notified at once.

If he is unavailable, the unit operator is to be notified.

Actual steps to be followed in decoking are listed below.

II. Car Handling

1. Each morning line up at least fifteen (15) empty cars to be pulled under the coke drums.
2. Locate the hook as far back on the string as possible so it will not have to be moved more than once per day.
3. Be sure an empty car or an almost empty car is located under the drum when boring through.
4. When there are nine full cars in the string, cars should be pulled forward until linked up with either full or empty cars which will be located just south of the RR crossing. When the full cars have been linked up, south of the crossing, immediately break the string. Use the big car puller to pull full cars until they just clear the crossing and leave them there until time to hook up the rest of the full cars.

5. Each evening leave full cars pulled down just far enough to leave the crossing open for 841. If the S.P. engine comes in and pulls the previous day's cut out, before you are able to use them for pulling the current day's cut, take the track mobile and line up 4 to 5 empty cars, so that the big car puller can be used as soon as the full cars link up with the empties. Then move the empties back on the outside track.
6. One man is to be on the bottom deck at all times during coke cutting. He is to be responsible for filling the empty cars evenly.
7. He will notify the driller by signal when a car is full, and as soon as he hears the wood valve go on by-pass, he is to immediately move another empty car under the drum. When the new empty car is in position, he will notify the driller to resume drilling. He will also keep track of the number of cars that have been filled.
8. The other man working the bottom deck will be responsible for moving cars with the big car puller, keeping the sluiceway cleaned up, keeping the sump pumps, fines tank, and jet water tank operating properly, clean the bottom head and bolts.
9. He will also provide relief for the man filling coke cars for smoke breaks, lunch breaks, etc. (Keep in mind one man is to be present filling cars at all times.)

III. Coke Cutting

1. Boring through is to commence as soon as drum heads are off, boring tool hooked up, and drill stem is in the drum.
2. Boring should be accomplished as rapidly as possible without sticking the drill stem. Leave jet water pump on main water when raising the drill stem following completion of boring, until about 2/3 of the way out of the coke bed.

3. Coke cutting is to start as soon as possible after changing to the final cutter.
4. The drill stems have been marked at 6-foot intervals (this is the approximate distance needed to fill one RR car). The driller will be responsible for keeping these marks visible.
5. Start cutting coke at the top of the bed (do not go down to the bottom and undercut).
6. Rotation is to be set at maximum speed and the hoist speed at minimum.
7. Starting at a point approximately 3 feet above the coke, the cutting head is to be lowered into the coke 6 feet (one and one-half marks on the stem).
8. After lowering the head 6 feet into the coke, it is to be raised slowly to the starting point, or until the sound of the jet water hitting bare metal is heard.
9. Continue lowering and raising the cutting head in the same manner (6 feet into the coke each time and 3 feet out). This will result in the drill stem being lowered somewhat after a couple of passes from the original starting point.
10. When the signal is given that a car has been filled, go on by-pass and raise the stem to a point 3 feet out of the coke.
11. When the signal is given that a new empty car is in place, resume cutting, again lowering the cutting head a full 6 feet into the coke.
12. Cutting should proceed in this manner until the 13th car is reached-- or in the case of a short drum, about one car above the cone.
13. When this point has been reached, lower the cutting head 6 feet into the coke each time; however, raise the cutting head back to

the starting point of the 13th car so that the area of the cone will be well polished by the time cutting has been completed.

14. Using the above technique, coke can be cut much faster than we have in the past, without danger of cave-ins.
15. Each driller will keep track of what car he is cutting in and if it takes longer than the times listed below he is cutting too slow.

Cars 1, 2, & 3	1-1/2 min. to 5 min. (max.)
Cars 3, 4, 5, 6, 7, & 8	10 min. to 15 min. (max.)
Cars 9, 10, 11, 12, & 13	15 min. to 20 min. (max.)
Cars 14 & 15	20 min. to 30 min. (max.)
16. The driller is to remain in the penthouse at all times during coke cutting, unless relieved by the head decoker for smoking or lunch breaks.
17. On completion of drilling, the unit operator is to be notified immediately to come and inspect the drum.

IV. Heading and Unheading Drums

1. When a drum has been inspected and is O.K., heads are to be put back on.
2. Once the top head has been put in place, the bottom head is to be moved into position and both heads bolted up at the same time.
3. When both heads have been bolted up, notify the unit operator, the drum is ready for test.
4. Each morning after checking with unit operator that the drum is ready to unhead, both heads are to be unbolted at the same time. Four (4) bolts be left intact in the bottom head until the top head has been removed. Then these bolts will be removed and the bottom head moved from under the drum.

V. Responsibility

The head decoker has overall responsibility to see that all phases of the decoking operation proceeds smoothly and efficiently. He will give corrective instructions to other members of the crew whenever necessary to insure the decoking operation is progressing in the proper manner. Every other member of the crew is responsible for the specific duties and equipment within his area of work. Good cooperation and coordination between all members of the crew is essential for a safe and efficient decoking operation.

841 DELAYED COKING UNITGENERAL START-UP PROCEDURE

The following procedure outlines the proper steps to be taken for a normal start-up. The time when each step is completed is to be recorded and initialed by the Operator so that the shift relieving will be informed as to the status of the unit.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Call Pump House 163 and get tank no. and tests on start-up oil.
_____	_____	2. Notify the following that the unit is starting up and the approximate time each will be affected.
_____	_____	a. Shift Foreman <u>Phone</u> 507
_____	_____	b. Gas Dispatcher 2265
_____	_____	c. Pump House 163 327
_____	_____	d. HF Alkylation 443 2162
_____	_____	e. Gulfiner 241 339
_____	_____	f. Gas Plant 7944 421
_____	_____	g. Boiler House No. 15 383
_____	_____	h. Power House No. 3 2263
_____	_____	3. Line unit up for circulating. (Make sure all flushing oil lines at heater are closed.)
_____	_____	4. Have a coke drum cleaned, headed up, purged, and steam tested.
_____	_____	5. Roll all pumps and line up cooling water, roll fans and put gas compressor auxiliary lube oil pump on.
_____	_____	6. Steam out all vessels, transfer lines, exchangers,

flushing oil lines, gland oil lines, and steam test for tightness at vessel working pressure.

- _____ 7. Activate flare line. Remove blanks from flare line at battery limit with valve to flare header closed. Steam flare line from 841 DCU to vent on flare line at battery limit. Gas up flare line from unit at same time unit is gassed up. Open 10" valve to flare header when gas up of unit is complete. Plug drain valve and blind flange vent valve at battery limit.
- _____ 8. Pressure the unit with fuel gas.
- _____ 9. Drain water from all vessels, exchangers, and lines until drains show no more water.
- _____ 10. Line up unit and bring in start-up gas oil into fractionator bottom. Circulate through furnace tubes and then pump oil from fractionator to slop.
- _____ 11. Cut start up steam through furnace superheater tubes.
- _____ 12. Bring additional start-up gas oil into fractionator, start circulation at about 6.0 divisions per pass (minimum 5.0 divisions), light furnace, and bring outlet temperature to 650-700°F at about 150°F per hour. See "Instructions for Firing Furnaces."
- _____ 13. Put feed accumulator in service by circulating through 26-J pump from tanks No. 1506 or 1507 and excessing from pump No. 11-J or 11-JA back to tanks. (Make sure valve by 11-C exchanger is closed.)

- _____ 14. Set 27 pounds on the low pressure separator to flare control valve and open the 1-1/2" fuel valve to the low pressure separator all the way.
- _____ 15. Drain water from all low points during start-up.
- _____ 16. Put a normal water level in the low pressure separator, foul condensate accumulator, foul condensate stripper, and 8-C steam generator.
- _____ 17. Start the foul condensate system.
- _____ 18. Back start-up gas oil into the absorber and establish a normal level.
- _____ 19. Get flushing oil started to the fractionator bottom sight glass and level column, furnace outlet pressure gauge and switch valve inlet pressure gauge.
- _____ 20. Put the start-up gland oil system on.
- _____ 21. When the furnace outlet temperature reaches 650-700°F, start warming the coke drum.
- _____ 22. When the coke drum temperature reaches 500°F (at the coolest point TI 101-44 or TI 104-47) raise the furnace outlet temperature to 800°F at about 50°F per hour.
- _____ 23. Use low pressure separator gasoline, heavy gas oil production and start-up gas oil for reflux as necessary to hold top tower temperature down.
- _____ 24. Cut the 1-1/2" fuel gas line out of the low pressure separator when making sufficient gas to hold up tower pressure.
- _____ 25. Pump initial oil levels in the heavy gas oil pan and light gas oil stripper to slop to flush out the lines.

- _____ 26. Drain all liquid from the low point in the vapor line between 1-C coolers and the low pressure separator before bringing in crude.
- _____ 27. Line up gasoline, light distillate fuel and heavy gas oil to slop until the fractionator reaches normal operating conditions; then, cut gasoline to 842 DCU gasoline fractionation section either direct to gasoline stripper 204-E or to the line to 102-C, depending on operating conditions. If the gasoline fractionation section is not in operation, gasoline will be sent direct to 6141 depropanizer. Light distillate fuel and heavy gas oil will be cut to cracking stock. Sample light distillate fuel and cut to Gulfiner 241 when it is on test.
- _____ 28. When the coke drum lower level temperature reaches 675-700°F and the furnace outlet temperature is to 800°F, set valves at coke drums, light all burners and start temperature up to 915°F as rapidly as possible and cut into coke drum. Start reduced crude to unit. Open 3/4" fuel gas minimum flow bypass valves on regulators at each furnace.
- _____ 29. Put the compressor on when making sufficient gas to keep it from pumping. If there is a delay in putting the compressor on, pressure up the absorber with the 1" fuel gas connections in the overhead line so normal reflux can be started.

30. Get normal reflux started as quickly as possible.
31. When a level appears in the light gas oil stripper, start normal gland oil system and cut out start up gland oil.
32. When steam production starts, put 8-C boiler on and cut start up steam out of superheater tubes.
33. Shut down the compressor auxiliary lube oil pump.
34. Line unit out at specified conditions.

841 DELAYED COKING UNIT
GENERAL SHUTDOWN PROCEDURE

The following procedure outlines the proper steps to be taken for a normal shutdown and for freeing the unit of hydrocarbons. The time each step is completed is to be recorded and initialed by the Operator so that the shift relieving will be informed as to the status of the unit.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Notify the following that the unit is shutting down and the approximate time the shutdown will start.
		<u>Phone</u>
_____	_____	a. Shift Foreman 507
_____	_____	b. Gas Dispatcher 2265
_____	_____	c. Pump House 163 327
_____	_____	d. HF Alkylation 443 2162
_____	_____	e. Gulfiner Unit 241 339
_____	_____	f. Gas Plant 7944 421
_____	_____	g. Boiler House No. 15 383
_____	_____	h. Power House No. 3 2263
_____	_____	2. Line up with 163 Pump House to furnish start up gas oil through the 6" gas oil line. If the 6" gas oil line is being used for Light Distillate Fuel, put the LDF through the 4" gas oil line.
_____	_____	3. Have a coke drum warmed up and ready to switch into, if needed.
_____	_____	4. Start maximum heavy gas oil recycle on TRC 103 and back out Reduced Crude to hold fractionator bottom level.
_____	_____	5. Cut gasoline, LDF, and heavy gas oil to slop. Block

off 841 gasoline line at the compressor discharge manifold at 842 DCU.

- _____ 6. Drop furnace outlet temperature quickly to 750°F, simultaneously by pass the coke drum and circulate into the fractionator, then cut out Reduced Crude and hold fractionator bottom level with heavy gas oil recycle and start up gas oil. Continue to drop outlet temperature at about 150°F per hour.
- _____ 7. Cut Reduced Crude coming to the unit out of Charge Accumulator to storage Tanks No. 1506 and 1507.
- _____ 8. When gas production drops off sufficiently (before the compressor starts pumping), open the 1-1/2" fuel gas line into the low pressure separator and shut the compressor down. Simultaneously block off 841 DCU absorber gas line at knock out drum 201F at 842 DCU. If normal reflux is still holding, cut the 1" fuel gas line into the absorber to hold the pressure up; otherwise, use start-up gasoline reflux, heavy gas oil, and start-up gas oil to hold the tower top down.
- _____ 9. When light gas oil pump loses suction, put start-up gland oil in operation.
- _____ 10. Steam the full coke drum into the fractionator, depressure to the blowdown drum and cool in the normal manner. Block in the drum that was warmed up for the switch and hold until it can be steamed and depressured. Be sure it does not cool and pull a vacuum.

- _____ 11. Shut pumps down as they lose suction.
- _____ 12. When steam production drops off from 8-C Boiler so that the superheater outlet temperature gets above 700°F, block in and vent 8-C; put steam through the superheater tubes and open the superheater vent.
- _____ 13. When the furnace outlet temperature reaches 400°F, shut off fuel gas to the furnace and pull the gas spool. Stop circulation and steam the furnace into the fractionator. When steam is observed at the furnace outlet headers open the emergency reel valve, close the "B" valve and steam the furnace tubes to the blowdown for 30 minutes.
- _____ 14. Pump oil from the fractionator to slop, blending with start up oil as necessary to keep the mixture below 200°F.
- _____ 15. Flush the Reduced Crude line with start-up gas oil from 11-C Exchanger into the Charge Tank and into the fractionator. Block the charge tanks away from the unit and pump the fractionator to slop.
- _____ 16. Steam out the flushing oil lines, quench oil lines, and 10-C fan cooler tubes.
- _____ 17. After steam is cut out of the furnace and the outlet header is sufficiently cool, close the reel valve and line up to start decoking.
- _____ 18. Shut down all fans, block off product manifolds, get start-up gas oil pumping discontinued.

19. Depressure, drain, vent, and steam out all vessels that will be opened during the shutdown. Steam and drain all lines at low point drains.

20. Block flare line at battery limits, open vent, and drain on flare line at battery limit and steam until gas free. Blank flare line at battery limits.

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DELAYED COKING UNIT 842GENERAL START-UP PROCEDURECOKING UNIT

The following procedure outlines the proper steps to be taken for a normal start-up. The time when each step is completed is to be recorded and initialed by the operator so that the shift relieving will be informed as to the status of the unit. Detailed descriptions of many of the steps may be found in Kellogg's Operator's Manual.

Time Initials

1. Notify the following that the unit is starting up and the approximate time each will be affected.

_____ a. Shift Foreman	<u>Phone</u> 507
_____ b. Gas Dispatcher	2265
_____ c. Pump House 163	327
_____ d. HF Alkylation Unit 443	2162
_____ e. Atmospheric & Vacuum Unit 144	381
_____ f. Gulfiner Unit 241	339
_____ g. Gas Plant 7944	421
_____ h. Boiler House No. 15	383
_____ i. Power Plant No. 3	2263
_____ j. Platforming Unit 1341	649
_____ k. Pump House 169	372

2. Get tank number and tests on start up oil from Pump House 163.

3. Line unit up for circulating. (Make sure all flushing oil lines at heater are closed.)

- _____ 4. Have a coke drum cleaned, headed, purged, and steam tested.
- _____ 5. Roll all pumps and line up cooling water, roll fans, start lube oil and seal oil systems for gas compressor.
- _____ 6. Steam out all vessels, transfer lines, exchangers, flushing oil lines until all air is removed from system. Steam test for tightness at vessel working pressure.
- _____ 7. Activate the flare lines. If the coking unit and gasoline fractionation section are both down, pull the blank in the 20" line at the main flare line with the 20" valve closed. Steam the flare line through the vent near the main line valve and when air free pressure up with fuel gas and then open the 20" flare line valve. If the gasoline fractionation section is running, steam flare line RV-9 to the vent near the 12" check valve. When air free gas the line up and pull the blank at the check valve.
- _____ 8. Pressure the unit up with fuel gas.
- _____ 9. Drain water from all vessels, exchangers, and lines until drains show no more water.
- _____ 10. Line up unit and bring start-up gas oil into fractionator bottom and circulate through furnace tubes. Then pump it to slop.
- _____ 11. Establish circulation in the steam generating system. Open vent on top of steam drum 117-F. Bring in

boiler feed water and establish a level of boiler water in the steam drum. Place boiler water circulating pump 131-J in operation discharging in parallel through steam generator 108-C and the boiler feed water coils in the coke furnaces, and return to the steam drum. Activate all instruments associated with the steam generating system.

- _____ 12. Bring additional start-up gas oil into fractionator and start circulation through furnace at 260 B/H, (33 B/H on each pass) light furnace using procedure from operating manual and bring heater outlet and flow rates up as follows:

First Hour 260 B/H to 250°F

Second Hour 290 B/H to 400°F

Third Hour 335 B/H to 600°F

- _____ 13. When circulation is started place fractionator bottoms coke filter in operation by starting coke filter circulating pump 114-J.

- _____ 14. Keep check on steam generating system and as production of steam starts, gradually close the vent valve on the steam drum and increase drum pressure to 125 psig. Then gradually open the "Edwards" non-return valve and let steam flow through the coker furnace superheater coils to the heater vent. Do not block the steam drum vent until steam is flowing through the superheater. When the superheater outlet is dry, steam may be released to the 125 PSIG steam supply header.

- _____ 15. Gradually increase the circulating rate to 530 B/H (75% of full charge) and increase the temperature to 650-700°F.
- _____ 16. Put the hot oil accumulator (104-F) in service by taking suction from tank No. 1511 or 1512 with 102-J and pumping to hot oil accumulator and taking suction from 104-F with pump 101-J and returning to storage in tank No. 1511 or 1512.
- _____ 17. Set 20 psig on the low pressure separator control valve to the flare (PICa 1002) and open the 1-1-2" fuel gas line to the low pressure separator wide open.
- _____ 18. Recheck for water at all low points.
- _____ 19. Establish a normal water level in the low pressure separator, foul condensate accumulator, and foul condensate stripper.
- _____ 20. Start the foul condensate system.
- _____ 21. When the furnace outlet temperature reaches 650-700°F, start warming up the coke drum.
- _____ 22. When the coke drum temperature reaches 500°F at the coolest point raise the furnace outlet temperature at 50°F/Hr. to 800°F.
- _____ 23. Use low pressure separator gasoline, and heavy gas oil production from the unit for reflux as necessary to hold tower top down.
- _____ 24. Pump initial oil levels from the heavy gas oil pan and the light gas oil stripper to slop to clear lines.
- _____ 25. When heavy gas oil production is sufficient establish

flushing oil to the fractionator bottom sight glass and level column, the furnace outlet pressure gauges and to the switch valve inlet pressure gauge.

- _____ 26. Put the 1-1/2" fuel gas line to low pressure separator on control (PRCa 1000) when making sufficient gas to hold tower pressure up.
- _____ 27. Line up gasoline, light distillate fuel, and heavy gas oil to slop until fractionator reaches normal operating conditions, then cut gasoline to the gasoline fractionation section, light distillate fuel and heavy gas oil to cracking stock. Cut light distillate fuel to Gulfiner 241 when on test.
- _____ 28. When the coke drum lower level temperature reaches 675 to 700°F and the furnace outlet is to 800°F, set valves at coke drums, light all burners and start temperature up to 915°F as rapidly as possible and cut into coke drum. Start reduced crude to unit. Open 3/4" fuel gas minimum flow by-pass valves on regulators at each furnace.
- _____ 29. Put the coker gas compressor on when a steady flow of gas sufficient to keep the compressor from pumping is being made. By-pass the absorber, sponge absorber and fuel gas scrubber and go to the flare at inlet to knockout drum 201-F. Set pressure regulator PRCa 1001 on the outlet of sponge absorber 104-F.

- _____ 30. Establish lean oil flow to absorber 103-E. When lean oil flow is established open the gas outlet valve on 103-E and gradually throttle the absorber gas by-pass while opening the absorber gas inlet until the by-pass valve is completely closed and the inlet valve wide open.
- _____ 32. Gradually cut absorber gas through fuel gas scrubber 201-E. Gradually closing line to flare and opening line to fuel gas scrubber until the flare valve is closed and the scrubber valve open. Keep a close watch on the fuel gas system to furnaces.
- _____ 33. Establish normal reflux conditions as rapidly as possible.
- _____ 34. Line the unit out at the specified conditions.

DELAYED COKING UNIT 842GENERAL START-UP PROCEDUREGASOLINE FRACTIONATION AND TREATING SECTION

The following procedure outlines the proper steps to be taken for a normal start-up. The time when each step is completed is to be recorded and initialed by the operator so that the shift relieving will be informed as to the status of the unit.

Time Initials

- | | | | |
|-------|-------|--|--------------|
| _____ | _____ | 1. Notify the following that the unit is starting up and the approximate time each will be affected. | <u>Phone</u> |
| | | _____ a. Shift Foreman | 507 |
| | | _____ b. Gas Dispatcher | 2265 |
| | | _____ c. Pump House No. 163 | 327 |
| | | _____ d. HF Alkylation Unit 443 | 2162 |
| | | _____ e. Platforming Unit 1341 | 649 |
| | | _____ f. Copper Sweetening Unit | 485 |
| | | _____ g. Gas Plant 7944 | 421 |
| | | _____ h. Boiler House No. 15 | 383 |
| | | _____ i. Pump House No. 169 | 372 |
| _____ | _____ | 2. Purge circulating hot oil system with steam by opening steam into all passes of the circulating hot oil furnace 201-B and flowing through all reboilers of the circulating hot oil system. Vent steam from the vent on hot oil accumulator 208-F. Purge all related piping. | |
| _____ | _____ | 3. When purging has been completed, test heater coils | |

by throttling heater outlets to apply full steam line pressure (125 psig) on heater coils. Reduce pressure gradually when test is completed.

- _____ 4. Throttle vent on hot oil accumulator 208-F and increase steam pressure to 10 pounds below relief valve setting on the hot oil accumulator. (Relief valve setting 45 psig. Test at 35 psig.)
- _____ 5. When test proves satisfactory reduce steam pressure gradually and hold at positive steam pressure until the balance of the gasoline fractionation is purged of air and the flare line is activated.
- _____ 6. Purge fuel gas scrubber 201-E of all air by filling with water and overflowing at vent. Hold until remainder of gasoline fractionation section is purged and flare line is activated.
- _____ 7. Purge C3-C4 scrubber 202-E and amine separator 202-F by filling with water and overflowing from vent on 202-F. Also, fill C3-C4 product line from 202-F to control valve PRCa-2008 with water. Hold until remainder of gasoline fractionation section is purged and flare line is activated.
- _____ 8. Steam purge amine reactivator 203-F, gasoline stripper 204-E, debutanizer 205-E, gasoline splitter 206-E, intermediate gasoline stripper 207-E, other related drums, and lines associated with the system through the vents and low point drains.

- _____ 9. When all air has been purged from the vessels and related lines apply pressure for leak test by throttling vessel vent valves. Raise pressure to normal operating pressure where possible and check for leaks.
- _____ 10. When test is completed reduce pressure to approximately 5 psig and hold until flare line is activated.
- _____ 11. Activate flare system. If the coking section and the gasoline fractionation section are both down, remove blind flange from 20" line at main flare line and keep 20" valve closed. Steam 20" line RV-1 through vents at flare line until free of air, then gas line up with fuel gas. Then open 20" valve to flare line. If coking unit is in operation, steam line RV-1 to check valve and gas up flare line with fuel gas, then remove blank.
- _____ 12. With flare line activated, proceed with gassing up all vessels and lines with fuel gas to approximately 5 psig.
- _____ 13. Back fuel gas from fuel gas knockout drum through gas line to 201-E and vent through 2" vent to purge air from line. Block in and pressure water from tower 201-E to sewer. Pressure 201-E to normal operating pressure with gas.
- _____ 14. Pressure water from C3-C4 scrubber 202-E, amine separator 202-F, and C3C4 line to control valve PRCa-2008 with fuel gas. When water is out, pressure to operating pressure with fuel gas, if possible.

- _____ 15. Establish DEA circulation and levels in 201-E and 202-E by charging 15% DEA by weight solution from storage tank No. 1515 (205-F) using DEA pumps 201-J and 202-J to charge C3-C4 and fuel gas scrubbers.
- _____ 16. Activate the bottom level controllers LRCa 2002 for 201-E and LRCa 2003 for 202-E and set the controllers for normal level in the fuel gas scrubber 201-E, but keep a lower than normal in C3-C4 scrubber 202-E. When a level is developed in the hydrocarbon release drum 203-F place level controller LC-2006 in operation to maintain a normal level in the drum.
- _____ 17. When the flow through LC-2006 establishes a working level in the bottom of the reactivator, take suction from the bottom of the reactivator through exchanger 201-C and cooler 202-C, using pumps 201-JA and 202-JA. Direct the discharge of 201-JA through FRCa 2006 to C3-C4 scrubber 202-E and 202-JA through FRCa 2007 to fuel gas scrubber 201-E.
- _____ 18. Open the start-up line to reactivator reboiler 204-C while the level is being established in the reactivator and add steam to reboiler to gradually raise the reboiler vapor to normal temperature. Start fans on 203-C and vent inert gas from 203-C and reactivator reflux drum 204-E.
- _____ 19. Place boiler feed water in operation to desuperheat steam to 204-C. Put PC-1038 and THIC 1016 on control to maintain 50 psig and 298°F on steam to

204-C. Place TRCa 2004 in operation to reset and control FRCa 2021 steam to reboiler 204-C.

20. Activate the unit condensate system to receive condensate from 204-C. Place condensate level controller LC-2008 in service to control condensate from 204-C.
21. When a level is established in reflux drum 204-E start reflux pump 203-J and discharge through level controller LC-2009 to the reactivator. Place level controller and alarms on reflux drum 204-E in service.
22. Establish gas oil circulation in circulating hot oil system. Bring in gas oil from DCU 841 through line 0-842 to circulating hot oil accumulator 203-F. When a working level is established in the accumulator, start circulating hot oil pump 206-J and discharge through furnace 201-B and return to the hot oil accumulator by the reboiler by-pass.
23. Circulate the system for about thirty minutes, then stop circulation for thirty minutes and draw water at all low points. Repeat until system is free of water. Equalize flow through heater passes.
24. Fire the circulating hot oil heater using the furnace firing procedure from the Gulf Procedure Manual. Increase the firing rate at 75°F/Hr. on the combined heater outlet until an outlet temperature of 575°F is reached. Care must be exercised in the rate of heating to allow complete drying of the oil.

25. Put gasoline stripper 204-E in operation. When starting up on gasoline from DCU 841, line up to take gasoline from 3-J pump at DCU 841 through line 0-256 to discharge of 103-J, then through 0-253 to gasoline stripper 204-E. Be sure blinds are turned to blank lines from DCU 842. Open overhead from 204-E tank to DCU 841 through line 0-408. Start a small flow of gasoline from DCU 841 and while a level is developing in the bottom of the gasoline stripper, open the reboiler start-up line and put instruments in operation. When a working level is established in the bottom of the gasoline stripper, start a flow of steam through reboiler 205-C and raise the reboiler vapor outlet gradually to normal operating temperature. Take suction from the bottom of the gasoline stripper with debutanizer feed pump 207-J and discharge to debutanizer 205-E via FRCa 2000 and debutanizer feed heater 212-C.
26. Put debutanizer 205-E in operation. As feed from the gasoline stripper establishes a level in the bottom of the debutanizer tower, open the debutanizer start-up line to insure feed to the reboiler during the early stages of the start-up, and start the fans on debutanizer overhead condenser 208-C. Place instruments associated with the debutanizer in service and start heating oil flow through the debutanizer reboiler. Gradually increase reboiler

vapor outlet to normal operating temperature and pressure and excess bottoms under level control (LRCa-2011) to gasoline splitter 206-E. Purge overhead condenser 208-C and debutanizer reflux drum free of noncondensables and as a level is established in the reflux drum put the reflux pump 204-J in service. Start reflux flow, place FRCa-2003 in service in the reflux line and use this controller as a straight flow controller. When tower operation is steady the fractional analog computer C-1 may be placed in operation. Place FRCa 2002 in operation and start product flow from the debutanizer reflux pump via debutanizer overhead cooler 209-C to the C3-C4 scrubber 202-E.

- _____ 27. Establish normal operating conditions on C3-C4 scrubber. The DEA level in the C3-C4 scrubber must be kept low at the start of operations to take care of the increase in level when C3-C4 stream is admitted to the tower. As the flow increases and an interface is established, the scrubber level may be set in the upper part of the tower. When a level is established in the amine separator 202-F, place level controller (LC-2005) and alarm instruments RLA-2040 and LLA-2041 in service.
- _____ 28. Put gasoline splitter 206-E in operation. Feed from the debutanizer bottom will start building a level in the bottom of gasoline splitter 206-E. While the level is building, open the start-up line to

to insure feed to the gasoline splitter reboiler 207-C and start the fans on gasoline splitter overhead condenser 210-C. Place instruments associated with the gasoline splitter in service and as a working level is established in the bottom of the tower, start heating oil flow through the gasoline splitter reboiler 207-C. Gradually increase the reboiler vapor outlet to normal temperature. Line up tower bottoms to heavy gasoline products pump 208-J and discharge bottoms to storage under control of FRCa-2014. Purge the overhead condenser 21-C and reflux drum 207-F free of noncondensables and when a level is established in the reflux drum, put the gasoline splitter reflux pump 203-J in service. Use FRCa 2004 as a straight flow controller until tower conditions are stabilized. Place all instruments associated with the gasoline splitter in service and adjust for normal conditions. Start cooling water flow through light gasoline products cooler 211-C and place cascade controller FRCa-2011 in service to control the level in the gasoline splitter reflux drum and send light gasoline to storage. When the tower top temperature is fairly stable, place the analog computer C-2 in operation and start a flow of intermediate gasoline to intermediate gasoline stripper 207-E.

— 29. Put intermediate gasoline stripper 207-E in operation.

As a level develops in intermediate gasoline stripper 207-E, place level controller LRCa-2001, high level alarm HLA-2026 and low level alarm LLA 2027 in service. Open the start-up line to reboiler 215-C. When a normal level is established in the bottom of the stripper, place FRCa-2018 in operation as a straight flow controller and start heating oil to intermediate gasoline stripper reboiler 215-C. Raise the reboiler vapor outlet temperature (TI 1000-31) gradually to normal operating temperature and put TRCa-2003 in cascade with FRCa-2018. Start fans on intermediate gasoline product cooler 213-C. Line up stripper bottoms to intermediate gasoline product pump 209-J and discharge through cooler 213-C and FRCa-2005 to storage.

DELAYED COKING UNIT 842
GENERAL SHUTDOWN PROCEDURE
COKING UNIT

The following procedure outlines the proper steps to be taken for a normal shutdown and for freeing the unit of hydrocarbons. The time when each step is completed is to be recorded and initialed by the operator so that the shift relieving will be informed as to the status of the unit.

<u>Time</u>	<u>Initials</u>			
_____	_____	1.	Notify the following that the unit is shutting down and the approximate time the shutdown will start.	
_____	_____	a.	Shift Foreman	<u>Phone</u> 507
_____	_____	b.	Gas Dispatcher	2265
_____	_____	c.	Pump House 163	327
_____	_____	d.	HF Alkylation Unit 443	2162
_____	_____	e.	Platformer Unit 1341	649
_____	_____	f.	Gulfiner Unit 241	339
_____	_____	g.	Gas Plant 7944	421
_____	_____	h.	Boiler House No. 15	383
_____	_____	i.	Power Plant No. 3	2263
_____	_____	j.	Pump House 169	372
_____	_____	k.	Atmospheric & Vacuum Unit 144	381
_____	_____	2.	Cut light distillate fuel to 8" Cracking Stock line at manifold 29th Street and Avenue F and have Pump House No. 163 line up start up gas oil through 6" Heavy Gas Oil line through DCU 841.	

- _____ 3. Have coke drum warmed up and ready to switch into, if needed.
- _____ 4. Gradually reduce charge rate to 530 B/H (75% of normal charge rate), start maximum heavy gas oil on TRCa 1013 and back out reduced crude to hold fractionator bottom level.
- _____ 5. If DCU 841 is running and will continue to go to the gasoline fractionation section, cut the 841 gasoline away from the inlet line to Cooler 102-C and route direct to gasoline fractionation through lines 0-256 and 0-253. Switch the gasoline stripper overhead away from the inlet line to Cooler 102-C and route it back to DCU 841. Turn spectacle blank in 841 gasoline line 0-255 going to Cooler 102-C.
- _____ 6. Cut gasoline, light distillate fuel and heavy gas oil to stop. Turn spectacle blind in gasoline line P-253. If DCU 841 is not sending gasoline to the gasoline fractionation section, shutdown procedure for the fractionation section should be started at this time.
- _____ 7. Drop furnace outlet temperature quickly to 750°F, simultaneously by-pass the coke drum and circulate into the fractionator; then, cut out reduced crude and hold fractionator bottom level with heavy gas oil recycle and start up gas oil. Continue to drop temperature at about 150°F/Hr.

- _____ 8. Cut the reduced crude from AVU 144 out of the feed accumulator direct to tanks No. 1511 and 1512.
- If AVU 144 is to continue sending reduced crude to tanks No. 1511 and 1512, Cooler 112-C should be placed in operation at the first opportunity and AVU 144 requested to cool reduced crude all possible.
- _____ 9. When the gas production drops off sufficiently, (before the compressor starts pumping) shut down the gas compressor. PRCa 1000B should admit fuel gas to hold pressure up on low pressure separator. If normal reflux is still holding, cut fuel gas into absorber to hold pressure up. Otherwise, use start-up gasoline reflux and heavy gas oil to hold tower top down. Block absorber gas line to fuel gas scrubber ahead of knockout drum 201-F.
- _____ 10. Steam the full coke drum into fractionator, depressure to the blowdown, and cool in the normal manner. Block in the drum that was warmed up for switch and hold it for further orders. Be sure drum is held under positive pressure.
- _____ 11. Shut pumps down as they lose suction.
- _____ 12. As the steam make on the steam generator decreases as indicated by flow recorder FRa 1028, close the valve in steam make line SS-1 and simultaneously open the vent line from the superheater coils and vent steam to atmosphere.
- _____ 13. When the furnace outlet temperature reaches 400°F, shut off fuel gas and remove the gas spool. Stop

- _____ 19. Steam out flushing oil lines, quench oil lines,
and the tubes of fan Cooler 110-CA.
- _____ 20. After steam is cut out of furnace tubes and the
outlet headers are sufficiently cool, close the
reel valves and line up to begin steam-air decoking.
- _____ 21. Shut down all fans associated with the coking unit,
block off coker product manifolds and have Pump
House 163 discontinue start-up oil.
- _____ 22. Depressure all vessels to the flare and then block
off from the flare system. If the gasoline
fractionation is to remain in operation, the flare
line from the coking unit will be blanked off
at the check valve in 12" line RC-9 and the flare
line in the unit steamed through the 3" vent. If
both the coking unit and the gasoline fractionation
unit are being shut down, block the 20" valve
at the main flare line and steam from the vent at
this location.
- _____ 23. Steam out all vessels, first through the vent
lines and then through the top heads. Steam all
lines and other equipment through vents and
bleeders until gas free.

842 DELAYED COKING UNITGENERAL SHUTDOWN PROCEDUREGASOLINE FRACTIONATION AND TREATING SECTION

The following procedure outlines the steps to be taken for normal shutdown and for freeing the unit of hydrocarbons. The time each step is completed is to be recorded and initialed by the operator so that the shift relieving will be informed as to the status of the unit.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Notify the following that the unit is shutting down and the approximate time the shutdown will start.
_____	_____	a. Shift Foreman 507
_____	_____	b. Gas Dispatcher 2265
_____	_____	c. Pump House No. 163 327
_____	_____	d. HF Alkylation Unit 443 2162
_____	_____	e. Platforming Unit 1341 649
_____	_____	f. Copper Sweetening Unit 485
_____	_____	g. Gas Plant 7944 421
_____	_____	h. Boiler House No. 15 383
_____	_____	i. Pump House No. 169 372
_____	_____	2. Cut stripper bottom to 6141 via the C ₃ -C ₄ line to 443 Alkylation.
_____	_____	3. When feed to the debutanizer is stopped, block out heating oil to feed preheater and debutanizer reboiler. Put debutanizer reflux on flow control and continue reflux until reflux pump 204-J loses suction, then shut 204-J down. Pressure debutanizer tower bottoms to gasoline splitter 206-E until

tower is empty. Block in regulator FRCa-2001 on the bottoms line as soon as tower is empty to avoid overpressuring of gasoline splitter and intermediate gasoline stripper. Pressure liquid from debutanizer reboiler to the flare. Close valves as necessary to isolate tower.

- _____ 4. When the debutanizer bottoms flow to the gasoline splitter stops, put reflux on flow control and block heating oil out of stripper reboiler. Pump intermediate stripper out and shut down intermediate gasoline pump 209-J.
- _____ 5. Following the shutdown of the intermediate gasoline stripper, block heating oil out of gasoline splitter reboiler 207-C. Continue to reflux the gasoline splitter until pump 205-J loses suction, then shut it down and block it off. Continue to pump bottoms to storage until heavy gasoline pump loses suction then shut it down and block lines. Pressure liquid from the reboilers on the gasoline splitter and the intermediate gasoline stripper into the flare system.
- _____ 6. Shut down the hot oil circulating system when the last user of heating oil is shut down. Cut fires on heater 201-B and pull gas spool. Continue circulating until oil in the system cools down, then if the system is to be emptied for any reason, pump the circulating oil to DCU 841, 842, or to

to storage as conditions require. Steam the heater tubes, drum, and lines and drain until clean and gas free.

DELAYED COKING UNIT 842SAFE AND QUICK SHUTDOWNEMERGENCY SHUTDOWN PROCEDURE DUE TO POWER FAILURECOKING UNIT

Delayed Coking Unit 842 is served by Power Circuit No. 86 out of Power House No. 3. There is an emergency lighting circuit on the unit that services the instruments, lights in the control room and at strategic locations on the unit. This is served by Power Circuit No. 62. In case of a power failure the emergency lighting will switch over automatically. The main line switches will also drop out in the switch house and must be reset when power is restored. The following procedure should be followed in case of power failure:

Time Initials

- | | | |
|-------|-------|--|
| _____ | _____ | 1. Cut fuel gas out of furnace burners at the 6" fuel gas valve near heater charge pump 108-J. |
| _____ | _____ | 2. Cut reduced crude from the fractionator. Put turbine driven charge pump 101-JA and turbine driven tank charge pump 102-JA in operation if they are not already running and circulate the feed charge accumulator until further orders. |
| _____ | _____ | 3. Shut 108-JA pump down, should it be running, and cut steam into the discharge line from 108-J pump; then, simultaneously block the transfer line Wedgeplug valve on the switch deck and open the furnace outlet reel valves into the blowdown drum. Steam to the blowdown drum until the furnace outlet header bleeders show the tubes to be clean. |

4. Block the coke drum off from the fractionator at the vapor line Wedgeplug valve on the switch deck, depressure and steam the coke drum to the blowdown drum. Steaming should be continued until power is restored, then the normal cooling cycle should be started. Get maximum cooling spray water into the blowdown drum.
5. Notify the following that DCU 842 is shutting down because of electric power failure:

a. Shift Foreman	507
b. Power Plant No. 3	2263
c. Gas Dispatcher	2265
d. Pump House No. 163	327
e. HF Alkylation Unit 443	2162
f. Platformer Unit 1341	649
g. Gulfiner Unit 241	339
h. Gas Plant 7944	421
i. Boiler House No. 15	383
j. Atmospheric & Vacuum Unit 144	381
6. Cut steam out of strippers.
7. Steam from 108-J pump discharge through the by-pass lines on pump 108-J and 108-JA into the fractionator for five minutes, then block off the suction valves to the pump, and continue to steam the pumps through the discharge bleeders and pump case drain until the pumps are clean.
8. As the steam make on the steam generator decreases as indicated by flow recorder FRa 1028, close the

4. Block the coke drum off from the fractionator at the vapor line Wedgeplug valve on the switch deck, depressure and steam the coke drum to the blowdown drum. Steaming should be continued until power is restored, then the normal cooling cycle should be started. Get maximum cooling spray water into the blowdown drum.
5. Notify the following that DCU 842 is shutting down because of electric power failure:

a. Shift Foreman	507
b. Power Plant No. 3	2263
c. Gas Dispatcher	2265
d. Pump House No. 163	327
e. HF Alkylation Unit 443	2162
f. Platformer Unit 1341	649
g. Gulfiner Unit 241	339
h. Gas Plant 7944	421
i. Boiler House No. 15	383
j. Atmospheric & Vacuum Unit 144	381
6. Cut steam out of strippers.
7. Steam from 108-J pump discharge through the by-pass lines on pump 108-J and 108-JA into the fractionator for five minutes, then block off the suction valves to the pump, and continue to steam the pumps through the discharge bleeders and pump case drain until the pumps are clean.
8. As the steam make on the steam generator decreases as indicated by flow recorder FRA 1028, close the

valve in the 10" steam make line and simultaneously open the vent from the superheater coils and vent steam to the atmosphere.

- _____ 9. Block off the absorber gas line to the fuel gas scrubber, gasoline to the gasoline fractionation section and light distillate fuel and heavy gas oil to field.
- _____ 10. Line up to take heavy gas oil from DCU 841 or start-up oil from 163 PH for flushing. Pump the bottoms from the fractionator with pump 113-J or 113-JA, using flushing oil to quench the stream as necessary to get 200°F on the outlet of 110-CB Cooler. Pump this to slop tank 1513 (109°F).
- _____ 11. Flush the reduced crude line to the fractionator through 107-C and 111-C until the line is clear of reduced crude. Also, flush the suction line from 108-J and 108-JA back into the fractionator. Pump the fractionator bottoms to slop tank 1513.
- _____ 12. Pump the fractionator bottoms filter out to the blowdown system, then flush the filter with start-up oil and pump it out.
- _____ 13. If the unit is down long enough for the steam make from the steam generator to stop, block off the boiler feed water flow to the steam drum and open the steam vent on the steam drum to the atmosphere.
- _____ 14. If the shutdown is prolonged, put tank cooler 112-C in operation and request AVU 144 to cool the reduced crude all possible.

NOTE: Do not go on circulation with 108-JA
steam turbine pump in event of an electric
power failure as there is sufficient heat
in the furnace to cause coke formation
of the fractionator from this hot oil.
Do not cut back into the coke drum that
was being filled. Warm up an EMPTY
drum to switch into.

DELAYED COKING UNIT 842SAFE AND QUICK SHUTDOWNEMERGENCY SHUTDOWN PROCEDURE DUE TO POWER FAILUREGASOLINE FRACTIONATION SECTION

The following procedure outlines the steps to be taken for an emergency shutdown due to power failure. A power failure affecting this section would involve the coking section also so that this section must be correlated with the coking unit. The time each step is completed is to be recorded and initialed by the operator.

Time Initials

- | | | |
|-------|-------|--|
| _____ | _____ | 1. Cut heat on all reboilers first by cutting back on controllers at the control board and secondly by blocking valves on steam lines and heating oil at reboilers. |
| _____ | _____ | 2. Cut fires on circulating hot oil furnace 201-B by closing valve on gas line near pump 101-J. |
| _____ | _____ | 3. Cut DCU 841 gasoline stream away from the inlet to 102-C cooler and send direct to 6141 depropanizer through DCU 841 gasoline line connection into the C3-C4 line. Notify HF Alkylation 443 - Phone 2162. |
| _____ | _____ | 4. Block DCU 841 absorber gas away from fuel gas scrubber and send to fuel gas system from DCU 841. |
| _____ | _____ | 5. Block DCU 842 absorber gas away from fuel gas scrubber. |
| _____ | _____ | 6. Block lines on the gasoline fractionation towers, and DEA system as necessary to maintain levels and hold until power is restored. |

DELAYED COKING UNIT 841SAFE AND QUICK SHUTDOWNEMERGENCY SHUTDOWN PROCEDURE DUE TO ELECTRIC POWER FAILURE

<u>Time</u>	<u>Name</u>	
_____	_____	1. Cut fuel gas out of the furnace at the chain valve on the fuel gas knock-out drum.
_____	_____	2. Cut steam into the furnace at 8J and 8JA pump discharge (shut 8JA steam turbine down, if it is still running); then, simultaneously block the transfer line wedge plug valve on the switch deck and open the furnace outlet reel valve. Cut steam into the transfer line at the switch valve to clear the line back toward the furnace and continue to steam the tubes from 8J and 8JA through the reel valve and into the blowdown drum until the furnace outlet header bleeders show the tubes to be clear. Cut steam out of the strippers.
_____	_____	3. Block the coke drum off from the fractionator at the vapor line wedge plug valves on the switch deck, depressure and steam the coke drum hard to the blowdown drums until electric power is restored and the normal cooling cycle can be started. Get as much cooling spray water as possible in the second blowdown drum for quench. Also, circulate any oil that may be present in the first blowdown drum with 27J pump through the spray nozzle.

4. Steam from 8J and 8JA pump discharge through the pump bypass lines into the section and into the fractionator for five minutes, then block off the suction valves and continue to steam the pumps through the discharge bleeders and pump case drain lines until the pumps are clear.
5. Block off absorber gas from the unit, heavy gas oil from the unit, light gas oil from the unit, and gasoline from the unit. When 8C boiler quits generating steam, block off boiler feed water to the unit. Notify all concerned personnel.
6. Line up to receive start up gas oil and pump the bottom of the fractionator with 10J and 10JA pump to No. 104 Pumphouse slop tanks Nos. 2410 and 2412, using start-up gas oil as necessary to quench the mixture below 200°F.
7. Flush the reduced crude charge line with start-up gas oil from 11C exchangers back to No. 1506 and 1507 tanks until the line is clear of reduced crude at 11J and 11JA pump sample bleeders, then block off the tank suction valves.
8. After the fractionator bottom is pumped down, flush the reduced crude charge line with start-up gas oil from 11C exchangers into the fractionator until the line is clear of reduced crude at FRC 101 fresh feed regulator bleeder. Pump the fractionator bottom and the fresh feed exchangers to No. 104 Pumphouse slop tanks Nos. 2410 and 2412.
9. Cut off all electric motor switches so equipment will not be damaged when electric power is restored.

NOTE: Do not go on circulation with 8JA steam turbine pump in event of an electric power failure as there is sufficient heat in the furnace to cause coke formation in the bottom of the fractionator from this hot oil. Do not cut back into a coke drum that was being filled. Warm up an empty drum to switch into.

DELAYED COKING UNIT 841EMERGENCY PROCEDURESDUE TO COOLING WATER/ BOILER FEED WATER/
INSTRUMENT AIR/ AND YARD STEAM FAILURESCOOLING WATER FAILURE

Put compressor 2J lube oil cooler, jet water pump 12J lube oil cooler, and cooling water to all pump jackets on blowdown pit water from 13J. Contact 82 Pump House as soon as possible to determine cause and expected duration of cooling water failure.

BOILER FEED WATER FAILURE

Cut back on fresh feed and circulation, cut back as much as possible on intermediate reflux and raise top reflux rate as needed, and prepare to put unit on circulation. Contact 15 Boiler House as soon as possible to determine cause and expected duration of boiler feed water failure.

INSTRUMENT AIR FAILURE

Determine if failure is due to loss of pressure thru air drier and if so, switch or bypass drier as necessary. If instrument air failure is due to pressure drop on the yard air line and the air jammer does not come on automatically, put the air jammer on manually. If the pressure does not come up, block off yard air to the unit at battery limits. If pressure still does not come up, shut the unit down in the same manner as for electric power failure and relieve pressures to the blowdown stack and flare manually as necessary. Contact No. 70 Compressor House as soon as possible to determine cause and duration of yard air failure.

YARD STEAM FAILURE

Cut back as much as possible on steam usage (i.e., on steam to light gas oil, lean oil and foul condensate strippers, on steam tracing, put 8J on if 8JA is running, etc.), lower steam pressure from 8C boiler to about 110# at the pressure controller. If steam pressure on the yard line drops below 100#, block it off as necessary at the battery limits to hold the pressure above 100#. Contact No. 15 Boiler House as soon as possible to determine cause and expected duration of yard steam failure.

DELAYED COKING UNIT 842EMERGENCY PROCEDURES FOR:

COOLING TOWER WATER FROM PH 169 FAILURE, RAW WATER FAILURE
BOILER FEED WATER FAILURE, INSTRUMENT AIR FAILURE, YARD STEAM FAILURE

COOLING TOWER WATER FROM PH 169 FAILURE

Check oil temperature on the gas compressor and jet water pump, if running. Shut both down if oil temperatures become high. Check temperatures on C3-C4, and light gasoline products. Contact PH 169, Phone No. 372, as soon as possible to determine cause and expected duration of cooling water failure. Notify HF Alkylation Unit 443, Phone No. 2162, and Treating Plant, Phone No. 485, of the increased temperature of the C3-C4, and light gasoline streams. Should the failure persist, arrange for hose connections to get raw water on 209-C and 211-C.

RAW WATER FAILURE

Put water from the blowdown pond into the raw water line through the 3" by-pass line to take care of pump cooling, air compressor after cooler, and air conditioner in the control room. It will be necessary to block off the raw water at the battery limits. Contact the Water Treating Plant, Phone No. 610 or 620, as soon as possible to determine the cause and expected duration of the water failure.

BOILER FEED WATER FAILURE

Cut back on fresh feed and circulation and prepare to go on circulation and cut fires on furnaces. Contact Boiler House No. 15 as soon as possible to determine cause and expected duration of boiler feed water failure.

INSTRUMENT AIR FAILURE

Determine if failure is due to loss of pressure through air dryer, preabsorber, or after filter and if so, switch or by-pass as necessary. If instrument air failure is due to pressure drop on yard air line and emergency air compressor does not come on automatically, put air compressor on manually. If pressure does not come up, block off yard air to instrument air line at regulator PVC-1037. If pressure still does not come up, it will be necessary to shut the unit down in the same manner as for electrical power failure and relieve pressure to flare manually as necessary. Contact No. 70 Compressor House as soon as possible to determine cause and duration of yard air failure.

YARD STEAM FAILURE

Failure of yard steam should have no effect on the unit as the steam generating facilities should supply sufficient steam to continue operation, provided steam usage is limited.

Steam operated pumps should be shut down and drum cooling operation limited, if in progress. Stripping steam may be limited or cut out, if necessary. If line pressure drops off below 100%, block off at battery limits as required to hold pressure up. Contact Boiler House No. 15, Phone No. 383, as soon as possible to determine cause and expected duration of yard steam failure. If the failure is to be prolonged, it will be necessary to shut the unit down because of lack of steam for coke drum cooling.

DELAYED COKING UNIT 842
GENERAL PROCEDURE FOR PUTTING
COKING UNIT ON CIRCULATION

The following procedure outlines the proper steps to be taken to put the unit on circulation. The time when each step is completed is to be recorded and initialed by the operator so that the shift relieving will be informed as to the status of the unit.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Notify the following that the unit is shutting down and the approximate time the shutdown will start.
_____	_____	a. Shift Foreman 507
_____	_____	b. Gas Dispatcher 421
_____	_____	c. Pumphouse 163 327
_____	_____	d. HF Alkylation Unit 443 2162
_____	_____	e. Platformer Unit 1341 649*
_____	_____	f. Gulfiner Unit 241 339
_____	_____	g. Gas Plant 7944 421
_____	_____	h. Boiler House No. 15 383
_____	_____	i. Power Plant No. 3 2263
_____	_____	j. Pumphouse 169 372
_____	_____	2. Check start-up oil system to be sure that start-up oil can be brought into the unit. Also, line up HGO from DCU as a back-up system.
_____	_____	3. Isolate the hot oil system on the Gasoline Treating Section. Line up to take approximately 25 B/H of HGO from DCU 841 and return it to DCU 841 after 842 is on circulation.

- _____ 4. If available have coke drum warmed up and ready to switch into, if needed.
- _____ 5. Gradually reduce charge rate to 530 B/H (75% of normal charge rate), start maximum heavy gas oil on TRCA 1013 and back out reduced crude to hold fractionator bottom level.
- _____ 6. If DCU 841 is running and will continue to go to the gasoline fractionation section, cut the 841 gasoline away from the inlet line to Cooler 102-C and route direct to gasoline fractionation through lines 0-256 and 0-253. Switch the gasoline stripper overhead away from the inlet line to Cooler 102-C and route it back to DCU 841, if DCU 841 is operating. If DCU 841 is not sending gasoline to the gasoline fractionation section, shutdown procedure for the fractionation section should be started at this time.
- _____ 7. Cut light distillate fuel and heavy gas oil to stop.
- _____ 8. Drop furnace outlet temperature quickly to 750°F, simultaneously by-pass the coke drum and circulate into the fractionator; then, cut out reduced crude and hold fractionator bottom level with heavy gas oil recycle and start up gas oil. Continue to drop temperature to 650°F and circulate.
- _____ 9. Cut the reduced crude from AVU 144 out of the feed accumulator direct to tanks No. 1511 and 1512. If AVU 144 is to continue sending reduced crude to

tanks No. 1511 and 1512, Cooler 112-C should be placed in operation at the first opportunity and AVU 144 requested to cool reduced crude all possible.

- _____ 10. When the gas production drops off sufficiently, (before the compressor starts pumping) shut down the gas compressor. PRFa 1000B should admit fuel gas to hold pressure up on low pressure separator. If normal reflux is still holding, cut fuel gas into absorber to hold pressure up. Otherwise, use start-up gasoline reflux and heavy gas oil to hold tower top down. Block absorber gas line to fuel gas scrubber ahead of knockout drum 201-F.
- _____ 11. Steam the full coke drum into fractionator, depressure to the blowdown, and cool in the normal manner. Block in the drum that was warmed up for switch and hold it for further orders. Be sure drum is held under positive pressure.
- _____ 12. Shut pumps down as they lose suction.
- _____ 13. As the steam make on the steam generator decreases as indicated by flow recorder FRa 1028, close the valve in steam make line SS-1 and simultaneously open the vent line from the superheater coils and vent steam to atmosphere.
- _____ 14. When steam make from steam generator has stopped, block off boiler feed water flow to the steam drum. Close blow off line and open vent to top of steam drum to prevent vacuum on cooling.

- _____ 15. Flush reduced crude lines with start-up oil from
the connection at 111-C exchanger to the fractionator
and back through the circulation line to 101-J
Pump fractionator to stop.
- _____ 16. Shutdown all fans associated with the coking unit
and block off coker product manifold.

* Have PU 1341 cut intermediate gasoline to 1805 tank.

841 DELAYED COKING UNIT
FURNACE STEAM/AIR DECOKING

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Blank inlet side of Wilson-Synder valve.
_____	_____	2. Roll the ells on the furnace outlet to direct the furnace effluent to the sluiceway.
_____	_____	3. Put start-up steam through the superheater and vent to the air (do not let the superheater outlet temperature exceed 800°F).
_____	_____	4. Line up steam through the furnace charge line and start steam through FRC 102, 103, 104, and 105 furnace charge meters at a rate of about 2750 lbs/hr. per pass (5.0 divisions per pass) or a total of about 11,000 lbs/hr. of steam.
_____	_____	5. Install fuel gas spool, light furnace burners, and raise the wall tube outlet temperatures (on new recorders) about 300-400°F per hour until 900°F is reached.
_____	_____	6. As soon as the heater is fired, start recording the following flows, temperatures, and pressures each hour as long as steam or air is in the tubes.
		A. Inlet pressure to pass "A"
		B. Inlet pressure to pass "B"
		C. Inlet pressure to pass "C"
		D. Inlet pressure to pass "D"
		E. Steam to pass "A"
		F. Steam to pass "B"

- G. Steam to pass "C"
- H. Steam to pass "D"
- I. Air to pass "A"
- J. Air to pass "B"
- K. Air to pass "C"
- L. Air to pass "D"
- M. Outlet temperature pass "A"
- N. Outlet temperature pass "B"
- O. Outlet temperature pass "C"
- P. Outlet temperature pass "D"
- Q. Convection section temperature "A"
- R. Convection section temperature "B"
- S. Superheater outlet temperature.

_____ 7. Check temperatures in firebox frequently. TEMPERATURES SHOULD NOT EXCEED 1400°F ON FIREBOX, TUBE OUTLET, OR OPTICAL TUBE READING.

_____ 8. As the heater outlet temperatures approach 900°F, coke should start spalling. If spalling occurs too fast, large particles of coke will be removed which can erode tubes and lines rapidly. If spalling is proceeding too fast, cut back on heater outlet.

With the flow rates lines out, any increase in inlet pressure indicates restricted flow and plugging.

_____ 9. Occasionally catch a sample of the effluent and let it settle to check particle size. Particles should be as fine as flour.

- _____ 10. Gradually raise heater outlet temperature (25-35°F/hr.) unless heater inlet pressure indicates plugging.
- _____ 11. Continue raising heater outlet temperatures until 1400°F HEATER OUTLET, 1400°F FIREBOX TEMPERATURE, OR 1400°F OPTICAL TUBE TEMPERATURE is reached. STOP WHEN ONE OF THE TEMPERATURES REACH THIS LIMIT.
- _____ 12. Continue to spall at the maximum temperature until the effluent clears. Tubes will be cherry red at the maximum temperature.
- _____ 13. After spalling is complete, decrease heater outlet temperature at 150°F/hr. to 1200°F.
- _____ 14. Decrease steam rate to 2000 lbs/hr. per pass (3.7 divisions/pass).
- _____ 15. Gradually, over a 30-minute period, raise the air rate to 200 lbs/hr/pass to start burning the coke that did not spall. The effluent should turn reddish.
- _____ 16. Watch temperature on outlet of each pass very closely. If it starts going up too fast, it may be necessary to: first, cut air back or out; second, increase steam; or third, cut firing rate. With this amount of air and steam, the outlet temperature should not go over 1350°F. If it does not go over 1300°F, make no changes. Check heater tubes often. If burning is too rapid, the tubes may get too hot. This can be checked by eye sight or optical pyrometer.
- _____ 17. Continue raising the heater outlet temperature until

the maximum of 1400^oF on tube outlet, firebox, or optical tube temperature is reached. Then, STOP.

- _____ 18. After the effluent stays clear for about 30 minutes, cut air out of each pass and raise steam to maximum for 30 minutes.
- _____ 19. Reduce steam rate to 2000 lbs/hr/pass and start air back in at 100 lbs/hr/pass. Repeat Item 18 until the effluent remains clear.
- _____ 20. Reduce maximum temperature to 1300^oF.
- _____ 21. Very gradually over a two-hour period, reduce steam rate to zero and at the same time increase the air rate to maximum. It is very important that the tubes be checked for excessive temperature every few minutes.
- _____ 22. If the temperature increases above 1350^oF, reduce air and increase steam.
- _____ 23. If it is necessary to cut air under Item 22, repeat Item 21 when maximum temperature has dropped to 1300^oF.
- _____ 24. When no temperature increase is seen or recorded raise to maximum tube outlet, firebox, or optical tube temperature of 1400^oF. Hold at maximum air rate for 2-4 hours, until effluent clears.
- _____ 25. Continue to check tubes for excessive temperature at least every 15 minutes.
- _____ 26. Every 30 minutes blow tubes with maximum steam for 3 or 4 minutes.

842 DELAYED COKING UNITPROCEDURE FOR STEAM-AIR DECOKING FURNACES 101-BA & BB

During the shutdown of the unit, the heaters are steamed out in the usual manner and the gas spool is dropped.

Time Name

- | | | |
|-------|-------|--|
| _____ | _____ | 1. Install DP cells and flow meters on the air lines to the air lines to the passes at orifice taps FE-1101 through FE-1108. |
| _____ | _____ | 2. Install an 8 point 0-1600°F temperature recorder to record points TR-1001-1 through TR-1001-8. |
| _____ | _____ | 3. Line up the furnace transfer through the switch valve into the drum by-pass line and close "B" valve. |
| _____ | _____ | 4. Roll the ells on the furnace outlet to direct the furnace effluent via the quench pot. Start water to quench pot. |
| _____ | _____ | 5. Cut start up steam through the superheater until the steam generator develops steam. |
| _____ | _____ | 6. Line up steam generator and have it ready to go. |
| _____ | _____ | 7. Line up steam through the furnace charge line and start steam through FRCa 1001 through FRCa 1008 furnace charge meters at the rate of 2,500 lbs/hr/pass or about 20,000 lbs/hr. for the two furnaces. |
| _____ | _____ | 8. Steam out fire boxes. |
| _____ | _____ | 9. Light about one-fourth the burners in each pass. <u>USE THE STANDARD FIRING PROCEDURE</u> . Keep burner pressure as low as possible. Stagger burners to distribute heat in the furnace as evenly as possible. |

10. As soon as the heater is fired, start recording the following flows, temperatures, and pressures each hour as long as steam or air is in the tubes:

A. Inlet pressure to Pass: A, 101BA, PRa 1045

B, 101BA, PRa 1044

C, 101BA, PRa 1046

D, 101BA, PRa 1047

A, 101BB, PRa 1049

B, 101BB, PRa 1048

C, 101BB, PRa 1050

D, 101BB, PRa 1051

B. Steam to Pass: A, 101BA, PRCa 1001

B, 101BA, FRCa 1002

C, 101BA, FRCa 1003

D, 101BA, FRCa 1004

A, 101BB, FRCa 1005

B, 101BB, FRCa 1006

C, 101BB, FRCa 1007

D, 101BB, FRCa 1008

C. Air to Pass: A, 101BA, FE1101

B, 101BA, FE1102

C, 101BA, FE1103

D, 101BA, FE1104

A, 101BB, FE1105

B, 101BB, FE1106

C, 101BB, FE1107

D, 101BB, FE1108

D. Temperature Outlet Pass: A, 101BA

B, 101BA

C, 101BA

D, 101BA

A, 101BB

B, 101BB

C, 101BB

D, 101BB

E. Temperature Convection Section: B, 101BA, TI-1000-57

A, 101BA, TI-1000-58

B, 101BB, TI-1000-65

A, 101BB, TI-1000-66

F. Temperature Superheater Outlet: 101BA, TI-1000-36

101BB, TI-1000-37

- _____ 11. Raise the temperature of the tube outlets at about 300°F per hour until 900°F is reached. Light more burners as necessary.
- _____ 12. Check temperatures in fire box as temperatures are increased. TEMPERATURES SHOULD NOT EXCEED 1400°F ON FIRE BOX, TUBE OUTLET, OR OPTICAL TUBE READING.
- _____ 13. As temperature on heater outlet approaches 850-900°F, coke should start spalling. If spalling becomes too fast, large particles of coke will be removed. These large particles can erode the tubes and lines rapidly. If spalling is proceeding too fast, cut back on heater outlet temperature. With flow rates lined out any increase in heater inlet pressure will indicate restricted flow and plugging.

14. Catch a sample of effluent and let it settle and check particle size. Particles should be fine as flour. Also catch sample from each pass if the particle size is not fine.
15. Gradually raise heater outlet temperature (25-35°F/hr) unless heater inlet pressure indicates plugging.
16. Continue raising heater outlet temperature until you reach 1400°F HEATER OUTLET, 1400°F FIRE BOX TEMPERATURE, OR 1400°F OPTICAL TUBE TEMPERATURE; WHICHEVER IS REACHED FIRST, THEN STOP.
17. Continue to spall at maximum temperature until effluent clears. Tubes will be cherry-red at maximum temperature.
18. After spalling is complete, decrease heater outlet temperature at 150°F per hour to 1200°F.
19. Decrease steam on each pass to 1000 lbs/hr.
20. Adjust number of burners to hold minimum gas pressure on burners and hold 1200°F on heater outlet temperature.
21. Gradually, over a 30-minute period raise the air rate to 100 lbs/hr for each pass to start burning the coke that has not spalled off. Check the effluent; it should turn reddish.
22. Watch temperature on outlet of each pass very closely. If it starts going up too fast, it may be necessary to: first, cut air out or back; secondly, increase steam; or thirdly, cut firing rate. With this amount of air and steam the outlet temperature should not go over 1350°F. If it does not go over 1300°F, make no changes. Check heater tubes often. If burning is too rapid, the tubes

may get too hot. This can be checked by eyesight or use of optical pyrometer.

- _____ 23. Continue raising the heater outlet temperature until the maximum of 1400°F on tube outlet, fire box or optical tube temperature; whichever is reached first, then, stop.
- _____ 24. After effluent stays clear for about half an hour, cut air out of each pass and raise steam to maximum rate.
- _____ 25. After 30 minutes of steaming, reduce steam to 1000 lbs/hr/pass and start air back at 100 lbs/hr/pass. Repeat Item No. 24 again and keep repeating as long as necessary to get effluent to stay clear.
- _____ 26. Reduce temperature to 1300°F maximum temperature.
- _____ 27. Very gradually, over a two-hour period, reduce steam rate to zero and at the same time increase air rate to maximum. It is very important that tubes be checked every few minutes for excessive temperature.
- _____ 28. If temperature increases above 1350°F, cut air and replace steam.
- _____ 29. If it is necessary to cut air under Item No. 28, repeat Item No. 27 when temperature has dropped to 1300°F maximum.
- _____ 30. When no temperature increase is recorded or seen, raise maximum tube outlet, fire box, or optical tube temperature to 1400°F.
- _____ 31. Hold maximum air rate for 2-4 hours, until effluent clears.
- _____ 32. Continue to check tubes for excessive heating at least every fifteen (15) minutes. Every thirty (30) minutes blow tubes with maximum flow of steam for 3 or 4 minutes.

- _____ 33. If no change is noticed in temperature after four (4) hours, reduce air to 100 lbs/hr/pass and gradually raise steam to 1000 lbs/hr/pass.
- _____ 34. Cut air out, raise steam to maximum rate. Decoking is finished.
- _____ 35. Reduce heater outlet temperature at rate of 100-150°F/hr. to 600°F. This step is very important on heaters having rolled tubes as too fast a cooling rate can cause roll leaks.
- _____ 36. When 600°F temperature is reached on the tube outlets, cut fires and turn spool in gas line.
- _____ 37. Cut steam to all passes to 1000 lbs/hr.
- _____ 38. When heater outlets are down to 400°F, cut steam out of tubes.
- _____ 39. Shut down steam generator circulation.
- _____ 40. Cut water out of the quench pot.
- _____ 41. Cool furnaces to 200°F before opening heater doors.
- _____ 42. Heater is now ready for maintenance work or testing.

DISCUSSION OF SELF-IMPROVEMENT

This section in the scheduled guide for learning is one in which the trainee is urged to continue studying to become a skilled operator.

Even after a person has been declared qualified, much remains to be learned before he can feel confident that he knows all he can learn about a unit.

You are urged to review this manual to become proficient in what you have learned to do and take advantage of opportunities for further improvement.

Among these are:

1. API Pilot Series
- *2. Correspondence Courses
- *3. College Courses
4. Periodic training in safety and firefighting
5. Departmental communications meetings
6. Training sessions on various subjects such as heaters or pumps

*Some outside courses of study qualify for Company aid.

PILOT Series

PILOT I Practical Distillation - 4 books
 Units 1 & 2 Units 5 & 6
 Units 3 & 4 Units 7 & 8

PILOT III Furnace Operation - 2 books
 Units 1 & 2 Units 3 & 4

PILOT VI Instrumentation for Operators - 3 books
 Unit 1, Sections 1 & 2
 Sections 3 through 5
 Unit 2, Process Control
 Unit 3, Controllers & Control Modes

PILOT VII Centrifugal Pumps - 2 books
 Unit 1, Centrifugal Pumps
 Unit 2, Positive Displacement Pumps

PILOT VIII Pumps and Compressor Drivers - 3 books
 Unit 1, AC Motors
 Unit 2, Steam Turbines
 Unit 6, Steam Engines and Steam Reciprocating Pumps

PILOT II Nature of Heat - 3 books
 Unit 1, Heat and Temperature
 Unit 2, Heat Transfer
 Unit 3, Fuels and Combustion

PILOT IV Mechanics of Fluids - 4 books
 Unit 1, An Introduction to Fluids
 Unit 2, The Behavior of Gases
 Unit 3, Statics
 Unit 4, Fluids in Motion

PILOT V

Compressors - 2 books

Unit 1, An Introduction to Compression

Unit 2, Positive Displacement Compressors

PILOT IX

1 book - Significance of Process Control Test
Valves

REQUEST FOR PRODUCTION

NO. 29

1957-1958

AGREEMENT

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

(A. F. of L.)

AND

(C. I. O.)

EL PASO, TEXAS

EL PASO PRINTING COMPANY

PRINTED ON UNION MADE AND WATER MARKED PAPER

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L.V. SHERRY
AUG 22 1957

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CHEV B8 7031

AGREEMENT
Between
STANDARD OIL COMPANY OF TEXAS
AND
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 17th day of June, 1957 between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Laboratory, Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I
PERIOD OF AGREEMENT AND WAGE
CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 1, 1957 and shall remain in effect until February 28, 1958, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other

in writing, of its intention to terminate the agreement, at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A regular work day shall consist of eight (8) consecutive hours in any calendar day, except that for employees whose shifts start at 11:00 p.m., 7:00 a.m., or 3:00 p.m., the work day shall commence at 11:00 p.m. on the preceding calendar day, whether paid at straight

or premium rate, exclusive of lunch periods. The lunch periods for regular day workers will be from 12:00 to 12:30 p.m., when consistent with the work on hand. The normal shift for regular day workers will be No. 2 Shift, 8:00 a.m. to 4:30 p.m.

B. A work week shall consist of seven (7) consecutive days, commencing at 12:01 a.m. Monday, except that a work week for employees scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts shall consist of seven (7) consecutive days starting at 11:00 p.m. Sunday.

C. A regular weekly work schedule shall consist of five (5) regular work days, with two consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc., whether paid or unpaid) on regular scheduled work days shall count as days worked. The Company will establish and post regular weekly work schedules, consistent with operating requirements, to permit consecutive days off.

ARTICLE III WAGE RATES, OVERTIME AND EXTRA COMPENSATION

A. Wage Rates, Exhibits, Shift Differentials

1. Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A", or any wage rate or classification mutually agreed to hereafter.

2. a. Where an employee works in two classifications in one day, and works less than a half day in the classification carry-

ing a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

4. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs, dependent upon the time thus worked. The principle outlined in paragraph 2.a. will be used in determining whether they will receive pay for one-half of a day or full day at the highest rate on each day of broken time. Seniority within the group working on the specific job involved, and ability shall be followed in selecting these men.

B. Overtime, Extra Compensation and Other Premium Pay

1. a. Overtime rate (1- $\frac{1}{2}$ times the

regular rate), except as specified below in b. and c., shall be paid for all work performed outside of or in excess of the regular weekly work schedule ("K" time).

b. Overtime rate (2 times the regular rate) shall be paid for:

(1) All hours worked in excess of 16 consecutive hours; i.e., beginning on the 17th consecutive hour ("K-D" time).

(2) All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, and these off days are consecutive calendar days but need not fall within the same work week ("K-D" time). For purposes of double-time payment only, both off days will start at 12:01 a.m. and end at 12:00 midnight the same day, except for employees whose shifts start at 11:00 p.m., 7:00 a.m. or 3:00 p.m., for whom both off days will start at 11:00 p.m. and end at 11:00 p.m. the next day.

c. An employee who is called out to work and who reports for such work, shall receive a minimum of four (4) hours pay at straight time rates, or time-and-one-half for work performed, whichever amount is greater ("Q" time); except that he shall be paid at double-time rate where b. above applies.

2. a. Extra compensation ($\frac{1}{2}$ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular, scheduled work day, under the following conditions:

(1) For the first shift of rearranged work schedule, without the required 40 hours notice prior to the beginning of first shift ("M" time).

(2) Time worked in excess of eight (8) hours in any (24) twenty-four hour period, other than overtime as defined in 1a. and b. above ("N" time).

C. Distribution of Overtime

1. An effort will be made to distribute overtime equally among employees qualified in the classification in which the overtime occurs. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as possible. When processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

2. To give effect to paragraph 1 above, as applied to Refinery Operators, the following procedures will be observed:

a. The Operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires and the regular Operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the Operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the Operators referred to above have already worked the afternoon shift on their first scheduled days off in their regular weekly work schedules, or

(3) Where the Company has more than eight (8) hours' advance notice of the absences, or

(4) Where there is an Operator on the

vacated shift who is breaking in on any job and who is qualified to relieve any job that will provide relief for the vacancy.

(5) In either (1) or (2) or (3) above, the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

D. Overtime Meals

1. When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal not to cost over \$3.00 in place of two separate meals at \$1.50 each. Company may also, at its option, provide employee with a meal allowance of \$1.50 in place of the meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company's expense, will be allowed for eating.

ARTICLE IV SENIORITY

A. For the purpose of administering this article and Article V, Seniority of two types shall be considered as stated below:

1. Refinery Seniority, which shall be

based on the date of entering the service of the El Paso Refinery; and

2. Section Seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized Refinery Sections are:

1. Operating
2. Filling and Shipping
3. Storehouse
4. Instruments
5. Electrical
6. Machinist and Tool Room
7. Welding
8. Pipe Fitting, Boiler Making and Utility

ARTICLE V PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this Agreement are "Exhibit B," Job Progression Chart — Maintenance — Storehouse, and "Exhibit C," Job Progression Chart—Operating Section, showing job classifications and the normal progression and regression paths between the various classification and groups of classification.)

A. Promotions

1. All promotions, demotions, placement of men displaced by job terminations, and all filling of permanent vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there

may be individuals who, thru lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the Section Seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by Management (in advance when possible) why such employee was not selected for such promotion; except that this notification shall not be necessary in the Operating Section for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Section.

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights. This will not preclude the employee's right to promotion to some other jobs which he is capable of performing.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a 2-year period to the job that their seniority and ability would have entitled them to, had they remained in the Refinery organization.

5. Promotions from Helper "B" to

Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of Refinery service and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon the completion of (12) twelve months of service in the Refinery Maintenance Division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months of service as Mechanic "B," and

b. 60 months of service in the Refinery Maintenance Division, including any service as Mechanic "B".

6. The Company will maintain a minimum of 60% overall Mechanic to Helper ratio for the Refinery as a whole, provided there are Mechanic Helpers who are qualified to be Mechanics.

B. Layoffs and Rehiring

1. Layoffs for lack of work, and rehiring shall be based on Refinery seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one year and less than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their Refinery Seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the Military service. Under emergency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. Demotions

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the Section Seniority list shall control within each section and the employee with the least Section Seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the Section Seniority list of the rate classification to which demoted for consideration in case a promotional opportunity develops in the rate classification from which demoted.

2. If an employee being demoted be-

cause of curtailment of work has previously worked in another section than that in which he is then working, he may be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater Refinery Seniority than the employee whose demotion would result therefrom. The new position in the new Section Seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his Refinery Seniority.

D. Inter-Section Status

1. For the purpose of administration of Articles IV and V, all employees will be assigned to a specific Refinery Section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability, as provided in Exhibits B and C. Section assignment as stated here shall not in any way interfere with Company having employee do any type of Refinery work that in Company's judgment he can do safely.

2. Transfers between Maintenance Sections may be made with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with Section Seniority dating from the date of entering the new Section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire Section Seniority in the new section nor lose acquired Section Seniority in his regular section. If any temporary transfer is later made permanent, Company records and the Seniority list will so indicate, and the provisions of paragraph 2 above will apply, except as provided in the last sentence of paragraph 1, Section C above.

ARTICLE VI VACATIONS, HOLIDAYS AND FRINGE BENEFITS

A. Vacations

Employees who have completed one year's service with Company shall be given two week's vacation with pay each calendar year. In the tenth calendar year and in each calendar year thereafter, employees will be given three week's vacation with pay. In the twentieth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

B. Holidays

1. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veterans' Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on Sunday,

the Monday immediately following shall be observed as the holiday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether schedule or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one half times the straight time rate for all hours worked. For the purposes of holiday payments, holidays will be considered as starting at 12:01 A.M. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 P.M., 7:00 A.M. or 3:00 P.M. shifts, holidays will be considered starting at 11:00 P.M. prior to the calendar day of the holiday and ending at 11:00 P.M. twenty-four (24) hours later.

4. All regular employees shall receive eight paid holidays per year. Those not so paid under the provisions of paragraphs 2 and 3 above, shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All benefit plans arranged by the

Company for its employees generally shall be available to employees covered by this Agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sick-ness-and-Non - Industrial - Injury Benefit Plan.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

ARTICLE VII UNION ACTIVITIES

A. Workman's Committee

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of Management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration, (except

where distances to be traveled require additional time, in which case not more than thirty (30 days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than four employees, provided that not more than two employees shall be granted a simultaneous leave.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special Leave of Absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for reemployment, if made within two years from date of start of such leave, will be considered and accepted on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two years.

c. Applicant, if re-employed within said period of two years, will enter the job that his seniority and ability would have entitled him to, had he remained in the Refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Discrimination, Coercion or Intimidation

1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining, the Union.

E. Conferences during Working Hours

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

F. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in

the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the Secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. Strikes and Lockouts

There shall be no cessation of work thru strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work and/or wage rates as provided in Article I and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this Agreement shall remain in full force and effect.

D. Smoking Areas

Smoking privileges will be provided for

all employees within the Refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the Refinery as long as the Refinery has the necessary men and equipment available to perform such work properly.

F. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two copies of the written record of this final warning. The additional copy may be provided the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an 8-hour day at the rate of pay he was receiving at the time of injury.

H. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required, to write, or affix his signature to, any letter or

printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this Agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his Foreman or appropriate Supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate Supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher Management if necessary to aid him. If at the conclusion of the discussion with his Supervisor he is not satisfied, the employee shall so state and advise his Supervisor that he is taking the first step in presenting a grievance.

2. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or thru the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the

grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted, or whether said decision shall be arbitrated.

3. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven (7) days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

4. If agreement on the third arbitrator cannot be reached within (14) fourteen days, the Federal Mediation and Conciliation service shall be asked to submit a list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding

on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The Arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

ARTICLE X

If any of the provisions of this contract shall be held invalid by any Governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating Engineers, Local No. 552
7629 Parraj Road
El Paso, Texas
Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS
By M. P. Paret, Jr., Vice President
INTERNATIONAL UNION OF OPERATING ENGINEERS,
LOCAL UNION NO. 552

By C. J. McBride, Jr., President
By F. W. J. Bishop, Secretary

EXHIBIT "A"

REFINERY CLASSIFIED OPERATING & MECHANICAL WAGE SCHEDULE

In Effect June 1, 1957

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A Catalytic Cracker Thermal Cracker Crude Distillation	HOA	\$3.0750	\$24.60
Head Operator B Gas Recovery-Alkylation Pumping Thermal Cracker	HOB	2.9683	23.75
Head Operator C Catalytic Cracker Gas Recovery-Alkylation Perco Desulfurizer High Pressure Boilers Platformer Gauging	HOC	2.8625	22.90
Operator A Catalytic Cracker Crude Distillation Gas Recovery-Alkylation Thermal Cracker Gauging Caustic Treating	OA	2.7563	22.05
Operator B Catalytic Cracker Gas Recovery-Alkylation Treater	OB	2.5975	20.78
Operator C Catalytic Cracker High Pressure Boilers Gauging	OC	2.3325	18.66

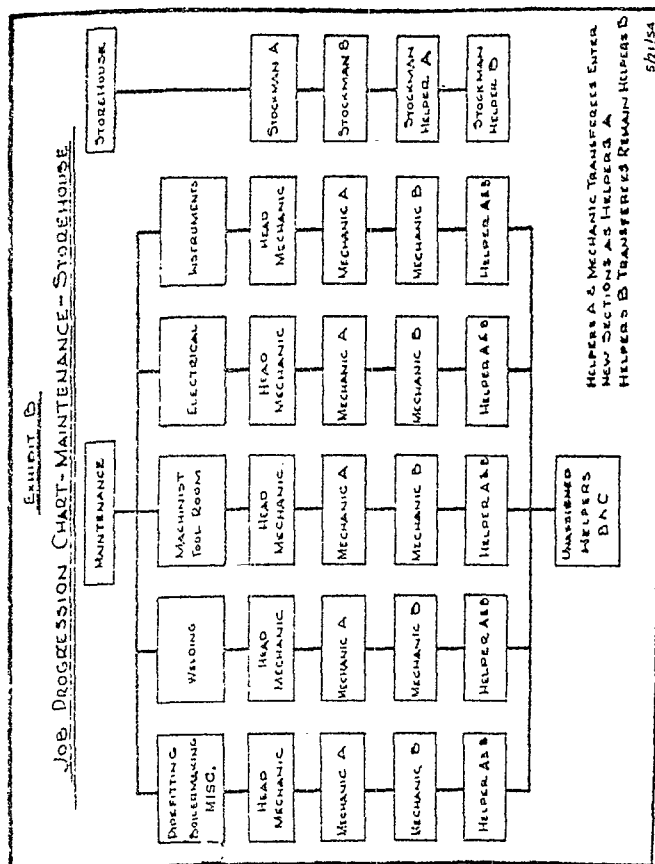
MAINTENANCE DIVISION

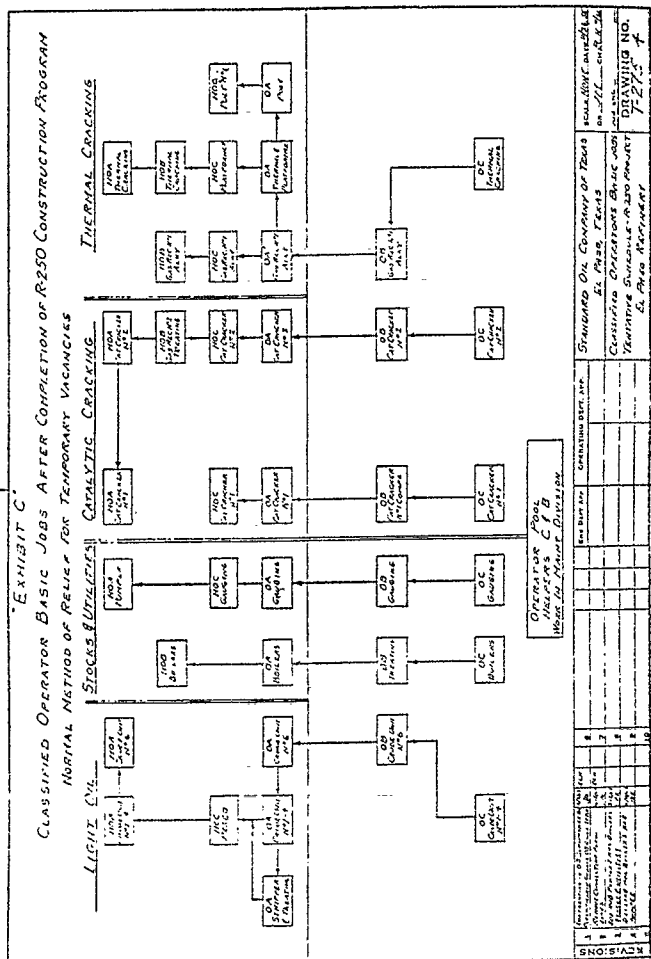
Classification	Hourly Rate	Daily Rate
Head Mechanic	\$2.9688	\$23.75
Mechanic A	2.8625	22.90
Stockman A	2.8625	22.90
Mechanic B	2.5975	20.78
Stockman B	2.5975	20.78
Stockman Helper A	2.4063	19.25
Helper A	2.4063	19.25
Stockman Helper B	2.2375	17.90
Helper B	2.2375	17.90
Helper C	2.0438	16.35
Laborer	1.7988	14.39

FILLING & SHIPPING

Finished Stock Gauger	2.5975	20.78
Carloader Senior	2.5975	20.78
Carloader A	2.4063	19.25
Carloader B	2.2375	17.90
Helper C	2.0438	16.35

Employees who work any time other than day shift will receive, in addition to the above rates, 8c an hour for the afternoon shift, or 16c an hour for the morning shift.





and the need for such training is justified.

Once the basic Operating organization is complete, men in the Operator Pool will be trained on not less than two OC jobs (one in each Division) and will be assigned to fill temporary vacancies in the OC classification for which they are qualified, as such vacancies occur. Permanent vacancies at the OC level will be filled by seniority from the Operator Pool. After receiving a permanent basic assignment in either of the combined divisions below the OA level, a man will remain in the assigned division except that during the month of November each year he may request a transfer to the other combined division and receive a new basic assignment according to seniority as soon thereafter as he is able to qualify by ability to hold such basic assignment.

Men will be placed in permanent OA vacancies in one of the four divisions from the OB level in the combined divisions according to seniority and ability. After a man accepts a permanent basic assignment of OA in one of the four divisions (Light Oil, Stocks & Utilities, Cat Cracking or Thermal Cracking), he will progress by seniority and ability only in that division. In the event he wishes to transfer to another division, he may do so at any time by making a written request to the Company and by taking a seniority placement in the new division just under the youngest basically assigned OB and progress in this relative position.

Temporary vacancies occasioned by illness, days off, vacations, leaves of absence, etc. will be filled in accordance with the progression chart.

Permanent vacancies in any division will be filled by seniority and ability except that any man may request in writing to the Company that he remain in line of progression in any one plant in a division rather than accept a job of higher classification in another plant in the same division.

Lateral training at all levels in a single division will be given to all Operators who desire such training and who are satisfactorily performing their duties in their basic assignment. Such training will be done consistent with Operating requirements, and a record of the jobs a man has qualified himself to hold will be posted.

All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor. Men at all levels may be broken in and worked without regard to seniority in the next higher classification than their basic assignment, except that such assignment does not require another man to work at a rate below his basic assignment. No one man shall work such an assignment for more than 20 work days per year. No man shall be paid at a rate below the rate of his basic assignment regardless of the job he works and shall be paid the rate of any higher classification than his basic assignment for any such work performed.

When a man requests and is therefore given a permanent plant assignment, he forfeits all future rights to a higher job

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in the same division except the higher job in the plant in which he requests to remain.

A man, at his written request to the Company, will be allowed to remain on any permanent assignment without progressing to higher jobs.

This agreement shall be effective as of June 1, 1957 and shall remain in effect until February 28, 1958.

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April 7, 1971 April 7, 1971
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AGREEMENT

Between

CHEVRON OIL COMPANY

d/b/a

STANDARD OIL COMPANY OF TEXAS

and

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL NO. 826

El Paso, Texas

This AGREEMENT is made and entered into April 7, 1971, between Chevron Oil Company, d/b/a Standard Oil Company of Texas, with a Refinery at El Paso, Texas, herein referred to as the "Company," and Local No. 826, International Union of Operating Engineers, AFL-CIO, herein referred to as the "Union." This Agreement shall be considered to be the entire Agreement between the parties, and no Agreement which predates this Agreement shall have any other force or effect.

WITNESSTH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative, for the purpose of collective bargaining in respect to rates of pay, wages, hours of employment, or other conditions of employment, of employees in the Maintenance, Operating, Laboratory and Filling and Shipping Divisions of the Company's El Paso Refinery for whom the Union was certified as

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the collective bargaining representative in the National Labor Relations Board certifications dated May 7, 1943 (Case No. 16-R-629), August 31, 1953 (Case No. 33-RC-453) and December 8, 1966 (28-AC-2), subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor Management Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This Agreement shall be effective as of 12:01 a.m., April 7, 1971, and shall continue in full force and effect for two (2) years from such date, and shall renew from year to year thereafter unless either party hereto shall give written notice to the other at least sixty (60) days but not more than ninety (90) days prior to an anniversary date of its desire to modify, amend or terminate this Agreement. Any such notice to modify or amend the Agreement shall contain the specific articles and subdivisions thereof to be discussed. If notice to modify or amend is given, the Agreement shall remain in effect during negotiations except that if agreement is not reached during negotiations within the sixty (60) day period prior to the anniversary date or thereafter if negotiations continue beyond the anniversary date, either party may give thirty (30) days' written notice to the other of its desire to terminate this Agreement. This Agreement will then terminate at the expiration of said thirty (30) days unless the parties hereto, by mutual agreement, extend this Agreement beyond the above termination date for a specific period for the continuance of negotiations.

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(Art. I)

B. It is recognized, however, by the parties that during the term of this Agreement it may become desirable to discuss wage rates in general (as set forth in Exhibit A) and hours and days of work (Article II. C.). For these purposes only, each party may open once upon written notice to the other, at least sixty (60) days, but not more than ninety (90) days prior to December 31, 1972, and once each contract year thereafter, to bargain on revisions in the light of conditions then existing. If agreement is not reached by December 31, 1972, either party may give sixty (60) days' written notice of its desire to terminate this Agreement, in which case the Agreement shall terminate as of the end of such sixty (60) day period unless by mutual consent the parties agree to an extension for the purpose of continuing negotiations.

ARTICLE II WORK DAY, WORK WEEK AND WORK SCHEDULES

A. The established work week shall consist of seven (7) consecutive twenty-four (24) hour periods beginning with the No. 1 Shift Monday. The Monday No. 1 Shift is that shift which begins 11:00 p.m. Sunday for shift workers and 12:01 a.m. Monday for day workers.

B. 1. A work day is twenty-four (24) consecutive hours beginning at the same time each day. The first work day begins at the time the established work week begins, and the seventh work day ends at the time the established work week ends.

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(Art. II, B.)

2. Normally, but not exclusively, the regular shift for day workers will be eight (8) consecutive hours, exclusive of an unpaid lunch period, between 6:00 a.m. and 6:00 p.m. as contrasted to shift workers who regularly work No. 1 Shift (11:00 p.m. to 7:00 a.m.), No. 2 Shift (7:00 a.m. to 3:00 p.m.) and No. 3 Shift (3:00 p.m. to 11:00 p.m.).

3. Day workers working a scheduled shift starting or ending outside the hours of 6:00 a.m. to 6:00 p.m. shall be allowed a thirty (30) minute paid lunch period on the job site.

4. The unpaid lunch period for day workers will be from 12:00 noon to 12:30 p.m., when consistent with the work on hand. When an employee is required to work through his regular lunch period he shall be provided a different unpaid lunch period which shall be no more than one (1) hour earlier or later than the established lunch period. In addition, the Company shall allow a five (5) minute paid period prior to the lunch period for day workers to stop work, clean up, and travel to the lunch area.

5. Day workers will be at their assigned job sites ready to go to work at the designated starting times at the beginning of the shift and after lunch.

C. Employees are expected to be available for shift work and overtime. Work schedules specify the days in the work week and hours in the work day during which employees are to work. With the exception of employees on a stable shift schedule, each weekly work schedule consists of eight (8) consecutive hours, exclusive of

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(Art. II, C.)

unpaid lunch periods, on each of five (5) work days, totaling forty (40) hours of work at the straight time rate within each work week, with two (2) consecutive days off. Such schedules do not guarantee or limit the hours of work. The Company will post each employee's assignment to the weekly work schedule as far in advance as practicable, consistent with work requirements. Notification of changes in the employee's work assignment will be posted as far in advance as practicable. Employees will review their work assignment before leaving the plant each work day.

ARTICLE III

WAGE RATES, OVERTIME AND OTHER PREMIUM PAY

A. Wage Rates, Exhibits, Shift Differentials

1. The wage rate classifications and present job titles applicable thereto are attached and made part hereof as Exhibit A. Employees will be paid for time worked in each classification to which assigned at not less than the job rate for the work performed, except for Helpers in the Maintenance Division who may be assigned work also performed by Mechanics, and Helpers in the Laboratory Division who may be assigned work also performed by Technicians.

2. a. Where an employee of an Operating Division works in two classifications in one (1) day, and works less than half ($\frac{1}{2}$) a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half ($\frac{1}{2}$) a day at the higher rate and the other half ($\frac{1}{2}$) day at the lower rate. If he works one-half ($\frac{1}{2}$)

(Art. III, A.)

day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When during a shift an Operating Division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay.

B. Overtime and Other Premium Pay

1. General - No more than one overtime or premium pay provision in this Agreement shall be applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. All work performed in excess of eight (8) hours in any work day, or forty (40) hours in the established work week, shall be paid for at the overtime rate of one and one-half ($1\frac{1}{2}$) times the straight-time rate. For the purpose of determining time worked in excess of forty (40) hours in the established work week, and except when the following occur on the scheduled overtime shift of a stable shift schedule, the following shall count as time worked:

- Scheduled work time lost on account of jury duty.
- Scheduled work time off with full pay on account of sickness or holiday.
- Scheduled work time off on account of leave of absence with pay.

(Art. III, B.)

3. One and one-half (1½) times the straight-time rate shall be paid for the hours worked under the following conditions:

a. Time worked in excess of eight (8) hours in any twenty-four (24) hour period, beginning at the time the employee begins work other than overtime as defined in III.B.2. or double time as defined in III.B.5.

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b. When employees are scheduled to work a shift which may extend from one work day into the next, the employee involved will be paid at the rate of one and one-half (1½) times the straight-time rate for the hours in excess of one-half (½) hour worked on such employee's first day off, with such day off considered as starting at the beginning of the established work day as covered in Article II.B.1.

c. For the first shift scheduled to be worked and worked where the scheduled hours of work have been changed as listed below without forty (40) hours notice prior to the start of the first shift changed.

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an Operator who is working on an operating schedule, or a Laboratory employee who is working on the Laboratory schedule; i.e., change from Shift No. 1 to Shift No. 2, etc.

(3) A change of more than one and one-half (1½) hours in the starting time from the preceding work day, of regular hours of work of a Maintenance and Storehouse Division worker, or of an

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(Art. III, B.)

Operator or Laboratory or Filling and Shipping employee who is working on, going onto, or coming off a maintenance schedule.

d. Compensation provided in Article III.B. 3.c.(3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular shift.

(2) When an employee changes to a day shift from any other shift.

4. "Call Out" - Any employee who reports for work after he has completed his shift and has left the plant, and before the start of next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight-time rate or time and one-half for work performed, whichever is greater. *✓ note*

Call Out - Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

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(Art. III, B.)

5. Double time rate of two (2) times the straight-time rate shall be paid for:

a. All hours worked in excess of sixteen (16) consecutive hours; i.e., beginning on the 17th consecutive hour.

b. All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week. For the purpose of double time payment only, both off days will start at the beginning of the established work day as covered in Article II.B.

C. Distribution of Overtime

1. An effort will be made to distribute overtime in the Operating, Maintenance, Laboratory, and Filling and Shipping Divisions, except to those employees assigned to light duty for health reasons. Overtime in Operations will be worked by qualified employees normally assigned to work in the classification and section in which the overtime occurs. Overtime in Maintenance will be worked by employees qualified for the work. During shutdowns the Company may assign Operating, Laboratory, or Filling and Shipping employees on overtime to supplement the Maintenance force. For the purpose of identification, only the overtime hours worked or offered and refused, as defined under the provisions of Articles III.B.2., III.B.4., III.B.5., will be counted as the basis for the distribution of overtime.

2. Any overtime worked or offered and refused by an employee at less than his basic rate will not be counted in the basis for the distribution of overtime.

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(Art. III.)

D. Overtime Meals

1. The Company will provide a wholesome meal, not to exceed \$1.50 in cost, to each employee at his job location after he has completed more than ten (10) consecutive hours of work (unpaid lunch periods excluded) and after completion of each successive four (4) hours of work thereafter.

2. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company expense, will be allowed for eating.

3. An employee may elect to take a meal allowance of \$1.50 instead of a meal if his supervisor offers the employee that option in advance of the time a meal is due.

ARTICLE IV SENIORITY

A. For the purpose of administering this Article and Article V, seniority shall consist of three (3) types as follows:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery.

2. Division seniority, which shall be based on the last date Company assigns an employee permanently to a Division as defined in this Article.

3. Section seniority, which shall be based on

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(Art. IV. A.)

the date Company assigns an employee to a definite section as defined in this Article.

B. For the purpose of this Article the recognized Divisions are:

1. Maintenance Division
2. Operating Division
3. Laboratory Division
4. Filling and Shipping Division

C. For the purpose of this Article, the recognized Refinery Sections are:

1. Process Section
2. Tank Field Section
3. Storehouse Section
4. Electrical and Instrument Section
5. Machinist Section
6. Welding, Pipefitting, Boilermaking and Miscellaneous Section

D. No employee may establish or retain Division Seniority in more than one Division nor Section Seniority in more than one Section.

ARTICLE V

PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

EXHIBITS:

Attached to and made a part of this Agreement are "Exhibit B - Job Progression Chart, Maintenance Division," "Exhibit C - Job Progression Chart, Operating Division," and "Exhibit D - Job Progression Chart, Filling and Shipping and Laboratory Divisions,"

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(Art. V.)

showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications. These exhibits are not intended for use in determining the number of basic jobs in these divisions, which are subject to change in accordance with the provisions of Article XI.

A. Promotions

1. All promotions to classifications within the bargaining unit except as otherwise provided herein shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs. When a promotion is made and the employee is not the highest on the seniority list in the next applicable classification, any employee higher in that classification and eligible for consideration for such promotion shall be advised by the Company why he was not selected.

Promotions in Operating Division

2. Promotions in the Operating Division to the basic O and UO classifications (above the red line), will be made when a basic job is permanently vacated and is still required or when a new basic

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Art. V., A.)

Job is created. Basic jobs are those which are determined by Management to be essential to the anticipated requirement for efficient operation of the plant. The number of basic jobs, as determined by the Company, may be revised from time to time to meet changing conditions. The Union will be kept informed of such changes made in the number of basic jobs in the Operating Division.

a. The number of employees assigned to each classification (above the red line), is determined by the number of employees needed to fill each basic job in that classification. Employees will be assigned to the classification in the order of Section Seniority. All swing jobs will be classified at the lower of the two swing classifications. Except as provided for in Article V.C., once an employee is assigned a position on the seniority list his name shall continue in the basic classification assigned even though he is absent for any reason and still retains his seniority.

3. All promotions to O and UO classifications shall be based on seniority and ability.

a. Effective April 10, 1968 ability shall include satisfactory completion of the Operator Training Program for promotion to Operator non-basic for all Operating Division employees with an Operating Division seniority date later than December 1958.

b. Effective April 10, 1972 ability shall include satisfactory completion of the Unit Operator Training Program for promotion to Unit Operator.

4. a. Employees newly assigned to the Operating

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(Art. V. A.)

Division will be placed in the Training Program at the Trainee A rate. Based on satisfactory progress, they will be successively promoted to the TR-1, TR-2 and TR-3 classifications. A trainee in the Operating Division will be paid the achieved trainee rates as shown in Exhibit A. for work in Operator (O) jobs until he has satisfactorily completed the Operator Training Program.

b. Employees with Company service dates between April 1, 1967 and April 10, 1968, will be required to go through the Program. Their pay for work in Operations during this period will be their achieved trainee rate or the present OB rate, whichever is higher. X

c. Employees with Company service dates between December 1958 and April 1, 1967 will be required to go through the Program. They may proceed with the Program as rapidly as possible and will have until April 10, 1971 to complete the Program. Until they satisfactorily complete the Training Program, their pay for jobs worked will be at the Operator non-basic rate. X

d. Upon satisfactory completion of the Trainee portion of the Operator Training Program, the trained operator will be assigned an Operator non-basic classification and will be paid the Operator non-basic rate for work performed in Operator (O) classification.

e. A trainee assigned temporarily to work in another Division because of work requirements will be credited with his previously completed

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(Art. V. A.)

training upon his reassignment to the Operating Division. All men assigned by the Company, or transferred to the Operating Division by request of the employee, will be assigned at not higher than the TR-1 rate in order of Operating Division seniority.

f. Trainees will be kept advised concerning their progress in the Operator Training Program and will be assisted with their difficulties.

(1) Trainees having Company service dates before April 1, 1967 who fail to meet the requirements of the Program will be assigned by the Company to another Division.

(2) Trainees having Company service dates after April 1, 1967 who fail to meet the requirements of the Program will be assigned by the Company to another Division or will be terminated as determined by the Company. However, any trainee who has reached the TR-2 or higher stage of the Program and is terminated under the provisions of this section [V.A.4.f.(2)] shall have the right to appeal such termination as provided for in the Grievance and Arbitration procedures of this Agreement, in which event the sole issue to be decided shall be whether the Company acted unreasonably in determining that the employee failed to meet the requirements of the Training Program.

g. The Company may adjust the content of the Operator Training Program to meet its need for trained operators. The Union will be informed of the changes. The Operator Training Program will not be suspended if there are trainees in the program; however, the Operator Training Program may be suspended

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(Art. V. A.)

by the Company if it has no current need for trainees. The Company agrees that it will not act unreasonably in the administration of the training programs and will meet with the Union to discuss problems or questions relating to the Program.

5. Promotions to fill basic jobs in the Operator (O) classification (above the red line) in the Process Section and Tank Field Section will be made from the Operator non-basic classification (below the red line). The promoted employee will be assigned a section seniority date effective the date of his promotion and will thereafter progress only in the section into which he is promoted. If a man is offered and turns down a basic assignment in the O classification in the Process Section or the Tank Field Section, he shall not — at a later date — go ahead of the junior man who accepted the job in that classification and section. If there is a vacancy in that classification and section at a later date, and he elects to accept it, he will take a position below the last man assigned to fill a basic job in the O classification in that section, and will thereafter advance in that relative position.

a. Promotions to fill basic jobs in the Unit Operator (UO) classification in the Process or Tank Field Sections will be made from employees holding section seniority in that section.

6. Temporary vacancies due to illness, leaves of absence, etc., of one (1) to not more than thirty (30) calendar days' duration, and all

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(Art. V. A.)

vacancies due to vacations will be filled as determined by the Company in a manner that will give employees training in equal or higher classifications with the objective of suitably protecting current and future operations and providing opportunities for employees to gain experience in work of the same or higher classifications.

a. Nothing herein shall require the Company to pay an overtime or premium rate to fill a temporary vacancy when a qualified employee is available for such work at no or less overtime or premium pay.

7. In the event of an anticipated vacancy in excess of thirty (30) calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, assignments to fill such vacancies although not promotions, will be filled in accordance with the same procedure used in making promotions without changing basic classifications. However, none of the provisions in this Article nor in any other of the Articles in this Agreement are intended to obligate the Company to fill all vacancies in basic jobs whether permanent or temporary, when not required by operating conditions at the time.

8. Schedule changes will be made if necessary to assure that over any thirty (30) day period no junior employee will be assigned to work more shifts in the next higher classification than the senior qualified man in each classification and section. The senior qualified man is that employee qualified to work in the next higher classification, whose

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(Art. V. A.)

name is highest on the seniority list in each classification and section.

9. An Operator who is not promoted to UO according to the Articles of this Agreement because of his lack of ability, may be retained within the Operator classification as long as there is a job that he can handle satisfactorily, but thereafter the Company shall not be required to consider such employee for promotion to a UO classification nor shall he be entitled to fill a temporary vacancy in a UO classification. In the event there are no jobs in the Operator classification in which he can perform satisfactorily, he will be transferred to another Division per Article V.C.1.c.

In Maintenance Division

10. In the Maintenance Division, promotions from Helper B to Helper A and from Mechanic B to Mechanic A are to be made solely on the basis of Maintenance Division seniority and not on the basis of performance of a higher or different classification of work. Helpers B will be promoted to Helpers A upon completion of twelve (12) months of service in the Maintenance Division. Mechanics B will be promoted to Mechanics A upon completion of:

- a. 12 months of service as Mechanic B,
- and
- b. 60 months of service in the Maintenance Division, including any service as Mechanic B.

11. The Company will maintain a minimum of 75% Mechanics A and B plus Senior Mechanics in

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(Art. V. A.)

the permanently assigned work force in the Maintenance Division (excluding Storehouse Section), provided there are employees who are qualified to be Mechanics.

a. Mechanics A will be promoted to Senior Mechanics upon completion of fifteen (15) years' Maintenance Division seniority, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

12. A Maintenance Division employee will be assigned to a specific Maintenance Division Section (Machinist; Electrical and Instrument; Welding, Pipe-fitting, Boilermaking, Miscellaneous; Storehouse) as provided in Exhibit B, upon completion of the general portion of the Mechanic Training Program. He will establish Section seniority in the Section assigned. Section assignment as stated here shall not in any way interfere with the Company having an employee do any type of refinery work that in the Company's judgment he can do safely.

13. Promotions within the Storehouse Section shall be based on Seniority and ability. Seniority as used in this section refers to Storehouse Section seniority.

In Laboratory Division

14. All men hired into the Laboratory Division for Laboratory Technician work will be hired at the Technician Helper C classification. This classification will be effective for a period of twenty (20) work days. After the initial twenty (20) day work period in the Laboratory Division he will be advanced to the Technician Helper B classification. Promotions from Tech-

(Art. V.A.)

nician Helper B to Technician Helper A are to be made solely on the basis of Laboratory Division Seniority and not the basis of performance of a higher or different classification of work. Technician Helper B will be promoted to Technician Helper A upon the completion of 12 months of service in the Laboratory. Technician B will be promoted to Technician A upon completion of:

- a. 12 months of service as Technician B, and
- b. 36 months of service in the Laboratory, including any service as Technician B.

15. The Company will maintain a minimum of 60% Technicians of the total of Technicians plus Technician Helpers in the Laboratory Division, provided there are Technician Helpers who are qualified to be Technicians.

In Filling and Shipping Division

16. Promotions within the Filling and Shipping Division shall be based on seniority and ability. Seniority as used in this Division refers to Filling and Shipping Division seniority.

(Art.V.B.)

B. Layoffs and Rehiring

1. Layoffs for lack of work shall be based on refinery seniority. However, the Company may retain a sufficient number of men experienced and qualified to perform the necessary work in each division (Maintenance, Operating, Laboratory and Filling and Shipping) as necessary to permit continued efficient operation.

2. Employees with less than one (1) year's refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within ninety (90) calendar days after the last day worked.

3. Employees with more than one (1) year but less than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within one hundred eighty (180) calendar days after the last day worked.

4. Employees with more than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within three hundred sixty five (365) calendar days after the last day worked.

5. Men laid off due to lack of work will be offered re-employment when vacancies arise on the basis of their refinery seniority at the time of layoff, provided the seniority protection period as outlined above has not expired and that they are fully qualified to fill the vacancy.

6. Notice of available positions will be sent to

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(Art. V.B.)

employees on the layoff list by certified or registered mail, return receipt requested, to the last address left with the Company. An employee will be given five (5) days from the time the notice was received to advise the Company of acceptance and an additional five (5) days to report for work after advising the Company of his availability for work. An employee who fails to notify the Company or fails to report to work within the period specified loses all rights to seniority. The Company may grant an extension of time, for an employee to report to work if he notifies the Company of sickness, death, or emergency involving himself or his immediate family within five (5) days of the date of the notice from the Company. Under emergency conditions, temporary employees may be used until former employees on the rehiring list have reported to work.

C. Demotions

In Operating Division

1. Demotions in the Operating Division will be made because of a reduction in the number of basic jobs or because of plant shutdowns for lack of stocks or commitments or because of deficiencies of the employee.

a. When the number of basic jobs is reduced in an Operating Section (Process or Tank Field), the employees affected will be demoted in order of section seniority. Unit Operators UO who are affected will be demoted to Operator O. Operators O who are affected will be demoted to Operator non-basic. Operators non-basic will not be

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(Art. V. C.)

demoted to the Trainee rates nor will Trainees be demoted to a lower Trainee rate. Operators non-basic and Trainees not needed in the Operating Division because of a reduction in basic jobs will be assigned to work in other Divisions in order of Operating Division seniority and paid per Article V.E.4.b. Trainees assigned to work in other Divisions because of a reduction in the number of basic jobs will be allowed to extend the time for completion of the Operator Training Program by the amount of time they are assigned to work outside the Operating Division.

b. Temporary demotions because of plant shutdowns due to lack of stock or commitments, as determined by the Company, will be made as in V.C.1.a. Demoted Operators will be used to fill temporary vacancies in either section if qualified, but will retain their section seniority. Pay for Operators temporarily demoted will be as provided for in V.E.4.b.

c. A Unit Operator who is demoted due to deficiencies will be assigned to the Operator O classification if qualified. Operators O and Operators non-basic, demoted due to deficiencies and Unit Operators demoted and unable to qualify at the Operator O classification will be assigned to other Divisions at classifications for which they are qualified, but not higher than Helper A or its equivalent. Such demotions and assignment to other Divisions will not displace employees in those Divisions with more refinery seniority.

In Maintenance Division

2. Demotions in the Electrical and Instrument; Machinist; or Welding, Pipefitting, Boilermaking and

(Art. V.C.)

Miscellaneous Sections are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified.

3. In making demotions in the Storehouse Section, position on the section seniority list in each classification shall control. Employees demoted out of the Storehouse Section will be assigned at not higher than the Helper A classification in the Maintenance Division.

In Laboratory Division

4. Demotions within the Laboratory Division are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified. Employees demoted out of the Laboratory Division due to a curtailment of work will be assigned to the Maintenance or Operating Divisions or the Filling and Shipping Division and will be assigned to a classification not higher than Helper A.

In Filling and Shipping Division

5. Demotions within the Filling and Shipping Division are made (1) because of curtailment of work and a decrease in the number of basic jobs in which case the number of employees assigned within the affected classifications is decreased accordingly, and (2) due to an employee's deficiencies, in which case the employee is moved from his former job and placed in a lower job for which he is qualified. Employees demoted out of the Filling and Shipping

Art. V.C.)

Division due to a curtailment of work will be assigned to the Maintenance, Operating, or Laboratory Division and will be assigned to a classification not higher than helper A.

Transfers

1. Transfers between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) may be made with Company approval. In all cases of permanent transfer between divisions, the transferring employee will enter the new division with division seniority dating from the date of entering the new division and will relinquish his former division and section seniority.

2. Temporary transfers may be made between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) for short periods of time as determined by the Company. Company records will clearly indicate the temporary nature of such transfers.

In all cases of temporary transfer between divisions, the transferred employee will not acquire division seniority in the new division, but will retain and continue to accrue his division and section seniority in the division from which transferred. If any temporary transfer is later made permanent, the permanent date of transfer will be made retroactive to include all continuous service in the new division subsequent to the temporary transfer and seniority in the new division will start with this date. The employee will relinquish his former division and section seniority.

E. General

1. An employee promoted to a higher classification

(Art. V.E.)

and failing to perform satisfactorily in it, will be allowed to return to the classification previously held by him without loss of seniority. When an employee is not progressing or performing his work in a satisfactory manner, he will be so informed.

2. When employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a two (2) year period to the job that their seniority and ability would have entitled them to, had they remained in the bargaining unit. They shall be given seniority credit for the time they were outside the bargaining unit. An employee transferred or assigned outside the bargaining unit for more than twenty-four (24) months in any thirty (30) month period will lose his refinery seniority protection under this provision.

3. For all periods when an employee is performing scheduled break-in or other training work he will be paid at the rate of his basic classification. He will receive the rate of the higher classification as soon as he can carry on the duties of the job alone and under normal supervision.

a. When a situation arises in an operating unit, which in Management's judgment requires more than the regular complement of Operators to insure adequate coverage of all aspects of the operation, an employee will be assigned as extra help. The employee assigned as extra help will be paid his basic rate.

(Art. V.C.)

(Art. V.E.)

4. When an operating unit is shut down, the Operators affected will be assigned to other work, if other work is available, and their pay rates will be protected according to the following provisions:

a. When a plant is shut down for maintenance (repairs, cleaning, or inspection) the Operators affected will be assigned to other operating duties or to maintenance work. Their pay will be protected at their basic rate for twenty-eight (28) calendar days. At the end of this protection period they will be paid at the rate of the job to which they are assigned in accordance with Exhibit A.

b. When a plant is shut down either temporarily or permanently, because its operation is not required by the Company to meet its stock commitments, the number of basic operating jobs will be decreased accordingly. Operators adversely affected will be demoted under the provisions of Article V.C. However, their pay rates will be protected at their former basic rate for a period of twenty-eight (28) calendar days after which period their new basic assignment will determine their new basic wage rate for rate protection purposes.

5. When no other work is available for employees adversely affected by the shutting down of an operating unit as provided for in V.E.4. above, the provisions of Article V.B. will apply.

6. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

(Art. V.E.)

7. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

8. Employees in the Operator Training Program will not change relative position on the Operating Division seniority list because of temporary assignments to work in another Division as provided for in Article V.A.4.e.

ARTICLE VI VACATIONS, HOLIDAYS, AND FRINGE BENEFITS

A. Vacations

1. A regular employee shall receive a vacation with pay after completion of one (1) year of continuous service and within each calendar year of continuous service thereafter.

Beginning January 1, 1966, a regular vacation will be as follows:

In Each Calendar Year In Which an Employee Completes	Length of Vacation
1 year or more but less than 5 years of continuous service	2 weeks (14 consecutive calendar days)
5 years or more but less than 10 years of continuous service	3 weeks (21 consecutive calendar days)
10 years or more but less than 20 years of continuous service	4 weeks (28 consecutive calendar days)
20 years or more of continuous service	5 weeks (35 consecutive calendar days)

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(Art. VI.A.)

2. Operating needs of the Company are controlling in scheduling vacations. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into three (3) periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. a. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veteran's Day
Memorial Day	Thanksgiving Day
Fourth of July	*Friday after Thanksgiving
	Christmas

*This holiday shall be observed on the Friday following Thanksgiving except when Christmas falls on Tuesday, in which case the holiday will be observed on Monday before Christmas.

b. Employees who are working rotating shifts on a seven day work week continuous operation, and employees who normally work Saturday and/or Sunday, at the time of a holiday will observe the holiday for pay purposes on the calendar day on which it falls.

c. All other employees will observe the holiday for pay purposes on the calendar day on which it falls, except a holiday which falls on Sunday will be observed on the following Monday, and a holiday which falls on Saturday will be observed on the preceding Friday.

(Art. VI.B.)

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight-time rate for the number of hours in their regular daily work schedule plus one and one-half ($1\frac{1}{2}$) times the straight-time rate for all hours worked. For the purpose of holiday payments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four (24) hours later.

4. All regular employees shall receive nine (9) paid holidays per year. Those not so paid under the provisions of paragraphs 2 and 3 above shall receive a day's pay at their regular straight-time rate for each such holiday except when a leave of absence is granted as covered under Article VII.B. and C.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight-time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

(Art. VI.C.)

C. Fringe Benefits

1. All employees' benefits in effect at the time of signing of this Agreement shall continue in full force and effect for the duration of this Agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

4. Employees with one or more years of continuous service who are permanently laid off for lack of work will receive one week's pay at the straight-time rate for each year of continuous service up to a maximum of fifteen (15) weeks' pay for those employees having fifteen (15) or more years of continuous service. Employees with twenty-five (25) years or more of continuous service are not eligible for payment under this provision. Lay-off of employees occasioned by seasonal fluctuations in the business will not be considered permanent. When re-employed within the time limits specified in Article V.B.2., 3., and 4., after lay-off and payments received under this section are repaid, seniority dates as of the date laid off will be restored.

(Art. VII.)

ARTICLE VII
UNION ACTIVITIES

A. Workmen's Committee

The Union may create a Workmen's Committee, composed of six (6) members of which at least five (5) are employees, to meet at mutually acceptable times, with representatives of management for discussion of mutual problems. The Union will inform the Company in writing of the names of the employee members of said committee.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration (except where distances to be traveled require additional time in which case not more than thirty (30) days) for the purpose of attending Union conferences or meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three (3) employees shall be granted simultaneous leaves. The conditions of such leaves with respect to Company benefits shall be as covered in each established plan. All requests for leaves of this nature shall be made in writing as far in advance as possible before the first scheduled work day that will not be worked by reason of such leave being granted. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

(Art. VII. C.)

C. Leave of Absence to Enter the Employment of The Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two (2) years from date of start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two (2) years.

c. Applicant, if re-employed within said period of two (2) years, will enter the job that his seniority and ability would have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

(Art. VII. D.)

D. Conferences During Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

E. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four (4) pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

(Art. VIII. B.)

B. Voluntary Payroll Deduction of Union Dues

1. Employees in the bargaining unit may authorize the Company in writing on a form mutually acceptable to the Union and the Company to deduct while this Agreement is in effect the regular monthly dues of the Union from their wages on the first pay day each month and to remit same to the Secretary of Local No. 826, International Union of Operating Engineers AFL-CIO not later than two (2) weeks after the end of the payroll period in which the deduction is made. Employees may at any time revoke such authorization by giving the Company notice on a suitable form.

2. The Company will advise the Union with each remittance the names of employees from whom new authorizations have been included and those previously authorizing deductions but for whom no deductions have been made because of lack of earnings, revocations of authorization, or leave Company service. These authorizations will terminate upon the termination of this Agreement.

C. Payroll Deductions for Savings

Upon the written request of the employee, using Form COEM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

(Art. VIII. D.)

D. Smoking Area

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. Contract Labor

1. The Company shall have the right to contract or subcontract maintenance, repair or construction work to outside contractors.

2. It is not the Company's intent by contracting or subcontracting maintenance, repair or construction work to eliminate the Company's Maintenance Division.

3. When the Company is supplementing its maintenance force with contractor employees and contractor employees are assigned to work with Company employees on a job, a contractor employee shall not be scheduled to work more hours per day than a Company employee on that job. That job means the specific job on which contractor and Company employees are working together, as defined in advance by the Company.

4. The contracting or subcontracting of work in the El Paso Refinery will not cause the layoff or demotion of qualified employees during the period the contractor is performing the work.

(Art. VIII. F.)

F. Reprimands 1971

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two (2) copies of the written record of this final warning. The additional copy may be provided the local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. Industrial Injury

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

H. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

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(Art. VIII. I.)

I. Pay Day

Pay day for employees covered by this Agreement will be on or before the first Friday following the close of the pay period unless the Company is prevented from complying with this provision by circumstances beyond its control.

ARTICLE IX

GRIEVANCE PROCEDURE

A. Processing of grievances shall not unduly interfere with the continuity and efficiency of operations. The general subject of wages, hours and working conditions shall not be the basis of grievance or grievances within the meaning hereof. In all cases of grievances presented under this grievance procedure, each of the parties hereto agrees to furnish the other party with all information in its possession regarding such grievances which may be necessary to a full understanding of the subject matter of the complaint and to facilitate the prompt handling of complaints. Individual grievances shall be settled in accordance with the procedure described below.

B. The Union and/or any employee or group of employees shall have the right to present grievances affecting him or them to the Company. If any employee or employees or the Union believes that the Company has violated the Articles of Agreement in the application of any of the terms of this Agreement, redress may be sought as follows:

1. The employee may take up the matter with

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(Art. IX. B.)

his Foreman, either individually or through his Union representative.

2. If satisfaction is not received, the employee, either individually or through the Union, may present the grievance in writing to the employee's Foreman. The grievance shall be presented within fifteen (15) days of the occurrence of the event upon which the grievance is based and shall state the nature of the occurrence giving rise to the grievance, the section or sections of this Agreement claimed to have been violated, and the relief sought. The Foreman shall reply in writing within five (5) days from the receipt of the written grievance.

3. If the employee or the Union is not satisfied with the Foreman's reply, he may, either individually or through the Union, or the Union may appeal the matter to the Refinery Manager or his designated representative. Such appeal shall be made in writing within ten (10) days from the date of Foreman's reply under B.2. above. A meeting to discuss the grievance shall be held between the Refinery Manager or his representative and not to exceed the employee and two (2) Refinery employee Union representatives. In addition, an accredited Union representative may be present. Such meeting will be held within ten (10) days after the appeal has been received. The Refinery Manager shall render his decision in writing within ten (10) days after the meeting.

4. If the grievance is not settled as the result of the steps set forth above, the employee may through the Union, or the Union may, present a written request for arbitration to the Refinery Manager. Such request

(Art. IX. B.)

shall be submitted within thirty (30) days after receipt of the decision as specified under B.3. above.

C. Employees will not suffer loss of regular pay in handling grievances, provided that the time consumed is reasonable.

D. In calculating time limits under this Article, Saturdays, Sundays, and holidays recognized under this Agreement shall not be counted. Time limits specified herein shall apply unless extended by mutual agreement in writing between the parties to take care of unusual cases such as illness or other justified absences. If the time limits specified herein, or as extended by mutual agreement, are not met by the party initiating the grievance, the case shall be considered closed and no longer subject to processing under the grievance procedure.

E. Where a grievance protests the discharge of an employee, the above procedure may be waived so as to permit the grievance to be referred directly to step B.3. above, so long as this is done within ten (10) days after the discharge.

ARTICLE X

ARBITRATION PROCEDURE

A. A grievance which is not settled as a result of the steps set forth in Article IX and which meets all of the following qualifications, may be arbitrated as herein-after provided:

1. The grievance was submitted in writing and

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(Art. X. A.)

signed by the aggrieved employee prior to becoming subject to this Article.

2. The grievance was processed in accordance with each step of the procedure provided in Article IX.

3. The issue involved in the grievance is limited to the application or interpretation of a provision in this Agreement.

4. The grievance occurred during a period when this Agreement was in effect.

5. The Union submits to the Refinery Manager a request in writing to arbitrate such grievance within thirty (30) days after receipt of the Refinery Manager's decision as specified in Section B.4. of Article IX.

B. Within fifteen (15) days after receipt of the written request for arbitration as specified under A.5. above, the Union shall designate one (1) member and the Company shall designate one (1) member to the Board of Arbitration and advise the other party of such designation.

C. The two arbitrators designated shall meet within thirty (30) days from date of receipt of the written request for arbitration as specified under A.5. above, and endeavor to reach an agreement.

D. If these two arbitrators should fail to reach an agreement, either party may request the selection of a third arbitrator. Such request shall be made within fifteen (15) days from the date the arbitrators meet as specified in C. above.

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(Art. X. E.)

E. If such request is made, the arbitrators appointed by the Union and the Company shall endeavor to agree upon the third arbitrator. If they are unable to agree within thirty (30) days from the date of request for such arbitrator, the third arbitrator will be selected from a list jointly requested by the Company and the Union arbitrators from the Federal Mediation and Conciliation Service.

F. If a dispute exists as to the arbitrability of a grievance, the issue of arbitrability shall first be determined by a Board of Arbitration as selected under paragraph E. above. If such grievance is found to be arbitrable, the grievance shall then be submitted to separate Board of Arbitration, selected under paragraph E. above, unless the parties agree otherwise.

G. If the Board of Arbitration as described herein has not convened within one hundred and eighty (180) calendar days from the date of receipt of the written request for arbitration under A.5. above, because of failure of the initiating party to proceed to final arbitration with due diligence, the case shall be considered to be closed.

H. The decision of the Board of Arbitration shall be final and binding upon both parties, but such decision shall be within the scope and terms of this Agreement and shall not change any of its terms or conditions. The expense and compensation of the arbitrator selected by each party shall be borne by such party and the expense of the third arbitrator shall be equally divided between the Company and the Union. The general expense of the arbitration proceedings shall be equally divided between the

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(Art. X. H.)

Company and the Union, with the exception of the expense and the compensation of any witnesses called before the Board, which shall be borne by the respective parties.

I. In calculating the time limits under this Article, Saturdays, Sundays, and holidays recognized under this Agreement shall not be counted except for G. above. Time limitations specified herein shall apply unless extended by mutual agreement in writing between the parties to take care of unusual cases such as illness or other justified absences. If the time limits specified in this Article, or as extended by mutual agreement, are not met by the party initiating the grievance, the case shall be considered closed and no longer subject to processing under the arbitration procedure.

ARTICLE XI MANAGEMENT RIGHTS

A. Subject to the provisions of this Agreement, the supervision and control of all operations and the direction of all working forces, such as the determination of the size of the work force; the right to hire, suspend, discipline and discharge for just cause; the establishment of work rules; the assignment of employees to jobs and assignment of duties to employees; are vested in the Company. It is agreed that the provisions of this Article shall not be exercised for the purpose of violating the terms of this Agreement.

B. Changes made by the Company in the number of basic jobs in the Operating Division as a specific result of job activity surveys by the Company will

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(Art. XI. B.)

not result in layoff of any of the Laboratory, Operating, Maintenance, and Filling and Shipping employees covered by this Agreement and in Company employment as of August 1, 1961. This provision does not apply to any layoffs due to curtailment of work or shutdown of operating equipment or plants as a result of lack of stock or commitments, which are covered in Article V.B., or resulting from causes beyond the Company's control.

ARTICLE XII SAVING CLAUSE

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XIII STRIKES AND LOCKOUTS

During the term of this Agreement there shall be neither strikes nor lockouts. Suspension of work or refusal to work on the part of any employee will make him subject to discharge provided, however, that the Union will not be liable for such suspension or refusal unless, upon request of the Company, it refuses to order the employees to return to work.

ARTICLE XIV NON-DISCRIMINATION

A. The Company and the Union agree that there shall be no discrimination against any employee because

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(Art. XIV. A.)

of race, color, creed, sex or national origin.

B. 1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

ARTICLE XV PROCEDURE FOR HANDLING NOTICES

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, certified or registered, and postage paid, and addressed by one party to the other as follows:

Standard Oil Company of Texas

P. O. Box 26002

El Paso, Texas 79998

Attn: Refinery Manager

International Union of Operating Engineers

Local No. 826

P. O. Box 9764

El Paso, Texas 79987

(Copy to:

P. O. Box 1590
Big Spring, Texas
79720)

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IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS

R. W. Davis

Refinery Manager

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL NO. 826, AFL-CIO

Clois Phinney, Jr. President

Don McKinney Secretary

Kenneth Howell Business Manager

NEGOTIATING COMMITTEE

Leo Wilson Chairman

J. F. Blackham Secretary

B. J. Melms Committeeman

C. E. Moore, Jr. Committeeman

R. E. Horst Committeeman

E. D. Givens Business Representative

LABORATORY

ANALYTICAL

MAY 1, 1972

Chemical	Moisture Rate	Daily Rate
Gasoline	4.41	\$43.28
Light Diesel	4.33	39.44
Heavy Diesel	4.33	39.44
Crude Oil	4.33	38.72
Tractor Fuel	4.33	34.64
Tractor Fuel	4.12	32.96
Tractor Fuel	3.72	29.76
Tractor Fuel	5.12	40.96
Motor Oil	5.24	41.92
Motor Oil	5.06	40.48
Motor Oil	4.50	36.00
Motor Oil	4.17	33.36
Motor Oil	3.89	31.12
Motor Oil	3.58	28.64
Motor Oil	3.16	25.28
Motor Oil	5.06	40.48
Motor Oil	4.93	39.44
Motor Oil	4.50	36.00
Motor Oil	4.17	33.36
Motor Oil	3.89	31.12
Motor Oil	3.58	28.64
Motor Oil	4.93	39.44
Motor Oil	4.50	36.00
Motor Oil	4.17	33.36
Motor Oil	3.89	31.12
Motor Oil	3.58	28.64

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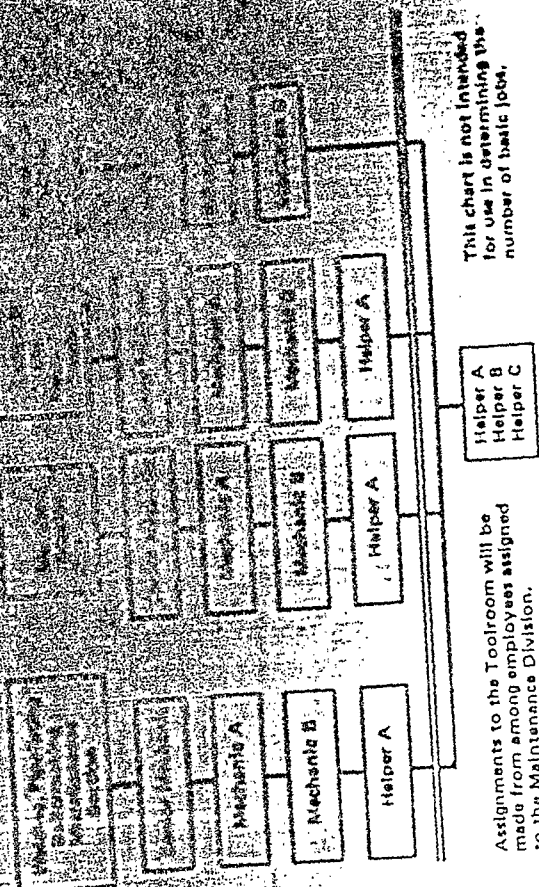
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<u>Classification</u>	<u>Symbol</u>	<u>Hourly Rate</u>	<u>Daily Rate</u>
<u>Laboratory Division</u>			
Head Inspector	HI	\$5.10	\$40.80
Technician A	TA	4.71	37.68
Technician B	TB	4.48	35.84
Technician Helper A	THA	4.28	34.24
Technician Helper B	THB	4.16	33.28
Technician Helper C	THC	3.58	28.64
Laboratory Helper	LH	3.58	28.64

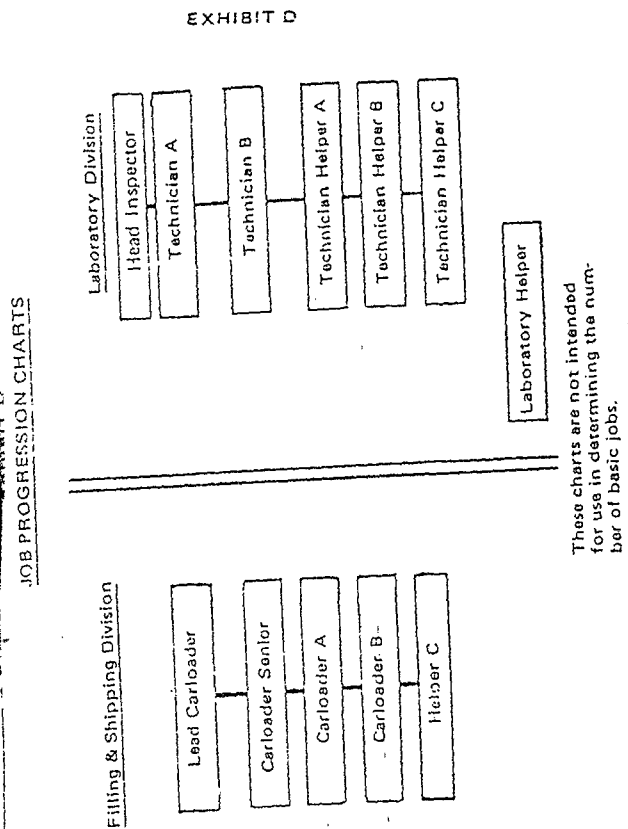
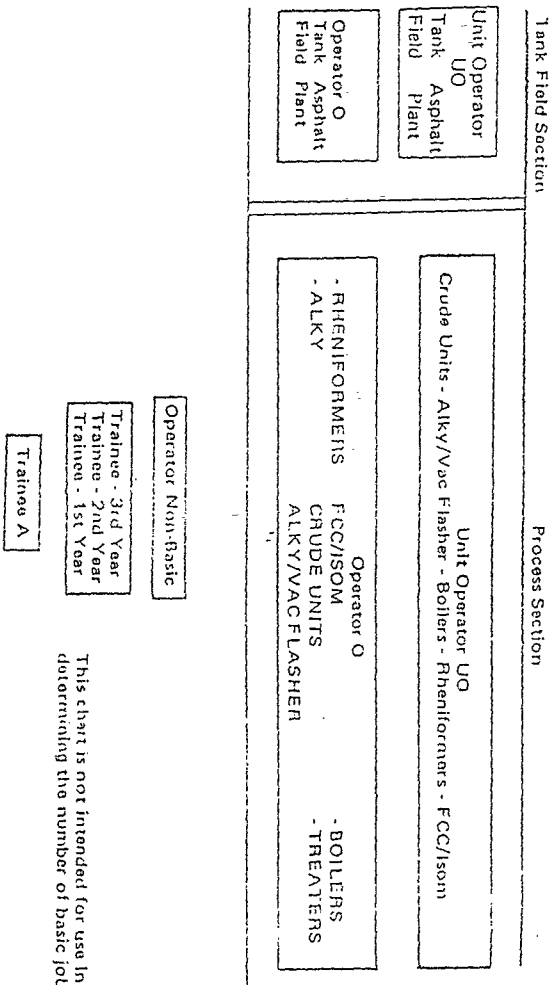
Shift workers who work any time other than day shift will receive, in addition to the above rates, 15¢ an hour for the No. 3 afternoon shift, or 30¢ an hour for the No. 1 morning shift.

For all shifts of day workers starting or ending outside the hours of 6:00 a.m. to 6:00 p.m., and for all overtime hours worked, the applicable shift differential shall be paid. Applicable shift differentials are as follows: 15¢ an hour from 4:00 p.m. until midnight, and 30¢ per hour from midnight until 8:00 a.m. When an employee works under conditions that entitle him to a shift differential, and also to an overtime or premium rate, the shift differential will be computed at the applicable overtime or premium rate.

Mechanic Helpers in the Mechanic Training Program making satisfactory progress shall receive, in addition to the Helper rate and any applicable shift differential, an achievement training differential of 6¢ per hour after completing 50% of the "general" portion and an additional 7¢ per hour after completing 100% of the "general" portion of the program.



CHEV B8 7074



AGREEMENT

BETWEEN

THE EL PASO REFINERY

OF

CHEVRON OIL COMPANY

WESTERN DIVISION

DOING BUSINESS AS

STANDARD OIL COMPANY OF TEXAS

AND

INTERNATIONAL UNION OF

OPERATING ENGINEERS

LOCAL NO. 826

(AFL-CIO)

EL PASO, TEXAS

EFFECTIVE APRIL 7, 1969

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AGREEMENT

Between

CHEVRON OIL COMPANY
d/b/a
STANDARD OIL COMPANY OF TEXAS
and

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL NO. 826

El Paso, Texas

This AGREEMENT is made and entered into April 7, 1969, between Chevron Oil Company, d/b/a Standard Oil Company of Texas, with a Refinery at El Paso, Texas, herein referred to as the "Company," and Local No. 826, International Union of Operating Engineers, AFL-CIO, herein referred to as the "Union." This Agreement shall be considered to be the entire Agreement between the parties, and no Agreement which predates this Agreement shall have any other force or effect.

WITNESSTH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative, for the purpose of collective bargaining in respect to rates of pay, wages, hours of employment, or other conditions of employment, of employees in the Maintenance, Operating, Laboratory and Filling and Shipping Divisions of the Company's El Paso Refinery for whom the Union was certified as

the collective bargaining representative in the National Labor Relations Board certifications dated May 7, 1943 (Case No. 16-R-629), August 31, 1953 (Case No. 33-RC-453) and December 8, 1966 (28-AC-2), subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor Management Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This Agreement shall be effective as of 12:01 a.m., April 7, 1969, and shall continue in full force and effect for two (2) years from such date, and shall renew from year to year thereafter unless either party hereto shall give written notice to the other at least sixty (60) days but not more than ninety (90) days prior to an anniversary date of its desire to modify, amend or terminate this Agreement. Any such notice to modify or amend the Agreement shall contain the specific articles and subdivisions thereof to be discussed. If notice to modify or amend is given, the Agreement shall remain in effect during negotiations except that if agreement is not reached during negotiations within the sixty (60) day period prior to the anniversary date or thereafter if negotiations continue beyond the anniversary date, either party may give thirty (30) days' written notice to the other of its desire to terminate this Agreement. This Agreement will then terminate at the expiration of said thirty (30) days unless the parties hereto, by mutual agreement, extend this Agreement beyond the above termination date for a specific period for the continuance of negotiations.

(Art. I)

B. It is recognized, however, by the parties that during the term of this Agreement it may become desirable to discuss wage rates in general (as set forth in Exhibit A) and hours and days of work (Article II. C.). For these purposes only, each party may open once upon written notice to the other, at least sixty (60) days, but not more than ninety (90) days prior to December 31, 1970, and once each contract year thereafter, to bargain on revisions in the light of conditions then existing. If agreement is not reached by December 31, 1970, either party may give sixty (60) days' written notice of its desire to terminate this Agreement, in which case the Agreement shall terminate as of the end of such sixty (60) day period unless by mutual consent the parties agree to an extension for the purpose of continuing negotiations.

ARTICLE II WORK DAY, WORK WEEK AND WORK SCHEDULES

A. The established work week shall consist of seven (7) consecutive twenty-four (24) hour periods beginning with the No. 1 Shift Monday. The Monday No. 1 Shift is that shift which begins 11:00 p.m. Sunday for shift workers and 12:01 a.m. Monday for day workers.

B. 1. A work day is twenty-four (24) consecutive hours beginning at the same time each day. The first work day begins at the time the established work week begins, and the seventh work day ends at the time the established work week ends.

(Art. II, B.)

2. Normally, but not exclusively, the regular shift for day workers will be eight (8) consecutive hours, exclusive of an unpaid lunch period, between 6:00 a.m. and 6:00 p.m. as contrasted to shift workers who regularly work No. 1 Shift (11:00 p.m. to 7:00 a.m.), No. 2 Shift (7:00 a.m. to 3:00 p.m.) and No. 3 Shift (3:00 p.m. to 11:00 p.m.).

3. Day workers working a scheduled shift starting or ending outside the hours of 6:00 a.m. to 6:00 p.m. shall be allowed a thirty (30) minute paid lunch period on the job site.

4. The unpaid lunch period for day workers will be from 12:00 noon to 12:30 p.m., when consistent with the work on hand. When an employee is required to work through his regular lunch period he shall be provided a different unpaid lunch period which shall be no more than one (1) hour earlier or later than the established lunch period. In addition, the Company shall allow a five (5) minute paid period prior to the lunch period for day workers to stop work, clean up, and travel to the lunch area.

5. Day workers will be at their assigned job sites ready to go to work at the designated starting times at the beginning of the shift and after lunch.

C. Employees are expected to be available for shift work and overtime. Work schedules specify the days in the work week and hours in the work day during which employees are to work. Each weekly work schedule consists of eight (8) consecutive hours, exclusive of unpaid lunch periods, on

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(Art. II, C.)

each of five (5) work days totaling forty (40) hours of work at the straight-time rate within each work week with two (2) consecutive days off. Such schedules do not guarantee or limit the hours of work. The Company will post each employee's assignment to the weekly work schedule as far in advance as practicable consistent with work requirements. Notification of changes in the employee's work assignment will be posted as far in advance as practicable. Employees will review their work assignment before leaving the plant each work day.

ARTICLE III WAGE RATES, OVERTIME AND OTHER PREMIUM PAY

A. Wage Rates, Exhibits, Shift Differentials

1. The wage rate classifications and present job titles applicable thereto are attached and made part hereof as Exhibit A. Employees will be paid for time worked in each classification to which assigned at not less than the job rate for the work performed, except for Helpers in the Maintenance Division who may be assigned work also performed by Mechanics.

2. a. Where an employee of an Operating Division works in two classifications in one (1) day, and works less than half ($\frac{1}{2}$) a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half ($\frac{1}{2}$) a day at the higher rate and the other half ($\frac{1}{2}$) day at the lower rate. If he works one-half ($\frac{1}{2}$)

(Art. III, A.)

day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When during a shift an Operating Division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay.

B. Overtime and Other Premium Pay

1. General - No more than one overtime or premium pay provision in this Agreement shall be applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. All work performed in excess of eight (8) hours in any work day, or forty (40) hours in the established work week shall be paid for at the overtime rate of one and one-half ($1\frac{1}{2}$) times the straight-time rate. For the purpose of determining time worked in excess of forty (40) hours in the established work week, the following shall count as time worked:

a. Scheduled work time lost on account of jury duty.

b. Scheduled work time off with full pay on account of sickness or holiday.

c. Scheduled work time off on account of leave of absence with pay.

(Art. III, B.)

3. One and one-half (1½) times the straight-time rate shall be paid for the hours worked under the following conditions:

a. Time worked in excess of eight (8) hours in any twenty-four (24) hour period, beginning at the time the employee begins work other than overtime as defined in III.B.2. or double time as defined in III.B.5.

b. When employees are scheduled to work a shift which may extend from one work day into the next, the employee involved will be paid at the rate of one and one-half (1½) times the straight-time rate for the hours in excess of one-half (½) hour worked on such employee's first day off, with such day off considered as starting at the beginning of the established work day as covered in Article II.B.1.

c. For the first shift scheduled to be worked and worked where the scheduled hours of work have been changed as listed below without forty (40) hours notice prior to the start of the first shift changed.

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an Operator who is working on an operating schedule, or a Laboratory employee who is working on the Laboratory schedule; i.e., change from Shift No. 1 to Shift No. 2, etc.

(3) A change of more than one and one-half (1½) hours in the starting time from the preceding work day, of regular hours of work of a Maintenance and Storehouse Division worker, or of an

(Art. III, B.)

Operator or Laboratory or Filling and Shipping employee who is working on, going onto, or coming off a maintenance schedule.

d. Compensation provided in Article III.B. 3.c.(3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular shift.

(2) When an employee changes to a day shift from any other shift.

4. "Call Out" — Any employee who reports for work after he has completed his shift and has left the plant, and before the start of next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight-time rate or time and one-half for work performed, whichever is greater.

Call Out — Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

(Art. III. B.)

5. Double time rate of two (2) times the straight-time rate shall be paid for:

a. All hours worked in excess of sixteen (16) consecutive hours; i.e., beginning on the 17th consecutive hour.

b. All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week. For the purpose of double time payment only, both off days will start at the beginning of the established work day as covered in Article II.B.

C. Distribution of Overtime

1. An effort will be made to distribute overtime in the Operating, Maintenance, Laboratory, and Filling and Shipping Divisions, except to those employees assigned to light duty for health reasons. Overtime in Operations will be worked by qualified employees normally assigned to work in the classification and section in which the overtime occurs. Overtime in Maintenance will be worked by employees qualified for the work. During shutdowns the Company may assign Operating, Laboratory, or Filling and Shipping employees on overtime to supplement the Maintenance force. For the purpose of identification, only the overtime hours worked or offered and refused, as defined under the provisions of Articles III.B.2., III.B.4., III.B.5., will be counted as the basis for the distribution of overtime.

2. Any overtime worked or offered and refused by an employee at less than his basic rate will not be counted in the basis for the distribution of overtime.

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(Art. III.)

D. Overtime Meals

1. The Company will provide a wholesome meal, not to exceed \$1.50 in cost, to each employee at his job location after he has completed more than ten (10) consecutive hours of work (unpaid lunch periods excluded) and after completion of each successive four (4) hours of work thereafter.

2. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company expense, will be allowed for eating.

3. An employee may elect to take a meal allowance of \$1.50 instead of a meal if his supervisor offers the employee that option in advance of the time a meal is due.

ARTICLE IV SENIORITY

A. For the purpose of administering this Article and Article V, seniority shall consist of three (3) types as follows:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery.

2. Division seniority, which shall be based on the last date Company assigns an employee permanently to a Division as defined in this Article.

3. Section seniority, which shall be based on

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(Art. IV. A.)

the date Company assigns an employee to a definite section as defined in this Article.

B. For the purpose of this Article the recognized Divisions are:

1. Maintenance Division
2. Operating Division
3. Laboratory Division
4. Filling and Shipping Division

C. For the purpose of this Article, the recognized Refinery Sections are:

1. Process Section
2. Tank Field Section
3. Storehouse Section
4. Electrical and Instrument Section
5. Machinist Section
6. Welding, Pipefitting, Boilermaking and Miscellaneous Section

D. No employee may establish or retain Division Seniority in more than one Division nor Section Seniority in more than one Section.

ARTICLE V

PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

EXHIBITS:

Attached to and made a part of this Agreement are "Exhibit B - Job Progression Chart, Maintenance Division," "Exhibit C - Job Progression Chart, Operating Division," and "Exhibit D - Job Progression Chart, Filling and Shipping and Laboratory Divisions."

(Art. V.)

showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications. These exhibits are not intended for use in determining the number of basic jobs in these divisions, which are subject to change in accordance with the provisions of Article XI.

A. Promotions

1. All promotions to classifications within the bargaining unit except as otherwise provided herein shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs. When a promotion is made and the employee is not the highest on the seniority list in the next applicable classification, any employee higher in that classification and eligible for consideration for such promotion shall be advised by the Company why he was not selected.

Promotions in Operating Division

2. Promotions in the Operating Division to the basic O and UO classifications (above the red line), will be made when a basic job is permanently vacated and is still required or when a new basic

(Art. V., A.)

job is created. Basic jobs are those which are determined by Management to be essential to the anticipated requirement for efficient operation of the plant. The number of basic jobs, as determined by the Company, may be revised from time to time to meet changing conditions. The Union will be kept informed of such changes made in the number of basic jobs in the Operating Division.

a. The number of employees assigned to each classification (above the red line), is determined by the number of employees needed to fill each basic job in that classification. Employees will be assigned to the classification in the order of Section Seniority. All swing jobs will be classified at the lower of the two swing classifications. Except as provided for in Article V.C., once an employee is assigned a position on the seniority list his name shall continue in the basic classification assigned even though he is absent for any reason and still retains his seniority.

3. All promotions to O and UO classifications shall be based on seniority and ability.

a. Effective April 10, 1968 ability shall include satisfactory completion of the Operator Training Program for promotion to Operator non-basic for all Operating Division employees with an Operating Division seniority date later than December 1958.

b. Effective April 10, 1972 ability shall include satisfactory completion of the Unit Operator Training Program for promotion to Unit Operator.

4. a. Employees newly assigned to the Operating

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(Art. V. A.)

Division will be placed in the Training Program at the Trainee A rate. Based on satisfactory progress, they will be successively promoted to the TR-1, TR-2 and TR-3 classifications. A trainee in the Operating Division will be paid the achieved trainee rates as shown in Exhibit A, for work in Operator (O) jobs until he has satisfactorily completed the Operator Training Program.

b. Employees with Company service dates between April 1, 1967 and April 10, 1968, will be required to go through the Program. Their pay for work in Operations during this period will be their achieved trainee rate or the present OB rate, whichever is higher.

c. Employees with Company service dates between December 1958 and April 1, 1967 will be required to go through the Program. They may proceed with the Program as rapidly as possible and will have until April 10, 1971 to complete the Program. Until they satisfactorily complete the Training Program, their pay for jobs worked will be at the Operator non-basic rate.

d. Upon satisfactory completion of the Trainee portion of the Operator Training Program, the trained operator will be assigned an Operator non-basic classification and will be paid the Operator non-basic rate for work performed in Operator (O) classification.

e. A trainee assigned temporarily to work in another Division because of work requirements will be credited with his previously completed

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(Art. V. A.)

training upon his reassignment to the Operating Division. All men assigned by the Company, or transferred to the Operating Division by request of the employee, will be assigned at not higher than the TR-1 rate in order of Operating Division seniority.

f. Trainees will be kept advised concerning their progress in the Operator Training Program and will be assisted with their difficulties.

(1) Trainees having Company service dates before April 1, 1967 who fail to meet the requirements of the Program will be assigned by the Company to another Division.

(2) Trainees having Company service dates after April 1, 1967 who fail to meet the requirements of the Program will be assigned by the Company to another Division or will be terminated as determined by the Company. However, any trainee who has reached the TR-2 or higher stage of the Program and is terminated under the provisions of this section [V.A.4.f.(2)] shall have the right to appeal such termination as provided for in the Grievance and Arbitration procedures of this Agreement, in which event the sole issue to be decided shall be whether the Company acted unreasonably in determining that the employee failed to meet the requirements of the Training Program.

g. The Company may adjust the content of the Operator Training Program to meet its need for trained operators. The Union will be informed of the changes. The Operator Training Program will not be suspended if there are trainees in the program; however, the Operator Training Program may be suspended

(Art. V. A.)

by the Company if it has no current need for trainees. The Company agrees that it will not act unreasonably in the administration of the training programs and will meet with the Union to discuss problems or questions relating to the Program.

5. Promotions to fill basic jobs in the Operator (O) classification (above the red line) in the Process Section and Tank Field Section will be made from the Operator non-basic classification (below the red line). The promoted employee will be assigned a section seniority date effective the date of his promotion and will thereafter progress only in the section into which he is promoted. If a man is offered and turns down a basic assignment in the O classification in the Process Section or the Tank Field Section, he shall not — at a later date — go ahead of the junior man who accepted the job in that classification and section. If there is a vacancy in that classification and section at a later date, and he elects to accept it, he will take a position below the last man assigned to fill a basic job in the O classification in that section, and will thereafter advance in that relative position.

a. Promotions to fill basic jobs in the Unit Operator (UO) classification in the Process or Tank Field Sections will be made from employees holding section seniority in that section.

6. Temporary vacancies due to illness, leaves of absence, etc., of one (1) to not more than thirty (30) calendar days' duration, and all

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(Art. V. A.)

vacancies due to vacations will be filled as determined by the Company in a manner that will give employees training in equal or higher classifications with the objective of suitably protecting current and future operations and providing opportunities for employees to gain experience in work of the same or higher classifications.

a. Nothing herein shall require the Company to pay an overtime or premium rate to fill a temporary vacancy when a qualified employee is available for such work at no or less overtime or premium pay.

7. In the event of an anticipated vacancy in excess of thirty (30) calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, assignments to fill such vacancies although not promotions, will be filled in accordance with the same procedure used in making promotions without changing basic classifications. However, none of the provisions in this Article nor in any other of the Articles in this Agreement are intended to obligate the Company to fill all vacancies in basic jobs whether permanent or temporary, when not required by operating conditions at the time.

8. Schedule changes will be made if necessary to assure that over any thirty (30) day period no junior employee will be assigned to work more shifts in the next higher classification than the senior qualified man in each classification and section. The senior qualified man is that employee qualified to work in the next higher classification, whose

(Art. V. A.)

name is highest on the seniority list in each classification and section.

9. An Operator who is not promoted to UO according to the Articles of this Agreement because of his lack of ability, may be retained within the Operator classification as long as there is a job that he can handle satisfactorily, but thereafter the Company shall not be required to consider such employee for promotion to a UO classification nor shall he be entitled to fill a temporary vacancy in a UO classification. In the event there are no jobs in the Operator classification in which he can perform satisfactorily, he will be transferred to another Division per Article V.C.1.c.

In Maintenance Division

10. In the Maintenance Division, promotions from Helper B to Helper A and from Mechanic B to Mechanic A are to be made solely on the basis of Maintenance Division seniority and not on the basis of performance of a higher or different classification of work. Helpers B will be promoted to Helpers A upon completion of twelve (12) months of service in the Maintenance Division. Mechanics B will be promoted to Mechanics A upon completion of:

a. 12 months of service as Mechanic B,
and

b. 60 months of service in the Maintenance Division, including any service as Mechanic B.

11. The Company will maintain a minimum of 75% Mechanics A and B plus Senior Mechanics in

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(Art. V. A.)

the permanently assigned work force in the Maintenance Division (excluding Storehouse Section), provided there are employees who are qualified to be Mechanics.

a. Mechanics A will be promoted to Senior Mechanics upon completion of fifteen (15) years' Maintenance Division seniority, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

12. A Maintenance Division employee will be assigned to a specific Maintenance Division Section (Machinist; Electrical and Instrument; Welding, Pipe-fitting, Boilermaking, Miscellaneous; Storehouse) as provided in Exhibit B, upon completion of the general portion of the Mechanic Training Program. He will establish Section seniority in the Section assigned. Section assignment as stated here shall not in any way interfere with the Company having an employee do any type of refinery work that in the Company's judgment he can do safely.

13. Promotions within the Storehouse Section shall be based on Seniority and ability. Seniority as used in this section refers to Storehouse Section seniority.

In Laboratory Division

14. All men hired into the Laboratory Division for Laboratory Technician work will be hired at the Technician Helper C classification. This classification will be effective for a period of twenty (20) work days. After the initial twenty (20) day work period in the Laboratory Division he will be advanced to the Technician Helper B classification. Promotions from Tech-

(Art. V.A.)

nician Helper B to Technician Helper A are to be made solely on the basis of Laboratory Division Seniority and not the basis of performance of a higher or different classification of work. Technician Helper B will be promoted to Technician Helper A upon the completion of 12 months of service in the Laboratory. Technician B will be promoted to Technician A upon completion of:

a. 12 months of service as Technician B, and

b. 36 months of service in the Laboratory, including any service as Technician B.

15. The Company will maintain a minimum of 60% Technicians of the total of Technicians plus Technician Helpers in the Laboratory Division, provided there are Technician Helpers who are qualified to be Technicians.

In Filling and Shipping Division

16. Promotions within the Filling and Shipping Division shall be based on seniority and ability. Seniority as used in this Division refers to Filling and Shipping Division seniority.

(Art. V.B.)

B. Layoffs and Rehiring

1. Layoffs for lack of work shall be based on refinery seniority. However, the Company may retain a sufficient number of men experienced and qualified to perform the necessary work in each division (Maintenance, Operating, Laboratory and Filling and Shipping) as necessary to permit continued efficient operation.

2. Employees with less than one (1) year's refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within ninety (90) calendar days after the last day worked.

3. Employees with more than one (1) year but less than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within one hundred eighty (180) calendar days after the last day worked.

4. Employees with more than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within three hundred sixty five (365) calendar days after the last day worked.

5. Men laid off due to lack of work will be offered re-employment when vacancies arise on the basis of their refinery seniority at the time of layoff, provided the seniority protection period as outlined above has not expired and that they are fully qualified to fill the vacancy.

6. Notice of available positions will be sent to

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(Art. V.B.)

employees on the layoff list by certified or registered mail, return receipt requested, to the last address left with the Company. An employee will be given five (5) days from the time the notice was received to advise the Company of acceptance and an additional five (5) days to report for work after advising the Company of his availability for work. An employee who fails to notify the Company or fails to report to work within the period specified loses all rights to seniority. The Company may grant an extension of time, for an employee to report to work if he notifies the Company of sickness, death, or emergency involving himself or his immediate family within five (5) days of the date of the notice from the Company. Under emergency conditions, temporary employees may be used until former employees on the rehiring list have reported to work.

C. Demotions

In Operating Division

1. Demotions in the Operating Division will be made because of a reduction in the number of basic jobs or because of plant shutdowns for lack of stocks or commitments or because of deficiencies of the employee.

a. When the number of basic jobs is reduced in an Operating Section (Process or Tank Field), the employees affected will be demoted in order of section seniority. Unit Operators UO who are affected will be demoted to Operator O. Operators O who are affected will be demoted to Operator non-basic. Operators non-basic will not be

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(Art. V. C.)

demoted to the Trainee rates nor will Trainees be demoted to a lower Trainee rate. Operators non-basic and Trainees not needed in the Operating Division because of a reduction in basic jobs will be assigned to work in other Divisions in order of Operating Division seniority and paid per Article V.E.4.b. Trainees assigned to work in other Divisions because of a reduction in the number of basic jobs will be allowed to extend the time for completion of the Operator Training Program by the amount of time they are assigned to work outside the Operating Division.

b. Temporary demotions because of plant shutdowns due to lack of stock or commitments, as determined by the Company, will be made as in V.C.1.a. Demoted Operators will be used to fill temporary vacancies in either section if qualified, but will retain their section seniority. Pay for Operators temporarily demoted will be as provided for in V.E.4.b.

c. A Unit Operator who is demoted due to deficiencies will be assigned to the Operator O classification if qualified. Operators O and Operators non-basic, demoted due to deficiencies and Unit Operators demoted and unable to qualify at the Operator O classification will be assigned to other Divisions at classifications for which they are qualified, but not higher than Helper A or its equivalent. Such demotions and assignment to other Divisions will not displace employees in those Divisions with more refinery seniority.

In Maintenance Division

2. Demotions in the Electrical and Instrument; Machinist; or Welding, Pipefitting, Boilermaking and

(Art. V.C.)

Miscellaneous Sections are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified.

3. In making demotions in the Storehouse Section, position on the section seniority list in each classification shall control. Employees demoted out of the Storehouse Section will be assigned at not higher than the Helper A classification in the Maintenance Division.

In Laboratory Division

4. Demotions within the Laboratory Division are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified. Employees demoted out of the Laboratory Division due to a curtailment of work will be assigned to the Maintenance or Operating Divisions or the Filling and Shipping Division and will be assigned to a classification not higher than Helper A.

In Filling and Shipping Division

5. Demotions within the Filling and Shipping Division are made (1) because of curtailment of work and a decrease in the number of basic jobs in which case the number of employees assigned within the affected classifications is decreased accordingly, and (2) due to an employee's deficiencies, in which case the employee is moved from his former job and placed in a lower job for which he is qualified. Employees demoted out of the Filling and Shipping

(Art. V.C.)

Division due to a curtailment of work will be assigned to the Maintenance, Operating, or Laboratory Division and will be assigned to a classification not higher than Helper A.

D. Transfers

1. Transfers between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) may be made with Company approval. In all cases of permanent transfer between divisions, the transferring employee will enter the new division with division seniority dating from the date of entering the new division and will relinquish his former division and section seniority.

2. Temporary transfers may be made between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) for short periods of time as determined by the Company. Company records will clearly indicate the temporary nature of such transfers. In all cases of temporary transfer between divisions, the transferred employee will not acquire division seniority in the new division, but will retain and continue to accrue his division and section seniority in the division from which transferred. If any temporary transfer is later made permanent, the permanent date of transfer will be made retroactive to include all continuous service in the new division subsequent to the temporary transfer and seniority in the new division will start with this date. The employee will relinquish his former division and section seniority.

E. General

1. An employee promoted to a higher classification

(Art. V.E.)

and failing to perform satisfactorily in it, will be allowed to return to the classification previously held by him without loss of seniority. When an employee is not progressing or performing his work in a satisfactory manner, he will be so informed.

2. When employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a two (2) year period to the job that their seniority and ability would have entitled them to, had they remained in the bargaining unit. They shall be given seniority credit for the time they were outside the bargaining unit. An employee transferred or assigned outside the bargaining unit for more than twenty-four (24) months in any thirty (30) month period will lose his refinery seniority protection under this provision.

3. For all periods when an employee is performing scheduled break-in or other training work he will be paid at the rate of his basic classification. He will receive the rate of the higher classification as soon as he can carry on the duties of the job alone and under normal supervision.

a. When a situation arises in an operating unit, which in Management's judgment requires more than the regular complement of Operators to insure adequate coverage of all aspects of the operation, an employee will be assigned as extra help. The employee assigned as extra help will be paid on the same basis as he would have been paid for filling a vacancy in the job most closely related to the extra help work he is performing.

(Art. V.E.)

4. When an operating unit is shut down, the Operators affected will be assigned to other work, if other work is available, and their pay rates will be protected according to the following provisions:

a. When a plant is shut down for maintenance (repairs, cleaning, or inspection) the Operators affected will be assigned to other operating duties or to maintenance work. Their pay will be protected at their basic rate for twenty-eight (28) calendar days. At the end of this protection period they will be paid at the rate of the job to which they are assigned in accordance with Exhibit A.

b. When a plant is shut down either temporarily or permanently, because its operation is not required by the Company to meet its stock commitments, the number of basic operating jobs will be decreased accordingly. Operators adversely affected will be demoted under the provisions of Article V.C. However, their pay rates will be protected at their former basic rate for a period of twenty-eight (28) calendar days after which period their new basic assignment will determine their new basic wage rate for rate protection purposes.

5. When no other work is available for employees adversely affected by the shutting down of an operating unit as provided for in V.E.4. above, the provisions of Article V.B. will apply.

6. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

(Art. V.E.)

7. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

8. Employees in the Operator Training Program will not change relative position on the Operating Division seniority list because of temporary assignments to work in another Division as provided for in Article V.A.4.e.

ARTICLE VI

VACATIONS, HOLIDAYS, AND FRINGE BENEFITS

A. Vacations

1. A regular employee shall receive a vacation with pay after completion of one (1) year of continuous service and within each calendar year of continuous service thereafter.

Beginning January 1, 1966, a regular vacation will be as follows:

In Each Calendar Year in Which an Employee Completes	Length of Vacation
1 year or more but less than 5 years of continuous service	2 weeks (14 consecutive calendar days)
5 years or more but less than 10 years of continuous service	3 weeks (21 consecutive calendar days)
10 years or more but less than 20 years of continuous service	4 weeks (28 consecutive calendar days)
20 years or more of continuous service	5 weeks (35 consecutive calendar days)

(Art. VI.A.)

2. Operating needs of the Company are controlling in scheduling vacations. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two (2) periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. a. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veteran's Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

b. Employees who are working rotating shifts on a seven day work week continuous operation, and employees who normally work Saturday and/or Sunday, at the time of a holiday will observe the holiday for pay purposes on the calendar day on which it falls.

c. All other employees will observe the holiday for pay purposes on the calendar day on which it falls, except a holiday which falls on Sunday will be observed on the following Monday, and a holiday which falls on Saturday will be observed on the preceding Friday.

(Art. VI.B.)

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight-time rate for the number of hours in their regular daily work schedule plus one and one-half (1½) times the straight-time rate for all hours worked. For the purpose of holiday payments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four (24) hours later.

4. All regular employees shall receive eight (8) paid holidays per year. Those not so paid under the provisions of paragraphs 2 and 3 above shall receive a day's pay at their regular straight-time rate for each such holiday except when a leave of absence is granted as covered under Article VII.B. and C.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight-time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

(Art. VI.C.)

C. Fringe Benefits

1. All employees' benefits in effect at the time of signing of this Agreement shall continue in full force and effect for the duration of this Agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

4. Employees with one or more years of continuous service who are permanently laid off for lack of work will receive one week's pay at the straight-time rate for each year of continuous service up to a maximum of fifteen (15) weeks' pay for those employees having fifteen (15) or more years of continuous service. Employees with twenty-five (25) years or more of continuous service are not eligible for payment under this provision. Lay-off of employees occasioned by seasonal fluctuations in the business will not be considered permanent. When re-employed within the time limits specified in Article V.B.2., 3., and 4., after lay-off and payments received under this section are repaid, seniority dates as of the date laid off will be restored.

(Art. VII.)

ARTICLE VII
UNION ACTIVITIES

A. Workmen's Committee

The Union may create a Workmen's Committee, composed of six (6) members of which at least five (5) are employees, to meet at mutually acceptable times, with representatives of management for discussion of mutual problems. The Union will inform the Company in writing of the names of the employee members of said committee.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration (except where distances to be traveled require additional time in which case not more than thirty (30) days) for the purpose of attending Union conferences or meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three (3) employees shall be granted simultaneous leaves. The conditions of such leaves with respect to Company benefits shall be as covered in each established plan. All requests for leaves of this nature shall be made in writing as far in advance as possible before the first scheduled work day that will not be worked by reason of such leave being granted. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

(Art. VII. C.)

C. Leave of Absence to Enter the Employment of The Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two (2) years from date of start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two (2) years.

c. Applicant, if re-employed within said period of two (2) years, will enter the job that his seniority and ability would have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

(Art. VII. D.)

D. Conferences During Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

E. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four (4) pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

(Art. VIII. B.)

B. Voluntary Payroll Deduction of Union Dues

1. Employees in the bargaining unit may authorize the Company in writing on a form mutually acceptable to the Union and the Company to deduct while this Agreement is in effect the regular monthly dues of the Union from their wages on the first pay day each month and to remit same to the Secretary of Local No. 826, International Union of Operating Engineers AFL-CIO not later than two (2) weeks after the end of the payroll period in which the deduction is made. Employees may at any time revoke such authorization by giving the Company notice on a suitable form.

2. The Company will advise the Union with each remittance the names of employees from whom new authorizations have been included and those previously authorizing deductions but for whom no deductions have been made because of lack of earnings, revocations of authorization, or leave Company service. These authorizations will terminate upon the termination of this Agreement.

C. Payroll Deductions for Savings

Upon the written request of the employee, using Form COEM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

(Art. VIII. D.)

D. Smoking Area

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. Contract Labor

1. The Company shall have the right to contract or subcontract maintenance, repair or construction work to outside contractors.

2. It is not the Company's intent by contracting or subcontracting maintenance, repair or construction work to eliminate the Company's Maintenance Division.

3. When the Company is supplementing its maintenance force with contractor employees and contractor employees are assigned to work with Company employees on a job, a contractor employee shall not be scheduled to work more hours per day than a Company employee on that job. That job means the specific job on which contractor and Company employees are working together, as defined in advance by the Company.

4. The contracting or subcontracting of work in the El Paso Refinery will not cause the layoff or demotion of qualified employees during the period the contractor is performing the work.

(Art. VIII. F.)

F. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two (2) copies of the written record of this final warning. The additional copy may be provided the local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. Industrial Injury

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

H. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

(Art. VIII. I.)

I. Pay Day

Pay day for employees covered by this Agreement will be on or before the first Friday following the close of the pay period unless the Company is prevented from complying with this provision by circumstances beyond its control.

ARTICLE IX

GRIEVANCE PROCEDURE

A. Processing of grievances shall not unduly interfere with the continuity and efficiency of operations. The general subject of wages, hours and working conditions shall not be the basis of grievance or grievances within the meaning hereof. In all cases of grievances presented under this grievance procedure, each of the parties hereto agrees to furnish the other party with all information in its possession regarding such grievances which may be necessary to a full understanding of the subject matter of the complaint and to facilitate the prompt handling of complaints. Individual grievances shall be settled in accordance with the procedure described below.

B. The Union and/or any employee or group of employees shall have the right to present grievances affecting him or them to the Company. If any employee or employees or the Union believes that the Company has violated the Articles of Agreement in the application of any of the terms of this Agreement, redress may be sought as follows:

1. The employee may take up the matter with

(Art. IX. B.)

his Foreman, either individually or through his Union representative.

2. If satisfaction is not received, the employee, either individually or through the Union, may present the grievance in writing to the employee's Foreman. The grievance shall be presented within fifteen (15) days of the occurrence of the event upon which the grievance is based and shall state the nature of the occurrence giving rise to the grievance, the section or sections of this Agreement claimed to have been violated, and the relief sought. The Foreman shall reply in writing within five (5) days from the receipt of the written grievance.

3. If the employee or the Union is not satisfied with the Foreman's reply, he may, either individually or through the Union, or the Union may appeal the matter to the Refinery Manager or his designated representative. Such appeal shall be made in writing within ten (10) days from the date of Foreman's reply under B.2. above. A meeting to discuss the grievance shall be held between the Refinery Manager or his representative and not to exceed the employee and two (2) Refinery employee Union representatives. In addition, an accredited Union representative may be present. Such meeting will be held within ten (10) days after the appeal has been received. The Refinery Manager shall render his decision in writing within ten (10) days after the meeting.

4. If the grievance is not settled as the result of the steps set forth above, the employee may through the Union, or the Union may, present a written request for arbitration to the Refinery Manager. Such request

(Art. IX. B.)

shall be submitted within thirty (30) days after receipt of the decision as specified under B.3. above.

C. Employees will not suffer loss of regular pay in handling grievances, provided that the time consumed is reasonable.

D. In calculating time limits under this Article, Saturdays, Sundays, and holidays recognized under this Agreement shall not be counted. Time limits specified herein shall apply unless extended by mutual agreement in writing between the parties to take care of unusual cases such as illness or other justified absences. If the time limits specified herein, or as extended by mutual agreement, are not met by the party initiating the grievance, the case shall be considered closed and no longer subject to processing under the grievance procedure.

E. Where a grievance protests the discharge of an employee, the above procedure may be waived so as to permit the grievance to be referred directly to step B.3. above, so long as this is done within ten (10) days after the discharge.

ARTICLE X

ARBITRATION PROCEDURE

A. A grievance which is not settled as a result of the steps set forth in Article IX and which meets all of the following qualifications, may be arbitrated as herein-after provided:

1. The grievance was submitted in writing and

(Art. X. A.)

signed by the aggrieved employee prior to becoming subject to this Article.

2. The grievance was processed in accordance with each step of the procedure provided in Article IX.

3. The issue involved in the grievance is limited to the application or interpretation of a provision in this Agreement.

4. The grievance occurred during a period when this Agreement was in effect.

5. The Union submits to the Refinery Manager a request in writing to arbitrate such grievance within thirty (30) days after receipt of the Refinery Manager's decision as specified in Section B.4. of Article IX.

B. Within fifteen (15) days after receipt of the written request for arbitration as specified under A.5. above, the Union shall designate one (1) member and the Company shall designate one (1) member to the Board of Arbitration and advise the other party of such designation.

C. The two arbitrators designated shall meet within thirty (30) days from date of receipt of the written request for arbitration as specified under A.5. above, and endeavor to reach an agreement.

D. If these two arbitrators should fail to reach an agreement, either party may request the selection of a third arbitrator. Such request shall be made within fifteen (15) days from the date the arbitrators meet as specified in C. above.

(Art. X. E.)

E. If such request is made, the arbitrators appointed by the Union and the Company shall endeavor to agree upon the third arbitrator. If they are unable to agree within thirty (30) days from the date of request for such arbitrator, the third arbitrator will be selected from a list jointly requested by the Company and the Union arbitrators from the Federal Mediation and Conciliation Service.

F. If a dispute exists as to the arbitrability of a grievance, the issue of arbitrability shall first be determined by a Board of Arbitration as selected under paragraph E. above. If such grievance is found to be arbitrable, the grievance shall then be submitted to separate Board of Arbitration, selected under paragraph E. above, unless the parties agree otherwise.

G. If the Board of Arbitration as described herein has not convened within one hundred and eighty (180) calendar days from the date of receipt of the written request for arbitration under A.5. above, because of failure of the initiating party to proceed to final arbitration with due diligence, the case shall be considered to be closed.

H. The decision of the Board of Arbitration shall be final and binding upon both parties, but such decision shall be within the scope and terms of this Agreement and shall not change any of its terms or conditions. The expense and compensation of the arbitrator selected by each party shall be borne by such party and the expense of the third arbitrator shall be equally divided between the Company and the Union. The general expense of the arbitration proceedings shall be equally divided between the

(Art. X. H.)

Company and the Union, with the exception of the expense and the compensation of any witnesses called before the Board, which shall be borne by the respective parties.

I. In calculating the time limits under this Article, Saturdays, Sundays, and holidays recognized under this Agreement shall not be counted except for G. above. Time limitations specified herein shall apply unless extended by mutual agreement in writing between the parties to take care of unusual cases such as illness or other justified absences. If the time limits specified in this Article, or as extended by mutual agreement, are not met by the party initiating the grievance, the case shall be considered closed and no longer subject to processing under the arbitration procedure.

ARTICLE XI MANAGEMENT RIGHTS

A. Subject to the provisions of this Agreement, the supervision and control of all operations and the direction of all working forces, such as the determination of the size of the work force; the right to hire, suspend, discipline and discharge for just cause; the establishment of work rules; the assignment of employees to jobs and assignment of duties to employees; are vested in the Company. It is agreed that the provisions of this Article shall not be exercised for the purpose of violating the terms of this Agreement.

B. Changes made by the Company in the number of basic jobs in the Operating Division as a specific result of job activity surveys by the Company will

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(Art. XI. B.)

not result in layoff of any of the Laboratory, Operating, Maintenance, and Filling and Shipping employees covered by this Agreement and in Company employment as of August 1, 1961. This provision does not apply to any layoffs due to curtailment of work or shutdown of operating equipment or plants as a result of lack of stock or commitments, which are covered in Article V.B., or resulting from causes beyond the Company's control.

ARTICLE XII SAVING CLAUSE

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XIII STRIKES AND LOCKOUTS

During the term of this Agreement there shall be neither strikes nor lockouts. Suspension of work or refusal to work on the part of any employee will make him subject to discharge provided, however, that the Union will not be liable for such suspension or refusal unless, upon request of the Company, it refuses to order the employees to return to work.

ARTICLE XIV NON-DISCRIMINATION

A. The Company and the Union agree that there shall be no discrimination against any employee because

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(Art. XIV. A.)

of race, color, creed or national origin.

B. 1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

(Art. XV.)

ARTICLE XV PROCEDURE FOR HANDLING NOTICES

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, certified or registered, and postage paid, and addressed by one party to the other as follows:

Standard Oil Company of Texas

P. O. Box 20002

El Paso, Texas 79998

Attn: Refinery Manager

International Union of Operating Engineers

Local No. 826

P. O. Box 9764

El Paso, Texas 79987

(Copy to:

P. O. Box 1590
Big Spring, Texas
79720)

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS

R. W. Davis Refinery Manager

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL NO. 826, AFL-CIO

Clovis Phinney, Jr. President

Johnie Williams Secretary

Kenneth Howell Business Manager

NEGOTIATING COMMITTEE

Leo Wilson Chairman

J. F. Blackham Secretary

B. J. Nelms Committeeman

C. E. Moore, Jr. Committeeman

R. B. Hord Committeeman

J. D. Givens Business Representative

EXHIBIT A

REFINERY CLASSIFIED LABORATORY, OPERATING AND MECHANICAL WAGE SCHEDULE

Classification	Symbol	Hourly Rate	Daily Rate
<u>Operating Division</u>			
Unit Operator	UO	\$4.39	\$35.12
Operator	O	4.05	32.40
- Operator Non-Basic	O Non-Basic	- \$4.05	- \$32.40
Trainee 3	TR-3	3.77	30.16
Trainee 2	TR-2	3.55	28.40
Trainee 1	TR-1	3.38	27.04
Trainee A	TR-A	3.05	24.40
Head Operator B	HOB	4.20	33.60
Operator B	OB	3.69	29.52
<u>Maintenance Division</u>			
Senior Mechanic	SM	4.25	34.00
Mechanic A	MA	4.10	32.80
Mechanic B	MB	3.69	29.52
Helper A	HA	3.43	27.44
Helper B	HB	3.20	25.60
Helper C	HC	2.94	23.52
Laborer	L	2.59	20.72
<u>Storehouse Section</u>			
Stockman A	SA	4.05	32.40
Stockman B	SB	3.69	29.52
Stockman Helper A	SHA	3.43	27.44
Stockman Helper B	SHB	3.20	25.60
<u>Filling and Shipping Division</u>			
Lead Carloader	LCL	4.05	32.40
Carloader Senior	CLS	3.69	29.52
Carloader A	CLA	3.43	27.44
Carloader B	CLB	3.20	25.60
Helper C	HC	2.94	23.52

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Classification	Symbol	Hourly Rate	Daily Rate
Laboratory Division			
Technician A	TA	\$3.87	\$30.96
Technician B	TB	3.67	29.36
Technician Helper A	THA	3.51	28.08
Technician Helper B	THB	3.42	27.36
Technician Helper C	THC	2.94	23.52
Laboratory Helper	LH	2.94	23.52

Shift workers who work any time other than day shift will receive, in addition to the above rates, 15¢ an hour for the No. 3 afternoon shift, or 30¢ an hour for the No. 1 morning shift.

For all shifts of day workers starting or ending outside the hours of 6:00 a.m. to 6:00 p.m. the applicable shift differential shall be paid. Applicable shift differentials are as follows: 15¢ an hour from 4:00 p.m. until midnight, and 30¢ per hour from midnight until 8:00 a.m. When an employee works under conditions that entitle him to a shift differential, and also to an overtime or premium rate, the shift differential will be computed at the applicable overtime or premium rate.

Mechanic Helpers in the Mechanic Training Program making satisfactory progress shall receive, in addition to the Helper rate and any applicable shift differential, an achievement training differential of 6¢ per hour after completing 50% of the "general" portion and an additional 7¢ per hour after completing 100% of the "general" portion of the program.

EXHIBIT B

JOB PROGRESSION CHART - MAINTENANCE DIVISION

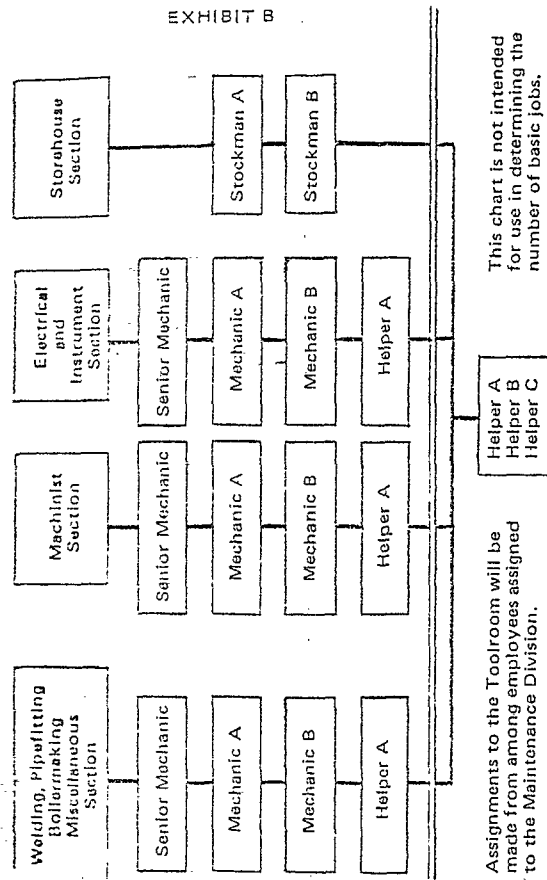
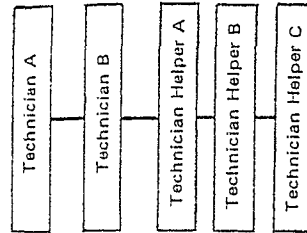


EXHIBIT D

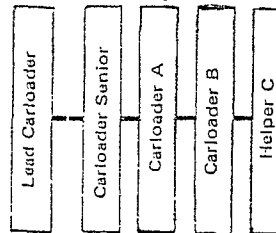
Laboratory Division



Laboratory Helper

These charts are not intended for use in determining the number of basic jobs.

Filling & Shipping Division



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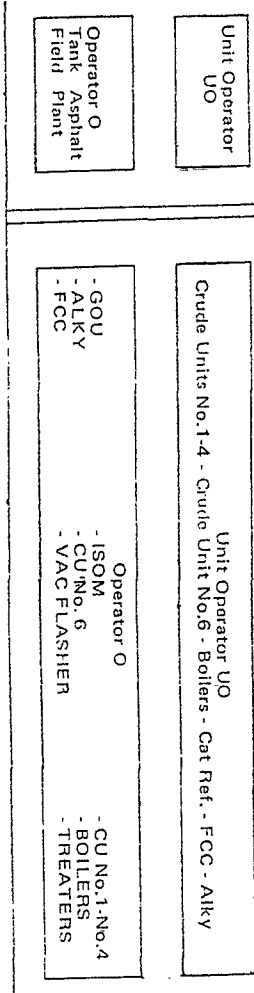
EXHIBIT C

JOB PROGRESSION CHART -- OPERATING DIVISION

EXHIBIT C

Tank Field Section

Process Section



Operator Non-Basic

Trainee - 3rd Year
Trainee - 2nd Year
Trainee - 1st Year

Trainee A

This chart is not intended for use in determining the number of basic jobs.

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1965-1966

AGREEMENT

BETWEEN

CALIFORNIA OIL COMPANY
WESTERN DIVISION

doing business as

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

(AFL-CIO)

EL PASO, TEXAS



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1965-1966
AGREEMENT

Between
CALIFORNIA OIL COMPANY
d/b/a
STANDARD OIL COMPANY OF TEXAS
and
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552
El Paso, Texas

This AGREEMENT is made and entered into this 28th day of April, 1965 between California Oil Company, d/b/a Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union." This agreement shall be considered to be the entire agreement between the parties, and no agreement which predates this agreement shall have any other force or effect.

WITNESSETH:
RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative, for the purpose of collective bargaining with respect to wages, hours

of work and other conditions of employment, of employees in the Maintenance, Operating and Laboratory Divisions of the Company's El Paso Refinery for whom the Union was certified as the collective bargaining representative in the National Labor Relations Board certifications dated May 7, 1943 (Case No. 16-R-629) and August 31, 1953 (Case No. 33-RC-453), subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of 12:01 a. m., April 28, 1965 and shall continue in full force and effect for one year from such date and shall renew from year to year thereafter unless either party hereto shall give written notice to the other at least sixty (60) days but not more than ninety (90) days prior to an anniversary date of its desire to modify, amend or terminate this agreement. Any such notice to modify or amend the agreement shall contain the specific articles and subdivisions thereof to be discussed. If notice to modify or amend is given, the agreement shall remain in effect during negotiations except that if agreement is not reached during negotiations within the sixty (60) day period prior to the anniversary date or thereafter if nego-

tations continue beyond the anniversary date, either party may give thirty (30) days' written notice to the other of its desire to terminate this agreement. The parties hereto may, however, by mutual agreement extend this agreement beyond the above termination date for a specific period for the continuance of negotiations.

B. It is recognized, however, by the parties that during the term of this agreement it may become desirable to discuss wage rates in general (as set forth in Exhibit A) and hours and days of work (Article II. C.) and for these purposes only each party may open once in each contract year thereafter to bargain on revisions in the light of conditions then existing. If agreement is not reached during the sixty (60) days following date of delivery of such notice either party may give thirty (30) days' written notice of its desire to terminate this agreement in which case the agreement shall terminate as of the end of such thirty (30) day period unless by mutual consent the parties agree to an extension for the purpose of continuing negotiations.

ARTICLE II

WORK DAY, WORK WEEK AND WORK SCHEDULES

A. The established work week shall consist of seven (7) consecutive twenty-four (24) hour periods beginning with the No. 1 Shift Monday. The Monday No. 1 Shift is that

shift which begins 11:00 p. m. Sunday for shift workers and 12:01 a. m. Monday for day workers.

B. 1. A work day is twenty-four (24) consecutive hours beginning at the same time each day. The first work day begins at the time the established work week begins, and the seventh work day ends at the time the established work week ends.

2. Normally, but not exclusively, the regular shift for day workers will be eight (8) consecutive hours, exclusive of an unpaid lunch period, between 6:00 a. m. and 6:00 p. m. as contrasted to shift workers who regularly work No. 1 Shift (11:00 p. m. to 7:00 a. m.), No. 2 Shift (7:00 a. m. to 3:00 p. m.) and No. 3 Shift (3:00 p. m. to 11:00 p. m.).

3. Day workers working a regular eight (8) hour shift starting or ending outside of the hours of 6:00 a. m. to 6:00 p. m. shall be allowed a fifteen (15) minute paid lunch period on the job site plus an additional five (5) minutes for clean up and travel to their respective lunches on the job.

4. The unpaid lunch period for day workers will be from 12:00 noon to 12:30 p. m., when consistent with the work on hand. When an employee is required to work through his regular lunch period he shall be provided a different unpaid lunch period which shall be no more than one (1) hour earlier or later than the established lunch period. In addition, the Company shall allow a five (5) minute paid period prior to the lunch period for day

workers to stop work, clean up, and travel to the lunch area.

C. Employees are expected to be available for shift work and overtime. Work schedules specify the days in the work week and hours in the work day during which employees are expected to work. The weekly work schedule consists of eight (8) consecutive hours, exclusive of unpaid lunch periods, on each of five (5) work days totaling forty (40) hours of work at the straight-time rate within each work week with two (2) consecutive days off. Such schedules do not guarantee or limit the hours of work. The Company will post each employee's weekly work assignment as far in advance as practicable consistent with work requirements. Notification of changes in the employee's weekly work assignment will be posted as far in advance as practicable. Employees will review their work assignment before leaving the plant each work day.

ARTICLE III

WAGE RATES, OVERTIME AND OTHER PREMIUM PAY

A. Wage Rates, Exhibits, Shift Differentials

1. The wage rate classifications and present job titles applicable thereto are attached and made part hereof as Exhibit A. Employees will be paid for time worked in each classification to which assigned at not less than the job rate for the work performed, except for

Helpers in the Maintenance Division who may be assigned work also performed by Mechanics.

2. a. Where an employee of an Operating Division works in two classifications in one (1) day, and works less than half ($\frac{1}{2}$) a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half ($\frac{1}{2}$) a day at the higher rate and the other half ($\frac{1}{2}$) day at the lower rate. If he works one-half ($\frac{1}{2}$) day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When during a shift an Operating Division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay.

B. Overtime and Other Premium Pay

1. General—No more than one overtime or premium pay provision in this agreement shall be applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. All work performed in excess of eight (8) hours in any work day, or forty (40) hours in the established work week shall be paid for at the overtime rate of one and one-half ($1\frac{1}{2}$) times the straight-time rate. For the purpose of determining time worked in ex-

cess of forty (40) hours in the established work week, the following shall count as time worked:

a. Scheduled work time lost on account of jury duty.

b. Scheduled work time off with full pay on account of sickness or holiday.

c. Scheduled work time off on account of leave of absence with pay.

3. One and one-half ($1\frac{1}{2}$) times the straight-time rate shall be paid for the hours worked under the following conditions:

X a. Time worked in excess of eight (8) hours in any twenty-four (24) hour period, beginning at the time the employee begins work other than overtime as defined in III. B. 2. or double time as defined in III. B. 5.

b. When employees are scheduled to work a shift which may extend from one work day into the next, the employee involved will be paid at the rate of one and one-half ($1\frac{1}{2}$) times the straight-time rate for the hours worked on such employee's first off day, with such off day considered as starting at the beginning of the established work day as covered in Article II. B. 1.

c. For the first shift scheduled to be worked and worked where the scheduled hours of work have been changed as listed below without forty (40) hours' notice prior to the start of the first shift changed.

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an Operator who is working on an operating

schedule, or a Laboratory employee who is working on the Laboratory schedule; i.e., change from Shift No. 1 to Shift No. 2, etc.

(3) A change of more than one (1) hour in the starting time from the preceding work day, of regular hours of work of a Maintenance and Storehouse Division worker, or of an Operator or Laboratory employee who is working on, going onto, or coming off a Maintenance schedule.

d. Compensation provided in Article III. B. 3. c. (3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular shift.

(2) When an employee changes to a day shift from any other shift.

4. "Call Out"—Any employee who reports for work after he has completed his shift and has left the plant, and before the start of his next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight-time rate or time and one-half for work performed, whichever is greater.

Call Out—Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested

to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

5. Double time rate of two (2) times the straight-time rate shall be paid for:

a. All hours worked in excess of sixteen (16) consecutive hours; i.e., beginning on the 17th consecutive hour.

b. All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week. For the purpose of double time payment only, both off days will start at the beginning of the established work day as covered in Article II. B.

C. Distribution of Overtime

1. An effort will be made to distribute overtime among qualified employees in the classification and section in which the overtime occurs, except those assigned to light duty for health reasons. For the purpose of identification, only the overtime hours worked, or offered and refused, as defined under the provisions of Articles III. B. 2., III. B. 4., and III. B. 5., will be counted as the basis for the Company's effort to distribute overtime defined by these same provisions.

D. Overtime Meals

1. The Company will provide a whole-some meal, not to exceed \$1.50 in cost, to each employee at his job location after he has completed ten (10) consecutive hours of work (unpaid lunch periods excluded) and after completion of each successive four (4) hours of work thereafter.

2. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company expense, will be allowed for eating.

3. An employee may elect to take a meal allowance of \$1.50 instead of a meal if his supervisor offers the employee that option in advance of the time a meal is due because it is reasonable to expect the completion of the work required of the employee within one (1) hour after the meal would be due.

ARTICLE IV SENIORITY

A. For the purpose of administering this article, and Article V, seniority of two types shall be considered as stated below:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery, and

2. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized refinery sections are:

1. Crude Distillation
2. Stocks and Utilities
3. Cracking
4. Filling and Shipping
5. Storehouse
6. Electrical and Instruments
7. Machinists and Tool Room
8. Welding, Pipefitting, Boilermaking and Miscellaneous
9. Laboratory

PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS ARTICLE V

(Attached to and made a part of this agreement are "Exhibit B—Job Progression Chart, Maintenance and Storehouse," and "Exhibit C—Job Progression Chart, Operating Sections," showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications. These exhibits are not intended for use in determining the number of basic jobs in the Operating or Maintenance Divisions which are subject to change in accordance with the provisions of Article X.)

A. Promotions

1. All promotions made in the Refinery Sections shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in

line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs. When a promotion is made and the employee is not the highest on the seniority list in the next applicable classification, any employee higher in that classification and eligible for consideration for such promotion shall be advised by the Company why he was not selected.

Operating Sections (Crude Distillation, Stocks and Utilities and Cracking)

2. Promotions in the Operating Division (OB classification and higher) are made only when a basic job is permanently vacated and is still required, or when a new basic job is created. The number of employees assigned to each classification (OB and higher) is determined by the number of employees needed to fill each basic job in the classification. Except as provided for in Article V. C., once an employee is assigned a position on the seniority list, his name shall continue in the basic job in the classification assigned even though he is absent for any reason from the basic job and still retains his seniority. Employees will be arranged in these classifications in the order of refinery seniority (OB and O classifications) and in order of section senior-

ity within a section (above the double line). Those employees assigned to the Operator Pool will be arranged on this list as covered in V. A. 3. in order of refinery seniority. Basic jobs (OB and higher) are those which are determined by management to be essential to the anticipated requirement for efficient operation of the plant. The number of basic jobs in each wage rate (classification) may be revised by the Company from time to time to meet changing conditions, and the Union will be kept informed of such changes made in the number of basic jobs in the Operating Division. Swing jobs in all cases are basically classified at the lower of the two swing classifications.

3. All men hired for Operations will be hired at the Helper C rate in the Operator Pool and assigned in order of refinery seniority. This rate will be effective for a period of twenty (20) work days, except in cases where men have become qualified and work an OB job in less than twenty (20) work days, the OB rate will then be paid for any OB work performed. After the initial twenty (20) day work period, if the man is not working in an OB classification he will be advanced to the Helper B rate. After one year of refinery service, he will be assigned to the Helper A classification. After having worked in an OB classification, a man will be paid at his basic rate in the Operator Pool as covered in this section, or at the rate of the classification in which he works, whichever is higher.

4. Promotions to fill basic jobs in the HOC classification in the Crude Distillation, Stocks and Utilities and Cracking Sections will be made from the OA classification. After accepting a basic assignment of HOC in one of the three progressional sections, he will progress only in that section. If a man is offered and turns down a basic assignment in the HOC classification in the Crude Distillation, Stocks and Utilities or Cracking Sections he shall not—at a later date—go ahead of the junior man that accepted the job in that classification or higher. If there is a vacancy in the classification at a later date, and he elects to accept it, he will take a position below the last man assigned to fill a basic job in the HOC classification and will thereafter advance in that relative position.

5. Temporary vacancies due to illness, leaves of absence, etc., of one (1) to not more than thirty (30) calendar days' duration, and all vacancies due to vacations will be filled as determined by the Company in a manner that will give employees training in equal or higher classifications with the objective of suitably protecting current and future operations and providing opportunities for employees to gain experience in work of the same or higher classifications.

Nothing herein shall require the Company to pay an overtime or penalty rate to fill a temporary vacancy when a qualified employee is available for such work at no or less overtime or penalty pay.

6. In the event of an anticipated vacancy in excess of thirty (30) calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, assignments to fill such vacancies although not promotions, will be filled in accordance with the same procedure used in making promotions without changing basic classifications. However, none of the provisions in this article nor in any other of the articles in this agreement is intended to obligate the Company to fill all vacancies in basic jobs whether permanent or temporary, when not required by operating conditions at the time.

7. Schedule changes will be made if necessary to assure that the senior qualified man in each basic classification in each progressional section (Crude Distillation, Stocks and Utilities and Cracking) shall over a period of one contract year, receive substantially more shifts of work in the next higher classification than any junior man in the same classification in the same progressional section.

8. An Operator who is not promoted according to the articles of this agreement, (except as covered in V. A. 4. above) because of a written request by him or due to his lack of ability; may be retained on a job within a classification that he can handle satisfactorily, but thereafter he shall not be considered for promotion, nor shall he be entitled to fill a temporary vacancy in a higher classification. In the event the job to which he is assigned is dis-

continued he will be assigned in accordance with seniority provisions to a job within the classification that he can perform satisfactorily or he will be demoted to a job in a lower classification that he can handle satisfactorily.

Maintenance and Storehouse Division

9. In the Maintenance Sections, promotions from Helper B to Helper A and from Mechanic B to Mechanic A are to be made solely on the basis of refinery service and not on the basis of performance of a higher or different classification of work. Helpers B will be promoted to Helpers A upon completion of twelve (12) months of service in the Refinery Maintenance Sections. Mechanics B will be promoted to Mechanics A upon completion of:

- a. 12 months of service as Mechanic B, and
- b. 60 months of service in the Refinery Maintenance Sections, including any service as Mechanic B.

10. a. The Company will maintain a minimum of 75% Mechanics A and B plus Senior Mechanics in the total assigned work force in the Maintenance Sections, provided there are employees who are qualified to be Mechanics.

b. Mechanics A will be promoted to Senior Mechanics upon completion of 15 years' refinery service, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

11. Maintenance and Storehouse employees will be assigned to a specific Maintenance-

Storehouse Division Section, as provided in Exhibit B, within one (1) year of date of employment in Company's refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability. Section assignment as stated here shall not in any way interfere with the Company having an employee do any type of refinery work that in the Company's judgment he can do safely.

12. Promotions within the Storehouse Section shall be based on seniority and ability. Seniority as used in this section refers to Storehouse section seniority.

Laboratory

13. In the Laboratory, promotions from Technician Helper B to Technician Helper A are to be made solely on the basis of laboratory service and not on the basis of performance of a higher or different classification of work. Technician Helper B will be promoted to Technician Helper A upon the completion of 12 months of service in the laboratory. Technician B will be promoted to Technician A upon completion of:

- a. 12 months of service as Technician B, and

b. 36 months of service in the laboratory, including any service as Technician B.

14. The Company will maintain a minimum of 60% Technicians of the total of Tech-

nicians plus Technician Helpers in the Laboratory Section, provided there are Technician Helpers who are qualified to be Technicians.

Filling and Shipping

15. Promotions within the Filling and Shipping Section shall be based on seniority and ability. Seniority as used in this section refers to Filling and Shipping Section seniority.

B. Layoffs and Rehiring

1. Layoffs for lack of work shall be based on refinery seniority. However, the Company may retain a sufficient number of men experienced and qualified to perform the necessary work in each Division (Maintenance-Storehouse, Operating-Filling and Shipping, and Laboratory) as necessary to permit continued efficient operation.

2. Employees with less than one (1) year's refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within ninety (90) calendar days after the last day worked.

3. Employees with more than one (1) year but less than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within one hundred eighty (180) calendar days after the last day worked.

4. Employees with more than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if re-

hired within three hundred sixty-five (365) calendar days after the last day worked.

5. Men laid off due to lack of work will be offered re-employment when vacancies arise on the basis of their refinery seniority at the time of layoff, provided the seniority protection period as outlined above has not expired and that they are fully qualified to fill the vacancy.

6. Notice of available positions will be sent to employees on the layoff list by certified or registered mail, return receipt requested, to the last address left with the Company. An employee will be given five (5) days from the time the notice was received to advise the Company of acceptance and an additional three (3) days to report for work after advising the Company of his availability for work. An employee who fails to notify the Company or fails to report to work within the period specified loses all rights to seniority. The Company may grant an extension of time for an employee to report to work if he notifies the Company of sickness, death, or emergency involving himself or his immediate family within five (5) days of the date of the notice from the Company. Under emergency conditions, temporary employees may be used until former employees on the rehiring list have reported to work.

C. Demotions

Operating Division

1. a. Demotions in the Operating Sections (OB classification and higher) are made only from basic jobs. If the number of basic jobs is decreased the number of employees within the affected wage rates (classifications) (see V. A. 2.) will be decreased accordingly, and demotions will be made according to position on the section seniority list in each classification, HOC classification and higher, or refinery seniority list, OA and OB classifications. Thus, each demoted employee will maintain the same relative section seniority position in any remaining lower basic jobs in the section, but will be placed according to refinery seniority in OA jobs and lower. Employees with one (1) or more years of seniority who are demoted from the OB classification will be placed in the Helper A classification in the Operator Pool (see Exhibit C) in order of refinery seniority, and those with less than one (1) year of seniority will be placed in the Helper B classification in the Operator Pool in order of refinery seniority. The seniority lists will reflect these changes.

b. An employee who must be demoted from a basic job because of deficiencies will be placed in a lower basic job for which he is qualified and will establish a new relative section seniority position at the top of that lower classification if it is HOC or higher, or, will be placed in order of refinery seniority within

the lower classification for which he is qualified if it is OA or lower. Any subsequent promotions will follow the provisions under V. A.

2. Temporary demotions of Operators in OB classification and above, because of seasonal shutdown of process units due to lack of stock or commitments, as determined by the Company, will be made as above, V. C. 1., except that employees in HOC classification and above will still maintain their section seniority in the classification assigned. However, they will be paid at the rate of the job in which they work except as covered in V. E. 4. of this article. Employees temporarily demoted from the HOC classification in one of three progressional sections (Cracking, Crude Distillation or Stocks and Utilities) may then be assigned to fill temporary vacancies (of either less than or more than 30 days), if qualified, in any of the three sections. However, they will not be promoted to fill a basic job in other than the progressional section in which they are maintaining their section seniority. No employee may establish or retain section seniority in more than one progressional section.

Maintenance and Storehouse Division

3. Demotions in the Maintenance Sections are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified.

4. In making demotions in the Storehouse

Section, position on the section seniority list in each classification shall control. Employees demoted out of the Storehouse Section will be assigned to a Maintenance Section at not higher than the Helper A classification.

Laboratory

5. Demotions within the Laboratory Section are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified. Employees demoted out of the Laboratory Section due to a curtailment of work will be assigned to the Maintenance-Storehouse Division or the Operating-Filling and Shipping Division and will be assigned to a classification not higher than Helper A.

Filling and Shipping Section

6. Demotions within the Filling and Shipping Section are made (1) because of curtailment of work and a decrease in the number of basic jobs in which case the number of employees assigned within the affected wage rates is decreased accordingly, and (2) due to an employee's deficiencies, in which case the employee is moved from his former job and placed in a lower job for which he is qualified. Employees demoted out of the Filling and Shipping Section due to a curtailment of work will be assigned to the Main-

tenance-Storehouse Division, Operating Division, or Laboratory and will be assigned to a classification not higher than Helper A.

D. Inter-Section Status

Maintenance and Storehouse Division

1. Transfers between sections may be made with Company approval. In all cases of permanent transfer between sections, the transferring employee will enter the new section with section seniority dating from the date of entering the new section and he will relinquish his section seniority in the former section.

2. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire section seniority in the new section nor lose acquired section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the seniority list will so indicate, and the provisions of par. 1. above will apply.

E. General

1. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, if it exists. If not, he will be assigned to a job in which he can perform satisfactorily without loss of seniority. When an employee is not progressing or performing his work in a satisfactory manner, he will be so informed.

2. When employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a two (2) year period to the job that their seniority and ability would have entitled them to, had they remained in the bargaining unit. They shall be given seniority credit for the time they were outside the bargaining unit. An employee transferred or assigned outside the bargaining unit for more than twenty-four (24) months in any thirty (30) month period will lose his refinery seniority protection under this provision.

3. For all periods of break-in or other training work an Operating Division employee will be paid at the rate of the classification at which he is breaking in or the rate of his basic classification, whichever is higher. For the purpose of further training an employee in the next higher classification as a refresher, a man basically assigned in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

4. When an operating unit is shut down, the Operators affected will be assigned to other work, if other work is available, and their pay rates will be protected according to the following provisions:

a. When a plant is shut down for maintenance (repairs, cleaning, or inspection) the Operators affected will be assigned to other operating duties or to maintenance work.

Their pay will be protected at their basic rate for twenty-eight (28) calendar days. At the end of this protection period they will be paid at the rate of the job to which they are assigned in accordance with Exhibit A.

b. When a plant is shut down either temporarily or permanently, because its operation is not required by the Company to meet its stock commitments the number of basic operating jobs will be decreased accordingly. Operators adversely affected will be demoted under the provisions of Article V. C. However, their pay rates will be protected at their former basic rate for a period of twenty-eight (28) calendar days after which period their new basic assignment will determine their new basic wage rate for rate protection purposes.

5. When no other work is available for employees adversely affected by the shutting down of an operating unit as provided for in V. E. 4. above, the provisions of Article V. B. will apply.

6. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

7. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

ARTICLE VI

VACATIONS, HOLIDAYS, AND FRINGE BENEFITS

A. Vacations

1. A regular employee shall receive a vacation with pay after completion of one (1) year of continuous service and within each calendar year of continuous service thereafter.

Beginning January 1, 1966, a regular vacation will be as follows:

In Each Calendar Year in Which an Employee Completes	Length of Vacation
1 year or more but less than 5 years of continuous service	2 weeks (14 consecutive calendar days) (1965 - 2 weeks)
5 years or more but less than 10 years of continuous service	3 weeks (21 consecutive calendar days) (1965 - 2 weeks)
10 years or more but less than 20 years of continuous service	4 weeks (28 consecutive calendar days) (1965 - 3 weeks)
20 years or more of continuous service	5 weeks (35 consecutive calendar days) (1965 - 4 weeks)

2. Operating needs of the Company are controlling in scheduling vacations. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two (2) periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. a. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veterans' Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

b. Employees who are working rotating shifts on a seven day work week continuous operation, and employees who normally work Saturdays and/or Sundays, at the time of a holiday will observe the holiday for pay purposes on the calendar day on which it falls.

c. All other employees will observe the holiday for pay purposes on the calendar day on which it falls, except a holiday which falls on Sunday will be observed on the following Monday, and a holiday which falls on Saturday will be observed on the preceding Friday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half ($1\frac{1}{2}$) times the straight time rate for all hours worked. For the purposes of holiday payments,

holidays will be considered as starting at 12:01 a. m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p. m., 7:00 a. m., or 3:00 p. m. shifts, holidays will be considered starting at 11:00 p. m. prior to the calendar day of the holiday and ending at 11:00 p. m. twenty-four (24) hours later.

4. All regular employees shall receive eight (8) paid holidays per year. Those not so paid under the provisions of par. 2. and 3. above shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All employees' benefits in effect at the time of the signing of this agreement shall continue in full force and effect for the duration of this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service,

an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

4. Employees with one or more years of continuous service who are permanently laid off for lack of work will receive one week's pay at the straight-time rate for each year of continuous service up to a maximum of fifteen (15) weeks' pay for those employees having fifteen (15) or more years of continuous service. Employees with twenty-five (25) years or more of continuous service are not eligible for payment under this provision. Lay-off of employees occasioned by seasonal fluctuations in the business will not be considered permanent. When re-employed within the time limits specified in Article V. B. 2., 3., and 4., after layoff and payments received under this section are repaid, seniority dates as of the date laid off will be restored.

ARTICLE VII UNION ACTIVITIES

A. Workmen's Committee

The Union shall create a Workmen's Committee, composed of five (5) employees, who shall meet monthly at mutually acceptable times, with representatives of management for discussion of individual or mutual problems, and to dispose of questions arising under this agreement. The Union will advise the Company in writing of the names of the members of said committee. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days' duration (except where distances to be traveled require additional time, in which case not more than thirty [30] days) for the purpose of attending Union conferences or meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three (3) employees shall be granted simultaneous leaves. The conditions of such leaves with respect to Company benefits shall be as covered in each

established plan. All requests for leaves of this nature shall be made in writing as far in advance as possible before the first scheduled work day that will not be worked by reason of such leave being granted. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two (2) years from date of start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two (2) years.

c. Applicant, if re-employed within said period of two (2) years, will enter the job that his seniority and ability would have en-

titled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Conferences During Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

E. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal

safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four (4) pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

1. Employees in the bargaining unit may authorize the Company in writing on a form mutually acceptable to the Union and the Company to deduct while this agreement is in effect the regular monthly dues of the Union from their wages on the first pay day each month and to remit same to the Secretary of Local Union No. 552, International Union of Operating Engineers not later than two (2) weeks after the end of the payroll period in which the deduction is made. Employees may at any time revoke such authorization by giving the Company notice on a suitable form.

2. The Company will advise the Union with each remittance the names of employees from whom new authorizations have been included and those previously authorizing deductions but for whom no deductions have been made because of lack of earnings, revocations of authorization, or leave Company service. These authorizations will terminate upon the termination of this agreement.

C. Payroll Deductions for Savings

Upon written request of the employee, using Form COEM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Smoking Areas

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment available to perform such work properly.

F. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give

the employee two (2) copies of the written record of this final warning. The additional copy may be provided the local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

H. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

I. Pay Day

Pay day for employees covered by this agreement will be on or before the first Friday following the close of the pay period unless the Company is prevented from complying with this provision by circumstances beyond its control.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this agreement shall promptly and personally, within five (5) days of the incident, attempt to adjust the matter with his foreman or appropriate supervisor. This shall be done by a full and free discussion of the matter with the foreman or appropriate supervisor.

2. The foreman or appropriate supervisor will investigate the case, calling upon higher Management—if necessary—to aid him. He shall then give the employee an answer to his complaint, within five (5) days after receiving the complaint.

3. If the answer does not satisfy the employee, he shall so state and advise his foreman or appropriate supervisor, within five (5) days after receiving the answer, which of the following courses he wishes to pursue:

a. Have an authorized Union representative of his choice aid him in the presentation of his case to his foreman or appropriate supervisor. If this request is made, the foreman or appropriate supervisor shall specify the time, not to exceed five (5) calendar days from the time of the employee's request, and the place for such meeting; or

b. take the first step in presenting a grievance.

4. If, at the conclusion of the meeting specified in IX. A. 3. a. the employee is not satisfied, he shall so state and advise his foreman or appropriate supervisor that he is taking the first step in presenting a grievance.

5. The aggrieved employee shall, as the first step of the grievance procedure, attempt to adjust the grievance by an oral discussion with the head of his division; i.e., Operations Superintendent, Chief Engineer or Superintendent-Process Engineering and Quality Control. The aggrieved employee may, if he so wishes, have an authorized Union representative of his choice present for such discussion. The time and place for this grievance discussion shall be designated by the appropriate Division Head and shall be held within five (5) days of the employee's request. The Union will be given the opportunity to have a representative present at the time an adjustment is given.

6. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee, within five (5) days thereafter, shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within five (5) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said

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grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within five (5) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted or whether said decision shall be arbitrated.

7. If notice of arbitration is given, then within fifteen (15) days after the date of notice the Union shall advise the Company in writing, and the Company shall advise the Union in writing, the name of an arbitrator. The two arbitrators so appointed shall communicate within thirty (30) days of the date of the written request for arbitration and shall endeavor to reach an agreement. If these two arbitrators fail to reach an agreement, either party may, within forty-five (45) days of the written request for arbitration, notify the other in writing that they wish to select a third arbitrator, or the case shall be considered closed. If a third arbitrator is requested within the time limit, the two arbitrators shall endeavor to make a selection within sixty (60) days of the date of the written request for arbitration. Should they fail to reach an agreement on the third arbitrator they will jointly request of the Federal Mediation Service a list of five (5) names from

which the third arbitrator shall be selected by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

D. 1. In calculating time under this article, Saturdays, Sundays and holidays recognized under this agreement shall not be counted. Time limitations specified herein shall ordinarily be applicable but may be extended by mutual agreement between the parties to the proceeding to take care of unusual cases such as illness or other justifiable absences.

2. The Company and Union will equally divide the expense of the third member, should any be incurred.

E. Where a grievance protests the discharge of an employee, the above procedure, A.1. through A.6. may be waived so as to permit the grievance to be referred directly to arbitration so long as this is done within ten (10) days after the discharge.

ARTICLE X MANAGEMENT RIGHTS

A. Subject to the provisions of this agreement, the supervision and control of all operations and the direction of all working forces, such as the determination of the size of the work force; the right to hire, suspend, discipline and discharge for just cause; the establishment of work rules; the assignment of employees to jobs and assignment of duties to employees; are vested in the Company. It is agreed that the provisions of this Article shall not be exercised for the purpose of violating the terms of this agreement.

B. Changes made by the Company in the number of basic jobs in the Operating sections as a specific result of job activity surveys by the Company will not result in layoff of any of the Laboratory, Operating, Maintenance and Filling and Shipping employees covered by this agreement and in Company employment as of August 1, 1961. This provision does not apply to any layoffs due to curtailment of work or shutdown of operating equipment or plants as a result of lack of stock or commitments, which are covered in Article V. B., or resulting from causes beyond the Company's control.

ARTICLE XI SAVING CLAUSE

If any of the provisions of this contract shall be held invalid by any governmental au-

thority, such actions shall not invalidate the other provisions hereof.

ARTICLE XII STRIKES AND LOCKOUTS

During the term of this agreement there shall be neither strikes nor lockouts. Suspension of work or refusal to work on the part of any employee will make him subject to discharge provided, however, that the Union will not be liable for such suspension or refusal unless, upon request of the Company, it refuses to order the employees to return to work.

ARTICLE XIII NON-DISCRIMINATION

A. The Company and the Union agree that there shall be no discrimination against any employee because of race, color, creed or national origin.

B. 1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

**ARTICLE XIV
PROCEDURE FOR
HANDLING NOTICES**

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, certified or registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating Engineers
Local No. 552
P. O. Box 9764
El Paso, Texas 79987

Standard Oil Company of Texas
P. O. Box 20002
El Paso, Texas 79998
Attn: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

**INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL NO. 552**

D. W. Jones, President
R. K. Anderson, Secretary
R. W. Davis, Refinery Manager

**EXHIBIT A
REFINERY CLASSIFIED LABORATORY,
OPERATING AND MECHANICAL
WAGE SCHEDULE**

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$3.68	\$29.44
Head Operator B	HOB	3.56	28.48
Head Operator C	HOC	3.43	27.44
Operator A	OA	3.30	26.40
Operator B	OB	3.12	24.96
Helper A	HA	2.89	23.12
Helper B	HB	2.68	21.44
Helper C	HC	2.45	19.60

MAINTENANCE DIVISION

Senior Mechanic	SM	3.56	28.48
Mechanic A	MA	3.43	27.44
Mechanic B	MB	3.12	24.96
Helper A	HA	2.89	23.12
Helper B	HB	2.68	21.44
Helper C	HC	2.45	19.60
Laborer		2.15	17.20

STOREHOUSE SECTION

Stockman A	SA	3.43	27.44
Stockman B	SB	3.12	24.96
Stockman Helper A	SHA	2.89	23.12
Stockman Helper B	SHB	2.68	21.44

FILLING AND SHIPPING

Finished Stock Gauger	FSG	3.12	24.96
Carloader Senior	CLS	3.12	24.96
Carloader A	CLA	2.89	23.12
Carloader B	CLB	2.68	21.44
Helper C	HC	2.45	19.60

LABORATORY

Technician A	TA	3.27	26.16
Technician B	TB	3.10	24.80
Technician Helper A	THA	2.95	23.60
Technician Helper B	THB	2.88	23.04
Bottlewasher	BW	2.45	19.60

Shift workers who work any time other than day shift will receive in addition to the above rates, 8c an

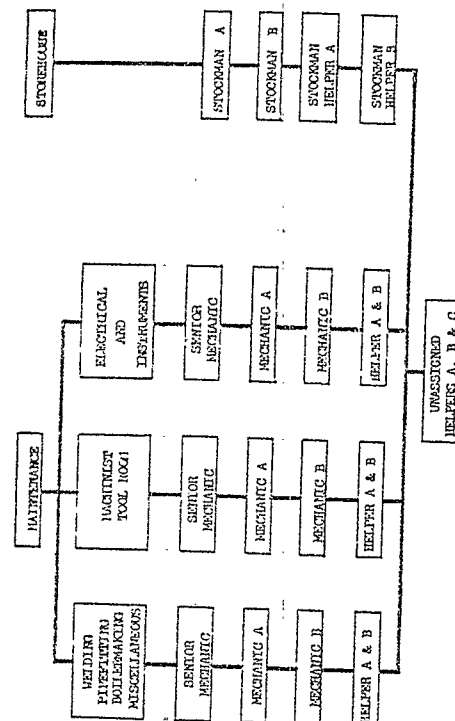
hour for the No. 3 afternoon shift, or 16c an hour for the No. 1 morning shift.

For all shifts of day workers starting or ending outside the hours of 6:00 a. m. to 6:00 p. m., and for all overtime hours worked, the applicable shift differential shall be paid. Applicable shift differentials are as follows: 8c an hour from 4:00 p. m. until midnight, and 16c per hour from midnight until 8:00 a. m.

Mechanic Helpers enrolled in the Mechanic Training Course and making satisfactory progress shall receive, in addition to the Helper rate and any applicable shift differential an achievement training differential of \$0.50 per day after one (1) year from the date of enrollment, and \$1 per day after two (2) years from the date of enrollment.

EXHIBIT B

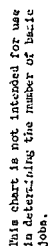
EXHIBIT B
FOR PROMOTION CHART - MECHANIC - ASSISTANCE - ASSISTANCE



Helpers A and Mechanic Transferees enter new sections as Helpers A, Helpers B Transferees remain Helpers B.

This chart is not intended for use in determining the number of basic jobs.

DIFFERENTIATION PROGRESSION CURVE SHOWING PROGRESSIONAL SECTIONS
STRETCHED TO CORRELATE SECTIONS IN PLANTS



AGREEMENT

Between

THE EL PASO REFINERY

of

CHEVRON OIL COMPANY

WESTERN DIVISION

doing business as

STANDARD OIL COMPANY OF TEXAS

and

INTERNATIONAL UNION OF

OPERATING ENGINEERS

LOCAL NO. 826

(AFL-CIO)

EL PASO, TEXAS

EFFECTIVE APRIL 1, 1967



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AGREEMENT

Between

CHEVRON OIL COMPANY
d/b/a
STANDARD OIL COMPANY OF TEXAS
and
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL NO. 826

El Paso, Texas

This AGREEMENT is made and entered into this March 29, 1967, between Chevron Oil Company, d/b/a Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and Local No. 826, International Union of Operating Engineers, AFL-CIO, herein referred to as the "Union." This Agreement shall be considered to be the entire Agreement between the parties, and no Agreement which predates this Agreement shall have any other force or effect.

WITNESSTH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representatives, for the purpose of collective bargaining in respect to rates of pay, wages, hours of employment, or other conditions of employment, of employees in the Maintenance, Operating, Laboratory and Filling

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and Shipping Divisions of the Company's El Paso Refinery for whom the Union was certified as the collective bargaining representative in the National Labor Relations Board certifications dated May 7, 1943 (Case No. 16-R-629), August 31, 1953 (Case No. 33-RC-453) and December 8, 1966 (28-AC-2), subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor Management Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. 1. This Agreement shall be effective as of 12:01 a.m., April 1, 1967 and shall continue in full force and effect for two (2) years from such date and shall renew from year to year thereafter unless either party hereto shall give written notice to the other at least sixty (60) days but not more than ninety (90) days prior to an anniversary date of its desire to modify, amend or terminate this Agreement. Any such notice to modify or amend the Agreement shall contain the specific articles and subdivisions thereof to be discussed. If notice to modify or amend is given, the Agreement shall remain in effect during negotiations except that if agreement is not reached during negotiations within the sixty (60) day period prior to the anniversary date or thereafter if negotiations continue beyond the anniversary date, either party may give thirty (30) days' written notice to the other of its desire to terminate

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this Agreement. This Agreement will then terminate at the expiration of said thirty (30) unless the parties hereto, by mutual agreement extend this Agreement beyond the above termination date for a specific period for the continuance of negotiations.

2. It is agreed that on or after February 1, 1968, either party may open this Agreement for the sole purpose of negotiating a Formal Operating Training Program. If agreement is not reached within sixty (60) days after this re-opening, then this Agreement shall terminate as of the end of the sixty (60) day period unless by mutual consent the parties agree to an extension for the purpose of continuing negotiations.

B. It is recognized, however, by the parties that during the term of this Agreement it may become desirable to discuss wage rates in general (as set forth in Exhibit A) and hours and days of work (Article II. C.). For these purposes only, each party may open once upon written notice to the other, at least sixty (60) days, but not more than ninety (90) days, prior to January 1, 1969, and, once each contract year thereafter, to bargain on revisions in the light of conditions then existing. If Agreement is not reached by January 1, 1969, either party may give thirty (30) days' written notice of its desire to terminate this Agreement in which case the Agreement shall terminate as of the end of such thirty (30) day period unless by mutual consent the parties agree to an extension for the purpose of continuing negotiations.

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ARTICLE II
WORK DAY, WORK WEEK AND
WORK SCHEDULES

A. The established work week shall consist of seven (7) consecutive twenty-four (24) hour periods beginning with the No. 1 Shift Monday. The Monday No. 1 Shift is that shift which begins 11:00 p.m. Sunday for shift workers and 12:01 a.m. Monday for day workers.

B. 1. A work day is twenty-four (24) consecutive hours beginning at the same time each day. The first work day begins at the time the established work week begins, and the seventh work day ends at the time the established work week ends.

2. Normally, but not exclusively, the regular shift for day workers will be eight (8) consecutive hours, exclusive of an unpaid lunch period, between 6:00 a.m. and 6:00 p.m. as contrasted to shift workers who regularly work No. 1 Shift (11:00 p.m. to 7:00 a.m.), No. 2 Shift (7:00 a.m. to 3:00 p.m.) and No. 3 Shift (3:00 p.m. to 11:00 p.m.).

3. Day workers working a scheduled shift starting or ending outside of the hours of 6:00 a.m. to 6:00 p.m. shall be allowed a twenty (20) minute paid lunch period on the job site.

4. The unpaid lunch period for day workers will be from 12:00 noon to 12:30 p.m.,

when consistent with the work on hand. When an employee is required to work through his regular lunch period he shall be provided a different unpaid lunch period which shall be no more than one (1) hour earlier or later than the established lunch period. In addition, the Company shall allow a five (5) minute paid period prior to the lunch period for day workers to stop work, clean up, and travel to the lunch area.

C. 1. Employees are expected to be available for shift work and overtime. Work schedules specify the days in the work week and hours in the work day during which employees are to work. Each weekly work schedule consists of eight (8) consecutive hours, exclusive of unpaid lunch periods, on each of five (5) work days totaling forty (40) hours of work at the straight time rate within each work week with two (2) consecutive days off. Such schedules do not guarantee or limit the hours of work. The Company will post each employee's assignment to the weekly work schedule as far in advance as practicable consistent with work requirements. Notification of changes in the employee's work assignment will be posted as far in advance as practicable. Employees will review their work assignment before leaving the plant each work day.

2. Maintenance Division work schedules will include two (2) consecutive days off. However, in periods of shutdowns, work schedules may include split days off for those employees assigned to work in the Maintenance Division. The method of scheduling split days

off will be to combine one (1) of the days off with two (2) consecutive days off in an adjacent week.

ARTICLE III

WAGE RATES, OVERTIME AND OTHER PREMIUM PAY

A. Wage Rates, Exhibits, Shift Differentials

1. The wage rate classifications and present job titles applicable thereto are attached and made part hereof as Exhibit A. Employees will be paid for time worked in each classification to which assigned at not less than the job rate for the work performed, except for Helpers in the Maintenance Division who may be assigned work also performed by Mechanics.

2. a. Where an employee of an Operating Division works in two classifications in one (1) day, and works less than half ($\frac{1}{2}$) a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half ($\frac{1}{2}$) a day at the higher rate and the other half ($\frac{1}{2}$) day at the lower rate. If he works one-half ($\frac{1}{2}$) day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When during a shift an Operating Division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay.

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B. Overtime and Other Premium Pay

1. General — No more than one overtime or premium pay provision in this Agreement shall be applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. All work performed in excess of eight (8) hours in any work day, or forty (40) hours in the established work week shall be paid for at the overtime rate of one and one-half ($1\frac{1}{2}$) times the straight-time rate. For the purpose of determining time worked in excess of forty (40) hours in the established work week, the following shall count as time worked:

a. Scheduled work time lost on account of jury duty.

b. Scheduled work time off with full pay on account of sickness or holiday.

c. Scheduled work time off on account of leave of absence with pay.

3. One and one-half ($1\frac{1}{2}$) times the straight-time rate shall be paid for the hours worked under the following conditions:

a. Time worked in excess of eight (8) hours in any twenty-four (24) hour period, beginning at the time the employee begins work other than overtime as defined in III. B. 2. or double time as defined in III. B. 5.

b. When employees are scheduled to work a shift which may extend from one work day into the next, the employee involved will be paid at the rate of one and one-half ($1\frac{1}{2}$)

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times the straight-time rate for the hours worked on such employee's first off day, with such off day considered as starting at the beginning of the established work day as covered in Article II. B. 1.

c. For the first shift scheduled to be worked and worked where the scheduled hours of work have been changed as listed below without forty (40) hours' notice prior to the start of the first shift changed.

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an Operator who is working on an operating schedule, or a Laboratory employee who is working on the Laboratory schedule; i.e., change from Shift No. 1 to Shift No. 2, etc.

(3) A change of more than one (1) hour in the starting time from the preceding work day, of regular hours of work of a Maintenance and Storehouse Division worker, or of an Operator or Laboratory employee who is working on, going onto, or coming off a Maintenance schedule.

d. Compensation provided in Article III. B. 3. c. (3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular shift.

(2) When an employee changes to a day shift from any other shift.

4. "Call Out" — Any employee who reports for work after he has completed his shift and has left the plant, and before the

start of next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight-time rate or time and one-half for work performed, whichever is greater.

— Call Out — Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

5. Double time rate of two (2) times the straight-time rate shall be paid for:

a. All hours worked in excess of sixteen (16) consecutive hours; i.e., beginning on the 17th consecutive hour.

b. All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week. For the purpose of double time payment only, both off days will start at the beginning of the established work day as covered in Article II. B.

C. Distribution of Overtime

1. An effort will be made to distribute overtime except to those employees assigned to light duty for health reasons. Overtime in Operations will be worked by qualified employees normally assigned to work in the classification and section in which the overtime occurs. Overtime in Maintenance will be worked by employees qualified for the work. During shutdowns the Company may assign Operating, Laboratory, or Filling and Shipping employees on overtime to supplement the Maintenance force. For the purpose of identification, only the overtime hours worked or offered and refused, as defined under the provisions of Articles III. B. 2., III. B. 4., III. B. 5., will be counted as the basis for the distribution of overtime.

2. Any overtime worked or offered and refused by an employee at less than his basic rate will not be counted in the basis for the distribution of overtime.

D. Overtime Meals

1. The Company will provide a wholesome meal, not to exceed \$1.50 in cost, to each employee at his job location after he has completed more than ten (10) consecutive hours of work (unpaid lunch periods excluded) and after completion of each successive four (4) hours of work thereafter.

2. When the meal is furnished by the Company for Maintenance personnel, a work stop-

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page of thirty (30) minutes, at Company expense, will be allowed for eating.

3. An employee may elect to take a meal allowance of \$1.50 instead of a meal if his supervisor offers the employee that option in advance of the time a meal is due.

ARTICLE IV SENIORITY

A. For the purpose of administering this Article and Article V, seniority shall consist of three (3) types as follows:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery.

2. Division seniority, which shall be based on the last date Company assigns an employee permanently to a Division as defined in this Article.

3. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this Article.

B. For the purpose of this Article the recognized Divisions are:

1. Maintenance Division
2. Operating Division
3. Laboratory Division
4. Filling and Shipping Division

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C. For the purpose of this Article, the recognized Refinery Sections are:

1. Process Section
2. Tank Field Section
3. Storehouse Section
4. Electrical and Instrument Section
5. Machinist Section
6. Welding, Pipefitting, Boilermaking and Miscellaneous Section

D. No employee may establish or retain Division Seniority in more than one Division nor Section Seniority in more than one Section.

ARTICLE V

PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

EXHIBITS:

Attached to and made a part of this Agreement are "Exhibit B — Job Progression Chart, Maintenance Division," "Exhibit C — Job Progression Chart, Operating Division," and "Exhibit D — Job Progression Chart, Filling and Shipping and Laboratory Divisions," showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications. These exhibits are not intended for use in determining the number of basic jobs in these divisions, which are subject to change in accordance with the provisions of Article X.

A. Promotions

1. All promotions to classifications within the bargaining unit except as otherwise provided herein shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs. When a promotion is made and the employee is not the highest on the seniority list in the next applicable classification, any employee higher in that classification and eligible for consideration for such promotion shall be advised by the Company why he was not selected.

Operating Division

2. a. Promotions in the Operating Division (OB classification and higher) are made only when a basic job is permanently vacated and is still required, or when a new basic job is created. The number of employees assigned to each classification (OB and higher) is determined by the number of employees needed to fill each basic job in the classification. Except as provided for in Article V.C., once an employee is assigned a position on the seniority list, his name shall continue in the basic classification assigned even though he is ab-

sent for any reason and still retains his seniority. Employees will be arranged in the classification in the order of Operating Division seniority. Those employees assigned to the Operator Pool will be arranged on this list as covered in V. A. 3. in order of Operating Division seniority. Basic jobs (in OB classification and higher) are those which are determined by management to be essential to the anticipated requirement for efficient operation of the plant. The number of basic jobs in each classification may be revised by the Company from time to time to meet changing conditions, and the Union will be kept informed of such changes made in the number of basic jobs in the Operating Division. Swing jobs in all cases are basically classified at the lower of the two swing classifications.

b. All employees currently in the Stocks and Utilities Section and all basic OA's as of the date of signing this Agreement will be given an opportunity to indicate a preference consistent with the employee's basic classification for one of the new Operating Sections (Process or Tank Field). Assignments to these Operating Sections of the employees specified above will be made by the Company in accordance with the requests and in accordance with the employee's Operating Division seniority and ability. Such assignments will be made as soon as practicable consistent with operating requirements.

3. All men hired for operations will be hired at the Helper C rate in the Operator Pool and assigned in order of Operating Division

seniority. This rate will be effective for a period of twenty (20) work days, except in cases where men have become qualified and work an OB job in less than twenty (20) work days. After the initial twenty (20) day work period, he will be advanced to the Helper B classification. After one (1) year of Operating Division seniority he will be advanced to the Helper A classification. The OB rate will be paid for any OB work performed. All men assigned by the Company or transferred to the Operating Division by request will be assigned to the Operator Pool in order of Operating Division seniority. They will be paid at the Helper B rate if they have less than one year of Refinery seniority or at the Helper A rate if they have one year or more of Refinery seniority. After having worked in the OB classification, a man will be paid at his basic rate in the Operator Pool as covered in this section, or at the rate of the classification in which he works, whichever is higher.

4. Promotions to fill basic jobs in the OA classification in the Process Section and Tank Field Section will be made from the OB classification. After accepting a basic assignment of OA in one of the two progressional sections, he will progress only in that section. Employees accepting promotion to OA classification (or higher) in one of the two Operating Sections shall be placed on the Section Seniority List in order of Operating Division seniority. If a man is offered and turns down a basic assignment in the OA classification in the Process Section or the Tank Field Section he shall

not — at a later date — go ahead of the junior man that accepted the job in that classification or higher. If there is a vacancy in the classification at a later date, and he elects to accept it, he will take a position below the last man assigned to fill a basic job in the OA classification and will thereafter advance in that relative position.

5. Temporary vacancies due to illness, leaves of absence, etc., of one (1) to not more than thirty (30) calendar days' duration, and all vacancies due to vacations will be filled as determined by the Company in a manner that will give employees training in equal or higher classifications with the objective of suitably protecting current and future operations and providing opportunities for employees to gain experience in work of the same or higher classifications.

Nothing herein shall require the Company to pay an overtime or penalty rate to fill a temporary vacancy when a qualified employee is available for such work at no or less overtime or penalty pay.

6. In the event of an anticipated vacancy in excess of thirty (30) calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, assignments to fill such vacancies although not promotions, will be filled in accordance with the same procedure used in making promotions without changing basic classifications. However, none of the provisions in this Article nor in any other of the Articles in this Agreement is intended to ob-

ligate the Company to fill all vacancies in basic jobs whether permanent or temporary, when not required by operating conditions at the time.

7. Schedule changes will be made if necessary to assure that over any thirty (30) day period no junior employee will be assigned to work more shifts in the next higher classification than the senior qualified man in each classification and section. The senior qualified man is that employee qualified to work in the next higher classification, whose name is highest on the seniority list in each classification and section.

8. An Operator who is not promoted according to the Articles of this Agreement, because of his lack of ability, may be retained within his basic classification as long as there is a job that he can handle satisfactorily, but thereafter the Company shall not be required to consider such an employee for promotion to a higher classification, nor shall he be entitled to fill a temporary vacancy in a higher classification. In the event there are no jobs in his basic classification in which he can perform satisfactorily, he will be demoted to a lower classification. This will then become his new basic classification. The above assignments will be made in accordance with seniority provisions.

Maintenance Division

9. In the Maintenance Division, promotions from Helper B to Helper A and from Mechanic B to Mechanic A are to be made solely on the

basis of Maintenance Division seniority and not on the basis of performance of a higher or different classification of work. Helpers B will be promoted to Helpers A upon completion of twelve (12) months of service in the Maintenance Division. Mechanics B will be promoted to Mechanics A upon completion of:

- a. 12 months of service as Mechanic B, and
- b. 60 months of service in the Maintenance Division, including any service as Mechanic B.

10. a. The Company will maintain a minimum of 75% Mechanics A and B plus Senior Mechanics in the permanently assigned work force in the Maintenance Division (excluding Storehouse Section), provided there are employees who are qualified to be Mechanics.

b. Mechanics A will be promoted to Senior Mechanics upon completion of fifteen (15) years' Maintenance Division seniority, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

11. A maintenance Division employee will be assigned to a specific Maintenance Division Section (Machinist; Electrical and Instrument; Welding; Pipefitting; Boilermaking; Miscellaneous; Storehouse) as provided in Exhibit B, upon completion of the general portion of the Mechanic Training Program. He will establish Section seniority in the Section assigned. Section assignment as stated here shall not in any way interfere with the Company having an employee do any type of refinery

work that in the Company's judgment he can do safely.

12. Promotions within the Storehouse Section shall be based on seniority and ability. Seniority as used in this section refers to Storehouse Section seniority.

Laboratory Division

13. In the Laboratory, promotions from Technician Helper B to Technician Helper A are to be made solely on the basis of Laboratory Division seniority and not the basis of performance of a higher or different classification of work. Technician Helper B will be promoted to Technician Helper A upon the completion of 12 months of service in the Laboratory. Technician B will be promoted to Technician A upon completion of:

- a. 12 months of service as Technician B, and
- b. 36 months of service in the Laboratory, including any service as Technician B.

14. The Company will maintain a minimum of 60% Technicians of the total of Technicians plus Technician Helpers in the Laboratory Division, provided there are Technician Helpers who are qualified to be Technicians.

Filling and Shipping Division

15. Promotions within the Filling and Shipping Division shall be based on seniority and ability. Seniority as used in this division refers to Filling and Shipping Division seniority.

B. Layoffs and Rehiring

1. Layoffs for lack of work shall be based on refinery seniority. However, the Company may retain a sufficient number of men experienced and qualified to perform the necessary work in each division (Maintenance, Operating, Laboratory and Filling and Shipping) as necessary to permit continued efficient operation.

2. Employees with less than one (1) year's refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within ninety (90) calendar days after the last day worked.

3. Employees with more than one (1) year but less than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within one hundred eighty (180) calendar days after the last day worked.

4. Employees with more than five (5) years' refinery seniority, who are laid off for lack of work, will have seniority protection if rehired within three hundred sixty five (365) calendar days after the last day worked.

5. Men laid off due to lack of work will be offered re-employment when vacancies arise on the basis of their refinery seniority at the time of layoff, provided the seniority protection period as outlined above has not expired and that they are fully qualified to fill the vacancy.

6. Notice of available positions will be sent to employees on the layoff list by certi-

fied or registered mail, return receipt requested, to the last address left with the Company. An employee will be given five (5) days from the time the notice was received to advise the Company of acceptance and an additional five (5) days to report for work after advising the Company of his availability for work. An employee who fails to notify the Company or fails to report to work within the period specified loses all rights to seniority. The Company may grant an extension of time for an employee to report to work if he notifies the Company of sickness, death, or emergency involving himself or his immediate family within five (5) days of the date of the notice from the Company. Under emergency conditions, temporary employees may be used until former employees on the rehiring list have reported to work.

C. Demotions Operating Division

1. a. Demotions in the Operating Division (OB classification and higher) are made only when there is a reduction in the number of basic jobs. If the number of basic jobs is decreased the number of employees within the affected classifications (see V. A. 2.) will be decreased accordingly, and demotions will be made according to position on the division seniority list in each classification. Each demoted employee will be placed on the Seniority List at the new classification in accordance with his Operating Division seniority. Employees with one (1) or more years of senior-

ity who are demoted from the OB classification will be placed in the Helper A classification in the Operator Pool (see Exhibit C) in order of division seniority, and those with less than one (1) year of seniority will be placed in the Helper B classification in the Operator Pool in order of division seniority. The seniority lists will reflect these changes.

b. An employee who must be demoted from a basic classification because of deficiencies will be placed in a lower classification for which he is qualified and will establish a new relative seniority position of that classification in accordance with his Operating Division seniority. Any subsequent promotions will follow the provisions under V. A.

2. Temporary demotions of Operators in OB classification and above, because of seasonal shutdown of process units due to lack of stock or commitments, as determined by the Company, will be made as above, V. C. 1. a. However, they will be paid at the rate of the job in which they work except as covered in V. E. 4. of this Article. Employees temporarily demoted from the OA classification in one of the progressional sections (Process or Tank Field) may then be assigned to fill temporary vacancies (of either less than or more than 30 days), if qualified, in either of the sections. However, they will not be promoted to fill a basic job in other than the progressional section in which they are maintaining their section seniority. No employee may establish or retain section seniority in more than one progressional section.

Maintenance Division

3. Demotions in the Electrical and Instrument; Machinist; or Welding, Pipefitting, Boilermaking and Miscellaneous Sections are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified.

4. In making demotions in the Storehouse Section, position on the section seniority list in each classification shall control. Employees demoted out of the Storehouse Section will be assigned at not higher than the Helper A classification in the Maintenance Division.

Laboratory Division

5. Demotions within the Laboratory Division are made only due to an employee's deficiencies, in which case the employee is moved from his former job and is placed in a lower job for which he is qualified. Employees demoted out of the Laboratory Division due to a curtailment of work will be assigned to the Maintenance or Operating Divisions or the Filling and Shipping Division and will be assigned to a classification not higher than Helper A.

Filling and Shipping Division

6. Demotions within the Filling and Shipping Division are made (1) because of curtailment of work and a decrease in the number of basic jobs in which case the number of employees assigned within the affected clas-

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sifications is decreased accordingly, and (2) due to an employee's deficiencies, in which case the employee is moved from his former job and placed in a lower job for which he is qualified. Employees demoted out of the Filling and Shipping Division due to a curtailment of work will be assigned to the Maintenance, Operating, or Laboratory Division, and will be assigned to a classification not higher than Helper A.

D. Transfers

1. Transfers between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) may be made with Company approval. In all cases of permanent transfer between divisions, the transferring employee will enter the new division with division seniority dating from the date of entering the new division and will relinquish his former division and section seniority.

2. Temporary transfers may be made between Divisions (Maintenance, Operating, Laboratory and Filling and Shipping) for short periods of time as determined by the Company. Company records will clearly indicate the temporary nature of such transfers. In all cases of temporary transfer between divisions, the transferred employee will not acquire division seniority in the new division, but will retain and continue to accrue his division and section seniority in the division from which transferred. If any temporary transfer is later made permanent, the permanent date of transfer will be made retroactive to include

all continuous service in the new division subsequent to the temporary transfer and seniority in the new division will start with this date. The employee will relinquish his former division and section seniority.

E. General

1. An employee promoted to a higher classification and failing to perform satisfactorily in it, will be allowed to return to the classification previously held by him without loss of seniority. When an employee is not progressing or performing his work in a satisfactory manner, he will be so informed.

2. When employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a two (2) year period to the job that their seniority and ability would have entitled them to, had they remained in the bargaining unit. They shall be given seniority credit for the time they were outside the bargaining unit. An employee transferred or assigned outside the bargaining unit for more than twenty-four (24) months in any thirty (30) month period will lose his refinery seniority protection under this provision.

3. a. For all periods of break-in or other training work an Operating Division employee will be paid at the rate of the classification at which he is breaking in or the rate of his basic classification, whichever is higher. For the purpose of further training an employee in the next higher classification as a refresher, a man

basically assigned in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

b. When a situation arises in an operating unit, which in Management's judgment requires more than the regular complement of Operators to insure adequate coverage of all aspects of the operation, an employee will be assigned as extra help. The employee assigned as extra help will be paid on the same basis as he would have been paid for filling a vacancy in the job most closely related to the extra help work he is performing.

4. When an operating unit is shut down, the Operators affected will be assigned to other work, if other work is available, and their pay rates will be protected according to the following provisions:

a. When a plant is shut down for maintenance (repairs, cleaning, or inspection) the Operators affected will be assigned to other operating duties or to maintenance work. Their pay will be protected at their basic rate for twenty-eight (28) calendar days. At the end of this protection period they will be paid at the rate of the job to which they are assigned in accordance with Exhibit A.

b. When a plant is shut down either temporarily or permanently, because its operation is not required by the Company to meet its stock commitments the number of basic operating jobs will be decreased accordingly. Operators adversely affected will be demoted

under the provisions of Article V. C. However, their pay rates will be protected at their former basic rate for a period of twenty-eight (28) calendar days after which period their new basic assignment will determine their new basic wage rate for rate protection purposes.

5. When no other work is available for employees adversely affected by the shutting down of an operating unit as provided for in V. E. 4. above, the provisions of Article V. B. will apply.

6. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

7. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

ARTICLE VI

VACATIONS, HOLIDAYS, AND FRINGE BENEFITS

A. Vacations

1. A regular employee shall receive a vacation with pay after completion of one (1) year of continuous service and within each calendar year of continuous service thereafter.

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Beginning January 1, 1966, a regular vacation will be as follows:

In Each Calendar Year in Which an Employee Completes	Length of Vacation
1 year or more but less than 5 years of continuous service	2 weeks (14 consecutive calendar days)
5 years or more but less than 10 years of continuous service	3 weeks (21 consecutive calendar days)
10 years or more but less than 20 years of continuous service	4 weeks (28 consecutive calendar days)
20 years or more of continuous service	5 weeks (35 consecutive calendar days)

2. Operating needs of the Company are controlling in scheduling vacations. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two (2) periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. a. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veteran's Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

b. Employees who are working rotating shifts on a seven day work week continuous operation, and employees who normally work Saturday and/or Sundays, at the time

of a holiday will observe the holiday for pay purposes on the calendar day on which it falls.

c. All other employees will observe the holiday for pay purposes on the calendar day on which it falls, except a holiday which falls on Sunday will be observed on the following Monday, and a holiday which falls on Saturday will be observed on the preceding Friday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half (1½) times the straight time rate for all hours worked. For the purpose of holiday payments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four (24) hours later.

4. All regular employees shall receive eight (8) paid holidays per year. Those not so paid under the provisions of paragraph 2 and 3 above shall receive a day's pay at their regular straight-time rate for each such holiday except when a leave of absence is granted as covered under Article VII, B and C.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight-time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All employees' benefits in effect at the time of signing of this Agreement shall continue in full force and effect for the duration of this Agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend Court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

4. Employees with one or more years of continuous service who are permanently laid

off for lack of work will receive one week's pay at the straight-time rate for each year of continuous service up to a maximum of fifteen (15) weeks' pay for those employees having fifteen (15) or more years of continuous service. Employees with twenty-five (25) years or more of continuous service are not eligible for payment under this provision. Lay-off of employees occasioned by seasonal fluctuations in the business will not be considered permanent. When re-employed within the time limits specified in Article V, B. 2., 3., and 4., after lay-off and payments received under this section are repaid, seniority dates as of the date laid off will be restored.

ARTICLE VII

UNION ACTIVITIES

A. Workmen's Committee

The Union shall create a Workmen's Committee, composed of five (5) employees, who shall meet monthly at mutually acceptable times, with representatives of management for discussion of individual or mutual problems, and to dispose of questions arising under this Agreement. The Union will advise the Company in writing of the names of the members of said committee. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days' duration (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for the purpose of attending Union conferences or meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three (3) employees shall be granted simultaneous leaves. The conditions of such leaves with respect to Company benefits shall be as covered in each established plan. All requests for leaves of this nature shall be made in writing as far in advance as possible before the first scheduled work day that will not be worked by reason of such leave being granted. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two (2) years from date of start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period

from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two (2) years.

c. Applicant, if re-employed within said period of two (2) years, will enter the job that his seniority and ability would have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Conferences During Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

E. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII
MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four (4) pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

1. Employees in the bargaining unit may authorize the Company in writing on a form mutually acceptable to the Union and the Company to deduct while this Agreement is in effect the regular monthly dues of the Union from their wages on the first pay day each month and to remit same to the Secretary of Local No. 826, International Union of Operating Engineers AFL-CIO not later than two (2) weeks after the end of the payroll period in which the deduction is made. Employees may at any time revoke such authorization by giving the Company notice on a suitable form.

2. The Company will advise the Union with each remittance the names of employees from whom new authorizations have been included and those previously authorizing deductions but for whom no deductions have been made because of lack of earnings, revocations of authorization, or leave Company service. These authorizations will terminate upon the termination of this Agreement.

C. Payroll Deductions for Savings

Upon the written request of the employee, using Form COEM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Smoking Area

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. Contract Labor

1. The Company shall the right to contract or subcontract maintenance, repair or construction work to outside contractors.

2. The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment, available to perform such work properly.

3. However, when the Company is supplementing its maintenance force on a job with contractor employees, the Company shall not schedule a contractor employee more hours per day than a Company employee scheduled on that job.

F. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two (2) copies of the written record of this final warning. The additional copy may be provided the local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. Industrial Injury

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

H. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

I. Pay Day

Pay day for employees covered by this Agreement will be on or before the first Friday following the close of the pay period unless the Company is prevented from complying with this provision by circumstances beyond its control.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this Agreement shall promptly and personally, within five (5) days of the incident, attempt to adjust the matter with his foreman or appropriate supervisor.

This shall be done by a full and free discussion of the matter with the foreman or appropriate supervisor.

2. The foreman or appropriate supervisor will investigate the case, calling upon higher Management — if necessary — to aid him. He shall then give the employee an answer to his complaint, within five (5) days after receiving the complaint.

3. If the answer does not satisfy the employee, he shall so state and advise his foreman or appropriate supervisor, within five (5) days after receiving the answer, which of the following courses he wishes to pursue:

a. Have an authorized Union representative of his choice aid him in the presentation of his case to his foreman or appropriate supervisor. If this request is made, the foreman or appropriate supervisor shall specify the time, not to exceed five (5) calendar days from the time of the employee's request, and the place for such meeting; or

b. take the first step in presenting a grievance.

4. If, at the conclusion of the meeting specified in IX. A. 3. a. the employee is not satisfied, he shall so state and advise his foreman or appropriate supervisor that he is taking the first step in presenting a grievance.

5. The aggrieved employee shall, as the first step of the grievance procedure, attempt to adjust the grievance by an oral discussion with the head of his division; i.e., Operations

Superintendent, Chief Engineer or Superintendent-Process Engineering and Quality Control. The aggrieved employee may, if he so wishes, have an authorized Union representative of his choice present for such discussion. The time and place for this grievance discussion shall be designated by the appropriate Division Head and shall be held within five (5) days of the employee's request. The Union will be given the opportunity to have a representative present at the time an adjustment is given.

6. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee, within five (5) days thereafter, shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within five (5) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing, within five (5) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted or whether said decision shall be arbitrated.

7. If notice of arbitration is given, then within fifteen (15) days after the date of notice the Union shall advise the Company

in writing and the Company shall advise the Union in writing, the name of an arbitrator. The two arbitrators so appointed shall communicate within thirty (30) days of the date of the written request for arbitration and shall endeavor to reach an agreement. If these two arbitrators fail to reach an agreement, either party may, within forty-five (45) days of the written request for arbitration, notify the other in writing that they wish to select a third arbitrator, or the case shall be considered closed. If a third arbitrator is requested within the time limit, the two arbitrators shall endeavor to make a selection within sixty (60) days of the date of the written request for arbitration. Should they fail to reach an agreement on the third arbitrator they will jointly request of the Federal Mediation Service a list of five (5) names from which the third arbitrator shall be selected by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this Agreement; and shall not have authority to alter any of the terms of the Agreement.

D. 1. In calculating time under this Article, Saturdays, Sundays and holidays recognized under this Agreement shall not be counted. Time limitations specified herein shall ordinarily be applicable but may be extended by mutual agreement between the parties to the proceedings to take care of unusual cases such as illness or other justifiable absences.

2. The Company and Union will equally divide the expense of the third member, should any be incurred.

E. Where a grievance protests the discharge of an employee, the above procedure, A. 1. through A. 6. may be waived so as to permit the grievance to be referred directly to arbitration so long as this is done within ten (10) days after the discharge.

ARTICLE X MANAGEMENT RIGHTS

A. Subject to the provisions of this Agreement, the supervision and control of all operations and the direction of all working forces, such as the determination of the size of the work force; the right to hire, suspend, discipline and discharge for just cause; the establishment of work rules; the assignment of employees to jobs and assignment of duties to employees; are vested in the Company. It is agreed that the provisions of this Article shall not be exercised for the purpose of violating the terms of this Agreement.

B. Changes made by the Company in the

number of basic jobs in the Operating Division as a specific result of job activity surveys by the Company will not result in layoff of any of the Laboratory, Operating, Maintenance and Filling and Shipping employees covered by this Agreement and in Company employment as of August 1, 1961. This provision does not apply to any layoffs due to curtailment of work or shutdown of operating equipment or plants as a result of lack of stock or commitments, which are covered in Article V. B., or resulting from causes beyond the Company's control.

ARTICLE XI SAVING CLAUSE

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XII STRIKES AND LOCKOUTS

During the term of this Agreement there shall be neither strikes nor lockouts. Suspension of work or refusal to work on the part of any employee will make him subject to discharge provided, however, that the Union will not be liable for such suspension or refusal unless, upon request of the Company, it refuses to order the employees to return to work.

ARTICLE XIII NON-DISCRIMINATION

A. The Company and the Union agree that there shall be no discrimination against any employee because of race, color, creed or national origin.

B. 1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

ARTICLE XIV
PROCEDURE FOR
HANDLING NOTICES

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, certified or registered and postage paid, and addressed by one party to the other as follows:

Standard Oil Company of Texas

P. O. Box 20,002

El Paso, Texas 79998

Attn: Refinery Manager

International Union of Operating Engineers

Local No. 826

P. O. Box 9764

El Paso, Texas 79987

(Copy to:

P. O. Box 1590

Big Spring, Texas 79720)

IN WITNESS WHEREOF the parties
have caused this instrument to be executed
by their duly authorized representatives the
day and year first above written.

STANDARD OIL COMPANY OF TEXAS

R. W. Davis, Refinery Manager

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL NO. 826, AFL-CIO

Roy Watkins, President

Kenneth Howell, Secretary

Frank Parker, Business Manager
Local No. 826

NEGOTIATING COMMITTEE

J. L. Wilson, Chairman

R. K. Anderson, Secretary

R. R. Terrell, Committeeman

R. B. Hord, Committeeman

B. W. Cota, Committeeman

Committee, composed of four employees, who shall meet monthly at mutually acceptable times, with representatives of management for discussion of individual or mutual problems, and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen days duration (except where distances to be traveled require additional time, in which case not more than thirty days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than six employees, provided that not more than three employees shall be granted simultaneous leaves. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two years from date of

start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two years.

c. Applicant, if re-employed within said period of two years, will enter the job that his seniority and ability would have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Discrimination, Coercion or Intimidation

1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into

joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

E. Conferences during Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

F. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. Payroll Deductions for Savings

Upon written request of the employee, using Form TXM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Strikes and Lockouts

There shall be no cessation of work thru strikes or lockouts during the period of this

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agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work, and/or wage rates as provided in Article I and no agreement is reached within ninety days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

E. Smoking Areas

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

F. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment available to perform such work properly.

G. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the management will give

the employee two copies of the written record of this final warning. The additional copy may be provided the local union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

H. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

I. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of

employment as set forth in his agreement shall promptly and personally, within five days of the incident, attempt to adjust the matter with his foreman or appropriate supervisor. This shall be done by a full and free discussion of the matter with the foreman or appropriate supervisor.

2. The foreman or appropriate supervisor will investigate the case, calling upon higher management—if necessary—to aid him. He shall then give the employee an answer to his complaint, within five days after receiving the complaint.

3. If the answer does not satisfy the employee, he shall so state and advise his foreman or appropriate supervisor, within five days after receiving the answer, which of the following courses he wishes to pursue:

a. Have an authorized Union representative of his choice aid him in the presentation of his case to his foreman or appropriate supervisor. If this request is made, the foreman or appropriate supervisor shall specify the time, not to exceed five calendar days from the time of the employee's request, and the place for such meeting; or

b. Take the first step in presenting a grievance.

4. If, at the conclusion of the meeting specified in 3. a. the employee is not satisfied, he shall so state and advise his foreman or appropriate supervisor that he is taking the first step in presenting a grievance.

5. The aggrieved employee shall, as the first step of the grievance procedure, attempt to adjust the grievance by a verbal discussion with the appropriate Operations Division Superintendent or Maintenance General Foreman. The aggrieved employee may, if he so wishes, have an authorized Union representative of his choice present for such discussion. The time and place for this grievance discussion shall be designated by the Superintendent or General Foreman, and shall be held within five days of the employee's request. The Union will be given the opportunity to have a representative present at the time an adjustment is given.

6. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee, within five days thereafter, shall present in writing his case personally, or thru the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within five days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within five days from the date of which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted or whether said decision shall be arbitrated.

7. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within five days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within five days from receipt of notice by the Union of its intent to arbitrate. Within ten days after the Company notifies the Union of its arbitrator, both the Company and Union arbitrators will meet and attempt to select a third arbitrator. If unable to agree in this meeting to the third party, they will jointly request of the Federal Mediation Service a list of five names from which the third arbitrator shall be selected by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

D. 1. In calculating time under this article. Saturdays, Sundays and holidays recognized under this agreement shall not be counted. Time limitations specified herein shall ordinarily be applicable but may be extended by mutual agreement between the parties to the proceeding to take care of unusual cases such as illness or other justifiable absences.

2. The Company and Union will equally divide the expense of the third member, should any be incurred.

E. Where a grievance protests the discharge of an employee, the above procedure,

A. 1. thru A. 6., may be waived so as to permit the grievance to be referred directly to arbitration so long as this is done within ten days after the discharge.

ARTICLE X

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating Engineers,
Local No. 552

P. O. Box 5295
El Paso, Texas

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas
Attn: Refinery Manager

IN WITNESS WHEREOF the parties
have caused this instrument to be executed by
their duly authorized representatives the day
and year first above written.

INTERNATIONAL UNION OF
OPERATING ENGINEERS,
LOCAL NO. 552
R. C. Bowlin, President
J. E. Sims, Secretary

STANDARD OIL COMPANY OF TEXAS
J. H. Kitchen, Refinery Manager

EXHIBIT "A"
REFINERY CLASSIFIED OPERATING
AND MECHANICAL WAGE SCHEDULE

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$3.3900	\$27.12
Head Operator B	HOB	3.2737	26.19
Head Operator C	HOC	3.1562	25.25
Operator A	OA	3.0400	24.32
Operator B	OB	2.8637	22.91
Operator C	OC	2.5725	20.58

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MAINTENANCE DIVISION

Senior Mechanic	SM	3.2737	26.19
Mechanic A	MA	3.1562	25.25
Stockman A	SA	3.1562	25.25
Mechanic B	MB	2.8637	22.91
Stockman B	SB	2.8637	22.91
Stockman Helper A	SHA	2.6537	21.23
Helper A	HA	2.6537	21.23
Stockman Helper B	SHB	2.4675	19.74
Helper B	HB	2.4675	19.74
Helper C	HC	2.2537	18.03
Laborer	L	1.9837	15.87

FILLING & SHIPPING

Finished Stock Gauger	2.8637	22.91
Carloader Senior	2.8637	22.91
Carloader A	2.6537	21.23
Carloader B	2.4675	19.74
Helper C	2.2537	18.03

Shift workers who work any time other than
day shift will receive, in addition to the above
rates, 8c an hour for the afternoon shift, or 16c an
hour for the morning shift.

For all shifts of day workers starting or ending
outside the hours of 7:00 a.m. to 5:30 p.m., and for
all overtime hours worked, the applicable shift dif-
ferential shall be paid. Applicable shift differentials
are as follows: 8c per hour from 4:00 p.m. until
midnight, and 16c per hour from midnight until
8:00 a.m.

Mechanic Helpers enrolled in the Mechanic
Training Course and making satisfactory progress
shall receive, in addition to the Helper rate and
any applicable shift differential an achievement
training differential of \$0.50 per day after one year
from the date of enrollment, and \$1 per day after
two years from the date of enrollment.

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Exhibit B



EXHIBIT C.



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EXHIBIT "C"

PROGRESSION & TRANSFERS WITHIN THE OPERATING DIVISION

1. All men hired for Operations will be hired at the Helper "C" rate. This rate will be effective for a period of 20 work days, except in cases where men have become qualified and work on OB job in less than 20 work days, the OB rate will then be paid for any OB work performed.

2. After the initial 20 day work period, if the man is not working in an OB classification, he will be advanced to the Helper "B" rate.

3. After having worked in an OB classification, thereafter a man will be paid at the rate of his basic classification or at the rate of the classification in which he works, whichever is higher. An employee's basic classification or assignment is the classification in which he would be working full time provided there were no absences in classifications above for any reason. Swing jobs in all cases are basically classified at the lower of the two swing classifications.

4. For all periods of break-in or other training work, he will be paid at the rate of the classification at which he is breaking in or the rate of the classification in which he would have been working, whichever is higher. For the purpose of further training an employee in the next higher classification as a

refresher, a man in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

5. During periods when there is a temporary surplus of Operating manpower, operators may be required to work in the Maintenance Division. During this period they will be paid at the Helper "B" rate during their first year of Refinery service, and the OC rate after their first year of Refinery service, if their basic assignment is in the Operator Pool, and will be paid at the rate of their basic assignment if their basic assignment is OB or higher.

6. Permanent vacancies at the OB level will be filled by seniority from the Operator Pool. After receiving a basic assignment of OB in the Cracking Section below the OA level, or the combined progressional sections in the Light Oil Division below the OA level, a man will remain in the assigned section except that during the month of November each year he may request, in writing, a transfer to the other progressional section and receive a new basic OB assignment below the OA level, according to seniority, as soon thereafter as he is able to qualify by ability to hold such basic assignment.

7. Men will be promoted to fill permanent OA vacancies (Crude Distillation, Stocks & Utilities or Cracking) from the OB level in the progressional section to which he is as-

* *See Matthews - They put me job as "B" at 40 rate in the pool, after that they are paid at the break-in rate.*

signed, according to seniority and ability. After a man accepts a permanent basic assignment of OA in one of the three progressional sections, he will progress by seniority and ability only in that section. In the event he wishes to transfer to another section, he may do so at any time by making a written request to the Company and by taking a basic assignment (OB) just under the youngest basically assigned OB in that particular progressional section, and progress in this relative position.

8. Temporary vacancies of not more than 30 calendar days duration occasioned by illness, vacations, leaves of absence, etc. will be filled in one of the following manners:

a. An operator from the Operator Pool will be assigned to the OB job in the plant in which the vacancy is to occur. Then the senior men on shift in the plant will move up from the classification in which they are scheduled (as indicated by the progression chart which is part of this exhibit) if they are qualified to work the job. If, at some level there is an operator who is not qualified to work the next higher job, a junior man—if qualified—will be used to fill the vacancy.

b. By an operator, on the shift on which the vacancy occurs, who is qualified to relieve any job that will provide relief for the vacancy.

c. By schedule changes to be made to provide adequate qualified men.

9. Schedule changes shall be made if necessary to assure that the senior qualified man in each basic classification in each progressional section shall, over a period of one contract year, receive substantially more shifts of work in the next higher classification than any junior man in the same basic classification in the same progressional section.

10. In event of an anticipated vacancy in excess of 30 calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, such vacancies will be filled in accordance with the procedure used in filling permanent vacancies, without changing basic classifications.

11. Permanent vacancies — Promotions to fill any job, above the OB level, when such job is permanently vacated, will be in accordance with seniority and ability. If a man is offered and turns down a basic OA job in either progressional section in the Light Oil Division, he shall not—at a later date—go ahead of the junior man that accepted the job. If there is a vacancy in the classification at a later date, and he elects to accept it, he will take a position below the last man that filled a basic OA job and thereafter advance in that relative position.

12. An operator who is not promoted according to the articles of this Agreement, because of a written request by him or due to his lack of ability, may be retained on an assignment that he can handle satisfactorily,

but thereafter he shall not be considered for promotion, nor shall he be entitled to fill a temporary vacancy in a higher classification.

13. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

14. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

1959-1960

AGREEMENT

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

(A. F. of L.)

AND

(C. I. O.)

EL PASO, TEXAS

EL PASO  PRINTING COMPANY

PRINTED ON UNION MADE AND WATER MARKED PAPER

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 5th day of June, 1959 between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except laboratory, clerical, supervisory, administrative and technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 1, 1959 and shall remain in effect until February 23, 1960, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the

agreement, at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II

WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A work week shall consist of (7) consecutive 24-hour week-days starting at 11:00 P.M. Sunday, for shift workers, and 12:01 A.M. Monday for day workers.

B. A regular work day shall consist of eight (8) consecutive hours, exclusive of lunch periods, except as specifically provided for herein. Each regular work day is to start in a different 24-hour week day specified in A. above. The unpaid lunch

period for day workers will be from 11:30 a.m. to 12:00 Noon when consistent with the work on hand. The Company shall allow a five (5) minute paid period prior to the lunch period for day workers to stop work, clean up and travel to the lunch area. Normally, but not exclusively, the regular work day for day workers will be the day shift worked between the hours of 7:00 A.M. and 5:30 P.M. Day workers working a regular 8-hour work day starting or ending outside the hours 4:00 A.M. to 8:30 P.M. shall be allowed a fifteen (15) minute paid lunch period on the job site plus an additional five (5) minutes for clean up and travel to their respective lunches on the job.

Day workers are those who normally work day shift as contrasted to shift workers who regularly work No. 1 shift—11:00 P.M. to 7:00 A.M., No. 2 shift—7:00 A.M. to 3:00 P.M., and No. 3 shift—3:00 P.M. to 11:00 P.M.

C. A regular weekly work schedule shall consist of five (5) regular work days, with two consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc., whether paid or unpaid) on regular scheduled work days shall count as days worked. The Company will establish and post regular weekly work schedules, consistent with operating requirements. The regular weekly work schedule of day workers shall show the hours of work, days of work, and the days off. Such weekly work schedules shall be posted not later than 3:30 P.M. on the Friday prior to the week in which they are to become effective.

ARTICLE III
WAGE RATES, OVERTIME AND
EXTRA COMPENSATION

A. Wage Rates, Exhibits, Shift
Differentials

1. Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A," or any wage rate or classification mutually agreed to hereafter.

2. a. Where an employee of an Operating Division works in two classifications in one day, and works less than half a day in the classification carrying a higher rate than the classification in which he works the balance of day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When an Operating Division employee, regularly employed in a higher pay bracket, is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

B. Overtime, Extra Compensation and
Other Premium Pay

1. a. Overtime rate (1-½ times the regular rate), except as specified below in b. and c., shall be paid for all work performed outside of or in excess of the regular weekly work schedule ("K") time).

b. Overtime rate (2 times the regular rate) shall be paid for:

(1) All hours worked in excess of sixteen (16) consecutive hours; i.e. beginning on the 17th consecutive hour ("K-D" time).

(2) All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, and these off days are consecutive calendar days but need not fall within the same work week ("K-D" time). For the purposes of double time payment only, both off days will start at 12:01 A.M. and end at 12:00 midnight the same day, except for employees whose shifts start at 11:00 P.M., 7:00 A.M., or 3:00 P.M. for whom both off days will start at 11:00 P.M. and end at 11:00 P.M. the next day.

c. Any employee required to report and who reports for work after he has completed his shift and has left the plant and before the start of his next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight time rate or time and one-half for work performed, whichever is the greater. For further clarification of the above, the following is to further identify a "call out".

(1) An employee, while on duty, is requested to report for work and reports

for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that in "2" the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

The above payments shall be referred to as "Q" time and shall be paid as provided herein except he shall be paid at "double time" rate where b. above applies.

2. a. Extra compensation ($\frac{1}{2}$ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular scheduled work day, under the following conditions:

(1) Time worked in excess of eight (8) hours in any twenty-four (24) hour period, other than overtime as defined in 1.a. and b. above ("N" time).

(2) When employees are scheduled to work a shift which may extend from one calendar day into the next, the employee involved will be paid at the overtime rate for the hours worked on such employee's first off day, with such off day considered as starting at 12:01 A.M. for day workers and 11:00 P.M. for shift workers.

(3) For the first shift scheduled to be worked and worked where the regular work day has been changed as listed below without 40 hours notice prior to the

start of the first shift changed ("M" time).

(a) A change in the scheduled days off.

(b) A change in the scheduled shifts; i.e., change from shift No. 1 to shift No. 2, etc.

(c) A change of more than one hour in the starting time from the preceding work day, of the regular day of a Maintenance and Storehouse Division worker.

(4) Compensation provided in (c) above shall not be paid because of:

(a) Consecutive hours worked preceding or following a regular work day.

(b) When an employee changes to a day shift from any other shift.

C. Distribution of Overtime

1. An effort will be made to distribute overtime equally among employees qualified in the classification and section in which the overtime occurs. Any employee who is to be absent from his assigned shift shall notify the Company as far in advance of such absence as possible.

2. To give effect to paragraph 1 above, as applied to refinery operators, the following procedures will be observed:

a. The operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the operators referred to above have already worked the afternoon shift on their first scheduled days off in their regular weekly work schedules, or

(3) Where the Company has more than eight (8) hours' advance notice of the absence, or

(4) Where there is an operator on the vacated shift who can be made available and who is qualified to relieve any job that will provide relief for the vacancy.

(5) In either (1), (2) or (3) above, the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

D. Overtime Meals

1. When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal not to cost over \$3 in place of two separate meals at \$1.50 each. Company may also, at its option, provide

employee with a meal allowance of \$1.50 in place of the meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company expense, will be allowed for eating.

ARTICLE IV

SENIORITY

A. For the purpose of administering this article, and Article V, seniority of two types shall be considered as stated below:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery; and

2. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized refinery sections are:

1. Light Oil
2. Stocks & Utilities
3. Catalytic Cracking
4. Thermal Cracking
5. Filling & Shipping
6. Storehouse
7. Electrical & Instruments
8. Machinist and Tool Room
9. Welding
10. Pipefitting, Boilermaking and Miscellaneous

ARTICLE V

PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this agreement are "Exhibit B,"—Job Progression Chart, Maintenance and Storehouse; and "Exhibit C"—Job Progression Chart, Operating Sections, showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications)

A. Promotions

1. All promotions, demotions, placement of men displaced by job terminations, and all filling of permanent vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there may be individuals who, thru lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the section seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by management (in advance when possible) why such employee

was not selected for such promotion; except that this notification shall not be necessary in the Operating Sections for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Sections.

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a 2-year period to the job that their seniority and ability would have entitled them to, had they remained in the refinery organization.

5. In the Maintenance Division, promotions from Helper "B" to Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of refinery service and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon completion of twelve (12) months of service in the Refinery Maintenance Division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months of service as Mechanic "B," and

b. 60 months of service in the Refinery Maintenance Division, including any service as Mechanic "B."

6. a. The Company will maintain a minimum of 60% overall Mechanic to

Helper ratio in the Maintenance Division, provided there are Mechanic Helpers who are qualified to be Mechanics.

b. Mechanics "A" will be promoted to Senior Mechanics upon completion of 15 years refinery service, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

B. Layoffs and Rehiring

1. Layoffs for lack of work, and rehiring shall be based on refinery seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one year and less than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their refinery seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of

sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the military service. Under emergency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. Demotions

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the section seniority list shall control within each section and the employee with the least section seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the section seniority list of the rate classification to which demoted and shall be the first to advance to the classification from which demoted.

2. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he shall—at his request—be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater refinery seniority than the employee whose demotion would result therefrom. The new position in the new section seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the

new section, the transferred employee shall retain his position in the new section according to his refinery seniority.

D. Inter-Section Status

1. For the purpose of administration of Articles IV and V, all Maintenance and Storehouse employees will be assigned to a specific refinery section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability, as provided in Exhibit B. Section assignment as stated here shall not in any way interfere with Company having employee do any type of refinery work that in Company's judgment he can do safely.

2. Transfers between sections may be made with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with section seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire section seniority in the new section nor lose acquired section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the seniority list will so indicate, and the provisions of par. 2. above will apply, except as provided in the last sentence of par. 1 section C. above.

ARTICLE VI
VACATIONS, HOLIDAYS AND
FRINGE BENEFITS

A. Vacations

1. Employees who have completed one year's service with Company shall be given two weeks vacation with pay each calendar year. In the tenth calendar year and in each calendar year thereafter, employees will be given three weeks vacation with pay. In the twentieth calendar year and in each calendar year thereafter, employees will be given four weeks vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veterans' Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on Sunday,

the Monday immediately following shall be observed as the holiday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half times the straight time rate for all hours worked. For the purposes of holiday payments, holidays will be considered as starting at 12:01 A.M. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 P.M., 7:00 A.M., or 3:00 P.M. shifts, holidays will be considered starting at 11:00 P.M. prior to the calendar day of the holiday and ending at 11:00 P.M. twenty-four (24) hours later.

4. All regular employees shall receive eight paid holidays per year. Those not so paid under the provisions of paragraph 2. and 3. above, shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All benefit plans, arranged by the Company for its employees, generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years service, an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

ARTICLE VII

UNION ACTIVITIES

A. Workman's Committee

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three employees shall be granted simultaneous leaves. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two years from date of start of such leave, will be considered and accepted on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two years.

c. Applicant, if re-employed within said period of two years, will enter the job that his seniority and ability would

have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Discrimination, Coercion or Intimidation

1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

E. Conferences during Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

F. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of

posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. Payroll Deductions for Savings

Upon written request of the employee,

using Form TXM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Strikes and Lockouts

There shall be no cessation of work thru strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work, and/or wage rates as provided in Article I and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

E. Smoking Areas

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

F. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment available to perform such work properly.

G. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand

FILLING AND SHIPPING

Finished Stock Gauger.....	\$3.01	\$24.03
Carloader Senior	3.01	24.08
Carloader A.....	2.79	22.32
Carloader B.....	2.59	20.72
Helper C.....HC	2.37	18.96

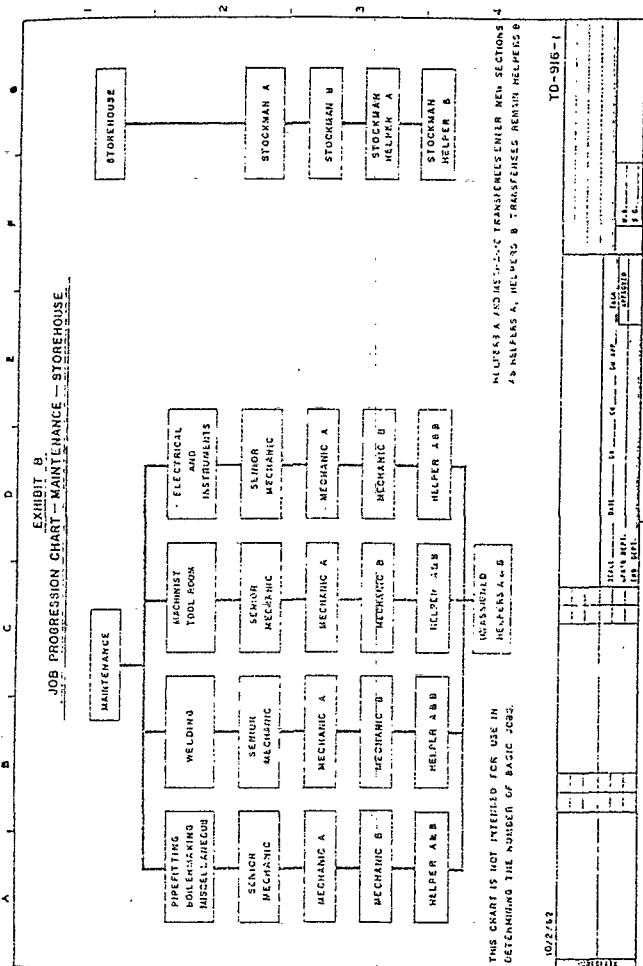
LABORATORY

Technician A.....TA	\$3.16	\$25.28
Technician B.....TB	3.00	24.00
Technician Helper A.....THA	2.35	22.80
Technician Helper B.....THB	2.78	22.24
Bottlewasher.....BW	2.37	18.96

Shift workers who work any time other than day shift will receive, in addition to the above rates, 8c an hour for the afternoon shift, or 16c an hour for the morning shift.

For all shifts of day workers starting or ending outside the hours of 7:00 a.m. to 5:30 p.m., and for all overtime hours worked, the applicable shift differential shall be paid. Applicable shift differentials are as follows: 8c an hour from 4:00 p.m. until midnight, and 16c per hour from midnight until 8:00 a.m.

Mechanic Helpers enrolled in the Mechanic Training Course and making satisfactory progress shall receive, in addition to the Helper rate and any applicable shift differential an achievement training differential of \$0.50 per day after one (1) year from the date of enrollment, and \$1 per day after two (2) years from the date of enrollment.



a man in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

5. During periods when there is a temporary surplus of Operating manpower, operators may be required to work in the Maintenance Division. During this period they will be paid at the Helper "B" rate during their first year of refinery service, and the OC rate after their first year of refinery service, if their basic assignment is in the Operator Pool, and will be paid at the rate of their basic assignment if their basic assignment is OB or higher.

6. Permanent vacancies at the OB level will be filled by seniority from the Operator Pool. After receiving a basic assignment of OB in the Cracking Section below the OA level, or the combined progressional sections in the Light Oil Division below the OA level, a man will remain in the assigned section except that during the month of November each year he may request, in writing, a transfer to the other progressional section and receive a new basic OB assignment below the OA level, according to seniority, as soon thereafter as he is able to qualify by ability to hold such basic assignment.

7. Men will be promoted to fill permanent OA vacancies (Crude Distillation, Stocks & Utilities or Cracking) from the OB level in the progressional section to which he is assigned, according to seniority and ability. After a man

accepts a permanent basic assignment of OA in one of the three progressional sections, he will progress by seniority and ability only in that section. In the event he wishes to transfer to another section, he may do so at any time by making a written request to the Company and by taking a basic assignment (OB) just under the youngest basically assigned OB in that particular progressional section, and progress in this relative position.

8. Temporary vacancies of not more than thirty (30) calendar days duration occasioned by illness, vacations, leaves of absence, etc. will be filled in one of the following manners:

a. An operator from the Operator Pool will be assigned to the OB job in the plant in which the vacancy is to occur. Then the senior men on shift in the plant will move up from the classification in which they are scheduled (as indicated by the progression chart which is part of this exhibit) if they are qualified to work the job. If, at some level there is an operator who is not qualified to work the next higher job, a junior man—if qualified—will be used to fill the vacancy.

b. By an operator, on the shift on which the vacancy occurs, who is qualified to relieve any job that will provide relief for the vacancy.

c. By schedule changes to be made to provide adequate qualified men.

9. Schedule changes shall be made if necessary to assure that the senior qualified man

in each basic classification in each progressional section shall, over a period of one contract year, receive substantially more shifts of work in the next higher classification than any junior man in the same basic classification in the same progressional section.

10. In event of an anticipated vacancy in excess of thirty (30) calendar days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, such vacancies will be filled in accordance with the procedure used in filling permanent vacancies, without changing basic classifications.

11. Permanent vacancies—Promotions to fill any job, above the OB level, when such job is permanently vacated, will be in accordance with seniority and ability. If a man is offered and turns down a basic OA job in either progressional section in the Light Oil Division, he shall not—at a later date—go ahead of the junior man that accepted the job. If there is a vacancy in the classification at a later date, and he elects to accept it, he will take a position below the last man that filled a basic OA job and thereafter advance in that relative position.

12. An operator who is not promoted according to the articles of this agreement, because of a written request by him or due to his lack of ability, may be retained on an assignment that he can handle satisfactorily, but thereafter he shall not be considered for pro-

motion, nor shall he be entitled to fill a temporary vacancy in a higher classification.

13. Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of the Company. Such movement will be done consistent with operating requirements.

14. All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

1961-1962

AGREEMENT

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 10

(A. F. of L.)

AND

(C. I. O.)

EL PASO, TEXAS

CHEV B8 7185

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1961-1962

AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS

and

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

El Paso, Texas

THIS AGREEMENT is made and entered into this 7th day of Sept. between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except laboratory, clerical, supervisory, administrative and technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 1, 1961 and shall remain in effect until February 28, 1962, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the agreement, at least sixty days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing at least sixty days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II

WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A work week shall consist of seven consecutive 24-hour week-days, starting at 11:00 p.m. Sunday, for shift workers, and 12:01 a.m. Monday for day workers.

B. A regular work day shall consist of eight consecutive hours, exclusive of lunch periods, except as specifically provided for herein. Each regular work day is to start in a different 24-hour week day specified in A. above. The unpaid lunch period for day workers will be from 11:30 a.m. to 12:00 noon when consistent with the work on hand. The Company shall allow a five minute paid period prior to the lunch period for day workers to stop work, clean up and travel to the lunch area. Normally, but not exclusively, the regular work day for day workers will be the day shift worked between the hours of 7:00 a.m. and 5:30 p.m. Day workers working a regular 8-hour work day starting or ending outside the hours 4:00 a.m. to 8:30 p.m. shall be allowed a fifteen minute paid lunch period on the job site plus an additional five minutes for clean up and travel to their respective lunches on the job.

Day workers are those who normally work day shift as contrasted to shift workers who regularly work No. 1 shift—11:00 p.m. to 7:00 a.m., No. 2 shift—7:00 a.m. to 3:00 p.m., and No. 3 shift—3:00 p.m. to 11:00 p.m.

C. A regular weekly work schedule shall consist of five regular work days, with two consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc., whether paid or unpaid) on regular scheduled work days shall count as days worked. The Company will establish and post regular weekly work schedules, consistent with operating requirements. The regular weekly work schedule of day workers shall show the hours of work, days of work, and the days off. Such weekly work schedules shall be posted not later than 3:30 p.m. on the Friday prior to the week in which they are to become effective.

ARTICLE III

WAGE RATES, OVERTIME AND EXTRA COMPENSATION

A. Wage Rates, Exhibits, Shift Differentials

1. Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A", or any wage rate or classification mutually agreed to hereafter.

2. a. Where an employee of an Operating Division works in two classifications in one day, and works less than half a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day

at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When an Operating Division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

B. Overtime, Extra Compensation and Other Premium Pay

1. General

No more than one premium or overtime provision in this agreement shall be applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. Extra Compensation ($\frac{1}{2}$ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular scheduled work day, under the following conditions:

a. Time worked in excess of eight hours in any 24-hour period, other than overtime as defined in 3.a. and 4. below ("N" time).

b. When employees are scheduled to work a shift which may extend from one calendar day into the next, the employee involved will be paid at the overtime rate for the hours worked on such employee's first off day, with such off day considered as starting at 12:01 a.m. for day workers and 11:00 p.m. for shift workers.

c. For the first shift scheduled to be worked and worked where the regular work day has been changed as listed below without forty hours notice prior to the start of the first shift changed ("M" time).

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an operator who is working on an operating schedule; i.e., change from shift No. 1 to shift No. 2, etc.

(3) A change of more than one hour in the starting time from the preceding work day, of the regular day of a Maintenance and Storehouse Division worker, or of an operator who is working on, going onto, or coming off a maintenance schedule.

d. Compensation provided in (3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular work day.

(2) When an employee changes to a day shift from any other shift.

3. Overtime rate (1½ times the regular rate) shall be paid for:

a. All work performed outside of, or in excess of, the regular weekly work schedule ("K" time), except as specified in b. and 4. below.

b. "Call out"—Any employee who reports for work after he has completed his shift and has left the plant, and before the start of his next regular scheduled shift or on a day off, shall be paid a minimum of four hours pay at his straight time rate or time and one-half for work performed, whichever is greater.

Call Out—Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

The payments shall be referred to as "Q" time and shall be paid as provided herein except a man shall be paid at "double time" rate where 4. below applies.

4. Overtime rate (2 times the regular rate) shall be paid for:

a. All hours worked in excess of sixteen

consecutive hours; i.e., beginning on the 17th consecutive hour ("K-D" time).

b. All hours worked on the second day off, where a minimum of four hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week ("K-D" time). For the purpose of double time payment only, both off days will start at 12:01 a.m. and end at 12:00 midnight the same day, except for employees whose shifts start at 11:00 p.m., 7:00 a.m., or 3:00 p.m. for whom both off days will start at 11:00 p.m. and end at 11:00 p.m. the next day.

5. Extra Compensation (straight time for hours scheduled, plus $1\frac{1}{2}$ times for hours worked).

a. Employees who work on an observed holiday shall receive $1\frac{1}{2}$ times the straight time rate for all hours worked in addition to straight time, for the number of hours in their regular daily work schedule. See Article VI.B.3.

C. Distribution of Overtime

1. An effort will be made to distribute overtime equally among employees qualified in the classification and section in which the overtime occurs, except those assigned to light duty for health reasons. Any employee who is to be absent from his assigned shift shall notify the Company as far in advance of such absence as possible.

2. To give effect to paragraph 1. above, as applied to refinery operators, the following procedures will be observed:

a. The operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the operators referred to above have worked more than twelve hours in the preceding twenty-four hours, or

(2) Where the operators referred to above have already worked the afternoon shift on their first scheduled days off in their regular weekly work schedules, or

(3) Where the Company has more than eight hours advance notice of the absence, or

(4) Where there is an operator on the vacated shift who can be made available and who is qualified to relieve any job that will provide relief for the vacancy.

D. Overtime Meals

1. When employees are required to work overtime more than two hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon completion of the first two hours of such overtime and at intervals of each four hours

of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal to cost not over \$3, in place of two separate meals at \$1.50 each. The employee shall, if he prefers, be provided with a meal allowance of \$1.50 in place of the second meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty minutes, at Company expense, will be allowed for eating.

ARTICLE IV SENIORITY

A. For the purpose of administering this article, and Article V, seniority of two types shall be considered as stated below:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery; and

2. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized refinery sections are:

1. Crude Distillation
2. Stocks & Utilities
3. Cracking

4. Filling & Shipping
5. Storehouse
6. Electrical and Instruments
7. Machinists and Tool Room
8. Welding
9. Pipefitting, Boilermaking and Miscellaneous

ARTICLE V PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this agreement are "Exhibit B,—Job Progression Chart, Maintenance and Storehouse," and "Exhibit C—Job Progression Chart, Operating Sections," showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications.)

A. Promotions

1 All promotions, demotions, placement of men displaced by job terminations, and all filling of permanent vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there may be individuals who, thru lack of knowledge, skill or efficiency on the job, are

not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the section seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by management (in advance when possible) why such employee was not selected for such promotion; except that this notification shall not be necessary in the Operation Sections for promotions made in accordance with "Exhibit C, Job Progression Chart—Operating Sections."

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a 2-year period to the job that their seniority and ability would have entitled them to, had they remained in the Refinery organization.

5. In the Maintenance Division, promotions from Helper "B" to Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of refinery service

and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon completion of twelve months of service in the Refinery Maintenance Division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months of service as Mechanic "B", and

b. 60 months of service in the Refinery Maintenance Division, including any service as Mechanic "B".

6. a. The Company will maintain a minimum of 75% overall Mechanic to Helper ratio in the Maintenance Division, provided there are Mechanic Helpers who are qualified to be Mechanics.

b. Mechanics "A" will be promoted to Senior Mechanics upon completion of 15 years refinery service, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

B. Layoffs and Rehiring

1. Layoffs for lack of work, and rehiring shall be based on refinery seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one year and less than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their refinery seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the military service. Under emergency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. Demotions

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the section seniority list shall control within each section and the em-

ployee with the least section seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the section seniority list of the rate classification to which demoted and shall be the first to advance to the classification from which demoted.

2. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he shall—at his request—be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater refinery seniority than the employee whose demotion would result therefrom. The new position in the new section seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his refinery seniority.

D. Inter-Section Status

1. For the purpose of administration of Articles IV and V, all Maintenance and Store-

house employees will be assigned to a specific refinery section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability, as provided in Exhibit B. Section assignment as stated here shall not in any way interfere with Company having employee do any type of refinery work that in Company's judgment he can do safely.

2. Transfers between sections may be made with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with section seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire section seniority in the new section nor lose acquired section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the seniority list will so indicate, and the provisions of par. 2. above will apply, except as provided in the last sentence of par. 1 section C. above.

ARTICLE VI VACATIONS, HOLIDAYS AND FRINGE BENEFITS

A. Vacations

1. Employees who have completed one year's service with Company shall be given two weeks vacation with pay each calendar year. In the tenth calendar year and in each calendar year thereafter, employees will be given three weeks vacation with pay. In the twentieth calendar year and in each calendar year thereafter, employees will be given four weeks vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. The following holidays shall be observed:

New Year's Day	Memorial Day
Washington's Birthday	Fourth of July

*ie pay for "H" when half pay day before +
day after - Per DWS. 9/4/61*

- | | |
|---------------|------------------|
| Labor Day | Thanksgiving Day |
| Veterans' Day | Christmas |

If any of these holidays falls on Sunday, the Monday immediately following shall be observed as the holiday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half times the straight time rate for all hours worked. For the purposes of holiday payments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four hours later.

4. All regular employees shall receive eight paid holidays per year. Those not so paid under the provisions of paragraph 2. and 3. above, shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay

WDS

at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All benefit plans, arranged by the Company for its employees, generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years service, an annual statement showing the employee's current status under the Sickness and Non-Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

ARTICLE VII
UNION ACTIVITIES

A. Workman's Committee

The Union shall create a Workman's

EXHIBIT A **REFINERY CLASSIFIED LABORATORY, OPERATING AND MECHANICAL WAGE SCHEDULE**

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$3.93	\$31.44
Head Operator B	HOB	3.81	30.48
Head Operator C	HOC	3.67	29.36
Operator A	OA	3.54	28.32
Operator B	OB	3.35	26.80
Helper A	HA	3.12	24.96
Helper B	HB	2.90	23.20
Helper C	HC	2.66	21.28

MAINTENANCE DIVISION

Senior Mechanic	SM	3.81	30.48
Mechanic A	MA	3.67	29.36
Mechanic B	MB	3.35	26.80
Helper A	HA	3.12	24.96
Helper B	HB	2.90	23.20
Helper C	HC	2.66	21.28
Laborer	L	2.35	18.80

STOREHOUSE SECTION

Stockman A	SA	3.67	29.36
Stockman B	SB	3.35	26.80
Stockman Helper A	SHA	3.12	24.96
Stockman Helper B	SHB	2.90	23.20

FILLING AND SHIPPING DIVISION

Lead Carloader	LCL	3.67	29.36
Finish Stock Guager	FSG	3.35	26.80
Carloader Senior	CLS	3.35	26.80
Carloader A	CLA	3.12	24.96
Carloader B	CLB	2.90	23.20
Helper C	HC	2.66	21.28

LABORATORY DIVISION

Technician A	TA	3.51	28.08
Technician B	TB	3.33	26.64
Technician Helper A	THA	3.18	25.44
Technician Helper B	THB	3.11	24.88
Bottle Washer	BW	2.66	21.28

Shift workers who work any time other than day shift will receive, in addition to the above rates, 10c an hour for

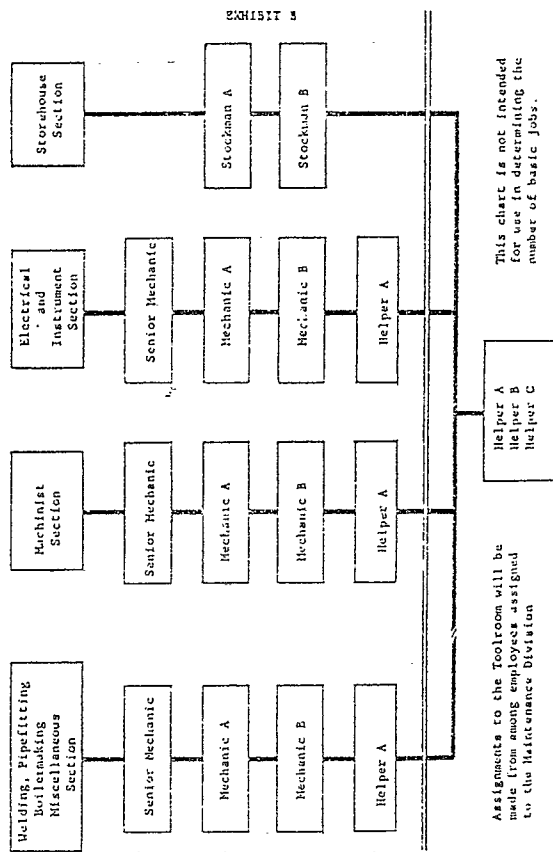
the No. 3 afternoon shift, or 20c an hour for the No. 1 morning shift.

For all shifts of day workers starting or ending outside the hours of 6:00 a.m. to 6:00 p.m., the applicable shift differential shall be paid. Applicable shift differentials are as follows: 10c an hour from 4:00 p.m. until midnight, and 20c per hour from midnight until 8:00 a.m. When an employee works under conditions that entitle him to a shift differential and also to an overtime or premium rate, the shift differential will be computed at the applicable overtime or premium rate.

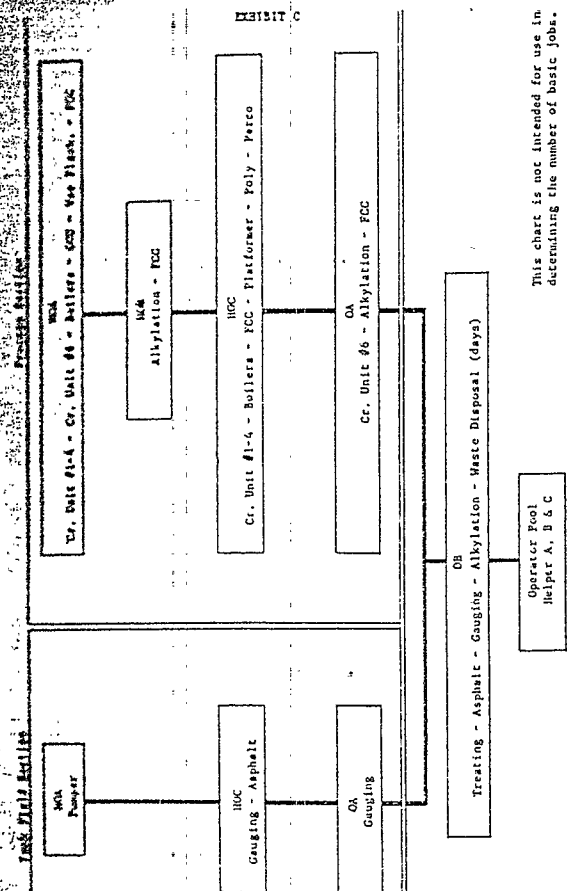
Mechanic Helpers in the Mechanic Training Program making satisfactory progress shall receive, in addition to the Helper rate and any applicable shift differential, an achievement training differential of 6c per hour after completing 50% of the "general" portion and an additional 7c per hour after completing 100% of the "general" portion of the program.

EXHIBIT B

JOB PROGRESSION CHART - MAINTENANCE DIVISION



-48-

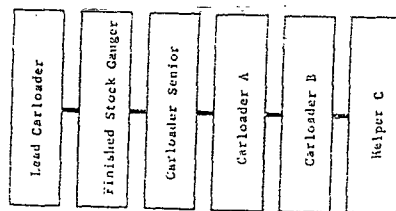


-49-

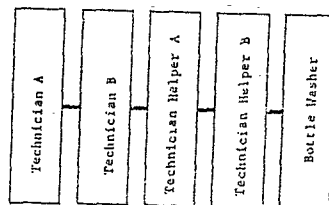
EXHIBIT D

JOB PROGRESSION CHARTS

LOADING & SHIPPING DIVISION



LABORATORY DIVISION



These charts are not intended for use in determining the number of basic jobs.

E

18-2/3 Expansion Joint @ Stack

7

1

1

A.
OM

CHEV B8 7159

JOB FCC SHUTDOWN

DATE 6/22/67

DRG. No. _____ SHEET _____

ORDER No. B/M-C-7530

APPRO. JOB No. 7560-407

TH WANSFIELD 355 MATERIAL REQ'D AT DEST'N BY 3/3/67 DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1		PIECE 2' WIDE X 40' LONG ASBESTOS CLOTH W/ WIRE WOVEN IN TYPE MP 3010-AA, GR A.A., 70% ASBESTOS, 3M OR EQUAL	
			WILL ACCEPT TWO 20' LONG PIECES	
			J. H. Mansfield	

CHEV B8 7160

CHEV B8 7160

SHEET / OF / SHEETS

MF0 334 175M.2 3
PROHIBU TO 27

MAIL ALL
RESPON-
SE TO
PURCHASE
3 STORES

- ☐ P. O. BOX 599, DENVER, COLORADO 80201
- ☐ P. O. BOX 117, SALT LAKE CITY, UTAH 84110
- ☐ P. O. BOX 20002, EL PASO, TEXAS 79998
- ☐ EL PASO, TEXAS

JUNE 22, 1967

FORWARD INVOICES IN QUADRUPPLICATE TO:
P. O. BOX 599
DENVER, COLORADO 80201

EPR- 27818

OW FULL
ME AND
ADDRESS

ISSUING POINT
GEORGE S. TROXON COMPANY INC.
P. O. BOX 17
EL PASO, TEXAS
DATE
JULY 3, 1967
DATE REQUIRED AT DESTINATION

PREFIX AND ORDER NUMBER
ORDER NUMBERS WITH PREFIX MUST
APPEAR ON ALL PACKAGES, SHIPPING
ORDERS AND INVOICES.

ITEM NO.	QUANTITY	DESCRIPTION OF MATERIAL	QUAN. REC.	PRICE
1	1 ONLY	PIECE 2' WIDE X 40' LONG ASBESTOS CLOTH W/WIRE WOVEN IN, TYPE MP-3010-AA, GR. A.A., 90% ASBESTOS, JUNIOR JM OR EQUAL. WILL ACCEPT TWO 20' LONG PIECES.		

SHIP TO AND MARK
ALL PACKAGES AND
BILLS OF LADING

DESTINATION
F.O.B.
Standard Oil Company of Texas
EPR-27818
ATTENTION OF T. H. MANSFIELD
REFINERY STOREHOUSE
SHOW PREFIX AND ORDER NUMBER ON BILL OF LADING
DESTINATION 6501 Trowbridge, P. O. Box 20002, El Paso, Texas

SHIP VIA
DATE RECEIVED
RECEIVED VIA
ALLIED BY
RT. BILL DATE
RT. BILL NO.
AR NO.
BILL OF MATERIAL NO.
INVOICE OR TRANSFER NO.
INVOICE DATE
REGISTER NO.
AMOUNT
DATE PAID
ACCOUNT NO.
FEA. LOCATION PLANT AREA BULK PLANT ITEM FIELD SRV. STATION LEASE APPROPRIATION
48360 001

☐ CHARGES COLLECT. ENDORSE BILL OF LADING
"Collect from Chevron Oil Company, P. O. Box 599, Denver, Colorado 80201 or at Carriers Option and Expense Draw Sight Drafts on First National Bank of Denver."

J. E. RIDLER

915-772-1411 269

DESCRIBE MATERIAL USE IF
CODING BLOCKS NOT APPLICABLE

CHEV B8 7161

1952-1953

A GREEN

REVIEW

CALIFORNIA OIL COMPANY

WESTERN OIL COMPANY

CORPORATION

STANDARD OIL COMPANY

OF TEXAS

INTERNATIONAL OIL COMPANY

OPERATING COMPANY

LOCAL UNION NO. 100

LOCAL

EL PASO OIL COMPANY

LOCAL

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1963-1964

AGREEMENT

between

CALIFORNIA OIL COMPANY

d/b/a

STANDARD OIL COMPANY OF TEXAS

and

INTERNATIONAL UNION OF

OPERATING ENGINEERS

LOCAL UNION NO. 552

El Paso, Texas

This AGREEMENT is made and entered into this 8th day of May, 1963 between California Oil Company, d/b/a Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union." This agreement shall be considered to be the entire agreement between the parties, and no agreement which predates this agreement shall have any other force or effect.

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative for the purpose of collective bargaining with respect to wages, hours of work and other conditions of employment, of employees in the Maintenance, Operating

and Laboratory Divisions of the Company's El Paso Refinery for whom the Union was certified as the collective bargaining representative in the National Labor Relations Board certifications dated May 7, 1943 (Case No. 16-R-629) and August 31, 1953 (Case No. 33-RC-453), subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 30, 1963 and shall remain in effect until March 30, 1964, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the agreement, at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II

WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A work week shall consist of seven (7) consecutive 24-hour week-days, starting at 11:00 p.m. Sunday for shift workers, and 12:01 a.m. Monday for day workers.

B. A regular work day shall consist of eight (8) consecutive hours, exclusive of lunch periods, except as specifically provided for herein. Each regular work day is to start in a different 24-hour week day specified in A. above. The unpaid lunch period for day workers will be from 11:30 a.m. to 12:00 noon when consistent with the work on hand. The Company shall allow a five (5) minute paid period prior to the lunch period for day workers to stop work, clean up and travel to the lunch area. Normally, but not exclusively, the regular work day for day workers will be the day shift worked between the hours of 7:00 a.m. and 5:30 p.m. Day workers working a regular 8-hour work day starting or ending

outside the hours 4:00 a.m. to 8:30 p.m. shall be allowed a fifteen (15) minute paid lunch period on the job site plus an additional five (5) minutes for cleanup and travel to their respective lunches on the job.

Day workers are those who normally work day shift as contrasted to shift workers who regularly work No. 1 shift—11:00 p.m. to 7:00 a.m.; No. 2 shift—7:00 a.m. to 3:00 p.m.; and No. 3 shift—3:00 p.m. to 11:00 p.m.

C. A regular weekly work schedule shall consist of five (5) regular work days, with two (2) consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc. whether paid or unpaid) on regular scheduled work days shall count as days worked. The Company will establish and post regular weekly work schedules, consistent with operating requirements. The regular weekly work schedule of day workers shall show the hours of work, days of work, and the days off. Such weekly work schedules shall be posted not later than 3:30 p.m. on the Friday prior to the week in which they are to become effective.

ARTICLE III

WAGE RATES, OVERTIME AND EXTRA COMPENSATION

A. Wage Rates, Exhibits, Shift Differentials

1. Wage rates shall be those for work per-

formed in the Company's present job classifications, set forth as Exhibit "A", or any wage rate or classification mutually agreed to hereafter.

2. a. Where an employee of an Operating division works in two classifications in one (1) day, and works less than half ($\frac{1}{2}$) a day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half ($\frac{1}{2}$) a day at the high rate and the other half ($\frac{1}{2}$) day at the lower rate. If he works one-half ($\frac{1}{2}$) day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When an Operating division employee is called upon to relieve a man in a lower classification, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

B. Overtime, Extra Compensation and Other Premium Pay

1. General—No more than one premium or overtime provision in this agreement shall be

applied to the same hours worked; however, the provision which results in the highest pay shall govern.

2. Extra Compensation ($\frac{1}{2}$ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular scheduled work day, under the following conditions:

a. Time worked in excess of eight (8) hours in any 24-hour period, other than overtime as defined in 3.a. and 4. below ("N" time).

b. When employees are scheduled to work a shift which may extend from one calendar day into the next, the employee involved will be paid at the overtime rate for the hours worked on such employee's first off day, with such off day considered as starting at 12:01 a.m. for day workers and 11:00 p.m. for shift workers.

c. For the first shift scheduled to be worked and worked where the regular work day has been changed as listed below without forty (40) hours notice prior to the start of the first shift changed ("M" time).

(1) A change in the scheduled days off.

(2) A change in the scheduled shifts of an Operator who is working on an operating schedule, or a Laboratory employee who is working on the Laboratory schedule: i.e., change from shift No. 1 to shift No. 2, etc.

(3) A change of more than one (1) hour in the starting time from the preceding work

day, of the regular day of a Maintenance and Storehouse division worker, or of an Operator or Laboratory employee who is working on, going onto, or coming off a maintenance schedule.

d. Compensation provided in (3) above shall not be paid because of:

(1) Consecutive hours worked preceding or following a regular work day.

(2) When an employee changes to a day shift from any other shift.

3. Overtime rate ($\frac{1}{2}$ times the regular rate) shall be paid for:

a. All work performed outside of, or in excess of, the regular weekly work schedule ("K" time), except as specified in b. and 4. below.

b. "Call out"—Any employee who reports for work after he has completed his shift and has left the plant; and before the start of his next regular scheduled shift or on a day off, shall be paid a minimum of four (4) hours pay at his straight time rate or time and one-half for work performed, whichever is greater.

Call Out—Identification

(1) An employee, while on duty, is requested to report for work and reports for work after completing his shift, but before the start of his next regular scheduled shift, and leaves the plant prior to the start of his next regular scheduled shift.

(2) An employee, after completing his shift and after leaving the plant, is requested to return and returns to the plant before the start of his next regular scheduled shift. It is agreed that the time and one-half rate shall not apply beyond the start of his next regular scheduled shift.

The payments shall be referred to as "Q" time and shall be paid as provided herein except a man shall be paid at "double time" rate where 4. below applies.

4. Overtime rate (2 times the regular rate) shall be paid for:

a. All hours worked in excess of sixteen (16) consecutive hours; i.e., beginning on the 17th consecutive hour ("K-D" time).

b. All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, when these off days are consecutive calendar days but not necessarily within the same work week ("K-D" time). For the purpose of double time payment only, both off days will start at 12:01 a.m. and end at 12:00 midnight the same day, except for employees whose shifts start at 11:00 p.m., 7:00 a.m., or 3:00 p.m. for whom both off days will start at 11:00 p.m. and end at 11:00 p.m. the next day.

5. Extra Compensation (straight time for hours scheduled, plus $1\frac{1}{2}$ times for hours worked).

a. Employees who work on an observed

holiday shall receive $1\frac{1}{2}$ times the straight time rate for all hours worked in addition to straight time, for the number of hours in their regular daily work schedule. See Article VI.B.3.

C. Distribution of Overtime

1. An effort will be made to distribute overtime equally among employees qualified in the classification and section in which the overtime occurs, except those assigned to light duty for health reasons. Any employee who is to be absent from his assigned shift shall notify the Company as far in advance of such absence as possible.

2. To give effect to paragraph 1. above, as applied to refinery operators, laboratory technicians and technician helpers, the following procedures will be observed:

a. The employee handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the employees referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the employees referred to above have already worked the afternoon shift on

their first scheduled days off in their regular weekly work schedules, or

(3) Where the Company has more than eight (8) hours advance notice of the absence, or

(4) Where there is an employee on the vacated shift who can be made available and who is qualified to relieve any job that will provide relief for the vacancy.

D. Overtime Meals

1. When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six (6) hours overtime, Company may provide him with one meal to cost not over \$3, in place of two separate meals at \$1.50 each. The employee shall, if he prefers, be provided with a meal allowance of \$1.50 in place of the second meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company expense, will be allowed for eating.

ARTICLE IV SENIORITY

A. For the purpose of administering this article, and Article V, seniority of two types shall be considered as stated below:

1. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery; and

2. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized refinery sections are:

1. Crude Distillation
2. Stocks & Utilities
3. Cracking
4. Filling & Shipping
5. Storehouse
6. Electrical & Instruments
7. Machinists and Tool Room
8. Welding
9. Pipefitting, Boilermaking & Miscellaneous
10. Laboratory

ARTICLE V PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this agreement are "Exhibit B—Job Progression

Chart, Maintenance and Storehouse," and "Exhibit C—Job Progression Chart, Operating Sections," showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications. These exhibits are not intended for use in determining the number of basic jobs in the Operating or Maintenance divisions which are subject to change in accordance with the provisions of Article X.)

A. Promotions

1. All promotions, demotions, placement of men displaced by job terminations, and all filling of permanent vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there may be individuals who, thru lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the section seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for considera-

tion for such promotion will be advised by management (in advance when possible) why such employee was not selected for such promotion; except that this notification shall not be necessary in the Operation sections for promotions made in accordance with "Exhibit C, Job Progression Chart—Operating Sections."

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a two (2) year period to the job that their seniority and ability would have entitled them to, had they remained in the refinery organization.

5. In the Maintenance division, promotions from Helper "B" to Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of refinery service and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon completion of twelve (12) months of service in the Refinery Maintenance division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months of service as Mechanic "B", and

b. 60 months of service in the Refinery

Maintenance division, including any service as Mechanic "B".

6. a. The Company will maintain a minimum of 75% overall Mechanic to Helper ratio in the Maintenance division, provided there are Mechanic Helpers who are qualified to be Mechanics.

b. Mechanics "A" will be promoted to Senior Mechanics upon completion of 15 years refinery service, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

7. Promotions from Technician Helper "B" to Technician Helper "A" are to be made solely on the basis of Laboratory service, and not on the basis of performance of a higher or different classification of work. Technician Helper "B" will be promoted to Technician Helper "A" upon the completion of 12 months of service in the Laboratory. Technician "B" will be promoted to Technician "A" upon the completion of:

a. 12 months of service as Technician "B", and

b. 36 months of service in the Laboratory, including any service as Technician "B".

8. The Company will maintain a minimum of 60% overall Technician-to-Technician Helper ratio for the Laboratory as a whole, provided there are Technician Helpers who are qualified to be Technicians.

B. Layoffs and Rehiring

1. Layoffs for lack of work, and rehiring shall be based on refinery seniority.

2. Regular employees with less than one (1) year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one (1) year and less than five (5) years of continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five (5) years of continuous service, who are laid off for lack of work, will have continuous service if rehired within one (1) year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their refinery seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten (10) days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five (5) days. This does not apply to men who are replacing men in the military service. Under emergency

conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. Demotions

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the section seniority list shall control within each section and the employee with the least section seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the section seniority list of the rate classification to which demoted and shall be the first to advance to the classification from which demoted.

2. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he shall — at his request — be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater refinery seniority than the employee whose demotion would result therefrom. The new position in the new section seniority list shall be at the bottom of the rate classification to which

transferred, except that in event of layoffs because of lack of work in the new section, the transferred employee shall retain his position in the new section according to his refinery seniority.

D. Inter-Section Status

1. For the purpose of administration of Articles IV and V, all Maintenance and Storehouse employees will be assigned to a specific refinery section within one (1) year of date of employment in Company's Refinery. Section assignment will be made by Company based on workload, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability, as provided in Exhibit B. Section assignment as stated here shall not in any way interfere with Company having employee do any type of refinery work that in Company's judgment he can do safely.

2. Transfers between sections may be made with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with section seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire section seniority in the new sec-

tion nor lose acquired section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the seniority list will so indicate, and the provisions of par. 2. above will apply, except as provided in the last sentence of par. 1. section C. above.

ARTICLE VI

VACATIONS, HOLIDAYS AND FRINGE BENEFITS

A. Vacations

1. Employees who have completed one (1) year of service with Company shall be given (2) weeks vacation with pay each calendar year. In the tenth (10th) calendar year and in each calendar year thereafter, employees will be given three (3) weeks vacation with pay. In the twentieth (20th) calendar year and in each calendar year thereafter, employees will be given four (4) weeks vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The vacation scheduling procedure is designed to apply to usual situations. An exceptional case may occur occasionally which is not clearly covered or contemplated. Any such case will be treated in a manner equitable to both the employee and the Company.

3. An employee may split his vacation into two (2) periods in a calendar year upon his request, consistent with the work at hand, and agreed to by the Company.

B. Holidays

1. a. The following holidays shall be observed:

New Year's Day	Labor Day
Washington Birthday	Veterans' Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

b. Employees who are working rotating shifts on a seven day work week continuous operation, and employees who normally work Saturdays and/or Sundays, at the time of a holiday will observe the holiday for pay purposes on the calendar day on which it falls.

c. All other employees will observe the holiday for pay purposes on the calendar day on which it falls, except a holiday which falls on Sunday will be observed on the following Monday, and a holiday which falls on Saturday will be observed on the preceding Friday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half ($1\frac{1}{2}$) times the straight time rate for all hours worked. For the purposes of holiday pay-

ments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four (24) hours later.

4. All regular employees shall receive eight (8) paid holidays per year. Those not so paid under the provisions of par. 2. and 3. above shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All benefit plans, arranged by the Company for its employees, generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sickness and Non-

Industrial-Injury Benefit Plan when requested in writing.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

ARTICLE VII UNION ACTIVITIES

A. Workmen's Committee

The Union shall create a Workmen's Committee, composed of five (5) employees, who shall meet monthly at mutually acceptable times, with representatives of management for discussion of individual or mutual problems, and to dispose of questions arising under this agreement. The Union will advise the Company in writing of the names of the members of said committee. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen

(14) days duration (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for the purpose of attending Union conferences or meetings will be granted during any calendar year to not more than six (6) employees, provided that not more than three (3) employees shall be granted simultaneous leaves. If the Union needs leaves of absence for additional men, the Company will consider such additional leaves upon request by the Union.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two (2) years from date of start of such leave, will be considered and accepted, on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two (2) years.

c. Applicant, if re-employed within said period of two (2) years, will enter the job that his seniority and ability would have entitled him to had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Discrimination, Coercion or Intimidation

1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

— 2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

E. Conferences during Working Hours

Employees, with the approval of the Refinery Manager, shall be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

F. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII

MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four (4) pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company

shall remit same to the secretary of Local Union No. 552 not later than two (2) weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. Payroll Deductions for Savings

Upon written request of the employee, using Form COEM-519, the Company will make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Strikes and Lockouts

There shall be no cessation of work thru strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work, and/or wage rates as provided in Article I and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

E. Smoking Areas

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

F. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment available to perform such work properly.

G. Reprimands

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the management will give the employee two (2) copies of the written record of this final warning. The additional copy may be provided the local union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

H. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue

working, will be paid for the unworked remainder of an eight hour day at the rate of pay he was receiving at the time of injury.

I. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this agreement shall promptly and personally, within five (5) days of the incident, attempt to adjust the matter with his foreman or appropriate supervisor. This shall be done by a full and free discussion of the matter with the foreman or appropriate supervisor.

2. The foreman or appropriate supervisor will investigate the case, calling upon higher

management—if necessary—to aid him. He shall then give the employee an answer to his complaint, within five (5) days after receiving the complaint.

3. If the answer does not satisfy the employee, he shall so state and advise his foreman or appropriate supervisor, within five (5) days after receiving the answer, which of the following courses he wishes to pursue:

a. Have an authorized Union representative of his choice aid him in the presentation of his case to his foreman or appropriate supervisor. If this request is made, the foreman or appropriate supervisor shall specify the time, not to exceed five (5) calendar days from the time of the employee's request, and the place for such meeting; or

b. take the first step in presenting a grievance.

4. If, at the conclusion of the meeting specified in 3.a. the employee is not satisfied, he shall so state and advise his foreman or appropriate supervisor that he is taking the first step in presenting a grievance.

5. The aggrieved employee shall, as the first step of the grievance procedure, attempt to adjust the grievance by an oral discussion with the head of his division; i.e., Operations Superintendent, Chief Engineer or Superintendent-Process Engineering & Quality Control. The aggrieved employee may, if he so wishes, have an authorized Union representative of his choice present for such discussion.

The time and place for this grievance discussion shall be designated by the appropriate Division Head and shall be held within five (5) days of the employee's request. The Union will be given the opportunity to have a representative present at the time an adjustment is given.

6. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee, within five (5) days thereafter, shall present in writing his case personally, or thru the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within five (5) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within five (5) days from the date of which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted or whether said decision shall be arbitrated.

7. If notice of arbitration is given, then within fifteen (15) days after the date of notice the Union shall advise the Company in writing and the Company shall advise the Union in writing, the name of an arbitrator. The two arbitrators so appointed shall communicate within thirty (30) days of the date of the written request for arbitration and shall

endeavor to reach an agreement. If these two arbitrators fail to reach an agreement, either party may, within forty-five (45) days of the written request for arbitration, notify the other in writing that they wish to select a third arbitrator, or the case shall be considered closed. If a third arbitrator is requested within the time limit, the two arbitrators shall endeavor to make a selection within sixty (60) days of the date of the written request for arbitration. Should they fail to reach an agreement on the third arbitrator they will jointly request of the Federal Mediation Service a list of five (5) names from which the third arbitrator shall be selected by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

D. 1. In calculating time under this article, Saturdays, Sundays and holidays recognized under this agreement shall not be counted. Time limitations specified herein shall ordinarily be applicable but may be extended by

mutual agreement between the parties to the proceeding to take care of unusual cases such as illness or other justifiable absences.

2. The Company and Union will equally divide the expense of the third member, should any be incurred.

E. Where a grievance protests the discharge of an employee, the above procedure, A.1. thru A.6. may be waived so as to permit the grievance to be referred directly to arbitration so long as this is done within ten (10) days after the discharge.

ARTICLE X

A. Subject to the provisions of this agreement, the supervision and control of all operations and the direction of all working forces, such as the determination of the size of the work force; the right to hire, suspend, discipline and discharge for just cause; the establishment of work rules; the assignment of employees to jobs and assignment of duties to employees; are vested in the Company. It is agreed that the provisions of this article shall not be exercised for the purpose of violating the terms of this agreement.

B. Changes made by the Company in the number of basic jobs in the Operating sections as a specific result of job activity surveys by the Company will not result in layoff of any of the laboratory, operating, maintenance and filling and shipping employees covered by this

agreement and in Company employment as of August 1, 1961. This provision does not apply to any layoffs due to curtailment of work or shutdown of operating equipment or plants as a result of lack of stock or commitments, which are covered in Article V.B., or resulting from causes beyond the Company's control.

ARTICLE XI

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XII

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating Engineers
Local No. 552
P. O. Box 9764
El Paso 87. Texas

Standard Oil Company of Texas
P. O. Box 20002
El Paso 98. Texas
Attn. Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

INTERNATIONAL UNION OF OPERATING ENGINEERS LOCAL NO. 552

D. W. Jones, President

R. K. Anderson, Secretary

STANDARD OIL COMPANY OF TEXAS

C. W. Kitto, Refinery Manager

EXHIBIT "A"

REFINERY CLASSIFIED LABORATORY, OPERATING AND MECHANICAL

WAGE SCHEDULE

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A.....	HOA	\$3.56	\$23.48
Head Operator B.....	HOB	3.44	27.52
Head Operator C.....	HOC	3.31	26.48
Operator A.....	OA	3.19	25.52
Operator B.....	OB	3.01	24.08
Operator C.....	OC	2.70	21.60

MAINTENANCE DIVISION

Senior Mechanic	SM	\$3.44	\$27.52
Mecanic A.....	MA	3.31	26.48
Stockman A.....	SA	3.31	26.48
Mechanic B.....	MB	3.01	24.08
Stockman B.....	SB	3.01	24.08
Helper A.....	HA	2.79	22.32
Stockman Helper A.....	SHA	2.79	22.32
Helper B.....	HB	2.59	20.72
Stockman Helper B.....	SHB	2.59	20.72
Helper C.....	HC	2.37	18.96
Laborer.....	L	2.08	16.64

is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the management will give the employee two copies of the written record of this final warning. The additional copy may be provided the local union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

H. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight (8) hour day at the rate of pay he was receiving at the time of injury.

I. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discrimi-

minatory treatment with respect to his conditions of employment as set forth in this agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his foreman or appropriate supervisor. This shall be done by a full and free discussion of the matter, and the foreman or appropriate supervisor will investigate the circumstances if not himself sufficiently familiar with the case, and will call upon higher management, if necessary, to aid him. If, at the conclusion of the discussion with his foreman or appropriate supervisor he is not satisfied, the employee shall so state and advise his foreman or appropriate supervisor that he is taking the first step in presenting a grievance.

2. The aggrieved employee shall, as the first step of the grievance procedure, attempt to adjust the grievance by a verbal discussion with the appropriate Operations Division Superintendent or Maintenance General Foreman. The aggrieved employee may, if he so wishes, have an authorized Union representative of his choice present for such discussion. The time and place of such discussion shall be designated by the Superintendent or General Foreman. The Union will be given the opportunity to be present at the time an adjustment is given.

3. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or thru the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee,

if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted or whether said decision shall be arbitrated.

4. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven (7) days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expense of the third member, should any be incurred.

5. If agreement on the third arbitrator cannot be reached within fourteen (14) days, the Federal Mediation and Conciliation Service shall be asked to submit a list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on

all parties. In such cases, the Company and the Union shall furnish the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

ARTICLE X

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operatnig
Engineers, Local No. 552
P. O. Box 5295
El Paso, Texas
Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

INTERNATIONAL UNION OF
OPERATING ENGINEERS,
LOCAL UNION NO. 552

W. P. Jackson, President
Arles D. Offutt, Secretary

STANDARD OIL COMPANY OF TEXAS
J. H. Kitchen, Refinery Manager

EXHIBIT "A"

REFINERY CLASSIFIED OPERATING AND MECHANICAL WAGE SCHEDULE

Operating Division

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$3.2287	\$25.83
Head Operator B	HOB	3.1175	24.94
Head Operator C	HOC	3.0062	24.05
Operator A	OA	2.8950	23.16
Operator B	OB	2.7275	21.82
Operator C	OC	2.4500	19.60

Maintenance Division

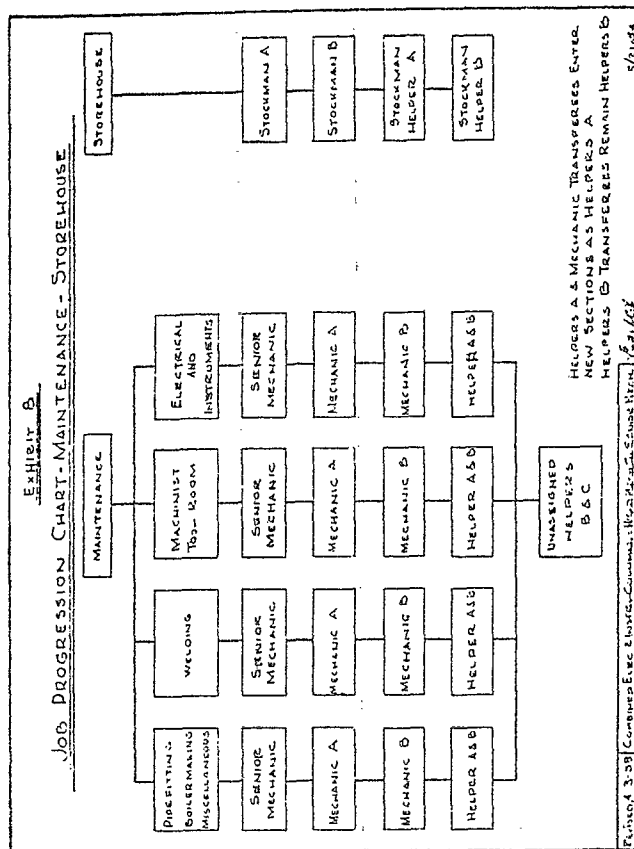
Senior Mechanic	3.1175	24.94
Mechanic A	3.0062	24.05
Stockman A	3.0062	24.05
Mechanic B	2.7275	21.82
Stockman B	2.7275	21.82
Stockman Helper A	2.5275	20.22
Helper A	2.5275	20.22
Stockman Helper B	2.3500	18.90
Helper B	2.3500	18.90
Helper C	2.1462	17.17
Laborer	1.8887	15.11

Filling and Shipping

Finished Stock Gauger	2.7275	21.82
Carloader Senior	2.7275	21.82
Carloader A	2.5275	20.22
Carloader B	2.3500	18.90
Helper C	2.1462	17.17

Shift workers who work any time other than day shift will receive, in addition to the above rates, 8c an hour for the afternoon shift, or 16c an hour for the morning shift.

For all shifts of day workers starting or ending outside the hours of 7:00 A.M. to 5:30 P.M., and for all overtime hours worked, the applicable shift differential shall be paid. Applicable shift differentials are as follows: 8c per hour from 4:00 P.M. until midnight and 16c per hour from midnight until 8:00 A.M.



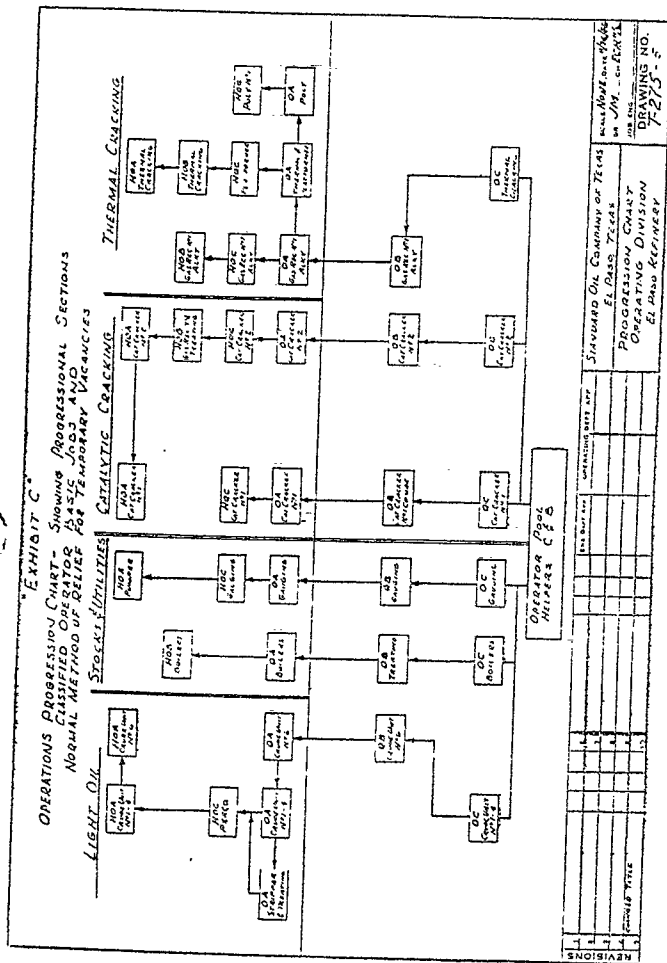


EXHIBIT "C" PROGRESSION & TRANSFERS WITHIN THE OPERATING DIVISION

All men hired for Operations will be hired at the Helper "C" rate. This rate will be effective for a period of 20 work days, except in cases where men have become qualified and work an OC job in less than 20 work days, the OC rate will then be paid for any OC work performed.

After the initial 20 day work period, if the man is not working in an OC classification, he will be advanced to the Helper "B" rate.

After having worked in an OC classification, thereafter a man will be paid at the rate of his basic classification or at the rate of the classification at which he is working, whichever is higher. An employee's basic classification or assignment is the classification in which he would be working full time provided there were no absences in classifications above for any reason. Swing jobs in all cases are basically classified at the lower of the two swing classifications.

For all periods of break-in or other training work, he will be paid at the rate of the classification at which he is breaking in or the rate of the classification in which he would have been working, whichever is higher. For the purpose of further training an employee in the next higher classification as a refresher, a man in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

During periods when there is a tempo-

vacancy in the classification at a later date, and he elects to accept it, he will take a position below the last man that filled a basic OA job and thereafter advance in that relative position.

When a man requests and is therefore given a permanent plant assignment, he forfeits all future rights to a higher job in the same progressional section except the higher job in the plant in which he requests to remain.

A man, at his written request to the Company, will be allowed to remain on any permanent assignment without progression to higher jobs. A man who has failed to be promoted, either at his request or by virtue of lack of ability, shall if he requests and is qualified for promotion at a later date and a vacancy occurs, be promoted into the job with seniority placement below the least senior man in that basic classification, and shall thereafter advance in that relative position.

Lateral training at all levels in a progressional section will be given to all operators who agree to such training and who are satisfactorily performing their duties in their plant assignment. Such training will be done consistent with Operating requirements.

Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of both the man and the Company.

All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

1958-1959

AGREEMENT

BETWEEN

STANDARD OIL COMPANY

OF TEXAS

AND

INTERNATIONAL UNION OF

OPERATING ENGINEERS

LOCAL UNION NO. 552

(A. F. of L.)

AND

(C. I. O.)

EL PASO, TEXAS

EL PASO  PRINTING COMPANY

PRINTED ON UNION MADE AND WATER MARKED PAPER

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS
AND
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 13th day of May, 1958 between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Laboratory, Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 1, 1958 and shall remain in effect until February 28, 1959, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing, of its intention to terminate the agree-

ment, at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A regular work day shall consist of eight (8) consecutive hours in any calendar day, except that for employees whose shifts start at 11:00 p.m., 7:00 a.m., or 3:00 p.m., the work day shall commence at 11:00 p.m. on the preceding calendar day, whether paid at straight or premium rate, exclusive of lunch periods. The lunch periods for regular day workers will be from 11:30 a.m. to 12:00 noon, when consistent with the work on hand. The Company shall allow a five

(5) minute period prior to the lunch period for the day workers to stop work, clean up and travel to the lunch area. The normal shift for regular day workers will be No. 2 Shift, 8:00 a.m. to 4:30 p.m.

B. A work week shall consist of seven (7) consecutive days, commencing at 12:01 a.m. Monday, except that a work week for employees scheduled to work the 11:00 p.m., 7:00 a.m., or 3:00 p.m. shifts shall consist of seven (7) consecutive days starting at 11:00 p.m. Sunday.

C. A regular weekly work schedule shall consist of five (5) regular work days, with two consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc., whether paid or unpaid) on regular scheduled work days shall count as days worked. The Company will establish and post regular weekly work schedules, consistent with operating requirements, to permit consecutive days off.

ARTICLE III WAGE RATES, OVERTIME AND EXTRA COMPENSATION

A. Wage Rates, Exhibits, Shift Differentials

1. Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A", or any wage rate or classification mutually agreed to hereafter.

2. a. Where an employee works in two classifications in one day, and works less than a half day in the classification carrying a higher rate than the classification

in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

4. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs, dependent upon the time thus worked. The principle outlined in paragraph 2.a. will be used in determining whether they will receive pay for one-half of a day or full day at the highest rate on each day of broken time. Section seniority within the group working on the specific job involved, and ability shall be followed in selecting these men.

B. Overtime, Extra Compensation and Other Premium Pay

1. a. Overtime rate (1½ times the regular rate), except as specified below in b. and c., shall be paid for all work performed out-

side of or in excess of the regular weekly work schedule "K" time.)

b. Overtime rate (2 times the regular rate) shall be paid for:

(1) All hours worked in excess of 16 consecutive hours; i.e., beginning on the 17th consecutive hour ("K-D" time).

(2) All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, and these off days are consecutive calendar days but need not fall within the same work week ("K-D" time). For purposes of double-time payment only, both off days will start at 12:01 a.m. and end at 12:00 midnight the same day, except for employees whose shifts start at 11:00 p.m., 7:00 a.m. or 3:00 p.m., for whom both off days will start at 11:00 p.m. and end at 11:00 p.m. the next day.

c. An employee who is called out to work and who reports for such work, shall receive a minimum of four (4) hours pay at straight time rates, or time-and-one-half for work performed, whichever amount is greater ("Q" time); except that he shall be paid at double-time rate where b. above applies.

2. a. Extra compensation (½ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular, scheduled work day, under the following conditions:

(1) For the first shift scheduled to be worked and worked in a rearranged work schedule without 40 hours notice prior to the start of the first shift changed ("M" time).

(2) Time worked in excess of eight (8) hours in any twenty-four period, other than

overtime as defined in l.a. and b. above ("N" time).

C. Distribution of Overtime

1. An effort will be made to distribute overtime equally among employees qualified in the classification in which the overtime occurs. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as possible. When processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

2. To give effect to paragraph 1 above, as applied to refinery operators, the following procedures will be observed:

a. The operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the operators referred to above have already worked the afternoon shift on their first scheduled days off in their regular weekly work schedules, or

(3) Where the Company has more than eight (8) hours' advance notice of the absence, or

(4) Where there is an operator on the vacated shift who can be made available

and who is qualified to relieve any job that will provide relief for the vacancy.

(5) In either (1) or (2) or (3) above, the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

D. Overtime Meals

1. When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal, not to cost over \$3.00 in place of two separate meals at \$1.50 each. Company may also, at its option, provide employee with a meal allowance of \$1.50 in place of the meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company's expense, will be allowed for eating.

ARTICLE IV SENIORITY

A. For the purpose of administering this article, and Article V, seniority of two types shall be considered as stated below:

1. Refinery seniority, which shall be

based on the date of entering the service of the El Paso Refinery; and

2. Section seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized refinery sections are:

1. Light Oil
2. Stocks & Utilities
3. Catalytic Cracking
4. Thermal Cracking
5. Filling & Shipping
6. Storehouse
7. Electrical & Instruments
8. Machinist and Tool Room
9. Welding
10. Pipe Fitting, Boiler Making and Miscellaneous

ARTICLE V PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this agreement are "Exhibit B," Job Progression Chart — Maintenance — Storehouse, and "Exhibit C," Job Progression Chart — Operating Sections, showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications.)

A. Promotions

1. All promotions, demotions, placement of men displaced by job terminations, and all filling of permanent vacancies shall be based on seniority and ability. It is the in-

tant to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there may be individuals who, thru lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the section seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by management (in advance when possible) why such employee was not selected for such promotion; except that this notification shall not be necessary in the Operating sections for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Sections.

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights. This will not preclude the employee's right to promotion to some other jobs which he is capable of performing.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a 2-year period to the job that their seniority and ability

would have entitled them to, had they remained in the refinery organization.

5. In the Maintenance Division, promotions from Helper "B" to Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of refinery service and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon the completion of twelve (12) months of service in the Refinery Maintenance Division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months of service as Mechanic "B," and

b. 60 months of service in the Refinery Maintenance Division, including any service as Mechanic "B."

6. a. The Company will maintain a minimum of 50% overall Mechanic to Helper ratio in the Maintenance Division, provided there are Mechanic Helpers who are qualified to be Mechanics.

b. Mechanics "A" will be promoted to Senior Mechanics upon completion of 15 years' refinery service, providing the number of Senior Mechanics does not exceed 10% of the total number of Mechanics.

B. Layoffs and Rehiring

1. Layoffs for lack of work, and rehiring shall be based on refinery seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than

one year and less than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years of continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their refinery seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the military service. Under emergency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. Demotions

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the section seniority list shall control within each section and the employee with the least section seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified

for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed to the top of the section seniority list of the rate classification to which demoted for consideration in case a promotional opportunity develops in the rate classification from which demoted.

2. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he may be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater refinery seniority than the employee whose demotion would result therefrom. The new position in the new section seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his refinery seniority.

D. Inter-Section Status

1. For the purpose of administration of Articles IV and V, all employees will be assigned to a specific refinery section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability, as provided in Exhibits B and C. Section assignment as stated here shall not in any way interfere with Company

having employee do any type of refinery work that in Company's judgment he can do safely.

2. Transfers between Maintenance sections may be made with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with section seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire section seniority in the new section nor lose acquired section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the seniority list will so indicate, and the provisions of paragraph 2 above will apply, except as provided in the last sentence of paragraph 1, section C above.

ARTICLE VI

VACATIONS, HOLIDAYS AND FRINGE BENEFITS

A. Vacations

Employees who have completed one year's service with Company shall be given two weeks' vacation with pay each calendar year. In the tenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twentieth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

B. Holidays

1. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Veterans' Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on Sunday, the Monday immediately following shall be observed as the holiday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive pay equal to the straight time rate for the number of hours in their regular daily work schedule plus one and one-half times the straight time rate for all hours worked. For the purposes of holiday payments, holidays will be considered as starting at 12:01 a.m. and ending at 12:00 midnight on the days which are observed, except that for workers scheduled to work the 11:00 p.m., 7:00 a.m. or 3:00 p.m. shifts, holidays will be considered starting at 11:00 p.m. prior to the calendar day of the holiday and ending at 11:00 p.m. twenty-four (24) hours later.

4. All regular employees shall receive eight paid holidays per year. Those not so paid under the provisions of paragraphs 2 and 3 above, shall receive a day's pay at their regular straight time rate for each such holiday.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. Fringe Benefits

1. All benefit plans arranged by the Company for its employees generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sickness-and-Non-Industrial-Injury Benefit Plan.

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent, his regular pay and retain any fee that he receives for the performance of such service.

ARTICLE VII UNION ACTIVITIES

A. Workman's Committee

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of management at regular monthly intervals for discussion of individual or mutual problems

and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. Union Leaves of Absence

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than four employees, provided that not more than two employees shall be granted a simultaneous leave.

C. Leave of Absence to Enter the Employment of the Union

1. If any member of the Union shall request a special leave of absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two years from date of start of such leave, will be considered and accepted on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two years.

c. Applicant, if re-employed within said period of two years, will enter the job that his seniority and ability would have entitled him to, had he remained in the refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. Discrimination, Coercion or Intimidation

1. There shall be no discrimination against any employee with respect, to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

E. Conferences during Working Hours

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or management on matters concerning employer-employee relations without loss of time or pay.

F. Bulletin Boards

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated

by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII MISCELLANEOUS AND GENERAL

A. Clothing

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. Payroll Deductions for Savings

Upon written request of the employee, using Form TXM-519, the Company will

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make payroll deductions from that employee's earnings and deposit this money to the employee's share account with the Standard El Paso Federal Credit Union. Such payroll deductions may be cancelled at any time upon written notice to the Company from the employee.

D. Strikes and Lockouts

There shall be no cessation of work thru strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work and/or wage rates as provided in Article I and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

E. Smoking Areas

Smoking privileges will be provided for all employees within the refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

F. Contract Labor

The Company agrees that it will not contract normal routine maintenance work within the refinery as long as the refinery has the necessary men and equipment available to perform such work properly.

G. Reprimands

1. An employee will always be given a

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copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the management will give the employee two copies of the written record of this final warning. The additional copy may be provided the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

H. Industrial Injuries

An employee who is injured while working on an off day, and is unable to continue working, will be paid for the unworked remainder of an eight (8) hour day at the rate of pay he was receiving at the time of injury.

I. Miscellaneous

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workmen's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his Foreman or appropriate supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher management, if necessary, to aid him. If at the conclusion of the discussion with his supervisor he is not satisfied, the employee shall so state and advise his supervisor that he is taking the first step in presenting a grievance.

2. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or thru the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Com-

pany on the grievance will be accepted, or whether said decision shall be arbitrated.

3. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven (7) days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

4. If agreement on the third arbitrator cannot be reached within fourteen (14) days, the Federal Mediation and Conciliation Service shall be asked to submit a list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

ARTICLE X

If any of the provisions of this contract shall be held invalid by any governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating
Engineers, Local No. 552
7629 Parral Road
El Paso, Texas

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

INTERNATIONAL UNION OF
OPERATING ENGINEERS,
LOCAL NO. 552

By C. J. McBride, Jr., President
By F. W. J. Bishop, Secretary

STANDARD OIL COMPANY OF TEXAS
By M. P. Paret, Jr., Vice President

EXHIBIT "A"

REFINERY CLASSIFIED OPERATING & MECHANICAL WAGE SCHEDULE

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$3.0750	\$24.60
Catalytic Cracker			
Thermal Cracker			
Crude Distillation			
Head Operator B	HOB	2.9683	23.75
Gas Recovery-Alkylation			
Pumping			
Thermal Cracker			
Head Operator C	HOC	2.8625	22.90
Catalytic Cracker			
Gas Recovery-Alkylation			
Perco Desulfurizer			
High Pressure Boilers			
Platformer			
Gauging			
Operator A	OA	2.7563	22.05
Catalytic Cracker			
Crude Distillation			
Gas Recovery-Alkylation			
Thermal Cracker			
Gauging			
Caustic Treating			
Operator B	OB	2.5975	20.78
Catalytic Cracker			
Gas Recovery-Alkylation			
Treater			
Operator C	OC	2.3325	18.66
Catalytic Cracker			
High Pressure Boilers			
Gauging			

MAINTENANCE DIVISION

Classification	Hourly Rate	Daily Rate
Senior Mechanic	\$2.9688	\$23.75
Mechanic A	2.8625	22.90
Stockman A	2.8625	22.90
Mechanic B	2.5975	20.78
Stockman B	2.5975	20.78
Stockman Helper A	2.4063	19.25
Helper A	2.4063	19.25
Stockman Helper B	2.2375	17.90
Helper B	2.2375	17.90
Helper C	2.0438	16.35
Laborer	1.7928	14.39

FILLING & SHIPPING

Finished Stock Gauger	2.5975	20.78
Carloader Senior	2.5975	20.78
Carloader A	2.4063	19.25
Carloader B	2.2375	17.90
Helper C	2.0438	16.35

Employees who work any time other than day shift will receive, in addition to the above rates, 8c an hour for the afternoon shift, or 16c an hour for the morning shift.

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EXHIBIT "C"

PROGRESSION & TRANSFERS WITHIN THE OPERATING DIVISION

All men hired for Operations will be hired at the Helper "C" rate. This rate will be effective for a period of 20 work days, except in cases where men have become qualified and work an OC job in less than 20 work days, the OC rate will then be paid for any OC work performed.

After the initial 20 day work period, if the man is not working in an OC classification, he will be advanced to the Helper "B" rate.

After having worked in an OC classification, thereafter a man will be paid at the rate of his basic classification or at the rate of the classification at which he is working, whichever is higher. An employee's basic classification or assignment is the classification in which he would be working full time provided there were no absences in classifications above for any reason. Swing jobs in all cases are basically classified at the lower of the two swing classifications.

For all periods of break-in or other training work, he will be paid at the rate of the classification at which he is breaking in or the rate of the classification in which he would have been working, whichever is higher. For the purpose of further training an employee in the next higher classification as a refresher, a man in the higher classification may be assigned a job in the next lower classification, and the man in the next lower classification assigned a job in the next higher classification.

During periods when there is a temporary surplus of Operating manpower, operators may be required to work in the Maintenance Division. During this period they will be paid at the Helper "B" rate if their basic assignment is in the Operator Pool, and will be paid at the rate of their basic assignment if their basic assignment is OC or higher.

Permanent vacancies at the OC level will be filled by seniority from the Operator Pool. After receiving a basic assignment in either of the combined progressional sections below the OA level, a man will remain in the assigned section except that during the month of November each year he may request a transfer to the other combined progressional section and receive a new basic assignment below the OA level, according to seniority, as soon thereafter as he is able to qualify by ability to hold such basic assignment.

Men will be promoted to fill permanent OA vacancies (Light Oil, Stocks & Utilities, Catalytic Cracking, Thermal Cracking) from the OB level in the combined progressional section to which he is assigned, according to seniority and ability. After a man accepts a permanent basic assignment of OA in one of the four progressional sections (Light Oil, Stocks & Utilities, Cat Cracking or Thermal Cracking), he will progress by seniority and ability only in that section. In the event he wishes to transfer to another section, he may do so at any time by making a written request to the Company and by taking a basic assignment (OC) just under the youngest basically assigned OB

in that particular progressional section, and progress in this relative position.

Temporary vacancies of not more than 30 days duration, occasioned by illness, vacations, leaves of absence, etc. will, when qualified men are available, be filled on the shift on which they occur, by vertical movement within the plant, as indicated by the Progression Chart, which is a part of this Exhibit. When adequate qualified men are not available for such vertical movement, then changes in schedule shall be made to provide adequate qualified men.

Schedule changes shall be made if necessary to assure that the senior qualified man in each basic classification in each progressional section shall, over a period of one contract year, receive substantially more shifts of work in the next higher classification than any junior man in the same basic classification in the same progressional section.

In event of an anticipated vacancy in excess of 30 days in an established basic job due to reasons such as extended illness, leaves of absence or special assignments, such vacancies will be filled in accordance with the procedure used in filling permanent vacancies, without changing basic classifications.

Permanent vacancies—Promotions to fill any job, above the OC level, when such job is permanently vacated, will be in accordance with seniority and ability, except that any man may request in writing to the Company that he remain in line of progression in any one plant in a progressional section rather than accept a job of higher

classification in another plant in the same progressional section.

When a man requests and is therefore given a permanent plant assignment, he forfeits all future rights to a higher job in the same progressional section except the higher job in the plant in which he requests to remain.

A man, at his written request to the Company, will be allowed to remain on any permanent assignment without progression to higher jobs.

Lateral training at all levels in a progressional section will be given to all operators who agree to such training and who are satisfactorily performing their duties in their plant assignment. Such training will be done consistent with Operating requirements.

Lateral movement between jobs within a progressional section will be made at reasonable intervals when such movement is desirable from the viewpoint of both the man and the Company.

All men at all levels within a plant shall be required to learn the next higher job in their respective plant as rapidly as possible. The Company shall aid every man as much as possible in this endeavor.

Added after 58-59
Contract

AGREED WORKING AGREEMENT CHANGES

These agreements are made this 25th day of September, 1958, effective 12:01 AM Wednesday, August 13, 1958, and 12:01 AM Wednesday, September 24, 1958, as amendments to that certain Working Agreement between these parties, dated May 13, 1958, as follows, to-wit:

Effective 12:01 AM Wednesday, August 13, 1958, add to ARTICLE II. A:

1. Maintenance employees working a shift other than the day shift be allowed a 15 minute lunch period on the job site plus an additional 5 minutes for cleanup and travel to their respective lunches on Company time.

Add to ARTICLE III. B. 2.a:

2. Since, at times, it may be necessary for the Company to schedule Maintenance employees to work a shift which may extend from one calendar day into the next, the employees involved will be paid at the overtime rate for the hours worked on such employee's first off day. It is understood that, in the next Working Agreement, Article II.A. will have to be expanded to clarify the existing language

Effective 12:01 AM Wednesday, September 24, 1958, add to ARTICLE II. A:

3. In the event the work schedule of a Maintenance employee is changed and his starting time on his new schedule is more than one hour sooner or later than the starting time under his schedule immediately prior to the change, he shall receive the extra compensation as provided in ARTICLE III. B.2.a.(1). Any change in starting time of one hour or less shall not require notice or payment provided in ARTICLE III. B.2.a.(1).

Add to EXHIBIT 'A':

4. For all shifts of Maintenance employees starting or ending outside the hours of 7:00 AM to 5:30 PM, the applicable shift differential shall be paid. Applicable shift differentials are as follows: 8¢ per hour from 4:00 PM until midnight, and 16¢ per hour from midnight until 8:00 AM.

Shift differential shall not be paid Maintenance employees whose regular day begins and ends between 7:00 AM and 5:30 PM or for unscheduled continuous hours worked beyond their regular day shift quitting time.

Add to ARTICLE II. A:

5. Should four or more hours of any regular work day for Maintenance employees fall outside the hours 7:00 AM to 5:30 PM, a lunch period shall be provided on Company time, as stated in the Standard Oil Company of Texas' letter to the

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International Union of Operating Engineers, Local No. 552, dated July 18, 1958, and accepted by the Union August 12, 1958. See paragraph 1 above.

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives this 25th day of September, 1958.

STANDARD OIL COMPANY OF TEXAS

By M. P. Paret, Jr., Vice-President

INTERNATIONAL UNION OF
OPERATING ENGINEERS,
LOCAL 552

By W.P. Jackson, President

By A.D. Offutt, Secretary

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WORK REQUISITION
GO-113

TO COST NOT
MORE THAN

S 12319

TO D.P. LYNCH, ATTN: C.D. HALL OCT 31, 1958 SUB. REQ. NO. _____
TO BE USED FOR INSULATION OF DRINKING WATER LINES APPR. S. O. } NO. _____
CHARGE TO 20-0523-1 W. O. } ITEM NO. _____
EQUIPMENT READY: DATE 10-31-58 TIME _____ LOCATION _____ DISTRICT _____
DATE REQUIRED 11-11-58

INSTRUCTIONS: PLEASE REFER TO GO-113 #R-35798 DATED 9/11/58 FOR
INSTALLATION OF DRINKING WATER LINES:
INSULATE ALL ABOVE GROUND PORTIONS OF ~~THESE~~
THESE LINES WITH STANDARD THICKNESS 55%.
MAGNESIA INSULATION.

APPROVED BY <u>10/31</u>	DATE COMPLETE
ASSIGN TO <u>10/31</u>	ACTUAL COST

SIGNED

R. V. Brown

DUPLICATE

GO-113 (5000 BKS. 2-57)

52-53

AGREEMENT

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION
OF OPERATING ENGINEERS
LOCAL UNION No. 552

(A. F. of L.)

EL PASO, TEXAS

1952-53

EL PASO PAPER CO.

PRINTED ON UNION MADE AND WATERMARKED PAPER

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS

and

INTERNATIONAL UNION OF

OPERATING ENGINEERS

Local Union No. 552

THIS AGREEMENT is made and entered into this 20th day of May, 1952, between Standard Oil Company of Texas, with a Refinery at El Paso, Texas, herein referred to as the "Company" and International Union of Operating Engineers, Local No. 552.

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act.

ARTICLE I

This Agreement shall be effective as of March 1, 1952, and shall remain in effect until February 28, 1953, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the Agreement at least sixty (60) days prior to the

first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any Article or Articles contained in said Agreement, and the serving of such notice shall have the effect of annulling the said Article if no agreement is reached within sixty (60) days after the termination date of the Agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

ARTICLE II

1. Regular hours of work shall be 8 hours per day exclusive of lunch periods.

2. A work day shall consist of the 24-hour period, commencing at 12:01 A.M. A work week shall consist of 7 consecutive days, commencing at 12:01 A.M. Monday.

3. The Company will establish weekly work schedules consistent with operating requirements to permit regular and consecutive days off when such schedules consist of 5 days or less, except that such cannot be strictly applied to shift breakers or extra men or due to the necessity of changing shifts. When the plant is working a 6-day schedule, the employees will be given a regular assigned day off in each 7-day work week. When employees are required to work on their regular day off because of an emergency, they will not be required to take another day off in lieu of their regular day.

ARTICLE III

1. Wage rates shall be those for work performed in the Company's present job classifications as set forth in the Refinery Wage Schedule attached to, and to become a part of, the original signed copies of the Working Agreement, as effective on the day of said Agreement, or any wage rate or classification mutually agreed to hereafter. Company wage schedules show shift differentials, where applicable, at the bottom of the wage schedule. The shift differentials are in addition to the basic daily rates. They apply to employees who work on regularly rotating shifts and to Maintenance employees when scheduled to work shifts other than their regular day shifts; but they will not be paid (a) for the first such shift of rearranged schedule when time-and-one-half is payable, nor (b) for overtime hours worked as a continuation of any shift.

2. Overtime rate shall be one and one-half times the regular rate and shall be paid: (a) for all work done in excess of eight (8) hours in any twenty-four hour period, or for work done in excess of forty hours in any work week; (b) for work done on off day or outside of regular scheduled hours at the Company's request, provided that an employee who is called out and reports for such work shall receive a minimum of four (4) hours pay at straight time rates and (c) for the first shift of rearranged work schedule, if the employee whose shift is changed shall not have been notified at least forty (40) hours prior to the beginning of the first shift.

3. No employee shall lose any time or pay by reason of shift changes.

4. Where an employee works in two classifications in one day, and works less than a half day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

5. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

6. Employees of the Helper Group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs dependent upon the time thus worked. The principle outlined in paragraph 4 will be used in determining whether they will receive pay for one-half of a day or a full day at the highest rate on each day of broken time. Seniority shall be followed in selecting these men, depending on their ability.

ARTICLE IV

1. The provisions of Article II and III, relating to hours and days of work and to wage rates, may be opened by either party for further negotiations at successive intervals of six months from date of contract.

2. Written notice of intention to open negotiations shall be given (30) thirty days prior to expiration of any six (6) months period, and negotiations shall be commenced within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective at commencement of six (6) months interval following that of which notice was given, unless the parties shall agree on some other effective date.

ARTICLE V

Seniority, as herein referred to, shall be fixed by the date of entering the service of the El Paso Refinery.

ARTICLE VI

PROMOTIONS, DEMOTIONS, LAY-OFFS AND RE-EMPLOYMENT

1. (a) Promotions and demotions shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union that ability must be given consideration in all such moves. Thus, there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily

handling some of the intermediate or lower jobs.

(b) Lay-offs and rehiring shall be based on seniority.

2. An employee working the full regular work schedule for the position held, whose term of employment has been less than one year and who may be laid off because of lack of work, shall be considered as having continuous service if he is re-employed by the Company within thirty (30) calendar days. The total lay-off during the first year shall not exceed forty-five (45) working days of the employee's yearly work schedule.

3. An employee with over one year but less than three years continuous service, who may be laid off because of lack of work, shall be considered as having continuous service if he is re-employed by the Company within sixty (60) calendar days. The total lay-off during the second or third year shall not exceed in either year sixty (60) working days of the employee's yearly work schedule.

4. An employee with three or more years of continuous service, who may be laid off for lack of work, shall be considered as having continuous service if he is re-employed by the Company within ninety (90) calendar days. The total lay-off during the fourth year, or any subsequent year, shall not exceed in any one year ninety (90) working days of the employee's yearly work schedule.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known local address in order of their foregoing senior-

ity to report for work. In the event any employee so notified shall fail to report for work within five (5) days of date of notice, such employee's seniority shall be terminated provided he is not prevented from reporting because of sickness, death or emergency involving himself or his immediate family and so notifies the Company within five (5) days. This does not apply to men who are replacing men in the military service. Under emergency conditions temporary men may be used until former employees on the re-hiring seniority list have reported for work.

ARTICLE VII

VACATIONS AND HOLIDAYS

1. Employees who have completed one year's service with the Company shall be given two weeks' vacation with pay each calendar year. In the fifteenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twenty-fifth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The following holidays shall be observed:

NEW YEAR'S DAY
WASHINGTON'S BIRTHDAY
MEMORIAL DAY
FOURTH OF JULY
LABOR DAY
ARMISTICE DAY
THANKSGIVING DAY
CHRISTMAS

3. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

4. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive two times their regular straight-time pay for the work performed.

5. If any of these holidays falls on a Sunday, the Monday immediately following shall be observed as the holiday.

ARTICLE VIII WORKMAN'S COMMITTEE

The Union shall create a Workman's Committee, composed of three employees, who shall meet with representatives of Management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this Agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

ARTICLE IX SETTLEMENT OF DISPUTES AND GRIEVANCES

1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment, shall promptly (within ten—10—days) attempt to adjust the matter with his foreman or appropriate Supervisor. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days

thereafter shall present in writing his case personally, or through the representative of the Union, to the Refinery Superintendent. The Refinery Superintendent shall within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Superintendent in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the company on the grievance will be accepted, or whether said decision shall be arbitrated. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

2. If agreement on the third arbitrator cannot be reached within fourteen days (14) days, the three District Judges shall be asked to submit the names of three possible arbitrators and each party shall be obligated to select the two of such three names submitted who will be satisfactory to them. The one selected by both parties shall be accepted as arbitrator. If both parties submit the same two names as sat-

isfactory, the Judges shall be asked to designate the one of these two to serve.

3. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

4. The Arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this Agreement; and shall not have authority to alter any of the terms of the Agreement.

ARTICLE X

All benefits arranged by the Company for its employees generally shall be available to employees covered by this Agreement. The Company shall make information concerning such benefits available to the employees.

ARTICLE XI

BULLETIN BOARDS

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in a place designated by the Company for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such board.

ARTICLE XII

UNION LEAVES OF ABSENCE

If plant conditions permit, leaves of absence of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which

case not more than thirty—30—days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than three employees, provided that not more than two employees shall be granted simultaneous leaves.

ARTICLE XIII

RESIGNATION TO ENTER THE EMPLOYMENT OF THE UNION

If any member of the Union shall request a special leave of absence from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within one year from date of start of such leave, will be considered and accepted on the following conditions:

1. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

2. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within one year.

3. Applicant, if re-employed within said period of one year, will re-enter the job classification to which his seniority at date of special leave of absence entitles him.

4. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative

again upon re-employment with such service accumulation attained at start of leave.

ARTICLE XIV

MISCELLANEOUS AND GENERAL

Section 1.—Discrimination:

There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

Section 2.—Conference During Working Hours:

Employees, with the approval of the Refinery Superintendent, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

Section 3.—Clothing:

Protective clothing will be provided by the Company where needed for personal safety, and where destructive action over and above that encountered in the course of regular employment makes it necessary.

Section 4.—Distribution of Overtime:

1. Consistent with operating requirements, the Company will, to the best of its ability, distribute overtime in an equitable manner to all employees in all classifications.

2. To give effect to Paragraph 1, as applied to Refinery Operators, when an ab-

sence will occur on an operating job, and the Company learns of the absence during the eight hours of the preceding shift, the Operator handling the job on that shift shall be offered this additional shift before the job is otherwise filled. This provision will not apply: (a) where the Operator referred to above has worked more than twelve hours in the preceding twenty-four hours, or (b) where the Company has more than eight hours advance notice of the absence. In either (a) or (b), the job will be filled, as nearly as possible, with an employee in the same classification having the least amount of overtime to his credit.

Section 5.—Civic Duties:

Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

Section 6.—Overtime Meals:

When employees are required to work overtime more than two hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first two hours of such overtime, and every four hours thereafter. The cost of meals so provided shall not exceed \$1.50 each.

When it is known in advance that the work will continue beyond the time at

which the meal will be due, the Company may furnish the meal in advance of such time.

Section 7.—Voluntary Payroll Deduction of Union Dues:

Employees covered by this Agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the Secretary of Local Union 552 not later than two weeks after the end of the first payroll period in each month to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

Section 6.—Miscellaneous:

No employee shall be required to write or affix his signature to any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining the Union.

ARTICLE XV

If any of the provisions of this contract shall be held invalid by any Governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XVI

Notice herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating Engineers

Local No. 552

1510 Upson Avenue

El Paso, Texas

Standard Oil Company of Texas
P. O. Box 862
El Paso Texas

Attention: Refinery Superintendent

IN WITNESS WHEREOF the parties
have caused this instrument to be executed
by their duly authorized representatives
the day and year first above written.

STANDARD OIL COMPANY OF TEXAS

By M. P. PARET, JR.
Vice President

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

By F. D. MATTHEWS
President

J. A. TRUITT, JR.
Secretary.

D. A. BRAZEL
Assistant District Representative,
International Union of Oper. Engrs.

CHEV B8 7257

E. L. Hovet

AGREEMENT

1953
~~1953-1954~~

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION
OF OPERATING ENGINEERS
LOCAL UNION No. 552

(A. F. of L.)

EL PASO, TEXAS

EL PASO  PIG. CO.

PRINTED ON UNION MADE AND WATERMARKED PAPER

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS
and

INTERNATIONAL UNION OF
OPERATING ENGINEERS

LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 20th day of April, 1953 between Standard Oil Company of Texas, with a Refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act.

ARTICLE I

This Agreement shall be effective as of March 1, 1953 and shall remain in effect until February 28, 1954, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the Agreement at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing, at least

sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any Article or Articles contained in said Agreement, and the serving of such notice shall have the effect of annulling the said Article if no agreement is reached within sixty (60) days after the termination date of the Agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

ARTICLE II

1. Regular hours of work shall be 8 hours per day exclusive of lunch periods.

2. A work day shall consist of the 24-hour period, commencing at 12:01 A.M. A work week shall consist of 7 consecutive days, commencing at 12:01 A.M. Monday.

3. The Company will establish weekly work schedules consistent with operating requirements to permit regular and consecutive days off when such schedules consist of 5 days or less, except that such cannot be strictly applied to shift breakers or extra men or due to the necessity of changing shifts. When employees are required to work on their regular day off because of an emergency, they will not be required to take another day off in lieu of their regular day.

ARTICLE III

1. (a) Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A"; or any wage rate or classification mutually agreed to hereafter.

(b) Company wage schedules show

shift differentials, where applicable, at the bottom of the wage schedule. The shift differentials are in addition to the basic daily rates. They apply to operating employees who work on regular rotating shifts; and to maintenance employees when scheduled to work shifts other than their regular day shifts. They will not be paid for the first shift of re-arranged schedule when time and one-half is payable, nor for overtime hours worked as a continuation of the day shift.

2. Overtime rate shall be 1-½ times the regular rate, and shall be paid for:

(a) All work done in excess of eight hours in any 24-hour period, or

(b) All work done in excess of 40 hours in any work week,

(c) All work done on first off day, or outside of regular scheduled hours, at Company's request,

(d) The first shift of rearranged work schedule, if the employee whose shift is changed shall not have been notified at least 40 hours prior to the beginning of the first shift.

3. An employee who is called out to work and who reports for such work shall receive a minimum of four hours' pay at straight time rates or time and one-half for work performed, whichever amount is the greater.

4. Double time (two times the base rate) shall be paid for work done on the second off day where the first off day is also worked.

5. Where an employee works in two classifications in one day, and works less

than a half day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

6. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

7. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs dependent upon the time thus worked. The principle outlined in paragraph 5 will be used in determining whether they will receive pay for one-half of a day or a full day at the highest rate on each day of broken time. Seniority and ability shall be followed in selecting these men.

ARTICLE IV

1. The provisions of Article II and Article III, relating to hours and days of

work and to wage rates, may be opened by either party for further negotiations at successive intervals of six months from date of contract.

2. Written notice of intention to open negotiations shall be given thirty (30) days prior to expiration of any six (6) months period, and negotiations shall be commenced within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective at commencement of six (6) months interval following that of which notice was given, unless the parties shall agree on some other effective date.

ARTICLE V

Seniority, as herein referred to, shall be fixed by the date of entering the service of the El Paso Refinery.

ARTICLE VI

PROMOTIONS, DEMOTIONS, LAY-OFFS AND RE-EMPLOYMENT

1. (a) All promotions, demotions, placement of men displaced by job terminations, and all filling of vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union that ability must be given consideration in all such moves. Thus, there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

(b) When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. If a promotion involving a man of less seniority is to be made because of the older man not qualifying, the older man will be so informed in advance of the move. He will be made to understand that he will be given promotional opportunities later if he is able to qualify.

(c) An employee promoted to a higher job and failing to perform satisfactorily on it will be allowed to return to the job previously held by him without loss of seniority rights. This will not preclude the employee's right to promotion to some other job which he is capable of performing.

In this case an employee will retain his rights to normal promotions in accordance with paragraph 1. (a).

(d) Lay-offs and rehiring shall be based on seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one year and less than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their foregoing seniority, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the Military Service. Under emergency conditions, temporary men may be used until former employees on the rehiring seniority list have reported for work.

6. Inter-Departmental Transfers:

(a) The recognized refinery departments are Operating, Mechanical, Laboratory, Filling & Shipping. New employees shall in every case be hired for one of these departments, and hiring records will show this information. Seniority lists, issued monthly, will show the permanent departmental status of each employee.

(b) Transfers between departments may be made, with Company approval.

(c) In all cases of permanent transfer between departments, at any time, the transferred employee will enter the new department with departmental seniority dating from the date of permanent transfer, and he will relinquish all seniority in the former department.

(d) Temporary inter-departmental transfers may be made, for short periods of time. Company records will clearly in-

dicade the temporary nature of such transfers. The employee will not acquire departmental seniority in the new department nor lose acquired departmental seniority in his regular department. If any temporary transfer is later made permanent, Company records and the Seniority List will so indicate, and the provisions of paragraph (c) above will apply.

ARTICLE VII

VACATIONS AND HOLIDAYS

1. Employees who have completed one year's service with the Company shall be given two weeks' vacation with pay each calendar year. In the fifteenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twenty-fifth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The following holidays shall be observed.

New Year's Day	Labor Day
Washington's Birthday	Armistice Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on a Sunday, the Monday immediately following shall be observed as the holiday.

3. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

4. Employees who work on such holi-

days, whether scheduled or unscheduled work days, shall receive two times their regular straight-time pay for the work performed.

5. All regular employees shall receive at least seven paid holidays per year, excluding Armistice Day. Those not so paid under the provisions of paragraphs 3 and 4 above, shall receive a day's pay at their regular straight time rate for each such holiday, excluding Armistice Day.

6. If, during an employee's vacation period, a recognized holiday occurs on what would have been his regular scheduled work day, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

ARTICLE VIII

WORKMAN'S COMMITTEE

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of Management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this Agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

ARTICLE IX

SETTLEMENT OF DISPUTES AND GRIEVANCES

1. Any employee who feels that he has

been subjected to unfair or discriminatory treatment with respect to his conditions of employment, shall promptly (within ten days) attempt to adjust the matter with his Foreman or appropriate Supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate Supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher Management if necessary to aid him.

Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted, or whether said decision shall be arbitrated. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee, consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third

to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

2. If agreement on the third arbitrator cannot be reached within fourteen (14) days, the Federal Mediation and Conciliation Service shall be asked to submit a list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

3. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

4. The Arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this Agreement; and shall not have authority to alter any of the terms of the Agreement.

ARTICLE X

All benefits arranged by the Company for its employees generally shall be available to employees covered by this Agreement. The Company shall make information concerning such benefits available to the employees.

ARTICLE XI
BULLETIN BOARDS

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE XII
UNION LEAVES OF ABSENCE

If plant conditions permit, leaves of absence of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which case not more than thirty -30- days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than three employees, provided that not more than two employees shall be granted simultaneous leaves.

ARTICLE XIII
RESIGNATION TO ENTER THE
EMPLOYMENT OF THE UNION

If any member of the Union shall request a special leave of absence from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within one year from date of start of such leave, will be considered and accepted on the following conditions:

1. That his physical condition shall not have changed materially during the period from date of such special leave to

date of application for re-employment.

2. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within one year.

3. Applicant, if re-employed within said period of one year, will re-enter the job classification to which his seniority at date of special leave of absence entitles him.

4. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at start of leave.

ARTICLE XIV
MISCELLANEOUS AND GENERAL
Section 1.—Discrimination:

There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

Section 2.—Conference During Working Hours:

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

Section 3.—Clothing:

(a) Protective clothing, including welder's gloves, sleeves and jackets, will

be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

(b) The Company shall furnish each employee with up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

Section 4.—Distribution of Overtime:

(a) Consistent with operating requirements, the Company will, to the best of its ability, distribute overtime in an equitable manner to all employees in all classifications. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as possible. When processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

(b) To give effect to Par. (a) above as applied to refinery operators, the following procedures will be observed:

The operator handling the job on the shift preceeding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the Company has more than eight hours' advance notice of the absence, or

(3) Where there is an operator on the vacated shift who is breaking in on any job and who is qualified to relieve any job that will provide relief for the vacancy.

In either (1) or (2) the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

Section 5.—Civic Duties:

Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

Section 6.—Overtime Meals:

When employees are required to work overtime more than two hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first two hours of such overtime, and every four hours thereafter. The cost of meals so provided shall not exceed \$1.50 each.

When it is definitely known in advance that an employee will work a full eight hour overtime shift, he may have the option of securing a double lunch, not to exceed \$3.00, at either meal period.

Section 7.—Voluntary Payroll Deduction of Union Dues:

Employees covered by this Agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the Secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

Section 8.—Strikes and Lockouts:

There shall be no cessation of work through strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work and/or wage rates as provided in Article IV and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this Agreement shall remain in full force and effect.

Section 9.—Smoking Areas:

Smoking privileges will be provided for all employees within the refinery. Schedules for smoking will be posted, designating places and times for which smoking is permitted.

Section 10.—Contract Labor:

When maintenance work is required,

necessitating the use of contract labor, an effort will be made to up-grade, temporarily, qualified maintenance employees prior to securing contract labor in these higher classifications.

Section 11.—Reprimands:

(a) An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

(b) Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two copies of the written record of this final warning. The additional copy may be provided the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

Section 12.—Miscellaneous:

(a) No employee shall be required to write or affix his signature to any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

(b) Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

(c) The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employ-

ees into withdrawing from, or refraining from, joining the Union.

ARTICLE XV

If any of the provisions of this contract shall be held invalid by any Governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XVI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:
International Union of Operating Engineers

Local No. 552

7602 Taxco Road

El Paso, Texas

Standard Oil Company of Texas

P. O. Box 862

El Paso, Texas

Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS

By /s/ M. P. PARET, Jr.,

Vice-President

INTERNATIONAL UNION OF
OPERATING ENGINEERS

LOCAL UNION NO. 552

By /s/ JAKE A. TRUITT, JR.,

President

/s/ FLOYD MYERS,
Secretary

EXHIBIT "A"

REFINERY

CLASSIFIED OPERATING & MECHANICAL WAGE SCHEDULE

Effective May 1, 1952

OPERATING DIVISION

Classification	Job Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$2.40	\$19.20
Catalytic Cracker Thermal Cracker			
Head Operator B	HOB	2.37	18.96
Recovery Plant Crude Distillation			
Head Operator C	HOC	2.33	18.58
Reactor Kiln Alkylation Plant Pumping			
Operator A	OA	2.23	17.84
Fractionation Thermal Cracker Perco Desulfurizer High Pressure Boilers			
Operator B	OB	2.17	17.36
Compressors Thermal Cracker Crude Distillation Treating Plant			
Operator C	OC	2.08	16.64
Reactor Kiln Alkylation Plant Caustic Treating Gauging			
Operator Helper A	OHA	2.06	16.48
Crude Distillation Gauging			
Operator Helper B	OH8	2.00	16.00
Recovery Plant Thermal Cracker Perco Desulfurizer High Pressure Boilers			

MAINTENANCE DIVISION

Classification	Hourly Rate	Daily Rate
Head Mechanic	\$2.40	\$19.20
Mechanic A	2.32	18.56
Stockman A	2.32	18.56
Mechanic B	2.11	16.88
Stockman B	2.11	16.88
Stockman Helper A	1.88	15.04
Helper A	1.88	15.04
Stockman Helper B	1.80	14.40
Helper B	1.80	14.40
Helper C	1.63	13.04
Laborer	1.42	11.36

FILLING & SHIPPING

Finished Stock Gauger	2.06	16.48
Carloader Senior	2.00	16.00
Carloader A	1.88	15.04
Carloader B	1.80	14.40
Helper C	1.63	13.04

Employees who work regular night shifts will receive, in addition to the above rates, 6¢ an hour for the afternoon shift, or 12¢ an hour for the morning shift. This includes employees who work on regularly scheduled rotating shifts and maintenance employees when scheduled to work shifts other than their regular day shifts; but they will not be paid (a) for the first shift of rearranged schedule when time-and-one-half is payable, nor (b) for overtime hours worked as a continuation of the day shift.

Night shift differentials are extended to include Maintenance employees.

T-4-H-14

AGREEMENT

1954-1955

BETWEEN

STANDARD OIL COMPANY

OF TEXAS

AND

INTERNATIONAL UNION

OF OPERATING ENGINEERS

LOCAL UNION No. 552

(A. F. of L.)

EL PASO, TEXAS

CHEV B8 7271

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS
and
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 7th day of April, 1954, between Standard Oil Company of Texas, with a Refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Laboratory, Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I

This Agreement shall be effective as of March 1, 1954, and shall remain in effect until February 28, 1955, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing of its intention to terminate the Agreement at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to

the first day of any contract year, of its desire to change, amend, or omit any Article or Articles contained in said Agreement, and the serving of such notice shall have the effect of annulling the said Article if no agreement is reached within sixty (60) days after the termination date of the Agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

ARTICLE II

1. A regular work day shall consist of eight (8) consecutive hours in any 24-hour period, exclusive of lunch periods.

2. A work week shall consist of seven (7) consecutive days, commencing at 12:01 A.M. Monday.

3. The Company will establish weekly work schedules consistent with operating requirements to permit regular and consecutive days off. No employee shall be required to take time off on his regular work schedule because of previously worked overtime, nor shall any employee lose any time because of a change in the work schedule.

ARTICLE III

1. (a) Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A"; or any wage rate or classification mutually agreed to hereafter.

(b) Company wage schedules show shift differentials, where applicable, at the bottom of the wage schedule. The shift differentials are in addition to the basic daily rates. They apply to operating employees who work on regular rotating shifts; and to maintenance employees when scheduled to

work shifts other than their regular day shifts. They will not be paid for the first shift of re-arranged schedule when time and one-half is payable, nor for overtime hours worked as a continuation of the day shift.

2. Overtime rate shall be $1\frac{1}{2}$ times the regular rate and shall be paid for:

(a) All work done in excess of eight (8) hours in any 24-hour period, or

(b) All work done in excess of forty (40) hours in any work week, or

(c) All work done on first off day at Company's request, or

(d) The first shift of rearranged work schedule, if the employee whose shift is changed shall not have been notified at least forty (40) hours prior to the beginning of the first shift.

3. An employee who is called out to work and who reports for such work, shall receive a minimum of four (4) hours' pay at straight time rates or time and one-half for work performed, whichever amount is the greater.

4. Double time (two times the base rate) shall be paid for work done on the second off day where the first off day is also worked, and these off days are consecutive calendar days.

5. Where an employee works in two classifications in one day, and works less than a half day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be

paid a full day at the higher rate.

When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

6. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

7. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs dependent upon the time thus worked. The principle outlined in paragraph 5 will be used in determining whether they will receive pay for one-half of a day or a full day at the highest rate on each day of broken time. Seniority and ability shall be followed in selecting these men.

ARTICLE IV

1. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened by either party for further negotiations at successive intervals of six (6) months from date of contract.

2. Written notice of intention to open negotiations shall be given (30) days prior to expiration of any six (6) months period, and negotiations shall be commenced within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective at commencement of six (6) months interval fol-

lowing that of which notice was given, unless the parties shall agree on some other effective date.

ARTICLE V SENIORITY

Section 1—For the purpose of administering this Article and Article VI, Seniority of two types shall be considered as stated below:

- a. Refinery seniority, which shall be based on the date of entering the service of the El Paso Refinery; and
- b. Section Seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this Article.

Section 2—For the purpose of this Article, the recognized Refinery Sections are:

- a. Operating
- b. Filling and Shipping
- c. Storehouse
- d. Instruments
- e. Electrical
- f. Machinist and Tool Room
- g. Welding
- h. Pipe Fitting, Boiler Making and Miscellaneous

ARTICLE VI PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this Agreement are "Exhibit B", Job Progression Chart—Maintenance-Storehouse, and "Exhibit C", Job Progression Chart—Operating Sections, showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications.)

Section 1—Promotions

a. All promotions, demotions, placement of men displaced by job terminations, and all filling of vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union, that ability must be given consideration in all such moves. Thus, there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

b. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the Section Seniority list of the next lower applicable rate classification, any employee higher on such rate classification, and eligible for consideration for such promotion, will be advised by Management (in advance when possible) why such employee was not selected for such promotion, except that this notification shall not be necessary in the Operating Section for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Section.

c. An employee promoted to a higher job, and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him without loss of seniority rights. This will not preclude the employee's right to promotion to some other jobs which he is capable of performing.

Section 2—Layoffs and Rehiring

a. Layoffs for lack of work, and rehiring shall be based on Refinery Seniority.

b. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

c. Regular employees with more than one year and less than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

d. Regular employees with more than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

e. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their Refinery Seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the Military Service. Under emergency conditions, temporary men may be used until former employees on the rehiring seniority list have reported for work.

Section 3—Demotions

a. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the Sec-

tion Seniority list shall control within each Section, and the employee with the least Section Seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work; and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the Section Seniority list of the rate classification to which demoted for consideration in case a promotional opportunity develops in the rate classification from which demoted.

b. If an employee being demoted because of curtailment of work, has previously worked in another section than that in which he is then working, he may be transferred to such rate classification in such other section for which he is qualified by experience and training, provided he has greater Refinery Seniority than the employee whose demotion would result therefrom. The new position in the new Section Seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his Refinery Seniority.

Section 4—Inter-Section Status

a. For the purpose of administration of Articles V and VI, all employees will be assigned to a specific Refinery Section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of em-

ployee's qualifications and preferences. The order of section assignment and promotion to the Helper A classification will be based on seniority and ability. Section assignment as stated here shall not in any way interfere with Company having employee do any type of Refinery work that in Company's judgment he can do safely.

b. Transfers between Sections may be made, with Company approval. In all cases of permanent transfer between Sections, the transferred employee will enter the new section with Section Seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

c. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire Section Seniority in the new section nor lose acquired Section Seniority in his regular section. If any temporary transfer is later made permanent, Company records and the Seniority list will so indicate, and the provisions of paragraph "b" above will apply.

ARTICLE VII

VACATIONS AND HOLIDAYS

1. Employees who have completed one year's service with the Company shall be given two weeks' vacation with pay each calendar year. In the fifteenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twenty-fifth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Armistice Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on a Sunday, the Monday immediately following shall be observed as the holiday.

3. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

4. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive two times their regular straight time pay for the work performed.

5. All regular employees shall receive at least seven paid holidays per year, excluding Armistice Day. Those not so paid under the provisions of paragraphs 3 and 4 above, shall receive a day's pay at their regular straight time rate for each such holiday, excluding Armistice day.

6. If, during an employee's vacation period, a recognized holiday occurs on what would have been his regular scheduled work day, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

ARTICLE VIII WORKMAN'S COMMITTEE

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of

Management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this Agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

ARTICLE IX SETTLEMENT OF DISPUTES AND GRIEVANCES

1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this Agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his Foreman or appropriate Supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate Supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher Management if necessary to aid him. If at the conclusion of the discussion with his Supervisor he is not satisfied, the employee shall so state and advise his Supervisor that he is taking the first step in presenting a grievance.

Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such

representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted, or whether said decision shall be arbitrated. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

2. If agreement on the third arbitrator cannot be reached within (14) fourteen days, the Federal Mediation and Conciliation Service shall be asked to submit a list of five names from which the third arbitrator shall be determined, by each party striking one name in alternate manner until only one remains.

3. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

4. The Arbitrators shall have authority

only to interpret and to make decisions based upon the provisions of this Agreement; and shall not have authority to alter any of the terms of the Agreement.

ARTICLE X

All benefits arranged by the Company for its employees generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

ARTICLE XI BULLETIN BOARDS

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE XII

UNION LEAVES OF ABSENCE

If plant conditions permit, leaves of absence of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than three employees, provided that not more than two employees shall be granted simultaneous leaves.

ARTICLE XIII

RESIGNATION TO ENTER THE EMPLOYMENT OF THE UNION

If any member of the Union shall request a special leave of absence from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within one year from date

of start of such leave, will be considered and accepted on the following conditions:

1. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

2. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within one year.

3. Applicant, if re-employed within said period of one year, will re-enter the job classification to which his seniority at date of special leave of absence entitles him.

4. It is understood that all company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at start of leave.

ARTICLE XIV

MISCELLANEOUS AND GENERAL

Section 1—Discrimination

There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

Section 2—Conference During Working Hours

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

Section 3—Clothing

(a) Protective clothing, including weld-

er's gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

(b) The Company shall furnish each employee with up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

Section 4—Distribution of Overtime

(a) An effort will be made to equally distribute overtime among employees qualified in the classification in which the overtime occurs. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as possible. When processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

(b) To give effect to paragraph (a) above as applied to refinery operators, the following procedure will be observed:

The operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacant shift is willing to work the other half. This provision will not apply:

(1) were the operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the Company has more than eight (8) hours' advance notice of the absence, or

(3) Where there is an operator on the vacated shift who is breaking in on any job and who is qualified to relieve any job that will provide relief for the vacancy.

In either (1) or (2) the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

Section 5—Civic Duties

Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

Section 6—Overtime Meals

When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal not to cost over \$3.00 in place of two separate meals at \$1.50 each. Company may also, at its option, provide employee with a meal allowance of \$1.50 in place of the meal. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company's expense, will be allowed for eating.

Section 7—Voluntary Payroll Deduction of Union Dues

Employees covered by this Agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the Secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

Section 8—Strikes and Lockouts

There shall be no cessation of work through strikes or lockouts during the period of this Agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work and/or wage rates as provided in Article IV and no agreement is reached within ninety days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this Agreement shall remain in full force and effect.

Section 9—Smoking Areas

Smoking privileges will be provided for all employees within the Refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

Section 10—Contract Labor

When maintenance work is required,

necessitating the use of contract labor, an effort will be made to up-grade, temporarily, qualified maintenance employees prior to securing contract labor in these higher classifications.

Section 11—Reprimands

(a) An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

(b) Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two copies of the written record of this final warning. The additional copy may be provided the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

Section 12—Miscellaneous

(a) No employee shall be required to write or affix his signature to any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

(b) Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

(c) The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from, joining the Union.

ARTICLE XV

If any of the provisions of this contract shall be held invalid by any Governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XVI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of
Operating Engineers
Local No. 552
6326 St. Lo Road
El Paso, Texas

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas
Attn: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS

By M. P. Paret, Jr., Vice President

INTERNATIONAL UNION OF OPERATING ENGINEERS. LOCAL UNION NO. 552

By J. M. Pickle, President

Carl Hofmann, Secretary

EXHIBIT 'A'

REFINERY

CLASSIFIED OPERATING & MECHANICAL WAGE SCHEDULE

Effective July 1, 1953

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A Catalytic Cracker Thermal Cracker	HOA	\$2.4963	\$19.97
Head Operator B Gas Recovery-Alkylation Pumping Crude Distillation	HOB	2.4650	19.72
Head Operator C Catalytic Cracker Alkylation Perco Desulfurizer High Pressure Boilers Thermal Cracker	HOC	2.4138	19.31
Operator A Catalytic Cracker Gauging	OA	2.3200	18.56
Operator B Gas Recovery-Alkylation Compressors Thermal Cracker Crude Distillation Treating Plant	OB	2.2575	18.06
Operator C Catalytic Cracker Alkylation Caustic Treating Gas Recovery *Gauging	OC	2.1638	17.31
Operator Helper A *High Pressure Boilers Thermal Cracker	OHA	2.1425	17.14
Operator Helper B Crude Distillation	OHB	2.0800	16.64

*Effective May 1, 1954

MAINTENANCE DIVISION

Classification	Hourly Rate	Daily Rate
Head Mechanic	\$2.4963	\$19.97
Mechanic A	2.4138	19.31
Stockman A	2.4138	19.31
Mechanic B	2.1950	17.56
Stockman B	2.1950	17.56
Stockman Helper A	1.9563	15.65
Helper A	1.9563	15.65
Stockman Helper B	1.8725	14.98
Helper B	1.8725	14.98
Helper C	1.6963	13.57
Laborer	1.4775	11.82

FILLING & SHIPPING

Finished Stock Gauger	2.1425	17.14
Carloader Senior	2.0800	16.64
Carloader A	1.9563	15.65
Carloader B	1.8725	14.98
Helper C	1.6963	13.57

Employees who work regular night shifts will receive, in addition to the above rates, 6c an hour for the afternoon shift, or 12c an hour for the morning shift. This includes operating employees who work on regularly scheduled rotating shifts, and maintenance employees when scheduled to work shifts other than their regular day shifts; but they will not be paid (a) for the first shift of rearranged schedule when time-and-one-half is payable, nor (b) for overtime hours worked as a continuation of the day shift.

Night shift differentials are extended to include Maintenance employees.

Exhibit D



HELPER A & MECHANIC TRANSFERRED ENTER
NEW SECTIONS AS HELPERS A
HELPER B TRANSFERRED REMAIN HELPERS B

EXHIBIT C



HELPERS A-B-C OPERA-
TION POOL: VLOG IN MAINT.

EXHIBIT C

PROGRESSION & TRANSFERS WITHIN THE OPERATING SECTION

All men hired for Operations, or men transferring from another section to Operations will receive their Operating assignment as OHB-Low Pressure Area. This will give all men some basic training, under close supervision of older Operators. Men in this classification shall learn fundamentals of gauging, interpreting instrument readings, operation of pumps, turbines and motors, firing furnaces, gas and fire hazards.

Promote from OHB to OHA—Boilers or Thermal Cracker. All men promoted to OHA will be expected to work both OHA jobs satisfactorily.

Promote from OHA to OC. At this point men who receive a permanent OC classification (any assignment except temporary for vacation relief, sickness relief, etc.) in either the L. P. or Cracking group, as determined by the Company, will remain in that group.

LOW PRESSURE AREA

Promote from either OC job to OB-Treater or OB-Crude Distillation. For promotion to OB-Treater, man must have worked OC-Gauger job satisfactorily. For promotion to Crude Distillation, man must have worked OC-Caustic Treating job satisfactorily. Upon being permanently assigned OB (any assignment except temporary for vacation relief, sickness relief, etc.) the man will remain in that line of progression; i.e., to OA-Gauger, to HOB-Pumper. All men perma-

nently assigned OB-Crude Distillation remain in that line of progression; i.e., HOC-Perco or Boilers. All men to go to HOB-Crude Distillation must have satisfactorily performed HOC-Perco Plant job.

CRACKING AREA—

OC to OB. To be promoted from OC to OB, man must have worked two OC jobs satisfactorily.

To be promoted from OB to OA or HOC, a man must have worked two OB jobs satisfactorily.

With Company approval, a man may be permitted to move from OB-Alkylation Plant and Gas Recovery to HOC-Alkylation Plant without working the OA job—Cat Cracker. A man may be permitted to move from OB-Thermal Cracker to HOC-Thermal Cracker without working the OA job—Cat Cracker. These moves may be made only in line with seniority and ability.

All moves to HOC-Cat Cracker require that man must have worked OA-Cat Cracker satisfactorily.

From HOC, promotion will be made according to seniority and ability to HOB-Alkylation Plant and Gas Recovery or to HOA-Cat Cracker or Thermal Cracker.

From HOB-Alkylation Plant and Gas Recovery to HOA-Cat Cracker, if man has worked HOC-Cat Cracker satisfactorily, or to HOA-Thermal Cracker, if man has worked HOC-Thermal Cracker satisfactorily.

In the event that any Operator desires to

change from one area to another, he may do so with Company approval.

No such change will be permitted until the man has reached the level of OB or higher.

At the time the change is made, the man will be placed in the area to which he transfers just under the youngest Operator C in that area. For promotional purposes, his seniority date in the area will be the effective date of his transfer.

AGREEMENT

1955-1956

BETWEEN

STANDARD OIL COMPANY
OF TEXAS

AND

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552
(A. F. of L.)

EL PASO, TEXAS

EL PASO  PRINTING COMPANY

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AGREEMENT

Between

STANDARD OIL COMPANY OF TEXAS
and

INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 8th day of March, 1955, between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Laboratory, Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I

This agreement shall be effective as of March 1, 1955 and shall remain in effect until February 29, 1956, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing, of its intention to terminate the agreement, at least sixty (60) days prior to the first day of any contract year; provided, however, that either party may

notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

ARTICLE II

1. A regular work day shall consist of eight (8) consecutive hours in any 24 hour period, exclusive of lunch periods. The lunch periods, for day workers, will be from 12:00 to 12:30 P.M. when consistent with the work at hand.

2. A work week shall consist of seven (7) consecutive days, commencing at 12:01 A.M. Monday.

3. The Company will establish weekly work schedules consistent with operating requirements to permit regular and consecutive days off. No employee shall be required to take time off on his regular work schedule because of previously worked overtime, nor shall any employee lose any time because of a change in the work schedule.

ARTICLE III

1. (a) Wage rates shall be those for work performed in the Company's present job classifications, set forth as Exhibit "A"; or any wage rate or classification mutually agreed to hereafter.

(b) Company wage schedules show shift differentials, where applicable, at

the bottom of the wage schedule. The shift differentials are in addition to the basic daily rates. They apply to all employees who work any time other than on day shifts.

2. Overtime rate shall be $1\frac{1}{2}$ times the regular rate and shall be paid for:

(a) All work done in excess of eight (8) hours in any 24-hour period, or

(b) All work done in excess of forty (40) hours in any work week, or

(c) All work done on first off day at Company's request, or

(d) The first shift of rearranged work schedule, if the employee whose shift is changed shall not have been notified at least forty (40) hours prior to the beginning of the first shift.

3. An employee who is called out to work and who reports for such work, shall receive a minimum of four (4) hours' pay at straight time rates, or time and one-half for work performed, whichever amount is greater.

4. Double time (two times the base rate) shall be paid for work done on the second off day, where a minimum of four (4) hours on the first off day is also worked, and these off days are consecutive calendar days. For the purpose of double time payment only, both off days will start at 12:01 A.M. and end at 12:00 midnight the same day. These off days need not fall in the same work week.

5. Where an employee works in two classifications in one day, and works less than a half day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day

at the lower rate. If he works one-half day or more in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

6. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

7. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs dependent upon the time thus worked. The principle outlined in paragraph 5 will be used in determining whether they will receive pay for one-half of a day or a full day at the highest rate on each day of broken time. Seniority and ability shall be followed in selecting these men.

ARTICLE IV

1. The provisions of Article II and Article III, relating to hours and days of work and to wage rates, may be opened by either party for further negotiations at successive intervals of six (6) months from date of contract.

2. Written notice of intention to open negotiations shall be given thirty (30) days prior to expiration of any six (6)

months period, and negotiations shall be commenced within thirty (30) days after notice has been given. Any agreed changes which may result from such negotiations shall be effective at commencement of six (6) months interval following that of which notice was given, unless the parties shall agree on some other effective date.

ARTICLE V SENIORITY

Section 1 For the purpose of administering this article and Article VI, Seniority of two types shall be considered as stated below:

- a. Refinery Seniority, which shall be based on the date of entering the service of the El Paso Refinery; and
- b. Section Seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

Section 2 For the purpose of this article, the recognized Refinery Sections are:

- a. Operating
- b. Filling and Shipping
- c. Storehouse
- d. Instruments
- e. Electrical
- f. Machinist and Tool Room
- g. Welding
- h. Pipe Fitting, Boiler Making and Utility.

ARTICLE VI PROMOTIONS, DEMOTIONS, LAYOFFS AND REHIRINGS

(Attached to and made a part of this agreement are "Exhibit B," Job Progression Chart—Maintenance-Storehouse, and "Exhibit C," Job

Progression Chart—Operating Sections, showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications.)

Section 1—Promotions

a. All promotions, demotions, placement of men displaced by job terminations, and all filling of vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union that ability must be given consideration in all such moves. Thus, there may be individuals who, through lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

b. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the Section Seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by Management (in advance when possible) why such employee was not selected for such promotion; except that this notification shall not be necessary in the Operating Section for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Section.

c. An employee promoted to a higher

job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights. This will not preclude the employee's right to promotion to some other jobs which he is capable of performing.

Section 2—Layoffs and Rehiring

a. Layoffs for lack of work, and rehiring shall be based on Refinery Seniority.

b. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

c. Regular employees with more than one year and less than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

d. Regular employees with more than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

e. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their Refinery Seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the Military Service. Under emer-

gency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

Section 3—Demotions

a. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the Section Seniority list shall control within each section and the employee with the least Section Seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the Section Seniority list of the rate classification to which demoted for consideration in case a promotional opportunity develops in the rate classification from which demoted.

b. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he may be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater Refinery Seniority than the employee whose demotion would result therefrom. The new position in the new Section Seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his Refinery Seniority.

Section 4—Inter-Section Status

a. For the purpose of administration of Articles V and VI, all employees will be assigned to a specific Refinery Section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load, and Company's evaluation of employee's qualifications and preferences. The order of section assignment and promotion to the Helper A classification will be based on seniority and ability. Section assignment as stated here shall not in any way interfere with Company having employee do any type of Refinery work that in Company's judgment he can do safely.

b. Transfers between Sections may be made, with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with Section Seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

c. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire Section Seniority in the new section nor lose acquired Section Seniority in his regular section. If any temporary transfer is later made permanent, Company records and the Seniority list will so indicate, and the provisions of paragraph "b" above will apply.

ARTICLE VII VACATIONS AND HOLIDAYS

1. Employees who have completed one year's service with the Company shall be given two weeks' vacation with pay each

calendar year. In the fifteenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twenty-fifth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

2. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Armistice Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

If any of these holidays falls on Sunday, the Monday immediately following shall be observed as the holiday.

3. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

4. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive two times their regular straight time pay for the work performed.

5. All regular employees shall receive at least seven paid holidays per year, excluding Armistice Day. Those not so paid under the provisions of paragraph 3 and 4 above, shall receive a day's pay at their regular straight time rate for each such holiday, excluding Armistice day.

6. If, during an employee's vacation period, a recognized holiday occurs on what would have been his regular scheduled work day, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's

pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

ARTICLE VIII

WORKMAN'S COMMITTEE

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of Management at regular monthly intervals for discussion of individual or mutual problems and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

ARTICLE IX

SETTLEMENTS OF DISPUTES AND GRIEVANCES

1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his Foreman or appropriate Supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate Supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher Management if necessary to aid him. If at the conclusion of the discussion with his Supervisor he is not satisfied, the employee shall so state and advise his Supervisor that he is taking the first step in presenting a grievance.

2. Failing to reach a satisfactory under-

standing or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted, or whether said decision shall be arbitrated. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company, thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

2. If agreement on the third arbitrator cannot be reached within fourteen (14) days, the Federal Mediation and Conciliation service shall be asked to submit a

list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

3. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

4. The Arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

ARTICLE X

All benefits arranged by the Company for its employees generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

ARTICLE XI

BULLETIN BOARDS

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE XII

UNION LEAVES OF ABSENCE

If plant conditions permit, leaves of absence of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which case not more than thirty (30) days) for

the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than four employees, provided that not more than two employees shall be granted a simultaneous leave.

ARTICLE XIII

RESIGNATION TO ENTER THE EMPLOYMENT OF THE UNION

If any member of the Union shall request a special leave of absence from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within one year from date of start of such leave, will be considered and accepted on the following conditions:

1. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.
2. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within one year.
3. Applicant, if re-employed within said period of one year, will re-enter the job classification to which his seniority at date of special leave of absence entitles him.
4. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at start of leave.

ARTICLE XIV MISCELLANEOUS AND GENERAL

Section 1—Discrimination

There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

Section 2—Conference During Working Hours

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

Section 3—Clothing

a. Protective clothing, including welder's gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

b. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

Section 4—Distribution of Overtime

a. An effort will be made to equally distribute overtime among employees qualified in the classification in which the overtime occurs. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as possible. When

processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

b. To give effect to paragraph a. above as applied to Refinery operators, the following procedures will be observed:

The operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires, and the regular operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the Company has more than eight (8) hours' advance notice of the absence, or

(3) Where there is an operator on the vacated shift who is breaking in on any job and who is qualified to relieve any job that will provide relief for the vacancy.

In either (1) or (2) the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

Section 5--Civic Duties

Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the

time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

Section 6--Overtime Meals

When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal not to cost over \$3 in place of two separate meals at \$1.50 each. Company may also, at its option, provide employee with a meal allowance of \$1.50 in place of the meal. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company's expense, will be allowed for eating.

Section 7--Voluntary Payroll Deduction of Union Dues

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the Union from their wages, and Company shall remit same to the Secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form a copy of which will be sent to the Union.

Section 8—Strikes and Lockouts

There shall be no cessation of work through strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations relating to hours, days of work and/or wage rates as provided in Article IV and no agreement is reached within ninety days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

Section 9—Smoking Areas

Smoking privileges will be provided for all employees within the Refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

Section 10—Contract Labor

When maintenance work is required, necessitating the use of contract labor, an effort will be made to up-grade, temporarily, qualified maintenance employees prior to securing contract labor in these higher classifications.

Section 11—Reprimands

a. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

b. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two copies of the written record of this final warning. The additional copy may be provided

the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

Section 12—Miscellaneous

a. No employee shall be required to write or affix his signature to any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

b. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

c. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining, the Union.

ARTICLE XV

If any of the provisions of this contract shall be held invalid by any Governmental authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XVI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered

and postage paid, and addressed by one party to the other as follows:

International Union of Operating
Engineers, Local No. 552
6326 St. Lo Road
El Paso, Texas

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be executed by their duly authorized representatives the day and year first above written.

STANDARD OIL COMPANY OF TEXAS
By M. P. Paret, Jr., Vice President

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL UNION
NO. 552

By J. M. Pickle, President
Carl Hofmann, Secretary

EXHIBIT "A"

REFINERY CLASSIFIED OPERATING & MECHANICAL WAGE SCHEDULE

Effective March 1, 1955

(Contains revisions made and agreed to
March 18, 1955)

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A Catalytic Cracker Thermal Cracker	HOA	\$2.6088	\$20.87
Head Operator B Gas Recovery-Alkylation Pumping Crude Distillation	HOB	2.5763	20.61
Head Operator C Catalytic Cracker Alkylation Perco Desulfurizer High Pressure Boilers Thermal Cracker	HOC	2.5225	20.18
Operator A Catalytic Cracker Gauging	OA	2.4250	19.40
Operator B Gas Recovery-Alkylation Compressors Thermal Cracker Crude Distillation Treating Plant	OB	2.3600	18.88
Operator C Catalytic Cracker Alkylation Caustic Treating Gas Recovery Gauging	OC	2.2638	18.11
Operator Helper A High Pressure Boilers Thermal Cracker	OHA	2.2425	17.94
Operator Helper B Crude Distillation	OHB	2.1738	17.39

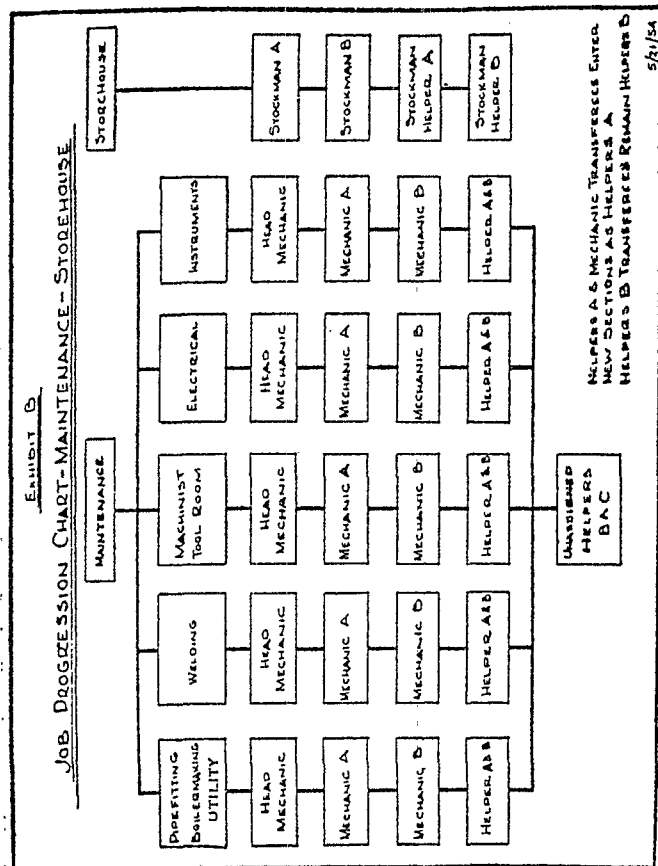
MAINTENANCE DIVISION

Classification	Hourly Rate	Daily Rate
Head Mechanic	\$2.6088	\$20.87
Mechanic A	2.5225	20.18
Stockman A	2.5225	20.18
Mechanic B	2.2950	18.36
Stockman B	2.2950	18.36
Stockman Helper A	2.1200	16.96
Helper A	2.1200	16.96
Stockman Helper B	1.9600	15.68
Helper B	1.9600	15.68
Helper C	1.7775	14.22
Laborer	1.5463	12.37

FILLING & SHIPPING

Finished Stock Gauger	2.2638	18.11
Carloader Senior	2.2638	18.11
Carloader A	2.0500	16.40
Carloader B	1.9600	15.68
Helper C	1.7775	14.22

Employees who work any time other than day shift will receive, in addition to the above rates, 6c an hour for the afternoon shift, or 12c an hour for the morning shift.



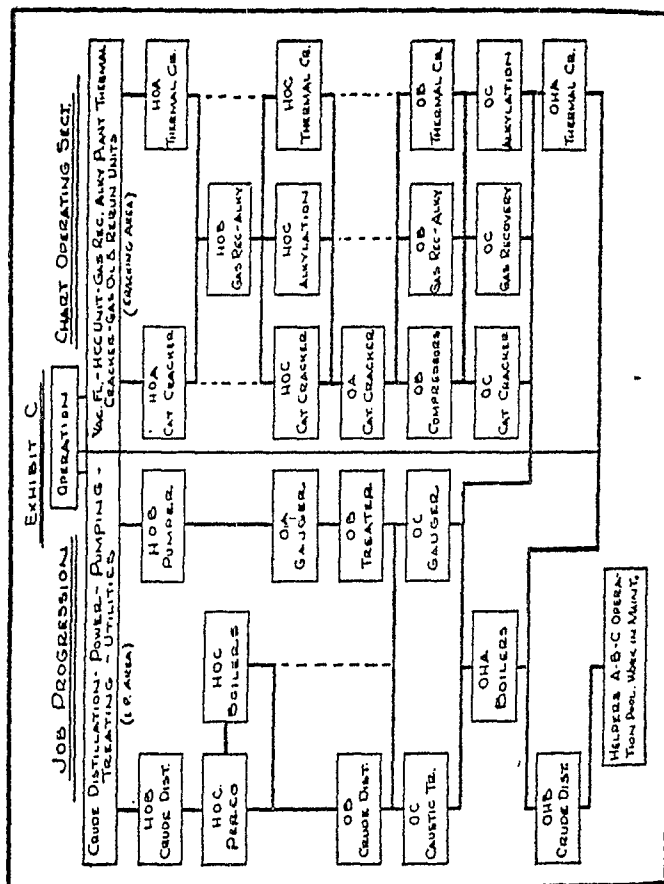


EXHIBIT "C"

PROGRESSION & TRANSFERS WITHIN THE OPERATING SECTION

All men hired for Operations, or men transferring from another section to Operations will receive their first Operating assignment as OHB-Low Pressure Area. This will give all men some basic training under close supervision of older Operators. Men in this classification shall learn fundamentals of gauging, interpreting instrument readings, operation of pumps, turbines and motors, firing furnaces, gas and fire hazards.

Promote from OHB to OHA—Boiler or Thermal Cracker. All men promoted to OHA will be expected to work both OHA jobs satisfactorily.

Promote from OHA to OC. At this point men who receive a permanent OC classification (any assignment except temporary for vacation relief, sickness relief, etc.) in either the L.P. or Cracking group, as determined by the Company, will remain in that group.

LOW PRESSURE AREA

Promote from either OC jb to OB-Treater or OB-Crude Distillation. For promotion to OB-Treater, man must have worked OC-Gauger job satisfactorily. For promotion to Crude Distillation, man must have worked OC-Caustic Treating job satisfactorily. Upon being permanently assigned OB (any assignment except temporary for vacation relief, sickness relief, etc.) the man will remain in that line of progression; i.e., to OA-Gauger, to HOB- Pumper. All men permanently assigned OB-Crude

Distillation remain in that line of progression; i.e., HOC-Perco or Boilers. All men to go to HOB-Crude Distillation must have satisfactorily performed HOC-Perco Plant job.

CRACKING AREA

OC to OB. To be promoted from OC to OB, man must have worked two OC jobs satisfactorily.

To be promoted from OB to OA or HOC, a man must have worked two OB jobs satisfactorily.

With Company approval, a man may be permitted to move from OB-Alkylation Plant and Gas Recovery to HOC-Alkylation Plant without working the OA job-Cat-Cracker. A man may be permitted to move from OB-Thermal Cracker to HOC-Thermal Cracker without working the OA job-Cat Cracker. These moves may be made only in line with seniority and ability.

All moves to HOC-Cat Cracker require that man must have worked OA-Cat Cracker satisfactorily.

From HOC, promotion will be made according to seniority and ability to HOB-Alkylation Plant and Gas Recovery or to HOA-Cat Cracker or Thermal Cracker.

From HOB-Alkylation Plant and Gas Recovery to HOA-Cat Cracker, if man has worked HOC-Cat Cracker satisfactorily, or to HOA-Thermal Cracker, if man has worked HOC-Thermal Cracker satisfactorily.

In the event that any Operator desires to change from one area to another, he may do so with Company approval.

No such change will be permitted until

the man has reached the level of OB or higher.

At the time the change is made, the man will be placed in the area to which he transfers just under the youngest Operator C in that area. For promotional purposes, his seniority date in the area will be the effective date of his transfer.

COPY OF ORDER
TO BE RETAINED BY PARTY
DRAWING ORDER

 SOT 25089



ISSUING POINT

DATE _____

19 31

FOR VENDORS USE ONLY

INV.
DATE

INV.
No.

**CASH
TERMS**

SHOW FULL NAME AND ADDRESS ABOVE

SHIP TO
AND MARK
ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF

DEPARTMENT

DESTINATION

PREPAID

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

[illegible]

CHEV B8 7302

ACCEPTED

Contractor's or Supplier's Signature

P. O. BOX 862
EL PASO, TEXAS



**COPY OF ORDER
TO BE RETAINED BY PARTY
DRAWING ORDER**



 SOT 25090

ISSUING POINT

DATE

*Above Order Number with prefix must appear
on all Packages, Shipping Papers and Invoices*

FOR VENDORS USE ONLY

INV.
DATE
CASH
TERM

INV.
No.

**CASH
TERMS**

SHOW FULL NAME AND ADDRESS ABOVE

SHIP TO
AND MARK
ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF A. J. McLaughlin

DEPARTMENT

DESTINATION

PREPAID

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

[illegible]

CHEV B8 7303

ACCEPTED

Contractor's or Supplier's Signature

30-B-A(TX)

QUINTUPLICATE

INVOICES AND SHIPPING PAPERS TO

STANDARD OIL CO. OF TEXAS

P. O. BOX 862

EL PASO, TEXAS



QUINTUPLICATE

COPY OF ORDER

TO BE RETAINED BY PARTY
DRAWING ORDER

ORDER & PREFIX

SOT 25070

**ISSUING POINT**

DATE _____

19

*Above Order Number with prefix must appear
on all Packages, Shipping Papers and Invoices*

FOR VENDORS USE ONLY

INV.
DATE

INV.
No.

**CASH
TERMS**

SHOW FULL NAME AND ADDRESS ABOVE

SHIP TO
AND MARK
ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF

DEPARTMENT

DESTINATION

PREPAID

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

[illegible]

Vendor agrees in accepting this order to hold this Company absolutely free and harmless from any and all loss, damage or injury, to defend at its own expense any and all suits or actions, and to pay any judgments against this Company arising out of alleged infringements of patent rights by the whole or any portion of the goods herein described.

Acceptance of this order signifies your warranty that the prices charged hereunder are in accordance with any and all applicable price regulations.

If Section 104 of the Renegotiation Act of 1951 applies to this order, this contract shall be deemed to contain all of the provisions required by said section.

THE GENERAL TERMS ON THE REVERSE SIDE HEREOF ARE HEREBY
 MADE A PART OF THIS ORDER.

CHARGE TO

DATE RECEIVED

RECEIVED VIA

ALLIED BY

FRT. BILL DATE

FRT. BILL No.

CHEV B8 7304

ACCEPTED

Contractor's or Supplier's Signature

P. O. BOX 862
EL PASO, TEXAS



QUINTUPLICATE

COPY OF ORDER
TO BE RETAINED BY PARTY
DRAWING ORDER

ORDER & PREFIX

 **SOT** 25069



ISSUING POINT

DATE _____

Above Order Number with prefix must appear on all Packages, Shipping Papers and Invoices

FOR VENDORS USE ONLY

INV.
DATE

INV.
No.

**CASH
TERMS**

SHOW FULL NAME AND ADDRESS ABOVE

SHIP TO
AND MARK
ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF

DEPARTMENT

DESTINATION

PREPAID

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

[illegible]

CHEV B8 7305

ACCEPTED

Contractor's or Supplier's Signature

INVOICES AND SHIPPING PAPERS TO
STANDARD OIL CO. OF TEXAS

P. O. BOX 862
EL PASO, TEXAS



COPY OF ORDER
TO BE RETAINED BY PARTY
DRAWING ORDER

ORDER & PREFIX

SOT 25068

EL PASO TEXAS

9-5 1956



ISSUING POINT

DATE

STANDARD OIL COMPANY OF TEXAS

P.O. Box 161

EL PASO TEXAS

Above Order Number with prefix must appear
on all Packages, Shipping Papers and Invoices

FOR VENDORS USE ONLY

INV.

INV.

DATE

No.

CASH

TERMS

SHOW FULL NAME AND ADDRESS ABOVE

SHIP TO

AND MARK

ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF J. H. C. B. S. E. N.

DEPARTMENT

DESTINATION

PREPAID

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	DESCRIPTION OF MATERIAL OR WORK TO BE PERFORMED	FOR VENDORS USE ONLY	
				UNIT PRICE	AMOUNT
			100000 LBS. EQUIPMENT SURGEON TO 100000 LBS. EQUIPMENT SURGEON FOR 100000 LBS. EQUIPMENT SURGEON		
			SUBMIT ONLY RECEIPTS - LISTING No. OF SPECS. FORWARDED; NO. OF SPECS. FORWARDED. ALSO INCLUDED THE PAPER DETAIL No. OF THE FORWARDED SPECS.		
			THIS WORK TO BE DONE PER COST PLUS (CONTRACT-STD 739.		

Vendor agrees in accepting this order to hold this Company absolutely free and harmless from any and all loss, damage or injury, to defend at its own expense any and all suits or actions, and to pay any judgments against this Company arising out of alleged infringements of patent rights by the whole or any portion of the goods herein described.
Acceptance of this order signifies your warranty that the prices charged hereunder are in accordance with any and all applicable price regulations.
If Section 104 of the Renegotiation Act of 1951 applies to this order, this contract shall be deemed to contain all of the provisions required by said section.

THE GENERAL TERMS ON THE REVERSE SIDE HEREOF ARE HEREBY
MADE A PART OF THIS ORDER.

CHARGE TO R. 911-4

DATE RECEIVED

RECEIVED VIA

TALLIED BY

T. BILL DATE

FRT. BILL No.

CHEV B8 7306

AMOUNT

SALES TAX

FREIGHT
CHARGES

TOTAL

ACCEPTED

Contractor's or Supplier's Signature

O-5-A(TX)

QUINTUPPLICATE

FORWARD ALL CORRESPONDENCE
INVOICES AND SHIPPING PAPERS TO
STANDARD OIL CO. OF TEXAS

P. O. BOX 862
EL PASO, TEXAS



QUINTuplicate

COPY OF ORDER
TO BE RETAINED BY PARTY
DRAWING ORDER

ORDER & PREFIX

SOT 25064

ISSUING POINT

DATE



Above Order Number with prefix must appear
on all Packages, Shipping Papers and Invoices

FOR VENDORS USE ONLY

INV.
DATE

INV.
No.

CASH
TERMS

SHIP TO

AND MARK

ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS, ATTENTION OF *J.H. Casen*

DEPARTMENT *PIPE*

DESTINATION *EL PASO TEXAS*

PREPAID

AUGUST 24, 1946

SHIP VIA

COLLECT

DATE REQUIRED AT DESTINATION

NOT VALID FOR PURCHASE OF MATERIALS OR EQUIPMENT HAVING A VALUE IN EXCESS OF \$100

QUANTITY ORDERED	QUANTITY SHIPPED	UNIT	DESCRIPTION OF MATERIAL OR WORK TO BE PERFORMED	FOR VENDORS USE ONLY	
				UNIT PRICE	AMOUNT
			<i>Please furnish labor, equipment and supervision to install 12 inch basin with 5000 ft. pipe from between 5000 ft. West Production camp on PG-12446-0 & existing Prod. Desulfurizer steel line shown on GA-1000 30-6. Copies of both drawings are attached.</i>		
			<i>Work to be done per Cost Plus Contract STD-237</i>		

Vendor agrees in accepting this order to hold this Company absolutely free and harmless from any and all loss, damage or injury, to defend at its own expense any and all suits or actions, and to pay any judgments against this Company arising out of alleged infringements of patent rights by the whole or any portion of the goods herein described. Acceptance of this order signifies your warranty that the prices charged hereunder are in accordance with any and all applicable price regulations. If Section 104 of the Renegotiation Act of 1951 applies to this order, this contract shall be deemed to contain all of the provisions required by said section.

THE GENERAL TERMS ON THE REVERSE SIDE HEREOF ARE HEREBY
MADE A PART OF THIS ORDER.

CHARGE TO *1507-8*

DATE RECEIVED

RECEIVED VIA

TALLIED BY

AT. BILL DATE

FRT. BILL No.

CHEV B8 7307

AMOUNT

SALES TAX

FREIGHT
CHARGES

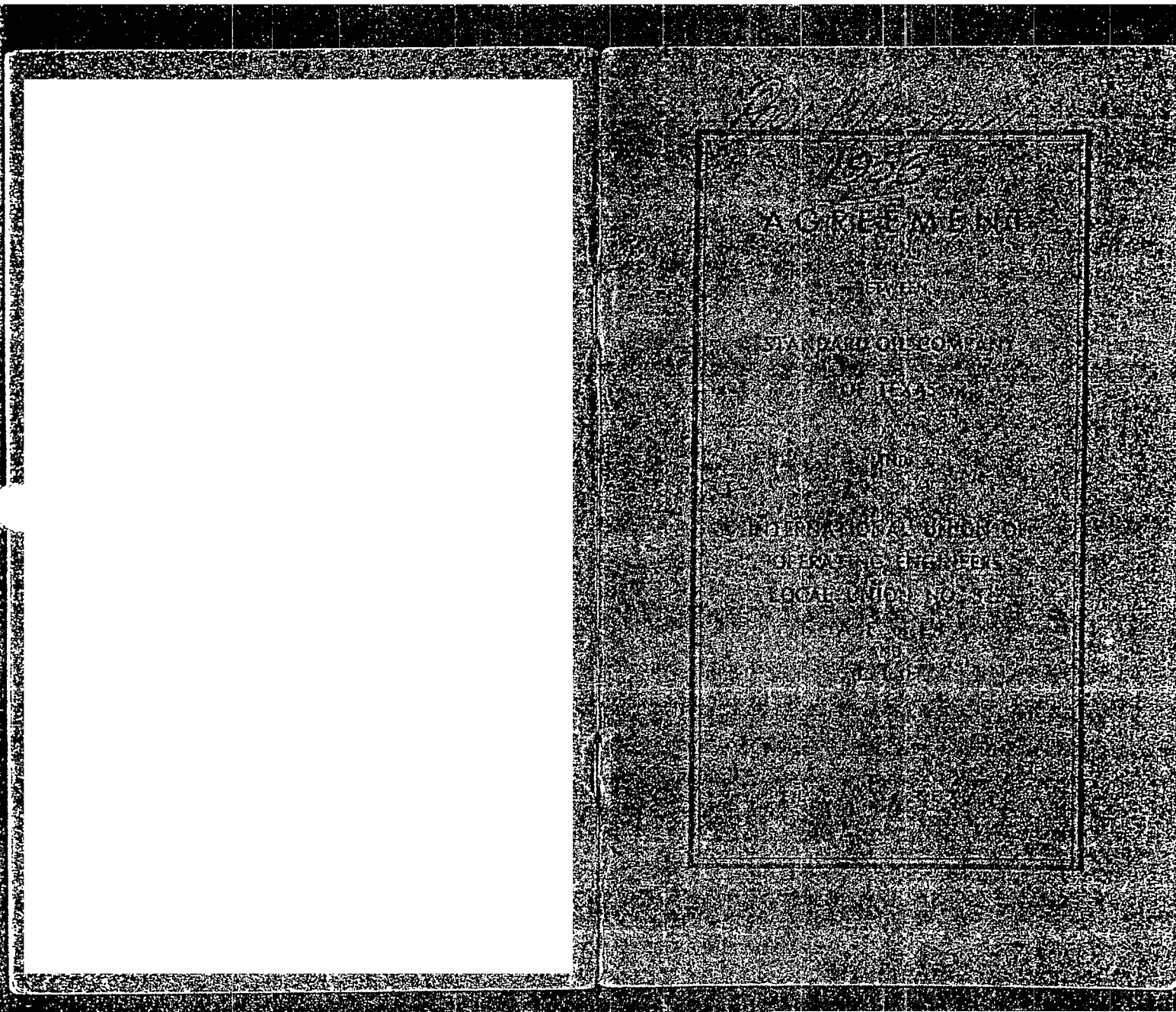
TOTAL

ACCEPTED

Contractor's or Supplier's Signature

10-3-A(TX)

QUINTuplicate



CHEV B8 7308

Question:
in case of a person working
as day off 4-12 Shift shall
we follow the requirement of
giving a 12-E vacancy to operator
handling the job. INDEX thereby requiring
that we pay double time.

ARTICLE SUBJECT PAGE

—	Recognition of Union	1
I	Period of Agreement & Wage Clause Negotiations	1
II	Work Day, Work Week & Work Schedules	2
III	Wage Rates, Overtime & Extra Compensation	3
IV	Seniority	7
V	Promotions, Demotions, Layoffs & Rehiring	8
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IX	Settlement of Disputes & Grievances	19
X	Saving Clause	21
XI	Notices, Procedure for Handling....	21
—	Wage Schedules	23
—	Job Progression Chart	25

AGREEMENT

Between
STANDARD OIL COMPANY OF TEXAS
and
INTERNATIONAL UNION OF
OPERATING ENGINEERS
LOCAL UNION NO. 552

THIS AGREEMENT is made and entered into this 31st day of May, 1956, between Standard Oil Company of Texas, with a refinery at El Paso, Texas, herein referred to as the "Company," and International Union of Operating Engineers, Local No. 552, herein referred to as the "Union."

WITNESSETH:

RECOGNITION OF UNION

The Company recognizes the Union as exclusive representative of all employees of the Company's El Paso Refinery except Laboratory, Clerical, Supervisory, Administrative, and Technical, for the purpose of collective bargaining with respect to wages, hours and other conditions of employment, subject to and in accordance with the provisions of the National Labor Relations Act, amended by the Labor-Management Relations Act.

ARTICLE I

PERIOD OF AGREEMENT AND WAGE CLAUSE NEGOTIATIONS

A. This agreement shall be effective as of March 1, 1956 and shall remain in effect until February 28, 1957, and shall be automatically renewed for consecutive periods of one (1) year each thereafter, unless either party shall notify the other in writing, of its intention to terminate the agreement, at least sixty (60) days prior to

the first day of any contract year; provided, however, that either party may notify the other party in writing, at least sixty (60) days prior to the first day of any contract year, of its desire to change, amend, or omit any article or articles contained in said agreement, and the serving of such notice shall have the effect of annulling the said article if no agreement is reached within sixty (60) days after the termination date of the agreement. The remainder of the contract shall be automatically renewed unless notice is given of intention to terminate the entire contract as hereinabove provided.

B. The provisions of Article II and III, relating to hours and days of work and to wage rates, may be opened one time by either party, for further negotiations at any time during the contract year; and negotiations shall commence within thirty days after notice has been given. Any agreed changes which may result from such negotiations shall be effective on the date mutually agreed upon.

ARTICLE II

WORK DAY, WORK WEEK AND WORK SCHEDULES

A. A regular work day shall consist of eight (8) consecutive hours in any calendar day, whether paid at straight or premium rate, exclusive of lunch periods. The lunch periods, for day workers, will be from 12:00 to 12:30 P.M., when consistent with the work on hand. The normal shift for regular day workers will be No. 2 Shift, 8:00 A.M. to 4:30 P.M.

B. A work week shall consist of seven (7) consecutive days, commencing at 12:01 A.M. Monday.

C. A regular weekly work schedule shall consist of five (5) regular work days with ~~two consecutive days off~~. The Company will establish regular weekly work schedules, consistent with operating requirements, to permit consecutive days off. No employee shall work less than a regular weekly work schedule. In determining the regular weekly work schedule, excused absences (such as sickness, personal leave, etc., whether paid or unpaid) on regular scheduled work days, shall count as days worked.

ARTICLE III

WAGE RATES, OVERTIME AND EXTRA COMPENSATION

A. WAGE RATES, EXHIBITS, SHIFT DIFFERENTIALS.

1. a. Wage rates shall be those for work performed in the Company's present job classifications as set forth in Exhibit "A", or any wage rate or classification mutually agreed to hereafter.

b. Company wage schedules show shift differentials, where applicable, at the bottom of the wage schedule. The shift differentials are in addition to the basic daily rates. They apply to all employees who work any time other than on day shifts.

2. a. Where an employee works in two classifications in one day, and works less than a half day in the classification carrying a higher rate than the classification in which he works the balance of the day, he shall be paid for one-half a day at the high rate and the other half day at the lower rate. If he works one-half day or more

CHEV B8 7311

in the classification carrying the higher rate of pay than in the classification in which the balance of the day is worked, he will be paid a full day at the higher rate.

b. When a man regularly employed in a higher pay bracket is called upon to relieve a man in a lower classification, because of an emergency situation, he will not be reduced in pay in cases where he might otherwise have continued to work at the higher pay. This is not intended to apply to changes from a higher to lower classification occasioned by the normal fluctuation in work.

3. An employee promoted to a higher classification shall be paid at the rate of that classification upon starting such work.

4. Employees of the Helper group, who are required to fill in temporarily in other classifications, shall be paid the rates applicable to those jobs, dependent upon the time thus worked. The principle outlined in paragraph 2. a. will be used in determining whether they will receive pay for one-half of a day or a full day at the highest rate on each day of broken time. Seniority within the group working on the specific job involved, and ability shall be followed in selecting these men.

B. OVERTIME, EXTRA COMPENSATION AND OTHER PREMIUM PAY.

1. a. Overtime rate (1½ times the regular rate), except as specified below in b. and c., shall be paid for all work performed outside of or in excess of the regular weekly work schedule ("K" time).

b. Overtime rate (2 times the regular rate) shall be paid for:

- (1) All hours worked in excess of 16

consecutive hours; i.e. beginning on the 17th consecutive hour ("K-D" time).

(2) All hours worked on the second day off, where a minimum of four (4) hours on the first off day is also worked, and these off days are consecutive calendar days but need not fall within the same work week ("K-D" time). For purposes of double-time payment only, both off days will start at 12:01 A.M. and end at 12 midnight the same day.

c. An employee who is called out to work and who reports for such work, shall receive a minimum of four (4) hours pay at straight time rates, or time-and-one-half for work performed, whichever amount is greater ("Q" time); except that he shall be paid at double-time rate where b. above applies.

2. a. Extra compensation (½ times the regular rate) shall be paid in addition to the regular rate, for hours worked on a regular, scheduled work day, under the following conditions:

(1) For the first shift of rearranged work schedule, without the required 40 hours notice prior to the beginning of first shift ("M" time).

(2) Time worked in excess of eight (8) hours in any twenty-four (24) hour period, other than overtime as defined in 1. a. and b. above ("N" time).

C. DISTRIBUTION OF OVERTIME.

1. An effort will be made to distribute overtime equally among employees qualified in the classification in which the overtime occurs. Any employee who is to be absent from his assigned shift will notify the Company as far in advance of such absence as

possible. When processing operations are temporarily halted for the shift on which the regularly assigned employee fails to report for work, the Company may determine whether or not it is necessary to fill this vacancy.

2. To give effect to paragraph 1. above, as applied to Refinery Operators, the following procedures will be observed:

a. The Operator handling the job on the shift preceding the vacant shift will be asked to work the additional shift. In this case he may work the entire shift; or half of it, if he so desires and the regular Operator on the shift following the vacated shift is willing to work the other half. This provision will not apply:

(1) Where the Operators referred to above have worked more than twelve (12) hours in the preceding twenty-four (24) hours, or

(2) Where the Company has more than eight (8) hours' advance notice of the absence, or

(3) Where there is an Operator on the vacated shift who is breaking in on any job and who is qualified to relieve any job that will provide relief for the vacancy.

(4) In either (1) or (2) above the job will be filled with an employee in the same classification when such qualified employee is available, having the least amount of overtime to his credit.

D. OVERTIME MEALS.

1. When employees are required to work overtime more than two (2) hours beyond their regular scheduled quitting time, meals at the Company's expense shall be considered due upon the completion of the first

two (2) hours of such overtime and at intervals of each four (4) hours of continuous overtime thereafter. The cost of meals so provided shall not exceed \$1.50 each.

2. When it is definitely known in advance that an employee will work over six hours overtime, Company may provide him with one meal not to cost over \$3 in place of two separate meals at \$1.50 each. Company may also, at its option, provide employee with a meal allowance of \$1.50 in place of the meal.

3. When the meal is furnished by the Company for Maintenance personnel, a work stoppage of thirty (30) minutes, at Company's expense, will be allowed for eating.

ARTICLE IV SENIORITY

A. For the purpose of administering this article and Article V, Seniority of two types shall be considered as stated below:

1. Refinery Seniority, which shall be based on the date of entering the service of the El Paso Refinery; and

2. Section Seniority, which shall be based on the date Company assigns an employee to a definite section as defined in this article.

B. For the purpose of this article, the recognized Refinery Sections are:

1. Operating
2. Filling and Shipping
3. Storehouse
4. Instruments
5. Electrical
6. Machinist and Tool Room
7. Welding
8. Pipe Fitting, Boiler Making and Utility.

ARTICLE V
PROMOTIONS, DEMOTIONS, LAYOFFS
AND REHIRINGS

(Attached to and made a part of this Agreement are "Exhibit B," Job Progression Chart — Maintenance-Storehouse, and "Exhibit C," Job Progression Chart—Operating Section, showing job classifications and the normal progression and regression paths between the various classifications and groups of classifications.)

A. PROMOTIONS.

1. All promotions, demotions, placement of men displaced by job terminations, and all filling of vacancies shall be based on seniority and ability. It is the intent to give every employee an opportunity to progress into higher jobs in line with his seniority. It is mutually recognized, however, by the Company and the Union that ability must be given consideration in all such moves. Thus, there may be individuals who, thru lack of knowledge, skill or efficiency on the job, are not capable of handling the higher skilled jobs, but who are capable of satisfactorily handling some of the intermediate or lower jobs.

2. When an employee is not progressing or performing his work in a satisfactory enough manner, he will be so informed. When a promotion is made and the employee promoted is not the highest on the Section Seniority list of the next lower applicable rate classification, any employee higher on such rate classification and eligible for consideration for such promotion will be advised by Management (in advance when possible) why such employee was not selected for such promotion; (ex-

cept that this notification shall not be necessary in the Operating Section for promotions made in accordance with "Exhibit C," Job Progression Chart—Operating Section.)

3. An employee promoted to a higher job and failing to perform satisfactorily on it, will be allowed to return to the job previously held by him, without loss of seniority rights. This will not preclude the employee's right to promotion to some other jobs which he is capable of performing.

4. Where employees are temporarily transferred or assigned to areas or organizations outside of the bargaining unit, they shall be allowed to return within a 2-year period to the job that their seniority and ability would have entitled them to, had they remained in the Refinery organization.

5. Promotions from Helper "B" to Helper "A" and from Mechanic "B" to Mechanic "A" are to be made solely on the basis of refinery service and not on the basis of performance of a higher or different classification of work. Helpers "B" will be promoted to Helpers "A" upon the completion of 12 months of service in the Refinery Maintenance Division. Mechanics "B" will be promoted to Mechanics "A" upon the completion of:

a. 12 months service as Mechanic "B", and

b. 60 months of service in the Refinery Maintenance Division, including any service as Mechanic "B".

6. The Company will maintain a minimum of 60% overall Mechanic-to-Helper ratio for the Refinery as a whole, provided there are Mechanic Helpers who are qualified to be Mechanics.

Handwritten notes:
The purpose is... are available
so that we do not have to perform mechanics work
...predominant

Handwritten notes:
...contribution
...such
...an
...Inspector
...started
...for
...time
...of progress

Handwritten note:
New

B. LAYOFFS AND REHIRING.

1. Layoffs for lack of work, and rehiring shall be based on Refinery seniority.

2. Regular employees with less than one year's continuous service, who are laid off for lack of work, will have continuous service if rehired within 13 weeks after the last day worked.

3. Regular employees with more than one year and less than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within 26 weeks after the last day worked.

4. Regular employees with more than five years' continuous service, who are laid off for lack of work, will have continuous service if rehired within one year after the last day worked.

5. In case of re-employment, employees who have been laid off shall be notified by registered letter at their last known address, in order of their Refinery Seniority of qualified men, to report for work. In the event any employee so notified shall fail to report for work within ten days of date of notice, such employee's seniority shall be terminated, provided he is not prevented from reporting because of sickness, death, or emergency involving himself or his immediate family, and so notifies the Company within five days. This does not apply to men who are replacing men in the Military Service. Under emergency conditions, temporary men may be used until former employees on the rehiring list have reported for work.

C. DEMOTIONS.

1. In making demotions because of curtailment of work and not because of an employee's deficiency, position on the Section Seniority list shall control within each section and the employee with the least Section Seniority in each rate classification affected shall be the first demoted from the rate classification to the next lower applicable rate classification, provided the employee who displaces him is qualified for the work and except that the Company may retain a sufficient number of qualified men on necessary operations to permit continued efficient operation. Such demoted employees shall be placed at the top of the Section Seniority list of the rate classification to which demoted for consideration in case a promotional opportunity develops in the rate classification from which demoted.

2. If an employee being demoted because of curtailment of work has previously worked in another section than that in which he is then working, he may be transferred to such rate classification in such other section for which he is qualified by experience and training provided he has greater Refinery Seniority than the employee whose demotion would result therefrom. The new position in the new Section Seniority list shall be at the bottom of the rate classification to which transferred, except that in event of layoffs because of lack of work, in the new section, the transferred employee shall retain his position in the new section according to his Refinery Seniority.

D. INTER-SECTION STATUS

1. For the purpose of administration of Articles IV and V, all employees will be as-

3.185 2nd year
3.03 1st year

signed to a specific Refinery Section within one year of date of employment in Company's Refinery. Section assignment will be made by Company based on work load and Company's evaluation of employee's qualifications and preferences. The order of section assignment will be based on seniority and ability. Section assignment as stated here shall not in any way interfere with Company having employee do any type of Refinery work that in Company's judgment he can do safely. *MAINT. WITHOUT LOSS OF CLASSIFICATION*

2. Transfers between sections may be made, with Company approval. In all cases of permanent transfer between sections, the transferred employee will enter the new section with Section Seniority dating from the date of entering the new section, and he will relinquish all seniority in the former section.

3. Temporary inter-section transfers may be made, for short periods of time. Company records will clearly indicate the temporary nature of such transfers. The employee will not acquire Section seniority in the new section nor lose acquired Section seniority in his regular section. If any temporary transfer is later made permanent, Company records and the Seniority list will so indicate, and the provisions of paragraph 2. above will apply, except as provided in the last sentence of paragraph 1. Section C. above.

ARTICLE VI VACATIONS, HOLIDAYS AND FRINGE BENEFITS

A. VACATIONS.

Employees who have completed one year's service with the Company shall be given

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100th year

two weeks' vacation with pay each calendar year. In the fifteenth calendar year and in each calendar year thereafter, employees will be given three weeks' vacation with pay. In the twenty-fifth calendar year and in each calendar year thereafter, employees will be given four weeks' vacation with pay. Operating needs are controlling as to when a vacation may be taken.

B. HOLIDAYS

1. The following holidays shall be observed:

New Year's Day	Labor Day
Washington's Birthday	Armistice Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas

a. If any of these holidays falls on Sunday, the Monday immediately following shall be observed as the holiday.

2. Regular employees shall receive their regular pay for holidays observed, when such holidays fall on their scheduled work days.

3. Employees who work on such holidays, whether scheduled or unscheduled work days, shall receive two times their regular straight time pay for the work performed. For the purposes of holiday payments, holidays will be considered as starting at 12:01 A.M. and ending at 12:00 midnight on the days which are observed.

4. All regular employees shall receive at least seven paid holidays per year, excluding Armistice Day. Those not so paid under the provisions of paragraphs 2. and 3. above, shall receive a day's pay at their regular straight time rate for each such holiday, excluding Armistice Day.

5. If, during an employee's vacation period, a recognized holiday occurs, he will be granted an extra day of paid vacation. The Company reserves the right to grant an extra day's pay at the straight time rate in lieu of an extra day of paid vacation, in any case where it considers such action desirable from an operating standpoint.

C. FRINGE BENEFITS

1. All benefit plans arranged by the Company for its employees generally shall be available to employees covered by this agreement. The Company shall make information concerning such benefits available to the employees.

2. The Company will furnish to each employee having one or more years of service, an annual statement showing the employee's current status under the Sick-ness-and-Non-Industrial-Injury Benefit Plan. *Union*
Wants to
know
pay 1/2
the
amount

3. Any employee required to be absent during his regular working schedule on account of jury duty, or required to attend court, or coroner's inquest, or to serve as a witness, shall be allowed the time off necessary to perform this service. An employee shall receive for the time he is thus absent the excess, if any, of his regular pay for such period over the fee received.

ARTICLE VII UNION ACTIVITIES

A. WORKMAN'S COMMITTEE

The Union shall create a Workman's Committee, composed of four employees, who shall meet with representatives of Management at regular monthly intervals

for discussion of individual or mutual problems and to dispose of questions arising under this agreement. Minutes of all such meetings shall be kept and signed by all parties attending. One signed copy shall be furnished for the use of the Union and one for the use of the Company.

B. UNION LEAVES OF ABSENCE

If plant conditions permit, leaves of absence without pay, of not more than fourteen (14) days duration, (except where distances to be traveled require additional time, in which case not more than thirty (30) days for the purpose of attending Union Conferences or Meetings will be granted during any calendar year to not more than four employees, provided that not more than two employees shall be granted a simultaneous leave.

C. LEAVE OF ABSENCE TO ENTER THE EMPLOYMENT OF THE UNION

1. If any member of the Union shall request a special Leave of Absence without pay from his employment with the Company for the purpose of accepting employment with the Union, the application of such member for re-employment, if made within two years from date of start of such leave, will be considered and accepted on the following conditions:

a. That his physical condition shall not have changed materially during the period from date of such special leave to date of application for re-employment.

b. The request for a special leave of absence shall be in writing and shall state the purpose for which it is made and that the employee intends to apply for re-employment within two years.

c. Applicant, if re-employed within said period of two years, will enter the job that his seniority and ability would have entitled him to, had he remained in the Refinery organization.

d. It is understood that all Company benefits, including life insurance, are suspended during the period of such special leave of absence but will become operative again upon re-employment with such service accumulation attained at end of leave.

D. DISCRIMINATION, COERCION OR INTIMIDATION

1. There shall be no discrimination against any employee with respect to his conditions of employment because of his membership in this Labor Union, or on account of any activity undertaken in good faith in his capacity as a representative of other employees.

2. The Union, its officers and members shall not intimidate or coerce employees into joining the Union or continuing their membership therein. Neither shall the employer intimidate or coerce employees into withdrawing from, or refraining from joining, the Union.

E. CONFERENCES DURING WORKING HOURS

Employees, with the approval of the Refinery Manager, may be permitted to confer during working hours with representatives of either Union or Management on matters concerning employer-employee relations without loss of time or pay.

F. BULLETIN BOARDS

The Union shall have the privilege of maintaining for its exclusive use bulletin boards on the premises in places designated

by the Company, for the purpose of posting notices or bulletins. It is understood that nothing of a controversial or political nature shall be posted on such boards.

ARTICLE VIII MISCELLANEOUS AND GENERAL

A. CLOTHING

1. Protective clothing, including welding gloves, sleeves and jackets, will be provided by the Company where needed for personal safety, or where destructive action over and above that encountered in the course of regular employment makes it necessary.

2. The Company shall furnish the employees with an average of up to four pairs of leather-palm gloves per contract year. Before receiving a new pair of gloves, each employee will be required to turn in his old pair.

B. VOLUNTARY PAYROLL DEDUCTION OF UNION DUES

Employees covered by this agreement may authorize the Company in writing on a suitable form to deduct the regular monthly dues of the union from their wages, and Company shall remit same to the Secretary of Local Union No. 552 not later than two weeks after the end of the first payroll period in each month, to cover the dues for the following month. Employees may at any time revoke such authorization by giving the Company written notice on a suitable form, a copy of which will be sent to the Union.

C. STRIKES AND LOCKOUTS

There shall be no cessation of work thru strikes or lockouts during the period of this agreement. If either party notifies the other of its intention to open negotiations

relating to hours, days of work and/or wage rates as provided in Article I and no agreement is reached within ninety (90) days after receipt of such notice, the "No Strike and Lockout" clause shall not be applicable thereafter with respect to disputes arising out of negotiations on these subjects only; all other terms and conditions of this agreement shall remain in full force and effect.

D. SMOKING AREAS

Smoking privileges will be provided for all employees within the Refinery. Smoking areas for different departments will be designated. Smoking is prohibited at all locations not specifically authorized by the Company.

E. CONTRACT LABOR

The Company agrees that it will not contract normal routine maintenance work within the Refinery as long as the Refinery has the necessary men and equipment available to perform such work properly.

F. REPRIMANDS

1. An employee will always be given a copy whenever any record of a reprimand is placed in his personnel file. He is to note on the Company's copy that he received his copy.

2. Whenever an employee is given a final warning that further unsatisfactory conduct will cause dismissal, the Management will give the employee two copies of the written record of this final warning. The additional copy may be provided the Local Union by the affected employee, if he so desires. He is to note on the Company's copy that he has received his copies of the record.

G. INDUSTRIAL INJURIES

An employee who is injured while work-

ing on an off day, and is unable to continue working, will be paid for the unworked remainder of an 8-hour day at the rate of pay he was receiving at the time of injury. *Tuition
used
for this*

H. MISCELLANEOUS

1. No employee shall, as an acknowledgment of guilt, be required to write, or affix his signature to, any letter or printed matter which the Company may use as a means of accumulating information for demoting or lowering his classification.

2. Any employee who accuses another employee of misconduct or mishandling of his duties shall be required to appear before the Workman's Committee, the Management, and the accused to substantiate his accusation.

ARTICLE IX SETTLEMENT OF DISPUTES AND GRIEVANCES

A. 1. Any employee who feels that he has been subjected to unfair or discriminatory treatment with respect to his conditions of employment as set forth in this agreement, shall promptly and personally, within ten days, attempt to adjust the matter with his Foreman or appropriate Supervisor. This shall be done by a full and free discussion of the grievance, and the Foreman or appropriate Supervisor will investigate the circumstances, if not himself sufficiently familiar with the case, and will call upon higher Management if necessary to aid him. If at the conclusion of the discussion with his Supervisor he is not satisfied, the employee shall so state and advise his Supervisor that he is taking the first step in presenting a grievance.

2. Failing to reach a satisfactory understanding or adjustment, the aggrieved employee within five (5) days thereafter shall present in writing his case personally, or through the representative of the Union, to the Refinery Manager. The Refinery Manager shall, within seven (7) days from the date of the presentation of the grievance in writing to him, give to the employee, if he presented his case personally, or to the representative of the Union if such representative presented said grievance, the written answer of the Company to said grievance, and the representative of the Union shall notify the Refinery Manager in writing within seven (7) days from the date on which the Company's answer is given, whether or not the decision of the Company on the grievance will be accepted, or whether said decision shall be arbitrated.

3. If notice of arbitration is given, then the grievance shall be referred to an arbitration committee consisting of three members, one to be appointed by the Union, one to be appointed by the Company, and the third to be selected by the first two. The Union shall appoint its arbitrator and notify the Company thereof, within seven (7) days from the date of giving written notice of intent to arbitrate. The Company likewise shall appoint its arbitrator and notify the Union of its choice within seven (7) days from receipt of notice by the Union of its intent to arbitrate. The Company and Union will equally divide the expenses of the third member, should any be incurred.

4. If agreement on the third arbitrator cannot be reached within (14) fourteen days, the Federal Mediation and Concilia-

tion Service shall be asked to submit a list of five names from which the third arbitrator shall be determined by each party striking one name in alternate manner until only one remains.

B. A majority decision of the Arbitration Committee shall be final and binding on all parties. In such cases, the Company and the Union shall furnish to the Arbitration Committee all information in their possession necessary to a full understanding of the subject matter of the grievance.

C. The Arbitrators shall have authority only to interpret and to make decisions based upon the provisions of this agreement; and shall not have authority to alter any of the terms of the agreement.

ARTICLE X

If any of the provisions of this contract shall be held invalid by any Government authority, such actions shall not invalidate the other provisions hereof.

ARTICLE XI

Notices herein provided may be given by depositing the same in the United States mail in a sealed envelope, registered and postage paid, and addressed by one party to the other as follows:

International Union of Operating
Engineers, Local No. 552
6326 St. Lo Road
El Paso, Texas
Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas
Attention: Refinery Manager

IN WITNESS WHEREOF the parties have caused this instrument to be exe-

cuted by their duly authorized representa-
tives the day and year first above
written.

STANDARD OIL COMPANY OF TEXAS
By M. P. Paret, Jr., Vice President
INTERNATIONAL UNION OF OPERAT-
ING ENGINEERS, LOCAL UNION
NO. 552

By J. M. Pickle, President
B. M. Walsmith, Secretary

EXHIBIT "A"
REFINERY
CLASSIFIED OPERATING &
MECHANICAL WAGE SCHEDULE

Effective March 1, 1956

(Contains revisions made and agreed to
in April, 1956)

OPERATING DIVISION

Classification	Symbol	Hourly Rate	Daily Rate
Head Operator A	HOA	\$2.9000	\$23.20
Catalytic Cracker			
Thermal Cracker			
Crude Distillation			
Head Operator B	HOB	2.8000	22.40
Gas Recovery-Alkylation			
Pumping			
Thermal Cracker			
Head Operator C	HOC	2.7000	21.60
Catalytic Cracker			
Gas Recovery-Alkylation			
Perco Desulfurizer			
High Pressure Boilers			
Platformer			
Gauging			
Operator A	OA	2.5750	20.60
Catalytic Cracker			
Crude Distillation			
Gas Recovery-Alkylation			
Thermal Cracker			
Gauging			
Caustic Treating			
Operator B	OB	2.5100	20.08
Catalytic Cracker			
Gas Recovery-Alkylation			
Treater			
Operator C	OC	2.4138	19.31
Catalytic Cracker			
High Pressure Boilers			
Gauging			
Operator Helper A	OHA	2.3238	18.59
Gauging			
Thermal Cracker			
Operator Helper B	OHB	2.2000	17.60
Crude Distillation			

CHEV B8 7321

MAINTENANCE DIVISION

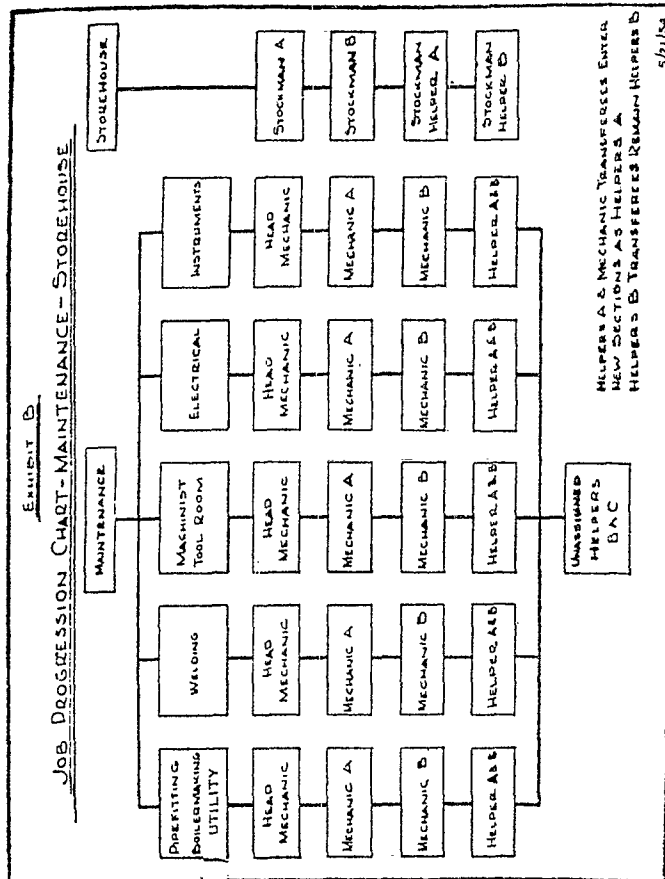
Classification	Hourly Rate	Daily Rate
Head Mechanic	\$2.8000	\$22.40
Mechanic A	2.7000	21.60
Stockman A	2.7000	21.60
Mechanic B	2.4450	19.56
Stockman B	2.4450	19.56
Stockman Helper A	2.2700	18.16
Helper A	2.2700	18.16
Stockman Helper B	2.1100	16.88
Helper B	2.1100	16.88
Helper C	1.9275	15.42
Laborer	1.6963	13.57

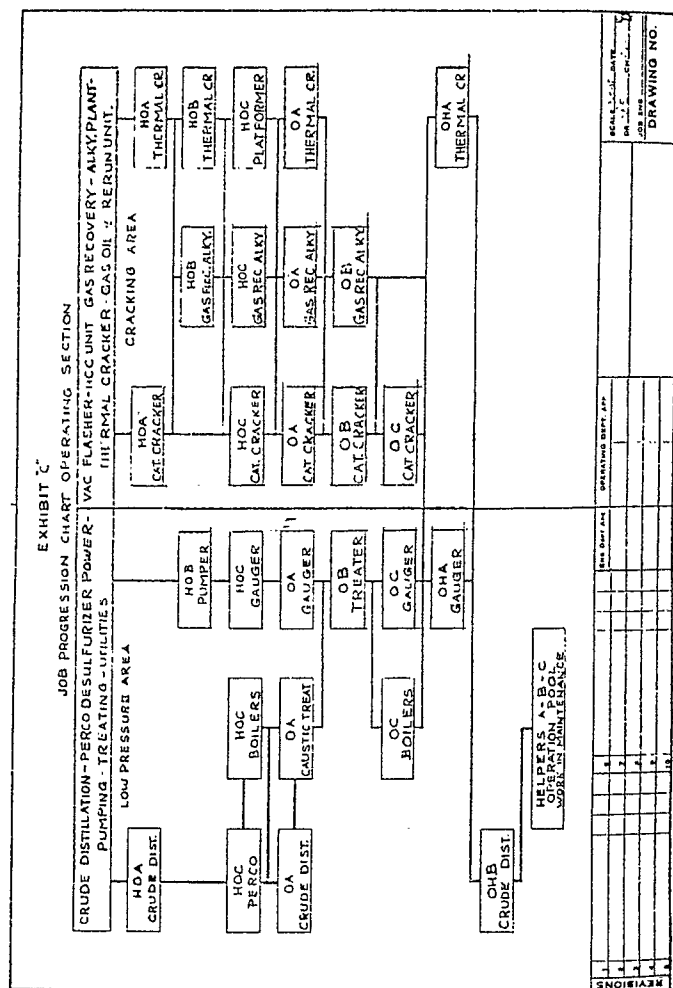
FILLING & SHIPPING

Finished Stock Gauger	2.4138	19.31
Carloader Senior	2.4138	19.31
Carloader A	2.2700	18.16
Carloader B	2.1100	16.88
Helper C	1.9275	15.42

Employees who work any time other than day shift will receive, in addition to the above rates, 5c an hour for the afternoon shift, or 16c an hour for the morning shift.

*8:15 afternoon
16 morning*





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EXHIBIT "C"

PROGRESSION & TRANSFERS WITHIN THE OPERATING SECTION

All men hired for Operations, or men transferring from another section to Operations will receive their first Operating assignment as OHB-Low Pressure Area. This will give all men some basic training under close supervision of older Operators. Men in this classification shall learn fundamentals of gauging, interpreting instrument readings, operation of pumps, turbines and motors, firing furnaces, gas and fire hazards.

Promote from OHB to OHA-Gauging or Thermal Cracker. All men promoted to OHA will be expected to work both OHA jobs satisfactorily.

Promote from OHA to OC. At this point men who receive a permanent OC classification (any assignment except temporary for vacation relief, sickness relief, etc.) in either the L. P. or Cracking group, as determined by the Company, will remain in that group.

LOW PRESSURE AREA

Man must work both OC-Boiler and OC-Gauger jobs satisfactorily before advancing to OB-Treater job. Promotion from the OB-Treater job is to either OA-Caustic Treating or OA-Gauging. For assignment to OA-Crude Distillation, man must have worked the OA-Caustic Treating satisfactorily. Upon accepting permanent assignment to OA (any assignment except temporary for vacation relief, sickness relief, etc.) the man will remain in that line of progression; i.e., OA-Gauging to HOC-

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CHEV B8 7323

Memorandum

Engineering Department
San Francisco, California
December 30, 1983

NON-ASBESTOS GASKETS & PACKING INFORMATION & TEST PROPOSAL

File: N28.10 and N28.13

TO: DISTRIBUTION

Health hazards associated with asbestos products have resulted in the development of non-asbestos gaskets and packing materials. Product manufacturers have developed some asbestos substitutes, though none are fully interchangeable with asbestos. Several manufacturers have reported they may eventually phase out asbestos completely. This has spurred interest throughout the Company on non-asbestos gaskets and packing.

The attached report summarizes current Company practice, identifies potential use of non-asbestos products, and evaluates standard tests for gaskets and packing. Currently-available non-asbestos materials are not fully interchangeable with asbestos and are not yet proven to be functionally satisfactory. Also, OSHA regulations on asbestos do not require the use of non-asbestos gaskets or packing and there is no technical need to use non-asbestos products right away. OSHA does have regulations on handling of asbestos and monitoring of asbestos exposure levels. The use of non-asbestos products would eliminate the need for these precautions. We believe there is enough interest and potential use of non-asbestos products to justify Materials Laboratory testing, and we have proposed a test program for 1984.

This survey was completed with funds from the Corporate Overhead Technical Program (Engineering Department-sponsored). The testing planned for 1984 will be done under the CRC-sponsored Materials Research Program. Comments will be appreciated and should be directed to R. D. Sweeney, Materials Laboratory, P.O. Box 4012, Richmond, CA 94804.


E. H. EDWARDS

BJC:dm

cc: D. H. Barber - S.F.
JGK
RDS
RS
WEE (2)
BJC
JCS

CHEV
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manufacturer's recommendations and may be optimistic. For example, we usually consider 500F too hot for Teflon.

Graphite Fiber - Several manufacturers are using graphite fibers for gaskets and packing. Graphite is a crystalline form of carbon. For gaskets, graphite fibers can be used in a tape form or as a filler in spiral wound gaskets. No graphite substitutes for compressed asbestos gaskets have been developed. Graphite packing comes in many configurations including tape, braid, and die-formed rings.

Graphite products are rated to high temperatures: 650F in oxidizing environments, 1200F in steam, and 3000F in neutral or reducing environments. Graphite also has very good chemical resistance: it is recommended for 0-14 pH services. Graphite is desirable in packing, due to its self-lubricating, low friction characteristics. There are reports that graphite packing, being relatively soft, tends to extrude.

Carbon - Carbon is used as a packing material. Carbon has similar temperature and chemical resistance to graphite, although some manufacturers rate it lower in both areas. Generally, carbon packing is cheaper than graphite fiber packing. Carbon is made in the same packing configurations as graphite fibers.

Ceramics - Alumina or silica fibers are used to make some gaskets and packing. Kennewick reported using a compressed ceramic sheet for gaskets but didn't give more details. Ceramics are used in braided and woven packing. The ceramics have temperature resistance up to 2300F and good chemical resistance, except to hydrofluoric and phosphoric acids, and severe caustics. Ceramics fibers have higher strength than asbestos.

Fiberglass - Fiberglass can be woven to make some types of packing. It is reportedly good to about 1000F, has higher strength than asbestos, and has good chemical resistance (but not to strong caustics).

Chlorite - One company, Flexitallic, is using chlorite fibers as a spiral wound gasket filler material to replace asbestos. The fibers are a mineral said to be similar to mica. The gaskets are called Flexite and Flexite Super depending on the binder (nitrile vs. graphite). They are rated to 1050F. Both are claimed to have good resistance to many services including caustics and mild acids.

Teflon - Many manufacturers make TFE and PTFE gaskets and packing. The gaskets sometimes have a filler material for strength. Packing usually is pure Teflon and comes in several configurations. Teflon has excellent chemical resistance and moderate temperature resistance (to about 500F). Pure teflon has a tendency to flow under pressure ("cold flow"). Some manufacturers add fillers which reportedly reduce cold flow without affecting chemical resistance. Teflon products have low friction coefficients. Teflon is often used as a lubricant for other packing.

Kevlar/Aramid - Kevlar is an aramid fiber, developed by DuPont, with temperature resistance to about 500F, and good chemical resistance (3 to 10 pH). Kevlar can be woven to form packing or compressed to form a substitute for compressed asbestos gaskets.

Flax - Flax is a plant fiber that is woven to make packings. Flax packings are not new but have been used in cold water service for years. Flax is only rated to about 150-200F. The strength of flax increases when the packing is wet.

Ramie - Ramie, a plant fiber, is similar to flax. It is used in cold water service, its strength increases when it is wet, and its temperature limit is 150-200F.

Cotton - Cotton, often referred to as "duck" fiber, is used as a cold water packing and is rated to 200F.

Rubbers - Rubbers are used for o-rings and gaskets. Neoprene and nitrile are the most common. Viton is used in more severe services. The elastomer products are generally recommended to temperatures of 200-400F.

Rubber is also a common binder in compressed asbestos sheet gaskets.

Metals - Metals are sometimes used as packing in foil form, but their largest use is in spiral wound gaskets as the inner and outer rings and the windings. Spiral wound gaskets can be made with virtually any metal. The packing foils are usually aluminum alloys, copper alloys, or babbitt. Metals are used in high temperature applications.

3. GASKET AND PACKING SELECTION

GASKETS

Characteristics of a "Good" Gasket

A gasket is used to maintain a pressure-tight joint between two static surfaces. There are several characteristics of a gasket which to some degree determine how well it will perform its function. Some important characteristics of a "good" gasket are:

- a. It should be relatively impermeable to the fluid or gas being sealed. It must also be resistant to attack by the fluid. Changes in volume, especially shrinkage, can dramatically affect the gaskets' performance. Finally, the gasket should not contaminate the fluid it is sealing.
- b. When flammable materials are being handled, the gaskets used must be fire resistant. This requirement eliminates several potential non-asbestos products, including Teflon, Kevlar, flax, ramie, cotton, and rubbers. These materials are candidates for non-flammable services.
- c. The gasket should be compressible, yet resilient. As the gasket is compressed, the bolting load is distributed over the entire gasket. Compressibility also allows the gasket to conform to irregularities in the surfaces being sealed. Resiliency allows the gasket to maintain a seal throughout small movements from changes in pressure and temperature, and vibration.
- d. There should be friction between the gasket and the sealed surfaces to prevent gasket "blow-out". The gasket can not be lubricated. Surfaces to be sealed should be neither too rough nor too smooth. Very smooth surfaces

can lead to blowouts; some "tooth" is needed for friction. Rough surfaces are difficult to seal and can result in seepage.

- e. The gasket should be easy to install and remove.
- f. The gasket should be able to withstand the service temperature encountered.
- g. The gasket should not flow or creep over time.

Methods of Gasket Selection

There are no widely accepted criteria by which to judge the performance of a gasket. The purpose of a gasket is to seal, but since several factors influence the gasket's ability to seal, there are several methods to select gaskets. Most are not based on test results, but rather on actual experience. Two methods were referred to most frequently in the literature.

- a. PxT Ratings - Many manufacturers report maximum pressure x temperature ratings for gaskets, to be used as a "rule of thumb" for initial gasket selection. The PxT products are based on experience - what works in what service. Along with PxT values, a maximum temperature limit for the gasket is given. Table IV gives PxT values for some gaskets (Garlock). These values are used in gasket selection as follows:

- 1) Candidate gaskets must be compatible with the fluid being sealed.
- 2) The service temperature must not exceed the recommended temperature limit for the material. Gasket manufacturers often overrate the temperature resistance of their gaskets. We recommend staying at least 50-100F below the manufacturer's rating. Divide the PxT rating by the service temperature to get an idea of what the maximum sealable internal pressure is. Check this against the expected service pressure to narrow down the candidates.

- b. ASME Boiler and Pressure Vessel Code - "m" and "y" Factors - The ASME Boiler and Pressure Vessel Code Section VIII Division I outlines Rules for Bolted Flange Connections in Appendix 2. In the appendix, two gasket factors, "m" and "y", are defined. These factors and the gasket thickness are the gasket parameters used in flange design calculations. Table 2-5.1 of the appendix, attached as Table V here, reports "m" and "y" values for several gasket materials and thicknesses. Reportedly the values originated from trial and error: "m" and "y" values for each type of gasket were changed until they most accurately reflected service performance of that gasket. ASME recommends use of their factors in the calculations, but states that other factors should be used if they are found to be more representative of the actual behavior of the gasket.

The origin of the "m" and "y" factors is sketchy, but the ASME Code is widely used, so "m" and "y" are the most commonly used parameters in gasket selection. A brief outline of the ASME flange design method will clarify what the factors are and how they are used.

- 1) A gasket is selected, using temperature limits and chemical compatibility to limit the candidates. "m" and "y" factors are gotten from the ASME table, the gasket manufacturer, or experience.
- 2) Calculations are made to determine bolt loading, size, and spacing and flange moments stress, and thickness. Two cases are considered in the calculations; this is where "m" and "y" come in.

Operating - Here the bolt loading must be enough to withstand the hydrostatic end force (from internal pressure), yet still provide enough compression to seat and seal the gasket. "m" is defined as the ratio of residual gasket pressure to internal pressure. Residual gasket pressure is the residual compressive force on the gasket contact area. For the gasket to seal, this must still be greater than the internal pressure after the compressive force has been relieved by the hydrostatic end force.

Gasket Seating - Before internal pressure is applied, the bolts must be loaded enough to compress and properly seat the gasket. This bolt load calculation involves "y", which is defined as the stress necessary to seat the gasket.

- 3) Both cases are considered until flange moments are calculated, where the higher moment value is then used to calculate the stresses on the flange and the necessary flange thicknesses.
- 4) If a gasket is being selected for an existing flange, these calculations can be run backwards to determine a range of "m's" and "y's" needed. Then a replacement gasket can be selected. An easier method is to replace the old gasket with a new gasket that has similar "m" and "y" factors. But, neither manufacturers nor the literature gave a clear idea of how close is close enough.

We asked several manufacturers about the origin and usefulness of "m" and "y" factors. None could tell exactly how they were originally chosen, but we found they are dependent on the leakage rate, the temperature, and the internal and external pressure. Currently, ASTM F-586 outlines how "m" and "y" versus leakage rate can be determined for a given temperature and internal pressure. Some manufacturers run these tests. Many have simplified versions of the ASME code that they use for flange design. However manufacturers reported that the code is widely used, so "m" and "y" values are useful.

PACKING

Characteristics of "Good" Packing

Packing is often called a "dynamic" seal as opposed to stationary seals (gaskets) because its purpose is to seal between moving equipment surfaces. Packing is most commonly used in pumps, compressors, and valves. The purpose of the packing is to seal, but some leakage must be allowed to cool the packing and lubricate moving surfaces. Characteristics of "good" packing are:

1. It should be chemically compatible with the fluid or gas being sealed.

2. The packing must be fire resistant if it is to be used in a flammable service. As with gasket materials, many potential non-asbestos products are eliminated by this requirement.
3. It should be able to withstand the service temperature.
4. Unlike gaskets, there should be little friction between packing and the sealed surfaces. This is most often accomplished with lubrication and "slippery" packing texture.
5. The packing should be resistant to extrusion from internal pressure. Often stiff packing is used in conjunction with softer packing to prevent extrusion of the softer packing.
6. The packing should be compressible enough to seal against the surfaces, yet resilient and durable enough to allow for movement.
7. The packing should be of the proper geometry or configuration for the service. The right configuration is determined by the type and speed of motion (rotating or reciprocating), temperature, pressure, availability of lubrication, and clearances. Some common configurations are twisted, braided, braid over braid, lattice braid, die-formed rings and tape.

Packing Selection

There is no clearly defined method to select packing. The packing material is chosen on the basis of temperature and chemical resistance. The packing configuration is primarily a matter of experience - manufacturers recommend what they've found to be suitable. As stated before, the proper configuration depends on several factors, most of all the type of movement encountered.

4. STANDARD TESTS

There are several ASTM standard tests for gasket materials. There are none specifically for packings, but the ASTM index refers to the gasket tests for packing also. Although there are many tests, there are no criteria or standards by which to judge the acceptability of results of the tests. Also, there is reportedly much variation in results from different laboratories. The ASTM test standards and their significance are discussed below.

A. ASTM F-36 COMPRESSIBILITY AND RECOVERY OF GASKET MATERIALS

Procedure - Sheet gaskets are loaded and released. The change in thickness is recorded as a measure of the gaskets' compressibility and recovery. The tests are conducted at room temperature.

Significance - The compressibility and recovery of a gasket are important factors in its ability to seal. This test could be incorporated in a sealability tests (F-586) by measuring thickness before and after loading.

B. ASTM F-37 SEALABILITY OF GASKET MATERIALS

Procedure - This test can be run at room temperature and elevated temperature on sheet gaskets. The gasket is loaded in a simulated flange with a fixed internal pressure, external load, and temperature: leakage is measured over time to determine leakage rates for the gaskets.

Significance - This is a good test for gaskets because it quantitatively measures their ability to seal. Unless many tests are run, the effects of temperature, external load, and internal pressure will not be measured. The test can be used to rank gasket materials.

C. ASTM F-38 CREEP RELAXATION OF GASKET MATERIALS

Procedure - This test can be run at any temperature. A gasket is loaded externally. Bolt strain is measured with time. As the gasket creeps, bolt strain is released. Tests are up to 24 hours long.

Significance - Creep relaxation is an important factor in gasket performance. However, in order to be significant this test would need to be run longer than 24 hours. Also, the effect of internal pressure is not measured.

D. ASTM F-146 FLUID RESISTANCE OF GASKET MATERIALS

Procedure - Gaskets are immersed in fluids and the effects on thickness, weight, volume, tensile strength, compressibility, and flexibility are measured. Exposures can be at any temperature.

Significance - Although a gasket in service is only exposed to the fluid at its edge, the chemical resistance of the material is important. The most important effect is on the gasket volume. If the gasket shrinks very much in the thickness direction, leakage is almost certain. Swelling is not as harmful but a large change does indicate a breakdown of the gasket material. Other properties also change with chemical exposure. We usually measure changes in weight and volume and sometimes hardness. So many tests may be excessive, especially the tensile strength and flexibility tests, since these aren't directly related to performance.

E. ASTM F-152 TENSION TESTING OF NON-METALLIC GASKET MATERIALS

Procedure - Gaskets are pulled in tension and the ultimate strength and elongation are measured.

Significance - This test is not related to gasket performance. In service, gaskets are not loaded in tension, but in compression. The test may have significance when used as a monitor of quality control.

F. ASTM F-586 LEAK RATES VERSUS y STRESSES AND m FACTORS FOR GASKETS

Procedure - Gaskets are loaded in a simulated flange. Leak rates are measured at a fixed temperature and internal pressure, at different external loads. " m " and " y " are calculated and plots of " m " vs. leak rate and " y " vs. leak rate are made. The internal pressure is different for the " m " and " y " tests.

Significance - This test simulates actual service and yields results that can be used in gasket selection and flange design. It provides the same information as F-37 but also measures the effect of load on leakage rate. Without a lot of tests, the effect of temperature is not measured. Some indication of the effect of internal pressure can be gained.

DISCUSSION

There are several gasket and packing products that have been developed as substitutes for asbestos. Some are being used by the Company and are reported to be doing well. But, for the most part, the Company is still using asbestos. The most difficult product to find a suitable substitute for is compressed asbestos gasketing. Products are available to replace most other asbestos products, but are more expensive and not proven.

There is not enough information available from literature and manufacturers to choose suitable asbestos substitutes and have good confidence of their likely success. Field trials would provide the best data, but it would be difficult to get quantitative results in a reasonable amount of time. Materials Laboratory tests can help narrow down the possibilities. Although OSHA and Company practice don't require switching to non-asbestos products, we believe lab tests are justified for the following reasons:

- * The Materials Division gets repeated requests for recommendations on non-asbestos products, and currently we don't know enough to give definitive answers.
- * Our survey showed that many Company locations are trying and have been trying non-asbestos products. These locations asked for any guidance the Materials Laboratory could give them.
- * Our survey also showed that most gasket and packing manufacturers have developed non-asbestos products. Many have said they will eventually phase out their asbestos products. Eventually, we may not be able to get asbestos products.

We believe the following tests will provide the most useful information.

1. Packing

For packing, we recommend chemical resistance tests and extrusion resistance tests. We do not know enough about the different packing configurations to judge what is suitable for a given service. This can be obtained from past experience and/or manufacturers. Temperature limits are dependent on the material and are fairly consistent in the literature and manufacturers' data. Manufacturers may overrate their products, so we recommend staying at least 50-100F below their limits.

A. Chemical Resistance

The chemical resistance testing we suggest is outlined below. We believe these tests are needed because manufacturers gave only pH limits for their products. pH limits are too general to use for choosing a packing for a specific service. The appendix gives cost estimates for this testing.

1. Use the same packing configuration for all the materials.

2. Immerse samples in the following fluids at room temperature for at least three time periods, eg. 1 day, 1 week, 1 month.
 - a) weak acid, pH 2-3
 - b) sulfuric acid, pH < 1
 - c) crude oil
 - d) low aromatic hydrocarbon
 - e) high aromatic hydrocarbon
 - f) caustic, pH > 14
3. Test at least the following materials:
 - a) chrysotile (white) asbestos
 - b) crocidolite (blue) asbestos
 - c) Teflon
 - d) graphite
 - e) carbon
 - f) Kevlar
 - g) ceramic
 - h) fiberglass
4. Measure weight and volume before and after each time period. Plot % Δ W and % Δ V versus time on a log-log scale. Check to see if changes level out with time. Rank materials by % Δ V and % Δ W at 30 days (extrapolated or actual). Use chrysotile asbestos as the acceptance standard for all fluids except sulfuric acid, where crocidolite asbestos should be the standard. Those materials that have lower % Δ V and % Δ W than the standard should be judged as passing. By this means identify possible asbestos substitutes for each fluid service class.

B. Extrusion Resistance Tests

Although there is no standard test for extrusion resistance of packing, we believe this is an important parameter to define. We did find a brief description of an extrusion resistance test that Rockwell developed for valve stem packing⁽⁶⁾. We recommend a similar test be included in the test program. The test is described below, but it must be further defined before tests are started.

Rockwell designed a test fixture which simulated cycling of a valve under pressure. The valve was cycled every 90 seconds for up to 2500 cycles. Tests were first run at room temperature, then at elevated temperature. Those packings which sealed for 2500 cycles, with minimal gland adjustments, were designated as passing.

For the Materials Laboratory tests, the procedure must be more well-defined. The following recommendations should be considered when developing the test procedure.

1. The same packing configuration should be used for all materials.
2. All tests should be run at the same pressure. Tests should be at room temperature only, unless there is time and money for elevated temperature tests.

3. Use the same type of valve for all tests.
4. Run the tests as closely as possible to Rockwell's procedure. Cycle until leakage occurs. Tighten the gland and see if leakage subsides. If so, continue cycling, up to 2500 cycles. If not, discontinue test. Record the number of cycles at which leakage first occurs and the number of times the gland must be tightened before 2500 cycles is reached. Use these two parameters to rank the packing materials.
5. Test the following materials. Run at least two tests per material.
 - a) chrysotile (white) asbestos
 - b) crocidolite (blue) asbestos
 - c) Teflon
 - d) graphite
 - e) Carbon
 - f) Kevlar
 - g) ceramic
 - h) fiberglass

2. Gaskets

We believe the two most important parameters for gaskets are chemical resistance and sealability. Manufacturers don't have sufficient data, so we recommend two tests, one for each of these parameters. The chemical resistance test is similar to that suggested for packing. The second is ASTM F-586 to determine "m" factors versus leak rates and "y" stresses versus leak rates. ASTM F-586 can be used to measure compressibility and recovery also. If there is time, ASTM F-586 can be run at a higher temperature to provide data on the effect of temperature. Recommended procedures are outlined below.

A. Chemical Resistance

1. Use sheet gasket materials. All gaskets should have the same thickness.
2. Immerse samples in the same room temperature fluids recommended for packing. Run tests for at least three time periods.
3. Test at least the following classes of materials:
 - a) chrysotile (white) asbestos
 - b) crocidolite (blue) asbestos
 - c) Teflon-pure or filled
 - d) Kevlar
 - e) ceramic
 - f) graphite ribbon
4. Measure changes in thickness, weight, and volume, and plot as described before. Rank materials and judge performance against white asbestos, except use blue asbestos for sulfuric acid. Identify possible substitutes for each service class.

B. Sealability (ASTM F-586)

1. Use sheet gaskets, all of the same thickness.
2. Follow ASTM F-586. Use 6 tests for each "m" versus leak rate curve and 6 tests for each "y" versus leak rate curve.
3. Also measure the thickness before testing, 60 seconds after load application (bolt down) and 60 seconds after the gasket load is released (similar to F-36 procedure). This will give compressibility and recovery data.
4. Test the following materials:
 - a) sheet gaskets
 - 1) chrysotile (white) asbestos
 - 2) crocidolite (blue) asbestos
 - 3) Teflon
 - 4) Kevlar
 - 5) ceramic
 - b) spiral wound gaskets
 - 1) chrysotile (white) asbestos
 - 2) crocidolite (blue) asbestos
 - 3) Teflon
 - 4) graphite
 - 5) ceramic
 - 6) chlorite
5. Run tests at room temperature. If possible, run some at a higher temperature.
6. Compare test results for candidates to results for white asbestos and blue asbestos. Those substitutes with "m's" and "y's" closest to asbestos' will perform the most similarly. Some gaskets may have consistently lower leak rates for all values of "m" and "y". These gaskets will require lower bolt loads than asbestos to achieve the same leakage rate. Those gaskets with consistently higher leak rates may seal satisfactorily, but will require higher bolt loads than asbestos to achieve the same leakage.

The candidate gaskets can also be ranked by the compressibility and recovery data. However, leakage rates are the most important parameter.

To initially identify possible substitutes for asbestos gaskets for a given service, temperature limits and chemical resistance tests can be used. The leak rate data will identify which candidates behave similarly or seal better than asbestos.

CONCLUSIONS AND RECOMMENDATIONS

There are several promising substitutes for asbestos gaskets and packing. However, currently-available non-asbestos materials are not fully interchangeable with asbestos and are not yet proven to be functionally satisfactory. We recommend Materials Laboratory tests be run to narrow down the possible substitutes for several service classes. Tests we recommend are:

1. Packing - chemical resistance tests and extrusion resistance tests.
2. Gaskets - chemical resistance and ASTM F-586 for sealability.

B.J. Cummiskey
B.J. CUMMISKEY

REFERENCES

1. U.S. Occupational Safety and Health Standards, 29 CFR, Part 1910.1000, Asbestos.
2. Conversations with D.H. Barber and H. J McDermott, Corporation Environmental, Industrial Hygiene & Safety Staff, San Francisco.
3. Rosato, D.V., "Asbestos: Its Industrial Applications," Reinhold Publishing Corporation, New York 1959, pp. 37-62, 178-185.
4. Peters, George A. and Barbara J., "Handbook on Asbestos Diseases: Medical, Legal, and Engineering Aspects," Garland Publishing Co., 1980.
5. ASME Boiler and Pressure Vessel Code, Section VIII, Division I, Appendix 2, Table 2-5.1.
6. Goodman, D. A. and Schweitzer, R. L., "Asbestos-Free Stem Packing for High Temperature Valves", Rockwell Technical Article V-Rep 82-1.

APPENDIX

ESTIMATED COSTS OF RECOMMENDED TESTS

	<u>Steps</u>	<u>Engineer Hours</u>	<u>Technician Hours</u>	<u>Materials \$</u>	<u>Total \$</u>
1.	Gathering materials	50	20	--	2,685
2.	Packing chemical resistance tests	30	50	100	2,775
3.	Packing extrusion resistance tests - build and de-bug apparatus.	40	50	2,000	5,100
4.	Running extrusion resistance tests.	20	75	-	2,950
5.	Gasket chemical resistance tests	30	50	100	2,775
6.	Gasket sealing tests - build and de-bug apparatus	30	50	3,000	5,675
7.	Running sealing tests	20	150	--	5,050
8.	Writing report	60	--	--	2,550
	TOTALS	280	445	5,200	29,560

TABLE I

CURRENT RECOMMENDED PACKING: CORPORATE AND REFINERY STANDARDS

SERVICE CLASS	SOURCE	VALVES	ROTATING	RECIPROCATING
ACIDS	Corporate	weak (except H ₂ SO ₄): A strong + H ₂ SO ₄ : B	weak: B, C, or G strong: B, C, or D	C, F, or Q*
	Refineries	C	C	C
CAUSTIC	Corporate	B	C	C
	Refineries	C	C	C
CHEMICAL	Corporate	A	G/E	F*
	Refineries	C	G/E or C	C or F*
GASES	Corporate	G	G/E	G/E or C
	Refineries	H	G/E or S	G/E or S
HF, HF + OIL	Corporate	F*	C	S
	Refineries	J*/B	—	—
LPG	Corporate	G	L*/E	M*
	Refineries	H	C, L*/E, or S	C, M*, or S
HEAVY OILS	Corporate	to 450F: A >450F: A	L*	A, E, or L*
	Refineries	to 450F: H >450F: H	K* or N* L* or N* K*	K* E or K* K*
LIGHT OILS	Corporate	A	L*/E	M*
	Refineries	H	G/E or C	C or M*
STEAM	Corporate	E	P*	G, L*, or T
	Refineries	H	K*, N*, O*, P*	C
WATER	Corporate	A or I*	Cold: C, G or Q* Hot (to 300F): C, L*/E, or R*	Cold: C or M* Hot (to 300F): C, G, or T
	Refineries	H	Cold: C Hot (to 300F): C, K*, N*, or O*	Cold: C or M* Hot (to 300F): C or K*

KEY:

PACKING TYPES

* = asbestos free
/ = combination
of types

A = chrysotile asbestos
B = crocidolite asbestos
C = Teflon-impregnated asbestos

D = Teflon-impregnated blue asbestos
E = asbestos-jacketed plastic
F = Teflon
G = graphited asbestos

H = graphited asbestos w/wire core
I = flax
J = Cu foil
K = Al foil

L = Babbitt foil
M = cotton w/neoprene binder
N = graphite yarn
O = graphite ribbon

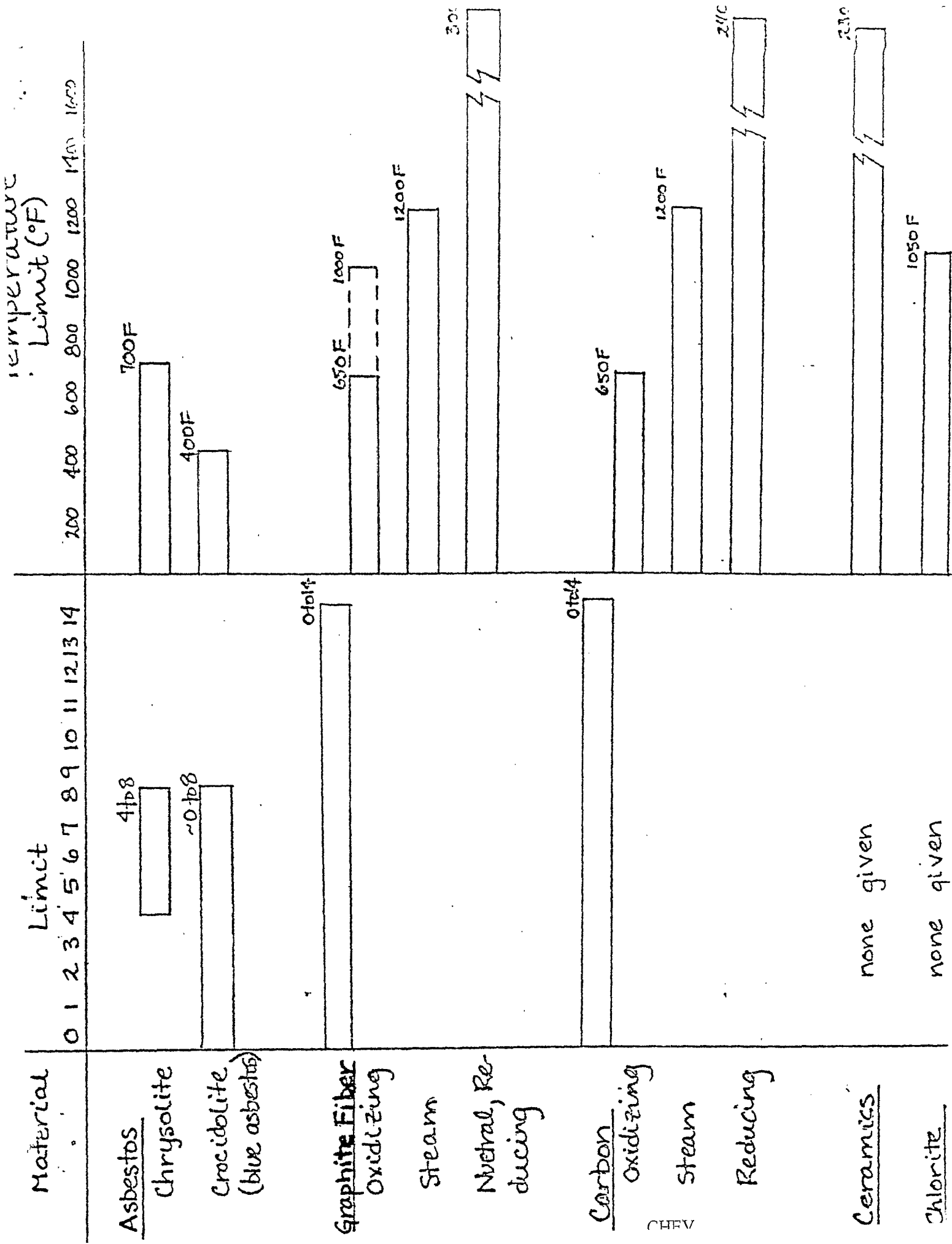
P = carbon rings
Q = rubber
R = plastic
S = mechanical seals
T = graphited blue asbestos

TABLE II

CHEMICAL RESISTANCE OF CHRYSOTILE
VERSUS CROCIDOLITE ASBESTOS(2)

	% Change in Weight*				
	<u>HCl</u>	<u>CH₃COOH</u>	<u>H₃PO₄</u>	<u>H₂SO₄</u>	<u>NaOH</u>
Chrysotile	56.00	24.04	56.45	56.00	1.03
Crocidolite	3.14	1.02	3.91	3.48	1.20

*Exposure: 25% acid or caustic, 26°F, 528 hours.



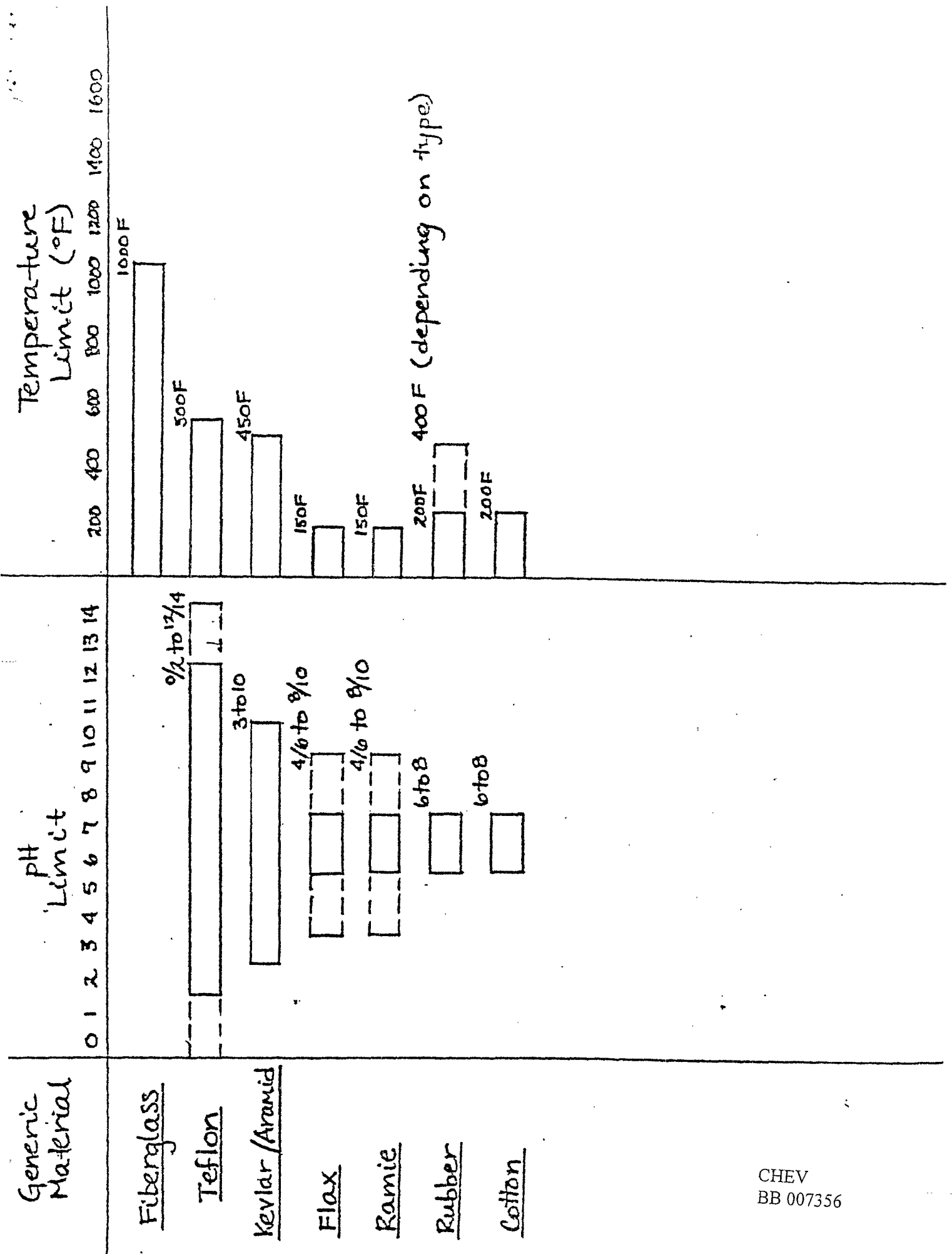


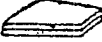
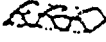
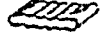
TABLE IV

PxT VALUES FOR SOME GASKETS*

<u>Gasketing Material</u>	<u>Maximum Pressure X Temperature, PSI x F</u>	<u>High Temperature Limit</u>	
		°C	°F
Compressed Asbestos	1,200,000	400	752
Blueguard (Kevlar)	700,000	370	700
PTFE	75,000	260	500
Gylon (Filled PTFE)			
Fawn or Black	200,000	260	500
Blue	150,000	260	500
Woven Asbestos Cloth	125,000	205-540	401-1004
Reinforced Rubber	125,000	120	248
Beater-Saturated Cellulose	50,000	150	302
Vegetable Fiber	40,000	105	221
Natural Rubber and SBR	20,000	100	212
Neoprene and Nitrile Rubber	20,000	120	248
Viton Flouroelastomer	20,000	200	392
Silicone Rubber	20,000	260	500

*From Garlock Catalog.

Table I: ASME boiler and pressure vessel code
m and y Values For Various Gaskets (4)

Gasket Material	Gasket Factor m	Min. Design Seating Stress y, psi	Sketches	Facing Sketch and Column in Table 2-5.2
Self-energizing types (O rings, metallic, elastomer, other gasket types considered as self-sealing)	0	0	...	...
Elastomers without fabric or high percent of asbestos fiber:				
Below 75A Shore Durometer	0.50	0		(1a),(1b),(1c),(1d), (4),(5); Column II
75A or higher Shore Durometer	1.00	200		
Asbestos with suitable binder for operating conditions:				
1/8 in. thick	2.00	1600		(1a),(1b),(1c),(1d), (4),(5); Column II
1/16 in. thick	2.75	3700		
1/32 in. thick	3.50	6500		
Elastomers with cotton fabric insertion	1.25	400		(1a),(1b),(1c),(1d), (4),(5); Column II
Elastomers with asbestos fabric insertion (with or without wire reinforcement):				
3-ply	2.25	2200		(1a),(1b),(1c),(1d), (4),(5); Column II
2-ply	2.50	2900		
1-ply	2.75	3700		
Vegetable fiber	1.75	1100		(1a),(1b),(1c),(1d), (4),(5); Column II
Spiral-wound metal, asbestos filled:				
Carbon	2.50	10,000		(1a),(1b); Column II
Stainless or Monel	3.00	10,000		
Corrugated metal, asbestos inserted, or Corrugated metal, jacketed asbestos filled:				
Soft aluminum	2.50	2900	 	(1a),(1b); Column II
Soft copper or brass	2.75	3700		
Iron or soft steel	3.00	4500		
Monel or 4-6% chrome	3.25	5500		
Stainless steels	3.50	6500		

Gasket Material	Gasket Factor m	Min. Design Seating Stress y , psi	Sketches	Facing Sketch and Column in Table 2-5.2
Corrugated metal:				
Soft aluminum	2.75	3700		(1a),(1b),(1c),(1d), Column II
Soft copper or brass	3.00	4500		
Iron or soft steel	3.25	5500		
Monel or 4-6% chrome	3.50	6500		
Stainless steels	3.75	7600		
Flat metal, jacketed asbestos filled:				
Soft aluminum	3.25	5500		(1a),(1b),(1c), (1d), ² (2), Column II
Soft copper or brass	3.50	6500		
Iron or soft steel	3.75	7600		
Monel	3.50	8000		
4-6% chrome	3.75	9000		
Stainless steels	3.75	9000		
Grooved metal:				
Soft aluminum	3.25	5500		(1a),(1b),(1c),(1d), (2),(3); Column II
Soft copper or brass	3.50	6500		
Iron or soft steel	3.75	7600		
Monel or 4-6% chrome	3.75	9000		
Stainless steels	4.25	10,100		
Solid flat metal:				
Soft aluminum	4.00	8800		(1a),(1b),(1c),(1d), (2),(3),(4),(5); Column I
Soft copper or brass	4.75	13,000		
Iron or soft steel	5.50	18,000		
Monel or 4-6% chrome	6.00	21,800		
Stainless steels	6.50	26,000		
Ring joints:				
Iron or soft steel	5.50	18,000		(6), Column I
Monel or 4-6% chrome	6.00	21,800		
Stainless steels	6.50	26,000		

NOTES:

- (1) This Table gives a list of many commonly used gasket materials and contact facings with suggested design values of m and y that have generally proved satisfactory in actual service when using effective gasket seating width b given in Table 2-5.2. The design values and other details given in this Table are suggested only and are not mandatory.
- (2) The surface of a gasket having a lap should not be against the rubbin.

BILL OF MATERIAL

JOB 38-061

DATE 11-13-80

DRG. No. _____ SHEET _____

ORDER No. BMS870

APPRO. JOB No. 6113 38-061-011

MATERIAL REQ'D AT DEST'N BY 12-1-80

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(17)	FT	2" PIPE SMLS SCH 40 CS BEW, L11EA2A	Stock
2	(1)	EA	2" FLANGE SLIP-ON CS 150 lb RF, L40BA3C	
3	(1)	EA	2" FLANGE WN CS 150 lb RF, L40BA3DE	
4	(1)	EA	3" DITTO ITEM 3	
5	(5)	EA	2" ELBOW STD WT CS BW 90° LR, L50MA1BC	
6	(1)	EA	3"x2" REDUCER STD WT CS BW CONC L55MA1DA	
7	(2)	EA	2" GASKET 150 lb RF 304/ASB SPARKWID LL18C	
8	(1)	EA	3" DITTO ITEM 7	

SHEET 1 OF 2 SHEETS

BILL OF MATERIAL

JOB 38-061

DATE 12-2-80 *See*

DRG. No. _____ SHEET _____

ORDER No. BM-8792 *Below*

SUPPLEMENT # 1

APPRO. JOB No. B0712-8138-02-250

B05 X 356

MATERIAL REQ'D AT DEST'N BY 12-8-80

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
17	4 1	EA	1/2" THK x 4 1/4" x 8" C.S. PLATE PER ASTM A-36	
18	8 4	EA	1/2" THK x 3" x 3" C.S. PLATE PER ASTM A-36	R/BM 6027 X 8792 Rampy still C/E 12/3/80
19	4	EA	1/2" THK x 2" x 2" C.S. PLATE PER ASTM A-36	
20	4	EA	1/2" THK x 5 1/16" x 5 1/2" C.S. PLATE PER ASTM A-36	
changed by Eng. to 1/2" ASTM A-36 OK Per. DWG 12/3/80				
21	4 4	EA	1 1/2" 150 lb GASKET R.F. 304/ASB SPIRAL WND	STOCK
22	4 4	EA	2" PER ITEM 21	↓
23	1 1	EA	4" PER ITEM 21	
DWG 12/2/80				
END Use : DISTRIBUTOR FOR D-3853				
W. Lind 12/3				

SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 18001

DATE 11/2/80

DRG. No. SHEET

ORDER No. 11M-8782

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY DATE 11/24/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
10	2	EA	1/4" STEAM TRAP JACO TYPE TID-52	R/BM-6114 X 8782 Engineered Equip C/F Martin 11/5/80
11	2	EA	1/4" GASKET ASB COMP 15015 RF L615TA	Stock
20	4	EA	1" 142 ITEM 19	Stock
1	8	EA	1/2" x 2 1/4" STUD LOCK 1 1/2 Hex NUTS L6700M	R/BM 80766 X 8782 Bases C/F W/Bolt 11/4
22	16	EA	1/2" x 2 1/2" 142 ITEM 21	
23	1	EA	1 1/4" x 1" WAGE NUT PIE WH 80 CS PBE CONC	Stock
24	1	EA	1 1/4" LOCK CS 142 LK 142 LK 142 LK 142 LK	Stock
15	1	EA	1" GLOBE VALVE 80015 CS SW L21 WIDE	R/BM 80751 X 8782
16	1	EA	1/2" CHECK VALVE 80015 CS SW L22 JAF	Keenan
			1" 142 ITEM 19	
			1" 142 ITEM 19	

BILL OF MATERIAL

JOB 38-061

DATE 11-18-80

DRG. No. _____ SHEET _____

ORDER No. BM-8782 (SUPP)

APPRO. JOB No. BM-8782-360

MATERIAL REQ'D AT DEST'N BY 12-1-80

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
23	1	EA	1 1/4" x 1" SWAGE NIPPLE SCH 80 CS TLE-PSE CONC L35GBKQ	AL BM 80752X 8782 Keenan C/K Rick "1/2"
24	(1)	EA	1 1/4" ELBOW CS 90° LR SCRD 300016 L30SBAB	Stock
25	2	EA	4" COUPLING 300016 SCRD CS L35BAH	
26	(1)	EA	1" ELBOW CS 90° LR SCRD 300016 L30SBAB	
10	(4)	EA	1" FLG, WN CS 15016 RF SCH 80 L40BA3DG	
20	(2)	EA	1" GASKET ASB COMP 15016 RF L61BTA	
22	8	EA	1/2 x 2 1/2 STD BOLTS B-7 W/2 HEX NUTS L620BM	CHEV B8 6017
4	1	EA	1" GATE VALVE 80016 CS SW L20KA1MD	AL BM 80751X 8782 Keenan C/K Rick "1/2"

END USE: 151 11016 STEAM FROM FTO G-3820

SHEET OF SHEETS

BILL OF MATERIAL

JOB 38-661

DATE 11/1/80

DRG. No. _____ SHEET 4 of 5

ORDER No. 11M-2750

APPRO. JOB No. 8158-02-260-120741

DOT X 256

MATERIAL REQ'D AT DEST'N BY 11/1/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
10	1	EA	1/4" X 2" BOSS HEAD CS SW L36 VLOS	Stock
11	1	EA	1/4" PLUG CS SODD L36 VLOS	
20	1	EA	1 1/2" GASKET 30016 1/4" ASB SPIRAL WND RF L61FEC	
21	3	EA	2" GASKET PER ITEM 20	✓
22	1	EA	2" GASKET 30016 204/ASB SPIRAL WND <u>FF</u>	11M 80754 X 8710 Hight C/F John 11/6
23	3	EA	3" GASKET 15016 3/4" ASB SPIRAL WND RF L61B-C	Stock
24	1	EA	3" GASKET 15016 3/4" ASB SPIRAL WND <u>FF</u>	11M 80754 X 8710 Hight
25	4	EA	3/4" X 3 1/2" STUD BOLTS R7 W/2 HEX NUTS L620LM	Stock
26	32	EA	5/8" X 3/4" PER ITEM 25	11M 80766 X 8780 Hight C/F John 11/5

BILL OF MATERIAL

JOB DC 001

DATE 10-30-80

DRG. No. _____

SHEET 1

ORDER No. LM-777

APPRO. JOB No. 11-14-80

MATERIAL REQ'D AT DEST'N BY 11-14-80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	EA	1" FLANGE CS W/AL RT SCH 40 1/2" DIA 1/2" THK	Stock
2	1	EA	2 FLANGE CS W/AL RT SCH 40 1/2" DIA 1/2" THK	Stock
3	1	EA	1" BUSH 1/2" LK STD RT CS LFIN L10M11C	Stock
4	1	EA	1" BUSH 1/2" LK STD RT CS LFIN L10M11C	Stock
5	1	EA	2" BUSH 1/2" LK STD RT CS LFIN L10M11C	Stock
6	1	EA	3" BASKET SF 1/2" DIA 1/4" 1/2" SPAC W/AL, L10M11C	Stock
7	1	EA	1" FLANGE CS W/AL RT SCH 40 1/2" DIA 1/2" THK	Shop
8	1	EA	1 1/2" FLANGE CS W/AL RT SCH 40 1/2" DIA 1/2" THK	Shop

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB

DATE 1-1-68

DRG. No. _____ SHEET. _____

ORDER No. _____

APPRO. JOB NO.

MATERIAL REQ'D AT DEST'N BY

rate

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	EA	1. 1/2" x 1/2" x 1/2" Aluminum 2. 1/2" x 1/2" x 1/2" Aluminum 3. 1/2" x 1/2" x 1/2" Aluminum 4. 1/2" x 1/2" x 1/2" Aluminum 5. 1/2" x 1/2" x 1/2" Aluminum	ALUM 8075 x 1775 K-1000
1	1	EA	2. 1/2" x 1/2" x 1/2" Aluminum 3. 1/2" x 1/2" x 1/2" Aluminum 4. 1/2" x 1/2" x 1/2" Aluminum 5. 1/2" x 1/2" x 1/2" Aluminum 6. 1/2" x 1/2" x 1/2" Aluminum	Block - 160
1	1	EA	7. 1/2" x 1/2" x 1/2" Aluminum 8. 1/2" x 1/2" x 1/2" Aluminum 9. 1/2" x 1/2" x 1/2" Aluminum 10. 1/2" x 1/2" x 1/2" Aluminum 11. 1/2" x 1/2" x 1/2" Aluminum	ITEM 11
1	1	EA	12. 1/2" x 1/2" x 1/2" Aluminum 13. 1/2" x 1/2" x 1/2" Aluminum 14. 1/2" x 1/2" x 1/2" Aluminum 15. 1/2" x 1/2" x 1/2" Aluminum 16. 1/2" x 1/2" x 1/2" Aluminum	ALUM 8075 x 1775 Base 1/2" x 1/2" x 1/2"
1	1	EA	17. 1/2" x 1/2" x 1/2" Aluminum 18. 1/2" x 1/2" x 1/2" Aluminum 19. 1/2" x 1/2" x 1/2" Aluminum 20. 1/2" x 1/2" x 1/2" Aluminum 21. 1/2" x 1/2" x 1/2" Aluminum	1/2" x 1/2" x 1/2"

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB 11-6-30 DATE 11-6-30
 DRG. No. SHEET ORDER No. 11-6-30
 APPRO. JOB No. 11-6-30

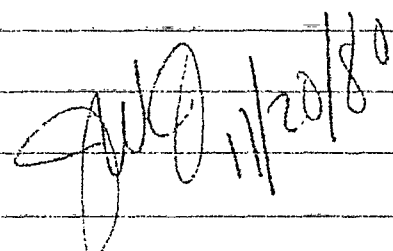
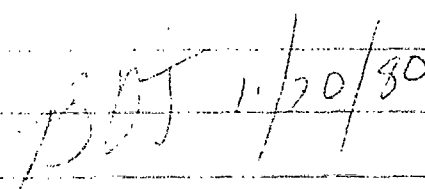
MATERIAL REQ'D AT DEST'N BY 11-6-30
DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	11	FT	2" PIPE SAWS SCH 40 CS. BEW. LUEA2A	
2	1	EA	2" FLANGE SLIP-ON CS 150 LB RF, L4DBA3C	
3	1	EA	2" FLANGE WN CS 150 LB RF, L4DBA3DE	
4	1	EA	3" DITTO ITEM 3	
5	5	EA	2" ELBOW STD WT CS 90° LF, L5DMA1BC	
6	1	EA	3"x2" REDUCER STD WT CS. FW CONC L55MA1DA	
7	2	EA	2" GASKET 150 LB RF 304/ASB SPALWAD L618GC	
8	1	EA	3" DITTO ITEM 7	

BILL OF MATERIAL

JOB 38 001 DATE 11-20-80
 DRG. No. SHEET ORDER No. BM-8609
Supplement # 1 APPRO. JOB No. 8138-L2 310.1501

MATERIAL REQ'D AT DEST'N BY 12-3-80
DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
11	EA		2" FLANGES W.H. CS 150LB RF SCH 40	
6	EA		2" GASKETS 150LB KF 304/16B SP LIND	
24	EA		3/4" x 3" STUD BOLT B7 W/2 HEX NUTS	
 11/20/80				
 11/20/80				
END USE: 2' stop line To Storage				

BILL OF MATERIAL

JOB 38-061

DATE 12-2-80

DRG. No. _____ SHEET _____

ORDER No. BM-8792

APPRO. JOB No. 13012-8138-02-250

BOS X 356

MATERIAL REQ'D AT DEST'N BY 12-8-80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
17	1 1	EA	1/2" THK x 4 1/4" x 8" C.S. PLATE PER ASTM A-56	
18	8 4	EA	1/2" THK x 3" x 3" C.S. PLATE PER ASTM A-56	
19	4	EA	1/2" THK x 2" x 2" C.S. PLATE PER ASTM A-56	
20	4	EA	1/2" THK x 5 15/16" x 5 1/2" C.S. PLATE PER ASTM A-56	
9119 12/2/80				
21	4	EA	1 1/2" 15016 GASKET RF 304/ASB SPIRAL WND	
22	4	EA	2" PER ITEM 21	
23	1	EA	4" PER ITEM 21	
BUT 12/2/80				
END USE : DISTRIBUTOR FOR D-3853				

BILL OF MATERIAL

JOB 22-1001

DATE 11-18-80

DRG. No. _____ SHEET _____

ORDER No. EM-3724/SAC

APPRO. JOB No. 907-112-11-1-1

MATERIAL REQ'D AT DEST'N BY 12-1-80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
3	4	EA	1/4" 150LB F.S. FLG W.N. CS R.F. SCH 80 L4DEA31G	
4	2	EA	3/4" GASKET 150LB COMP 150LB R.F. L61BTA	
5	2	EA	3/4" COUPLING 3000LB SCH 80 CS L3A5EAM	
			CHL 11/18/80	
			BOS 11/18/80	
			END USE: LOW & MED CONDENSATE FROM G-3820	

CHEV B8 6024

JOB 38-1161

DATE

11/3/80

DRG. No.

SHEET

ORDER No.

EM-8782

8138-02-360-80304

APPRO. JOB No.

~~8138-02-360-80304~~

BOJ X356

MATERIAL REQ'D AT DEST'N BY

11/24/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
18	2	EA	3/4" STEAM TRAP SARCO TYPE TD-52	
19	2	EA	3/4" GASKET ASB ³⁰⁴ 304 1501b RF, L61BTA SPIRAL WND	
20	4	EA	1" PER ITEM 19	
21	8	EA	1/2" x 2 1/4" STUD BOLTS B-7 W/2 HEX NUTS, L620BM	
22	16	EA	1/2" x 2 1/2" PER ITEM 21	
23	1	EA	1 1/4" x 1" SWAGE NIPPLE SCH 80 CS PBE CONC	
24	1	EA	1 1/4" ELBOW CS 90° LR SRD 30001b L30SBAB	
25	1	EA	1" GLOBE VALVE 6001b CS SW L21JA1DF 12 CR TRM	
26	1	EA	3/4" CHECK VALVE 6001b CS SW L22JA1RAF 12 CR LIFT	

11/3/80

BOJ 11/3/80

FRTD

USE 1" 151b STD
FROM G-3820 AND

1 1/4" STD TO G-3820 SHEET 5 OF 5 SHEETS

BILL OF MATERIAL

JOB 38-061

DATE 11-18-80

DRG. No. _____ SHEET _____

ORDER No. DM-8782-1507

APPRO. JOB No. 41-8-17-860-13050

DATA 356

MATERIAL REQ'D AT DEST'N BY 12-1-80

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
23	1	EA	1 1/4" x 1" SWAGE NIPPLE SCH 80 CS TLE-PSE CONC L35GBKG	
24	1	EA	1 1/4" ELBOW CS 90° LR SCRD 3000 lb L30SBAB	
25	2	EA	4" COUPLING 3000 lb SCRD CS L34SBAB	
26	1	EA	1" ELBOW CS 90° LR SCRD 3000 lb L30SBAB	
10	4	EA	1" FLG, WN CS 150 lb RF SCH 80 L40BA3DG	
20	2	EA	1" GASKET ASB CUM 150 lb RF L6/BTA	
22	8	EA	1/2 x 2 1/2 STD BOLTS B-7 W/2 HEX NUTS L6ZOBM	
4	1	EA	1" GATE VALVE 800 lb CS SW L20KALMD	

CHEV B8 6026

Est. No. 15 1/2" COE STEAM FOM TUB G-3820

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB 38-061

DATE 11/3/80

DRG. No.

SHEET 4 of 5

ORDER No. BM-8780

8138-02-360-B0J01

APPRO. JOB No. 4138-02-B0J01

B0J X 356

MATERIAL REQ'D AT DEST'N BY 11/24/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
18	1	EA	3/4" X 2" BOSS 600016 CS SW L36 VBS	
19	1	EA	3/4" PLUG CS SCRD L37DAEN	
20	1	EA	1 1/2" GASKET 30016 304/ASB SPIRAL WND RF L61FGC	
21	3	EA	2" GASKET PER ITEM 20	
22	1	EA	2" GASKET 30016 304/ASB SPIRAL WND FF H.P. Full Face	
23	3	EA	3" GASKET 15016 304/ASB SPIRAL WND RF L61BGC	
24	1	EA	3" GASKET 15016 304/ASB SPIRAL WND FF H.P. Full Face	
25	4	EA	3/4" X 3 1/2" STUD BOLTS B-7 W/2 HEX NUTS L620BM	
26	32	EA	5/8" X 3/4" PER ITEM 25	

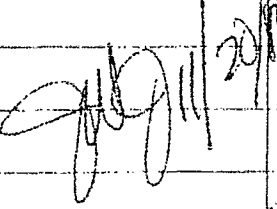
CHEV B8 6027

BILL OF MATERIAL

JOB 10-661 DATE 11-20-80
 DRG. No. SHEET ORDER No. BM-8780
Supplement #1 APPRO. JOB No. 8138-02-340-1070

MATERIAL REQ'D AT DEST'N BY 12-3-80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
32	2	EA	2" GASKET 150W 14/100 SPIRAL WIND RF	
34	12	EA	5/8" x 3" STUD BOLTS B-7 W/2 HEX NUTS	
33	1	EA	3/4" Thick Plate steel per ASTM A-36 (Flanges) 7" DIA	
34	1	EA	5 1/2" DIA 3/4" Thick Plate Steel per ASTM A-36 (Flanges)	
35	1	EA	2" TEE STRAIGHT CS BW STD WT	
36	1	EA	5" x 2" REDUCER CONE CS STD WT BW	

BOJ 11/20/80 

CHEV B8 6028

BILL OF MATERIAL

JOB 10001

DATE 11/11/80

DRG. No. SHEET

ORDER No. DM-8720

APPENDIX #1

APPRO. JOB No. 10001

MATERIAL REQ'D AT DEST'N BY 12/3/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	15	FT	2" PIPE STD. CS SCH 40 BFW	
2	411	FT	3" PER ITEM 1	
8	6	EA	2" FLANGE W.N. CS 150lb RF SCH 40	
10	1	EA	1" FLANGE W.N. CS 300lb RF SCH 80	
11	2	EA	2" GATE VALVE 150lb RF CS 12" L.R.	
13	1	EA	2" ELBOW STD WGT CS 90° L.R. BFW	
14	4	EA	3" PER ITEM 13	
16	1	EA	1"x2" SOCKET x S CS	
20	1	EA	1" GASKET 300lb 304/ASB SPIRAL WND. R.F.	

CHEV B8 6029

BILL OF MATERIAL

JOB 38-061

DATE 11/3/80
10-30-80

DRG. No.

SHEET 1 OF 2

ORDER No. BM-8779

8138-02-360-80502
APPRO. JOB No. ~~8138-02-15076~~

BOJ X 356

MATERIAL REQ'D AT DEST'N BY 11-24-80
DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	22	ft	2" PIPE, SMCS CS SCH 40 BFW L11EA2A	
2	1	EA	2" FLANGE CS, WN, RF, SCH 40, 30016, L4DFA3DE	
3	1	EA	2" ELBOW 90° LR STD WET CS BFW, L5DMA1BC	
4	1	EA	1 1/2" GASKET RF 30016 304 ASB SPIRAL WND, L61FGC	
5	1	EA	2" GASKET, PER ITEM 4	
6	1	EA	3" GASKET RF 15016 304 ASB SPIRAL WND, L61BGC	
7	6	ft	3" PIPE, SMCS, CS SCH 40 BFW L11EA2A	
8	1	EA	1 1/2" FLANGE CS WN RF SCH 40 30016, L4DFA3DE	

CHEV B8 6030

BILL OF MATERIAL

JOB 38-061

DATE 11/28/80

DRG. No.

SHEET 4 of 5

ORDER No.

8138-01-360-80308

APPRO. JOB No.

8138-01-360-80308

MATERIAL REQ'D AT DEST'N BY

11/24/80

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	1	EA	3/4" Plug - PIPE, THREADED NPT, BAR STOCK ROUND HEAD, U.S. PER ASTM A-306 GR. 60, MAX CARBON .03% FREE MACHINE STEEL NOT ACCEPTABLE	
14	1	EA	2" SPIRAL WOUND GASKET PER API STD. 601, TYPE 304 STAINLESS STEEL WITH AFRICAN BLUE ASBESTOS FILLER, WITH INTEGRAL 1/8" THICK C.S. COMPRESSION RING RINGS J.M. STYLE #13	
15	3	EA	3" PER ITEM 14 ↑	
16	4	EA	5/8" φ x 3" STUD BOLT GR. B7 W/2 HEX NUTS L620BM	
17	12	EA	5/8" φ x 3 1/2" - ITEM 16	
18	2	EA	3" KO# F.S. SHOCK FL. W. 1" L.R. 1/2"	

CHEV B8 6031

SHEET 4 OF 5 SHEETS

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LIST OF MATERIALS

 504 List No RDBM-8304

 Accounting Charge No. 0172-570-MISC.3

 Ph. 388

 DATE REQUIRED: 3-20-80 Date 3-20-80

 Lead Engr: G.M.H.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
32	1"	Smis. Stl. Pipe Sch. 80		
50#	2"	" " 40		
8	2"	Stl. 90° B.W. Elbow L.R. Std. Wt.		
4	2"	150# CS Flg. 1/16 RF Gate Valve Bit Bnt		
10	2"	150# FS W.N. Flg. 1/16 RF Sch 40		
4	1"	" " 80		
11	1"	3000# FS S.W. 90° Elbow		
	1"	" " Tee		
2	1"	600# Stl. S.W. Gate Valve Bit Bnt.		
2	10 x 2"	Weldolet FS Red. B.W. Std. Wt.		
2	3/4"	800# Stl. Std. Gate Valve Bit Bnt.		
3	2 x 3/4"	3000# FS Std Elbow		
8	3/8 x 2"	Machine Bolt Mil. Stl. w/ Hex Nuts		
2	1 1/2"	3000# FS S.W. Tee		
4	1 1/2 x 1"	Smis Stl. Conc. Swaged TLE Sch 80		
2	3/4 x 4"	Smis Stl. Pipe Nipple - L Sch 80		
2	3/4"	Std Stl. Bolt Flange Pipe Rd Hd		
2	1"	150# x 1/16 thk. Asb Comp Gasket		
10	2"	" " " "		
8	1/2 x 1"	Std Bolt Gr. F w/ 1/2 Hex Nut		
2	2" x 1"	Smis Stl. Conc. Swaged TLE Sch 80		
2	1/4 x 1/2"	" " " " " "		
2	2"	150# FS Std. Flg 1/16 RF		
1	1"	3000# FS Std Tee		
1	1"	Std Stl. Bolt Flange		
1	3/4"	3000# Stl. Weld Gskt		
1	2 1/2"	Std. Stl. Bolt Stock		
		EXCHANGER	RDBM 8299	

CMA 71/91 80

H

J

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LIST OF MATERIALS

RD 3.0

51-04

List No. 8242

Accounting Charge No. 5171-24-300-10070

an MPD 10070

DATE REQUIRED: FEB 2/9/50 Date 2-27-50

r: 210

Lead Engr: S. H. H.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

1

ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
7	40	3/4"	PIPE SMLS SCH 80 CS		
31	19	3/4"	VALVE, GATE 800LB SCRD CS		
139	20	3/4"	FLANGE, SLIP-ON FS 150LB SCH 80		
74	3	3/4"	ELBOW, SCRD 3000LB 90° LR FS		
75	12	3/4"	TEE, SCRD 3000LB STRGHT FS		
77	6	3/4"	PLUG RD HD BAR STOCK FS SCRD		

2

393	1	2" X 3/4"	REDUCER, CONC. SCH 80 CS BW		
260	40	1/2 X 2 1/4	STUD BOLT B-7 W/2 HEX NUTS		
7	10	3/4"	GASKET ASB. COMP 150LB RF		
31	2	1/2"	VALVE, GATE 800LB SCRD CS		

3

191	4	3/4 X 1	SWAGE NIPPLE SCH 80 CS CONC. BBE		
10	4	1 X 1 3/4	PIPE NIPPLE " " " BOE-TOE		
114	4	1"	ELBOW XS 90° LR CS BW		
105	2	1"	TEE STRGHT CS BW XS		
	2	5" BODY DIA	LEVEL CONTROL SWITCH MAGNETROL MODEL BC-751 TYPE SIM	RDBM 8223	
	2		LEVEL GAGE JERGUSON NO. 15R20 (3/4") (9 3/8" O.A.L.)	RDBM 8223	

4

CHEV B8 6037

LIST OF MATERIALS

Project Name: *SEWAGE TREATMENT PLANT*

Operating Charge No. *EL-20-71-340*

SYTA. *2000*

DATE REQUIRED: FIRM *2-23-80* Date *2-22-80*

MIC

Lead Engr: *G.M.H.*

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

QTY	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST DEL DATE
37	1"	Sm/s. Stl. Pipe Sch. 80		
14	2"	" " 40		
1	3'	150# FS Blind Flg. 1/6" RF		
1	2"	Stl. Tee R.W. Std. Wt.		
1	1"	3000# Stl. Weld Boss S.W.		
2	1"	2000# FS 90° Elbow S.W.		
1	1	800# Std. Stl. Gate Valve Blt. Bnt.		
2	2"	150# FS W.N. Flg. 1/6" Sch 40		
3	3"	" " " "		
1	2"	150# CS Flg. 1/6" RF. Gate Valve Blt. Bnt.		
2	3"	" " " "		
3	2"	150# x 1/6" thk. Asb. Comp Gasket		
2	3"	" " " "		
12	5/8 x 3/4	Stud Bolt Gr. B7 W/2 Hex Nuts		
10	5/8 x 3/4	" " " "		
1	3" h x 12"	Std Pipe Shoe Type I		
1	2"	150# FS Blind Flg. 1/6" RF		

PREPARED BY: *EL-20-71-340*

DATE: *2/22/80*

UVA

BILL OF MATERIAL

JOB 16-062

DATE _____

DRG. NO. AD-13-29953 SHEET 20

ORDER No. BA 9192

APPRO. JOB NO 53903-6139-01-

MATERIAL REQ'D AT DEST'N BY 4/13/81 FZD

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	55	Ft	4" P.P.F SMLS CS SCH40 BFW	
2	3	ea	4" FLANGE WN 150# RF CS SCH 40	
3	1	ea	4" BLIND FLANGE 150# RF CS	
4	4	ea	4" ELBOW 90° LRCS STD WT BW	
5	1	ea	4" TEE STRAIGHT CS STD WT BW	
6	1	ea	3/4" BOSS CS 6000# SCR'D	
7	1	ea	3/4" PLUG CS SCR'D	
8	4	ea	4" GASKET 150# RF AFB COMP.	
9	32	ea	3/8x3 1/2" STUD BOLTS B-7 NUTS	
10	1	ea	4" GATE VLV 150# RF CS 12CR TRW	
			End Use : Tie-in for E 390' to tankage	
			EJBRV 3/23/81	
			[Signature]	

CHEV B8 6039

SHEET / OF SHEETS

K

J. B. W. Lead Engr: -- -- -- FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
EA2H	35'	4"	PIPE 3MLS CS SCH40 BFW		
PA3DE	3	4"	FLANGE WN 150# RF CS SCH40		
BA3	1	4"	BLIND FLANGE 150# RF CS		
MAIBC	4	4"	ELBOW 90° LR CS STD WT BW		
MAI	1	4"	TEE STRAIGHT CS STD WT BW		
BAS	1	3/4"	RODS CS 6000# SCD		
ABW	1	2 1/4"	RODS CS SCD		
BTA	4	4"	GASKET 150# RF ASB COMP		
DBM	32	5/8 x 3 1/2	STUD BOLTS B-7 W/2 HEX NUTS		
PA3CA	1	4"	GATE VLV 150# RF CS 12CR TR		

H

J

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LIST OF MATERIALS

112-068

List No. _____

Accounting Charge No. 8112-07-570-KWC116

G. T. A. Ph. 399

DATE REQUIRED: _____ Date 2-27-80

KWC

Lead Engr: CRP

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
6	40ft	4"	Sm/s. Stl. Pipe Sch 40		
6	30ft	6"	" " "		
7	30ft	1 1/2"	" " 80		
113	6	4"	Stl. 90° B.W. Elbow L.R. Std.		
113	6	6"	" " " "		
114	6	1 1/2"	" " XH		
7	40ft	1"	Sm/s. Stl. Pipe Sch 80		
74	8	1"	3000# FS 90° scd. Elbow		
75	3	1"	" " Tee		
31	1	3/4"	800# scd. Stl. Gate Valve Blt Bnt		
31	1	1/4"	" " " "		
36	1	1"	600# " Globe " "		
250	8	1"	150# FS scd. Flg 1/6" RF		
151	4	1"	150# x 1/16" thk. Asb. Comp Gasket		
92	1	1 x 3/4"	Sm/s Stl Conc Swaged TBE Sch 80		
77	1	3/4"	scd. Stl. Bar Stock Plug Rd. Hd.		
260	16	1/2" x 2 3/4"	Std Bolt Gr B7 W/2 Hex Nuts		
	18"	2 x 1/2"	Stl Strap		
	2	6"	Std. Pipe Clamp		
	2	8 x 1/4 x 5"	Stl Plate		
	3	3" H x 12" L	Std Pipe Shoe Type I		
<u>Matl ordered</u> <u>on RDBM 8292 (3/14/80)</u> <u>KWC</u> <u>Do not reorder matl</u>					
				CHEV B8 6042	

WORK REQUISITION

MAINTENANCE PLANNER

PLANT #6 Crude Unit

EQUIP. NO. OR DESCRIPTION Debut Reboiler E-1622

EQUIP. READY Yes

REQUIRED COMPLETION DATE

JOB No. 16-400	ENGR. JWS			
REQ No.	TYPE	COST CENTER	JOB No.	ITEM No.
JW	501-0116			-280

MATERIAL ORDERED ON RDBM 8135, 8136, 8137

PAGE 1 of 2

INSTRUCTIONS: THE DEBUT REBOILER, E-1622, WILL BE REMOVED FROM SERVICE TO REPAIR A SUSPECTED FLOATING HEAD LEAK. NEW MATERIALS HAVE BEEN ORDERED TO DO THIS WORK. NEW BELLVILLE WASHERS, B-16 STUDS AND SS CLADDED ASBESTOS GASKETS. AN EXTENSIVE CHECK OF FLANGE DIMENSIONS AND GASKET SURFACES WILL BE NECESSARY BEFORE THE NEW MATS ARE USED AND THE FOLLOWING SEQUENCE OF WORK WILL HELP INSURE THE RECOMMENDED INSTALLATION. PLEASE COMPLETE THE FOLLOWING.

- 1) REMOVE E-1622 FROM SERVICE AND HAUL TO MACHINE SHOP.
- 2) Loosen shell cover and check each Floating head stud bolt for looseness.
- 3) IF ALL BOLTS ARE TIGHT, A TUBE SIDE TEST SHOULD BE DONE TO DETERMINE IF ANY TUBES ARE LEAKING. (TEST TO 285 PSIG)
- 4) REMOVE all floating head studs, floating head and pull bundle from shell. Notify Drafting to also check.
- 5) MEASURE DIMENSIONS SHOWN ON ATTACHED DWGS AND INSPECT FLANGES FOR ANY WIRE DRAWING OR PITTING. PLEASE NOTE ACTUAL DIMENSIONS AND MARK THEM ON DWG.

DISTRIBUTION:

MAINTENANCE PLANNER-4, OPERATIONS-2 *JAC*
INSPECTION-1 (CWV) LEAD ENGR.-1 (RAB.),
ENGR-1 JWS, OTHERS, *PLNance*

APPROVALS:

LEAD ENGR. *CRP 1/10/80*
OPERATIONS *JAC 1/10/80*
CHIEF ENGR.

ENGR JWS Jones PHONE 225 DATE 1/9/80

WORK REQUISITION

TO : MAINTENANCE PLANNER

PLANT # 6 Crude Unit

EQUIP. NO. OR DESCRIPTION Debut Reboiler E-1622

EQUIP. READY YES

JWJ

JOB No. <u>16-400</u>		ENGR. <u>JW Jones</u>	
REQ No.	TYPE	COST CENTER	JOB No. ITEM No.
<u>16-01-0</u>	<u>1</u>	<u>16-0</u>	<u>0-280</u>

MATERIAL ORDERED ON RDBM'S 8135, 8136, 8137

COMPLETE PAGE 2 OF 2
REQUIRED COMPLETION DATE TO BE SCHEDULED

INSTRUCTIONS: (6) IF ANY DIMENSIONS DO NOT CHECK OR IF ANY GASKET SURFACES ARE FOUND IN NEED OF WORK, THE REPAIR PROCEDURE WILL BE DECIDED ON AT THAT TIME.

(7) THE NEW SS CLAD ASBESTOS GASKET, ITEM 1 ON RDBM - 8135, STUDS AND BELLVILLE WASHERS WILL THEN BE INSTALLED AS SHOWN ON ATTACHED DWG. (Sketch #2) USE THE ATTACHED PROCEDURE FOR APPLICATION OF BOLT TORQUE ON FLANGED JOINTS. TORQUE EACH BOLT TO A MAXIMUM OF 106 FOOT- LBS.

THE GAP BETWEEN FLANGES (Floating Head and Tube Sheet) should now be even ALL AROUND AND THE BELLVILLE WASHERS COMPRESSED TO APPROXIMATELY 50% OF THEIR DEFLECTION. THIS DIMENSION IS SHOWN ON ATTACHED DWG AND EQUALS 0.928". USE heavy grease to hold gasket in place and heavy OIL with graphite on all studs, nuts and bellville washers to reduce friction when tightening.

Test tube side to 285 PSIG - check for leaks.

Return to service

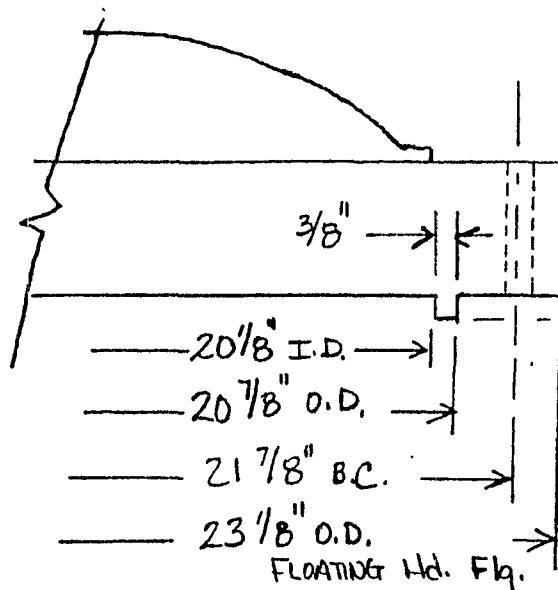
NOTE: THE Flange GAP should not have to be closed to get the test to hold. If it is the flanges are not properly fitted and should be resocketed.
Check Flange Run Out with dial indicator

DISTRIBUTION : MAINTENANCE PLANNER - 4, OPERATIONS - etc
INSPECTION - 1 (CWW) LEAD ENGR. - 1 (RAD.),
ENGR - 1, OTHERS, _____

APPROVALS:
LEAD ENGR. CRP 10/80
OPERATIONS _____
CHIEF ENGR. _____

ENGR. JW Jones PHONE 225 DATE 1/9/80

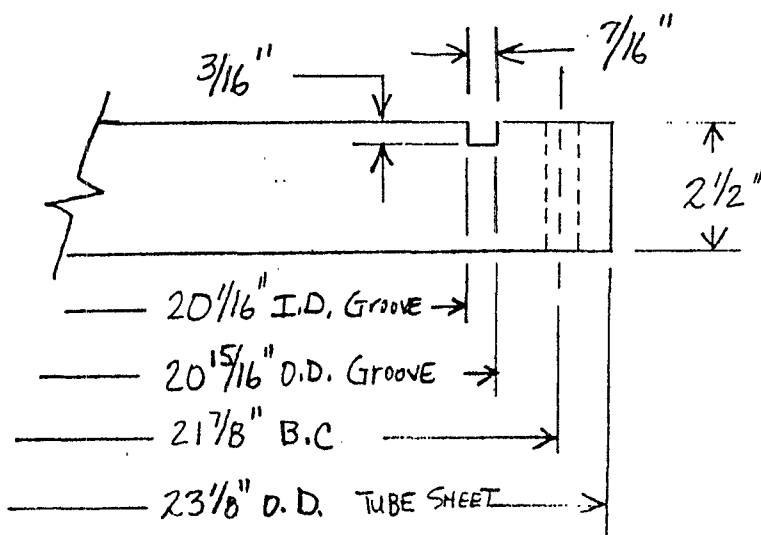
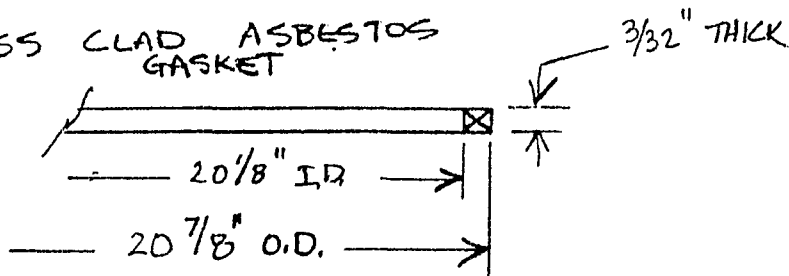
E-1622 DETAILS



FLOATING HEAD FLANGE

FIELD TO
OBTAIN THESE
DIMENSIONS

SS CLAD ASBESTOS GASKET

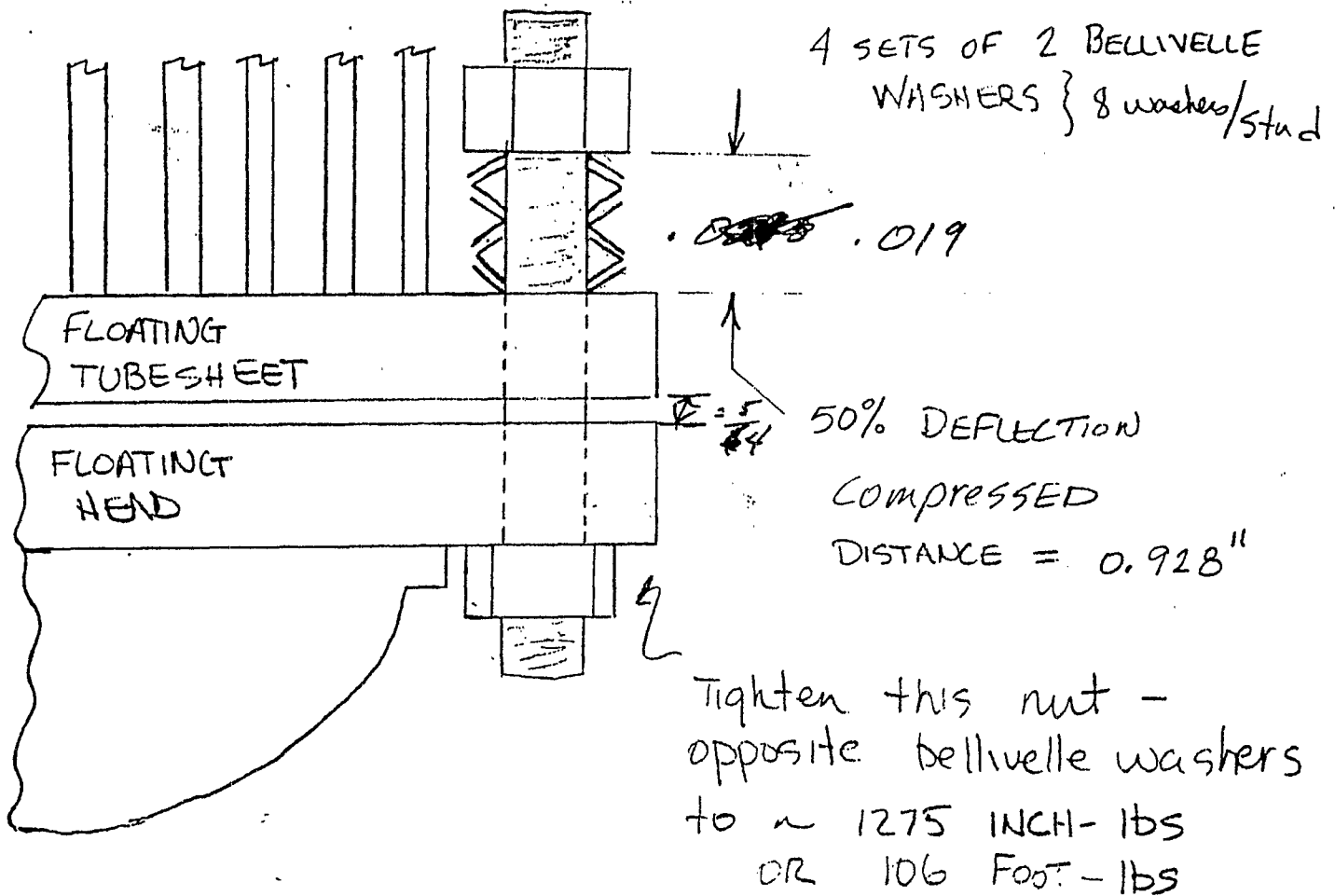


TUBE SHEET FLANGE

SKETCH 1

July 11/9/80

E-1622 BOLT UP PROCEDURE



NOTE: ALL STUDS & WASHERS (BELLIVELLE) TO BE WELL LUBRICATED WITH HEAVY OIL & GRAPHITE TO REDUCE FRICTION

FLANGES GAP = $\frac{5}{64}$ "

SKETCH 2

JOB 16-400

DATE 1/3/80

DRG. No. _____ SHEET _____

ORDER No RDBM - 8135

0116-00-280-JWJ02

APPRO. JOB No

* FIRM

1-9-80

ENGR: JONES

MATERIAL REQ'D AT DEST'N BY

DATE _____

SHEET / OF / SHEETS

JOB 16-400

DATE 1/3/80

DRG. No. _____ SHEET _____

ORDER No. RDBM-8136

~~APPRO. JOB NO 0116-00-280-JWJO~~

FIRM *

MATERIAL REQ'D AT DEST'N BY

1-9-80

AM

Engn: Jones

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	30	ea.	5/8" Nominal diameter Stud BOLTS Length - 7³/₄" FINE THREAD FULL LENGTH Grade - B-16 per ASTM A-193 EACH STUD WITH Z (two) HEX NUTS 5/8" φ x 2³/₃₂" High x 1⁵/₁₆" ACROSS FLATS	
			JWG 1/3/80	
			AIRFREIGHT AUTHORIZED IF NECESSARY	CRP 1/3/80
			<u>END USE:</u> E-1622 Repair	

CHEV B8 6050

SHEET / OF / SHEETS

JOB 16-400

DATE 1/3/80

DRG. No. _____ SHEET _____

ORDER No. RDBM- 8137

APPRO. JOB No. 0116-00-280-JUL01

FIRM *

1-9-80 AM

MATERIAL REQ'D AT DEST'N BY

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	290	ea.	5/8" Nominal Size SOLON FLANGE WASHER (Bellville)	
			Part # 10-F-112 ID = 0.656" OD = 1.145" Thickness = 0.112" Deflection to Flat = 0.016" Load at Flat = 9000 Lb.	PRICE \$90/100
			Material: H-11 Tool Steel, Cadmium Plated	
				gldg 1/3/80
			Ship best way to meet delivery	CRP 1/3/80
			End USE: E-1622 Repair	
			PES Order from Solon Mfg Co Ralph Dunn 216 286-7149	

SHEET / OF / SHEETS

WORK REQUISITION

TO 8 MAINTENANCE PLANNER

PLANT #6 Crude Unit

EQUIP NO. OR DESCRIPTION Debut Reboiler E-1622

EQUIP. READY Yes

JOB No. 16-400		ENGR. JWS	
REQ No.	TYPE	COST CENTER	JOB No. ITEM No.
JWJ01-0116-			-280

MATERIAL ORDERED ON RDBM 8135, 8136, 8137

PAGE 1 of 2

REQUIRED COMPLETION DATE

INSTRUCTIONS: THE DEBUT REBOILER, E-1622, WILL BE REMOVED FROM SERVICE TO REPAIR A SUSPECTED FLOATING HEAD LEAK. NEW MATERIALS HAVE BEEN ORDERED TO DO THIS WORK. NEW BELLVILLE WASHERS, B-16 STUDS AND SS CLADDDED ASBESTOS GASKETS. AN EXTENSIVE CHECK OF FLANGE DIMENSIONS AND GASKET SURFACES WILL BE NECESSARY BEFORE THE NEW MATS ARE USED AND THE FOLLOWING SEQUENCE OF WORK WILL HELP INSURE THE RECOMMENDED INSTALLATION. PLEASE COMPLETE THE FOLLOWING.

1. REMOVE E-1622 FROM SERVICE AND HAUL TO MACHINE SHOP.
2. Loosen shell cover and check each Floating head stud bolt for looseness.
3. IF ALL BOLTS ARE TIGHT, A TUBE SIDE TEST SHOULD BE DONE TO DETERMINE IF ANY TUBES ARE LEAKING. (TEST TO 285 PSIG)
4. Remove all floating head studs, floating head and pull bundle from shell. Notify Drafting to also check.
5. MEASURE DIMENSIONS SHOWN ON ATTACHED DWGS AND INSPECT FLANGES FOR ANY WIRE DRAWING OR PITTING. PLEASE NOTE ACTUAL DIMENSIONS AND MARK THEM ON DWG.

DISTRIBUTION: MAINTENANCE PLANNER - 4, OPERATIONS - 2, INSPECTION - 1 (CWW) LEAD ENGR. - 1 (RAB.), ENGR - 1 JWS, OTHERS, NLNance

ENGR JWS Jones PHONE 225 DATE 1/9/80

APPROVALS: LEAD ENGR. CRP 1/10/80 OPERATIONS JWS 1/10/80 CHIEF ENGR.

JWJ

WORK REQUISITION
TO 8 MAINTENANCE PLANNER
PLANT # 6 Crude Unit

JOB No. 16-400		ENGR. JW JONES	
REQ No.	TYPE	COST CENTER	JOB No. ITEM No.
16-400-1-1	16-0	0-2	80

EQUIP. NO. OR DESCRIPTION Rebut Reboiler
E-1622

MATERIAL ORDERED ON RDBM'S 8135, 8136, 8137

EQUIP. READY yes

COMPLETE
REQUIRED COMPLETION DATE PAGE 2 OF 2
TO BE SCHEDULED

INSTRUCTIONS: (6) IF ANY DIMENSIONS DO NOT CHECK OR IF ANY GASKET SURFACES ARE FOUND IN NEED OF WORK, THE REPAIR PROCEDURE WILL BE DECIDED ON AT THAT TIME.

(7) THE NEW SS CLAD ASBESTOS GASKET, ITEM 1 ON RDBM - 8135, STUDS AND BELLIVELLE WASHERS WILL THEN BE INSTALLED AS SHOWN ON ATTACHED DWG. (Sketch #2) USE THE ATTACHED PROCEDURE FOR APPLICATION OF BOLT TORQUE ON FLANGED JOINTS. TORQUE EACH BOLT TO A MAXIMUM OF 106 FOOT- LBS.

THE GAP BETWEEN FLANGES (Floating Head and Tube Sheet) should now be even ALL AROUND AND THE BELLIVELLE WASHERS COMPRESSED TO APPROXIMATELY 50% of their DEFLECTION. THIS DIMENSION IS SHOWN ON ATTACHED DWG AND EQUALS 0.928". USE heavy grease to hold gasket in place and heavy OIL with graphite on all studs, nuts and bellivelle washers to reduce friction when tightening.

(8) Test tube side to 285 PSIG - check for leaks.
Return to service

NOTE: THE Flange GAP should not have to be closed to get the test to hold. If it is the flanges are not properly fitted and should be rechecked.
Check Flange Run Out with dial indicator

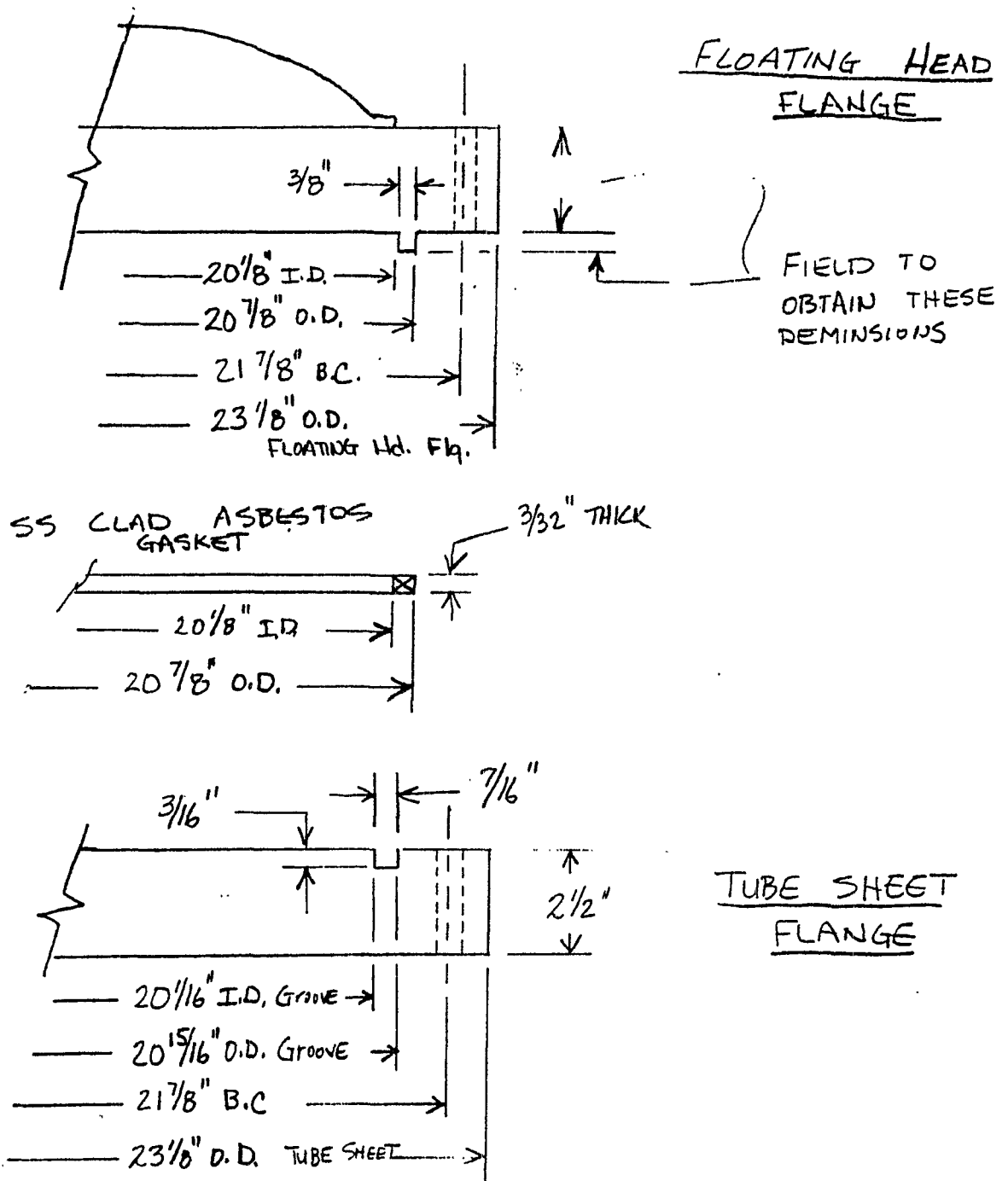
DISTRIBUTION: MAINTENANCE PLANNER - 4, OPERATIONS - 4
INSPECTION - 1 (CWW) LEAD ENGR. - 1 (RAB.),
ENGR - 1, OTHERS, _____

APPROVALS:
LEAD ENGR. CRP 1/10/80
OPERATIONS _____
CHIEF ENGR. _____

ENGR. JW Jones PHONE 225 DATE 1/9/80

CHEV B8 6046

E-1622 DETAILS

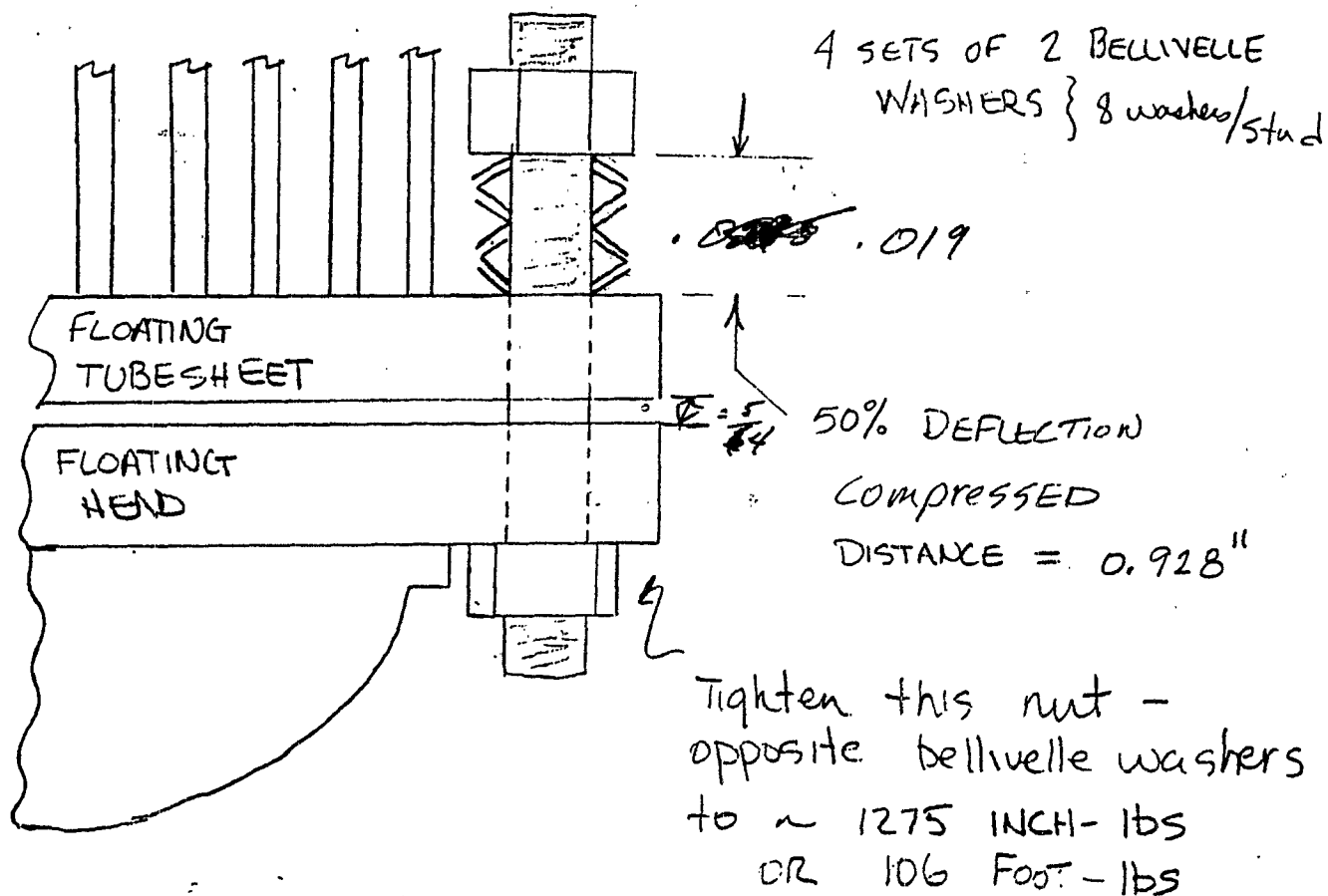


SKETCH 1

CHEV B8 6047

July 11/9/80

E-1622 BOLT UP PROCEDURE



NOTE: ALL STUDS & WASHERS (BELLVILLE) TO BE WELL LUBRICATED WITH HEAVY OIL & GRAPHITE TO REDUCE FRICTION

FLANGES GAP = $\frac{5}{64}$ "

SKETCH 2

CHEV B8 6048

Aug 1/9/80

JOB 16-400

DATE 1/3/80

DRG. No. _____ SHEET _____

ORDER No RDBM - 8135

0116-00-280-JWJ02

APPRO. JOB No.

* FIRM

1-9-80

ENGR: JONES

MATERIAL REQ'D AT DEST'N BY

SHEET / OF / SHEETS

COVER PLATE

1" PROX-SVERS
(35 FT³)

321 SS. WIRE SCREEN
#2 MESH

SCALLOP*
SCREENS
(28)

TYPE B
CATALYST
(795 FT³)
(31,122 #)

CENTERPIPE SHROUD
19 1/2" HIGH

SHEET METAL EXTENSION
ON THREE SCALLOPS TO
MEET COVERPLATE.*

CENTERPIPE EXTENSION
14 1/2" HIGH - OPEN ENDED

REFRACTORY LINER

1/8" PROX-SVERS (16 FT³)

1" PROX-SVERS (35 FT³)

PACK DRAIN WITH
ASBESTOS ROPE BEFORE
LOADING CATALYST.

*ALL BUT 3 SCALLOPS ELEVATED 18" - EXTENSIONS ADDED TO 3 LOW SCALLOPS

REVS.

1

2



REACTOR LOADING DIAGRAM R-4160
PLANT 41
AS LOADED 8-26-79
RHENIFORMER - EL PASO

SCALE NONE DATE 9-7-79

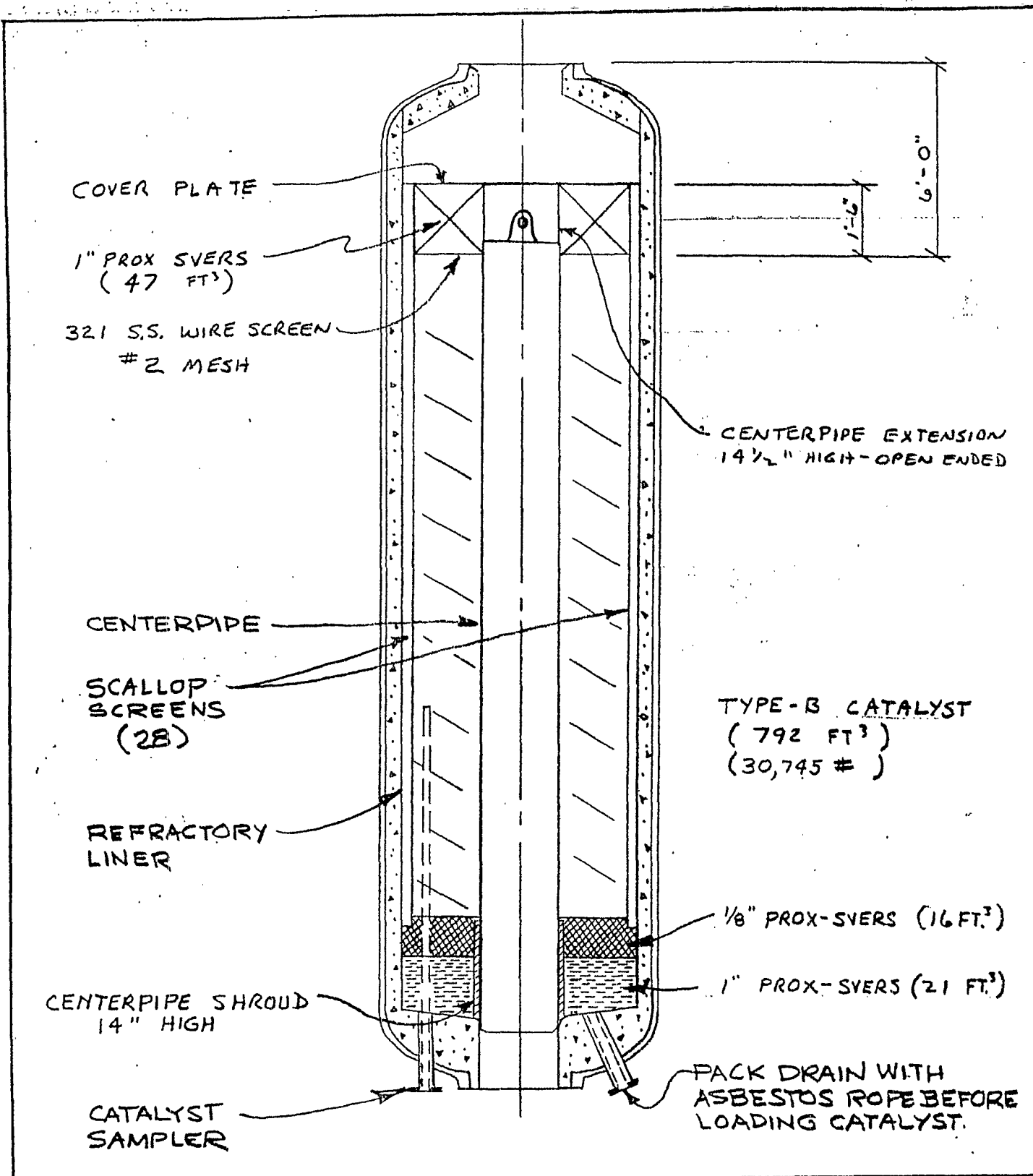
DR. RBW CH DR. APP ENG

OPRG. DEPT. APPROVED

ENG. DEPT.

CHEV B8 6055

GO. 450-E11 (5M. CD. 8. 671)



REVS.

1

2



SCALE NONE DATE 9-7-79

DR. RW CH. DR. APP. ENG.

OPRG. DEPT. APPROVED

ENG. DEPT. APPROVED

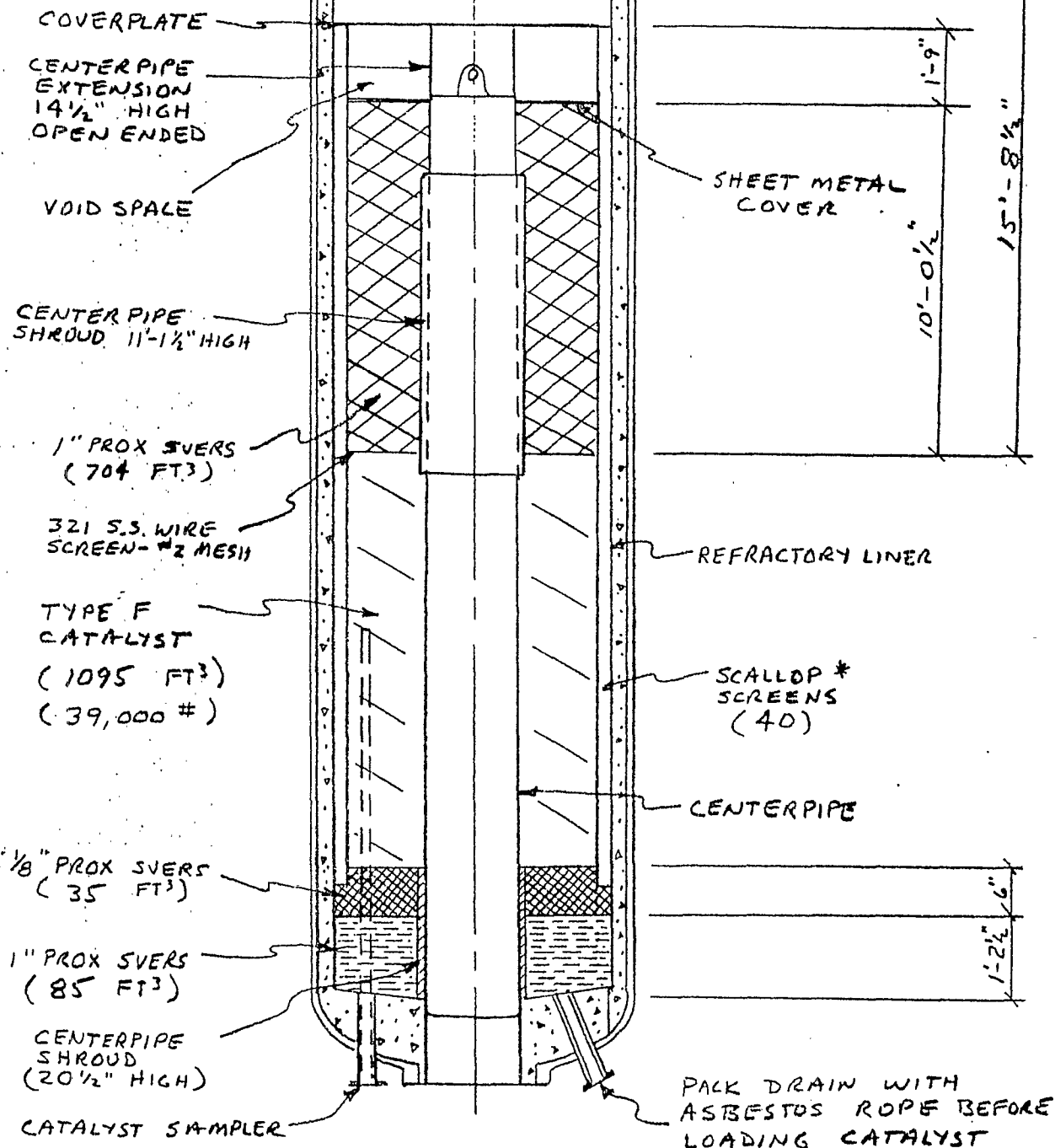
REACTOR LOADING DIAGRAM, R-4170

PLANT 41

AS LOADED 8-26-79

RHENIFORMER - EL PASO

CHEV B8 6056



* SCALLOPS ELEVATED OFF SEAT - NON UNIFORMLY

REVS. 1

2



SCALE NONE DATE 10-1-79

DR RBW CH DR. APP ENG

OPRG. DEPT. APPROVED

ENG. DEPT.

REACTOR LOADING DIAGRAM - R-4180

PLANT 41

AS LOADED 8-26-79

RHENIFORMER - EL PASO

CHEV B8 6057

I-R Compressors

4- 900 CFM @ 125 PSIG

3600

\$4350 /WK

(NO TRANSPORTATION
CHARGES)

Romco Equip

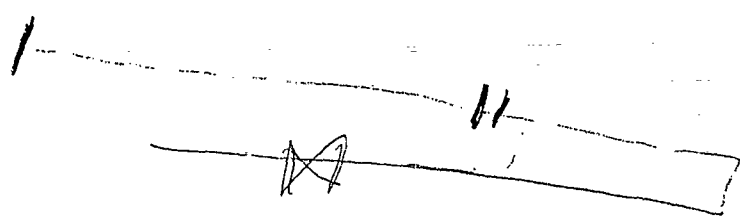
2- 1200 @ 125 PSIG
1- 600

\$2700 /WK

+ Trans 2300⁰⁰

+ Standby
Operator 1000

\$6000⁰⁰



● BILL OF MATERIAL ●

JOB _____

DATE 7-25-79

DRG. No. _____ SHEET _____

ORDER No. RDBM-7790

APPRO. JOB No. 2141-05

MATERIAL REQ'D AT DEST'N BY 8-15-79

DATE				
ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	300	ft	1" Diameter Asbestos Rope	
2	100	Linear ft	3 ft wide Asbestos Blanket	
CWA ✓ / ✓ July 7/25/79				
END USE: R-4150				
R-4160				
R-4170				
R-4180				

CHEV B8 6059

CHEV B8 6059

CHEVRON U.S.A., INC.
ENGINEERING DEPARTMENT - EL PASO, TEXAS

SPECIFICATION NO. EP-353-N
March 8, 1979
Page 1 of 6

SPECIFICATION NO. EP-339-N
INSULATION & WEATHERCOATING
BOILER FEEDWATER PIPING

SECTION 1 - GENERAL REQUIREMENTS

1.0 SCOPE OF WORK

1.1 CONTRACTOR shall provide all materials, utilities, tools, construction equipment, labor, including supervision and inspection, and all items of a consumable nature that are required for the insulation and weathercoating of piping, valves, and fittings in the Vacuum Flasher at the Chevron U.S.A., Inc., El Paso Refinery as detailed by this Specification, including the drawings and other attachments listed in the Appendix, except as otherwise provided in Section 1.2 below.

This work includes but is not limited to:

- (A) Insulation in accordance with Standard Drawings GA-N99783-3 and GB-N99993-0 of all lines shown on the attached drawings PC-10-20972, sheets 68 thru 74.
- (B) Insulation work shall include all valves, flanges and fittings associated with piping on drawings PC-02-20993 sheets 69-74 and 76-78.
- (C) Insulation shall be N6 (1" thick) on piping 2" and below; N7 (1½" thick) on 3" and 4" piping; N8 (2" thick) on 6" and larger piping. All insulation shall be Hydrous Calcium Silicate Johns-Manville Thermo-12 (asbestos-free) or COMPANY approved equal.
- (D) Weathercoating shall be 0.016" thick corrugated aluminum pipe jacket with moisture barrier backing manufactured by Childers Mfg. or COMPANY approved equal.
- (E) CONTRACTOR will clean up and dispose of daily, all debris and trash created by the work being done.

1.2 In addition, CONTRACTOR shall provide all items of material to be incorporated into the Facility.

2.0 WORK, MATERIAL AND UTILITIES BY COMPANY OR OTHERS

2.1 Work by Others

The following items of work related to the Facility will be performed for COMPANY by others:

(A) COMPANY will fabricate and install all new and replacement piping.

(B) COMPANY will provide a site within the Refinery for trash disposal.

3.0 SEQUENCE OF WORK

The sequence of work shall be as mutually agreed between the COMPANY and CONTRACTOR and shall be consistent with the facing sheet of the Agreement.

4.0 INTENT

The Facility shall be complete in every respect, constructed in accordance with generally accepted, current good practices of the several trades involved and the detailed requirements of this Specification and ready to operate in the manner expressed or implied herein, regardless of whether or not full details of such completeness or practices are contained herein.

5.0 COMPANY REVIEW AND APPROVAL

COMPANY's review of, approval of, or agreement to the performance of certain items of work or the provisions of certain material shall in no way relieve CONTRACTOR of full responsibility for the performance of such work, or for the adequacy of such material. All such reviews, approvals or agreements shall be obtained through COMPANY's Construction Representative, or in a manner previously approved in writing by COMPANY's Construction Representative.

SECTION 2 - GENERAL CONDITIONS AND PERFORMANCE OF WORK

6.0 PRECEDENCE

- 6.1 As used in the standard specification attached hereto:
(a) "Purchaser" shall mean COMPANY; (b) "Supplier" or "Vendor" shall mean CONTRACTOR; and (c) "Purchaser's Inspector" shall mean COMPANY Construction Representative.
- 6.2 Unless other wise expressly provided in this Specification,
(a) any data, specification, material, and work or any other matter which is covered by this Agreement which the standard specifications require to be provided by COMPANY shall instead be provided by CONTRACTOR; (b) any provisions of the standard specifications requiring COMPANY to inspect certain material or work shall mean that COMPANY has an option, rather than the obligation, to so inspect such material or work; (c) any warranty or guarantee provisions contained in the standard specifications shall be of no effect and the warranty and guarantee provisions of this Specification, if any, shall apply; and (d) any item of material, work, inspection or testing to be furnished at extra expense to COMPANY pursuant to the standard specifications shall be furnished under this Specification at no increase in CONTRACTOR's compensation.

All provisions in the standard specifications concerning compensation of payment to CONTRACTOR in case of delay shall be of no effect, and the provisions of the Terms and Conditions and of this Specification shall apply.

In the engineering instructions, reference to COMPANY's personnel shall be of no effect, and CONTRACTOR's personnel shall perform all activities which are to be performed under the engineering instructions, except as otherwise provided elsewhere in this Specification.

Where standard specifications on materials contain sections covering COMPANY's normal requirement for purchasing and field erection, these sections shall be of no effect except as otherwise expressly stated in this Specification.

7.0 FIELD REPRESENTATIVES

7.1 COMPANY's Representative

COMPANY will maintain a Representative in the field pursuant to Section 3.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

7.2 CONTRACTOR's Construction Representative

CONTRACTOR shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR's work and maintain field liaison between CONTRACTOR and COMPANY's Construction Representative.

8.0 OTHER CONTRACTS

COMPANY reserves the right to let other contracts or perform other services in connection with CONTRACTOR's work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs.

9.0 WORK WEEK AND OVERTIME

CONTRACTOR shall pursue to field construction work on a 40-hour per week work schedule in accordance with Section 5.0 of Refinery Instruction No. 1404, General Instruction to Contractors Working Within the Refinery, attached.

10.0 PLANT REGULATIONS

Prior to the commencement of work, CONTRACTOR shall become familiar with the plant regulations specified in the attached Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery and the following regulations. CONTRACTOR shall be responsible for compliance with these regulations during the execution of his work.

10.1 Electrical Safety Requirements

CONTRACTOR shall provide and use ground fault circuit interrupters for personnel protection at all construction sites (including areas inside existing plants) on all 120 volt single phase 15 and 20 amper receptacle outlets.

Hubbell type GFP or Porta-Power Pak Inc. Model 72 series are typical of acceptable portable receptacle units.

Ground fault circuit interrupters shall not be used in areas where flammable vapors are present.

It is essential that the polarity of the conductors in all cords, plugs and receptacles supplying single pole portable ground fault circuit interrupter units be properly maintained to insure proper operation of the units.

10.2 Work Space and Storage Area

COMPANY will assign space in the general vicinity of the CONTRACTOR's work for CONTRACTOR's office, work space and storage area.

11.0 TEMPORARY CONSTRUCTION FACILITIES

11.1 CONTRACTOR shall provide and install all necessary temporary facilities including, but not limited to, tool rooms, locker rooms, toilets, office and storehouse. All temporary installations shall be subject to approval by COMPANY prior to installation.

11.2 In addition, CONTRACTOR shall provide all necessary temporary equipment and material including, but not limited to, shoring, concrete forms, bracing, ladders, scaffolding, staging, drop cloths and tarpaulins.

11.3 CONTRACTOR shall maintain all temporary facilities, material and equipment in a safe and adequate manner and remove them immediately upon completion of the work requiring their presence.

12.0 DRAWINGS AND DIMENSIONS

COMPANY will provide to CONTRACTOR two copies of all pertinent standard drawings, standard specifications, reference drawings, and construction drawings.

13.0 INSPECTION AND TESTING

13.1 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR's employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall in no way relieve CONTRACTOR of full responsibility for the work hereunder.

14.0 INSULATION

14.1. Insulation

All insulation work shall be by CONTRACTOR and installed in accordance with Standard Drawings GA-N99783-3 and GB-N99993-0 and as directed by our COMPANY Representative. All insulation materials will be furnished by CONTRACTOR. CONTRACTOR shall be responsible for relaying all technical questions pertaining to insulation work to COMPANY for resolution.

15.0 CLEANING UP

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material and, at the completion of the work, the site shall be cleared of all debris, left-over tools, consumable supplies, and material which may have accumulated in the performance of the work. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work; the cost of such work shall be for CONTRACTOR's account and may be deducted from the sums due or to become due CONTRACTOR.

16.0 COMPLETION

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this Specification.

SPECIFICATION NO. EP-353-N

March 8, 1979

Appendix

Page 1

17.0 DRAWINGS AND SPECIFICATIONS

The following Engineering Instructions and Standard Specifications further detail the work covered by this specification.

Construction Drawing PC-10-20972 Sheets 68 thru 74

Standard Drawings GA-N99783-3 Standard Insulation for Hot Piping
GB-N99993-0 Standard Insulation Item Numbers

Refinery Instruction 1404 - Instruction to Contractors Working
Within the Refinery

LIST OF MATERIALS

st No.. 7052, SHT 1

DATE: 5-31-78

5401300-001

DATE REQUIRED: 6-12-78

Lead Engr: R.A.E.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

SIZE	DESCRIPTION	SOURCE STOCK OR P.O.No.	EST. DEL. DATE
3"	Sm/s.Stl. Pipe Sch. 40		
8"			
3x3"	Stl. Conc. Red. B.W. Std. Wt.		
8"	Stl. 45° Elbow B.W. L.R. Std. Wt.		
3"	" 90° " " "		
8"	" " " " "		
3"	" Tee B.W. Std. Wt.		
8"	" " " "		
10"x8"	Stl. Weld. Saddle		
3"	600# FS W.N. Flg. 1/4" RF Sch 40		
3"	300# SG. Sch 40		
2 1/2"	600# FS W.N. Flg. 1/4" RF Sch. 40		
3"	300# Stl Clad Asb Gasket		
3"	600# Spiral Wound Gasket		
2 1/2"	600# " " "		
3/4" x 4 1/2"	Stud Bolt Gr B7 W/2 Hex Nuts		
3/4" x 4 3/4"	" " " "		
3" x 2 1/2"	Stl. 90° B.W. Red. Elbow L.R. Std Wt.		
1"	Stl. Weld Boss, Threaded		
1" x 3"	Sm/s.Stl. Pipe Nipple T.B.E. Sch. 160		
1"	800# Stl. Scd Gate Valve Steel Tr. Blt Bnt		
3"	600# CS Flg Gate Valve Blt. Bnt.	2-RDEP-6058X	7/21/
3"	600# " Check "	2-RDEP-6058X	7/21/
<i>M. P. Young 5/31/70</i>			

DATE. 4/3/78

DATE REQUIRED: 4/21/78

Lead Engr: *RA 8*

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN	SIZE	DECR. ON	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
L4	80'	10"	SCH 20 STL. SABLE PIPE	RDEP 6053X-7010	
L5312	1	10"	SCH 20 CS BW 90° ELBOW LG. RADII		
L149	2	6"	150# ES. WELD. NECK FLG. 1/16 R.F.		
L149	1	10"	" " " " " " " "		
L140	(1)	10"	" " BLIND FLG 1/16 R.F.	STOCK	
L124	1	6"	150# FLGD CS. GATE VALVE 1/16 L.F.	RDEP 7119	
L306	(1)	83T EX 6"	OUTLET WE DOCKET	SURPLUS THM BIN	OUT
L6	(2')	6"	SCH 40 STL SABLE PIPE	SHOP	
L151	(2)	6"	1/16TH AIR COMP. RING GASSET FOR 150#	STOCK	
L151	(1)	10"	" " " " " " " "		
H262	16	3/4"x3/4"	LG STUD BOLTS GR BT W/2 HEX NUTS	RDEP 6053X-7010	
H263	(12)	7/16"x4 1/2"	" " " " " " " "	STOCK	
L5313	2	10"	SCH 20 CS BW 90° ELBOW S.R.	RDEP 6053X-7010	
L319	(1)	10"ELL X 3/4"	OUTLET 3000# ELBOLET, FOR 10" ELL & TIE IN	STOCK	
91	(1)	3/4"x4"	SGH SC SABLE STL PIPE 1/16 R.F. T&E		
L31	(1)	3/4"	SCC# JORD. STL GATE VALVE CLEY ELEMENT		
L77	(1)	3/4"	SGD. STL. BAR STOCK PLUG (LAWIC 40)		
			*R BULL 4/13		
			BUSTO - RDEP 6053X		
			GRANT - RDEP 6053X		
			INCREASE DIESEL PUMP RATE TO CPL.		
			CHEV B8 6068		

SPECIFICATION NO. EP-278-L

INSTALLATION OF REPLACEMENT

FCC REGENERATED CATALYST

AND SPENT CATALYST U-BENDS

EL PASO REFINERY

CHEVRON OIL COMPANY, WESTERN DIVISION

d/b/a STANDARD OIL COMPANY OF TEXAS

APRIL 20, 1976

CHEV B8 6069

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- 1.2 Work, Material and Utilities by COMPANY or Others
- 1.3 Drawings, Specifications and Instructions
- 1.4 Intent

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- 2.1 Precedence
- 2.2 Field Representatives
- 2.3 Other Contracts
- 2.4 Subcontractors
- 2.5 Changes in the Work
- 2.6 Cost Breakdown
- 2.7 Plant Regulations

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- 3.2 Temporary Construction Facilities
- 3.3 Materials Handling
- 3.4 Drawings
- 3.5 Inspection and Testing
- 3.6 Bolting-Up Practice
- 3.7 Rigging Plan
- 3.8 Work Plan
- 3.9 Cleanup

APPENDIX

- A.1 Drawing Index
- A.2 Standard Specifications
- A.3 Refinery Instructions
- Field Instruction

SECTION 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

- 1.11 This Specification covers the removal and replacement of existing regenerated catalyst and spent catalyst U-bends which are part of the Fluid Catalytic Cracking Unit located at the Standard Oil Company of Texas Refinery, El Paso, Texas.
- 1.12 CONTRACTOR shall perform all labor and furnish all supplies, construction equipment, temporary facilities and all items of a consumable nature (such as listed in Specification Nos. EG-1048-A and EG-1049-C) required for the performance of this work as detailed by this Specification, including the drawings and other attachments, except as otherwise provided in Section 1.21 below.
- a) This work includes but is not limited to:
- 1) Removal of existing and installation of new U-bends.
 - 2) Design, fabrication, installation and removal of all temporary structural supports, clips and anchorages required for the replacement work.
 - 3) Removal, temporary support, alteration and re-installation of all permanent piping attached to U-bends including struts, shock absorbers and hangers.
 - 4) Radiographic inspection of all field welds on U-bends.
 - 5) Postweld heat treatment of field welds involving Chromium-Molybdenum steel.
 - 6) Erection and removal of all staging required.

1.2 WORK, MATERIAL AND UTILITIES BY COMPANY OR OTHERS

- 1.21 The following items of work related to the work defined in Section 1.1 shall be performed by the COMPANY or others.
- a) Refractory and hex-mesh repair or replacement.
 - b) U-bend insulation replacement.
 - c) Repair or replacement of insulation for piping attached to U-bends.
 - d) Removal of catalyst from U-bends.

- e) Disconnect and reinstall instrument connections to U-bends.
- f) Install blinds, unhead and head up vessels.

1.22 Material Furnished by COMPANY

The COMPANY shall provide the following material to be incorporated into the work:

- a) Replacement regenerated catalyst U-bend furnished in 3 sections as detailed on drawing PA-18-22828-2. Material is Chromium-Molybdenum, per ASTM JA-387-D, (2½ Cr.- 1 Mo.)
- b) Replacement spent catalyst U-bend furnished in 3 sections as detailed on drawing PA-18-14561-5. Material is carbon steel per ASTM SA-515 grade 55. or better.
- c) Materials required for replacement or alterations of piping attached to U-bends.
- d) Materials required to make utilities connections.

1.23 Utilities furnished by COMPANY

The following construction utilities shall be furnished by COMPANY at no expense to CONTRACTOR. Connections to required utilities shall be made by CONTRACTOR.

- a) 440V., 3 ph., 200 A. electric power.
- b) 110V., 1 ph. electric power.
- c) Utility air at approximately 100 psig.
- d) Drinking water - in CONTRACTOR'S containers at a location to be designated by COMPANY'S Construction Representative.
- e) Industrial fresh water.

1.3 DRAWINGS, SPECIFICATIONS AND INSTRUCTIONS

The drawings, standard specifications, fabrication specifications and Refinery Instructions attached and listed in the Appendix further detail the work and are part of this Specification.

1.4 INTENT

It is the intent of this Specification that the CONTRACTOR shall provide and complete the work described herein in a complete and finished fashion even though full details may not be specifically noted. CONTRACTOR is expected to perform all work in accordance with safe, accepted, current good industry practices and applicable codes and regulations.

SECTION 2 - GENERAL CONDITIONS

2.1 PRECEDENCE

In the event of a conflict between any of the following items, they shall take precedence in the order listed:

- a) Contract Facing Sheet.
- b) Terms and Conditions.
- c) Specification No. EP-278-L.
- d) Construction drawings incorporated into Specification No. EP-278-L.
- e) Standard specifications incorporated into Specification No. EP-278-L.
- f) Reference drawings and Refinery Instructions incorporated into Specification No. EP-278-L.
- g) American Society of Testing Materials Specifications or other similar publications referred to in this Specification No. EP-278-L but not attached, if any.

2.2 FIELD REPRESENTATIVES

2.21 COMPANY'S Construction Representative

COMPANY shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

2.22 CONTRACTOR'S Construction Representative

CONTRACTOR shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

2.3 OTHER CONTRACTS

COMPANY reserves the right to let other contracts or perform other work or services in connection with CONTRACTOR'S work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs. If any part of CONTRACTOR'S work depends for proper execution upon existing work or work to be performed by others, CONTRACTOR shall measure and visually inspect such other work and promptly report to COMPANY if there are any discrepancies or defects therein which render it unsuitable for proper execution of CONTRACTOR'S work.

2.4 SUBCONTRACTORS

All subcontractors shall be subject to COMPANY approval.

2.5 CHANGES IN THE WORK

As required, COMPANY will issue supplemental instructions to CONTRACTOR on a Field Instruction Form (copy attached in Appendix). COMPANY will classify these instructions as either -

- a) Supplementary instructions, not involving a change in work.
- b) Change in work

In accordance with the Terms and Conditions of the Contract. If a change in the work is involved, COMPANY will further issue an Authorization for Change in the Work (GO-283-GEN) once the terms of reimbursement to CONTRACTOR or rebate to COMPANY have been agreed upon. Any problems or conflicts in this regard shall be negotiated by the CONTRACTOR'S and COMPANY'S Construction Representatives. If the COMPANY elects, the contract price will be adjusted as provided in the "Exhibit - Change in the Work", attached to this contract.

2.6 COST BREAKDOWN

Upon receiving notification of the acceptance of his bid, CONTRACTOR shall provide COMPANY a breakdown of his bid price according to the following items:

- a) Removal and replacement of FCC Regenerated Catalyst U-Bend.
- b) Removal and replacement of FCC Spent Catalyst U-Bend.

CONTRACTOR shall provide revised breakdown of final cost for each item above (initial price plus subsequent contract changes) to COMPANY with CONTRACTOR'S final invoice.

2.7 PLANT REGULATIONS

Prior to commencement of work, CONTRACTOR shall become familiar with the following Refinery regulations and shall be responsible for compliance with these regulations.

- a) Refinery Instruction No. 1404 entitled "General Instructions to Contractor Working within Refinery".
- b) Refinery Instruction No. 1007 entitled "Union Business Agent Visits".

THIS PAGE ENDS SECTION 2.

SECTION 3 - PERFORMANCE OF WORK

3.1 WORK SPACE AND STORAGE AREA

COMPANY shall assign space in the area as designated by COMPANY'S Construction Representative for CONTRACTOR'S office, work space, and storage area.

3.2 TEMPORARY CONSTRUCTION FACILITIES

3.21 CONTRACTOR shall provide and install all temporary facilities required for the performance of the work. All temporary installations shall be subject to approval by COMPANY prior to installation.

3.22 In addition, CONTRACTOR shall provide as required for completion of the work any temporary equipment and material including, but not limited to, bracing, ladders, scaffolding, staging, drop cloths and tarpaulins.

3.23 CONTRACTOR shall maintain all temporary facilities, material, and equipment in a safe and adequate manner and remove them immediately upon completion of the portion of work requiring their presence.

3.3 MATERIALS HANDLING

CONTRACTOR shall be furnished with material listed in Section 1.22 from any one of several storage areas in the refinery. CONTRACTOR will be responsible for movement of such material and the return of all unused material. All material withdrawals from Refinery Storehouse shall be approved by the COMPANY Construction Representative. CONTRACTOR will be responsible for moving existing U-bend sections from the Unit to a storage area designated by COMPANY Construction Representative as soon as practical to minimize congestion in the construction area. All salvaged materials will remain property of the COMPANY.

3.4 DRAWINGS

CONTRACTOR will be furnished at least 3 sets of all construction drawings. One set shall be maintained by CONTRACTOR and he shall indicate on this set of drawings any changes or deviations which have been made during the course of construction. This set shall be returned with changes noted, to the COMPANY upon completion of the job. COMPANY will promptly furnish CONTRACTOR revised issues of drawings as appropriate. CONTRACTOR shall prepare any supplemental or additional drawings he requires to properly execute the work at hand. Any discrepancies found by CONTRACTOR on drawings furnished by COMPANY shall promptly be brought to COMPANY'S attention.

3.5 INSPECTION AND TESTING

3.51 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR'S employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall not relieve CONTRACTOR of full responsibility for the work hereunder.

3.52 Welding Inspection and Testing

The following modifications and additions to Standard Specification No. EG-2505-G, entitled "Fabrication of Steel Piping", shall apply for this Contract:

- a) Welding samples for chromium-molybdenum welds may be taken by COMPANY Inspector during fabrication at a frequency of 3 samples per field welded joint on U-bends. (Re: Section 4.3).
- b) Brinell hardness tests will be performed by COMPANY Inspector after post weld heat treatment.
- c) 100 percent Radiography is required for all field welded circumferential joints, both U-bends.
- d) Root passes or other weld passes may be dye checked as elected by COMPANY Inspector.

3.53 Hydrostatic Testing

CONTRACTOR shall perform hydrostatic tests on altered or replacement piping attached to U-bends in accordance with Refinery Instruction No. 1501. No hydrostatic testing is required for U-bends.

3.6 BOLTING-UP PRACTICE

Bolting-up of flanged joints shall be in accordance with Engineering Instruction No. R-800-1. In addition, flanges requiring spiral wound gaskets shall be tightened progressively on bolts in a 12:00-6:00 - 9:00-3:00 sequence that will assure uniform and sufficient compression to seat the gasket.

3.7 RIGGING PLAN

CONTRACTOR shall submit a detailed Rigging Plan, including supporting calculations, for removal and replacement of U-bends for COMPANY approval three weeks prior to start of work.

3.8 WORK PLAN

CONTRACTOR shall submit a detailed work plan to include a Critical Path Schedule for COMPANY review four weeks prior to start of work.

3.9 CLEANUP

During the course of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated waste material and at the completion of the work, the site shall be cleared of all debris, tools, equipment and material which may have accumulated in the execution of the work.

THIS PAGE ENDS SECTION 3.

A.1 - DRAWING INDEX

CONSTRUCTION DRAWINGS

PA-18-22828-2	Regenerated Catalyst U-Bend Assembly and Details
PA-18-14561-5	Spent Catalyst U-Bend Assembly and Details
PA-18-14548-6	D-1802 Regenerator Insulation and Nozzle Details
PA-18-14620-2	Barco Strut and Shock Absorber Details

REFERENCE DRAWINGS

PA-18-14560-4	Regenerated Catalyst U-Bend Assembly and Details (Original Installation)
PA-18-14561-4	Spent Catalyst U-Bend Assembly and Details (Original Install)
PB-18-22440-1	Replacement Section of Regen. Cat. U-Bend (Installed 12/71)

Reactor and Regenerator Structures

PA-18-14621-3	Framing Plan - El. 118'-0-3/4 and El. 114'-11-3/4
PA-18-14622-4	Framing Plan - El. 131'-7-1/2
PA-18-14623-3	Framing Plan - El. 140'-8
PA-18-14625-3	Framing Elevations - Col. Lines A-B-C-D
PA-18-14626-2	Framing Elevations - Col. Lines 1-2-3-4

Piping Drawings

PA-18-14524-15	Piping Plan - El. 116'-0 to Grade
PA-18-14525-12	Piping Plan - El. 130'-3 to El. 116'-0
PA-18-14526-7	Piping Plan - El. 149'-9 to El. 130'-3
PA-18-14530-4	Piping Sections and Details, Catalyst U-Bends
PA-18-14532-15	Piping Section - El. 169'-9 to Grade

A.2 - STANDARD SPECIFICATIONS

EG-2505-G	Fabrication of Steel Piping
EG-1048-A	Small Tools and Equipment
EG-1049-C	Supplies
R-800-1	Bolting up Practice

THIS PAGE ENDS APPENDIX A.2 - INDEX

A.3 - REFINERY INSTRUCTIONS

- 1007 Union Business Agent Visits
- 1404 General Instructions to Contractors Working Within the
Refinery
- 1501 Hydrostatic Testing of Refinery Equipment

THIS PAGE ENDS APPENDIX A.3 - INDEX

SPECIFICATION NO. SS-2502REFRACTORY LINING FOR REGENERATED CATALYST U-BEND IN THE FCCU1. GENERAL

- 1.1 This Specification covers requirements for materials, installation, curing, repairing, testing, and inspecting a cast 4-5/8 inch thick monolithic refractory lining. The lining shall contain 1.2 volume percent stainless steel fiber reinforcement in a 48 inch diameter U-bend (per Drawing SD-120612) and be suitable for 1300°F operating temperature.
- 1.2 CONTRACTOR shall provide and install all materials required following good workmanship practices. All work shall be free from injurious defects.

2. MATERIALS2.1 Refractories

- 2.11 The "castable refractory" shall be a 130-140lb/ft³ density ASTM C-401 Class C refractory Resco RS-17E. No substitutes will be accepted.
- 2.12 The "erosion resistant refractory," shall be a 160-170lb/ft³ density acid bonded refractory Resco AA-22. No substitutes will be accepted.

2.2 Stainless Fibers

- 2.21 The stainless fibers shall be AISI 302 or 304 stainless steel, and shall be made by the melt extraction process. Fibers made of chopped wire shall not be used.
- 2.22 Stainless fibers mixed into the castable refractory shall have an average length of 1 3/8 inches, and an equivalent diameter of 0.018 to 0.020 inch.
- 2.23 Stainless fibers mixed into the erosion resistant field joint refractory shall have an average length of 3/4 inch, and an average diameter of 0.018 to 0.020 inch.

2.3 Hexmesh

- 2.31 The hexmesh shall be 3/4 inch thick, 14 gauge AISI 405 or 410S (low carbon) stainless steel. 304 SS
- 2.32 The hexmesh shall be 1 3/4 inches across the flats, welded or riveted (not clinched), and shall have two "prongs" extending into each hex.
- 2.33 The hexmesh shall be Bufnel Lance Grid, or COMPANY approved equivalent.

2.4 Anchors

- 2.41 Castable refractory anchors shall be 3½ inches tall, 3/16 inch diameter, AISI 304 stainless steel V-studs.
- 2.42 Hexmesh supports shall be ½ inch diameter AISI 304 stainless steel Nelson studs welded on 2 inch by 2 inch by ¼ inch AISI 304 stainless flats.

3. INSTALLATION

3.1 Anchors

- 3.11 V-studs for the castable refractory shall be installed in staggered alternate rows 8½ inches apart and oriented per Drawing SK-RCC-FCC-8.
- 3.12 Nelson studs for the hexmesh shall be installed and oriented per nozzle detail SK-RCC-FCC-8.
- 3.13 Nelson and V-studs shall be welded to the inside of the U-bend using E-309-15 welding electrodes.
- 3.14 The entire inside surface of the U-bend shall be grit blasted to a commercial blast finish (SSPC-SP6), and shall be cleaned of all grit, dust, rust, scale and grease before welding in the studs.

3.2 Hexmesh:

- 3.21 The hexmesh shall be rolled the "hard way" (with the axis of the roll and axis of the rivets parallel) and installed in accordance with Drawing SD-120612.
- 3.22 The hexmesh shall be welded together and to its supports in accordance with Drawing SD-120612 using E-309-15 welding electrodes.
- 3.23 The hexmesh shall be thoroughly cleaned and all grease and oil removed before welding.

3.3 Refractories

- 3.31 The entire inside surface of the U-bend shall be cleaned of all grit, dust, rust, scale and grease before applying any and all refractory. All refractory anchors and hexmesh shall be thoroughly cleaned and all grease and oil removed before applying any and all refractory.
- 3.32 The U-bend metal temperature, surrounding air temperature, and refractory temperature shall be maintained between 50°F and 90°F throughout refractory mixing and application operations.

- 3.3 All refractories shall be properly proportioned and thoroughly mixed in accordance with the manufacturer's instructions and specifications.
- a. Each batch of similar type refractory shall be mixed to the same consistency and workability established by CONTRACTOR and approved by COMPANY.
 1. CONTRACTOR shall submit for COMPANY approval the ASTM C860 Ball In Hand Test range at which the castable refractory will be cast.
 2. CONTRACTOR shall submit for COMPANY approval the ASTM C181 Workability Index range at which the AA-22 erosion resistant refractory will be rammed.
 - b. Within the manufacturer's recommended water limits, only enough water shall be added to the refractory to achieve the approved application consistency and workability.
 1. For the castable refractory, no more than 20 cups of water shall be added per 100 pounds of refractory without COMPANY approval.
 2. For the erosion resistant refractory, no more than 6 cups of water shall be added per 50 pounds of refractory without COMPANY approval.
 - c. All refractories shall be poured or placed within the manufacturer's recommended time limitations. Refractory not used within the recommended time shall be discarded, and not remixed.
 1. Castable refractory not applied within 25 minutes after the addition of water shall be discarded, and not reused.
 2. Erosion resistant refractory not applied within 15 minutes after the addition of water shall be discarded, and not reused.
 - d. Refractory should be mixed only long enough to produce a uniform mix. Under no circumstances shall refractory be mixed longer than 5 minutes after the addition of water.
 - e. Only fresh, unused, non-recovered refractory shall be used.
 - f. Only clean, fresh, nonpolluted water suitable for drinking and free from injurious amounts of organic matter or other deleterious substances shall be used.
 - g. Refractory mixers shall be cleaned, and free of any contaminant, before mixing each batch of refractory.

- 3.4 Six pounds of clean, oil-free stainless fibers shall be mixed into every cubic foot of castable refractory (1.2% fibers by volume). The stainless fibers shall be screened to breakup knotted fiber and thoroughly mixed into the castable refractory to achieve a uniform distribution of randomly oriented fibers.
- 3.5 The castable refractory shall be vibration cast into each U-bend segment in one continuous operation in accordance with manufacturer's instructions and specifications.
- a. Each U-bend segment shall be poured as a single continuous casting. If more than one pour is required to complete a U-bend segment, the time between pours shall be minimized and shall not exceed 30 minutes.
 - b. Sufficient vibration shall be applied to the U-bend to achieve a dense, uniform casting free of vapor pockets and voids.
 - c. Casting forms and molds shall be treated or coated to prevent premature loss of moisture during refractory curing, and to minimize refractory adhesion to the forms.
 - d. Within 30 minutes after completing a U-bend segment casting, all exposed refractory surfaces shall be coated with a color tinted curing compound approved by the refractory manufacturer.
- 3.6 The erosion resistant refractory shall be rammed into each hexmesh section in accordance with manufacturer's instructions and specifications.
- a. Underlying castable refractory shall be clean and free of any contamination that would adversely affect adhesion.
 - b. Sufficient ramming and hammering shall be applied to the erosion resistant refractory in each hexmesh section to achieve a dense, uniform "biscuit" free of air bubbles, pocket and voids, and completely filling the hexmesh.
 - c. If a batch of refractory should stiffen before placement in the hexmesh, to the point where it is not binding together, the batch shall be discarded. Under no circumstances shall more water be added or the refractory remixed.
 - d. The erosion resistant refractory shall not be coated with a curing compound without COMPANY approval.

4. REFRACTORY CURING

- 4.1 All refractory shall be cured and dehydrated in accordance with manufacturer's instructions and specifications.
- 4.2 Prior to the installation of any refractory, CONTRACTOR shall provide, for COMPANY approval, a planned curing and dehydration schedule showing hold times, temperatures, and heating rates. The COMPANY approved schedule shall be followed for all refractory curing and dehydration.

- 4.3 All refractory shall be hydraulic cured at least 24 hours (or at least 48 hours if the temperature is below 65°F) before removing the casing forms.
 - 4.31 The castable refractory shall be kept moist throughout hydraulic curing. A fine water (suitable for drinking) spray shall be applied to exposed refractory surfaces and casting forms as necessary to keep the castable refractory moist during hydraulic curing.
 - 4.32 The erosion resistant refractory shall not be moist cured without COMPANY approval. Water or water spray shall not be applied to the erosion resistant refractory during curing. Erosion resistant refractory shall not be sealed from direct contact with the atmosphere.
 - 4.33 Surrounding air temperatures shall be maintained between 50°F and 80°F during all refractory hydraulic curing.
 - 4.34 After removing the casting forms, all refractory shall air dry at least 24 hours before heating for dehydration.
- 4.4 All refractory shall be thermally dehydrated to 600°F at a rate slow enough to prevent steaming. As a maximum, all refractory shall be dehydrated no faster than the following, with additional holds as necessary to prevent steaming.
 - 4.41 Heat from ambient temperature to 250°F at no more than 25°F per hour.
 - 4.42 Hold temperature at 250°F for at least 12 hours.
 - 4.43 Heat from 250°F to 600°F at no more than 50°F per hour.
 - 4.44 Hold temperature at 600°F for at least 6 hours.
 - 4.45 Temperatures above are curing gas temperatures; not refractory or metal temperature.
- 4.5 The thermal dehydration of all refractory shall be done using only the convection heat of hot circulating gases. No portion of the refractory shall be subjected to flame impingement or direct radiation at any time during the thermal dehydration.
 - 4.51 The gas temperature shall be continuously monitored and recorded throughout the dehydration procedure with at least 3 thermocouples, one at the middle and each end of each U-bend segment.
 - 4.52 The temperature difference between thermocouples in a U-bend segment shall be minimized and not exceed 50°F.
 - 4.53 The record of the thermocouples' temperatures shall be given to the COMPANY.

- 4.6 The U-bend metal temperature shall be continuously monitored and recorded throughout the dehydration procedure with at least 2 thermocouples evenly spaced on each U-bend segment.

4.61 The record of the thermocouples' temperatures shall be given to the COMPANY.

5. REFRACTORY REPAIRS

- 5.1 All refractory that does not meet all the requirements of this Specification shall be replaced or repaired, at CONTRACTOR's expense, in accordance with this Specification, including refractory mixing, application and quality control.

- 5.2 CONTRACTOR shall provide for COMPANY approval a planned curing and dehydration procedure for all repaired areas. Repaired areas shall be cured and dehydrated in accordance with the COMPANY approved procedure.

- 5.3 Small voids and large cracks in the castable refractory shall be chiseled out to sound adjacent refractory, and repaired with rammed Resco AA-22 or COMPANY approved equivalent.

5.31 Repair areas less than 1 1/2 inches deep or covering less than 50 square inches shall be considered small.

- 5.4 Moderate sized voids and defective areas in the castable refractory shall be completely removed down to the U-bend exposing at least one entire V-stud.

5.41 The sidewalls of the repair area shall be angled outward 15-25 degrees such that the repair area adjacent to the U-bend is larger than the outer surface of the repair area.

5.42 Repair areas with only one exposed V-stud shall be rammed with fiber reinforced Resco AA-22 or COMPANY approved equivalent.

5.43 Repair areas with 2 to 4 exposed adjacent V-studs shall be re-cast with fiber reinforced castable refractory.

5.44 Repair areas with more than 4 exposed adjacent V-studs shall be considered major repairs.

- 5.5 Major voids and defective areas in the castable refractory shall be completely removed down to the U-bend in a band 360 degrees around the U-bend exposing at least two rows of V-studs. The removed refractory shall be re-cast with fiber reinforced castable refractory.

- 5.6 Defective erosion resistant refractory biscuits in the hexmesh shall be completely removed, and replaced with rammed erosion resistant refractory.

6. QUALITY CONTROL

6.1 Testing

6.11 Refractory studs:

All Nelson and V-stud attachment welds shall be hammer tested. All loose studs, bent over studs, and studs with cracked or partial attachment welds shall be removed, replaced, and retested.

6.12 Refractory Mix:

- a. Each lot of refractory shall be pretested to determine the amount of water necessary to obtain the COMPANY approved consistency and workability. This water content shall be reported to COMPANY (as cups of water per 100 pounds of refractory) along with the refractory lot identification.
- b. For every batch of refractory mixed, the total amount of water (in cups) and refractory (in pounds) added to the mix shall be reported to the COMPANY along with the refractory lot identification.
- c. Every batch of mixed refractory shall be ASTM C860 and ball-in-hand tested for proper consistency and workability before casting or ramming.

6.13 Refractory Cure:

- a. Each lot of refractory shall be pretested in accordance with ASTM C268 to determine its modulus of rupture with the specified reinforcing fibers. All refractory lots with an average modulus of rupture after thermal dehydration less than 1500 psi, or a single test value below 1000 psi shall be rejected and not used.
 1. CONTRACTOR shall provide COMPANY certified ASTM C268 test results for each thermally dehydrated test brick from every refractory lot tested. The test report shall also indicate the refractory dry weight (to the nearest 100 grams) of the test batch, and the amount of water added (to the nearest milliliter).
 2. The ASTM C268 test batch of refractory shall be mixed using the amount of water necessary to obtain the COMPANY approved consistency and workability.
 3. The five thermally dehydrated ASTM C268 test bricks shall be dehydrated at 1200°F rather than one of the ASTM C268 heating schedules.

CAN USE
DATA SUPPLIED
BY REFR.
MANUF.

4. The five, hydraulically cured only, ASTM C268 test bricks shall be clearly identified with the refractory lot number, and provided to COMPANY for information only.

b. [The cold crush strength of each batch of mixed refractory shall be determined in accordance with ASTM C133 modified as follows:

1. A 2 inch by 2 inch by 2 inch cube test specimen shall be used instead of the ASTM C133 specimen.
2. Nine specimens shall be tested from each batch of refractory mixed.
3. The refractory specimens shall be hydraulically cured 24 hours and thermally dehydrated 18 hours at 250°F before testing.
4. CONTRACTOR shall report all cold crush test results (to the nearest 10 psi) to COMPANY, along with the required water content report. In addition, the location of each batch within the U-bend segments shall be reported to COMPANY.

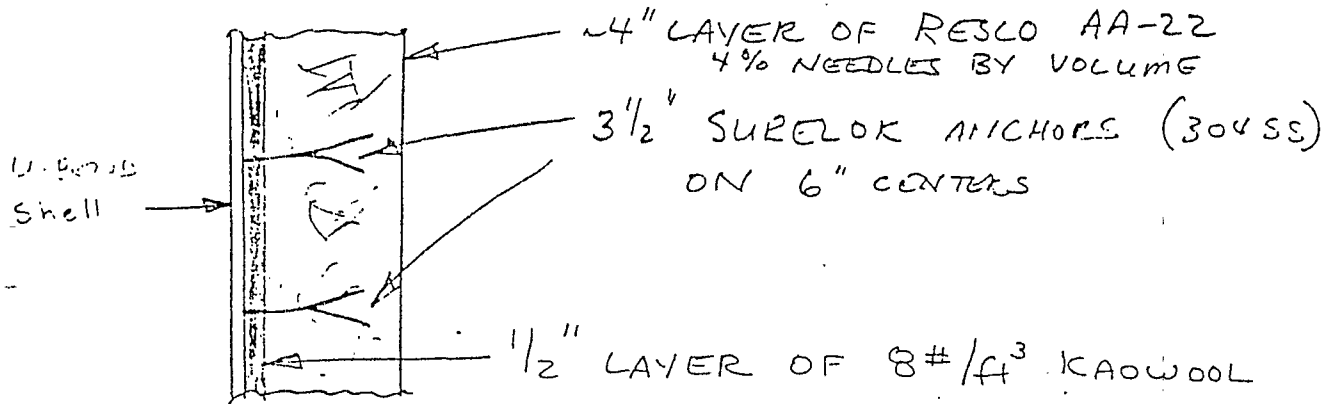
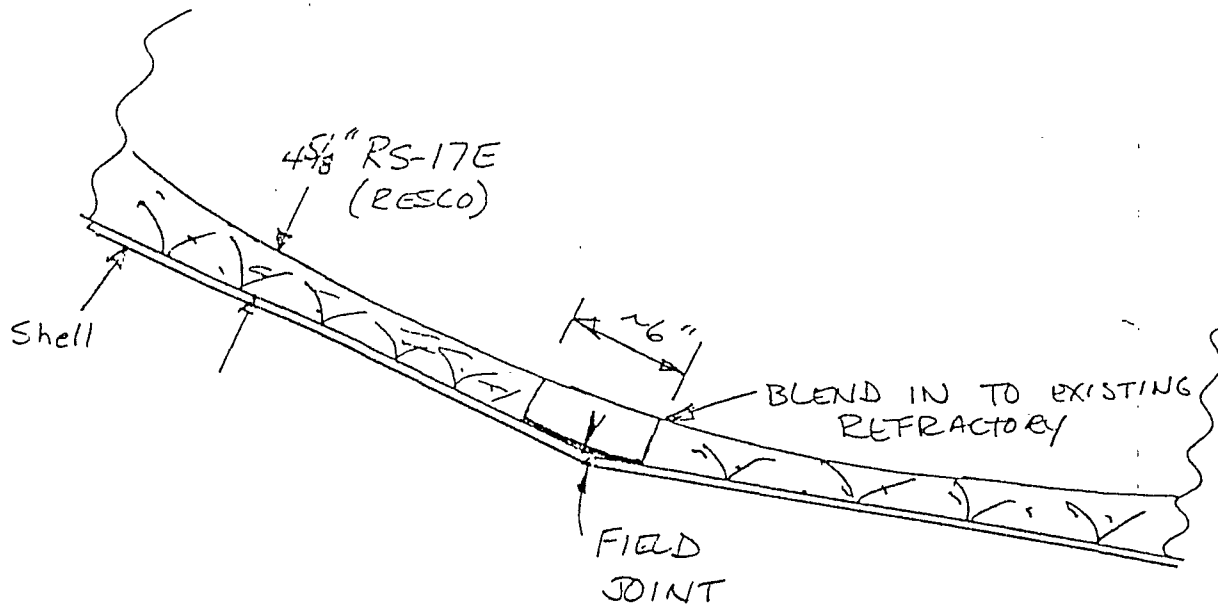
All refractory batches with an average cold crush strength less than 8000 psi, or a single test valve below 5000 psi shall be rejected and replaced.

6.2 Inspection

6.21 COMPANY inspectors and representatives shall have access to CONTRACTOR's facilities to inspect the refractory during all phases of installation, including anchoring, mixing, application, curing, and testing.

6.22 CONTRACTOR shall visually inspect all exposed refractory, after it has been cured and thermally dehydrated, for cracks, voids, spalling, and unbounded material.

- a. Cracks deeper than one inch or wider than 1/16 inch are unacceptable, and shall be repaired.
- b. Voids and holes deeper than 3/16 inch or wider than 1/2 inch are unacceptable, and shall be repaired.
- c. Any and all spalling or blistering is unacceptable, and shall be repaired.
- d. Unbounded or soft refractory more than 1/8 inch deep is unacceptable, and shall be repaired.
- e. Erosion resistant refractory more than 1/16 inch below the hexmesh edge is unacceptable, and shall be repaired.
- f. The refractory radial mismatch between adjacent U-bend segments shall not exceed 1/8 inch.
- g. Segregation or preferential alignment of the reinforcing fibers is unacceptable, and shall be repaired.



DETAIL OF FIELD JOINT

REGEN U-BEND REFRACTORY

FIELD JOINTS

ECCyfr

JANUARY 20, 1961

Sheet 2 of 2 Sheets

Item No.	Quantity	Size Or Stock Number	Description	Size Code
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RECEIPT OF MAJOR MATERIALS AS VERIFIED BY FIELD INSPECTOR
\$191,897

(3) BALANCE OF BASE CONTRACT UPON SHIPMENT, RECEIPT, AND ACCEPTANCE
 BY CHEVRON, EL PASO REFINERY, OF THE MAJOR FABRICATED SECTIONS
 AS FOLLOWS:

a.	REGENERATOR U-BEND	\$55,339
b.	OVERFLOW WELL	61,178
c.	SPENT CAT. U-BEND	18,254
d.	TRANSITION SECTION	14,483

F. O. B:

DELIVERED EL PASO REFINERY, WITH MOTOR FREIGHT FROM HOUSTON TO
 EL PASO TO CHEVRON'S ACCOUNT.

JANUARY 20, 1981Sheet 1 of 2 Sheets

n J.	Quantity	Size Or Stock Number	Description	Size Code
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IMPORTANT:

SHOP FABRICATION FOR ITEMS 1-4 TO BE IN ACCORDANCE WITH THE ATTACHED SPECIFICATION EG-2505-H AND ASTM-A-155.

FABRICATOR TO FURNISH ALL MATERIALS AND LABOR REQUIRED FOR FABRICATION.

FABRICATOR SHALL FURNISH THREE PRINTS OR ONE REPRODUCIBLE TRANSPARENCY OF ALL SHOP DRAWINGS WITHIN FOUR (4) WEEKS AFTER RECEIPT OF ORDER. SHOP DRAWINGS SHALL SHOW LOCATION OF ALL LONGITUDINAL SEAMS. FABRICATOR SHALL ALSO FURNISH ONE REPRODUCIBLE TRANSPARENCY OF FINAL SHOP DRAWINGS FOR PURCHASER'S RECORDS.

THE ATTACHED DRAWINGS, SPECIFICATIONS, TERMS AND CONDITION, INSPECTION AND GUARANTEE CLAUSES FORM AN INTEGRAL PART OF THIS PURCHASE ORDER.

I. DRAWINGS:

PD-18-32038 PC-18-32044 PC-18-32342
 PD-18-32332 PC-18-32045 PC-18-32337
 PC-18-32041 PC-18-32047 PD-18-32334
 PC-18-32042 PC-18-32048 PD-18-20744-6
 PC-18-32043 PC-18-32049

II. SPECIFICATIONS: EG-2505-H
EP-417-SIII. STANDARD DRAWINGS: GA-C14311-7IV. TERMS AND CONDITIONS PD-52
-GUARANTEE CLAUSE PD-38
-INSPECTION CLAUSE PD-37

NOTE: End Use: REGENERATED & SPENT CATALYST U-BEND REPLACEMENT-
CAT. CRACKER NO. 2

PRICE:

(1)	REGENERATOR U-BEND	\$158,112
(2)	OVERFLOW WELL	174,794
(3)	SPENT CAT U-BEND	52,155
(4)	TRANSITION SECTION	<u>41,377</u>

TOTAL CONTRACT PRICE \$426,438

SCHEDULE OF PAYMENTS:

(1) 20% OF BASE CONTRACT PRICE DUE WITHIN FIFTEEN (15) CALENDAR DAYS UPON AWARD OF CONTRACT AND RECEIPT OF INVOICE DATED 1-28-81\$85,287 ✓

(2) 45% OF BASE CONTRACT DUE WITHIN THIRTY (30) CALENDAR DAYS FOR

Chevron U.S.A. Inc.

Purchase Order

ing EL PASO, TEXAS Date January 20, 19 81TURNAROUND MAINTENANCE INC.P. O. BOX 12674HOUSTON, TX 77017

Prefix and Order Number

RLBM-8879

Important: Show above prefix and order number on all invoices, shipping papers, packages and correspondence.

Date Required at Destination

APRIL 10, 1981in QUADRUPLICATE to: Chevron U.S.A. Inc., P.O. BOX 20002 EL PASO, TX 79998
ATTN: PURCHASING DEPT.

Chevron U.S.A. Inc.

Attention of:

Show Prefix & Purchase Order No.

RLBM-8879REFINERY OPERATIONS-FCC UNIT6501 TROWBRIDGEEL PASO, TEXAS 79905Bill of Lading - Upon shipment, send original copy of your B/L referenced with our order number to:
Chevron U.S.A. Inc., P.O. Box 7945, San Francisco, CA 94120☐ Prepay freight for your account.☒ Ship collect - endorse your B/L for delivering carrier to collect from us at the address indicated below:☐ Chevron U.S.A. Inc.☐ P.O. Box W

Concord, CA 94524

☐ Chevron U.S.A. Inc.☐ P.O. Box J

Concord, CA 94524

☐ Prepay and charge on invoice. Declare actual value.
(UPS, Federal Express or Parcel Post only.)a FOR ROUTING INSTRUCTIONS, CONTACT CHEVRON TRANSPORTATION(415) 894-3784

lo.	Quantity	Stock Number	Description of Material
			CONFIRMING PHONE ORDER TO: MR. EDWARD FITZPATRICK
			THIS ORDER ACCEPTS THE SPECIFICATIONS AND PRICES SET FORTH IN YOUR PROPOSAL NUMBER T-81-005, DATED JANUARY 20, 1981.
	ONE ONLY		REGENERATED CATALYST U-BEND PIPING WITH REINFORCED MONOLITHIC INSULATION IN ACCORDANCE WITH DWGS. PD-18-32038-0, PC-18-32337-0, AND COVERED UNDER SPECIFICATION NO. EP-417-S.
	ONE ONLY		PIPING EXTENDED FROM REGENERATED CATALYST U-BEND WITH REINFORCED MONOLITHIC INSULATION IN ACCORDANCE WITH DWGS. PD-18-32038-0, PC-18-32337-0, AND COVERED UNDER SPECIFICATION NO. EP-417-S.
	ONE ONLY		SPENT CATALYST U-BEND PIPING SECTION IN ACCORDANCE WITH DWG. PD-18-32332-0, AND COVERED UNDER SPECIFICATION NO. EG-2505-H.
	ONE ONLY		TRANSITION PIPING SECTION IN ACCORDANCE WITH DWG. PD-18-32334-0 AND PD-18-20744-6.

AS SHOWN HEREIN

Terms

AS SHOWN HEREIN

☐ Not for Resale ☐ For Resale ☐ Tax Exempt

AS SHOWN HEREIN

Charge to

U-BEND-2118-16-360

Quotations obtained from	Price				F.O.B. Point	Delivery
	Item 1	Item 2	Item 3	Item 4		

Approved

L. R. SHANKS.

C- 53042

for placement

J. OLINGER

(915) 772-1411

269

Telephone

Extension

By

CHEV B86092

GO-5 (OS-11-79)
Printed in U.S.A.

48118-321 // FCC U-Bend Replace-
ment; 1981 FCC S/D

FCC U-BEND REPLACEMENT
PART 1.

CHEV B8 6252

PROJECT, W. O. 6711
PLANT

DWG. NO. FE-39-24246 SHEET 1 OF 8

INDEX OF MATERIAL ORDERS FOR El Paso Hydrofiner
Plant 39 Hydrofiner

PROJECT, W.O. 6711

PLANT

ORDER NO.	MATERIAL	SUPPLIER
	"J" - Instruments	
KEP-13-J1	Level Switch	Froot Engineering
KEP-13-J2	Rotameter	Brook Instrument
KEP-13-J3	Dial Thermometer	Decker Instrument
KEP-13-J4	Level Gage	Jerguson Gage and Valve
KEP-13-J5	Pressure Transmitter	Foxboro
KEP-39-J22	Displacement Liquid Level Instrument	N. J. Hatter
KEP-39-J23	Blind Pressure Transmitter	Foxboro Company
KEP-39-J24	Indicating Pressure Control	Bristol Company
KEP-39-J25	Blind Temp. Transmitter	Foxboro Company
KEP-39-J26	Bellow Type Diff. Transmitter	Barton Instrument Co.
KEP-39-J27	Diff. Press. Indicators and Recorders	Barton Instrument Co.
KEP-39-J28	Blind Flow Transmitter	Foxboro Co.
KEP-39-J29	Annunciator System	Scam Instrument Corp.
KEP-39-J30	Control Panel Instruments (Pneumatic)	Foxboro Co.
KEP-39-J31	Control Panel Instruments (Electronic)	Foxboro Co.

CHEV B8 6254

INDEX OF MATERIAL ORDERS FOR El Paso Hydrofiner
Plant 39 Hydrofiner

PROJECT, W.O. 6711
 PLANT

ORDER NO.	MATERIAL "J" - Instruments	SUPPLIER
KEP-39-J32	Temperature Switches	United Electric Controls
KEP-39-J33	Pressure Switches	Mercoid - c/o Jensen Inst.
KEP-39-J34	Control Valves (Special)	Control Component Inc.
KEP-39-J35	Oxygen and Combustible Analyzer	Bailey Meter
KEP-39-J36	Control Valves (Conventional)	Black, Divalis and Bryson, Inc.
KEP-39-J37	Level Gage Glasses	a) Fenberthy Mfg. Co. b) Jerguson Gages and Valves
KEP-39-J38	Steam Jet Ejector	Graham Mfg. Co., Inc.
KEP-39-J39	Furnace Draft Gage	Harriam Instrument c/o G. M. Cooke
KEP-39-J40	Float Operated Level Switches	Magnetrol c/o Frost Engr. Service
KEP-39-J41	Indicating Pressure Gages	Leighton Stone Corporation
KEP-39-J43	Dial Thermometers	Dicker Instruments
KEP-39-J44	Reactor Thermowell Assem.	Claud Gordon Co.
KEP-39-J45	Safety Relief Valves	Farris Eng. Corp. c/o Bellilove
KEP-39-J47	Rotameters	Brook Instrument Div.
KEP-39-J48	Orifice Plates	J.T. Shaler
KEP-39-J52	Gas Gravity Analyzer	The Permutit Co. c/o Oliver Lyman
KEP-39-J53	Thermocouple & Thermowell Assems.	Thermowells, Inc.
KEP-39-J56	PH Analyzer	Foxboro
KEP-39-J57	Purge Meter	Pacific Scientific
KEP-39-J58	HT Orifice Insert	Hammel-Dahl
KEP-39-J64	Fabricated Inst. Frgs.	a) O'Brien Metal Works b) Industrial Fabrication Co. c) Hawley Forge Co.
KEP-39-J66	Field Air Switch	Foxboro Company
KEP-39-J70	Direct Acting Pressure Controller	Fisher Governor Co.

CHEV B8 6255

PROJECT, W.O. 6711
PLANT

DWG. NO. FE-39-24246 SHEET 5 OF 8

INDEX OF MATERIAL ORDERS FOR El Paso Hydrofiner

PROJECT, W. O. 6711

Plant 39 Hydrofiner

PLANT

[illegible]

CHEV B8 6257

PROJECT, W. O. 6711
PLANT

ORDER NO.	MATERIAL "N" - Insulation	SUPPLIER
KEP-39-N74	Insulation of Pipe Etc.	Willard A. Selle, Inc.
	"P" - Electrical	
KEP-11-P1	2400-Volt Unit Sub Station	General Elect. Co.
KEP-11-P3	14.4 KV Primary Distribution Switch For Sub-Sta. #21 Feeder	S. C. Electric Co. Graybar
KEP-11-P5	Motor Control Center Sub-Station No. 6	Square D Co.
KEP-11-P6	Lighting Control	Graybar Electric
KEP-11-P7	Lighting Control	Fisher-Pierce
KEP-11-P8	Magnetic Starters	Graybar Electric Co.
KEP-11-P9	Bimetallic Thermal Unit	Graybar Electric Co.
KEP-11-P10	Bimetallic Thermal Unit	A. Graybar Electric Co.
	"P" - Electrical	CHEV B8 6258
KEP-39-F4		
KEP-39-F49	Control Cabinet To Compressor MK-3901	Delta Switchboard Co.

purchase order



CHEVRON OIL COMPANY

WARD INVOICE IN QUADRUPLICATE TO:

PURCHASE AND STORES

BOX 599

DENVER, COLORADO 80201

 ALL
 RES-ON-
 NCE TO
 BOX
 CHECKED

- ☐ P.O. BOX 599, DENVER, COLORADO 80201
- ☐ P.O. BOX 117, SALT LAKE CITY, UTAH 84110
- ☐ P.O. BOX 20002, EL PASO, TEXAS 79998

☐ EL PASO, TEXAS

AUGUST 26, 1970

19

ISSUING POINT

DATE

EPR-31951

PREFIX AND ORDER NUMBER

 ORDER NUMBERS WITH PREFIX
 MUST APPEAR ON ALL PACKAGES,
 SHIPPING ORDERS AND INVOICES.

VENDOR NOTE

 INVOICES SENT TO OTHER THAN
 ABOVE DENVER ADDRESS MAY
 DELAY OUR REMITTANCE TO YOU.

 W FULL
 ME AND
 DRESS

VINSON SUPPLY COMPANY

P. O. BOX 3629

ODessa, TEXAS

DATE REQUIRED AT DESTINATION

OCTOBER 5, 1970

ITEM
NO.

QUANTITY

DESCRIPTION OF MATERIAL

TAG EACH ITEM WITH OUR ITEM NUMBER AND IDENTIFY
EACH ITEM ON YOUR INVOICE WITH OUR ITEM NUMBER.

PRICE

1 ONLY

REFERENCES:

- A. SOTEX QR-EP-580B DATED JULY 20, 1970.
- B. VINSON SUPPLY CO. QUOTATION (REVISED) DATED
AUGUST 21, 1970.

 PLEASE FURNISH ONE CONTROL VALVE SEE (A) AND (B)
 ABOVE AND AS DESCRIBED BELOW.

1 1/2" FISCHER TYPE 667ED CONTROL VALVE COMPLETE WITH
 SIZE 1/2" ACTUATOR, 3/4" TRAVEL, 3-15# SPRING, CLOSE
 ON AIR FAILURE, 300# ANSI RASSED FACE FLANGED STEEL BODY
 WITH EQUAL PERCENT TRIM, 1-7/8" PORT SIZE. STANDARD
 TRIM TRIM MATERIALS, TEFLON IMPREGNATED ASBESTOS STEM
 PACKING. SERVICE CONDITIONS AS SPECIFIED IN REF. (A)
 ABOVE. TAG ITEM - ICV-19-332

\$378.75 EACH

 FOLLOWING DWGS REQUIRED WITHIN TWO WEEKS FROM DATE OF
 ORDER.

- 5 ONLY OUTLINE AND DIMENSION DRAWINGS - CERTIFIED
- 2 ONLY INSTALLATION AND OPERATING INSTRUCTIONS

F.O.B. MARSHALLTOWN, IOWA

 P TO AND MARK
 L PACKAGES AND
 LS OF LADING

STANDARD OIL COMPANY OF TEXAS

EPR-31951

ATTENTION R. M. COULTER
OF REFINERY STOREHOUSE

SHOW PREFIX AND ORDER NUMBER ON BILL OF LADING

☐ P.O. BOX 20002 ☒ 6501 TROWBRIDGE DR.

EL PASO, TEXAS 79998

☐ Prepay & charge
on invoice.
☐ CHARGES COLLECT: ENDORSE BILL OF LADING
 Collect from Chevron Oil Company, P.O.
 Box 599, Denver, Colorado 80201 or at
 Carrier's Option and Expense Draw Sight
 Drafts on First National Bank of Denver.

VIA

MOTOR FREIGHT

DATE RECEIVED	INVOICE OR TRANSFER NO.			
RECEIVED VIA	INVOICE DATE			
PAID BY	INVOICE AMOUNT			
BILL DATE	FREIGHT AMOUNT			
BILL NO.	REGISTER NO.			
ITEM NO.	CHARGE TO			
	FEA	EXPENSE UNIQUE	JOB NO.	APPROPRIATION NO. WORK LIST
ITEM NO.			44729	002
ROVED				
CRIBE MATERIAL USE IF DING BLOCKS NOT APPLICABLE				

J. E. BINKER

915-772-1411

269

2.4. Materials - Material selection and hardness for guide bushings, posts, plugs, and seat rings shall follow manufacturer's recommendation for a given service.

2.5 Service Restriction

- (a) Single-seat valves shall be used in tight shut-off service.
- (b) Double seated valves in on-off service (as for APS) shall have plug and seat ground in at operating temperature to minimize leakage.

3.0 GENERAL

3.1 General - Control valve top works shall be of the high lift enclosed spring type. Spring and diaphragm shall be designed to fully stroke the valve on a 3 to 15 psig air change and shall be sized to hold the valve closed against the stated maximum upstream pressure. The 3 to 27 psig pressure range may be utilized for single-seated control valves in on-off service if required to reduce the size of the valve top-works. Application of 3 to 27 psig system shall be made only with COMPANY approval.

3.2 Diaphragm Housings - Shall have minimum rating of 40 psig.

3.3 Air Connection - Diaphragm casing air connection shall be 1/4-inch NPT.

3.4 Diaphragm Material - The diaphragm shall be Nylon fabric reinforced Neoprene.

3.5 Topworks Material - The topworks -- diaphragm housing, spring housing, yoke, etc. -- shall be manufacturer's standard unless other materials are required for environmental reasons.

3.6 Connector - Operator stem to valve stem shall be positive locking to prevent rotation. All parts shall be steel or stainless steel.

3.7 Position Indicator - A stem position indicator is required.

3.8 Reverse Acting Topworks - May be supplied only on 3/4-inch valves when close-on-air-failure valve action is specified.

3.9 Manufacturer's Nameplates on Control Valves - Shall include the air operating pressure range when the control valve is in service (normally 3-15 psig) and also the "Bench Set" pressure range; that is, where there is no pressure or flow through the control valve.

3.10 Control Valve Positioners - Where positioners are specified, they shall have bypasses and 3 gages, except those in split range applications where the bypass shall be omitted. Positioners shall be integrally mounted on the control valve, using 3/8-inch O.D. tubing between the positioner and the control valve diaphragm casing.

3.11 Control Valve Packing and Lubricants - Valve packing is to be supplied and installed at the factory by the valve manufacturer. Lubricant is to be supplied by the valve manufacturer and shipped separately for installation at the job site. Teflon chevron packing is not acceptable unless no other type will withstand the service.

CONTROL VALVE PACKING AND LUBRICANT LIST

<u>Service</u>	<u>Packing</u>	<u>Lubricant</u>
Air	Garlock 256 or John Crane 6-AM	Dow-Corning 234
Ammonia	Garlock 145, Raybestos Manhattan 1225, or John Crane 6-AM	Nordstrom 421 or 147
Asphalt & Tars	Garlock 256 or 145	Nordstrom 555
Aromatic solvents (as benzene, toluene, etc.) to 600F	Garlock 256 or 145	Nordstrom 755
Chlorine Liquid and Chlorine Gas	John Crane C-98	Nordstrom 188
Hydrocarbon Liquids to 600F. LPG, fuel & lube oil, crude distillates	Garlock 256 or 145 or John Crane 6-AM	Nordstrom 555
Gasoline, kerosene, mineral oil, naphthas	Garlock 256 or 145 or John Crane 6-AM	Nordstrom 357
Hydrocarbon gas	Garlock 256	Nordstrom 555 or 386
Hydrochloric Acid and Hydrochloric Acid- Hydrocarbon Mixtures	John Crane C-98	Nordstrom 921
Hydrofluoric Acid 80 to 100%	John Crane 704	Nordstrom 799
Nitric Acid (0 to 80%) to 140F	John Crane 704	Nordstrom 921
Phenol	John Crane 704	Nordstrom 921
Phosphoric Acid (70-100%) to 250F	John Crane 704	Nordstrom 921
Salt Water	Garlock 256 or John Crane 6-AM	Dow-Corning 234
Sodium Hydroxide to 425F	John Crane 704 or C-98, or Flexrock 401	Nordstrom 421, 147 or 921
Steam to 125 psig	Garlock 145 or John Crane 6-AM	Dow-Corning 234
Steam over 125 psig	Alternate rings Garlock 256 and John Crane 6-AM, bottom and top rings to be John Crane 6-AM	Nordstrom 921
Sulfuric Acid (75% to fuming) 40 to 100F	John Crane 704 or Flexrock 401	Nordstrom 921
Water - Fresh, Cooling tower	Garlock 256	Dow-Corning 234

DESIGN NOTES

1. BLINDS ARE DESIGNED FOR MAXIMUM COLD TEST PRESSURES AS FOLLOWS:
- | | 150" STEEL FLANGES | 300" STEEL FLANGES | 400" STEEL FLANGES | 600" STEEL FLANGES |
|---------------|--------------------|--------------------|--------------------|--------------------|
| CAREWON STL | 425 psi | 1100 psi | 1450 psi | 2175 psi |
| TYPE 304L STL | 425 psi | 775 psi | 1035 psi | 1550 psi |
2. BLIND THICKNESSES ARE DETERMINED BY THE FORMULA
- $$T = r \sqrt{\frac{0.875 P}{S_{MAX}}}$$
- T = REQUIRED THICKNESS
 r = INTERNAL RADIUS OF PIPE
 P = TEST PRESSURE
- $S_{MAX} = 25,000$ psi FOR TYPE 304L & TYPE 316L SST.
 $S_{MAX} = 30,000$ psi FOR CAREWON STL & CR-MO ALLOYS.
3. STUD LENGTHS FOR C1 FLANGES BASED ON 1/8" GASKETS.
 STUD LENGTHS FOR STL FLANGES BASED ON 1/8" GASKETS.

T = REQUIRED THICKNESS
 r = INTERNAL RADIUS OF PIPE
 P = TEST PRESSURE

CONSTRUCTION NOTES

1. TOLERANCES SHALL CONFORM TO THOSE ALLOWED BY THE A S A STANDARD B16.5 "STEEL PIPE FLANGES AND FLANGED FITTINGS."
2. GAS-TIGHT CONTACT SURFACES SHALL BE:
COMMERCIALY SMOOTH WITH A MAXIMUM ROUGHNESS NOT TO EXCEED 50 C FMS OR 2 MIL MAXIMUM PEAK TO VALLEY MEASUREMENT.

MATERIAL NOTES

1. CARBON STEEL BLINDS SHALL BE MACHINED FROM FORGINGS OR PLATES CONFORMING TO ASTM A-81 GRADE I OR ASTM A-285 GRADE C.
2. ALLOY BLINDS SHALL BE MADE FROM STOCK SPECIFIED ON PURCHASERS ORDER.

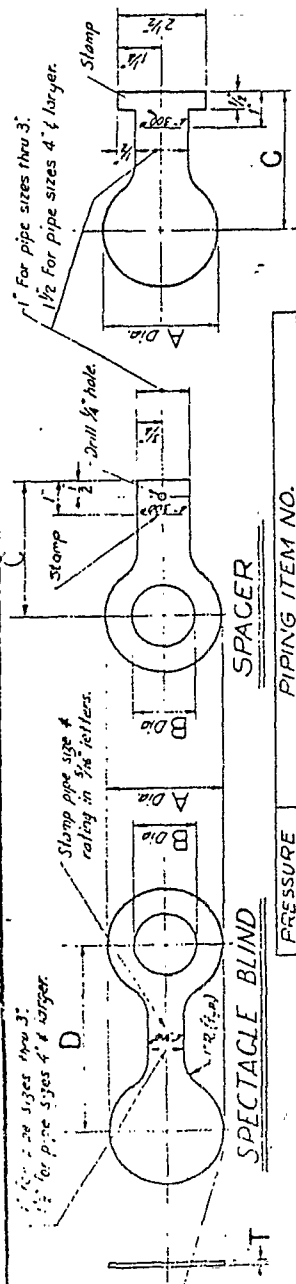
[illegible]

STANDARD OIL COMPANY OF CALIFORNIA
ENGINEERING DEPARTMENT
SAN FRANCISCO

SCALE NONE DATE FEB 22 1956
DR. F. I. CHAN CH'KT ENGR.
OPR G. DEPT. APPROVED
ENG DEPT.

STANDARD SPECTACLE BLINDS,
BLINDS AND SPACERS
FOR RF & FF FLANGES

W. O.	GC-L3 452-15
S. O.	



BLIND

PRESSURE CLASS	PIPING ITEM NO.			
	SECC BLIND	SPACER	BLIND	SPACER BLIND SET
150 PSI-150 STL	1685	1616.6	16625	16271 *
350 PSI-350 STL	1686	17100	16748	16678 *
400 PSI-400 STL	16667			
600 PSI-600 STL	1287	16846	16668	*

* Standard Items
 * Special Items
 * All dimensions are in inches

[illegible]

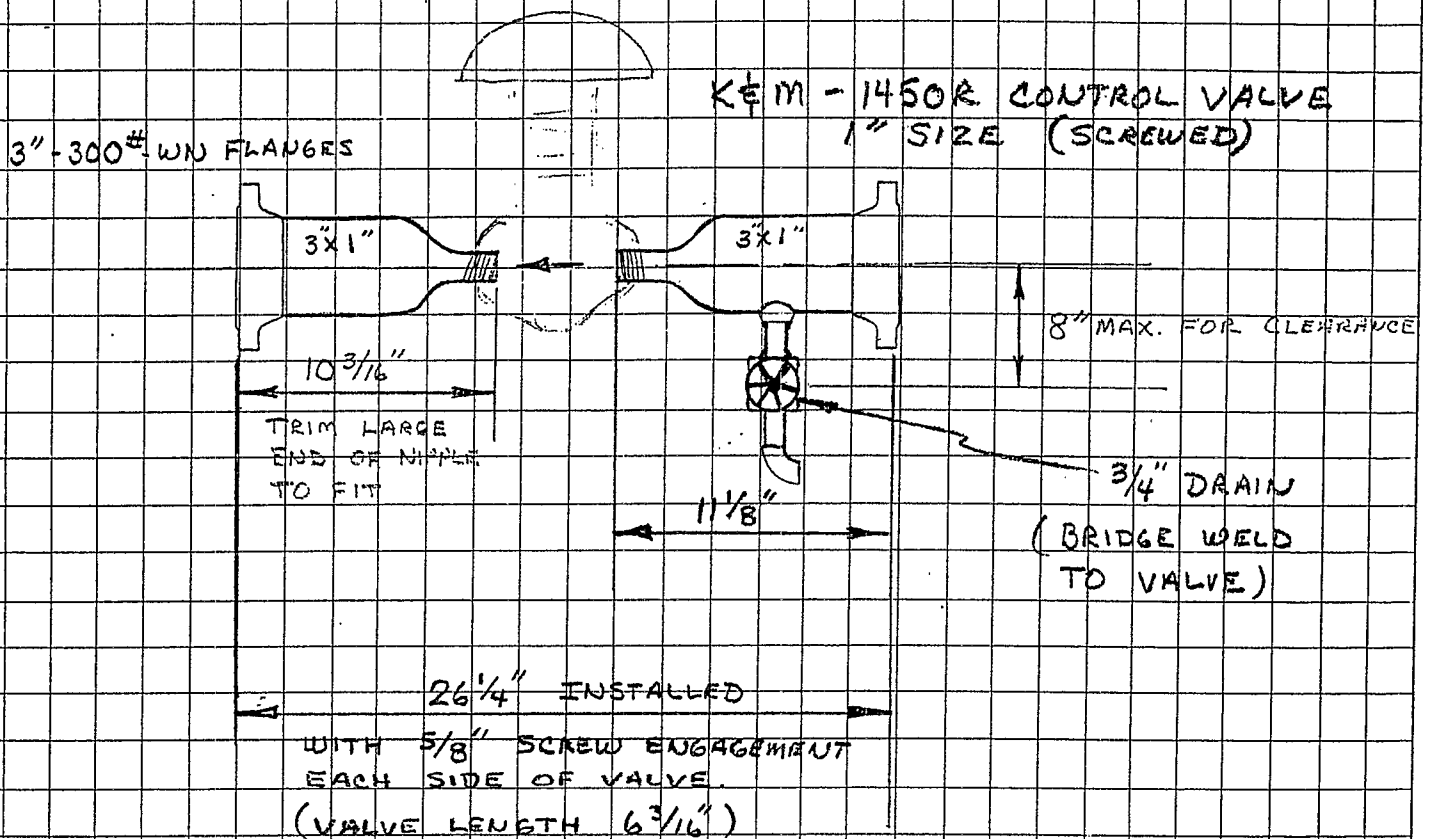
PIPE SIZE	400 STEEL										600 STEEL										PIPE SIZE
	A	B	C	D	T	NO REQ	DIA	LENGTH	A	B	C	D	T	NO REQ	DIA	LENGTH					
1/2	2	1/2	3 3/4	4 1/4	3/16	4	1/2	3 1/4	2	1/2	3 3/8	4 1/4	3/16	4	1/2	3 1/4					
3/4	2 1/2	1 1/2	3 1/2	5 1/8	3/16	4	1/2	3 3/4	2 1/2	1 1/2	3 13/16	5 1/8	3/16	4	1/2	3 3/4					
1	3 1/2	2 1/4	3 3/4	5 3/8	3/16	4	1/2	3 1/2	2 3/4	1 3/4	3 5/8	5 3/8	3/16	4	1/2	3 3/4					
1 1/2	3 3/4	2 3/4	4 1/8	6 5/8	3/16	4	3/4	4 1/2	3 3/8	1 3/4	4 3/4	6 5/8	1/4	4	3/4	4 1/2					
2	4 1/4	2 1/2	4 1/2	7	3/4	8	3/8	4 1/2	4 1/4	1 3/4	4 3/4	7	1/4	8	3/8	4 1/2					
3	5 1/4	3 1/4	5 1/8	8 3/4	3/4	8	3/4	5 1/4	5 3/4	2 3/4	5 3/8	8 3/4	3/8	8	3/4	5 1/4					
4	6 1/8	4 1/2	6 1/2	10 1/2	3/4	8	3/8	6 1/4	7 1/4	3 3/4	6 3/8	11 1/4	1/2	8	3/8	6 1/4					
5	8 1/4	5 1/2	7	11 1/2	1/2	8	1/2	6 3/4	9 3/8	4 3/4	8	13 1/2	3/8	8	1	7					
6	9 3/4	6 1/4	7 3/4	12 1/2	3/8	12	3/8	6 3/2	10 3/8	5 3/4	8 1/2	14 3/4	3/4	12	1 1/2	7 1/2					
8	11 7/8	8	9	15 1/2	3/8	12	1	7 1/2	12 3/8	7 3/8	9 3/4	17	1	12	1 1/2	8 1/2					
10	14	9 3/4	10 3/4	18	1	16	1 1/8	8 1/2	15 3/8	9 3/4	11 1/2	19	1 1/4	16	1 3/4	9 3/4					
12	15 1/2	11 3/8	11 3/4	20 1/2	1 1/4	16	1 1/4	9 1/4	17 3/8	11 3/8	12 1/2	21 1/2	1 1/2	20	1 3/4	10 1/4					

CHEV B8 6263

STAFF

SMITH YAC

CALCULATION SHEET GO-144-2



SEE M/L 002
ENGR JOB # 17-024

CHEV B8 6096

INITIALS CRP PROJECT No. LC-17-304 REPLACEMENT
DATE 8-12-75 SUBJECT SPOOLS JOB # 17-024

LIST OF MATERIALS

Job No. 77-024 List No. 001

DATE: 7-17-75

Accounting Charge No. 3-5117

DATE REQUIRED: 8-15-75

Engineer: CRP

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

CR 58063

MR. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1		(1) only		Air operated diaphragm control		
2				valve per attached list		
3				Sheet EF-514-102	#355 ⁰²	
4				Please supply dimensions on	PER F. MARKS	
5				valve prior to delivery.		
6				KM #1450R	Ship Lines	
7					Ship Lines	
8				Suggested Suppliers:	FOSS	
9				(1) KIELEN & MODLER 25 1450R		
10				Valve		
11				HALTOM CO.		
12				5814 SCHMUCKER		
13				Houston, TEXAS 77027		
14				713-792-5625		
15						
16				2. FOXBORO		
17				THE FOXBORO CO.		
18				835 Tower Drive		
19				DORSETT TEXAS 79761		
20				915-333-2791		
21						
22						
23						
24						
25				Replacement Valve for stations		
26				line at Process Water Station		
27						
28				CRP 7-17-75		
29						
30				MLB 7/17/75		
31						
32						

CRP → LIST OF MATERIALS ←

8-13

Job No. 17-024

List No. 002

DATE: 8-11-75

Accounting Charge No. 3-5117

DATE REQUIRED: 8-29-75

Engineer: CRP

Lead Engr: WJM

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO) ☒

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	<u>L-42</u> <u>L193</u>	2	3"x1"	Swage Nipples, Sch 80 (Td.Sm. End.)	STOCK	
2	L205	1	3"x3/4"	Threadlet, 3000# F.S.	EPR494X	
3	L149	(2)	3"	300# F.S. W.N. Flange R.F. Sch 80	SURPLUS CRP.BIN	
4	L91	(2)	3/4"x2"	Smls SH. Nipple T.B.E. Sch 80	STOCK	
5	L31	(1)	3/4"	Sec Stl. Gate Valve		
6	L74	(1)	3/4"	3000# Sec F.S. 90° Elbow		
7	L152	(2)	3"	1/16" Asb. Gasket for 300# Flgs.		
8						
9						
10						
11						
12				CRP 8-12-75		
13						
14						
15						
16				Material to Install LC-17-304		
17				REPLACEMENT CONTROL VALVE.		
18						
19						
20						
21						
22						
23						
24						
25						
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32						
33						
34						

SCHULTZ

[Signature]

EP P & S

AUG 13 1975

CHEV B8 6100

HLL
Job No. 16-354

LIST OF MATERIALS

List No. 930 (Sh # 233) DATE: 8/4/75

8-6

Accounting Charge No. 7-5116

DATE REQUIRED: 8/20/75

Engineer: HLL

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 ☒ (YES) (NO)

K.O.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L9	(1 1/2')	1 1/2"	Sm/s Stl. Pipe Sch 160	STOCK	
2	L543	1	1 1/2" x 2 1/2"	" " Nipple, TOE, Sch 160	EP 424X	
3		(1)	1 1/2" x 3/4"	Sch. 160 Sm/s. Stl. Conc. Swaged Nipple, TBE	SURPLUS HLL BIN	
4	L114	(3)	1 1/2"	Stl. 90° B.W. Elbow LR. XH	STOCK	
5	L139	(5)	1 1/2"	150# F.S. Slip-on Flg R.F.		
6	L140	(1)	1 1/2"	" Blind "		
7	L7	(2 ft)	1 1/2"	Sm/s Stl Pipe Sch 80		
8	L31	(2)	3/4"	800# Scd. Stl. Gate Valve Blt Bnt.	STOCK	
9		(1)	1 1/2"	6000# FS Scd Tee	SURPLUS HLL BIN	
10	L151	(5)	1 1/2"	150# x 1/16" thk Asb. Comp Gasket	STOCK	
11	H260	(20)	1/2" x 3/4"	Stud Bolt Gr. B7 w/2 Hex Nuts		
12	L77	(2)	3/4"	Scd. Stl. Bar Stock Plug, Rd. Hd.		
13	L205	(1)	1 1/2" x 3/4"	1 1/2" Run x 3/4" Thrd. outlet 3000# FS Thredole		
14	L91	(1)	3/4" x 3"	Sch. 80 Sm/s. Stl. Pipe Nipple - TBE		

MARTINEZ
MLB

EP P & S

AUG 5 1975

8-6

Q. 11.

DATE: 02/02/00

Land Rev. 18. 1.

FOUO/NO FOR E.O. 12812, EP-2083 (4/5) (NO)

CHEV B8 6104

H

J

LIST OF MATERIALS

Job No. 16-356

List No. 930 SH #232

DATE 9/26/75

Accounting Charge No. 4590190-001

DATE REQUIRED: 10/7/75

Engineers: HLL

Lead Engr: ALG

FOLLOW-UP PER ENGR. INSTR. EP-201

MK. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	STOCK
1	L 6	50'	3"	SMALL STL PIPE 1 CM 40	
2	"	70'	4"	" " " " " "	
3	L 31	5	3/4"	800" CO STL GATE VALVE B.H.	
4	L 73	1	1 1/2"	3000" STL T.S. UNION	
5	L 77	2	3/4"	500 STL BAR STOCK PLUG	
6	L 91	5	3/4" close	SMALL STL PIPE NIP - TBE SCH 80	
7	L 91	1	3/4" x 2'	" " " " " " " "	
8	L 112	2	4"	STL WT. STL. Eccen. Weld. Reducer	
9	L 105	1	3"	" 45° WELD ELBOW STL. L.R.	
10	"	1	4"	" " " " " " " "	
11	L 113	12	3"	" 90° " " " " " "	
12	"	3	4"	" " " " " " " "	
13	L 91	1	1 1/2"	SMALL STL PIPE NIP - TBE SCH 80	
14	L 117	2	3"	STL WELD TEE STD	
15	L 119	5	3/4"	" " BOSS - T.H.	
16	"	1	1 1/2"	" " " " " " " "	
17	L 149	19	3"	150° F.S. W.N. FL5 R.F. STD. RING	
18	"	10	4"	" " " " " " " "	
19	L 7A	1	3/4"	200° F.S. 90° ELBOW	
20	L 151	13	3"	1/2" ACP CORR. RING FOR 150° FLG.	
21	"	6	4"	" " " " " " " "	
22	L 103	1	3/4"	FS WELD. PLUG	
23	L 306	4	4" x 3"	WELD. COUPLER - ALL STL WT.	
24	H 261	100	5/8" x 1/2"	STL. NUTS - ALL STL. WT.	
25	L 125	1	4"	150° F.S. COUPLER VALVE, RF	
26	"	1	0-10"	STL. COUPLER VALVE, RF	
27	"	"	"	STL. COUPLER VALVE, RF	
28	"	"	"	STL. COUPLER VALVE, RF	
29	"	"	"	STL. COUPLER VALVE, RF	

RGA

LIST OF MATERIALS

Job No. 48106-000(75) List No. 002ADATE: 8-19-75Accounting Charge No. 5-49090-003DATE REQUIRED: 11-1-75Engineer: RGALead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

8-20

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	(12)	6" Φ	Sch 80 smls carbon steel pipe	SHOP	
2						
3	L244	1	6" Φ	300* FS weld neck flange, SG, Sch 80 bore	CR555X890	
4						
5	L244	1	4" Φ	" " " " " "		
6						
7	L307	1	6" Φ run	x 4" Φ outlet weldolet, FS, extra strong		
8						
9	L102	1	6" Φ	XS CS BW pipe cap		
10						
11	L119	(1)	3/4" Φ	stl welding boss, threaded, Dwg GB-L-31368	STOCK	
12						
13	L105	2	6" Φ	XS CS BW straight tee	CR555X820	
14						
15	L155	(1)	6" Φ	stl clad asbestos gasket, STAG joint	STOCK	
16						
17	"	(1)	4" Φ	" " " " " "	STOCK	
18						
19	H262	(12)	3/4" Φ	x 5 1/2" lg. stud bolts, ASTM A-193, Gr B7 w/2 hex nuts	STOCK	
20						
21	"	(8)	"	x 5" " " " " "	STOCK	
22						
23						
24						
25						
26				End Use: Piping replacement @ D-634		
27				outlet (water coalescer to DIB column).		
28						
29						
30						
31						
32						
33						
34						

RGA 8-19-75

MLB

J. E. Bimler

AUG 20 1975

RGA

LIST OF MATERIALS

Job No. 48106-00075 List No. 001ADATE: 8-19-75Accounting Charge No. 5-49090-003DATE REQUIRED: 11-1-75Engineer: RGALead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

8-20

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L114	(1)	4" Ø	stl 90° weld elbow, XS, long radius	STOCK	
2						
3	L244	1	4" Ø	300# FS weld neck flange, S.G., sch 80 bore	EP555X820	
4						
5	L7	(4')	4" Ø	smis stl pipe, sch 80	SHOP	
6						
7	L119	(1)	1" Ø	stl weld boss, threaded, per dwg. GB-L-31368	STOCK	
8						
9	L119 41	(1)	1" Ø	x 1 1/2" lg sch 80 smis cs pipe nipple, TBE	STOCK	
10						
11	L31	(1)	1" Ø	800# stl screwed gate valve, OS&Y, BB	STOCK	
12						
13	L244	1	4" Ø	300# FS, weld neck flange, st., sch 80 bore	EP555X820	
14						
15	L155	(2)	4" Ø	stl clad asbestos gasket, ST&G joint	STOCK	
16						
17	H262	(16)	3/4" Ø	x 5" lg stud bolts, ASTM A-193, Gr B7, w/ hex nuts	STOCK	
18						
19						
20						
21				End Use: Piping replacement @ D-610		
22				outlet (Deprop O/H Drum).		
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						

J. E. SIMLER

AUG 20 1975

JEB H

J

K

LIST OF MATERIALS

Job No. 48106-000(76) List No. 900-082DATE: 9-1-76Accounting Charge No. 45090900-003DATE REQUIRED: 10-1-76Engineer: RGALead Engr: JBB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L7	2'	3"	SMLS STL PIPE SCH 80	SHOP	
2	L105	1	3"	XS SMLS STL WELDING TEE	EARLY 494X14	
3	L149	3	3"	150# F.S. WELD NECK FLG. 1/16" R.F. ⁵⁴⁸⁰ bore	L	1
4	L6555	(3)	3"	1/16" THK AFR. BLUE ASB. RING GASKET-150#	RGA-BIN	
5	H261	(12)	5/8" x 3 1/2"	LG. STUD BOLTS B7 W/2 HEX NUTS.	STOCK	
6				RGA 9-1-76		
7				JBB		
8				5/1/76		
9						
10						
11				End Use: Spent acid piping		
12				@ D-607B		
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27					EP P & S	
28					SEP 2 1976	
29						
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31						
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CHEV B8 6108

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LIST OF MATERIALS

Job No. 48106-000(76) List No. 900-081DATE: 9-1-76Accounting Charge No. 45090900-003DATE REQUIRED: 10-1-76Engineer: RGALead Engr: JBB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

9-2

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	55	3"	SMLS. STL. PIPE SCH 80	EPIC 555X	
2	L114	4	3"	X.S. 1 1/2 D. 90° WELD ELBOW	EPIC 494X	10/1
3	L149	1	3"	150# F.S. WELD NECK FLG 1/16 RF	BARE SCH 80	
4	L149	1	6"	" " " " " " " "		
5	L101	1	6"x3"	X.S. ECCENTRIC WELDING REDUCER		
6	L309	1	3"x1 1/2"	XXS WELD OLET F.S. BUTT WELD.		
7	L149	1	1 1/2"	150# F.S. WELD NECK FLG 1/16 RF BORE XXS		
8	L6555	1	3"	1/16" THK. AFR. BLUE ASB. RING GASKET-150#	RGA-BIN	
9	L6555	1	6"	" " " " " " " "	STOCK	
10	L6555	1	1 1/2"	" " " " " " " "	RGA-BIN	
11	H261	8	5/8" x 3 1/2"	LG. STUD BOLTS B7 W/2 HEX NUTS.	STOCK	
12	H260	4	1/2" x 2 3/4"	LG. " " " " " "		
13	H-262	8	3/4" x 3 3/4"	LG. " " " " " "		
14	M-200	2	3" Hi. x 12"	LG. STD PIPE SHOE		
15				RGA 9-1-76		
16				JBB 9/1/76		
17						
18						
19						
20						
21				End Use: Spent acid piping		
22				to EPAC.		
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
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SCHULTZ
DALE

EP P & S

SEP 2 1976

CHEV B8 6109

LIST OF MATERIALS

Job No. 48106-000(75) List No. 002A

DATE: 8-19-75

Accounting Charge No. 5-49090-003

DATE REQUIRED: 11-1-75

Engineer: RGA

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	12'	6" Φ	Sch 80 smls carbon steel pipe		
2						
3	L244	1	6" Φ	300# FS weld neck flange, 5G, sch 80 bore		
4						
5	L244	1	4" Φ	" " " " " "		
6						
7	L307	1	6" Φ run	x 4" Φ outlet weldolet, FS, extra strong		
8						
9	L102	1	6" Φ	XS CS BW pipe cap		
10						
11	L119	1	3/4" Φ	stl welding boss, threaded, Dwg GB-L-31368		
12						
13	L105	2	6" Φ	XS CS BW straight tee		
14						
15	L155	1	6" Φ	stl clad asbestos gasket, ST&G joint		
16						
17	"	1	4" Φ	" " " " " "		
18						
19	H262	12	3/4" Φ	x 5 1/2" Lg. stud bolts, ASTM A-193, Gr B7 w/2 hex nuts		
20						
21	"	8	"	x 5" " " " " "		
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
2						
33						
34						
35						

RGA 8-19-75
MLB

End Use: Piping replacement @ D-634
outlet (water coalescer to DIB column).

CHEV B8 6117

JEB

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LIST OF MATERIALS

Job No. 48106-000(76) List No. 900-081DATE: 9-1-76Accounting Charge No. 45090400-003DATE REQUIRED: 10-1-76Engineer: RGALead Engr: JBB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

9.2

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	55	3"	SMLS. STL. PIPE SCH 80	EP2555X	
2	L114	4	3"	X5. 1 1/2 D. 90° WELD ELBOW	EP2494X	10/1
3	L149	1	3"	150# F.S. WELD NECK FLG 1/16 RF ^{Bare} SCH 80		
4	L149	1	6"	" " " " " " " "		
5	L101	1	6"x3"	X5. ECCENTRIC WELDING REDUCER		
6	L309	1	3"x1 1/2"	XXS WELDOLET F.S. BUTT WELD.		
7	L149	1	1 1/2"	150# F.S. WELD NECK FLG 1/16 RF BORE XXS		
8	L6555	(1)	3"	1/16" THK. AFR. BLUE ASB. RING GASKET-150#	RGA-BIN	
9	L6555	(1)	6"	" " " " " " " "	Stock	
10	L6555	(1)	1 1/2"	" " " " " " " "	RGA-BIN	
11	H261	(8)	5/8" x 3 1/2"	LG. STUD BOLTS B7 W/2 HEX NUTS.	Stock	
12	H260	(4)	1/2" x 2 3/4"	LG. " " " " " "		
13	H-262	(8)	3/4" x 3 3/4"	LG. " " " " " "		
14	M-200	(2)	3" Hi. x 12"	LG. STD PIPE SHOE		
15				RGA 9-1-76		
16				JBB 9/1/76		
17						
18						
19						
20						
21				End Use: Spent acid piping		
22				to EPAC.		
23						
24						
25						
26						
27						
28					EP P & S	
					SEP 2 1976	
30						
31						
32						
33						

SCHULTZ
DALE

CHEV B8 6109

725/28

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LIST OF MATERIALS

Job No. 48106-000(76)

List No. 900-080

DATE: 9-1-76

9-2

Accounting Charge No. 45090 900-003

DATE REQUIRED: 10-1-76

Engineer: RGA

Lead Engr: JBB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	15	3"	SMLS STL PIPE SCH 80	EPR 555X	
2	L105	1	3"	XS SMLS STL. WELDING TEE	EPR 494X	10/1
3	L114	5	3"	X.S. 1 1/2 D. 90° WELDING ELBOW		
4	L149	3	3"	150# F.S. WELD NECK FLG 1/16" R.F. ^{BARE} SCH 80		
5	L149	1	1"	" " " " " " " " ^{BARE} X.S.		
6	L309	1	3" x 1"	WELDOLET XXS F.S. BUTT WELD		
7	L6555	3	3"	1/16" THK. AFR. BLUE ASB. RING GASKET-150# R.F.	RGA-Bin	
8	L6555	1	1"	" " " " " " " "	EPR 494X	10/1
9	H261	12	5/16" x 3 1/2"	LG. STUD BOLTS B7 W/2 HEX	Stock	
10	H260	4	1/2" x 2 1/2"	LG. " " " " "		
11				RGA 9-1-76		
12				JBB		
13				9/1/76		
14						
15				End Use: Spent acid piping		
16				into tanks D-607 B & C.		
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27					EP P & S	
28					SEP 2 1976	
29						
30						
31					CHEV B8 6110	
32						
33						

SCHULTZ
DALE

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LIST OF MATERIALS

Job No. 48106-000 (76) List No. 900-079DATE: 9-1-76Accounting Charge No. 3-5106DATE REQUIRED: 10-1-76Engineer: RGALead Engr: JB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

9/2

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	35	3"	SMLS STL PIPE SCH 80	EPR555X	
2	L1/4	4	3"	X5 1/2 D 90° WELD ELBOW	STOCK	
3	L149	2	3"	150# F.S. WELD NECK FLG 1/16" R.F. ^{BORE} SCH 80	EPR444X	1/1
4	L149	1	3/4"	" " " " " " " " " " ^{BORE} XXS		1
5	L309	1	3" x 3/4"	XXS WELDOLET F.S. BUTT WELD.		
6	L6555	2	3"	1/16" THK. AFR. BLUE ASB. RING GASKET-150# R.F.	R.G.A. BIN	
7	L6555	1	3/4"	" " " " " " " " " "	EPR444X	1/1
8	H261	8	5/8" x 3 1/2"	LG STUD BOLTS B7 W/2 HEX NUTS	STOCK	
9	H260	4	1/2" x 2 1/2"	LG " " " " " " " "		
10	M-200	2	3" HI x 12"	LG. STANDARD PIPE SHOE		
11						
12						
13						
14						
15						
16						
17						
18				End Use: Spent acid piping to provide common spare G-622, G-623		
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						

RGA 9-1-76 JB 9/1/76

SCHULTZ DALE

EP P & S
SEP 2 1976

CHEV B8 6111

RGA LIST OF MATERIALS

Job No. 43106-000 (76)

List No. 900-078

DATE: 9-1-76

Accounting Charge No. 45090900-003

DATE REQUIRED: 10-1-76

Engineer: RGA

Lead Engr: JTB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

9-8

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L7	10'	2'	SMLS STL. PIPE SCH 80		
2	L7	65'	3"	" " " " "		
3	L114	2	2"	XS 1/2 D 90° WELD ELBOW		
4	L114	7	3"	" " " " "		
5	L105	1	3"	XS SMLS STL. WELDING TEE		
6	L305	1	3 X 1/2	WELDOLET 160 SCH FS. BUTT WELD		
7	L305	2	3' x 2"	" " " " " " " "		
8	L149	2	2"	150° FS. WELD NECK FLG 1/6" RF. ^{Sch 80}		
9	L149	3	3"	" " " " " " " "		
10	L149	①	1 1/2'	" " " " " " " "		
11	L6555	1	1 1/2'	1/6" THK. AFR. BLUE ASE. RING GASKET-150° RF		
12	L6555	2	2"	" " " " " " " "		
13	L6555	3	3"	" " " " " " " "		
14	H200	4	1/2" x 2 1/2"	1/6" STD BOLT & BT W/2 HEX NUTS		
15	H201	3	5/8" x 5 1/2"	" " " " " " " "		
16	H201	12	5/8" x 3 1/2"	" " " " " " " "		
17		3	3" x 1 1/2"	STD PIPE SHOE		
18						
19						
20						
21						
22						
23						
24				End Use: Fresh acid piping		
25				in tank basin area.		
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

EPR 424X
① EPR 424X
② RGA BIN
RGA BIN

9/1/76
JTB

CHEV B8 6112

EP P & S

Joe No. 48106-000List No. 400-073DATE: 6-21-761-15Accounting Charge No. 45090900-003DATE REQUIRED: 8-18-76 or soonerA. 388
Engineer: RGALead Engr: JB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	12	3"	Sm/s. Stl. Pipe Sch. 40	SHOP	
2	10	4"	" " "	SHOP	
3	2	4x3"	Stl Ecc. Red. B.W. Std. Wt.	Stock	
4	2	3"	Stl. 90° B.W. Elbow L.R. Std. Wt.		
5	1	4"	" " "		
6	1	4"	Stl. B.W. Tee Std. Wt.		
7	3	3/4"	Stl Weld Boss. Threaded		
8	1	1"	" " "		
9	2	3/4x2"	Sm/s. Stl. Pipe Nipple TBESch 80		
10	1	1x2"	" " "		
11	2	3/4"	800# Std. Stl. Gate Valve Blt. Bnt.		
12	1	1"	" " "		
13	1	3"	300# FS W N. Flg. S.T. Sch 40		
14	1	4"	" " " "		
15	3	3"	" " " SG Sch. 40		
16	2	4"	" " " "		
17	4	3"	300# Stl. Club Asb Gask. for S.T. & G.		
18	4	4"	" " " "		
19	32	3/4x4 1/4"	Stud Bolt Gr B w/ 2 Hex Nuts		
20	8	3/4x4 1/2"	" " " "		
21	8	3/4x5 1/2"	" " " "		
22					
23					
24					
25					
26					
27					
28					
29					
30					
31				EP P & S	
32				JUL 15 1976	
33					
34					
35				CHEV B8 6113	
36					

Job No. 48106-000 List No. 900-074DATE: 6-22-761-16Accounting Charge No. 45090900-003DATE REQUIRED: 7-22-76 or soonerS.T.A. 388Engineer: RGALead Engr: JBB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

QK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L7	35ft.	6"	Sm/s, Stl. Pipe Sch 80	EPR424X	
2	L114	4	6"	Stl. 90° B.W. Elbow XH	EPR494X	
3	L105	2	6"	Stl Tee BW XH	EPR494X	
4	L101	1	6"x2"	Sm/s, Stl, Ecc Red. BW XH		
5	L308	1	6"x2"	Weldolet FS Red. Sch. 160		
6	L149	2	2"	150# FS W.N. Flg 1/16" RF Sch 160		
7	L149	3	6"	" " " 80		
8	L6560	2	2"	150# x 3/32" thk Teflon Impregnated		
9			JM ^{CHEM} 92	Blue African Asb. Ring Gasket		
10	L6560	(3)	6"	" " "	STOCK	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20				End Use: Suction Piping to		
21				spent acid pumps - Alky S/D		
22						
23						
24						
25						
26						
27						
28						
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32						
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35						
36						

RGA 7/14/76
JBB 7/14/76HECTOR.
BROOKEREP P & S
JUL 16 1976

LIST OF MATERIALS

Job No. 48106-000(75) List No. 002

DATE: 2-3-75

Accounting Charge No. 5-49090-003

DATE REQUIRED: 6-1-75

Engineer: RGA Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L6	12'	6" Φ	SMLS STEEL PIPE, SCH 40		
2						
3	L244	1	6" Φ	300# FS WELD NECK FLANGE, SG, SCH 40 B2F		
4						
5	"	1	4" Φ	" " " " " "		
6						
7	L306	1	6" RUN	X4" BRANCH WELDOLET, FS, REDUCING, STD. WT.		
8						
9	L116	1	6" Φ	STL WELDED PIPE CAP, STD. WT.		
10						
11	L119	1	3/4" Φ	STL WELDING BOSS, THREADED, DWG 60-L31368		
12						
13	L117	2	6" Φ	STL WELDING TEE, STD WT.		
14						
15	L155	1	6" Φ	STL CLAD ASBESTOS GASKET, ST&G JOINT		
16						
17	"	1	4" Φ	" " " " " "		
18						
19	H262	20	3/4" Φ	X 5/4" LG. STUD BOLT, ASTM A-193 Gr B7, W/2 HEX NUTS		
20						
21				RGA 1/31/75		
22						
23				M/LB		
24						
25				NOTE: FOR PIPING REPLACEMENT @		
26				D-634 OUTLET (WATER COALESCER TO DIB		
27				COLUMN). ALKY S/D		
28						
29						
30						
31						
32						
33					CHEV B8 6115	
34						
35						

LIST OF MATERIALS

Job No. 48106-000(75) List No. 001

DATE: 2-3-75

Accounting Charge No. 5-49090-003

DATE REQUIRED: 6-1-75

Engineer: RGA Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MR. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L113	1	4" Φ	STEEL 90° WELD ELBOW, STD. WT., LONG RADIUS		
2						
3	L244	1	4" Φ	300# FS WELD NECK FLANGE, S.G., SCH 40 BORE		
4						
5	L6	3'	4" Φ	SMLS STEEL PIPE, SCH 40		
6						
7	L119	1	1" Φ	STEEL WELD BOSS, SCREWED, DWG. GO-L31368		
8						
9	L194	1	1" x 1/2"	SMLS STEEL NIPPLE, SCH 80, TBE		
10						
11	L315	1	1" Φ	800# STL. SCREWED GATE VALVE, OS&Y, B.B.		
12						
13	L243	1	4" Φ	300# FS WELD NECK FLANGE, S.T., SCH 40 BORE		
14						
15	L155	2	4" Φ	STEEL CLAD ASBESTOS GASKET, ST&G JOINT		
16						
17	H262	16	3/4" Φ	x 5 1/4" LG. STUD BOLT, ASTM A-193 GR B7 w/2 HEX NUTS		
18						
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RGA 1/31/75

[Signature]

NOTE: FOR PIPING REPLACEMENT @ D-610
OUTLET (DEPROP OVHD), ALKY S/D

CHEV B8 6116

LIST OF MATERIALS

Job No. 48106-000(75) List No. 002A

DATE: 8-19-75

Accounting Charge No. 5-49090-003

DATE REQUIRED: 11-1-75

Engineer: RGA

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L7	12	6" Φ	Sch 80 emls carbon steel pipe		
2						
3	L244	1	6" Φ	300# FS weld neck flange, 5G, Sch 80 bore		
4						
5	L244	1	4" Φ	" " " " " "		
6						
7	L307	1	6" Φ run	x 4" Φ outlet weldolet, FS, extra strong		
8						
9	L102	1	6" Φ	XS CS BW pipe cap		
10						
11	L119	1	3/4" Φ	stl welding boss, threaded, Dwg GB-L-31368		
12						
13	L105	2	6" Φ	XS CS BW straight tee		
14						
15	L155	1	6" Φ	stl clad asbestos gasket, ST&G joint		
16						
17	"	1	4" Φ	" " " " " "		
18						
19	H262	12	3/4" Φ	x 5 1/2" lg. stud bolts, ASTM A-193, Gr B7 w/2 hex nuts		
20						
21	"	8	"	x 5" " " " " "		
22						
23						
24						
25						
26				End Use: Piping replacement @ D-634		
27				outlet (water coalescer to DIB column).		
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RGA 8-19-75
MLB

CHEV B8 6117

LIST OF MATERIALS

Job No. 48106-000(15) List No. 001A

DATE: 8-19-75

Accounting Charge No. 5-49090-003

DATE REQUIRED: 11-1-75

Engineer: RGA Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L114	1	4" Ø	stl 90° weld elbow, XS, long radius		
2						
3	L244	1	4" Ø	300# FS weld neck flange, S.G., sch 80 bore		
4						
5	L7	4'	4" Ø	smis stl pipe, sch 80		
6						
7	L119	1	1" Ø	stl weld boss, threaded, per dwg, GB-L-31368		
8						
9	L194	1	1" Ø	x 1 1/2" lg sch 80 smis CS pipe nipple, TBE		
10						
11	L31	1	1" Ø	800# stl screwed gate valve, OS&Y, BB		
12						
13	L244	1	4" Ø	300# FS, weld neck flange, S.G., sch 80 bore		
14						
15	L155	2	4" Ø	stl clad asbestos gasket, ST&G joint		
16						
17	H262	16	3/4" Ø	x 5" lg stud bolts, ASTM A-193, Gr B7, w/2 hex nuts		
18				RGA 8-19-75		
19				MLB		
20						
21				End Use: Piping replacement @ D-610		
22				outlet (Deprop O/W Drum).		
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H

J

K

DLP

LIST OF MATERIALS

Job No. 19-285List No. 790-170DATE: 6-20-75

6-23

Accounting Charge No. 5-49133-001DATE REQUIRED: 7-7-75Engineer: D.L.R.Lead Engr: M.L.B.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L6	(50)	2"	Sm/s. Stl. Pipe Sch. 40	Stock	
2	L113	(3)	2"	Stl. 90° B.W. Elbow L.R. Std. Wt.		
3	L149	(4)	2"	150# FS. W.N. Flg 1/16" RF Sch 40		
4	L306	(1)	3"x2"	Weldolet FS. Red. Std. Wt.		
5	L143	(1)	2"	300# FS Blind Flg. 1/16" RF.		
6	L151	(3)	2"	150# x 1/16" thk Asb. Comp. Gasket		
7	H261	(8)	5/8" x 3"	Stud Bolt Gr B7 w/ 2 Hex Nuts		
8	M-200	(2)	3"H x 12"L	Std Pipe Shoe Type I		
9	L247	(1 pr.)	2"	300# FS W.N. Orifice Flg. Sch 40		
10	L152	(3)	2"	300# x 1/16" thk Asb Comp. Gasket		
11	L31	(2)	1/2"	800# Scd. Stl. Gate Valve Blt. Bnt		
12	L91	(2)	1/2" x 3"	Sm/s. Stl. Pipe Nipple TBE Sch 80		
13	L77	(2)	1/2"	Scd Stl Bar Stock Plug Rd. Hd.		
14	H261	(8)	5/8" x 4 3/4"	Stud Bolt Gr B7 w/ 2 Hex Nuts		
15	L119	(2)	3/4"	Stl. Weld. Boss, Threaded		
16	L77	(2)	3/4"	Scd. Stl. Bar Stock, Plug, Rd. Hd.		
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DR
CPL
6/20

EP P & S

JUN 23 1975

JAS

LIST OF MATERIALS

617

Job No. 10-246

List No. 972-057

DATE: 6-10-75

Accounting Charge No. 5-44403-005

DATE REQUIRED: 7-14-75

G.T.A. 389

Engineer: J.A.S.

Lead Engr: W.J.M.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L6	(25ft)	3"	Smls.Stl.Pipe Sch. 40	Stock	
2	L.111	(1)	4"x3"	Stl. BW Conc.Red std Wt		
3	L.113	(4)	3"	" " 90° Elbow "		
4	L.149	(4)	3"	150#FS W.N. Flg 1/16" R.F. Sch 40		
5	L.149	(1)	4"	" " " "		
6	L.306	(1)	4"x3"	Weldolet F.S.B.W. Red std Wt.		
7	M-200	(1)	3"Hx12"L	Std. Pipe Shoe Type I		
8	L.124	(1)	3"	150#CS.Flq. Gate Valve Blt Bnt.		
9	L.126	(1)	3"	150#" " " Check "147x		
10	L.151	(4)	3"	150#x1/16"+thk. Asb. Comp. Gasket		
11	L.151	(1)	4"	" " " "		
12	H261	(24)	5/8"x3 1/2"	Stud Bolt Gr B7 W/2 Hex Nut		
13	L6	(5ft)	2"	Smls stl Pipe Sch 40	Salvage	
14		(1)	25"x1/4"x5/8"	Stl. Plate	Salvage	
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EP P & S

CHEV B8 6120

JUN 17 1975

LIST OF MATERIALS

12-13

Accounting Charge No. 5-44841-725
Engineer: DLR

List No. 973-5

DATE: 12-4-74

DATE REQUIRED: 12-23-74

CRK

Lead Engr: MLG

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	1149	1	12"	150# F.S. W.N. FLG. BORE SCH 20	EPR 424X	
2	1151	1	"	1/8" ASB COMP. RING GASK. FOR 150# FLG.	STOCK	
3	1151	1	14"	" " " " " " " "		
4	1151	12	7/8"x4"	MACH. BOLT W/1 HEX NUT		
5	1151	1	16"x14"x32"	LG. ECC. TAPER PER DWG PA-14-28925	SEE L/M #02	
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DR 12/4/74

MLG 12/4/74

HEITOR

EP H & S
DEC 5 1974

FOR G-1414 - PIPING.

祝

Job No. 48118-193

List No. 781-080

DATE: 11-14-74

11-15

Accounting Charge No. 5-48450-007

DATE REQUIRED: 12-16-74

57A. 388.

Engineer: DLR

Lead Engr: M.L.B.

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L6	(4ft)	8"	Sm/s. Stl. Pipe Sch 40.	SHOP	
2	L7	(10ft)	1 1/2"	" " 80	SHOP	
3	L31	(1)	1 1/2"	800# Std. Stl. Gate Valve Blt Bnt.	STOCK	
4	L74	(2)	1 1/2"	3000# FS. Std 90° Elbow		
5	L75	(1)	1 1/2"	" " Tee		
6						
7	L80	(1)	1 1/2"	3000# FS. Std 45° Elbow		
8	L155	(4)	8"	Stl. Clad Asp. Gask. For S.T.E.G. Joint		
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DLK LIST OF MATERIALS

Job No. 41-066

List No. 01

DATE: 11-8-74

11-11

Accounting Charge No. 5-49089-001

DATE REQUIRED: 12-9-74

Engineer: DLR

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	(1)	6"	300 LB. ASA FLANGED GATE VALVE,	EP-494X	
2			C.S. PER ASTM A-216 GR. WCB,		
3			12% CR SEAT, DISC & STEM, FOLDED		
4			BONNET, 1/16" R.F. FLANGE FACING,		
5			CRANE 33X, PACIFIC 350-1 OR		
6			EQUAL.		
7	(3)	6"	NPS SPIRAL WOUND GASKET, 304 SS	STOCK	
8			& ASE. FLEXITALLIC.		
9	(12)	3/4" DIA x 5 1/2" LG	B-7 STUDS W/ 2 HEX NUTS		
10	1	6"	STANDARD SPECTACLE BLIND FOR	EP-520111NC	
11			300 LB R.F. FLANGES PER ATTACHED		
12			DWG. GC-L31452-17, C.S.		
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BROKEN
CRACKED

DLR
11/8/74

EP & S
NOV 11 1974

CHEV B8 6123

DLK LIST OF MATERIALS

Job No. 41-066 List No. 01

DATE: 11-8-74

11-11

Accounting Charge No. 5-49089-001

DATE REQUIRED: 12-9-74

Engineer: DLR Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L-130	(1)	6"	300 LB. ASA FLANGED GATE VALVE,	EP 494X	
2				C.S. PER ASTM A-216 GR WCB,		
3				12% CR SEAT, DISC & STEM, BOLTED		
4				BONNET, 1/16" R.F. FLANGE FACING,		
5				CRANE 33X; PACIFIC 3SD-1 OR		
6				EQUAL.		
7	L-160	(3)	6"	NPS SPIRAL WOUND GASKET, 304 SS	STOCK	
8				& ASB. FLEXITALLIC.		
9	H-262	(12)	3/4" DIA x 5 1/2" LG	B-7 STUDS W/ 2 HEX NUTS		
10	—	(1)	6"	STANDARD SPECTACLE BLIND FOR	EP 52011 NC	
11				300 LB R.F. FLANGES PER ATTACHED		
12				DWG. GC-L31452-17, C.S.		
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DLR
11/8/74

BROOKER
CARSEN

EP P & S
NOV 11 1974

CHEV B8 6124

Accounting Charge No. 5-49030-021

DATE: 11-8-74

DATE REQUIRED: 12-7-74

Engineer: DCR

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-20

MK. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	S STC P.
1	L-130	(1)	6"	300 LB. ASA F11.52 GATE VALVE	EP
2				C.S. PER ITEM A-216.52 WCB	
3				12 1/2 CR. GATE, DUCT STEM, BOLTED	
4				BRACKET, 1/16" R.F. FLANGE F11.52	
5				CRANE BRK, PACIFIC 350-1 OR	
6				EQUIV.	
7	L-160	(3)	6"	HPS SPIRAL WOUND GASKET, 304 SS	STC
8				8 1/2" F11.52	
9	H-262	(12)	3/4" DIA. 5/16" LG	5/16" LG B-7 STUDS W/ 2 HEX NUTS	
10	—	(1)	6"	STANDARD. SPECTACLE BLIND FOR	EP 52
11				300 LB. R.F. FLANGES PER ATTACHED	
12				DWG. GC-L31452-17, C.S.	
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LIST OF MATERIALS

Job No. 16-348

List No. 001

DATE: 12/1/74

Accounting Charge No. 1-5116

DATE REQUIRED: 10/11/74

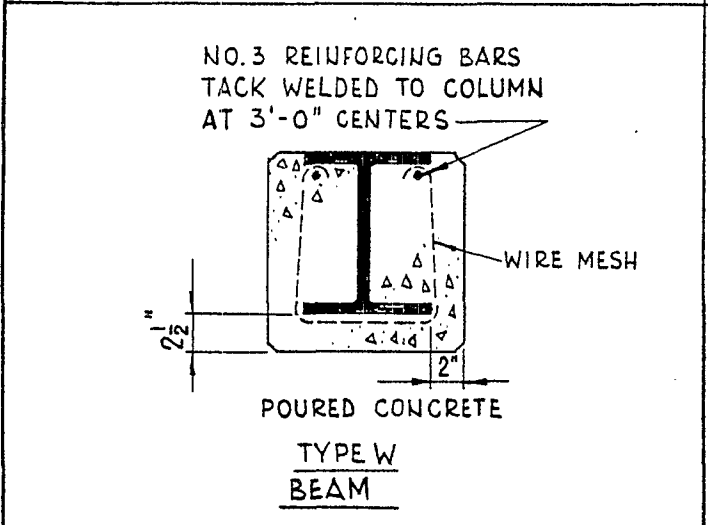
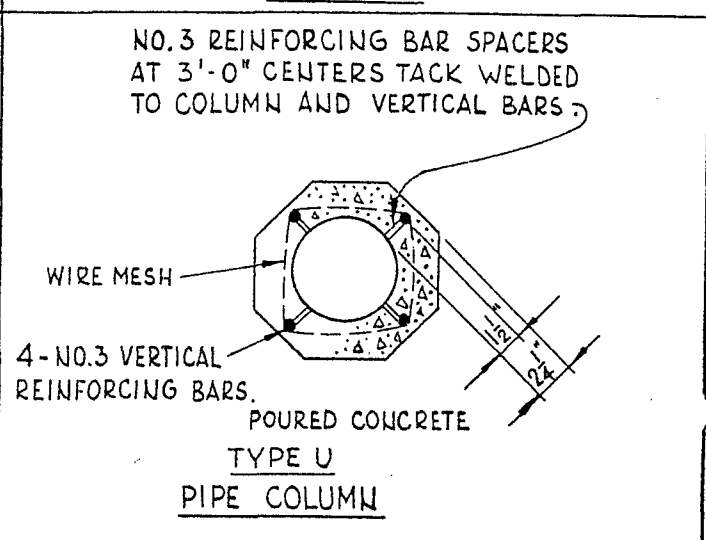
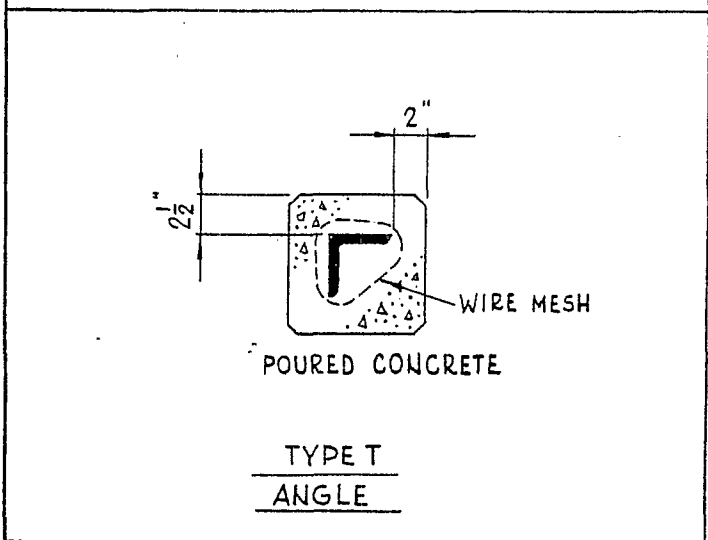
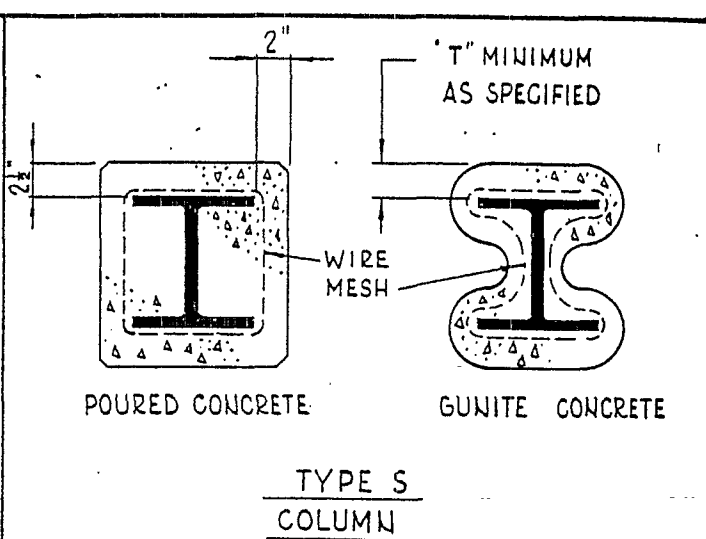
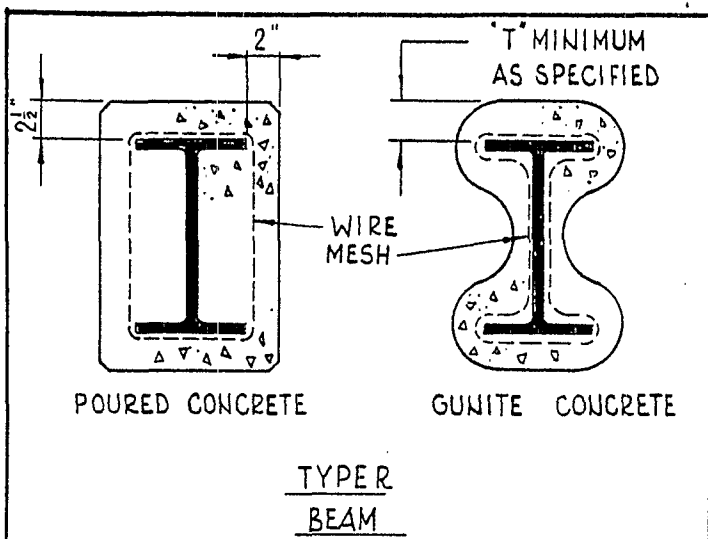
Engineer: HLL

Lead Engr: MLB

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

QTY.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L31	(7)	1/2"	800# Std. St'l. Gate Valve, OS & Y, Bitd. Bnt	STOCK	
2	L73	(3)	1/2"	3000# Std. FS Gr. Jt. Union, A1 St'l, AAR		
3	L75	(4)	1/2"	" " " Tee		
4	L77	(6)	1/2"	Std. St'l. Bar Stock Plug, Rd. Hd.		
5	L91	(11)	1/2"x3"	Sch. 80 Smls. St'l. Pipe Nipple - T&E		
6	L91	(2)	1/2"x6"	Ditto		
7	L564	(2)	1/2" Thrd.	Nipples, Seal Pat. Vertical per		
X				Mtr. 5' Std. Dwg. GE-J 31252		
9	L592 L2	(30')	1/2"	O.D. Smls. St'l. Tubing, ASTM A-179,		
X				.065" Wall		
11	L861	(2)	1/2"x1/4"	Male Connector, 1/2" O.D. Tube x 1/4" Male NPT,	STOCK	
X				St'l., Compr. Type		
13	L862	(2)	1/2"x1/2"	Female Connector, 1/2" O.D. Tube x 1/2" Female NPT,		
-				St'l., Compr. Type	EPR 484X	
	L860	(4)	1/2"	O.D. Tube Union, St'l. Compr. Type	STOCK	
16		(4)	5/8" x 4"	Concrete Sitch Anchor		
17	J-301	(1)	2"	Orifice Plate, 304SS, for 2"-300#		
X				R.F. Flanges, Not Boreal, Type "A"		
X				per attached Std. Dwg. GC-J 99504-9		
20	L247	(1 pr)	2"	300# FS W.N. Orifice Flanges, RF Sch. 40 Bore		
21	L152	(4)	2"	1/16" Ash. Comp. Ring Gask. for 300# Flgs.		
22	H261	(8)	5/8"x4 3/4"	Stud Bolt, ASTM A-193, Gr B7, w/2-Hex Nuts		
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33				Mat'l's. for installation of FR in G ²		
34				Condensate from #6 C.U.	CHEV B8 6126	
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Handwritten signature/initials



NOTES:

ALL WIRE MESH SHOWN HEREON SHALL BE
4x4-10 GA x 10 GA OR EQUAL.

ALL FIREPROOFING SHALL BE PORTLAND CEMENT
CONCRETE WITH NORMAL AGGREGATES, UNLESS
OTHERWISE SPECIFIED.

CHAMFER POURED CONCRETE CORNERS
3/4" - 45° MINIMUM.

BEFORE FIREPROOFING MAJOR STRUCTURAL
SUPPORTS, SANDBLAST OR WIRE BRUSH CLEAN,
THEN PRIME USING ONE COAT SPEC. 818 OR TWO
COATS SPEC. 819 PRIMER. UNLESS SPECIFIED, DO NOT
PRIME UNDER FIREPROOFING ON PIPE SUPPORTS.

REVS.	1	REDRAWN, ADDED GUNITE DETAIL AND TYPE R THRU W. REVISED NOTES	AAK J.E.H. GJH PH	2			
-------	---	--	-------------------------	---	--	--	--



STANDARD OIL COMPANY OF CALIFORNIA
ENGINEERING DEPARTMENT

SAN FRANCISCO

STANDARD DETAILS
CONCRETE FIREPROOFING
FOR STRUCTURAL MEMBERS.

SCALE NONE DATE 7-13-43
DR. LSB CHWFW JR. DR. APP. ENG

OPRG. DEPT.
ENG. DEPT. D 7/23

APPROVED
R 8/10/43

GE-N33336-11

SERVICE CLASSIFICATION		SERVICE	RECOMMENDED PACKING (SEE NOTES 1-4 INC.)				ALSO NOTE
			ROTATING		RECIPROCATING		
			EL SEGUNDO	RICHMOND (9)	EL SEGUNDO	RICHMOND (9)	
GASES	Air	CEC	CEC	CEC	CEC	K	8
	Ammonia Vapor	CEC	CEC	CEC	CEC	K	8
	Butane Vapor	CEC	CEC	CEC	CEC	K	8
	Gases, Recovery and Natural	CEC	CEC	CEC	CEC	K	8
LPG	Gases, Butane and Propane	CEC	CEC	CEC	CEC	K	8
	Butane (Liquid) and LPG	CEC	CEC	CEC	CEC	K	8
OILS, LIGHT	Oil, LPG	CEC	CEC	CEC	CEC	K	8
	Gasoline	CEC	CEC	CEC	CEC	K	8
	Gum Inhibitor	CEC	CEC	CEC	CEC	K	8
	Kerosene	CEC	CEC	CEC	CEC	K	8
OILS, HEAVY (UP TO 450F)	Oil, Light	CEC	CEC	CEC	CEC	K	8
	Asphalt	CEC	CEC	CEC	CEC	K	8
	Fuel Oil	CEC	CEC	CEC	CEC	K	8
	Oil, Asphalt, Fuel and Heavy	CEC	CEC	CEC	CEC	K	8
OILS, HEAVY (ABOVE 450F) or DOWTHERM (HOT)	Oil Sludge	CEC	CEC	CEC	CEC	K	8
	Asphalt	CEC	CEC	CEC	CEC	K	8
	Dowtherm	CEC	CEC	CEC	CEC	K	8
	Fuel Oil	CEC	CEC	CEC	CEC	K	8
HF, HF + OIL	Oil, Asphalt, Fuel and Heavy	CEC	CEC	CEC	CEC	K	8
	Oil Sludge	CEC	CEC	CEC	CEC	K	8
	Acid HF	CEC	CEC	CEC	CEC	K	8
	Water, Cooling Tower	CEC	CEC	CEC	CEC	K	8
WATER	Water, Fresh	CEC	CEC	CEC	CEC	K	8
	Water, Salt	CEC	CEC	CEC	CEC	K	8
	Water, Hot (UP TO 300F)	CEC	CEC	CEC	CEC	K	8
	Steam	CEC	CEC	CEC	CEC	K	8
STEAM (UP TO 450F)	Steam	CEC	CEC	CEC	CEC	K	8
	Acid Acetic	CEC	CEC	CEC	CEC	K	8
	Acid, H ₂ SO ₄ Weak	CEC	CEC	CEC	CEC	K	8
	Acid, H ₂ SO ₄ Strong	CEC	CEC	CEC	CEC	K	8
ACIDS, STRONG	Sludge Acid	CEC	CEC	CEC	CEC	K	8
	Ammonia Solution	CEC	CEC	CEC	CEC	K	8
	Caustic	CEC	CEC	CEC	CEC	K	8
	Doctor Solution	CEC	CEC	CEC	CEC	K	8
CAUSTIC	Lime Slurry	CEC	CEC	CEC	CEC	K	8
	Butane and H ₂ SO ₄	CEC	CEC	CEC	CEC	K	8
	Butane and H ₂ PO ₄	CEC	CEC	CEC	CEC	K	8
	Phenol	CEC	CEC	CEC	CEC	K	8
ACID OILS OR SLUDGES	Acid Sludge	CEC	CEC	CEC	CEC	K	8
	Butane and H ₂ SO ₄	CEC	CEC	CEC	CEC	K	8
	Butane and H ₂ PO ₄	CEC	CEC	CEC	CEC	K	8
	Phenol	CEC	CEC	CEC	CEC	K	8
METAL	Metallic Aluminum Foil	CEC	CEC	CEC	CEC	K	8
	Metallic Rabbit Foil	CEC	CEC	CEC	CEC	K	8
	Braided Asbestos Packing Graphited	CEC	CEC	CEC	CEC	K	8
	Duck and Rubber	CEC	CEC	CEC	CEC	K	8
PLASTIC	Plastic Asbestos and Graphite	CEC	CEC	CEC	CEC	K	8
	Chevron Sets Plus Top and Bottom Rings	CEC	CEC	CEC	CEC	K	8
	Long Fiber Blue Asbestos and Graphite	CEC	CEC	CEC	CEC	K	8
	Plastic (Stick Form)	CEC	CEC	CEC	CEC	K	8
RUBBER	Rubber	CEC	CEC	CEC	CEC	K	8
	Full Metallic Packing	CEC	CEC	CEC	CEC	K	8
	Lantern Ring	CEC	CEC	CEC	CEC	K	8
	Vinyon and Copper Foil	CEC	CEC	CEC	CEC	K	8
TEFLON	Teflon Y-Ring Sets With Adapters	CEC	CEC	CEC	CEC	K	8
	Carbon Rings	CEC	CEC	CEC	CEC	K	8
	Duck Channel	CEC	CEC	CEC	CEC	K	8
			CEC	CEC	CEC	CEC	K

NOTES ON USE OF PACKING CHART									
1. Where a single letter occurs (F or N), stuffing boxes shall be filled with a single type of packing or with packing sets.									
2. Where three letters occur, (A, B or C) shall be a combination type using hard, firm material (A, B or C) as top and bottom rings or next to lantern rings with alternate rings of plastic (E), i.e., A-B-A-B-A-B or A-B-A-B-A-B.									
3. If a sealing medium or lubricant is to be used, or if stuffing box vents are to be used, packing shall be installed so that lantern rings are placed opposite tapped openings.									
4. Ordinarily, turbines will be furnished with carbon rings or labyrinth seals.									
5. Single mechanical seals may be used on rotating shafts, up to about 450F stock temperature. The pump specialist will normally decide whether or not to use mechanical seals instead of packing. If seals are not used, pumps shall be packed as shown.									
6. Double mechanical seals shall be used in HF and HF-oil service with flushing oil ahead of the first seal and pressurized lubricating oil between seals. Double O-rings with pressurizing equipment have been quite satisfactory at Richmond. However, packings are shown in case it is ever necessary to pack pumps not equipped with seals.									
7. When Chevron or Sea Rings are used, spacers shall be installed under gland bolt nuts to prevent over-tightening. Do not use more rings than recommended by packing manufacturer's Catalog. Use spacers in stuffing box if necessary.									
8. If centrifugal compressors are not equipped with labyrinth seals, use packing shown.									
9. At locations other than El Segundo, use packings shown for Richmond unless operators have other preferences.									

REVISIONS	
4	
3	
2	
1	

SCALE _____ None _____ CH. _____ TON _____	
DATE January 5, 1954	
ENGR. J. H. J.	
APPROVED _____	
OPR'g DEPT. _____	
ENG. DEPT. _____	

PACKING FOR PUMPS, COMPRESSORS AND TURBINES	
W.O. _____	
S.O. _____	

GO-G-90710	
------------	--

NOTES ON USE OF PACKING CHART

- Where a single letter occurs (F or N), stuffing boxes shall be filled with a single type of packing or with packing sets.
- Where three letters occur, packing shall be a combination type using hard, firm material (A, B or C) as top and bottom rings or next to lantern rings with alternate rings of plastic (E), i.e., AEAALAEA or AEAEEA etc.
- If a sealing medium or lubricant is to be used, or if stuffing box vents are to be used, packing shall be installed so that lantern rings are placed opposite tapped openings.
- Ordinarily, turbines will be furnished with carbon rings or labyrinth seals.
- Single mechanical seals may be used on rotating shafts, up to about 450F stock temperature. The pump specialist will normally decide whether or not to use mechanical seals instead of packing. If seals are not used, pumps shall be packed as shown.
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- If centrifugal compressors are not equipped with labyrinth seals, use packing shown.
- At locations other than El Segundo, use packings shown for Richmond unless operators have other preferences.

REVISIONS

4	
3	
2	
1	

SCALE None CH: TGN DATE January 9, 1954
 DR. LER ENGR. 134/57
 OPR'g DEPT. APPROVED
 ENG. DEPT. 134/57

PACKING FOR PUMPS, COMPRESSORS AND TURBINES

W.O. GC-G-90710
 S.O.

PRINTED IN U.S.A.

STANDARD DRAWING

ENGINEERING DEPARTMENT
EL PASO, TEXAS

SPECIFICATION NO. EP-207A

July 3, 1967

INDEX Page 1

SECTION 1. General Requirements

- 1.1 Scope of Work
- 1.2 Work, Material and Equipment, and Utilities by Company or Others
- 1.3 Location of Work
- 1.4 Drawings and Specifications
- 1.5 Intent
- 1.6 Errors and Omissions
- 1.7 Company Approval

SECTION 2. General Conditions

- 2.01 Field Representatives
- 2.02 Change in the Work
- 2.03 Schedules and Cost Breakdown
- 2.04 Refinery Regulations

SECTION 3. Performance of Work

- 3.01 Excavation and Backfill
- 3.02 Removal of Existing Equipment
- 3.03 Materials Handling and Corresponding Paper Work
- 3.04 Inspection and Testing
- 3.05 Correction of Defects
- 3.06 Completion
- 3.07 Acceptance
- 3.08 Mechanical Guarantee

SECTION 4. Construction

SECTION 5. Appendix

Index of Standard Drawings

Index of Standard Specifications and Engineering Instructions.

ORDERING DATA	
When ordering Orifice Plates from this drawing, specify: Size, type and rating of flange.	
Kind of material: Dimension "A" and "B" Line number and identification, if required.	
SERVICE	MATERIAL
ACID - H ₂ SO ₄	Alloy 20
ACID - Phosphoric	16-13-3 Type 317
ACID - Oil Mixture (Hydro-polymer)	K-Monel
ACID - HCl (Isomerization)	Hastelloy B
HF Alkylation	Monel
AIR - Fuel gas (Less than 240°F)	18-8 Type 304
OIL - Hot or cold (Not acid)	18-8 Type 304
SALT WATER	18-8 Type 304
STEAM	18-8 Type 304
CONSTRUCTION NOTES	
1. Orifice plate thickness shall be N° 16 U.S. Ga. for plates in pipes up to 6" inclusive. Plates for larger pipe shall be N° 11 U.S. Ga.	
*2. Orifice diameter "B" varies with different installations and will be given for each installation. The Orifice itself must have sharp 90° edges. Do not use emery cloth to remove burr at edge as the rounding of the edge thus caused will affect the accuracy of the measurement. Allowable tolerance for dimension "B" shall be per table I.	
3. Tolerance for dimension "A" ± 1/4".	
4. The maximum eccentricity of the bore "B" with respect to the plate dia. "A" shall not exceed 1/16".	
5. Location of lettering on tag exactly as shown.	
6. Line number and identification shall be stamped only if required by order.	
REVISIONS 1. Changed marking instructions for Type 317 & 316 L to use 1/16" hole. 2. Changed note 5. 3. Changed title, Dwg. No. & Const. notes. 4. Added identification tag. 5. Changed materials & Note 2 tolerance on Dim. "B". 6. Reduced lettering from 1/16" to 1/32". Added Note 6.	
SCALE: None	DATE: 2-1-44
DR: J.L.D.	CH: 4/44
OPRG. DEPT:	JOB ENG: 2/44
ENG. DEPT: 2/44	
STANDARD ORIFICE PLATES	
GC-J995 4-6	
DRAWING IN U.S. STANDARD DIMENSIONS	

Stamp actual dia. of Orifice to nearest thousandth inch.

Stamp Flg. size & rating.

Both edges of Orifice must be sharp & square

See Constr. Note 2

Orifice Dia. "A"

Flange Dia. "B"

Flange Thickness "C"

Stamp actual dia. of Orifice to nearest thousandth inch.

Stamp Flg. size & rating.

Both edges of Orifice must be sharp & square

See Constr. Note 2

Orifice Dia. "A"

Flange Dia. "B"

Flange Thickness "C"

Stamp actual dia. of Orifice to nearest thousandth inch.

Stamp Flg. size & rating.

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See Constr. Note 2

Orifice Dia. "A"

Flange Dia. "B"

Flange Thickness "C"

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Stamp Flg. size & rating.

Both edges of Orifice must be sharp & square

See Constr. Note 2

Orifice Dia. "A"

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Flange Thickness "C"

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Both edges of Orifice must be sharp & square

See Constr. Note 2

Orifice Dia. "A"

Flange Dia. "B"

Flange Thickness "C"

QUANTITY TO SUI

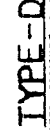
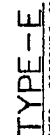
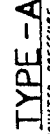
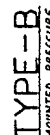
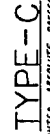
DESIGN NOTES

D-1 THESE DETAILS ARE SUITABLE FOR TRACING STREAM PRESSURES UP TO 150 PSIG AND FOR PRODUCT LINES OPERATING BELOW 400°.

D-2 WHEN TRACING TEMPERATURE IS TOO HIGH AND CAUSES VAPORIZATION OR REACTION OF THE PROCESS FLUID, USE "LIGHT TRACING" (APPLY ASBESTOS TAPE OVER LEADS BEFORE TRACING AND INSULATING).

CONSTRUCTION NOTES

- C-1 INSTALL TRACERS, WELD DRAWING CH-10000, STAINLESS STEEL, PERMANENTLY.
- C-2 VERIFY REQUIRED STEAM TRAP DRAWING CH-10000, THE STANDARD STEAM TRAP MANIFOLD.
- C-3 DETAILS FOR INSULATION PER DRAWING CH-10000, STAINLESS STEEL, INSULATION OF HOT LINES. DO NOT INSULATE UNIONS.
- C-4 GROUP STEAM SUPPLY VALVES FOR SEVERAL INSTRUMENTS TOGETHER, AND GROUP STEAM TRAP VALVES TOGETHER WITH EACH VALVE STATION WITH INSTRUMENTS. STAINLESS STEEL MANIFOLD AND 240 LUST FOR STAINLESS STEEL.

[illegible]

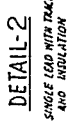
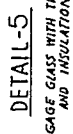
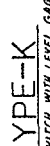
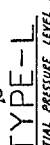
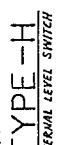
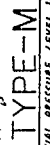
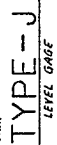
CONSTRUCTION NOTES

C-1 INSTALL TRACERS PER DRAWING GA-19808B, STANDARD DETAILS FOR STEAM TRACING.

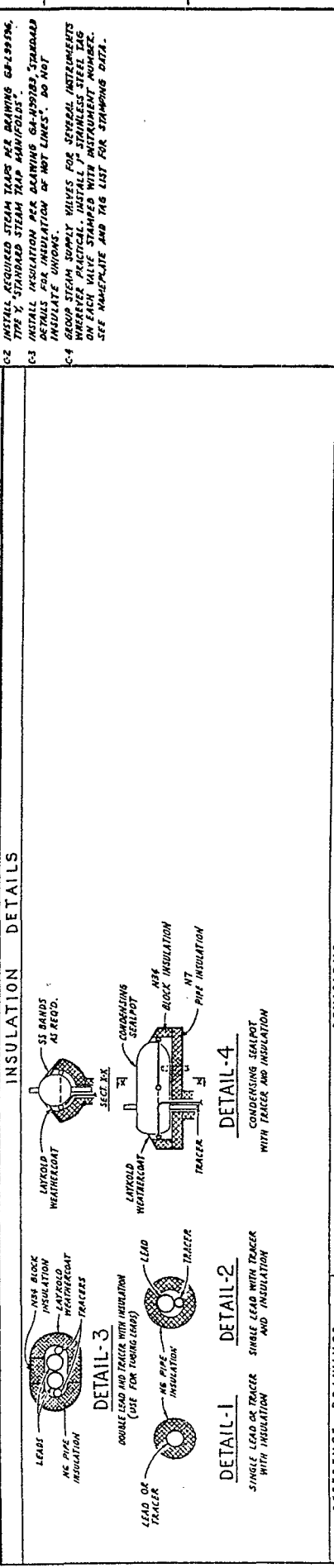
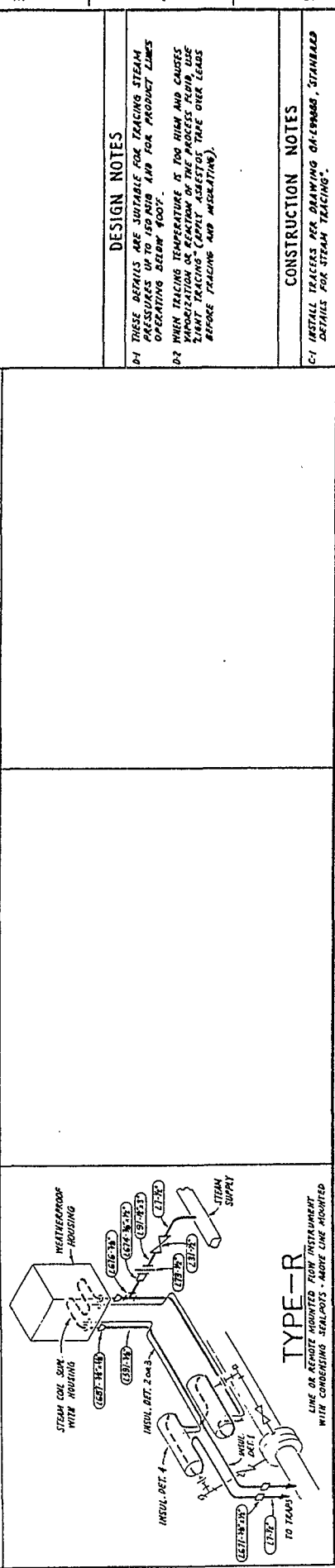
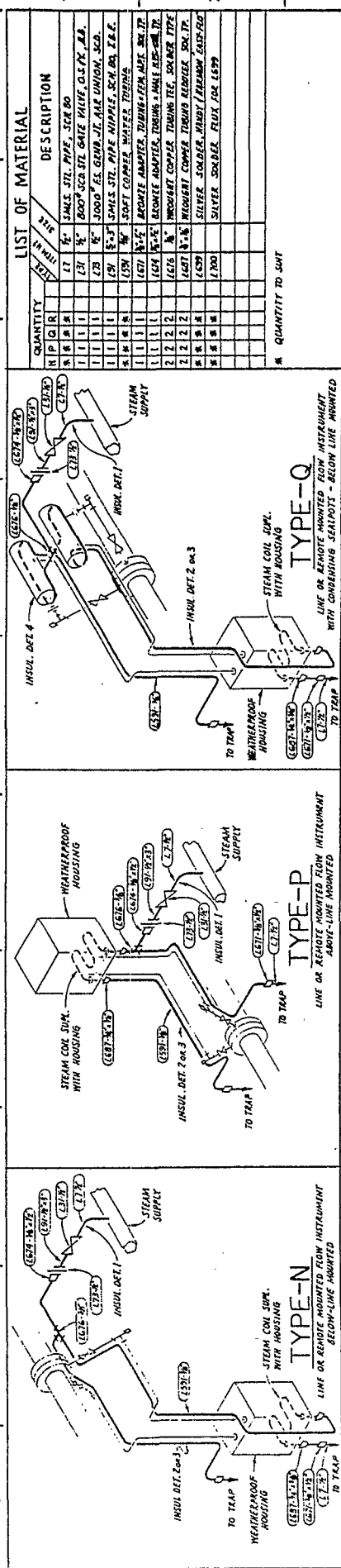
C-2 INSTALL REQUIRED STEAM TRAPS SEE MANFOLDING, TYPE "V", STANDARD STEAM TRAP MARKINGS.

C-3 INSTALL INSULATION PER DRAWING GA-N9878B, "STANDARD DETAILS" FOR INSULATION OF HOT LINES". DO NOT USE LUMBER.

C-4 GROUP STEAM TRAPS, VALVES FOR GENERAL INSTRUMENTS WHEREVER PRACTICAL. INSTALL A STAINLESS STEEL NUT ON EACH VALVE STAMPED WITH INSTRUMENT NUMBER. SEE NAMEPLATE AND TAG LIST FOR STAMPING DATA.

[illegible]

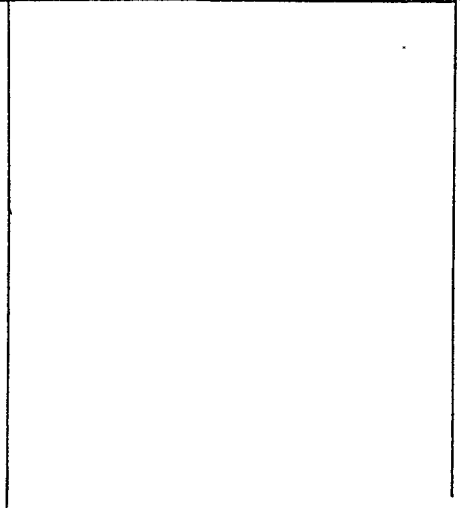
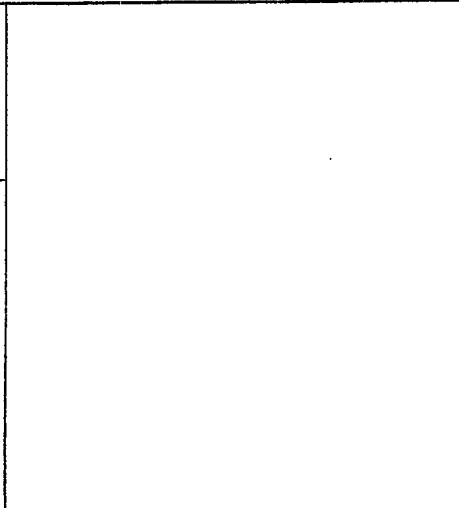
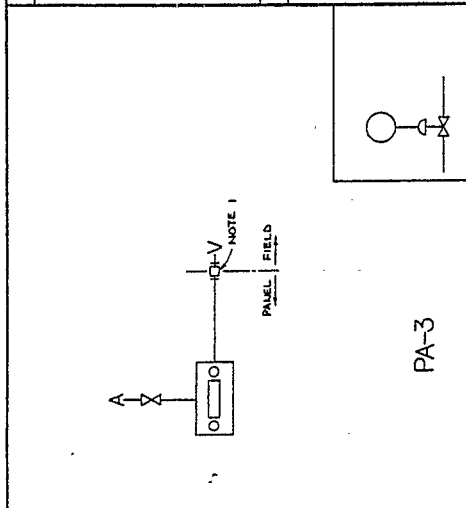
A B C D E F G H J K



REFERENCE DRAWINGS		REVISIONS	
STANDARD STEAM TRAP MANIFOLD DETAIL	GB-19974-1	1	DATE 11-3-51
STANDARD DETAIL FOR INSULATION OF HOT LINES	GB-19974-2	2	DATE 11-3-51
STANDARD DETAIL FOR STEAM TRAP INSULATION	GB-19974-3	3	DATE 11-3-51
STANDARD DETAIL FOR STEAM TRAP INSULATION	GB-19974-4	4	DATE 11-3-51
STANDARD STEAM TRAP TRACING FOR FLOW INSTRUMENTS		STANDARD OIL COMPANY OF CALIFORNIA	
ENGINEERING DEPARTMENT		SCALE 1/2" = 1'-0"	
DATE 11-3-51		BY J. J. BERRY	
CHECKED BY J. J. BERRY		APPROVED BY J. J. BERRY	
ENC. DET. 11-3-51		ENC. DET. 11-3-51	

GB-19974-2

10 DRAWING



CHEV B8 6135

NOTES

- 1- BULKHEAD CONNECTION TO RECEIVE FIELD TUBING SHALL BE 1/2" NPT FEMALE. INSTALL REMOVABLE PLUG IN SMALL CONNECTIONS PRIOR TO SHIPPING PANEL.
- 2- INSTALL ONLY THOSE TESTS REQUIRED FOR THE ALARMS INSTALLED.
- 3- THREE VALVES ARE REQUIRED WHEREVER ONE OR MORE ALARM SWITCHES ARE INSTALLED ON A TRANSMITTED AIR LINE. PLUG SIZE OUTLET "H" CONNECTION. IF NO TEST HEADER SYSTEM IS SPECIFIED.
- 4- TEST HEADER SYSTEM IS REQUIRED ONLY IF SPECIFIED ON ORDER.

CODE OF CONNECTIONS

- T - TRANSMITTER
- 11 - TRANSMITTER-1
- 12 - TRANSMITTER-2
- H - TEST HEADS
- V - CONTROL VALVE
- A - AIR SUPPLY
- C - CHART DRIVE (ELECTRIC), IF PNEUMATIC DRIVE IS USED. INSTALL SHUT-OFF VALVE AT EACH INSTRUMENT.

4	REVISOR 4 REDRAWN.	11-17-57	ALBY 11/17	11-17-57	11-17-57
3	Revised Note 1		11-17-57	11-17-57	11-17-57
2					
1					

SCALE NONE	DATE JAN. 21 '55
DR H. FAUDECK ON BLK of 134 ENGR 146	
OPRG. DEPT. 11	APPROVED
ENG. DESK 11	KCH 21

STANDARD TUBING DIAGRAMS FOR PANEL-

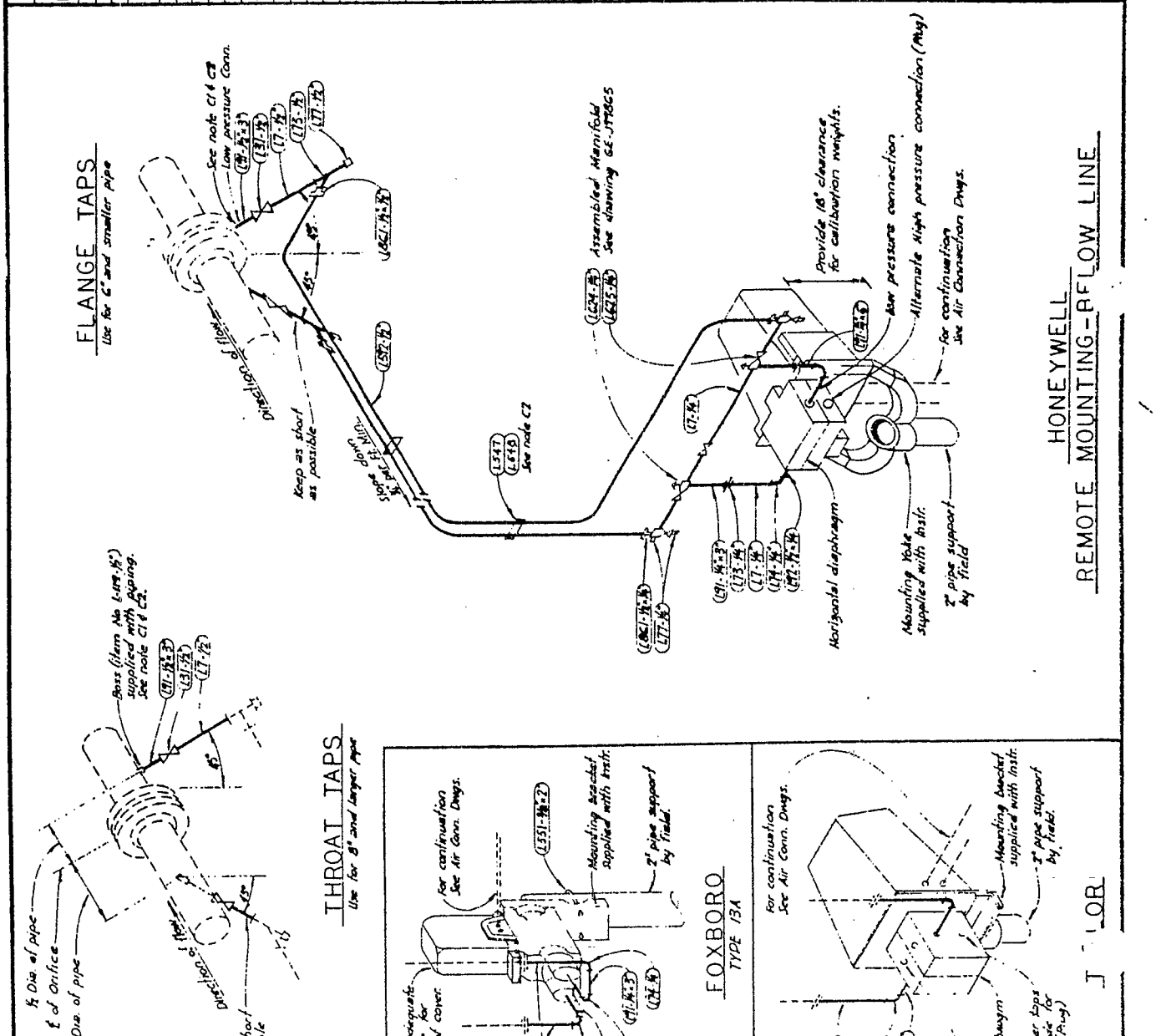
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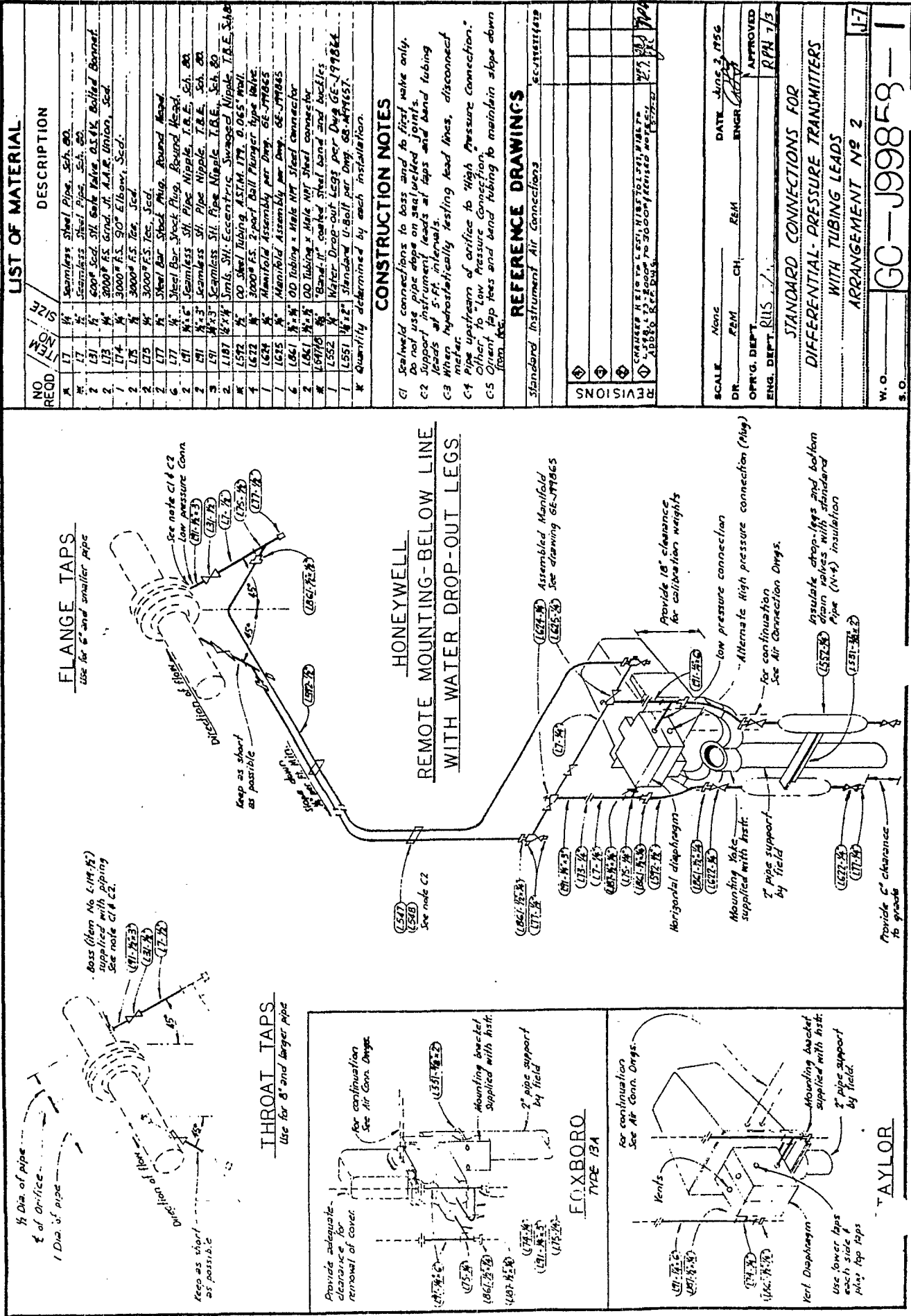
W. O. — GB-19;
18-2

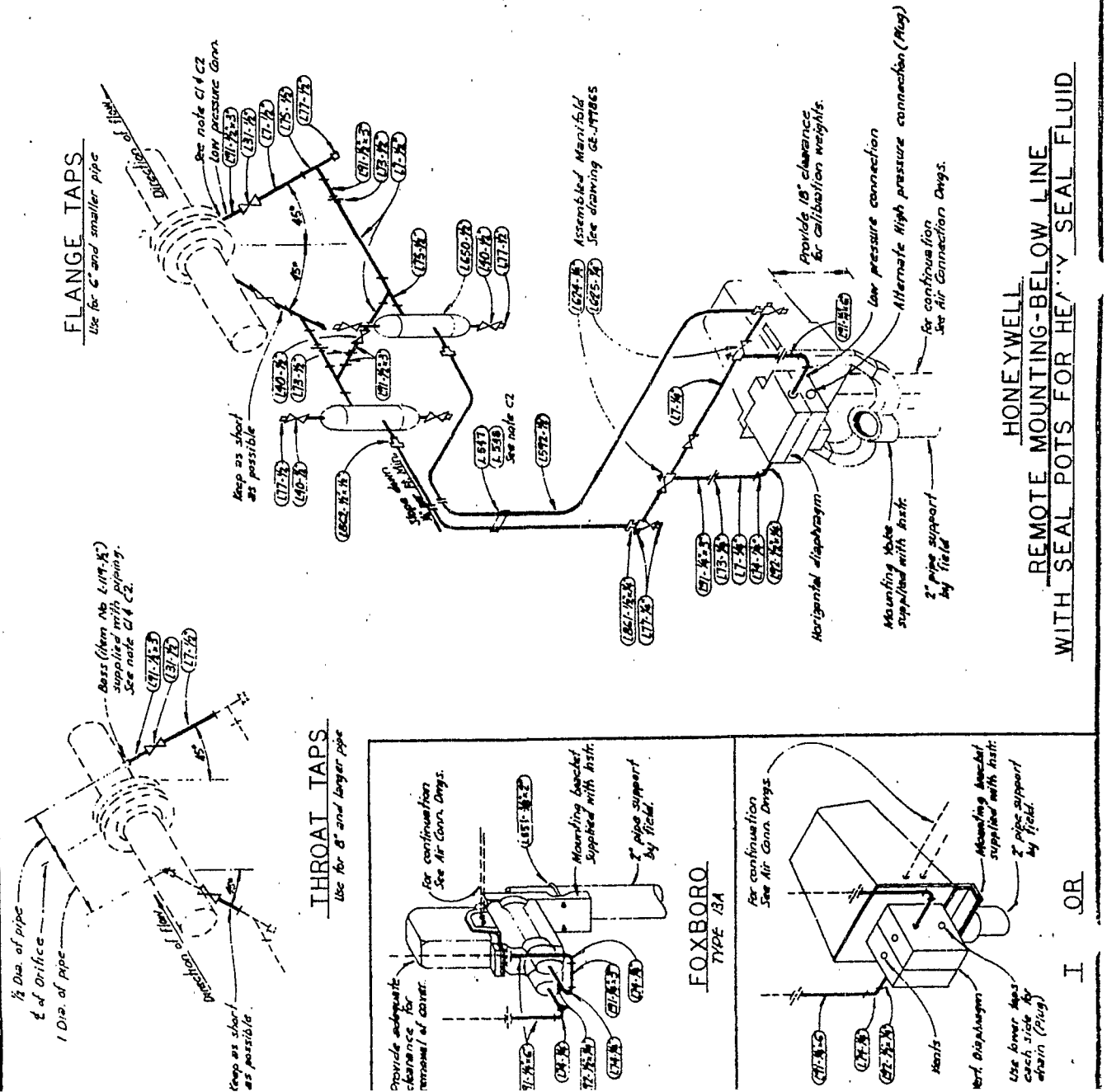
NOTES		CODE OF CONNECTIONS	
1. BULKHEAD CONNECTION TO RECEIVE FIELD TUBING SHALL BE 1/2" NPT FEMALE. INSTALL REMOVABLE PLUG IN OPEN CONNECTIONS PRIOR TO SHIPPING PANEL. 2. INSTALL ONLY THOSE TEES REQUIRED FOR THE ALARMS INSTALLED. 3. THREE-WAY VALVE REQUIRED WHENEVER ONE OR MORE ALARM SWITCHES ARE INSTALLED ON A TRANSMITTED AIR LINE. PLUG SIDE OUTLET "H" CONNECTION, IF NO TEST HEADER SYSTEM IS SPECIFIED. 4. TEST HEADER SYSTEM IS REQUIRED ONLY IF SPECIFIED ON ORDER.		T - TRANSMITTER T1 - TRANSMITTER-1 T2 - TRANSMITTER-2 H - TEST HEADER V - CONTROL VALVE A - AIR SUPPLY C - CHART DRIVE (ELECTRIC). IF PNEUMATIC DRIVE IS USED INSTALL SHUT-OFF VALVE AT EACH INSTRUMENT.	

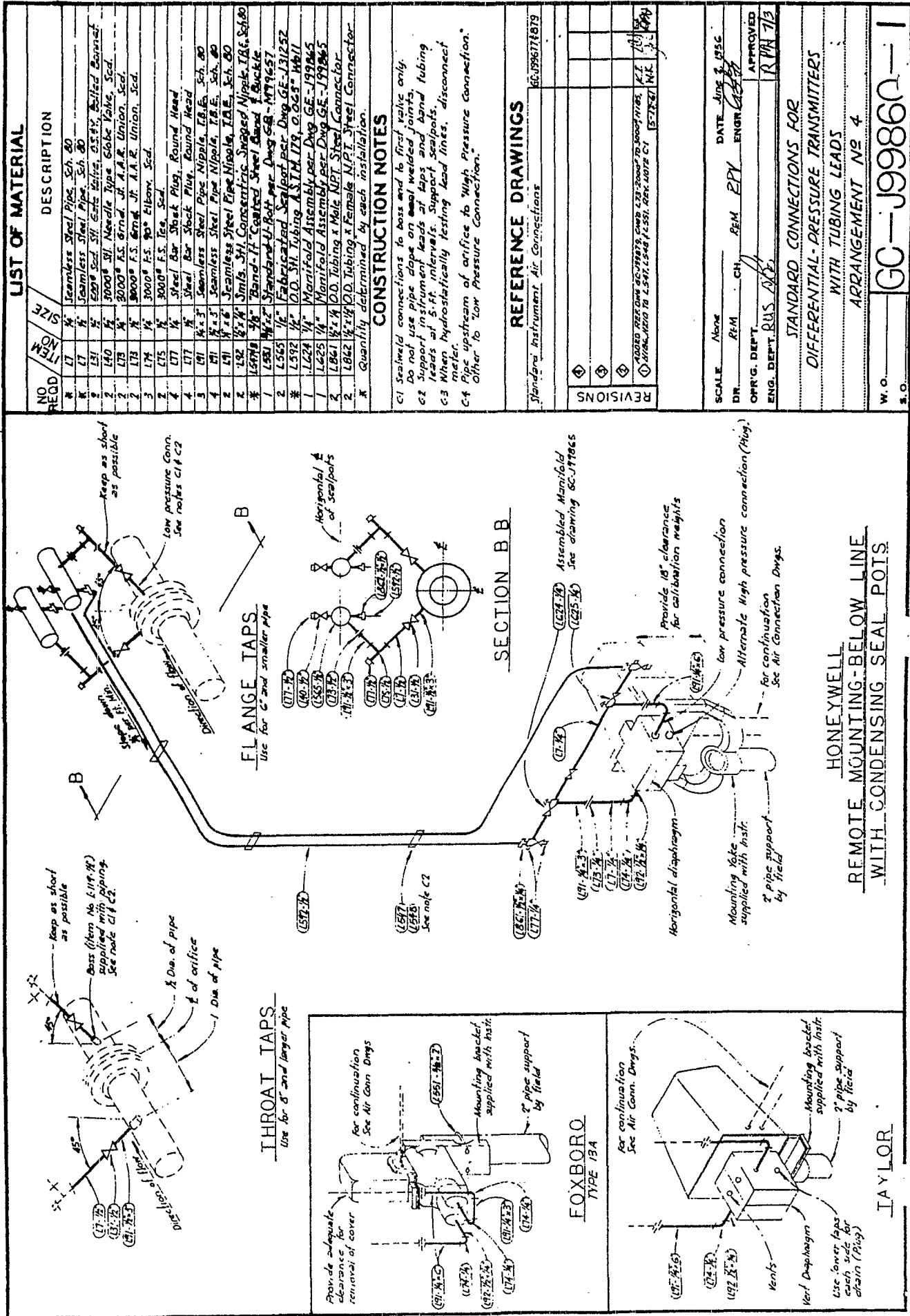
TYPE	NUMBER ALARMS	PA-19	PA-20	PA-21	PA-22	PA-23				
TYPE PA-19 PA-20A PA-20B	0 1 2				TYPE PA-22 PA-22A PA-22B	0 1 2		TYPE PA-23 PA-23A PA-23B PA-23C PA-23D PA-23E PA-23F PA-23G PA-23H	0 1 2 0 1 2 1 1 2 1 2	

TYPE	NUMBER ALARMS	PA-19	PA-20	PA-21	PA-22	PA-23				
TYPE PA-19 PA-20A PA-20B	0 1 2				TYPE PA-22 PA-22A PA-22B	0 1 2		TYPE PA-23 PA-23A PA-23B PA-23C PA-23D PA-23E PA-23F PA-23G PA-23H	0 1 2 0 1 2 1 1 2 1 2	





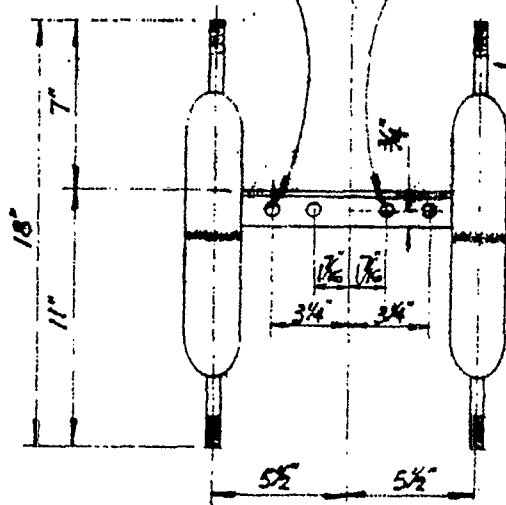




4	3	2	1
REVISIONS			
8-19-60	8-19-60	8-19-60	8-19-60
1-26-59	1-26-59	1-26-59	1-26-59
ADD "seamless" to note 2.	ADD "seamless" to note 2.	ADD "seamless" to note 2.	ADD "seamless" to note 2.
CHANGED note 3. Note 5 was note 6	CHANGED note 3. Note 5 was note 6	CHANGED note 3. Note 5 was note 6	CHANGED note 3. Note 5 was note 6

Drill or burn $\frac{1}{2}$ " hole for Insul. Attach. Wire

Drill $\frac{1}{2}$ " hole for $\frac{3}{8}$ " L. Bolt.



Four - $\frac{1}{2}$ " x 3" pipe nipples, Sch. 80, T.O.E.

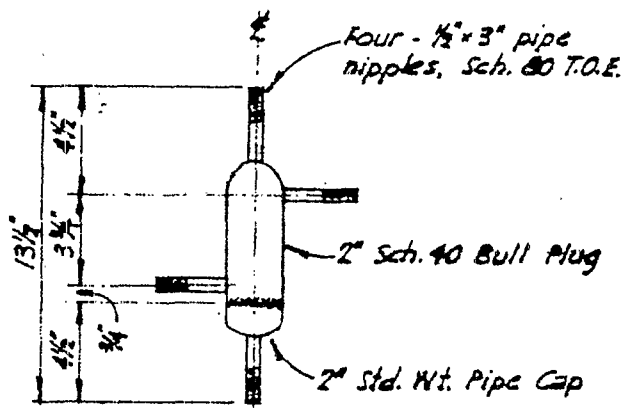
Four - 2" Sch. 40 Bull Plugs

Cope angle to suit bull plug

Weld

$1\frac{1}{2}$ " = $1\frac{1}{2}$ " x $\frac{3}{8}$ " L

ITEM L552 WATER LEGS



ITEM L650 SEALPOT

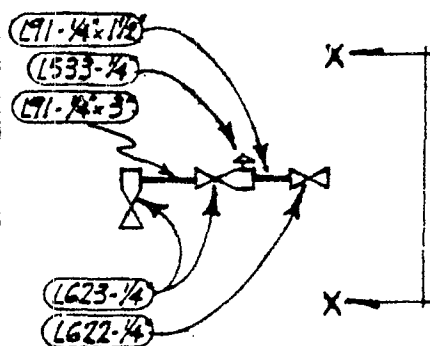
NOTES

1. All welds subject to internal pressure must be full penetration. Welding may be performed by electric-arc or Oxy-acetylene with carbon steel electrodes conforming to ASTM-A233.
2. Nipples shall conform to ASTM-A53, A-83, A-106 or API-5L, grades A or B, seamless.
3. Nipple threads shall be American Standard Tapered Pipe Threads per latest revision of ASA B2.1.
4. Completed units shall be hydrostatically tested to 1000 psig.
5. Nipple threads shall be suitably protected with caps or covers to prevent damage during transit.

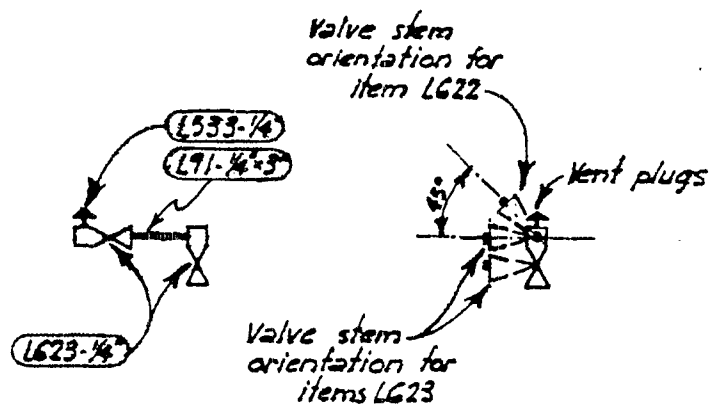
STANDARD SEALPOTS & WATER LEGS
FOR DIFFERENTIAL-PRESSURE INSTRUMENTS

GE-J99864-2

4	3	2	1
REVISIONS			
L622 & L624 WERE "BALL PLUNGER" VALVES.			
Clarified arrows for item numbers			
6-22-62			
8-13-50			
RUS			
RPH			



ITEM L624



ITEM L625

SECTION X-X

LIST OF MATERIAL

NO	REQD	ITEM NO	SIZE	DESCRIPTION
1		L91	1/4" x 1 1/2"	Seamless Steel Pipe Nipple, T.B.E., Sch. 80
1	1	L91	1/4" x 3"	Seamless Steel Pipe Nipple, T.B.E., Sch. 80
1	1	L533	1/4"	Steel Vent Plug, Foxboro *X-178
1		L622	1/4"	3000* F.S. 2-port Cone Plunger Valve, Scd., Fox. *H1-42107
2	2	L623	1/4"	3000* F.S. 4-port Cone Plunger Valve, Scd., Fox. *H2-42116

NOTES

1. All schedule 80 seamless nipples shall conform to ASTM-A53, A-83, A-106 or API-5L, grades A or B.
2. Threads shall be American Standard Tapered Pipe Threads per ASA B2.1-1945.
3. Valve ports not used in shop assembly shall be plugged to exclude dirt and water during transit.
4. All exposed steel parts shall be coated with a proper rust-preventative material.

STANDARD 1/4" ASSEMBLIES
FOR DIFFERENTIAL
PRESSURE INSTRUMENT MANIFOLD J-12

GE-J99865-2

QUANTITY	ITEM NO	SIZE	DESCRIPTION
1	27	1/4"	SEAMLESS STEEL PIPE SCH. 40
1	27	1/4"	SEAMLESS STEEL PIPE SCH. 40
2	231	1/2"	6000" SCH. 40 STEEL PIPE 0.5" X 60" BOLLER
2	279	1/4"	1000" SCH. F.S. BAND 1/4" X 100"
2	275	1/4"	3000" SCH. F.S. TIE
4	277	1/4"	STEEL BAR STOCK PLUG ROUND NO.
2	277	1/4"	STEEL BAR STOCK PLUG ROUND NO.
4	291	1/4"	SEAMLESS STEEL PIPE NPT 1.0" X 50" SCH. 40
2	291	1/4"	SEAMLESS STEEL PIPE NPT 1.0" X 50" SCH. 40
2	274	1/4"	3000" SCH. F.S. 90° ELBOW
1	2547	3/8"	"BAND-IT" COATED STEEL BAND
1	1318	3/8"	"BAND-IT" COATED STEEL BUCKLE
1	2854	1/4"	MANIFOLD ASSEMBLY PER DWG. 65-109865
1	2825	1/4"	MANIFOLD ASSEMBLY PER DWG. 65-109865
2	2861	1/4"	O.D. TUBING X MALE NPT STEEL CONNECTOR
2	2861	1/4"	O.D. TUBING X MALE NPT STEEL CONNECTOR
1	2594	1/2"	STEEL TUBING A.S.T.M. 179 - 065 WALL

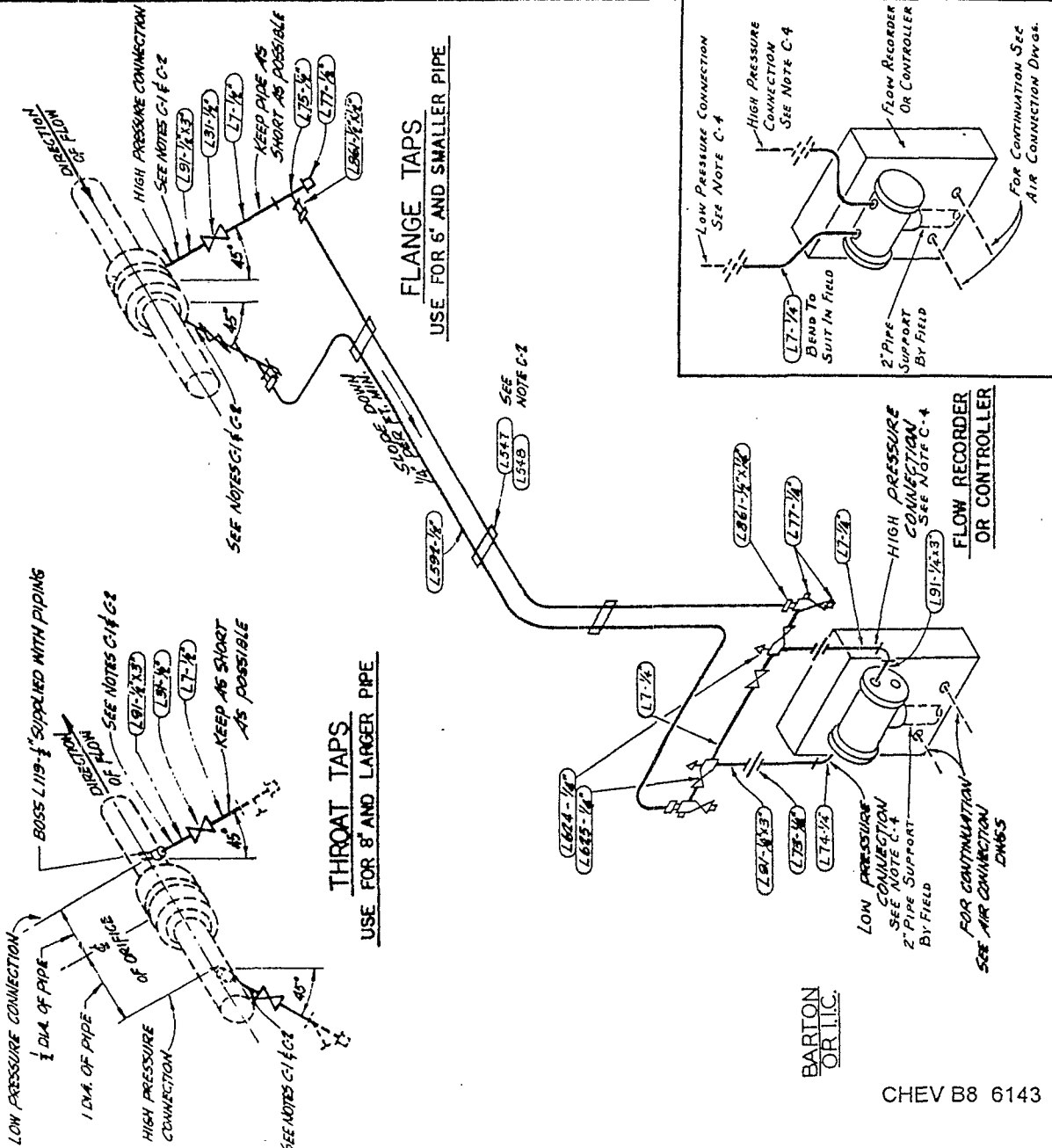
- C-1. SEAKNIELD CONNECTIONS TO TAP & TO FIRST VALVE ONLY. DO NOT USE PIPE DOPE ON SEAL WEEDED JOINTS.
- C-2. SUPPORT INSTRUMENT LEADS AT TAPS & BEND TUBING AT 5 FT. INTERVALS.
- C-3. WHEN HYDROSTATICALLY TESTING LEAD LINES, DISCONNECT METER.
- C-4. PIPE DOWNSTREAM LEAD TO HIGH PRESSURE METER CONNECTION, OTHER LEAD TO LOW PRESSURE METER CONNECTION. METER CONNECTIONS SHOULD BE VERIFIED IN FIELD BEFORE INSTALLATION.

[illegible]

SCALE	NONE	DATE	5-31-56
DR.	C. QUAN	CH	BY JC RAN
OP'NG. DEPT.		ENGR.	2274
ENG. DEPT.	RUS	APPROVED	RAN 7/3

STANDARD CONNECTIONS FOR
FLOW METER-BELLOWS TYPE.
WITH TUBING LEADS ARRANGEMENT.

W. O. 7
S. O. 2
GC-J99896-2
J46
STANDARD DRAWING
PRINTED IN U.S.A.



ALTERNATE CONNECTIONS
FOR FOXBORO, HONEYWELL,
AMERICAN DRI-FLO

REMOTE MOUNTING BELOW LINE

[illegible]

- C-1 SEAMWELDED CONNECTIONS TO TAP & TO FIRST VALVE ONLY. DO NOT USE FIVE POUND OR SEAL WELDED JOINTS.
- C-2 SEAMWELDED JOINTS TO TAP & TO FIRST VALVE ONLY. DO NOT USE FIVE POUND OR SEAL WELDED JOINTS.
- C-3 SEAMWELDED JOINTS TO TAP & TO FIRST VALVE ONLY. DO NOT USE FIVE POUND OR SEAL WELDED JOINTS.
- C-4 SEAMWELDED JOINTS TO TAP & TO FIRST VALVE ONLY. DO NOT USE FIVE POUND OR SEAL WELDED JOINTS.
- C-5 SEAMWELDED JOINTS TO TAP & TO FIRST VALVE ONLY. DO NOT USE FIVE POUND OR SEAL WELDED JOINTS.

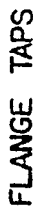
STANDARD INSTRUMENT AIR CONNECTIONS	6C-J996771879
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REVISIONS	DATE	BY	REVISIONS	DATE	BY
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2	12-1-63	WES	2	12-1-63	WES
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33	12		33	12	

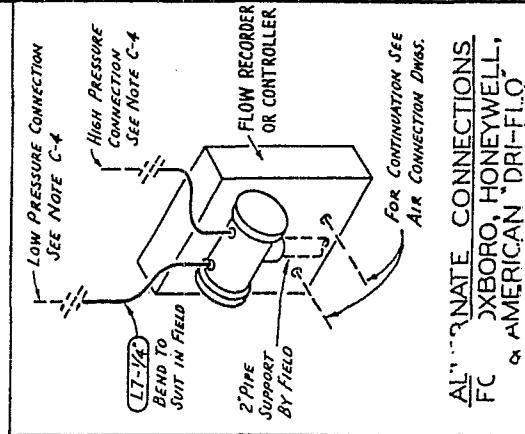
SCALE	NONE	DATE	6-4-56
DR	C. QUAN	CH.	105 PPK ENGR. [Signature]
OPR'G. DEPT.	41	APPROVED	
ENG. DEPT.	RLS 105.1		RP4-73

WITH TUBING LEADS ARRANGEMENT NO.2

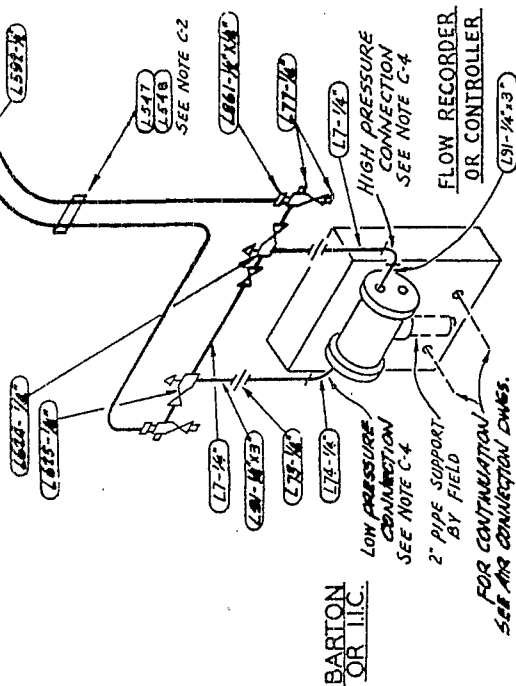
W.O. 7	GC-J998	7-2
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USE FOR 6" AND SMALLER PIPE



ALTERNATE CONNECTIONS
FC JXBORO, HONEYWELL,
α AMERICAN "DRI-FLO"



REMOTE MOUNTING BELOW LINE

ITEM NO.	QUAN	SIZE	DESCRIPTION
* L7	* 1	1/4"	SEAMLESS STEEL PIPE SCH. 80
* L7	* 1	1/2"	SEAMLESS STEEL PIPE SCH. 80
* L31	* 2	1 1/2"	3000" SCD. STEEL GATE VALVE D.S.P. BORED BONNET
* L73	* 2	1 1/4"	3000" SCD. F.S. GATE VALVE D.S.P. UNION
* L73	* 2	1 1/4"	3000" SCD. F.S. BRND. JT. A.A.R. UNION
* L75	* 2	1 1/2"	3000" SCD. F.S. TEE
* L77	* 4	1 1/2"	STEEL BAR STOCK PLUG ROUND HD.
* L77	* 4	1 1/2"	STEEL BAR STOCK PLUG ROUND HD.
* L91	* 4	1 1/2"	SEAMLESS STEEL PIPE NIPPLE T.B.E. SCH. 80
* L74	* 2	1 1/4"	3000" SCD. F.S. 90° ELBOW
* L91	* 4	1 1/2"	SEAMLESS STEEL PIPE NIPPLE T.B.E. SCH. 80
* L40	* 2	1 1/2"	3000" SCD. STEEL WEDGE TYPE GLOBE VALVE
* L547	* 1	3/8"	"BAND-IT" COATED STEEL BAND
* L548	* 1	3/8"	"BAND-IT" COATED STEEL BUCKLE
* L545	* 2	1 1/2"	FLAREKATOD SEALGAT PER DWG. GE-151252
* L624	* 1	1 1/2"	MANIFOLD ASSEMBLY PER DWG. GE-159065
* L625	* 1	1 1/2"	MANIFOLD ASSEMBLY PER DWG. GE-159065
* L592	* 1	1 1/2"	STEEL TUBING A.S.T.M. 179 - ONE WALL
* L641	* 2	1 1/2"	C.O. TUBING X WALL NOT STEEL CONNECTION
* L642	* 2	1 1/2"	C.O. TUBING X WALL NOT STEEL CONNECTION

C-1 SEALWELD CONNECTIONS TO TAP & TO FIRST VALVE ONLY. DO NOT USE PAIR DONE ON SEAL WELDED JOINTS.
C-2 SUPPORT INSTRUMENT LEADS AT TAPS & BAND TUBING AT 5' FT. INTERVALS. SUPPORT SENSORS.
C-3 WHEN HYDROSTATICALLY TESTING LEAD LINES DISCONNECT METER.
C-4 DISE UPSTREAM LEAD TO HIGH PRESSURE METER CONNECTION. OTHER LEAD TO LOW PRESSURE METER CONNECTION.
METER CONNECTIONS SHOULD BE VERIFIED IN FIELD BEFORE INSTALLATION.

STANDARD INSTRUMENT AIR CONNECTIONS	66-99674879
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[illegible]

SCALE NONE DATE 6-5-56
DR. C. QUAN CH. 16-14-PPV ENGR. R. H. H.
OPR'G. DEPT. OUT. APPROVED

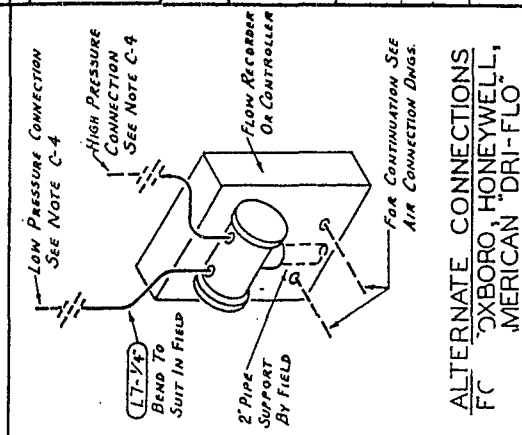
STANDARD CONNECTIONS FOR FLOW METER-BELLOWS TYPE

WITH TUBING LEADS ARRANGEMENT NO 3

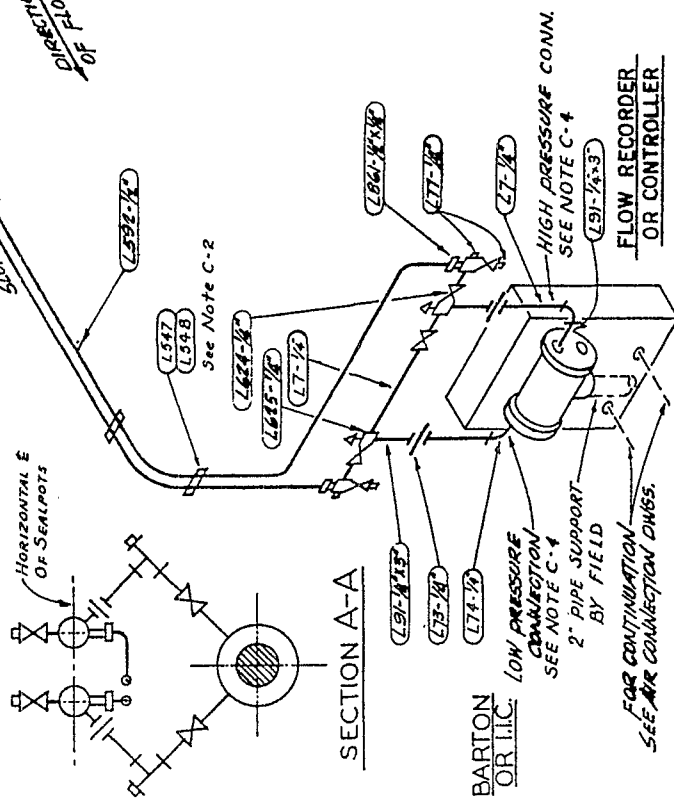
GC-J998 3-2
w.o. 7
S.O.



USE FOR 6" AND SMALLER PIPE



ALTERNATE CONNECTIONS
FC
"OXBORO, HONEYWELL,"
"AMERICAN DRI-FLO"



FOR CONTINUATION
SEE AIR CONNECTION DWGS.

REMOTE MOUNTING BELOW LINE

CONDENSING SEALPOTS

LIST OF MATERIAL

QUAN	ITEM NO.	SIZE	DESCRIPTION
1	L7	1/4"	SEAMLESS STEEL PIPE SCH. 80
1	L7	1/4"	SEAMLESS STEEL PIPE SCH. 80
2	L31	1/4"	600" SCD. STEEL GATE VALVE Q.S.V. BOILED BONNET
2	L73	1/4"	3000" SCD. F.S. STEEL
2	L75	1/4"	3000" SCD. F.S. STEEL
4	L77	1/4"	STEEL BAR STOCK PLUGS ROUND HD.
2	L77	1/4"	STEEL BAR STOCK PLUGS ROUND HD.
4	L91	1/4"	SEAMLESS STEEL PIPE NIPPLE T.B.E. SCH. 80
2	L74	1/4"	3000" SCD. F.S. 90° ELBOW
2	L91	1/4"	SEAMLESS STEEL PIPE NIPPLE T.B.E. SCH. 80
1	L147	3/4"	"BAND-IT" COATED STEEL BAND
1	L151	3/4"	"BAND-IT" COATED STEEL BUCKLE
1	L392	1/4"	STEEL TUBING A.S.T.M. 179 - .045" WALL
1	L424	1/4"	MANIFOLD ASSEMBLY PER DWG. 66-109865
1	L425	1/4"	MANIFOLD ASSEMBLY PER DWG. 66-109865
2	L581	1/4"	C.D. TUBING X MALE NPT STEEL CONNECTOR
2	L581	1/4"	C.D. TUBING X MALE NPT STEEL CONNECTOR

* QUANTITY DETERMINED BY EACH INSTALLATION

CONSTRUCTION NOTES

- C-1 SEAMLESS CONNECTIONS TO TAP & TO FIRST VALVE ONLY. DO NOT USE PIPE COPE ON SELL WELDED JOINTS.
- C-2 SUPPORT INSTRUMENT LEADS AT TAPS & BAND TUBING AT 5' FT INTERVALS.
- C-3 WHEN HYDROSTATICALLY TESTING LEAD LINES, DISCONNECT METER.
- C-4 PIPE UPSTREAM LEAD TO HIGH PRESSURE METER CONNECTION. OTHER LEAD TO LOW PRESSURE METER CONNECTION. METER CONNECTIONS SHOULD BE VERIFIED IN FIELD BEFORE INSTALLATION.

REFERENCE DRAWINGS

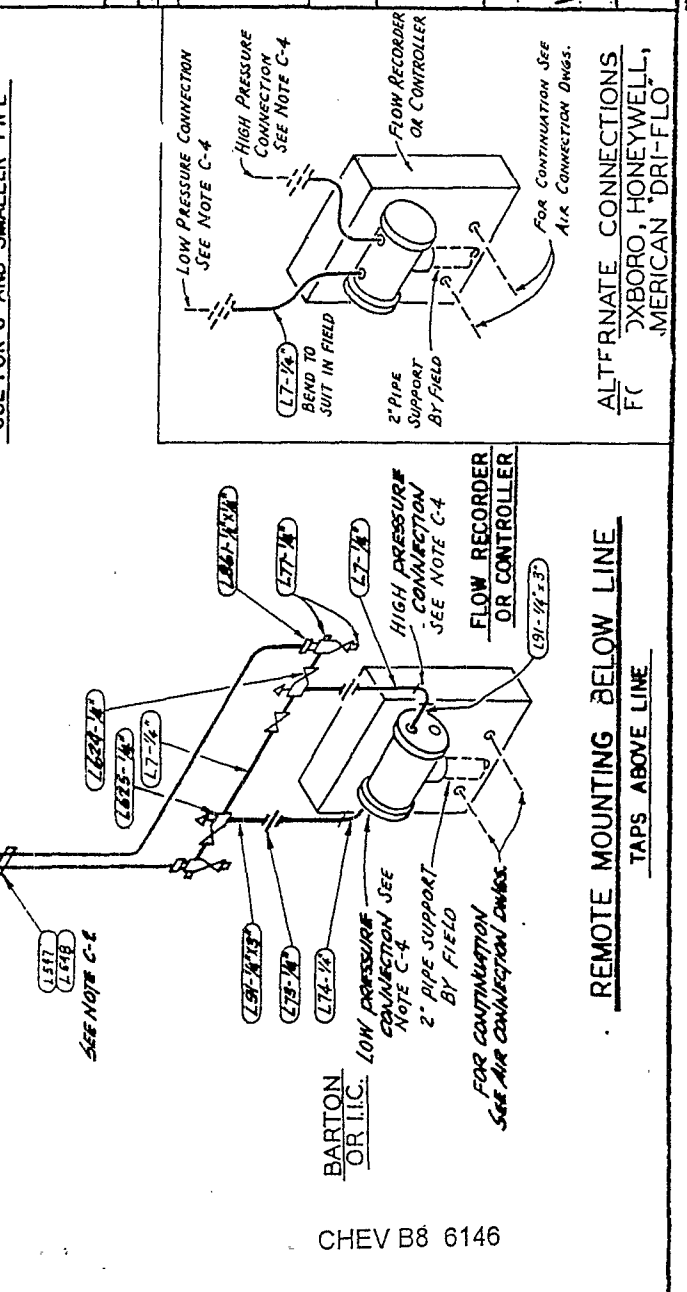
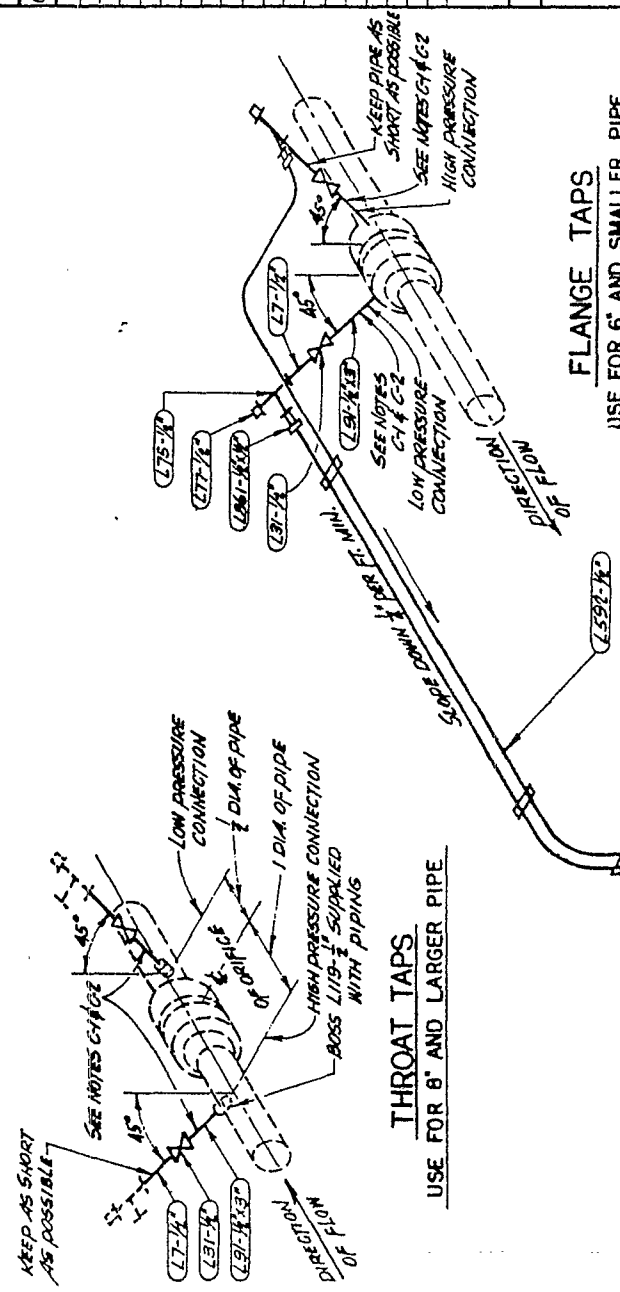
STANDARD INSTRUMENT AIR CONNECTIONS 66-111712/127

REVISIONS	DATE	BY	CHKD	APP'D
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2	6-6-56	CH	W	W
3	6-6-56	CH	W	W
4	6-6-56	CH	W	W

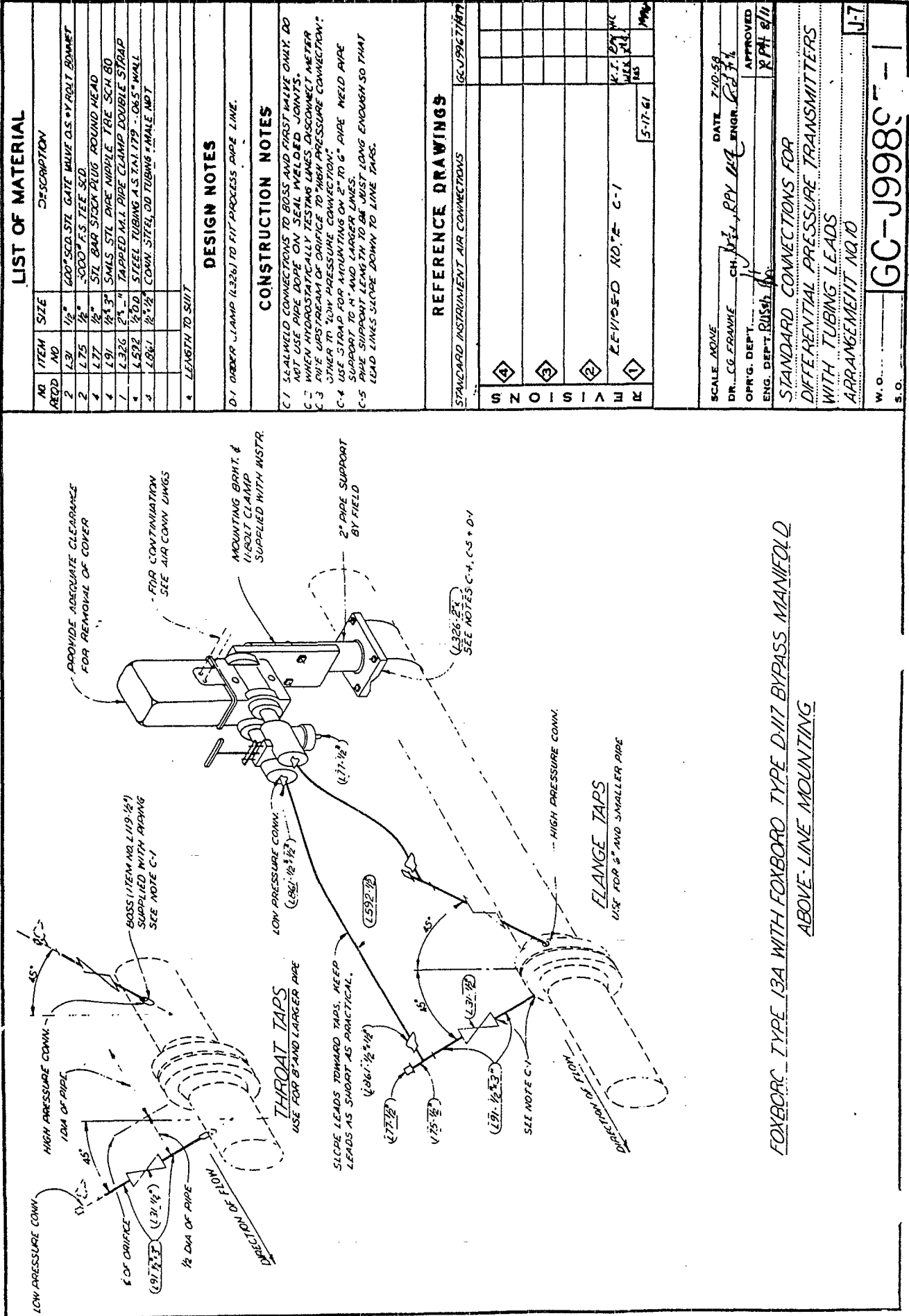
SCALE NONE DATE 6-6-56
DR C. RYAN CH 10/1/56 REV ENGR. 10/1/56
OPRG. DEPT. 4/1/56
ENG. DEPT. BUS. 10/1/56
APPROVED R. PAUL

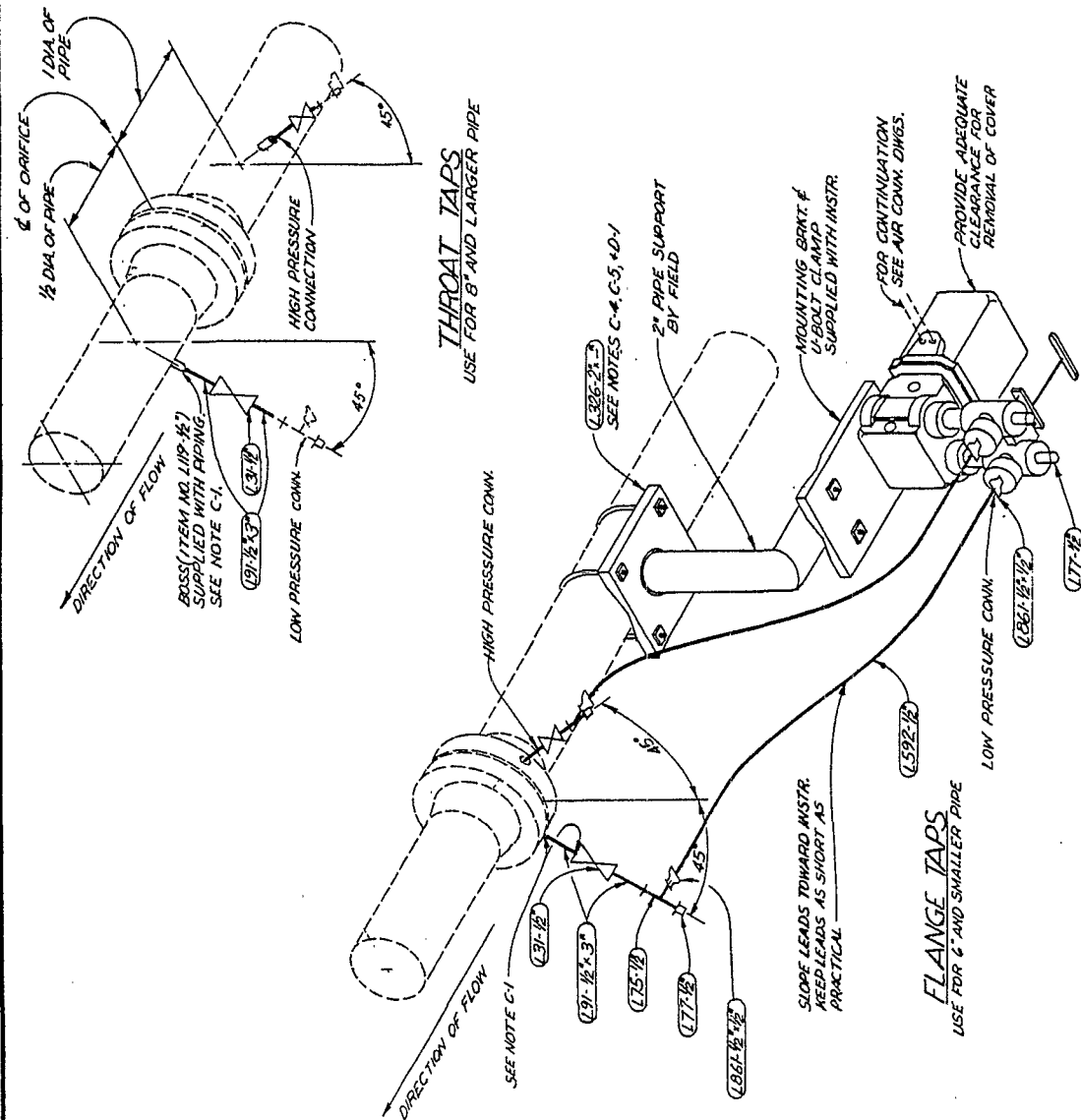
STANDARD CONNECTIONS FOR FLOW METER - BELLOWS TYPE WITH TUBING LEADS ARRANGEMENT NO. 4

W.O. 7 GC-J998 J-6
S.O. 3-2
PRINTED IN U.S.A. STANDARD DRAWING



CHEV B8 6146





FOXBORO TYPE 13A WITH FOXBORO TYPE D-17 BYPASS MANIFOLD
BELOW LINE MOUNTING

LIST OF MATERIAL	
ITEM NO.	DESCRIPTION
1	600" SCH. 40 STEEL PIPE (AS F. BOLT MANIFOLD)
2	3000" F.S. TEE STD.
3	SIL. BAR STOCK PLUG, ROUND HEAD
4	SMLS. STEEL PIPE, 1/2" NPT, 1/2" SCH. 40
5	TAPPED M.I. PIPE CLAMP DOUBLE STRAP
6	1/2" DIA. STEEL TUBING A.S.T.M. 179 - 0.635" WALL
7	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
8	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
9	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
10	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
11	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
12	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
13	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
14	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
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17	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
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23	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
24	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
25	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
26	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
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40	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
41	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
42	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
43	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
44	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
45	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
46	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
47	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
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81	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
82	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
83	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
84	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
85	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
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94	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
95	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
96	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
97	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
98	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
99	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT
100	1/2" DIA. CONN. STEEL, OD TUBING - MALE NPT

DESIGN NOTES	
D-1	ORDER CLAMP (L326) TO FIT PROCESS PIPE LINE.

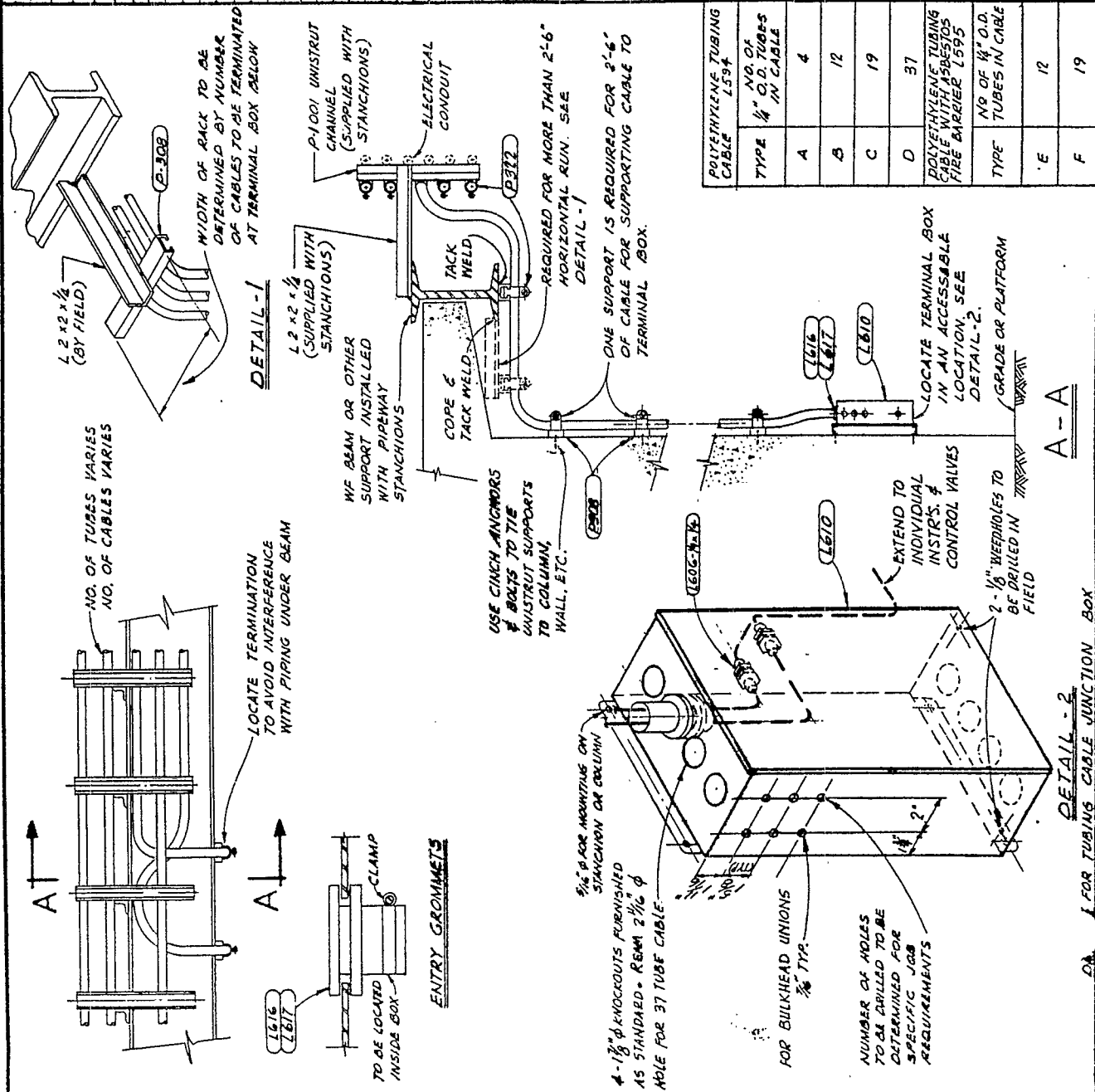
CONSTRUCTION NOTES	
C-1	SEAL WELD CONNECTIONS TO BOSS AND FIRST VALVE ONLY. DO NOT USE PIPE DOPE ON SEAL WELDED JOINTS.
C-2	WHEN HYDROSTATICALLY TESTING LINES, DISCONNECT METER PIPE UPSTREAM OF ORIFICE TO HIGH PRESSURE CONNECTION. OTHER TO LOW PRESSURE CONNECTION.
C-3	USE STRAP FOR MOUNTING ON 2" TO 4" PIPE. WELD PIPE SUPPORT TO 8" AND LARGER LINES.
C-4	PIPE SUPPORT LENGTH TO BE JUST LONG ENOUGH SO THAT LEAD LINES SLOPE DOWN TO LINE TAPS.

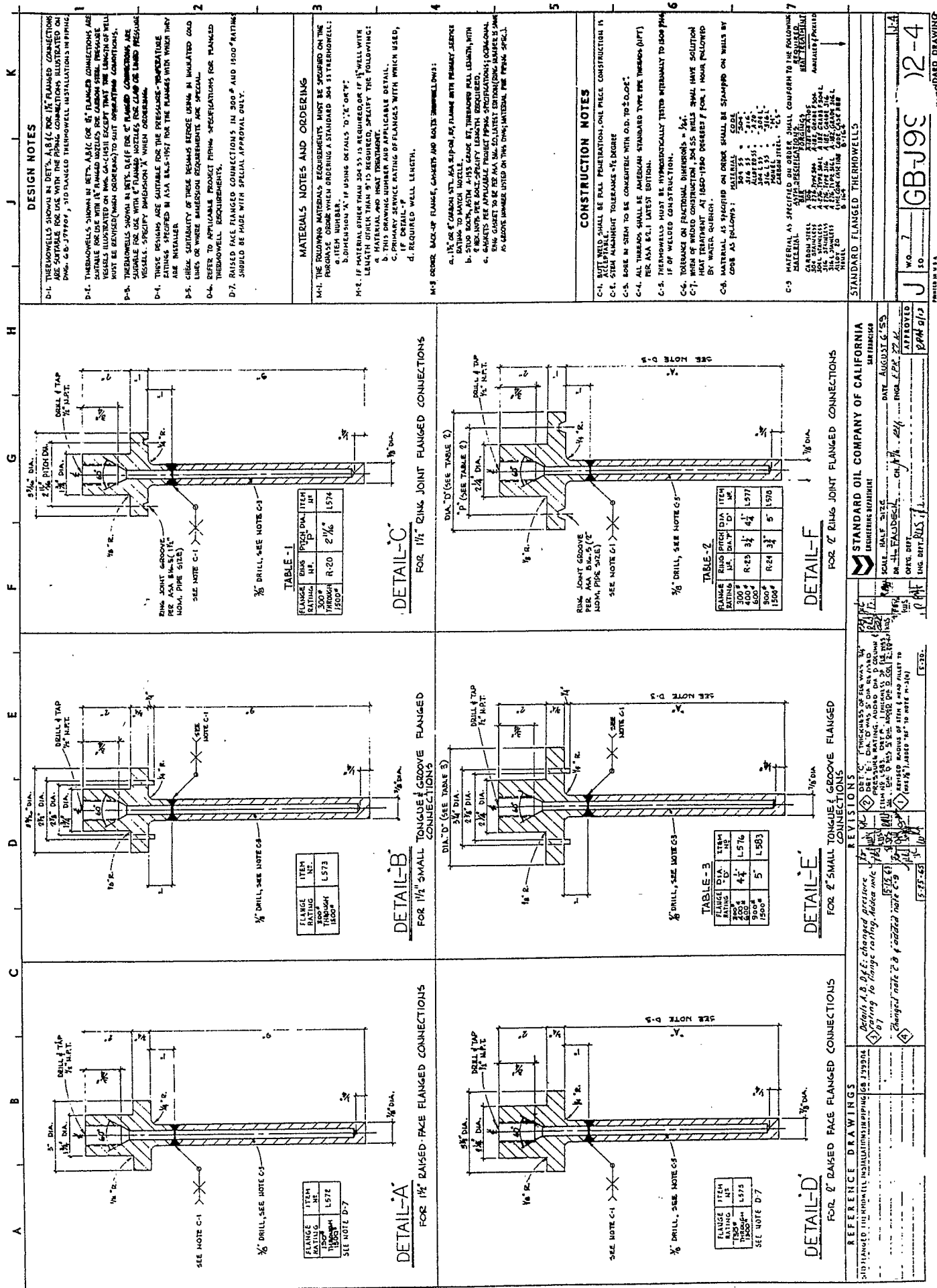
REFERENCE DRAWINGS	
STANDARD INSTRUMENT AIR CONNECTIONS	GC-159677/1079

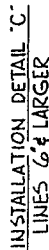
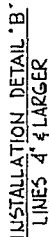
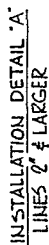
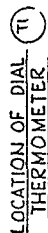
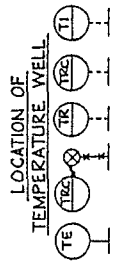
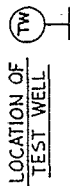
REVISIONS	
1	REVISED NOTE C-1 & ADDED REF. DWG. K-1 MS
2	
3	
4	

SCALE	
DR. C.G. ERANKE	DATE 7-15-58
ENGR. DEPT.	ENGR. DEPT.
APPROVED	APPROVED
ENG. DEPT. RUSKIN	ENG. DEPT. RUSKIN

STANDARD CONNECTIONS FOR DIFFERENTIAL PRESSURE TRANSMITTERS WITH TUBING LEADS ARRANGEMENT NO. 11	
W. O.	GC-J9989-1
S. O.	





[illegible]

NOTE X: WALL THICKNESS VARIES WITH SIZE & SCHEDULE OF PIPE. SEE CATALOGS.

NOTE Y: ADD $\frac{1}{4}$ " FOR RAISED FACE IN 600, 900 & 1500 RATINGS

NOTE 2: SEE PROJECT PIPING CLASSIFICATIONS FOR GASKETS, THICKNESS IN RAISED FACE OR TONGUE & GROOVE CONNECTIONS. FOR RING JOINT CONNECTIONS USE DIMENSION OF $\frac{3}{8}$ " DEPTH OF GROOVE PLUS CLEARANCE BETWEEN FLANGES.)

EXAMPLE: FLANGED THERMOWELL IN A 6" SCHEDULE 40
LINE USING X3 WELDLET, 300° 1/2" R.F. WELD
NECK FLANGE, PER DETAIL C.
IMMERSION = $L - (D + T + \frac{1}{16})$
= $9 - (1 \frac{3}{16} + 2 \frac{1}{16} + .280 + \frac{1}{16})$
= 4.65"

1- ELBOWS, WELDOCKETS, & PRIMARY FLANGES ARE TO BE PER PROJECT PIPING CLASSIFICATION.

2- BACK-UP FLANGES ARE TO BE ENHANCED FLANGE CLIP ON TYPE OF THE PRESSURE CLASS REQUIRED BY THE PROJECT PIPING CLASSIFICATION.

3. STUD BODY LENGTHS ARE TO BE A MINIMUM OF $\frac{1}{4}$ LONGER FOR DETAILS AND 1" LONGER FOR DETAILS C/LF THAN THAT REQUIRED FOR A STD. LONGER ASSEMBLY JOINT OF PROJECT PIPING CLASSIFICATION. SEE GD-J 99302..

4. FOR IMMERSION OF WELLS SEE TABLE BELOW.

ANY DETAIL MAY BE USED ON SMALLER LINES BY PROVIDING 1/16 REDUCER BEFORE AND AFTER TEMPERATURE WELLS. CHECK WELL LENGTH INTERFERENCE.

7-10- IN ALL INSTALLATIONS MUST HAVE TIP OF WELL LOWER THAN CONNECTION END SO THAT OIL WILL STAY IN WELL. PREFERRED LOCATION IS WITHIN VERTICAL, BUT ANY LOCATION WITHIN 45° OF VERTICAL ϕ IS ACCEPTABLE.

8- IT IS PREFERRED TO HAVE TEMPERATURE INSTRUMENT

OF THESE CLASSIFICATIONS- WITH THE WELL LOCATED ON EITHER VERTICAL OR HORIZONTAL ϕ . LOCATION IN ANY PLANE IS ACCEPTABLE; ACCESSIBILITY IS MOST IMPORTANT FACTOR IN LOCATION.

THE PROBE OF THE TYPE SHOWN IS EASILY VISIBLE FROM USUAL OPERATOR POSITION. STRAIGHT FORM AND EVERY ANGLE FORM DIAL THERMOMETER* ARE CONSIDERED SPECIAL, BUT MAY BE USED.

11- WELLS FOR FILLED BULK TYPE TEMPERATURE INSTRUMENTS ARE FURNISHED BY INSTRUMENT VENDOR. REFER TO INSTRUMENT SECTION FOR DETAILS OF THESE WELLS.

12: DIMENSIONS ARE SATISFACTORY FOR SCHEDULE 40, 80 & 160 PIPE.

LENGTH	WIDTH	THICKNESS	WEIGHT	NO. OF SHEETS	NO. OF SHEETS PER TRUCKLOAD
9'	2 1/2'	3 3/8"	116 lb	2	2%
	3 1/2'	3 1/2"	125 lb	2	2%
	4 1/2'	3 1/2"	153 lb	2	2%
	5 1/2'	3 1/2"	223 lb	2	2%
	6 1/2'	3 1/2"	293 lb	2	2%
	7 1/2'	3 1/2"	363 lb	2	2%
	8 1/2'	3 1/2"	433 lb	2	2%
	9 1/2'	3 1/2"	503 lb	2	2%
	10 1/2'	3 1/2"	573 lb	2	2%
	11 1/2'	3 1/2"	643 lb	2	2%
	12 1/2'	3 1/2"	713 lb	2	2%
	13 1/2'	3 1/2"	783 lb	2	2%
	14 1/2'	3 1/2"	853 lb	2	2%
	15 1/2'	3 1/2"	923 lb	2	2%
	16 1/2'	3 1/2"	993 lb	2	2%
	17 1/2'	3 1/2"	1063 lb	2	2%
	18 1/2'	3 1/2"	1133 lb	2	2%
	19 1/2'	3 1/2"	1203 lb	2	2%
	20 1/2'	3 1/2"	1273 lb	2	2%
	21 1/2'	3 1/2"	1343 lb	2	2%
	22 1/2'	3 1/2"	1413 lb	2	2%
	23 1/2'	3 1/2"	1483 lb	2	2%
	24 1/2'	3 1/2"	1553 lb	2	2%
	25 1/2'	3 1/2"	1623 lb	2	2%
	26 1/2'	3 1/2"	1693 lb	2	2%
	27 1/2'	3 1/2"	1763 lb	2	2%
	28 1/2'	3 1/2"	1833 lb	2	2%
	29 1/2'	3 1/2"	1903 lb	2	2%
	30 1/2'	3 1/2"	1973 lb	2	2%
	31 1/2'	3 1/2"	2043 lb	2	2%
	32 1/2'	3 1/2"	2113 lb	2	2%
	33 1/2'	3 1/2"	2183 lb	2	2%
	34 1/2'	3 1/2"	2253 lb	2	2%
	35 1/2'	3 1/2"	2323 lb	2	2%
	36 1/2'	3 1/2"	2393 lb	2	2%
	37 1/2'	3 1/2"	2463 lb	2	2%
	38 1/2'	3 1/2"	2533 lb	2	2%
	39 1/2'	3 1/2"	2603 lb	2	2%
	40 1/2'	3 1/2"	2673 lb	2	2%
	41 1/2'	3 1/2"	2743 lb	2	2%
	42 1/2'	3 1/2"	2813 lb	2	2%
	43 1/2'	3 1/2"	2883 lb	2	2%
	44 1/2'	3 1/2"	2953 lb	2	2%
	45 1/2'	3 1/2"	3023 lb	2	2%
	46 1/2'	3 1/2"	3093 lb	2	2%
	47 1/2'	3 1/2"	3163 lb	2	2%
	48 1/2'	3 1/2"	3233 lb	2	2%
	49 1/2'	3 1/2"	3303 lb	2	2%
	50 1/2'	3 1/2"	3373 lb	2	2%
	51 1/2'	3 1/2"	3443 lb	2	2%
	52 1/2'	3 1/2"	3513 lb	2	2%
	53 1/2'	3 1/2"	3583 lb	2	2%
	54 1/2'	3 1/2"	3653 lb	2	2%
	55 1/2'	3 1/2"	3723 lb	2	2%
	56 1/2'	3 1/2"	3793 lb	2	2%
	57 1/2'	3 1/2"	3863 lb	2	2%
	58 1/2'	3 1/2"	3933 lb	2	2%
	59 1/2'	3 1/2"	4003 lb	2	2%
	60 1/2'	3 1/2"	4073 lb	2	2%
	61 1/2'	3 1/2"	4143 lb	2	2%
	62 1/2'	3 1/2"	4213 lb	2	2%
	63 1/2'	3 1/2"	4283 lb	2	2%
	64 1/2'	3 1/2"	4353 lb	2	2%
	65 1/2'	3 1/2"	4423 lb	2	2%
	66 1/2'	3 1/2"	4493 lb	2	2%
	67 1/2'	3 1/2"	4563 lb	2	2%
	68 1/2'	3 1/2"	4633 lb	2	2%

NOTE Y: ADD $\frac{1}{4}$ " FOR RAISED FACE IN 600, 900 & 1500 RATINGS.
PIPE. SEE CATALOGS.

NOTE Z: SEE PROJECT PIPING CLASSIFICATIONS FOR GASKET
THICKNESS IN RAISED FACE OR TONGUE & GROOVE.

CONNECTIONS. FOR RING JOINT CONNECTIONS USE DIMENSION OF $\frac{3}{16}$ " (DEPTH OF GROOVE PLUS CLEARANCE BETWEEN FLANGES.)

EXAMPLE: FLANGED THERMOWELL IN A 6" SCHEDULE 40 PIPE HAVING $\frac{3}{4}$ " HOLE. 1000 LBS. WELD.

IMPRESSION = $L \cdot (D + D \cdot \frac{1}{2})$
 $= 9 \cdot (1\frac{1}{2} + 2\frac{1}{2}) = 2.80 + 1\frac{1}{2}$
 $= 4.65$

STANDARD FLANGED THERMOWELL INSTALLATIONS IN PIPING

W.O.	CD 100 34	0-2
------	-----------	-----

14-1
JARD DRAWING

REVISIONS

Added ratings to Details A, B & C.
 1. Changed notes 1, 2, 3 & 4. Added note 5.
 2. Added location of original thermometers.
 3. Added immersion table.

REFERENCE DRAWINGS

STANDARD PLANGED THERMOWELLS

1

DESIGN NOTES

CONSTRUCTION NOTES

- C-1 SEALWELD ONLY AT CONNECTION BETWEEN HEX VALVE AND TAP. DO NOT USE PIPE DOPE ON SEALWELDED JOINTS.
- C-2 WHEN HYDROSTATICALLY TESTING LINES, DISCONNECT METER PIPING FROM MAIN LINES.
- C-3 PIPE UPSTREAM OF ORIFICE TO "HIGH PRESSURE CONNECTION", DOWNSTREAM TO LOW PRESSURE CONNECTION"
- C-4 USE CLAMP FOR MOUNTING ON 2" TO 6" PIPE. WELD PIPE SUPPORT TO 8" AND LARGER LINES.
- C-5 PIPE SUPPORT LENGTH TO BE LONG ENOUGH SO THAT LEADS SLOPE DOWN TOWARD INSTRUMENT.

REFERENCE DRAWINGS

STANDARD INSTRUMENT AIR CONNECTIONS.

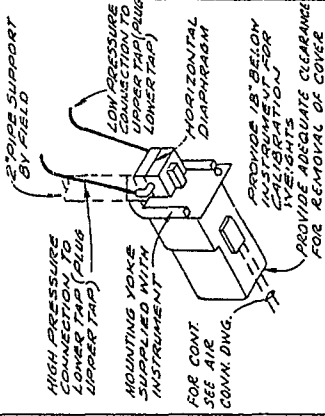
[illegible]

SCALE	HOUSE	DATE	DEC. 15, 1961
DR.	DWY	CH.	May 2nd
OPR'G. DEPT.		ENGR.	12/14/61
ENG. DEPT.	PUS 441	APPROVED	R 24 12/29/61

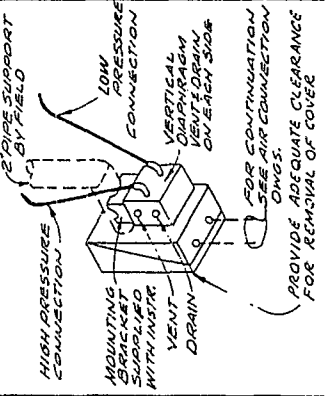
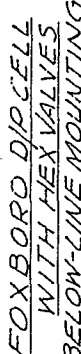
STANDARD CONNECTIONS FOR
DIFFERENTIAL-PRESSURE TRANSMITTER
WITH HEX VALVES & TUBING LEADS
BELOW-LINE-MOUNTED

GC-19947-0
W.O. 7
S.O.

PRINTED IN U.S.A.

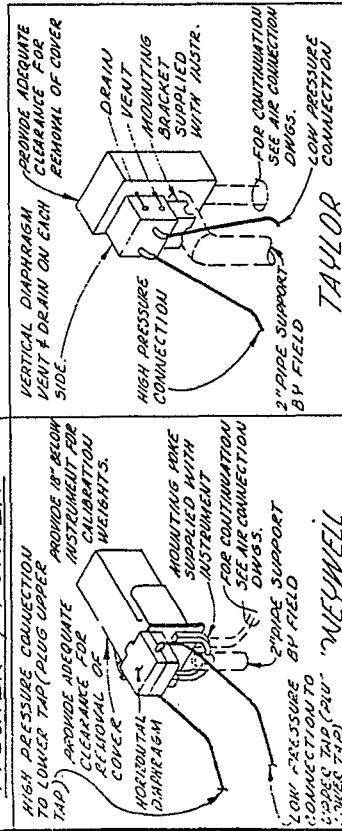
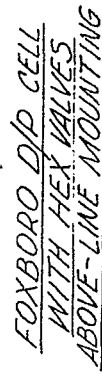


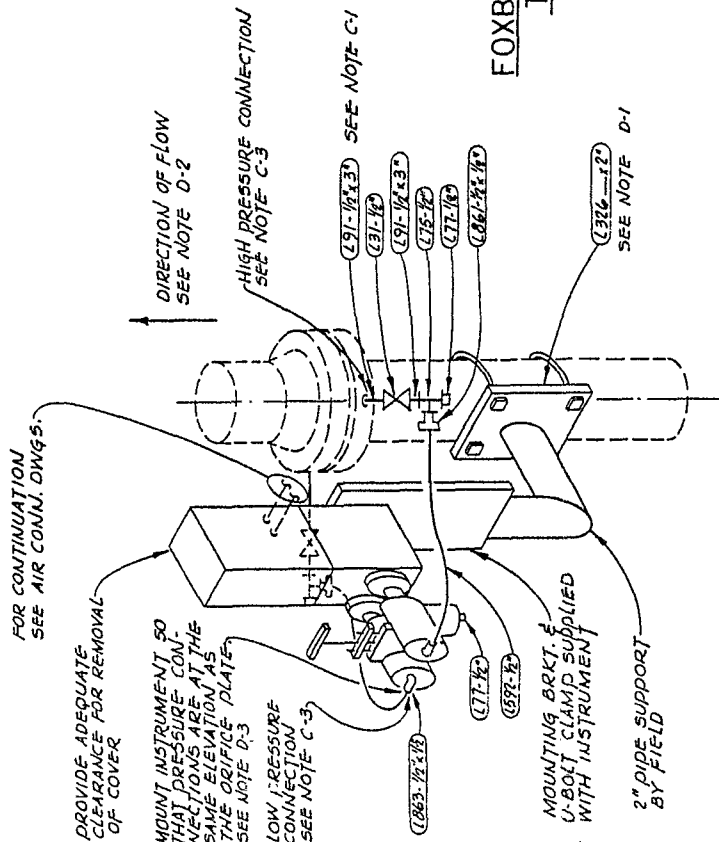
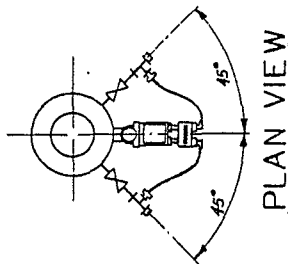
BOSS (ITEM 2119 - 1/2")
SUPPLIED WITH PIPING
SEE NOTE C-1



FLANGE TAPS
FOR 6" AND SMALLER PIPE

TAYLOR





FOXBORO TYPE 13A D/P CELL WITH
TYPE D-117 BYPASS MANIFOLD

FLANGE TAPS
USE FOR 6" AND SMALLER PIPE

LIST OF MATERIAL	
NO REQ'D	ITEM NO. SIZE DESCRIPTION
2	L31 1/2" 600# SCD STL GATE VALVE
2	L75 1/2" 3000# SCD F5 TEE
4	L77 1/2" STL BAR STOCK PLUG, RD HD.
4	L91 1/2" 3" 5WLS STL PIPE NIPPLE, T&E, SCH 80
1	L376 2" TAPPED MI PIPE CLAMP, DOUBLE STRAP
4	L592 1/2" STL TUBING ASTM 179 0.065" WALL
2	L863 1/2" STL CONNECTOR, OD TUBING x MALE NPT
2	L863 1/2" STL COMP. TYPE TUBING TO MALE NPT
2	* LENGTH TO SUIT

DESIGN NOTES	
D-1	ORDER CLAMP (L376) TO FIT PROCESS PIPE LINE.
D-2	DETAIL SUITABLE FOR FLOW IN EITHER UPWARD OR DOWNWARD DIRECTION. SEE CONSTRUCTION NOTE C-3.
D-3	FOR HOT STOCKS ABOVE 250°F, MOUNT TRANSMITTER 2" TO 3" BELOW TAPS TO OBTAIN A STAGNANT SEAL IN LEADS FOR COOLING.

CONSTRUCTION NOTES	
C-1	SEALWELD CONNECTIONS TO BOSS AND FIRST VALVE ONLY. DO NOT USE PIPE DPIPE OR SEALWELDED JOINTS.
C-2	WHEN HYDROSTATICALLY TESTING LINES, DISCONNECT THE METER.
C-3	PIPE UPSTREAM OF ORIFICE TO HIGH PRESSURE CONNECTION. OTHER TO LOW PRESSURE CONNECTION.

REFERENCE DRAWINGS	
STANDARD INSTRUMENT AIR CONNECTIONS	GC-199671472
4	
3	
2	
1	

STANDARD CONNECTIONS FOR	
LINE MOUNTED DIFFERENTIAL PRESSURE	
TRANSMITTERS WITH TUBING LEADS	
IN VERTICAL RUNS	

SCALE NONE	
DATE 12-27-61	
DR. A.T.	CH. J.C.
OPR'G. DEPT. RUS	ENGR. J.C.
ENG. DEPT. RUS	APPROVED

W. O. GC-199671472	
S. O.	J-7

LIST OF MATERIAL

NO.	ITEM	SIZE	DESCRIPTION
1	REQD. NO. 177	1/2"	SCD STL BAR STOCK DUG, ROUND HEAD
1	1326	x 2"	TAPPED M.I. PIPE CLAMP DOUBLE STRAP
*	1592	1/2" OD	STEEL TUBING, ASTM 179
3	1861	1/2" x 1/2"	CONNECTOR, STL COMP TYPE TUBING x MALE NOT
3	1863	1/2" x 1/2"	ELBOW, STL COMP TYPE TUBING x MALE NOT
3	1611	1/2"	FLX DEFENCE WAVE TYPE HO.M W/BOULTED GLANDS & SLEY
*			LENGTH TO SUIT

DESIGN NOTES

D-1 ORDER CLAMP (132K) TO FIT PROCESS PIPE LINE.
D-2 DETAIL SUITABLE FOR FLOW IN EITHER UPWARD OR DOWNWARD DIRECTION. SEE CONSTRUCTION NOTE C-3
D-3 FOR HOT STOCKS ABOVE 250°F. MOUNT TRANSMITTER 2" TO 3" BELOW TAPS TO OBTAIN A STAGNANT SEAL IN TAPS FOR COOLING.

CONSTRUCTION NOTES

C-1 SEALWELD ONLY AT CONNECTION BETWEEN HEX VALVE & TAP. DO NOT USE PIPE CODE ON SEALWELDED JOINTS.

C-2 WHEN HYDROSTATICALLY TESTING LINES, DISCONNECT METER.

C-3 PIPE UPSTREAM OF ORIFICE TO "HIGH PRESSURE CONNECTION." OTHER TO "LOW PRESSURE CONNECTION."

REFERENCE DRAWINGS

REVISIONS	STANDARD INSTRUMENT AIR CONNECTIONS	62-1996772-819
1		
2		
3		
4		

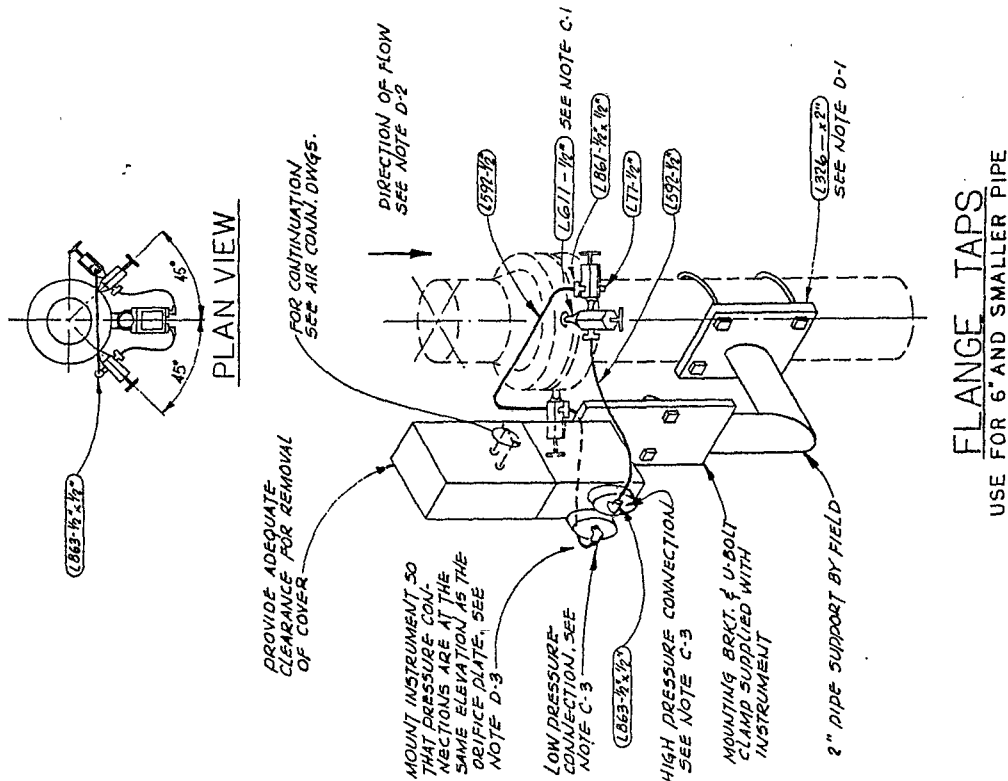
SCALE	NONE	DATE	1-12-62
DR.	A.T.	CH.	Wing N.J.C.
OPR'G. DEPT.		ENGR.	APPROVED
ENG. DEPT.			12/24/62

STANDARD CONNECTIONS FOR

LINE MOUNTED DIFFERENTIAL PRESSURE TRANSMITTERS
WITH HEX VALVES & TUBING LEADS
IN VERTICAL RUNS

GC-J990-0-0

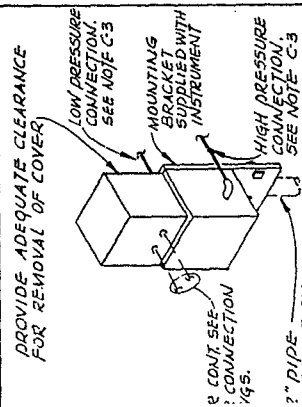
PRINTED IN U.S.A.



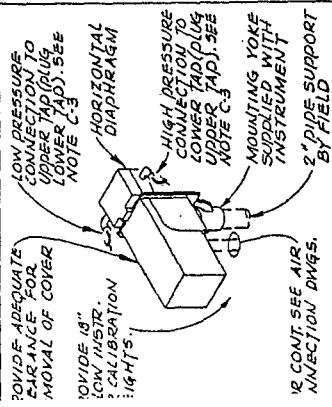
FLANGE TAPS

USE FOR 6" AND SMALLER PIPE

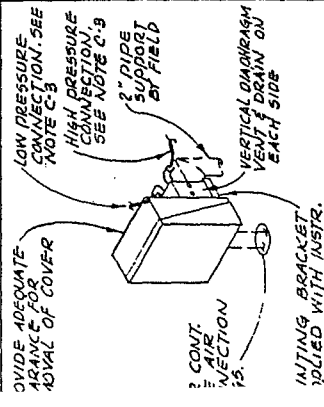
FOXBORO TYPE 13A D/P CELL
WITH HEX VALVES



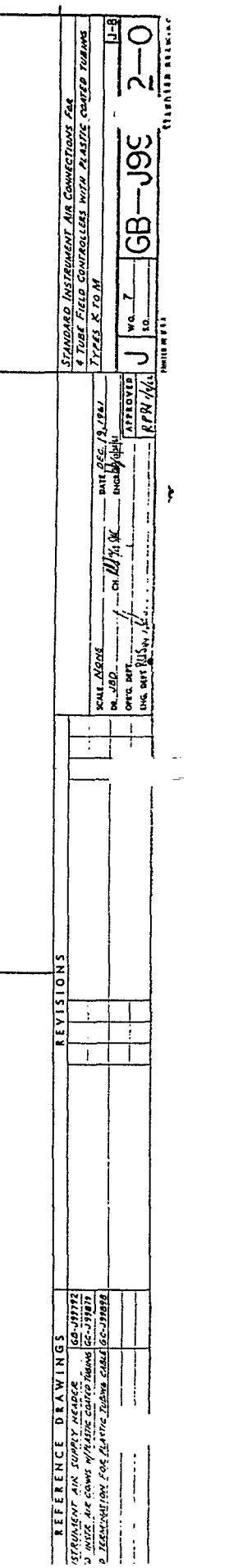
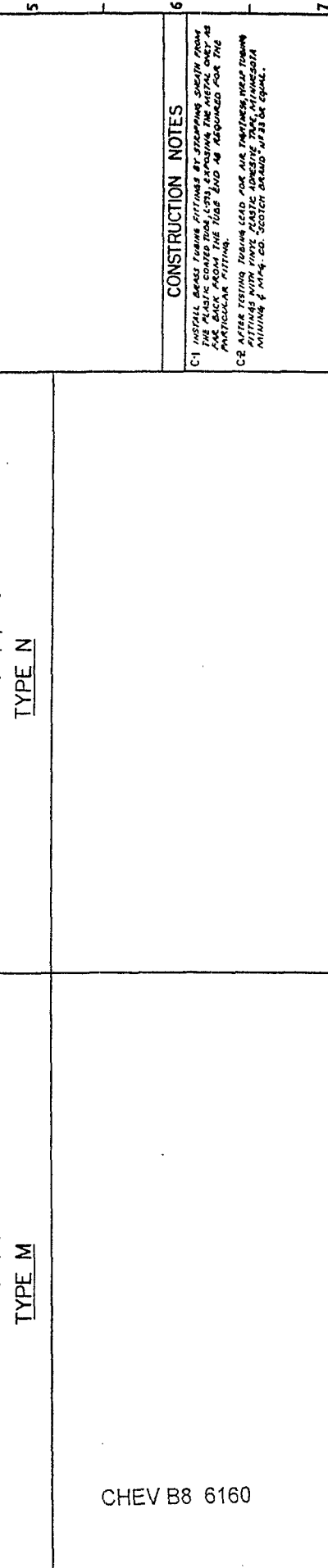
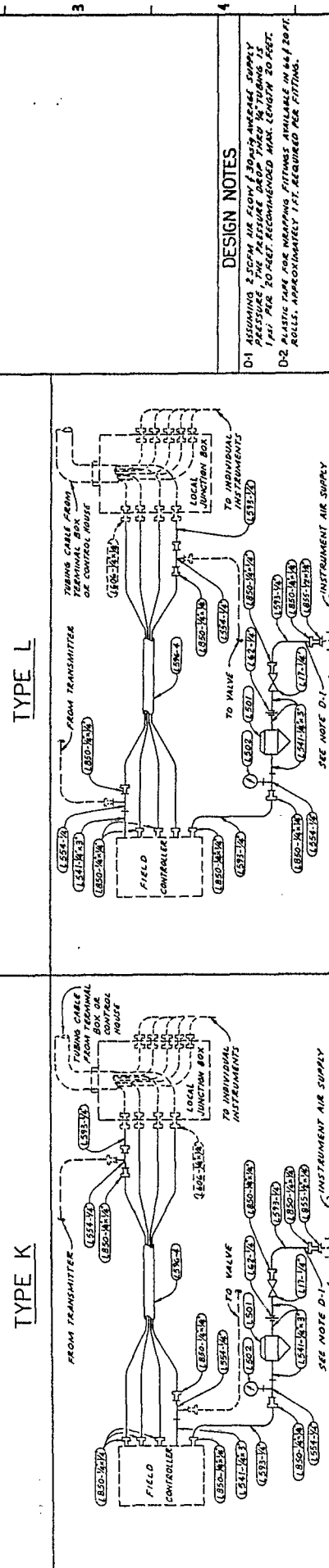
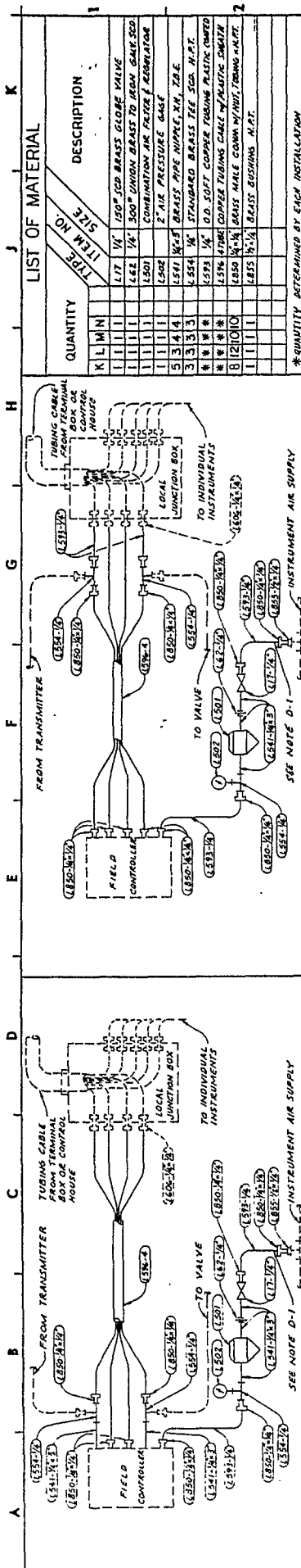
FISCHER & PORTER



HONEYWELL



T, OR



LIST OF MATERIAL										K	
QUANTITY		ITEM NO.		SIZE		DESCRIPTION					
K	L	M	N								
								</			

DESIGN NOTES

D-1 ASSUMING 2" STAIN AIR FLOW, 8" 304L STAINLESS STEEL SUPPLY
TUBES, 1" DIA. PER 20 FEET RECOMMENDED MAX LENGTH 20 FEET.
D-2 PLASTIC TUBE FOR WRAPPING FITTINGS AVAILABLE IN 64.8 20 FT.
ROLLS, APPROXIMATELY 1 FT. REQUIRED PER FITTING.

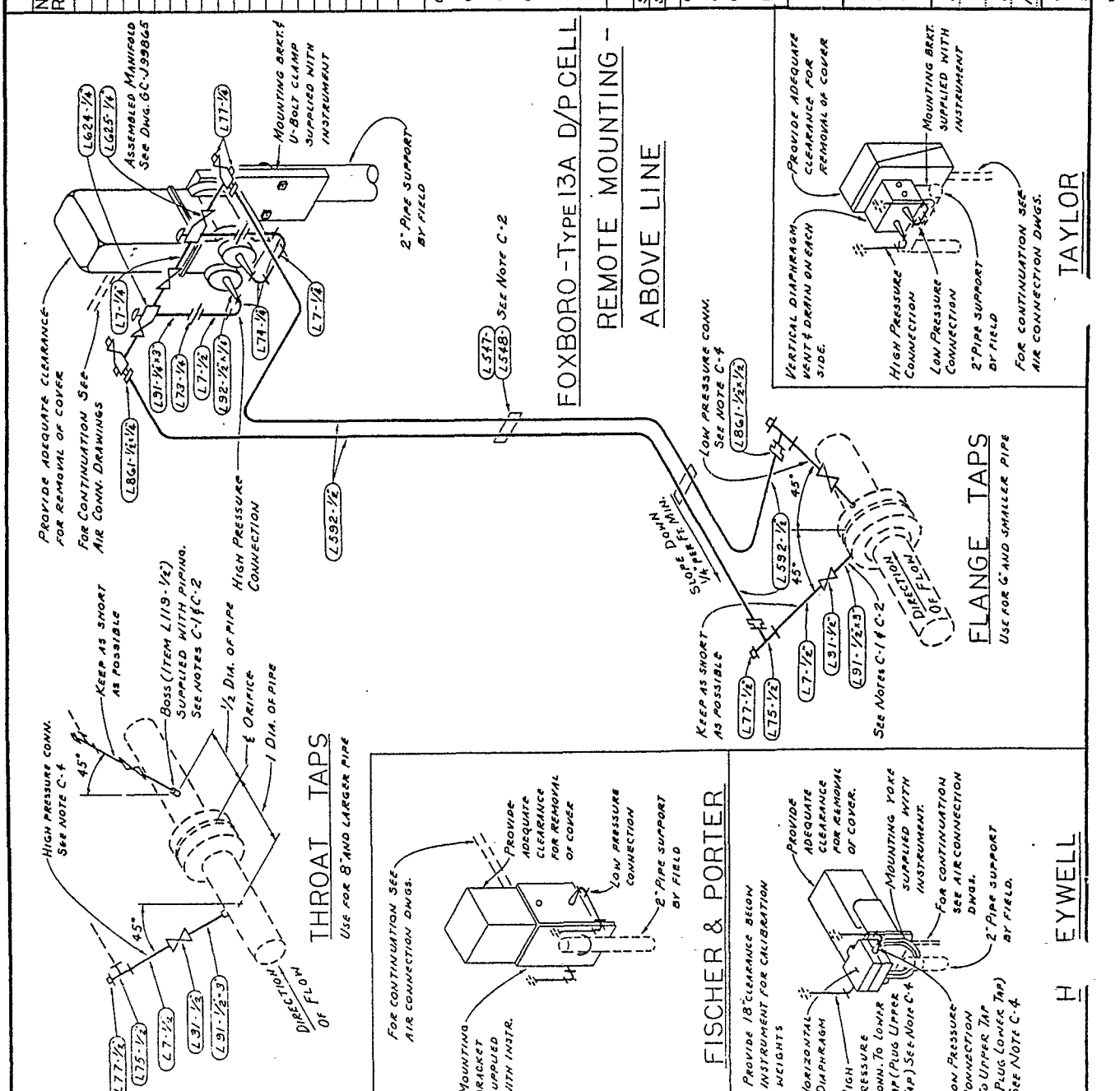
CONSTRUCTION NOTES

C-1 INSTALL BRASS TUBING FITTINGS BY STOPPING SWEL IN FROM
CONCRETE. STOP STOPPING THE METER ONLY AS
FAR BACK FROM THE TUB AND AS REQUIRED FOR THE
PARTICULAR FITTING.

C-2 AFTER TESTING TUBING LEAD FOR AIR TIGHTNESS, WELD TUBING
FITTINGS WITH VINYL PLASTIC ADHESIVE TAPE, MINNESOTA
MINING & MFG. CO. SECTION DRAWD #123 OR EQUAL.

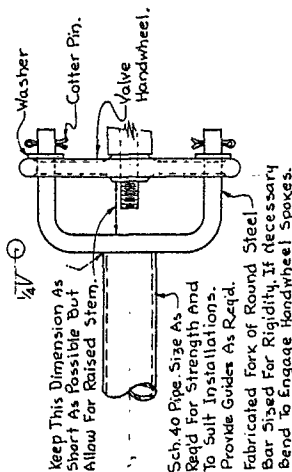
STANDARD INSTRUMENT AIR CONNECTIONS FOR 4 TUBE FLOW CONTROLLERS WITH PLASTIC COATED TUBING TYPES R TO M		J-B	J-B
J	W. 7 10	GB-J9C	2-0
PRINTED IN U.S.A.		REGISTERED BUSINESS	

[illegible]

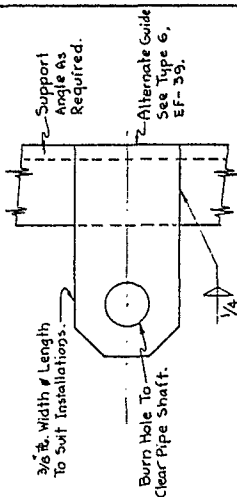


CONSTRUCTION NOTES

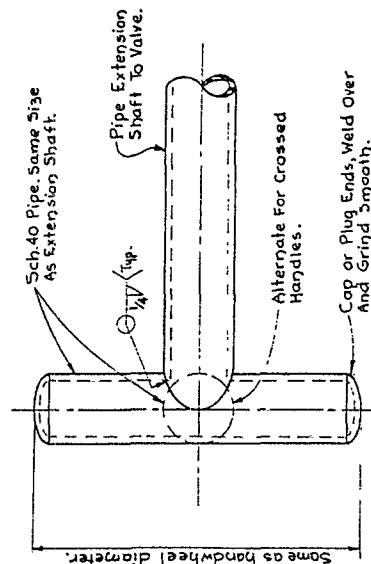
1. Locate extension handles as shown on piping layout drawings.
2. Use scrap pipe and plate wherever possible.
3. Grind exposed welds and sharp edges smooth.
4. Place guides (where required) on shaft before attaching handle or use Type 6 guides per EF-39.
5. For permanent extensions requiring 3 or more Universal Joints, use flexible shafts or other means rather than extension handles.
6. Except as noted, all members shall be sized in the field for strength and rigidity, and to fit the valves supplied.



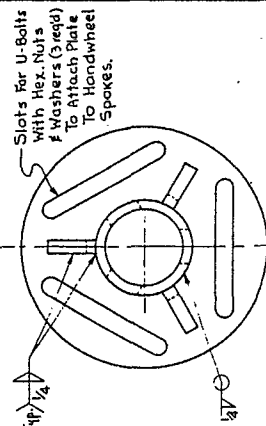
TEMPORARY EXTENSION FOR VALVE



DETAIL OF GUIDE FOR EXTENSION SHAFTS

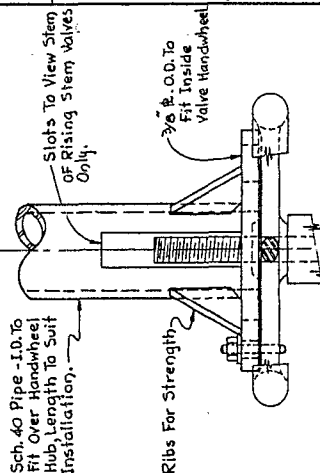


VALVE EXTENSION HANDLE DETAIL
(To Be Used With All The Extensions, Unless Otherwise Specified.)

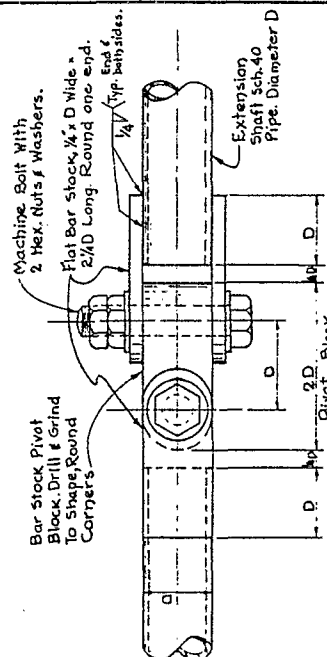


Sch. 40 Pipe - I.D. To Fit Over Handwheel Hub, Length to Suit Installation.

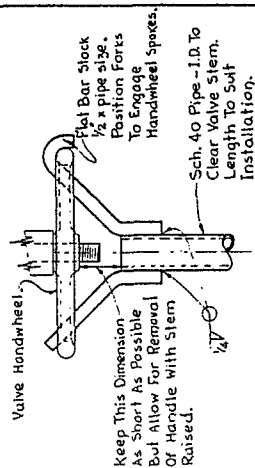
Slots To View Stem of Rising Stem Valves Only.



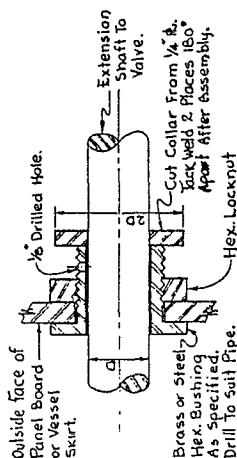
PERMANENT EXTENSION
FOR VALVE



UNIVERSAL JOINT
(Max. deflection angle = 30°)



PORTABLE EXTENSION FOR OVERHEAD
VALVE



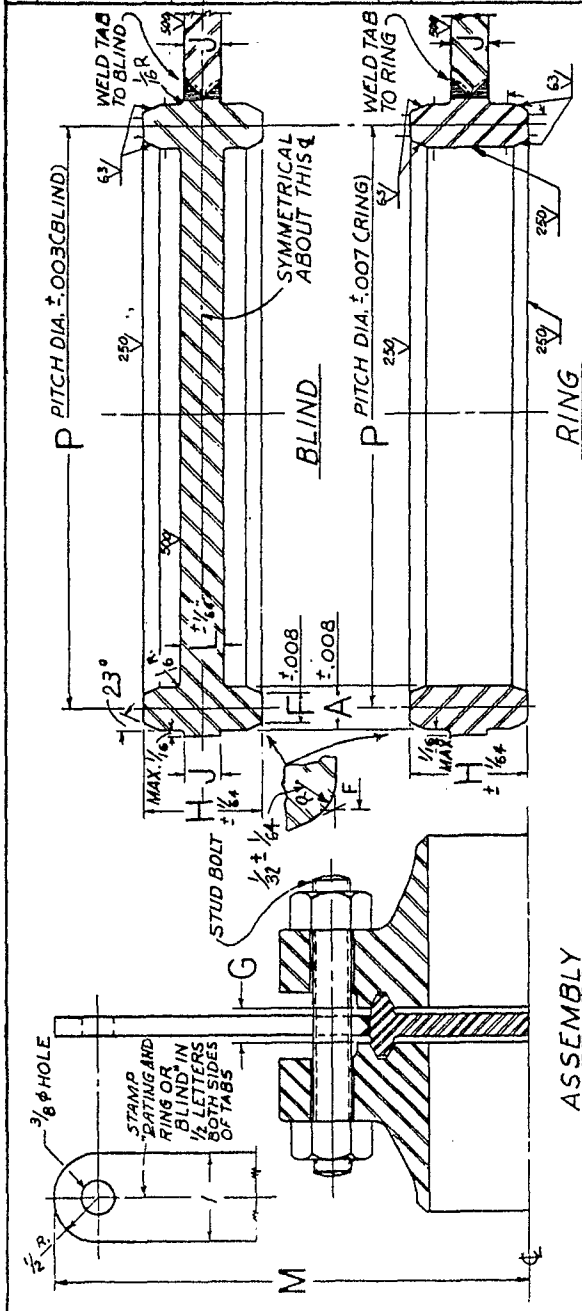
BUSHING AND STOP COLLAR FOR EXTENSIONS
THROUGH PANEL BOARD OR VESSEL SKIRT

[illegible]

SCALE: None DATE 4-5-55
DR. R.R. LOPEZ, CHIEF, BME III T32 ENGR.
OPNG. DEPT. 11 APPROVED

**STANDARD FIELD FABRICATED
VALVE EXTENSION HANDLES**

N. O.	GB-L	363-2
10		
UNITED STATES STANDARD DRAWING		



300 #																	600 #																
PIPE SIZE	P	H	J	A	F	L	G	STUD BOLTS			M	P	H	J	A	F	L	G	STUD BOLTS			M	PIPE SIZE										
								NO REQ	DIA.	LENGTH									NO REQ	DIA.	LENGTH												
3/4	1 1/16	1 1/8	1 1/4	5/16	.206	1/8	3/8	4	5/8	3 3/4	7 1/4	1 1/16	23/32	1/4	5/16	206	5/32	3/8	4	5/8	3 1/2	7 1/4	3/4										
1	2	3/4	1 1/4	5/16	.206	3/16	13/32	4	5/8	3 3/4	7 1/2	2	3/4	1/4	5/16	.206	3/16	13/32	4	5/8	3 1/2	7 1/2	1										
1 1/2	2 1/16	13/16	1 1/4	5/16	.206	1/4	15/32	4	3/4	4 1/2	7 1/2	2 1/16	7/8	1/4	5/16	.206	5/16	17/32	4	3/4	4 1/2	7 1/2	1 1/2										
2	3 1/4	5/16	1 1/4	7/16	.305	1/4	17/32	5	5/8	4 1/2	7 3/4	3 1/4	1 1/16	1/4	7/16	.305	3/8	5/8	5	5/8	5	7 3/4	2										
2 1/2	4	1	1 1/4	7/16	.305	5/16	19/32	5	3/4	5	8 1/4	4	1 1/8	3/8	7/16	.305	7/16	1 1/16	5	3/4	5 1/2	8 1/4	2 1/2										
3	4 7/8	1 1/16	1 1/4	7/16	.305	3/8	21/32	8	3/4	5 1/2	8 5/8	4 7/8	1 1/4	3/8	7/16	.305	9/16	13/16	8	3/4	6	8 5/8	3										
3 1/2	5 7/16	1 1/8	3/8	7/16	.305	7/16	23/32	8	3/4	6	9	5 3/8	1 1/4	3/8	7/16	.305	9/16	13/16	8	3/4	6 1/2	9	3 1/2										
4	5 7/8	1 3/16	3/8	7/16	.305	1/2	25/32	8	3/4	6	9 1/2	5 7/8	1 3/8	3/8	7/16	.305	1 1/16	15/16	8	7/8	7	9 5/8	4										
5	7 1/8	1 1/4	3/8	7/16	.305	9/16	27/32	8	3/4	6 1/2	10	7 1/8	1 1/2	3/8	7/16	.305	13/16	1 5/16	8	1	8	11	5										
6	8 5/16	1 3/8	3/8	7/16	.305	1 1/16	31/32	12	3/4	6 1/2	10 3/4	8 5/16	1 5/8	3/8	7/16	.305	15/16	1 3/4	12	1	8 1/2	11 1/2	6										
8	10 5/8	1 5/8	3/8	7/16	.305	7/8	15/32	12	7/8	7 1/2	12	10 5/8	1 7/8	3/8	7/16	.305	1 3/4	1 7/8	12	1 1/8	9 1/2	12 3/4	8										
10	12 3/4	1 3/4	3/8	7/16	.305	1 1/2	1 1/32	16	1	8 1/2	13 1/4	12 3/4	2 1/8	3/8	7/16	.305	1 7/8	1 1/16	16	1 1/4	10 1/2	14 1/4	10										
12	15	1 5/8	3/8	7/16	.305	1 1/4	1 1/32	16	1 1/8	9 1/2	14 3/4	15	2 1/16	3/8	7/16	.305	3/4	2	20	1 1/4	11	15 1/2	12										

Note - All dimensions are in inches.

MATERIAL NOTES

1. Rings & blinds shall be made from carbon steel or alloy as required.
2. Tabs shall be made from carbon steel, ASTM A7 or equal.
3. Supplier of rings & blinds shall furnish stud bolts only when they are included on the order.

CONSTRUCTION NOTES

1. Welding shall be electric arc using coated rods conforming to the E60 series of ASTM A233 for carbon steel; for alloys, rods shall be approved by purchaser prior to fabrication of rings or blinds.

DESIGN NOTES

1. Ring proportions are based on ASA Std. B16.5-1937 with depth of ring modified to suit blind thickness (L) & spacing (G).
2. The theoretical formula for stress in a circular plate clamped at the edge may be expressed as follows:
 $L = 0.866 r \sqrt{p}$
 Where p = cold test pressure, psi
 r = inside radius of ring, inches
 L = thickness, inches
 S = maximum allowable unit stress = 30,000 psi

This formula is based on the theory presented in Timoshenko "Strength of Materials," Part II 2nd Edition, page 140
 3. Hydrostatic test pressures shall be as follows:
 a. For 300# flanges: 1100 #
 b. For 600# flanges: 2175 #

4. In cramped locations, such as manifolds, provide one jack screw in each flange. These screws must be of sufficient length to allow for removal of blind or ring. Instructions to the field should emphasize flanges are to be assembled with jack screws 180° apart.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

SCALE - NONE

DR. V. H. K. CH. W.D.R.

OPRG. DEPT. 10443 KEM 1/4 D. 10%

ENG. DEPT. 10443 KEM 1/4 D. 10%

STANDARD ASSEMBLY & DETAILS OF

BLINDS & SPECIAL RINGS

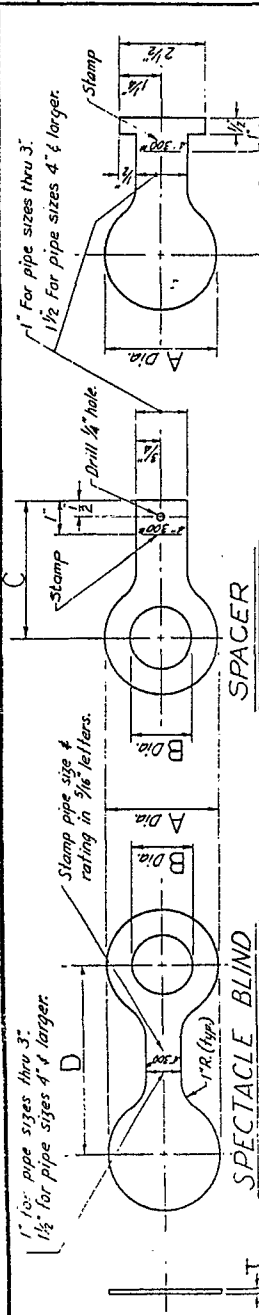
FOR 300# & 600#

RING JOINTS

GC-L142 3-4

PRINTED IN U.S.A.

L	W.O. 100-100-100 S.S. 100-100-100	GB-L31	3-19
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PRESSURE CLASS	PIPING ITEM NO.			
	SPEC. BLIND	SPACER	BLIND SET	SPACER
150#	L285	L666	L665	L667
250#	L286	L667	L666	L668
400#	L287	L668	L667	L669
600#	L288	L669	L668	L670

*Standard Items
*Special Items
Note: All dimensions are in inches

PIPE SIZE	125# C.I. & 150# STEEL				250# C.I. & 300# STEEL			
	A	B	C	D	A	B	C	D
1/2	1 1/4	1 1/2	3 1/4	4	2	2 1/2	3 3/4	4 1/2
3/4	2 1/2	2 3/4	4 1/2	5 1/2	3 1/2	3 3/4	4 3/4	5 1/2
1	3 1/2	3 3/4	5 1/2	6 1/2	4 1/2	4 3/4	5 3/4	6 1/2
1 1/2	4 1/2	4 3/4	6 1/2	7 1/2	5 1/2	5 3/4	6 3/4	7 1/2
2	5 1/2	5 3/4	7 1/2	8 1/2	6 1/2	6 3/4	7 3/4	8 1/2
3	6 1/2	6 3/4	8 1/2	9 1/2	7 1/2	7 3/4	8 3/4	9 1/2
4	7 1/2	7 3/4	9 1/2	10 1/2	8 1/2	8 3/4	9 3/4	10 1/2
5	8 1/2	8 3/4	10 1/2	11 1/2	9 1/2	9 3/4	10 3/4	11 1/2
6	9 1/2	9 3/4	11 1/2	12 1/2	10 1/2	10 3/4	11 3/4	12 1/2
8	11 1/2	11 3/4	13 1/2	14 1/2	12 1/2	12 3/4	13 3/4	14 1/2
10	13 1/2	13 3/4	15 1/2	16 1/2	14 1/2	14 3/4	15 3/4	16 1/2
12	15 1/2	15 3/4	17 1/2	18 1/2	16 1/2	16 3/4	17 3/4	18 1/2
14	17 1/2	17 3/4	19 1/2	20 1/2	18 1/2	18 3/4	19 3/4	20 1/2
16	19 1/2	19 3/4	21 1/2	22 1/2	20 1/2	20 3/4	21 3/4	22 1/2
18	21 1/2	21 3/4	23 1/2	24 1/2	22 1/2	22 3/4	23 3/4	24 1/2
20	23 1/2	23 3/4	25 1/2	26 1/2	24 1/2	24 3/4	25 3/4	26 1/2
22	25 1/2	25 3/4	27 1/2	28 1/2	26 1/2	26 3/4	27 3/4	28 1/2
24	27 1/2	27 3/4	29 1/2	30 1/2	28 1/2	28 3/4	29 3/4	30 1/2

PIPE SIZE	400# STEEL				600# STEEL			
	A	B	C	D	A	B	C	D
1/2	2	2 1/2	3 3/4	4 1/2	2	2 1/2	3 3/4	4 1/2
3/4	2 1/2	2 3/4	4 1/2	5 1/2	2 1/2	2 3/4	4 1/2	5 1/2
1	3 1/2	3 3/4	5 1/2	6 1/2	3 1/2	3 3/4	5 1/2	6 1/2
1 1/2	4 1/2	4 3/4	6 1/2	7 1/2	4 1/2	4 3/4	6 1/2	7 1/2
2	5 1/2	5 3/4	7 1/2	8 1/2	5 1/2	5 3/4	7 1/2	8 1/2
3	6 1/2	6 3/4	8 1/2	9 1/2	6 1/2	6 3/4	8 1/2	9 1/2
4	7 1/2	7 3/4	9 1/2	10 1/2	7 1/2	7 3/4	9 1/2	10 1/2
5	8 1/2	8 3/4	10 1/2	11 1/2	8 1/2	8 3/4	10 1/2	11 1/2
6	9 1/2	9 3/4	11 1/2	12 1/2	9 1/2	9 3/4	11 1/2	12 1/2
8	11 1/2	11 3/4	13 1/2	14 1/2	11 1/2	11 3/4	13 1/2	14 1/2
10	13 1/2	13 3/4	15 1/2	16 1/2	13 1/2	13 3/4	15 1/2	16 1/2
12	15 1/2	15 3/4	17 1/2	18 1/2	15 1/2	15 3/4	17 1/2	18 1/2

DESIGN NOTES

- BLINDS ARE DESIGNED FOR MAXIMUM COLD TEST PRESSURES AS FOLLOWS:
150# STEEL FLANGES 425 psi
300# STEEL FLANGES 775 psi
400# STEEL FLANGES 1100 psi
600# STEEL FLANGES 1450 psi
STUD THICKNESSES ARE DETERMINED BY THE FORMULA
 $T = \frac{P \cdot R}{S}$
T = REQUIRED THICKNESS
R = INTERVAL RADIUS OF PIPE
P = TEST PRESSURE
S_{MAX} = 25,000 psi FOR TYPE 304L & TYPE 316L SST.
S_{MAX} = 30,000 psi FOR CARBON STL & CR-MO ALLOYS.
STUD LENGTHS FOR C.I. FLANGES BASED ON 1/8" GASKETS.
STUD LENGTHS FOR STL FLANGES BASED ON 1/8" GASKETS.
- CONSTRUCTION NOTES
- MATERIAL NOTES

CONSTRUCTION NOTES

- TOLERANCES SHALL CONFORM TO THOSE ALLOWED BY THE A.S.A. STANDARD B16.5 STEEL PIPE FLANGES AND FLANGED FITTINGS.
- GASKET CONTACT SURFACES SHALL BE:
COMMERCIAL FINISH WITH A MAXIMUM ROUGHNESS NOT TO EXCEED 500 RMS OR 2 MIL. MAXIMUM PEAK TO VALLEY MEASUREMENT.

MATERIAL NOTES

- CARBON STEEL BLINDS SHALL BE MACHINED FROM FORGINGS OR PLATES CONFORMING TO ASTM A285 GRADE C.
- ALLOY BLINDS SHALL BE MADE FROM STOCK SPECIFIED ON PURCHASERS ORDER.

REVISIONS

NO.	DESCRIPTION	DATE
1	Added test press. for SST & construction note 2.	11-21-58
2	Adjusted stud length in all pressure classes.	11-21-58
3	Spec. blind was L288. Added separate stud length columns for 125# & 150# 300# items. 1-3-60	1-3-60
4	Added Pipe Sizes 1/2, 3/4, 1 1/2. Replaced Machine Bolts with Stud Bolts for 125# C.I. & 150# Steel.	9-21-59
5	Corrected Length Of Bolt For 2" 150# Flange.	11-21-58

STANDARD OIL COMPANY OF CALIFORNIA
ENGINEERING DEPARTMENT
SAN FRANCISCO

SCALE: NONE
DATE: FEB. 20, 1956
DR. E. I. CHAN
ENGR.
APPROVED
OPR'G. DEPT.
ENG. DEPT.

STANDARD SPECTACLE BLINDS,
BLINDS AND SPACERS
FOR RF & FF FLANGES

W.O. GC-L3145-15
S.O.

REVISED DRAWING NUMBER.

RE
ONS

APPROVALS

7/25/38

ENG. DEPT.

OPR'G DEPT.

SCALE
NONE

DATE
7-22-38

DR. Demers

CH. 100.7/25

7-26

7

3/8" x 3/8" Round
Head Stove
Bolt

3/4" Galv. Plumbers
Tape - #20 Gage.

Car Seal.

Drill 1/4" Hole in Hand Wheel when necessary

CHEV B8 6166

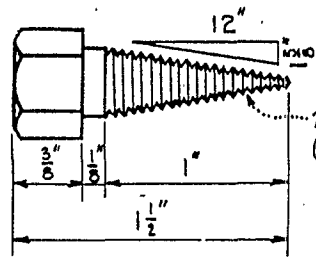
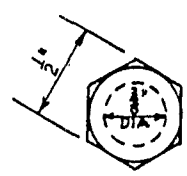
STANDARD DRAWING

DETAIL OF METHOD FOR

4	3	2	1
REVISIONS			
APPROVALS			
3-22-41 ENG. DEPT. 3-15-40 DR. H.W. General CH. L.H. ENGR. R.H.H.			
OPR'G DEPT.			
SCALE			
FULL SIZE			
DATE			

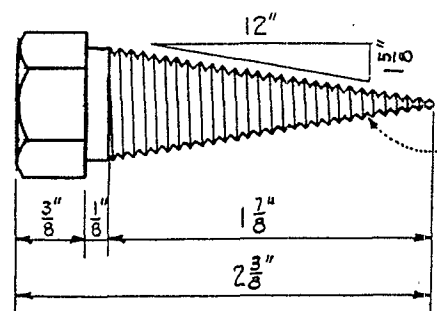
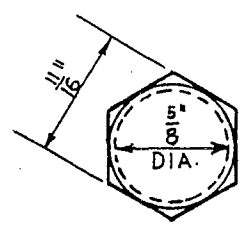
Changed Plug Heads From Square To Hex.
Revised and Retraced
This Drawing supersedes Drug 72477 dated July 19, 1933

C.M. RULF
9/16/40
W.C.B. L.S.S.
2/13/41
H.W.G.
3/15/40



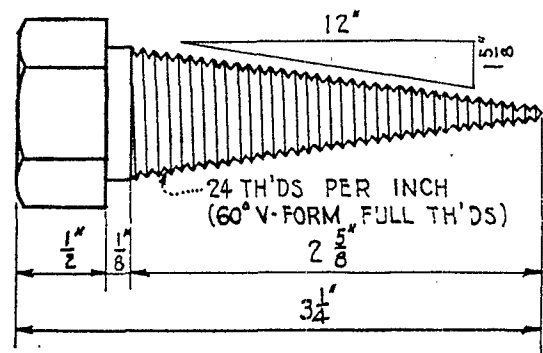
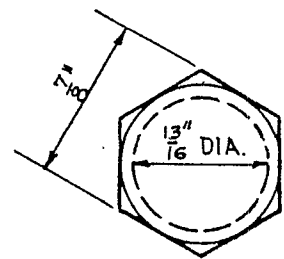
3/8" PLUG

ALL THREADS MUST
BE ACCURATE TO
POINT OF PLUGS



5/8" PLUG

24 TH'DS PER INCH
(60° V-FORM FULL TH'DS)

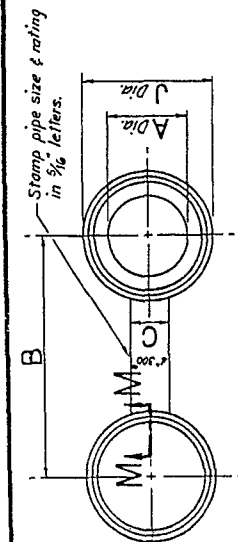


1 3/16" PLUG

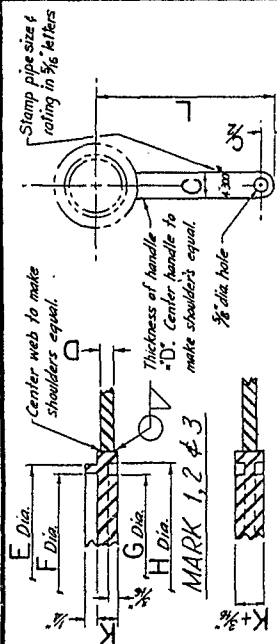
24 TH'DS PER INCH
(60° V-FORM FULL TH'DS)

APPROVED
BOARD OF ENGINEERS
3-22-41
DATE
CHAIRMAN

PLUGS TO BE MACHINED FROM HEX. BAR STOCK OF SAE 1112 STEEL. THREADS TO EXTEND TO END OF PLUG. ROUND OFF CORNERS ON HEAD. PACK HARDEN PLUGS, FOLLOWED BY DRAWING AT A TEMPERATURE WHICH WILL RELIEVE THE PLUGS OF BRITTLINESS AND STILL LEAVE THEM HARD ENOUGH TO THREAD THEMSELVES INTO THE WALL OF STEEL PIPE.



SPECTACLE BLIND



HANDLE FOR SEPARATE BLIND OR SPACER

MARK 1A, 2A & 3A
All other dimensions same as Mr. 1, 2 & 3
M-M

DESIGN NOTES

- BLINDS ARE DESIGNED FOR MAXIMUM COLD TEST PRESSURES AS FOLLOWS:
 150° C.S. FLANGES 425 psi
 300° C.S. FLANGES 1100 psi
 400° C.S. FLANGES 1450 psi
 600° C.S. FLANGES 2175 psi
 900° C.S. FLANGES 3250 psi
 MAXIMUM FIBRE STRESS = 90,000 psi.
- BLIND THICKNESSES ARE DETERMINED BY THE FORMULA $T = \frac{P \cdot R}{S}$.
 T = BLIND THICKNESS, R = RADIUS BETWEEN SUPPORTS, P = PRESSURE
 S = UNIT STRESS. THIS FORMULA IS ADAPTED FROM THE FORMULA
 FOR MAX. STRESS IN A CIRCULAR PLATE UNIFORMLY LOADED &
 SIMPLY SUPPORTED AT THE EDGE, AS SET FORTH IN THOSCHERMAN'S
 "STRENGTH OF MATERIALS" PART I, 2ND EDITION, PAGE 41 EQUATION #34.
 USE THICKNESS "X" FOR "Y" ON 300° & 400° BLINDS FOR 1500°
 4. HYDROSTATIC TEST ON FURNACES.
- MARK #2 & #2A IS PREFERRED FOR 20" BLINDS.

CONSTRUCTION NOTES

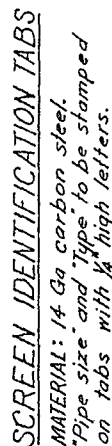
- TOLERANCES SHALL CONFORM TO THOSE ALLOWED BY THE A.S.A. STANDARD B16.5-1957 STEEL PIPE FLANGES AND FLANGED FITTINGS.
- WELDING SHALL BE ELECTRIC USING COATED ROD, FOR CARBON STEEL, ELECTRODES SHALL CONFORM TO THE E60 SERIES OF ASTM A233.

MATERIAL NOTES

- CARBON STEEL BLINDS SHALL BE MACHINED FROM FORGINGS OR PLATES CONFORMING TO ASTM A181 GRADE 1 OR ASTM A285 GRADE C.
- ALLOY BLINDS SHALL BE MADE FROM STOCK SPECIFIED ON PURCHASERS ORDER.

NOTE: All dimensions are in inches.

PIPE SIZE	DESCRIPTION	DIMENSIONS COMMON TO ALL PRESSURES												150°												300°												PIPE SIZE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		A	B	C	D	E	F	G	H	X (Design Note #4)		J	K	L	STUD BOLTS W/REQ DIA. LENGTH		M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG		AH	AI	AJ	AK	AL	STUD BOLTS W/REQ DIA. LENGTH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
1/2	Spectacle Blind T & G	1/2	5/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/4	3	3 1/8	3 1/4	3 1/2	3 3/4	4	4 1/8	4 1/4	4 1/2	4 3/4	5	5 1/8	5 1/4	5 1/2	5 3/4	6	6 1/8	6 1/4	6 1/2	6 3/4	7	7 1/8	7 1/4	7 1/2	7 3/4	8	8 1/8	8 1/4	8 1/2	8 3/4	9	9 1/8	9 1/4	9 1/2	9 3/4	10	10 1/8	10 1/4	10 1/2	10 3/4	11	11 1/8	11 1/4	11 1/2	11 3/4	12	12 1/8	12 1/4	12 1/2	12 3/4	13	13 1/8	13 1/4	13 1/2	13 3/4	14	14 1/8	14 1/4	14 1/2	14 3/4	15	15 1/8	15 1/4	15 1/2	15 3/4	16	16 1/8	16 1/4	16 1/2	16 3/4	17	17 1/8	17 1/4	17 1/2	17 3/4	18	18 1/8	18 1/4	18 1/2	18 3/4	19	19 1/8	19 1/4	19 1/2	19 3/4	20	20 1/8	20 1/4	20 1/2	20 3/4	21	21 1/8	21 1/4	21 1/2	21 3/4	22	22 1/8	22 1/4	22 1/2	22 3/4	23	23 1/8	23 1/4	23 1/2	23 3/4	24	24 1/8	24 1/4	24 1/2	24 3/4	25	25 1/8	25 1/4	25 1/2	25 3/4	26	26 1/8	26 1/4	26 1/2	26 3/4	27	27 1/8	27 1/4	27 1/2	27 3/4	28	28 1/8	28 1/4	28 1/2	28 3/4	29	29 1/8	29 1/4	29 1/2	29 3/4	30	30 1/8	30 1/4	30 1/2	30 3/4	31	31 1/8	31 1/4	31 1/2	31 3/4	32	32 1/8	32 1/4	32 1/2	32 3/4	33	33 1/8	33 1/4	33 1/2	33 3/4	34	34 1/8	34 1/4	34 1/2	34 3/4	35	35 1/8	35 1/4	35 1/2	35 3/4	36	36 1/8	36 1/4	36 1/2	36 3/4	37	37 1/8	37 1/4	37 1/2	37 3/4	38	38 1/8	38 1/4	38 1/2	38 3/4	39	39 1/8	39 1/4	39 1/2	39 3/4	40	40 1/8	40 1/4	40 1/2	40 3/4	41	41 1/8	41 1/4	41 1/2	41 3/4	42	42 1/8	42 1/4	42 1/2	42 3/4	43	43 1/8	43 1/4	43 1/2	43 3/4	44	44 1/8	44 1/4	44 1/2	44 3/4	45	45 1/8	45 1/4	45 1/2	45 3/4	46	46 1/8	46 1/4	46 1/2	46 3/4	47	47 1/8	47 1/4	47 1/2	47 3/4	48	48 1/8	48 1/4	48 1/2	48 3/4	49	49 1/8	49 1/4	49 1/2	49 3/4	50	50 1/8	50 1/4	50 1/2	50 3/4	51	51 1/8	51 1/4	51 1/2	51 3/4	52	52 1/8	52 1/4	52 1/2	52 3/4	53	53 1/8	53 1/4	53 1/2	53 3/4	54	54 1/8	54 1/4	54 1/2	54 3/4	55	55 1/8	55 1/4	55 1/2	55 3/4	56	56 1/8	56 1/4	56 1/2	56 3/4	57	57 1/8	57 1/4	57 1/2	57 3/4	58	58 1/8	58 1/4	58 1/2	58 3/4	59	59 1/8	59 1/4	59 1/2	59 3/4	60	60 1/8	60 1/4	60 1/2	60 3/4	61	61 1/8	61 1/4	61 1/2	61 3/4	62	62 1/8	62 1/4	62 1/2	62 3/4	63	63 1/8	63 1/4	63 1/2	63 3/4	64	64 1/8	64 1/4	64 1/2	64 3/4	65	65 1/8	65 1/4	65 1/2	65 3/4	66	66 1/8	66 1/4	66 1/2	66 3/4	67	67 1/8	67 1/4	67 1/2	67 3/4	68	68 1/8	68 1/4	68 1/2	68 3/4	69	69 1/8	69 1/4	69 1/2	69 3/4	70	70 1/8	70 1/4	70 1/2	70 3/4	71	71 1/8	71 1/4	71 1/2	71 3/4	72	72 1/8	72 1/4	72 1/2	72 3/4	73	73 1/8	73 1/4	73 1/2	73 3/4	74	74 1/8	74 1/4	74 1/2	74 3/4	75	75 1/8	75 1/4	75 1/2	75 3/4	76	76 1/8	76 1/4	76 1/2	76 3/4	77	77 1/8	77 1/4	77 1/2	77 3/4	78	78 1/8	78 1/4	78 1/2	78 3/4	79	79 1/8	79 1/4	79 1/2	79 3/4	80	80 1/8	80 1/4	80 1/2	80 3/4	81	81 1/8	81 1/4	81 1/2	81 3/4	82	82 1/8	82 1/4	82 1/2	82 3/4	83	83 1/8	83 1/4	83 1/2	83 3/4	84	84 1/8	84 1/4	84 1/2	84 3/4	85	85 1/8	85 1/4	85 1/2	85 3/4	86	86 1/8	86 1/4	86 1/2	86 3/4	87	87 1/8	87 1/4	87 1/2	87 3/4	88	88 1/8	88 1/4	88 1/2	88 3/4	89	89 1/8	89 1/4	89 1/2	89 3/4	90	90 1/8	90 1/4	90 1/2	90 3/4	91	91 1/8	91 1/4	91 1/2	91 3/4	92	92 1/8	92 1/4	92 1/2	92 3/4	93	93 1/8	93 1/4	93 1/2	93 3/4	94	94 1/8	94 1/4	94 1/2	94 3/4	95	95 1/8	95 1/4	95 1/2	95 3/4	96	96 1/8	96 1/4	96 1/2	96 3/4	97	97 1/8	97 1/4	97 1/2	97 3/4	98	98 1/8	98 1/4	98 1/2	98 3/4	99	99 1/8	99 1/4	99 1/2	99 3/4	100	100 1/8	100 1/4	100 1/2	100 3/4	101	101 1/8	101 1/4	101 1/2	101 3/4	102	102 1/8	102 1/4	102 1/2	102 3/4	103	103 1/8	103 1/4	103 1/2	103 3/4	104	104 1/8	104 1/4	104 1/2	104 3/4	105	105 1/8	105 1/4	105 1/2	105 3/4	106	106 1/8	106 1/4	106 1/2	106 3/4	107	107 1/8	107 1/4	107 1/2	107 3/4	108	108 1/8	108 1/4	108 1/2	108 3/4	109	109 1/8	109 1/4	109 1/2	109 3/4	110	110 1/8	110 1/4	110 1/2	110 3/4	111	111 1/8	111 1/4	111 1/2	111 3/4	112	112 1/8	112 1/4	112 1/2	112 3/4	113	113 1/8	113 1/4	113 1/2	113 3/4	114	114 1/8	114 1/4	114 1/2	114 3/4	115	115 1/8	115 1/4	115 1/2	115 3/4	116	116 1/8	116 1/4	116 1/2	116 3/4	117	117 1/8	117 1/4	117 1/2	117 3/4	118	118 1/8	118 1/4	118 1/2	118 3/4	119	119 1/8	119 1/4	119 1/2	119 3/4	120	120 1/8	120 1/4	120 1/2	120 3/4	121	121 1/8	121 1/4	121 1/2	121 3/4	122	122 1/8	122 1/4	122 1/2	122 3/4	123	123 1/8	123 1/4	123 1/2	123 3/4	124	124 1/8	124 1/4	124 1/2	124 3/4	125	125 1/8	125 1/4	125 1/2	125 3/4	126	126 1/8	126 1/4	126 1/2	126 3/4	127	127 1/8	127 1/4	127 1/2	127 3/4	128	128 1/8	128 1/4	128 1/2	128 3/4	129	129 1/8	129 1/4	129 1/2	129 3/4	130	130 1/8	130 1/4	130 1/2	130 3/4	131	131 1/8	131 1/4	131 1/2	131 3/4	132	132 1/8	132 1/4	132 1/2	132 3/4	133	133 1/8	133 1/4	133 1/2	133 3/4	134	134 1/8	134 1/4	134 1/2	134 3/4	135	135 1/8	135 1/4	135 1/2	135 3/4	136	136 1/8	136 1/4	136 1/2	136 3/4	137	137 1/8	137 1/4	137 1/2	137 3/4	138	138 1/8	138 1/4	138 1/2	138 3/4	139	139 1/8	139 1/4	139 1/2	139 3/4	140	140 1/8	140 1/4	140 1/2	140 3/4	141	141 1/8	141 1/4	141 1/2	141 3/4	142	142 1/8	142 1/4	142 1/2	142 3/4	143	143 1/8	143 1/4	143 1/2	143 3/4	144	144 1/8	144 1/4	144 1/2	144 3/4	145	145 1/8	145 1/4	145 1/2	145 3/4	146	146 1/8	146 1/4	146 1/2	146 3/4	147	147 1/8	147 1/4	147 1/2	147 3/4	148	148 1/8	148 1/4	148 1/2	148 3/4	149	149 1/8	149 1/4	149 1/2	149 3/4	150	150 1/8	150 1/4	150 1/2	150 3/4	151	151 1/8	151 1/4	151 1/2	151 3/4	152	152 1/8	152 1/4	152 1/2	152 3/4	153	153 1/8	153 1/4	153 1/2	153 3/4	154	154 1/8	154 1/4	154 1/2	154 3/4	155	155 1/8	155 1/4	155 1/2	155 3/4	156	156 1/8	156 1/4	156 1/2	156 3/4	157	157 1/8	157 1/4	157 1/2	157 3/4	158	158 1/8	158 1/4	158 1/2	158 3/4	159	159 1/8	159 1/4	159 1/2	159 3/4	160	160 1/8	160 1/4	160 1/2	160 3/4	161	161 1/8	161 1/4	161 1/2	161 3/4	162	162 1/8	162 1/4	162 1/2	162 3/4	163	163 1/8	163 1/4	163 1/2	163 3/4	164	164 1/8	164 1/4	164 1/2	164 3/4	165	165 1/8	165 1/4	165 1/2	165 3/4	166	166 1/8	166 1/4	166 1/2	166 3/4	167	167 1/8	167 1/4	167 1/2	167 3/4	168	168 1/8	168 1/4	168 1/2	168 3/4	169	169 1/8	169 1/4	169 1/2	169 3/4	170	170 1/8	170 1/4	170 1/2	170 3/4	171	171 1/8	171 1/4	171 1/2	171 3/4	172	172 1/8	172 1/4	172 1/2	172 3/4	173	173 1/8	173 1/4	173 1/2	173 3/4	174	174 1/8	174 1/4	174 1/2	174 3/4	175	175 1/8	175 1/4	175 1/2	175 3/4	176	176 1/8	176 1/4	176 1/2	176 3/4	177	177 1/8	177 1/4	177 1/2	177 3/4	178	178 1/8	178 1/4	178 1/2	178 3/4	179	179 1/8	179 1/4	179 1/2	179 3/4	180	180 1/8	180 1/4	180 1/2	180 3/4	181	181 1/8	181 1/4	181 1/2	181 3/4	182	182 1/8	182 1/4	182 1/2	182 3/4	183	183 1/8	183 1/4	183 1/2	183 3/4	184	184 1/8	184 1/4	184 1/2	184 3/4	185	185 1/8	185 1/4	185 1/2	185 3/4	186	186 1/8	186 1/4	186 1/2	186 3/4	187	187 1/8	187 1/4	187 1/2	187 3/4	188	188 1/8	188 1/4	188 1/2	188 3/4	189	189 1/8	189 1/4	189 1/2	189 3/4	190	190 1/8	190 1/4	190 1/2	190 3/4	191	191 1/8	191 1/4	191 1/2	191 3/4	192	192 1/8	192 1/4	192 1/2	192 3/4	193	193 1/8	193 1/4	193 1/2	193 3/4	194	194 1/8	194 1/4	194 1/2	194 3/4	195	195 1/8	195 1/4	195 1/2	195 3/4	196	196 1/8	196 1/4	196 1/2	196 3/4	197	197 1/8	197 1/4	197 1/2	197 3/4	198	198 1/8	198 1/4	198 1/2	198 3/4	199	199 1/8	199 1/4	199 1/2	199 3/4	200	200 1/8	200 1/4	200 1/2	200 3/4	201	201 1/8	201 1/4	201 1/2	201 3/4	202	202 1/8	202 1/4	202 1/2	202 3/4	203	203 1/8	203 1/4	203 1/2	203 3/4	204	204 1/8	204 1/4	204 1/2	204 3/4	205	205 1/8	205 1/4	205 1/2	205 3/4	206	206 1/8	206 1/4	206 1/2	206 3/4	207	207 1/8	207 1/4	207 1/2	207 3/4	208	208 1/8	208 1/4	208 1/2	208 3/4	209	209 1/8	209 1/4	209 1/2	209 3/4	210	210 1/8	210 1/4	210 1/2	210 3/4	211	211 1/8	211 1/4	211 1/2	211 3/4	212	212 1/8	212 1/4	212 1/2	212 3/4	213	213 1/8	213 1/4	213 1/2	213 3/4	214	214 1/8	214 1/4	214 1/2	214 3/4	215	215 1/8	215 1/4	215 1/2	215 3/4	216	216 1/8	216 1/4	216 1/2	216 3/4	217	217 1/8	217 1/4	217 1/2	217 3/4	218	218 1/8	218 1/4	218 1/2	218 3/4	219	219 1/8	219 1/4	219 1/2	219 3/4	220	220 1/8	220 1/4	220 1/2	220 3/4	221	221 1/8	221 1/4	221 1/2	221 3/4	222	222 1/8	222 1/4	222 1/2	222 3/4	223	223 1/8	223 1/4	223 1/2	223 3/4	224	224 1/8	224 1/4



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S. O. _____
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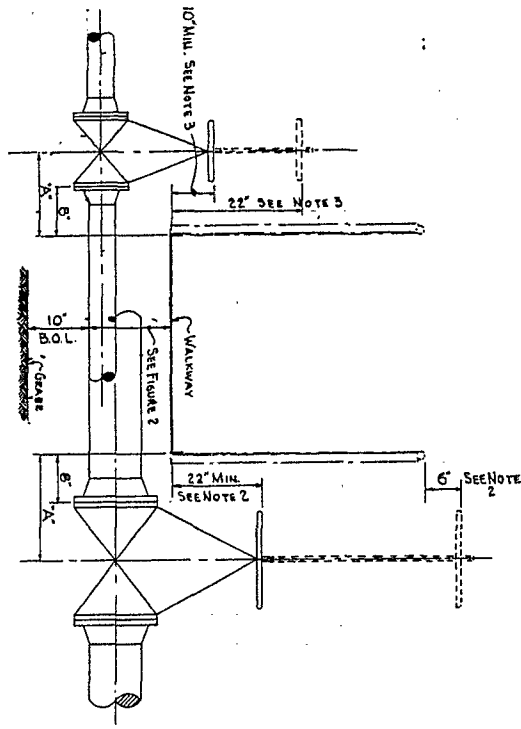


FIGURE 1
RECOMMENDED CLEARANCE BETWEEN VALVE & WALKWAY
AND REQUIREMENTS FOR EXTENSION HANDLES

- NOTES: 1. VALVES IN HORIZONTAL RUN OF PIPE SHALL BE LOCATED SO THAT NEAR FLANGE FACE IS 6\"/>
 2. VALVES OPERATED ONCE PER DAY OR THOSE REQUIRING EMERGENCY OPERATION SHALL HAVE A MINIMUM HANDWHEEL HEIGHT OF 27\"/>
 - 3. HANDWHEEL HEIGHT OF 10\"/>
 - 4. VALVES IN ADJACENT LINES MUST BE STAGGERED ON EACH SIDE OF WALKWAY.
 - 5. SECONDARY BRACING OF EXTENSION HANDLES IS REQUIRED IF THE EXTENSIONS ARE OVER 6' LONG.
 - 6. VALVES IN LINES PARALLEL TO WALKWAYS SHALL BE LOCATED IN SAME RELATIVE POSITION TO WALKWAY AS VALVES IN LINES NORMAL TO WALKWAY.

DIMENSION A:

VALVE SIZE	2"	3"	4"	6"	8"	10"	12"
125-150 GATE	11 1/4"	12"	12 1/2"	13 1/4"	13 3/4"	14 1/2"	15"
250-300 GATE	13 1/4"	13 3/4"	14"	15 1/4"	16 1/4"	17"	17 1/2"
150" GLOBE	12"	12 1/2"	13 1/4"	16"	17 1/4"	—	—
300" GLOBE	13 1/4"	14 1/4"	15 1/2"	16 3/4"	19"	—	—

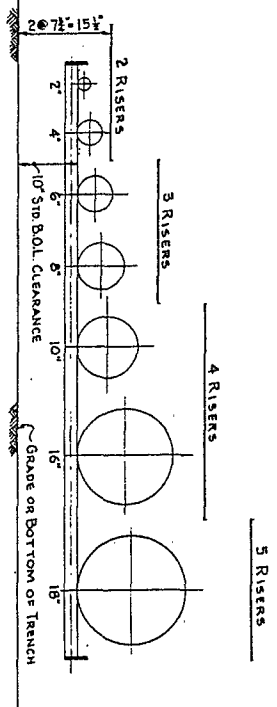


FIGURE 2

RECOMMENDATIONS FOR WALKWAY ELEVATIONS

- NOTES: 1. WALKWAY CLEARANCE OVER LINES SHOULD BE KEPT TO A MINIMUM.
2. CHANGES IN WALKWAY ELEVATION SHOULD BE KEPT TO A MINIMUM. THIS APPLIES NOT ONLY TO A SPECIFIC CROSSING OVER A PIPEWAY, BUT ALSO SHOULD BE OBSERVED THROUGHOUT THE PLANT.
 3. DEPTH OF PIPE TRENCH SHOULD BE KEPT TO A MINIMUM AND SHOULD NOT EXCEED 2'-6\"/>
 - 4. TO MEET THE ABOVE REQUIREMENTS, THE FOLLOWING POINTS SHOULD BE NOTED:
 - a. ANTICIPATE MAXIMUM LINE SIZE TO BE ACCOMMODATED.
 - b. IF LINE SIZES ARE SUCH THAT WALKWAY ELEVATION MUST BE ABOVE GRADE, GROUP LARGE LINES ON SIDE OF TRENCH USUALLY ADJACENT TO COLUMNS OR VESSELS. SINCE THAT SIDE WILL PROBABLY HAVE A WALKWAY ABOVE GRADE AND PARALLEL TO THE TRENCH TO CLEAR THE LINES SERVING SUCH EQUIPMENT.

REVISIONS	NO.	DESCRIPTION	DATE
1			
2			
3			
4			

SCALE: NONE

DATE: JAN 30 1951

DR. M.C.B. CH. 1050

APP'D. [Signature]

ENG. DEPT. [Signature]

RECOMMENDED LAYOUT OF GATE & GLOBE VALVES IN PROCESS PLANTS WITH RESPECT TO WALKWAYS

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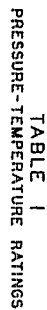


TABLE 1
PRESSURE-TEMPERATURE RATINGS

TABLE 2
STUD BOLT DIMENSIONS

TABLE 2
STUD BOLT DIMENSIONS

INSULATING MATERIAL DIMENSIONS

INSULATING MATERIAL DIMENSIONS

DESIGN NOTES

DESIGN NOTES

- CONSTRUCTION NOTE**

CONSTRUCTION NOTE

- RESEARCH DESIGN

RESEARCH DESIGN

- ### REGULATING METHODS TO RETAIN TRUTH

REGULATING METHODS TO RETAIN TRUTH

- 554

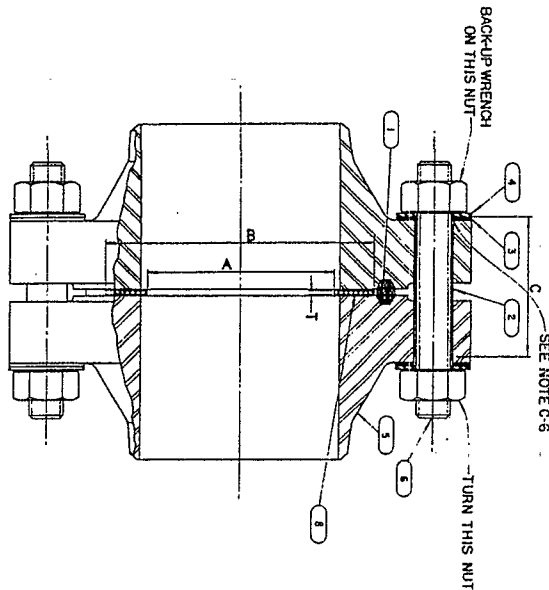


TABLE I

INSULATING MATERIAL DIMENSIONS

PRIMER SERVICE DATE, BY STATION, AND LISTED STILL, inches	360			360			405			450			480			2400		
	A	B	T	C	B	T	C	B	T	C	B	T	C	B	T	C		
1 1/2	1 5/16	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8		
2	1 5/16	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8	2 7/8	3 1/8	2 3/8		
3	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
4	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
5	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
6	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
7	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
8	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
9	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
10	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
11	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
12	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
13	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
14	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
15	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
16	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
17	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
18	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
19	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
20	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
21	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
22	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
23	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
24	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
25	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
26	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
27	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
28	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
29	2 3/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		
30	2 1/16	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8	3 1/2	3 1/4	2 7/8		

TABLE 2

STUD BOLT DIMENSIONS AND INSULATING RING NUMBERS

[illegible]

DESIGN NOTES

1. INSULATING MATERIAL, known as GLASS WOOL, is a soft, fibrous material made from molten glass. It is used in a variety of applications, including insulation, soundproofing, and filtration. It is composed of fine glass fibers that are spun together to form a dense, non-combustible material. It is available in various forms, including batts, blankets, and loose-fill. It is commonly used in walls, ceilings, and floors to provide thermal and acoustic insulation. It is also used in industrial applications, such as in the construction of fireproofing and in the manufacturing of filters. It is a versatile material that can be used in a wide range of applications.

CONSTRUCTION NOTES

- [illegible]

LIST OF MATERIAL

[illegible]

ORDERING DESCRIPTION

1. GENERAL INFORMATION (a) NAME _____ (b) DATE _____ (c) TIME _____ (d) LOCATION _____ (e) WEATHER _____ (f) WIND _____ (g) SEA _____ (h) STATE _____ (i) COUNTRY _____ (j) OTHER _____
2. DESCRIPTION OF THE INCIDENT (a) TYPE _____ (b) CAUSE _____ (c) EFFECT _____ (d) REMARKS _____
3. PERSONNEL INVOLVED (a) NAME _____ (b) POSITION _____ (c) STATUS _____ (d) OTHER _____
4. EVIDENCE (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____
5. ANALYSIS (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____
6. CONCLUSIONS (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____
7. RECOMMENDATIONS (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____
8. OTHER INFORMATION (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____
9. SIGNATURES (a) NAME _____ (b) POSITION _____ (c) STATUS _____ (d) OTHER _____
10. REMARKS (a) TYPE _____ (b) LOCATION _____ (c) STATUS _____ (d) OTHER _____

SERVICE CLASSIFICATION	SERVICE	RECOMMENDED PACKING	SERVICE CLASSIFICATION	SERVICE	RECOMMENDED PACKING
ACIDS, WEAK	Acetic Hydrochloric Maleic Naphthalenic Phthalic Sulfuric	B B B B B C	OILS, HEAVY (UP TO 450F)	Asphalt Fuel Oil Oil Sludge	J J J + End rings of K
ACIDS, STRONG	Acid Sludge Butene plus Phosphoric Acid Butene plus Sulfuric Acid Sludge Acids Sulfuric	C C C C C	OILS, HEAVY (450F-750F)	Asphalt Fuel Oil	B + End rings of E B + End rings of E
CAUSTIC	Ammonia Solutions Caustic Detergent Solution Lime Slurry Sodium Carbonate	A C D K K	OILS, LIGHT (UP TO 700F)	Cumene Gasoline Gum Inhibitor Kerosene Lube Oils Paraffin	B B B B B B
CHEMICALS	Detergent Slurry Diethanolamine Dioxane Kaphthalene Phenol Sulfonate A	B B E B F B	STEAM (UP TO 450F)	Steam	L
GASES	Air Ammonia Butane Butane plus Propane Recovery and Natural Gases Freon	B A D D D A	STEAM (OVER 450F)	Steam	L
HF, HF AND OIL	Hydrofluoric HF Alkylate	M M	WATER	Cooling Tower Fresh (Cold) Fresh (up to 300F) Salt	M M B M
LPG	Butane (Liquid) Oil (LPG)	D D			

RECOMMENDED PACKING

SCALE NONE DATE NOV. 29, 1954 DR. R. L. PDH. CH. HEN 130 ENGR OPRG. DEPT. 134 ENG. DEPT. 134 PACKING FOR VALVES APPROVED W.O. GC-L99771-1 S.O. PRINTED IN U.S.A. STA. AWING		CONSTRUCTION NOTES 1. Since manufacturers seldom, if ever, know the services in which their valves are to be operated they pack them with material suitable only to withstand shop hydrostatic tests. However, a few manufacturers pack their valves with high quality asbestos such as B, D, G or J knowing that these will be suitable for a high percentage of services in which their valves will be used. 2. To be sure that valves in critical service are properly packed, they shall be checked after being installed in the lines where they are to operate. Remove the top ring of packing. If it is suitable, the valve need not be repacked, but if it is not suitable, the valve shall be repacked with material shown on this chart.
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SECTION 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

1.11 CONTRACTOR shall perform all labor and furnish all utilities, supplies, tools equipment, temporary facilities and all items of a consumable nature (such as listed in Specifications Nos. EG-1048 and EG-1049) that are required for construction of the Butane Isomerization Plant at El Paso, Texas for Chevron Oil Company, d/b/a Standard Oil Company of Texas as detailed by this Specification, except as otherwise provided in Sections 1.21 below.

a. This plant will be in accordance with Plot Plan PA-20-23313 and Piping and Instrument Diagrams PA-20-23304, 23305 and 23306 as well as other pertinent drawings to be supplied by CONTRACTOR and items shown in Section 1.4 to be supplied by COMPANY.

1.12 In addition, CONTRACTOR shall furnish the following material and equipment to be incorporated in the finished work:

Materials purchased in field, such as insulation, foundations, paving and grouting, miscellaneous supports. Field supplies, such as welding rod, oxygen, acetylene, gasoline, diesel fuel, lumber, tie wire, nails, etc.

1.2 WORK, MATERIAL AND EQUIPMENT, AND UTILITIES BY COMPANY OR OTHERS

1.21 Material and equipment by COMPANY

COMPANY will furnish all items of material and equipment to be incorporated in the finished work except as provided in Section 1.12 above.

1.22 Construction Utilities by COMPANY

1.221 COMPANY will furnish metered electrical energy to CONTRACTOR at no expense to CONTRACTOR at either 480-volts, 3-phase, or 120/240 volts, single-phase. Suitable disconnect switches and all materials for extension of service to CONTRACTOR'S work areas shall be furnished and installed by CONTRACTOR.

1.222 COMPANY will provide industrial fresh water in moderate quantities at no expense to CONTRACTOR. Tie-ins, connections and extensions from these points to CONTRACTOR'S work areas shall be furnished and installed by CONTRACTOR.

1.223 COMPANY will provide drinking water at no expense for
CONTRACTOR'S containers.

1.3 LOCATION OF WORK

The work described in this Specification will be performed at COMPANY'S refinery,
El Paso, Texas

1.4 DRAWINGS AND SPECIFICATIONS

1.41 "The construction drawings and specifications listed in the Appendix further
detail the work hereunder and are part of this Specification:"

1.5 INTENT

It is the intent of this Specification that CONTRACTOR shall provide the work defined
herein, complete in every respect, and in accordance with the good practices of the
several trades involved and the detailed requirements of this Specification, ready to
operate in the manner indicated or manifestly implied herein, regardless of whether or
not full details of such completeness, workmanship or practices are contained herein.

1.6 ERRORS AND OMISSIONS

The specifications and drawings are not complete in every detail but show the purpose
and intent only, and the CONTRACTOR shall comply with their true intent and meaning,
taken as a whole, and shall not avail himself of any manifest errors or omissions to the
detriment of the work. Should any error, omission or discrepancy appear in the draw-
ings, specifications, instructions, or in work done by other, CONTRACTOR shall notify
the COMPANY at once, and COMPANY will issue instructions to be followed. If
CONTRACTOR proceeds with any such work prior to receiving such instructions,
necessary corrections shall be at CONTRACTOR'S expense. Any work and material not
indicated on the drawings or called for in the specifications which is manifestly necessary
for full and faithful performance of the work in accordance with the true intent of the
contract shall be provided and incorporated at the expense of the CONTRACTOR to
the same extent as if both indicated and specified. Any work indicated on the drawings
but not specified, or vice versa, shall be furnished as though fully set forth in both.

1.7 COMPANY APPROVAL

COMPANY'S approval of or agreement to the performance of certain items of construction
work or the furnishing of certain materials and equipment by CONTRACTOR as required
in this Specification shall in no way relieve CONTRACTOR from the full responsibility
for the performance of such work, for the adequacy of such material and equipment or
for the sole responsibility for the work performed under this Specification. CONTRACTOR
shall obtain such approval or agreement through COMPANY'S Construction Representa-
tive, or in a manner previously approved in writing by COMPANY'S Construction
Representative.

SECTION 2 - GENERAL CONDITIONS

2.01 FIELD REPRESENTATIVES

2.011 COMPANY'S Construction Representative

COMPANY will maintain a Construction Representative in the field who will be the only COMPANY employee in the field authorized to represent COMPANY with respect to contractual matters for work covered in this Specification.

2.0111 Examples of his functions are to:

- a. Establish and maintain field liaison between CONTRACTOR'S Construction Representative and COMPANY.
- b. Furnish materials and equipment to CONTRACTOR per Paragraph 3.03 of this Specification.
- c. Review CONTRACTOR'S construction schedule
- d. Explain drawings and specifications as required.
- e. Review and approve field changes or material substitutions, or any other matter where COMPANY'S approval or agreement is required by this Specification.
- f. Negotiate with CONTRACTOR'S Construction Representative the amount of increase or decrease in compensation due CONTRACTOR arising from any Changes in the Work which COMPANY may authorize.

2.012 CONTRACTOR'S Construction Representative

CONTRACTOR shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

2.0121 Examples of his functions are to:

- a. Represent CONTRACTOR in matters pertaining to construction quality, schedule and accounting practice.
- b. Represent CONTRACTOR during acceptance tests.
- c. Receive materials and equipment from COMPANY per Paragraph 3.03 of this Specification.
- d. Negotiate and approve for CONTRACTOR the amount of increase or decrease in compensation due CONTRACTOR arising from COMPANY'S authorized Changes in the Work to be performed by CONTRACTOR.

2.02 CHANGE IN THE WORK

In the event that a Change in the Work is authorized in writing by COMPANY, as provided in Section 2.1 of the Terms and Conditions and COMPANY and CONTRACTOR fail to agree in writing upon an adjustment or upon a basis for an adjustment in the compensation, then upon written election by COMPANY, such adjustment shall be determined in accordance with the provisions of the Contract facing sheet.

2.03 SCHEDULE AND COST BREAKDOWN

CONTRACTOR shall maintain a detailed construction schedule for all phases of work covered in this Specification.

2.031 Construction schedule shall indicate, for each portion of work, the start of construction, job progress and completion date.

2.032 CONTRACTOR will be furnished with current information regarding delivery dates as the job progresses. Delivery delays up to 4 weeks will not be considered cause for delays in completing the work hereunder for reimbursement pursuant to Section 3.2 of the Terms and Conditions. Delivery delays of longer than 4 weeks in the delivery of major materials and equipment to be furnished by COMPANY will be considered as causes for delays in completing the work hereunder and as delays caused by COMPANY under Section 3.2 of the Terms and Conditions.

2.033 CONTRACTOR will cooperate with COMPANY in obtaining a cost breakdown by equipment categories after the job is completed

2.04 REFINERY REGULATIONS

CONTRACTOR shall comply with El Paso Refinery Instruction No. 1404, "General Instructions to Contractors Working Within the Refinery."

SECTION 3 - PERFORMANCE OF WORK

3.01 EXCAVATION AND BACKFILL

Earthwork shall be in accordance with applicable paragraphs of Specification EG-581. CONTRACTOR shall haul any excess excavated material to a location designated by COMPANY'S Construction Representative.

3.02 REMOVAL OF EXISTING EQUIPMENT

Existing equipment that is dismantled by CONTRACTOR and not used in the plant shall be removed by CONTRACTOR to a place designated by COMPANY'S Construction Representative.

3.03 MATERIALS HANDLING AND CORRESPONDING PAPER WORK

3.031 CONTRACTOR shall receive from any one of several storage areas located within the refinery the equipment and materials furnished by COMPANY and required for the work described in Section 1.1 of this Specification.

3.032 CONTRACTOR will be required to complete and submit a COMPANY materials requisition, Form GO-111, to the COMPANY'S field construction office for withdrawal of COMPANY furnished material and equipment for performance of the work. Requests for material shall be based on quantities shown on drawings of Lists of Materials furnished by COMPANY. CONTRACTOR must obtain approval from COMPANY'S Construction Representative before materials in excess of the quantities shown on the Lists of Materials can be issued.

3.033 Subject to Section 5.3 of the Terms and Conditions CONTRACTOR shall:
(a) be responsible for keeping all materials and equipment in good condition until the completed facility is accepted by COMPANY: (1) take any necessary steps such as painting, greasing, installation of rust preventive oil, or covering, etc., to protect all equipment externally and internally from mechanical damage or damage from the elements, and (2) protect all instruments and control panels from corrosion, etc., due to humidity, precipitation, temperature and atmospheric conditions or environment; (b) be held accountable for surplus materials furnished by COMPANY, items received from COMPANY and to be returned, and for shortages or damages to equipment and materials furnished by COMPANY. Where necessary CONTRACTOR shall apply code colors for the identification of special alloy materials when they are received, to insure that these alloy materials are properly installed and that correct weld rod is used.

- 3.034 Upon completion of the job, CONTRACTOR shall furnish COMPANY an inventory of all remaining equipment and materials which were furnished by COMPANY including the quantity, description, and the item number for each item. When directed by COMPANY, CONTRACTOR shall transport the remaining equipment and materials to such locations within the refinery as designated by COMPANY.

3.04 INSPECTION AND TESTING

3.041 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR'S employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall not relieve CONTRACTOR of full responsibility for the work hereunder.

3.042 Welding Inspection

- 3.0421 CONTRACTOR shall arrange for welding qualification tests at his expense in accordance with Engineering Instruction EP-310, "Qualification of Welders." Welders shall be required to pass qualification tests before performing any operation during construction of the project. COMPANY reserves the right to require additional qualification tests during construction if it has any doubt about the competence of welders. COMPANY shall be allowed to witness tests and to examine test coupons. If additional tests are required and passed by welders, cost of retesting will be borne by COMPANY; if failed, cost of retesting shall be borne by CONTRACTOR.

3.043 Hydrostatic Testing

CONTRACTOR shall perform hydrostatic tests on all equipment and lines after erection, but before insulation or backfill. Before performing any hydrostatic test, CONTRACTOR shall notify COMPANY'S Construction Representative sufficiently in advance so that all hydrostatic tests may be witnessed by COMPANY inspector. CONTRACTOR shall furnish all equipment needed for use in hydrostatic testing.

Tests shall be accomplished in accordance with Engineering Instruction EP-300. Tests shall be performed with all welded, screwed, or flanged joints exposed.

3.044 Electrical Inspection and Testing

CONTRACTOR shall inspect wiring, cables, motors, controllers, and lighting and test grounding, all in accordance with Specification Nos. EG-894 and EG-1675.

3.045 Instrument Testing

CONTRACTOR shall inspect and make all necessary tests and such additional tests as COMPANY may request to insure that instruments are installed correctly in accordance with Specification No. EG-1586.

3.046 Columns and Vessels

CONTRACTOR shall prepare all pressure vessels and columns for final inspection, including opening of all internal and external manways and handholes, providing proper gaskets for all openings and removal of debris. When CONTRACTOR has proceeded with his work to the point where a column or vessel is ready for a COMPANY check, he shall advise COMPANY. When COMPANY has had reasonable opportunity to complete its inspection and COMPANY'S Construction Representative is satisfied that no further action is required before final heading up of the column or vessel, he will give CONTRACTOR written notice releasing it for final heading up.

3.047 Mechanical Equipment

3.0471 CONTRACTOR shall align the shafts of all drivers and connected driven equipment such as motors or turbines driving equipment such as pumps and compressors. CONTRACTOR shall notify COMPANY'S Construction Representative sufficiently in advance prior to bolting up couplings so that COMPANY may inspect and approve alignments. CONTRACTOR shall be responsible for equipment alignment until correct alignment has been demonstrated at operating temperature. Pumps, drivers, gears, etc., mounted on baseplates or soleplates shall be doweled to preserve alignment while operating and to restore alignment when equipment is removed for maintenance.

3.0472 CONTRACTOR shall check rotation of motors, set turbine overspeed trips, turn over compressor, etc., in the presence of COMPANY inspector.

3.048 Equipment Lubrication

COMPANY will furnish all lubricants, and CONTRACTOR shall lubricate all equipment including couplings in accordance with the lubrication schedule, Drawing PC-20-20742

3.049 Bolting-Up Practice

The bolting-up of spiral-wound gasketed, flanged joints shall be as follows:

- (1) A programmed bolting sequence of uniform loads, i.e., start with the flange bolt in the 12 o'clock position, then transfer successively to the 6 o'clock, 9 o'clock, 3 o'clock, etc., bolt positions, increasing the bolt load uniformly each time the sequence is completed.
- (2) Tighten the bolts until the flanges are uniformly seated on the gasket centering ring. Lubrication of the gasketed surface is required only where necessary to obtain tight joints.

3.05 CORRECTION OF DEFECTS

CONTRACTOR shall correct all defects revealed by any test or inspection. When a defect is due to the faulty workmanship of CONTRACTOR, or to defective or unsatisfactory material furnished by CONTRACTOR, the cost of correction shall be borne by CONTRACTOR, in the manner provided in Section 4.2 of the Terms and Conditions for work and materials condemned by COMPANY. Where a defect is due to defective material furnished by COMPANY, the correction of the defect and any damage caused thereby shall be performed by CONTRACTOR and the contract price shall be adjusted in accordance with the "Exhibit - Change in the Work" for such correction work.

3.06 COMPLETION

The work will be considered "complete" when CONTRACTOR has performed all work specifically stated or manifestly implied in this Specification. The following illustrate the type of work items which must have been satisfactorily accomplished before the work will be considered complete:

3.061 Completion of all required tests.

3.062 Completion of all required inspections including P&ID check.

3.063 Pumps, machinery and drivers checked for alignment after final tightening of connecting piping, bearings flushed and lubricated.

- 3.064 Instruments, alarms, and controls cleaned, lubricated, and checked insofar as practicable.
- 3.065 Piping washed or blown clean with air. All strainers in place and cleaned.
- 3.066 Electrical circuits tested for grounds or shorts, motors checked for rotation and run a minimum of two hours. All lights cleaned and operating, and all control circuits checked.
- 3.067 All nameplates, identification stencils, etc., installed.

3.07 ACCEPTANCE

3.071 Custody of Plant for Initial Operation

When the Plant is tested and completed in accordance with the requirements of this Specification (except for finishing work not essential for the operation of such Plant which COMPANY and CONTRACTOR agree can be completed while the Plant is in the custody of COMPANY, such as painting,) CONTRACTOR shall so notify COMPANY in writing. After receipt of such notice, COMPANY may then take custody of such Plant to begin initial operation to verify that the Plant conforms with requirements of this Specification. Such custody of such Plant shall not be construed as Acceptance pursuant to Paragraph 3.072 below. Any additional work required to be performed by CONTRACTOR in such Plant after COMPANY has taken custody shall be performed on a work permit basis.

3.072 Acceptance

CONTRACTOR'S work hereunder shall be considered accepted on the date COMPANY gives written notice to CONTRACTOR that it is satisfied all work has been completed in accordance with the requirements of this Specification. Acceptance by COMPANY shall in no way relieve CONTRACTOR of his obligation or liabilities under the Contract.

3.08 MECHANICAL GUARANTEE

CONTRACTOR guarantees the Plant to be free of defects in design, materials, equipment and workmanship (insofar as design, materials, equipment and workmanship are furnished by CONTRACTOR) for a period up to one year after the date COMPANY starts-up the Plant but no to exceed 15 months after delivery to COMPANY. Any such equipment, materials, workmanship or designs found to be defective within said one-year period shall be replaced by CONTRACTOR at his sole expense with designs, materials, equipment and workmanship that are satisfactory for a like period of time; provided, however, that said

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3.08 MECHANICAL GUARANTEE (continued)

design, equipment, materials and workmanship are not subjected to conditions more severe than described or implied in this Specification. CONTRACTOR shall be notified of such defects in writing and given reasonable opportunity, if in the opinion of COMPANY the nature of the defect and COMPANY'S operating schedule permit, to inspect and correct such defective designs, materials, equipment or workmanship. Otherwise, after such written notification, COMPANY may make requisite corrections and bill CONTRACTOR for the portion of the costs incurred which are to be borne by CONTRACTOR, as provided herein.

SECTION 4 - CONSTRUCTION

4.01 GENERAL

4.011 Nameplates and Tags

A nameplate or tag shall be installed on each pump, driver, vessel, exchanger, instrument, items of electrical equipment, and each mechanical equipment item. Electrical conduit markers and instrument tubing tags shall also be installed.

4.012 Equipment Setting

All equipment shall be set, leveled, and grouted in accordance with Specification EG-985, and aligned, and/or doweled in accordance with manufacturer's instructions. Non-shrinking grout, such as Embeco, shall be used for all machinery bases and under bearing plates for structural columns.

4.02 VESSELS

4.021 The following vessels will be shop stress-relieved. No welding shall be done on them in the field: D-2010 D-2016

4.0211 Welding for any minor modification or repair required on other columns and vessels shall be in accordance with the latest edition of the ASME Code for Unfired Pressure Vessels.

4.03 HEAT EXCHANGERS

4.031 Fire proofing shall be installed on all heat exchanger supports.

4.04 PUMPS AND DRIVERS

4.041 Coupling guards shall be installed on all pumps.

4.042 Auxiliary piping shall be installed on all pumps.

4.043 Pumps not equipped with mechanical seals shall be repacked. COMPANY will furnish packing.

4.044 Motor drivers will be shipped installed on pump baseplates.

4.045 Protective coatings shall be removed prior to the installation of lubricants.

4.05 INSTRUMENTS

4.051 Instrument Work by Suppliers

Instruments furnished and installed by major equipment suppliers are identified on the instrument schedules. All instruments including those installed by equipment suppliers, shall be cleaned, tested, and inspected by CONTRACTOR in accordance with Specification EG-1586.

4.052 Location

Location of all field instruments are shown on the instrument location plans, electrical layout drawings and piping plan drawings.

4.053 Mounting

All instruments shall be mounted and connected in accordance with the special or standard installation drawings referred to on the instrument schedules. No installation drawings are included for bracket mounting instruments such as pressure and temperature transmitters. Minimum requirements for these items are that they be free from vibration and located for ease of maintaining and adjusting the instrument. Wherever practical, the brackets should locate the instrument counterline 4 ft. above grade or operating platform.

4.054 Control Valves

Control valves will be furnished with packing and lubricators. Lubricator and lubricant will be furnished separately and shall be installed by CONTRACTOR. Type of packing shall be checked for conformance with specified type on control valve schedule and repacked, if not packed or incorrectly packed.

4.055 Orifice Plates

Orifice plates shall be left uninstalled, wired to their respective flanges until lines are flushed.

4.056 Pressure Gages

Any pressure gages obviously out of calibration shall be returned by CONTRACTOR to COMPANY at its instrument shop. COMPANY will test and adjust such pressure gages and release them to CONTRACTOR with a tag attached identifying the gage and indicating that the gage is satisfactory for installation. COMPANY will not test new undamaged pressure gages.

4.057 Relief Valves

All relief valves shall be returned by CONTRACTOR to COMPANY at its shop for COMPANY to check and adjust, if necessary, relief valve settings. COMPANY will attach a tag to each relief valve showing that it is in satisfactory condition, identifying it, and noting the set pressure. COMPANY will then release valves to CONTRACTOR for installation.

4.06 PIPING

4.061 General

All piping, except that marked "by others," as shown on the Construction Drawings shall be installed by CONTRACTOR.

4.0611 Fabrication and installation shall be in accordance with

- (a) This Specification EP-207A
- (b) ASA B31.3, Petroleum Refinery Piping Code.
- (c) Piping Standards, Drawing GC-135169
- (d) Specification EG-2505, Fabrication of Steel Piping.

4.0612 Screwed connections shall be seal welded to the extent shown in Piping Standards.

Where seal welding is not required screwed pipe fittings shall be sealed with 1/2-inch teflon thread sealant tape, such as Scotch Brand No. 48, or John Crane Thred-Tape.

4.0613 Clear headway of not less than 6-ft 6-inches shall be provided over all platforms, walkways, passageways and working areas.

4.0614 The area adjacent to pumps, turbines, and other mechanical equipment that is used for maintenance access to this equipment shall have not less than 11-ft. 6-inch clear head room.

4.0615 The minimum permissible width of clear passageway on platforms, walkways, etc. shall be 2-ft. 6-inches. Bottom of lines shall be a minimum of 10-inches above the high point of paving.

4.0616 No valves shall be installed with stems pointed down unless COMPANY specifically agrees to same in writing.

4.062 Routing of Small Lines

4.0621 Open-ended "dummy" extension shall be used for supports where required. Dead-ends of piping shall not be used.

4.0622 Piping shall not be installed above the stanchion lines of the main pipe-ways where space for future double-decking has been provided.

4.063 Vents and Drains on Piping

All vents and drains shall be installed as shown on the piping and instrument diagrams. However, additional vents and drains at all high and low points in the piping which are required for complete venting or draining for hydrostatic test may not be shown on these drawings. These shall be installed at no extra cost to COMPANY. Vents and drains installed for hydrotesting shall be plugged and seal welded upon completion of testing.

4.064 Line Cleaning

Piping shall be washed or blown clean with air to remove loose materials. This may be performed in conjunction with the hydrostatic testing.

4.065 Pump Suction Screens

Temporary suction screens for initial operation of pumps shall be furnished and installed by CONTRACTOR. Suction screens shall be cleaned after cleaning lines. COMPANY will remove screens after plant startup. Typical screens are shown on Standard Drawing GC-L88612.

4.066 Pipe Plugs

All square-head plugs furnished on equipment shall be replaced by round-head barstock steel plugs.

4.067 Valve Packing

All valves shall be checked for free operation. During hydrostatic tests, valve packings shall be examined for leakage and corrected, if necessary.

4.068 Valve, Flange, and Stem Safety Covers

Valve stem safety covers shall be installed on all valves 2 inches and larger which have horizontal stems extending into operating areas and which can be considered safety hazards. Milsheff valve covers shall be installed on all valves in caustic services.

4.069 Valve Extension Handles and Chain Operators

Valve extension handles or chain operators are required for all valves not accessible from grade, platforms or walks unless company agrees to delete. CONTRACTOR shall fabricate and install valve extension handles similar to those shown on Standard Drawing GB-L-13963.

CONTRACTOR shall install chain operators. CONTRACTOR shall fabricate and install brackets to hold chains out of operating areas and accessways when not in use.

4.0610 Buried Lines

4.06101 Protective coatings shall be as follows:

4.061011 COMPANY will furnish coated pipe for lines under concrete paving, structures, buildings, water, or otherwise equally inaccessible. CONTRACTOR shall make field joints and shall repair any damage in the coating, using field joint forms, heating and mixing kettles, and other equipment recommended by the coating applicator.

4.061012 All other underground lines shall be P2A wrapped by CONTRACTOR (including those under asphalt paving) per Drawing GB-L-69318.

4.07 STRUCTURES

4.071 Steel Erection

All work shall comply with latest editions of the AISC Code of Standard Practice for steel building and bridges, AISC Specifications for design, fabrication, and erection of structural steel for buildings and AWS Standard Code for arc and gas welding in building construction.

Loading racks, platforms, stiles, stairs and ladders will be delivered to the job site fabricated per Specification EG-398 as complete as possible, consistent with the economy of handling and shipping the assembled units, in order to minimize field connections.

4.072 Fabrication

All structural steel fabricated by the CONTRACTOR shall conform to Specification EG-398.

4.073 Pipe Shoes

Pipe shoes for insulated hot piping shall be fabricated by CONTRACTOR from stock material and installed in accordance with Detail E of Drawing GA-N-99783 with shoe details per Type 1 of Drawing GD-N-99653 on all insulated lines 2" in diameter and larger at all supports. Shoes shall be 3" in height. Insulated piping 1-1/2" and smaller shall have insulation notched per left hand sketch of Detail E of Drawing GA-N-99783.

4.074 Bolts and Clips

All bolts and clips required to fasten all pipe supports to structures shall be installed even though the attachments are not shown on the construction drawings.

4.08 INSULATION, STEAM TRACING AND FIREPROOFING

4.081 Insulation

4.0811 Insulation of all lines and vessels will be the responsibility of CONTRACTOR

4.082 Steam Tracing

4.0821 Steam tracing shall be the responsibility of the CONTRACTOR and shall be in accordance with Drawing PB-99-12919

4.083 Fireproofing

4.0831 Fireproofing on major steel supports (skirts and legs) shall be installed to an elevation of 20 ft. above grade. Fireproofing of structural members shall be per Standard Drawing GE-N-33336, and of column and vessel skirts shall be per Standard Drawing GB-N-99994.

4.0832 Fireproofing shall be installed on the saddle supports of all horizontal vessels and exchangers which are 14-inches in diameter or larger.

4.0833 CONTRACTOR shall pressure fill with grout all pipe stanchions fabricated from pipe.

4.09 POWER AND LIGHTING

4.091 Performance of Work

Specification EG-1675, Installation of Electrical Facilities, describes the general requirements for installation of electrical facilities.

- 4.092 Drawings show location of lights, instruments and equipment, and general routing of conduit. The exact arrangement of conduit shall be established by CONTRACTOR to avoid interferences and to provide maintenance access. Prior to start of conduit installation, CONTRACTOR shall submit proposed routing and arrangement to COMPANY for approval.

4.10 FOUNDATIONS

4.101 Reinforced Concrete

Placing and curing concrete shall be in accordance with Specification EG-850.

Material and fabrication of reinforcing shall conform to Specification EG-516, unless otherwise specified on the drawings.

4.1011 Concrete Properties

Ready Mix concrete shall be furnished in accordance with ASTM Specification C-94.

If field mix concrete is used, materials to be used and the procedure to be followed in proportioning and mixing Portland Cement Concrete in the field shall conform with Specification EG-851. Consistency and workability shall be in accordance with Specification EG-851 with a minimum ultimate compressive strength of 3000 psi after 28 days of curing.

Method of measuring materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

4.102 Anchor Bolts

All anchor bolts securing machinery or equipment, shall be provided with sleeves in accordance with drawings. After setting equipment, these sleeves shall be filled with grout. Anchor bolts shall be accurately placed, and securely tied to avoid movement during concrete placement.

4.11 MISCELLANEOUS

4.111 Grading

Grading work includes removal of soil or placement and compaction of fill to attain finish grade elevation.

Finish grading shall be in accordance with applicable provisions of Specification EG-851.

Where fill must be added to bring an area to finish grade, the area shall be scarified and fill placed in layers not exceeding 6" in loose depth, with each layer watered as necessary to obtain optimum moisture content for compaction. All fill material shall be compacted to attain a maximum 95% modified AASHO density.

4.112 Drainage Facilities

4.1121 Septic Tank and Drain Tile

Fabrication and installation of septic tank and drain tile shall be in accordance with Specifications EG-581 and EG-582.

4.113 Paving

4.1131 Asphalt Paving

The design, material and methods of construction of the asphalt paved areas shall be in accordance with the latest, "Specification and Construction Methods for Hot Mix Asphalt Paving," by the Asphalt Institute.

Paving shall be Type IV, dense graded, hot mix asphalt to match what exists in plant.

4.114 Painting

4.1141 General

Surface preparation and painting shall be in accordance with Painting Specification Drawing PB-99-21446. No exceptions shall be made to this drawing without written COMPANY approval.

4.1142 Shop Fabricated Equipment

Shop fabricated equipment and structural steel will be primed by the suppliers. Primers shall be touched up before final painting if the shop prime is damaged.

4.1143 Manufactured Equipment

Compressors, dryers, motor control centers, transformers, loading pumps and other equipment will be finished painted by the equipment manufacturer. Paint shall be touched up by CONTRACTOR if damaged.

4.1144 Special Surfaces

Aluminum and galvanized surfaces, and insulation weathercoat shall not be painted.

INDEX OF STANDARD DRAWINGS

GC-G99710	Packing for Pumps, Compressors
GB-J14247-5	Thermocouple Installations
GA-J14286-9	Field Mountings for Instruments
GE-J31223-5	Bar Stock Plugs
GC-J78258-16	Thermocouple Conduit Connections
GC-J78660-13	3/4 Inch Screwed Thermowell
GC-J88609-6	Details of Nameplates
GC-J99504-6	Orifice Plates
GB-J99742-2	Standard Steam Tracing for Pressure Instruments
GB-J99743-2	Standard Steam Tracing for Level Instruments
GB-J99744-2	Steam Tracing for Flow Instruments
GB-J99758-2	Tubing Diagrams for Panel Mounted Indicating and Recording Instruments
GB-J99760-3	Tubing Diagrams for Panel Mounted Control Instruments
GC-J99857-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 1
GC-J99858-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 2
GC-J99859-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 3
GC-J99860-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 4
GE-J99864-2	Seal Pots and Water Legs for Differential Pressure Instruments
GE-J99865-2	1/4 Inch Assemblies for Differential Pressure Instrument Manifold
GC-J99866-2	Connections for Flow Meter-Bellows Type with Tubing Leads Arrgt No. 1
GC-J99867-2	Connections for Flow Meter-Bellows Type with Tubing Leads Arrgt No. 2
GC-J99868-2	Connections for Flow Meter-Bellows Type with Tubing Leads Arrgt No. 3
GC-J99869-2	Connections for Flow Meter-Bellows Type with Tubing Leads Arrgt No. 4
GC-J99879-4	Instrument Air Connections with Plastic Coated Tubing Types A to J
GC-J99881-2	Connections for Flow Meter-Bellows Type with Tubing Lead Arrgt No. 5
GC-J99886-0	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 8
GC-J99887-0	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 9
GC-J99895-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 10
GC-J99896-1	Differential-Pressure Transmitters with Tubing Leads Arrgt No. 11
GC-J99898-2	Termination for Plastic Tubing Cable with Local Junction Box
GB-J99902-4	Flanged Thermowells
GB-J99903-1	Screwed Thermowell Installations in Piping
GB-J99904-1	Flanged Thermowell Installations in Piping
GA-J99911-1	Terminal Box for Underground Tubing Cables for 2, 3 or 4 Conduits
GC-J99947-0	Differential Pressure Transmitters with Hex Valves and Tubing Leads-Below Line Mounted
GC-J99948-0	Differential Pressure Transmitters with Hex Valves and Tubing Leads-Above Line Mounted
GC-J99949-0	Line Mounted Differential Pressure Transmitters with Hex Valves and Tubing Leads - Above Line Mounted

INDEX OF STANDARD DRAWINGS

GC-J99950-0	Line Mounted Differential Pressure Transmitters with Hex Valves and Tubing Leads in Vertical Runs
GB-J99951-0	Instrument Air Connections for 4-Tube Field Controllers - Types K to M
GB-J99952-0	Instrument Air Connections for 4-Tube Field Controllers with Plastic Coated Tubing Types K to M
GC-J99954-0	Differential Pressure Transmitters with Tubing Leads - Remote Mounted Above Line
GB-L13963-2	Field Fabricated Valve Extension Handles
GC-L14298-4	Blinds and Special Rings for 300 Lb. and 600 Lb. API Oct. Ring Joints
GB-L31368-19	Welding Bosses, 5/64
GC-L31452-15	Spectacle Blinds, Blinds and Spacers
GE-L31477-1	Method for Sealing Valves Open or Closed
GB-L69318-16	Wrapped Coatings for Underground Pipe Lines
GE-L72477-3	Pipe Repair Plug
GE-L78715-10	Screen for Pump Suction Lines
GC-L87309-10	Forged Steel Tongue and Groove Spectacle Blind, Blinds and Spacers
GC-L88612-3	Conical Pump Suction Screen for Raised Face and Ring Joint Flanges
GB-L89154-0	Design Detail for Earth Pressure or Buried Rigid Conduit in Ditches or Under Embankments
GB-L99507-7	Orifice Flange Assemblies
GA-L99596-4	Steam Trap Manifold
GA-L99651-0	Recommended Layout of Gate and Globe Valves in Process Plants with Respect to Walkways
GA-L99654-3	Raised-face Insulated Flange Assembly
GA-L99655-2	Ring Joint Insulated Flange Assembly
GC-L99771-0	Packing for Valves
GE-N33336-1	Concrete Fireproofing for Structural Members
GD-M99653	Standard Pipe Shoes and Anchors
GA-N99783-1	Insulation for Hot Piping
GA-N99785-4	Insulation for Hot Vessels
GB-N99993-0	Standard Insulation Item Numbers
GB-N99994-0	Standard Fireproofing Specification for Vessel Skirts
GB-P87601-3	Signs and Markers for Underground Cables
GA-P99544-8	Mountings for Welding Outlets with Circuit Breakers
GD-P99711-2	Nameplate Bracket for X-P Push Button Station
GA-P99716-2	Conduit Connections at Motors, Underground, Vaportight
GA-P99717-2	Conduit Connections at Motors, Underground, Explosion-Proof
GA-P99719-2	Conduit Connections at Motors, Overhead, Vaportight
GA-P99720-2	Conduit Connections at Motors, Overhead, Explosion-Proof
GB-P99721-4	Motor Installation Details
GB-P99734-0	Grounding Details Grounding Electrodes
GB-P99735-1	Grounding Details Equipment Connections
GB-P99873-1	Arrangement for Cabling Conductors and Bonding Conduits

ENGINEERING DEPARTMENT
EL PASO, TEXAS

SPECIFICATION NO. EP-207A
July 3, 1967
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GA-P99935-1	Standard Conduit Support and Elec. Equip. Connection Details
GA-P99968-1	Standard Manual Transfer Panel for Double-Ended Substations
GE-P99973-0	Standard V-Bolt for Clamping Conduit to Crossarm
GA-P99988-0	Typical One Line Electrical Diagram
GA-P99989-0	Typical Elementary and Interconnection Diagrams
GB-Q68922	Anchor Bolts
GC-S78325	C.I. Catch Basin for 6" and 8" Sewer Connections
GC-S88543	Rack for Gas Cylinders
PC-20-20742	Lubrication Chart
PB-99-12919	Steam Tracing Details
PB-99-21446	Painting Specification Drawing

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EG-1241	Centrifugal Pumps
EG-983	Centrifugal Pumps
EG-1343-A	Proportioning Pumps
EG-985	Grouting of Machinery
EG-1586-C	Cleaning, Testing, Inspecting Instruments
EG-2488, Sec. A&B	Twisted and Shielded Thermocouple Extension Cable
EG-2454	Protection of Mechanical Equipment During Construction
EG-2505	Fabrication of Steel Piping
EG-2411	Descaling and Cleaning Steel Piping
EG-2350	Control Valve Construction
E -1374-C	Fabrication of Pipe
EG-850	Placing and Curing Concrete
EG-851	Concrete Proportioning and Mixing
EG-516	Reinforcing Steel Fabrication
EG-398, Sec. A&B	Steel Fabrication
EG-1381, Sec. A	Thermal Insulation
EG-1824, Sec. A	Induction Motors
EG-894	Inspection, Starting, Squirrel Cage Motors
EG-2487	Control and Telemetering Cable
EG-2451	Motor Winding Immersion Tests
EG-1595	Installation of Electrical Facilities
EG-1675	Installation of Electrical Facilities
806-D	Aluminum Paint Vehicle
813-D	Black Enamel
814-A	Aluminum Paint
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EG-582-A	Sewerage Facilities
EG-2027-E	Isorundum Non-Skid Surfacing
EG-1049-C	Supplies
EG-1048-A	Small Tools and Equipment
E -1073	Equipment Rental Rates
EG-581	Clearing, Grading and Earthwork

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EP-310	Qualification of Welders
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EG-581	Clearing, Grading and Earthwork

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EP-310	Qualification of Welders
Engineering Instruction 1404	

drawal v 2 PdRCL8-302

6/2/84 - 2000
N. M. T. 9/1/84

(2)

19

FROM: MR.

SUBJECT:

OUR FILE:

YOUR FILE:

For your info, following is
a list of spare parts in stock,
with unit prices:

STOREHOUSE STOCK NO.	ANNIN PART NO.	DESCRIPTION	UNIT PRICE
LV704-1	16035	Sleeve & Top Plate Assy.	255.20
LV704-2	16023	Slide Valve Plate	178.97
LV704-3	16024	Bearing Plate	161.70
LV704-4	00647 16034	Stem Guide, Cu Plated S.S.	8.95
LV704-5	16030	Asbestos Rubber Gasket	2.58
LV704-6	16031	" " "	0.74
LV704-7	10444	Teflon Packing	16.55/4

CHEV B8 6202

Spare Part 2 - 1er P.O. 15-72-5730
25796

323.41

Qty	Unit	Part No.	Description	Unit Price
704-1	16035	Sleeve & Top Plate Assy, consists of Sleeve & Top Plate, material to be carbon steel carbideizing grade, note 1		233.20
704-2	16023			
704-3	16024	Slide Valve Plate, stainless 440-C,		178.97
704-4	00647	Bearing Plate, carbon steel, carbideizing grade, note 1		161.70
704-5	16030	Stem Guide, stnls steel, chrome plated.		8.95
704-6	16031			
704-7	10444	Asbestos Rubber gasket		2.88
		Asbestos Rubber gasket		0.74
		Teflon Packing		16.25

P.O. 13-72-5730

3217 ORDER: EST32316
32317
32118

EST 32316

EL PASO, TEXAS
ISSUING POINT

APRIL 25, 1960
DATE

195

EST



PREFIX AND ORDER NUMBER
IMPORTANT Show above prefix and order number
on all invoices, shipping papers and correspondence
RENDER INVOICES IN QUADRUPLICATE

FORWARD ALL DOCUMENTS TO
PURCHASING DIVISION

P. O. BOX 862
EL PASO, TEXAS

WILLIAM A. SWIFT

215 N. FORLAR STREET

EL PASO, TEXAS

DATE MUST BE MET
MAY 11, 1960

DATE REQUIRED AT DESTINATION

QUANTITY

DESCRIPTION OF MATERIAL

ITEM NO

QUANTITY
RECEIVED

INVOICE

FREIGHT

TOTAL

430 ONLY BLOCKS 6" WIDE, 36" LENGTH, 3" THICK. MATERIAL TO

1

95 PER SQ. FT.

PE HYDROUS CALCIUM SILICATE (J.M. THERMOVESTOS OR
EQUAL)

400 LBS. INSULATING CEMENT, JOHNS-MANVILLE NO. 302 OR EQUAL

2

6.00 PER CWT.

2 ONLY ROLLS 45# ASPHALT SATURATED AGIENTOS BASE FELT.

J.M. NO. 45 OR EQUAL,

3

5.75 PER CWT.

850 FT. 3/4" X 0.015" TYPE 302 STAINLESS STEEL STRAPPING

4

120.00 PER CWT

30 TYPE 302 STAINLESS STEEL BUCKLE FOR 3/4" X 0.015 STRAPPING

5

1.20 LOT NET

CONFIRMING TO YOUR MR. CROCKETT

DO NOT DUPLICATE

PRICE AS SHOWN PER YOUR QUOTE OF APRIL 22, 1960. BUYING WAREHOUSE, EL PASO, TEXAS

SHIP TO
AND MARK
ALL PACKAGES

EST

ATTENTION OF

REFINERY STAGE.

PREFIX AND ORDER NUMBER

G. A. ANDERSON

DESTINATION EL PASO, TEXAS

SHIP VIA DELIVER

RECEIVED

APR 27 1960

R. L. ANDERSON

- ☐ Prepay & charge on invoice. Attach original receipt, bill for any freight.
☐ Charges collect (if by Railway Express declare actual value).
☐ Supplier endorse on Bill of Lading—"Carrier's Agent: Bill prepaid & collect from Standard Oil Company of Texas," Traffic Department, P.O. Box 862, El Paso, Texas.

20-5932

CHEV B8 6204

TO EL PASO PURCHASING DIVISION

Order No. _____

FOR
PURCHASING
DIVISION
USE

Requisition No. _____

Date APRIL 21, 1960

Place EL PASO REFINERY

Company Name S.O.T.

Department MFG.
(Mfg. or Mktg., etc.)

QUANTITY	DESCRIPTION OF MATERIAL	ITEM NO.	
450	INSULATING FIBER 1" WIDE 3 1/2" LENGTH, 3" THICK MATERIAL TO BE HYDROUS CALCULATED WEIGHT (N.M. THERMOBESTS OR EQUAL)		32314
400 LB.	INSULATING CEMENT WONN-MANVILLE NO 302 OR EQUAL	2	32316
3	PPL. "LAYKOLD" WEATHERCOAT "AMERICAN BITUMENS AND ASPHALT CO"	3	32317
-	ROLLS 45 # ASPHALT SATURATED ASBESTOS BASE FELT. N.M. NO. 45 OR EQUAL	4	32318
450	SQ FT. 1" MESH X 20 GA. 4 FT WIDE GALVANIZED POULTRY NETTING	5	32319
500 FT.	16 GA. GALVANIZED IRON WIRE	6	32318
50 FT	3/4" X 0.015" TYPE 302 STAINLESS STEEL STRAPPING	7	32319
0	TYPE 302 STAINLESS STEEL BUCKLE FOR 3/4" X 0.015 STRAPPING		32316

FOB

Charge to Account # 20-5232

To REFINERY STOREHOUSE

Attention of R. E. ANDERSON Department EL PASO

Via _____

Required at Destination MAY 11, 1960 DATE MUST BE MET.

Requisition Prepared By [Signature] Approved By [Signature]

Date 9/1/60 Date 4/21/60

TX

CHEV B8 6205

RECEIVED

APR 21 1960

J. E. HAYDEN

Collect

Prepaid

ESTIMATE SHEET

S.O.

- I T E M .

SHEET.

OF

DATE

DRWG. NO.

REQUESTED BY

MADE BY

CHECKED BY

APPROVED BY

UNIT

PRICE

LABOR

MAT'L

TOTAL

 f_2

150

107

7.5:0



900

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32.5

100

27

150

69

O. G. C.

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100

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00.02

439

MFG. 658 (16M.CD.7.55)
PRINTED IN U.S.A.



WORTHINGTON CORPORATION

ADDRESS ALL CORRESPONDENCE TO:

SEND REMITTANCES ONLY TO NEAREST P. O. BOX:

NEW YORK: BOX 1642, CHURCH ST. STATION, NEW YORK 8, N. Y.

CHICAGO: BOX 9084, CHICAGO 90, ILLINOIS

LOS ANGELES: BOX 9884, TERMINAL ANNEX, LOS ANGELES 84, CALIFORNIA

TERMS: NET CASH

CUSTOMERS ORDER NO. **EST-31923(4/14/60) WELLSVILLE WORKS**

U-11485 RU-65866

REQUISITION NO.
CONTRACT NO.

WORKS NO.

DISTRICT OFFICE NO. **EL. P. W-308-R**

**STANDARD OIL CO. OF TEXAS
ATT: REFINERY STOREHOUSE
EL PASO, TEXAS**

SOLD TO
**STANDARD OIL COMPANY OF TEXAS
PURCHASING DIVISION
P. O. BOX 862
EL PASO, TEXAS**

SHIPPED TO

SPECIAL MARKS: **OR #EST-31923**

COLLECT ☐

PREPAID ☐

INVOICE DATE

INVOICE NO.

DATE SHIPPED

VIA

FROM

F.O.B.

5-2-60

5-33,061

5-2-60

Frt. Prep'd

Wellsville, NY

11

SIZE, MAKE, TYPE AND
SERIAL NO. OF UNIT ->

**U-11485 TURBINE 20590 Form 1SU4
ROT-L.H. RPM-6830**

ITEM NO.	TOTAL QUANTITY ON ORDER	DESCRIPTION	UNIT LIST PRICE	QUANTITY SHIPPED	BILLING AMOUNT
		THE FOLLOWING OLD LABYRINTH RINGS ARE TO BE RETURNED WITHOUT REPAIRS WITH THE FOLLOWING NEW MATERIAL:			
		MAY 17 1960 M. L. BROWN			
		ONE (1) LABYRINTH RING LD-75335 GR. 1			
		FIVE (5) LABYRINTH RINGS LD-66600 GR. (2)			
		ONE (1) LABYRINTH RING LD-66601 GR. 5			
		FIVE (5) LABYRINTH RINGS LD-66601 GR. 1			
		THREE (3) LABYRINTH RINGS LD-75336 GR. 1			
144		SPRINGS W-62082			\$184.32
24		STOPS ST W-62100			20.64
6		SPRINGS V-17406			15.96
12		STOPS W-74668-1			15.36
RUSH - PHONE ORDER CLAIMS MUST BE MADE WITHIN 15 DAYS AFTER RECEIPT OF ORDER					
CONTINUED ON PAGE 3					
				COMPLETE SHIPT.	
				PARTIAL SHIPT.	
				FINAL SHIPT.	

WORTHINGTON CORPORATION

WORKS ORDER NO. RU-65866
 DISTRICT OFFICE EL PASO
 DIST. OFFICE NO. W-308-R
 CUSTOMER NO. EST-31923
 PAGE NO. 3 OF 5
U-11485

WELLSVILLE WORKS

STANDARD OIL CO.

REMIT TO GENERAL 5700 NEW JERSEY

ITEM NO.	TOTAL QUANTITY ON ORDER	DESCRIPTION	UNIT LIST PRICE	QUANTITY SHIP'D	BILL AMOUNT
	36	MACHINE SCREWS			n/c
		ST 1/4-20 x 1/2			
	1	#2 ROLL JOHNS-MANVILLE-ASBESTOS TAPE			2.3
		#4202			
		Special Messenger to Buffalo			35.0
					\$273.

ORIGINAL

CONTINUED ON PAGE 4

CHEV B8 6208

EST ~~39~~ 31923

day No.
144 Springs, W-62082
24 Stops, day W-62100
6 Springs, V-17406
12 Stops, W-47668-1
36 Machine screws, steel, $\frac{1}{4} \times 20 \times \frac{1}{2}$
1 No. 2 J-M Asbestos Tape,
No. 4202

1 Laby Ring LD-75335-GR1
5 Laby Ring LD-66600-GR2
1 Laby Ring LD-66601-GR5
5 Laby Ring LD-66601-GR?
3 Laby Ring LD-75336-

CLASS 41
PUMPS
EXCEPT CENTRIFUGAL
GASKETS

00-00-00-XXXX

Carbon Steel		Chrome Nickel Steel (Cont'd)	
1001	Carbon Steel Jacket Asb. Fill.	5006	321/347 Jacket Asb. Filled
1002	Carbon Steel Jacket Other Than Asb. Filling	5007	" " Other than Asb. Fill.
1004	Carbon Steel or Armco Iron	5009	Other CR NI Alloy Jacket Asb. Fill.
1006	Carbon Steel "Flexitallic" Type	6001	Other CR NI Alloy Jacket Other than Asb. Fill.
<u>Chrome Steels</u>		6004	304
2008	Chrome Jacket (Thru 6%) Asb.Fill.	6005	304 EIC
2009	" " (Over 6%) " "	6006	316
3001	" " (All Alloys) other than Asb. Filled	6007	316 EIC
3003	Chrome Steel	6008	Alloy 20
3005	Chrome Steel "Flexitallic" Type	6009	Other CR NI Alloys
<u>Chrome Nickel Steel</u>		7004	Flexitallic - 304
4001	304 (302 and 303 also) Jacket Asb. Fill.	7005	" 304 EIC
4002	304 (302 and 303 also) Jacket other than Asb. Fill.	7006	" 316
4003	304 EIC Jacket Asb. Fill.	7008	" EIC
4004	" " " Other than Asb. Fill.	7009	" Other CR NI Alloys
		<u>Nonferrous</u>	
4006	316 Jacket Asb. Filled	8003	Aluminum Jacket Asb. Filled
4007	" " Other than Asb. Filled	8004	"
4008	316 EIC Jacket Asb. Filled	8005	Copper Jacket Asb. Filled
4009	" " " Other than Asb. Filled	8006	"
5003	Alloy 20 Jacket Asb. Fill.	8008	Monel " Teflon "
5004	" " " Other than Asb. Filled	8007	"
		8009	Lead and Lead Alloys
		<u>Nonmetallic</u>	
9001	Asbestos (Pure)	9001	Asbestos (Pure)
9002	Asbestos service sheet	9002	Asbestos service sheet
9003	Paper & Veg. Fiber Base Types	9003	Paper & Veg. Fiber Base Types
9004	Rubbers Natural	9004	Rubbers Natural
9005	" Synthetic	9005	" Synthetic
9006	Teflon & Teflon Types	9006	Teflon & Teflon Types
9007	Animal Fiber (Felts etc.)	9007	Animal Fiber (Felts etc.)
9008	Plastics (other than Teflons)	9008	Plastics (other than Teflons)
9009	Cork	9009	Cork

TABLE 40 PUMPS CENTRIFUGAL

TABLE 41 GASKETS: 00-00-00-XXXX

Carbon Steel		Chrome Nickel Steel (Cont'd)	
1001	Carbon Steel Jacket Ash. Filled	5006	321/347 Jacket Ash. Filled
1002	Carbon Steel Jacket Other Than Ash. Filling	5007	" " Other than Ash. Filled
1003	Carbon Steel or Alloy Iron	5008	Other CR NI Alloy Jacket Ash. Filled
1005	Carbon Steel "Flexitallie" Type	5001	Other CR NI Alloy Jacket Other than Ash. Filled
<u>Chrome Nickel Steel</u>		5004	304
2008	Chrome Jacket (Iron 5%) Ash. Filled	5005	304 EIC
2009	" " (Over 5%) " "	5006	316
3001	" " (All Alloys) Other than Ash. Filled	5007	316 EIC
3003	Chrome Steel	5008	Alloy LC
3005	Chrome Steel "Flexitallie" Type	5009	Other CR NI Alloys
<u>Chrome Nickel Steel</u>		7004	Flexitallie - 304
4001	304 (302 and 303 also) Jacket, Ash. Filled	7005	" 304 EIC
4002	304 (302 and 303 also) Jacket, Other than Ash. Filled	7006	" 316
4003	304 EIC Jacket Ash. Filled	7008	" " EIC
4004	" " " Other than Ash. Filled	7009	" Other CR NI Alloys
<u>Nonferrous</u>		<u>Nonferrous</u>	
4006	316 Jacket Ash. Filled	8003	Aluminum Jacket Ash. Filled
4007	" " Other than Ash. Filled	8004	" " " "
4008	316 EIC Jacket Ash. Filled	8005	Copper Jacket Ash. Filled
4009	" " " Other than Ash. Filled	8006	" " " "
5003	Alloy 20 Jacket Ash. Filled	8008	Monel " Teflon "
5004	" " " Other than Ash. Filled	8007	" " " "
<u>Nonmetallic</u>		8009	Lead and Lead Alloys
9001	Asbestos (Pure)	<u>Nonmetallic</u>	
9002	Asbestos service sheet	9001	Asbestos (Pure)
9003	Paper & Veg. Fiber Base Types	9002	Asbestos service sheet
9004	Rubbers Natural	9003	Paper & Veg. Fiber Base Types
9005	" Synthetic	9004	Rubbers Natural
9006	Teflon & Teflon Types	9005	" Synthetic
9007	Animal Fiber (Felts etc.)	9006	Teflon & Teflon Types
9008	Plastics (other than Teflons)	9007	Animal Fiber (Felts etc.)
9009	Cork	9008	Plastics (other than Teflons)

SHUT

CHEV B8 6214

WORK CHECK LIST FOR

ALLOCATION PLANT
Standard List

845

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP NO.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INS	ENGR					OPR	ENGR
71-G- 020-8045							C - COLUMNS			
							Column No. Service			
							C-601 Deisobutanizer Tower			
							C-602 Debutanizer Tower			
							C-603 Depropanizer Tower			
							C-604 Reflux Tower			
							C-605 Caustic Scrubber Deprop. Units.			
							Install & remove blinds on the following columns. See Operator's Blind List.			
							C-601			
							C-602			
							C-603			
							C-604			
							C-605			
	2						Hot halt, open and head up all external manways on the following columns except as noted. See Operator's Blind List.			
							C-601			
							C-602			
							C-603 (open top manway only, Inspect for cleanliness.)			
							C-604			
							C-605			
							Open and head up tray and baffle manways on the following columns:			
							C-601			
							C-602			
							C-603			
							C-604			
							C-605			
							Clean the following columns:			
							C-601			
							C-602			
							C-603			
							C-604			
							C-605			

WORK CHECK LIST FOR

ALKYLATION PLANT
Standard List

SHUT

WORK NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP NO	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060- 030-8045										
						D - DRUMS				
						Drum No. Service				
						D-601 Compressor Dry Drum				
						D-602 Isobutane Recycle Flash Drum				
						D-603 Spent Acid Flash Drum				
						D-604A Caustic Handroliner				
						D-604B Water Tank				
						D-605 Deisobut. Reflux Drum				
						D-606 Debut. Reflux Drum				
						D-607A Acid Storage Drum				
						D-607B Acid Storage Drum				
						D-607C Acid Storage Drum				
						D-607D Acid Storage Drum				
						D-609 Caustic & Water Degassing Drum				
						D-610 Depropenizer Reflux Drum				
						D-611 Alkylation Reactor				
						D-612 Isobutane Recycle Condenser				
						D-613 Fresh Feed Cooler				
						D-614 Wash Water Drum				
						D-615 Fresh Butane Feed Cooler				
						D-616 Compressor Condensate Drum				
						D-617 Reflux Tower Reflux Drum				
						D-619 Propane Caustic Knock Out Drum				
						D-620 Steam Condensate Drum				
						D-621 Acid Catch Leg				
						Install & remove blinds on the following vessels & drums. See Operator's Blind List.				
						D-601				
						D-602				
						D-603				
						D-604A				
						D-604B				
						D-605				
						D-606				
						D-607A				
						D-607B				
						D-607C				
						D-607D				
						D-609				
						D-610				
						D-611				
						D-612				
						D-613				
						D-614				
						D-615				
						D-616				
						D-617				
						D-619				

WORK CHECK LIST FOR

ALKYLATION PLANT
Standard List

SHUT

CHARGE NUMBER	JOB NO	ORIGIN			PRIORITY	EQUIP No.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060- 030 - 8045	2						D - DRUMS (Cont'd)			
							Hot bolt, open and head up external manways on the following drums, except as noted:			
							D-600			
							D-601			
							D-602			
							D-603			
							D-604A			
							D-604B			
							D-605			
							D-606			
							D-607A			
							D-607B			
							D-607C			
							D-608			
							D-609			
							D-610			
							D-611			
							D-612			
							D-613			
							D-614			
							D-615			
							D-616			
							D-617			
							D-618			
							D-619			
							D-620			
							D-621			
	3						Clean the following drums as noted:			
							D-601			
							D-602			
							D-603			
							D-604A			
							D-604B			
							D-605			
							D-606			
							D-607A			
							D-607B			
							D-607C			
							D-608			
							D-609			
							D-610			
							D-611			
							D-612			
							D-613			
							D-614			

WORK CHECK LIST FOR

ALKYLATION PLANT

SHUT

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	Equip No.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060 030- 8045	4					D - DRUMS				
		X				Change packing in D-613, Fresh Feed Occulocor.				
			X			Drain & dry out all water on floor plates of Acid Drum, D-607D for inspection.				
			X			Strip insulation at areas designated by Inspector for sanding the Spent Acid Flash Drum, D-603.				

WORK CHECK LIST FOR

ALKYLATION PLANT
Standard List

SHUT

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	Equip. No.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060- 040-8045						E - EXCHANGERS				
						Exchanger No. Service				
						E-601 Butane Condenser				
						E-601A Butane Condenser				
						E-602 Fresh Feed-Reactor Effluent Exchangers				
						E-603 Isobut. Recycle-Reactor Effluent Exchanger				
						E-604 Deisobut. Feed Preheater				
						E-605 Deisobut. Reflux Condenser				
						E-606 Deisobut. Recycle Cooler				
						E-606a " " " "				
						E-606b " " " "				
						E-607 Deisobut. Reboiler				
						E-608 Deisobut. Reflux Condenser				
						E-609 A & B Butane Product Cooler				
						E-610 Deisobut. Reboiler				
						E-611a Deisobut. Tower Preheater				
						E-611b " " " "				
						E-612 Deprop. Bottoms Cooler - 2				
						E-613 Deprop. Bottoms-Feed Exchanger - 2				
						E-614 A, B & C Deprop. Feed Heater				
						E-615 Deprop. Reflux Condenser - 6				
						E-616 Deprop. Reboiler				
						E-617 Propane Cooler				
						E-618a Reflux Condenser				
						E-618b " " " "				
						E-619 Reflux Column Reboiler				
						E-619A " " " "				
						E-620 A, B, C, D				
						E & F Reflux Bottoms Coolers				
						E-621 A, B, C, D Light Alkylate Coolers				
						E-622 Deisobut. & Ref. Column Bottoms Cooler				
						E-623 A, B, C, D Reactor Refrig. Recycle Cooler				
						E-624 Reflux Column Feed Heater				
						E-625 Compressor Lube Oil Cooler				

WORK CHECK LIST FOR

ALKYLATION PLANT
STANDARD LIST

SHU

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP NO.	WORK DESCRIPTION	ASSIGNED TO	OPR	ENGR	OK
		OPR	INSP	ENGR							
71-060-040-8045	1						E - EXCHANGERS				
							Install and remove blinds on the following exchangers. See Operator's Blind List:				
							E-601				
							E-601A				
							E-602				
							E-603				
							E-604				
							E-605				
							E-606A				
							E-606B				
							E-606C				
							E-606D				
							E-607				
							E-608				
							E-609A				
							E-609B				
							E-610				
							E-611A				
							E-611B				
							E-612				
							E-613				
							E-614A				
							E-614B				
							E-614C				
							E-615				
							E-616				
							E-617				
							E-618A				
							E-618B				
							E-619				
							E-619A				
							E-620A, B, C, D, E				
							E-621 A, B, C, D				
							E-622				
							E-623 A, B, C, D				
							E-624				
							E-625				
	2						Remove and reinstall channel covers, channels, bucket heads, and floating heads on the following exchangers, except as noted. *Believed leaking; test before unheading.				
							E-601 *				
							E-601A *				
							E-602				
							E-603				
							E-604 *				
							E-605 *				
							E-606 *				

Work Check List For

ALKYLATION PLANT
Standard List

SHUT

CHARGE NUMBER	JOB NO	ORIGIN			PRIORITY	EQUIP NO	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060- 040- 8045						E - EXCHANGERS (Cont'd)				
						E-610				
						E-611A				
						E-611B				
						E-612				
						E-613				
						E-615 *				
						E-616				
						E-618A				
						E-618B				
						E-619				
						E-619A				
						E-620				
						E-621				
	3					Pull and reinstall the following bundles. *Send to shop. Others to be field inspected and sent to shop per instruction from E.D. Division Foreman.				
						E-601				
						E-601A				
						E-602				
						E-603				
						E-604				
						E-605				
						E-607				
						E-608				
						E-610				
						E-611A				
						E-611B				
						E-612				
						E-613				
						E-615				
						E-616				
						E-618A				
						E-618B				
						E-619				
						E-619A				
						E-620				
						E-621				
	4					Clean the following exchanger bundles and shells except as noted:				
						E-601				
						E-601A				
						E-602				
						E-603				
						E-604				

WORK CHECK LIST FOR

ALKYLATION PLANT

SHUT

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP NO.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INS	ENGR					OPR	ENGR
71-060- 040- 8045	8		X				E - EXCHANGERS			
			X				Replace and seal weld the two 3/4" nipples on shell of Deprop. Reboiler, S-616.			
			X				Repair corr and gasket seating surface on floating tubsheet of S-616 Deprop. Reboiler.			
			X				Build up corroded 6" outlet nozzle off S-604 (shell side)			
			X				Build up corroded bottom shell cover of S-607.			
	9		X				Replace the existing 3/4" probe valve on outlet of E-615 with new 1 1/2" I.V. valve at storehouse on EST-34255.			

CHEV B8 6223

WORK CHECK LIST FOR ALKYLATION PLANT
Standard List

ALKYLATION PLANT
Standard List

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CHEV B8 6224

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CHEV B8 6225

ALKYLATION PLANT
standard List:

SNU

CHEV B8 6226

WORK CHECK LIST FOR

ALKYLATION PLANT

SHU

CHARGE NUMBER	JOB NO	ORIGIN			PRIORITY	EQUIP No.	WORK DESCRIPTION	ASSIGNED INFO	OK'D	
		OPR	INSR	ENGR					OPR	ENGR
							J - INSTRUMENTS			
		x					Install thermowell and dial thermometer (0-150F range) on D-621 outlet shellside at boss already installed.			
	2	x					Replace leaking gauge glass on "A" zone of reactor.			
		x					Repair leaking gauge glass on D-605.			
	3						Check all thermometers on compressor, K-601.			
	4	x					Clean all gauge glasses on Reactor, D-611.			
		x					Clean gauge glass & leads on D-601, Compressor Dry Drum.			
	5	x					Clean gauge glass & leads on D-616, Compressor Condensate Drum.			
	6		x				Install orifice plate on D-616 Condensate Recycle to Reactor. Orifice plate was Fabricated on Work Requisition T11594 & is stored at Maint Office.			

CHEV B8 6227

WORK CHECK LIST FOR

ALKYLATION PLANT
Standard List

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CHEV B8 6228

WORK CHECK LIST FOR

ALKYLATION PLANT

SHU

CHARGE NUMBER	JOB NO	ORIGIN			PRIORITY	EQUIP No	WORK DESCRIPTION	ASSIGNED TO	OK'd	
		OPR	INS	ENGR					OPR	ENGR
71-060- 080- 8045							K - COMPRESSOR, K-601			
				X			Remove and re-install top half of K-601 compressor case.			
				X			Inspect 1st and 2nd bearings. Check clearance with plastic gage. Note conditions of bearings, and shaft journals. (Bearing clearance should be .003" to .005".)			
				X			Check thrust collar and thrust shoes. Record axial end play with dial indicator. (Should be .008" to .012").			
				X			Check clearance and condition of all labyrinthing.			
				X			Remove rotating element and wash with water thoroughly.			
				X			Wash top and bottom halves of case with water. (Once washing operation has begun continue until no water and acid sludge remains in case.)			
	2			X			Check condition of Internal Oil Pump.			
	3			X			Check condition of oil pump driving gear (back lash should be .008" to .012".)			
				X			Check condition of mechanical seal and renew any worn parts. Be sure that rotating element is replaced in correct lateral position (See P&ID, 101-11-179 in carrier compressor book).			
	4			X			Install new balanced coupling			
	5			X			Clean oil cooler			
6			X			Clean Cuno filter.				
	X									

CHEV B8 6229

WORK CHECK LIST FOR

ALKYLATION PLANT

SHU

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	Equip No.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSR	ENGR					OPR	ENGR
74-060- 080- 8045							TK-601 - COMPRESSOR TURBINE-DRIVER			
	7		x				Remove top half of turbine case.			
	8		x				Check bearing journals.			
	9		x				Check clearance on bearings (new bearings have .004" clearance.			
	10		x				Check condition of carbon seals and glands and replace if required.			
	11		x				Balance turbine rotor.			
	12		x				Install new balanced coupling.			
	13		x				Install new oil pump and check back lash of driving gears.			
	14		x				Install new suction line to oil pump.			
	15		x				Check governor linkage and rebush or replace worn parts.			
	16		x				Clean out oil reservoir and replace oil.			
	17		x				Open governor valve and check for worn parts. Be sure that resetting mechanism operates satisfactorily.			
	18		x				Align turbine cold so that it is in alignment laterally; but .008" lower than the Compressor.			
	19		x				Check automatic shutdowns and alarms.			
	20		x				Check relief valve on oil line.			
	21		x				Clean oil cooler.			
	22		x				Renew in and out thermometers in oil cooler.			

WORK CHECK LIST FOR

ALKYLATION PLANT
Standard List

SHUT

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP No	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSR	ENGR					OPR	ENGR
71-060- 090-8045	1						L-Lines			
	2						Install & remove blinds per Operator's Blind List. Do not blind under safety valves unless directed so.			
	3						Repack, repair, or replace valves as indicated on Operator's Valve Repair List.			
	4						Connect & disconnect steam & water hoses.			
	5						Pop & reset safety valves indicated on "Safety Valve Check List." Refer to Engr. & Maint. Instr. EP-314, 815, & 2019. Div. Foreman (Shops)-have Mechanic Foreman (Machine Shop) initial scoop line lines after shutdown & send them to Inspection Section.			
							a. Check if safety valves are identified; then send to shop; install boilermakers.			
							b. Pop, repair, & reset as required & return safeties to field.			
							c. Remove boilermakers & install safeties.			
							Strip & reinstall insulating from lines per inspector's Work Lists. Salvage materials where possible for reuse. This should be completed at least two days before the plant is shut down.			

WORK CHECK LIST FOR

ALKYLATION PLANT

SHU

CHARGE NUMBER	JOB NO	ORIGIN			PRIORITY	EQUIP No.	WORK DESCRIPTION	ASSIGNED TO	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
							L - LINES			
71-060- 090-8045	6	x					Repair leaking 3" flange on 160" steam to TRC 60.			
20-060- 090- 2576	7	x					Install 2" - 150# RF WN Flanges and check valve in 2" caustic charge line to Propane Scribber, C-605. Locate valve in line just north of reactor cell A, refer to Engineering for location. DRWG NO. GA-6035-16 ATTACHED FOR LOCATION. Pick up 2" CHECK VALVE PRECHARGED AT C.H.			
20-060- 090- 2527			x				Install 8" - 150# RF WN Flanges and orifice plate made up on work requisition T1586 issued on 12/27/60 and marked for Alky Plant S.D. Install flanges in 10" steam to E-607 in horizontal run. REFER TO DRWG. FOR LOCATION.			
71-060- 090- 8045				x			Seal weld the two 3/4" ball plugs on 4" nozzle on bottom of Deisobut. Reboiler, E-607.			
	8	x					Relocate acid sample draws to suction side of C-611 and C-612.			
20-060- 090- 2575			x				Install water wash facilities on E-611 A & B non- drwg. PE-06-18215-0 ATTACHED FOR LOCATION.			
71-060- 090- 8045	9						Seal weld repair leaking union on steam out of TRC 601 off Leprop. Reboiler, E-616.			
71-13- 090-	10						Tie in Tank 87 suction Line to G-1336 & G-1339 as shown on DRWG. TE-13-231-0. Hydrostatic test Line @ 350 psig.			

WORK CHECK LIST FOR

ALKYLATION PLANT

SHUT

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	Equip No	WORK DESCRIPTION	Assigned To	OK'D	
		OPR	INSP	ENGR					OPR	ENGR
71-060- 090- 8045	11		X				L - LINES			
							Strip insulation from the following locations for inspection.			
							1. 6" Isobutane Recycle line from D-601 to D-611 (for sluggaging).			
							2. 6" & 8" Reactor flash piping from A & B zones of Reactor D-601 to West End (for sluggaging).			
							3. 12" O.D. Compressor Suction piping (for sluggaging).			
							4. 3" Olefin feed line at Control manifold PRCA - 601 under Reactor (for hammering).			
							5. 3" Olefin feed line at olefin feed condenser D-613 (for hammering).			
							6. 2" Fresh Chustic line from Acid House north to Caustic Pumps G-614 (for hammering).			
							NOTE:			
							The above piping will be marked for removal of insulation by Inspector prior to Shutdown.			
	11		X				Seal weld the 1" covered branch line between D-615 and water accumulator.			
	12			X			Replace the 2" treated water line to D-614 with plastic line per the work requisition issued on 5/2/60 (Engr. attached to work requisition).			
							Install 3/4" hansen on D-615 water leg per instruction from engineering for high pressure control.			
	12						Disconnect Suction & Discharge piping on the following pumps for inspection:			
							G-611 G-611A			
							G-613 G-612			
							G-611 G-616			

MEMORANDUM GO-144

TO: MR. V. E. Bimler

Sept. 25 1962

FROM: MR. R. W. NyceSUBJECT: EST-40663OUR FILE: 26-94

YOUR FILE:

Re: to letter from Mr. Frank Copeland
of Snyder Company, dated 9/21/62.
Please have Supplier furnish
the RM-K-68 Raybestos Gaskets
as he already has installed
in the Bottom 202A Flow
Recorder.

J. Haldrich

CHEV B8 6235

SNYDER
INCORPORATED *Company*

Controls and Values • Process Equipment

709 WEST COUNTY ROAD • TELEPHONE FEDERAL 2-9408
ODESSA, TEXAS

P. O. Box 1067
September 21, 1962

RECEIVED

SEP 25 1962

L. T. WINSLOW, JR.

Standard Oil Company of Texas
Purchasing Division
P. O. Box 20002
El Paso, Texas

Attention: Mr. J. E. Bimler

SEP 24 1962
J. E. BIMLER

RE: Your Order EST 40663
Ref: COR-653

Gentlemen:

Thank you for your above subject purchase order for one
Barton Model 202A flow recorder.

We have this instrument in our Odessa stock for immediate
delivery. This instrument meets all your specifications with
the exception of the body gaskets. Your order specifies teflon
or Buna N for gasket material. The standard material used for
these gaskets is RM-K-68 Raybestos. We have used this material
on most petroleum products and have had very little trouble.
However, if you feel you need teflon, we can have them made or
we can also furnish 316 stainless steel gaskets.

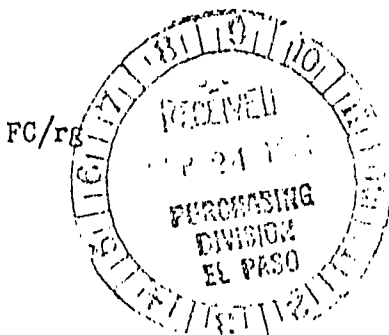
We will hold your order pending receipt of the above infor-
mation.

Very truly yours,

SNYDER COMPANY, INC.

Frank Copeland

Frank Copeland
Store Manager



ADVIS E. RICH

CHEV B8 6236

MATERIAL REQUISITION

TO EL PASO PURCHASING DIVISION

Order No.

CEP-2510

Requisition No.

Date

3/26/63

Place

El Paso

Company Name

Calipail Co.

Department

Mfg.

(Mfg. or Mktg., etc.)

FOR
PURCHASING
DIVISION
USE

QUANTITY	DESCRIPTION OF MATERIAL	ITEM NO.
2	1 1/2" 600 lb screwed globe valve forged steel per ASTM A-105 Gr 2 11-13% chrome trim. Inside screw. Union Bonnet Crane 3620X or equal.	L-33
2	1 1/2" 600 lb, screwed steel horizontal check valve lift type 11-13% Cr. Fr. Union Bonnet, Pacific No 41, Vogt No 9091-9098 or equal	L-35
2	1 1/2", 600 lb carbon steel "Y" strainer with screwed ends, 1/4" perforated or 40 woven mesh monel or stainless steel screen, straight threaded steel strainer cap and copper clad asbestos gaskets	L-165

Price FOB

Charge to Account # 283-1-39-18-90 -2128

Ship To Refinery Storehouse

Attention of J. A. Callahan Department Mfg.

Via Collect Prepaid

Date Required at Destination April 17, 1963

Requisition Prepared By J. A. Callahan Approved By M. L. Brown

EQUIPMENT MANUAL

ALKYLATION PLANT

PLANT 06

EL PASO 2230 PROGRAM

EL PASO REFINERY

1965

K-P

CHEV B8 6238

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY

PROJECT, W.O. 8335

2230 PROGRAM

PLANT 05

ORDER NO.	MATERIAL	SUPPLIER
	C - COLUMNS	
PC-6-C-7	Sieve Tray Column C-506	Wyatt Industries
	D - DRUMS & TANKS	
PC-6-D-1	Reactor Section - Contactors D-627 and D-628	Stratford Eng. Corp.
-9	Vessels D-629, D-630, D-623 D-623 and D-633	AMF Beaird
-15	Coalescers D-626, D-631 D-634 and D-625	Warner Lewis
-29	Relief Drum D-648	Trinity Steel Co.
-38	Vessels D-635, D-634, D-643 D-624, D-639, D-645, D-646 & D-644	A. Gunthard
-47	Seal Oil System	Durametallic Corp.
DX -73	Stal Entrainment Separator D-620	Peerless Mfg. Co.
	E - EXCHANGERS COOLERS CONDENSERS	
PC-6-E-6	Exchangers E-627, 628, 632	Industrial Fabricating
-31	Exchangers E-633, 639, 638	Western Supply
-83	Heat. Exch. Tube Bundle Pulling Attachments	Saracco Tank & Mfg. Corp.
-108	Ht. Exch. Tube Bundle Pulling Att.	Conseco
	G - PUMPS & DRIVERS	
PC-6-G-2	Pumps G-625&A, G-626&A, G-627 G-629&A and G-630&A	Pacific Pumps, Inc.
-22	Pumps G-631&A, G-641 and G-645&A	The Duriron Co.

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ORDER NO.	MATERIAL	SUPPLIER
	G- PUMPS & DRIVERS (Cont'd)	
PC-6-G-25	Prop. Pump & Caustic Washer G-628&A	B.I.F.
-34	Pumps G-633&A, G-634&A G-635&A and G-640.	Byron Jackson Pumps
-50	G-646	Graham Man.
-51	G-642	Union Pump
-56	New Stage for Debut. Reflux Pumps G-607&A	Bingham Pump Co.
-94	Corrosion Inhibitor Inject. G-643	Manzel
	J - INSTRUMENTS	
PC-6-J-8	Panel Instruments	Foxboro Co.
-10	Control Panel	Method Control
-11	Suppressed Range Pressure Transmitters	Foxboro Co.
-12	Blind Pneumatic Flow Transmitters	Fischer & Porter
-13	Indicating Pressure Transmitters	Leighton Stone
-14	Level Switches	Johnson Eng.
-16	Fluid Flow Indicator & Recorders	Barton Instrument
-17	Temp. Switch TAH-06-511	United Electric Cont.
-18	Flow & Level D/P Transmitters	Foxboro Co.
-19	Blind Pneumatic Temp. Trans.	Taylor Instrument
-20	Indicating Pressure Controllers	Bristol Co.
-21	Level Controllers & Transmitters	Mason-Neilan
-24	Field Receiver Gages	Foxboro
-26	Level Gages	Straham Valves
-27	Indicating Temp. Controllers	Bristol
-28	Field Pneumatic Press. Contr.	Fisher Governor

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY
2230 PROGRAM

PROJECT, W.O. 8335
 PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
	J - INSTRUMENTS (Cont'd)	
PC-6-J-32	Alloy 20 Control Valves	Kielex & Mueller
-35	Caustic Tank LI-06-415	
-36	Field Pressure Gages	Ashcroft
-40	Level Controller LC-06-316	Moore Products
-42	Dial Thermometers & Thermowells	Weston
-45	Control Valves	Hammel-Dahl
-46	Temperature Controller TC-06-322	Montgomery Bros.
-49	Rotameters	Fischer & Porter
-48	Air Relay FSL-06-31	George Dahl
-59	Blind Pneumatic Trans.	Fischer & Porter
-60	Blind Temp. Trans.	Taylor Instruments
-63	Dial Thermometers	Weston
-64	Level Gages	Strahman Valves
-65	Charts & Scales	Foxboro
-66	Pressure Controller	Fischer Governor
-67	Field Flow Controller	Cancel. Supp. 1
-68	Level Controller	Fisher Governor
-69	Field Pressure Gages	Leighton Store
-70	Thermocouple Switch Cabinet	Honeywell
-72	Control Valves	A-Hammel Dahl B-La Habra Cons. Whse.
-73	Replacement Trim-Valve FRC-06-136	Kielex & Mueller
-75	Receiver Gages	Foxboro
-76	Pressure Switch	Meletron
-78	ConoFlow Model H10 Pressure Regulator	ConoFlow Corp.
-79	Compressor Suction Vanes Press. Gage	Ashcroft
-80	Air Dryer	Jayco

CHEV B8 6241

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY
2230 PROGRAM

PROJECT, W.O. 8335
PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
	J - INSTRUMENTS (Cont'd)	
PC-6-J-81	Sta-Dri Filters Model 65-SU	Beach Stra-Dri
-82	Indicating Press. Transm.	Ashcroft
-84	Orifice Plates	J. T. Shaler
-85	Repl. Annunciator Components	Scan Instru.
-86	Installation Material	Fisher Governor
-87	Venturi Tube FE-06-460	Mosher Steel Co.
-88	Thermowells	Decker Instrument Supply Co.
-89	Instr. Installation Mat'l	Pacific Pipe Co.
-92	TI-06-8182, TI-06-8183	Weston
-93	Instr. Winterizing House	Moran Furnace
-95	D/P Transmitters	Foxboro Co.
-96	Thermowell TAH-06-510	Decker Inst.
-97	Orifice Plates	J. T. Shaler
-98	Manometer Pl-06-684	Meriam
-99	Refrigeration System Rupture Disc. Installations	Black Sivvals
-101	Restriction Orifices	Republic Supply Co.
-102	Freon Leak Detector	General Electric
-105	Instal. Mat'l for APS	N. J. Hatter
-106	Nameplates & Tags	Acme Engraving Co.
-107	Rotameter	Fischer & Porter Co.
-113	Fisher & Porter Purge Meter	Fischer & Porte
-114	Thermowells TW-06-823 & 06-824	Decker Instrument Co.
-116	Orifice Plates	J. T. Shaler
-117	Alloy 20 Orifice Plate FT-06-410	J. T. Shaler
-119	Liquid Level Gages	Strahman Valves

PROJECT, W.O. 8335
PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
	J - INSTRUMENTS (Cont'd)	
PC-6-J-121	Purge Unit Install.	A - Crane Supply B - Black-Sivvals & Bryson C - Leighton Stone D - Adam Hill Co. E - Schutte & Koerting
-126	Thermowell TIC-06-307	Richmond Reclamation
-127	Scales for Level Gages	Strahman Valve
-128	Press. Gage Pl-06-605	Ashcroft
-133	Thermowell TIC-06-305	
-134	Flanged Thermowells	
-135	Dial Thermometers	
	K - MECHANICAL EQUIPMENT	
PC-6-K-4	Freon Compressor Driver	Worthington Corp.
-5	Freon Refrigeration System	York Corporation
PC-6-SP-90	Spare Compressor Rotor	York
-91	Spare Turbine Rotor	Worthington
	L - PIPING	CHEV B8 6243
PC-6-L-33	Relief Valves	Leighton Stone

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY
2230 PROGRAM

PROJECT, W.O. 8335
PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
PC-6-LX-5	Consol. Stock - Valves	
-6	C/S Valves & Ftgs.	A - El Paso Pipe & Supply Co. B - Jules & Bennett Co.
-7	Pipe - C/S	X - Richmond C - Mine & Smelter Supply B - El Paso Pipe Supply Co. D - Metal Goods Corp.
-8	C/S Flanged Valves	
-9	C/S Screwed Valves	A - El Paso - B - Franklin Supp. C - Division Supply D - Vernon Tool E - York Div. Borg - Warner
-10	C/S Flanges	B - Jules Bennett C - Western Forge - D - Vinson
-11	C/S Welding Fittings	C - Jules Bennet D - Republic
-12	C/S Strainers, Couplings Flanges	B - G. S. Thomas-C Border Mach. D - O'Brien Iron E - Kreml - F. M. N. Atkon
-13	C/S Bolts & Gaskets	A - Refy Sthse. - B - El Paso C - Houston Gas Ref.
-14	C/S	
-15	C/S Screwed Fittings	A - Refy Sthse. B - Norville Wilder - C - Jules Bennett
-16	C/S Somatic Coated Pipe	
-17	C/S Pipe Ftgs. & Valves	B - El Paso
-18	Flanged Valves	A - El Paso - B - Alley Steel C - Jules Bennett
-19	C/S Pipe Ftgs. & Valves	
-20	C/S Cooling System	Franklin Supply
-28		A - Metal Goods B - El Paso Pipe
-29	C/S Instru.	
-34	L-7832 - 3/4	Vernon Tool
-35	C/S	Centex Inc.
-36	C/S Misc. Pipe	A - El Paso B - O'Brien Iron
-37	C/S Valves	A - Storehouse - B - Mid-Cont. C - J. G. Bennett
-38	C/S L-7649-6	El Paso Pipe Supply

ORDER NO.	MATERIAL	SUPPLIER
PC-6-LX-39	C/S Pipe	A. Vinson Supply Co. B. Borden Machinery Co. C. Monsen - Dunnegan - Regan D. Trident Engineering
-40	C/S Pipe	A. Vinson Supply Co. B. Norville-Wilder
-41	Alloy 20 Pipe	A. Mid. Continent Supply B. Associated Steel C. Vernon Tool Co. D. El Paso Pipe & Supply
-42	C/S Pipe	A. Mid Continent Supply B. Associated Steel C. Valve Company
-44	Pipe	A. Monsen, Dunnega, Ryan B. El Paso Pipe & Supply C. Esco
-45	Hose Stations	Darb/Shire Steel Co.
-46	C/S Instr. Mat'l	
-47	C/S Piping & Valves	
-48	C/S Pipe	A. Storehouse B. El Paso Pipe
-49	Refrigeration Valves	A. York B. El Paso Pipe
-51	Pipe & Flanges	
-52	Refrigeration Lube System	
-57	C/S Piping	
-59	Relief Piping	
-60	Relief Line Materials	A. Kubic Valve - B. El Paso C. Oil Well
-61	Pipe	A. Storehouse Stl. B. Monson-Dunnegan, Ryan C. Spraying Systems D. Norville-Wilder E. Wheeling Pacific F. El Paso Pipe & Supply G. Ram Forge & Steel
-64	Pipe	A. Vinson Supply B. Associated Steel
-65	Flanges	A. Republic Supply Co. B. Hawley Forge & Mfg. Co. C. O'Brien Iron Works D. El Paso Pipe & Supply Co.
	CHEV B8 6245	

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY
2230 PROGRAM

PROJECT, W.O. 8335
 PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
PC-6-LX-66	Screwed Fittings	A. Wheeling Pacific Co. B. El Paso Pipe & Supply Co. C. Mid-Continent Supply Co. D. Mills Iron Works E. George S. Thomson Co.
-67	Welded Fittings	A. El Paso Pipe & Supply Co. B. Norvell Wilder Co.
-68	C/S Misc. Instr. Fittings & Tubing	A. Wheeling Pacific Co. B. El Paso Pipe & Supply C. Fairchild Miller Corp. D. Geo S. Thomson Co. E. Mills Iron Works F. James J. Kone Co. G. Foxboro Co. H. Darb/Shire Steel Co. I. Samuel Moore & Co.
-69	Bolts & Gaskets	A. El Paso Saw & Belting B. Lamons Metal Gasket
-70	Screwed Valves	A. Geo Thomson B. Vinson Supply C. El Paso Pipe & Supply
-71	Flanged Valves	X. El Paso Pipe & Supply A. Norvell Wilder B. Jules G. Beckett
-72	Cooling Water Pipe	Continental Enseco
-74	Pipe & Tube	
-75	Screwed Valves	A. Pacific Valves B. Oil Well Supply
-76	Bolts & Gaskets	B. Geo. S. Thompson Co. C. El Paso Saw & Belting
-77	Misc.	A. Ref. Sthse B. Darbyshire Steel Co.
-78	Flanges	A. Hawley Forge & Mfg. B. Oil Well Supply
-79	C/S Flanged Valves	Mid Continent Supply
-80	C/S Welded Fittings	
-81	Screwed Fittings	El Paso Pipe & Supply
-83	C/S 1" Hose Couplings	C. L. North Co.
-87	Consolidated Steel	A. El Paso Pipe & Supply B. Associated Steel

CHEV B8 6246

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY PROJECT, W.O. 8335
2230 PROGRAM PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
	M-&X - STRUCTURES	
PC-6-M-&X-2	Fabricated Steel	Darby Shire Steel
-X		
-41	Stanchion Edge Beams	Equitable Equip.
-63	Vapor Barrier	H. Welsh Co.
-X		
	N - INSULATION	
PC-6-N-62	Insulation	Willard A. Salle
	P - POWER & LIGHTING	
PC-6-P-37	NEMA type 3 MCC	Cuttler Hammer
-57	P-579	Westinghouse
-58	P-541 and P-532	Graybar
-103	Alarm Horn	Westinghouse Electric Supply Co.
-104	Circuit Breakers	Westinghouse Electric Supply Co.
-109	Thermostat Control	Mercoid Corp.
-110	Dry Transformer	Westinghouse Electric Supply Co.
-111	Elect. Heat Tracing	Nelson Electric Mfg. Co.
-122	Telephone Booths	Graybar Electric Co.
-129	Replacement Switch - Refrig. System	
-130	Replacement Switch - Refrig. System	
-131	Replacement Solenoid Valves Refrig. System	
		CHEV B8 6247

INDEX OF MATERIAL ORDERS FOR EL PASO REFINERY
2230 PROGRAM

PROJECT, W.O. 8335
 PLANT 06

ORDER NO.	MATERIAL	SUPPLIER
	P - POWER & LIGHTING	
PC-11-P-1	Primary Switchgear	S&C Electric Co.
-2	Unswitched Capacitor Bank	Westinghouse Electric Corp.
-3	Fused Disc. Sw. Parts	S & C Electric Co.
-23	Transformer & Swgr.	General Electric
PC-6-PX-22	C/S Electrical Material	A. Electrical & Mech. Shop B. Zork Hdwe. C. Triangle Electric
-23	C/S Electrical Material	A. Refinery B. Triangle Electric
-24	C/S Electrical Material	Zork
-25	C/S Electrical Material	A. El Paso - B. Edward Hdwe C. H. Welach
-26	C/S P609-1	Lead & Northup
-27	C/S Electrical Material	A. Mine & Smelter - B. Zork Hdwe B. Hollywood Electric
-30	P-240, P-241, P-6001	Graybar
-31	Power Line Hardware	Zork Hdwe.
-32	9LA2HC53, 9L111AW844	General Electric
-53	C/S Elect. Wire	
-54	Conduit, Supports & Junc. Box	
-55	Lighting Fixtures	
-56	Misc. Electrical Items	
-58	Nameplates & Tags	
		CHEV B8 6248

FPY-16-E54-15

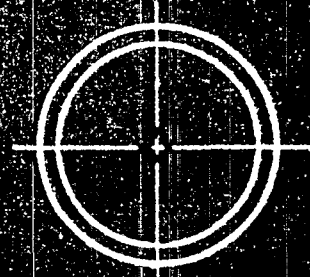
21684A ITEM E-1616
1220 SQ. FT. AFTER CON. DENSEN. #61 2ND. ST. - E. EU.
21684A ITEM E-1616
1220 SQ. FT. AFTER CON. DENSEN. #61 2ND. ST. - E. EU.

ITEM No.	PART	LOCATION	SIZE	MATERIAL	QUAN
37	STUD	ST. CHEST TO SUCT. CHAMBER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
38	STUD	DIFFUSER TO SUCT. CHAMBER	3/4"-10 X 2 7/8" LG.	C.M.S.	8
39	NUT		3/4"-10	H.C. STL.	8
40	MACH. BOLT	DIFFUSER TO DIFFUSER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
41	NUT		5/8"-11	H.C. STL.	8
42	GASKET	ST. CHEST & SUCT. CHAMBER	1/32" X 7 1/2" O.D. X 4" I.D.	RUBBER ASBESTOS	1
43	GASKET	DIFFUSER & SUCT. CHAMBER	1/32" X 11" O.D. X 7" I.D.	RUBBER ASBESTOS	1
44	GASKET	DIFFUSER & DIFFUSER	1/16" X 5 1/8" O.D. X 5 1/4" I.D.	RUBBER ASBESTOS	1
45					
46	STUD BOLT	FLOATING HEAD TO BACKING DEVICE	3/4"-10 X 6 1/4" LG.	C.M.S.	24
47	STUD BOLT	SHELL COVER TO SHELL	3/4"-10 X 6 1/4" LG.	C.M.S.	20
48	NUT		3/4"-10	H.C. STL.	88
49	STUD BOLT	SHELL CHANNEL TO SHELL	5/8"-11 X 7" LG.	C.M.S.	24
50	STUD BOLT	CHANNEL COVER TO CHANNEL	5/8"-11 X 5 1/2" LG.	C.M.S.	24
51	NUT		5/8"-11	H.C. STL.	96
52	FLEX. GASKET STYLE-R	FLOATING HEAD & TUBE SHEET	1/8" X 22 7/8" O.D. X 22 1/8" I.D.	MONEL & ASB.	1
53	FLEX. GASKET STYLE-R	SHELL & TUBE SHEET	1/8" X 25 1/2" O.D. X 24 3/4" I.D.	MONEL & ASB.	1
54	GASKET	SHELL & SHELL COVER	1/16" X 29 3/4" O.D. X 28" I.D.	RUBBER ASBESTOS	1
55	GASKET	CHANNEL & CHANNEL COVER CHANNEL & TUBE SHEET	1/16" X 25 7/8" O.D. X 24 3/8" I.D.	RUBBER ASBESTOS	2
56					
57					
58					
59					
60	STUD BOLT	6" DIA. HANDHOLE	3/4"-10 X 4" LG.	C.M.S.	16
61	NUT		3/4"-10	H.C. STL.	272
62	GASKET	6" DIA. HANDHOLE	1/16" X 11" O.D. X 6" I.D.	RUBBER ASBESTOS	2
63	STUD BOLT	FLOATING HEAD TO BACKING DEVICE	3/4"-10 X 6 1/4" LG.	C.M.S.	28
64	STUD BOLT	SHELL COVER TO SHELL	3/4"-10 X 7 1/2" LG.	C.M.S.	28
65	STUD BOLT	SHELL CHANNEL TO SHELL	3/4"-10 X 9 1/2" LG.	C.M.S.	32
66	STUD BOLT	CHANNEL COVER TO CHANNEL	3/4"-10 X 7 3/4" LG.	C.M.S.	32
67	FLEX. GASKET STYLE-R	FLOATING HEAD & TUBE SHEET	1/8" X 34 5/8" O.D. X 33 5/8" I.D.	MONEL & ASB.	1
68	FLEX. GASKET STYLE-R	SHELL & TUBE SHEET	1/8" X 37 7/8" O.D. X 36 7/8" I.D.	MONEL & ASB.	1
69	GASKET	SHELL & SHELL COVER	1/16" X 41 7/8" O.D. X 40 1/4" I.D.	RUBBER ASBESTOS	1
70	GASKET	CHANNEL & CHANNEL COVER CHANNEL & TUBE SHEET	1/16" X 38 1/8" O.D. X 36 5/8" I.D.	RUBBER ASBESTOS	2

CALIFORNIA STATE PRODUCTS DIVISION
ADSCO INDUSTRIES, INC.
 RICHMOND, CALIFORNIA



MARK "A"



MARK "C"



MARK "B"



MARK "D"

NOTE: 1/2" Radius in all Corners

GASKET LIST

REQ'D	MARK	SIZE	LOCATION	THK	MATERIAL
1	A	14 1/2" O.D. X 13 3/4" I.D.	CHAN. TO CHAN. COVER	1/16"	DURABLE
1	A	14 1/2" O.D. X 13 3/4" I.D.	CHANNEL TO TUBESHEET	1/16"	DURABLE
1	B	14 1/2" O.D. X 13 3/4" I.D.	TUBESHEET TO SHELL	3/32"	COPPER CLAD ASBESTOS
1	C	17 3/4" O.D. X 17" I.D.	SHELL TO SHELL COVER	3/32"	STEEL CLAD ASBESTOS
1	D	11 1/2" O.D. X 11 1/16" I.D.	FLOATING HEAD	3/32"	COPPER CLAD ASBESTOS
		O.D. X I.D.			
		O.D. X I.D.			

TOTAL NUMBER OF GASKETS REQ'D:

12 - MARK "A"

6 EACH - MARKS "B", "C" & "D"

ENGINEERING DEPT.

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 SERVICES SECTION

APPROVED

NOV 7 1956

E. S. WARNER - Per *ESW*

CHEV B8 6286

ITEMS E-1609-A & E-1609-B

JOB

**EXCHANGER
 GASKETS**

REV.

10 13 50

CALIFORNIA STEEL PRODUCTS DIVISION
ADSCO INDUSTRIES, INC.
RICHMOND, CALIFORNIA

BOLT LIST



1. 28 - 3/4" DIA. - 6 7/8" LONG STUD BOLTS WITH 2 CLASS 2H
HEX NUTS EACH. MATERIAL - ASTM A-193 GR. B-7.
FOR CHANNEL TO CHANNEL COVER.
2. 28 - 3/4" DIA. - 8 1/8" LONG STUD BOLTS WITH 2 CLASS 2H
HEX NUTS EACH. MATERIAL - ASTM A-193 GR. B-7.
FOR CHANNEL TO SHELL.
3. 28 - 7/8" DIA. - 8 1/8" LONG STUD BOLTS WITH 2 CLASS 2H
HEX NUTS EACH. MATERIAL - ASTM A-193 GR. B-7.
FOR SHELL TO SHELL COVER.
4. 24 - 1" DIA. - 8 1/8" LONG STUD BOLTS WITH 2 CLASS 2H
HEX NUTS EACH MATERIAL - ASTM A-193 GR. B-7.
FOR FLOATING HEAD.
5. _____ DIA. * _____ LONG STUD BOLTS WITH _____ CLASS 2H
HEX. NUTS EACH MATERIAL - ASTM A-193 GR. B-7.
FOR _____

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(NUMBER LISTED IS FOR ONE SET)

CUSTOMER - STD. OIL CO. OF TEXAS

CUST. PO. NO. BY 165-53

ITEM NO. 1660A1B 1/2

CHEV B8 6287

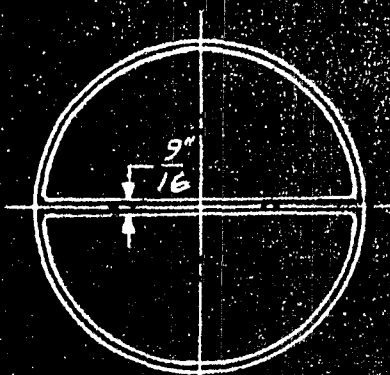
165-16-653-4

SOUTHWESTERN ENGINEERING COMPANY

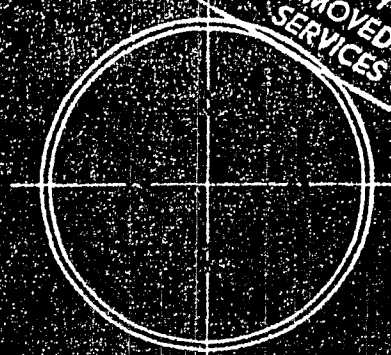
4800 SANTA FE AVENUE

LOS ANGELES, CALIF.

ENGINEERING DEPT.
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MARK "A"



MARK "B" & "D"



MARK "C"

NOTE: $\frac{1}{2}$ " RADIUS IN ALL CORNERS

GASKETS

NO REQ'D	MARK	SIZE	LOCATION	THK	MATERIAL
1	A	32 $\frac{1}{16}$ " O.D. X 30 $\frac{3}{8}$ " I.D.	COVER TO CHANNEL	$\frac{1}{16}$ "	JM 60
1	A	32 $\frac{1}{16}$ " O.D. X 30 $\frac{3}{8}$ " I.D.	CHANNEL TO TUBE SHEET	$\frac{1}{16}$ "	JM 60
1	B	31 $\frac{3}{8}$ " O.D. X 30 $\frac{3}{8}$ " I.D.	TUBE SHEET TO SHELL	$\frac{3}{32}$ "	D.I. COPPER CLAD ASB.
1	D	35 $\frac{3}{8}$ " O.D. X 34 $\frac{3}{8}$ " I.D.	SHELL TO SHELL COVER	$\frac{3}{32}$ "	D.I. ST. CLAD ASB.
1	C	29 $\frac{3}{8}$ " O.D. X 28 $\frac{1}{4}$ " I.D.	FLOATING HEAD	$\frac{3}{32}$ "	D.I. COPPER CLAD ASB.
		O.D. X I.D.			
		O.D. X I.D.			

LONGITUDINAL SHELL
BAFFLE

$\frac{3}{16}$ " SO PALMETTO GASKET FOR
SEAL BAR REQ'D LG

$\frac{5}{8}$ " X $\frac{3}{32}$ " GARLOCK NO 160 LEAD CORE
ASBESTOS REQ'D

STUD BOLTS & NUTS

NO BOLTS	DIA.	LENGTH	NO NUTS	LOCATION	MATERIAL
28	$\frac{7}{8}$ "	7 $\frac{3}{8}$ "	56	CHANNEL COVER TO CHANNEL	ASTM A 193 GR. B7
28	$\frac{7}{8}$ "	9 $\frac{3}{8}$ "	56	CHANNEL TO SHELL	L L
32	$\frac{7}{8}$ "	7 $\frac{3}{4}$ "	64	SHELL TO SHELL COVER	L L
32	$\frac{3}{4}$ "	7 $\frac{1}{4}$ "	64	FLOATING HEAD	L L

APPROVED
DEC 26 1956
E. S. WARNER - P.E.

CHEV B8 6288

STUD BOLTS, EXCEPT AS NOTED, SHALL BE THREADED FULL LENGTH, AMERICAN NATIONAL COARSE FOR SIZES 1" AND BELOW AND 8 THREADS PER INCH ABOVE 1" SIZE, CLASS 3 FIT. STUDS SHALL HAVE CLASS 3 FIT ON NUT END. ALL NUTS, EXCEPT AS NOTED, SHALL BE AMERICAN STANDARD HEAVY SEMI-FINISHED CHAMFERED AND TRIMMED TO A.S.A. B18.2-1941 AND A.S.T.M. SPEC. A 194-48 CLASS 2H, CLASS 2 FIT.

TOTAL NO. OF SPARE GASKETS REQ'D-8

3-A - 2-D
1-B - 2-C
QUANTITIES SHOWN ARE FOR ONE UNIT
2 UNITS REQ'D

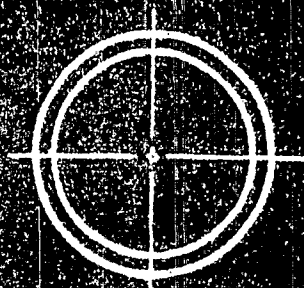
CUSTOMER
STANDARD OIL CO OF TEXAS
EL PASO TEXAS
PO. BOX 165-52
ITEM E-1607-A & B

JOB	BOLT & GASKET LIST	REV	DATE	BY	CHKD	SEAL

CALIFORNIA STEEL PRODUCTS DIVISION
ADSCO INDUSTRIES, INC.
 RICHMOND, CALIFORNIA



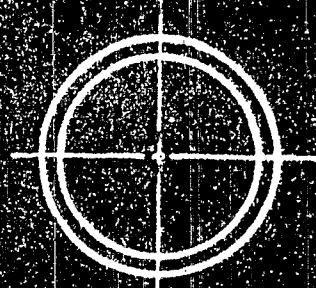
MARK "A"



MARK "C"



MARK "B"



MARK "D"

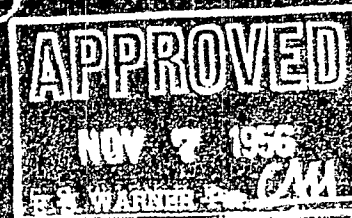
NOTE: 1/2" Radius in all Corners

GASKET LIST

REQ'D	MARK	SIZE	LOCATION	THK	MATERIAL
1	A	27 1/2" O.D. X 26 1/2" I.D.	CHAN. TO CHAN. COVER	1/16"	DURABLE
1	A	27 1/2" O.D. X 26 1/2" I.D.	CHANNEL TO TUBESHEET	1/16"	DURABLE
1	B	27 1/2" O.D. X 26 1/2" I.D.	TUBESHEET TO SHELL	3/32"	CORNER CLAD ASBESTOS
1	C	31 7/8" O.D. X 30 7/8" I.D.	SHELL TO SHELL COVER	3/32"	STEEL CLAD ASBESTOS
1	D	25 1/2" O.D. X 24 1/2" I.D.	FLOATING HEAD	7/32"	CORNER CLAD ASBESTOS
		O.D. X I.D.			
		O.D. X I.D.			

TOTAL NUMBER OF GASKETS REQUIRED:
 12 MARK "A"
 6 EACH MARK "B", "C", & "D"

CHEV B8 6289



FOR ITEMS 1603 A & 1603 B

EXCHANGER

26/11/56

AT 1603

26/11/56

1791.11.653-3

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

PLANT

CHEV B8 6290

PROJECT, W. O. 8-32
PLANT 27

[illegible]

PLANT

CHEV B8 6293

16

SHEET 5 OF 12

INDEX OF MATERIAL ORDERS FOR R-250 Program - El Paso PROJECT, W.O. 6332
Grade Unit #9 PLANT 16

ORDER NO. PY	MATERIAL	SUPPLIER
PY-16K-11 _{1/2}	Gas Compressors & Drivers K-1601 and K-1601A	Clark Bros.
16K-138	Tubing for Heat Exchanger Tube Bundle Extractor	
16K-144	Bars for Tube Bundle Extractor	
16K-148	Tube Bundle Extractor	
16K-165	Tube Bundle Extractor	
16K-169	Air Hoist for Perco Sweetener Catalyst	Ingersoll Rand Company
16K-176	Steel Ball Bearing Screws for Tube Bundle Extractor	
16X-K177	Catalyst Loading Funnel	United Pipe Fabricating Co.
16K-188	Track Wrench	
16K-189	Gripper Slings	
16K-190	Nylon Bristle Wiper for Tube Bundle Extractor	
16L-79	Fabricated Carbon Steel Piping	Gulf Coast Fabricating Co.
16L-97	Air Traps for Perco Sweeteners	Tay Holbrook Inc.
16X-1100	Plug Valves for Cooling Water System	Gulf Supply Company
16L-121	Alloy Valves	A- P. & S. Dept., Richmond B- Chapman Valve Company C- Republic Supply
16L-122	Cooling Water Strainers	Staples & Pfeiffer
16L-124	Suction Strainers	Ed W. Smith Machine Works
16L-126	Alloy Pipe, Flanges & Fittings	B- Electric Steel Foundry Co. C- Pacific Metals Co., Ltd. D- Chas. S. James Company
16X-1127	Alloy Fittings	Geo. S. Thomson Co., Inc.
16L-130	Alloy Spectacle Blinds	Union Machine Works
16X-1134	Unfinished Pipe & Fittings	Refining Supply Company

ORDER NO. PY	MATERIAL	SUPPLIER
16X-L135	Valves	El Paso Pipe & Supply Company
16L-136	Fabricated Alloy Piping	The Gulf Coast Fabricating Company
16L-123	Line Strainers for Perco Sweeteners	Granberg Corporation
16X-L141	Valves for Sweetener Vessels	Saran Lined Pipe Company
16X-L142	C. S. Pipe and Fittings	A- Horvell-Wilder Supply Co. B- Morasen, Dunnagan Ryan C- El Paso Pipe & Supply Co. D- American Packing & Gasket Co. E- Gulf Supply Company F- Global Packing Company
16X-L145	Saran Piping	Saran Line Pipe Company
16L-147	Expansion Joints	Badger Manufacturing Company
16X-L161	Oil Strainers	Crane O'Fallon Company
16X-L166	Sample Cooler - Water Injection System	O'Brien Iron Works
16L-170	Sample Coolers	O'Brien Iron Works
16L-171	Sample Coolers	Kewanee-Ross Corporation
16X-L172	Steam Traps	Geo. S. Thomson Company, Inc.
16L-174	Aluminum Discs for Sweetener Air Diffusers	The Norton Company
16X-L175	Air Vent Filter for Sweeteners	Air-Maze Corporation
16L-178	Flame Arrestor	Shand & Jure
16X-L179	Flexible Hoses	Geo. S. Thomson Company, Inc.
16X-L182	C.S. Fittings, Blinds & Spacers	A- El Paso Pipe & Supply B- O'Brien Iron Works
16X-L183	Heater Lighting Torch	John Zink Company
16L-195	Alloy Piping (Spools)	
16X-27	Structural Steel	Darbyshire Steel Company, Inc.
16X-M79	Anchor Bolts - Structural Shapes	Ramsay Steel Company, Inc.

ORDER NO. PY	MATERIAL	SUPPLIER
16M-111	Unistrut for Pipe Stanchions	Landes, Zachary & Peterson
16M-112	Pipe Davits	Ramsey Steel Company, Inc.
16X-M129	Embedded Structural Angles	Darbyshire Steel Company
16X-M130	Anchor Bolts & Structural Steel	Ramsey Steel Company, Inc.
16X-M149	Anchor Bolts for Pipe Stanchions	El Paso Machine Works
16M-155	Unistrut for Pipe Stanchions	Landes, Zachary & Peterson
16X-M156	Structural Steel	Darbyshire Steel Company
16X-M159	Pipe Supports & Brackets	United Pipe Fabricating Co.
16X-M160	Pipe Supports	Industrial Hardware & Supply Company
16X-M163	Structural Steel for Pipe Supports	Ramsey Steel Company
16X-M168	Pipe Supports and Brackets	United Pipe Fabricating Co.
16X-M180	Steel Angle and Plate for Sample Connections	Ramsey Steel Company
16X-M184	Structural Steel for Pipe Supports	Darbyshire Steel Company
16X-M185	Hose Cabinets	El Paso Sheet Metal Works
16X-M186	Barrel Racks	El Paso Machine Works
16X-M196	Pipe Supports	Industrial Hardware & Supply
16X-M201	Troughs for Sample Connections	
16X-M139	Wire Mesh for Fireproofing	Ramsey Steel Company
16P-16	Motor Control Centers	Westinghouse Electric Corp.
16P-59	Transformers, Panels & Circuit Breakers	A- Fred G. Guthrie & Assoc. B- Westinghouse Electric Corp.

INDEX OF MATERIAL ORDERS FOR EL PASO PROJECT, W.O. 6332
PLANT

ORDER NO.	MATERIAL	SUPPLIER
16P-1	100 Boxes and Junction Boxes	A- Westinghouse Electric Corp. B- Fraser & Johnston
16P-2	Various Receptacles	Westinghouse Electric Corporation
16P-3	Switchgear (Unit Substations)	I.T.E. Circuit Breaker Company
16P-4	Steel Covers for Pull Boxes	Ramsey Steel Company
16P-5	Miscellaneous Electrical Material	A- F. Somers & Peterson B- Calif. Wholesale & Elec. Co. C- General Electric Supply Co. D- Westinghouse Electric Corp.
16P-6	Nameplates and Tags - Underground	A- H. M. Nutter Company B- Acme Engraving Company
16P-7	P.D. Conduit Boxes, Covers, Switches & Receptacles	Westinghouse Electric Corp.
16P-8	Electric Clock for Control House	General Electric Supply Company
16P-9	Nameplates and Tags - Overhead	A- H. M. Nutter Company B- G. G. Pemis Company
16P-10	Lighting Panel Nameplate Holder	Acme Engraving Company
16P-11	Lighting Fixtures for Control House	General Electric Supply Company
16P-12	Terminal & Junction Boxes for Thermocouples and Alarms	Boersig & Company
16P-13	C. L. Junction Boxes	General Electric Supply Company
16P-14	Holder for Control House	M. A. Chaben Company
16P-15	Spares Circuit Breaker	I.T.E. Circuit Breaker Company
16P-16	Circuit Breaker & Motor Starter	Westinghouse Electric Corporation
16P-17	Wire for Thermocouple (P-1602)	
16X-200	Anchor Bolts	A- Darbyshire Steel Company, Inc. B- Gulf Coast Bolt & Nut Company
16X-201	Anchor Bolts	El Paso Machine Works
16X-202	Anchor Bolts for Foundations	Darbyshire Steel Company
16X-203	Anchor Bolts	Ramsey Steel Company
16X-204	Anchor Bolts for Foundations	Darbyshire Steel Company
16X-205	Anchor Bolts	El Paso Machine Works
16X-206	Anchor Bolts for Foundations	Darbyshire Steel Company
16X-207	Anchor Bolts for Foundations	Darbyshire Steel Company

PLANT

[illegible]

UNION**BILL OF MATERIAL**

5000-101

MP COMPANYTAG(ITEM)NO: G-1607-1 (EPR-46478)
PUMP SERIAL NO: 742762-201

GROUP I "H" PUMP

PUMP TYPE

QTY EACH	SECT PART NO	DESCRIPTION	REC. SPARE PARTS	PATT. OR DWG. NO.	MATERIAL
1	849	¹ BEARING BRACKET		849-D-1506	CAST IRON
1		² STEEL BALL		1/4" DIA. ST'D.	GRADE STEEL
1	813-1	³ INBOARD COVER		813-A-2348	B-1113 STEEL
1	829-1	⁴ INBOARD COVER DEFLECTOR		829-A-2349/1	ALUMINUM
2		⁵ CUP POINT SOCKET HEAD SET SCREWS		#10-24 x 5/8" LG.	STEEL
1	813-2	⁶ OUTBOARD COVER		813-C-1944	CAST IRON
1	815-5	⁷ OUTBOARD COVER "O" RING	1	ARP-568-251	BUNA "N"
6		⁸ HEX. HEAD CAPSCREWS	3/8-16	UNC x 1-1/4" LG.	STEEL
1	829-3	⁹ OUTBOARD COVER DEFLECTOR		829-A-2349	ALUMINUM
		¹⁰			
2		¹¹ CUP POINT SOCKET HEAD SET SCREWS		#10-24 x 5/8" LG.	STEEL
1		¹² OIL LEVEL INDICATOR		BIJUR #B-5631	
1		¹³ CONSTANT LEVEL OILER		TRICO #3	
1		¹⁴ PIPE NIPPLE	1/4"	PIPE x 2" LG.	STEEL
1		¹⁵ 3/8" HOLLOW HEAD PIPE PLUG		3/8" N.P.T.	STEEL
		¹⁶			
1	820	¹⁷ SHAFT	1	820-C-2447	A-582 TYPE 416
1	881-1	¹⁸ RADIAL BEARING	1	MRC-210M	
1	881-2	¹⁹ THRUST BEARING	1	MRC-5309-G	
1	831	²⁰ BEARING LOCKWASHER	1	W-09	
1	821-4	²¹ BEARING LOCK NUT	1	N-09	
1	829-2	²² OIL FLINGER		829-A-2110	CAST ALUMINUM
2		²³ CUP POINT SOCKET HEAD SET SCREW		1/4-20 x 1/4" LG.	STEEL
1		²⁴ ROL-PIN		31-S-125-0375	STEEL
1	845	²⁵ COOLER COVER		845-C-1945	CAST IRON
1	815-6	²⁶ COOLER COVER GASKET		815-A-1824	DURABLA
6		²⁷ HEX. HEAD CAP SCREWS	3/8-16	x 1-1/4" LG.	STEEL
		²⁸			
		²⁹			
		³⁰			
		³¹			
		³²			
		³³			
		³⁴			

CHEV B8 6300

SECTIONAL DWG.

OUTLINE DWG.

MADE BY

CHKD.

PAGE NO.

ORDER NO.

UNION**BILL OF MATERIAL****PUMP COMPANY**
BATTLE CREEK, MICHIGANITEM NO: G-1607-1 (EPR-46478)
SERIAL NO: 742762-2014 x 6 x 10-1/2 "H" LINE
PUMP TYPE

QUAN.		SECT PART NO.	DESCRIPTION	REC. SPARE PARTS	PATT. OR DWG. NO.	MATERIAL
AL	EACH					
	1	800	¹ CASING 300# R.F.		800C2358	A216 GR. WCB
	1		² 3/4" N.P.T. BULL PLUG - DRAIN		M-39-34	A108 GR. B1113
	1	815-1	³ CASING GASKET - FLEXITALLIC	1	815B1181/2	304 ST. STL. ASB. FILLED
	12		⁴ CASING STUD		A2236/6-10-12	A193 GR. B7
	12		⁵ CASING NUT (HEAVY HEX.)		3/4-10 UNC	A194 GR. 2H
			⁶			
	1	805	⁷ IMPELLER (10-1/2" DIA. MAX.)	1	805C1445/9	ACT-CA-6-NM
	2	806-1	⁸ IMPELLER RINGS	2	806A1418	A582 TP 416
			⁹			
	1	808-1	¹⁰ CASE RING - FRONT (HT-401)	1	808A1412	A582 TP 416
	1	808-2	¹¹ CASE RING - BACK (HT-401)	1	808A2179	A582 TP 416
			¹²			
	1	821-1	¹³ IMPELLER NUT	1	821A2188	A296 GR. CF-8M
	1		¹⁴ CUP POINT SOCKET HEAD SETSCREW		#10-24x3/16 LG	18-8 ST. STL.
	1	811-1	¹⁵ IMPELLER KEY	(1) 1/4x1-15/16"		316 ST. STL.
			¹⁶			
	1	847-1	¹⁷ THROAT BUSHING	1	847A2350	A582 TP 416
			¹⁸			
	1	802	¹⁹ CASING COVER		802D1949	A216 GR. WCB
			²⁰ CONSISTING OF:			
	1	802	²¹ COVER		802D1949	A216 GR. WCB
	1	L802	²² WELD IN PLATE		L802B1837	A216 GR. WCB
			²³ WELD AND STRESS RELIEVE AT UNION PUMP COMPANY			
			²⁴			
	4		²⁵ HEX. HEAD CAPSCREWS (COVER TO BRG. BRKT)	1/2-13 UNC x 1-1/4 LG		STEEL
	1		²⁶ METAL TAG (WATER COOLING IN)		L-A-2358	18-8 ST. STL.
	1		²⁷ METAL TAG (WATER COOLING OUT)		L-A-2359	18-8 ST. STL.
	2		²⁸ METAL TAG (LANTERN RING IN OR OUT)		L-A-2360	18-8 ST. STL.
			²⁹ PACKED PUMPS ONLY:			
	1		³⁰ METAL TAG (SEAL FLUSH IN) (SEAL PUMPS ONLY)		L-A-2362	18-8 ST. STL.
	1		³¹ ROTATION ARROW		L-A-2361	18-8 ST. STL.
	1		³² NAME PLATE		L-B-1853	18-8 ST. STL.
	16		³³ ECUTHEON PINS ROUND H.D.	CHEV B8 6301	#12 x 1/4 LG.	18-8 ST. STL.



4 x 6 x 10-1/2 .HHS

Serial No. 742762-201

[illegible]

MATERIAL SPECIFICATIONS

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

PUMP NO

6-25-56

SHIPPING INVOICE NO.

"PR" PROCESS PUMP -- COMMON PARTS

QTY	ARTICLE	"PR" PROCESS PUMP	-- COMMON PARTS
/DEL.	ROW THRUST BRG. & BAL.	RING CONSTRUCTION	SIZE 10 $\frac{1}{2}$ " PUMPS
			17476 4 25

Standard Oil Co. of Texas

DWG. NO.

SHEET NO. 3	TOTAL SHEETS 4
DATE ISSUED 10-8-57	DATE WANTED 1-7-58

P A R T		NUMBER	MATERIAL		DRAWING NUMBER	DWG SIZE	QUANTITY REQUIRED FOR ONE	ALLO-CA-TION	IS-SUE	LABOR FINAL CHECK	BURDEN PROD. CONTROL	MATE-RIAL ORDER NO	TOTAL RECEIPTS
DESCRIPTION	CODE NO		DESCRIPTION										
IMPELLER - 1/4 SQ x 2-3/4" LG	V2377A-9	84	304 S.S.	V2377A	A	1							
LOCKWASHER: (IMPELLER)	2601297	86	316 S.S.	2601297	A	1							
LOCKNUT: (IMPELLER)	2601296	86	316 S.S.	2601296	A	1							
ASKET: VOLUTE (ARMORED)	2601713	0	S.S. & ASBESTOS	2601713	A	1							
LINGER: WATER	2601306	20	SAE 63 BRONZE	2601306	A	2							
RACKET: SUPPORT	2601309	56	M STL PLATE	2601309	B	1							
LATE: SEAL	2601304	40	CL 30 C. I.	2601304	B	1							
LATE: THRUST	2601305	40	CL 30 C. I.	2601305	B	1							
LINGER: OIL	2601307	40	CL 30 C. I.	2601307	A	2							
ASKET: SEAL PLATE	2601310	107	GARLOCK #7021	2601310	A	1							
ASKET: SHAFT SLEEVE	2601312	107	GARLOCK #7021	2601312	A	1							
ASKET: THRUST PLATE	2601311	127	CORK & NEOPRENE	2601311	A	1							
LOCKWASHER: B.B. W-11	2610359	56	STEEL	WAS-2.01		1							
LOCKNUT: B.B. N-11	2609967	56	STEEL	DNUT-8		1							
GAUGE: OIL (CONSTANT LEVEL)	TRICO 1/4 TYPE "EH"					1							
TUBE: BREATHER	TRICO 1/8 TYPE "C"	56	STEEL			1							
CHEV B8 6314													

BINGHAM PUMP CO.
MIDLAND ORE

MATERIAL LIST

SHEET No. 1 No. Sheets 7 LIST No. 3CAD-29

DATE
1-27-56

ROTATION
CW-CCW

PUMP SIZE AND TYPE
3x4x6 1/4 CAD G-1607

FIRST-USED
32621

CAD PROCESS PUMP

FOR ORDER No.

32621

QTY.	DESCRIPTION	DRAWING No.	PT No.	PATTERN No.	MATERIAL
	<u>STANDARD CAD PUMP:: 7 BRACKET</u>				
1	Volute Case - Std. Mach. Dwg. Other Mach. Dwg.	E-6036			C.S. ASTM A216-47 Grade WCA
	Patt. Dwg.	ZS-2046		3/4 CAD-19	C.I. ASTM A48-48 Class 30
2	Studs - Volute Case	A-20295	4		Steel ASTM A-193-52T Grade B7 H.T
3	Nuts - Volute Case - Semi-fin. Hvy. Patt. 1/2"				ASTM A-194 Class 2H
	<u>DO NOT DRILL GAUGE CONN.</u>				
1	Pipe Plug - Vent LONG SHANK 1/2"				St.
2	Pipe Plug - Drains LONG SHANK 1/2"				St.
2	Pipe Plug - Gauge Conns.				St.
7	1 Pipe Plug - Case Closure LONG SHANK 3/4"				St.
3	4 Capscrews - Pump Hold Down 3/4 x 1 3/4				St.
2	2 Taper Pins - #7 x 3				St.
10	1 Gasket - Case to Stuff. Box 6 3/4 O.D. x 6 1/2 I.D. x 1/8 THK				18-8 CLAD Asb. CORE
11	1 Stuffing Box - Std. Mach. Dwg. Other Mach. Dwg.	ES-4349			C.S. ASTM A216-47 Grade WCA
	Patt. Dwg.	ZS-4303		13/4 CAD-4	C.I. ASTM A48-48 Class 30
12	1 Reducing Bushing - Flush Type 1" to 1/2" PT.				St.
17	1 Pipe Plug - Jacket Closure - Ctsk. 1"				St.
14	1 Pipe Plug - Coolant In & Out 1/2"				St.
15	2 Pipe Plug - Injection In & Out 1/2"				St.

G-1616
6-1616A

CHEV B8 6316.

MATERIAL SPECIFICATIONS

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

SPECIFICATION NO. 2015130

PUMP NO.

173315

DATE 6-25-56

SHIPPING INVOICE NO. 1717 GA

ARTICLE "PR" PROCESS PUMP -- COMMON PARTS

4/DBL. ROW THRUST BRG. & BAL. RING CONSTRUCTION SIZE 10 1/2" PUMPS MAT. GRP. 4 MOD.

NAME: STANDARD OIL CO. OF TEXAS

DWG. NO.

PART	DESCRIPTION	NUMBER	CODE NO.	MATERIAL		DRAWING NUMBER	DWG SIZE	QUANTITY REQUIRED FOR ONE	ALLO. CA. TION	IS. SUE	LABOR FINAL CHECK	BURDEN MOD. CONTROL	MATE. RIAL ORDER NO	TOTAL RECEIPTS
				DESCRIPTION										
IMPELLER - 1/4 SQ x 2-3/4" LG	V2377A-9	84	84	304 S.S.		V2377A	A	1						
OCKWASHER: (IMPELLER)	2601297	86	86	316 S.S.		2601297	A	1						
OCKNUT: (IMPELLER)	2601296	86	86	316 S.S.		2601296	A	1						
ASKET: VOLUTE (ARMORED)	2601713	0	0	S.S. & ASBESTOS		2601713	A	1						
LINGER: WATER	2601306	20	20	SAE 63 BRONZE		2601306	A	2						
RACKET: SUPPORT	2601309	56	56	M STL PLATE		2601309	B	1						
LATE: SEAL	2601304	40	40	CL 30 C. I.		2601304	B	1						
LATE: THRUST	2601305	40	40	CL 30 C. I.		2601305	B	1						
LINGER: OIL	2601307	40	40	CL 30 C. I.		2601307	A	2						
ASKET: SEAL PLATE	2601310	107	107	GARLOCK #7021		2601310	A	1						
ASKET: SHAFT SLEEVE	2601312	107	107	GARLOCK #7021		2601312	A	1						
ASKET: THRUST PLATE	2601311	127	127	GORK & NEOPRENE		2601311	A	1						
OCKWASHER: B.B. W-11	2610359	56	56	STEEL		WAS-2.01		1						
OCKNUT: B.B. N-11	2609967	56	56	STEEL		DNUT-8		1						
(CONSTANT LEVEL)	TRICO 4							1						
AUGE: OIL (HIGH SURGE 4 OZ. CAP)	TRICO 1/8							1						
UBE: BREATHER	TRICO 1/8							1						

CHEV B8 6317

MATERIAL SPECIFICATIONS

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

SPECIFICATION NO. 2615129

PUMP NO. 113320

DATE 6-25-56

SHIPPING INVOICE NO. 1721 67

QTY 1 ARTICLE "PR" PROCESS PUMP ----- COMMON PARTS

W/DBL. ROW THRUST BRG. & BAL. RING CONSTRUCTION SIZE 8 1/2" PUMPS

MATH. GR. 6

NAME: Standard Oil Co. of Texas - San Francisco, Calif.

DWG. NO.

SHEET NO	3	TOTAL SHEETS	4
DATE ISSUED	7-25-56	DATE WANTED	1-7-57

P A R T		M A T E R I A L		DRAWING NUMBER	DWG SIZE	QUANTITY REQUIRED FOR ONE	ALLO. CA. TION	IS. SUE	LABOR FINAL CHECK	BURDEN PROG. CONTROL	MATE. RIAL ORDER NO	TOTAL RECEIPTS
DESCRIPTION	NUMBER	CODE NO	DESCRIPTION									
KEY: IMPELLER - 1/4 SQ x 2-3/4 IG	V2377A-9	84	304 S.S.	V2377A	A	1						
LOCKWASHER: (IMPELLER)	2601297	86	316 S.S.	2601297	A	1						
LOCKNUT: (IMPELLER)	2601296	86	316 S.S.	2601296	A	1						
GASKET: VOLUTE (ARMORED)	2603424	D	S.S. & ASBESTOS	2603424	A	1						
SLINGER: WATER	2602841	20	SAE 63 BRONZE	2602841	A	2						
BRACKET: SUPPORT	2602844	56	M STL PLATE	2602844	B	1						
PLATE: SEAL	2602839	40	CL 30 C.I.	2602839	B	1						
PLATE: THRUST	2602842	40	CL 30 C.I.	2602842	B	1						
SLINGER: OIL	2602845	40	CL 30 C.I.	2602845	A	2						
GASKET: SEAL PLATE	2602840	107	GARLOCK #7021	2602840	A	1						
GASKET: SHAFT SLEEVE	2602847	107	GARLOCK #7021	2602847	B	1						
GASKET: THRUST PLATE	2602843	127	CORK & NEOPRENE	2602843	A	1						
LOCKWASHER: B.B. W-10	2610358	56	STEEL	WAS 2.01		1						
LOCKNUT: B.B. N-10	2609966	56	STEEL	DNUT 8		1						
GAUGE: OIL (CONSTANT LEVEL)(HIGH SURGE)	TRICO 1/8 TYPE "C"					1						
TUBE: BREATHER		56	STEEL			1						

CHEV B8 6318

G-1604

FPY-16-919-46

ITEM No.	PART	LOCATION	SIZE	MATERIAL	QUAN
1	STUD	ST. CHEST TO SUCT. CHAMBER	3/4"-10 X 2 7/8" LG.	C.M.S.	8
2	STUD BOLT	DIFFUSER TO SUCT. CHAMBER	7/8"-9 X 4 3/4" LG.	C.M.S.	16
3	NUT		3/4"-10	H.C. STL.	8
4	NUT		7/8"-9	H.C. STL.	32
5	GASKET	ST. CHEST & SUCT. CHAMBER	1/32" X 11" O.D. X 7" I.D.	RUBBER ASBESTOS	1
6	GASKET	DIFFUSER & SUCT. CHAMBER	1/32" X 23 1/2" O.D. X 17" I.D.	RUBBER ASBESTOS	1
7					
8	STUD	ST. CHEST TO SUCT. CHAMBER	3/4"-10 X 2 7/8" LG.	C.M.S.	8
9	BOLT	DIFFUSER TO SUCT. CHAMBER	3/4"-10 X 3" LG.	C.M.S.	12
10	NUT		3/4"-10	H.C. STL.	20
11	GASKET	ST. CHEST & SUCT. CHAMBER		RUBBER ASBESTOS	1
12	GASKET	DIFFUSER & SUCT. CHAMBER		RUBBER ASBESTOS	1
13					
14	MACH. BOLT	6" DIA. HANDHOLE	3/4"-10 X 3" LG.	C.M.S.	16
15	NUT		3/4"-10	H.C. STL.	208
16	GASKET	6" DIA. HANDHOLE	1/16" X 11" O.D. X 6" I.D.	RUBBER ASBESTOS	2
17	STUD BOLT	FLOATING HEAD TO BACKING DEVICE	3/4"-10 X 7 1/4" LG.	C.M.S.	24
18	STUD BOLT	SHELL COVER TO SHELL	3/4"-10 X 6 3/4" LG.	C.M.S.	24
19	STUD BOLT	SHELL CHANNEL TO SHELL	3/4"-10 X 8 1/2" LG.	C.M.S.	24
20	STUD BOLT	CHANNEL COVER TO CHANNEL	3/4"-10 X 6 3/4" LG.	C.M.S.	24
21	FLEX. GASKET STYLE-R	FLOATING HEAD & TUBE SHEET	1/8" X 28 5/8" O.D. X 27 5/8" I.D.	MONEL & ASB.	1
22	FLEX. GASKET STYLE-R	SHELL & TUBE SHEET	1/8" X 31 3/4" O.D. X 30 3/4" I.D.	MONEL & ASB.	1
23	GASKET	SHELL & SHELL COVER	1/16" X 35 3/4" O.D. X 34" I.D.	RUBBER ASBESTOS	1
24	GASKET	CHANNEL & CHANNEL COVER CHANNEL & TUBE SHEET	1/16" X 32" O.D. X 30 1/2" I.D.	RUBBER ASBESTOS	2
25					
26					
27					
28	STUD	ST. CHEST TO SUCT. CHAMBER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
29	STUD	DIFFUSER TO SUCT. CHAMBER	3/4"-10 X 2 7/8" LG.	C.M.S.	8
30	NUT		3/4"-10	H.C. STL.	8
31	MACH. BOLT	DIFFUSER TO DIFFUSER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
32	NUT		5/8"-11	H.C. STL.	8
33	GASKET	ST. CHEST & SUCT. CHAMBER	1/32" X 7 1/2" O.D. X 9" I.D.	RUBBER ASBESTOS	1
34	GASKET	DIFFUSER & SUCT. CHAMBER	1/8" X 11" O.D. X 7" I.D.	RUBBER ASBESTOS	1
35	GASKET	DIFFUSER & DIFFUSER	1/16" X 5 1/2" O.D. X 5 1/4" I.D.	RUBBER ASBESTOS	1
36					

APPROVED
AUG 18 1957
E. S. WARNER

CHEV B8 6319

CUSTOMERS ORDER #PY-G-19 AND PY-16-E-54

ITEM No.	PART	LOCATION	SIZE	MATERIAL	QUAN
37	STUD	ST. CHEST TO SUCT. CHAMBER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
38	STUD	DIFFUSER TO SUCT. CHAMBER	3/4"-10 X 2 7/8" LG.	C.M.S.	8
39	NUT		3/4"-10	H.C.STL.	8
40	MACH. BOLT	DIFFUSER TO DIFFUSER	5/8"-11 X 2 1/2" LG.	C.M.S.	4
41	NUT		5/8"-11	H.C. STL.	8
42	GASKET	ST. CHEST & SUCT. CHAMBER	1/32" X 7 1/2" O.D. X 4" I.D.	RUBBER ASBESTOS	1
43	GASKET	DIFFUSER & SUCT. CHAMBER	1/32" X 11" O.D. X 7" I.D.	RUBBER ASBESTOS	1
44	GASKET	DIFFUSER & DIFFUSER	1/16" X 5 1/8" O.D. X 5 1/4" I.D.	RUBBER ASBESTOS	1
45					
46	STUD BOLT	FLOATING HEAD TO BACKING DEVICE	3/4"-10 X 6 1/4" LG.	C.M.S.	24
47	STUD BOLT	SHELL COVER TO SHELL	3/4"-10 X 6 1/4" LG.	C.M.S.	20
48	NUT		3/4"-10	H.C. STL.	88
49	STUD BOLT	SHELL CHANNEL TO SHELL	5/8"-11 X 7" LG.	C.M.S.	24
50	STUD BOLT	CHANNEL COVER TO CHANNEL	5/8"-11 X 5 1/2" LG.	C.M.S.	24
51	NUT		5/8"-11	H.C. STL.	96
52	FLEX. GASKET STYLE-R	FLOATING HEAD & TUBE SHEET	1/8" X 22 7/8" O.D. X 22 1/8" I.D.	MONEL & ASB.	1
53	FLEX. GASKET STYLE-R	SHELL & TUBE SHEET	1/8" X 25 1/2" O.D. X 24 3/4" I.D.	MONEL & ASB.	1
54	GASKET	SHELL & SHELL COVER	1/16" X 29 3/4" O.D. X 28" I.D.	RUBBER ASBESTOS	1
55	GASKET	CHANNEL & CHANNEL COVER CHANNEL & TUBE SHEET	1/16" X 25 7/8" O.D. X 24 3/8" I.D.	RUBBER ASBESTOS	2
56					
57					
58					
59					
60	STUD BOLT	6" DIA. HANDHOLE	3/4"-10 X 4" LG.	C.M.S.	16
61	NUT		3/4"-10	H.C. STL.	272
62	GASKET	6" DIA. HANDHOLE	1/16" X 11" O.D. X 6" I.D.	RUBBER ASBESTOS	2
63	STUD BOLT	FLOATING HEAD TO BACKING DEVICE	3/4"-10 X 8 1/4" LG.	C.M.S.	28
64	STUD BOLT	SHELL COVER TO SHELL	3/4"-10 X 7 1/2" LG.	C.M.S.	28
65	STUD BOLT	SHELL CHANNEL TO SHELL	3/4"-10 X 9 1/2" LG.	C.M.S.	32
66	STUD BOLT	CHANNEL COVER TO CHANNEL	3/4"-10 X 7 3/4" LG.	C.M.S.	32
67	FLEX. GASKET STYLE-R	FLOATING HEAD & TUBE SHEET	1/8" X 34 5/8" O.D. X 33 5/8" I.D.	MONEL & ASB.	1
68	FLEX. GASKET STYLE-R	SHELL & TUBE SHEET	1/8" X 37 7/8" O.D. X 36 7/8" I.D.	MONEL & ASB.	1
69	GASKET	SHELL & SHELL COVER	1/16" X 41 7/8" O.D. X 40 1/4" I.D.	RUBBER ASBESTOS	1
70	GASKET	CHANNEL & CHANNEL COVER CHANNEL & TUBE SHEET	1/16" X 38 1/8" O.D. X 36 5/8" I.D.	RUBBER ASBESTOS	2



BILL OF MATERIAL

PUMP COMPANY
BATTLE CREEK, MICHIGAN

ITEM NO: G-1607-1 (EPR-46478)
SERIAL NO: 742762-201

GROUP I "H" PUMP
PUMP TYPE

QUAN.		SECT PART NO.	DESCRIPTION	REC. SPARE PARTS	PATT. OR DWG. NO.	MATERIAL
AL	EACH					
	1	822-1	¹ SHAFT SLEEVE-PACKED (HT-401)	1	822B1876	A582 TP 416
	1	815-3	² SHAFT SLEEVE GASKET	1	815A2466	ASBESTOS
			³			
	1	809	⁴ LANTERN RING	1	809A2398	A582 TP 416
	1	38	⁵ SET OF PACKING	1	38A2399	ASBESTOS
			⁶			
	1	807	⁷ GLAND (2 HALVES)		807B1875	A216 GR. WCB
			⁸			
	1	847-6	⁹ GLAND BUSHING	1	847A2350	BRONZE
			¹⁰			
	2		¹¹ GLAND BOLTS (ALLEN HEAD CAPSCREWS)	3/8-16	UNC x 1-1/4 LG.	STEEL
			¹²			
	2		¹³ GLAND STUDS		A2234/4-13-10	A193 GR. B7
			¹⁴			
	2		¹⁵ GLAND NUTS		1/2-13 UNC	A194 GR. 2H
			¹⁶			
			¹⁷			
			¹⁸			
			¹⁹			
			²⁰			
			²¹			
			²²			
			²³			
			²⁴			
			²⁵			
			²⁶			
			²⁷			
			²⁸			
			²⁹			
			³⁰			
			³¹			
			³²			
			³³			
			³⁴			

CHEV B8 6321

SECTIONAL DWG.

OUTLINE DWG.

MADE BY

CHKD.

PAGE NO.

ORDER NO.

BILL OF MATERIAL

JOB 11-100 DATE 9/14/41

DRG. No. SHEET ORDER No. 474 474.1

APPRO. JOB No. 10010-2115-74-570

MATERIAL REQ'D AT DEST'N BY 410/1.5

MATERIAL REQ'D AT DEST'N BY 77 101 000 000

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
5	76	ea	2" Flange W/ 150" CE Sub 80	
7	38	ea	2" Flange W/ 150" CE Sub 80	
9	11	ea	1/2" x 2 3/4" Stud bolts R-7 W/ 1/2" Flat Nut	
10	11	ea	3/8" x 1/2" Swage nipple Sub 80 R-100-735	
End Use: replace lost and system R-100 / R-1002				

CHEV B8 6322

CHEV B8 6322

SHEET 5 OF 1 SHEETS

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. PD-16-24953 SHEET 57

ORDER NO. 80269

APPRO. JOB NO. Falks 2116 11-

MATERIAL REQ'D AT DEST'N BY 113/61 C/KA

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	140	ft	2" PIPE SMLS 40 CS SCH 80	
2	8	ea	2" BALL VALVE ISO# RF CS 7/16 G.S. NPT	
3	8 PR	ea	2" LINE HIND FLANGE 300# PACKING 2" x 1/2"	
4	16	ea	2" FLANGE WN ISO# RF CS SCH 80	
5	16	ea	1 1/2" FLANGE WN ISO# RF CS SCH 80	
6	16	ea	2" ELBOW 90° LR STD WT CS BW	
7	32	ea	2" ELBOW 45° LR STD WT CS BW	
8	8	ea	3/4" BOSS 6000# CS SW	
9	8	ea	2" x 1 1/2" REDUCER CONC. STD WT CS BW	
10	8	ea	1 1/2" GASKET ISO# RF ASB COMP	
11	16	ea	2" GASKET ISO# RF ASB COMP	
12	32	ea	1/2" x 2 3/4" STUD BOLT B-7 M2 HEX NUTS	
13	64	ea	5/8" x 3" STUD BOLT B-7 M12 HEX NUTS	
14	8	ea	3/4" GATE VALVE ISO# CS FEMALE NPT	
15	60	ft	1 1/2" PIPE SMLS SCH 80 CS PF	
16	8	ea	1 1/2" ELBOW 90° LR STD WT CS BW	
			End User's Rep.	
			Full name	
			Signature	
			Date	
			Initials	

CHEV B8 6323

CHEV B8 6323

SHEET 7 OF 7 SHEETS

MIC 3.74 25.1 2.23.

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. D-16-29753 SHEET 52

ORDER NO. BM 9170

6.513 4100 500 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

APPRO. JOB NO. 16-438-14 500

MATERIAL REQ'D AT DEST'N BY 4/3/81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	70	ea	1 1/2" PIPE 5m15 CS SCH 80 RF	
2	175	ea	2" PIPE 5m15 CS SCH 80 BW	
3	11	ea	2" BALL VAL 150# RF CS 316 SS BBS	
4	11	ea	3/4" GATE VAL 500# FEMALE NPT CS 12 CR TR	
5	22	ea	2" FLANGE W.N. 150# CS RF SCH 40	
6	33	ea	1 1/2" FLANGE W.N. 150# CS RF SCH 80	
7	11 PR	ea	2" LINE BLIND FLANGE 500# SCH 40 ASIS FRKING	
8	44	ea	2" ELBOW 90° LR STD WT CS BW	
9	22	ea	2" ELBOW 45° LR STD WT CS BW	
10	11	ea	1 1/2" ELBOW 90° CS SW	
11	11	ea	2" x 1 1/2" REDUCER CONCENTRIC STD WT CS BW	
12	11	ea	3/4" BUSH 600# FB SW	
13	22	ea	2" FLANGE 150# RF ASP COMP	
14	22	ea	1 1/2" FLANGE 150# RF ASP COMP	
15	88	ea	1/2" x 2 3/4" SHO BOLT B-7 1/2 HEX NUTS	
16	88	ea	5/8" x 3" SHO BOLT B-7 1/2 HEX NUTS	
End Use - replace old system				
4/3/81				
JH				

CHEV B8 6324

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. 16-443-0 SHEET 53

ORDER NO. BIM 9172

#6 SID 401, #6 10 INTERMID

STAGE

APPRO. JOB NO. 16-416-14-

570

EBW-225

MATERIAL REQ'D AT DEST'N BY 1/3/81 EBW

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	140	FT	1" SCH 5 SL PIPE SCH 40	
2	25	FT	3" SCH 5 SL PIPE SCH 40	
3	3	EQ	3" SCH 5 SL GATE VALV ONE END W/ACE	
4	6	EQ	3/4" SCH 5 END FLANGE NPT. BUTT.	
5	1	EQ	2" ISO 90° FLG 1/4" R.F. GATE VALV BUTT.	
6	—	—	VOID ——— VOID ———	
7	3	EQ	1/4" ISO 90° FLG 1/4" R.F. GATE VALV SCH 40	
8	1	EQ	2" ISO 90° FLG 1/4" R.F. SCH 40	
9	2	EQ	1/2" ISO 90° FLG 1/4" R.F. SCH 40	
10	—	—	VOID ——— VOID ———	
11	10	EQ	2" ISO 90° FLG 1/4" R.F. SCH 40	
12	4	EQ	2" SCH 5 W. TEE STD WT	
13	2 PR	EQ	2" SCH 5 W. W. COUPLER STD WT	
14	2	EQ	3" SCH 5 90° B.W. ELBOW LR STD WT	
15	—	—	VOID ——— VOID ———	
16	2	EQ	3" SCH 5 W. TEE STD WT	
17	2	EQ	2" SCH 5 W. TEE STD WT	
18	1	EQ	2" SCH 5 W. TEE STD WT	
19	4	EQ	1/2" SCH 5 W. TEE STD WT	
20	4	EQ	1/2" SCH 5 W. TEE STD WT	
21	1	EQ	1/4" SCH 5 W. TEE STD WT	
22	20	EQ	1" SCH 5 W. TEE STD WT	
23	—	—	VOID ——— VOID ———	

CHEV B8 6325

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. D-16-27953-0 SHEET 55

ORDER No. BM 9173

#6 SID NO. 6 SID INTERIM
STOPPAGE

APPRO. JOB NO. ELS-2116-14-570

FBIL-205
3/23/81

MATERIAL REQ'D AT DEST'N BY 1/3/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	150	ft	2" SCH 40 PIPE	
2	V	O	1 D	
3	1	ea	1/4" 300# SET SCREW VLV ONE END THRU 3/4"	
4	2	ea	1/4" 300# END FERRULE NPT BLT BNT	
5	1	ea	2" 150# CS FLO, 1/16" R.F. GATE VLV BLT BNT	
6	1	ea	2" 150# CS FLO, 1/16" R.F. GLOBE VLV BLT BNT	
7	1	ea	1/4" 6000# STL WELD BOSS, THREADED	
8	7	ea	1/4" 6000# STL WELD BOSS, S.W.	
9	10	ea	2" 150# F.S. W.N. FLO, 1/16" R.F. SCH 40	
10	2	ea	1 1/2" 300# F.S. W.N. FLO, 1/16" R.F. SCH 50	
11	12	ea	1 1/2" 150# F.S. W.N. FLO, 1/16" R.F. SCH 50	
12			VOID	
13	9	ea	2" 150# 90° ELB FLO, 1/16" R.F. SCH 50	
14	2	ea	2" x 1 1/2" STL ECC CONC. PED B.W. X.S.	
15			Sec. STL BAR STOCK PLUG, RD. HD.	
16	1	ea	1/4" SCH STL BAR STOCK PLUG, RD. HD.	
17	10	ea	2" 150# x 1/16" LHK. ASB. COMP. GASKET	
18	2	ea	1/2" 300# x 1/16" LHK. ASB. COMP. GASKET	
19	6	ea	1/4" 300# STL S.W. GATE VLV BLT BNT	
20	32	ea	1/8" x 3" STUD BOLT GR. B. W/2 HEX NUTS	
21	1	ea	1/2" x 1" STUD BOLT GR. B. W/2 HEX NUTS	
22	8	ea	1/4" x 1 1/4" STUD BOLT GR. B. W/2 HEX NUTS	
23	4	ea	1/4" x 8 1/4" STUD BOLT GR. B. W/2 HEX NUTS	
24	1	ea	1/2" x 2 1/2" STL BLT. GATE VLV BLT BNT	
25	1	ea	1/4" x 1/4" STL BOLT	

CHEV B8 6326

BILL OF MATERIAL

JOB

16-438

DATE

3/23/81

DRG. No. 1'-2753-A SHEET 55

ORDER No. 200 917.3

- 6" ID 16" ID # 6" ID 16" ID

STURM

APPRO. JOB No. 165-216-A-570

16-225

MATERIAL REQ'D AT DEST'N BY 3/13/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
26	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
27	4	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
28	1	ft	1" 16" ID 16" ID 16" ID 16" ID	
29	2	ea	1" 16" ID 16" ID 16" ID 16" ID	
30	2	ea	1" 16" ID 16" ID 16" ID 16" ID	
31	15	ft	1/4" 16" ID 16" ID 16" ID 16" ID	
32	1	ea	1/4" 16" ID 16" ID 16" ID 16" ID	
33	6	ea	1/4" 16" ID 16" ID 16" ID 16" ID	
34	6	ea	1/4" 16" ID 16" ID 16" ID 16" ID	
35	2	ea	1/4" 16" ID 16" ID 16" ID 16" ID	
36	30	ft	1" 16" ID 16" ID 16" ID 16" ID	
37	18	ft	1/2" 16" ID 16" ID 16" ID 16" ID	
38	4	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
39	4	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
40	4	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
41	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
42	2	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
43	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
44	2	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
45	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
46	4	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
47	2	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
48	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
49	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
50	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
51	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
52	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
53	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
54	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
55	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
56	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
57	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
58	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
59	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
60	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
61	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
62	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
63	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
64	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
65	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
66	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
67	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
68	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
69	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
70	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
71	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
72	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
73	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
74	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
75	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
76	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
77	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
78	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
79	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
80	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
81	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
82	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
83	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
84	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
85	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
86	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
87	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
88	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
89	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
90	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
91	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
92	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
93	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
94	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
95	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
96	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
97	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
98	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
99	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	
100	1	ea	1/2" 16" ID 16" ID 16" ID 16" ID	

CHEV B8 6327

BILL OF MATERIAL

JOB 16-438

DATE 3-23-81

DRG. NO. PC 16-29453-0 SHEET 57

ORDER NO. B779175

S/D #6 NOTE #6 S/D INSTRUCTION
STW

APPRO. JOB NO. FWG-2116-141
570

MATERIAL REQ'D AT DEST'N BY 4/13/81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
25	1 PR	ea	1" 300# FS WNV CRIPPER F19 1/16" RF Sch 40	
26	3	ea	3/4" Sch. Stl Bar Stock Plug Rd Hcl	
27	2	ea	1/2" Sch Stl Bar Stock Plug Rd Hcl	
28	—	—	150# x 1/16" thk Ash Comp. GASKET	
29	2	ea	1/2" 150# x 1/16" thk Ash Comp GASKET	
30	6	ea	4" 150# x 1/16" thk Ash Comp GASKET	
31	6	ea	4" 300# x 1/16" thk Ash Comp GASKET	
32	16	ea	3/4" x 1 1/4" Stud Bolt Gr B7 w/ NUTS	
33	8	ea	1/2" x 2 3/4" Stud Bolt Gr B7 w/ NUTS	
34	4/8	ea	5/8" x 3 1/2" Stud Bolt Gr B7 w/ NUTS	
35	8	ea	3/4" x 5" Stud Bolt Gr B7 w/ 1/2 Hex Nut	
36	8	ea	3/4" x 2" Stud Bolt Gr B7 w/ 1/2 Hex Nut	
37	2	ea	8 x 3 1/8 x 8" Stl. Plate	
38	4	ea	7/8" x 8" MACHINE BOLT MND SR w/ HEX NUT	
39	2	ea	4" x 1 1/2" WELD GLET FS B.W. RFD X H	
40	1	ea	4" 500# OS F19 1/16" W/ CRIT BOLL VALVE	
}			F9 1 1/2 3345 L S Y REGULAR	
			Port REGULAR TRIM	
43	1	ea	4" 150# US HANMER BLIND 3-BOLT	
}			LINE BLIND MODEL 3B WIS-1534	
			WELD END TYPE WCC Division	
			End Use 2 Type 150#	
46				

CHEV B8 6328

BILL OF MATERIAL

JOB 16-138

DATE 3/23/81

DRG. No. AD-11-29953 SHEET 56

ORDER No. BIM 9174

#6 S/D #6 S/D INTERIOR
STANDARD

APPRO. JOB NO. FUEL C. UNIT

MATERIAL REQ'D AT DEST'N BY 11/3/81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	100	EA	1" SMLS STL PIPE SCH 40	
2	4	EA	2" 150# CS Flg 1/16" R.F. GATE VALV BLT BNT	
3	2	EA	2" 150# CS Flg 1/16" R.F. CHECK VALV BLT BNT	
4	8	EA	2" 150# FS. W. W Flg 1/16" R.F. SCH 40	
5	11	EA	2" STL 90° B.W. ELBOW 1/2" STD W/	
6	1	EA	2" STL B.W. TEE STD.	
7	2	EA	2" 150# STL SPECTACLE BLIND	
8	12	EA	2" 150# x 1/16" thk Ash. Pump CRANKET	
9	32	EA	1/8" x 3" Stud Bolt GR B7 W/2 HEX NUTS	
10	8	EA	1/8" x 3 1/2" Stud Bolt GR B7 W/2 HEX NUTS	
End User replace Fuel oil system 57321 3/23/81 FIRM				
40- 3/24/81				

CHEV B8 6329

BILL OF MATERIAL

JOB 116-438

DATE 3/23/81

DRG. NO PD-16-29953-0 SHEET 1/3

ORDER NO. BM 9180

#1 S11 MOLD #1 S11 TUBIN

STORAGE APPRO. JOB NO FL 19 2116-14-
570

MATERIAL REQ'D AT DEST'N BY 1-3-81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	40	ft	2" SMLS STL PIPE SCH 40	
2	4	ea	2" STL 90° B.W. ELBOW W.L.R. STL 11T.	
3	2 ea	ea	2" 150# AS W.H. FLG 1/16" P.F. SCH 40	
4	1 ea	ea	2" 150# CS FLG 1/16" P.F. GATE VALVE BH. B.T.	
5	1	ea	3/4" 600# STL WELD ROSS S.W.	
6	1	ea	3/4" 800# 4 ONE END FEMALE NPT B.T. ENT	
7	24	ea	2" 150# X 1/16" 1/4" AS COMP GASKET	
8	16-3	ea	5/8" X 3" STD BOLT GR B7W/2 HEX NUTS	
9	1	ea	2" 150# FS 3 BOLT LINE BLIND VLV SERIES	
			150# NUTTER, MODEL 3B W/15 WELDING	
			END TYPE UNICO DIVISION	
12	1	ea	3/4" STD STL Bore Shock Plug Rd. x hd	
13	1	-		
End Use: replace fuel gas system F-101/F-102				

CHEV B8 6330

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. PD 16-29953-0 SHEET 57

ORDER NO. BIM 9177

S/D # 6 APPROX # 6 STA JATEPIN

APPRO. JOB NO. FELS 2116-14-

FEW-225
on 7/1/81

MATERIAL REQ'D AT DEST'N BY 1/13/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	170	ft	2" SMLS STL PIPE SCH 40	
2	3	ea	3/4" 1 UNIF END FLOWLINE NOT BLT BNT	
3	2	ea	2" ISO# CS FLG 1/16" R.F. GATE VALV DITENT	
4	1	ea	2" ISO# CS FLG 1/16" R.F. GLOBE VALV DLT HNT	
5	1	ea	1/4" 6000# SH WELD BOSS, THREADED	
6	3	ea	1/4" 6000# SH WELD BOSS, S.W.	
7	4	ea	2" ISO# FS. W.N. FLG 1/16" R.F. SCH 40	
8	2	ea	1 1/2" ISO# FS. W.N. FLG 1/16" R.F. SCH 40	
9			VOID	
10	3	ea	2" STL 90° B.W. ELBOW 1/2" STD WT	
11	2	ea	1 x 1/2" STL GIC. 1/2" BLD P.D. V.S.	✓ S.F.C.I
12	2	ea	1/2" ISO STL COMP SHOCK PLUG, RD 11.1	
13	8	ea	2" ISO x 1/16" 4HS ASH COMP GASKET	
14	2	ea	1 1/2" ISO x 1/16" 4HS ASH COMP GASKET	
15	33	ea	7/16 x 3" STD BOLT GR B7 1/2 HEX NUTS	
16	1	ea	7/16 x 4" STD BOLT GR B7 1/2 HEX NUTS	
17	4	ea	7/16 x 1 1/2" STD BOLT GR B7 1/2 HEX NUTS	
18			VOID	
19	2	ea	2" SH B.W. TEE STD WT	
20	2	ea	8" x 3 1/8" x 1/8" SH PLATE	
21	4	ea	7/8" x 8" MACHINE BOLT MILD STL	
22	1	ea	2" ISO# CS FLG 1/16" R.F. CHECK VALV BNT	

CHEV B8 6331

BILL OF MATERIAL

JOB 16-438

DATE 3/23/81

DRG. NO. PD 16-29153-0 SHEET 58

ORDER NO. B02 9176

#6 S/D NO. 16 S/D TAPING

APPRO. JOB NO. 16-2116-14-570

STORAGE

EBW-225

MATERIAL REQ'D AT DEST'N BY 1/3/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	50	ft	" SMIS STL PIPE SCH 40	
2			VOID	
3	3	ea	1" 150# CS GATE VALVE END MALE S.W.	
4	2	ea	2" 150# CS Flg 1/16" R.F. GATE VALVE BLT. BRT.	
5	1	ea	2" 150# CS Flg 1/16" R.F. GLOBE VALV BLT. BRT.	
6	1	ea	3/4" 6000# STL WELD BOSS, THREADED	
7	3	ea	3/4" 6000# STL WELD BOSS, S.W.	
8	4	ea	2" 150# FS W.N. Flg 1/16" R.F. SCH 40	
9	2	ea	1/2" 300# FS W.N. Flg 1/16" R.F. SCH 40	
10			VOID	
11			VOID	
12	4	ea	2" SH. 90° B.W. ELBOW L.P. STD WT	
13	1	ea	2" STL B.W. TEE STD WT	
14	2	ea	2" x 1 1/2" STL ECC RED. B.W. x.S.	
15			VOID	
16			VOID	
17	4	ea	1/4" STD STL BAR STOCK PLUG, PC Hnd	
18	5	ea	2" 150# x 1/16" R.F. ASB COMP GASKET	
19	2	ea	1 1/2" 300# x 1/16" R.F. ASB COMP GASKET	
20	6	ea	2" 300# x 1/16" R.F. ASB COMP GASKET	
21	16	ea	7/8" x 3" STD Bolt + GR BT W/2 HEX NUTS	
22		ea	STD Bolt 2" B, W/2 HEX NUTS	
23		ea	1 1/2" x 1 1/2" STL PLT + GR BT W/2 HEX NUTS	
24	4	ea	1/4" x 3/4" STL PLT + GR BT W/2 HEX NUTS	

CHEV B8 6332

BILL OF MATERIAL

JOB 16-434

DATE 4/6/81

DRG. No. _____ SHEET _____

ORDER No. BM-9180

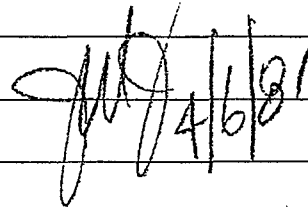
#630. Hold Interim Storage

APPRO. JOB No. FUCIG-2116-14-570

EBW X-225

Supplement #1

MATERIAL REQ'D AT DEST'N BY 4/17/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
3	2	ea	2" 150# C.S. WN Flg 1/2" RF Sch 40	
4	1	ea	2" 150# C.S. Flg 1/2" RF gate vlv Blt Bnt 12CrTr	
7	2	ea	2" 150# x 1/2" THK Ash Comp Gasket	
8	8	ea	3/4" Ø x 3" Stud Bolt B-7 w/2 Hex Nuts	
13	1	ea	6"x2" Weldolet C.S. Red B.W. Std Wt	
EBW 4/6/81  4/6/81 End Use: additional mat. for F-1601 & W2 fuel gas				
				CHEV B8 6333

BILL OF MATERIAL

JOB

DATE _____

DRG. No.

SHEET.

ORDER No.

APPRO. JOB NO.

MATERIAL REQ'D AT DEST'N BY

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	6" S&W 90° Elbow = 2.40	
2	3	ea	6" S&W 90° B.W. Elbow L.P. Std. Wt.	
1	2	ea	6" 150° CS Flg 1/2" RF L.H. V. L. R.H. Port 12 cr Tr	
2	4	ea	3" 150° CS WN Flg 1/2" RF S&W 40	
3	4	ea	6" 150° CS WN Flg 1/2" RF S&W 40	
4	4	ea	2" 150° x 1/2" THK ASB Comp Gasket	
5	4	ea	6" 150° x 1/2" THK ASB Comp Gasket	
6	32	ea	3/8" x 3/4" Std Bolt Gr B-7 Hex Head Gr A 100 Bolt Material S	

CHEV B8 6334

SHEET OF SHEETS

BILL OF MATERIAL

JOB 16-483

DATE 3/23/81

DRG. No. 16-29953 SHEET 71

ORDER No. BM 9186

SID # 6 NGLD # 4 SID # 10 FTR # 10

APPRO. JOB No. Fuels 214-14-

EBW - 225

MATERIAL REQ'D AT DEST'N BY 4-3-51 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	10	ft	1" DIA. STEEL PIPE	
2	1	ea	2" DIA. STEEL PIPE	
3	1	ea	2" DIA. STEEL PIPE	
4	1	ea	2" DIA. STEEL PIPE	
5	11	ea	2" DIA. STEEL PIPE	
6	10	ea	1/4" BSS 6000#	
7	1	ea	1" BSS 6000#	
8	1	ea	1/4" BSS 6000#	
9	1	ea	1/4" BSS 6000#	
10			2" DIA. STEEL PIPE	
11	4	ea	1/4" x 3" STUD BOLTS	
12	1	ft	1/4" DIA. STEEL PIPE	
13	6	ft	1/4" DIA. STEEL PIPE	
			End User replace steam	
			3/4" DIA. STEEL PIPE	
			1/4" DIA. STEEL PIPE	

CHEV B8 6335

BILL OF MATERIAL

JOB 14-438

DATE 7/3/23/81

DRG. NO. 16-5753-0 SHEET 2

ORDER NO. BIM 9181

#6 SID NCD #6 SID INTERIM
STORAGE

APPRO. JOB NO. 16-5753-0

CRW-225

MATERIAL REQ'D AT DEST'N BY 7/13/81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	100	ft	5MIS STL PIPE Sch 80	
2	22	ea	1" 3000# FS 90° SCD ELBOW	
3	6	ea	1" 3000# FS TEE Sch	
4	1	ea	1" 800# STL Sch Gate Vlv Bt. Bnt	
5	2	ea	1" 800# STL Sch GLOBE VLV Bt. Bnt	
6	12	ea	1" 150# FS. W. R. Flg 1/16" Sch 80	
7	6	ea	1" 150# x 1/16" the Ash Comp GASKET	
8	2	ea	1" 3/4" STL CIRC SWAGED TEE Sch 80	
9	2	ea	1" 800# STL SCD GATE VLV ALT BNT	
10	2	ea	3/4" SCD STL BAR Stock Plug Rd Hd	
11	24	ea	1/2 x 3/4" Std Bolt GR Bt W/2 HEX NUTS	
12	2	ea	1" 6000# STL #WEID BOSS, THREADED	
13	2	ea	1" 4m TRAP YAPKUNY 110/120	
End Vapourplane steam				
S. L. W. F. H. / F. R. Z				
CRW 7/23/81				

CHEV B8 6336

BILL OF MATERIAL

JOB 16-438

DATE 4/6/81

DRG. No. _____

SHEET _____

ORDER No. BM-9180

6 YD Hold Interim Storage
CBW 1.225

APPRO. JOB No. _____

Supplement #1

MATERIAL REQ'D AT DEST'N BY 4/12/81 Fire

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
3	(2)	ea	150° C.S. WN Flg 1/4" RF Sch 40	Stock
4	(1)	ea	2" 150° C.S. Flg 1/4" RF gate vlv Blt Bnt 12CrTr	✓
7	(2)	ea	2" 150° x 1/4" THk Ash Comp Gasket	✓
8	(8)	ea	3/4" Ø x 3" Std Bolt B-7 w/2 Hex Nuts	✓
13	(1)	ea	6" x 2" Weldolet C.S. Red B.W. Std Wt	✓
SBW 4/6/81 <i>[Signature]</i> 4/6/81 End Use: additional mat. for F-11001 & U2 Fuel gas				TSS 4/7/81 CHEV B8 6337

BILL OF MATERIAL

JOB 16-438

DATE 4/3/81

DRG. No. SHEET

ORDER No. BM-9170

~~#670~~ HLL Interim Storage ~~#68~~

Fuel 16-2116-14-51

EPW X-223

APPRO. JOB No.

Supplement # 1

MATERIAL REQ'D AT DEST'N BY 4/10/81 Firm

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
2	(100)	ft	2" pipe 5mils C.S. Sch 40 BW	Stock
5	14	ea	2" Flange WN 150 [#] CS RF Sch 40	RLBM-80754X-9170 GRANT OF DAVID 4/6/81
8	22	ea	2" elbow 90° LR Std WT CS BW	
13	(22)	ea	2" gasket 150 [#] RF A-b comb	
15	(88)	ea	3/4" X 3" Stud bolt B-7 w/2 Hex Nuts	Stock
			SPW #4/2/81	-165 4/6/81
			End Use: replace fuel gas system F-1601/ F-1602	

CHEV B8 6338

BILL OF MATERIAL

JOB 16-438

DATE 4/6/81

DRG. No. #630 SHEET Hold Interim Storage

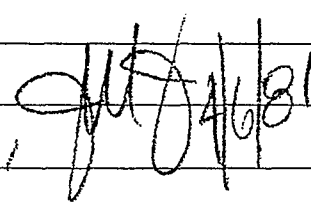
ORDER No. BM-9179

APPRO. JOB NO. Fuel G-2116-14-51

ERW X-225

Supplement #1

MATERIAL REQ'D AT DEST'N BY 4/17/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
3	2	ea	2" 150# CS WN Flg 1/4" RF Sch 40	
4	2	ea	2" 150# CS Flg 1/4" RF Gate vlv Blt Bnt 12C-Tr	
7	2	ea	2" 150# 1/4" thk Asp Comp gasket	
8	8	ea	5/8" ϕ x 3" Stud Bolt Gr B-7 W/2 Hex Nuts	
13	1	ea	6" x 2" Weldolet C.S. Red Std Wt.	
 ERW 4/6/81				
End Use: additional material for F-1601 + F-1602 fuel gas				
CHEV B8 6339				

BILL OF MATERIAL

JOB 16-439

DATE 5/23/61

DRG. No. AD-16-29953 SHEET 54

ORDER NO. 540 509

APPRO. JOB No. 5040

MATERIAL REQ'D AT DEST'N BY 113/4 FIRM

[illegible]

CHEV B8 6340

BILL OF MATERIAL

JOB 16-432

DATE 3/23/81

DRG. NO. PD-16-29953-D SHEET

ORDER NO. BM9191

6318 NOLD # 6318 INTERIM STORAGE

APPRO. JOB NO. PDVP-2116-14-570

EGW 225
GTH PH-388

MATERIAL REQ'D AT DEST'N BY 7/3/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(4)	ft	1" SMLS STL PIPE Sch. 80	SHD P
2	(6)	ft	3/4" SMLS STL PIPE Sch	
3	(10)	ft	2" SMLS STL PIPE Sch 40	
4	(1)	ea.	1 3/4" 3000# FS SW. 90 ELBOW	STOCK
5	(1)	ea.	1" 3000# FS SW. 90 ELBOW	
6	(1)	ea.	1 1/2" 3000# FS SW. 90 TEE	
7	1	ea.	1" x 3/4" STL ECC SWAGED BRF Sch 80	RLBM 80754X 9191 GRANT CP DAVID 3/11
8	1	ea.	1 1/2" x 3/4" STL ECC SWAGED PLE TEE Sch 80	sch 3/31
9	1	ea.	2" x 1 1/2" STL ECC SWAGED BRF Sch 80	
10	(1)	ea.	2" STL 90° B.W. ELBOW 1 R STD WT.	STOCK
11	(3)	ea.	2" 150# FS W.N. FLG 1/16" R.F. Sch 40	
12	2	ea.	3/4" 150# FS W.N. FLG 1/16" R.F. Sch 80	RLBM 80754X 9191 GRANT
13	(1)	ea.	3" 150# FS BLIND FLG 1/16" R.F.	STOCK
14	(1)	ea.	3" 300# BLIND FLG 1/16" R.F.	
15	(1)	ea.	3/4" 150# x 1/16" LHK ASB Comp. GASKET	
16	(1)	ea.	3" 150# x 1/16" LHK ASB Comp GASKET	
17	(1)	ea.	2" 150# SPIRAL WOUND GASKET	
18	(1)	ea.	3" 300# SPIRAL WOUND GASKET	
19	(1)	ea.	1/2" x 2 1/4" STD BOLT GR BT W/2 HEX NUTS	
20	(4)	ea.	3/8" x 3 1/2" STD BOLT GR BT W/2 HEX NUTS	
21	(8)	ea.	1/8" x 3" STD BOLT GR. BT. W/2 HEX NUTS	
22	(8)	ea.	3/16" x 4" STD BOLT GR. BT. W/2 HEX NUTS	
23	(1)	ea.	3/4" 800# STD ST. GATE VALV BLT. PNT.	CHEV B8 6341
24	(1)	ea.	3/4" SMLS STL BAR STOCK PLG. Fd Hd.	

SHEET 1 OF 2 SHEETS

BILL OF MATERIAL

JOB 16-432

DATE 3/23/81

DRG. NO. PD-16-2953-0 SHEET

ORDER NO. B/M 9191

#6 S/D HOLD #6 S/D INTERIM STORAGE

APPRO. JOB NO. GROUP 2116-111

EBW x 225

MATERIAL REQ'D AT DEST'N BY 4/3/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
25	(50)	ft	1/4" SMIS STL PIPE 50 H 50	STOCK
26	(14)	ea	1/4" 150# SED MI 90° ELBOW	
27	(2)	ea	1/4" 150# BRASS SED GATE VALVE	
28	(2)	ea	1/4" 150# SED MI UNION	
29	(2)	ea	1/4"x3" SMIS STL PIPE NIPPLE TBE 50	
30	(2)	ea	1/4" 150# STL NIPPLE 50. THREADED	
31	(2)	ea	150# F.S. BLIND FLG 1/4" P.F.	✓
			End Use: Piping So F-163?	
			can be removed	
			EBW 3/24/81	
			3/26/81	

CHEV B8 6342

BILL OF MATERIAL

JOB 16-4235

DATE 5/23/81

DRG. NO. D16-27953-0 SHEET 66

ORDER NO. BM 9182

#16 SID HLD #6 SID INTERIOR
STAIRCASE

APPRO. JOB NO. FL16-3116-1-1

MATERIAL REQ'D AT DEST'N BY 7/13/81 F.M.H.

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
49	30	ft	ELWELL STRAIGHT TRACK CHAIN	RLBM 80752X 9182
			RF 2-6, 6 GA. FOR USE WITH	KEENAN CP RICK 3/26
			Pacific Valve Universal Type	
			CHAIN KNEEL NO 912-F	
51			VOID	VOID
52	4	ea	1/2" x 3/4" SILLUPE RED. E.W. X.S.	
53	1	ea	1" 300 th OS FT, 1/8" P.F. LIGHT BARELY	
			FIG NO. ¹²²³ 123347 US. 11 240-448 FULL	RLBM 70110X 9182
			1/2" + REGULAR TIM. OK E.B.W.	ORBIT CPLYNW 3/26/81
56	1	ea	1" 300 th FS NAME PLATE BLIND 3-BOLT	RLBM-9190 F.M.H.
			LINE BLIND MODEL 3815 ASA	
			BLIND END TYPE WOOD DIVISION	
			End Use: <u>Exhaust Fan</u>	
			for system <u>Exhaust Fan</u>	
			<u>RV 3/23/81</u>	
			<u>7/13/81</u>	

CHEV B8 6343

BILL OF MATERIAL

JOB 110-138

DATE 3/23/81

DRG. NO. 110-2753-0 SHEET 66

ORDER NO. BM 9182

#4 SID X10LD #6 SID INTERIM

APPRO. JOB NO. FUEL 6-211-11

STORAGE

MATERIAL REQ'D AT DEST'N BY 4/13/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
25	(5)	ea.	3/4" STD STL BR SUECK Plug Rd H/L	STOCK
26	(16)	ea.	1/4" x 1 1/4" Stud Bolt Gr B7 w/2 HEX NUTS	
27	(4)	ea.	3" 500# 1/16" THK Ash Comp. Gasket	
28	(8)	ea.	1 1/2" 150# 1/16" THK Ash Comp. Gasket	
29	(16)	ea.	1" 150# 1/16" THK Ash Comp. Gasket	
30	(1)	ea.	1" 300# 1/16" THK Ash Comp. Gasket	
31	(32)		1/4" x 1 1/4" Stud Bolt Gr B7 w/2 HEX NUTS	
32	(32)		1/2" x 3/4" Stud Bolt Gr B7 w/2 HEX NUTS	
33	(128)		3/8" x 3/4" Stud Bolt Gr B7 w/2 HEX NUTS	
34	(8)		1/2" x 5" Stud Bolt Gr B7 w/2 HEX NUTS	
35	16		1/2" x 10 3/4" Stud Bolt Gr B7 w/2 HEX NUTS	RLBM 80766X 9182 BOSCO CP RALPH 3/1/81
36	4		5/8" x 8" Stl. Plate	RLB146027X 9182 RAMSEY CP YOLI 3/23/81
37	8		1/8" x 8" machine Bolt mld STL w/11 HEX NUT	RLBM 80766X 9182
38	(6)		1/4" 6000# ST1 WELD BASS SW	STOCK
39	(1)		1/4" 6000# ST1 WELD BASS THREADED	
40			VOID	VOID
41	1		1" V3" St1 CONC RED S.W. Std wt.	RLBM 80752X 9182 KEENAN CP RICH 3/1/81
42	2		Pacific Valve Universal Type Chain	
43			WHEEL 912-E FEA LDF WITH	
44			STRAIGHT LINK TYPE CHAIN.	
45			Do Not Substitute	
46	2	3"	Flex I	
47	30	1"	Chisel	
48				

CHEV B8 6344

BILL OF MATERIAL

JOB 16-438

DATE 4/6/81

DRG. NO. 670. Hold Interim Storage SHEET EBW. X-223

ORDER NO. BM-9179

APPRO. JOB NO. Fuel 6-2111

Supplement #1

MATERIAL REQ'D AT DEST'N BY 4/17/81 FIVE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
3	(2)	ea	2" 150° CS WN Flg 1/4" RF Sch 40	Stock
4	(2)	ea	2" 150° CS Flg 1/4" RF Gate vlv Blt Bnt 12C. Tr	✓
7	(2)	ea	2" 150° 1/4" thk Asp Comp gasket	✓
8	(8)	ea	5/8" ϕ x 3" Stud Bolt Gr Bolt-7 w/2 Hex Nuts	✓
13	(1)	ea	6" x 2" Weldolet C.S. Red Std Wt.	✓
EBW 4/6/81 End Use: additional material for F-16W + F-16W2 fuel gas				4/7/81 CHEV B8 6345

BILL OF MATERIAL

JOB 10 3*4 16-438

DATE 4/3/81

DRG. No. _____ SHEET _____

ORDER No. EM-9187

Hold Interim Storage 6 5/8

APPRO. JOB NO. Inter-S-2116--14.

5/10/61 A-225

MATERIAL REQ'D AT DEST'N BY 4/5/81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	85	ea	2" PIPE SMLS CS SCH 40 BFW	Stock
2	1	ea	2" FLANGE WN CS SCH 40 150#	✓
3	1	ea	2" BLIND FLANGE 150# RF CS	✓
4	1	ea	2" ELBOW 90° LR CS STD WT BW	✓
5	11	ea	2" ELBOW 45° LR CS STD WT BW	RUBM-80752X KCCMAN op Bill 4-7-81
6	10	ea	3/4" BOSS 6000# CS SW	↓
7	1	ea	1" BOSS 6000# CS SW	↓
8	1	ea	3/4" BOSS 6000# CS SCRD	Stock
9	1	ea	3/4" PLUG CS SCRD	✓
10	1	ea	2" GASKET 150# RF ASB COMP	✓
11	4	ea	A5/8x3" STUD BOLTS b-7 W/2 HEX NUTS	✓
12	6	ft	st3x6.25 STRUCT. STL TEE st3x6.25/ASEM A-36	RUBM-6527X RAMSEY op ART 4-7-81
13	6	ft	1x1x1/8 " STRUCT stl angle 1"x1"x1/8"	↓
			End Use: Piping for atomizing steam	
			JUL 24/81	
				ES 4/7/81
				CHEV B8 6346

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB 10-41 DATE _____

DRG. No. _____ SHEET _____ ORDER No. _____

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY 4/17/61 DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(13)	ea	6" S&T 90° 40	SMOP
2	(7)	ea	6" S&T 90° 40	Stock
1	2	ea	6" 150° CS Flg 1/4" RF 6" 40 40 120 Tr	RLBM-80751X KCEW100 Bill 4-7-81
2	(4)	ea	3" 150° FLS UN FL 1/4" RF 40 40	Stock
3	(4)	ea	6" 150° CS WN FL 1/4" RF 40 40	✓
4	(4)	ea	3" 150° X 1/4" 10K Ark	✓
5	(4)	ea	6" 150° X 1/4" 10K Ark	✓
6	(4)	ea	3" 150° X 1/4" 10K Ark	✓
7	(4)	ea	3" 150° X 1/4" 10K Ark	✓
8	(4)	ea	3" 150° X 1/4" 10K Ark	✓
9	(4)	ea	3" 150° X 1/4" 10K Ark	✓
10	(4)	ea	3" 150° X 1/4" 10K Ark	✓
11	(4)	ea	3" 150° X 1/4" 10K Ark	✓
12	(4)	ea	3" 150° X 1/4" 10K Ark	✓
13	(4)	ea	3" 150° X 1/4" 10K Ark	✓
14	(4)	ea	3" 150° X 1/4" 10K Ark	✓
15	(4)	ea	3" 150° X 1/4" 10K Ark	✓
16	(4)	ea	3" 150° X 1/4" 10K Ark	✓
17	(4)	ea	3" 150° X 1/4" 10K Ark	✓
18	(4)	ea	3" 150° X 1/4" 10K Ark	✓
19	(4)	ea	3" 150° X 1/4" 10K Ark	✓
20	(4)	ea	3" 150° X 1/4" 10K Ark	✓
21	(4)	ea	3" 150° X 1/4" 10K Ark	✓
22	(4)	ea	3" 150° X 1/4" 10K Ark	✓
23	(4)	ea	3" 150° X 1/4" 10K Ark	✓
24	(4)	ea	3" 150° X 1/4" 10K Ark	✓
25	(4)	ea	3" 150° X 1/4" 10K Ark	✓
26	(4)	ea	3" 150° X 1/4" 10K Ark	✓
27	(4)	ea	3" 150° X 1/4" 10K Ark	✓
28	(4)	ea	3" 150° X 1/4" 10K Ark	✓
29	(4)	ea	3" 150° X 1/4" 10K Ark	✓
30	(4)	ea	3" 150° X 1/4" 10K Ark	✓
31	(4)	ea	3" 150° X 1/4" 10K Ark	✓
32	(4)	ea	3" 150° X 1/4" 10K Ark	✓
33	(4)	ea	3" 150° X 1/4" 10K Ark	✓
34	(4)	ea	3" 150° X 1/4" 10K Ark	✓
35	(4)	ea	3" 150° X 1/4" 10K Ark	✓
36	(4)	ea	3" 150° X 1/4" 10K Ark	✓
37	(4)	ea	3" 150° X 1/4" 10K Ark	✓
38	(4)	ea	3" 150° X 1/4" 10K Ark	✓
39	(4)	ea	3" 150° X 1/4" 10K Ark	✓
40	(4)	ea	3" 150° X 1/4" 10K Ark	✓
41	(4)	ea	3" 150° X 1/4" 10K Ark	✓
42	(4)	ea	3" 150° X 1/4" 10K Ark	✓
43	(4)	ea	3" 150° X 1/4" 10K Ark	✓
44	(4)	ea	3" 150° X 1/4" 10K Ark	✓
45	(4)	ea	3" 150° X 1/4" 10K Ark	✓
46	(4)	ea	3" 150° X 1/4" 10K Ark	✓
47	(4)	ea	3" 150° X 1/4" 10K Ark	✓
48	(4)	ea	3" 150° X 1/4" 10K Ark	✓
49	(4)	ea	3" 150° X 1/4" 10K Ark	✓
50	(4)	ea	3" 150° X 1/4" 10K Ark	✓

CHEV B8 6347

SHEET OF SHEETS

BILL OF MATERIAL

JOB 10-438

DATE 1

DRG. NO. 10-438-0 SHEET 53

ORDER NO. 10-438

APPRO. JOB NO. 10-438

MATERIAL REQ'D AT DEST'N BY 10-438

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	10	ft	5" S&S STEEL PIPE 10' L	RLBM-80776X 9172 6-20-41 Sp. David 3/25/31
2	10	ft	5" S&S STEEL PIPE 10' L	
3	10	ft	5" S&S STEEL PIPE 10' L	
4	10	ft	5" S&S STEEL PIPE 10' L	RLBM-80776X 9172 KEGON 10' 7/14/41
5	10	ft	5" S&S STEEL PIPE 10' L	
6	10	ft	5" S&S STEEL PIPE 10' L	
7	10	ft	5" S&S STEEL PIPE 10' L	
8	10	ft	5" S&S STEEL PIPE 10' L	
9	10	ft	5" S&S STEEL PIPE 10' L	
10	10	ft	5" S&S STEEL PIPE 10' L	
11	10	ft	5" S&S STEEL PIPE 10' L	
12	10	ft	5" S&S STEEL PIPE 10' L	
13	10	ft	5" S&S STEEL PIPE 10' L	
14	10	ft	5" S&S STEEL PIPE 10' L	
15	10	ft	5" S&S STEEL PIPE 10' L	
16	10	ft	5" S&S STEEL PIPE 10' L	
17	10	ft	5" S&S STEEL PIPE 10' L	
18	10	ft	5" S&S STEEL PIPE 10' L	
19	10	ft	5" S&S STEEL PIPE 10' L	
20	10	ft	5" S&S STEEL PIPE 10' L	
21	10	ft	5" S&S STEEL PIPE 10' L	
22	10	ft	5" S&S STEEL PIPE 10' L	
23	10	ft	5" S&S STEEL PIPE 10' L	
24	10	ft	5" S&S STEEL PIPE 10' L	
25	10	ft	5" S&S STEEL PIPE 10' L	
26	10	ft	5" S&S STEEL PIPE 10' L	
27	10	ft	5" S&S STEEL PIPE 10' L	
28	10	ft	5" S&S STEEL PIPE 10' L	
29	10	ft	5" S&S STEEL PIPE 10' L	
30	10	ft	5" S&S STEEL PIPE 10' L	
31	10	ft	5" S&S STEEL PIPE 10' L	
32	10	ft	5" S&S STEEL PIPE 10' L	
33	10	ft	5" S&S STEEL PIPE 10' L	
34	10	ft	5" S&S STEEL PIPE 10' L	
35	10	ft	5" S&S STEEL PIPE 10' L	
36	10	ft	5" S&S STEEL PIPE 10' L	
37	10	ft	5" S&S STEEL PIPE 10' L	
38	10	ft	5" S&S STEEL PIPE 10' L	
39	10	ft	5" S&S STEEL PIPE 10' L	
40	10	ft	5" S&S STEEL PIPE 10' L	
41	10	ft	5" S&S STEEL PIPE 10' L	
42	10	ft	5" S&S STEEL PIPE 10' L	
43	10	ft	5" S&S STEEL PIPE 10' L	
44	10	ft	5" S&S STEEL PIPE 10' L	
45	10	ft	5" S&S STEEL PIPE 10' L	
46	10	ft	5" S&S STEEL PIPE 10' L	
47	10	ft	5" S&S STEEL PIPE 10' L	
48	10	ft	5" S&S STEEL PIPE 10' L	
49	10	ft	5" S&S STEEL PIPE 10' L	
50	10	ft	5" S&S STEEL PIPE 10' L	
51	10	ft	5" S&S STEEL PIPE 10' L	
52	10	ft	5" S&S STEEL PIPE 10' L	
53	10	ft	5" S&S STEEL PIPE 10' L	
54	10	ft	5" S&S STEEL PIPE 10' L	
55	10	ft	5" S&S STEEL PIPE 10' L	
56	10	ft	5" S&S STEEL PIPE 10' L	
57	10	ft	5" S&S STEEL PIPE 10' L	
58	10	ft	5" S&S STEEL PIPE 10' L	
59	10	ft	5" S&S STEEL PIPE 10' L	
60	10	ft	5" S&S STEEL PIPE 10' L	
61	10	ft	5" S&S STEEL PIPE 10' L	
62	10	ft	5" S&S STEEL PIPE 10' L	
63	10	ft	5" S&S STEEL PIPE 10' L	
64	10	ft	5" S&S STEEL PIPE 10' L	
65	10	ft	5" S&S STEEL PIPE 10' L	
66	10	ft	5" S&S STEEL PIPE 10' L	
67	10	ft	5" S&S STEEL PIPE 10' L	
68	10	ft	5" S&S STEEL PIPE 10' L	
69	10	ft	5" S&S STEEL PIPE 10' L	
70	10	ft	5" S&S STEEL PIPE 10' L	
71	10	ft	5" S&S STEEL PIPE 10' L	
72	10	ft	5" S&S STEEL PIPE 10' L	
73	10	ft	5" S&S STEEL PIPE 10' L	
74	10	ft	5" S&S STEEL PIPE 10' L	
75	10	ft	5" S&S STEEL PIPE 10' L	
76	10	ft	5" S&S STEEL PIPE 10' L	
77	10	ft	5" S&S STEEL PIPE 10' L	
78	10	ft	5" S&S STEEL PIPE 10' L	
79	10	ft	5" S&S STEEL PIPE 10' L	
80	10	ft	5" S&S STEEL PIPE 10' L	
81	10	ft	5" S&S STEEL PIPE 10' L	
82	10	ft	5" S&S STEEL PIPE 10' L	
83	10	ft	5" S&S STEEL PIPE 10' L	
84	10	ft	5" S&S STEEL PIPE 10' L	
85	10	ft	5" S&S STEEL PIPE 10' L	
86	10	ft	5" S&S STEEL PIPE 10' L	
87	10	ft	5" S&S STEEL PIPE 10' L	
88	10	ft	5" S&S STEEL PIPE 10' L	
89	10	ft	5" S&S STEEL PIPE 10' L	
90	10	ft	5" S&S STEEL PIPE 10' L	
91	10	ft	5" S&S STEEL PIPE 10' L	
92	10	ft	5" S&S STEEL PIPE 10' L	
93	10	ft	5" S&S STEEL PIPE 10' L	
94	10	ft	5" S&S STEEL PIPE 10' L	
95	10	ft	5" S&S STEEL PIPE 10' L	
96	10	ft	5" S&S STEEL PIPE 10' L	
97	10	ft	5" S&S STEEL PIPE 10' L	
98	10	ft	5" S&S STEEL PIPE 10' L	
99	10	ft	5" S&S STEEL PIPE 10' L	
100	10	ft	5" S&S STEEL PIPE 10' L	

RECEIVED 10-438-0182 10/19/41

BILL OF MATERIAL

16-457

DATE _____

1. No. 100-110753

SHEET 70

ORDER No

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

DATE _____

[illegible]

CHEV B8 6349

BILL OF MATERIAL

JOB 16-438

DATE 5/25/81

DRG. NO. DD 27753-0 SHEET 57

ORDER NO. BH 7176

#65/D MOLD #65/D INTERIOR

APPRO. JOB NO. FL 22-211

EBW-225

STUDIOS

MATERIAL REQ'D AT DEST'N BY 7/13/81 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	30	ft	" 3000 STL PIPE 3/4" ID	RLBM 80776X 9176 GRANT CP DAVID 3/26
2			VOID	
3	(3)	ea	1/4" 1-1/2" END FLANGE 4AT	STOCK
4	(12)	ea	2" 150# OS FLG 1/16" P.F. BUTT VALVE BLT. BWT.	RLBM 80763X 9176 GRANT CP DAVID 3/26
5	1	ea	2" 150# OS FLG 1/16" P.F. GLOBE VLV BLT. BWT.	STOCK
6	(1)	ea	1/4" 6000# STL WELD BOSS, THREADED	STOCK
7	(3)	ea	1/4" 6000# STL WELD BOSS, S.W.	RLBM 80754X 9176 GRANT
8	4	ea	2" 150# FS W.N. FLG 1/16" P.F. SCL. 40	STOCK
9	2	ea	1/2" 300# FS W.N. FLG 1/16" P.F. SCL. 80	STOCK
10			VOID	
11			VOID	
12	(7)	ea	2" SH. 90° B.W. ELBOW L.P. STD. WT.	STOCK
13	(1)	ea	2" STL B.W. TEE STD. WT.	RLBM 80755X 9176 GRANT
14	2	ea	2" x 1 1/2" STL OCC. RED. B.W. X.S.	STOCK
15			VOID	
16			VOID	
17	(4)	ea	1/4" STD STL BOLT STOCK PLUG PCD HCL	STOCK
18	(5)	ea	2" 150# x 1/16" P.F. HSB. COMP GASKET	
19	(2)	ea	1 1/2" 300# x 1/16" P.F. HSB. COMP GASKET	
20	(6)	ea	2" 300# x 1/16" P.F. HSB. COMP GASKET	
21	(16)	ea	3/8" x 3" STD BOLT GR B7 1/2 HEX NUTS	
22	-	ea	STD BOLT GR B7 1/2 HEX NUTS	
23	-	ea	STD BOLT GR B7 1/2 HEX NUTS	
24	4	ea	1/4" x 8 1/4" STD BOLT GR B7 1/2 HEX NUTS	RLBM 80766X 9176 BOSCO CP DAVID 3/26

SHEET 1 OF 2 SHEETS

BILL OF MATERIAL

JOB 16-438

DATE 3-23-81

DRG. No. PC 4-29953-6 SHEET 57

ORDER No. 8179175

10) #6 7/10 #6 3/10 JEFF RIL

APPRO. JOB NO. FUEL G-2111-1-1-

MATERIAL REQ'D AT DEST'N BY 9/3/51 Finner

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
25	1 PR	ea	1" 300# FS W/ ORBITER FLY 1/4" RF SCL	RLBM-9172
26	(3)	ea	3/4" SCD STL BAR Stock Plugged Hcl	STOCK
27	(2)	ea	1/2" SCD STL BAR Stock Plugged Hcl	L
28	—	—	150# x 1/16" thk ASB. COMP. GASKET	
29	(2)	ea	1/2" 150# x 1/16" thk ASB. COMP. GASKET	STOCK
30	(6)	ea	4" 150# x 1/16" thk ASB. COMP. GASKET	
31	(6)	ea	4" 300# x 1/16" thk ASB. COMP. GASKET	
32	(16)	ea	3/4" x 1 1/4" Stud Bolt C/P B7 w/ NUTS	
33	(8)	ea	1/2" x 2 3/4" Stud Bolt C/P B7 w/ NUTS	
34	(48)	ea	5/8" x 3 1/2" Stud Bolt C/P B7 w/ NUTS	
35	8	ea	3/4" x 5" Stud Bolt C/P B7 w/ 1 1/2" NUTS	RLBM 80766X 9175 BOSCO CP RALPH 3/25/81
36	8	ea	3/4" x 2" Stud Bolt C/P B7 w/ 1 1/2" NUTS	
37	2	ea	8" x 3/8" x 8" STL. PLATE	RLBM 6027X 9175 KAWSC CP YOLI 3/25/81
38	4	ea	7/8" x 8" MINOR BOLT MOD 52 (1/4" H) NUT	RLBM 80766X 9175
39	2	ea	4" x 1 1/2" REDUCER FS B.W. PTH X H.	RLBM 80752X 9175 KEENAN CP RICK 3/26
40	1	ea	4" 300# FS FLY 1/4" RF ORBIT 3/4" W/ NUT	RLBM-70110X 9175
			Fig. 1223 FULL 1223 1/2" S-Y. 1/2" L-1223 1/2" 1/2" COLLAR TIGHT OK PER 2BW	ORBIT CP LYNN 3/26/81 SEND. 3/27/81
43	1	ea	4" 300# OS HAMMER BIND 3-BOLT	RLBM-91783 Fric
			LINT BIND MODEL 3500-AS4	
			RELD AND TYPE WCCO Division	
			For Use: 1/2" x 1/2" x 1/2"	
			1/2" x 1/2" x 1/2"	
			2BW 7/23/81 1/4" 1/4" 1/4"	

BILL OF MATERIAL

JOB 16-439

DATE APR 17 1961

DRG. NO. _____

SHEET _____

ORDER NO. 201-7612

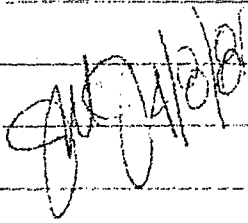
6-10-10 10:00 AM 10-10-10

APPRO. JOB NO. 16-439

4-10-10 355

MATERIAL REQ'D AT DEST'N BY _____

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	4' Flange 1/2" 300# RF CS S L 40	
2	1	ea	4' Gasket 300# RF 3 1/2" sp WND	
3	4	ea	6" Nipple T.O.E 9" Long	
4	8	ea	5/8" ϕ x 1 1/4" Machine bolt mild steel w/ nut	
5	4	ea	1" Cross 6000# CS SURD	
6	4	ea	1" hose coupling (100's foot) female thread	
7	4	ea	1" Nipple CS Sch 80 T.B.E 3" Long	
8	4	ea	3/8" x 1 1/2" x 19" Long mild steel bar	
<i>FRK 4/8/61</i> 				
Encl Use: Material for shot blasting				CHEV B8 6352

BILL OF MATERIAL

JOB 16-434

DATE 3-10-81

DRG. NO. PD-116-29953 SHEET 46

ORDER NO. BM-9123

Hold for Fabrication, Chevron

APPRO. JOB NO. ~~SD609-2116-14-25~~

Korman X 355

MATERIAL REQ'D AT DEST'N BY 3-23-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	13	ft	4" Pipe SMLS CS Sch 40 BW	
2	100	ft	6" Pipe SMLS CS Sch 40 BW	
3	1	ea	3" Flange WN 300# RF CS Sch 40	
4	1	ea	4" Flange WN 300# RF CS Sch 40	
5	1	ea	4" Flange WN 150# RF CS Sch 40	
6	2	ea	6" Flange WN 150# RF CS Sch 40	
7	2	ea	12" Flange WN 300# RF CS Sch 40	
8	3	ea	6" Elbow 90° LR STD WT CS BW	
9	1	ea	4"x3" Reducer conc STD WT CS BW	
10	2	ea	12"x6" Reducer conc STD WT CS BW	
11	1	ea	3" Gasket 300# RF 304/ASB sp WND	
12	1	ea	4" Gasket 300# RF 304/ASB sp WND	

CHEV B8 6353

BILL OF MATERIAL

JOB _____ DATE _____

DRG. No. _____ SHEET _____ ORDER No. _____

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
9	4	ea	3" gaskets 300 ^{lb} Asb comp RF	
10	2	ea	3" Flg 300 ^{lb} C.S. RF WN Bore Sch 40	
11	2	ea	3" gate vlv 300 ^{lb} C.S RF 12Cr Tr	
12	50	lbs	Quartzite Gunita	
13	5	ft ²	3" x 3" A. 135 A 135 (10 SWG) Stell Wire Mesh	
			23W 4/7/81	
			End Use: Additional Blowdown nozzles for D-16-19	

CHEV B8 6354

BILL OF MATERIAL

JOB K-457

DATE 4/1/81

DRG. No. #650 - Hold Interim Storage

SHEET 1

ORDER No. BM 1260

APPRO. JOB No. 1260

EEJ - 1225

Supplement #1

MATERIAL REQ'D AT DEST'N BY 3/18/81 Fico

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
			Additional material	
4	2	ea	1" gate VLV 800# C.S. S.W. 12cr welded	RLBM-50507x KECHIND cp DMLC 4-13-81
5	(4)	ft	1" pipe smls sch 80 C.S. RF	Stack
6	(2)	PR- ea	1" 300# ^{ORifice} Flg C.S. RF WN Bare sch 80	RLBM-92681NC COLUMBIA SPEC. 4-14-81
7	(2)	ea	1" gasket 300# 304/ Ash spiral wind	Stack
8	(8)	ea	5/8" x 3/4" stud bolt 3-7 w/2 Hex Nuts	Stack
9	1	ea	1", 300#, 304SS sch 80 Orifice Plate, per Std dwg. 6C-T99504-9 6C-T99504-9 (attached)	RLBM-92681NC BEAL Equip cp GLEN 4-14-81

CHEV B8 6355

BILL OF MATERIAL

JOB KL-437

DATE 4/2/01

DRG. No. _____

SHEET _____

ORDER No. BM-7201

APPRO. JOB NO. 211-14

MATERIAL REQ'D AT DEST'N BY 5/8/01 FIRM

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
8	(1)	ea	3" X 2" reducer - std WT C.S. RW conc	stock
9	(1)	ea	3" Flg 300 ^{lb} C.S. RF WN Bore sch 40	✓
10	(1)	ea	1/4" X 1/4" stud bolt B-7 W/2 Hex nuts	✓
11	(1)	ea	2" galv 300 ^{lb} 304/ A 5/8 spiral wind	✓
12	(1)	ea	2" galv 300 ^{lb} 304/ A 5/8 spiral wind	✓
			SPN 4/2/01	✓
			4/6/01	✓
			End Use: _____	
			Approved: C. K. 30	

CHEV B8 6356

BILL OF MATERIAL

JOB 16-457

DATE 4/2/81

DRG. No. _____ SHEET _____

ORDER No. BM-9261

APPRO. JOB No. 61636-2116-19-57

MATERIAL REQ'D AT DEST'N BY 5/8/81 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
8	1	ea	3"x2" reducer std wt C.S. BW conc	
9	1	ea	3" Flg 300 [#] C.S. RF WN Bore sch 40	
10	8	ea	3/4" X 4 1/4" Stud bolts B-7 w/2 Hex nuts	
11	9	ea	2" gasket 300 [#] 304/ Asb spiral wnd	
12	1	ea	3" gasket 300 [#] 304/ Asb spiral wnd	
EW 4/2/81 <i>[Signature]</i> 4/2/81 End Use: Suction Piping G-1636				

CHEV B8 6357

BILL OF MATERIAL

JOB 16-457

DATE 4/9/81

DRG. No. #650 SHEET Hold Interim Storage

ORDER No. BM 9260
G-1636-2116-14-570
APPRO. JOB No.

EBW X-225
Supplement #1

MATERIAL REQ'D AT DEST'N BY 5/8/81 Firm
DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
			Additional material	
4	2	ea	1" gate vlv 800# C.S. S.W. 12cr welded	
5	4	ft	1" pipe smls sch 80 C.S. RF	
6	2	ea	1" 300# ^{orifice} Flg C.S. RF WN Bore sch 80	
7	2	ea	1" wsket 300# 304/ Asb spiral wnd	
8	8	ea	5/8" x 3 1/4 stud bolt B-7 w/2 Hex Nuts	
9	1	ea	1", 300#, 304SS sch 80 Orifice Plate, per Std dwg GC-J99504-9 GC-J99504-9 (attached)	

CHEV B8 6358

Basement Files

85
#10

16-479// Controls or C-1602 Botms
quench

BILL OF MATERIAL

JOB 114-479

DATE 4-15-81

DRG. No. PD-16-29953 SHEET 61

ORDER No. BM-9334

#6 ^{5/10}

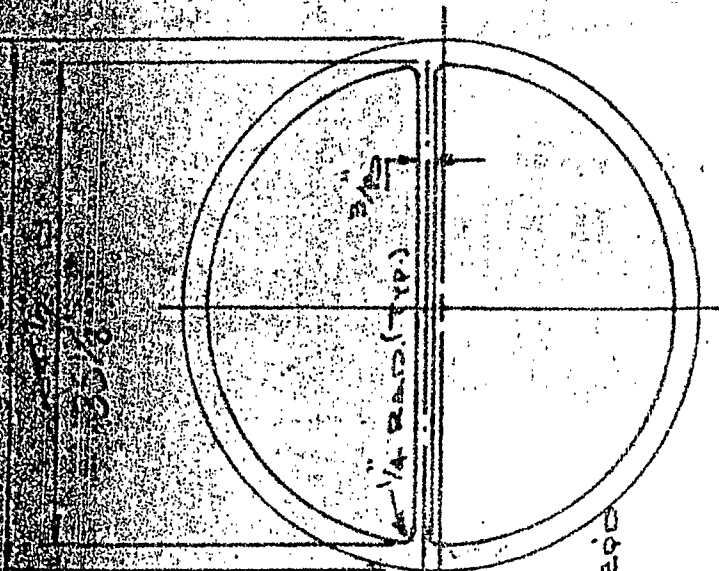
APPRO. JOB No. EBW08-2116-14

EBW X-225

MATERIAL REQ'D AT DEST'N BY 4/24/81 Firm

DATE

	ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
+10Ft	1	20	ea	2" Pipe 3mls SCH 40 CS BFW	
	2	2	ea	2" Gate vlv 150 [#] CS RF BB 12 CR TR	
	3	1	ea	1 1/2" Globe vlv 150 [#] CS RF 12 CR TR	
+H	4	4	ea	3" Elbow std wt CS BW 90° LR	
✓	5	3	ea	2" Tee std wt CS BW	
16	4	ea	2"x1 1/2" Reducer std wt CS BW cone		
✓	7	2	ea	2" ORIF. Flgs, 300 [#] CS RF WN Bore 40	
8	4	ea	1 1/2" Flange 150 [#] CS RF WN Bore 40		
+2	9	4	ea	2" Flange 150 [#] CS RF WN Bore 40	
10	2	ea	1 1/2" Gasket (300 [#]) 304/ASB Spiral WND		
11	2	ea	2" Gasket (300 [#]) 304/ASB Spiral WND		
✓	12	8	ea	5/8x1 3/4 Stud bolt B7 w/2 Hex nuts	
✓	13	8	ea	3/4x8 1/4 Stud bolt B7 w/2 Hex nuts	
32	14	8	ea	5/8x3 Stud bolt B7 w/2 Hex nuts	
15	8	ea	1/2x2 3/4 Stud bolt B7 w/2 Hex nuts		
✓	16	1	ea	3/4 Boss 6000 [#] CS SW	
✓	17	2	ea	1/2 Gate vlv 800 [#] CS m-f/sw-scrd	
✓	18	2	ea	1/2 Plug CS SCD	
19	1	ea	1 1/2" Complex Control vlv RF Test		
✓	20	1	ea	3/4" Gate vlv 800 [#] CS m-f/sw-scrd	
✓	21	1	ea	3/4" Plug CS SCD	
✓	22	1	ea	2"x3/4" Elbow 15 CS SCD	
23	10	Ft	L 3x3x3/8" Angle Iron		CHEV B8 6360
24	2	ea	6x6x1/4" stl plate		



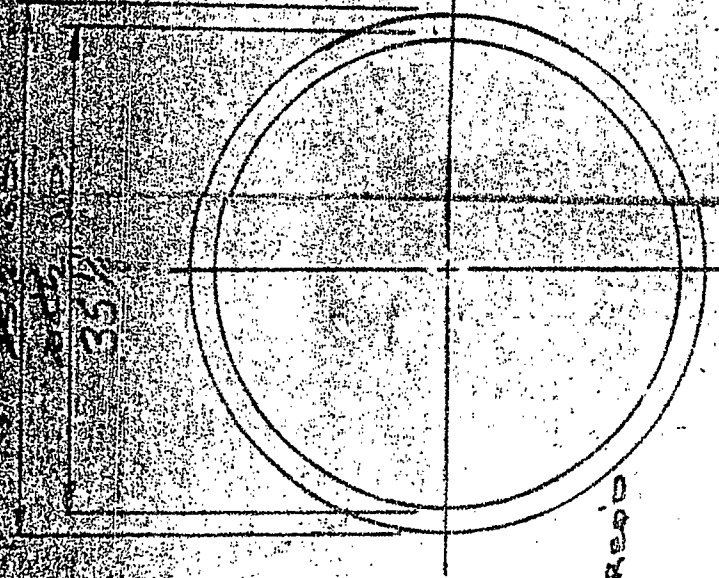
(A) 1-Rep'd

CHANNEL GASKET

1/16" Thick Solid Nickel-Bronze
(Double Sealed)

E-1932-1

1/8" D.J. SL. CLAD ASBESTOS



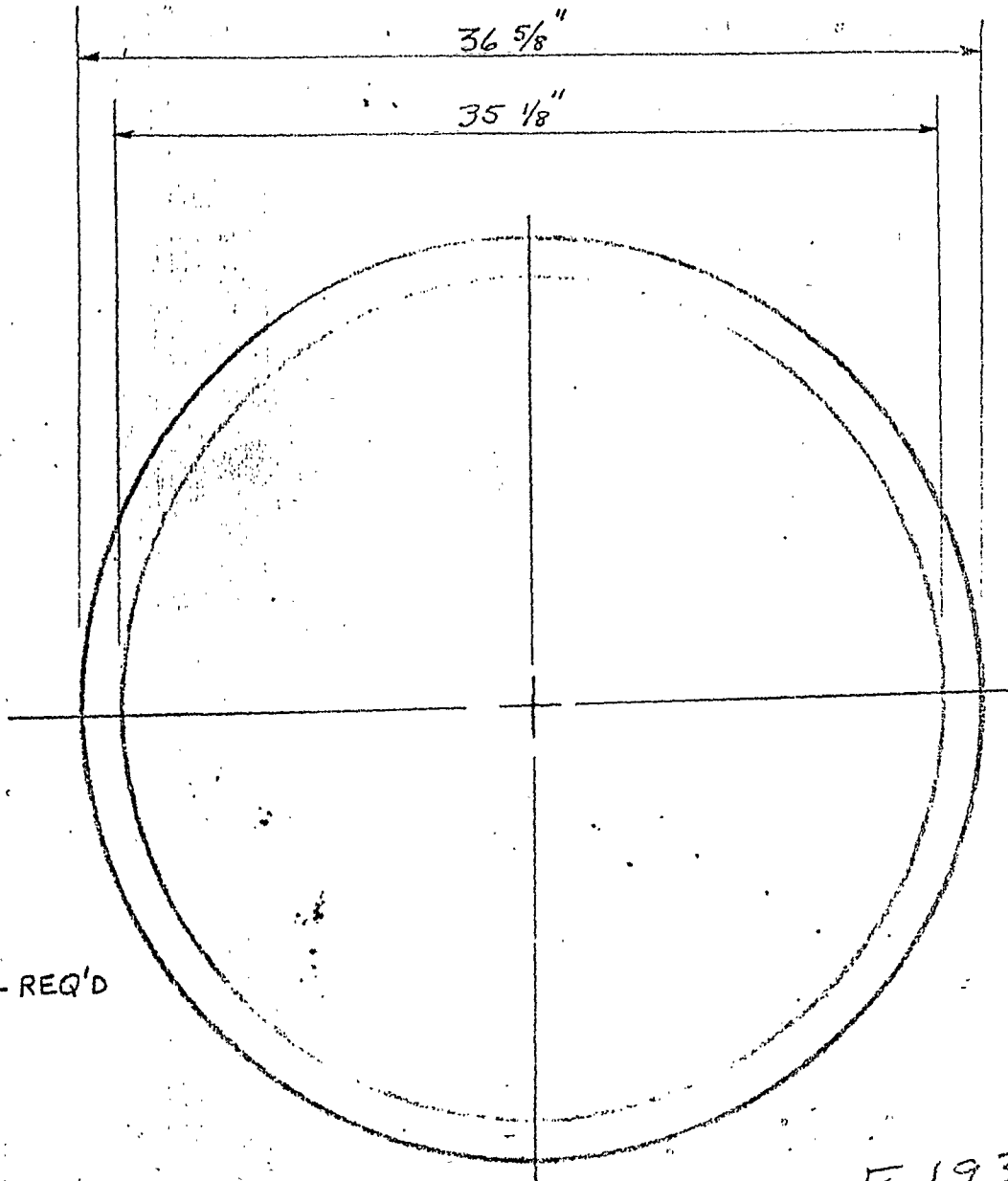
(B) 1-Rep'd

SHELL GASKET

1/16" Thick Solid Nickel-Bronze
(Double Sealed)

E-1932-2

1/8" D.J. SL. CLAD ASBESTOS



Ⓑ 2-REQ'D

E 1932-2

SHELL GASKET
1/8" D.J. STL CLAD ASBESTOS

REVS.



SHELL GASKET
E-1932A & B

SCALE NONE DATE 5/15/81

DR RGL CH DR. APP ENG RGL

OPRG. DEPT. _____

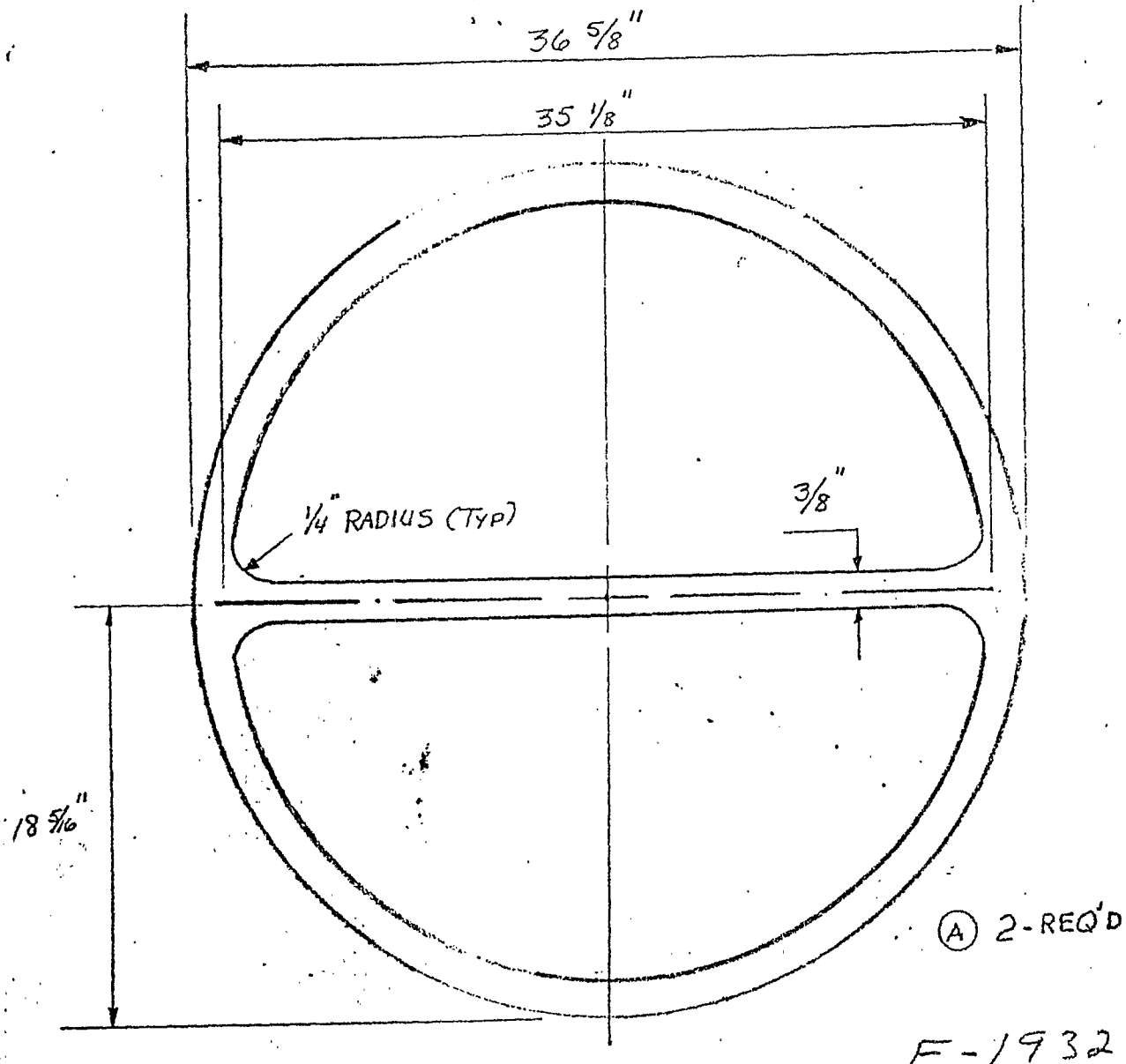
APPROVED

ENG. DEPT. _____

RGL

REFERENCE

FKEP-33-EL-26-1



CHANNEL GASKET
1/8" D.J. STL. CLAD ASBESTOS

REVS.

1

2



CHANNEL GASKET
E-1932A & B

SCALE NONE DATE 5/16/81
DR. RH2 CH. DR. APP ENG. RH2

OPRG. DEPT. APPROVED
ENG. DEPT. RH2

REFERENCE:
FKEP-33-E1-16-1

REQUEST FOR PRODUCTION

NO. 27

GENERAL INSTRUCTIONS TO CONTRACTORS WORKING
WITHIN THE REFINERY

Purpose	1. The purpose of this instruction is to acquaint you with general rules and regulations of the Refinery pertaining to your work while in the Refinery. We will appreciate your cooperation in complying with these regulations.
Contractor	2. The term "Contractor" as used in these instructions, shall be understood to include any and all subcontractors performing work under terms of the contract under consideration. Contractor is responsible for getting this information to subcontractors and for directing and supervising work of subcontractors.
Company Representatives	3. In order to assist you in following these instructions, a Company Representative will be assigned to you. It is his duty to act as the Company's agent in all matters relative to your activities while in the Refinery. All questions concerning these instructions and additional instructions or information necessary for the proper performance of your work shall be referred to the Company Representative. In certain instances a Safety Operator may be assigned to work with you. (Identified by green stripes on hat)
Working Hours	4. Under no circumstance shall any work be started until the Company Representative has been contacted. 5. You are expected to work the same hours as the Company maintenance force, unless special arrangements are made. On weekends you must clock in each day with the Operating Division Shift Supervisor before you start any work. Your Company Representative will tell you on Friday which Operating Shift Supervisor to contact on the weekend.
Passes	6. Contact the Company Representative prior to the start of work to arrange for Refinery passes for each of your employees. Badges are assigned to individual employees; and are not transferable. Vehicle passes, when required, will be supplied by the Company. The Contractor shall be solely responsible for the badges issued to his employees and final payment on the contract will be delayed until all badges are returned. In the case of loss of a badge, a report should be made to the Company Representative immediately, including badge number, time and place of loss, and circumstances surrounding the loss.
Protective Equipment	7. All of your employees must wear hard hats whenever they are in field operating, maintenance or construction areas and shop buildings. Safety glasses are mandatory for all contractor employees working jointly with Company employees. We strongly urge that you require safety glasses be worn by all of your employees on any job within the Refinery.

GENERAL INSTRUCTIONS TO CONTRACTORS WORKING
WITHIN THE REFINERY

	The Company Representative will advise you of special types of eye protection and other personnel protection required in unusually hazardous areas such as acid and caustic areas.
Matches	8. Carrying "strike anywhere" matches in the Refinery is prohibited. Any cigar or cigarette lighters carried within the Refinery shall have the flint, steel, and operating mechanism enclosed in such a manner as to prevent the possibility of accidental lighting or sparking.
Smoking	9. Smoking by Contractor's employees will be permitted only within areas designated by Company Representative and subject to his restrictions.
Motorized Equipment	10. Your motorized equipment shall be equipped with mufflers in good condition, and the wiring in good order before the equipment will be allowed to enter the Refinery. All battery boxes must be covered and all gasoline lines and carburetors free from leakage.
Driving & Parking	11. Drive carefully. Maximum speed limit in the Refinery is 20 mph. A walking guide must be furnished by you when cumbersome loads or equipment is moved on Refinery streets. All movement of material by truck within the Refinery shall be in accordance with State laws covering fastening loads, red warning flags, etc. unless special permission is granted by Company Representative.
Parking	12. Your motorized equipment shall be parked within the Refinery only within areas designated by the Company Representative. Contractor employees' privately owned cars are not permitted within the Refinery. The Company assumes no responsibility for damages to cars, trucks or other vehicles which belong to Contractor, subcontractors or Contractor's employees when driven or parked on Company property.
Doctor, Hospital, Ambulance	13. You shall provide necessary emergency care in case of injury. Furnish the Company Representative with information as to which doctor, hospital, and ambulance is to be used in case of accident or injury to Contractor's personnel.
Accidents	14. In the case of any injury sustained on Refinery property by any of your employees, report the circumstances promptly to the Company Representative.
Operating Units	15. Do not allow your employees to enter operating units or operate any valve except water bibbs specifically designated by the Company Representative.

GENERAL INSTRUCTIONS TO CONTRACTORS WORKING
WITHIN THE REFINERY

Fires & Fire
Equipment

16. Do not use or move fire fighting equipment, except that which is assigned for your use. Keep space around fire hydrants, extinguishers, hose houses, etc. clear at all times. In case of fire, keep away from the vicinity of the fire and out of the way of fire fighting activities.

In case of fire:

- a. Call local 333.
- b. Report location of fire.
- c. Keep clear of the burning area to allow Refinery personnel to extinguish fire.
- d. Remove your equipment and employees from the area.

Material
Deliveries

17. Notify the Company Representative of expected material deliveries.

Clearances

18. Maintain a minimum clearance of 10'0" from centerline of all railroad tracks. This applies to tools, material and equipment.

Good House-
keeping

19. Maintain the premises in which you are working in a neat and orderly manner.

Hazards

20. Prevent hazards to others resulting from upturned nails, unguarded excavations, falling objects, etc.

Approvals:
Written
Permit

21. You must obtain a written permit through the Company Representative before starting any of the following: (To avoid delays, give the Company Representative as much notice as possible -- preferably at least one day.)
- a. Entering tanks or vessels.
 - b. Using a torch, electrode, melting pot, forge, electric motor, soldering iron, or any open flame.
 - c. Closing walkways, roads, or restricting traffic. (Proper warning signs shall be used.)
 - d. Starting excavations.
 - e. Sandblasting, guniting, or spray painting.
 - f. Opening or cutting through fire walls (earthen or brick).

GENERAL INSTRUCTIONS TO CONTRACTORS WORKING
WITHIN THE REFINERY

Verbal Approval	g. Use of radioactive materials. 22. You must obtain verbal approval from Company Representative before: a. Working on existing pipelines or equipment. b. Using gasoline motors. c. Using utilities such as compressed air, steam, water, or electricity. d. Moving cranes, tractors, or heavy equipment in process areas. e. Operating cranes or similar equipment near operating process units, overhead power lines or pipe lines. f. Storing or using inflammables, such as gasoline, oils, paints, oxygen and Presto bottles, etc. g. Disposing of rubbish. h. Walking or working upon any roofs over buildings or equipment. (Attention is further called to the specific hazard of breaking through of the corrugated asbestos types.) i. Fueling your gasoline driven equipment on Company property. j. Repairing your equipment on Refinery property. k. Working any time at variance with regular schedule.
Qualified Welders	23. Only welders who have been qualified in accordance with Company tests shall be used. Contact Company Representative to arrange for testing.
Stopping Work in Event of Hazard	24. The Company Representative or Safety Operator is authorized to stop any work which he may consider hazardous to Company personnel or equipment. Any Company employee may stop work in the event a hazard develops in the area.
Photographs	25. Only Company photographers are permitted to carry cameras or take pictures within the Refinery. If progress or finished construction photographs are desired, a written request should be made to the Refinery Manager describing the photograph proposed and the end use of same.

Revised: 4/1/70

CHEV B8 6379

Approved


R. W. Davis, Refinery Manager

Dat _____

NOTIFICATION OF
CONTRACTOR IN REFINERY

F. R. DAVIS:

The following contractor will be working in the Refinery. Pertinent data on the work schedule and method of controlling entry of his men and vehicles to the Refinery is listed below:

1. Contract No. _____ Shop Order _____ Engr. Job No. _____
2. Contractor _____
3. Co. Representative _____ Phone No. _____
Engineer _____ Phone No. _____
4. Work to be done _____
Location _____
5. Work to start _____ To Complete _____
6. Working Schedule _____
7. Contractor's foreman in charge _____
8. Contractor's Representatives who will identify men entering Refinery _____

9. Number of men on job _____
10. Identification (Pass badge serial number) Company _____ Contractor _____
11. Number and type of Vehicles to enter Refinery _____

12. Supervisory personnel authorized to drive passenger cars into Refinery _____

13. In case of injury to Contractor's men, notify _____
(Name and Telephone)
who will arrange for care of injured. If unable to contact this man, send
injured to: Doctor _____ If no doctor is shown, injured will
Address _____ be sent to:
Phone _____ Johnstone Clinic (24 hours) 859-7987
125 Snelson Road (Ysleta)
Via El Paso Ambulance Service 565-9994
14. List of Subcontractors:
(1) _____
(2) _____
(3) _____

CHEV B8 6380

I have read and agree to comply with all provisions of Refinery Instruction 1404
General Instructions to Contractors working within the Refinery. Route signed copy
to Employee Relations - Safety

GUIDE
FOR
INSPECTION OF REFINERY EQUIPMENT

CHAPTER XVIII
PROTECTION OF IDLE EQUIPMENT

FIRST EDITION
1959



AMERICAN PETROLEUM INSTITUTE

Division of Refining

111 West 50th Street

New York 20, N. Y.

Price \$1.00

CHEV B8 6381

GUIDE
FOR
INSPECTION OF REFINERY EQUIPMENT

CHAPTER XVIII
PROTECTION OF IDLE EQUIPMENT

FIRST EDITION
1959

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American Petroleum Institute, New York 20, N. Y.

PREFACE

This chapter is one of a series which make up the manual, *Guide for Inspection of Refinery Equipment*. It is based on the accumulated knowledge and experience of engineers of the petroleum industry. All users are invited to submit suggested revisions to the director of the Division of Refining, American Petroleum Institute, 111 West 50th Street, New York 20, N. Y.

The information contained in this publication has been arranged in its present form as a means of facilitating continuity of presentation and convenience of reference. It does not constitute, and should not be construed to be, a code of rules, regulations, or minimum safe practices. It is not intended that the practices described in this publication supplant practices that have been proven satisfactory. Nor is it intended that this publication discourage innovation and originality in the inspection of refineries. Users of the publication are reminded that no book or manual is a substitute for the judgment of a responsible engineer.

The *Guide for Inspection of Refinery Equipment* is subdivided as follows:

Chapter	I	Introduction
Chapter	II	Conditions Causing Deterioration or Failures
Chapter	III	General Preliminary and Preparatory Work
Chapter	IV	Inspection Tools
Chapter	V	Safe Practices and Safety Inspection
Chapter	VI	Unfired Pressure Vessels
Chapter	VII	Heat Exchangers, Condensers, and Cooler Boxes
Chapter	VIII	Direct-Fired Boilers
Chapter	IX	Fired Heaters and Stacks
Chapter	X	Pumps, Compressors, and Blowers and Their Drivers
Chapter	XI	Pipe, Valves, and Fittings
Chapter	XII	Foundations, Structures, and Buildings
Chapter	XIII	Inspection of Atmospheric and Low-Pressure Storage Tanks
Chapter	XIV	Electrical Systems
Chapter	XV	Instruments and Control Equipment
Chapter	XVI	Pressure-Relieving Devices
Chapter	XVII	Auxiliary and Miscellaneous Equipment
Chapter	XVIII	Protection of Idle Equipment
Appendix		Inspection of Welding

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GUIDE FOR INSPECTION OF REFINERY EQUIPMENT

CHAPTER XVIII

PROTECTION OF IDLE EQUIPMENT

1801 BASIS OF PROTECTION

1801.01 General

The protection of idle equipment is an involved and detailed process of safeguarding inactive and unattended equipment from deterioration. The prime requisite of all protective measures is to insure that spare equipment can, after an extended period of idleness, be returned to service with a minimum of delay and expenditure.

1801.02 Causes of Deterioration

Usually, deterioration during periods of idleness is caused by conditions entirely different from those existing during operation. This must be carefully considered in determining the parts to be protected and the methods to be employed.

Primarily, moisture is the main cause of deterioration. Low temperature, generally atmospheric, permits condensation of moisture which is prevented during operation by the higher ambient temperature. Moisture combined with oxygen may cause rusting and pitting of surfaces similar to the atmospheric corrosion of structures or other metallic equipment operating at atmospheric temperatures. Moisture from rain or snow may seep in through small cracks and crevices in insulation, fireproofing, or other coverings or coatings and may accumulate to cause corrosion. If surfaces are not properly cleaned, chemicals, deposits, or products of corrosion remaining on the surface may become more corrosive due to the presence of moisture.

Steel and metal alloys, which have satisfactorily resisted corrosion from process streams at operating temperature, may be seriously affected by atmospheric conditions. Where the atmosphere may be polluted by various gases or dusts, moisture may cause these to be extremely corrosive.

Par. 202.04, Chapter II, *Conditions Causing Deterioration or Failures*, contains more details concerning atmospheric corrosion.

1801.03 Basis for an Effective Program

An effective program which will provide protection to idle equipment is the result of an understanding of conditions contributing to equipment deterioration and a knowledge of methods and facilities available for protecting the equipment. It is based on, and formulated after, an evaluation of the following items:

1. A complete inspection of the equipment after removal from service.

2. A review of the mechanical design of the equipment.
3. The determination of an estimated period of idleness.
4. A consideration of the methods of protection applicable to the piece or pieces of equipment.
5. The economics or costs involved in protecting the equipment.
6. Replacement value of the equipment.
7. Anticipated need for the equipment.

1801.04 Conditions Affecting Protective Requirements

The protective requirements for idle equipment will vary from one refinery to another. They will be greatly affected by the differences in:

1. Climatic conditions having varying degrees of:
 - (a) Humidity.
 - (b) Temperature extremes.
 - (c) Precipitation.
2. Plant atmospheres affected by their proximity to:
 - (a) Chemical plants.
 - (b) Industrial plants.
 - (c) Salt water.

1801.05 Determination of Protection Required

1801.051 INSPECTION: In evaluating the protective requirements for any piece of equipment, a complete and detailed inspection is paramount and should be the first step taken. The inspection will accurately disclose the condition of the equipment as it exists and will be instrumental in determining what protective action must be performed. Moreover, it will indicate whether or not the equipment is of sufficient value to warrant protection. Obviously, it is uneconomical to protect equipment which has deteriorated to the point where replacement is imminent.

The inspection should be recorded and the following information shown:

1. A detailed description of the condition of the equipment.
2. An estimated service life still available from the equipment. This information should be based on past inspection records.
3. A recommendation as to the cleaning required.
4. The immediate maintenance required if the equipment were to continue in operation.

An inspection of the idle equipment will show what maintenance and repairs are needed to facilitate im-

mediate use of the equipment when it is returned to service.

The inspection of equipment should not be limited to major pieces of equipment only; it should include all equipment worthy of protection.

1801.052 REVIEW OF EQUIPMENT DESIGN: A detailed review of the design of any piece of equipment will be beneficial in the determination of protective needs. It is apparent that equipment fabricated from materials impervious or highly resistant to the conditions prevailing will require but a minimum of protection. Conversely, equipment fabricated from materials subject to rapid deterioration from the same conditions must be given special consideration.

1801.053 EQUIPMENT ENCLOSURE: The nature of the enclosure of a particular piece of equipment can greatly affect the measures taken. For example, the protection required for explosionproof equipment need not be as extensive as that required for equipment unprotected from vapors or dust.

1801.054 INITIAL TYPE OF PROTECTIVE COATING: The type of protective coating initially specified in the design, such as provided by painting, metalizing, etc., must be considered in the light of its effectiveness and the amount of protection required. It is possible that sufficient external protection has been provided in the original protective coating if the idle period is of short duration.

1801.055 DETERMINATION OF PERIOD OF IDLENESS: Possibly the most indeterminate, and yet most singularly important factor in the protection of idle equipment, is the determination of the expected period of idleness. Its effect on any and all action taken is important. It is reflected in every aspect of planning, for it is obvious that the measures taken to provide protection for a month are incomparable to the efforts expended in safeguarding equipment for a period of many months.

A poor prediction of idle time will have an adverse effect on the cost of maintaining the equipment in a serviceable condition. An underestimate of idle time will result in either the loss of the equipment or a rehandling and retreatment of the equipment. An overestimate contributes to excessive cost in "gold plating" the protection. In either case, the consequence is an unsatisfactory use of company funds and energy.

1801.056 ECONOMIC CONSIDERATIONS: The selection of one or more protective methods will be based on the value of the equipment, cost of protecting, and quantity of protection needed.

Process equipment in a refinery represents a sizable capital investment, yet it is impractical to protect all equipment for extended periods of idleness. Many pieces of equipment, because of their comparatively low initial cost and comparatively high cost of protecting,

should not be considered in a protective program. Equipment which will fall into this category includes:

1. Inexpensive instruments—mercury thermometers, manometers, small pressure gages, etc.
2. Small isolated electrical equipment—fractional horsepower motors, push buttons, dry transformers, etc.
3. Inexpensive mechanical equipment—pumps of small capacity and low head, cast-iron valves, small pipe and fittings.

A review of any protective action taken should show that the actual expenditure for protective measures does not approach the replacement cost of the equipment. In view of the constant evolution and improvement of processes and equipment designs, it is easy to appreciate that conceivably great sums of money may be expended for equipment which may soon become obsolete. Obviously, there are exceptions to this rule. Examples include storage vessels, large electric motors, compressors, etc.

1802 METHODS OF PROTECTION

1802.01 General

The procedures described in the ensuing paragraphs pertain to various types of equipment. The need for protection, the anticipated downtime, and the applicability of each method should be considered in deciding the method or methods to be employed. They should be used only after a thorough investigation into the condition of the equipment and an understanding of the costs involved.

1802.02 Exterior Protection

1802.021 ORGANIC COATINGS: One of the most common exterior surface coatings employed for protection is paint; varnish, lacquer, and similar materials are also used. Where surfaces have been protected by paint or other organic coatings during operation, they should be examined carefully. All loose or blistered coatings should be removed, and the areas thus exposed should be recoated. Where the coating is generally cracked or chipped over large areas, a complete re-coating job may be required.

1802.022 HEAVY GREASE: Bearing and sliding surfaces, and others which for some reason cannot be protected with an organic coating, may be coated with a heavy grease.

1802.023 WRAPPING: Some surfaces may be wrapped with a heavy waterproofed paper or a plastic material. In some cases the waterproofed paper may be treated with a vapor-phase inhibitor. Vapor-phase inhibitors are proprietary materials, and the manufacturer should be consulted as to the one most suitable for the purpose.

1802.024 INSULATION AND FIREPROOFING: A careful examination should be made when equipment is insulated or fireproofed. All defective material should be removed; the surface below the defect should be cleaned and, if necessary, painted and the covering replaced. Care should be taken to assure that the exterior surface of the insulation or fireproofing is properly waterproofed.

1802.025 METALLIC COATINGS: Where surfaces have been protected by metallic coatings, they should be carefully examined. All defective areas should be thoroughly cleaned and recoated by flame spraying with the same metal used in the original coating.

1802.03 Interior Protection

1802.031 OIL COATING: The interior surfaces of all vessels, heat exchangers, piping, heater and furnace tubes and headers, compressor and pump cylinders, as well as valve chambers, turbine cases, and other closed equipment, can be protected by a coating of light oil, either inhibited or uninhibited, which has sufficient viscosity to adhere to the walls of the equipment. In equipment large enough to permit entry and work, and where all surfaces are available, this may be accomplished by spraying; care should be taken to coat all surfaces thoroughly. In other cases, the equipment may be completely filled with the oil and then drained, leaving a coating on all surfaces.

A suitable light oil is any oil with low viscosity which does not tend to evaporate rapidly. Inhibitors are proprietary materials, and the manufacturer should be consulted as to the one most suitable for the purpose.

1802.032 FILLING: All closed equipment may be protected by completely filling with a light, noncorrosive petroleum oil, such as gas oil; this may be either inhibited or uninhibited. In some cases, inhibited water may also be used for filling. (See Par. 1802.031 for reference to inhibitors.)

1802.033 VAPOR-PHASE INHIBITORS: The interior of vessels may be protected by vapor-phase inhibitors. Inasmuch as these are proprietary preparations, the manufacturer should be consulted regarding the type of inhibitor required and the method of its application. Vapor-phase inhibitors are also used in special impregnated waterproof wrapping papers and may be used in conjunction with cocooning.

1802.034 INERT GAS: All closed equipment may be protected by displacing the air with a dry, inert gas such as carbon dioxide.

1802.035 DESICCANTS: In closed vessels desiccants may be used to absorb moisture. The desiccant should contain an indicator to show when the saturation point has been reached. The use of this method requires opening the vessel periodically to examine the desiccant and to replace it when necessary.

1802.036 CAUTION: A protective coating or an inhibitor which is suitable for protection of one material may be harmful to another material. Care should be exercised in selecting a protective coating or inhibitor to assure that it is suitable for the intended service.

1802.04 Overall Protection

1802.041 COCOONING: Cocooning is the envelopment and protection of equipment by a sprayable plastic coating. It has been used extensively and successfully by the military services and by industry in the protection of idle equipment; its use is unlimited. The size and geometry of the equipment to be protected are not of great consequence in its application.

The proper application of the plastic coating can provide, up to a period of 10 years, a protective covering against:

1. Rain, snow, and moisture.
2. Industrial acids and vapors.
3. Mold and mildew.
4. Salt air.

The period of protection is determined by the thickness of the covering and the type of plastic used. Material specifications covering the physical and chemical properties of the various types of plastics are available from the manufacturers.

The application of the sprayable plastic coating is not an involved process. The process requires the following equipment:

1. Air compressor—60 cu ft per min, 90 psi to 100 psi.
2. Air-pressure regulator.
3. Pressure feed tank of 10- to 15-gal capacity with air-driven agitator.
4. Spray gun and connecting hoses.

The average maintenance man can become an expert cocooning applicator with very little practice. The actual application and information on the procedure for applying it can be obtained from any one of the several manufacturers of the sprayable plastics.

1802.042 PACKAGING: Small parts and instruments may be protected by placing them in plastic bags or packing them in moistureproof cartons or boxes.

1802.05 Protection by Alteration of Environment

1802.051 AIR-CONDITIONING: Where equipment is housed in an enclosed building, protection may be provided by air-conditioning the building to maintain a uniform temperature and low humidity.

1802.052 DEHUMIDIFYING: In certain cases, equipment may be stored in a sealed room which is kept dehumidified by mechanical dehumidification or by desiccants which contain an indicator to show when the

saturation point has been reached. When a desiccant is used, it should be placed where it is visible through a window to prevent anyone entering the building except to renew the desiccant when the saturation point has been reached.

1803 PROCEDURES FOR SPECIFIC EQUIPMENT

1803.01 General

The procedures described in the ensuing paragraphs pertain to specific types of equipment. The actions suggested should be weighed in the light of the need for protection and the anticipated downtime. These recommendations should be used only as guides, and only after the condition of the equipment has been thoroughly investigated and there is an understanding of the costs involved.

1803.02 Mechanical Equipment

1803.021 COMPRESSORS: The protection afforded large compressors, because of their original cost, should be extensive and detailed. Machinery of this type is complex and dictates that a thorough inspection and a detailed programming of protective measures be undertaken. The problem of evaluating the effect of an environment upon a compressor which is to remain in an operating position must be considered. Obviously, removing a large gas-engine-driven compressor from a field installation would be difficult and expensive, yet there are conditions when removal is justified and recommended.

Special consideration must be given to compressors removed and stored in areas remote from field positions. A compressor which is not resting on a foundation must be supported the full length of its frame to prevent any possible sag or distortion. Support can be provided by a frame of welded structural-steel members.

It is important, and in keeping with the value of a compressor, to protect it from the weather, either in a building or by a tarpaulin or similar covering. The use of an enclosed building is the most satisfactory because of the need for safeguarding protective surface coatings and the compressor in general from the elements.

The following steps are recommended for protecting a gas-engine-driven compressor in place for a period of extended idleness. They can also, in general, be applied to steam-driven or gasoline-driven compressors.

a. Pumping End

1. Drain water from all cylinder jackets and, where used, from intercoolers and intercooler moisture separators. Drain outlets sometimes plug during draining; therefore, when the flow stops, the outlets should be probed to assure that all water has been drained.
2. Fill all lubricators completely full of oil to prevent rusting of the pumping parts.

3. Remove all piston-rod packing rings and oil wiper rings and clean in a suitable solution. Apply a coating of a satisfactory rust preventive and wrap in a water-proof paper or place in a plastic container. A rust preventive may be grease, oil with a high viscosity, or a proprietary material. If a proprietary material is to be used, the manufacturer should be consulted as to the one most suitable for the service. Tag and properly identify the rings to assure reassembly in their original position.

4. Remove the inlet and discharge valves from the compressor cylinders, clean, and apply a coating of a satisfactory rust preventive. Completely coat the valve bores and piston rods with a spray or other suitable means while the valves are removed.

5. Rotate the gas-driven engine and completely cover all surfaces of the compressor cylinder bores with a protective coating of lubricating oil or suitable rust preventive.

6. Replace all valves in their original position and tighten in place.

b. Power End

1. Drain the cooling water from the power end. Remove the cylinder head and wipe the cylinder bore clean. Apply a protective coating of lubricating oil or a suitable rust preventive to as much of the bore as possible. Remove the power valves from the cylinder head and completely cover the valve bores and seats with a similar protective coating. Reassemble the head. Protect valve springs by adjusting screws, etc., when the exposed outer surface of the compressor is covered.

2. Remove side cover plates (access openings to crankshaft, camshaft, etc.) and wipe dry all interior surfaces of the crankcase and moving parts. The interior of the crankcase may be washed down with kerosine or another solvent before drying. Rotate the engine by barring, when required, and be certain that the following engine parts are completely covered with a protective spray coating of lubricating oil or suitable rust preventive:

- (a) Crosshead guides and pins.
- (b) Connecting rods.
- (c) Crankshaft.
- (d) Camshaft.
- (e) Main and connecting rod bearings (to the extent possible).
- (f) Crankcase interior.

3. Replace all side covers and be certain they are dust-tight. After all covers have been replaced and barring of the engine is no longer required, clean the external surfaces and apply a protective coating to this entire outer area.

4. Thoroughly check the entire frame and be certain that all holes which could admit dust and moisture are plugged or blocked off by satisfactory means.

5. Remove the magnetos, clean them, and store in a dry, warm storage area. Protect the magnetos while in storage by enclosing them in a heavy paper carton or similar container.

6. Clean and apply a protective coating to all small auxiliary equipment, relief valves, piping, filters, etc.

A periodic inspection should be made of compressors which are to remain idle for a considerable length of time. A recommended interval between inspections is three to four months. During the inspections, it is recommended that small surfaces on cylinder bores, crankshafts, bearing journals, piston rods, crossheads, etc., be wiped free of protective coatings to determine their condition. When protection appears to be satisfactory, the same care as originally used in the application of the protective coating must be used in covering the exposed surfaces. If the compressor is protected by cocooning, the inspection interval may be lengthened as experience dictates.

If there is any sign of rust or corrosion on any of the aforementioned parts, they should be wiped clean and dry and the protective coating reapplied.

A modification of the foregoing procedure can be used in protecting compressors when the anticipated idle time is of a short duration. In most climates or plant atmospheres, it is unwise to permit either the interior or exterior of a compressor to be unprotected for longer than four to six weeks. Should it appear that this time will be exceeded, the necessary steps must be taken to clean and cover the compressor with a protective covering. In all events, in those areas where freezing occurs the water should be drained from the compressor cylinder jackets and the cooling system in the power end of the compressor. Drain outlets sometimes plug during draining; therefore, when flow stops, the outlets should be probed to assure that all water has been drained.

1803.022 PUMPS: Centrifugal, reciprocating, and injection-type pumps, because of the simplicity of their mechanical construction, lend themselves to effective and rather inexpensive preservation. Exclusive of the driver, treatment of the pump as a unit is practical. No detailed disassembly of the pump is required even when preparing the pump for long periods of idleness. In those services where the medium being handled is considered corrosive, the protective measures taken for either a short period of idleness (three to four months) or an extended period are similar. The only exceptions are the manner and extent of cleaning the pump.

a. Centrifugal Pumps: The following is a recommended procedure for safeguarding vertically split centrifugal pumps:

1. Open all vents and drains in the pump casing and bearing housing. Flush the casing and housing with a satisfactory solvent or cleaning material.
2. Break all pipe connections and blind suction and discharge flanges if the pump is to be removed and placed in storage. When the pump is to be maintained in a field position, be certain that the suction and discharge valves are closed and blanked off.

3. When single mechanical seals are used:

- (a) Loosen the seal gland.
- (b) Inspect the seal to determine that the sealing faces are satisfactory for continued service.
- (c) Pack the seal with a light grease.
- (d) Tighten seal gland lightly.

4. Where double mechanical seals are used, drain the stuffing box and flush with a cleaning agent. Plug the lower stuffing-box drain and fill with a lightweight grease or oil.

5. Where conventional packing is used, loosen the packing gland and remove all packing. Coat the interior of the stuffing box with a light grease. Repack the pump with a nonmetallic packing and retighten the packing gland. Tag the pump to indicate that the service packing has been removed.

6. Plug bearing-housing drains and fill with oil. Close off all bearing-housing vents.

7. Close all drains and fill the entire pump casing with a light oil. Slowly rotate the pump shaft to assure complete coating of the inner surfaces. Permit the pump casing to remain filled with light oil for at least one hour. The light oil used should be one with a low viscosity and which will not evaporate rapidly.

8. If the pump is to be placed in storage, draw the oil from the pump casing and close off all openings. If the pump is to be left in the field position, it is common practice to leave the casing filled with oil; however, it may also be drained if desired.

9. When single mechanical seals are used, the lightly tightened seal will have permitted oil to flow into the stuffing box and cover the seal. The seal should be retightened to prevent leakage.

10. Wrap the exposed pump shaft with plastic tape. At the points where the shaft enters the pump casing and the bearing housing, carefully wrap to seal off the openings.

11. Cover all other exposed surfaces with either paint or some suitable rust-preventive material.

Horizontally split centrifugal pumps can be preserved in a manner similar to the aforementioned procedure with but minor modifications.

b. Reciprocating Pumps: Steam pumps of the various types (simplex, duplex, etc.) can be protected by the following procedure:

1. Open all vents and drains on both the liquid and steam ends of the pump.
2. Break all pipe connections; blind off the suction, discharge, and steam flanges; and close drains.
3. Remove the valve cover plate from the liquid end of the pump and the slide valve cover from the steam end.
4. Remove a valve from each end of each cylinder on the liquid end. Fill all cylinders with a suitable rust preventive [see Par. 1803.021a(3) for definition of rust preventive]. Fill the steam cylinders through the slide

valve opening on the steam end. Slowly bar each piston back and forth.

5. Apply a suitable rust preventive to all valves and valve covers. Drain excess rust preventive from cylinders and close all vents and drains.
6. Replace valves and valve covers.
7. Remove packing from the stuffing box and coat stuffing box and rods inside of box with a suitable preservative. Replace packing and tighten gland.
8. Wrap any exposed rods with plastic tape.
9. Spray or brush all external surfaces with a suitable rust preventive.
10. Fill all lubricators with oil.

c. Injection-Type Pumps: Injection or metering pumps can be preserved by using the aforementioned methods as guides. Procedures to cover the peculiarities can be devised. Special attention should be given to the gear system of the pump.

1803.023 TURBINES: The rugged simplicity in the design of this high-speed rotating driver makes protective action easy and effective. There is no need for extensive disassembly or special action. The following procedure is suggested for a steam-driven turbine of the horizontal type; a simple modification or extension of this procedure can make it suitable for other types of turbines:

1. Open all drains on turbine case and bearing housing.
2. Blank off the inlet and exhaust flanges.
3. Close turbine-case drains.
4. Fill the turbine case with a light oil. Open the governor valve when filling the case to permit flooding the valve.
5. Rotate the turbine wheel slowly to permit covering all parts. Permit the oil to remain in the case for 30 min.
6. Drain oil from the case and close all vents and drains.
7. Fill the bearing housing with a lightweight grease.
8. Close all vents and drains in bearing housing.
9. As an alternative to steps 7 and 8, seal the bearing housing along the shaft with a nonhardening, plastic-type material or packing. The bearing housing should then be filled to the top with light oil, either inhibited or uninhibited (see Par. 1802.031 for reference to inhibitors). A periodic check should be made of the oil level. This alternative protects the shaft, bearings, seals, and inner housing and eliminates disassembly at startup for the purpose of removing grease from the housing. At the time of startup, remove the plastic seal from the shaft, drain and flush the bearing housing, and fill the housing with lubricating oil to the proper level.
10. Remove the governor housing.
11. Pack the overspeed trip mechanism with a light grease.
12. Remove packing from the governor valve and fill the stuffing box with a light grease.

13. Spray all exposed moving parts in the housing with a suitable rust preventive [see Par. 1803.021a(3) for definition of rust preventive].

14. Replace the governor housing.

15. Wire-brush and clean all exterior surfaces and either paint or spray with a rust preventive.

16. Tape the exposed drive shaft with a plastic wrapping.

When the turbine is to be stored for an extended period in an area which is neither heated nor dry, cocooning of the entire turbine is recommended as an effective protective measure.

1803.03 Coolers and Exchangers

1803.031 COOLING TOWERS: The originally specified materials of construction of a cooling tower will dictate the protective measures which must be taken while the tower is idle.

Inasmuch as the environment is less severe while the tower is idle than while in service, the problem of programming the protective action is not too difficult. Generally, it is the mechanical equipment and construction hardware which require attention.

The following procedure is suggested for a mechanical-draft cooling tower with concrete basin and redwood construction:

1. Open and drain all exposed piping.
 2. Drain all water from basin and flush the basin clean.
 3. Block open basin drain valves.
 4. Replace all unsatisfactory structural members. Replace warped and missing slats.
 5. Tighten all fasteners in the tower framework.
 6. Remove the fan drive motor and protect as described in the section on electrical equipment.
 7. Remove the gear reducer as follows:
 - (a) Drain oil from reducer and refill with a high-grade mineral oil.
 - (b) Clean exterior surfaces of gear-reducer housing and paint.
 - (c) Wrap all exposed shafts with plastic tape.
 - (d) Store in a warm, dry area.
 8. Wire-brush and chemically clean the fan.
 9. Cover the fan drive gear with a light grease and a waterproof paper.
 10. Paint or metalize the fan.
 11. Secure the fan blades to prevent rotation and to provide support.
- In areas where it is undesirable or unnecessary to remove the fan drive components, it is recommended that:
1. The fan be operated every three to four weeks.
 2. Normal preventive maintenance be provided.

When the wood dries out, cooling towers become a fire hazard. During prolonged shutdowns, the wood should be given a thorough periodic wetting.

1803.032 HEAT EXCHANGERS: The protective action required for a tubular heat exchanger is comparatively simple. In fact, it is only a minor extension of the routine maintenance resulting from tube fouling and shell buildup. The same methods of chemical or mechanical cleaning are applied. The following is a suggested procedure for protecting floating-head tubular heat exchangers, whether they are to be stored or maintained in field positions:

1. Drain the shell and tube sides of the exchanger.
2. Remove the shell cover, floating-head cover, and clamp ring.
3. Clean thoroughly to remove all deposits.
4. With a spray or brush, coat all surfaces of the floating-head cover and clamp ring and the inside surfaces of the shell cover with a light oil.
5. Remove the channel and channel cover.
6. Clean thoroughly to remove all deposits.
7. Cover the inside surfaces of the channel and channel cover with light oil.
8. Remove the tube bundle.
9. Clean the tube bundle and channel, following normal maintenance procedures.
10. Spray the interior of the shell and all nozzles with a light oil.
11. Immerse the cleaned tube bundle in a light oil bath for 30 min.
12. Reassemble the heat exchanger.
13. Blank off all flanges. Plug all vents and drains.
14. Protect all exposed bolting by spraying with oil.
15. Paint all exterior surfaces.
16. For brief shutdowns encase the bolted flanges in a heavy waterproof paper; for lengthy shutdowns cocooning is more effective.

It is very important, in cleaning heat exchangers, to remove all ammonium salts which promote corrosion of brass and all chlorides and sulfides which promote cracking of stainless steel.

When the tube bundle is not to be replaced in the shell, or when protection is to be given to spare bundles, the following additional measures should be taken:

1. Bolt a wooden flange to both tube sheets.
2. Wrap the tube bundle with waterproof paper or cocoon.
3. Securely attach the tube bundle to a pallet by strapping.

1803.033 SPRAY COOLERS: The operating conditions for spray coolers are similar to those enumerated for cooling towers. Of course, the materials of construction are very different; the usual spray coolers are

fabricated from structural-steel members, piping, and concrete. The following procedure can be used in preserving a spray cooler:

1. Close the water inlet valve to the water trough and blank.
2. Drain the water trough.
3. Blank the product inlet line.
4. Flush product lines and drain.
5. Blank off cooler product lines.
6. Wire-brush and prime cooler piping and water troughs.
7. Clean and paint structural-steel members.
8. Cover water troughs with a watertight metal cover.
9. Drain the concrete catch basin.
10. Block open basin drain valves.

1803.034 FINNED AIR COOLERS: The fan for a finned air cooler should be protected as described in Par. 1803.031 for a mechanical-draft cooling tower, items 6 through 11. The tubes should be opened, thoroughly cleaned, and closed. Steel tubes should have a light oil pumped through them, they should be drained and blanked at the outlet and inlet, and the exterior should be sprayed with a suitable rust preventive [see Par. 1803.021a(3) for definition of rust preventive].

1803.04 Storage Tanks and Pressure Vessels

1803.041 GENERAL: Corrosive attack in storage tanks and pressure vessels will usually appear in varying degrees throughout all parts. Atmospheric corrosion will occur on external surfaces. The seriousness of this attack will depend on humidity and temperature conditions. Because of the ease in detecting external corrosion, prompt and effective corrective measures may be taken.

In most instances internal corrosion is of an insidious nature. Frequently, it is not detected until failure has occurred or a thorough cleaning and inspection are made. Often, by the time the attack is recognized within a tank or vessel, the cost of repairing has become substantial.

The procedure practiced in preparing tanks and vessels for periods of idleness should be given special consideration.

1803.042 STORAGE TANKS: Before entering any tank, it is necessary to take certain precautions. The procedures used in making a tank safe for various types of work are discussed in Chapter V, *Safe Practices and Safety Inspection*. Briefly, the tank must be freed of gas and any residues which might generate gas.

When pyrophoric iron sulfide or residues of leaded gasoline are present, precautions should be taken, as also explained in Chapter V.

When a tank is certified to be free of gas, clear of gas-generating residues and toxic materials, isolated

from any source of toxic or gas-generating material, and has an atmosphere containing sufficient oxygen, inspection should be made and protective measures should be taken.

It is advisable to make a visual internal inspection through available openings of overhead parts and supports before entering a tank, in order to assure that there are no loose purlins, large patches of loose scale, weakened support columns or brackets, or any other object which might fall and cause personal injury. After the tank is certified safe for entry and work, all loose scale should be removed and any necessary repairs should be made. The walls should be dried thoroughly; if necessary, an eductor should be used to draw air through the tank.

The following procedure can be used for protecting almost any type of tank against deterioration:

1. Coat interior surfaces by spraying or brushing structural members with a light oil.
2. Close all manholes with gasketed covers.
3. Wire-brush, sandblast, or hammer-chip external surfaces for proper surface preparation and cover with a suitable paint.

If the tanks are located in areas subjected to windstorms of high velocity, consideration should be given to filling the vessel with an inhibited water. A tank filled with water will be strengthened materially against strong winds and will not be subject to floating.

As a general rule, tanks removed from service should be inspected at least annually.

1803.043 PRESSURE VESSELS: Safety precautions must be taken before entering a vessel. Because of the limited access and confined space in most vessels, safety precautions are probably more important in vessel inspection and repair work than with any other type of equipment.

In particular, the vessel should be blanked off from all sources of liquids, gases, or vapors. It should be drained, purged, and cleaned before entering. This will minimize the dangers caused by toxic gases, oxygen deficiency, explosive mixtures, and irritating chemicals. Clothing which will protect the body and eyes from the hazards existing in the vessel should be worn. Details of the precautions to be followed are covered in Chapter V.

Before inspection and protective measures are started on the interior of a pressure vessel, all persons working around the vessel should be informed that men will be working inside. Posting tags on the manways of tall towers is a worthwhile precaution. Frequently, a helper can be stationed as a guard at the manway nearest the area where work is being done and can record information or otherwise assist in the work. Men working inside a vessel should be informed when any work is to be done on the exterior. This will avoid needless fright caused by unexpected noises.

After the vessel is certified safe for entry and work, the interior should be inspected and any necessary repairs should be made.

The following procedure can be used for protecting almost any type of pressure vessel:

1. Cover all manholes with a gasketed cover.
2. Close all other openings tightly.
3. Pressure-test with an inert gas for leaks.
4. Close the inert-gas inlet and leave the vessel blanketed with inert gas.
5. Wire-brush, sandblast, or hammer-chip external surfaces for proper surface preparation and cover with a suitable paint.

Other methods of protecting the interior of vessels are:

1. Oil coating, described in Par. 1802.031.
2. Filling, described in Par. 1802.032.
3. Use of vapor-phase inhibitors, described in Par. 1802.033.
4. Use of desiccants, described in Par. 1802.035.

1803.05 Instruments

1803.051 GENERAL: An appreciable percentage of the capital investment of any installation is in the cost of its control equipment. The accuracy and magnitude of control of such equipment are dependent upon the maintenance and the protection provided therefor. Fortunately, the geometry and size of control instruments virtually eliminate the need for expensive or intricate protective procedures.

The treatment of both primary and secondary instruments is similar despite the differences of the environments they normally encounter. Primary instruments, widely dispersed in the proximity of the lines and vessels they meter, are subject to deleterious atmospheres and the elements. On the other hand, secondary instruments are frequently located in structural enclosures remote from field conditions. In all instances primary instruments are treated individually. Because of the grouping of secondary instruments, group treatment, such as is afforded some electrical equipment, frequently can be employed.

For prolonged shutdowns it may be advisable to remove all primary and other scattered instruments and store them in a dehumidified sealed room, as described in Par. 1802.052.

For purposes of illustrating the simple protective measures which can be taken in place when removal is not justified, the following procedure may be used for a flow meter of the differential pressure type using a pneumatic transmission system to transmit its readings to a receiver-recorder:

a. For the Flow Meter

1. Disconnect the lines from the orifice flanges to the differential pressure cell.

2. Plug the connections in the orifice flanges.
3. Fill both chambers of the meter body with a light oil.
4. Plug the chamber inlets.
5. Disconnect the air lines at the pneumatic transmitter housing.
6. Plug the air inlets.
7. Spray the interior of the pneumatic transmitter housing and all components with a light oil.
8. Spray or brush the external surfaces of the cell with a protective coating of oil.
9. Enclose the entire cell in a plastic bag and secure with plastic tape. An alternative procedure would be cocooning the cell after the protective measures specified in items 1 to 7 are taken.

b. For the Receiver-Recorder

1. Break all lines entering the receiver-recorder case.
2. Plug all vents and openings.
3. Cover all junctures of the sheet-metal case with plastic tape.
4. Insert a small jar of silica gel or other chemical drying agent.
5. Seal the door with plastic tape.
6. Spray the outside of the case with a light oil.

As alternative measures consideration can be given to:

1. Heating the interior of the case with an electric light to prevent moisture from forming.
2. Purging the interior of the case by maintaining a positive internal pressure with instrument air.
3. Cocooning the entire unit.

When secondary instruments are grouped and enclosed in weatherproof structures, protection as recommended in the section on electrical equipment can be applied.

1803.06 Pipe, Valves, and Fittings

Pipe and valves typify that class of equipment which is best protected in periods of either operation or idleness by an original wise selection of materials, coverings, and method of installation. Frequently the location of lines makes protective procedures uneconomical, if not impossible. Inasmuch as numerous lines are insulated or wrapped with plastic tape to prevent external corrosion, it is impossible to inspect them.

Unless the location of pipe 2 in. and less is convenient for servicing, little effort or expense should be given to protecting it during periods of extended idleness. The following procedure is suggested for larger lines:

1. Flush lines clean.
2. Break flanges and open valves at low points to permit complete draining.

3. Dry lines or circulate an inhibited or uninhibited oil through them (see Par. 1802.031 for reference to inhibitors).

4. Inspect insulated and wrapped lines, uncovering pipe where leaks are suspected.

5. Repair all damaged insulation and wrapping. Bare pipe should be wire-brushed and painted.

6. Lubricate all valves.

7. Spray all external surfaces of the valves with a medium-weight oil and cover handwheels and exposed valve stems with grease.

8. Tighten all pipeline connections.

9. Operate valves and relubricate every three months.

1803.07 Electrical Equipment

1803.071 GENERAL: The preservation of electrical equipment is, in general, related to the mechanical aspect of the design of electrical equipment. Failure or deterioration will most likely be a matter of attack upon moving parts, fasteners, suspensions or supporting members, hardware, etc. The cleaning and protective action taken will be similar to methods used in protecting strictly mechanical devices and vessels. Unit treatment of the equipment, instead of disassembly and detailed treatment, will be the rule except in the case of electric motors.

The very nature of the installation of electrical equipment dictates that, whenever possible, equipment (other than spares) be protected in the field. Removal and storage in areas remote from operating positions would, in the case of most equipment, be expensive.

1803.072 MOTORS: Electric motors, because of their proximity to rotating and material transfer equipment, are frequently subjected to environments and conditions which are detrimental to the motor life. In most installations they are in constant contact with acid vapors, water vapors, harmful dusts, and the elements. Designers of electric motors have taken these factors into consideration, but because of the number and severity of services, it is impossible to design for all conditions.

The following procedure is recommended for motors to be removed from field positions and placed in storage:

1. Wire-brush and, with a suitable solvent, clean all exterior surfaces of the motor. Where the motor has been in a particularly difficult service and the outer surfaces have a hard residue covering them, it is frequently necessary to sandblast the motor. If sandblasting is required, protect the shaft before sandblasting by wrapping with a plastic tape or other satisfactory covering. In open motors, protect the windings against sand. With totally enclosed motors, plug or cover openings to air passages.

2. Disassemble the motor.

3. Steam-clean all parts except those containing windings, using a cleaning agent with the steam. Use suitable

solvents, such as trichloroethylene, carbon tetrachloride, etc., to clean windings.

4. Blow out all water possible.
5. Place the disassembled motor in a drying oven and bake dry.
6. Test the motor for shorts by "megging." Repair if necessary.
7. Apply a coating of air-drying insulating varnish to the motor windings.
8. Check the bearings and, if necessary, replace. Pack bearings with a satisfactory bearing grease.
9. Assemble the motor.
10. Wrap the motor shaft with plastic tape and cover the terminal leads with a sheet-metal box.
11. Paint and store in a warm, dry area.

Motors to be shielded in a field position can be protected by the following procedure:

1. Drain oil from the bearing housing if it is oil-lubricated.
2. Remove the outboard end bell.
3. Install a strip heater inside the motor near the windings, of sufficient size to maintain the temperature a few degrees above the ambient temperature and to keep the motor dry.
4. Replace the outboard end bell.
5. Completely fill the bearing housing with grease.
6. Seal off the opening where the shaft enters the bearing housing by wrapping with plastic tape. Continue the wrapping to completely cover the exposed shaft.
7. Plug all vents and openings.
8. Clean exterior surfaces by wire-brushing and paint.
9. Tie in power to strip heaters.

When electric motors are to remain in the field and continue to exist in corrosive and harmful environments, or when power is not available for operating strip heaters, consideration should be given to cocooning or providing some other protective unit housing.

1803.073 TRANSFORMERS: The average power transformer requires only a minimum of preservation during periods of idleness. By the very nature of its design and construction it is comparatively immune to deterioration. The need for protection is generally centered on the external surfaces and power tie-ins. The following procedure should apply whether a transformer is to be idle for several months or for an extended period:

1. Clean all power bushings with the use of a solvent and a wire brush.
2. Cover the metal portion of the bushing with a light grease.
3. Encase the entire bushing in a plastic bag or heavily wrap with a plastic tape or waterproof paper.

4. Clean the outer surface of the oil conservator tank, when used, and inspect for leaks.

5. Install a small air dehumidifier in the breather or ventilator.

6. Check all valves and drains to assure that they are closed and that there is no leak.

7. Clean all external surfaces and cover with a suitable paint. If the transformer is an uninstalled spare and it appears that idle time will be long, cocooning should be considered.

1803.074 SWITCHGEAR: Large switchgear is usually enclosed in sheet-metal cabinets which provide protection to electrical apparatus from the elements. In many installations, a secondary enclosure is located within the external or primary enclosure and further protects the necessary instruments and control and protective devices. This combination of enclosures is sufficient to provide most of the protection needed. To supplement the protection afforded in the normal design, it is necessary only to install strip heaters within the primary enclosure to maintain a dry atmosphere and clean and paint the external surfaces. If power is not available for strip heaters, a desiccant may be used.

Small switchgear, relays, push buttons, circuit breakers, etc., can be protected by enclosing them in plastic bags or by cocooning, when economical. Frequently normal maintenance procedures of cleaning, painting, and periodic inspection will suffice. This latter procedure can be augmented to include the installation of small quantities of chemical drying agents in the various enclosures.

In plants where much of the electrical control equipment is housed in enclosed structures, the most effective method of protecting the equipment is by controlling the atmosphere within the enclosure to assure that corrosive vapors are nonexistent. One effective and inexpensive method is the use of a commercial air-cooling and dehumidifying unit. Such an installation requires only a minor capital investment, and the effectiveness and reliability are excellent. A second method considered frequently employs the use of a ventilating fan installed in such a manner as to provide a slight positive pressure within the enclosure. The fan air intake should be provided with a dehumidifier and filter. The slight pressure will exclude outside air and will safeguard the equipment without further action.

1803.075 POWER LINES: The preservation of overhead power lines is a difficult and time-consuming process because of the inaccessibility and number of parts involved. Frequently, an inspection or maintenance of a line or section thereof requires scaffolding or special equipment. Power lines which fall in that category of equipment can be best protected at all times by a wise and advantageous selection of materials during the initial design.

Once a power line has been erected, there is little, if

any, protection which can be given the cable proper. Protective measures will usually center on pole hardware, guying materials, grounding equipment, wire holders and brackets, and strain and suspension members.

It is impossible to program a detailed procedure to be followed in protecting auxiliary equipment used in power-line construction. However, an inspection of any power line will reveal that unit treatment of auxiliary equipment is an outgrowth of equipment dispersion.

Pole-line hardware, guying materials, or strain and suspension material may be protected by the following method:

1. Clean by wire-brushing and hammer-chipping.
2. Inspect and determine the suitability of the materials used.
3. Replace with suitable materials items which need replacement.
4. Paint or metalize by flame spraying.

Metallically sheathed underground power lines should be inspected and protected from detrimental influences. Cathodic protection, if afforded, should remain in effect when the line is out of service.

1803.08 Fired Heaters and Stacks

1803.081 GENERAL: The descriptions given in Chapter IX; *Fired Heaters and Stacks*, break down the various types of such equipment. The intent of these suggested protective measures is to cover only those portions of this equipment which are subject to deteriorating effects while the equipment is idle. In general, this is the external steel and auxiliary equipment of the heaters.

No attempt is made to offer a means of protection for masonry, concrete, linings, and insulation inasmuch as it is common practice to inspect these items and make necessary repairs before the unit is returned to service. Should defects be noted while the equipment is idle which would tend to weaken the structure, repairs should be made immediately.

1803.082 FURNACE SETTINGS

a. Header Boxes and Casing: All painted metal should be treated in the same manner as structural steel. Hinges on header doors, peepholes, and access doors should be coated thoroughly with a heavy grease to permit immediate functioning when the unit is returned to service. In those openings where seating surfaces could corrode because of leakage of rain or moisture, it is advisable to seal the doors with a readily removable mastic or waterproofing compound such as is used in sealing joints in insulation.

b. Burners: Treatment of this equipment is dependent upon the type of burner used, and some will require more care than others. The movable parts

should be covered with heavy grease to protect threads or adjusting mechanisms.

c. Breeching and Ducts: If the external surfaces of this equipment are protected by heat-resistant paint, all areas which show failure should be retouched as indicated from periodic inspections. When the breeching and ducts are not painted, all external surfaces should be cleaned of loose material and sprayed or brushed with a commercial rust preventive. It may be necessary to repeat this procedure during the idle period; however, application is much less expensive than in the case of paint, and the rust preventive will burn off readily when heat is applied again.

Internal surfaces, if not insulated, should be cleaned of any deposits or condensation. Rechecks should be made to insure no absorption of moisture during the idle period.

Operating mechanisms on the dampers should be coated with heavy grease to insure operability when returned to service.

d. Instruments: Care of instruments, such as draft gages, carbon dioxide indicators, fuel control valves, and flame monitors, will depend upon the service and complexity of the mechanism. An instrument such as a draft gage could be disconnected and completely enveloped in a plastic bag, whereas more complex instruments should receive treatment as suggested in the instrument section of this chapter.

Particular care should be given automatic fuel shutoff valves. This can be accomplished by removing the cover and spraying all parts with light oil, replacing the cover, and either sealing or cocooning. The inspection plate on the lower portion of the body should be sealed also.

e. Tubes: All tubes should be thoroughly cleaned inside, and the headers should be closed. All accessible tubes should be thoroughly cleaned on the outside.

1803.083 STACKS

a. Steel Stacks: Should external inspection reveal paint failures, it is advisable to touch up and maintain the paint on a regular schedule. Those areas, such as seams, cooling fins, or attachment lugs, which are more susceptible to holding condensation, should be painted even if an entire paint job is unnecessary. The stacks should be capped.

b. Attachments: It is good practice to replace guy lines at intervals established by experience; however, it is possible to combat corrosion by coating accessible guy lines with a nonhardening mastic.

Ladders on any type of stack fall in the category of a "must" maintenance item and should be painted at periodic intervals to insure adequate protection.

The painters' trolley is removed between periods of use; therefore, it should be maintained in the same manner as any piece of rigging equipment.

1803.09 Steam Boilers

Par. C7.301, C7.302, and C7.303 of *Care of Power Boilers*, Section VII of the *ASME Boiler and Pressure Vessel Code*, cover the "Laying-up of Boilers" and should be followed when steam boilers are to remain idle.

1803.10 Structural Steel

All exposed structural-steel members, such as columns, beams, supporting structures, stairways, walkways, and platforms, will be subject to atmospheric

attack. Although in most cases this attack will not be serious, the necessary protection should be given. Because this equipment will not be under regular scrutiny, it is suggested that touchup painting be applied immediately upon shutdown and that a routine visual inspection be made for paint deterioration at intervals governed by the severity of the corrosion in that area. Where paint programs are set up which require one-coat applications at periodic intervals, it is considered economically feasible to continue such practice on idle equipment rather than to allow a breakdown of the system and, consequently, require application of a complete paint job including surface preparation.

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ENGINEERING DEPARTMENT-SAN FRANCISCO

SPECIFICATION EG-1048-A
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SPECIFICATION NO. EG-1048 -A

SMALL TOOLS AND EQUIPMENT

1.0 SCOPE

This specification lists the types of items that COMPANY classes as "small tools and equipment" whether recoverable, non-recoverable or consumable. Such items shall be furnished complete, including accessories and expendable operating parts such as blades, bits, abrasive wheels, etc., and shall be maintained in good condition including replacement of parts as may be necessary.

2.0 SMALL TOOLS AND EQUIPMENT

Adapter, Hose, -Pipe, Thread
Adze
Anvil, Blacksmith
Apron
Arbor
Auger
Awl
Axe

Brooms
Brush, Wire, Paint, etc.
Puckets

Bar, Claw, Crow, Pinch, etc.
Barrel, Trash
Belt, Safety w/strap
Bender, Hydraulic, Manual
Bevel
Beveler, Transite
Binder, Load
Bit, Auger, Carpenter
Blades, All Types
Blanket, Wool, Rubber
Block, Chain, Rope, Cable,
etc.
Boots, Rubber
Box (Bag), Tool
Brace, Ratchet

Cable, Welding, Electrode, Ground,
etc.
Calipers
Cans
Cart, Concrete, etc.
Casters
Caulking Tool (Yarning Iron)
Chain, Surveyor, Measuring, Steel
Loading
Charger, Battery
Chisels, All Types-Hand, Pneumatic
Chuck, Taper, Drill
Clamp, Pipe Aligning, Saw,
Carpenter, etc.
Clip, Wire Rope
Clipper, Bolt
Coat, Rain
Connector, Welding Cable
Conveyor, Gravity Roller
Cooler, Drinking Water
Cord, Electric Extension
Coupling, Hose
Crimper, Electrician's
Cutter, Bar, Wire, Pipe-Hand,
Pipe-Geared, Gasket, etc.

STANDARD OIL COMPANY OF CALIFORNIA
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Lanterns, All Types
Lead Joint Runner
Level, Hand, Line, etc.
Light, Portable Flood
Lighter, Torch
Line, Mason, Chalk, etc.
Lubricator, Air Line

Pouch, Tool
Protractor
Puller, Nail, Wire, Spike, Rod
Pulley
Pump, Hand, Barrel, Sump, Test
Punch, Center, Back out, Hob,
Gasket, etc.

Mallet
Manometer, Portable Field
Mandrel, All Types
Mattock
Maul
Mender, Hose
Meter, Vibration, Volt, Amp, etc.
Micrometer
Mover, Freight Car, Hand

Radio, Portable, Two Way Intercom
Rake
Rasp
Reamer, Pipe, Bridge, Burring, etc.
Regulator, Welding Gas
Respirator, Dust (incl. refill)
Roller, Riggers
Rope, Manila, Wire
Rules, All Types

Nipper
Nozzle, Hose, Weld, etc.
Nut, Die
Nut, Driver

Oiler, Can
Oven, Welding Rod

Pail
Paving Breaker, Pneumatic
Peavey
Pick
Pin, Drift, Barrel, Bull
Pincer
Plane
Pliers
Plumb Bob
Point, Trammel
Pole, Pike, Range
Pot, Melting, Fire

Salamander
Sander, Disc, Belt
Saw, Portable, All Types-Hand, Power
Scraper, Bearing, Miscellaneous
Screwdriver
Screw stop
Screw plate (set)
Scriber
Set, Nail, Rivet
Shackle
Shear, Bar, Tinners
Sheave
Sheeting, Plastic, Paper
Shield, Face
Shovel
Sleeve, Morse Taper Shank
Sling, Canvas Pipe, Wire Rope,
Nylon
Snip, Tinners
Socket Set
Soldering Iron
Spade
Spike, Marline
Square, Combination, Framing, etc.
Staple, Tacker
Star Drill
Stencil, Steel, Brass, Paper

SPECIFICATION EG-1049-C
DECEMBER 21, 1965
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SPECIFICATION NO. EG-1049-C

SUPPLIES

1.0 SCOPE

This specification lists the types of items COMPANY classes as "supplies," whether incorporated into the finished work or used in the course of construction.

2.0 SUPPLIES

Acid	Nails
Adhesive	Oil, All Types (except for lubrication and fuel for construction equipment and tools).
Alcohol	Paint (for Erection Marking)
Antifreeze (not for construction equipment)	Paper, Sand
Babbitt	Paper, Toilet
Carbide	Paste, Solder
Carbon Tetrachloride	Putty
Chalk	Rag
Coal and Coke	Rust Preventive
Compound, Cleaning, Pipe, Thread, Grinding	Salt Tablets
Cotter Pin	Screen Cloth, Wire
Crayon	Screws
Creosote	Shim
Cup, Drinking	Soap
Disinfectant	Soap Stone
Emery Cloth	Solder
Explosives	Stake, Survey
First-Aid Supplies	Staples
Flux, Brazing, Welding	Tape, Adhesive, Masking, Friction, Rubber, Plumbers, etc.
Fuse (except for permanent plant use)	Tacks
Gasket Paste	Towel, Paper
Glue	Twine
Glycerine	Washing Powder
Graphite	Waste, Cotton
Grease (except for construction equipment and tools)	Weld Rod
Ice	Welding Gases
Keel (Lumber Crayon)	Wire, Tie, and Miscellaneous
Kerosene	Wool, Steel
Lamp, 120 V Electric	
Litharge	
Lubricant, Thread Cutting, Electric	
Wire Pulling	

SPECIFICATION NO. E-1073

DEFINITION OF "EQUIPMENT RENTAL RATES"

IN CONSTRUCTION CONTRACTS

1.0 SCOPE

This specification defines the costs included and excluded in rental rates for construction equipment and specifies the method of application of these rates.

2.0 DEFINITION OF RENTAL RATES

2.1 Operating Period

Equipment rental rates shall be based on operating periods of 8 hours per day, 56 hours per week and 240 hours per month.

2.2 Costs Included

Equipment rental rates shall include all maintenance, painting, and incidental repairs on the equipment throughout the construction period.

2.3 Costs Excluded

Equipment rental rates do not include the following items of expense:

2.31 Freight from shipping point to destination and the return freight at the expiration of the rental period.

2.32 Loading and unloading charges if necessary for loading on a car or unloading from a car.

2.33 Wages of Operators

2.34 Cost of fuel and lubricant and wages paid for fueling and lubricating.

3.0 APPLICATION OF RENTAL RATES

3.1 Rental Period

The rental rates shall apply only during the time the equipment is actually operated at the construction site.

PRECIPITATOR SHUTDOWN REPAIR GUIDE

K-1803

Section

- I PRE-SHUTDOWN
- II INITIAL INSPECTION
- III CLEANING OPERATION
- IV POST CLEANING INSPECTION AND REPAIRS
 - A. INSULATORS AND HOUSINGS
 - B. HIGH VOLTAGE CABLES
 - C. RAPPERS
 - D. HOUSING
 - E. EMITTER ELECTRODES
 - F. DISTRIBUTOR PLATES
 - G. TRANSFORMER
- V CHECKLIST AND STARTUP TEST
 - A. FINAL INSPECTION
 - B. AIR LOAD TEST

El Paso Refinery
Refinery Engineering
October 1, 1976
Revised January 1981

CHEV B8 64

I. PRE-SHUTDOWN ITEMS

- A. Make pressure survey of all insulator housings. May need to replace air filters to get sufficient supply air. Note any housings with low pressure. Check regulators by swapping positions.

Order parts for shutdown.

- B. Arrange for service engineer if desired.
- C. Check gear reducer drives. Check oil level, chains, and overall condition.
- D. Inspectors note gas leak locations.

II. INITIAL INSPECTION - PRECIPITATOR DIRTY

A. Large and Small Insulators and Housings

1. Note degree of dust buildup and condensation in housings. (The air purge is designed to prevent both conditions.)
2. Note degree of corrosion to housing.
3. Note the problems to be corrected.

B. High Voltage Cable

1. Note extent of dust buildup and signs of condensation.
2. Check for corrosion damage to housing and cable.
3. Open all the inspection plates in the high voltage cable system. Check for dust buildup. Examine all the insulators for cracks and tracking.

C. Gas Inlet and Outlet Distribution Plates

1. Open side manways and obtain Entry Permit.
2. Check and note pattern of dust buildup. Also check for plugging. The distribution plates are designed to provide a uniform flow across the unit.
3. Check for cracks, distortion and overall corrosion.
4. Check for accumulation of catalyst debris in the inlet pipe and note whether any of the distribution holes are covered.

Note - Inspectors may want manways opened.

D. Precipitator Housing

1. Note dust buildup on the interior members of the housing. There should be an even distribution showing a balanced flow.
2. Note the dust buildup on collector plates. They should have a slight buildup. Large buildups suggest rapping problems.

CAUTION: Avoid stepping on the emitting frame and shock bars. Add wooden planks for walking support before entering.

III. CLEANING OPERATION

A. Insulators and Housings

1. Remove the old packing from the packing groove.
Install new packing.
2. Power wire brush the entire compartment interior EXCEPT for the insulators. Vacuum all the catalyst dust and scale from the compartment.
3. Gently clean the insulators. Use caution so as not to chip or scratch the ceramic materials.
Clean the insulators with a soft cloth and solvent.
4. Just before closing the lids - rewipe the insulators with denatured alcohol on a soft cloth to remove dirt particles and moisture.
5. Set yard air to purge system and check that each housing holds air pressure.
6. Test eight purge relief valves (3.5 psi) and re-install.

B. High Voltage Cables

1. Vacuum or air blow the high voltage cable housing of all loose scale and catalyst dust.
2. Clean all the insulators with the solvent soft cloth system.
3. Just prior to closing the units, dry the insulators with the denatured alcohol wash.

C. Precipitator Internals

1. Water wash the entire interior of the precipitator. Use fire water to rinse the unit as clean as possible.

	Initials	Date
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IV. POST CLEANING INSPECTION AND REPAIRS

A. Large and Small Insulators and Housings

1. Inspect the insulator housings. Look for holes and potential leakage sites.
2. Make a close thorough examination of all insulators for cracks, rough spots, absence of glaze, tracking, etc. A bright light will help locate insulator flaws.
3. Mark damaged units for removal and replacement.
4. Check packing on grid rapper shafts to prevent excessive leakage of purge air. (Orifice is sized for 0.5 CFM/housing).

B. High Voltage Cables

1. Check the wires and conduit for mechanical problems.
2. Inspect the insulators for cracks, tracing, etc.
3. Mark areas for repair or replacement.

C. Collector and Emitter Rappers

Expect considerable wear requiring welding repairs or new parts. Hopper work platforms may be needed.

1. Repair worn or bent guide fingers and pipe sleeves over guide fingers.
2. Check for eccentric wear of anvils and hammers (wheels) which indicates poor alignment. Hammer hits below center of anvil 1" - 1½" when cold. Straighten shock bars if bent.
3. Check and if necessary replace worn bolts through plate extensions. Shock bars must clear bars supporting guide fingers by 2" minimum when cold.
4. Each shock bar and related plates should swing freely. (It may be necessary to remove temporary planks to check). Shock bars should contact each plate at rest, so that each plate is impacted at the same time. Shock bars should return to this position after each rap.
5. Check rapper pillow block bearings. Replace if there is excessive play.
6. Check emitting rappers. Expect to build-up, hard face, and grind smooth the cams and trip arms. Check shaft collars and split bearings.
7. Run all systems before starting and check operation.

IV. POST CLEANING INSPECTION AND REPAIRS (continued)

D. Precipitator Housing

1. Inspect the shell for cracks and holes. Define repairs as required.
2. Note the condition of the structural members and the welds.

E. Emitter Electrodes (Wires)

NOTE: Discharge electrode failures are the most frequent failure made in the precipitator. Failures are typically caused by corrosion, fatigue, or electrical arcing.

1. Check for broken or loose wires. Proper tension is 15-30 lbs.
2. Replace all wires in rows. This will be done sequentially south in the West Bank and then north in the East Bank to periodically replace all electrode wires. Spread adjacent plates to provide access room. Installation of wires requires extreme care to avoid kinks or strains. Wires must be prestretched to 8'-0" to 8'-3" with anti-kinking device shown in Sketch A. A hooking tool to aid in removing and installing wires is shown on Dwg. 4MSK-516.

Carefully inspect removed wires for evidence of metal loss. This must be in Inspection records as a guide for replacement rate. Cut off one end so wire cannot be accidentally reused.

3. Note the condition of existing wires. Look for notches, wear points or obvious failure points. Especially check the J hangers on both ends of the wires.
4. Examine the entire support frame especially the welds and support hooks.
5. Check that the entire frame is level and that the wires are parallel to the collector plates. The wires should be centered between the two adjacent plates. (Plate to wire distance $4\frac{1}{2}" \pm \frac{1}{4}"$.) Mark faulty sections for repair. Tack weld nuts on diagonal bracing.

(See the attached Drawing #3ESK-8)

NOTE: According to Buell, 10% is the upper limit on scattered missing wires. Replace wires if many wires are missing within a row or section. Spread adjacent plates to provide access room.

6. Replace rows of emitter wires as a step toward complete replacement, Stock No. KP-B1-4. Check the hooks and hook welds on each end of wires replaced. Pre-stretch new wire per drawing to 8'-3" (+0" or -3"). The force required to do this is about 50 lbs. If overstretched or kinked, the wire is ruined. Inspect removed wires carefully for end wear, notches and burns as a guide to replacement schedule of others. Junk old wires.

V. POST CLEANING INSPECTION AND REPAIRS (continued)

F. Gas Inlet Distribution Plates

1. Check for plugging of the distribution holes, corrosion, or distortion of the plates.
2. Note any items that could prevent an even flue gas distribution within the inlet section.

G. Transformer

Sample transformer oil and test insulation level. If it is below 22,000 volts replace or filter oil. Retest. Add oil if necessary.

V. STARTUP CHECK LIST - FINAL INSPECTION AND TEST

A. The following items must be checked by the Unit Operator and the Inspector or Engineer prior to final closing.

1. Insulators & Housings (Ready to Close)
 - a. Check that all units are clean and dry. All repairs are complete.
 - b. Check that gaskets and seals are in place.
 - c. Trial run air purge.
2. Collector & Emitter Rappers (Complete)
 - a. Check all internal repairs.
 - b. Check external system - motors, oil levels, etc.
 - c. Turn on the rappers for a trial run. Check inside and out for proper operation.
3. High Voltage Cable & Housing (Ready to Close)
 - a. Check that all repairs are complete.
 - b. Insulators should be clean and dry.
 - c. Check all gaskets and seals.
4. Emitter Electrodes - Wires (Ready to Close)
 - a. Check that the frames are level and the wires are centered between the plates ($4\frac{1}{2}'' \pm \frac{1}{4}''$ distance).
 - b. Check that all hook and wire replacement work is complete.
 - c. Check that there are no materials to cause a plate to wire short.
5. Collector Electrodes - Plates (Ready to Close)
 - a. Check that the plates are plumb and parallel. All plates must be straight.
 - b. Check that the plates are resting against the shock bar for proper rapping.

[illegible]

V. STARTUP CHECK LIST - FINAL INSPECTION AND TEST (continued)

- c. Check that the plates have 2" for expansion at the plate bottom.
- d. Check that overall repair work is complete.
- 6. Inlet Distribution Plates (Ready to Close)
 - a. Check that the plates are unplugged and all repairs are complete.
- 7. Housing & Hoppers (Ready to Close)
 - a. Check that the shell and support work has been completed.
 - b. Check that all work materials have been removed and door seals are in good condition.
 - c. Replace hopper dump valves.

Initials	Date

B. Air Load Test

1. After all work is complete make an "AIR LOAD" test. Push doors closed, but have electrician on side door platform. Energize power supplies, observe operation of fast and slow voltage ramps, and record operating data without rappers, and with rappers operating. If sparking occurs below volts try to locate sparking by looking through doors. DO NOT ENTER. This check is easier after dark.
2. Shutdown and secure electric power and attempt to locate and correct spark-over problem. Retest if any changes are made.

3. Get operator approval of final Air Load Test.

Initials	Date

4-0
DHS - FIC
El Paso, Texas
January 10, 1958

JAN 17 1958

O. B. MAAG

INDUSTRIAL NURSE
NONINDUSTRIAL MEDICAL TREATMENT
File: 163.1

MR. M. P. ~~PARET~~, JR. - 2

After my conversation with you on January 7, 1958, the question of handling nonindustrial cases by our nurse was investigated with her in conjunction with Messrs. J. D. Cole and O. B. Maag. We found that over the past five months about 36% of the cases handled by our nurse have been nonindustrial. The review of these cases did not disclose evidence of abuse by our people; however, Mrs. Burleson was advised to let us know any time that abuse is indicated. She assured us that she would have done that anyway.

In Dr. Curtis' letter of May 28, 1957 wherein he advised the establishment of the position of Industrial Nurse here, he stated that nonindustrial care be limited to such emergency treatment as is necessary, and quoted from the Company Policy Manual, a copy of which is attached. It is my recommendation that we continue handling these cases as we have in the past until abuse is indicated, as we have had definite proof that it has reduced absenteeism that would have resulted from employees leaving work because of illness.

In addition to treating nonindustrial cases in our First Aid Room, we have had the Nurse, in a few instances, visit people who had reported in sick, as a step towards reducing our absenteeism because of sickness.

J. H. KITCHEN

JHK:hb

cc: J. D. Cole
Mrs. F. W. Burleson

File

JAN 17 1958

G. B. McCLESKEY

CHEV B8 6416

GENERAL SAFETY INSTRUCTIONS APPLYING TO ALL EQUIPMENT

Fifteen General Safety Instruction Sheets cite the hazards that exist in the operation and maintenance of equipment and give recommendations for avoiding hazards and for inspections and tests. The first three sheets apply generally to all equipment. Special hazards and recommendations that are peculiar to a class or type of equipment are given on the following sheets (4 to 15) applying to the more important classifications of equipment. Particularly significant or unusual hazards, recommendations, inspections or testing to a specific item of equipment should be given on the Safety Instruction Sheet made out for that particular item.

HAZARDS

General hazards to be considered in the operation of all process plant include:

Unsafe condition due to defects existing in equipment as built or as repaired.

Unsafe condition of equipment due to operation at pressure, temperature, speed, minimum thickness, or other condition in excess of the established safe limits.

Unsafe condition resulting from corrosion (internal or external) reducing thickness below the minimum allowable limit. This may occur from direct attack or result from failure of protective linings.

Cracking or deterioration caused by caustic embrittlement, hydrogen attack, intergranular corrosion, or stress-corrosion.

Fatigue failures occasioned by vibration or repeated stress.

Reduction of strength, of ductility, or of impact resistance, and/or the setting up of high residual stress as a result of improper welding or heat treating operations.

Unsafe condition or failure due to thermal stresses occasioned by exceeding established limiting rates of temperature change - during heating, cooling, or operating cycles.

Excessive strain or failure at rigid connections due to heating of lines or equipment above design temperatures for which expansion provision is made.

Unsafe condition or failure of reciprocating or rotating machines, or motors due to operation at speeds or overloads in excess of design limits.

Failure, inadequacy or blocking-off of excess pressure relieving equipment, or other automatic safety devices.

Excessive pressure caused by thermal expansion of liquid in filled lines, vessels, pumps, containers, etc. - "sun pressure".

Damage to equipment caused by testing at pressures in excess of established limits, testing at too low temperatures, or from excess loading due to weight of testing medium.

Release of flammable, poisonous, or corrosive gases or liquids due to failure of equipment from any cause.

GENERAL SAFETY INSTRUCTIONS APPLYING TO ALL EQUIPMENT
HAZARDS (Cont'd.)

Leakage at threaded or gasketed joints, or at packing glands of pumps, compressors, valves, level controls and instruments.

Opening of relief valves that are not equipped with discharge conduits leading to a safe location.

Explosive mixtures in equipment caused by the failure of control valves, non-operated valves, cycle timers, etc.

Collapse of towers, columns, stacks, tanks, etc. under wind or earth shock loading due to corrosion below minimum safe thickness or deterioration of foundations, supports, or guys.

Collapse of equipment due to external pressure loading in excess of design limits of pressure, thickness or roundness.

RECOMMENDATIONS FOR AVOIDING HAZARDS

Do not exceed the safe limits for any equipment in operation, cleaning or maintenance as given in:

- The Safety Instruction Sheets.
- Operating Standards and applicable Standing Orders.
- Refinery and Engineering Instructions.
- Codes and Standards authorized for refinery use, and
- Mandatory State Safety Orders.

Notify the Engineering Division - Design Engineer, Maintenance Foreman, Equipment Inspector as the case may require, whenever there is any question as to the safety of equipment, or danger of exceeding established safe limits.

Require inspection of all critical repairs and new equipment installation.

Check the mechanical condition and functioning of instruments and control equipment at regular intervals as required to assure dependable and safe operation.

Consult the Engineering Division before changing any established safe limits for the operation of equipment.

INSPECTIONS

Obtain adequate periodic inspection of equipment in accordance with:

The Equipment Inspection Schedule for the plant; or in lieu of such schedule, as recommended in the Safety Instruction Sheets.

Requirements of State Safety Orders for periodic inspection of boilers, air pressure tanks, elevators and mechanical equipment.

3. ACCOUMULATING
REQUIREMENTS

4. DESIGN
CONDITIONS

CHEV B8 6418

GENERAL SAFETY INSTRUCTIONS APPLYING TO ALL EQUIPMENT
INSPECTIONS (Cont'd.)

See that adequate maintenance schedules are established and followed for the servicing and inspection of:

- a. Electrical equipment - motors and controls; power circuits; lighting service; control systems; and signals and alarms,
- b. Mechanical equipment - pumps, turbines, compressors, etc., and their governors and protective devices.
- c. Instruments and control equipment, particularly those which are vital to controlling operation within established safe limits.

During initial operation of equipment maintain close inspection of:

- a. Effects of thermal expansion on line systems, and lines stairs and ladders connecting to hot vessels for restricted movement, interference, or evidence of excessive strain.
- b. Bearings, shaft packing, and governors on mechanical equipment.
- c. Electrical equipment for overloads, heating, sources of ignition, and for proper functioning of controls, alarms, and protective devices.

TESTS

Test all equipment after any major repair affecting the strength of the equipment.

Test certain equipment, as fired heater coils, at specified intervals as called for in the Equipment Inspection Schedules or as specifically recommended in the Safety Instruction Sheets.

The test pressure for routine field tests of equipment shall be as given in the Safety Instruction Sheets.

Hydrostatic testing procedure shall conform to Engineering Instruction 200 and 301 or as given on special Hydrostatic Test Schedules prepared for particular installations.

Consult the Engineering Division before applying any pneumatic test.

Actual tests applied during shop fabrication or field construction are given on the Safety Instruction Sheets or on Hydrostatic Test Schedules prepared to cover initial testing.

Remove, test and reset safety or relief valves protecting the equipment at frequencies given in the Equipment Inspection Schedule for the plant, in lieu of such a schedule as recommended on the Safety Instruction Sheets.

3. ACCOUNT.
REQUIREMENTS

4. DES.
CONDITIONS

GENERAL SAFETY INSTRUCTIONS APPLYING TO PROCESS LINES

HAZARDS

The hazards that are particularly to be considered in the operation of process lines, include:

1. Those hazards listed in the General Safety Instructions Applying to All Equipment which apply to piping systems.
2. Hydraulic shock from rapid closing of valves.
3. Excessive vibration or repeated strain leading to fatigue failure.
4. Exceeding design limits for expansion or anchorage of lines or alteration of supports, anchors, tie rods, hanger adjustments, initial "cold pull", etc.
5. Failure of gaskets or packing due to deterioration, corrosion or exceeding pressure or temperature limits for the packing material.
6. Leakage or failure due to external corrosion - both general and localized conditions, and particularly buried lines - electrolysis and soil corrosion.
7. Breakage of threaded piping especially small sizes due to mechanical strains, thermal expansion, operating valves, etc.
8. Excessive stress in welded piping at supports, mitre welds, tee intersections, etc. leading to opening of cracks. Particularly important in lines: with high internal pressure; subject to severe thermal expansion strains; in low temperature service; hot caustic service; or of alloy steel materials.
9. Internal combustion or explosions in lines.
10. Fire hazard from ignition of flammable materials (timber, paper insulation sheathing, etc.) located too close to high temperature lines.
11. Release of flammable, poisonous or corrosive liquids or vapors due to relaxation of flange bolts at high temperatures or sudden temperature change of flanged joints, or corrosion or erosion of pyrometer or thermometer wells in lines.

RECOMMENDATIONS FOR AVOIDING HAZARDS

1. Note recommendations in the General Instructions Applying to All Equipment.
2. Warm up lines gradually and avoid sudden temperature change except in an emergency.
3. Maintain supports, anchorages, spring hangers, tie rods, etc. in proper condition and with specified adjustments. Consult Engineering Division before altering supports or adjustments.

3. ACCOUNT
REQUIREMENTS

4. DESIGN
CONNECTIONS

GENERAL SAFETY INSTRUCTIONS APPLYING TO PROCESS LINES
RECOMMENDATIONS FOR AVOIDING HAZARDS (Cont'd.)

Do not block off sections full of liquid without venting or draining.
Protect dead ends or idle lines against freezing by insulating, draining,
or by maintaining flow.

Replace installed pipe and fittings in kind, or in accordance with
Materials Standard No. 319, or per recommendations of the Engineering
Division.

Test out before reconnecting dead or idle lines, particularly if buried.

Protect lines against mechanical strains during maintenance operations.

Protect 18-8 Cr. Ni. and 18-8-3 Cr. Ni. Mo. material against intergranu-
lar corrosion during idle periods. Refer to Recommended Practice No. 124.

Observe all precautions given in Engineering Instructions on maintenance
and installation practice including: No. 800 - Bolting Up Practice;
No. 810 - Fitting Up Fabricated Pipe; No. 506 - Installing Gaskets;
No. 656 - Breaking Lines.

Observe all precautions given in Engineering Instructions covering weld-
ing practice and requirements for stress relief, annealing or heat treat-
ing welded piping - both steel and alloy.

Unless otherwise stated, maximum allowable operating pressures and tem-
peratures for new lines should conform to Materials Standard No. 319 for
the particular class of fitting and service. The ratings given therein
are based on the A.S.A. Standards and Piping Code.

Where not specifically given, the minimum safe thicknesses for steel pipe
and commercial sizes of A.S.A. steel fittings, can be determined from
minimum thickness charts: MF-4026, steel lines; MF-4639, steel fittings;
MF-4640 low alloy fittings; and MF-4641, 18-8 Cr. Ni. fittings.

INSPECTIONS AND TESTS

Refer to General Safety Instructions Applying to All Equipment.

Unless otherwise specified, the test pressures for separable piping sec-
tions shall be in conformance with the A.S.A. Pressure Piping Code:

150 lb. steel fitted lines shall be tested at 350 psi.

300 lb. steel fitted lines shall be tested at 750 psi.

Safe test pressures for lines may be limited by reduced thickness
(corrosion), special fittings (as control valves, expansion joints,
etc.), and pressure test limits for connected equipment where lines
cannot be isolated. Refer to sheet on Hydrostatic Test Pressures
supplementing Engineering Instruction No. 300.

Consult Engineering Division for proper test pressure and procedure in
event of any question.

GENERAL SAFETY INSTRUCTIONS FOR FIRED HEATERS

HAZARDS

The hazards to fired heater installations in operation, include:

Those general hazards listed in the General Safety Instructions Applying to All Equipment which apply to fired heater installations.

Excessive tube temperatures resulting in damage to, or failure of, tubes. Excessive temperatures may be caused by coke or other deposits, by excessive firing rates or by uneven heat distribution.

Excessive pressures caused by stoppage or restricted flow due to obstructions or coke formation in the heating element or transfer lines. Cores, collapsed liners, pass or outlet control valves, may cause restricted flow.

Excessive pressures due to failure, plugging or coking of relief valves.

Failure or loosening of rolled joints or of tube seal welds due to repeated cycles of temperature change, or to sudden changes in temperature, or to improper use of dissimilar metals in rolled joints or in adjacent tube positions.

Leakage or opening of header plugs due to damaged seats, or to breakage, loss of strength or excessive wear of screws and holding members, or to insecurely seated plugs.

Damage or actual rupture of parts involved in flashes from leakage of rolls or plugs.

Explosions in firebox from ignition of explosive fuel-air mixtures or interruption of gas fuel flow.

Structural failure from overheating or deterioration of tube supports, supporting steel structures, breechings, stacks, internal insulation, etc.

Damage to tubes, particularly alloy tubes, by abuse in cleaning, by continued service at excessive temperatures or by too rapid cooling.

Corrosion or oxidation of exterior tube surfaces by furnace gases in operation; and corrosion - inside or outside - by residual salts and moisture during idle periods, including intergranular corrosion of 18-8 Cr. Ni. material.

In shell stills: overheating of fire sheet, excessive vacuum, corrosion of still bottom, deterioration of still supports, or excessive pressure or "bumping" from water in still.

GENERAL SAFETY INSTRUCTIONS FOR FIRED HEATERS

RECOMMENDATIONS FOR AVOIDING HAZARDS

Observe recommendations given in the General Safety Instructions Applying to All Equipment.

Proper firing control is the most important factor in avoiding conditions leading to tube failure. Avoid flame impingement on tubes, excessive flame length, distorted flames from dirty or faulty burners, or uneven heat distribution with multiple burners. Maintain proper combustion control. Visually check fires and heated surfaces at regular and frequent intervals.

Take all precautions to prevent sudden change or stoppage of flow through tubes. Maintain cores, check valves, outlet and pass control valves in dependable condition. Pass control valves must be set to assure positive and balanced flow at all times.

Observe all precautions given in Engineering Instructions on heater maintenance and specialities including those covering: Tube cleaning, Heading Up, Bolting-up Practice, Tube Rolling and Removal, Skin Point Installation, Safe Ending and Seal Welding Tubes; and those covering Welding and Heat Treatment of both steel and alloy materials.

INSPECTIONS AND TESTS

See recommendations given on sheet - General Safety Instructions Applying to All Equipment.

Make periodic inspections for corrosion or deterioration. Make special inspections for possible damage after fires, flashes, or local overheating - particularly where alloy materials are involved.

Apply hydrostatic leakage tests as required. Apply hydrostatic strength tests at specified regular intervals, and after any tube rolling or strength welding. Observe precautions given in Engineering Instruction No. 300 - Hydrostatic Testing, including supplementary sheet on Hydrostatic Test Pressures, and No. 301 - Hydrostatic Testing of Tube and Header Installation.

Consult Engineering Division for proper test pressure and procedure in event of any question on pressure testing.

3. ACCOUNTING REQUIREMENTS

4. DE GRADING CONDITIONS

GENERAL SAFETY INSTRUCTIONS FOR HEAT TRANSFER EQUIPMENT

HAZARDS

The hazards to heat exchange equipment in operation include:

Those general hazards listed in the General Safety Instructions Applying to All Equipment which apply to heat exchange units.

Excessive pressures on tube or shell side, as from:

- a. Fouling or plugging of tubes, of shell passes, or of relief valves.
- b. Leakage from high pressure into low pressure side.
- c. Failure of cooling medium circulation or of heating medium controls.
- d. Thermal expansion of liquid if closed off when filled, due to heating from opposite side, or to "sun pressure."

Temperatures in excess of limits set by: cast iron construction, non-ferrous tube bundles, packed or gasketed joints, shells protected by internal insulation.

Excessive temperature difference or excessive rate of temperature change causing high stresses, deformation of tube bundle or loosening of rolled tubes. These may occur from interruption or failure of cooling medium flow, heating without cooling medium circulation, or loss of liquid level where bundles are designed to operate immersed.

Excessive pressures or temperatures caused by failure of automatic control equipment.

Excessive corrosion by the fluids handled and particularly in the case of:

Excessive salt water temperatures (above 120°F.) with brass (admiralty) tubes.

Oxygen or carbon dioxide released in steam reboilers or preheaters.

Electrolytic corrosion at contacts of dissimilar metals, including metal gaskets.

Effects of neutralizing or treating agents, ammonia, caustic, chlorine, etc., on non-ferrous materials.

Caustic embrittlement of steel, hydrogen attack in steel at high temperatures, intergranular and stress corrosion of 18-8 Cr. Ni.

Corrosive influences must be considered not only during operation but also while units are shutdown and during chemical cleaning.

Hazards occasioned by internal leakage such as: contamination of stock of treated cooling water; chemical reactions between hot and cold fluids, if mixed; entrance of water into dry feed stocks to high temperature equipment; or the release of flammable or poisonous vapors through the water conduits to cooling towers or sewers. Also release of hydrogen sulfide gas in chemical cleaning operations.

GENERAL SAFETY INSTRUCTIONS FOR HEAT TRANSFER EQUIPMENT

RECOMMENDATIONS FOR AVOIDING HAZARDS

Observe recommendations on sheet - General Safety Instructions Applying to All Equipment.

In initial operation check closely for free expansion at supports, expansion joints and connected piping.

Maintain close watch on instruments and controls regulating operating conditions.

Have cold medium circulating before starting hot side flow.

Avoid excessive rates of temperature change or thermal "shock".

Vent unprotected units when idle and closed off.

Maintain requisite pH control on cooling tower water, steam reboiler and heater condensate, and on overhead streams to check neutralizing.

Salt water outlet temperatures should not exceed 120°F. for brass (Admiralty metal) tubes.

Clean, flush, or neutralize shutdown units as necessary to prevent damage when steaming out or standing idle. Whenever possible salt water cooled units should be flushed with fresh water before steaming out, to prevent rapid dezincification.

INSPECTIONS AND TESTS

See general recommendations given on sheet - General Safety Instructions Applying to All Equipment.

Make inspections for corrosion of all exposed parts whenever tube head or shell cover (and floating head) are opened.

Make complete inspection of unit, including gage measurements of shell thickness - if required, whenever a unit is retubed.

Apply specified test pressure after repairs to tube bundle or shell.

Apply at least water system pressure test to bundle after replacing floating head to check fit and gaskets before replacing shell cover head.

Consult Engineering Division for proper test pressure and procedure in event of any question on pressure testing.

GENERAL SAFETY INSTRUCTIONS FOR PRESSURE VESSELS

HAZARDS

The hazards to pressure vessel equipment include:

Those general hazards listed in the General Safety Instructions Applying to All Equipment which apply in the case of pressure vessels.

Failure, plugging, isolation from, or too high settings of pressure relief valves, resulting in excessive pressure.

Failure of regulating or control equipment, resulting in excessive pressure or temperature.

General reduction below minimum safe shell thickness, or local penetration, or weakening of internal bracing or structures due to: normal process corrosion or localized or accelerated attack; failure of internal protective linings; inadequate neutralizing of corrosive media; or corrosion caused by opening, purging, washing or chemical cleaning.

Weakening or failure of supports due to: wind or earth shock loads in excess of design provisions; fire exposure; corrosive leakage; temperatures in excess of design limits for strength or for free expansion; or binding or restraint of special support elements.

Collapse due to: external pressure in excess of design limits; corrosion of shell or internal bracing below safe minimum thickness for external pressure loading; or out-of-roundness in excess of safe limits for external pressure. Also damage to internal linings, especially lead linings, due to external pressure loading.

Release of hot, flammable, corrosive, or poisonous liquids or gases in event of rupture or cracking; or leakage from fitted or packed joints, riveted joints, gage glass breakage; or in draining or opening vessels.

Thermal stresses at localized points caused by too rapid rates of temperature change, or too great temperature differences, especially in thick wall vessels, glass or brick lined, or packed vessels.

Cracking or deformation at supports, at line connections; or at shell attachments, caused by: repeated loading or vibration; differential expansion of connected lines or structures; or by over-loading davits or brackets.

Shock loading: as by sudden stoppage of flow through filled vessels (hydraulic shock); or by internal explosions; or by external impact loads - particularly in the cases of vessels in low temperature service or of cast iron construction.

Thermal expansion of contents if closed off too full; or freezing of contained water, especially in drains and connections.

3. ACCOUNTING
REQUIREMENTS

4. DESIGN
CONSIDERATIONS

CHEV B8 6426

GENERAL SAFETY INSTRUCTIONS FOR PRESSURE VESSELS

HAZARDS (Cont'd.)

Admission of water or trapping or pocketing of water in hot equipment causing violent pressure surges as "Blows" in columns.

Failure of internal insulating linings or of "vapor stops" in insulation, causing excessive shell temperature and/or corrosion.

Embrittlement and cracking: as by hydrogen attack if metal temperatures exceed safe limits; or by caustic embrittlement, especially if not stress-relieved.

Chemical reactions - inherent in process or accidental - causing excessive pressures, temperatures, or corrosion.

Cracking, embrittlement, or residual stress caused by unauthorized heating or welding, particularly on high tensile or alloy steel or stress-relieved vessels.

RECOMMENDATIONS FOR AVOIDING HAZARDS

Observe general recommendations on sheet - General Safety Instructions Applying to All Equipment.

Inspect hot vessels during initial warm-up, for restricted movement or evidence of strain particularly at supports and connected lines or structures.

Maintain close observation of instruments and controls regulating operating conditions and those indicating shell metal temperatures. Take additional temperature readings in critical areas where there is any danger of exceeding safe temperature limits.

Observe all precautions necessary to safeguard against accidental blocking of safety or relief valves or of blow-off lines from relief valves, especially where three-way valves, locked-open valves, or bursting discs are installed under relief valves.

Avoid excessive external pressure in operation; or in steaming out, in emptying contents, or in testing.

Observe all precautions given in Engineering Instructions on vessel construction, maintenance, and repair including those covering: Design, Alteration, Repairs, and Inspections of Vessels (No. 103); Installing Alloy Linings (No. 501); Handling Compressed Gas Cylinders (No. 404); Repair Welds in Vessel Shells (No. 650); Cleaning Vessels (No. 663); Bolting Up Practice (No. 800); and all those covering Welding, Heat Treatment and Stress-Relieving Practice for both steel and special alloy materials.

Consult the Engineering Division in regard to any repairs or alterations to pressure vessel equipment.

GENERAL SAFETY INSTRUCTIONS FOR PRESSURE VESSELS

INSPECTIONS AND TESTS

See general recommendations given on sheet - General Safety Instructions Applying to All Equipment.

Make regular periodic inspection of all pressure vessels in the manner prescribed in the Equipment Inspection Manual and at frequencies as given in the Equipment Inspection Schedule for the plant, or in lieu of such a schedule as recommended on the Safety Instruction Sheets. Pressure Tanks in California must be inspected biennially under the State Safety Orders.

Make special inspections for possible damage after any instance of fires, flashes, overheating or excessive pressure.

Test vessels to routine test pressures given on the Data Sheets, after any major repair or welding affecting the strength of the equipment. Observe precautions given in Engineering Instruction No. 300 - Hydrostatic Testing, including supplementary sheet on Hydrostatic Test Pressures.

Consult Engineering Division for proper test pressure and procedure: in event of any question on pressure testing; in any case of pneumatic testing; and in any case of test of spheres or spheroids.

3. ACCOL. INC.
REQUIREMENTS

4. SIGN
CONDITIONS

GENERAL SAFETY INSTRUCTIONS FOR MECHANICAL EQUIPMENT

HAZARDS

The hazards to mechanical equipment in operation, include:

Those general hazards given in the General Instructions Applying to All Equipment which apply to the type of mechanical equipment considered.

Excessive pressures: in pumps caused by discharge shut-off, excessive suction pressure, or excessive speed, particularly in series operation of pumps, or in testing; in compressor cylinders caused by discharge shut-off, excessive intake pressure or blocked-off jacket water circulation; and in turbine cases caused by a closed exhaust.

Shock and/or excessive pressure: in reciprocating pumps or engines due to wet steam or failure to drain in starting, particularly in flywheel engines; and in compressors from liquid entering cylinders with the gas.

Distortion or failure of parts and damage to bearings caused by overload as due to operation of machines or motors in excess of design capacity or speed; or to abnormal variation of compressor intake pressure.

Damage to turbine or compressor blading caused by: water in steam; erosion of solids in the fluids; excessive temperatures; and by corrosion during shutdown periods.

Excessive speeds caused by malfunctioning or failure of governors speed controllers or overspeed trips or failure of couplings resulting in runaway and "explosion" of driver, flywheel, or driven machine.

Excessive vibration leading to fatigue failure of parts and of connected lines - especially small threaded connections - caused by improper foundations, poor alignment, or improper balancing of rotating elements.

Excessive temperatures of steam or fluids handled causing: distortion or failure of cases or parts due to reduced strength of the material above the design temperature limit; reduced clearances or running fits leading to excessive wear or seizing; irregular expansion and misalignment leading to vibration, interference, bearing or packing failure, or shearing of bolts or anchor bolts; deterioration and excessive scaling in water jackets and cooling systems. Steaming out equipment which normally operates at lower temperature may cause expansion strains on pump flanges, castings, etc., resulting in failure or misalignment.

Excessive temperatures not due to process heat, caused by: mechanical difficulties such as interference of loose parts or misalignment; overloading bearings; presence of foreign material; failure of cooling systems; and loss or contamination of lubricant to bearings.

Thermal shocks leading to cracking of case parts - particularly irregularly shaped castings and cast iron parts - due to sudden temperature changes, such as too rapid starting from cold or in cutting-in standby units, or too rapid cyclic changes.

GENERAL SAFETY INSTRUCTIONS FOR MECHANICAL EQUIPMENT

HAZARDS (Cont'd.)

Overheating and scoring or seizing of close clearance parts in centrifugal or rotary pumps if operated on other than the designated fluid or at low throughput due to shutoff or bypassing to the suction.

Excessive temperatures in motors leading to damage to windings and possible fire hazard caused by improper bearing adjustment or lubrication, overloads, shorting, or obstruction of ventilation. Motor overloads may result from pumps designed for low gravity oils being operated on higher gravity stocks or water.

Corrosion or damage to insulation and shorting of motor windings by moisture, chemical leakage, dirt, or excessive lubrication.

Direct release of hot, flammable, corrosive or poisonous liquids or gases in the event of gasket, thread, or packing leakage, or actual failure of case or connections.

Source of ignition hazards such as dragging gland followers on pumps, electrostatic charges on belts, defective gas engine exhausts; and explosion hazards in gas engine crank cases and starting air systems.

RECOMMENDATIONS FOR AVOIDING HAZARDS

Observe recommendations on sheet - General Safety Instructions Applying to All Equipment.

Provide for adequate "running in", and close observation in initial operation for strains, vibration, misalignment, bearing temperature, packing gland adjustment, functioning of sealing, cooling and lubricating systems and of governors and overspeed trips. Take precautions against foreign material entering wearing parts and bearings. Observe precautions in Engineering Instruction No. 600 - Installing Pumps.

Maintain close attention in service to functioning and condition of all instruments, regulating equipment, governors, automatic cutouts, protective devices, and relief valves which serve to control operating conditions within safe limits.

Avoid losing suction or sudden shutoff against pumps, particularly positive displacement types. Check series or tandem combinations to prevent excessive pressure on the second pump.

Bleed steam supply lines and drains on pumps, engines, and turbines and open exhaust valves before admitting live steam. Warm up any hot service equipment slowly when putting it in operation.

GENERAL SAFETY INSTRUCTIONS FOR MECHANICAL EQUIPMENT

RECOMMENDATIONS FOR AVOIDING HAZARDS (Cont'd.)

Follow safe practices for operation and lubrication of equipment as given in the Operating Standards including 9091 - Lubricants for Refinery Equipment, 9421 - Operation of Reciprocating Pumps, and 9422 - Operation of Centrifugal Pumps and in the Manufacturers' Instruction Manuals for specific units.

Pay particular attention to gland adjustment, cooling water or oil circulation to glands and bearings, Duraseals, jacket water circulation, and bearing lubrication systems. Observe precautions in Engineering Instruction No. 500 - Installing Packing in Pumps and Compressors.

Keep cooling air passages in motors clean and free from obstructions. Do not operate motors without specified fuses or overload protection devices.

Turn over standby units at regular intervals as specified in Operating Standards. Check functioning of traps in steam to standby units frequently.

Observe requirements of State Safety Orders for Engines and Mechanical Power Transmission relative to guarding, clearances, access and ventilation in pump and compressor rooms.

INSPECTIONS AND TESTS

See general recommendations given in the General Safety Instructions Applying to All Equipment.

Regular periodic tests and inspections of all protective devices including test and resetting of relief valves. Relief valve set pressures to be given on the Data and Operating Limits Sheets.

Regular inspection and servicing by machine and electric shops in accordance with departmental or district maintenance schedules. Have Electrical Inspector check any explosion-proof motor that is opened before closing the case.

Inspection of critical units for corrosion, or materials by Equipment Inspectors whenever opened for maintenance, or as specifically called for in the Safety Instruction Sheets or the Equipment Inspection Schedule for the plant.

Test equipment to test pressure given on the Safety Instruction Sheets after any major repair affecting the strength of the equipment.

Consult the Engineering Division for proper test pressure and procedure in event of any question on pressure testing.

GENERAL SAFETY INSTRUCTION SHEET

Mechanical Equipment - Pumps, Compressors, and Drivers

ME-5102

Sheet 15

5-45.

3. ACCOUNTING
REQUIREMENT

4. DESIGN
CONDITIONS

TMI ENGINEERING STANDARDS

Insulating Standards

Installation Wear
Resistant Refractory
RESCO AA-22

1.0 SCOPE

This standard provides two procedures for installing Resco AA-22 in Hex Grid reinforced applications.

- 1.1 The "hammered" method is recommended for extreme high erosion and is to be used in all installations where there is sufficient room for hammering.
- 1.2 The "hand-packed" method is to be used only in installations where there is not adequate room for hammering.

2.0 MATERIALS

- 2.1 The following procedures are based on the use of Resco Products Company material Resco Cast AA-22, reinforced with Hex Grid.
- 2.2 Resco Cast AA-22 is a chemically bonded castable shipped in a 50 pound moisture proof container, consisting of two 25 pound packages. It requires the blending of the 25 pound damp (pink colored) portion with the 25 pound dry (white powder) and the addition of water to prepare for use.

Compaction may take place during transportation causing caking or lumps to develop. If this condition is noted it should not be considered detrimental to the quality of the product as the caking or lumps will dissolve upon the addition of water and subsequent mixing.

- 2.3 The water should be fresh, clean, cool (35° to 60°F.), suitable for drinking, and containing less than 50 ppm chlorides.
- 2.4 Be sure all equipment and tools are free of foreign material. Contamination can affect setting and strength of the castable.

3.0 APPLICATION

- 3.1 Dust, rust, weld slag, oils, and other foreign materials on the hex steel or cyclones will affect the bond of AA-22. The entire area should be inspected and cleaned to assure proper bond of AA-22 and contacted metal.
- 3.2 In cold weather the refractory and surface to be lined should be kept at a temperature above 40°F. during application and for at least 48 hours thereafter. Suitable means for heating should be provided, however live steam should not be used for this purpose.

3.0 APPLICATION (Continued)

- 3.3 Neither the AA-22 nor the contacted metal should be above 80°F. Air conditioning or external water sprays may be necessary. Ice buckets may be used to keep the AA-22 between 40°F. and 80°F. If spray water is used on the outside of cyclones the water must contain less than 50 ppm chlorides. No water should contact the AA-22 refractory.

4.0 CURING

- 4.1 After the AA-22 has been applied it should be allowed to air set 24 hours.
- 4.2 Do not moisture cure AA-22. Neither membrane curing nor water spraying is allowed.

5.0 INSTALLATION - HAMMERED METHOD

- 5.1 Place contents of the enclosed 25 pound bag of damp (pink) material and the 25 pounds of dry (white powder) into a clean mixing vessel, about 6 gallon size, and blend thoroughly. Pre-mixed "damp" and "dry" can be stored up to 24 hours before adding water, provided the container they are stored in is covered. This mixture is then divided into 12-1/2 pound batches and screened. Double batches (25 pounds) can be mixed if two men are applying material. Start the 12-1/2 mix at 270 cc then vary if necessary for tamping and hammering. The water requirement is a minimum 250 cc to a maximum 315 cc (8.5 to 10.5 fluid ounces based on 30 cc/ounce will produce 4.5 to 5.5% water.

The 12-1/2 pound batch is put in the mixing vessel first and then the pre-blended AA-22 is added. Mixing time will vary between one and one half minutes minimum and two and one half minutes maximum. (Use Timer) The material will form together into putty-like lumps when properly mixed. Ambient conditions will make it necessary to adjust water content within the above limits. However, the minimum amount of water necessary should be used since excess water is detrimental to the strength of the refractory. If uniformity of batches is not consistent, weigh contents of pink and white material prior to initial mixing. A suggested mixer that has been used successfully for mixing the AA-22 is a Hobart Mixer.

- 5.2 Mix only as much AA-22 as can be applied within 10 minutes after the addition of water.
- 5.3 If a batch of material should stiffen, before actual placement into the hex steel, to a point where it is not knitting together, the batch should be discarded. Under no circumstances should more water be added and the material retempered.
- 5.4 Hand pack the refractory thoroughly into the hex mesh, working as needed to fill the anchorage holes in the mesh and to eliminate air bubbles or pockets.

5.0 INSTALLATION - HAMMERED METHOD (Continued)

- 5.5 After the material has been fairly uniformly distributed, use a plastic or wooden mallet to pound the AA-22 into the corners, etc. of the hex steel and eliminate any voids or air pockets. Move the hammer slightly forward and backward during hammering strokes to aid in filling holes in the mesh.
- 5.6 When cutting off excess material even with the top of the hex steel, special care should be taken not to cut off too much material and have an underfilled hex. The surface can then be pounded flush and finished with the mallet or by fubbing with a rubber glove or hard rubber float. The tips of the mallet should be washed between batches to prevent build-up of the Resco Cast AA-22.

6.0 INSTALLATION - HAND PACKED METHOD

- 6.1 Place contents of the enclosed 25 pound bag of damp (pink) material and the 25 pounds of dry (white powder) into a clean mixing vessel, about 6 gallon size, and blend thoroughly. Pre-mixed "damp" and "dry" can be stored up to 24 hours before adding water, provided the container they are stored in is covered. This mixture is then divided into four equal parts or 12-1/2 pound batches. Double batches (25 pounds) can be mixed if two men are applying material. The water requirement is a minimum 300 cc to a maximum 380 cc (10 to 12 ounces based on 30 cc/ounce will produce 5 to 6% water).

The 12-1/2 pound batch is put in the mixing vessel first and then pre-blended AA-22 is added. Mixing time will vary between one minute minimum and two minutes maximum. The material will form together into putty-like lumps when properly mixed.

- 6.2 A suggested mixer that has been used successfully for mixing the AA-22 is drill and paddle (electric).
- 6.3 Mix only as much AA-22 as can be applied within 15 minutes after the addition of water.
- 6.4 If a batch of material should stiffen, before actual placement into the hex steel, to a point where it is not knitting together, the batch should be discarded. Under no circumstances should more water be added and the material retempered.
- 6.5 Hand pack the refractory thoroughly into the hex mesh, working as needed to fill the anchorage holes in the mesh and to eliminate air bubbles or pockets. Work in well with heel of hand.
- 6.6 When cutting off excess material even with the top of the hex steel, special care should be taken not to cut off too much material and have an underfilled hex. The surface can then be made uniform by rubbing across the surface with a dampened hard rubber float. Dense sponge face floats should not be used since water may be added from the sponge rubber.

TECHNICAL DATA

INSULATION

TYPICAL ANALYSIS DATA

PRODUCT: PANELEX T.P.

DESCRIPTION: NON-ASBESTOS, ULTRA LIGHT,
HIGH-STRENGTH, INSULATION.

SPECIMEN TYPES: GUNNED

RECOMMENDED
SERVICE LIMIT: 2000°F

P.C.E.: CONE 5 (2230°F)

ASTM CLASS (C-401): CLASS "O"

WATER REQUIRED TO
CAST 100 LBS MATERIAL: N/A

MATERIAL REQUIRED
TO GUN 1 CU. FT. : * 28 TO 32 LBS

RECOMMENDED PRE-WET
PER 100 LBS. (GUN) : 10 TO 15% (BY WEIGHT)

PACKAGING: 50 LB BAG

APPLICATION METHODS: TROWEL, CAST, GUN,
PUMP

CHEMICAL ANALYSIS

SiO ₂	41.83 %
Al ₂ O ₃	12.96
Fe ₂ O ₃	2.75
CaO	26.86
MgO	6.39
TiO ₂	.33
Alkalies	
as Na ₂ O	3.05
L.O.I.	5.83

THERMAL CONDUCTIVITY (BTU/FT²/HR./°F/IN.)

MEAN TEMP.	"K"
500	.80
1000	1.15
1300	1.27

PHYSICAL PROPERTIES:

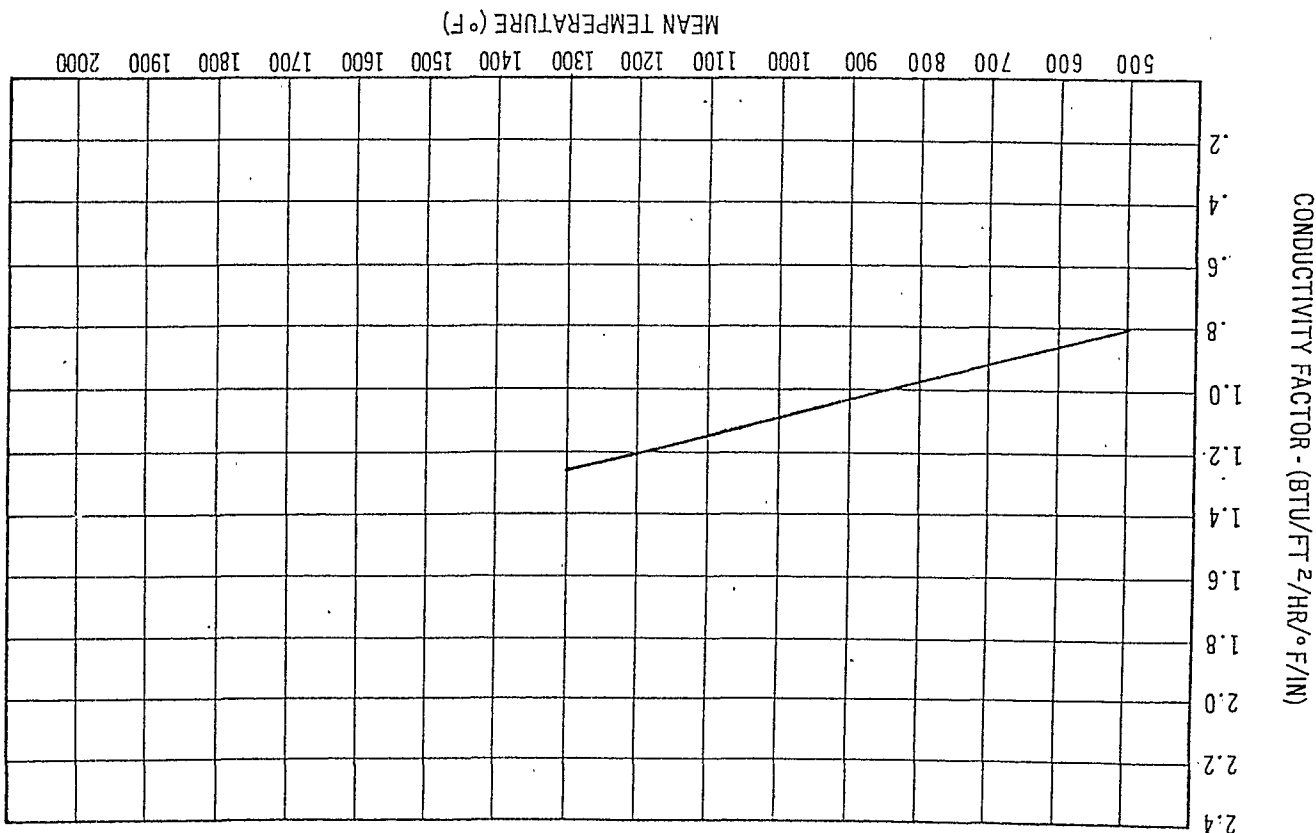
Fired to F°	Density Lbs/cu.Ft.	Linear Change %	Modulus of Rupture, psi	Cold Crushing Strength, psi
220	25.4	0.0	154	294
500	26.0	-0.2	150	289
1000	27.1	-0.6	135	287
1500	26.5	-1.0	84	186
2000	25.3	-1.7	45	84

* NOT INCLUDING FIELD WASTE

NOTE: ASTM TEST METHODS USED WHERE APPLICABLE

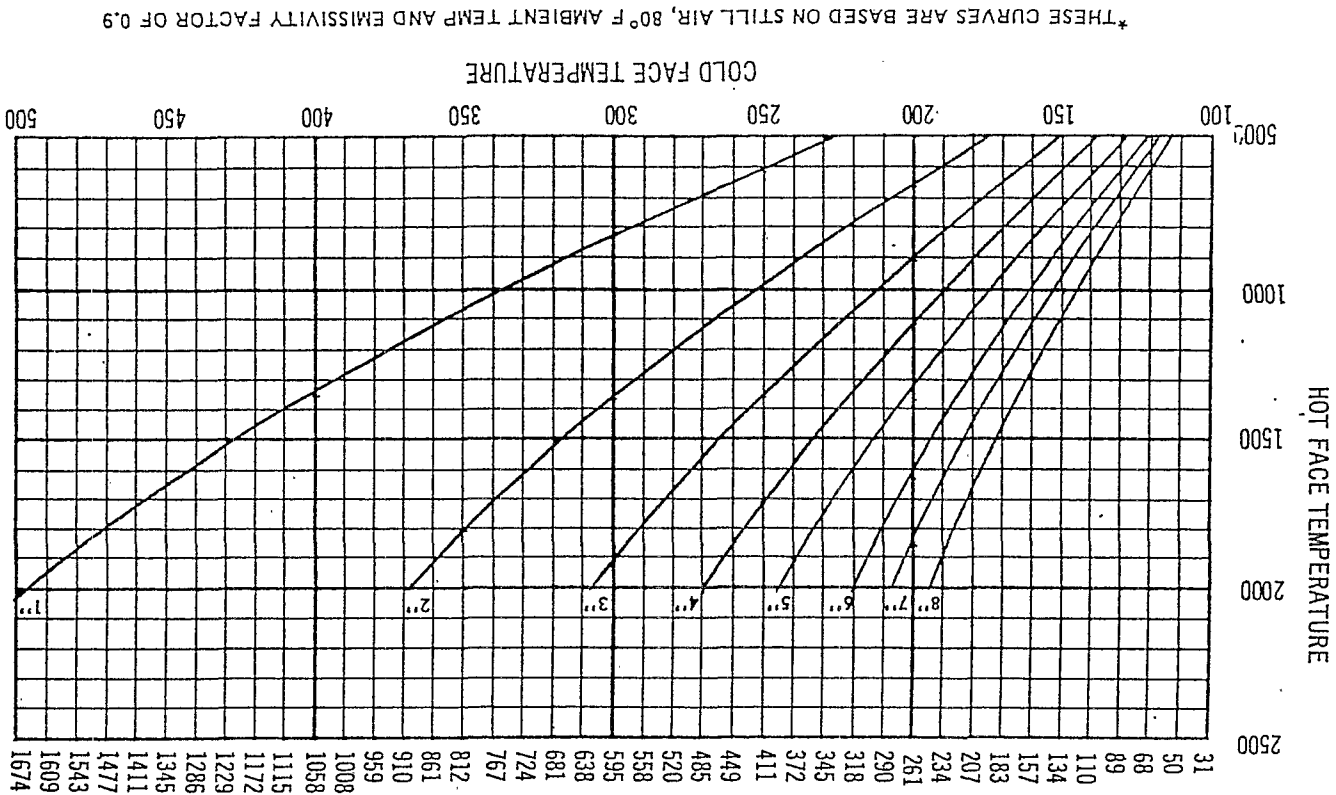
375(406G)
(873 Rev.)

THERMAL CONDUCTIVITY - PANLEX TP (Gunned)



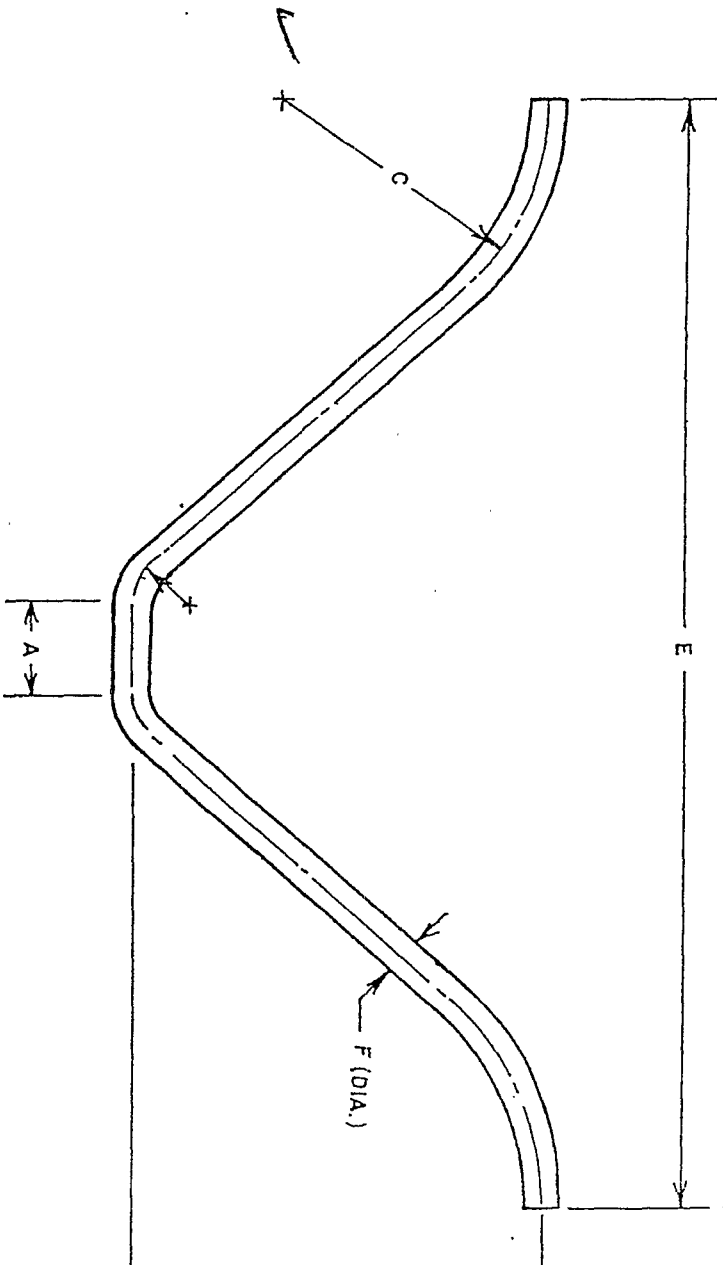
* PERFORMANCE GRAPH - PANLEX TP (Gunned)

BTU LOSS (F_1^2/H_1)



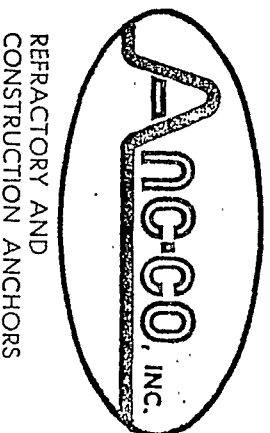
* THESE CURVES ARE BASED ON STILL AIR, 80° F AMBIENT TEMP AND EMISSIVITY FACTOR OF 0.9

NO	A	B	C	D	E	F
-1	7/16	5/16	1-3/8	3/4	5-3/4	3/16
-2	7/16	5/16	1-3/8	1	5-3/4	3/16
-3	7/16	5/16	1-3/8	1-1/2	5-3/4	3/16
-4	7/16	5/16	1-3/8	2	5-3/4	3/16
-5	7/16	5/16	1-3/8	2-1/4	5-3/4	3/16
-6	1/2	1/2	1-1/2	2-1/2	6	3/16
-7	1/2	1/2	2-1/4	3	7	3/16
-8	1/2	1/2	1-1/2	3-1/2	6	3/16
-9	1/2	1/2	2-1/4	3-1/2	7-3/4	3/16
-10	3/4	3/4	2	3-3/4	8	3/16
-11	1/2	1/2	2-1/4	4-1/2	8	3/16
-12	3/4	3/4	2-1/4	5	9-15/16	3/16
-13	3/4	3/4	2	3-3/4	8	1/4
-14	3/4	3/4	2	4	8	1/4
-15	3/4	3/4	2-1/2	4-1/2	8-1/2	1/4
-16	3/4	3/4	4	6	11-1/2	5/16



CHEV B8 6437

AR-731



Box
2 of 2

Operator
Training Manual
CRU 1342

11-11-11

11-11-11

PU-1342 OPERATOR TRAINING MANUAL

Section I - General Description of the UOP Reforming (Platforming) Process on PU-1342

The Hydrobon-Platforming Unit is designed to produce high quality gasoline motor fuel from straight-run naphthas and gasolines from the crude units.

In the complete unit two different catalytic processes are incorporated. The two processes are known as "Hydrobon" and "Platforming". A "catalytic process" is an operation in which a "catalyst" or "reaction-promoting-substance" is used. In the case of the Hydrobon process, the catalyst either removes or promotes the rearrangement or break-down of the molecules containing sulfur, nitrogen and various metallic compounds. These reactions take place in the presence of a recycle hydrogen stream.

The Platforming process catalyst is used to convert the low quality, low octane straight-run gasoline into high grade, high octane motor fuel. In this process Hydrogen gas is liberated and recycled through the reactors to help promote the reaction.

It is convenient to consider the unit in three sections - Hydrobon, Platformer Reactors and Products Fractionation. Reference to the simplified flow sheet and plot plan, copies of which are included in this section, will assist in visualizing the equipment and sequence of flow.

The prefractionator is used to prepare hydrobon reactor charge from the straight-run gasoline which is available as charge for the unit. Desirable charge should contain a minimum of pentane and lighter. While this light material is not in any way to be considered harmful, it does take up plant capacity which might be used more profitably in the reforming of the heavier gasoline fractions. This is so because this light fraction normally has a reasonably good octane number and Platforming does not appreciably improve the quality from an octane standpoint.

Platformer reactor charge should never have a distillation endpoint higher than ^{350°F} ~~350°F~~ in the interest of promoting longer catalyst life.

The straight-run gasoline charged to PU-1342 is a mixture of depentanized gasolines from 6443, 6444 and 6445, 6447 and IU-341 dehexanizer sidestream. These streams are brought together in tankage which is controlled by 163 Pump House. The tanks which are used for PU-1342 charge storage are 77, 78, 93, 2588 and 2590. Tanks 77, 78 and 93 are back-up storage and either 2588 or 2590 tank is used as the unit charge tank. Any time there is any

Section I-Continued

problem with the unit charge flow or charge pump suction pressure, 163 Pump House should be contacted.

The straight run gasoline is first charged to the prefractionator. Hydrobon reactor charge is withdrawn as bottoms product. The light fraction is taken overhead and sent to storage. The prefractionator will also remove overhead hydrogen sulfide, oxygen, water and ammonia, removal of these materials from the reactor charge is desirable.

In the Hydrobon reactor a mixture of recycle gas rich in hydrogen, and the prefractionator bottoms are passed over the Hydrobon catalyst. Here contaminants such as sulfur, nitrogen, and metallic compounds are converted to easily removed forms, or are removed directly from the naphtha charge. This results in a much more suitable charge stock for the subsequent Platforming operation. The hydrogen sulfide formed from the sulfur compounds in the presence of the Hydrobon catalyst is removed from the naphtha stream in the Hydrobon stripper column. Stripper bottoms become the charge material for the Platformer reactors.

In the Platformer Reactor Section the stripper column bottoms are mixed with a hydrogen rich recycle gas stream, heated in exchangers and fired heaters, and charged through the Platforming reactors. Here the desired improvement in octane number is made on the naphtha. Intermediate heaters are provided between the successive reactors to make up the endothermic (that is, requiring or using up heat) heat of reaction. After heat exchange the effluent from the reactor section is cooled and resultant liquid-gas mixture is sent to the products separator.

In the separator the cooled reactor effluent is separated into a liquid stream and a gas stream rich in hydrogen. The major portion of the gas stream is recycled back to the Platformer and Hydrobon reactors. The liquid stream is charged to a depropanizer. Propane and ethane gases formed during the Platforming reaction are taken as overhead product from the depropanizer and are sent to the Ethylene Unit. The bottoms from the depropanizer are charged to the debutanizer, where butane is taken as an overhead liquid product and sent to alkylation unit storage. The bottoms from the debutanizer is Platformate, high octane gasoline, which is sent to gasoline blending storage.

Section I-Continued

Summary of PU-1342 Product Streams

<u>Product Stream</u>	<u>Normal Disposition</u>	<u>Other Possible Dispositions</u>
Prefractionator Overhead	PU-1343 Charge	97 P.H. (Gasoline Treating)
Prefractionator Wet Gas	7944 Gas Plant	Emergency Flare
Prefractionator Bottoms	H.B. Reactor Charge	Charge Tank 2588 or 2590
Hydrobon Stripper Gas	7944 Gas Plant	Product Gas Drum, Emergency Flare
Depropanizer Overhead (Gas)	Refinery Propane (Ethylene Unit)	Product Gas Drum, Emergency Flare
Butane (Liquid)	6341 Tank (Alkylation Unit charge)	
Debutanizer Platformate	No. 1 or 2 Gasoline Line (GG) or No. 4 Gasoline Line (MM)	Charge Tank 2588 or 2590
Hydrogen:		
1) H.B. Separator Gas	Hydrogen Gathering System	Product Gas Drum, Emergency Flare
2) H.B. Flash Drum Gas	Product Gas Drum	Emergency Flare
3) Platformer Separator Gas	Hydrobon Reactor, PU-1343, Hydrogen Gathering System	Product Gas Drum, Emergency Flare

Any questions or problems regarding a liquid product stream after the unit battery limits and any time a stream's disposition is changed, 163 Pump House should be notified. Any questions or changes concerning a gas stream or the hydrogen system should be directed to the Gas Dispatcher who is contacted through the Guard Office.

SAFETY

GENERAL SAFETY PROCEDURES

GULF OIL COMPANY - U.S.

PORT ARTHUR REFINERY

FOREWORD

These General Safety Procedures are prepared for the purpose of putting into written form some of the fundamental procedures to be followed in our refinery in order to prevent injury to our people and damage to equipment.

For these procedures to be effective, for the benefit of all of us, it will be necessary for everyone to be familiar with them and to observe them. Everyone is expected to give his full cooperation in that respect.

In these General Safety Procedures, you will notice that the terms "should," "shall," and "must" are used. "Should" indicates recommended or advisory steps, and "shall" and "must" indicate mandatory rules.

In the preparation of these procedures, the contents will necessarily be confined to practical limits. We recognize that safety is an inherent part of every job and every operation, no matter how small; however, it is not the intention to include here every procedure which involves the element of safety.

In addition, in our various departments there are written procedures formulated for their particular operations. It would not be practical to include all such procedures in these General Safety Procedures.

State and Federal agencies also issue safety regulations which apply to us. Those regulations will not be duplicated here.

Revisions and additions to these General Safety Procedures will be made and distributed as required.



B. F. Short
Refinery Manager

ELT:cc

11-1-72

CHEV B8 6444

GENERAL SAFETY PROCEDURE NO. 11-1BASIC WORK RULESI. GENERAL

As some of our Basic Work Rules involve safety procedures, they are repeated here in order to be included in our General Safety Procedure record.

II. BASIC WORK RULES

- A. The basic work rules listed below are presently in effect and are issued for the information, guidance and safety of employees. The list obviously does not include all Company rules and regulations.
- B. Each employee is required to abide by the following rules. Your cooperation will be appreciated.
 1. Employees shall be responsible for being at their assigned work locations at their scheduled starting time.
 2. Employees shall not leave their jobs without permission from their foreman, except for normal personal reasons or in case of emergency.
 3. Employees shall eat lunches only at approved lunch periods. ?
 4. Employees scheduled to work 7:30 AM to 4:00 PM shall remain on the job until the 11:30 AM whistle blows, unless given permission by their foreman to do otherwise. Employees may put away their small tools before 11:30 AM.
 5. Employees scheduled to work 7:30 AM to 4:00 PM shall be at their assigned job locations when the 12:00 noon whistle blows, unless given permission by their foreman to do otherwise.
 6. Employees required to return tools or other Company equipment at the end of their workday will be allowed a reasonable time to do so, taking into account the distance of their work from the check-in point and the nature of the tools to be handled. Normally, an employee will be allowed ten minutes to do this. Employees shall remain at their work locations until the end of their shift or schedule unless they have permission from their foreman to do otherwise.
 7. All employees assigned to off-schedule work shall not leave their assigned jobs during the entire shift without permission from their foreman, except for normal personal reasons or in case of emergency.
 8. Employees shall notify their department office or the Medical and Health Services Division when unable to report for work.
 9. Employees shall not smoke in the plant, except in approved smoking areas.

10. Employees shall carry out orders given by their foreman or the person for whom they are working.
11. Employees shall obtain leave of absence by requesting permission from their foreman.
12. Employees shall follow safe work practices and wear protective equipment as required.
13. Employees shall not give or loan their employee identification pass to any other person.
14. Employees shall be responsible for proper use of bath houses.
15. Employees shall be responsible for checking out and properly caring for tools.
16. Employees shall not participate in horseplay.
17. Employees shall use only safety matches in the plant, when matches are authorized, or approved lighters.
18. Employees shall not remove Company property from the plant without proper authorization.

Gulf Oil Company - U.S.
Port Arthur Refinery
Accident Prevention Division

/cc

11-1-72
(From Basic Work Rules dated 2-24-67)

GENERAL SAFETY RULES

1. Hard hat must be worn when outside of control room in battery limits.
2. No canvas type shoes are to be worn. It is recommended that safety shoes be worn.
3. No sleeveless shirts are to be worn.
4. Do not stand directly behind a burner when lighting because the burner may backfire.
5. Open peep holes and lighting holes on heaters cautiously because a positive pressure in the furnace may cause a flow of hot gases through these holes.
6. Use kerosene on torches for lighting burners. Never use gasoline.
7. Use kerosene for cleaning. Never use gasoline.

LTS:mkw:11-25-75

GENERAL SAFETY PROCEDURE NO. 11-14TAGSI. GENERAL

- A. The proper use of tags is an important tool for making our environment a safer place in which to work. The following procedures are established to insure the safety of personnel and equipment.
- B. All employees must know and follow proper tagging procedures. Supervisors must see that those working under their supervision who are authorized to use tags understand and follow these procedures.

II. TYPES OF TAGS AND PROCEDURES

A. Red tags ("Danger")

- 1. Red tags (Gulf Form 9234) shall be used only by Electrical Section personnel, and they shall be used for "tagging out" defective electrical equipment or circuits being worked on by Electricians.
- 2. The Electrical Section must "tag out" equipment or circuits for other personnel (except in power plants) when the equipment or circuits cannot be tagged without entering electrical switch gear or opening disconnect switches with a switch stick.
- 3. In no case shall red tags be removed by anyone other than Electrical Section personnel.
- 4. General Safety Procedure No. 11-15, Red Tags and Locks on Electrical Equipment, governs the use of red tags.

B. White tags ("Do Not Operate")

- 1. White tags (PA Form E-1010) shall be used by Maintenance personnel only (other than Electricians).
- 2. Maintenance personnel (other than Electricians) shall not place their tag on equipment before it has been tagged by the department owning the equipment or by Electricians when specified under section II-A-2.
- 3. Any Maintenance employee (other than Electricians) assigned to work on equipment where unexpected energization or start-up of the equipment or process would be potentially dangerous shall first "tag out" the equipment with a white tag.
- 4. The white tag will be attached in addition to tags placed by Operations or other personnel.
- 5. The person who tags equipment shall write on the tag the reason for tagging and sign his name, department and date.

6. Number of white tags to be applied:

- a. When assignment to work on the same job involves only one work crew of the same craft, only one white tag is required.
 - b. If more than one work crew of the same craft is working because there is more than one job being performed, then each work crew shall add its own tag.
 - c. If more than one craft is involved in the work being performed, then each craft shall add its own tag.
7. If one person is relieved by another before the job is completed, the first person shall remove his tag and a new tag shall be put on by his relief. However, if a person discontinues the job before it is completed without first being relieved by someone else, then he must leave his tag in place.
8. A white tag shall not be removed by anyone other than the person who signed the tag or by an authorized supervisor. An "authorized supervisor" is one who is directing a job on the equipment that has been tagged out and is knowledgeable in the progress of the job. He may remove a tag, or direct that it be removed, only if the employee who signed the tag is away from the plant or not readily available.
9. When the job assignment requires entry into a cooling tower fan stack, in addition to tags as provided above, the equipment shall be also locked out in the safe condition with a padlock. Locks for this purpose only are available in the Zone Maintenance offices and the Weekend Maintenance office and will be issued to employees as required. When the job is complete, locks shall be removed and returned to the office where they were issued.

C. Yellow tags ("Caution")

- 1. Yellow tags (Gulf Form 9233) shall be used by Operations and Laboratory personnel only.
- 2. Operations and Laboratory personnel shall use these tags to tag out electrical switches on equipment, to prohibit the operation or use of a valve or line, to warn of a physical hazard that might cause injury to personnel or damage to equipment, etc. (except in locations mentioned in section II-A-2).
- 3. The person who tags equipment shall write on the tag the reason for tagging and sign his name, department and date.
- 4. A yellow tag shall not be removed by anyone other than the person who signed the tag or by a knowledgeable individual given the authority and responsibility by his supervisor.

NOTE: EQUIPMENT WHICH HAS BEEN TAGGED OUT WITH ANY OR ALL OF THE ABOVE TAGS SHALL NOT BE PUT IN SERVICE, OPERATED OR TEST-RUN UNTIL ALL TAGS HAVE BEEN REMOVED.

D. Yellow tags (plain, 1-3/8" x 2-3/4")

These tags shall be used on acid and caustic samples and other samples where special precautionary handling is necessary.

E. Tags for HF Alkylation Unit

These are special tags designed exclusively for the HF Alkylation Unit and are described in General Safety Procedure No. 11-41, Handling Hydrofluoric Acid.

F. Blue tags

These tags are for Storehouse purposes to identify stock.

G. Manila tags

These tags are used for information purposes, for tagging steam leaks or any other purpose not specifically covered in this procedure.

H. Manila sample tags

These are printed tags used primarily for Laboratory samples.

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Revised 8-8-75

GENERAL SAFETY PROCEDURE NO. 11-40HOT WORK AND/OR VESSEL ENTRY PERMITSI. GENERAL

- A. When it is necessary to do hot work or to enter a vessel, a Hot Work and/or Vessel Entry Permit must first be obtained in order to safeguard personnel and equipment involved.
- B. Special cases in issuing permits may arise which are not specifically covered in this pamphlet. In such cases the procedures given herein should be used as a guide.
- C. Work done by contractors shall be covered by the provisions of this pamphlet unless other special written agreements have been made between them and the company.
- D. All supervisory personnel must be familiar with these procedures and see that they are followed.
- E. Authorization for issuing permits - Department superintendents are authorized to issue permits. They may also designate other supervisors, No. 1 operators, etc., to do so.
- F. Gas tests
 - 1. Gas tests are made by the Accident Prevention Division upon request for combustible and toxic gases and vapors (hydrogen sulfide, carbon monoxide, aromatics, tetraethyl lead, etc.) and oxygen content of vessels.
 - 2. The person who issues a permit must be sure that the appropriate tests have been made.
- G. Initiating and completing permit
 - 1. Before starting any work which requires a permit, the craftsman or his supervisor will request that the authorized person issue the permit.
 - 2. The permit must be filled out completely before it is signed. If there is no applicable entry to be made on any of the blank lines, a notation to that effect should be made (for example, "none").
 - 3. It is the responsibility of the issuing person to make sure that any restrictive features of the permit are understood by the person to whom he issues the permit.
 - 4. It is the responsibility of the person who receives the permit to check it for completeness and to comply with its provisions. In cases where one permit is for a number of craftsmen or jobs (such as on a unit shut-down) the maintenance supervisor in charge is responsible for seeing that everyone concerned is familiar with the provisions of the permit.

5. The permit shall be good only until the following 7 AM, unless an earlier expiration time is specified.
6. A copy of the permit form is shown in Appendix A, along with explanatory notes concerning information to be shown on it.

H. Extending permit

1. The maximum time limit for a permit shall be 7 AM following the time of issuance. It can be extended when an authorized person obtains another gas test and rechecks the area to make sure that conditions permit extension of the permit.
2. The authorized person shall enter on the reverse side of the permit the new date, starting time, expiration time, gas test result, and his signature.
3. The expiration time of a permit extension shall not be longer than the following 7 AM.
4. If there is any change necessary in provisions shown on the face of the permit, it cannot be extended. In that case a new permit shall be issued. No erasures or alterations shall be made on the face of the permit.

I. Cancelling permit and revalidating

1. A permit automatically becomes invalid when conditions under which it was issued change or if instructions on the permit are not being followed.
2. It is the responsibility of anyone who becomes aware of changes in conditions which might cause fire or exposure to gases to halt work immediately and notify his supervisor.
3. When the condition has been corrected, the permit can be revalidated by the signature of an authorized person on the reverse side.
4. In case of fire, explosion, etc., the permit shall not be altered or destroyed. Work to be done thereafter shall require a new permit, and the original permit cannot be revalidated.

II. HOT WORK PROCEDURES

A. Definition of hot work

1. Hot work is any work in which heat generated or applied is of sufficient intensity to ignite flammable liquids, vapors, or gases, or any other combustible material. The following are examples of operations which are considered hot work in this pamphlet: welding, brazing, burning, open fires, hot forging, hot riveting, dry sandblasting.
2. For clarification, the following categories are not considered hot work in this pamphlet, and a written permit is not required for them:

- a. Operations which are considered less likely to cause ignition (such as using combustion engines, grinding, electric soldering, breaking concrete, power chipping or ripping of metal, using portable electric powered apparatus or lights, and using photographic flashbulbs) are not considered hot work. However, they may be prohibited by area authorities, and for that reason such operations shall not be performed without consent of the area authority.
 - b. Use of flame or heat producing or arcing apparatus which is integrally part of established operations (such as fires in process heaters or boilers, laboratory equipment, and permanently established electrical equipment) is not considered hot work.
 - c. Temporary or permanent smoking pens are not included in this pamphlet. They are requested and approved under other established procedures.
- B. All hot work requires a hot work permit except that done in free burning areas listed in Section II-G.
- C. Multiple area authority
- 1. When two or more departments have equipment in the same area and a hot work permit is required, all of the departments involved shall sign it. The department in charge of the equipment to be worked on shall obtain signatures from the other departments before issuing the permit.
 - 2. The Bulk Oil Department shall sign hot work permits for the area between Avenue A and the turning basin from Gate 26 to the south end of the turning basin, as well as the vicinity of the shore line continuing around the south bank to the turning basin "point." However, this does not include permits for the Main Office, No. 1 Cafeteria, Laboratory, Medical and No. 1 Bath House buildings (which those area authorities will sign), nor to any free burning areas listed in Section II-G.
- D. Preparation of site - The following steps shall be taken to prepare the site and equipment for hot work:
- 1. All connecting lines to a vessel (including process, gas, steam, water, and air lines, as well as level gauge columns, level float columns, and similar reservoir type instruments and/or appurtenances) shall be either blanked or disconnected as close to the vessel as practicable, with the exceptions listed below. If disconnecting is the method used, it shall consist of removal of a sufficiently long part of the line to prevent passage of gas across the gap.
 - a. Lines to equipment in boiler houses need not be blanked or disconnect if the double block valve, bleeder, and tag system is used.
 - b. Water lines to equipment at the Water Treating Plant need not be blanked or disconnected if the valves are closed and yellow-tagged by Operations.
 - 2. Flammable vapors and liquids and loose combustible materials shall be removed or adequately covered before hot work is authorized. The proximity of other equipment and the possibility of flammable vapor drifting into the hot work area shall also be taken into consideration.

3. Materials which, even though non-flammable, can release toxic vapors when heated shall be removed before hot work is authorized, or else adequate respiratory equipment shall be used. For example, metal which has been in contact with tetraethyl lead solutions shall have scale and rust removed down to bright metal for a distance of at least six inches around the area which will be heated.
4. Sewers and drains in the vicinity of hot work shall be kept covered.
5. A fire watcher shall be kept stationed in the vicinity of hot work with adequate fire fighting equipment when there is a possibility of ignition of any combustible materials.
6. None of the above is intended to prohibit certain hot work on the exterior of a closed vessel in service, such as welding a saddle on a pipe line for a hot tap, sandblasting certain tanks in service, etc.

E. Gas tests for hot work

1. A combustible gas test must be made for every hot work permit, with the following exception: When the person in charge of the area is satisfied that the location is in the open, completely away from any possible sources of gas, and a vessel is not involved, a gas test is not required.
2. The gas test of a vessel shall not be made until after it has been isolated as described in Section II-D-1.
3. When hot work in a free burning area involves a vessel, a combustible gas test of the vessel must be made even though a hot work permit is not required in the free burning area.
4. Hot work shall not be permitted unless the combustible gas test result is zero percent of the lower explosive limit.

F. Hot work on marine vessels

1. Issuing permit - Permits for marine vessel hot work will be issued only by the Bulk Oil Department Dock Foreman or the Senior Loading Foreman on duty.
2. Permissible locations
 - a. The only hot work permitted alongside the docks is in engine rooms or boiler rooms of Company-owned or chartered ships. However, this shall not include any work on the skin of those ships nor any work which would necessitate running welding cables from the dock to the ship.
 - b. Any hot work which is not permitted alongside the docks in 2-a above may be done at the south bank of the turning basin.
3. Handling cargo - Loading or unloading of products is permissible while hot work is being done in the engine rooms or boiler rooms of the ships mentioned above.
4. Location of equipment
 - a. Gas cylinders used in any hot work shall be located within the enclosure of the afterhouse on ships.

- b. Any welding cables strung from the shore to a ship (which is permissible only at the south bank) shall go to the ship's stern, with the ground lead cable grounded inside the living quarters or the engine room or boiler room.
5. Other clearances - It is the responsibility of the Marine Department to notify the Coast Guard before hot work is done aboard a marine vessel and to obtain Certified Gas Chemist certificates when required. (When that is done, the usual refinery gas test is still required, however.)

G. Free burning areas

1. A permit will not be required for hot work in the following areas:

- a. Boiler Shop and under shed west of shop
- b. Tin Shop
- c. Machine Shop and designated sandblast area south of shop
- d. Electric Shop
- e. Water Cooler Repair Shop
- f. Instrument Shop
- g. Pipe Shop and designated area north and west of shop
- h. Lead Shop and storage yard west of shop
- i. Carpenter Shop and designated repair area south of shop
- j. Garage
- k. Locomotive shed
- l. Car repair shed and designated track area
- m. Laboratory maintenance shop
- n. Reclamation Yard
- o. Dump
- p. 1542 Ethylene Unit area between heaters and railroad

2. Additional areas may be designated by agreement with the department superintendent over the area, the Fire Protection Section, and the Accident Prevention Division.

III. VESSEL ENTRY PROCEDURES

A. Definitions

- 1. Vessel - Vessels are any normally closed enclosures such as tanks, towers, drums, oil reservoirs, tank cars, tank trucks, barge tanks, ship tanks, pipe lines, sewers, and similar equipment. For the purpose of this pamphlet the term also applies to furnaces and to condenser boxes and other open enclosures in which flammable or toxic gases or insufficient oxygen may be present. (Floating roof tank tops are not included in this definition. Procedures for going onto those tank roofs are contained in General Safety Procedure No. 11-32, Going on Floating Roof Tanks in Service.)
- 2. Vessel entry - Vessel entry is the bodily entry of a person into a vessel so that he is exposed to the contents of the vessel.

- B. All vessel entry requires a vessel entry permit except where it would mean that a department issues a permit to itself to enter its own equipment. In those cases, even though no written permit is required, the other vessel entry procedures shall be followed.

C. Preparation of site - The following steps shall be taken to prepare the vessel for entry:

1. All connecting lines to a vessel (including process, gas, steam, water, and air lines, as well as level gauge columns, level float columns, and similar reservoir type instruments and/or appurtenances) shall be either blanked or disconnected as close to the vessel as practicable, with the exceptions listed below. If disconnecting is the method used, it shall consist of removal of a sufficiently long part of the line to prevent passage of gas across the gap.
 - a. Lines to equipment in boiler houses need not be blanked or disconnected if the double block valve, bleeder, and tag system is used.
 - b. Water lines to equipment at the Water Treating Plant need not be blanked or disconnected if the valves are closed and yellow-tagged by Operations.
2. Corrosive chemicals and other harmful substances shall be removed before vessel entry is authorized unless adequate personal protective equipment is used.

D. Gas test for vessel entry

1. A combustible gas test must be made for all vessel entry.
2. The vessel entry permit cannot be issued unless the gas test result is 50% of the lower explosive limit or below.
3. Toxic gas tests where applicable must be made for all vessel entry unless the result of the combustible gas test or other circumstances (for example, known presence of tetraethyl lead) already require that the maximum respiratory protection be used.

E. Respiratory protection

1. A vessel must be free of combustible and toxic gases and contain sufficient oxygen before it can be entered without respiratory protection.
2. The correct type of respiratory protective equipment shall be provided and worn, depending on the type of gas and concentration encountered. (See General Safety Procedure No. 11-2, Respiratory Protection, for requirements under various conditions.)

F. Portable vessels

1. Tank cars and tank trucks - Tank cars, tank trucks, and similar portable vessels can, for the purposes of the vessel entry section of this pamphlet only, be considered as belonging to the maintenance supervisor during the period of time his people enter to perform their work. Then as stated in Section III-B, a written vessel entry permit will not be required, but the other vessel entry procedures shall be followed.

2. Marine vessels

- a. Marine vessels can, for the purposes of the vessel entry section of this pamphlet, be considered as belonging to the Bulk Oil Department while its own dock personnel enters tanks. Then, as stated in Section III-B, a written vessel entry permit will not be required, but the other vessel entry procedures shall be followed.
- b. Vessel entry by Marine Department personnel or maintenance crews under their direction for the purpose of doing repair work is covered by General Safety Procedure No. 11-34, Handling Ships, Barges and Tugboats at Docks.

Appendix B summarizes the procedures outlined herein and indicates the sections in which those procedures are explained.

In special cases it may be impractical to conform to the above procedures. In these cases minor deviations may be agreed upon by Operations, Engineering, and the Accident Prevention Division as long as the safety of personnel and equipment is not affected. Such deviations, however, are not to be considered permanent modifications of the outlined procedures.

Attachments: Appendix A
Appendix B

Gulf Oil Company - U.S.
Port Arthur Refinery
Accident Prevention Division

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Issued 11-1-72

Front:

PA PERMIT-16

GULF OIL COMPANY - U. S. - PORT ARTHUR REFINERY

HOT WORK AND/OR VESSEL ENTRY PERMIT

CHECK ONE: HOT WORK ☐ VESSEL ENTRY ☐ BOTH ☐

DATE _____ STARTING TIME _____ AM PM EXPIRATION TIME _____ AM PM

ISSUED TO (name of craft or supervisor)
(description of work to be done - for example, welding, sand-
WORK blasting, open fire for lead pot, enter for cleaning, etc.)LOCATION (number of unit, name of vessel, etc.)LOCATION OF WORKMAN'S EQUIPMENT (location of welding machine, etc., when it should be in certain area)ROUTE OF CABLES AND BURNING HOSE (specific route when cables or hose should be kept out of certain area)SPECIAL INSTRUCTIONS (for example, keep sewer covered, have area wet down, keep fire watch at site, etc.)GAS TEST RESULTS (results of combustible and toxic gas tests reported by Safety Inspector)

(SEE REVERSE SIDE)

SIGNATURE OF AUTHORIZED PERSON

Back:

PERMIT EXTENSION

DATE	STARTING TIME	EXPIRATION TIME	GAS TEST RESULTS	SIGNATURE OF AUTHORIZED PERSON

Do not use this side of permit if conditions have changed from those specified on face of card. Issue new permit.

SUMMARY - GENERAL SAFETY PROCEDURE NO. 11-40

WORK	HOT WORK PERMIT	VESSEL ENTRY PERMIT	BLANK OR DISCONNECT	COMBUSTIBLE		TOXIC GAS TEST
				GAS TEST	GAS TEST	
AT WORK:						
Free burning area, not on vessel	No (II-B)			No	No	
Free burning area, on vessel	"		Yes (II-D-1)	Yes (II-E-3)	"	
Lines to equipment in boiler houses	Yes (II-B)		Yes, or double block, bleeder, and tag (II-D-1-a)	Yes (II-E-1)	"	
Water lines to equipment at Water Treating Plant	"		Yes, or close and tag valves (II-D-1-b)	"	"	
Open, away from gas, not on vessel	"			No (II-E-1)	"	
All other hot work	"		Yes (II-D-1)	Yes (II-E-1)	"	
ESSEL ENTRY:						
Self-entry in own vessel	No (III-B)		Yes, unless exempted below (III-C-1)	Yes (III-D-1)	Where applicable (III-D-3)	
Lines to equipment in boiler houses	Yes (III-B)		Yes, or double block, bleeder, and tag (III-C-1-a)	"	"	
Water lines to equipment at Water Treating Plant	"		Yes, or close and tag valves (III-C-1-b)	"	"	
Tank cars, tank trucks, marine vessels	No (III-F)			"	"	
All other vessel entry	Yes (III-B)		Yes (III-C-1)	"	"	

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11-1-72

GENERAL SAFETY PROCEDURE NO. 11-2RESPIRATORY PROTECTIONI. GENERAL

- A. This procedure shall serve as a guide for the proper selection, use and care of respiratory protective equipment in the Port Arthur Refinery.
- B. Respiratory protective equipment shall be used whenever processes, environment, or chemicals are encountered in a manner capable of harming the body through inhalation.
- C. The Accident Prevention Division shall approve all new types of protective equipment to be obtained for use.

II. EMPLOYEE RESPONSIBILITY

- A. Employees shall use the protective equipment provided in accordance with instructions and training received.
- B. Employees shall guard against damage to the equipment.
- C. Employees shall report any malfunction of the equipment to their supervisor.
- D. Employees who are performing routine tasks shall not borrow emergency respiratory protective equipment which is permanently assigned to a specific location without special permission of the supervisor in charge of the area in which the emergency equipment is kept.

III. SELECTION OF RESPIRATORY PROTECTIVE EQUIPMENTA. General

- 1. The chemical and physical properties, toxicity, and concentration of hazardous material shall be considered before respiratory equipment is selected.

NOTE: Any deviation in the selection of respiratory protective equipment shall be on the safe side.

- 2. Supervisors shall become familiar with the various types of respiratory protective equipment and their limitations, as the conditions encountered may range from nuisance odors or irritation to those which are immediately dangerous to life.

3. Supervisors shall be responsible for selecting the proper respiratory equipment.
4. A guide to aid in the proper selection of equipment for the most common substances and materials is shown in Appendix A. The equipment listed (or equipment giving a higher degree of protection, if desired) shall be used. Questions concerning unusual circumstances should be referred to the Accident Prevention Division.
5. A form is available for supervisors to give to employees in order to obtain the correct respirator or gas mask from the Tool House. That form, "Request for Respiratory Equipment," is shown in Appendix B.

B. Nature of the hazard

The following is a general guide. For atmospheres containing specific contaminants, see Appendix A.

1. Oxygen-deficient atmospheres

Only self-contained breathing apparatus or supplied-air masks shall be used in any atmosphere that is deficient in oxygen. For the purpose of this procedure, any atmosphere that tests perceptibly lower than the normal 20.8% of oxygen is considered to be oxygen-deficient.

2. Immediately hazardous atmospheres

Only self-contained breathing apparatus, supplied-air masks or canister gas masks shall be used in atmospheres where gases are present in concentrations that would rapidly endanger a person.

3. Not immediately hazardous atmospheres

Chemical cartridge respirators or canister gas masks shall be used for gaseous contaminants. Mechanical filter respirators shall be worn as protection against particulate matter.

C. Work requirements and conditions

The selection of appropriate respiratory protective equipment can only be made after it has been determined what work must be performed, what length of time it will require and under what conditions. For example, emergency repairs requiring a short period of time in an oxygen-deficient atmosphere and with normal access would permit the use of either a self-contained breathing apparatus or a supplied-air mask. However, lengthy tasks or confined areas may permit the use of a supplied-air mask only. Additionally, some contaminants may be absorbed through or irritate the skin upon contact. Consideration must be given to providing the wearer total protection if conditions warrant.

IV. USE OF RESPIRATORY PROTECTIVE EQUIPMENT

A. Restrictions

1. In areas where the user, with failure of the respiratory protective equipment, could be overcome by a toxic or oxygen-deficient atmosphere:
 - a. The user shall have a lifeline attached.
 - b. At least one additional person shall be present.
 - c. Communications, either visual, voice, or signal line, shall be maintained.
 - d. Planning shall be such that at least one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist in case of emergency.
2. Respiratory protective equipment shall not be worn when conditions prevent a good face seal such as a growth of beard, absence of dentures, temple pieces on glasses, etc. Also, to assure proper protection, the facepiece fit shall be checked by the user each time he puts on the equipment.
3. Vessel entry is not permitted, even with appropriate respiratory equipment, in atmospheres that test above 50% of the lower explosive limit (LEL).

B. Training

1. For the safe use of any respiratory protective equipment, it is essential that the user be properly instructed in its selection, use and maintenance.
2. Users shall receive fitting instructions which include:
 - a. Demonstrations and practice in how the respiratory protective equipment should be worn.
 - b. How to adjust the equipment.
 - c. How to determine if it fits properly.
 - d. Wearing it in normal air and in a test atmosphere for familiarity purposes.
3. Employees shall be made aware of the capabilities and limitations of respiratory protective equipment that they will be required to use, including how to determine when equipment is expended or out of date.

4. Supervisors shall be responsible for assuring that all employees assigned to their respective areas are properly instructed in the use of emergency respiratory protective equipment kept in that area.
5. After initial training in the use of respiratory protective equipment, supervisors shall periodically evaluate their personnel's ability to use that equipment and arrange for refresher training if required. The form shown in Appendix C, Respiratory Protective Equipment Training Record, shall be maintained as a training record and kept on file in the employee's department.

C. Types of respiratory protective equipment

1. Dust, fume, and mist respirators

- a. Mechanical filter respirators offer protection against airborne particulate matter including dusts, mists, metal fumes and smoke.
- b. Mechanical filter respirators do not provide protection against gases, vapors, or oxygen-deficiency.

2. Chemical cartridge respirators

- a. Chemical cartridge respirators afford protection against light concentrations of certain acid gases and organic vapors by utilizing various chemical agents to purify the inhaled air. They shall not be used in atmospheres which are oxygen-deficient.
- b. Chemical cartridge respirators shall not be used for protection against:
 - (1). Gaseous material that is extremely toxic in small concentrations.
 - (2). Exposure to harmful gaseous material which cannot clearly be detected by odor.
 - (3). Gaseous material in concentrations which are highly irritating to the eyes.
 - (4). Gaseous material which is not effectively stopped by chemical cartridges utilized, regardless of concentration.
- c. Chemical cartridge respirators may be used as shown in Appendix A.
- d. Some chemical cartridges are also identified by coded designations, as shown in Appendix D.

3. Canister gas masks

- a. Gas masks can be used effectively in limited concentrations of certain gases, vapors and particulate matter listed on the canister label and in Appendix A.
- b. Canisters may be referred to by colors or by coded designations, as shown in Appendix D.
- c. Because gas masks are air-purifying devices, they shall not be used in atmospheres which are oxygen-deficient.
- d. If the exposure concentrations are suspected of exceeding the canister limitations, only a self-contained breathing apparatus or a supplied-air mask shall be used.
- e. A gas mask user shall return to fresh air and replace the canister if:
 - (1). Any leakage is detected by smell and taste or by irritation of the eyes, nose or throat.
 - (2). High breathing resistance develops.
 - (3). Uncomfortable heat is noticed in the inhaled air or the canister becomes hot to the touch.
 - (4). A feeling of nausea, dizziness, or ill-being develops.
 - (5). The window indicator on the red type of canister changes color to indicate need for replacement.
- f. When the seal is removed from the bottom of a gas mask canister, the current date shall be entered in the space provided on the label on the canister.
- g. The canister shall be replaced when any one of the following three limits is reached:
 - (1). One year from date of seal removal
 - (2). Expiration date shown on canister
 - (3). When expended, as outlined in 3-e above

4. Hose mask with blower

- a. The hose mask with blower will provide respiratory protection in any atmosphere regardless of the degree of contamination or oxygen deficiency. Other protection may be required for the skin, depending on circumstances.

- b. Whenever a hose mask is used in an atmosphere immediately dangerous to life, a rope shall be attached to the harness and a standby man, or men shall be present in a safe location with suitable rescue equipment.
- c. The entire hose mask assembly including facepieces, harnesses, air hoses, blower and rescue ropes shall be stored in the portable trunks provided and maintained in a usable condition.
- d. Hose mask hoses shall have a minimum inside diameter of one inch, be highly resistant to petroleum vapors, withstand crushing weights, and not exceed 300 feet in length.
- e. Employees shall carefully consider the placement of the hose mask blower and assure that it is located outside any contaminated area.

5. Air-supplied hood

- a. The air-supplied hood is normally used where the user only requires protection against nuisance levels of materials or requires an air flow for cooling purposes.
- b. This equipment shall not be used in any situation where the user would be endangered by loss of air pressure.
- c. Intake of air supply shall be in clean air.

6. Air line respirator

- a. The air line respirator consists of a mask supplied with breathing air by either a compressor or large stationary cylinders.
- b. The air line respirator will provide protection in any atmosphere regardless of the degree of contamination or oxygen deficiency. Other protection may be required for the skin, depending on circumstances.
- c. Whenever an air line respirator is used in an atmosphere immediately dangerous to life, a rope shall be attached to the harness and a standby man or men shall be present in a safe location with suitable rescue equipment.
- d. Care must be exercised to prevent damage to the hose and regulator while in use, and the assembly shall be stored in such a way that damage will be avoided.

7. Cylinder type self-contained breathing apparatus

- a. This self-contained breathing apparatus utilizes compressed breathing air and will provide protection in any atmosphere regardless of contamination or oxygen deficiency. Other protection may be required for the skin, depending on circumstances.

- b. When anticipating the use of this apparatus, consideration shall be given to the service life of the cylinders. Although this equipment should provide breathing air for approximately 30 minutes, extreme exertion or emotional strain may reduce the rated time.
- c. Users of this equipment shall immediately begin exiting the hazardous atmosphere when the low pressure alarm sounds.
- d. Whenever compressed air apparatus is used in an atmosphere immediately dangerous to life, a lifeline shall be attached to the person using the apparatus and a standby man or men shall be present in a safe location with suitable rescue equipment.

8. Chemox self-contained breathing apparatus

- a. Since this equipment is an oxygen-generating, self-contained breathing apparatus, it will provide protection in any atmosphere regardless of contamination or oxygen deficiency. Other protection may be required for the skin, depending on circumstances.
- b. Extreme caution shall be exercised when using this apparatus in confined spaces, as a tear in the breathing bag will make the Chemox inoperable.
- c. Expended Chemox canisters shall be placed in areas free of oil, grease, or anything which might react with oxygen, as the canister may continue to generate oxygen.
- d. The Chemox assembly shall be stored in the portable trunk provided and maintained in a usable condition.
- e. Whenever a Chemox is used in an atmosphere immediately dangerous to life, a lifeline shall be attached to the person using the apparatus and a standby man or men shall be present in a safe location with suitable rescue equipment.

V. MAINTENANCE AND CARE OF RESPIRATORY PROTECTIVE EQUIPMENT

A. Inspection for defects

- 1. All respiratory protective equipment shall be inspected routinely before and after each use.
- 2. Breathing air cylinders shall be maintained at a minimum of 1500 pounds pressure except while being depleted during use. The regulator and any warning device shall be tested during inspections to determine if they function properly.

3. Inspection of equipment shall include a check of the tightness of connections and the condition of the facepieces, headbands, valves connecting tubes, canisters, hoses and regulators. Rubber or elastometer parts shall be inspected for pliability and signs of deterioration. (See Appendix E, Respiratory Protective Equipment Inspection Procedure.)
4. Equipment that is not routinely used but is kept ready for emergency use shall be inspected after each use and at least monthly by supervisors in departments to assure that it is in satisfactory working condition. The form shown in Appendix F, Emergency Respiratory Protective Equipment Monthly Inspection Report, shall be completed by each department, and a copy shall be forwarded to the Accident Prevention Division by the last day of each month. Accident Prevention Division personnel shall also make random inspections.

B. Cleaning of respiratory protective equipment

1. Masks issued for routine use by one person shall be cleaned and inspected by the wearer after each day's use.
2. Masks used by more than one person shall be returned to the Tool House for cleaning and disinfecting after each use.
3. Masks maintained for emergency use shall be returned to the Tool House for cleaning and disinfecting after each use.

C. Repair of respiratory protective equipment

1. Repairs shall be made only by authorized trained persons with parts designed for the equipment.
2. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations.
3. Reducing or admission valves or regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair.

D. Storage of respiratory protective equipment

1. Respiratory protective equipment shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture or damaging chemicals.
2. Respiratory protective equipment placed in work areas shall be stored in clearly marked compartments which are quickly accessible at all times.

3. Respiratory protective equipment shall be stored so that the face-piece and exhalation valve will rest in a normal position and function will not be impaired by the elastometer becoming set in an abnormal position.
4. Respiratory protective equipment shall not be stored in such places as lockers or tool boxes unless they are in carrying cases or cartons.

VI. To insure an effective respiratory protection program, Accident Prevention Division and Industrial Hygiene representatives will monitor and evaluate various operations to assure that respiratory protective equipment is properly selected, used, cleaned and maintained. Anyone desiring assistance with this procedure should contact the Accident Prevention Division.

Attachments: Appendices A through F

Gulf Oil Company - U.S.
Port Arthur Refinery
Accident Prevention Division

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Issued 2-4-76

RESPIRATORY PROTECTION REQUIREMENTS

11-2 - Appendix A
(page 1)

MATERIAL OR SUBSTANCE	TYPE OF RESPIRATORY PROTECTIVE EQUIPMENT TO BE WORN
Ammonia	Green canister gas mask. If odor is detected through canister, use self-contained breathing apparatus or supplied air.
Antiknock compounds	From 2 to 20 micrograms per cubic foot, use yellow canister gas mask. Above 20 micrograms per cubic foot, or whenever cleaning tanks, use self-contained breathing apparatus or supplied air.
Arsine	Self-contained breathing apparatus or supplied air.
Asbestos	Dust respirator
Benzene	Up to 200 ppm, use organic vapor cartridge respirator. Up to 14% LEL, use yellow canister gas mask. Above 14% LEL, use self-contained breathing apparatus or supplied air.
Carbon monoxide	Up to 3000 ppm in unconfined space, use red canister gas mask. Above 3000 ppm in unconfined space, use self-contained breathing apparatus or supplied air. In confined space, use self-contained breathing apparatus or supplied air.
Chlorine	Yellow canister gas mask. If odor is detected through canister, use self-contained breathing apparatus or supplied air.
Cumene	Same as benzene.
Cyclohexane	Same as benzene.
Dusts	Dust respirator.
Ethylene	Up to 14% LEL, use yellow canister gas mask. Above 14% LEL, use self-contained breathing apparatus or supplied air.
Furfural	Up to 14% LEL, use yellow canister gas mask. Above 14% LEL, use self-contained breathing apparatus or supplied air.
Gasoline	Up to 14% LEL, use yellow canister gas mask. Above 14% LEL, use self-contained breathing apparatus or supplied air.

RESPIRATORY PROTECTION REQUIREMENTS, Cont'd.

11-2 - Appendix A
(page 2)

MATERIAL OR SUBSTANCE	TYPE OF RESPIRATORY PROTECTIVE EQUIPMENT TO BE WORN
Hydrogen	Above 14% LEL, use self-contained breathing apparatus or supplied air.
Hydrogen cyanide	Self-contained breathing apparatus or supplied air.
Hydrogen fluoride	Supplied-air hoods available on HF Unit (refer to General Safety Procedure 11-41).
Hydrogen sulfide	Up to 14% LEL in unconfined space, use yellow canister gas mask. Above 14% LEL in unconfined space, use self-contained breathing apparatus or supplied air. In confined space, use self-contained breathing apparatus or supplied air.
Insecticides	Cartridge respirator for toxic insecticides.
Metal fumes	Fume cartridge respirator.
Naphtha	Up to 14% LEL, use yellow canister gas mask. Above 14% LEL, use self-contained breathing apparatus or supplied air.
Nickel carbonyl	Self-contained breathing apparatus or supplied air.
Oxygen deficiency	Self-contained breathing apparatus or supplied air. For severe oxygen deficiency, as in inert gas purging of vessels, special additional procedures will be established.
Phenol	Yellow canister gas mask. If odor is detected through canister, use self-contained breathing apparatus or supplied air.
Solvents, paint thinners, degreasers, similar products	Organic cartridge respirator. If odor is detected through cartridge, use yellow canister gas mask.
Sulfur dioxide	Acid gas cartridge respirator, yellow canister gas mask, or self-contained breathing apparatus or supplied air, as dictated by odor entering mask.
Toluene	Same as benzene.
Xylene	Same as benzene.

Front:

PA Form 10-20C	
<u>REQUEST FOR RESPIRATORY EQUIPMENT</u>	
Tool House:	Date _____
_____ is authorized to check out following respirator/cartridge/gas mask:	
_____ 7100 respirator (dust)	
_____ R-90N cart. (dust) - R-2000 or R-5000 respirator	
_____ R-51 " (Organic vapors) - R-5000 respirator	
_____ R-52 " (acid gases) - R-5000 respirator	
_____ R-53 " (organic and acid gases) - R-5000 or R-9000	
_____ R-166 " (dusts and fumes) - R-9000 respirator	
_____ R-563 " (organic, acid, dusts, fumes) - R-5000 or R-9000	
_____ R-56 " (dusts and fumes) - R-5000 respirator	
_____ R-58 " (toxic insecticides) - R-5000 respirator	
_____ Yellow canister gas mask	
_____ Green canister gas mask)	Expiration Date _____
_____ Red canister gas mask)	
_____ Supervisor	

Back:

Resp's.	7100 - Effective against nuisance and toxic dusts. R-2000- Requires an appropriate cartridge. R-5000- Requires two appropriate cartridges. R-9000- Belt-mounted. Requires two appropriate cartridges.
Cartridges	R-90N - Nuisance and toxic dusts. R-51 - Hydrocarbons. R-52 - Sulfur dioxide, etc. Do not use in hydrogen sulfide, hydrocyanic acid gas, or hydrogen fluoride. R-53 - See both R-51 and R-52. R-166 - Dusts and fumes, including metal fumes. R-563 - Organic vapors, acid gases, dusts, and fumes, including metal fumes. R-56 - Dusts and fumes, including metal fumes. R-58 - Toxic insecticides in dust, mist, spray, or vapor form.
Canisters	Yellow - Organic vapors and acid gases. Green - Ammonia. Red - Organic vapors, acid gases, carbon monoxide, ammonia, dusts, mists, fogs, smokes.

(Part 1)

GAS MASK CANISTER DESIGNATIONS

<u>Atmospheric Contaminants to be Protected Against</u>	<u>Bureau of Mines Type</u>	<u>ANSI K13.1-1967 Canister Color Code</u>
Acid gases	A	White
Acid gases and particulate matter	AE	White with gray stripe around canister near top
Organic vapors	B	Black
Organic vapors and particulate matter	BE	Black with gray stripe around canister near top
Acid gases and organic vapors	AB	Yellow
Acid gases, organic vapors, and particulate matter	ABE	Yellow with gray stripe around canister near top
Ammonia gas	C	Green
Ammonia gas and particulate matter	CE	Green with gray stripe around canister near top
Carbon monoxide	D	Blue
Acid gases, organic vapors, ammonia gas, carbon monoxide, and particulate matter	N	Red

(Part 2)

RESPIRATOR CHEMICAL CARTRIDGE DESIGNATIONS

<u>Atmospheric Contaminants to be Protected Against</u>	<u>Bureau of Mines Type</u>
Organic vapors	E
Organic vapors and particulate matter	BE

RESPIRATORY PROTECTIVE EQUIPMENT INSPECTION PROCEDURE

I. CANISTER GAS MASK

- A. If the canister seal is not broken, the expiration date shall be checked to assure it has not been exceeded. When the canister seal is broken, the date that it is placed in service shall be indicated on the canister label. Discard canisters one year after removing seals or sooner, if canister is expended or becomes outdated. Expired or expended canisters shall be returned to Tool House and replaced immediately.
- B. The breathing hose shall be stretched and examined closely for any breaks or holes. (Minor cracking in the hose surface between corrugations will not disqualify the hose for service.)
- C. The facepiece and head straps shall be pulled on with a firm tearing motion to be sure that the facepiece will not tear or the head straps break when they are put in use.
- D. Facepiece lenses shall be examined for evidence of chipping or cracking that may permit leakage. Damaged lenses shall be replaced.
- E. The exhalation valve at the bottom of the facepiece shall be examined to assure that it functions properly.
- F. The canister hose shall be securely attached to the facepiece and canister with a gasket in place.

II. CARTRIDGE OR FILTER RESPIRATORS

- A. The respirator shall be inspected as described in I-C and I-E.
- B. Cartridges or filters that are visibly ineffective due to an accumulation of foreign matter or that permit odors shall be replaced.

III. HOSE MASK WITH BLOWER

- A. The hose mask shall be inspected as described in I-B through I-E.
- B. Hose gaskets shall be inspected and replaced if defective.
- C. The blower's crank handle shall be turned to assure that the blower is operable and provides sufficient air.

- D. A rescue harness with "D" ring and enough 3/4-inch manila rope to equal the length of the blower hose shall be in the case and shall be examined for defects.

IV. AIR SUPPLIED HOOD

- A. The hood shall be inspected for cracks or holes.
- B. The air hose and fittings shall be in good condition.
- C. The lenses shall be examined for excessive pitting, scratches or other defects which would affect good vision.

V. AIR LINE RESPIRATOR

- A. This type of equipment shall be inspected as described in I-C through I-E.
- B. The air hose, hose connections, and regulator shall be in good condition.
- C. The harness shall be inspected for rips or other defects.

VI. CYLINDER TYPE SELF-CONTAINED BREATHING APPARATUS

- A. This type of equipment shall be inspected as described in I-B through I-E.
- B. Cylinders of stored units that do not have a minimum of 1500 pounds of pressure shall be taken to the Fire Station and exchanged for a full cylinder.
- C. The low pressure alarm shall be tested to assure that it functions properly.
- D. The harness shall be inspected for rips or other defects.

VII. CHEMOX SELF-CONTAINED BREATHING APPARATUS

- A. The Chemox assembly shall be inspected as described in I-B through I-E.
- B. The canister seals shall be examined to assure that they have not been broken.
- C. The breathing bags shall be examined for any breaks or tears.
- D. The signal bell shall be tested to assure that it functions properly.

Date _____

Monthly Inspection Report

[illegible]

Department Head

Under each type of equipment, indicate number on hand.

Fast insertion procedure. see appendix E of General Safety Procedure 11-2.

FIRE CONTROL /

P U 1342
FIRE CONTROL PLAN

1. Any person discovering a fire is responsible for reporting the fire. A card posted at the unit phone shows the procedure for reporting a fire:

The Method of Reporting a Fire on This Unit is:
Dial 2200 (Fire Protection Section)
Report: FIRE - Platforming Unit 1342 -
Section II
Indicate whether 1, 2, or 3 Alarm.

2. Fires on P U 1342 will be either oil, electrical, or trash fires.
3. In the event of a fire ON THE UNIT, the No. 1 Operator will be responsible for all fire fighting activity until relieved by the Unit Foreman, Shiftforeman, or the Fire Chief. The Inside Assistant Operator will remain in the Control Room. All other operators will report to the No. 1 Operator for duties.
4. In the event of a fire IN SECTION II, the man designated by the No. 1 Operator will go directly to the scene of the fire and report to the person in charge.
5. In the event of fires in OTHER FIRE SECTIONS, one assistant, designated by the No. 1 Operator, will go to the Cracking Department Shiftforeman's Office for transportation to the scene of the fire, when he hears the whistle at 15 BH or is notified by the Shiftforeman.
6. Attached are three plot plans of the unit showing location of:
- a. All fire control equipment and type.
 - b. Electrical switch gear and master switches.
 - c. Block valves on lines entering and leaving unit.

J. M. Cain

TBL:jdl: 8/1/73

Attachments

C: WDD ✓
RJW
Unit

CHEV B8 6478

AS IS JULY 1973

1342

LED NORTH

Booster
Compressors

Control Room

Pump Row

Towers

Access

PU 1342

Heaters

27TH STREET

CO₂

WATER FIRE HYDRANT

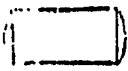
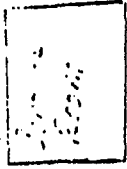
Foamite

Small Dry Chemical

LARGE Dry Chemical

28 TH STREET

CHAD LINE

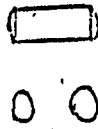


PRODUCT AND UTILITIES LINES

BOOMER CONDUITS

PRODUCT LINES

PUMPS



TOWERS

Access

AVE F

PU 1342

OR

OR

PH 401
HEATER

OR

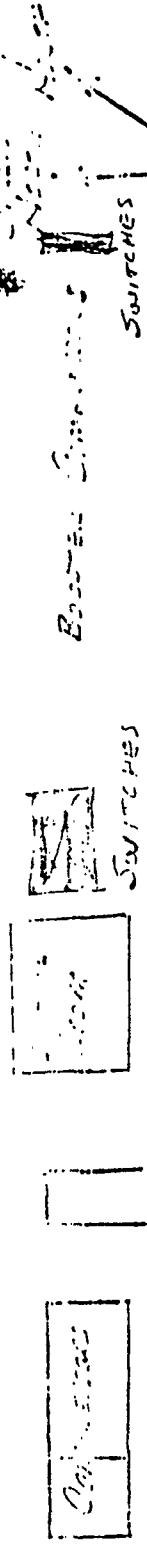
PH 500
HEATER

HEATERS

OR

LOCATION OF PRODUCT
AND UTILITY LINES
TO/FROM PU 1342

28 TH STREET



PUMPS

TOWERS

Access

AVE F

PU 1342

OR

OR

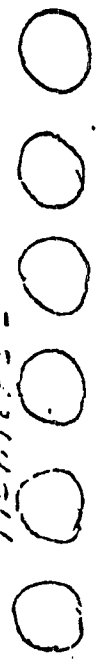
PH 401
HENTER

OR

OR

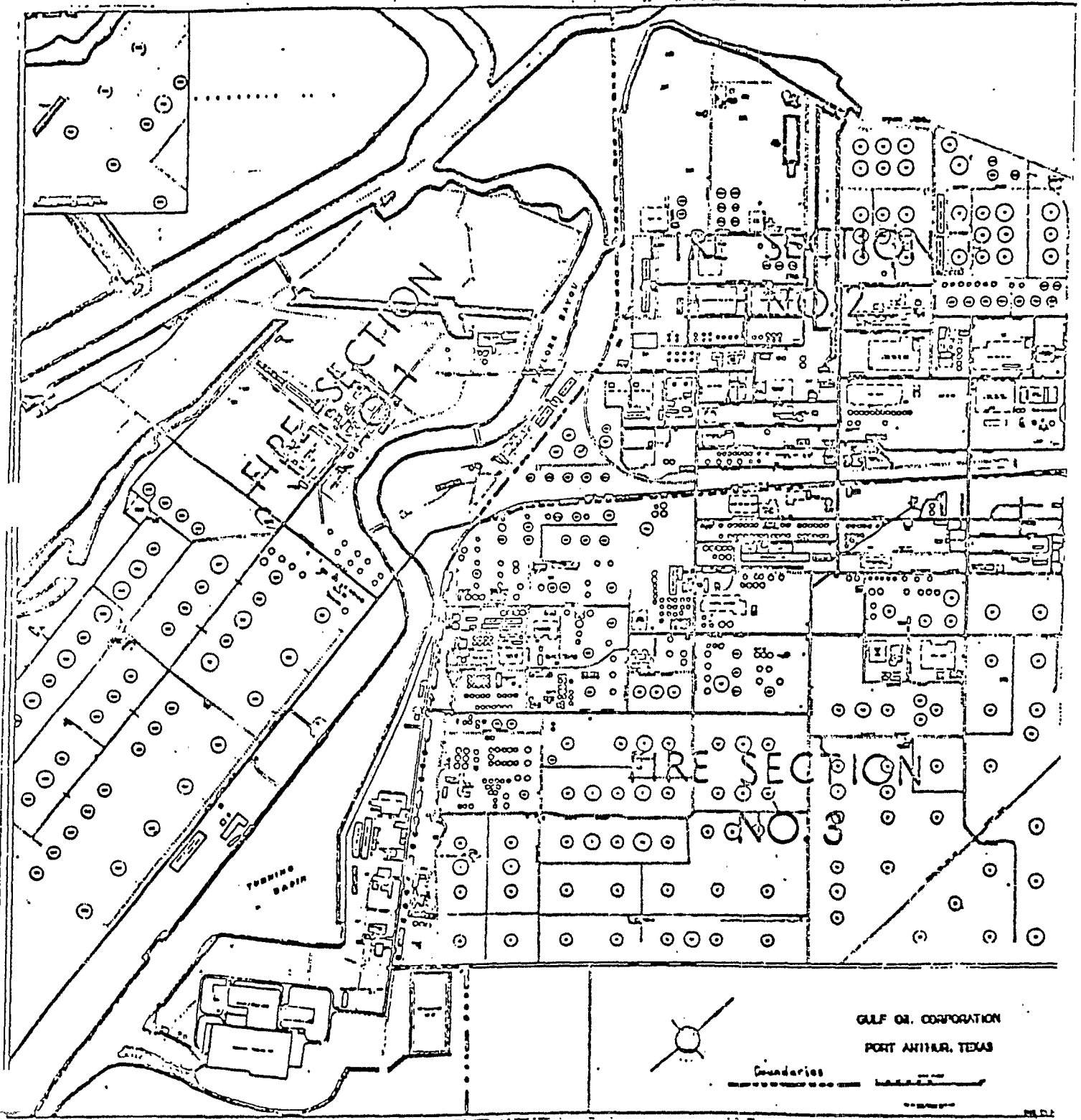
PH 400
HENTER

HENTERS



27 TH STREET

LOCATION OF ELECTRICAL
SWITCHES AT PU 1342



FIRE! PROTECTION



Gulf Oil Co. U.S.
Port Arthur Refinery

CHEV B8 6483

AMERICAN PETROLEUM

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DID YOU KNOW ?

1. THE LARGEST LOSS OF LIFE BY FIRE IN A SINGLE BUILDING OCCURRED IN CHICAGO, ILLINOIS ON DECEMBER 30, 1903, WHEN 602 PERSONS WERE KILLED IN THE NEW FIRE RESISTIVE IROQUOIS THEATRE.
2. THE LARGEST LOSS OF LIFE BY FIRE IN THE UNITED STATES OCCURRED ON OCTOBER 8, 1871. ISOLATED FIRES IN THE GREEN BAY AREA OF WISCONSIN ENTERED FOREST LAND AND SPREAD RAPIDLY OVER 1,280,000 ACRES. THE FIRE LEVELED PESHTIGO AND AT LEAST 16 OTHER TOWNS, AND CAUSED DEATHS CONSERVATIVELY ESTIMATED AT 1,152 (WITH SOME FIGURES AS HIGH AS 2,000).
3. THERE IS AN ANNUAL TOLL OF 12,000 DEATHS BY FIRE IN THE UNITED STATES ALONE. THE ANNUAL TOLL IN CANADA IS 600.
4. LOSS OF LIFE BY FIRE RANKS THIRD AMONG CAUSES OF ACCIDENTAL DEATH, BEING LED ONLY BY AUTO ACCIDENTS AND FALLS.
5. FROM 1950 TO 1965, THE POPULATION IN THE UNITED STATES INCREASED 28% AND THE ANNUAL DEATH RATE BY FIRE INCREASED 20%.
6. IN A STUDY FROM 1960 TO 1964, IT WAS FOUND THAT 17.6% OF FIRE DEATHS HAPPEN TO CHILDREN UNDER 5 YRS. OF AGE, 10% TO THE 5 TO 14 YEAR OLDS, 44.7% TO THOSE IN THE 15 TO 64 YEARS AGE BRACKET, AND 27.7% TO THOSE OVER AGE 65.
7. THE GREATEST CAUSE OF DEATH BY FIRE IS FROM GASES OR PRODUCTS OF COMBUSTION RESULTING IN ASPHYXIATION/OR ANOXIA (RESIDENTIAL DWELLINGS).
8. THE THREE MAIN FACTORS RESPONSIBLE FOR THE FAILURE OF PERSONS TO ESCAPE FROM FIRES ARE: (1) BEING ASLEEP, (2) BEING FELLED BY SMOKE OR HEAT, AND (3) TOO YOUNG.

9. THE TWO MAIN FACTORS RESPONSIBLE FOR THE SPREAD OF SMOKE AND FIRE RESULTING IN LOSS OF LIFE ARE: (1) OPEN STAIRWAYS, AND (2) COMBUSTABLE WALL FINISH.
10. THE MAJOR CAUSE OF CLOTHING IGNITION IS SMOKING.
11. CONSERVATIVE ESTIMATES INDICATE THAT AT LEAST 5,000 INJURIES, INCLUDING SEVERAL DEATHS AND 1,400 FIRES, ARE CAUSED BY FIREWORKS EACH YEAR.
12. THE LARGEST LOSS OF LIFE BY FIRE OCCURS IN (1) URBAN DWELLINGS, (2) RURAL DWELLINGS, (3) APARTMENTS, HOTELS, LODGINGS, DORMATORIES, ETC., AND (4) AIRCRAFT.
13. FROM 1961 TO 1966, THE AVERAGE ANNUAL DIRECT PROPERTY FIRE LOSS IN THE UNITED STATES AMOUNTED TO \$1,693,200,000.

REPORTING FIRES

A. RESPONSIBILITY

ANY PERSON DISCOVERING A FIRE IS RESPONSIBLE FOR REPORTING IT (FIRE DEPARTMENT EXTENSION 2200). THE FIRE PROTECTION SECTION MUST BE NOTIFIED OF ALL FIRES, REGARDLESS OF THEIR MAGNITUDE, SO THAT PRECAUTIONS MAY BE TAKEN TO ASSURE THAT THE FIRE IS BROUGHT UNDER CONTROL AND EXTINGUISHED, AND SO THAT THE FIRE CAN BE PROPERLY REPORTED.

B. DEFINITION OF ONE-, TWO-, AND THREE-ALARM FIRES

1. ONE ALARM FIRES

A ONE ALARM FIRE IS ONE WHICH WOULD CAUSE ONLY MINOR DAMAGE TO PROPERTY OR EQUIPMENT, NOT ENDANGER PERSONNEL, AND MAY BE CONTROLLED AND EXTINGUISHED WITH THE PERSONNEL AND EQUIPMENT AVAILABLE WITHIN THE UNIT.

2. TWO ALARM FIRES

A TWO ALARM FIRE IS ONE WHICH WOULD CAUSE MAJOR DAMAGE TO PROPERTY AND EQUIPMENT, ENDANGER THE LIVES OF SOME FEW PEOPLE, AND REQUIRE ADDITIONAL ASSISTANCE TO CONTROL AND EXTINGUISH..

3. THREE ALARM FIRE

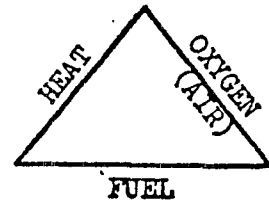
A THREE ALARM FIRE COULD CAUSE GRAVE DAMAGE TO PROPERTY AND EQUIPMENT, SERIOUSLY ENDANGER THE LIVES OF MANY PEOPLE, AND REQUIRE MAXIMUM ADDITIONAL ASSISTANCE AVAILABLE TO CONTROL AND EXTINGUISH. (THIS MAY INCLUDE COMMUNITY FACILITIES IN ADDITION TO REFINERY FIRE FIGHTING EQUIPMENT).

REMEMBER: REPORT FIRES TO EXTENSION 2200.

FIRE

THE CHEMISTRY OF FIRE

TO HAVE A FIRE, THREE ELEMENTS MUST BE BROUGHT TOGETHER IN BALANCE; FUEL, HEAT, AND OXYGEN. FIRE IS A CHEMICAL REACTION RESULTING FROM COMBINING A COMBUSTIBLE SUBSTANCE--FUEL; WITH OXYGEN AND HEAT. THIS IS CALLED THE FIRE TRIANGLE, IN OTHER WORDS, FUEL HEATED TO ITS IGNITION TEMPERATURE WITH A SUFFICIENT AMOUNT OF OXYGEN WILL ALWAYS RESULT IN FIRE. REMEMBER--IN ORDER TO BURN, ALL FUELS MUST BE IN A GAS OR VAPOR FORM.

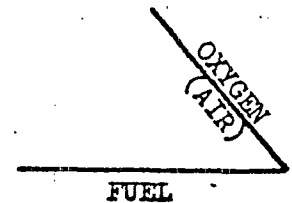


PRINCIPLES OF EXTINGUISHMENT

THE FIRE GOES OUT IF ANY ONE OF THE THREE SIDES OF THE FIRE TRIANGLE IS REMOVED. THIS IS THE BASIS OF FIRE EXTINGUISHMENT.

HEAT CAN BE TAKEN AWAY BY COOLING OR QUENCHING, AND THIS IS DONE BY APPLYING SOMETHING THAT WILL ABSORB THE HEAT. WATER IS AN EFFICIENT COOLER OR QUENCHER OF FIRE, AND IS USED MORE THAN ANY OTHER AGENT FOR COOLING FIRES. IT IS APPLIED IN THE FORM OF A SOLID STREAM, FINELY DIVIDED SPRAY OR FOG, OR USED IN FOAM.

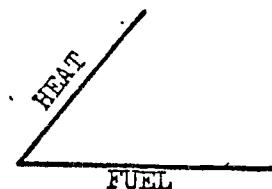
FUEL CAN SOMETIMES BE REMOVED FROM A FIRE, BUT THIS IS USUALLY DIFFICULT OR DANGEROUS. WE CAN PUMP OIL FROM AN INVOLVED TANK OR VESSEL TO REMOVE AS MUCH FUEL AS POSSIBLE



OR IF FLOWING LIQUIDS OR GASES ARE BURNING FROM A LEAK IN A PIPE, IF A VALVE CAN BE CLOSED THE FIRE WILL GO OUT. WHEN FUEL IS REMOVED FROM A FIRE, WE STARVE IT.

THE FUEL LEG OF THE TRIANGLE IS VERY IMPORTANT IN FIRE PREVENTION. IT IS EASY TO REMOVE FUEL TO PREVENT FIRES. WE DO THIS BY PRACTICING GOOD HOUSEKEEPING AT HOME AND ON THE JOB. ALL UNNECESSARY FUELS SHOULD BE PROMPTLY REMOVED FROM OUR WORK AREAS. AT HOME; ATTICS, CLOSETS, GARAGES, ETC. SHOULD BE AS FREE OF UNNECESSARY FUELS AS POSSIBLE. GRASS SHOULD BE CUT AND REMOVED FROM AROUND BUILDINGS. A MINIMUM OF FLAMMABLE LIQUIDS SHOULD BE KEPT, AND THEY SHOULD BE STORED IN APPROVED STORAGE CANS, AWAY FROM ALL SOURCES OF IGNITION. FLAMMABLE LIQUIDS SHOULD NEVER BE USED FOR CLEANING PURPOSES.

OXYGEN IS TAKEN AWAY FROM A FIRE BY COVERING IT WITH A WET BLANKET, CHEMICAL OR MECHANICAL FOAM, PLACING A LID ON A SKILLET OR POT, CLOSING THE HATCH ON A TANK OR VESSEL, ETC. OXYGEN IS DISPLACED OR DISPERSED BY ADDING AN INERT GAS THAT IS HEAVIER THAN AIR INTO THE BURNING VAPORS. CARBON DIOXIDE (CO_2) IS MOST WIDELY USED FOR THIS PURPOSE. WHEN WE EXTINGUISH A FIRE BY REMOVING THE OXYGEN, WE HAVE SMOTHERED IT.



CAUSES OF FIRES

MOST FIRES (70% to 80%) COULD HAVE BEEN PREVENTED. CARELESSNESS OR THE MISUSE OF FUELS IS THE CAUSE OF MANY FIRES, BUT BASICALLY, FIRES ARE STARTED BY A SOURCE OF HEAT OCCURRING IN AN UNWORKED, UNPLANNED AREA. IN INDUSTRY THE SOURCE OF HEAT IN THE MAJORITY OF FIRES CAN BE TRACED TO THE FOLLOWING CAUSES:

1. OPEN FLAMES OR HIGH TEMPERATURES - HEATERS, WELDING AND BURNING, FLARES, HEATED PIPES AND SURFACES.
2. FRICTION - HOT BEARINGS AND SEALS.
3. ELECTRICITY - DEFECTIVE WIRING, SPARKS, HEAT RESISTANCE, STATIC ELECTRICITY.
4. CHEMICAL REACTIONS - SPONTANEOUS IGNITION, OXIDIZING AGENTS, USE OF REAGENTS AND ACIDS.

IN HOMES, THE MAJOR CAUSES OF FIRE ARE:

1. SMOKING AND MATCHES.
2. HEATING DEFECTS.
3. MISUSE OF ELECTRICITY.
4. KITCHEN HAZARDS.
5. MISUSE OF FLAMMABLE LIQUIDS.

CLASSIFICATION OF FIRES

FIRES HAVE BEEN DIVIDED INTO THREE CLASSES TO INDICATE THE NATURE OF THE FUELS INVOLVED.

CLASS A - THIS CLASS OF FIRE OCCURS IN ORDINARY COMBUSTABLE MATERIALS SUCH AS WOOD, PAPER, TEXTILES, RUBBISH, ETC. THE QUENCHING AND COOLING EFFECT OF WATER OR SOLUTIONS CONTAINING LARGE PERCENTAGES OF WATER (FOAM) IS MOST EFFECTIVE. THIS REDUCES THE TEMPERATURE OF THE BURNING MATERIAL TO BELOW ITS VAPORIZATION POINT.

CLASS B - THIS CLASS OF FIRE OCCURS IN VAPOR AND AIR MIXTURE OVER THE SURFACE OF FLAMMABLE LIQUIDS, SUCH AS GASOLINE, SOLVENTS, PAINTS, LUBRICATING OILS, AND GREASES. A SMOTHERING OR BLANKETING EFFECT IS NECESSARY TO EXTINGUISH THIS CLASS OF FIRE.

FOAM, DRY CHEMICAL AND CARBON DIOXIDE (CO_2) ARE USED TO EXTINGUISH

CLASS B FIRES. WATER SPRAY OR FOG CAN BE USED ON HEAVY OILS DEPENDING ON THE CIRCUMSTANCES. STEAM IS AN EXCELLENT AGENT TO PREVENT AS WELL AS EXTINGUISH SMALL UNIT FIRES.

CLASS C - THESE ARE FIRES INVOLVING ELECTRICAL EQUIPMENT SUCH AS MOTORS, GENERATORS, ELECTRICAL APPLIANCES, SWITCH PANELS, ETC., AND FIRES IN THE PROXIMITY OF ELECTRICAL DISTRIBUTION LINES. NON-CONDUCTING EXTINGUISHING AGENTS MUST BE USED FOR THIS CLASS FIRE. DRY CHEMICAL OR CARBON DIOXIDE EXTINGUISHERS ARE NON-CONDUCTORS AND ARE SAFE TO USE ON ELECTRICAL FIRES. FOAM AND WATER TYPE EXTINGUISHERS, AND STREAMS SHOULD NOT BE USED. THEY CONDUCT ELECTRICITY AND THEIR USE COULD RESULT IN INJURY. FUEL IN A CLASS C FIRE COULD BE EITHER A OR E OR A COMBINATION OF BOTH WITH THE ADDED PROBLEM OF ENERGIZED ELECTRICAL WIRING OR EQUIPMENT, PRESENTING A SHOCK HAZARD.

FIRE EXTINGUISHERS

MOST FIRES START SMALL ENOUGH TO BE EXTINGUISHED WITH FIRE EXTINGUISHERS. FOR THIS REASON, EACH EMPLOYEE SHOULD BE THOROUGHLY FAMILIAR WITH THE LOCATION AND PROPER OPERATION OF ALL FIRE EQUIPMENT IN THEIR WORK AREA. FIRE EXTINGUISHERS ARE DESIGNED FOR SMALL FIRES AND MUST BE USED CLOSE TO THE BURNING MATERIAL. DON'T EXPECT FIRE EXTINGUISHERS TO TAKE THE PLACE OF EQUIPMENT DESIGNED FOR LARGE FIRES. THEREFORE, BE CERTAIN THAT ALL FIRES ARE PROMPTLY AND CORRECTLY REPORTED TO THE FIRE STATION - EXTENSION-2200.

HAND FIRE EXTINGUISHERS
IN USE IN THE REFINERY

EXTINGUISHING AGENT	EXTINGUISHER TYPE AND/OR SIZE	CLASS OF FIRE BEST USED ON
WATER	2½ GALLON (PRESSURIZED)	A
DRY CHEMICAL	20 POUNDS OF DRY CHEMICAL (CO ₂ CARTRIDGE) 20 POUNDS OF DRY CHEMICAL (N ₂ -PRESSURIZED) 30 POUNDS OF DRY CHEMICAL (CO ₂ CARTRIDGE) 150 POUNDS OF DRY CHEMICAL (WHEELED) 350 POUNDS OF DRY CHEMICAL (WHEELED)	B - C B - C B - C B - C B - C
CARBON DIOXIDE	5 POUNDS OF CO ₂ 15 POUNDS OF CO ₂ 20 POUNDS OF CO ₂ 50 POUNDS OF CO ₂	B - C B - C B - C B - C
FOAM	40 GALLON (WHEELED)	A - B

THE LETTERS REFER TO THE CLASS OF FIRES ON WHICH THE USE OF THE PARTICULAR EXTINGUISHER IS APPROVED FOR MOST EFFECTIVE FIRE EXTINGUISHMENT.

CARBON DIOXIDE AND DRY CHEMICAL TYPE EXTINGUISHER MAY BE USED ON CLASS A FIRES BUT ARE NOT AS EFFECTIVE AS ON OTHER CLASSES OF FIRES.

FIRE EXTINGUISHER FACTS

TYPE OF EXTINGUISHER	FOR WHAT KIND OF FIRE	CONTENTS	HOW TO OPERATE	HOW THEY EXTINGUISH
PRESSURIZED WATER	CLASS "A" (WOOD, PAPER, TEXTILES, ETC.)	PLAIN WATER AIR PRESSURIZED	PULL PIN SQUEEZE HANDLE (KEEP UPRIGHT)	REDUCE TEMPERATURE BY COOLING AND QUENCHING *DANGER - DO NOT USE ON CLASS "C" FIRES (ELECTRICAL)
DRY CHEMICAL (CARTRIDGE OPERATED)	CLASS "B"- "C" (OIL AND ELECTRICAL) IF NOTHING ELSE IS AVAILABLE, THESE EXTINGUISHERS MAY HAVE SOME EFFECT ON CLASS "A" FIRES	BICARBONATE OF SODA - CO ₂ CARTRIDGE	REMOVE HOSE PUSH PLUNGER SQUEEZE NOZZLE	SMOTHERS BY DISPLACING OR DILUTING FLAMMABLE VAPORS
DRY CHEMICAL (PRESSURIZED)		BICARBONATE OF SODA PRESSURIZED NITROGEN	LIFT LEVER HOLD NOZZLE SQUEEZE HANDLE	
CARBON DIOXIDE		CARBON DIOXIDE	PULL PIN SQUEEZE HANDLE	
FOAM	CLASS "A"- "B" FIRES (OIL, GASOLINE, PAINT, GREASE, ETC.)	WATER SOLUTION OR ALUMINUM SULFATE AND BICARBONATE OF SODA	OPEN VALVE ON HEAD AND TURN OVER	SMOTHERS BY BLANKETING ALSO COOLS

WATER EXTINGUISHERS
(PRESSURIZED)

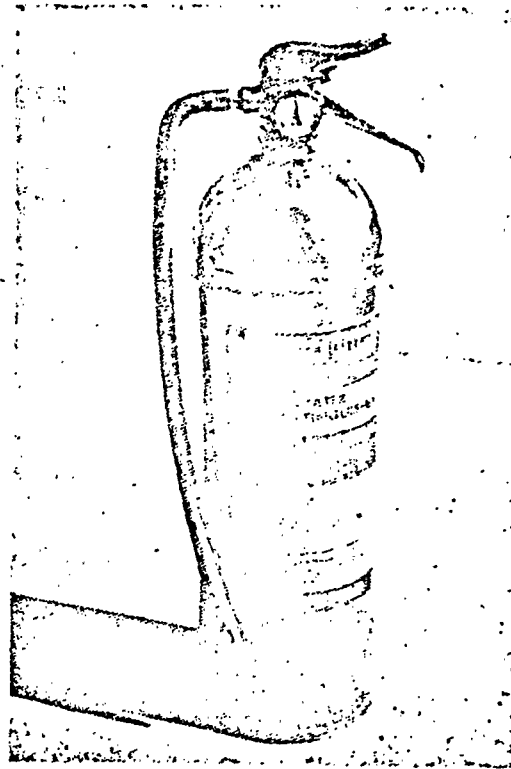
TO OPERATE :

1. KEEP IN UPRIGHT POSITION.
2. PULL LOCKING PIN.
3. SQUEEZE HANDLE TO RELEASE WATER.
4. DIRECT WATER AT BASE OF FLAME.
5. GET EXTINGUISHER RECHARGED AS SOON AS POSSIBLE.

EFFECTIVENESS

1. EFFECTIVE ON SMALL FIRES IN WOOD, PAPER, TEXTILES, AND RUBBISH,
2. MAY BE USED TO COOL HOT WOOD OR METAL.
3. IS NOT EFFECTIVE ON PETROLEUM TYPE FIRES..

NOTE: CONDUCTS ELECTRICITY - DANGEROUS TO USE ON LIVE ELECTRICAL EQUIPMENT.



THE EFFECTIVENESS OF WATER LIES IN ITS ABILITY TO COOL AND TO PENETRATE. THUS TO COOL A FIRE, SOME SUBSTANCE MUST BE PROVIDED WHICH WILL ABSORB HEAT TO BRING THE BURNING MATERIAL TO A POINT BELOW ITS IGNITION TEMPERATURE. THIS WILL EXTINGUISH THE FIRE. WATER, WHICH IS A GOOD HEAT ABSORBER, IS MOST COMMONLY USED FOR THIS PURPOSE. IF COOLING TO PREVENT RE-IGNITION IS NECESSARY. WATER CAN BE USED VERY EFFECTIVELY (ON NON-ELECTRICAL FIRES) IN CONJUNCTION WITH CO₂ OR DRY CHEMICAL.

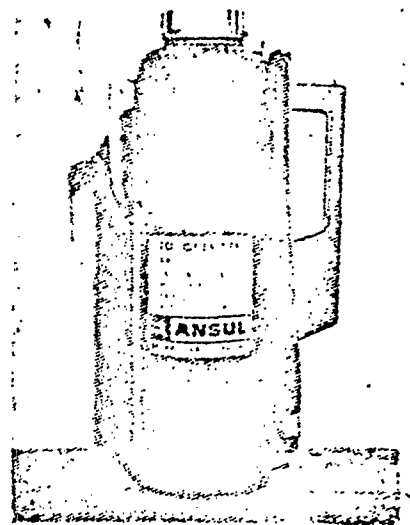
DRY CHEMICAL EXTINGUISHERS

THE EFFECTIVENESS OF DRY CHEMICAL IS IN ITS ABILITY TO INTERRUPT THE CHAIN-REACTION OF OXIDATION AND NEARLY INSTANTLY SUPPRESS FLAME. A CLOUD OF DRY CHEMICAL IS SIMILAR TO A FLAME ARRESTOR IN THAT A FLAME CANNOT PASS THROUGH A CLOUD OF PARTICLES WHEN IN PROPER CONCENTRATION, AND CONVERSELY WHEN A CLOUD OF PARTICLES IS PRODUCED WHERE THE COMBUSTION REACTION IS PROCEEDING, EXTINGUISHMENT TAKES PLACE.

TO OPERATE:

CARTRIDGE TYPE:

1. REMOVE HOSE AND PUSH ON LEVER TO PUNCTURE CO₂ CARTRIDGE.
2. SQUEEZE HANDLE ON HOSE NOZZLE TO RELEASE POWDER.
3. DIRECT POWDER AT BASE OF FLAMES WITH SIDE-TO-SIDE MOTION.
4. GET EXTINGUISHER RECHARGED AS SOON AS POSSIBLE.



CARTRIDGE TYPE



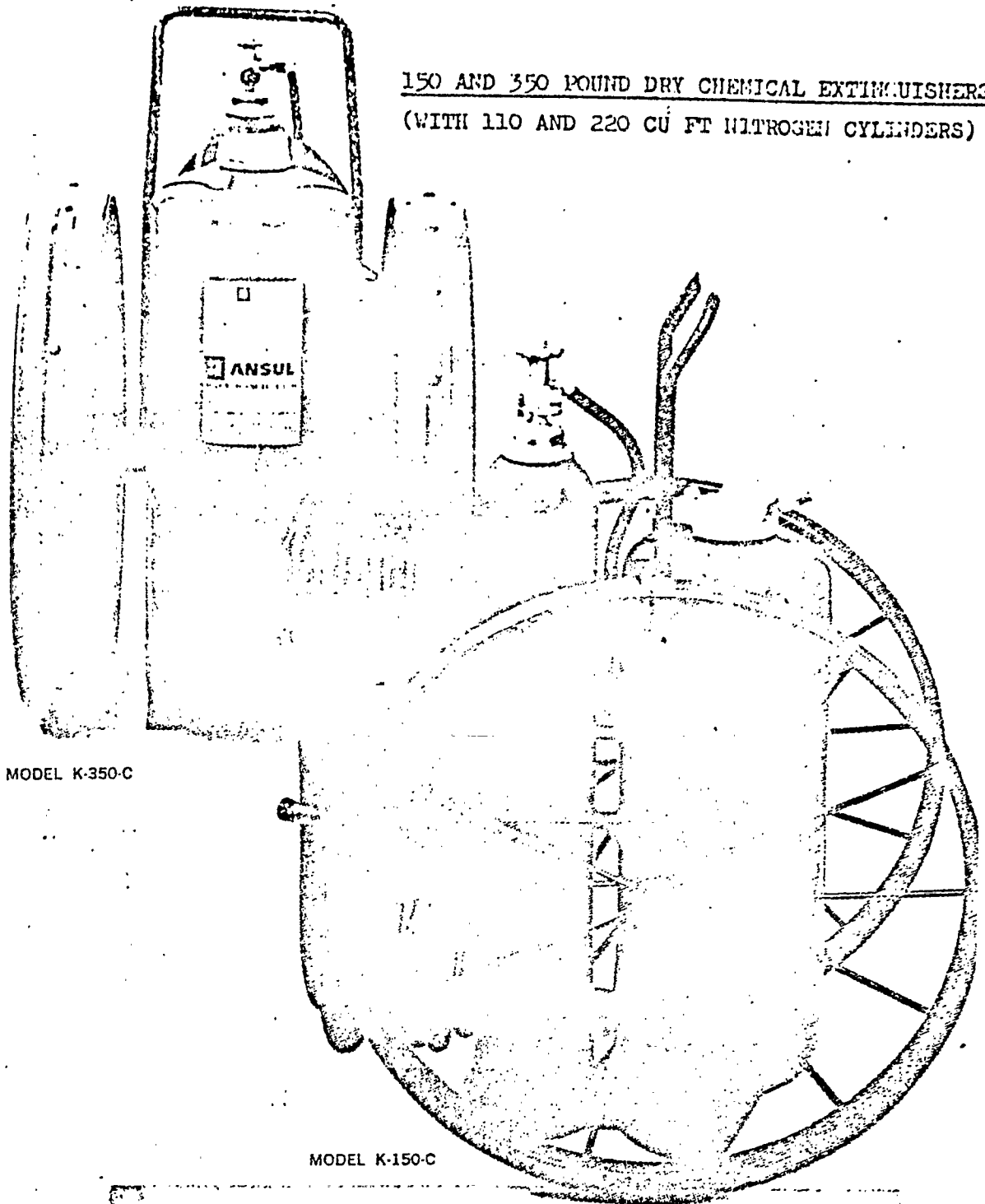
PRESSURIZED
TYPE

PRESSURIZED TYPE:

1. LIFT LOCKING LEVER.
2. SQUEEZE HANDLE TO RELEASE POWDER.
3. DIRECT POWDER AT BASE OF FLAMES WITH SIDE-TO-SIDE MOTION.
4. GET EXTINGUISHER RECHARGED AS SOON AS POSSIBLE.

NOTE: WHEN OPERATING, KEEP BOTH TYPES OF DRY CHEMICAL EXTINGUISHERS IN AN UPRIGHT POSITION.

150 AND 350 POUND DRY CHEMICAL EXTINGUISHERS
(WITH 110 AND 220 CU FT NITROGEN CYLINDERS)



TO OPERATE:

1. KEEP EXTINGUISHER UPRIGHT.
2. OPEN CYLINDER VALVE.
3. PULL OUT HOSE AND OPEN NOZZLE.
4. DIRECT STREAM AT BASE OF FLAME WITH A SIDE-TO-SIDE MOTION.
5. GET EXTINGUISHER RECHARGED AS SOON AS POSSIBLE.

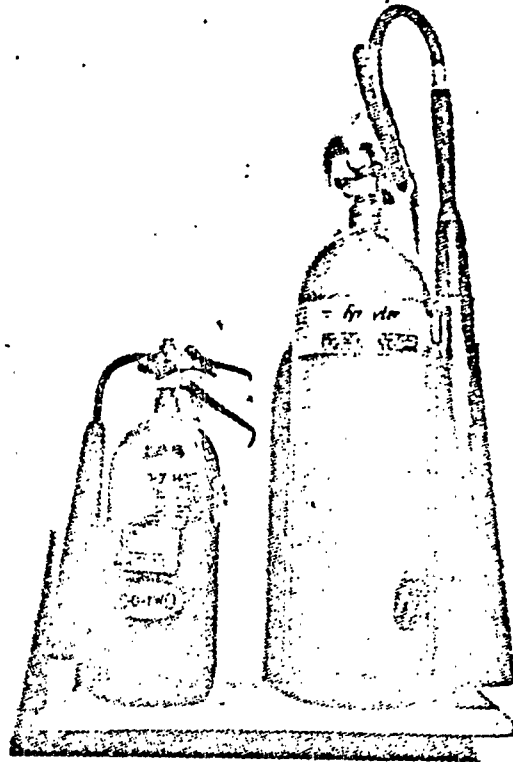
CARBON DIOXIDE EXTINGUISHERS

TO OPERATE:

1. PULL PIN.
2. SQUEEZE HANDLE TO RELEASE GAS.
3. DIRECT GAS AT BASE OF FLAME (RANGE IS VERY LIMITED, SO DISCHARGE MUST BE CLOSE TO FLAME).
4. GET EXTINGUISHER RECHARGED AS SOON AS POSSIBLE.

EFFECTIVENESS:

1. ALL TYPES OF HYDROCARBON FIRES.
2. EXCELLENT EXTINGUISHER FOR ELECTRICAL FIRES (IS A NON-CONDUCTOR OF ELECTRICITY).
3. LEAST EFFECTIVE ON WOOD, PAPER, ETC.



THE EFFECTIVENESS OF CARBON DIOXIDE LIES IN ITS ABILITY TO BLANKET A FIRE WITH A NON-COMBUSTABLE ATMOSPHERE, AND THUS SMOTHER THE FIRE BY EXCLUSION OF THE OXYGEN REQUIRED FOR COMBUSTION. IT ALSO HAS SOME COOLING EFFECT, BUT THIS IS OF MINOR IMPORTANCE. IF COOLING TO PREVENT RE-IGNITION IS NECESSARY, WATER SHOULD BE USED IN CONJUNCTION WITH CO_2 . WATER AND CO_2 WORK VERY WELL TOGETHER.

THIS GAS IS DRY, CLEAN, AND HARMLESS TO EQUIPMENT AND UNBURNED MATERIALS, THUS LIMITING DAMAGE TO THAT DONE BY THE FIRE ITSELF. CARBON DIOXIDE GAS WILL NOT CONDUCT ELECTRICITY. IT IS THEREFORE IDEALLY SUITED FOR USE AROUND EQUIPMENT IN CONGESTED AREAS OR ELECTRICAL EQUIPMENT.

OPERATION C

PREFRACTIONATOR SYSTEM - PU-1342

Section III-A

Purpose:

The Prefractionator is used to prepare Hydrobon Reactor charge from the straight run gasoline which is charged to the unit. Desirable charge should contain a minimum of pentane and lighter. The lighter material is not harmful to the process, but does take up unit capacity which is more profitably used to reform the heavier gasoline fraction. Also, the prefractionator will remove overhead any hydrogen sulfide (H_2S), oxygen, water and ammonia which may be in the straight run gasoline charged to the unit.

Operation:

Straight run gasoline from various crude still depentanizers is charged to PU 1342 from either tank No. 2588 or No. 2590. Pump House No. 163, Bulk Oil Department, maintains the charge tank inventory. The straight run gasoline charge is picked up at PU 1342 by P-400A Prefractionator Charge Pump (Spared by P-400B) and sent through the charge filters PV-409, 410, and 411 in parallel flow. The charge filter elements are made of paper which will filter out any particles greater than 5 microns (0.0013 inches) in diameter. Over a period of time, due to the build up of particles on the paper elements, a pressure drop is created across the filters. When this pressure drop approaches 15 pounds per square inch (i.e. 15 psi), the charge filters are by-passed, steamed out and washed with water, and new elements are installed (11 double elements/filter).

After the charge filters, the straight run gasoline is split into two streams. Each stream passes through a charge regulator (FRC-277 or FRC-278) which is set to maintain the desirable charge rate to the Prefractionator tower. After the charge regulators, each stream is sent through the shell side of an exchanger (E-400A or E-400B) where the Prefractionator charge (straight run gasoline) gains heat liberated by the Platformer Reactor effluent stream flowing through the tube side of the exchangers.

Following the preheat exchangers, the streams combine and the single stream is charged normally to the 16th tray of the Prefractionator Tower. An alternate inlet on the 27th tray is normally not used. The Prefractionator Tower is a distillation column in which lighter fractions of the unit charge

REFRACTIONATOR SYSTEM-PU 1342 Section III-A - Continued

are "boiled" overhead through the addition of heat. Heat is added to the bottom of the Prefractionator Tower by means of a "reboiler circuit" which passes through two fired furnaces. The reboiler circuit begins at a draw off on the bottom of the Prefractionator tower. This draw off provides the suction to the Prefractionator Reboiler pump P-2A (Spared by P-2B). After the discharge of P-2A, the reboiler circuit splits into two streams. One stream goes through the vertical Prefractionator Reboiler Heater, PH-602. This stream splits into four passes before PH-602. The flow in each pass is controlled by either FRC-640, FRC-639, FRC-638 or FRC-31. This reboiler heater has four burners with pilots. The amount of firing gas to these burners is controlled by the level (LR-14) in the Prefractionator Tower. Firing gas control valve, FRC-30, is automatically reset to provide more gas, thus more heat, as the level in the Prefractionator Tower rises, or less gas as the tower level falls.

The other stream in the reboiler circuit is sent through the upper portion (convection section) of PH-400 heater to recover heat which would otherwise be wasted out through the stacks. There are four passes through the convection section of PH-400 heater. Each pass has a flow control valve (FRC-151, FRC-152, FRC-153 or FRC-154) to maintain a constant and evenly distributed flow through the convection section. The hot streams coming from the convection section of PH-400 and from PH-602 are combined and sent to the flash section (space between bottom tray and bottom of tower) of the Prefractionator Tower. The lighter fractions will go up the tower and come out in the overhead stream.

The overhead vapor stream is sent through four water condensers E-1A-1&2 and E-1B-1&2 to condense these vapors. After the condensers, the overhead stream goes to the Prefractionator Reflux Accumulator, PV-2. That lighter portion which does not condense, (oxygen, H₂S and some water vapor) can be taken off as a gas from the top of the accumulator through PRC-38 control valve. This wet gas is sent to the gas plant GCU 7944. In this operation the amount of gas being vented through PRC-38 controls the pressure on the top of the Prefractionator Tower. The liquid in the accumulator is used as reflux, pumped by P-1A (spared by P-1B), to the top of the Prefractionator Reflux, controlled by FRC-49, is used to control the top temperature on the tower and also as an absorption oil flowing down the tower to keep heavier fractions in the bottom of the tower. The liquid which is not used as reflux from the accumulator is sent out as Prefractionator overhead product, pumped by P-10A (spared by P-10B), to Benzene unit charge or to the Gasoline Treating

PREFRACTIONATOR SYSTEM-FU 1342 Section III-A - Continued

Plant at 97 Pump House. The amount of Prefractionator overhead product is reset by a level controller which maintains a set level in the accumulator. If the level starts rising, the level controller opens control valve FRC-52 so that more overhead product will leave the accumulator, and closes the control valve if the level starts falling.

An alternate operation on the Prefractionator Reflux Accumulator is to run with a liquid full, or "flooded", accumulator. In this operation the pressure control is switched from PRC-38 to FRC-52. The liquid which is not used as reflux is still sent out as Prefractionator overhead product through FRC-52. However, with the level controller taken out of service, and a liquid full receiver, as the pressure on the Prefractionator Tower increases, the pressure controller will open FRC-52 to allow more overhead product to be pulled thus lowering the pressure back to normal. In this operation the lighter non-condensing-fractions will remain in solution and eventually go out with Prefractionator overhead product.

The Prefractionator bottoms that are not used in the reboiler circuit is the stream which will eventually be charged to the Platformer Reactors. However, this stream contains some compounds which would be harmful to the Platformer Reactor catalyst. For this reason, the Prefractionator bottoms are pumped with P-3 (spared by P-8B) through a Hydrobon Reactor system which is covered in the next section of this manual.

Miscellaneous:

1. Because of corrosion problems in the Prefractionator overhead condensers (E-1A-1&2 and E-1B-1&2), we use two methods of insuring minimum corrosion effects. First, there is a continuous injection of a corrosion inhibitor, Cronox-601, into the Prefractionator Overhead stream before the overhead condensers. This inhibitor greatly reduces the deposit of corrosion promoting compounds on the tubes of the condensers. A second method of preventing corrosive compounds from building up concentrations is to periodically water wash the shell side of the condensers by injecting water, with P-4 pump, into the overhead stream ahead of the condensers. This water settles out in the overhead accumulator water-boot and is drawn to the sewer.
2. During start-up and in the event of an emergency, the Prefractionator bottoms stream can be directed straight to the field back to the unit

PREFRACTIONATOR SYSTEM-PU 1342 Section IIIA - Continued

- charge tank. This is done through FRC-3 control valve and by lining up back to the tank at the product manifold. The stream will be cooled by the E-3A&B coolers ahead of FRC-3 before being sent to the charge tank.
3. The start-up circulation system flow is controlled by MCV-1 (Manual Control Valve) on the circulation stream flowing to the Prefractionator Overhead Accumulator. The entire start-up system is covered in a separate section.
 4. When running the Prefractionator Tower with a wet gas product stream controlling the tower pressure, there are times when there is not enough light gas in the Prefractionator charge to maintain the tower pressure. During this operation, therefore, a small amount of natural gas is added to the Prefractionator O.H. Accumulator to aid in giving good control on the tower pressure.

RWL:mkw:10-8-75

Sample Questions

REFRACTIONATOR SYSTEM

1. Where does charge come into unit?
2. What pump picks up the unit charge? P400A Prefractionator chg. pump
3. Where is pressure transmitter on suction to the charge pump?
4. What does a change in the suction pressure to the charge pump indicate?
5. What pump is the spare to the charge pump? P400B
6. What happens if both suction valves to the spare charge pump are open or leaking?
7. How do you by-pass the charge filters?
8. How do you pumpout the charge filters?
9. How do you wash the charge filters?
10. How do you put charge filters back in service?
11. What does differential pressure across the charge filters indicate?
12. Where is differential pressure gage located?
13. When should charge filter be by-passed?
14. Why and where is charge to prefractionator split?
15. Where are control valves for charge to prefractionator?
16. Where are flow indicators (D/P cells and orifices) for prefractionator charge located?
17. When and why do you vary flow to prefractionator?
18. Where and what product heats charge to prefractionator?
19. Where does charge enter prefractionator?
20. Is there a check valve in prefractionator charge line? No
21. Where is gas added to prefractionator?
22. Why is gas added to prefractionator?
23. When do you vary amount of gas to prefractionator?
24. How is pressure controlled on prefractionator?
25. Do you add an inhibitor to prefractionator overhead? If so, what is the inhibitor and how is it added.
26. Where are the overhead condensers for the prefractionator?
27. How do you know if prefractionator overhead condensers are leaking.

FU 1342 PREFRACTIONATOR

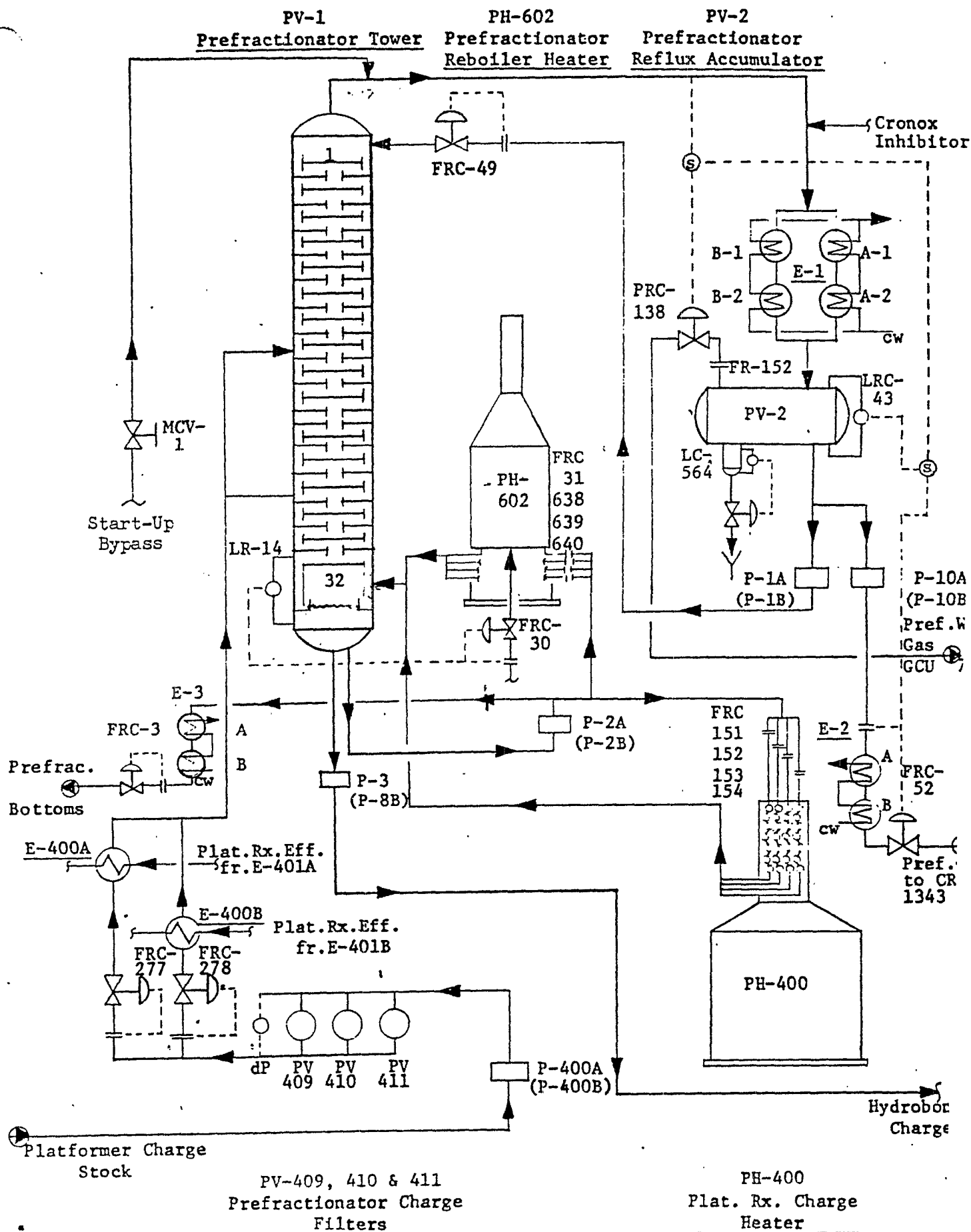
28. Where is prefractionator reflux accumulator (Overhead Receiver)?
29. How do you draw water from receiver?
30. How do you wash prefractionator overhead condensers?
31. Where is prefractionator reflux pump?
32. Where is reflux regulator and flow meter?
33. How do you control reflux rate to prefractionator?
34. How do you control level in reflux accumulator?
35. How do you check level in reflux accumulator?
36. What is normal level in reflux accumulator?
37. Where is control valve and flow meter for prefractionator liquid overhead product?
38. Where is liquid overhead from prefractionator pumped to?
39. What pump pumps liquid overhead product?
40. Where is overhead pump located?
41. Where does overhead gas go?
42. Where are overhead gas meter and flow control?
43. What pressure do we normally maintain on the prefractionator?
44. Where are safeties located on prefractionator? How many?
45. What pressure do the safeties pop on the prefractionator?
46. How is heat put into tower?
47. How is level controlled in bottom of tower?
48. What controls gas flow to prefractionator reboiler heater (PH-602)?
49. Where is control valve and flow meter for prefractionator reboiler heater?
50. How many passes on prefractionator reboiler heater? 4
51. Where are control valves and flow meters for reboiler heater located?
52. What other heater (besides PH-602) supplies heat for prefractionator?
53. How many passes in convection section of PH-400 heater?
54. Where are control valves and flow meters for PH-400 heater convection section?
55. What is meant by convection section?
56. What pump circulates oil thru the heater? p-2 A

PU 1342 PREFRACTIONATOR

57. Where does reboiler circulation return to the tower?
58. Is there a check valve at the tower on reboiler circulation?
59. What pump other than the reboiler pump takes suction from the prefractionator bottoms? Where is this oil pumped?
60. What pump spares prefractionator reboiler pump (P-2A)?
61. What happens if both suction valves are open to P-2B pump?
62. What pump spares hydrobon charge pump P-3?
63. What happens if both suction valves are open to P-8B?
64. When do we take some prefractionator bottoms directly to the field?
65. Where are control valve and flow meter on prefractionator bottoms?
66. How can you tell if prefractionator bottoms cooler is leaking?
67. How do you maintain temperature on tower? Where are the temperature sensing points? When do you change the overhead temperature?
68. How much reflux do we add to tower? When would you change amount of reflux?
69. What level can control amount of liquid overhead we produce?
70. What controls amount of liquid bottoms we produce?
71. When do we put some prefractionator bottoms to charge tank? How do we control this amount?
72. What alarms are on this tower and its overhead receiver? When do you check these alarms? How do you check these alarms?
73. What happens if you get a vacuum on this tower? How can you prevent a vacuum?
74. How is prefractionator tower pressure controlled using "flooded" overhead accumulator?

RWL:mkw:10-14-75

PU-1342
PREFRACTIONATOR SYSTEM



~~HYPERION~~

HYDROBON SYSTEM

Section III - B

The Hydrobon Section is designed to treat low quality straight run gasoline for production of superior quality platforming charge stock. The Hydrobon Process is a fixed bed hydrogenation process employing UOP S-6 catalyst and a hydrogen rich recycle stream. In the Hydrobon Reactor, a mixture of recycle gas and prefractionator bottoms is passed over the catalyst. Here contaminants such as sulfur and nitrogen are converted to the easily removed forms of hydrogen sulfide and ammonia. Also, olefins are saturated and oxygen compounds decomposed.

X The prefractionator bottoms picks up heat from the Hydrobon Reactor effluent in the E-5 heat exchangers. The preheated bottoms then goes through the four passes of Hydrobon Charge Heater PH-1, then through the four passes of Hydrobon Charger Heater PH-2. Approximately one half of the hydrogen rich recycle stream is split before E-4 heat exchanger. One half mixes with the prefractionator bottoms after FRC-76 and before the E-5 heat exchangers. The other half picks up heat from the Hydrobon Reactor effluent in E-4 heat exchanger before it mixes with the Hydrobon Reactor charge from PH-2 Heater. Splitting the hydrogen allows the heater not to be fired as hard. This mixed stream then enters the top of the Hydrobon Reactor PV-3.

The reaction in the Hydrobon Reactor is usually slightly endothermic; that is, it consumes heat. This is shown by a small temperature decrease from the inlet reactor temperature to outlet reactor temperature.

After the reactor, the effluent first gives up heat to the hydrogen recycle stream in E-4 heat exchanger, then to the Hydrobon Reactor charge in the E-5 heat exchanger and finally to the Hydrobon Stripper charge in the E-6 heat exchangers. The effluent is then further cooled with cooling tower water in the E-7 effluent condensers.

The cooled reactor effluent is then separated into a gas stream rich in hydrogen and a liquid stream in PV-4 Hydrobon Products Separator. The gas stream goes to other process units via booster compressors C-401 and C-500 A, B, and C. The liquid stream is pressured to PV-5 Hydrobon Flash Drum, where hydrogen and other light ends (methane, ethane, etc.) are flashed off and sent to fuel. The liquid off the Flash Drum is pumped by P-5 pump through E-6 heat exchangers where it picks up heat from the Hydrobon Reactor effluent, then to PV-6 Hydrobon Stripper Tower.

In the Stripper, the hydrogen sulfide and ammonia are stripped out of the heavier oil and carried overhead along with light hydrocarbons as a vapor. The heavier fractions in the overhead vapor are condensed in E-8 condensers, accumulated in PV-7 Hydrobon Stripper Reflux Accumulator and pumped back to the tower as reflux by P-6 pump. The non-condensed gasses (hydrogen sulfide, ammonia and light hydrocarbons) are sent to the gas plant. Pump P-7 takes suction on the bottom of PV-6 and pumps the oil through the four passes of PH-3 Hydrobon Stripper Reboiler Heater, where approximately 50% of the oil is vaporized and returned to the bottom section of the tower. Also taking suction at the bottom of the tower is pump P-8, which pumps stripper bottoms to Platformer Reactor Charge. This charge should contain less than one (1) ppm sulfur and one (1) ppm nitrogen.

The results from the Hydrobon System are a much more suitable charge stock for the subsequent platforming operation with little or no volume yield loss.

The following is the control instrumentation used in Hydrobon Section:

- 1) Platformer Charge - controlled FRC's 250, 251, 259, and 260. FRC's 258 and 556 can be used to by-pass platformer charge around the effluent exchangers E-402A and E-402B. The quantity of oil charged to the Platformer is determined by the quantity of straight run gasoline stock available to the unit. The total Platformer Reactor charge is recorded on FR-671. This flow will remain constant until orders are given to raise or lower Platformer Reactor Charge. When the charge is raised or lowered, an equal amount should be raised or lowered on FRC's 250, 251, 259, and 260.
- 2) Hydrobon Charge - controlled by FRC-76. The quantity of oil charged to the Hydrobon is directly related to the amount of oil charged to the Platformer. If Platformer Charge is raised, a proportional amount of Hydrobon Charge is raised. This instrument is also used to hold the level in PV-6 Hydrobon Stripper. When the level begins to fall in the Stripper, the pen on FRC-76 is raised slightly and vice versa.
- 3) Hydrobon Reactor Inlet Temperature - controlled by TRC-62 working in cascade with FRC-61, fuel gas to PH-2 Hydrobon Charge Heater. To raise the reactor inlet temperature, the pointer on TRC-62 is raised. The fuel gas to the heater is therefore increased through FRC-61 regulator.
- 4) Fuel Gas to PH-1 Hydrobon Charge Heater - controlled by FRC-415. This flow usually remains constant. The flow is set to balance the heat load between PH-1 and PH-2.

(3)

- 5) Hydrobon Products Separator Pressure - controlled by PRC-97, which senses and records the pressure of the separator. If the pressure is below the set point, an air signal is sent to the regulator to close, allowing less gas to the Booster Compressor System. FR-98 records the gas flow from the separator.
- 6) Hydrobon Products Separator Level - controlled by LRC-100 working in cascade with FRC-101 liquid to Hydrobon Flash Drum. The level is set by the instrument man. LRC-100 sends an air signal to FRC-101 to either increase or decrease as needed the flow of liquid from the Separator to the Flash Drum.
- 7) Hydrobon Flash Drum Pressure - controlled by PRC-103, which senses and records the pressure of the Flash Drum. If the pressure is above the set point, an air signal is sent to the regulator to open allowing more gas to the Product Gas Drum. FR-104 records the gas flow from the separator.
- 8) Hydrobon Flash Drum Level - controlled LRC-106 working in cascade with FRC-110, Hydrobon Stripper Charge. The level is set by the instrument man. LRC-106 sends an air signal to FRC-110 to either increase or decrease as needed the flow of liquid from the Flash Drum to the Stripper.
- 9) Emergency By-Pass Around Hydrobon Flash Drum - it is actuated by a high level in the Flash Drum. It protects the Platformer Reactor Charge Pump P-8A from losing suction due to a low level in the Hydrobon Stripper. If pump P-5, Stripper Charge Pump were to kick off, the level could be lost in the Hydrobon Stripper before the pump could be put back in service due to the Hydrobon Stripper being a small tower. Since the Hydrobon Products Separator operates at a higher pressure than the Hydrobon Stripper, the liquid from the Hydrobon Products Separator can be by-passed around the Flash Drum and pressured directly to the stripper. When a high level exists, an electrical signal is automatically sent to the by-pass regulator for it to open and for FRC-110 to close. LRC-100 then controls the amount of charge to the stripper.
- 10) Hydrobon Stripper Receiver Level - controlled by LRC-137 working in cascade with FRC-129, Hydrobon Stripper Reflux, to hold a preset level. The Hydrobon Stripper operates with total reflux; that is, all the liquid accumulated in the receiver is returned to the tower as reflux. The LRC sends an air signal to FRC-129 to either increase or decrease as needed the flow of reflux.

- 11) Hydrobon Stripper Reflux - the amount of reflux should be held at 3.5 - 4.0 divisions on FRC-129. To increase or decrease this quantity, FRC-128, fuel gas to PH-3 heater is varied. To increase the amount of reflux, the amount of fuel gas to the heater is increased.
- 12) Hydrobon Stripper Pressure - controlled by PRC-135. The pressure is controlled by regulating the amount of Stripper Gas going to the Gas Plant. When the pressure begins to build, more gas is let off the Hydrobon Stripper Reflux Accumulator and vice versa. The amount of gas leaving is recorded by FR-134.
- 13) Cronox 601 Injection - Because of corrosion problems in the Stripper Overhead Condensers (E-8A&B), a continuous injection of Cronox 601 corrosion inhibitor is injected into the Stripper Overhead stream before the condensers. This inhibitor greatly reduces the deposit of corrosion promoting compounds on the tubes of the condensers. This inhibitor is injected from V-8 Corrosion Inhibitor Tank by P-9 Corrosion Inhibitor Injection Pump. To vary the amount injected the stroke of the pump is either shortened or lengthened.

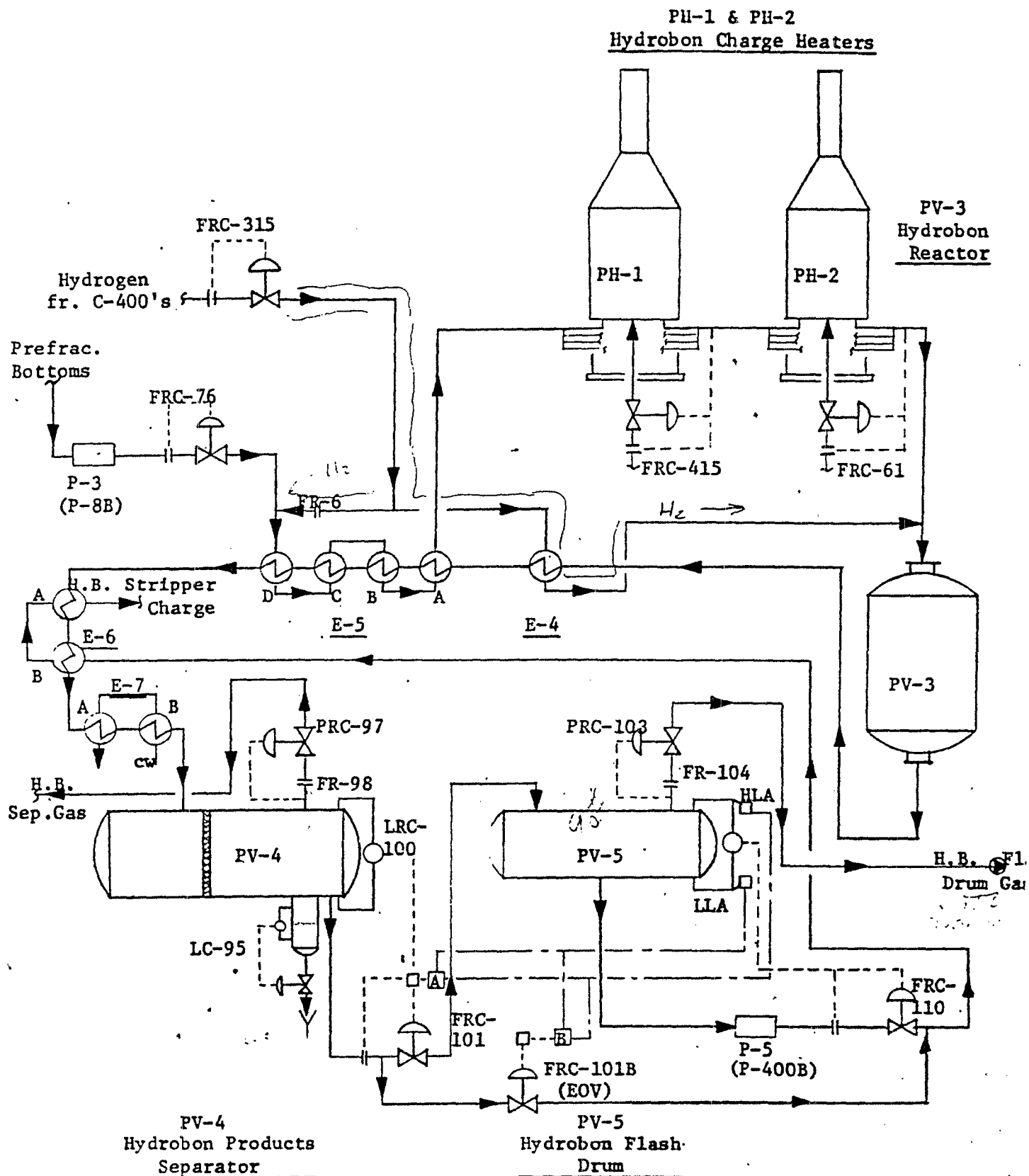
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QUESTIONS - Hydrobon Section

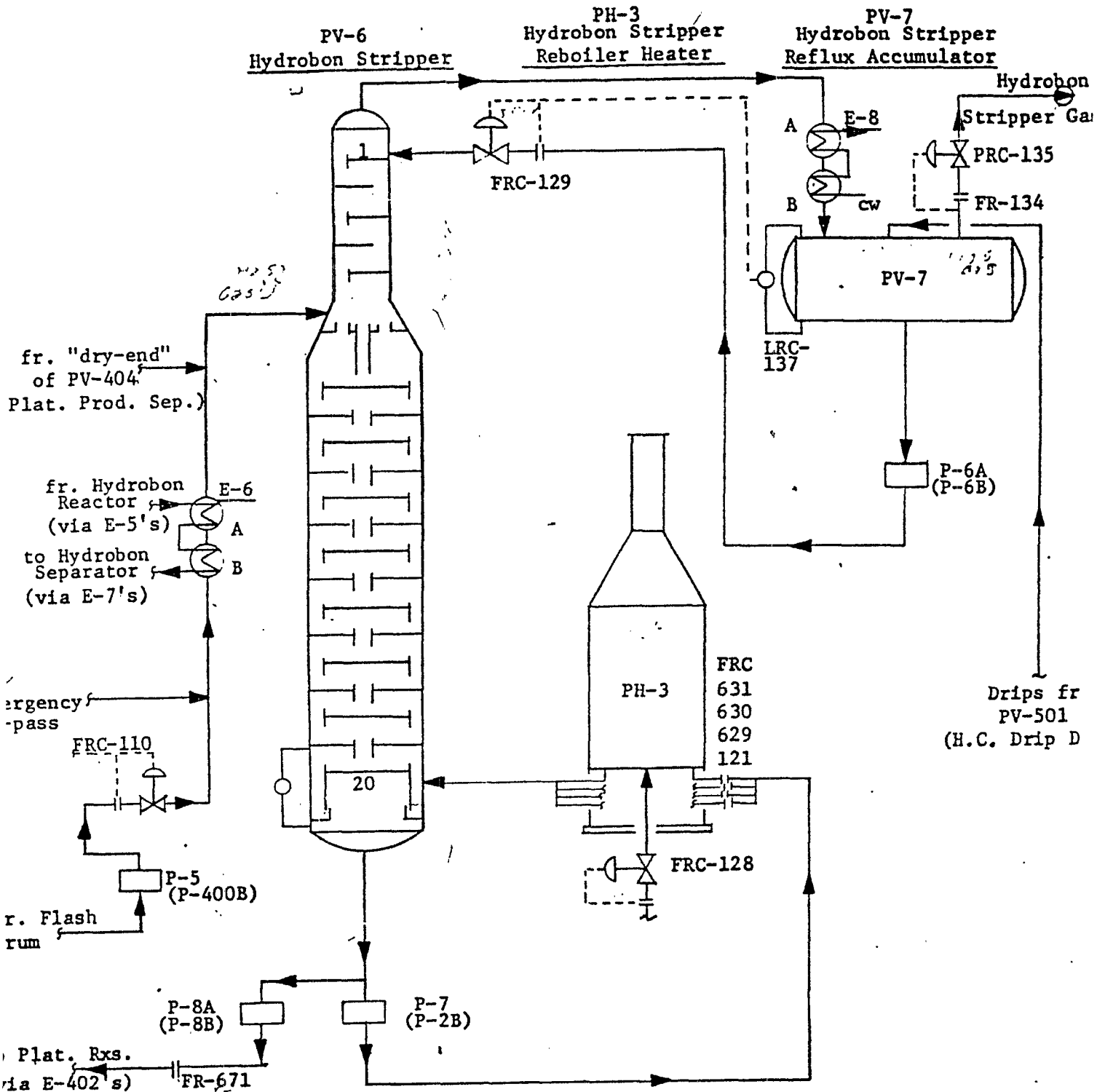
1. What is the purpose of the Hydrobon Reactor? How does it work?
2. What is the purpose of the Hydrobon Products Separator?
3. What is the purpose of the Hydrobon Flash Drum?
4. What is the purpose of the Hydrobon Stripper?
5. Which heater supplies heat to the Hydrobon Stripper? Where located?
6. Which heaters supply heat to the Hydrobon Reactor? Where located?
7. What is the maximum amount of sulfur allowed in Platformer Charge? Nitrogen?
8. What determines the amount of Platformer Charge?
9. What determines the amount of Hydrobon Charge?
10. How is the Hydrobon Stripper Level controlled?
11. How is the Hydrobon Reactor inlet temperature controlled?
12. How is the Hydrobon Products Separator pressure controlled?
13. How is the Hydrobon Products Separator level controlled?
14. How is the Hydrobon Flash Drum pressure controlled?
15. How is the Hydrobon Flash Drum level controlled?
16. What is the purpose of the emergency by-pass? How does it work?
17. How is the Hydrobon Stripper Receiver level controlled?
18. How is the Hydrobon Stripper reflux controlled? How much is needed?
19. How is the Hydrobon Stripper pressure controlled?
20. What is the normal distribution of the Hydrobon Products Separator?
21. What is the disposition of the Hydrobon Stripper Gas?
22. What is the disposition of the Hydrobon Flash Drum Gas?

LTS:cjm 1-28-76

PU-1342
HYDROBON REACTOR SYSTEM



PU-1342
HYDROBON STRIPPER SYSTEM



RWL
10-13-75

PLATFORMING SECTION
SECTION III-C

The Platforming Section is a catalytic reforming process employing U O P R-11 catalyst and a hydrogen rich recycle stream to convert straight run gasoline into a high octane motor fuel.

Four main reactions take place in the reactors: dehydrogenation or aromatization, hydrocracking, isomerization, and cyclization. Dehydrogenation removes hydrogen atoms from naphthenes to form aromatics. The reaction is endothermic, that is it consumes heat. It is a relatively fast reaction which results in a slight overall volume shrinkage. Large temperature drops across the first reactor; high hydrogen production per barrel of charge plus high hydrogen purity indicates good aromatization.

Hydrocracking consumes hydrogen in the breakup of a paraffin molecule into smaller paraffin molecules. The reaction is exothermic, that is, it creates heat. Decreasing temperature drop across the last reactor, increased Depropanizer and Debutanizer overhead production per barrel of reactor charge, decreased Debutanizer bottom product yield, or decreased separator gas hydrogen content, generally indicates an increase in the hydrocracking reaction. If the hydrocracking reaction becomes too severe an excessive amount of coke is deposited on the catalyst. When coke is deposited on the catalyst, higher reactor temperatures are required to obtain the same octane as before the coking, and the percent hydrogen in the recycle gas decreases.

The isomerization reaction is one in which the hydrocarbon formula remains the same but the shape of the hydrocarbon molecule changes. The reaction products are subject to further reaction to form aromatics and smaller paraffins. Isomerization reactions are mildly exothermic but the heat created is insignificant when compared to hydrocracking.

Cyclization converts paraffins into naphthenes with the production of some hydrogen. This reaction is endothermic. Dehydrogenation of the naphthenes to aromatics follows the cyclization reaction.

The Hydrobon Stripper bottoms splits into four passes with each pass being combined with the hydrogen rich recycle stream. The combined streams then pick up heat from the Platformer Reactor Effluent in E-402-A and E-402-B. After the combined stream exists the E-402's, water and propylene dichloride are injected. The water injection serves two purposes: (1) It washes away chloride to prevent an excessive amount of chloride buildup on the catalyst, and

It forms acid sites with the chloride on the catalyst which promote the reactions. The addition of chloride promotes the hydrocracking reaction. Too much chloride injection promotes an excessive amount of hydrocracking which tends to increase coke deposits on the catalyst.

The combined streams then enter the four passes of PH-400 Charge Heater where the oil is vaporized before entering the top of PV-400 Reactor. The majority of the hydrogenation occurs in this reactor. This is shown by a large temperature drop. The effluent from the first reactor enters the four passes of the number one coil of PH-401 Intermediate Heater before entering the top of PV-401 Reactor. The reaction in this reactor is also endothermic but to a lesser degree. The effluent from the second reactor enters the four passes of the number two coil of PH-401 Intermediate Heater before entering the top of PV-402 Reactor. In the third reactor the primary reaction is hydrocracking, but there is also enough dehydrogenation to make the total reaction slightly endothermic.

The effluent from the third reactor gives up heat to the reactor charge in the E-402's, then to the hydrogen rich recycle stream in the E-401's and finally to the Prefractionator charge in the E-400's. The reactor effluent is then cooled with cooling tower water in the E-403's.

In PV-404 Reactor Products Separator the cooled reactor effluent is separated into a liquid stream and a gas stream rich in hydrogen. The major portion of the gas stream is recycled back to the Platformer Reactors and to the Hydrobon Reactor by compressors C-400 A and B. Normally the liquid stream is pressured to PV-600 Depropanizer. During start-up and shutdown Depropanizer Charge Pump P-401 is put in service.

The following is the control instrumentation used on the Platforming Section.

- 1) First Reactor Inlet Temperature - Controlled by TRC-155, TRC-156, TRC-157 and TRC-158 working in cascade with FRC-186, FRC-185, FRC-188 and FRC-187 fuel gas to PH-400 Heater. These TRC's control the outlet temperatures of the four passes in PH-400 Heater. To raise the inlet temperature, the pens on each of these instruments are raised an equal amount. An air signal is then sent to the FRC's to open allowing a greater amount of fuel gas to be burned in the heater; thus, the reactor inlet temperature is raised.
- 2) Second Reactor Inlet Temperature - Controlled by TRC-218 working in cascade with FRC-232 fuel gas to coil 1 of PH-401 Heater. To raise the inlet temperature the

PLATFORMING SECTION-Continued

pen on this TRC is raised. An air signal is then sent to the FRC to open allowing a greater amount of fuel gas to be burned in the heater; thus, the reactor inlet temperature is raised.

- 3) Third Reactor Inlet Temperature - Controlled by TRC-220 working in cascade with FRC-233 fuel gas to coil 2 of PH-401 Heater. To raise the inlet temperature, the pen on this instrument is raised. An air signal is then sent to the FRC to open allowing a greater amount of fuel gas to be burned in the heater; thus, the reactor inlet temperature is raised.
- 4) Chloride Injection - Raised or lowered by adjusting the stroke on the North end of P-404 pump.
- 5) Water Injection - Raised or lowered by adjusting the stroke on the South end of P-404 pump.
- 6) Pentanes from PU 1343 - This quantity is controlled by PU 1343. It is recorded at PU 1342 by FR-205.
- 7) Recycle Hydrogen to Platformer Reactors - Controlled by the speed of compressors C-400A and C-400B. To increase the flow, the compressors' speeds are increased. This quantity is recorded by FR-273.
- 8) Reactor Products Separator Level - Controlled by LRC-295 working in cascade with FRC-300, separator liquid to Depropanizer PV-600. LRC-295 holds a preset level by sending an air signal to FRC-300 to either increase or decrease as needed the flow of liquid from the separator.
- 9) Reactor Separator Pressure - Controlled by PRC-298. This PRC regulates the amount of hydrogen going to PV-500 Hydrogen Filters. When the pressure is low, less hydrogen leaves the separator and vice versa. This flow is recorded on FR-299.

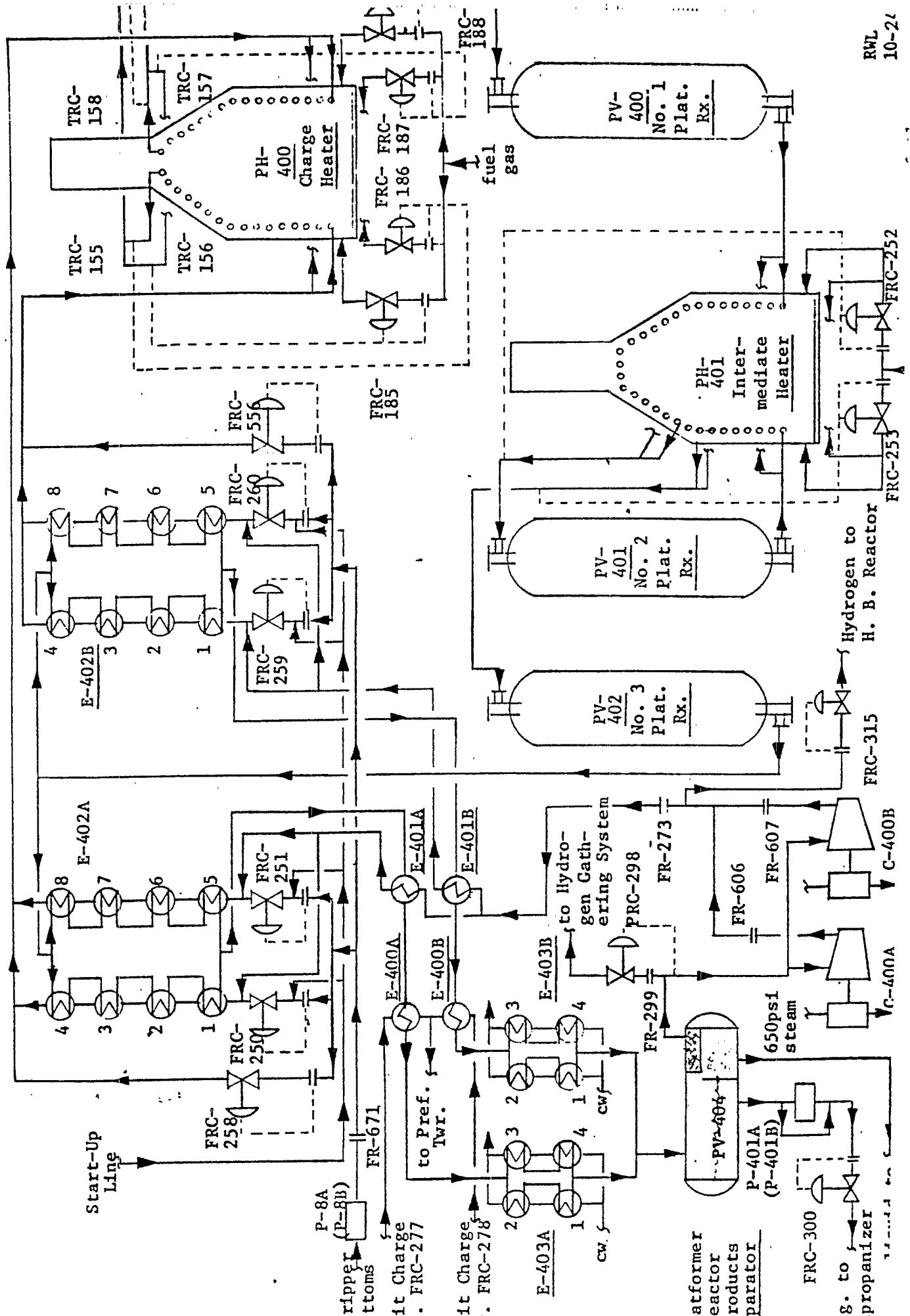
LTS:oj:4-2-76

PLATFORMING SECTION

1. What is the purpose of the Platforming Section?
2. What catalyst is used?
3. What is an endothermic reaction?
4. What is an exothermic reaction?
5. Which type reaction is dehydrogenation?
6. Which type reaction is hydrocracking?
7. What are the characteristics of dehydrogenation?
8. What are the characteristics of hydrocracking?
9. What can happen if the hydrocracking reaction becomes too severe?
10. What effect does coke deposited on the catalyst have on the operation of the unit?
11. What is the purpose of water injection? How is it controlled?
12. What is the purpose of chloride injection? How is it controlled?
13. Which heater supplies heat to No. 1 Reactor? Where is it located?
14. Which heater supplies heat to No. 2 Reactor? Where is it located?
15. Which heater supplies heat to No. 3 Reactor? Where is it located?
16. What is the purpose of the Reactor Products Separator? Where is it located?
17. How are the reactor inlet temperatures controlled on No. 1 Reactor?
No. 2 Reactor? No. 3 Reactor?
18. How is the Reactor Products Separator pressure controlled?
19. How is the level in the Reactor Products Separator controlled?
20. How is the quantity of recycle hydrogen to Platformer Reactors controlled?

LTS:oj:4-2-76

PLATFORMER REACTOR SYSTEM



DEPROPANTIZER

DEPROPANIZER PV-600

The purpose of the Depropanizer is to remove overhead the propane and lighter gases from the catalytic reformat charge from PV-404 Reactor Products Separator.

Reboiling heat is supplied by convection section coils of PH-401 heater, plus vertical tube Depropanizer Reboiler, PH-600. Heater PH-600 is exclusively in Depropanizer reboiler service and furnishes the trim heating for control of the 27th tray temperature.

The Depropanizer bottoms are partially cooled by cold feed to the Depropanizer in the E-600 exchangers and pressured to PV-604 Debutanizer as feed.

Vapors from the tower overhead are condensed in the E-601 condensers. The net propane and light gas stream are separated from the reflux liquid in PV-601 Depropanizer Receiver. The Depropanizer operates with total reflux; that is, all the liquid accumulated in the receiver is returned to the tower by pump P-603. The net overhead is a gas and is normally sent to the Ethylene Units as charge stock, but it can also be routed to fuel. To be suitable for Ethylene Unit charge, the 5% point of the boilaway should be between -25°F and -15°F.

The following is the control instrumentation used on the Depropanizer Tower:

- 1) Depropanizer Level - Controlled by LRC-337 working in cascade with FRC-342, Depropanizer Bottoms to Debutanizer. This instrument works automatically to hold a preset level. An air signal is sent from LRC-337 to FRC-342 to increase or decrease as needed the amount of Depropanizer bottoms to Debutanizer Feed.
- 2) Depropanizer Receiver Level - Controlled by LC-353. LC-353 controls the regulator on the hot vapor by-pass line around the E-601 overhead condensers. To increase the level in the receiver LC-353 sends an air signal to the regulator to close. As a result of this a greater amount of vapor is sent through the E-601 overhead condensers where it is condensed to a liquid; thus the receiver level increases.

DEPROPANIZER PV-600 - Continued

- 3) Depropanizer Overhead Temperature - Controlled by TRC-600 working in cascade with FRC-323, fuel gas to PH-600. To raise the overhead temperature, the pen on TRC-600 is raised. An air signal is then sent to FRC-323 to open, allowing a greater amount of fuel gas to be burned in PH-600 heater. As the temperature in the bottom of the tower increases, hotter vapors go overhead; thus, the overhead temperature is raised.
- 4) Depropanizer Reflux - Controlled by FRC-354. To raise or lower the amount of reflux, the pen on FRC-354 is raised or lowered. This flow, though, usually remains constant.
- 5) Reboiler Flow - Flow to PH-600 controlled by FRC's-322, 654, 655, and 656. Flow to PH-401 controlled by FRC's 196, 197, 198 and 199. Pump P-600 takes suction on the bottom of the tower and pumps the oil through the convection section of PH-401 and through the vertical tube reboiler which operate in parallel. These flows remain constant.
- 6) Depropanizer Pressure - Controlled by PRC-344 propane to the field. PRC-344 sends a signal to a regulator on the propane product to open when the pressure is high and close when the pressure is low. This flow is recorded on FR-343.

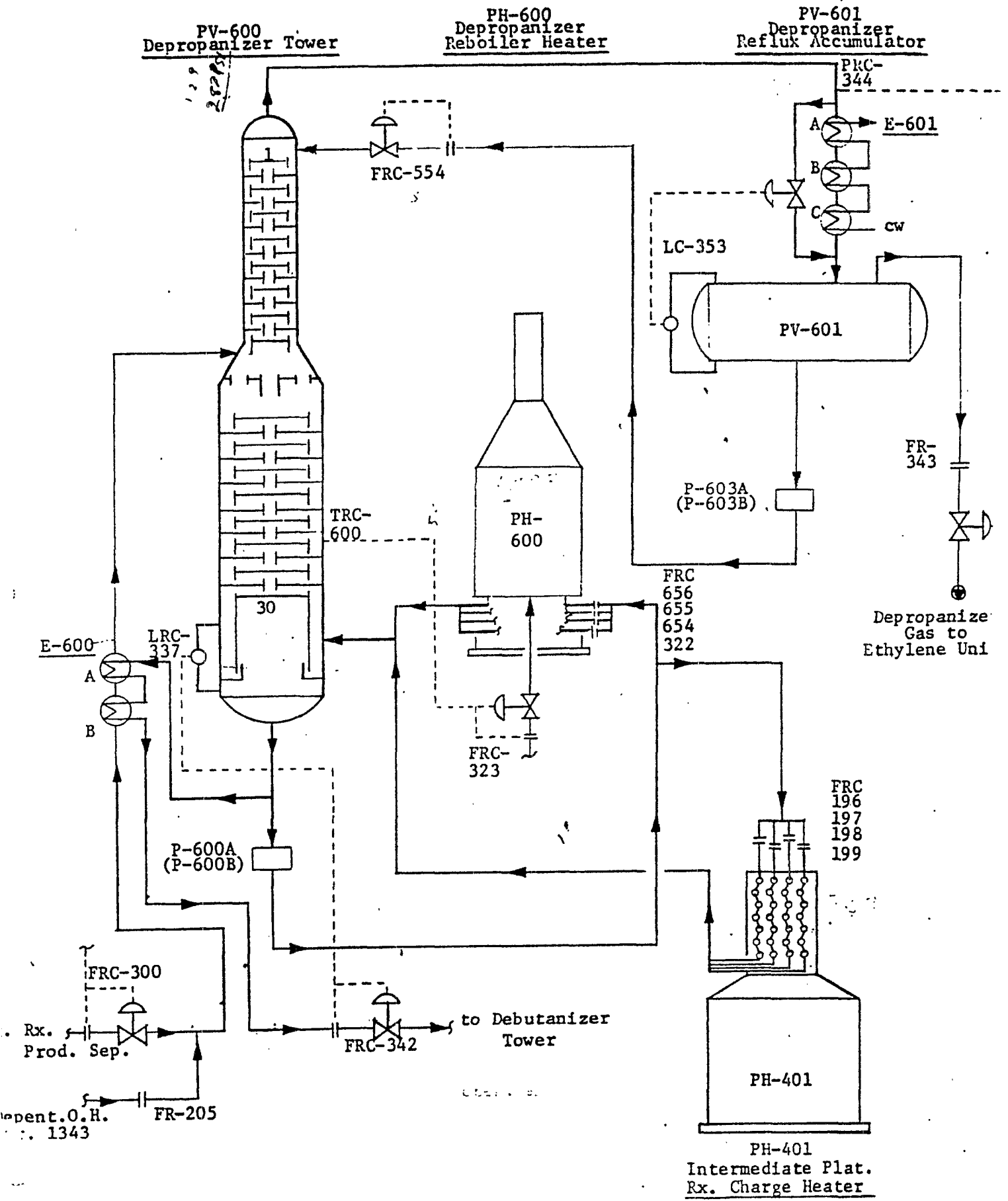
LTS:mkw:6-15-76

DEPROPANIZER PV-600

1. What is the purpose of the Depropanizer?
2. Which heaters supply heat to the Depropanizer?
3. Which heater is used to control the temperature of the Depropanizer?
Where is it located?
4. Where does the Depropanizer bottoms go?
5. Where does the overhead gas normally go? Where can it also go?
6. What boilaway should the propane product be?
7. How is the Depropanizer level controlled?
8. How is the Depropanizer Receiver level controlled?
9. How is the Depropanizer overhead temperature controlled?
10. How is the Depropanizer pressure controlled?
11. What is total reflux?
12. How does the hot vapor by-pass operate.

LTS:mkw:6-15-76

PU-1342
DEPROPANIZER SYSTEM



7
PERITANIZER

DEBUTANIZER PV-602

The purpose of the Debutanizer is to remove the butane and lighter gases from the Depropanizer bottoms charge to the tower. The Debutanizer bottoms has a high octane and is blended by Bulk Oil into motor gasoline.

The feed is introduced on tray 15 from the top. Reboiling heat is supplied by vertical tube Debutanizer Reboiler PH-601. Heater PH-601 furnishes heat for control of the 26th tray temperature. The Debutanizer bottoms are pumped through PH-601 Heater by the Debutanizer Reboiler and Bottoms pump P-601.

Vapors from the tower overhead are condensed in the E-602 condensers and accumulated in the Debutanizer Receiver PV-603. This receiver is a flooded receiver with the liquid being pumped by P-604 back to the tower as reflux or through E-603 cooler to the field as butane product. To be suitable for Alkylation Unit charge, the butane product's 5% point on the boilaway should be between 28°F and 32°F.

The Debutanizer bottoms are pumped by P-609 through Debutanizer Bottoms Cooler E-606 to the gasoline manifold. The Debutanizer bottoms to gasoline can be split into two different gasoline lines by a slipstream that takes off between the orifice plate and regulator of FRC-397. The slipstream is controlled by FRC-100.

The following is the control instrumentation used in the Debutanizer Tower:

- 1) Debutanizer Level - controlled by LRC-366 working in cascade with FRC-397 Debutanizer bottoms to gasoline. This instrument works automatically to hold a preset level. An air signal is sent from LRC-366 to FRC-397 to increase or decrease, as needed, the amount of Debutanizer bottoms to gasoline.
- 2) Debutanizer Pressure - controlled by PRC-385 working in cascade with FRC-394, butane product. The Debutanizer Receiver is a flooded receiver. To increase the pressure, the pen on PRC-385 is raised. An air signal is then sent to FRC-394, which closes off some allowing less liquid to leave the Debutanizer Receiver.
- 3) Debutanizer Overhead Temperature - controlled by TRC-580 working in cascade with FRC-376; fuel gas to PH-601. To raise the overhead temperature, the pen on TRC-580 is raised. An air signal is then sent to FRC-376 to open, allowing a greater amount of fuel gas to be burned in PH-601 heater. As the temperature in the bottom of the tower increases, hotter vapors go overhead; thus, the overhead temperature is raised.

DEBUTANIZER PV-602 - Continued

- 4) Debutanizer Reflux - controlled by FRC-358. To raise or lower the amount of reflux, the pen on FRC-358 is raised or lowered. This flow, though, usually remains constant.
- 5) Debutanizer Reboiler Flow - controlled by FRC's 377, 651, 652, & 653. To raise or lower the amount of flow through the reboilers, the pens on the FRC's are raised or lowered. This flow, though, usually remains constant.
- 6) Splitting Debutanizer Bottoms into Different Gasoline Lines - When the Debutanizer bottoms is split between the Good Gulf line and the NoNox line, FRC-100 is used to control the slipstream. To raise or lower the amount slipstream, the pen is raised or lowered.

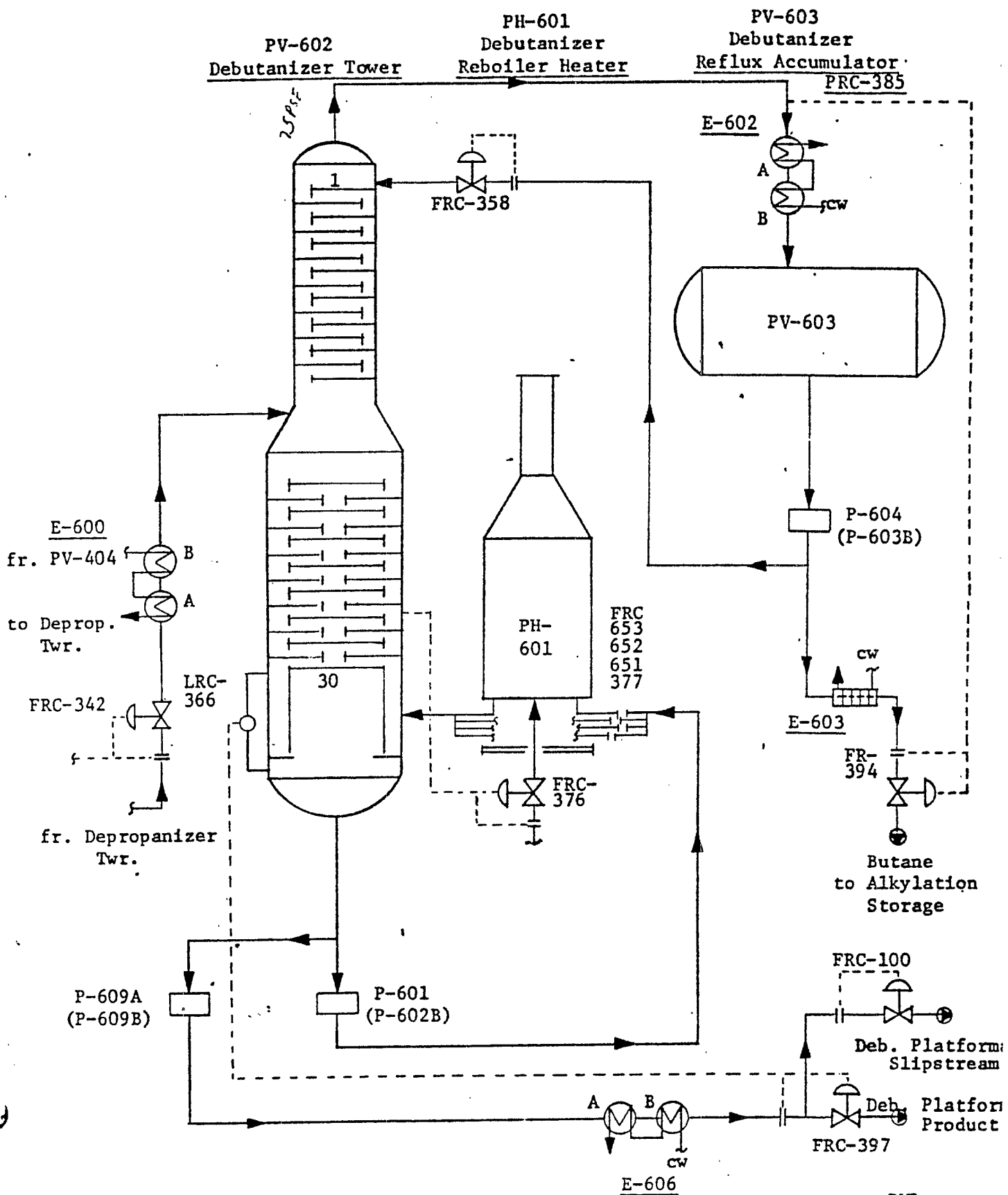
LTS:mkw:6-15-76

DEBUTANIZER PV-602

1. What is the purpose of the Debutanizer?
2. Which heater supplies heat to the Debutanizer? Where is it located?
3. What is the normal distribution of Debutanizer overhead product?
4. What boilaway should the butane product be?
5. How is the Debutanizer level controlled?
6. How is the Debutanizer pressure controlled?
7. How is the Debutanizer overhead temperature controlled?
8. How is the Debutanizer bottoms split into different gasoline lines?

LTS:mkw:6-15-76

PU-1342
DEBUTANIZER SYSTEM



RWL
10-29-75

二、三、四、五、六、七、八、九、十、十一、十二、十三、十四、十五、十六、十七、十八、十九、二十、二十一、二十二、二十三、二十四、二十五、二十六、二十七、二十八、二十九、三十、三十一、三十二、三十三、三十四、三十五、三十六、三十七、三十八、三十九、四十、四十一、四十二、四十三、四十四、四十五、四十六、四十七、四十八、四十九、五十、五十一、五十二、五十三、五十四、五十五、五十六、五十七、五十八、五十九、六十、六十一、六十二、六十三、六十四、六十五、六十六、六十七、六十八、六十九、七十、七十一、七十二、七十三、七十四、七十五、七十六、七十七、七十八、七十九、八十、八十一、八十二、八十三、八十四、八十五、八十六、八十七、八十八、八十九、九十、九十一、九十二、九十三、九十四、九十五、九十六、九十七、九十八、九十九、一百。

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FUEL GAS SYSTEM

Product Gas Drum, PV-407, provides fuel gas surge and knockout of entrained liquid for refinery fuel gas. Fuel Gas Drum, PV-406, provides surge, mixing and knockout volume for a natural gas and refinery fuel gas mixture.

The Product Gas Drum floats on the refinery fuel gas system pressure; that is, refinery fuel gas can either be taken from the system or added to the system depending on the unit's needs and make. Gas streams that can be routed to the Product Gas Drum are Hydrobon Flash Drum Gas, Hydrogen from Hydrogen Filters, Propane and Hydrobon Stripper Gas. Hydrobon Flash Drum Gas can also be routed directly to the Fuel Gas Drum.

The following is the control instrumentation used on the Product Gas Drum and the Fuel Gas Drum:

- 1) Product Gas Drum Pressure--Since this vessel floats on the refinery fuel gas system, its pressure will be the same as the refinery fuel gas system.
- 2) Fuel Gas Drum Pressure--
 - a) 100% Refinery Fuel Gas--Controlled by PRC-618. To raise the pressure, the pointer on PRC-618 is raised. An air signal is then sent to the regulator to open allowing more refinery gas into the Fuel Gas Drum; thus the pressure of the Fuel Gas Drum is raised. PRC-613, natural gas to Fuel Gas Drum, should be set at a slightly lower pressure. In the event refinery fuel gas system pressure is lost, natural gas would be let into the Fuel Gas Drum automatically to hold the pressure up.
 - b) 100% Natural Gas--Controlled by PRC-613. To raise the pressure the pointer on PRC-613 is raised. An air signal is then sent to the regulator to open allowing more natural gas into the Fuel Gas Drum; thus the pressure of the Fuel Gas Drum is raised. PRC-618, refinery fuel gas to Fuel Gas Drum, should be set at a slightly lower pressure. This protects the Fuel Gas Drum from depressuring due to a loss of the Natural Gas System pressure.
 - c) Mixture of Refinery Fuel Gas and Natural Gas--Pressure controlled by PRC-613, Natural gas to Fuel Gas Drum. PRC-618 is switched to PRC-618 with the control board mounted switch. The pointer on PRC-618 is then set for the desired amount of refinery fuel gas. PRC-613 then controls the pressure.

FUEL GAS SYSTEM

1. What is the purpose of the Product Gas Drum?
2. What is the purpose of the Fuel Gas Drum?
3. What gas streams can go to the Product Gas Drum?
4. How is the pressure controlled on the Product Gas Drum?
5. How is the pressure controlled on the Fuel Gas Drum when burning 100% refinery fuel gas?
6. How is the pressure controlled on the Fuel Gas Drum when burning 100% natural gas?
7. How would you burn a 50:50 mixture of refinery fuel gas and natural gas?
How is the pressure controlled?

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3-29-77

HEATERS

HEATERS

The heaters consist of a steel structure with an integral self-supporting stack. The inside of the casing is lined with insulation which in turn is protected by a layer of insulating refractory brick to form the combustion chamber or firebox. Burners are located in the floor of the vertical heaters and in the floor of three of the horizontal heaters. The remaining horizontal heater has side fired burners.

The bottom section of the heater is called the radiant section. Here the surface of the tube is exposed to direct radiant heat from the burner flames. In this portion of the furnace, the major portion of heat absorbed by the tubes and, therefore, by the fluid, is transferred by means of radiation.

Above the radiant section is the convection section of the furnace. In the convection section the tubes are mechanically screened from seeing the flame burst and, therefore, depend upon convection transfer from the combustion gases sweeping over them for the major portion of their heat absorption.

Each of the horizontal heaters has a center wall or bridgewall. This wall is made of refractory material and divides the two combustion chambers. It also serves the purpose of reflecting radiant heat back to the tubes in the radiant section.

All but one of the vertical heaters have a central reradiating cone located at the upper end of the combustion chamber. This serves the dual purpose of effecting an even distribution of radiant heat and increasing the flue gas velocity at the upper section of the furnace as the temperature of the products of combustion is decreased. During normal operation the tip of the cone should be a bright cherry red in color. Under more severe firing conditions the cone will become brighter, turning a definite orange color. This condition approximates 1650°F cone metal temperature and represents the maximum continuous permissible operating load.

Draft

Natural-draft process heaters use the draft produced by the heater stack for induction of combustion air through the burners into the firebox and the transport of the combustion gases through the heater and out the stack to the atmosphere.

HEATERS-Continued

The draft produced by the stack depends on the height of the stack and the temperature of the combustion gases going up the stack. The column of hot combustion gases in the stack weighs less than column of air of equal height at ambient temperature.

The draft is measured in inches and fractions of an inch of water. Draft is a slightly lower pressure than atmospheric pressure and is therefore a negative gauge pressure.

Excess Oxygen

The single most important controllable variable affecting heater efficiency is excess oxygen content in the flue gas. There are other variables influencing process heater fuel consumption such as stack temperature, charge stock inlet temperature and charge stock composition. But none of these are directly controllable by the operator. Only excess oxygen is subject to his direct and continuous control by the adjustment of burner air registers.

A deficiency of oxygen will result in incomplete combustion of the fuel gas. Instead of being burnt in the furnace, the unburnt combustibles will go through the stack to the atmosphere, thus, the heater efficiency is reduced.

Too much oxygen will also result in a decrease of heater efficiency. When too much air is present, a portion of the heat of combustion is used to heat up the extra oxygen instead of heating up the firebox.

It is therefore very important that the excess oxygen content in the flue gas be held between two and four percent. The oxygen content of the flue gas should be monitored periodically with a portable oxygen analyzer, and the primary and secondary air adjusted as needed to hold the target oxygen content.

The primary air mixes with the fuel gas before the burner tip. It should be adjusted so the flame burns immediately above the burner tip. The secondary air mixes with the fuel gas at the burner tip. It is used to control the amount of excess oxygen in the heater. See Exhibit 5.

Flame Impingement

Flame impingement on tube surfaces will greatly decrease tube life and may result in a serious tube failure. The furnace should be checked for

HEATERS-Continued

any signs of flame impingement at regular intervals and particularly after any change in load. Mis-alignment of the burners, insufficient combustion air, or enlargement and corrosion of the burner ports are frequently the cause of incorrect flame pattern.

LTS:mkw:11-26-75

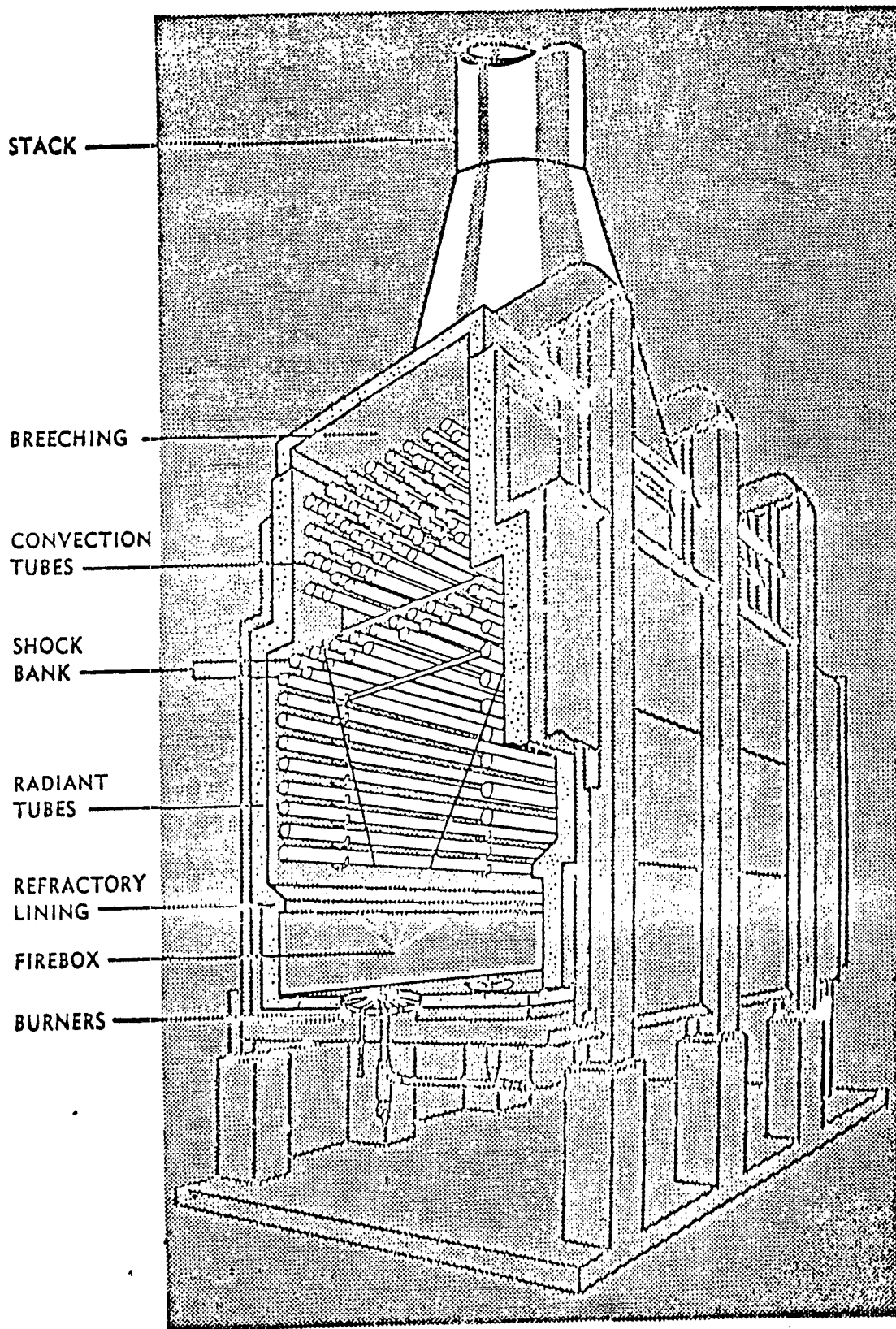


EXHIBIT 1
HORIZONTAL HEATER

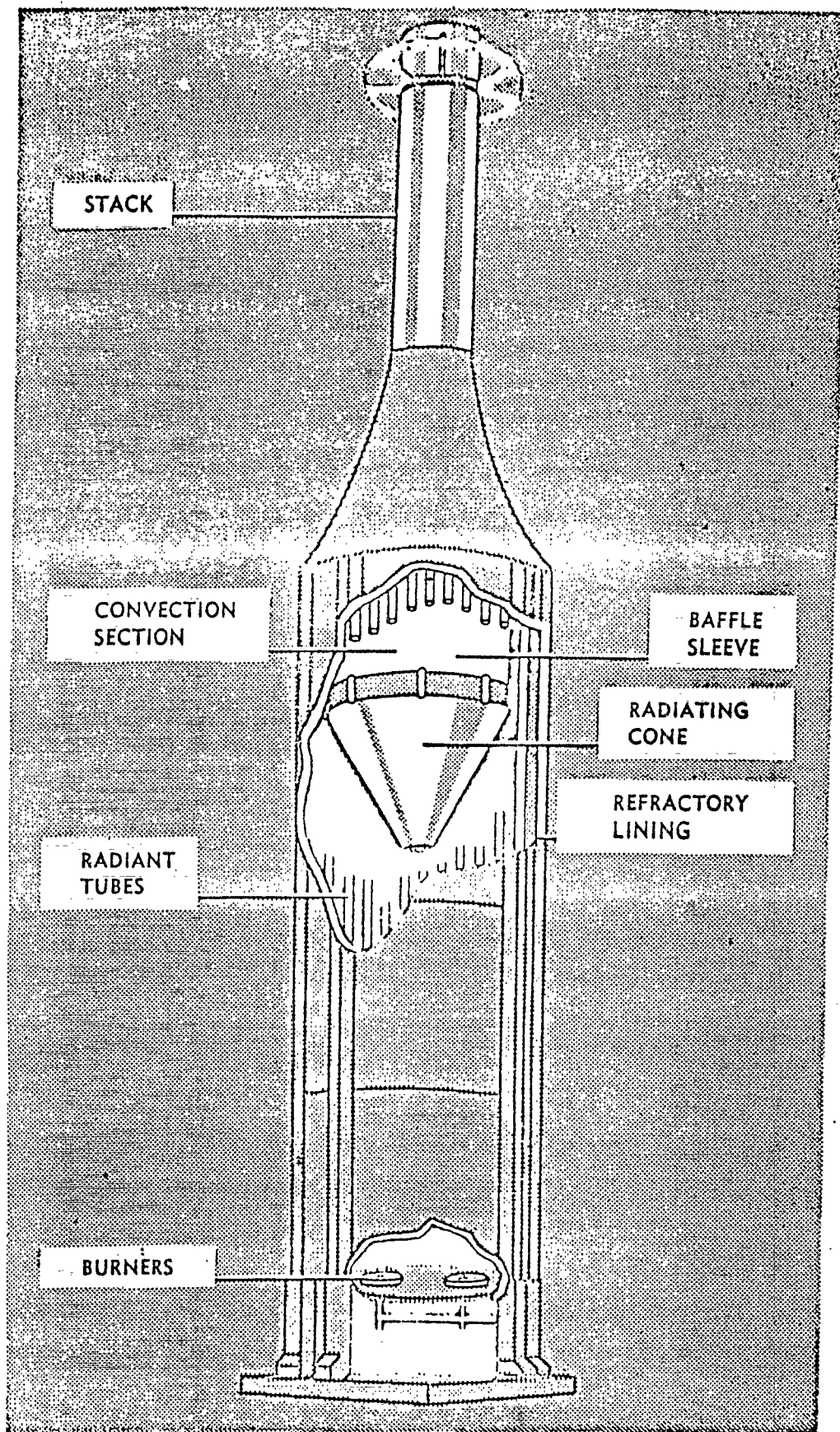


EXHIBIT 2

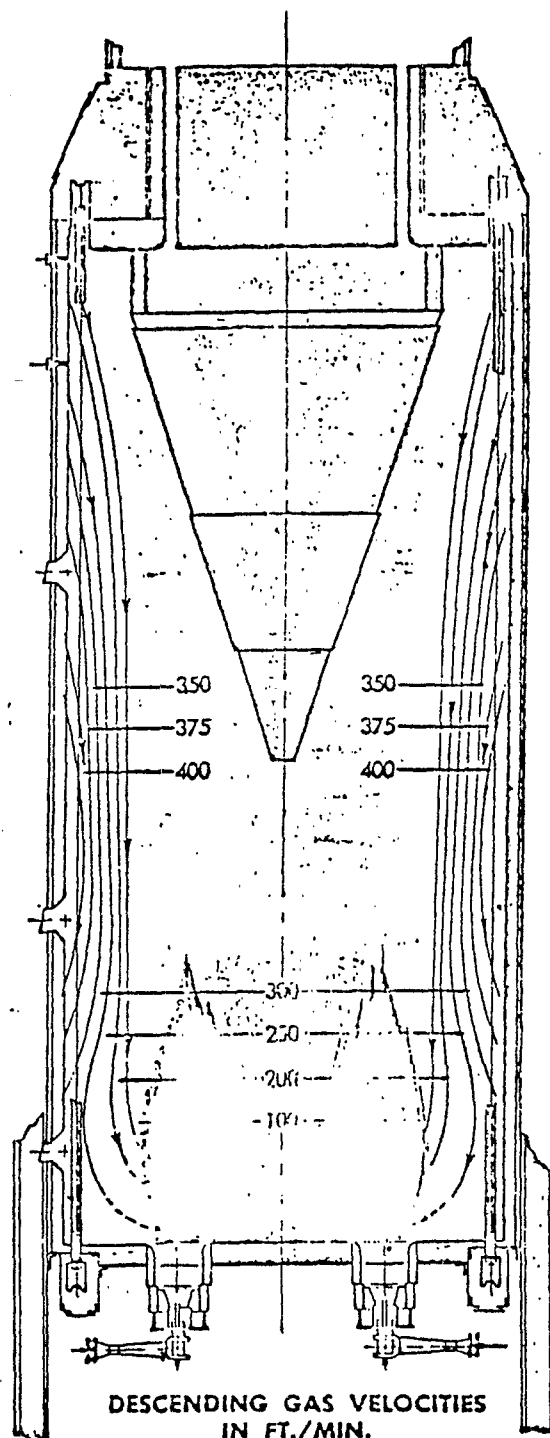


Exhibit 3

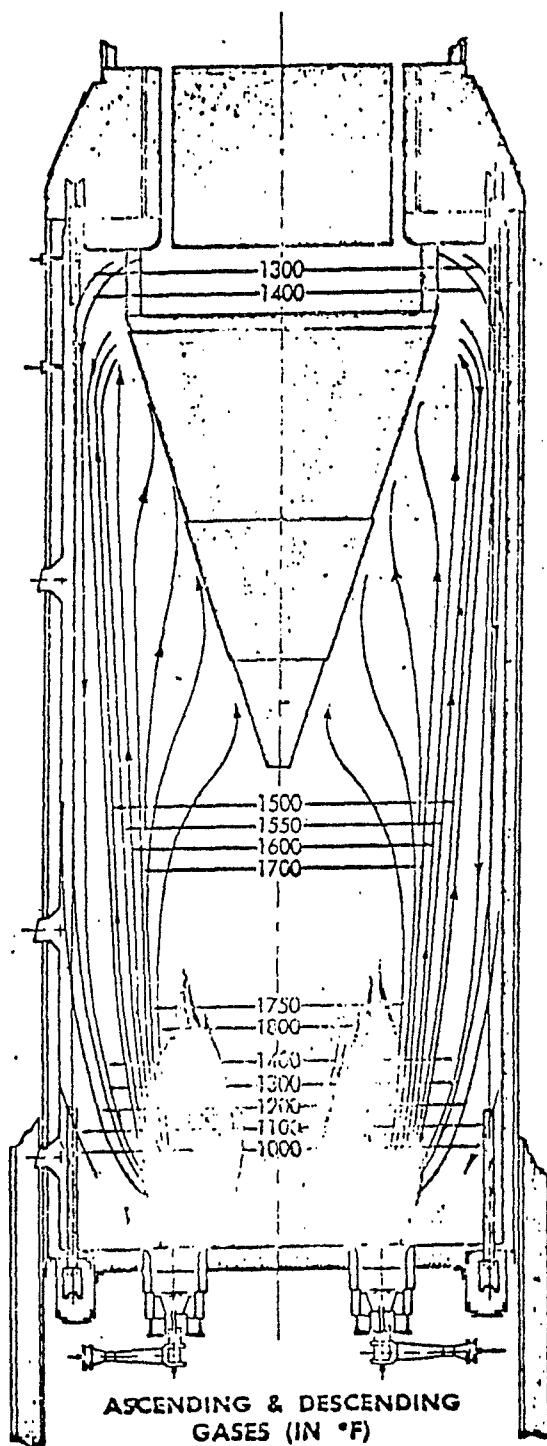
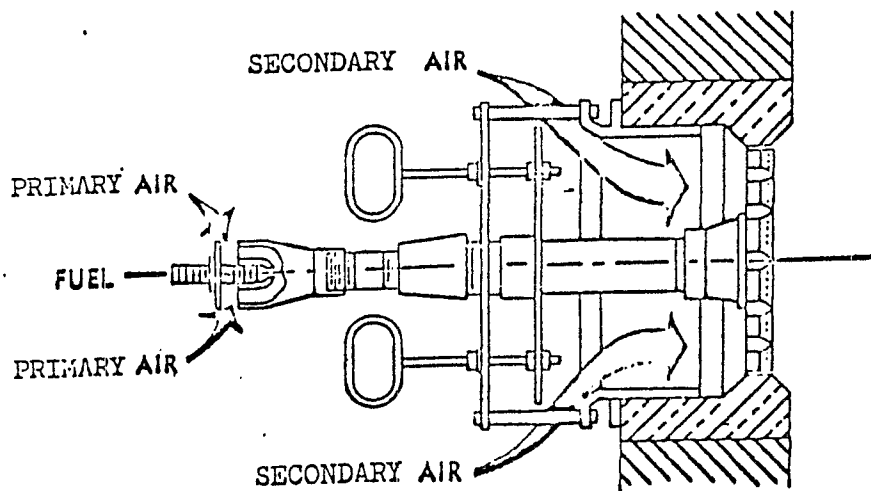


Exhibit 4



BURNER
Exhibit 5

Heater Start-Up Procedure

1. Start flow through the heater. Flow distribution between the passes should be adjusted as closely as possible.
2. Steam firebox for 30 minutes.
3. Roll in gas spool(s).
4. Check to be sure fuel gas valves to individual burners are blocked.
5. After heater has steamed for 30 minutes, light the required number of burners to dry out firebox (3 burners per side horizontal heaters and 1 or 2 burners per vertical heater). The by-pass valve around the fuel gas regulator should be used to light the burners and then adjusted to hold 3-5 psig fuel gas header pressure.
6. After fires are lit, check outlet temperatures of each pass. The outlet temperatures of each pass should be approximately equal. If there is a large discrepancy, adjust flow through passes. The outlet temperatures should be closely monitored until the heater reaches normal operating conditions.
7. Dry firebox for 30 minutes before lighting additional burners.
8. Light additional burners as needed to begin raising the heater outlet temperatures.
9. DO NOT RAISE CUTLET TEMPERATURES FASTER THAN 150°F PER HOUR.
10. If additional burners will supply too much heat to the firebox, increase the fuel gas header pressure slightly using the by-pass valve.
11. Set by-pass valve at 3-5 psig after lighting all burners.
12. After setting by-pass for 3-5 psig burner pressure with all burners lit, put firing gas regulator in service.
13. Continue bringing up outlet temperature to normal operating conditions using automatic fireman.

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COMPRESSORS

COMPRESSORS

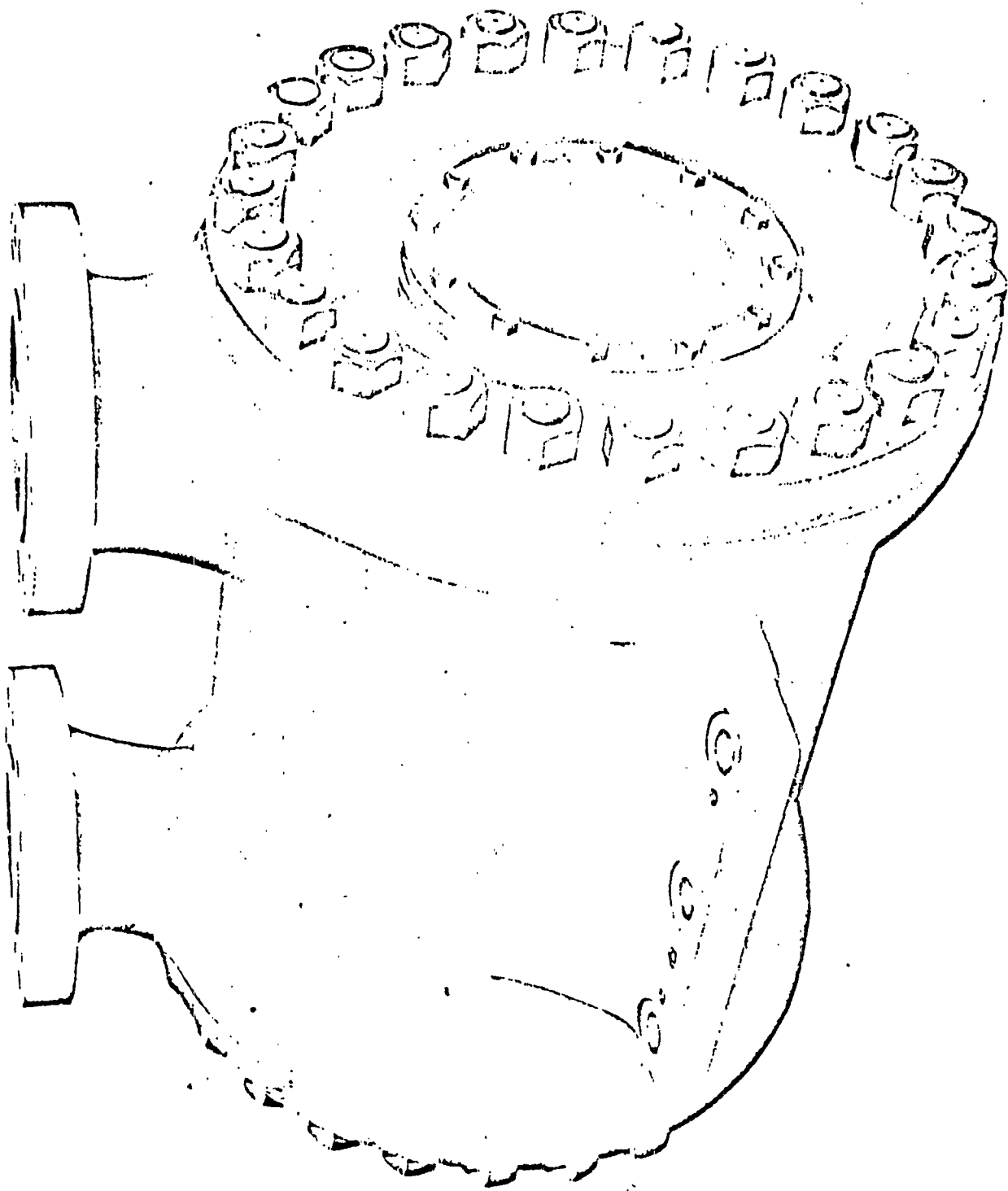
The Barrel Type Compressor is essentially a high speed, high pressure machine consisting of two or more radial flow type impellers mounted on a shaft, rotating within a specially designed casing. Compression of the gas is accomplished by drawing the gas into the compressor through the inlet connection and directed into the inlet, or eye, of the first impeller through a set of inlet guide vanes. The guide vanes serve to direct the gas in the proper direction.

The impeller, or wheel, rotates at high speeds. This high rotative speed causes the gas to be thrown outward by centrifugal force and with high velocity. Centrifugal force creates a lower pressure at the impeller inlet so that more gas is forced in by the external pressure in the suction pipe.

The velocity is decreased and converted into pressure in the diffuser channel following the impeller. The gas then crosses over and returns to the next impeller through a set of return channels, including guide vanes to direct the gas into the next impeller properly. As the gas goes through each stage its pressure is increased. After the gas leaves the last stage impeller, it is collected in the volute from which it passes into the discharge pipe.

The shaft of a compressor has a tendency to vibrate at its own natural frequency depending on the length and stiffness of the shaft. The faster the shaft rotates, the faster the vibrations will occur. On a high speed multi-stage machine, there is a speed range below the normal operating speed in which there is an excessive amount of vibration. This is known as the critical speed. If allowed to operate in the critical speed range, the excessive vibration can cause damage to the bearings, seals, or rotor. It is very important to pass through the critical speed of the machine as quickly as possible with the least amount of vibration.

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CLARK VERTICAL SPLIT CASE, MULTI - STAGE, CENTRIFUGAL COMPRESSOR



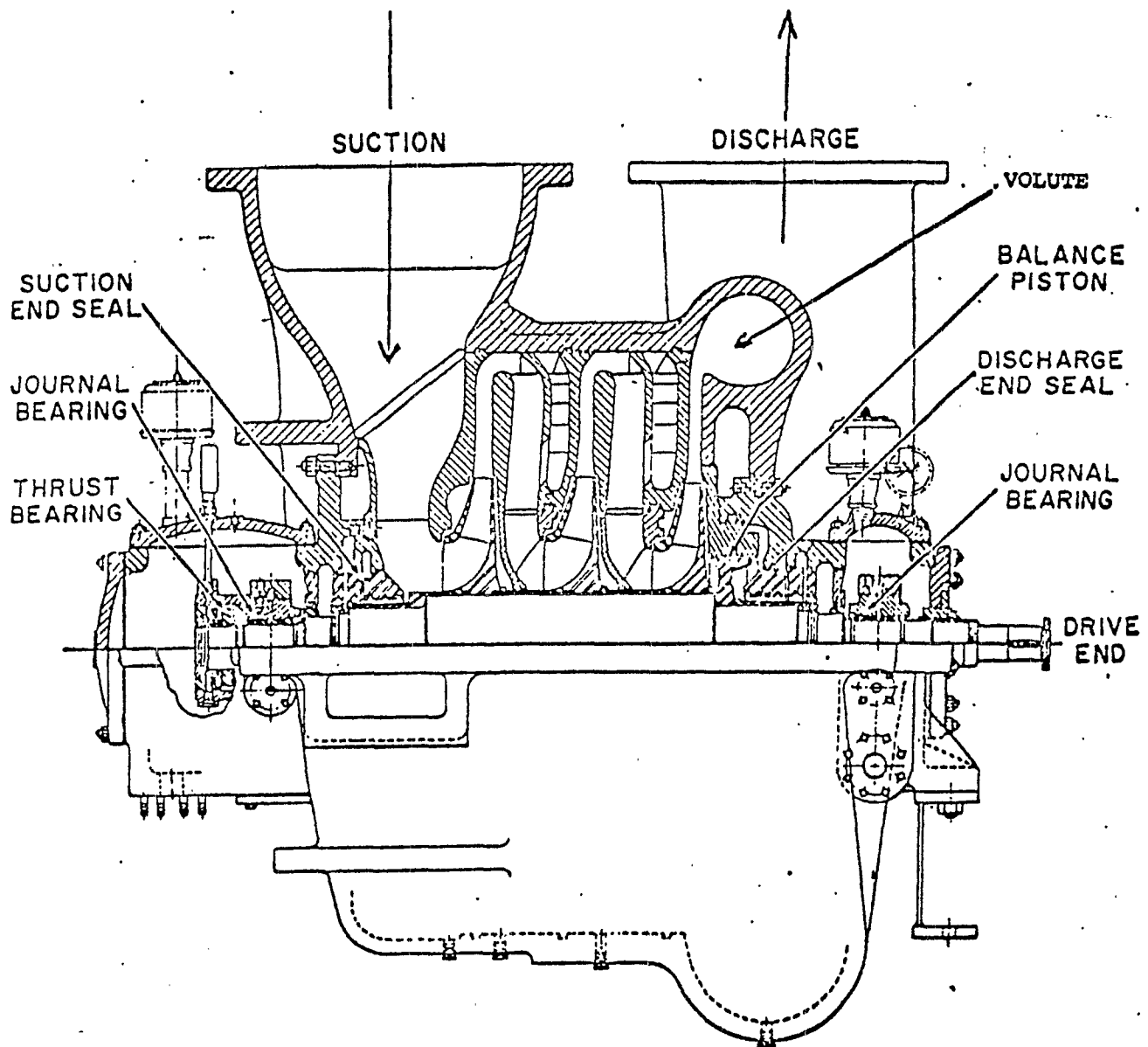
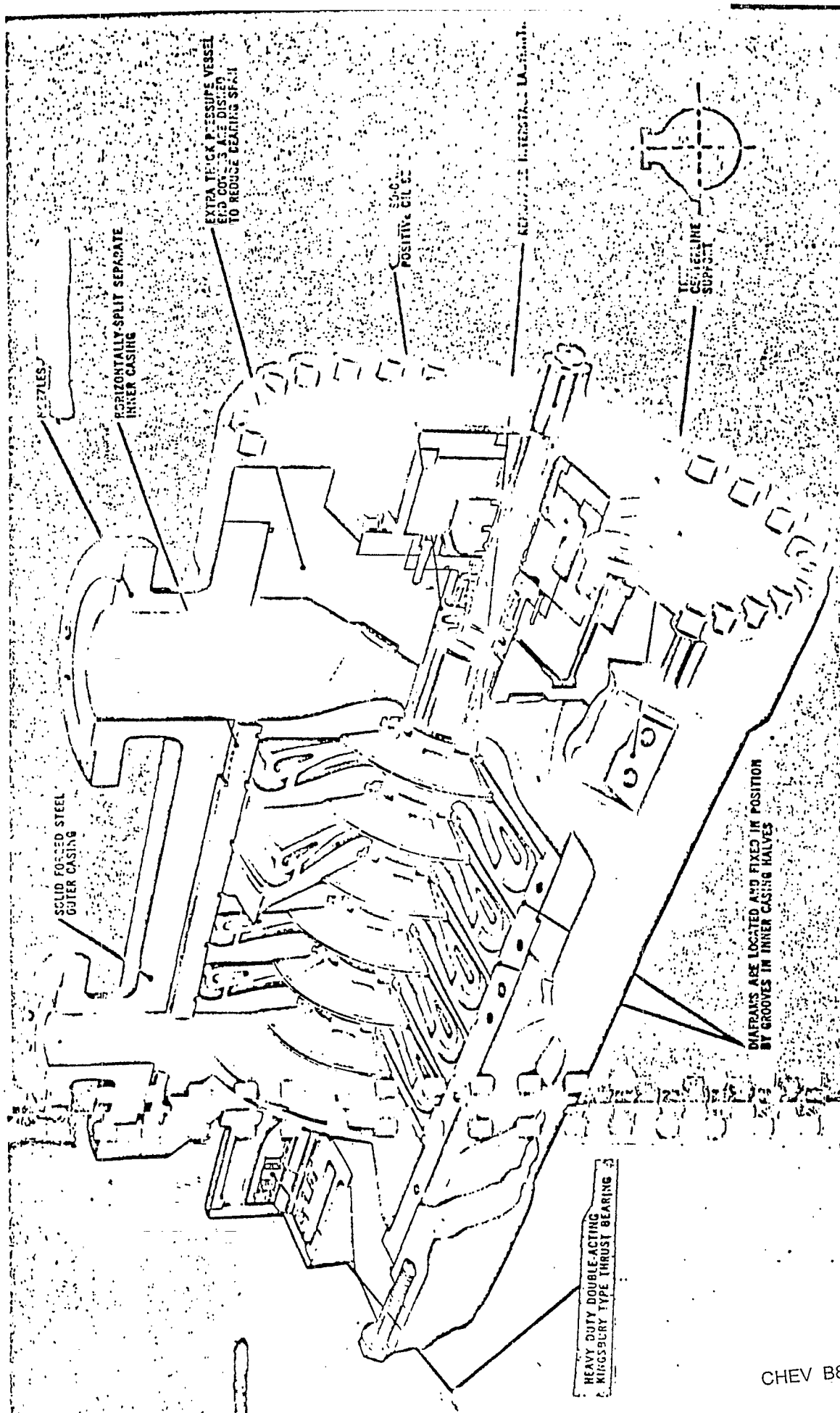
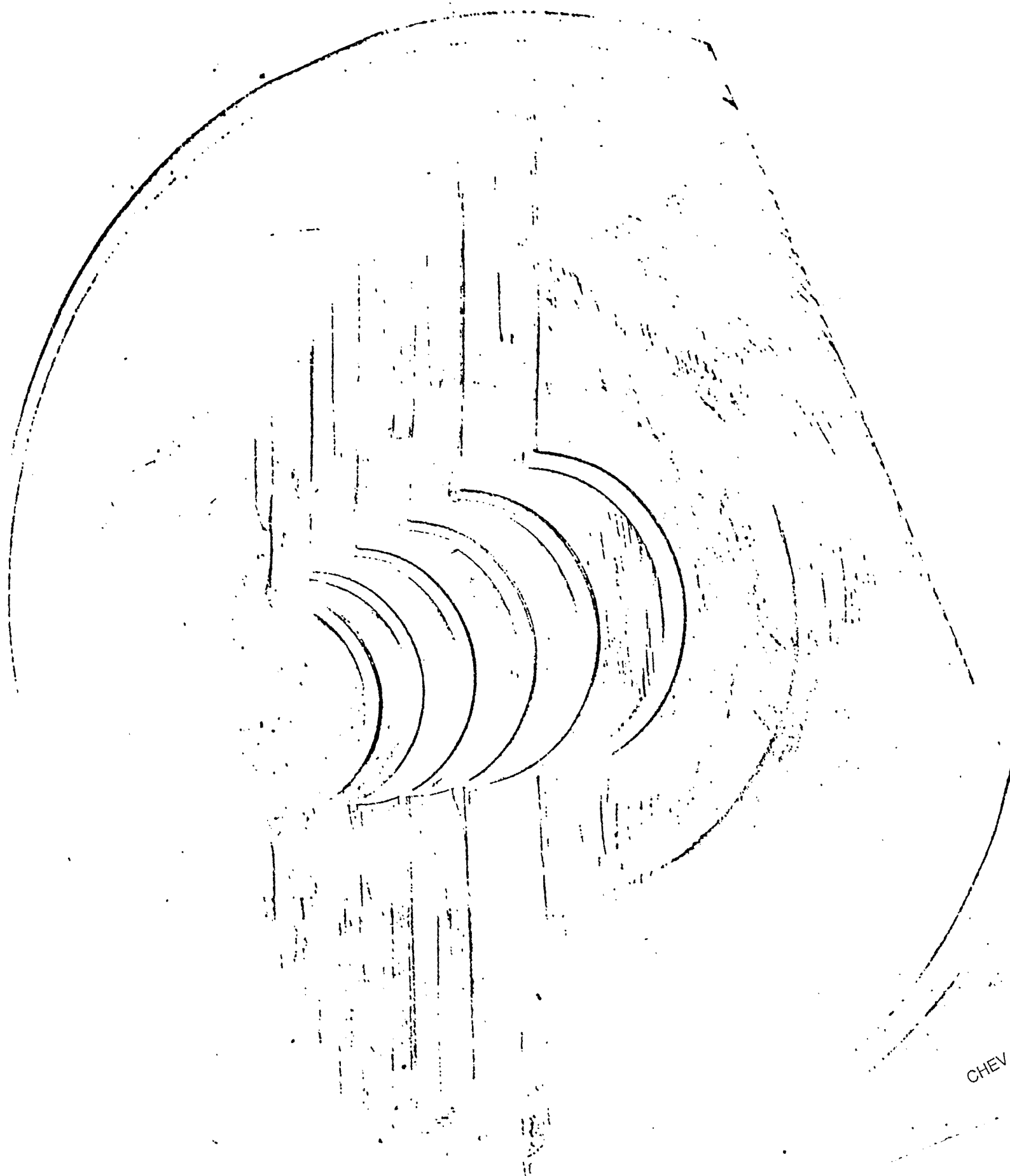


FIGURE 1
TYPICAL COMPRESSOR WITH
THRUST BEARING ON SUCTION END

SIX STAGE HIGH PRESSURE

VERTICALLY-SPLIT COMPRESSORS





CHEV B8 6550

NOMENCLATURE

The purpose of this section is to familiarize the reader with the names and functions of various parts of a centrifugal compressor.

IMPELLER OR WHEEL

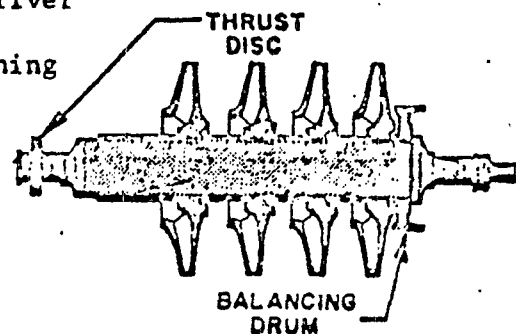
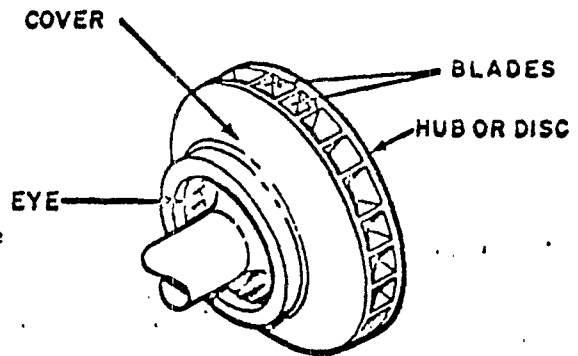
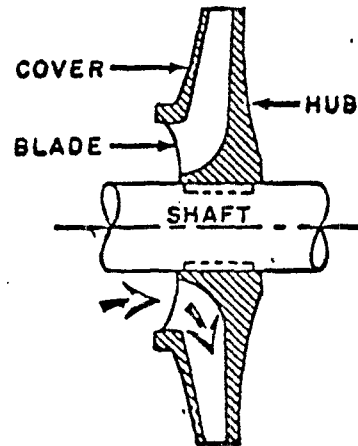
The "BLADE" increases the velocity of a gas by rotating about the center line and causing the gas to move from the inlet of the blade (or wheel) to the tip or discharge. The difference in the distance from the axis of rotation of the blade inlet and the blade discharge causes an increase in velocity which results in an increase in kinetic energy.

The DISC or HUB for either a closed or a semi-open wheel serves two functions ...to drive the blade and to confine the gas to the blade area.

Three parts - BLADE, COVER and DISC - constitute the IMPELLER, also known as the wheel. The wheel illustrated is a closed wheel, so-called as the gas is confined on both sides of the blade.

SHAFT

The SHAFT is used to support the wheels and to deliver the driving power to the discs. Methods of fastening the wheels to the shaft are many and varied. The most common method is the combining of shrink fit with keys



SHAFT SLEEVES are used between wheels on the shaft for

axial location of the wheels, and to afford wear-

ing surfaces for interstage seals. In certain

instances shaft sleeves protect the shaft from

corrosive elements in the gas. Sleeves are

also used in conjunction with shaft seals and

occasionally for bearing surfaces.

ROTOR

All of the parts mounted on the shaft, together

with the shaft, are known as the ROTOR. The

rotor is one of the two major elements and shall be

considered by its parts from the inlet to the dis-

charge.

The inlet flange connects the inlet nozzle to

the piping system. The inlet nozzle systematically

increased the velocity (by reducing the pressure)

of the gas, guides it to the eye of the first

impeller, and distributes the gas around the 360°

of the impeller eye.

DIAPHRAGM

A full diaphragm is a stationary element between

two stages which forms half of the diffuser chan-

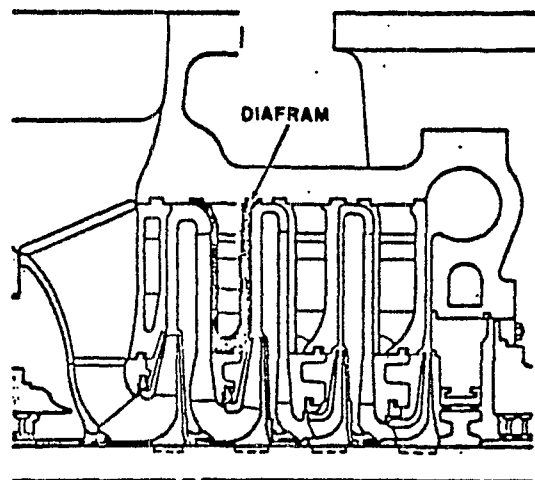
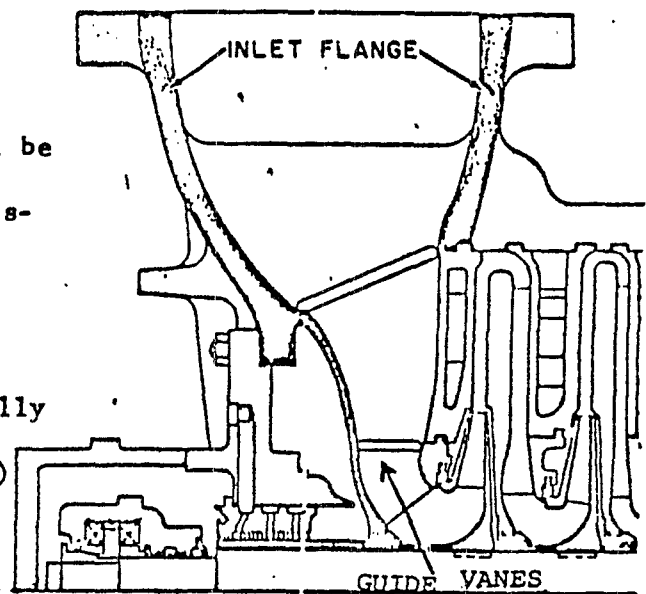
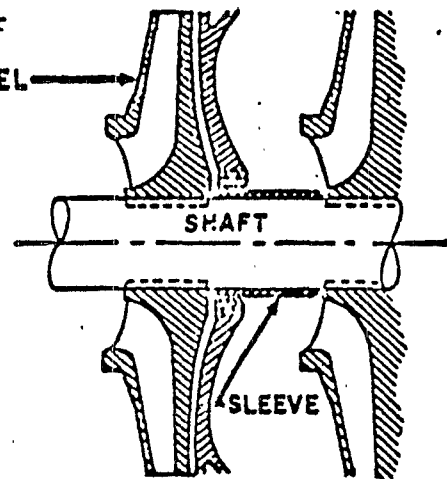
nel of the earlier stage, part or all of the return

bend, all of the return channel and half of the

diffuser of the later stage. The diaphragm also

supports the shaft seal following the earlier

stage and the eye seal of the later stage.

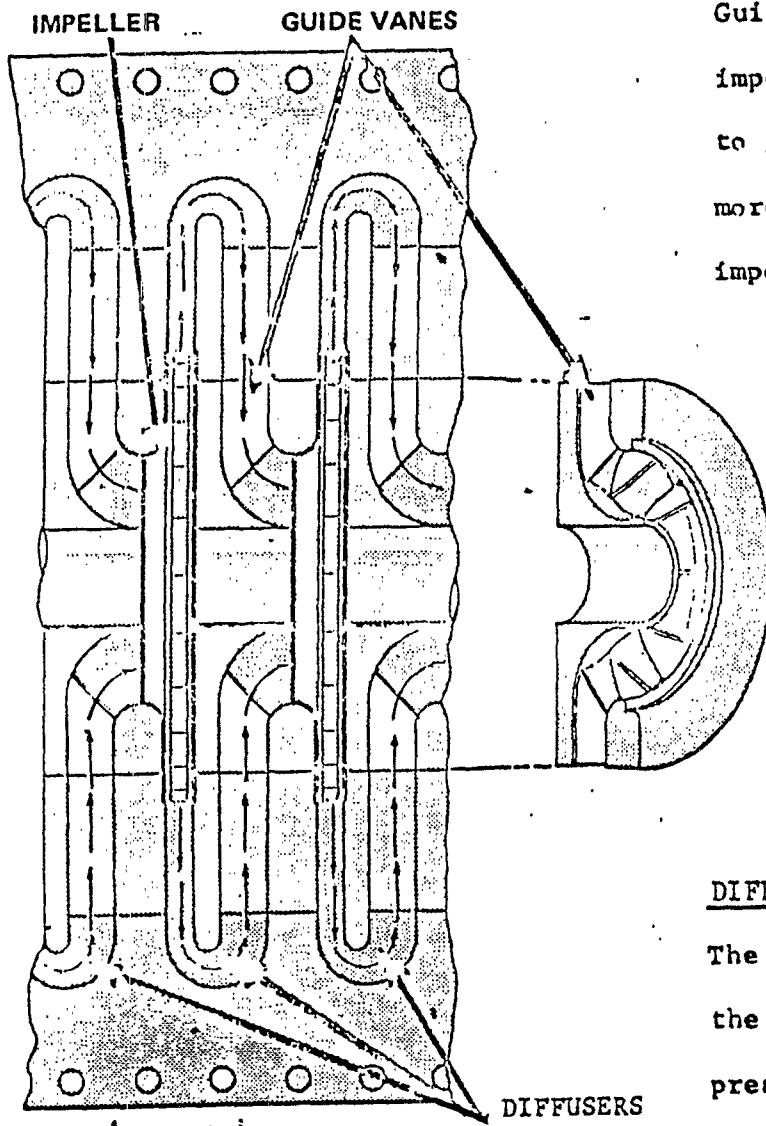


DISCHARGE VOLUTE

Volute collects the gas from last stage diffuser and delivers the gas to the discharge nozzle

GUIDE VANES

Guide Vanes are just ahead of each impeller inlet or eye and are designed to guide the flow of gas more evenly and more efficiently into the eye of each impeller.



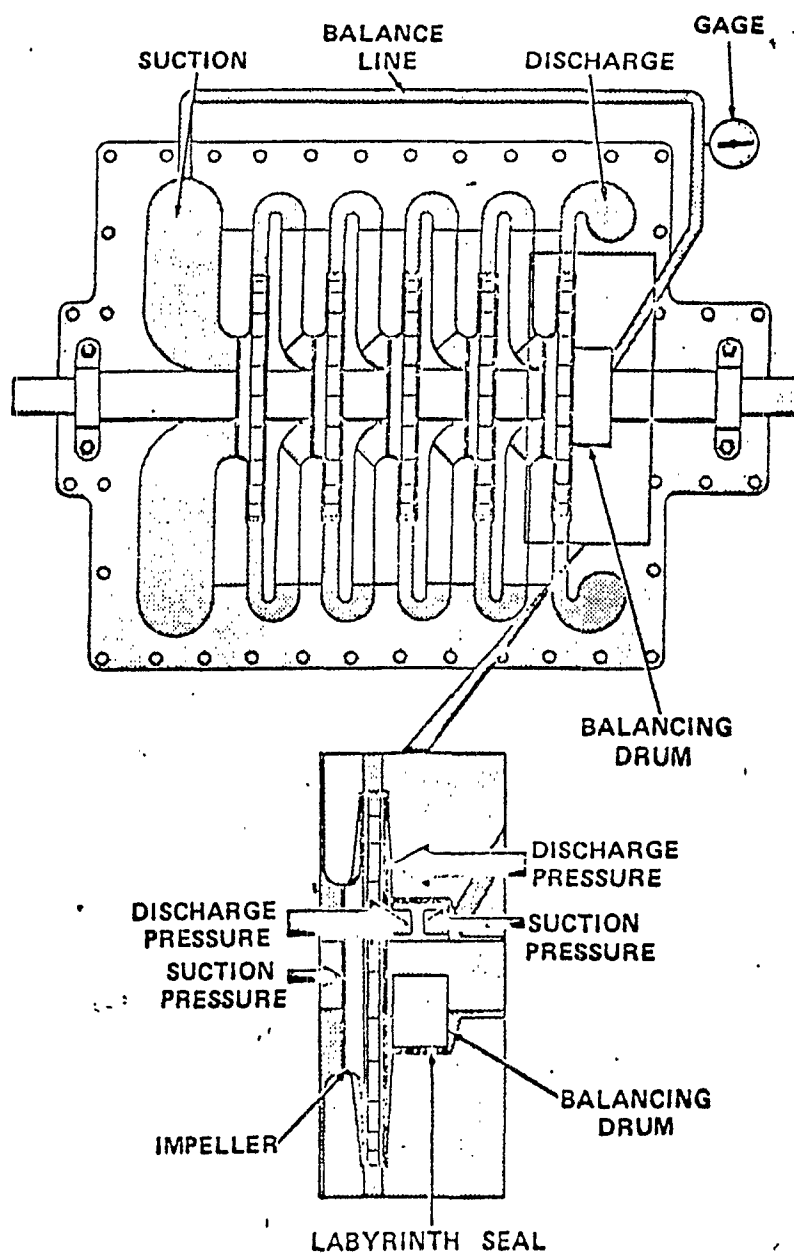
DIFFUSER JOB

The diffuser converts the velocity of the gas into pressure inside the compressor.

BALANCING DRUM

Balancing Drum is used to equalize thrust when the axial thrust is too great for the thrust bearing. This is accomplished by two forces balancing each other out because they are exerted in opposite directions.

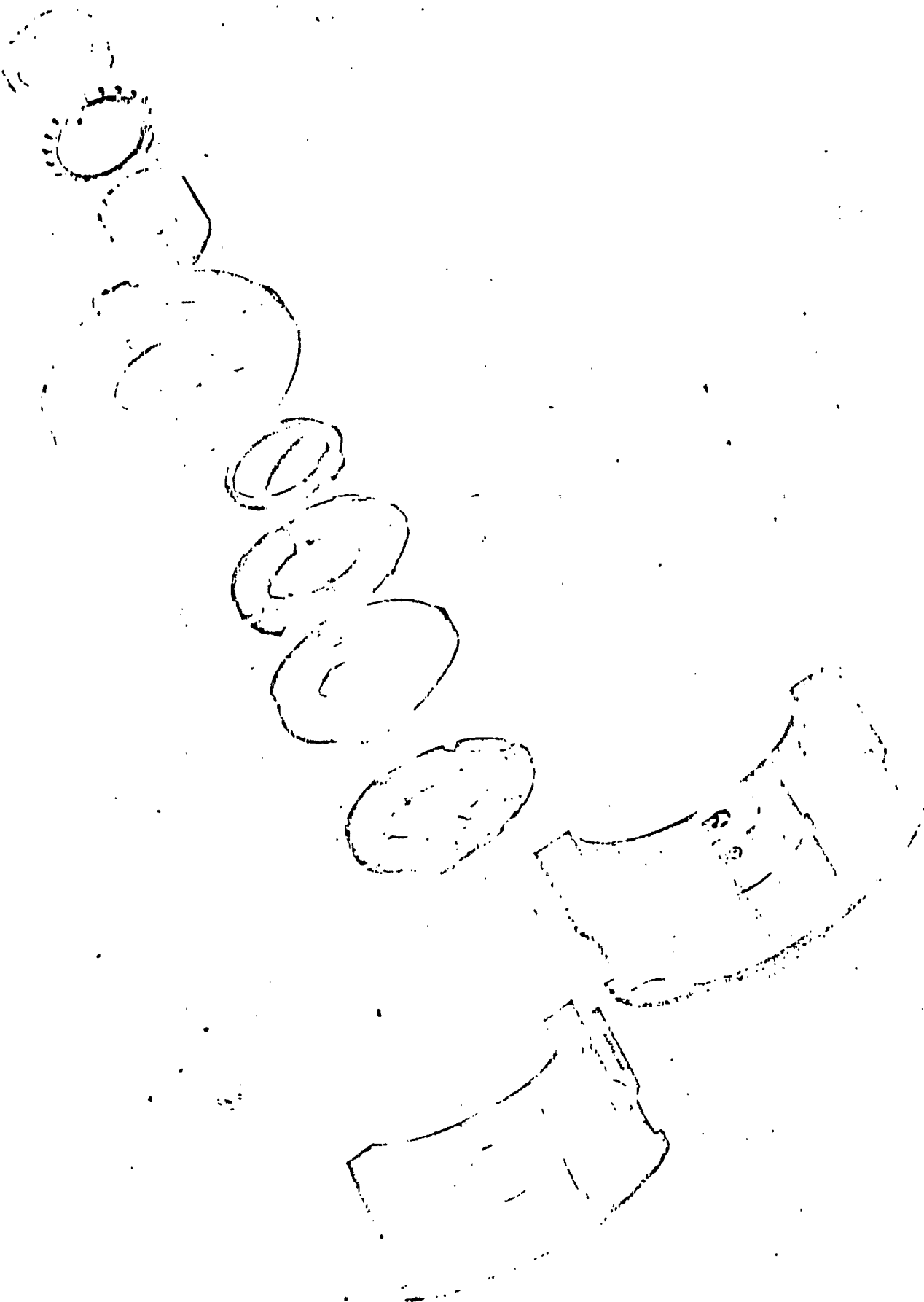
Compare these forces.



BEARINGS

The rotor is supported by two precision journal bearings having babbitt faced liners. Pressurized oil for lubrication and cooling is furnished by the oil supply system.

The balancing drum, located on the discharge end of the rotor, is sized to direct the thrust toward the suction end of the rotor. This thrust is absorbed by a Michell, (Kingsbury Type), thrust bearing. The thrust bearing is designed to take axial thrust from either direction. This is accomplished by locating thrust shoes on either side of the thrust disc. A spacer is used in assembling the thrust disc to the shaft to center the impellers in their correct axial location.

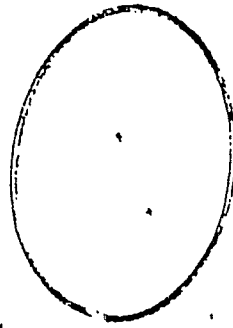
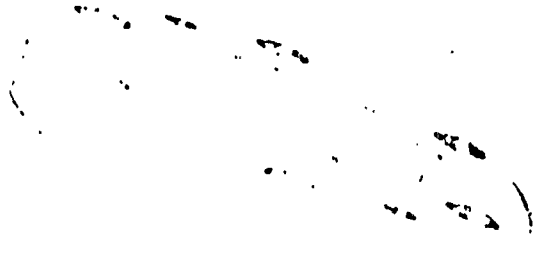


SHAFT SEALS

The seal in use on the barrel type Clark Centrifugal Compressor is a high pressure internal floating ring type oil seal. The floating ring type seal was developed to isolate the gas stream from the lube oil and bearing chambers or to seal the shaft opening into the compressor in certain other high pressure applications.

The floating ring seal maintains a pressure tight barrier along a rotating shaft by use of two floating sleeves, concentric and with accurate radial clearances with relation to the shaft. These rings are able to move radially, following any minute radial action which the shaft may be permitted by bearing clearances. Seal oil is fed between the two rings at a pressure approximately 5 psi greater than the gas pressure being sealed against.

Under these conditions there is always a small flow of seal oil inward to the area of high pressure gas. It is collected in the high pressure chamber and disposed of thru a suitable trap. If the high pressure gas is harmful to the oil through contamination, the small inward flow may be discarded as it emerges from the trap. The application of this type of seal results in no gas leakage externally from the compressor.



H. SHAFT SEALS

Shaft seals, located at each end of the compressor shaft are used to separate the gas stream from the bearing chamber.

(1) Labyrinth Seals

The simplest, most rugged, and most economical of all shaft seals is the straight labyrinth seal (Figure #3). This seal consists of a series of thin strips or fins which are normally mounted in a stationary ring which maintains a close clearance between the shaft and the tip of the fins. The seals are usually made of soft metal, such as brass or aluminum. So that if it rubs on the shaft it will not cause any extensive damage.

(a) Basic Principles of a Labyrinth Seal Operation

As gas enters the seal from the gas side of the compressor, it forms "eddies" or whirlpools in each "V" groove and fin compartment.

As gas leaks pass from one "V" groove to the next, there is a decrease in pressure. "Eddies" forming in each "V" groove makes it harder for the gas to leak through. As it loses its pressure it will cancel out its ability to flow past the labyrinth seal into the atmosphere.

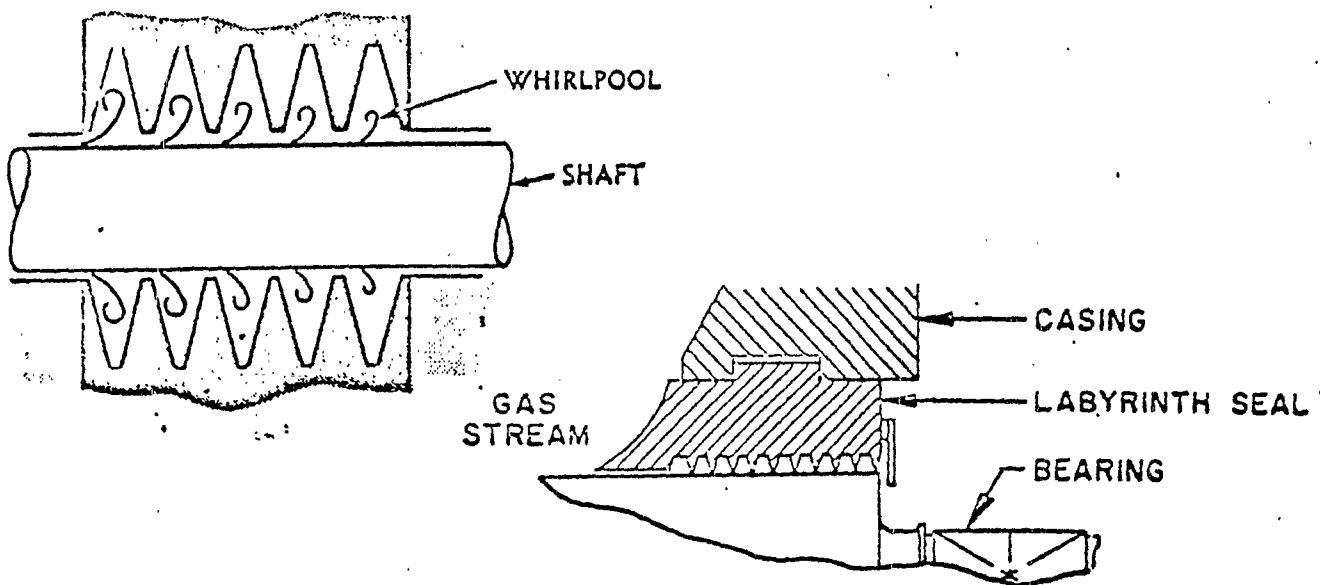


FIG. 3

FIGURE
STRAIGHT LABYRINTH SEAL

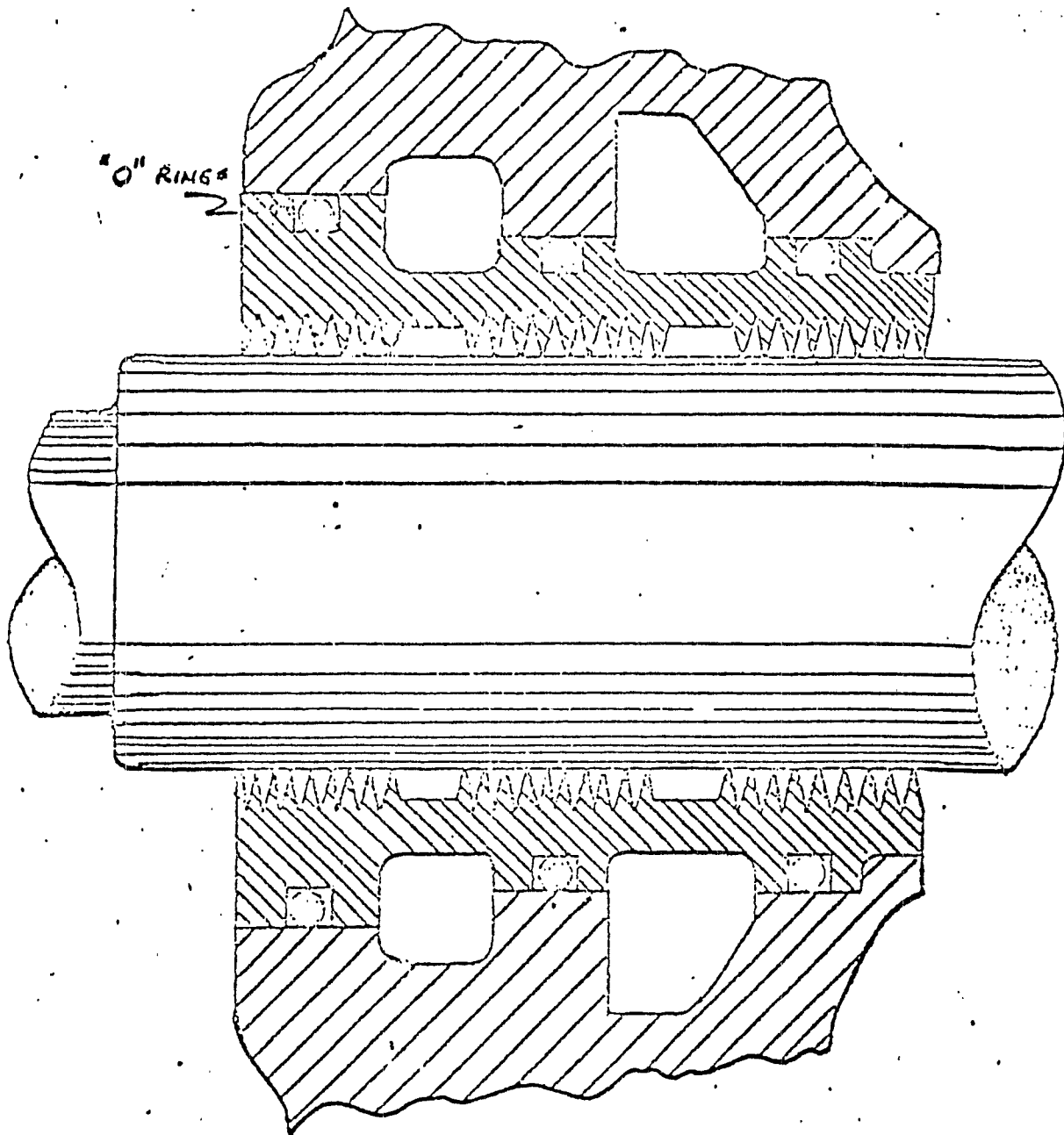
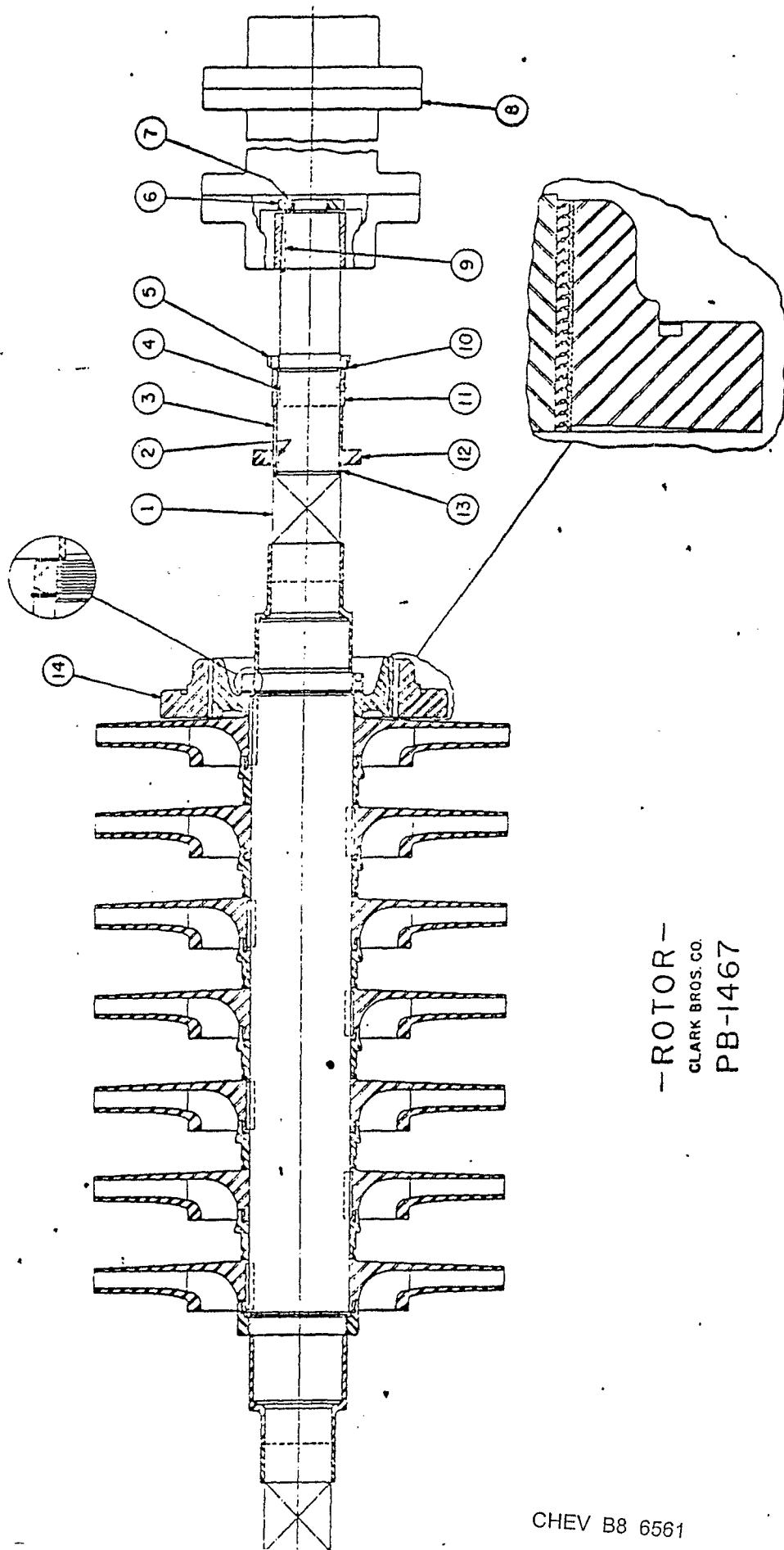


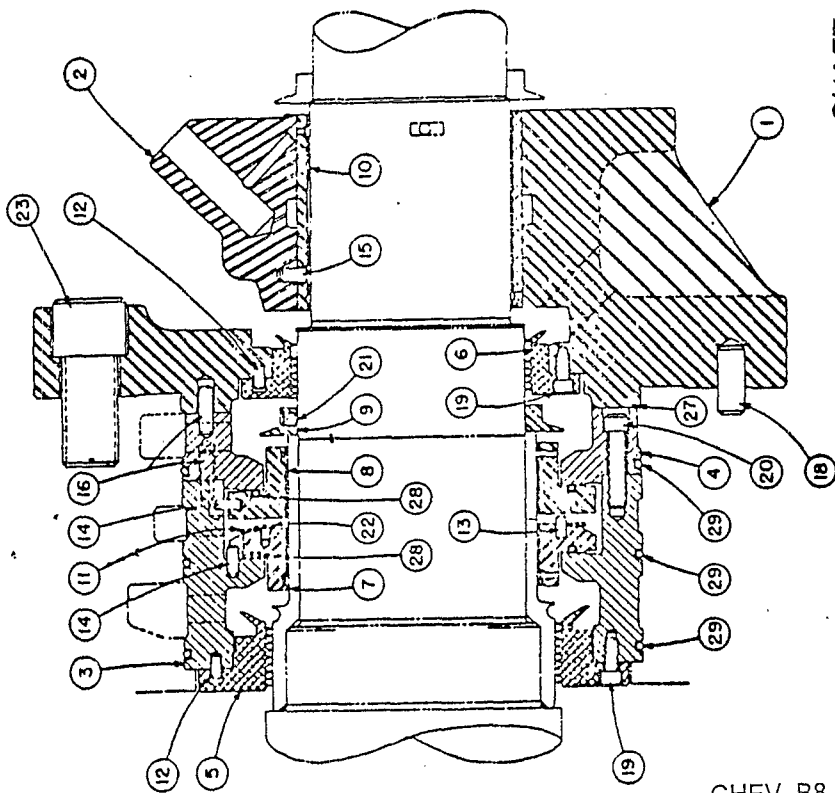
FIGURE 3 LABYRINTH SEAL



—ROTOR—
CLARK BROS. CO.
PB-1467

ROTOR
Assembly PB-1467

<u>Item No.</u>	<u>Part</u>
1	Impeller Shaft
2	Thrust Disc Key
3	Worm Spacer
4	Not Used
5	Locknut - L.H.
6	Coupling Locknut
7	Setscrew
8	Fasts Coupling
9	Coupling Key
10	Lockwasher Ball Brg.
11	Not Used
12	Thrust Disc
13	Thrust Disc Spacer
14	Balance Piston Labyrinth



SHAFT BEARING & OIL SEAL

— CLARK BROS. CO. —

PB-1627

CHEV B8 6563

SHAFT BEARING & OIL SEAL - DISCHARGE END

PB-1627

<u>Item No.</u>	<u>Part</u>
1	Bearing Housing
2	Bearing Cap
3	Seal Housing - Inner Oil Seal
4	Seal Housing - Inner Oil Seal
5	Inner Seal Labyrinth
6	Outer Seal Labyrinth
7	Inner Floating Ring
8	Outer Floating Ring
9	Oil Slinger
10	Bearing Liner
11	Seal Ring Spring
12	Dowel Pin
13	Dowel Pin
14	Dowel Pin
15	Dowel Pin
16	Dowel Pin
17	Dowel Pin
18	Dowel Pin
19	Capscrew
20	Capscrew
21	Setscrew
22	Machine Screw
23	Capscrew
24	Setscrew
25	Capscrew
26	Pull Dowel & Nut
27	Gasket - Inner Seal
28	"O" Ring
29	"O" Ring
30	Screw- Wire Locking
31	Locking Wire

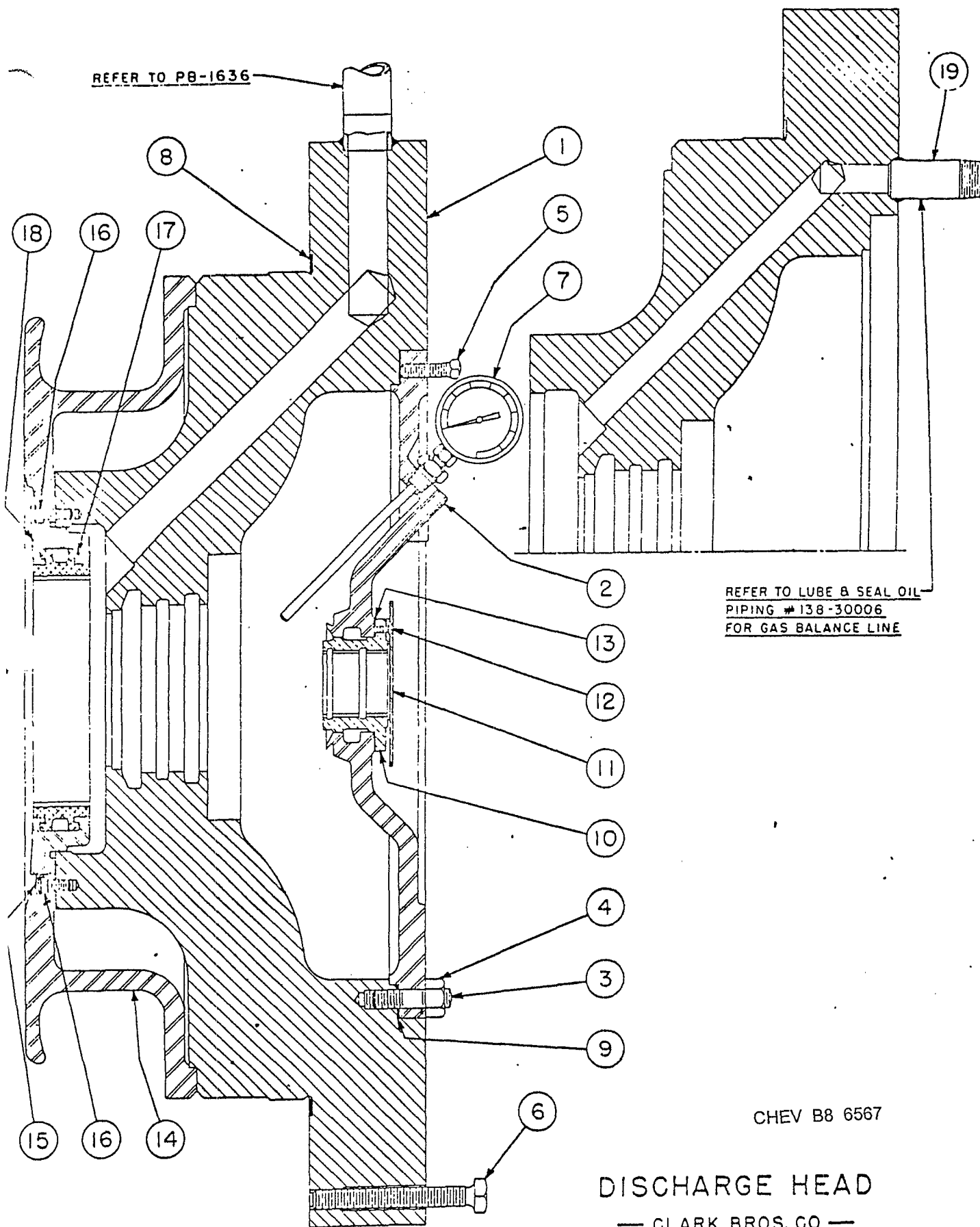
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SHAFT BEARING, THRUST BEARING & OIL SEAL INTAKE END

PB-1628

<u>Item No.</u>	<u>Part</u>
1	Bearing Housing - Intake End
2	Bearing Cap - Intake End
3	Thrust Bearing Cover
4	Seal Housing - Inner Oil Seal
5	Seal Housing - Inner Oil Seal
6	Seal Labyrinth - Inner
7	Seal Labyrinth - Outer
8	Floating Ring - Inner
9	Floating Ring - Outer
10	Bearing Liner
11	Thrust Disc
12	Base Ring -L.H.
13	Thrust Bearing Shoes - L.H.
14	Base Ring - R.H.
15	Thrust Bearing Shoes - R.H.
16	Oil Slinger
17	Dowel Pin
18	Dowel Pin
19	Dowel Pin
20	Dowel Pin
21	Dowel Pin
22	Dowel Pin
23	Dowel Pin
24	Capscrew
25	Capscrew
26	Capscrew
27	Capscrew
28	Capscrew
29	Setscrew
30	Machine Screw
31	Setscrew
32	Machine Screw
33	Pipe Plug
34	Pull Dowel & Nut
35	Thrust Bearing Seal Ring
36	Seal Ring Spring
37	"O" Ring Silicone
38	"O" Ring Silicone
39	Gasket Inner Seal
40	Thrust Bearing Housing Gasket
41	Retaining Pin
42	Screw - Wire Locking
43	Locking Wire

REFER TO PB-1636



REFER TO LUBE & SEAL OIL
PIPING #138-30006
FOR GAS BALANCE LINE

CHEV B8 6567

DISCHARGE HEAD

— CLARK BROS. CO. —

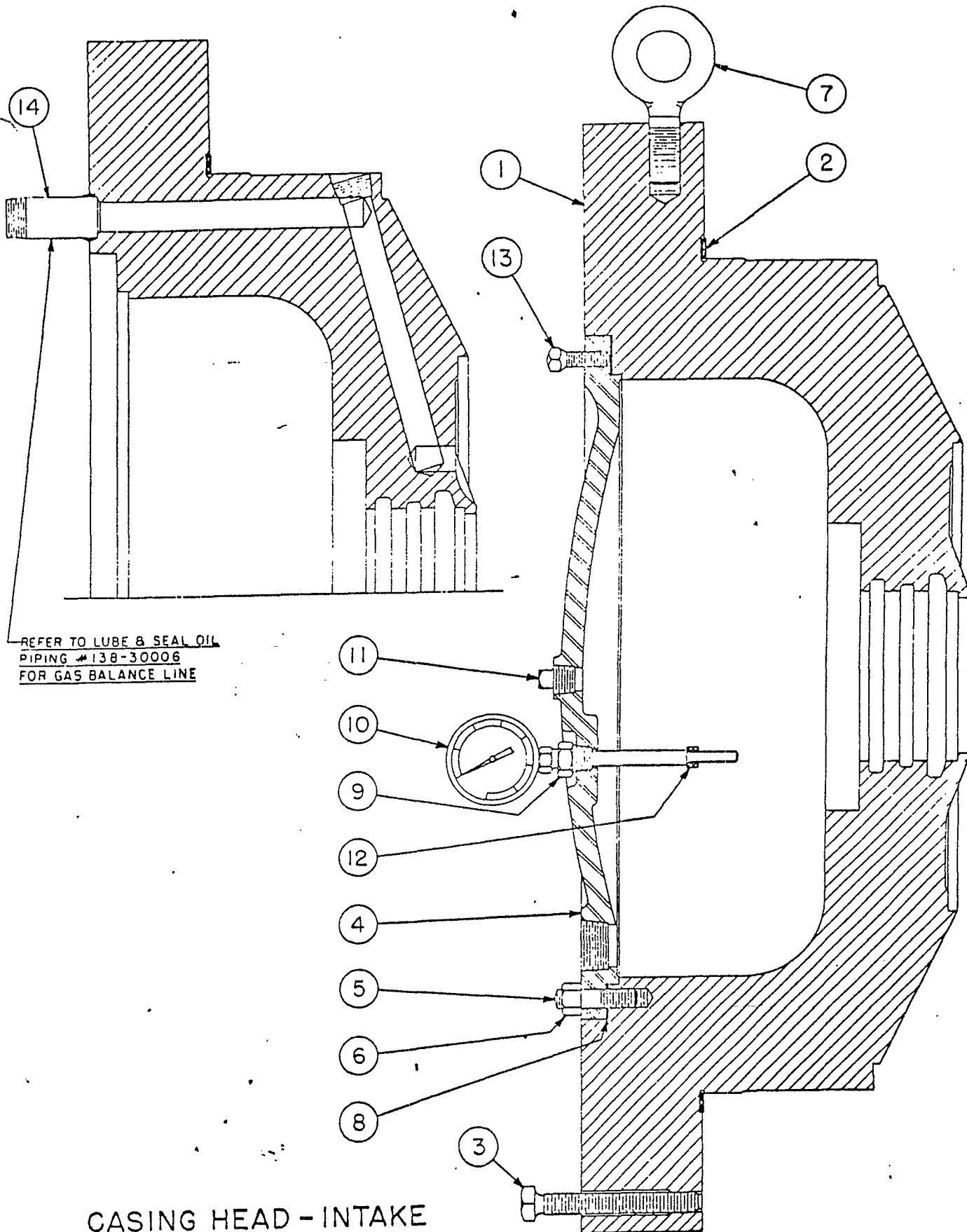
PB-1633

DISCHARGE HEAD

PB-1633

<u>Item No.</u>	<u>Part</u>
1	Discharge Head
2	Discharge Head End Cover
3	Stud
4	Nut
5	Setscrew
6	Setscrew
7	Thermometer 12" Stem with Separable Socket
8	Gasket - Flexitallic
9	Gasket - End Cover
10	Shaft Seal Labyrinth
11	Baffle
12	Fill Hd. Screws Socket Head (Baffle)
13	Shaft Seal Labyrinth Gasket
14	Discharge Volute
15	Screw - Locking Plug
16	Capscrew
17	Balance Piston Labyrinth
18	Labyrinth Ring
19	Steel Nipple
*	Fillister Head Machine Screw
*	Dowel-End Cover
	*Not Shown on Drawing

LTS:mkw:12-3-75



CASING HEAD - INTAKE

— CLARK BROS. CO. —

PB-1634

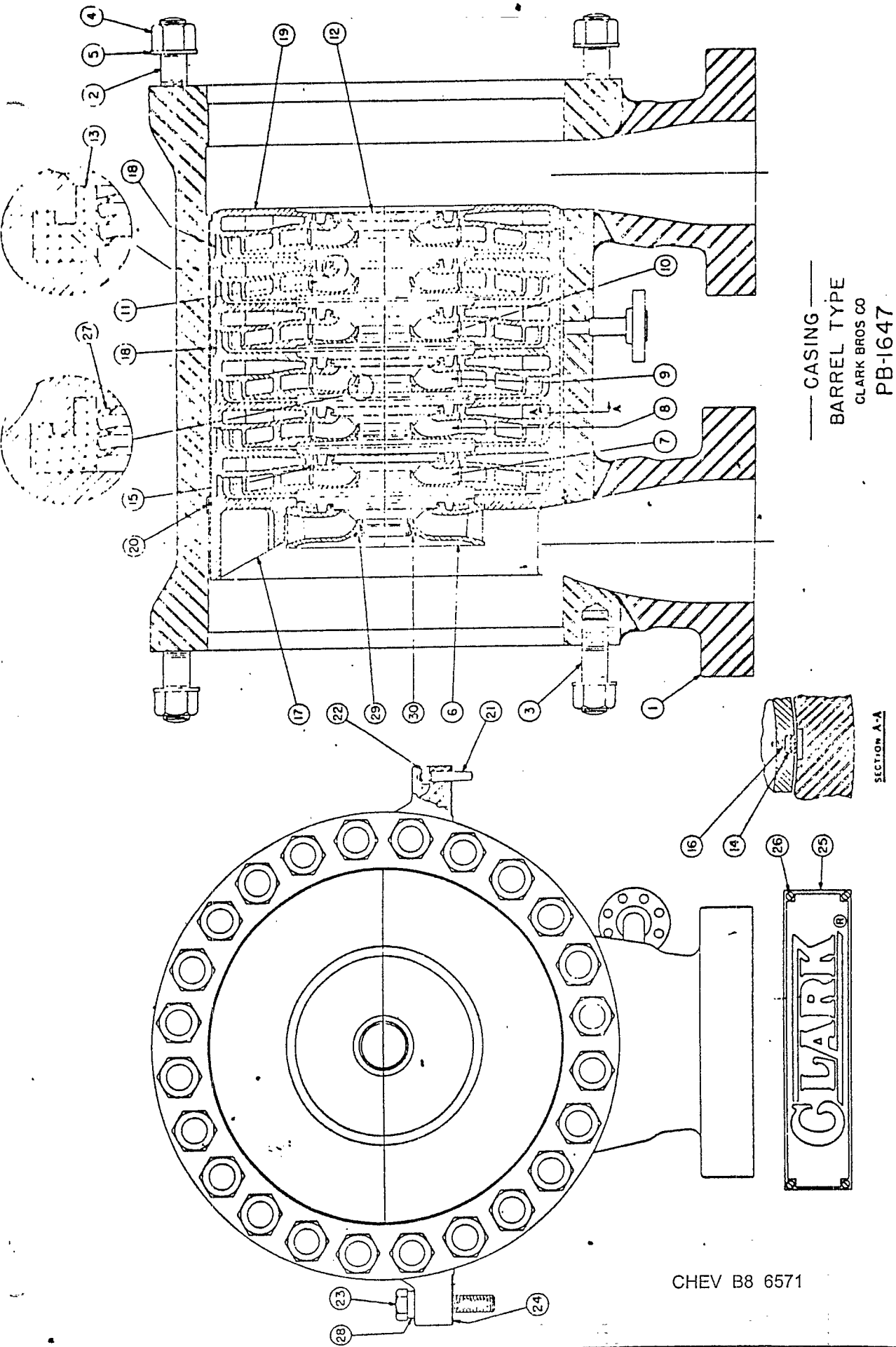
CHEV B8 6569

CASING HEAD INTAKE

PB-1634

<u>Item No.</u>	<u>Part</u>
1	Casing Head - Intake
2	Gasket Flexitallic
3	Setscrew
4	Casing Head End Cover
5	Cover Stud
6	Nut
7	Eyebolt
8	Gasket - Casing Head End Cover
9	Separable Socket
10	Thermometer
11	Pipe Plug
12	Thermometer Bushing
13	Setscrew
14	Steel Nipple

LTS:mkw:12-3-75



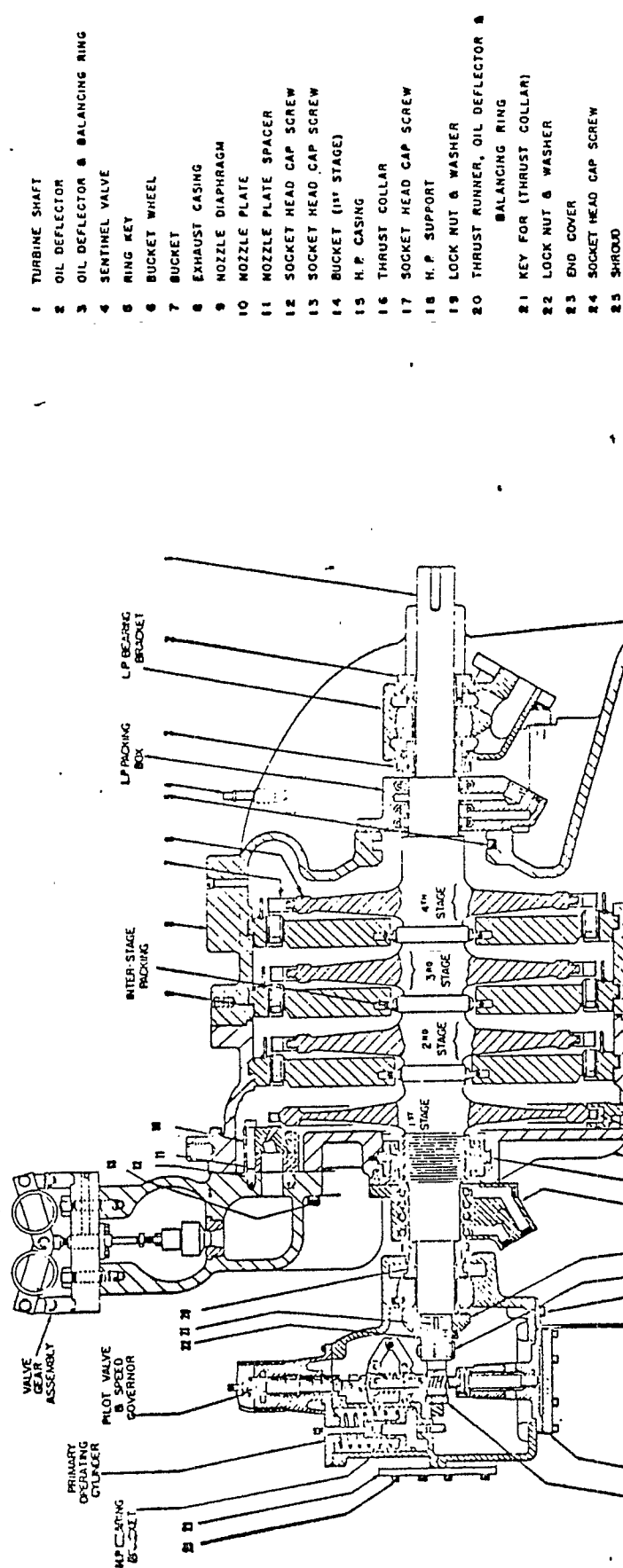
— CASING —
 BARREL TYPE
 CLARK BROS CO
 PB-1647

CHEV B8 6571

CASING #3-7 STAGE BARREL TYPE COMPRESSOR

PB-1647

<u>Item No.</u>	<u>Part</u>
1	Casing
2	Head Studs
3	Head Studs
4	Nuts
5	Washer for 3" Studs
6	Inlet Guide 1st Stage Agst
7	Inlet Guide 2nd Stage Rad.
8	Inlet Guide 3rd Stage Rad.
9	Inlet Guide 4th Stage Rad.
10	Inlet Guide 5th Stage Rad.
11	Inlet Guide 6th Stage Rad.
12	Inlet Guide 7th Stage Rad.
13	Labyrinth Ring - Large
14	Internal Assembly Key
15	Dowel Pin
16	Machine Screw
17	Inlet Wall "E" Impeller
18	Sawtooth Diaphragm Between 1st & 2nd , 2nd & 3rd, 3rd & 4th, 4th & 5th Stages
19	Sawtooth Diaphragm Last Stage
20	"O" Ring
21	Full Dowel
22	Nut
23	Bolt
24	Compressor Foot Shim
25	Name Plate
26	Parker Kalon Drive Screw
27	Labyrinth Ring - Small
28	Washer - Compressor Foot
29	1st Stage Inlet Guide Labyrinth
30	Screw Cap (1st Stage Inlet Guide Labyrinth)



101A30003

FIG.1 TURBINE ASSEMBLY

HOW THE DRV GOVERNOR OPERATES

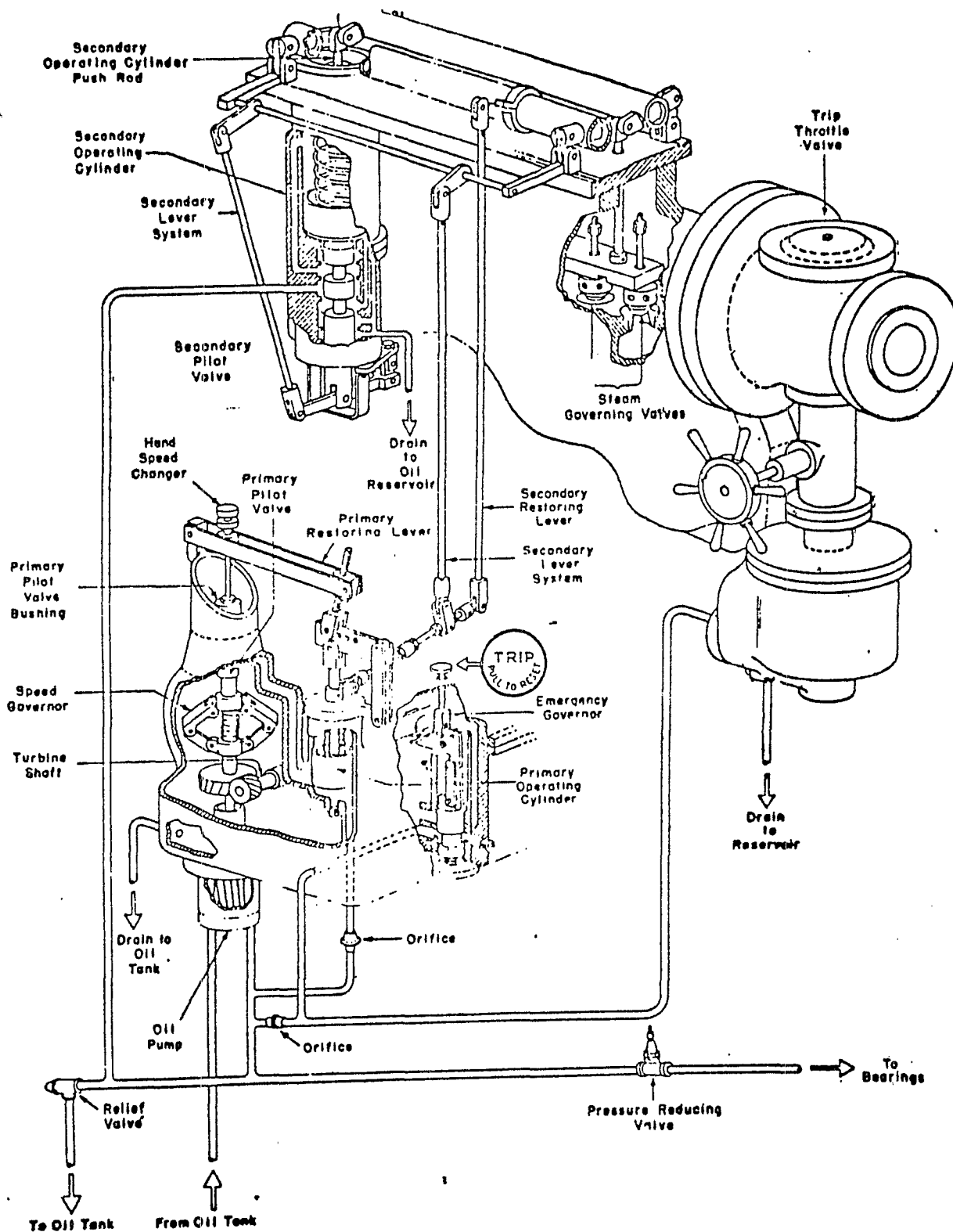
C-400A&B COMPRESSOR

The DRV governing system is a double relay hydraulic servomechanism. The flyweight mechanism, geared to the turbine shaft, adjusts the position of a pilot valve which controls the oil pressure in the primary hydraulic cylinder. The primary hydraulic cylinder actuates a secondary pilot valve, which in turn controls the position of a secondary hydraulic operating piston connected to the governing valves through a mechanical linkage. In this manner, power amplification is obtained to insure more than adequate force to accurately position the valves and provide sensitive governing.

Oil is supplied at constant pressure to the hydraulic system by means of a positive displacement oil pump driven by the turbine shaft through gearing, or by means of an auxiliary motor or a steam driven oil pump. This oil is used to supply lubrication for the bearings and gears as well as to supply hydraulic power for the governing system.

The hydraulic power oil is supplied to the system through the metering orifice. The flyball speed governor, driven by the turbine shaft, positions the pilot valve and establishes a relative ratio between the orifice feed area and the pilot valve drain area. This area ratio establishes oil pressure to the operating piston. If the speed increases, the governor weights move out, drawing the pilot valve downward. The pilot valve movement drains oil away faster than this orifice can furnish it and oil flows from the primary piston toward the pilot valve, lowering the pressure under the primary piston, and causing it to move downward. When the primary piston moves downward, the secondary pilot valve is also moved downward through a mechanical linkage system. This increases the oil pressure on the upper side of the secondary operating piston and decreases the oil pressure on the lower side. The secondary operating piston then moves down which closes the steam control valves through the mechanical linkage between the piston and the valves. Upon a drop in turbine speed the system acts in reverse.

As both the primary and secondary pistons assume new positions, they adjust the position of a bushing located around the primary pilot valve to modulate the pilot valve drain area in such a manner as to oppose the initial change. This function called "restoring" prevents speed or load overshoot and results in stable governing.



SCHEMATIC DIAGRAM OF GOVERNING SYSTEM OF G-E TYPE DRY MULTI-STAGE TURBINE.

REV. 10-11-20

SMALL TURBINE AND SUPERCHARGER DEPARTMENT

GENERAL  ELECTRIC

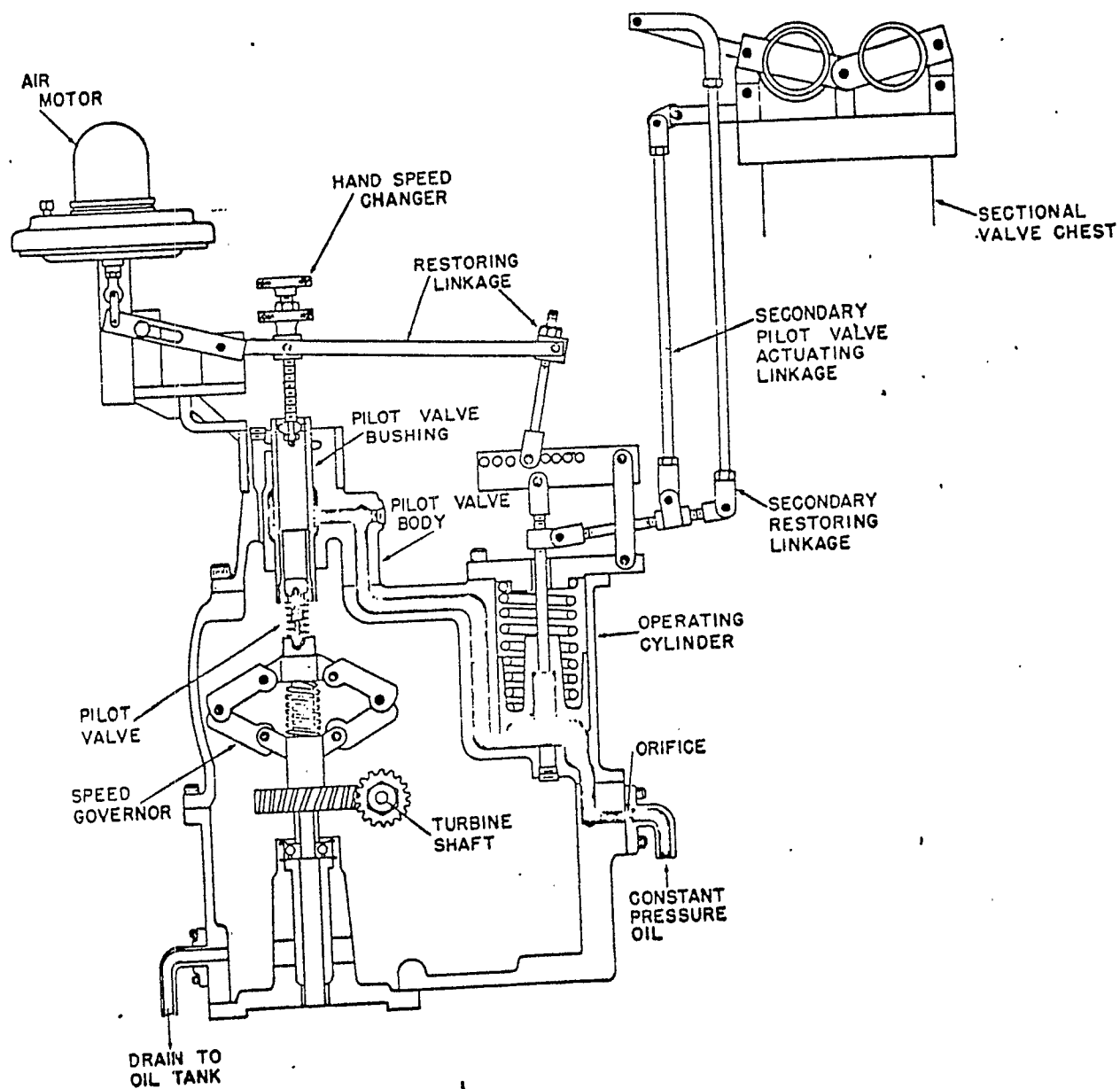
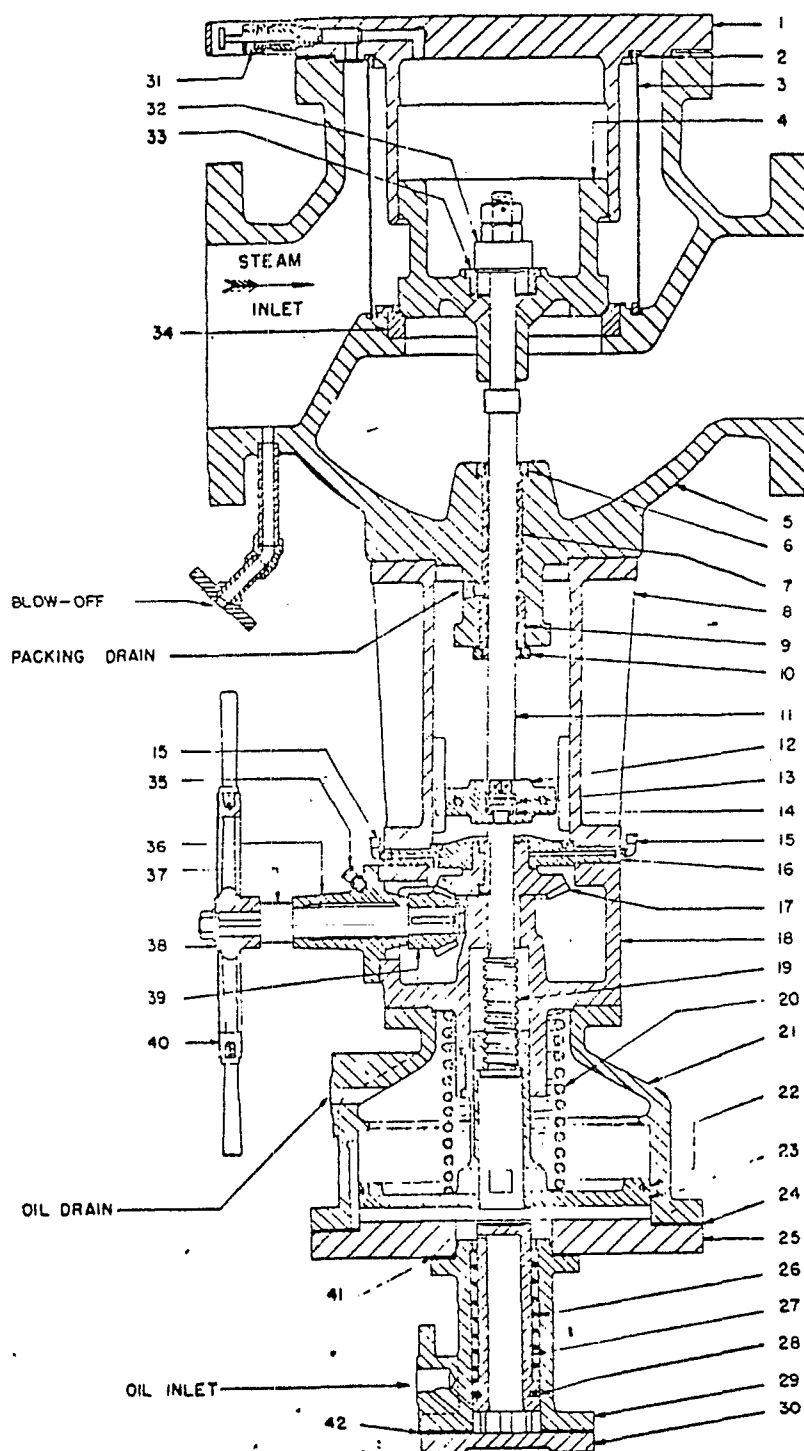


FIG. 1 PRIMARY RELAY

104A32204



- 1-COMB CYLINDER AND COVER
- 2-GASKET
- 3-STRAINER
- 4-POPPET
- 5-BODY
- 6-BUSHING RET. RING
- 7-BODY BUSHING (LONG)
- 8-YOKE
- 9-BODY BUSHING (SHORT)
- 10-BUSHING RET. PLATE
- 11-VALVE STEM
- 12-COUPLING
- 13-THRUST WASHER
- 14-SPINDLE WASHER
- 15-OIL CUP (ANGLE)
- 16-GEAR SPACER
- 17-BEVEL GEAR
- 18-GEAR HOUSING
- 19-SPINDLE
- 20-SPRING
- 21-OIL CYLINDER
- 22-PISTON RING
- 23-PISTON
- 24-GASKET
- 25-CYLINDER COVER
- 26-PILOT VALVE SPRING
- 27-PILOT VALVE PISTON
- 28-PILOT PISTON RING
- 29-PILOT VALVE CYLINDER
- 30-PILOT VALVE COVER
- 31-ADJUSTABLE SCREW ASSEMBLY
- 32-PILOT POPPET
- 33-PILOT POPPET SEAT
- 34-BODY RING
- 35-OIL CUP (STRAIGHT)
- 36-PINION GUIDE COVER
- 37-PINION SHAFT
- 38-HANDWHEEL
- 39-BEVEL PINION
- 40-NAMEPLATE
- 41-GASKET
- 42-GASKET

LUBE OIL SYSTEM C-400A&B COMPRESSORS

As can be seen by reference to the oil piping diagram, oil for governing and lubrication of the turbine and driven equipment is furnished by an electric driven oil pump. An auxiliary turbine driven oil pump is connected as shown in the diagram for the purpose of raising oil pressure in the system and for starting if the main electric driven oil pump is inoperative, or in the event the main oil pump fails to maintain the required pressure. These pumps draw oil from the Lube Oil Reservoir and deliver it under pressure to the governing system of the turbine and lubrication systems of both turbine and driven equipment.

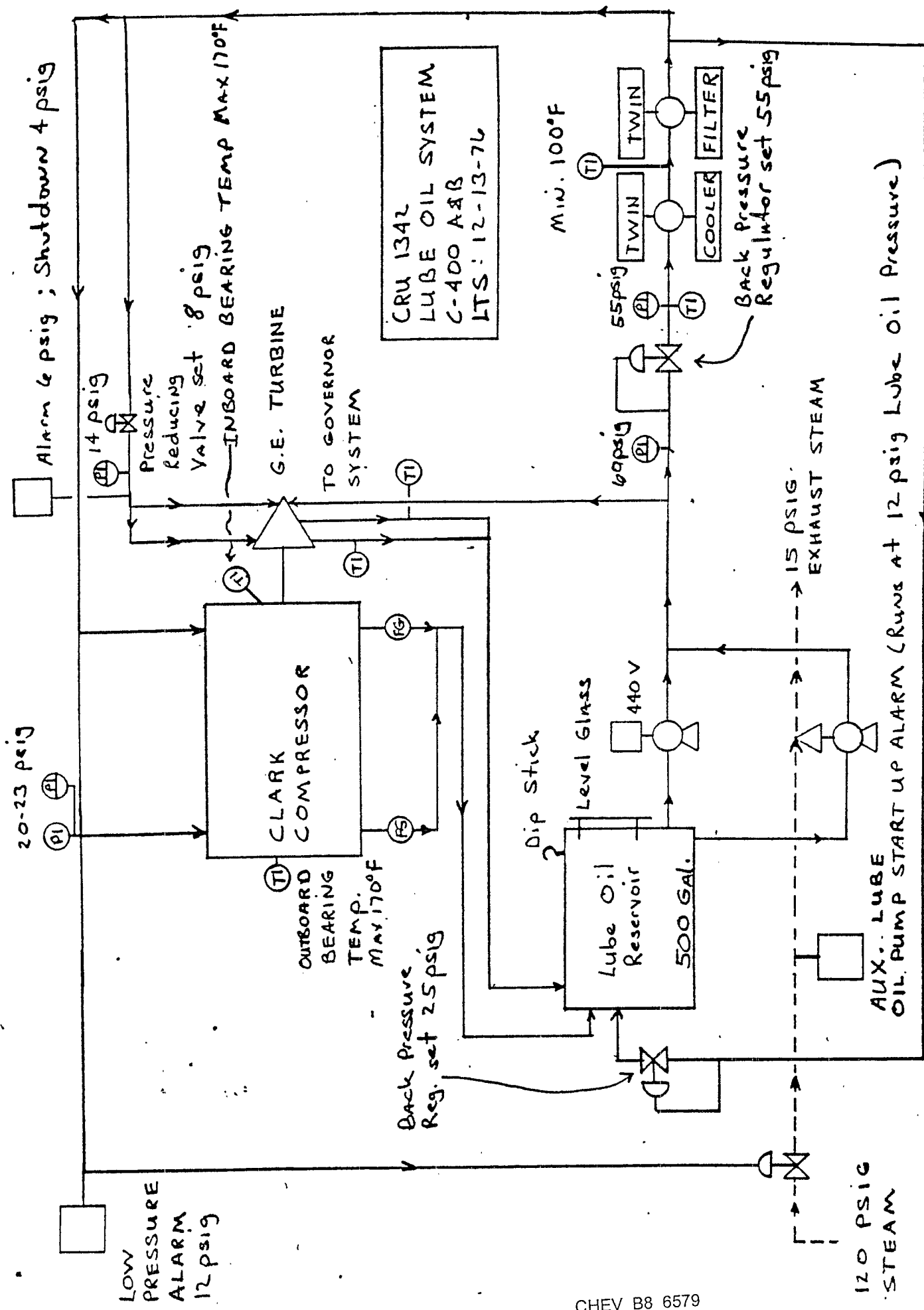
From the discharge of the lube oil pump the oil flows to the governor or through twin coolers, then twin filters and then to the journal and thrust bearings of the compressor and turbine. After the oil emerges from the bearings, it is collected in the bottom of the bearing chambers and drained back to the Lube Oil Reservoir.

The pump and bearing pressures can be checked by means of pressure gages inserted in the lines. The main pump pressure is held at 55 PSIG by a back pressure regulator located before the twin coolers. This is the pressure of the oil supplying the governor. The pressure of the lube oil to the compressor bearings is held at 20 to 23 PSIG by a back pressure regulator that dumps excess oil back into the reservoir. The lube oil to the turbine bearings is held at 12 to 14 PSIG by a pressure reducing valve located before the bearings.

Lube Oil Alarm Signals And Switches

1. Low lube oil pressure set to alarm and start auxiliary lube oil pump at 12 PSIG decreasing pressure. Set to trip turbine at 8 PSIG decreasing pressure.
2. Low turbine bearing pressure set to alarm at 6 PSIG and to trip turbine at 4 PSIG decreasing pressure.
3. Alarm sounding when auxiliary lube oil pump starts.

LTS:mkw:12-14-76



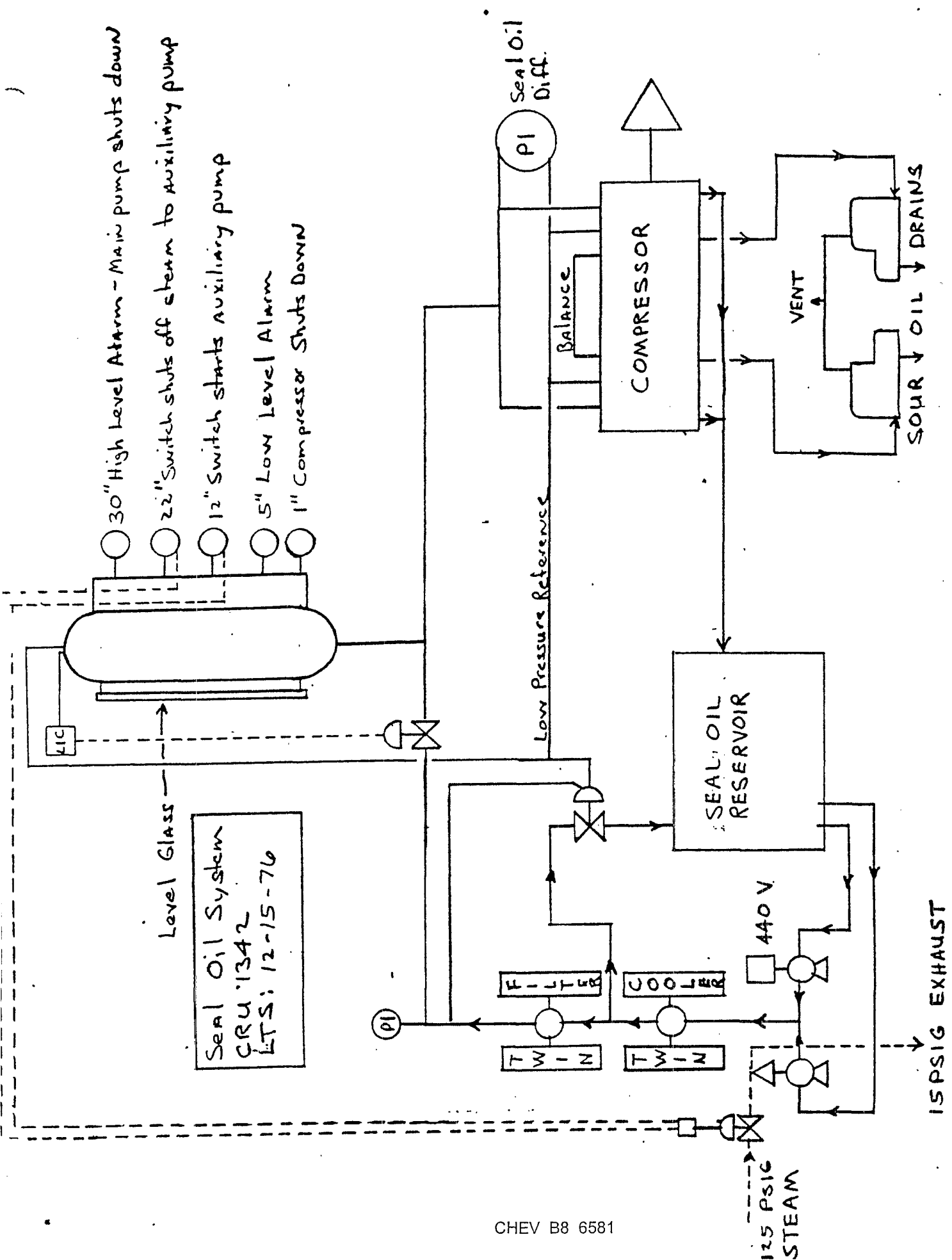
Seal Oil System C-400A&B Compressors

The sealing system acts as a gas tight seal between the compression chamber and the bearing chamber. A further result is the complete absence of contamination of the lube oil by the gas being handled.

The seal oil pump receives its suction from the Seal Oil Reservoir. From the pump, the seal oil flows through the Seal Oil Coolers to a pressure controller which maintains a pressure about 100 psig above the compressor inlet pressure by dumping excess oil back to the reservoir. From the coolers, the oil also flows through the Seal Oil Filters to a level controller that holds a level in the Seal Oil Tank. When the level in the Seal Oil Tank falls below 12 inches, the auxiliary seal oil pump is automatically started. If the level continues to fall a low level alarm sounds at 5 inches of level. When the level falls to 1 inch in the tank, the compressor will be automatically shutdown. This is done by an electrical signal sent from the magnetrol on the seal oil tank which energizes a solenoid operated valve in the lube oil pressure line to the trip throttle valve operating cylinder. When energized, the valve dumps the oil from the cylinder back to the reservoir, thus shutting down the compressor. If the level rises to 22 inches the steam is shut off to the auxiliary seal oil pump. If the level continues to rise to 30 inches, a high level alarm sounds and the main electric seal oil pump shuts down.

The seals are located within the case at the point where the shaft enters the compression chamber from the bearing chamber. The oil entering the seals flows in two directions; inward toward the compression chamber, and outward into the bearing chamber. The oil flowing inward forms a gas-tight seal between the stationary seal sleeve and the rotating shaft. This oil ultimately reaches a row of drainage ports which are channeled into a seal oil drain line to the sour oil traps. The oil flowing outward into the bearing chamber is returned to the reservoir.

LTS:mkw:12-30-76



CHEV B8 6582

C-100 A B 3 C

7
DWMDC

CENTRIFUGAL PUMPS

The simplest type of centrifugal pump is the single stage machine which consists fundamentally of a rotating element, called an impeller, and a casing. Liquid is led to the eye or center of the impeller and is set into rotation by the impeller vanes. By virtue of centrifugal force the liquid is thrown from the rim or periphery of the impeller with a considerable velocity and pressure. The casing which closely surrounds the impeller, has a volute shaped passage of increasing area which collects the liquid leaving the impeller and converts a portion of its velocity energy into additional pressure energy. This casing passage leads to the discharge nozzle of the pump from which piping conducts the liquid to its place of use.

Regulation and Characteristics

Pressure and volume delivered by a centrifugal pump are best controlled by throttling the discharge valve, provided the pump is driven by an electric motor. If the pump is driven by a steam turbine, it is best to throttle the steam to the turbine. Less steam is used and better efficiency results, except at very low rates.

Because most centrifugal pumps are run by electric motors at constant speed, it is customary for the pump manufacturer to test each pump, and to supply the customer with a set of test curves which show the effect of throttling the discharge valve on the performance of the pump. Figure 9 shows a typical set of curves. The graph has its horizontal scale divided off in barrels per hour volume delivered by the pump. The vertical scale at the left shows pump pressure either in psi or in feet of water head. Water is used as the test medium because it is always readily available.

The curves are called "characteristic curves" because they show the character of the pump no matter how it is operated, as long as two conditions are present: (a) it is handling the stock used in the test (water in this case) and (b) it is operating at the test speed (3500 rpm in this case). For newer pumps, the curves are included in the plant photostat books. These curves tell the operator what to expect from the pump.

The head capacity, or pump pressure curve, is important as it shows the pressure is maximum at shutoff. This curve also shows that the pressure drops off as flow is increased by opening the discharge valve. With the valve wide open the flow is maximum for the resistance in the piping. If resistance of the piping system is gradually removed, the volume will increase and pressure decrease to a point called the "cutoff". At cutoff, the volume is maximum and pressure quickly drops to zero. For other stocks and other speeds, the shape of the curve is the same. Higher viscosity shifts it down; higher gravity shifts it up. Throttling the steam to slow down a turbine drive shifts the head capacity curve down. It also shifts the power curve down, which is an advantage.

If the scale values in psi are divided by 0.43, which is the pressure exerted by one foot of water, the result is head in feet. If the head (in feet) is multiplied by 0.43, the result is pressure in psi when pumping water. The head (in feet) indicates how far the stock would rise in a standpipe on the discharge of the pump. The head (in feet) is the same regardless of the gravity of the stock. It depends on the speed with which each drop is thrown from the impeller. Consider two balls of the same size. A lead ball spun on a string will go the same distance or just as high in the air as a steel ball for the same speed, but the lead will hit harder, giving more pounds of pressure. Likewise, gasoline in a standpipe on the discharge of the centrifugal pump will rise to the same height as water; but psi pressure at the bottom of the pipe will be more for water because it is heavier.

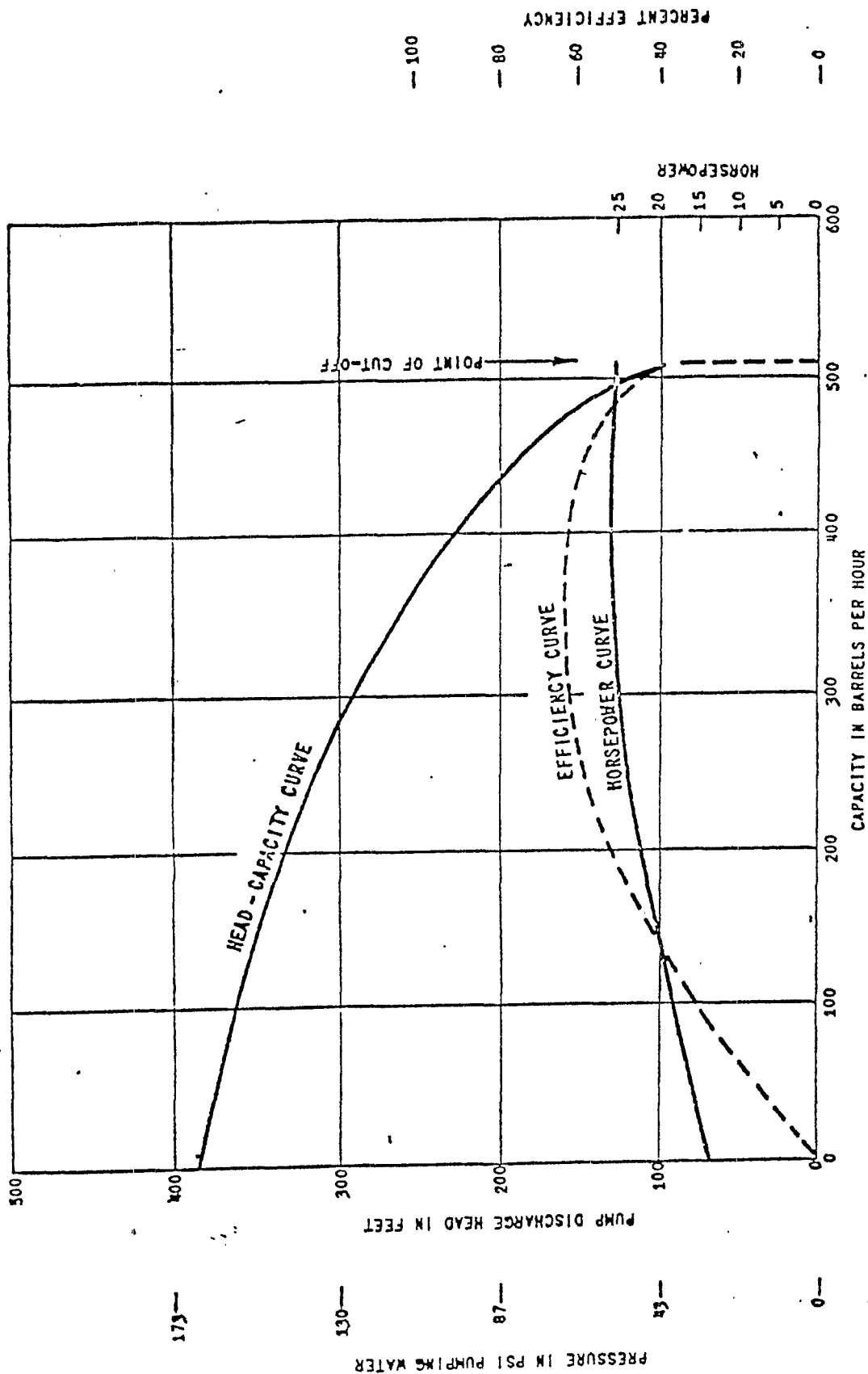
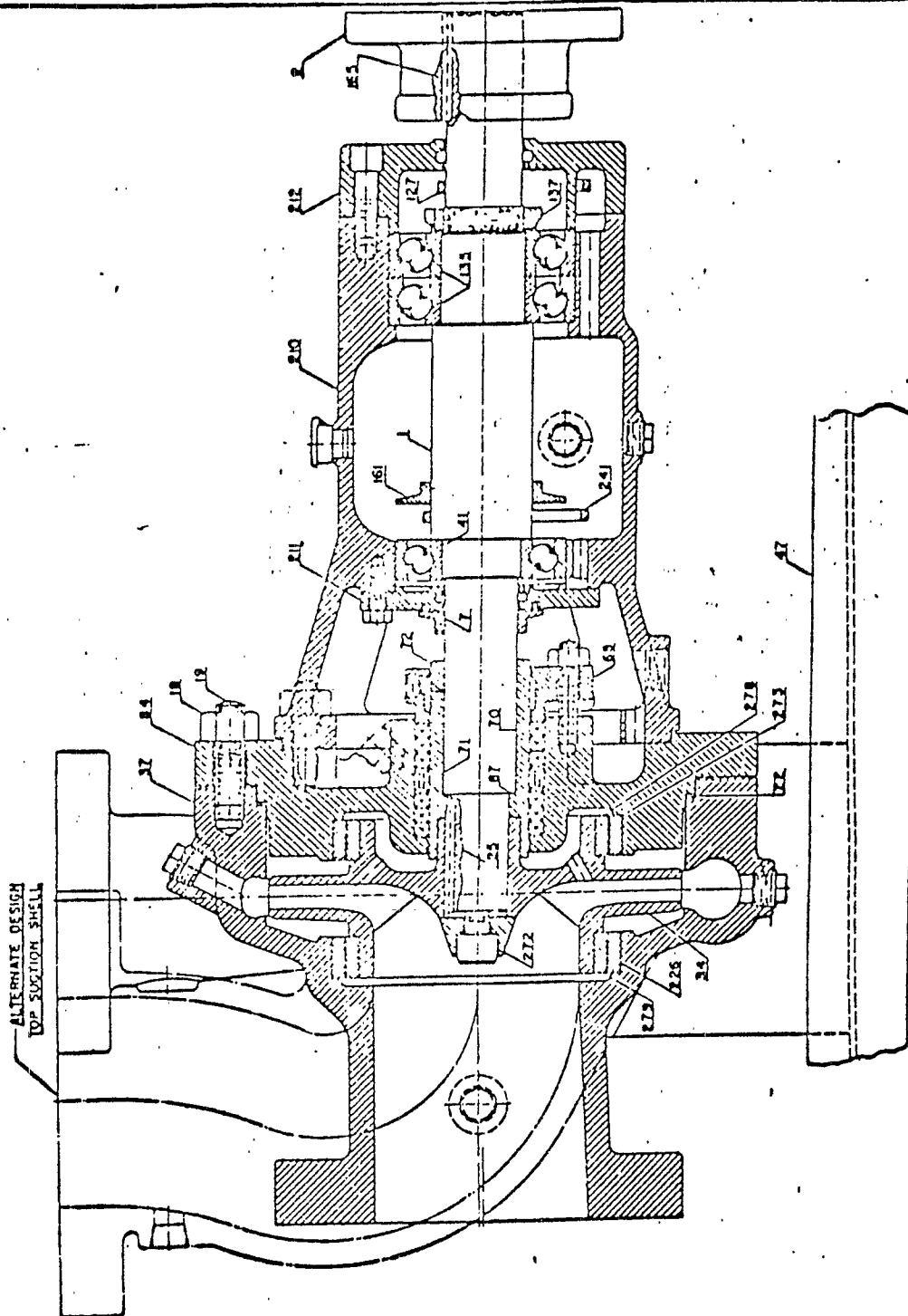


Figure #9

TYPICAL CHARACTERISTIC CURVES



	NAME OF PART
1	PUMP SHAFT
2	FLEXIBLE COUPLING
3	DEFLECTOR RING
4	SHELL NUT
5	SHELL STUD
6	HEAD GASKET
7	IMPELLER KEY
8	IMPELLER
9	S-FL
10	RACE
11	PACKING GLAND
12	PACKING
13	LANTERN RING
14	S-A-JT SLEEVE
15	HEAD
16	S-A-JT SHOULDER GASKET
17	OUNG RING - THRUST
18	THRUST BALL BEARING
19	BEARING LOCKNUT & WASHER
20	OIL SLINGER
21	FLEXIBLE COUPLING KEY
22	BALL BEARING HOUSING
23	RADIAL BEARING COVER
24	THRUST BEARING COVER
25	SHELL WEARING RING
26	OILING RING - RADIAL
27	IMPELLER WASHER & CAPSCREW
28	HEAD WEARING RING
29	IMPELLER WEARING RING- HEAD SIDE
30	IMPELLER WEARING RING-SHELL SIDE

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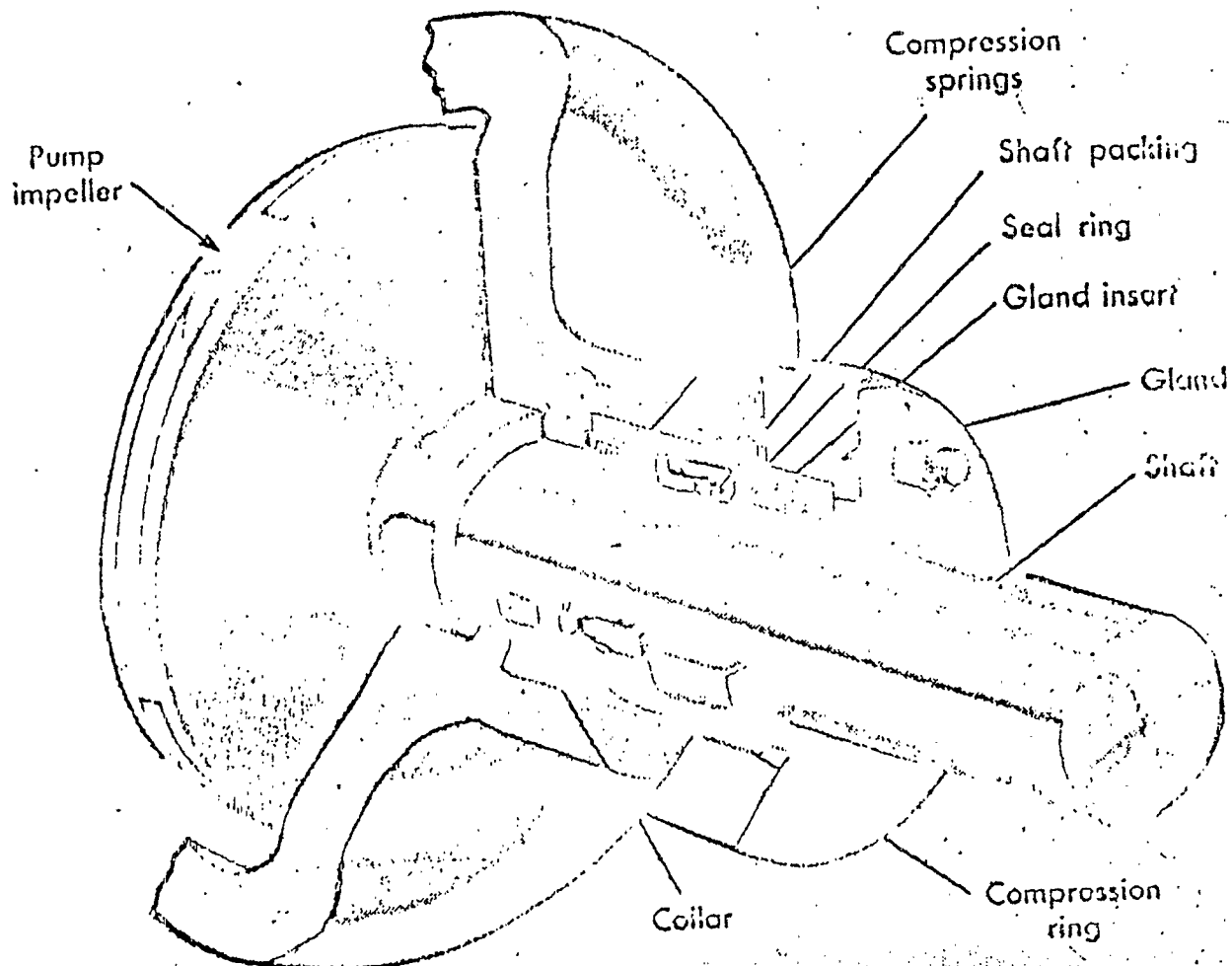


Fig. 5
DURA-SEAL MECHANICAL SEAL

FUNDAMENTALS OF MECHANICAL SEAL OPERATION

MECHANICAL SEAL REQUIREMENTS

Before we determine how a mechanical seal operates, it is necessary to thoroughly understand the nature of the job it is called upon to perform.

Perhaps the most frequently encountered requirement for sealing a rotating shaft is found on a centrifugal pump. Figure I-A illustrates the

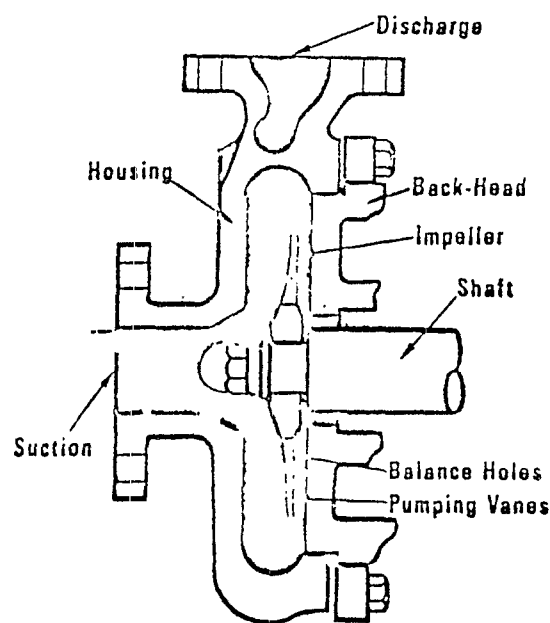


FIG. I-A
CENTRIFUGAL PUMP LIQUID END

liquid end of a typical centrifugal pump. The liquid to be pumped enters the suction inlet at the eye of the impeller. As the impeller rotates, at relatively high speed, liquid occupying the space between the vanes is held captive by the close clearance that exists between the front of the impeller and the pump housing or volute.

Having no other path of escape, the liquid is centrifugally forced to the outside diameter of the impeller where it flows out through the discharge nozzle. At the point of discharge, the pressure of the liquid is many times higher than it is at the suction inlet, which accounts for the centrifugal pump's ability to push liquid to heights far above the pump. This same discharge pressure, however, flows down behind the impeller to the drive shaft which is connected to a driver outside the pump. This is the shaft that must be efficiently sealed if the pump is to be of any practical use.

To make the job of sealing the drive shaft somewhat easier, most pump manufacturers relieve some of the pressure behind the impeller. For example, on an open impeller pump, this is usually accomplished in either one of two ways, or a combination of both. Considering that the clearance between the back of the impeller and the pump back-head is actually much closer than shown in our illustration, small pumping vanes are often placed on the back side of the impeller. Although not as large or as efficient as the vanes on the front of the impeller, these smaller vanes will significantly reduce the pressure of the liquid trying to escape to the atmosphere from behind the impeller. In addition to pumping vanes, balance holes can also be drilled through the impeller to the suction eye, thus relieving the high pressure behind the impeller to the low pressure suction eye of the impeller. By decreasing the pressure differential between the front and rear of the impeller, these methods also greatly reduce the axial thrust on the shaft, thereby prolonging thrust bearing life. Even with the existence of pumping vanes and balance holes, suction pressure, plus usually a small percentage of discharge pressure, always surrounds the drive shaft. Therefore this shaft must be fitted with a reliable seal.

PACKED STUFFING BOX

As pointed out in the introduction, the earliest method conceived for performing the task of sealing a rotating shaft, was to compress some form of resilient material into an extension of the pump back-head, called the stuffing box. This eventually became known as packing.

Figure I-B shows a typical stuffing box sealed with square rings of compression packing. If this packing were to rub against the shaft, without lubrication present to prevent a build-up of

amount of lubrication. When this flow of lubrication exits from the packing, it becomes identified as leakage.

Other inconveniences associated with packing are adjustment and sleeve or shaft wear. It has already been suggested that because of certain irregularities, a particular ring of packing is periodically in contact and out of contact with the shaft. When the packing wears, or loses its resiliency, leakage increases. The packing must then be adjusted to bring the leakage under

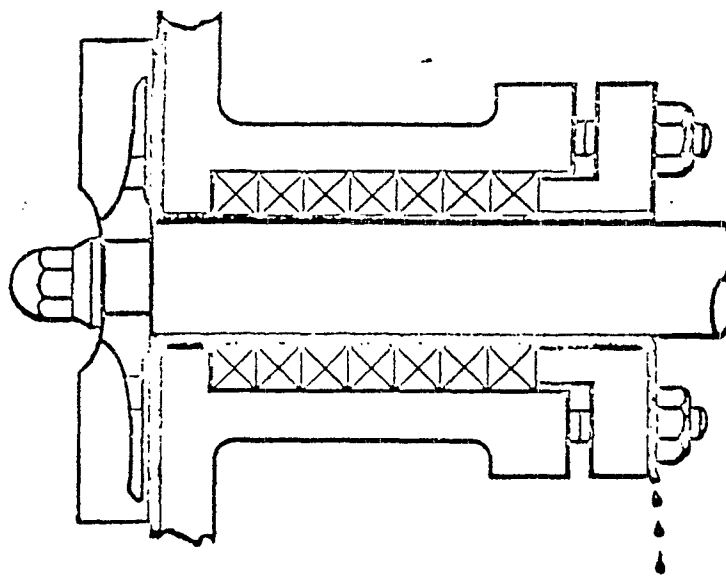


FIG. I-B TYPICAL STUFFING BOX WITH COMPRESSION PACKING

frictional heat, it would soon destroy itself. Therefore, a certain amount of the liquid being pumped—or some other liquid injected at high pressure from an outside source—must be allowed to flow between the packing and the shaft, as shown in Figure I-B. Because of the surface irregularities of packing, eccentricity between the stuffing box bore and the shaft, as well as normal shaft run-out, a significant amount of packing must be used to compensate for these irregularities. It is this generous amount of packing that requires a proportionately generous

control. This is a continuing maintenance program that can be easily measured in terms of dollars and cents.

These same irregularities also exert uneven pressure on the shaft and restrict lubrication flow at certain locations, producing wear on the shaft or shaft sleeve. When this wear has been allowed to become acute, stuffing box leakage increases drastically. The only solution to reducing the leakage is to incur the expense of a new or repaired shaft or shaft sleeve.

The best method of packing adjustment is to take up one flat on each side of the gland nut and wait a few minutes, allowing time for packing to refit itself to the shaft. After adjustment, the gland should be snug but still feel "live" and springy, not jammed in hard. When the gland is fully tightened it is time to remove all the old packing and full repack the pump. Adding a ring or two of new packing on top of the old can lead to chewing up the shaft sleeve. If the packing runs hot, an air hose can be used to cool the exterior of the stuffing box when breaking in new packing. Water hoses should not be used for this purpose, as they frequently cause water to get into the bearings.

Cavitation

All throttling of centrifugal pump should be done on the discharge and never on the suction line, to prevent cavitation. Cavitation is the formation of small bubbles of vaporized stock in the casing, followed by the violent collapse of these bubbles as they pass through the impeller, where pressure is suddenly increased. If the suction pressure gets below the vapor pressure of the stock at that temperature, vapor is formed. Often a noisy, growling sound is made by collapsing bubbles as they reach the area of high pressure.

It is estimated that, at the point of collapse, impact pressures of the order of 25,000 psi occur. Bits of metal are picked up from the surface of the impeller where the bubbles collapse. In time the impeller can be completely chewed away by cavitation. Cavitation has other bad effects. When cavitating, the impeller may be slammed up and down or back and forth by hydraulic unbalances. This can result in ruined packing, damaged shaft seals, burned-out bearings, and seized wear rings. The operator should look for cavitating conditions, before these troubles are experienced.

Pulling Air into the pump or losing suction can cause an effect similar to cavitation. Although lost suction may not cause pitting, the hydraulic unbalances created are even worse with regard to damaged bearings, packings, and seals. If left untended, a pump with lost suction will overheat, causing wear rings to seize and ultimately ruin the pump. He should operate at all times with the suction wide open and the discharge pinched back to where the pump case stays full of liquid and cavitation is avoided.

Preventative Maintenance

Preventative maintenance is necessary to insure proper operation of pumps, with a minimum of repairs. Reminders for ways of reducing repair costs, improving start-up and operation, and watching for danger signals are included in Figures 6 and 8

A SIMPLE MECHANICAL SEAL

Now that the problems associated with packing have been defined, let's see how a mechanical seal operates, and then, how it overcomes the objections to packing.

Figure I-C shows the parts of a simple mechanical seal. The coil spring, "O" ring shaft packing, and seal ring fit over the shaft and rotate with it. The spring can be made from any one of a number of materials. The selection of the material depends upon the corrosion resistance required to withstand attack from the product being pumped. Similar considerations are evaluated when selecting the "O" ring shaft packing material and seal ring material. The insert and insert "O" ring mounting are fitted into a bore provided in the gland ring. This entire assembly is then attached to the pump stuffing box, remaining stationary as the shaft rotates. The insert is made from carbon graphite which offers

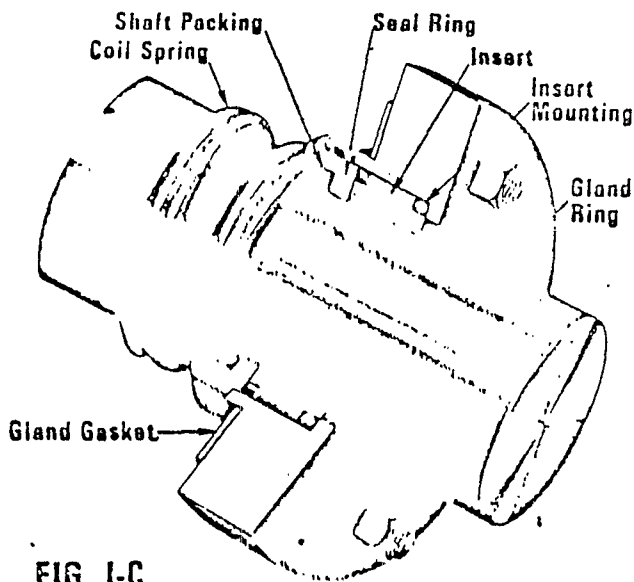


FIG. I-C
A SIMPLE MECHANICAL SEAL

a good bearing surface for a variety of seal ring materials to rotate against, and is inert to corrosive attack by most chemicals at a wide range of temperatures.

Figure I-D shows this simple seal completely assembled in the pump stuffing box. The coil spring rests against the back of the pump impeller, pushing the seal ring forward so that it

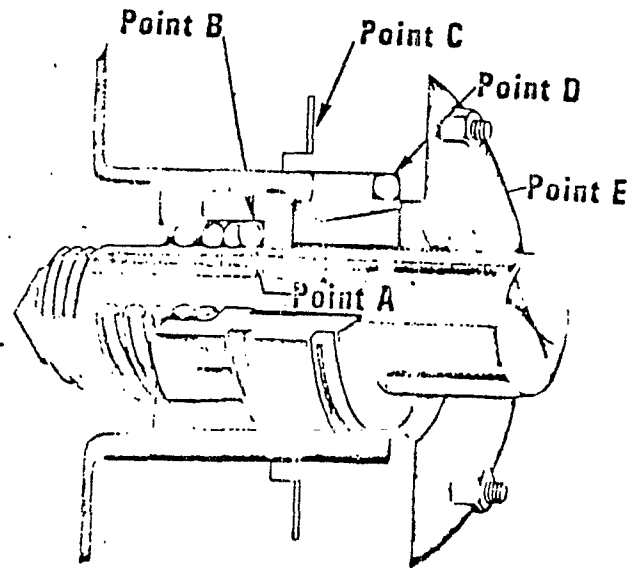


FIG. I-D
STUFFING BOX WITH MECHANICAL SEAL

remains in intimate contact with the stationary insert. Friction between the rotating pump shaft and shaft packing causes the seal ring to rotate with the shaft. Friction between the spring and the impeller, as well as the spring and the compressed "O" ring, is responsible for the spring rotating with the seal ring and shaft packing. The insert is positioned within the gland bore. The gland itself is bolted to the face of the stuffing box. Friction between the "O" ring insert mounting and the I.D. of the gland bore holds this part of the seal stationary as the shaft rotates within the bore of the insert.

SEALING POINTS

With our simple mechanical seal now properly assembled in the stuffing box, let's see how the liquid in the pump is prevented from es-

caping to the atmosphere. The path of the liquid down the shaft is blocked by the "O" ring shaft packing at Point A on Figure I-D. Liquid attempting to pass under the seal ring is blocked by the "O" ring shaft packing at Point B. Liquid attempting to pass over the seal ring is finally blocked from reaching the atmospheric side of the pump by the gland gasket; Point C, and the "O" ring insert mounting Point D. The path of escape remaining is the seam between the rotating seal ring and the stationary insert, Point E. This is where the real secret of the mechanical seal's efficiency lies.

The face of the seal ring and the face of the stationary insert are lapped to a flatness that is measured in millionths of an inch. Therefore, these faces remain in contact throughout their entire contact surface area, thereby providing a nearly positive seal. Just as in the case of packing, the faces must be lubricated, however. After all, these faces are, in a sense, friction bearing surfaces. But because the area of the bearing surface is only a fraction of that encountered with packing, and because the contact pressure is equally distributed throughout the interface, much less lubrication is required. Consequently, a correspondingly smaller amount of lubrication passes between the seal faces to exit as leakage. Whereas most packing depends upon a measurable flow of liquid between it and the shaft for lubrication, the mechanical seal faces ride on a microscopic film of liquid that is able to migrate between them. Indeed it is true that when this film reaches the atmosphere, it can be classified as leakage. This leakage is usually so slight, however, that it will vaporize before it can be visually detected. Where liquids that do not readily evaporate, such as wax, are being sealed, minor accumulations may be detectable under the gland, but only after many hours of operation.

ADVANTAGES OF A MECHANICAL SEAL

We have seen how a mechanical seal offers a much more positive seal than packing. It is im-

portant to note that the mechanical seal also overcomes the other major objections to packing mentioned earlier in this section. Since the spring exerts constant pressure on the seal ring, the mechanical seal automatically adjusts for wear at the faces, thereby eliminating the need for manual adjustment. Also, because the bearing surface is between the rotating and stationary parts of the seal, the shaft or shaft sleeve does not become worn. Only the seal, not the shaft or sleeve, will eventually require replacement. Only a mechanical seal offers the user long maintenance-free and leak-free life. It is not unusual for a mechanical seal to function flawlessly for more than 15,000 hours of operation.

Although a mechanical seal is more difficult to install than packing, it offers many advantages not available in a packed pump.

Wear Rings

The wear rings keep liquid from bypassing inside the case of a centrifugal pump from the discharge back to the suction. The wear rings are installed in pairs, with a pair on each side of the impeller. A matching set of wear rings can be seen on the left impeller in Figure 3 & 4. The clearance between rings is kept small for the sake of efficiency. In a good pump not over 5% of the liquid pumped leaks past the wear rings.

If the clearance is too small, the wear rings may cut and seize, or even ruin the pump. More clearance is needed for hot stocks. Seizing may be caused by unequal thermal expansion or by foreign material in the stock. Some liquid always leaks past the wear rings whenever the pump is operating and in time, as they wear the clearance gets greater. Wear is hastened by gritty material in the stock. In time, so much efficiency is lost that the pump can no longer handle the job and must be shut down for installation of new wear rings.

Centrifugal Pump Bearings

Bearings must support the weight of the shaft and impeller and absorb whip or hydraulic pressures. They must support both radial loads and withstand end thrust due to hydraulic unbalance. Radial and thrust loads may be handled by the same or by separate bearings.

A sleeve bearing consists of (a) the journal, which is smooth surface machined on the steel shaft, and (b) the sleeve, which is a tube of softer material fitted over the journal, and usually split to make it removeable. They are fixed to and rotate with the shaft. Sleeves are usually babbitt lined or bronze.

A ball bearing consists of an inner race, an outer race, a set of balls, and a cage or rack to space the balls equally around the races. They are either ring oiled like as shown in Figures 2 & 4 or level oiled. In the level oiled type the oil level is about half way up on the bottom ball. Correct oil level is highly important for this type. If too low, the bearing may run dry and burn out. If too high, the oil will foam, choking up the housing and cause the bearing to overheat and burn out.

The bearing housing must be vented to allow breathing as oil temperature changes. It is also fitted with a filler and inspection hole on top and a drain plug on the bottom. Correct oil level is usually marked on the sight glass. It is regulated by a drip bottle.

The bearing housing is water jacketed and cooling water is piped through the jacket. Water and dirt must be kept out of bearing housings, and should be checked

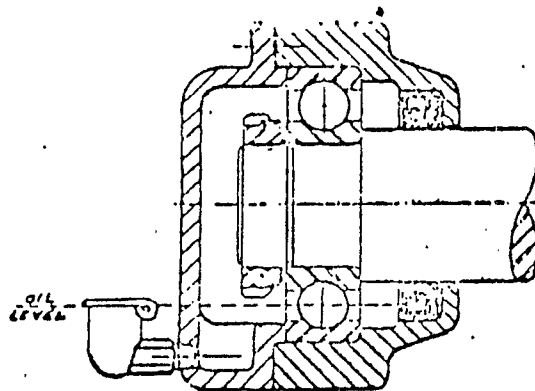


Fig. 2A

Oil Cup Lubrication

In each of the above methods of lubrication, it is important that the proper oil level be maintained. An oil level which is too high or too low can cause or contribute to bearing failures. There are many disadvantages in the use of the common oil cup shown in Figure 2A. Disadvantages of installations utilizing the oil cup and the advantages of constant level oilers are shown in Figure 4A.

In many instances the oil cup has been replaced with a constant level oiler as shown in Figure 4A. When properly installed, the constant level oiler fulfills each of the rules for the selection of a method of oil application to ball bearings.

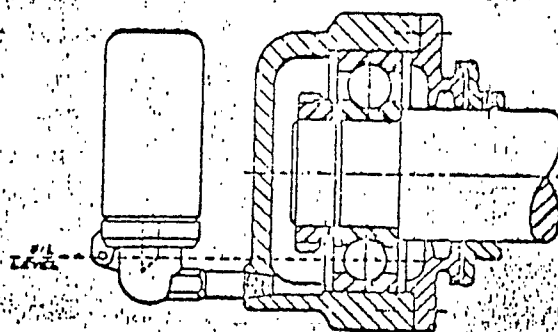


Fig. 4A

Constant Level Oiler

The oiler functions as follows: When the oil level in the reservoir falls, air passes into the bottle and permits oilflow out of the bottle until the air entry is again cut off by the rise of the oil level in the reservoir. The bottle is detached for servicing. The reservoir in the bearing housing should always be filled by emptying the constant level oiler; this insures the proper oil level.

FLEXIBLE COUPLING

When the shafts of two pieces of equipment are coupled to rotate as a unit, precise alignment of the shaft axes is a vital requirement. Even under the ideal conditions of initial assembly or installation, true alignment is difficult to achieve. Consequently, the probability of maintaining accurate alignment is greatly lessened during actual operation of the equipment. Settling of foundations, dimensional changes due to temperature variations, shaft deflection, fatigue of structural members, and many other factors, all contribute to misalignment of coupled shafts.

The repeated flexing of rigidly coupled rotating shafts, however slightly misaligned, can induce serious stresses in the shafts themselves and dangerously overload the shaft bearings. Likewise, undue stresses and overloads are present when normal axial movement of rigidly coupled shafts is constrained. Rapid failure of the equipment is certain under these conditions.

A flexible coupling is the answer to this problem.

It serves as the component means of connecting rotating shafts and, at the same time, it compensates for misalignment and allows for free end movement of the coupled shafts.

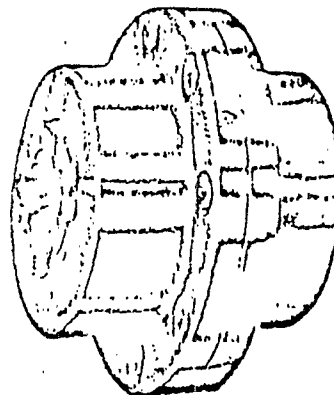
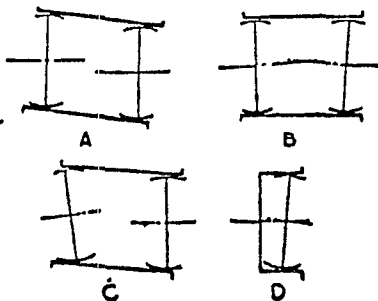
Types of Misalignment

There exist three major types of misalignment associated with coupled shafts:

1. Offset misalignment. Axes of shaft are parallel and offset (see diagram A)
2. Angular misalignment. Axes of shafts intersect at point of coupling (see diagrams B and D)
3. Offset and Angular misalignment. Axes of shafts do not intersect at point of coupling and are not parallel. (see diagram C).

Functions of a Flexible Coupling

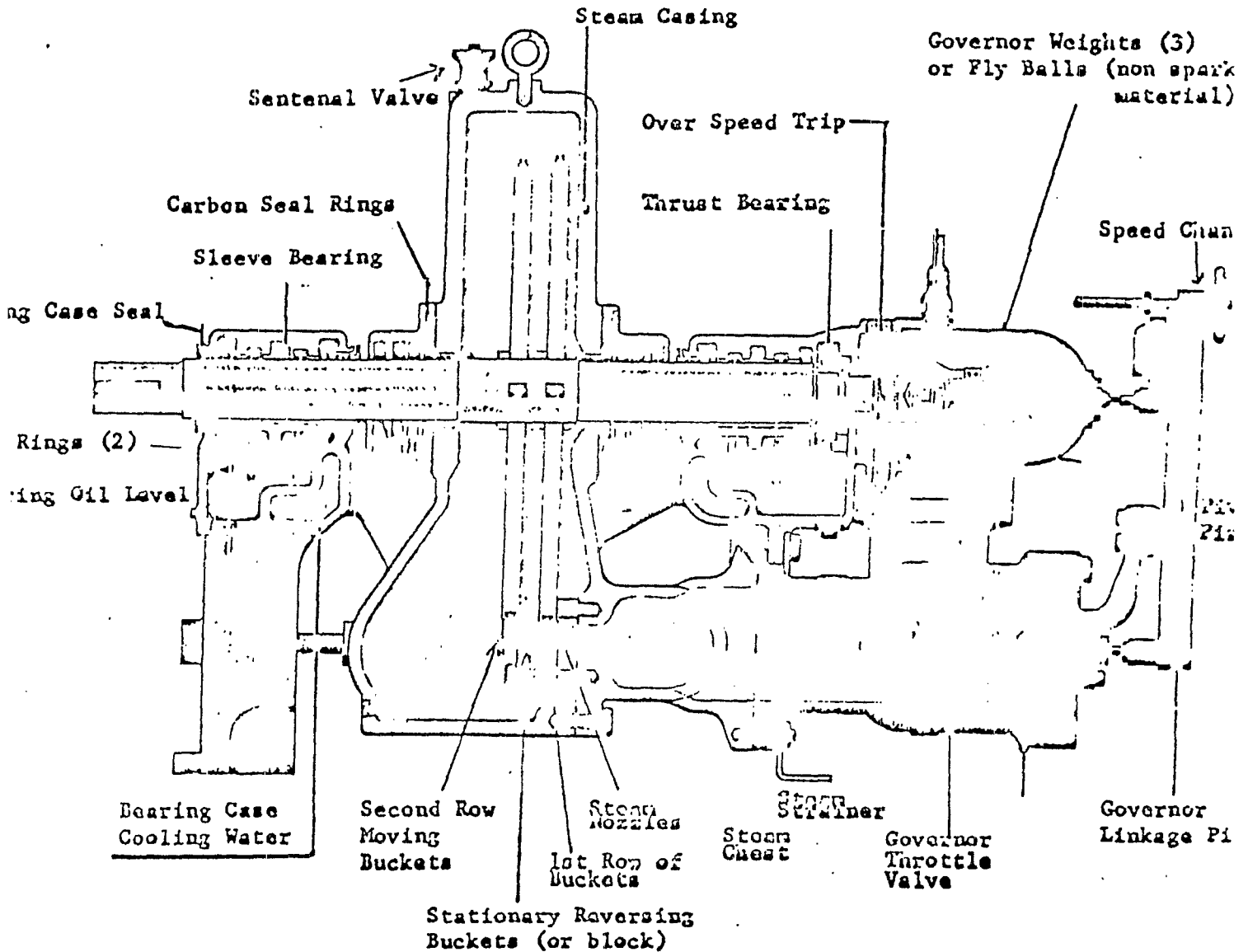
1. To connect shafts for the direct and consistent transmission of mechanical power from one shaft to the other.
2. To compensate for all types of misalignment between the shafts without inducing abnormal stresses and loads on the connected equipment and without tangible loss of power.
3. To allow for end or axial movement of the coupled shafts.



STEAM TURBINES

Steam enters the governor valve after passing through the strainer and throttle valve. The position of the governor valve determines how much steam is admitted to the steam chest and the nozzles. As the steam passes through the nozzles, its pressure drops and its velocity increases to a very high value. The rapidly moving steam then enters the first row of buckets, where part of its energy is used to drive the bucket wheel. The stationary reversing buckets serve to reverse the direction of flow so that the steam will be traveling in the proper direction to enter the second row of moving buckets. In the second row of moving buckets more energy is extracted from the steam. Finally, the steam leaves the turbine through the exhaust piping.

STEAM TURBINE



GOVERNOR - FLYBALL GOVERNOR & VALVE

James Watt devised a governor to control the speed of his steam engine. Very few changes or improvements have been made on it since then, and modern governors operate in much the same way. The engine rotated a shaft which caused two iron balls to move up as the speed of the machine increased. This movement caused the throttle to close and slow the engine down. When the engine went to slow the fly-balls fell, opening the throttle and increasing the speed of the machine.

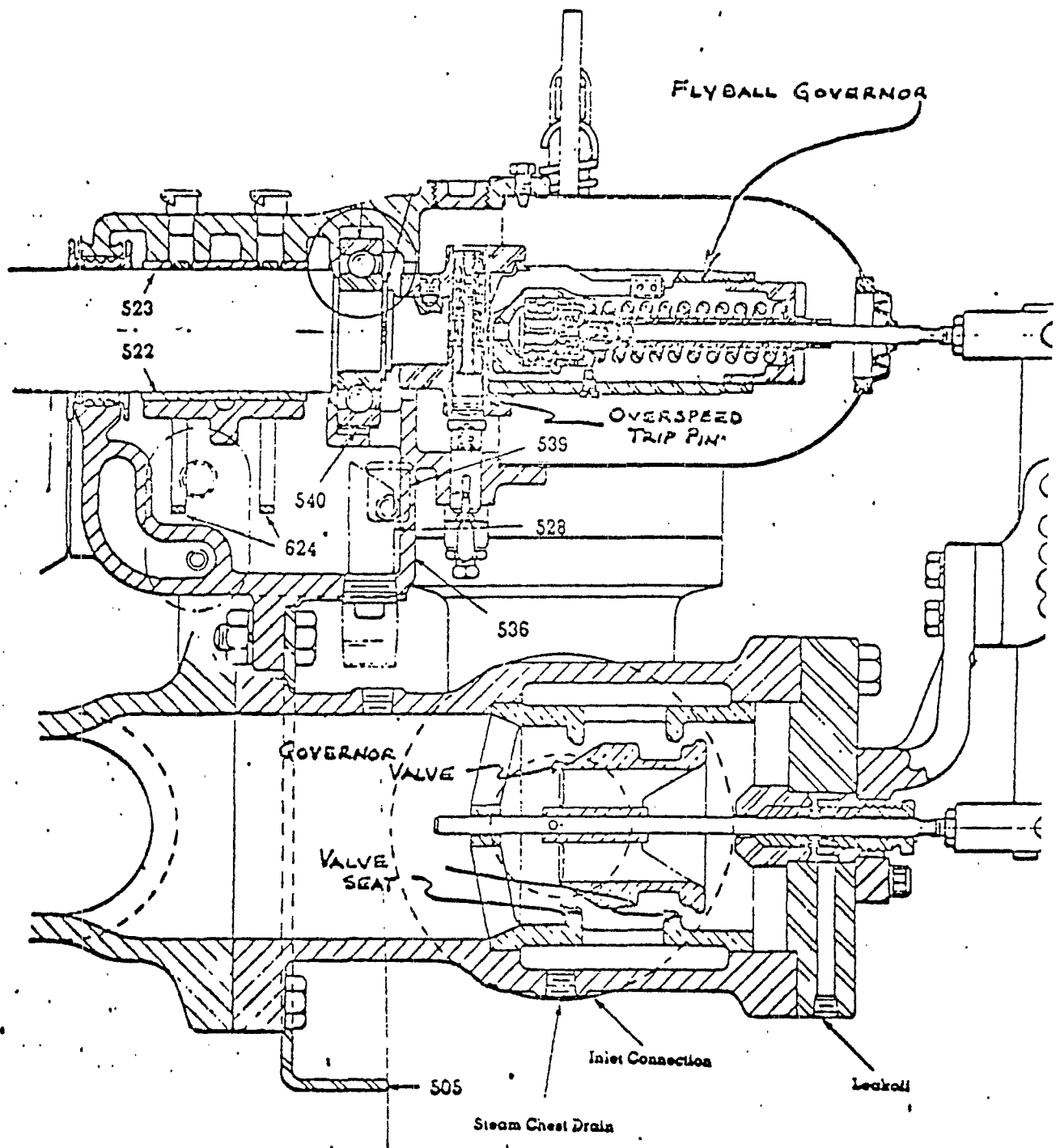


FIGURE 9 FLYBALL GOVERNOR AND VALVE

PP - 35, 36, 37, & 38

HOW THE DP GOVERNING SYSTEM WORKS

The DI governing system controls the speed and load of a turbine through the action of a hydraulic relayed, force restoring type governor.

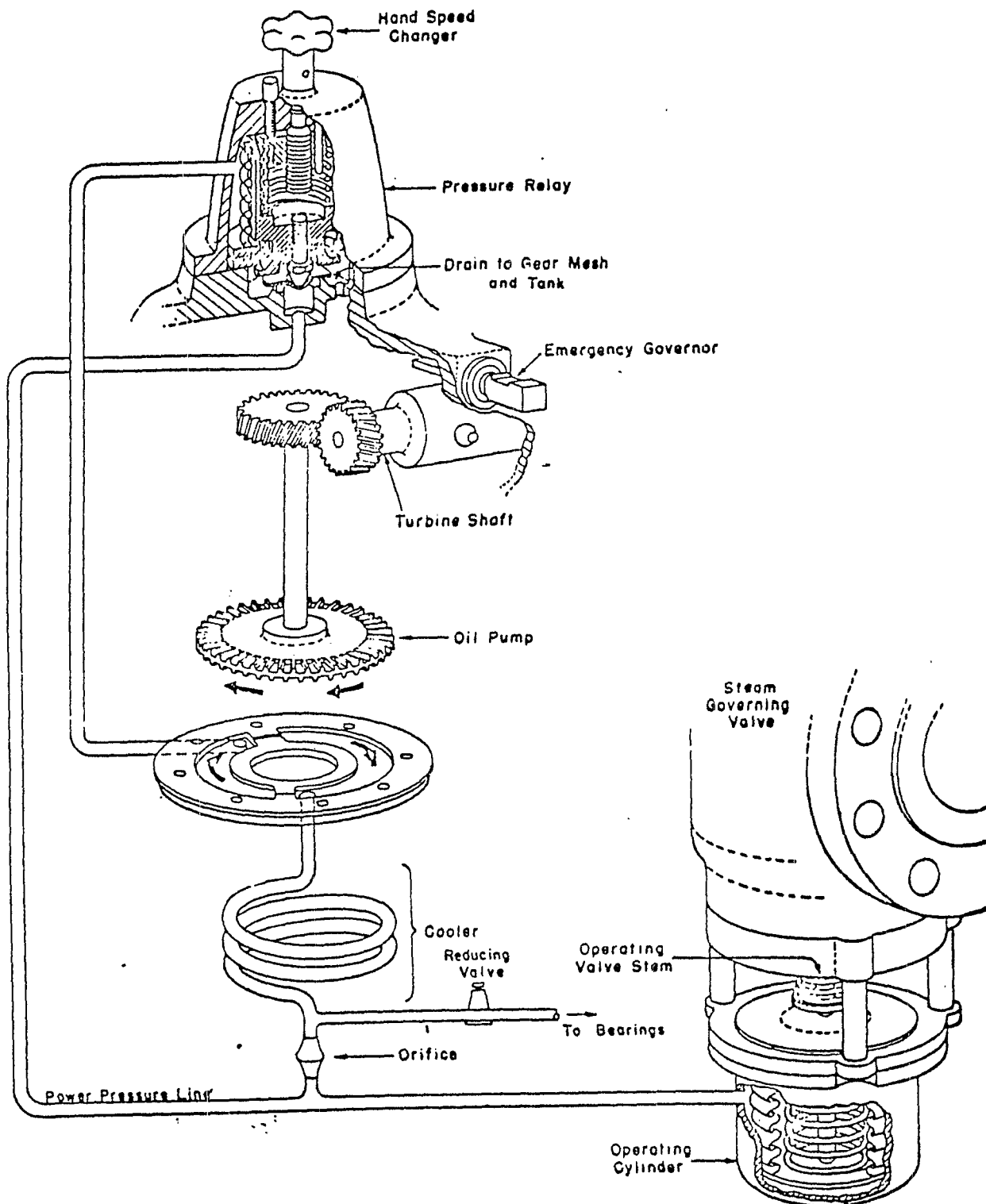
The governing system consists of:

1. A pump which supplies a signal as a function of speed, a power source to operate the steam admission valve, and oil for bearing and gear lubrication.
2. An orifice relay which receives the speed function signal from the pump and through it modulates the power pressure.
3. An operating cylinder which receives the modulated power pressure from the relay and through it positions the steam admission valve.

The pump consists of an impeller and a casing which divides the pump into two separate sections. One section is used to supply the pressure signal which is a function of impeller speed. Since the pump is of a centrifugal type, viscosity changes due to temperature changes in the oil have little effect on the pressure head developed and the pressure signal will be constant for any given speed. The second section of the pump is used for the power source and the bearing lubrication.

The relay consists of a spring loaded diaphragm with a means of varying the spring tension for speed adjustment. This bellows operates a disc valve (or control valve). The speed function signal acts upon the spring loaded diaphragm to position the cup valve and bleed oil from the orificed power pressure line to establish a governed pressure in the operating cylinder.

The operating cylinder consists of a spring loaded bellows which receives the governed oil pressure from the relay and positions the steam admission valve.



SCHEMATIC DIAGRAM OF GOVERNING SYSTEM OF G-E TYPE DP MECHANICAL-DRIVE TURBINE.

SCHEMATIC DIAGRAM

DIRECT ACTING WOODWARD PG GOVERNOR WITH PNEUMATIC SPEED CONTROL

PP - 4 A & B

(Increase in Air Pressure increases speed;
decrease in Air Pressure decreases speed)

When air pressure from the controller increases on diafram "A", it causes relay valve "E" to move downward allowing oil under pressure to enter the cylinder above piston "F". This forces "F" downward, causing flyball weights "W" to move inward, lowering relay valve "R" and letting high pressure oil enter buffer cylinder and push buffer piston "T" to the right. The downward motion of "F" also, through levers "G" and "D", returns "E" to its neutral position assuring a single position of "F" for each value of pressure on diafram "A".

Buffer piston "T" moving to the right forces oil into the cylinder above piston "H". The resulting downward motion of "H" opens governor valve "V" through action of lever "J".

At the same time, when buffer piston "T" moves to the right, a pressure drop is developed, causing a differential pressure to act on compensator piston "N", returning relay valve "R" to its neutral position. The adjustable orifice gradually allows the buffer piston to return to neutral establishing a definite turbine speed for each position of piston "F".

Similarly, a decrease in air pressure on diafram "A" results in a decrease in turbine speed.

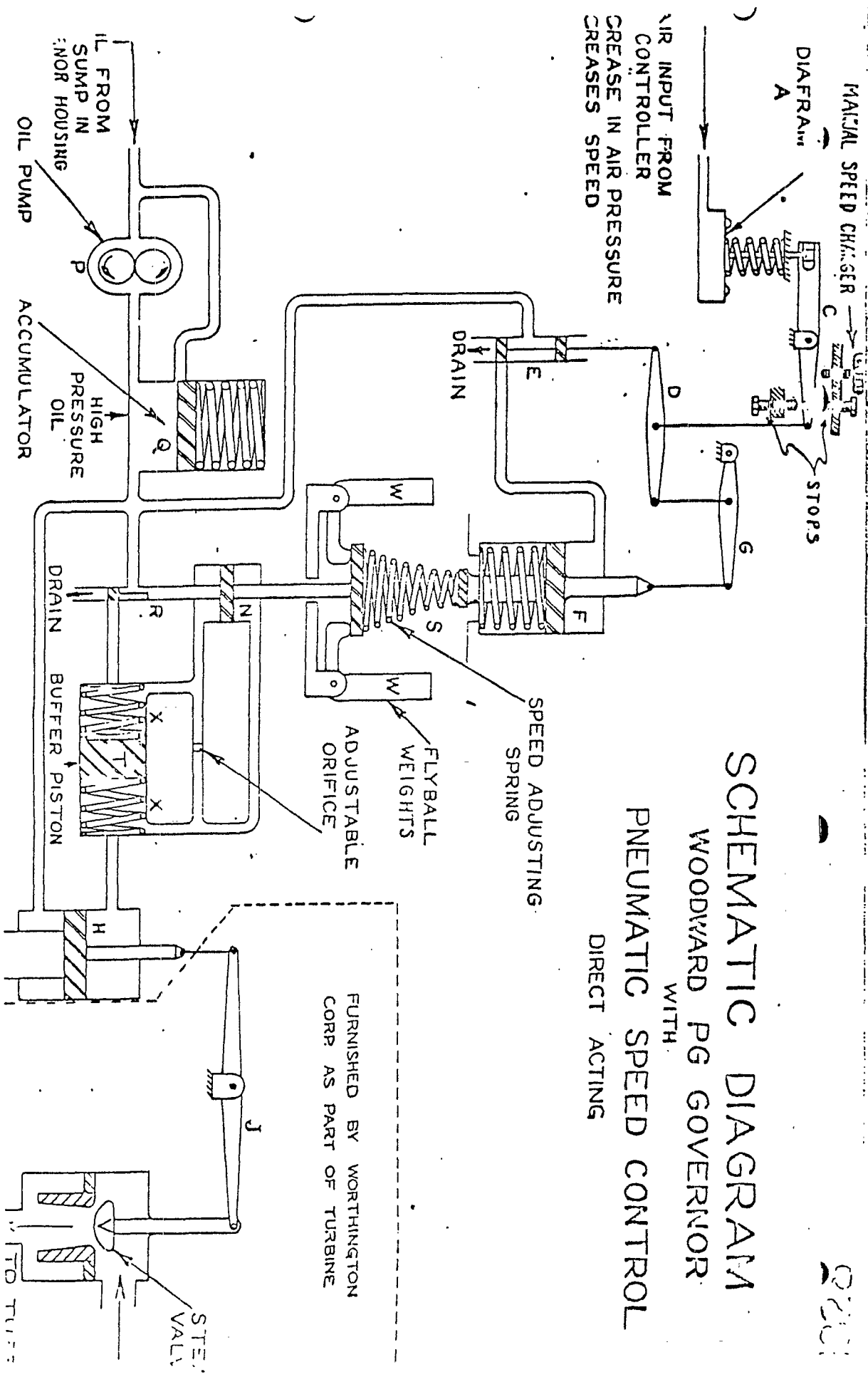
For each value of air pressure on Diafram "A", a definite turbine speed will be maintained, independent of turbine initial steam pressure or exhaust pressure variations.

The governor is also furnished with a manual speed changer to limit diafram "A" and actuate relay valve "E" manually to control the turbine speed within the same range as diafram "A".

Both maximum and minimum speed limits can be set by adjusting stops. In the event of total loss of air pressure from the controller, the turbine will not go below the minimum speed setting.

This governor falls within the limitations of NEMA Class D.

See also Woodward Governor Company Bulletins 36001, 36003 and 6008.



SCHEMATIC DIAGRAM
 WOODWARD PG GOVERNOR
 WITH
 PNEUMATIC SPEED CONTROL
 DIRECT ACTING

PG-PL GOVERNOR

SECTION I/GENERAL INFORMATION

INTRODUCTION

This bulletin provides description, operation, installation, adjustment, maintenance, and replacement parts information for the PG-PL governor.

The basic PG governor (pressure compensated governor) with a pneumatic speed setting mechanism (direct or reverse) and a short column that is used primarily for controlling engine or turbine speed has been assigned the designation PG-PL governor. This PG governor was first used on pipe lines, hence the PL, but has since found wide acceptance on all types of diesel engines, gas engines, steam turbines driving pumps and compressors, and many special applications. The PG-PL governor includes a pneumatic speed setting mechanism, standard short column, standard base assembly, and 12 foot-pound power cylinder assembly. The repair manual for the PG-A governor (similar to the PG-PL in speed setting, but with a long column to house various options for load control) is bulletin 36699.

All PG governors have the same basic components regardless of how simple or complex the complete control may be. The following components, found in each PG-PL governor, are sufficient to enable the governor to maintain a constant engine speed as long as the load does not exceed engine capacity:

1. an oil pump, storage area for oil under pressure, and a relief valve by which maximum oil pressure may be limited;
2. a centrifugal flyweight head-pilot valve assembly which controls flow of oil to and from the governor cylinder assembly;
3. a power cylinder assembly--sometimes referred to as a servomotor--which positions the fuel racks, fuel valve, or steam valve of the engine or turbine;
4. a compensating system for stability of the governed system;
5. a pneumatic speed setting mechanism for adjusting the governor speed setting.

A cutaway view of the PG-PL governor is shown in figure 1.

DESCRIPTION

The governor controls engine or turbine speed by controlling the amount of fuel or steam supplied to the engine or turbine. Speed control is isochronous, i.e., the governor will maintain constant engine or turbine steady state speed, within the capacity of the unit, regardless of load.

The standard operating oil pressure for PG governors is 100 psi. However, with appropriate modifications the oil pressure may be increased, thus increasing the work capacity of the power cylinder assembly. Table 1 lists typical governor oil pressures versus power cylinder work capacities.

Table 1. Governor Oil Pressure Versus Power Cylinder Work Capacities (Typical)

Governor Operating Oil Pressure (PSI)	Power Cyl. Work Capacities in Ft-Lb		
	12	17	29
100 (std.)	12	17	29
130		22	38
200		34	58

An air pressure signal from a pneumatic air transmitter or controller supplies air to the governor speed setting mechanism. The governor will control the engine at a definite speed for each air pressure. The most common air pressure range for the governor is from 3-15 psi. Normal minimum control air pressure is 3 psi; however, a minimum of 1 psi and a maximum of 100 psi can be accommodated. The governor speed range normally falls between 250-1000 rpm, but a low speed of 200 rpm or a high speed of 1600 rpm can be obtained. Contact Woodward Governor Company for recommended control air pressure to governor speed setting relationship to meet the requirements of the particular installation.

The pneumatic speed setting mechanism (direct or reverse) is a bellows type mechanism and is standard equipment on all PG-PL governors now manufactured by Woodward. The speed setting unit is an accurate durable mechanism which

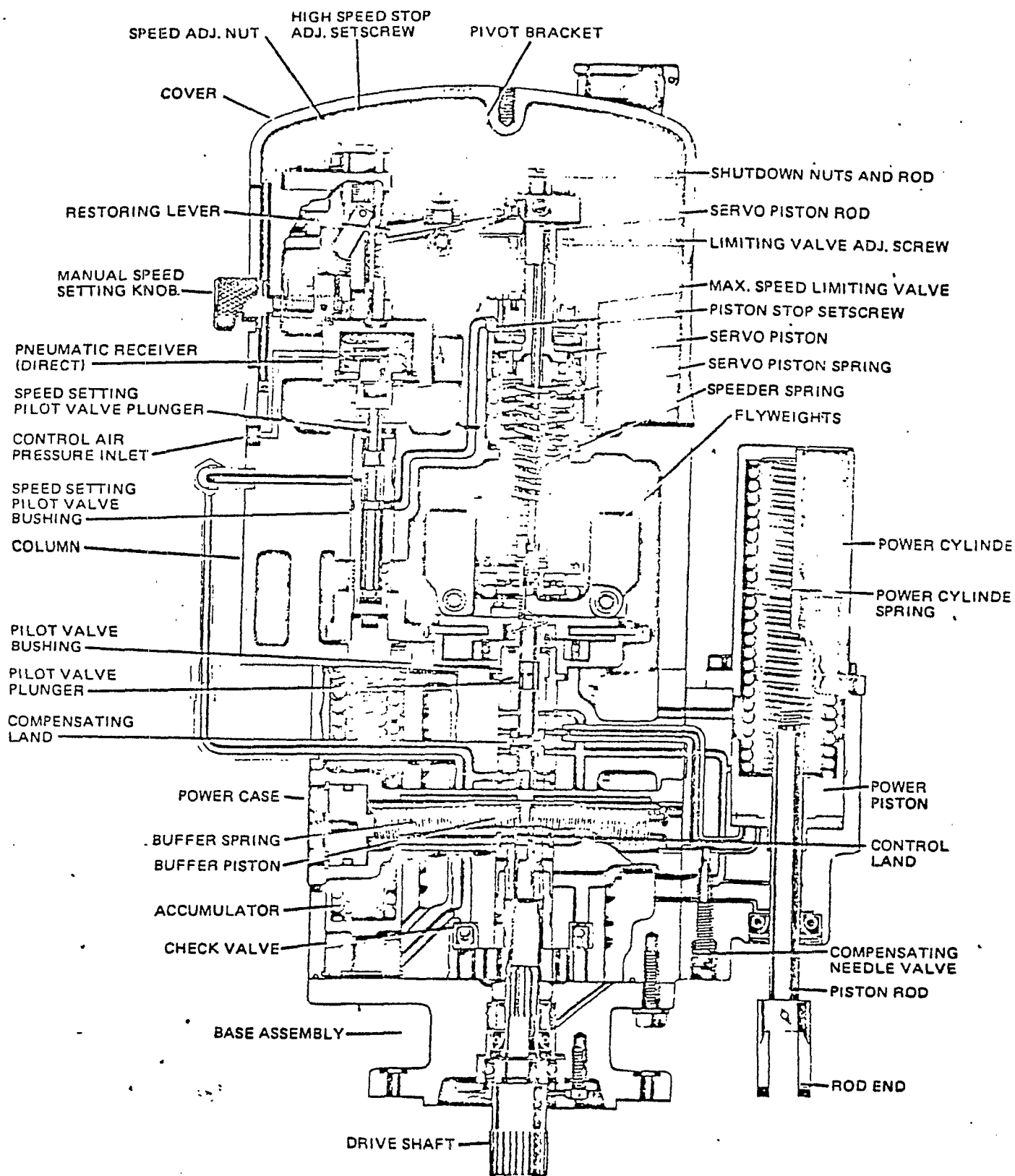


Figure 1. Cutaway View PG-PL Governor

virtually eliminates the hysteresis loops encountered with less sensitive pneumatic speed setting elements. (A hysteresis loop is a plot of the speeds obtained at various control signal pressures; one portion is recorded as speed setting signals are being increased, the other portion as the signals are being decreased.) Bellows type speed setting provides a definite, accurate relationship between speed and speed signal.

The speed setting mechanism is available for use with air input signals of varying range and magnitude (e.g. 3 to 15 psi, 20 to 70 psi, etc.). Depending upon the exact configuration installed in the governor, speeds may be adjusted up to a 5 to 1 range. The speed setting mechanism can be furnished to increase governor speed setting for an increase in control air pressure (direct type) or to increase

governor speed setting for a decrease in control air pressure (reverse type).

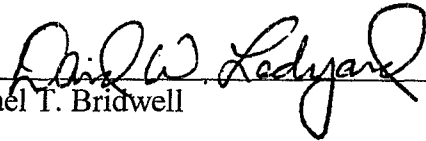
The manual speed setting knob permits manual operation when the air pressure signal is not available.

Diaphragm receiver models of the governors are obsolete and no longer manufactured as a complete unit. However, replacement parts for these units are available and detail information on the units is found at the end of this manual.

As is the case with any governor of any type, it is essential that the engine or turbine be equipped with a separate overspeed shutdown device to prevent runaway in the event of failure of the governor, the mechanism which drives it, or the control it operates.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing Chevron U.S.A. Inc.'s Supplemental Response to Plaintiff's Request for Production is being furnished to Plaintiffs' counsel by certified mail, return receipt requested, on the 11th day of September, 2000.



Michael T. Bridwell

REQUEST FOR PRODUCTION NO. 3:

Produce all documents disseminated or published by any trade association that contain information relating to the hazards of asbestos and all documents which refer to such documents.

RESPONSE:

See documents attached. Bates numbers CHEV BB 5567-5583

REQUEST FOR PRODUCTION NO. 5:

Produce all safety meeting minutes or other documents, that refer to the dangers of asbestos safety measures to be used in the vicinity of asbestos at Defendant's Premises.

RESPONSE:

See documents attached. Bates numbers CHEV BB 5584-5617

REQUEST FOR PRODUCTION NO. 6:

Produce all contracts, or other documents that relate to abatement of asbestos at Defendant's Premises.

RESPONSE:

See documents attached. Bates numbers CHEV BB 5618-5620

REQUEST FOR PRODUCTION NO. 19:

Produce all documents, including invoices, shipping receipts, bills of lading and purchase orders, related to the purchase of asbestos-containing products for use at Defendant's Premises.

RESPONSE:

See documents attached. Bates numbers CHEV BB 5621-6374, 7360-7420

REQUEST FOR PRODUCTION NO. 9:

Produce all documents that relate to abatement of asbestos from any of your plants, including but not limited to the Defendant's Premises located in El Paso, Texas.

RESPONSE:

See documents attached. Bates numbers CHEV BB 7335-7359

REQUEST FOR PRODUCTION NO. 27:

Produce a copy of all regulations, orders, rules and/or policies which have been used relating to the safety of the Defendant's Premises.

RESPONSE:

See documents attached. Bates numbers CHEV BB 6375-7028

REQUEST FOR PRODUCTION NO. 29:

Produce all documents which contain complaints by Union representatives of Defendant's Premises regarding safety conditions and work place conditions at the Defendant's Premises.

RESPONSE:

See documents attached. Bates numbers CHEV BB 7029-7324

SEP 16 00:00 006078

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Re: *Cause No. 2000-757; Ignacio Serafin, et al v. Chevron U.S.A. Inc.; In the County Court at Law No. 3, El Paso County, Texas (Enrique Garcia and Ignacio Serafin)*

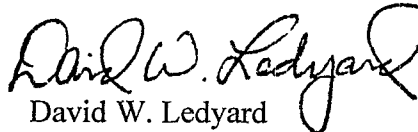
Dear Ms. Finch:

Enclosed please find Chevron U.S.A., Inc.'s Supplemental Response to Request for Production and Certificate of Filing.

If you have any questions or need additional information, please feel free to contact me. Thank you for your attention to this matter.

Very truly yours,

STRONG, PIPKIN, NELSON,
BISSELL & LEDYARD, L.L.P.


David W. Ledyard

CMRRR 7000 0520 0024 1846 2645

REQUEST FOR PRODUCTION

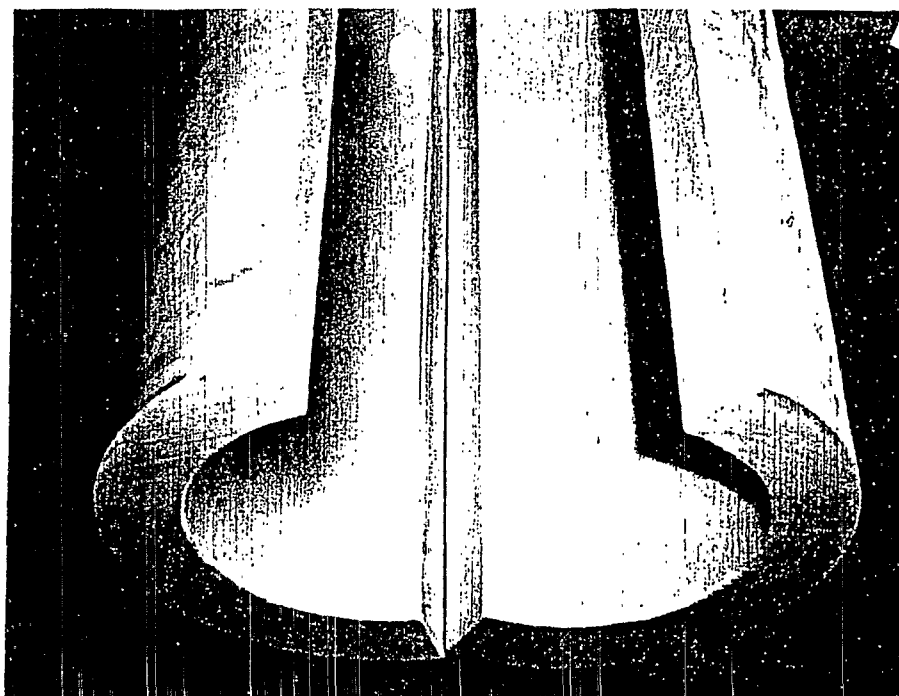
NO. 3

Johns-Manville

PRODUCT INFORMATION

type: Pipe & Block

temp. limit: 1500F



G. C. JORDAN

FEB 11 1982

J-M THERMO-12

asbestos-free pipe and block insulation

■ **DESCRIPTION:** A molded, high temperature pipe and block insulation, J-M Thermo-12 is composed of hydrous calcium silicate. It is an insulating material which, because of its light weight, low thermal conductivity, great structural strength and insolubility in water, is ideal for high temperature piping and equipment.

■ **AVAILABLE FORMS:** Thermo-12 is furnished in both sectional pipe insulation and block form. The pipe insulation comes in a complete selection of sizes up to 24" x 4" half sections. Pipe sizes 25" through 33" are available in quad segments. Scored blocks 12" x 36" in thicknesses from 1½" to 3½" are available for application on curved surfaces representing a diameter range from 34" through 180". Scored blocks are furnished with three equally spaced scores. Beveled blocks are also available in widths of 6", 12", and 18", by 36" lengths, in a full range of thicknesses.

■ **USES:** Especially recommended for use in the power generation and process industries on indoor and outdoor piping and equipment operating at temperatures to 1500F. Thermo-12 is light enough for easy handling and fast application. Repeated wettings have no permanent effect on it which makes it ideal for installations subjected to weather, or for insulating underground steam lines. Because it will not burn or carry flame, it may also be advantageously specified for use in the presence of inflammable gases and liquids.

■ **ADVANTAGES:**

Exceptional Strength

Similar in chemistry and composition to a very fine concrete, Thermo-12 will withstand unusual operating abuse without appreciable damage.

Extreme Lightness

Thermo-12 is as light as many insulating materials possessing a fraction of its strength and durability.

Not Damaged by Water

Can be soaked in water without damage. After drying, conductivity will be as good as new.

Easy Application

Thermo-12 is purposely made in large blocks and half-sections to facilitate handling and reduce number of joints.

Low Conductivity

Thermo-12 offers one of the lowest *k* factors of all insulations in general use throughout the power generation and process industries.

Low Chloride Content

Thermo-12 has a low chloride content and can be used on Austenitic stainless steel without problems since it meets MIL-I-24244 Amendment 3 for chloride content.

THERMO-12 PIPE & BLOCK INSULATION

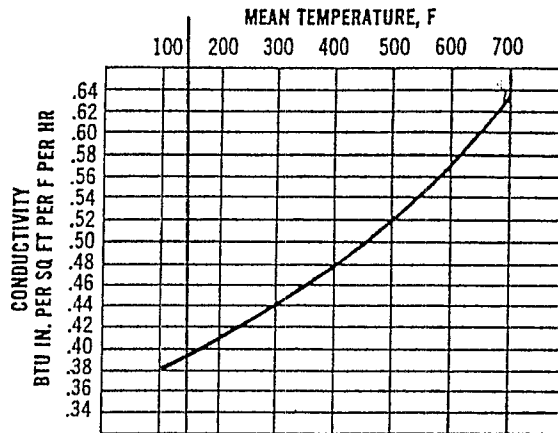
Specification Data*

PHYSICAL PROPERTIES

Density (dry)	13 lbs per cu ft
Transverse Strength (modulus of rupture)	80 psi
Compressive Strength (based on 2" thickness of block)	165 psi to produce 5% compression
Linear Shrinkage	1.1% after 24-hr soaking period at 1500F
Maximum Service Temperature	1500F

*The physical properties of Johns-Manville Thermo-12 represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check the Johns-Manville district office to assure current information.

THERMAL CONDUCTIVITY (Btu in. per sq ft per F per hr)



COMPLIANCE WITH GOVERNMENT SPECS

Pipe Insulation:

MIL-1-2781

Grade I, Class b, to 600F (except k at 200F)

Grade II, Class d, to 750F (except k at 200F)

Grade III, Class e, Type I and II, to 1200F

HH-I-523 Type II, Class A and B, to 1200F

MIL-I-24244, Amendment 3

Block Insulation:

MIL-I-2819

Class 1, to 600F (except k at 200F)

Class 2, to 1200F

Class 3, to 1500F

HH-I-523 Type I, to 1200F

COMPLIANCE WITH ASTM STANDARDS

Pipe and Block Insulation:

C533, to 1200F

G. C. JORDAN

FEB 11 1982



Johns-Manville

Greenwood Plaza • Denver, Colorado 80217

Sales Offices in Principal Cities



Chevron U.S.A. Inc.

Purchase Order

R6L

Point

Date 11-11-64 1964

Prefix and Order Number

Important: Show above prefix and order number on all invoices, shipping papers, packages and correspondence.

Date Required at Destination

To Chevron U.S.A. Inc.
1500 California Street
San Francisco, Calif. 94111

11-11-64

Invoice in QUADRUPLICATE to: Chevron U.S.A. Inc., P.O. Box ☒ 9250 ☐ 9300, Concord, CA 94524

Show Prefix & Purchase Order No.

Ship to Chevron U.S.A. Inc.
Attention of: Contract Administration
1500 California Street
San Francisco, Calif. 94111
Attn: Mr. J. J. ...

Bill of Lading - Upon shipment, send original copy of your B/L referenced with our order number to:
Chevron U.S.A. Inc., P.O. Box 7945, San Francisco, CA 94120

☐ Prepay freight for your account.
☒ Ship collect - endorse your B/L for delivering carrier to collect from us at the address indicated below:
☒ Chevron U.S.A. Inc. ☐ Chevron U.S.A. Inc.
☒ P.O. Box W ☐ P.O. Box J
Concord, CA 94524 Concord, CA 94524

☐ Prepay and charge on invoice. Declare actual value. (UPS, Federal Express or Parcel Post only.)

Ship Via Air

Item No.	Quantity	Stock Number	Description of Material
1	1		1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111
			1500 California Street, San Francisco, Calif. 94111

Price _____ Terms _____ ☒ Not for Resale ☐ For Resale ☐ Tax Exempt

F.O.B. _____ Charge to _____

Quotations obtained from	Price				F.O.B. Point	Delivery
	Item 1	Item 2	Item 3	Item 4		

Approved C. J. ...

CHEV B8 5569

C- 45873

Reason for placement ...

Name _____ Telephone _____ Extension _____ By _____

R-P&C FORGED STEEL VALVES

F-190 150 lb. Flanged End
F-390 300 lb. Flanged End
F-690 600 lb. Flanged End

Sizes:
 $\frac{1}{2}$ " Thru 2"

PISTON CHECK VALVE
BOLTED CAP

150 P.S.I. @ 500°F.
300 P.S.I. @ 850°F.
600 P.S.I. @ 850°F.

(For Horizontal Installation Only)

WORKING PRESSURE (NON-SHOCK)

F-190 — 150# FLANGED END

150 PSI @ 500°F STEAM-OIL

275 PSI @ -20°F TO 100°F

TEST PRESSURE: 425 PSI HYDROSTATIC SHELL

F-390 — 300# FLANGED END

300 PSI @ 850°F STEAM-OIL

720 PSI @ -20°F TO 100°F

TEST PRESSURE: 1100 PSI HYDROSTATIC SHELL

F-690 — 600# FLANGED END

600 PSI @ 850°F STEAM-OIL

1440 PSI @ -20°F TO 100°F

TEST PRESSURE: 2175 PSI HYDROSTATIC SHELL

MATERIALS OF CONSTRUCTION

No.	Part	Material	A.S.T.M. Spec.	Remarks
1	Nameplate	Aluminum	—	Commercial
2	Cap	Forged Steel	A105	Grade II
3	Bolt, Cap	Alloy Steel	A193	Grade B7
4	Gasket	Stainless Steel Asbestos Filled		Spiral Wound
5	Disc	Stainless Steel	A276	Type 420 (500 BHN)
6	Body	Forged Steel	A105	Grade II Seat Stellite #6

TRIM SELECTION CHART

Figure Number	Body & Bonnet	Disc & Integral Seat	Bonnet Gasket	Packing
F 190 DE	A-105 Gr. II	CR 13*	304-ASB	—
F 190 A	A-105 Gr. II	316 S.S.	304-ASB	—
F 190 M	A-105 Gr. II	Monel	Monel-ASB	—
F 190 MT	A-105 Gr. II	Monel	Monel-TEF	—

*Integral seat Stellite-Faced

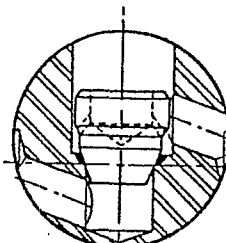
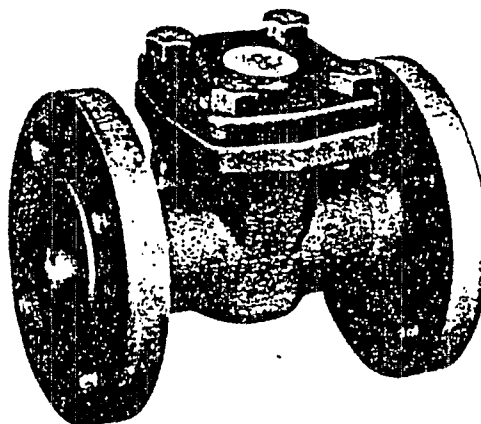
Note: F 390 (300# Flg) & F 690 (600# Flg) Also Available In Above Trims

Valves with Teflon trim are limited to 500° F service.

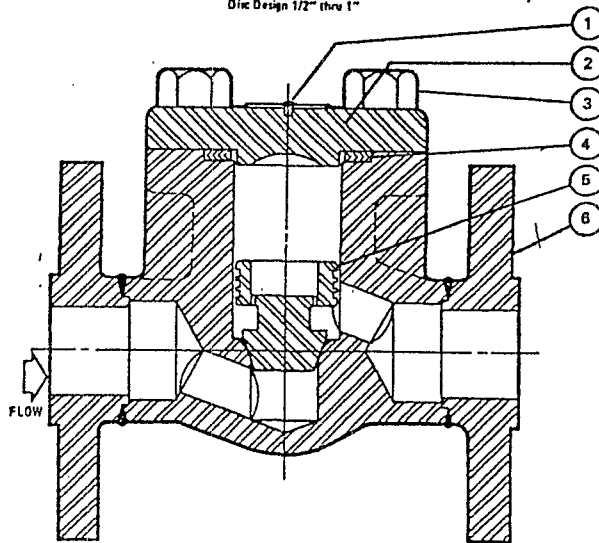
DIMENSIONAL SPECIFICATIONS

Size	Face to Face			Center to Top (Open)	Gasket Size $\frac{1}{8}$ " Thick	Dia. of Port Opening	Approx. Weight		
	*F-190	*F-390	†F-690				F-190	F-390	F-690
$\frac{1}{2}$	4 $\frac{1}{4}$	6	6 $\frac{1}{2}$	2	1 $\frac{3}{4}$ x 1 $\frac{1}{4}$	$\frac{3}{8}$	6	7 $\frac{1}{4}$	7 $\frac{3}{4}$
$\frac{3}{4}$	4 $\frac{3}{8}$	7	7 $\frac{1}{2}$	2 $\frac{3}{8}$	1 $\frac{3}{4}$ x 1 $\frac{1}{4}$	$\frac{1}{2}$	6 $\frac{3}{4}$	9 $\frac{3}{4}$	10 $\frac{3}{4}$
1	5	8	8 $\frac{1}{2}$	2 $\frac{7}{8}$	1 $\frac{13}{16}$ x 1 $\frac{11}{32}$	$\frac{3}{4}$	10	11	12
1 $\frac{1}{2}$	6 $\frac{1}{2}$	9	9 $\frac{1}{2}$	3 $\frac{3}{8}$	2 $\frac{1}{8}$ x 1 $\frac{17}{32}$	1 $\frac{1}{4}$	17	22	25
2	8	10 $\frac{1}{2}$	11 $\frac{1}{2}$	4 $\frac{1}{2}$	2 $\frac{3}{4}$ x 2 $\frac{3}{8}$	1 $\frac{1}{2}$	26	32	34

*†Conforms to ANSI-B16.10 (*Includes $\frac{1}{16}$ " Raised Faces †Includes $\frac{1}{4}$ " Raised Faces).



Disc Design 1/2" thru 1"



CHEV B8 5570

R-P&C

FAIRVIEW, PA. 16415
 TELEPHONE: 814-474-5581
 TELEX: 91-4454

One of the White Consolidated Industries


R-P&C FORGED STEEL VALVES

F-90 Screwed End
F-91 Socket Weld End

Sizes: 1/4" Thru 2"

PISTON CHECK VALVE
BOLTED CAP

800 P.S.I. @ 850°F.

(For Horizontal Installation Only)

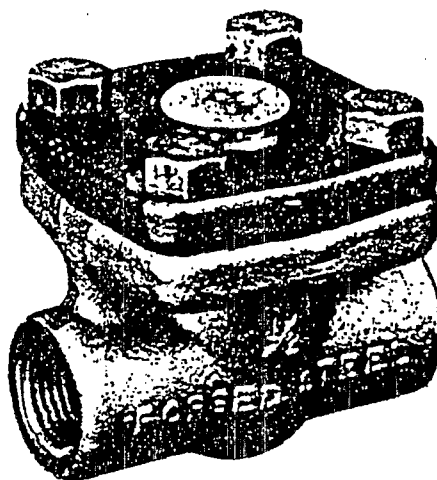
WORKING PRESSURE (NON-SHOCK)

600 PSI @ 900°F STEAM-OIL

800 PSI @ 850°F STEAM-OIL

2000 PSI @ -20°F TO 100°F

TEST PRESSURE: 3000 PSI HYDROSTATIC SHELL



MATERIALS OF CONSTRUCTION

No.	Part	Material	A.S.T.M. Spec.	Remarks
1	Nameplate	Aluminum	—	Commercial
2	Cap	Forged Steel	A105	Grade II
3	Bolt, Cap	Alloy Steel	A193	Grade B7
4	Gasket	Stainless Steel Asbestos Filled		Spiral Wound
5	Disc	Stainless Steel	A276	Type 420 (500 BHN)
6	Body	Forged Steel	A105	Grade II Seat Stellite #6

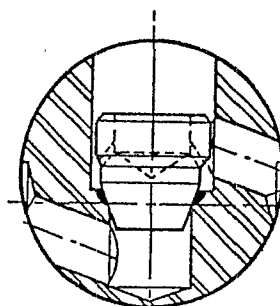
TRIM SELECTION CHART

Figure Number	Body & Bonnet	Disc & Integral Seat	Bonnet Gasket	Packing
F 90 DE	A-105 Gr. II	CR 13*	304-ASB	—
F 90 A	A-105 Gr. II	316 S.S.	304-ASB	—
F 90 M	A-105 Gr. II	Monel	Monel-ASB	—
F 90 MT	A-105 Gr. II	Monel	Monel-TEF	—

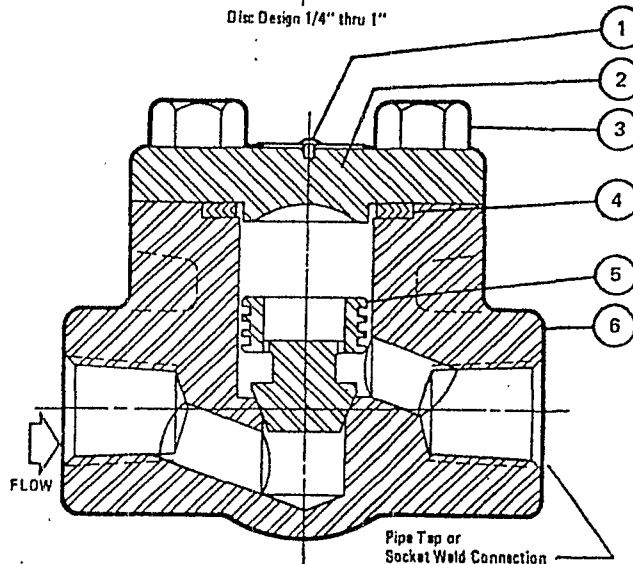
*Integral seat Stellite-Faced

Note: F 91 also available in above trims.

Valves with Teflon trim are limited to 500° F service.



Disc Design 1/4" thru 1"



DIMENSIONAL SPECIFICATIONS

Size	Face to Face	Center to Top	Gasket Size 1/8 Thick	Dia. of Port Opening	Socket Weld Bore*	Socket Weld Depth*	Approx. Weight
1/4	3	2	1 3/4 x 1 1/4	1/4	.555	3/8	3 1/4
3/8	3	2	1 3/4 x 1 1/4	3/8	.690	3/8	3 1/4
1/2	3	2	1 3/4 x 1 1/4	1/2	.855	3/8	3 1/4
3/4	3 1/2	2 3/8	1 3/4 x 1 1/4	3/4	1.065	1/2	3 1/4
1	4 3/8	2 3/8	1 3/4 x 1 1/4	1	1.330	1/2	5 1/2
1 1/4	6	3 3/4	2 1/8 x 1 3/4	1 1/4	1.675	1/2	11
1 1/2	6	3 3/4	2 1/8 x 1 3/4	1 1/2	1.915	1/2	11
2	7	4 1/2	2 3/4 x 2 3/8	1 1/2	2.406	5/8	14 1/2

*Conforms to ANSI B16.11

R-P & C

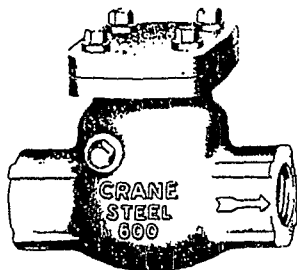
FAIRVIEW, PA. 16415
TELEPHONE: 814-474-5581
TELEX: 91-4454

One of the White Consolidated Industries
WCI

CHEV B8 5571

CRANE

SWING CHECK VALVE CLASS 600 • 1/2" to 12"



No. 174, T-Pattern

Bolted Cap

No. 174, Threaded

No. 175, Flanged

No. 175 1/2, Butt-Welding

Pressure-Temperature Rating

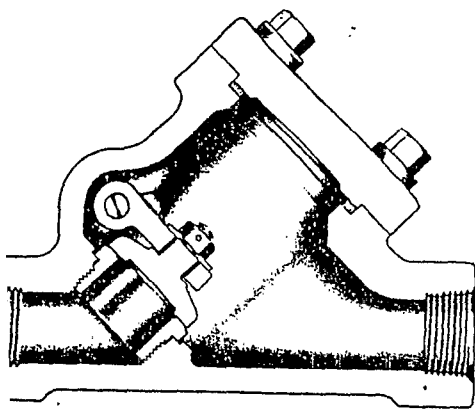
Carbon Steel, ASTM A216 Grade WCB

1480 psi @ -20F to 100F

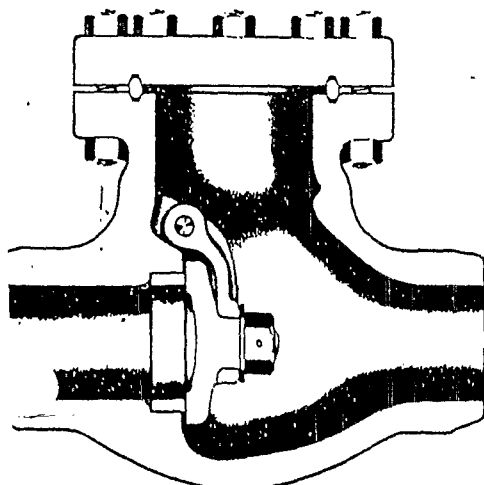
See page 55 for ratings of other materials and temperatures

Design Data and Features:

- These valves comply with applicable requirements of Standards: ANSI-B16.5, ANSI-B16.10, ANSI-B16.25, ANSI-B16.34.
- Material—carbon steel. Other materials available when specified—Crane No. 5, 7, 9, LCB and "Arctic" steels. See page 3 for specifications and recommendations.
- Trim—X or XU—suitable for a broad spectrum of services to 1100F. Other trims available when specified include: L or LU and A or AU. See pages 3 and 22 for trim description and service recommendations.
- Outside weight and lever to assist in rapid closing or for sensitive balance at low velocities is available on valves up to 8" in size.
- Drilling templates are shown on page 51.
- Flange and facing dimensions are shown on page 47.
- Ring joint facing (page 48) can be supplied when specified.
- Butt-welding ends are bored to match the inside diameter of the pipe to be used. Orders must specify the diameter of bore (I.D. of pipe). See page 45.
- Threaded end valves are furnished with spiral wound stainless steel asbestos filled bonnet gasket.
- Flanged and butt-welding end valves are furnished with ring type joint bonnet gasket.
- Threaded end valves in sizes 1/2", 3/4" and 1" are Y-Pattern with seat and cap at 45° to run of valve.
- For test information, see page 54.

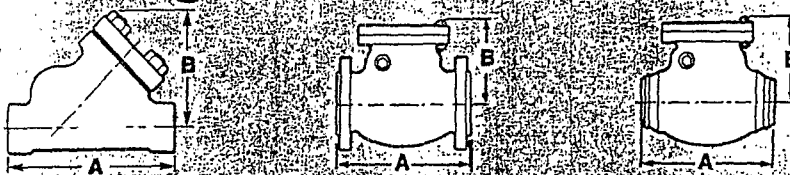


No. 174, Y-Pattern



No. 175 1/2

Weights and Dimensions



Valve N.P.S.	Weight—Pounds				Dimensions—Inches				
	174 "Y" Pattern	174 "T" Pattern	175	175 1/2	A			B	
	174 "Y" Pattern	174 "T" Pattern	175 & 175 1/2	174	174 "Y" Pattern	174 "T" Pattern	175 & 175 1/2	174	175 & 175 1/2
1/2	5	—	—	—	4.62	—	—	3.38	—
3/4	8	—	—	—	6.00	—	—	4.00	—
1	11	—	—	—	7.00	—	—	4.50	—
1 1/4	—	22	38	32	—	7.50	9.0	5.50	6.25
1 1/2	—	29	50	40	—	8.50	9.5	6.25	6.75
2	—	36	70	55	—	9.50	11.5	6.25	7.00
2 1/2	—	—	104	70	—	—	13.0	—	8.25
3	—	—	135	100	—	—	14.0	—	9.00
4	—	—	255	170	—	—	17.0	—	10.25
5	—	—	400	300	—	—	20.0	—	12.75
6	—	—	530	420	—	—	22.0	—	13.50
8	—	—	900	740	—	—	26.0	—	15.25
10	—	—	1250	1030	—	—	31.0	—	18.75
12	—	—	1830	1410	—	—	33.0	—	21.50

"S" pattern is straightway design, as illustrated.



STATE OF ILLINOIS
POLLUTION CONTROL BOARD
189 WEST MADISON STREET SUITE 900
CHICAGO, ILLINOIS 60602

DAVID P. CURRIE, CHAIRMAN
SAMUEL R. ALDRICH
JACOB D. DUMELLE
RICHARD J. KISSEL
SAMUEL T. LAWTON, JR.

TELEPHONE
312-793-3620

ASBESTOS HEARINGS SCHEDULED

Finding that the uncontrolled spraying of asbestos fiber and other fiber-containing material unreasonably interferes with the enjoyment of life and property and presents a severe threat to the public health and welfare, the Board authorized in Danville that hearings be held on detailed proposed regulations which would restrict the commercial use of products containing asbestos. The set of regulations, if adopted, would be the most comprehensive set of controls for the toxic substance ever enacted.

The proposed regulations would, among other things, require a permit for the manufacturing of asbestos products, for the commercial use of asbestos in construction work and for the demolition of asbestos-containing buildings. Demolition of buildings containing asbestos would have to be conducted in accord with strict controls to reduce dust emission. Plants manufacturing asbestos products would be required to meet an emission standard. The spraying of asbestos fiber, done in high-rise construction, would be unlawful. And the use of asbestos in the brake lining of vehicles manufactured after January 1, 1975 and sold for use in Illinois would be prohibited. A copy of the proposed regulation is appended to this Newsletter.

Asbestos-containing products have, in recent years, been widely used, especially in the fireproofing of buildings and in the lining of automobile brakes. These uses and others contribute annually to the discharge of asbestos fiber into the atmosphere. The fiber, once released, is thought to be virtually indestructible, resulting in a gradual, irreversible increase in the amount of asbestos fiber present in the ambient air. Medical evidence has shown that heavy, prolonged exposure to asbestos fiber can cause a lung disease known as asbestosis and a very rare cancer of the lining of the lungs, mesothelioma.

R 71-16
Asbestos and Spray Insulation

EXPLANATION OF PROPOSED REGULATIONS

Science is pointing its medical finger at asbestos and describing the "miracle fiber" as a mineral whose commercial blessings can exact a rather costly toll. Asbestos insulation and factory workers exposed to heavy concentrations of asbestos fiber over prolonged periods have suffered devastating consequences. They are visited with an alarmingly high incidence of asbestosis, which produces a diffuse fibrosis of the lower lung, of lung cancer and of an extremely rare cancer of the lining of the lung and abdomen, mesothelioma. The rates of lung cancer are extraordinarily high especially among asbestos workers who are smokers, indicating the synergistic potential of the mineral fiber.

The medical evidence is indefinite as to why asbestos is carcinogenic, with three theories in vogue: (1) The fibers once ingested or inhaled act as a continuous physical irritant, inducing a tumor after 20 to 30 years; (2) The fibers contain carcinogens such as benzo(a)pyrene; (3) Fibers accumulate in the lung and remain immobilized as "asbestos bodies" which cause cancer upon disintegration.

Similarly, while the adverse effect of prolonged exposure to heavy concentrations of asbestos is clearly documented, the medical data is disturbingly vague as to the results of long-term exposure to low and moderate concentrations. Nor is there a clear dose-time relationship for exposure to heavy concentrations. In short, as with many other environmental contaminants, the public has discovered too late that asbestos is potentially dangerous and too little of the extent of that threat.

But two depressing facts are agreed upon: That millions of Americans are likely to contain "asbestos bodies" in their lungs and that asbestos fiber once released is relatively indestructible. That is, the qualities of durability and of resistance to normal chemical and physical stress, which make asbestos such a commercial success, render it potentially dangerous to present and future generations because of the tendency of the fibers to accumulate in the atmosphere and in the lungs.

In light of these facts, the PCB has proposed the nation's most comprehensive set of asbestos controls. To ban all uses of asbestos would be "alarmism" at its most clamorous. But ignoring

the need to explore and, perhaps, to adopt controls for the significant contributors to a swelling volume of asbestos fiber in our air would constitute a foolish complacency.

To this end, the suggested regulations would identify these "significant contributors" as the commercial use of asbestos in construction work; the demolition of asbestos-containing structures; the manufacturing and processing of asbestos-containing products; the transportation of certain asbestos-containing products; the disposal of asbestos-containing waste; and the use of asbestos in the brakes of millions of vehicles.

Part II would impose several general requirements upon all commercial construction, repair, alteration, demolition, manufacturing or processing activity from which asbestos fiber is discharged into the environment. The persons responsible for such activity must obtain a permit from the EPA. The permit system will serve to produce the advanced assurance of compliance with the applicable control regulations and will thus reduce the cost and burden of in-the-field enforcement.

In addition these commercial activities would have to provide facilities to prevent the removal of asbestos fibers from the site of such activity on the clothing of employees. Indeed, this poses a rather new concept of air pollution control. Those who have died from lung ailments induced by long, close association to an asbestos worker may be powerful proof of the need for novelty.

Finally, Part II would provide for careful waste disposal procedures, as wind-blown refuse heaps and scrap piles contribute to the volume of asbestos fiber in our air. The simple steps for control eliminate any excuse for such dangerously sloppy housework.

Part III would prohibit the spraying of asbestos-containing insulation and fireproofing. Experience has indicated that procedural safeguards are inadequate and their enforcement is an overtaxing burden. Chicago has banned spray asbestos, and New York city and Philadelphia are considering doing so.

Procedural safeguards designed to reduce fiber emissions would be required to spray non-asbestos insulation. The biological effects of these fibers is unknown. Prudence would seem to dictate reasonable efforts to soften the potential future blow from spray fiber aspiring to asbestos' status.

Part IV suggests that various asbestos-related activities at construction sites be done within an enclosure. It would also require that asbestos construction products be so installed as to preclude the emission of fiber into the circulating air.

Part V expresses, ironically, what may be a key reason for banning spray asbestos. It would require that procedural safeguards be pursued in order to demolish a structure whose destruction would otherwise expose members of the public to asbestos fiber. Clouds of dust are often raised by demolition work. The facts that great numbers of persons may be exposed to this dust in urban areas and that the post-war generation of high-rises were the first buildings to use asbestos insulation extensively speak in favor of some such regulation.

Part VI suggests an emission standard for manufacturers of asbestos products. The standard is believed to be within the capture efficiency of baghouse filtration. The proposed boundary standard is thought to be a method for preventing dilution of exhaust gases.

The standard would measure only fibers longer than five microns. The justification for this seems to be the administrative convenience of avoiding difficulties in measuring fibers from .5 to five microns in length. Medical evidence has indicated that the very small fibers may be the most dangerous. And the Board will seek extensive evidence on this point.

Part VII would prohibit the use of brake lining in vehicles manufactured after January 1, 1975 and sold for use in Illinois.

If brake lining decomposition emits asbestos fiber, then the tremendous number of vehicles using asbestos, and the impracticality of controlling these numerous small emission sources would appear to speak to the need for a product ban. The prohibition is carefully worded to avoid the necessity of fitting vehicles produced prior to 1975 with non-asbestos brakes. It is contemplated that the ban will necessitate design changes, probably to disc brakes, and it is thought that requiring the individual vehicle owner to undergo this expense is unreasonable. The time lag of over three years is thought to be sufficient for vehicle manufacturers to accomplish any necessary design changes.

Proposed Regulation Only
June 9, 1971
CHAPTER V: TOXIC SUBSTANCES
ASBESTOS; SPRAY INSULATION

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	202. Removal of Asbestos from clothing
	203. Waste disposal
Part III	<u>Spray Fireproofing and Insulation</u>
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	302. Non-asbestos spray insulation
Part IV	<u>Construction, Alteration and Repair of Structure</u>
	401. Enclosure
	402. Preclude exposure to circulating air
part V	<u>Demolition</u>
	501. Necessary and practicable safeguards
	502. Cessation of demolition work.
Part VI	<u>Manufacturing</u>
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	603. Waste sludge disposal
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PART I: INTRODUCTION

101. Authority

Pursuant to the authority in Sections 9, 10 and 13 of the Environmental Protection Act which empower the Board to adopt regulations forbidding the "sale, offer, or use for reasons of air pollution control" of any article, and to set "standards specifying the maximum amounts or concentrations of various contaminants that may be discharged into the atmosphere"; and to set standards for the issuance of permits for the operation of any equipment or facility capable of causing or contributing to air pollution; and to promulgate "conditions regarding the... use of any....article determined by the Board to constitute an air pollution hazard"; and to adopt effluent standards limiting the amounts of contaminants that may be discharged into the water of Illinois, the Board adopts the following rules and regulations:

102. Policy

It is the purpose of the General Assembly in adopting the Environmental Protection Act to maintain and enhance the purity of the air and water of Illinois in order to protect health, welfare and the quality of life. Accordingly, it is hereby determined that the uncontrolled discharge of asbestos fiber into the environment tends to severely endanger the public health and welfare and that the uncontrolled spraying of fiber-containing materials unreasonably interferes with the enjoyment of life and property.

It is the purpose of these regulations to control the amount of asbestos fiber released into the environment from the major sources of emission. Such control is necessary not only to protect those members of the public who are in proximity to heavy concentrations of asbestos fiber but also to safeguard the health of future generations endangered by the continuous discharge of asbestos fiber which can be toxic and which tends to be cumulative both in the atmosphere and in the human body.

Where health can be protected by the adoption of an emission standard or of procedural safeguards, such a course has been pursued. In those instances where restriction is unfeasible because of the tremendous number of small, uncontrollable emission sources (automotive) or because of the unusual nature of the emission source (spray asbestos at construction sites) a product ban has been resorted to. These prohibitions have been made with full consideration given to the available alternative materials.

It is also the purpose of these regulations to reduce the emission of non-asbestos particulate from spray-fireproofing and

insulation. To protect against these emissions, the biological effects of which are unknown, procedural safeguards have been enacted.

103. Definitions

- Agency - The Illinois Environmental Protection Agency
- Asbestos - Any fiber or any mixture containing fiber of hydrated silicate mineral, which, on the basis of its crystalline structure, falls into one of two categories:
- (1) pyroxenes - chrysotile fiber;
 - (2) amphiboles - crocidolite, amosite, tremolite, actinolite or anthophyllite fiber.
- Board - The Pollution Control Board of Illinois.
- Commercial Activity - Any activity done for hire or having financial profit as a primary aim.
- Debris - Asbestos-containing waste produced by the demolition of a structure.
- Spraying - The pneumatic application of material used for fireproofing or insulation.
- Waste - Any asbestos-containing matter which has been or is intended to be discarded.

PART II: General Requirements

No commercial activity, not otherwise hereinafter prohibited, involving the discharge of asbestos fiber into the environment from the construction, alteration, repair or demolition of a structure or from the processing or manufacturing of asbestos-containing products, shall be conducted unless the person or entity in charge of such activity complies with the following regulations:

201. A permit shall be obtained from the Agency to engage in such activity. Before obtaining such permit, the applicant shall demonstrate compliance with the following safeguards:

(a) The designation of personnel to exercise full-time supervisory authority over all aspects of the activity from which the release of asbestos fiber into the environment could result, in such a manner as to insure compliance

with the pertinent asbestos control regulations.

(b) That each employee engaged in such activity has completed or will complete a satisfactory course of instruction on the potential hazards of exposure to asbestos fiber including the precautions that must be observed to prevent or restrict the dispersion of asbestos fiber into the environment.

(c) That such additional safeguards as are hereinafter specifically required and such precautions consistent with the purpose of these regulations as the Agency deems necessary under the circumstances shall be complied with.

202. Facilities shall be provided and procedures instituted and supervised that prevent the removal of asbestos-containing material from the site on the clothing of employees.

203. Asbestos-containing wastes shall be immediately vacuumed or otherwise collected where vacuuming is impossible, and shall be placed in a container resistant to tearing or breaking under normal handling conditions, which shall be tightly sealed and clearly marked as containing asbestos waste. Such containers shall be placed directly upon a vehicle for disposal by burial at an approved site.

Section 203 shall not apply to the demolition of a structure, except as provided in Section 501(a), (d) and (e) or to the disposal of sludge waste except as provided in Section 603.

PART III: SPRAY FIREPROOFING AND INSULATION

301. The spraying of asbestos-containing material is prohibited.

302. Non-asbestos particulate matter used for insulation or fireproofing shall not be sprayed unless the following procedures are taken:

(a) Before the start of spraying operations, all floor areas shall be swept clean and cleared of all objects, material and equipment other than that employed in the application of the fiber-containing material, or, in the alternative, all such objects, material and equipment shall be covered with plastic or plastic-coated tarpaulins.

(b) The entire floor or area to be sprayed shall be enclosed with plastic or plastic-coated tarpaulins in a manner which shall preclude the escape of fiber-containing material from the enclosure. All interior open areas such as elevator shafts and stairwells shall be enclosed in a manner which shall prevent the escape of fiber-containing

material from the working area. "Stack effect" of the shafts, stairwells and comparable spaces shall be considered in providing proper enclosures.

(c) Regardless of adherence to the stated control practices, any visible emission of fiber-containing materials beyond the building perimeter will be considered a violation.

(d) In case of visible emission of fibrous material from the construction site, immediate steps shall be taken to cause the cessation of such emissions by either effective control measures or work stoppage at the source of the emissions. There shall then be immediate and complete cleanup of all material that has escaped the construction site, and measures shall be taken that will insure that no further dispersal of any fibrous material into the atmosphere can occur.

(e) The entire sprayed area, all ledges and surfaces including tarpaulins within the enclosure shall be thoroughly vacuumed upon completion of the spraying operation and immediately before the enclosure is dismantled. The vacuum cleaner shall contain a strong, single-service, disposable inner bag of durable material which shall be removed from the vacuum cleaner and tightly sealed. The bag shall then be placed in a container and disposed of at an approved site in accordance with Section 203.

(f) All areas used for opening bags containing fibrous material or the changing of hoppers shall be enclosed so as to prevent the escape of such material from the immediate area in which such activity occurs.

(g) Any plenum or other structure coated with or containing fibrous insulation and used in the circulation of air in a building shall be thoroughly cleaned of all debris and waste insulation. All applied fiber-containing insulation within a plenum or duct shall be coated with a sealant which precludes exposure of the fiber-containing material to the circulating air.

PART IV: CONSTRUCTION, ALTERATION AND REPAIR OF STRUCTURE

401. (a) The cutting, trimming, fitting or stripping of asbestos-containing material in the construction, alteration or repair of a structure which is done at the site of such structure shall be conducted within a special enclosure designed to preclude the escape of asbestos fiber from the immediate area of such enclosure.

(b) The mechanical exhaustion of dust from such enclosure to the ambient air is prohibited unless such exhaust system is equipped with a fabric filter for dust collection.

402. Asbestos-containing material applied in the construction, alteration or repair of a structure shall be coated with a sealant, provided with a cover or installed in some other manner so as to preclude exposure of the asbestos fiber to the circulating air.

PART V: DEMOLITION

501. Where the risk of public exposure to asbestos fiber from the dislodging of asbestos-containing materials is present, no demolition of a structure shall be initiated unless all safeguards necessary and practicable to reduce the emission of dust are taken.

Such procedures shall include, but are not necessarily limited to:

(a) Boilers and pipes insulated with asbestos-containing material shall be wetted and stripped before toppling of walls is begun. This procedure shall be followed, where practicable, as to all other asbestos-lined surfaces. Such asbestos waste shall be immediately bagged and disposed of in accordance with Section 203.

(b) Demolition by toppling of walls is prohibited except within an enclosure approved by the Agency as part of the permit granted for demolition of that structure.

(c) Before the demolition of any section of the structure, adequate wetting to suppress the dust shall be employed.

(d) Asbestos-containing debris shall not be dropped or thrown from any floor but shall be transported by dust-tight chutes or buckets. Asbestos-containing debris in chutes or buckets shall be sufficiently wetted to preclude dust dispersion at the point of discharge..

(e) All asbestos-containing debris shall be thoroughly wetted before loading into trucks, other vehicles or containers. During transport such waste shall be enclosed or covered so as to prevent dust dispersion. Asbestos-containing debris shall be disposed by burial at an approved site.

502. In the event asbestos-containing matter becomes air-borne beyond the property boundaries or in the event freezing temperatures preclude the use of water for dust suppression, demolition work shall cease until adequate alternate measures can be taken.

PART VI: MANUFACTURING

601. (a) No factory, plant or enterprise which engages in the processing or manufacturing of any asbestos-containing product shall emit asbestos fiber into the ambient air in excess of .5 fiber per cubic centimeter of air. The ambient

air quality at the boundary of such factory, plant or enterprise shall not exceed .05 fiber per cubic centimeter of air.

(b) Only fibers of 5 microns or greater in length with a length to breadth ratio of 3 to 1 shall be counted.

(c) Sampling shall be determined by the membrane filter method with phase contrast microscopy at 430 X magnification.

602. No water used in processing or manufacturing which contains concentrations of asbestos fiber shall be discharged into sewage systems or to the waters of Illinois.

603. Waste sludge containing asbestos collected from settling ponds shall be enclosed during transport and shall be disposed by burial at an approved site.

PART VII: ASBESTOS-CONTAINING PRODUCTS

701. No product which may emit asbestos-fiber during its transportation shall be transported unless such product is enclosed in such a manner as to preclude the emission of asbestos fiber into the ambient air,

702. The use of asbestos in the brake lining of vehicles manufactured after January 1, 1975, and sold for use in Illinois is prohibited.

REQUEST FOR PRODUCTION

NO. 5

RELEASE OF OPERATING EQUIPMENT
FOR MECHANICAL WORK

RI-9900
EL PASO REFINERY

20A SAFETY AND HEALTH HAZARDS-RESTRICTED AREAS (CONTINUED)

Rev. 11/78

ENTRY PERMIT

NO. _____

HIGH CONCENTRATION H₂S AREAS
COPY OF PERMIT MUST BE IN ENTRANT'S POSSESSION WHILE IN PLANT

DATE _____ 19 _____ FOR PERIOD BETWEEN _____ AND _____

PERMISSION IS GIVEN TO THE FOLLOWING INDIVIDUAL _____

TO ENTER PLANT NO. _____ FOR THE PURPOSE OF _____

_____ WITHIN THE FOLLOWING LIMITS _____

_____ CONDITIONS AND RESTRICTIONS _____

APPROVED _____
UNIT OPERATOR

(This permit is good only for the day
it was issued.)

		ACTUAL IN/OUT TIME
IN	OUT	SIGNATURE
☒	☒	
☒	☒	
☒	☒	
☒	☒	
☒	☒	
☒	☒	

RELEASE OF OPERATING EQUIPMENT
FOR MECHANICAL WORK

RI-9900
EL PASO REFINERY

20A SAFETY AND HEALTH HAZARDS-RESTRICTED AREAS

Revised: 6/84 (Replaces 5/75)

INDUSTRIAL HYGIENE SURVEY

CHEVRON U.S.A., INC.

MANUFACTURING

EL PASO REFINERY

Report Date: June 29, 1984

Prepared By: C. L. Kyllonen
C. L. Kyllonen
Industrial Hygienist

Reviewed By: N. C. Zeiser
N. C. Zeiser
Senior Industrial Hygienist

INDUSTRIAL HYGIENE SURVEY EL PASO REFINERY

INTRODUCTION

An industrial hygiene review of the El Paso Refinery was conducted by Mr. C. L. Kyllonen of Corporation Industrial Hygiene during visits in April 1983 and June 1984. The primary purpose was to review plant operations and activities in order to identify any potential worker health hazards, based upon walkthroughs of the facility and discussions with employees. Principal findings are discussed below.

DISCUSSION

Refinery Streams

Current toxicity information indicates that potential health hazards can be present in refinery streams. Appropriate personal protective equipment, including impervious gloves and any additional measures such as respiratory protection, use of engineering controls, and good personal hygiene measures are the main elements in minimizing potential exposures to such streams.

Hydrogen Sulfide

Under certain upset conditions, routine detector tube testing of process fuel gas streams, such as from C1909 at the FCCU and from D3906 at the Hydrofiner, could result in the release of H_2S within the operator breathing zone. Remote venting and gas-tight sampling provisions on such streams can be used to minimize potential exposures. Similar remote venting of streams away from the operator breathing zone can minimize H_2S releases when discharging light hydrocarbons from lines at the older crude unit accumulator pots, and when checking for hydrocarbons while draining foul water from C3901 at the Hydrofiner. Personal lead-acetate paper tape H_2S warning devices, occasionally seen within the Refinery, do not provide adequate protection against potential H_2S inhalation hazards due to their lack of distinctive warning properties. A number of MDA Monitox personal H_2S monitor/alarm units have been bought by the Refinery. During work in remote areas (such as water-drawing from sour tankage), such solid-state units can serve as warning devices if potentially-hazardous H_2S is released. Such water-draw sites within the Refinery are provided with signs warning of potential H_2S hazards.

Within the SRU/TGU Control House, it was noted that Channel 25 of the General Monitors H_2S alarm unit does not clearly display which of four sensing locations has triggered the unit, including one near the Control House rooftop air intake. Expansion of the system's display capabilities could provide clearer indication of individual sensing locations. It is understood that the H_2S alarm system is often triggered during collection of D5950 overhead reflux samples. Air monitoring can be useful in determining actual airborne H_2S levels during such work, and/or the need for any additional control measures.

Crystalline Silica

It is understood that conventional sand is used for dry, unconfined abrasive blasting outside the Shop areas. Silica-free abrasive blasting agents are preferred for such purposes, to minimize potential inhalation hazards. It is understood that the use of dust masks approved for silicosis-producing dusts is incorporated within written procedures and followed during recharging activities at the Clay Treaters.

Asbestos

El Paso Refinery Instruction No. 1410 summarizes current requirements for asbestos handling within the facility. Future air monitoring during selected work operations (including gasket cutting at the Storehouse) will be useful in determining actual airborne asbestos concentrations. Isolated stockpiles of older asbestos rope packing materials and other friable asbestos products were spotted during the visit. Substitution of newer asbestos-free materials or appropriate packaging of stockpiled items to control dusting can be used to minimize potential exposure hazards.

Respiratory Protection

3-M Model 9920 respirators approved for toxic dusts, mists, and fumes were observed in appropriate use within the Refinery during our visit. The existing yard air/regulator/filter assembly providing breathing air to the abrasive blasting hoods outside the shops does not comply with existing Federal OSHA requirements regarding documentable air purity.

Inorganic Arsenic

Future air monitoring during maintenance activities involving the Alkylation Plant and associated spent acid storage tanks will be useful in determining whether inorganic arsenic (a trace contaminant within smelter acid) is likely to accumulate within process equipment. The handling, storage, labelling, and usage of inorganic arsenic compounds is regulated by Federal OSHA, including those compounds likely to be present with the Quality Control Laboratory.

Safety Showers and Eyewash Fountains

Existing bottle-type emergency eyewash units seen within the Refinery cannot provide 15 minutes flushing capabilities; hard-piped units are preferred. Numerous safety shower and/or eyewash units have been installed recently, including ones at the Dry Dye Building, near Tank 108, across from the Tankfield Control House, and at the QC Lab bottle washer. All such units are periodically tested, with records maintained on inspection sheets. A permanent safety shower/eyewash was not seen within the Northeast end of the South Alkylation Plant area; no eyewash was observed within the Alkylation Plant Lab Shack.

Chemical Additives

Numerous bulk storage and closed-system chemical transfer/injection facilities have been installed recently within the Refinery, eliminating unnecessary operator handling of such materials. Some compounds, such as Betz C-5P Microorganism Control or chromates in cooling towers are no longer used. It is understood that Pave-Bond Anti-Strip is no longer handled at the Asphalt Plant truck racks. Additives facilities at Cooling Tower No. 6 were recently repositioned and provided with correct chemical hazard identification. Unused chemicals formerly stored near the WWTP and other plant locations have been discarded. At the Old Tool Room Area, cleaning agents stored in drums lacked appropriate labels, which would ensure prompt identification in case of emergencies. Refinery locations where Betz Krom-trol is dispensed lacked appropriate chemical hazard identification (yellow lining or equivalent). The material contains chromates (and in some formulations, phosphoric acid). The corrosive antioxidant handled within the Dry Dye Building was lacking similar chemical area hazard identification. Certain Betz Slimicides (including C-30 and DE-364) contain dimethylformamide (DMF), a material whose toxic properties are described in Chevron MIB #1426. Future air monitoring during open-air handling of such slimicides will be useful in determining typical airborne concentrations of DMF. When handling any such compounds, careful work practices and appropriate personal protective equipment are important measures in minimizing potential exposure hazards.

Lead Compounds

Potential exposure hazards to inorganic lead (not to be confused with organic lead compounds such as those in motor fuel anti-knock additives) may exist during certain Refinery work activities. These may include abrasive blasting and hot work on surfaces previously coated with lead-based compounds, work at sites formerly used to weather organic lead tank sludges, and batching of lead acetate solutions with the Quality Control Lab. Inorganic lead compounds are stringently regulated by Federal OSHA. Future air monitoring during such representative work activities will be useful in determining actual airborne inorganic lead concentrations. An appropriate label on the Sixth Street overhead organic lead pipeline, identifying the toxic contents of the line, would ensure better warning in the event of an unexpected release. Other organic lead handling activities at the unloading spots and storage drums appeared to be consistent with Ethyl and Dupont guidelines.

Landfarming Operations

During our visit, it was understood that respiratory protection is routinely worn by the tractor operator during discing or other landfarming activities likely to generate airborne dusts. Future air monitoring during such work will be useful in determining actual airborne dust levels and the adequacy of existing respiratory protective devices.

Sulfur Recovery, Tail Gas Plants

Sulfur seal rodding-out activities at the SRUs could result in the release of SO₂ within the worker breathing zone. Future air monitoring during such work will be useful in determining actual airborne SO₂ levels. At the TGU, it is understood that workers involved in the handling of powdered Murex Vanasol at the Balance Basin wear the recommended respiratory protection due to the irritant properties of vanadium compounds.

Rheniformer and Isomerization Plants

Existing ethylene dichloride (EDC) dedrumming/mixing/injection facilities at these plants could result in the release of EDC vapors while in use. The potential health hazards associated with EDC are summarized in Chevron MIB #554. Alternative chloriding agents or revised handling methods/equipment are possible approaches in minimizing potential worker exposures to EDC.

FCCU

Signs outlining the required respiratory protection are posted within the catalyst fines-handling areas beneath the precipitator. Similar respiratory protection, worn by workers immediately downwind of such fines-handling activities, would serve to minimize potential dust inhalation hazards until revised catalyst handling methods can be investigated.

Crude Unit No. 6

Powdered Merox catalyst formerly used within this plant has been superseded by the water-based slurry formulation, eliminating potential dust exposure hazards. At the time of our visit, no Merox slurry contamination of personal protective equipment among operators was observed.

Laboratory Facilities

At the time of our visit, fume hoods within the Asphalt Plant Lab and QC Lab did not meet minimum recommended Company face velocity specifications; the hood in the Octane Lab similarly did not meet more-stringent Ethyl or Dupont minimum face velocity specifications. It is understood that Designs Engineering is investigating hood improvements. The Octane Lab fume hood was provided with a means of controlling unexpected spillage from the burets. QC Lab bottle washer ventilation system improvements have been made; face velocity measurements performed by Mr. J. M. Driscoll have been within acceptable limits. Only unbreakable plastic containers of laboratory reagents were seen atop the Eagle storage cabinet in the solutions room of the QC Lab. The QC Lab's chemical inventory list will prove useful in future identification of unnecessary stockpiles of little-used chemicals which could otherwise result in potential exposure hazards through mis-handling or improper storage. No aging unstable acids such as perchloric or picric remain in the Lab.

Maintenance

Within the Welding Shop, the use of general dilution ventilation and pedestal fans cannot assuredly control potential welding fume inhalation hazards. The use of local exhaust ventilation devices, collecting the contaminants at their point of generation, is a recognized means of control; the use of appropriate respiratory protection is considered acceptable primarily in the absence of other effective control measures. Within the Machine Shop, it is understood that hearing protection is routinely worn by personnel performing metalspraying, but not likely to be worn by others in adjacent work areas. Due to the high noise levels generated by the metalspray apparatus, appropriate hearing protection can be used to control potential noise exposures among nearby personnel, or the alternate use of noise control barriers. There was visible evidence of overspray behind the metalspray lathe bed and leakage from the ductwork seams between the Clarage fan and the north shop wall. Minor sheet metal fabrication/repair work could control both conditions. Prior spillage of mercury within the Instrument Shop could result in the generation of odorless mercury vapors. The use of vapor depressant compounds during spill cleanup is an appropriate means of controlling such potential inhalation hazards.

Memorandum

San Francisco, CA
June 29, 1984

INDUSTRIAL HYGIENE FOLLOWUP VISIT
EL PASO REFINERY
File 121: CUSA Mfg.

MR. J. C. KEATING:

A visit to the El Paso Refinery was made by Mr. C. L. Kyllonen of Corporation Industrial Hygiene in April, 1983 as a followup to the industrial hygiene survey performed in June 1980. The purpose of the visit was to review the status of the recommendations made by the industrial hygiene group and to discuss any additional items of concern. As no report encompassing the 1983 visit had yet been issued earlier this year when Corporation Industrial Hygiene formalized its review and followup procedures regarding new and previous recommendations for all facilities, a return visit was made to the Refinery by Mr. Kyllonen on June 3-4, 1984. During that most recent visit, mutual agreement was reached on all items appearing in this report, which effectively supersedes the 1980 report and provides a single set of recommendations addressing all current concerns.

Summary

During the 1983 visit, thorough walkthroughs of all plant areas were conducted, accompanied by Mr. J. M. Driscoll. Particular attention was directed to facilities and work activities specifically reflected in the Corporation Industrial Hygiene survey report recommendations dated November 10, 1980. Due to operational changes with the Refinery, plant modifications, and implementation of specific Refinery measures to control potential employee exposures, many of the original 1980 industrial hygiene recommendations were determined to be satisfactorily resolved or otherwise no longer applicable. Partial descriptions of such "closed" recommendations appear in later portions of this report.

The ongoing industrial hygiene program for the El Paso Refinery should emphasize the completion of the current industrial hygiene recommendations appearing in Attachment 1, with supporting information shown in Attachments 2 and 3. The current recommendations, categorized on the basis of relative significance as explained in Attachment 1, consist of unresolved items from the 1980 report plus additional areas of concern developed during our subsequent visits and ensuing telephone conversations. As agreed upon during our June 1984 visit, we request that implementation timetables be developed for each recommendation and forwarded to us within thirty days of

receipt of this report. It was additionally agreed that followup status reports will be prepared by the Refinery and forwarded to us at six month intervals thereafter, so that our files will remain current. The side-by-side recommendation and response format suggested in Attachment 1 is adequate for the implementation timetable and followup reports.

Discussion

The 1980 recommendations regarding the control of potential worker exposures to PNA-containing streams have been superseded by recommendations encompassing all refinery streams. This change is in response to the toxicity information on refinery streams currently available, and partially in anticipation of the recently-promulgated Federal OSHA Hazard Communication Standard. That standard requires employers to establish by May 25, 1986 a system for informing employees about the chemical health hazards present at their worksite. A review of this standard is currently being coordinated by Corporation Industrial Hygiene to determine how it will apply to Chevron facilities and to develop a compliance strategy for the Company. Information and assistance in complying with the standard will be provided to Chevron facilities as it becomes available to enable them to meet the legal deadline of the standard. As the first step in complying with the standard, we have recommended that the El Paso Refinery chemical inventory be expanded to encompass all intermediate refining streams for which there is some potential for worker exposure. Additional information regarding such inventory efforts will be forwarded by Corporation Industrial Hygiene once it becomes available.

The air monitoring activities outlined in Attachment 3 have been developed as "starting point" guidelines, intended to fulfill one or more of the following purposes: to comply with monitoring requirements mandated by existing applicable Federal OSHA regulations; to determine the effectiveness of existing exposure control measures; or to provide rangefinding data for suspect activities which could result in potential worker exposures. It is anticipated that additional monitoring may also be warranted for other compounds in response to possible inquiries or complaints from workers; following implementation of operational or facility modifications within the Refinery; or in anticipation of future rulemaking currently undergoing Federal OSHA review, for compounds such as benzene or ethylene dibromide.

As part of the above monitoring program, a periodic review of the monitoring results should be performed by Refinery personnel to determine if exposure results are low indicating that monitoring of those operations can be concluded, if exposure results are elevated and engineering controls or other protective measures are needed, or if exposure results are inconclusive and additional monitoring is needed. A suggested format for this summary, and the data elements to include are shown in Attachment 4. However, if an alternative summary format containing this information is preferred, it can be used in place of the attached format. Corporation Industrial Hygiene is available to assist in the interpretation of Refinery

June 29, 1984

monitoring data wherever necessary.

Report Format

This report consists of two related segments. This memorandum plus Attachments 1-4 are provided for the use of management. They are followed by a separate second portion containing survey observations and discussions relating to the Attachment 1 recommendations and older resolved items. That portion has been compiled in a format consistent with the requirements of the Fed-OSHA regulation (29 CFR 1910.20) regarding employee access to exposure records.

We thank you for your cooperation and the valuable assistance provided by facility personnel during the visits. If you should have any questions, please contact Mr. C. L. Kyllonen at (CTN) 894-6915.

S. L. DRYDEN



CLK:jlw
Attachments

cc: Mr. W. E. Dunn
Mr. I. H. Gilman
Mr. R. S. Proctor
Mr. N. C. Zeiser

To

L W HOLLEBEKE
EL PASO REF'Y

From

C L KYLLONEN
EH + S S.F.

On File 121 CUSA
MFG Your File
EL PASO

Subject QC LAB TRANSITE STUDY

Date

5-21 1982

WAYNE: ATTACHED ARE SAMPLE RESULTS OF ADM'S ASBESTOS INVESTIGATION. MITCH CHOSE TO SAMPLE WITHIN THE BREATHING ZONES OF TWO TECH HELPERS DURING ROUTINE WORK ACTIVITIES. NO ASBESTOS FIBERS WERE DETECTED UPON ANALYSIS OF THE FILTER CASSETTES. BOB REINHART, OUR LAB TECHNICIAN, IS FORWARDING THESE SAME RESULTS DIRECTLY TO MITCH UNDER SEPARATE COVER. MITCH IS APPARENTLY WILLING TO SAMPLE AT A FIXED LOCATION IMMEDIATELY BENEATH A CEILING LOUVER (AS WAS ORIGINALLY PROPOSED) UPON HIS RETURN FROM VACATION. CALL ME, AND WE CAN DISCUSS ANY PROPOSED ADDITIONAL SAMPLING, IF NECESSARY OR APPROPRIATE.

Signed

An immediate reply will help finalize this matter.

Reply

Date

19

CC: NCZ

Signed

Printed In U.S.A.

GO-144-C (OS-7

Originator - Retain yellow copy. Forward white and pink (with carbon attached). Addressee - Please return white copy with your reply.

②

5

EAL Corporation

**Thermo
Electron**
CORPORATION

RJR
5-20-82

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

ANALYSIS REPORT

Customer Standard Oil of California
225 Bush Street - Room 1324
San Francisco, CA 94104

Date: 5/17/82

Samples Received: 5/11/82

EAL W. O. No. 470172-37-440

Purchase Order No.: SCMED115312X

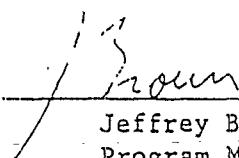
Attention: R.J. Reinhart

BATCH NO. ADM 82-01

SAMPLE IDENTIFICATION		ASBESTOS FIBER COUNT			VOLUME
EAL	CUSTOMER	Fibers/100 Fields	Fibers/Filter	Fibers/cc	(L)
37-440-1	AA-1	<1	$<6.58 \times 10^2$	<0.0037	180
37-440-2	AA-2	<1	$<6.58 \times 10^2$	<0.0037	180
37-440-3	AA-10 Blank	<1	$<6.58 \times 10^2$	---	---

Analysis by phase contrast microscopy per NIOSH P&CAM 239.

JB/dss


Jeffrey Brown
Program Manager

EAL Corporation laboratories are Accredited by the American Industrial Hygiene Association; approved by the State of California for complete chemical, radiological, bacteriological and bioassay analyses; licensed by the State of California as a Clinical Chemistry laboratory.

CHEV B8 5598

EL PASO REFINERY

Guidelines for Gasket Applications

<u>Flange Ratings</u>	<u>Service</u>	<u>Gasket Material</u>
125 lb. flat face	Fire system, utility air and water systems.	Service sheet/ asbestos
150 lb. RF	110 lb. steam, LPG/H ₂ S and general services to 450°F	Spiral wound/ 304 asbestos
300 lb. RF	400 lb. steam, LPG/H ₂ S and general services to 750°F	Spiral wound/ 304 asbestos
600 lb. RF	All services with 600 lb. RF flanges except sulfuric acid service.	Spiral wound/ 304 asbestos
150 & 300 lb. RF	Fresh and spent <u>SULFURIC ACID</u>	Spiral wound/ 316 African blue
Ring Joint	All services	See note 2
Small T&G	All services	316 double jacketed asbestos ring

- Notes:
- (1) Contact engineering prior to replacing service sheet gaskets with spiral wound gaskets in RF flanges on vessels, drums, columns and exchangers.
 - (2) Contact engineering for information on the type of material required for ring joint gaskets.
 - (3) If there is any question about specific installations contact your supervisor.

EL PASO REFINERY

GUIDELINES FOR GASKET APPLICATIONS

<u>FLANGE RATINGS</u>	<u>SERVICE</u>	<u>GASKET MATERIAL</u>
125 LB FLAT FACE CAST IRON	FIRE SYSTEM, UTILITY AIR & WATER SYSTEMS	SERVICE SHEET/ ASBESTOS
150 LB RF	110 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 450 °F	SPIRAL WOUND/ 304 ASBESTOS
300 LB RF	400 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 750 °F	SPIRAL WOUND/ 304 ASBESTOS
600 LB RF	ALL SERVICES WITH 600 LB R.F. FLANGES EXCEPT SULFURIC ACID SERVICE.	SPIRAL WOUND/ 304 ASBESTOS
150 & 300 LB RF	FRESH & SPENT <u>SULFURIC ACID</u>	SPIRAL WOUND/ 316 AFRICAN BLUE
RING JOINT	ALL SERVICES	SEE NOTE 2
SMALL T & G	ALL SERVICES	316 DBL JACKETED ASBESTOS RING

NOTES : (1) CONTACT ENGINEERING PRIOR TO REPLACING SERVICE SHEET
GASKETS WITH SPIRAL WOUND GASKETS IN R.F. FLANGES
ON VESSELS, DRUMS, COLUMNS AND EXCHANGERS

(3) IF THERE IS ANY QUESTION ABOUT SPECIFIC INSTALLATIONS
CONTACT YOUR SUPERVISOR

(2) CONTACT ENGINEERING FOR INFORMATION ON THE TYPE
OF MATERIAL REQUIRED FOR RING JOINT GASKETS

EL PASO REFINERY

Guidelines for Gasket Applications

<u>Flange Ratings</u>	<u>Service</u>	<u>Gasket Material</u>
125 lb. flat face	Fire system, utility air and water systems.	Service sheet/ asbestos
150 lb. RF	110 lb. steam, LPG/H ₂ S and general services to 450°F	Spiral wound/ 304 asbestos
300 lb. RF	400 lb. steam, LPG/H ₂ S and general services to 750°F	Spiral wound/ 304 asbestos
600 lb. RF	All services with 600 lb. RF flanges except sulfuric acid service.	Spiral wound/ 304 asbestos
150 & 300 lb. RF	Fresh and spent <u>SULFURIC ACID</u>	Spiral wound/ 316 African blue
Ring Joint	All services	See note 2
Small T&G	All services	316 double jacketed asbestos ring

- Notes: (1) Contact engineering prior to replacing service sheet gaskets with spiral wound gaskets in RF flanges on vessels, drums, columns and exchangers.
- (2) Contact engineering for information on the type of material required for ring joint gaskets.
- (3) If there is any question about specific installations contact your supervisor.

EL PASO REFINERY

GUIDELINES FOR GASKET APPLICATIONS

<u>FLANGE RATINGS</u>	<u>SERVICE</u>	<u>GASKET MATERIAL</u>
125 LB FLAT FACE CAST IRON	FIRE SYSTEM, UTILITY AIR & WATER SYSTEMS	SERVICE SHEET/ ASBESTOS
150 LB RF	110 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 450 °F	SPIRAL WOUND/ 304 ASBESTOS
300 LB RF	400 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 750 °F	SPIRAL WOUND/ 304 ASBESTOS
600 LB RF	ALL SERVICES WITH 600 LB R.F. FLANGES EXCEPT SULFURIC ACID SERVICE.	SPIRAL WOUND/ 304 ASBESTOS
150 & 300 LB RF	FRESH & SPENT <u>SULFURIC ACID</u>	SPIRAL WOUND/ 316 AFRICAN BLUE
RING JOINT	ALL SERVICES	304 ORJ
SMALL TIG	ALL SERVICES	316 DBL JACKETED ASBESTOS RING

Add Note 2

NOTES : (1) CONTACT ENGINEERING PRIOR TO REPLACING SERVICE SHEET
GASKETS WITH SPIRAL WOUND GASKETS IN R.F. FLANGES
ON VESSELS, DRUMS, COLUMNS AND EXCHANGERS

(2) IF THERE IS ANY QUESTION ABOUT SPECIFIC INSTALLATIONS
CONTACT YOUR SUPERVISOR.

(3)

OK/UA

KRAS/13/83
ACB

MEMORANDUM GO-144

19

FROM:

SUBJECT:

GASKET TYPES/MATERIALS
FOR DIFFERENT SERVICES.

OUR FILE:

YOUR FILE:

SERVICE FLANGE TYPE/RATING GASKET TYPE/MATERIAL

UTILITY AIR, INSTRUMENT AIR, RF/150 LB SERVICE SHEET/ASBESTOS

FRESH & COOLING TOWER WATER FF/125 LB C.I. SERVICE SHEET/ASBESTOS

110# STEAM AND GENERAL RF/150 LB SPIRAL WOUND/304-ASBESTOS

SERVICES TO 450 °F

20# STEAM AND GENERAL RF/300 LB SPIRAL WOUND/304-ASBESTOS

SERVICE TO 750 °F

STEAM, CONDENSATE & BOILER FEED RF/600 LB SPIRAL WOUND/304-ASBESTOS

WATER TO 600 PSIG

FRESH AND SPENT SULFURIC RF/150 & 300 LB SPIRAL WOUND/316L-AFRICAN
ACID BLUE ASB.

LPG/H₂S RF/150 & 300 LB SPIRAL WOUND/304-ASBESTOS

NOTES (1) SERVICE SHEET GASKETS ARE ALLOWED ONLY AS SHOWN
ABOVE OR FOR BLINDING.

(2) IF THERE IS ANY QUESTION ABOUT SPECIFIC INSTALLATIONS
CONTACT YOUR SUPERVISOR.

- CHEV B8 5603

EL PASO REFINERY

GUIDELINES FOR GASKET APPLICATIONS

<u>FLANGE RATINGS</u>	<u>SERVICE</u>	<u>GASKET MATERIAL</u>
125 LB FLAT FACE CAST IRON	FIRE SYSTEM, UTILITY AIR & WATER SYSTEMS	SERVICE SHEET/ ASBESTOS
150 LB RF	110 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 450 °F	SPIRAL WOUND/ 304 ASBESTOS
300 LB RF	400 LB STEAM, LPG/H ₂ S & GENERAL SERVICES TO 750 °F	SPIRAL WOUND/ 304 ASBESTOS
600 LB RF	ALL SERVICES WITH 600 LB R.F. FLANGES EXCEPT SULFURIC ACID SERVICE.	SPIRAL WOUND/ 304 ASBESTOS
150 & 300 LB RF	FRESH & SPENT <u>SULFURIC ACID</u>	SPIRAL WOUND/ 316 AFRICAN BLUE
RING JOINT	ALL SERVICES	304 ORJ only No OK correct
WALL TIG	ALL SERVICES	316 DBL JACKETED ASBESTOS RING

NOTES:

- (1) CONTACT ENGINEERING PRIOR TO REPLACING SERVICE SHEET GASKETS WITH SPIRAL WOUND GASKETS IN R.F. FLANGES ON VESSELS, DRUMS, COLUMNS AND EXCHANGERS
- (2) IF THERE IS ANY QUESTION ABOUT SPECIFIC INSTALLATIONS CONTACT YOUR SUPERVISOR.

OK 

KRAS/13/83
5/13/83

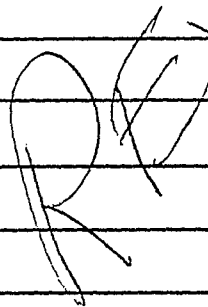
MEMOGRAM

Date 5/19/83

To: LAW

From: RGL

ATTACHED FOR YOUR REVIEW AND
APPROVAL IS THE PROPOSED GUIDE
FOR GASKET APPLICATIONS WITH THE
CHANGES YOU SUGGESTED PLUS CHANGES
SUGGESTED BY ACB, KRA, & GMH.
PENDING YOUR APPROVAL IT WILL GO
THIS TYPED, REDUCED LAMINATED
AND DISTRIBUTED REFINERY WIDE.



GO-24-Long (D 11/0)

2098

SAFETY DATA SHEET

NOV 17 1981

Eric Bailey

SECTION I

diaries

EMERGENCY TELEPHONE NO.

303/978-3118

80217

ulation

TRADE NAME AND SYNONYMS

THERMO-12, ①

FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS.	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Ground Silica				by weight	40-50%
Silica combines during the manufacturing process so that less than 1% free crystalline silica of respirable size is present in the dust generated by fabrication.					
Glass and Organic Fibers				3-8%	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	0.21
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	12%
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR White odorless solid - pipe covering or block			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	LeI	UeI
EXTINGUISHING MEDIA	Non-flammable			
SPECIAL FIRE FIGHTING PROCEDURES				
UNUSUAL FIRE AND EXPLOSION HAZARDS				

SECTION V - HEALTH HAZARD DATA

PERmissible Exposure Limit (PEL)

Nuisance dust - TLV 50 mppcf or 15 mg/M³ total dust; 5 mg/M³ respirable dust.

EMERGENCY AND FIRST AID PROCEDURES

Avoid breathing excessive dust when handling and cutting.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) None in designed use.			
HAZARDOUS DECOMPOSITION PRODUCTS None			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use good housekeeping procedures.

WASTE DISPOSAL METHOD

Normal good practices.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NIOSH approved for protection against nuisance dusts.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Maintain good housekeeping practices.

OTHER PRECAUTIONS

PAGE (2)
GPO 930-540

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, Form OSHA-20 Rev. May 72
 JOHNS-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT
 THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

INDUSTRIAL HYGIENE SURVEY

CHEVRON U.S.A., INC.

MANUFACTURING

EL PASO REFINERY

Report Date: June 29, 1984

Prepared By: C. L. Kyllonen
C. L. Kyllonen
Industrial Hygienist

Reviewed By: N. C. Zeiser
N. C. Zeiser
Senior Industrial Hygienist

INDUSTRIAL HYGIENE SURVEY EL PASO REFINERY

INTRODUCTION

An industrial hygiene review of the El Paso Refinery was conducted by Mr. C. L. Kyllonen of Corporation Industrial Hygiene during visits in April 1983 and June 1984. The primary purpose was to review plant operations and activities in order to identify any potential worker health hazards, based upon walkthroughs of the facility and discussions with employees. Principal findings are discussed below.

DISCUSSION

Refinery Streams

Current toxicity information indicates that potential health hazards can be present in refinery streams. Appropriate personal protective equipment, including impervious gloves and any additional measures such as respiratory protection, use of engineering controls, and good personal hygiene measures are the main elements in minimizing potential exposures to such streams.

Hydrogen Sulfide

Under certain upset conditions, routine detector tube testing of process fuel gas streams, such as from C1909 at the FCCU and from D3906 at the Hydrofiner, could result in the release of H_2S within the operator breathing zone. Remote venting and gas-tight sampling provisions on such streams can be used to minimize potential exposures. Similar remote venting of streams away from the operator breathing zone can minimize H_2S releases when discharging light hydrocarbons from lines at the older crude unit accumulator pots, and when checking for hydrocarbons while draining foul water from C3901 at the Hydrofiner. Personal lead-acetate paper tape H_2S warning devices, occasionally seen within the Refinery, do not provide adequate protection against potential H_2S inhalation hazards due to their lack of distinctive warning properties. A number of MDA Monitox personal H_2S monitor/alarm units have been bought by the Refinery. During work in remote areas (such as water-drawing from sour tankage), such solid-state units can serve as warning devices if potentially-hazardous H_2S is released. Such water-draw sites within the Refinery are provided with signs warning of potential H_2S hazards.

Within the SRU/TGU Control House, it was noted that Channel 25 of the General Monitors H_2S alarm unit does not clearly display which of four sensing locations has triggered the unit, including one near the Control House rooftop air intake. Expansion of the system's display capabilities could provide clearer indication of individual sensing locations. It is understood that the H_2S alarm system is often triggered during collection of D5950 overhead reflux samples. Air monitoring can be useful in determining actual airborne H_2S levels during such work, and/or the need for any additional control measures.

Crystalline Silica

It is understood that conventional sand is used for dry, unconfined abrasive blasting outside the Shop areas. Silica-free abrasive blasting agents are preferred for such purposes, to minimize potential inhalation hazards. It is understood that the use of dust masks approved for silicosis-producing dusts is incorporated within written procedures and followed during recharging activities at the Clay Treaters.

Asbestos

El Paso Refinery Instruction No. 1410 summarizes current requirements for asbestos handling within the facility. Future air monitoring during selected work operations (including gasket cutting at the Storehouse) will be useful in determining actual airborne asbestos concentrations. Isolated stockpiles of older asbestos rope packing materials and other friable asbestos products were spotted during the visit. Substitution of newer asbestos-free materials or appropriate packaging of stockpiled items to control dusting can be used to minimize potential exposure hazards.

Respiratory Protection

3-M Model 9920 respirators approved for toxic dusts, mists, and fumes were observed in appropriate use within the Refinery during our visit. The existing yard air/regulator/filter assembly providing breathing air to the abrasive blasting hoods outside the shops does not comply with existing Federal OSHA requirements regarding documentable air purity.

Inorganic Arsenic

Future air monitoring during maintenance activities involving the Alkylation Plant and associated spent acid storage tanks will be useful in determining whether inorganic arsenic (a trace contaminant within smelter acid) is likely to accumulate within process equipment. The handling, storage, labelling, and usage of inorganic arsenic compounds is regulated by Federal OSHA, including those compounds likely to be present with the Quality Control Laboratory.

Safety Showers and Eyewash Fountains

Existing bottle-type emergency eyewash units seen within the Refinery cannot provide 15 minutes flushing capabilities; hard-piped units are preferred. Numerous safety shower and/or eyewash units have been installed recently, including ones at the Dry Dye Building, near Tank 108, across from the Tankfield Control House, and at the QC Lab bottle washer. All such units are periodically tested, with records maintained on inspection sheets. A permanent safety shower/eyewash was not seen within the Northeast end of the South Alkylation Plant area; no eyewash was observed within the Alkylation Plant Lab Shack.

Chemical Additives

Numerous bulk storage and closed-system chemical transfer/injection facilities have been installed recently within the Refinery, eliminating unnecessary operator handling of such materials. Some compounds, such as Betz C-5P Microorganism Control or chromates in cooling towers are no longer used. It is understood that Pave-Bond Anti-Strip is no longer handled at the Asphalt Plant truck racks. Additives facilities at Cooling Tower No. 6 were recently repositioned and provided with correct chemical hazard identification. Unused chemicals formerly stored near the WWTP and other plant locations have been discarded. At the Old Tool Room Area, cleaning agents stored in drums lacked appropriate labels, which would ensure prompt identification in case of emergencies. Refinery locations where Betz Krom-trol is dispensed lacked appropriate chemical hazard identification (yellow lining or equivalent). The material contains chromates (and in some formulations, phosphoric acid). The corrosive antioxidant handled within the Dry Dye Building was lacking similar chemical area hazard identification. Certain Betz Slimicides (including C-30 and DE-364) contain dimethylformamide (DMF), a material whose toxic properties are described in Chevron MIB #1426. Future air monitoring during open-air handling of such slimicides will be useful in determining typical airborne concentrations of DMF. When handling any such compounds, careful work practices and appropriate personal protective equipment are important measures in minimizing potential exposure hazards.

Lead Compounds

Potential exposure hazards to inorganic lead (not to be confused with organic lead compounds such as those in motor fuel anti-knock additives) may exist during certain Refinery work activities. These may include abrasive blasting and hot work on surfaces previously coated with lead-based compounds, work at sites formerly used to weather organic lead tank sludges, and batching of lead acetate solutions with the Quality Control Lab. Inorganic lead compounds are stringently regulated by Federal OSHA. Future air monitoring during such representative work activities will be useful in determining actual airborne inorganic lead concentrations. An appropriate label on the Sixth Street overhead organic lead pipeway, identifying the toxic contents of the line, would ensure better warning in the event of an unexpected release. Other organic lead handling activities at the unloading spots and storage drums appeared to be consistent with Ethyl and Dupont guidelines.

Landfarming Operations

During our visit, it was understood that respiratory protection is routinely worn by the tractor operator during discing or other landfarming activities likely to generate airborne dusts. Future air monitoring during such work will be useful in determining actual airborne dust levels and the adequacy of existing respiratory protective devices.

Sulfur Recovery, Tail Gas Plants

Sulfur seal rodding-out activities at the SRUs could result in the release of SO₂ within the worker breathing zone. Future air monitoring during such work will be useful in determining actual airborne SO₂ levels. At the TGU, it is understood that workers involved in the handling of powdered Murex Vanasol at the Balance Basin wear the recommended respiratory protection due to the irritant properties of vanadium compounds.

Rheniformer and Isomerization Plants

Existing ethylene dichloride (EDC) dedrumming/mixing/injection facilities at these plants could result in the release of EDC vapors while in use. The potential health hazards associated with EDC are summarized in Chevron MIB #554. Alternative chloriding agents or revised handling methods/equipment are possible approaches in minimizing potential worker exposures to EDC.

FCCU

Signs outlining the required respiratory protection are posted within the catalyst fines-handling areas beneath the precipitator. Similar respiratory protection, worn by workers immediately downwind of such fines-handling activities, would serve to minimize potential dust inhalation hazards until revised catalyst handling methods can be investigated.

Crude Unit No. 6

Powdered Merox catalyst formerly used within this plant has been superseded by the water-based slurry formulation, eliminating potential dust exposure hazards. At the time of our visit, no Merox slurry contamination of personal protective equipment among operators was observed.

Laboratory Facilities

At the time of our visit, fume hoods within the Asphalt Plant Lab and QC Lab did not meet minimum recommended Company face velocity specifications; the hood in the Octane Lab similarly did not meet more-stringent Ethyl or Dupont minimum face velocity specifications. It is understood that Designs Engineering is investigating hood improvements. The Octane Lab fume hood was provided with a means of controlling unexpected spillage from the burets. QC Lab bottle washer ventilation system improvements have been made; face velocity measurements performed by Mr. J. M. Driscoll have been within acceptable limits. Only unbreakable plastic containers of laboratory reagents were seen atop the Eagle storage cabinet in the solutions room of the QC Lab. The QC Lab's chemical inventory list will prove useful in future identification of unnecessary stockpiles of little-used chemicals which could otherwise result in potential exposure hazards through mis-handling or improper storage. No aging unstable acids such as perchloric or picric remain in the Lab.

Maintenance

Within the Welding Shop, the use of general dilution ventilation and pedestal fans cannot assuredly control potential welding fume inhalation hazards. The use of local exhaust ventilation devices, collecting the contaminants at their point of generation, is a recognized means of control; the use of appropriate respiratory protection is considered acceptable primarily in the absence of other effective control measures. Within the Machine Shop, it is understood that hearing protection is routinely worn by personnel performing metalspraying, but not likely to be worn by others in adjacent work areas. Due to the high noise levels generated by the metalspray apparatus, appropriate hearing protection can be used to control potential noise exposures among nearby personnel, or the alternate use of noise control barriers. There was visible evidence of overspray behind the metalspray lathe bed and leakage from the ductwork seams between the Clarage fan and the north shop wall. Minor sheet metal fabrication/repair work could control both conditions. Prior spillage of mercury within the Instrument Shop could result in the generation of odorless mercury vapors. The use of vapor depressant compounds during spill cleanup is an appropriate means of controlling such potential inhalation hazards.

Design Guide says -

No corrections req'd if -

1) $\Delta P = 100''$ or less - 100''

2) $d/D = 0.2 - 0.7$ - 0.640

3) Press > 40 psia - 413 psia

Were OK

Correction factors only, apparently,
used where accuracy to more
than $\pm 2\%$ is desired.

RMC
8/20/20

MEMOGRAM

SPEAK IT - FORGET IT - WRITE IT - REMEMBER

DATE

7/27/70

TO:

MLB

FROM:

RMC

DATA SHEET

check nos.

original

checked by someone.

RMC

7/31/70

Throat Taps

OK to 12"

In a pipe class (i.e. N-2 R-2230)

which calls for Flexitallic gaskets
do these get used on ontree
flanges as well? or do we use
asbestos gaskets?

I saw a note on the ontree flange
dwg. which says something to the
effect that soft asbestos gasket
are needed to prevent Chattering
of the ontree plate.

J

7/27/70

Answer - No! use flexitallic

Soft Asbestos applies only to

ORG & T-G. Flanges

GO-24-LONG (CDD 1/67)

per MLB 7/28/70

~~10/1~~
~~10/1~~
TF

MANAGEMENT Newsletter

(SEE PAGE 2)



August 1972/No. 311

Cleaner refineries

El Segundo and Perth Amboy refineries are a continent apart geographically but they are first cousins environmentally. Each is situated in a vast population center and each is related to all other refineries in the common need for careful environmental considerations. The Company has spent some \$40 million to protect the environment at El Segundo and about \$8 million at Perth Amboy. Another \$6.2 million will shortly be spent on the two for further environmental controls.

El Segundo

Back in August of 1970, Corporation Engineering, Chevron Research and the Western Operations Manufacturing people at El Segundo started a three-month study of the waste water situation at the refinery. The result was a 1½-inch-thick master plan defining the alterations necessary to meet state and Federal regulations which at the time were only being talked about but were nevertheless clearly predictable.

The refinery plan will cost \$5 million and has three major parts which are all under way.

The first, which is scheduled for completion by the fall of 1973, calls for a new large cooling tower. The refinery presently draws in about 24,000 gallons of sea water a minute for cooling and returns it to the ocean. The new tower will take over this cooling function by using fresh water circulating within a closed system.

The second part provides a parallel drainage system which will allow separation of the contaminated streams for different purification processing.

Third is an air flotation tank in which bubbles of air will rise up through the water, separating the small quantities of oil from the water and sending it to the surface where it can be removed.

(This separation process is in lieu of large settling ponds which are used at Richmond Refinery. At El Segundo, there is not enough spare acreage for ponds.)

The entire project will be completed by mid-1976.

Perth Amboy

If you could peek inside the cat cracker at Chevron-East's Perth Amboy Refinery, you'd see among other things, a lot of silica-alumina catalyst pellets being jostled up and down and sideways under intense heat and slowly being abraded to dust.

Dust is a dirty word in these days of environmental concern, especially in oil refineries and other manufacturing plants. Perth Amboy's cracker already has considerable equipment installed to prevent most of this dust from escaping to the atmosphere. However, careful analysis has shown that up to 160 pounds per hour is still escaping from two flue gas stacks.

More sophisticated equipment is now being added, at a cost of \$1.2 million, which will reduce the dust loss by 99 percent. The project will be completed by the end of 1973.

Problem in Peru

Last May 16, the tax court in Peru ruled that Refineria Conchan Chevron S.A., a Social refining and marketing subsidiary in Peru, must pay stamp taxes amounting to several millions of dollars for a period dating back to 1967, and must continue to pay such taxes in the future. Subsequently, the government placed an embargo on Conchan's concession rights, its physical assets and its bank accounts.

Because of the embargo (attachment in U.S. terminology), plus restrictions on the importations of crude oil, Conchan was forced to suspend operations on June 3. Finally, on July 13, the Peruvian Government took possession of the company's assets. CH 00826

TF 110.1 Asbestor

CHEV B8 5616

The Conchan situation is complicated. It dates back to contracts signed with the Peruvian Government in the early 1960's which exempted the Conchan operation from all taxes except those on income. In 1966, the government modified the petroleum code to eliminate the tax exemptions. In December 1967, the government tax office brought a claim against Conchan for payment of stamp taxes retroactive to 1964. Six months later, a special tax tribunal confirmed the stamp tax exemption.

The present government of Peru has seen fit to challenge the exemption once again; the decision of May 16 represents the culmination of that challenge.

Conchan management has made a strenuous effort to seek an agreement with Peru, which would result in a mutually satisfactory settlement of the tax dispute. This effort is continuing.

Aramco's Sea Island

Sea Island 4 ended its 9000-mile journey from Japan to Ras Tanura, Saudi Arabia, on June 27 and slipped into position within 1 inch of its design position. It joined its sisters, Sea Islands 1, 2 and 3 as part of the largest offshore loading facility in the world.

Sea Island 4 will accommodate simultaneously two supertankers ranging from 150,000 to 500,000 dead-weight tons and brings the total berths at the Sea Island complex to eight.

This latest addition to the complex is larger than any of its three older sister installations. The central platform measures 265 x 125 feet; walkways connecting it to the six mooring dolphins and to Sea Island 3 give it an overall length of 1750 feet. With its arrival, the length of the total Sea Island complex becomes 1.1 miles.

The giant loading facility is located about two miles offshore in 90 feet of water. Sea Island 4 is scheduled to go into operation in September 1972.

OSHA and asbestos

Asbestos is a grayish or greenish fibrous mineral used for making incombustible or fireproof articles. In modern industry there are some 3000 applications of this unique mineral.

Early in this century, a scarring disease—*asbestosis*—of the lungs was found in individuals exposed to asbestos-laden dust. Recent studies indicate that more serious complications can result.

Socal has few employees who are exposed to asbestos dust and their exposure is very different than occurs in the asbestos manufacturing and construction industries where most health complications have occurred. No Socal employee has contracted asbestosis.

OSHA (Occupational Safety and Health Administration) recently established safety and health standards for exposure to asbestos dust. These were established only after much debate and disagreement. The disputes have centered around the determination of a specific level of asbestos fiber concentration in the air below which exposure is safe.

OSHA has established 10 regulations which:

1. Set maximum exposure limits;
2. Require engineering controls to achieve compliance;
3. Require specific controls for certain operations;
4. Limit the use of respirators for compliance;
5. Require provision of special work clothing;
6. Specify monitoring of airborne dust levels;
7. Require caution signs and labels;
8. Require pre-employment, annual and termination medical examinations;
9. Specify retention time and access of medical and monitoring records;
10. Require disposal of wastes in sealed containers.

In keeping with Company policy and practice, and mainly as a matter of information, the Corporation Safety Division is preparing compliance guidelines for distribution to all organizations.

MGMT. NEWSLETTER

August 1972 No. 311

Request for Production

No. 6

Memorandum

JAN 15 '85

San Francisco, CA
January 7, 1984

[illegible]

cc's done
ple

DU PONT STUDY ON RESPIRATORS
FOR ASBESTOS REMOVAL

~~File 193.5~~ Respirators

11C. 1 asterisk

✓ 71.0

EMPLOYEE RELATIONS MANAGERS (SELECTED)
SAFETY ENGINEERS

A recent study by Du Pont on respirators for asbestos removal was discussed in the November 15, 1984 issue of the Bureau of National Affairs (BNA) Occupational Safety and Health Reporter. The study addressed the protection provided by negative pressure air purifying respirators and self contained breathing apparatus (SCBA) during the removal of asbestos containing materials. One important conclusion presented in the study was that negative pressure respirators may provide protection which is not significantly less than the protection obtained from SCBA.

The attached critique prepared by the Corporate Industrial Hygiene staff presents an analysis of the study and a discussion of the validity of the study's conclusions. In our opinion, the study does not present adequate data to support the conclusion mentioned above. It does, however, indicate that negative pressure respirators can provide significant protection from asbestos exposure during asbestos removal operations, when employees are qualitatively fit tested.

If you should have any questions concerning this study please contact Mr. J. S. Hatfield (CTN 894-5280).

S. L. DRYDEN

JSH:mjg
Attachment

DU PONT STUDY ON RESPIRATORS FOR ASBESTOS REMOVAL

The Du Pont study on respirators for asbestos removal, discussed in the 11/15/84 Bureau of National Affairs Occupational Safety and Health Reporter, measured protection factors (PF) during asbestos removal operations for a variety of models of negative pressure respirators and for one model of SCBA. The protection factors were determined while employees were involved in asbestos removal by measuring the asbestos concentrations outside (i.e., ambient levels) and inside of the respirator facepiece. This study presents two findings on the protection provided by negative pressure respirators (as discussed below), however, the data in the study does not adequately support the first finding.

- The study concludes that the negative pressure air purifying respirator PF results were not significantly below the results for the SCBA suggesting that similar protection against asbestos would be provided by both types of respirators.
- The study results indicated that all negative pressure respirator models tested resulted in PF of 5 or more for all individuals involved in the study (i.e., 17 individuals).

The data on PF for SCBA presented in this study to support the first finding consists of only two data points corresponding to two individuals wearing the same SCBA unit. This first finding would contradict a large body of data which has been obtained in previous studies on PF for negative pressure respirators and SCBA which show a large difference in the protection obtained between the two types of respirators. Finally, although the average PF from the two SCBA data points approximates the average PF for the other kinds of respirator models tested, a large fraction of the employees tested while wearing negative pressure respirators obtained PF well below the SCBA PF results. Thus this study does not contain adequate data to make the conclusion that the protection factors obtained with SCBA (or supplied air respirators) are comparable with the PF for negative pressure respirator models during asbestos removal operations.

The second finding is important because it addresses the protection obtained while employees were actually involved in asbestos removal operations. The data in the study showed that all of the employees who obtained an adequate fit with a negative pressure respirator (as determined by a saccharin mist qualitative fit test) achieved at least a PF of 5 during the operation and all but one employee achieved a PF of 10 or more during the operation for all models of negative pressure respirators included in the study. The PF determined for negative pressure respirators ranged from 5 to 5600. The study results also showed that some disposable respirators obtained PF comparable if not greater than PF for some models of reuseable dual cartridge respirators.

Since the study involved only 17 individuals, it is unlikely that they represent the complete range of facial sizes and shapes in a work population.

The report does not provide any breakdown on factors such as facial size, sex, age, etc., which would help to indicate how representative a panel these individuals were. Thus this study cannot be extrapolated to all employees or all negative pressure respirators. The study does suggest, however, that most individuals would be expected to get a PF of at least 10 with the models of negative pressure respirators tested (if they have achieved an adequate fit with a qualitative fit test) during asbestos removal operations.

This study supports the continued selection and use of negative pressure respirators to control employee exposures to below the OSHA exposure limit; either the current level of 2.0 fibers/cc or the proposed level of either 0.2 or 0.5 fibers/cc. The selection of supplied air respirators or SCBA for asbestos removal operations presents significant potential safety problems associated with climbing ladders, climbing over pipes and other structures and working on staging. SCBA are particularly inappropriate for this kind of operation due to the severe restrictions imposed on physical movement when wearing an SCBA, the added weight burden and increased instability, and the significant time restriction associated with the limited air supply in a SCBA breathing air container. This study does not, however, provide adequate data to respond to the issue of whether employee exposures to asbestos should be reduced to the greatest extent possible by using respirators providing the greatest protection.

BILL OF MATERIAL

JOB 110-362

DATE 6/22/82

DRG. No. _____ SHEET _____

ORDER No. BM-9659

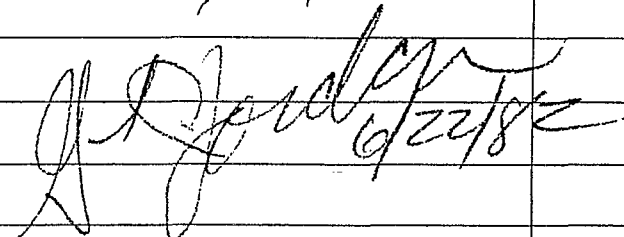
DELIVER TO

APPRO. JOB No 2110-18-300

J. BLACKHAM

V.A.S. 334

MATERIAL REQ'D AT DEST'N BY 6/24/82 FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	6000'	LN-Ft	IRON CONSTANTAN THERMOCOUPLE WIRE TYPE J THERMOPLASTIC INSULATION	
END USE F1001 BOILER				
V. Sofia 6/22/82				
				

Extension

By

Chevron U.S.A. Inc.
P.O. BOX 20002
EL PASO, TEXAS 79998

Purchase Order

Prefix and Order Number

RLHM-9659

Important: Show above prefix and order number on all invoices, shipping papers, packages and correspondence.

Date Required at Destination

6-24-82 FIRM

618/465-7623

EL PASO, TEXAS

Date JUNE 23, 1962

INDUSTRIAL PYROMETER & SUPPLY COMPANY

142 HACK STREET

ALTON, ILL. 62002

Invoice in QUADRUPLICATE to: Chevron U.S.A. Inc., P.O. Box ☒ 9250 ☐ 9300, Concord, CA 94524

Ship to Chevron U.S.A. Inc.
Attention of:

/Show Prefix & Purchase Order No.

RLBM-9659

REFINERY STOREHOUSE

6501 TOWNBRIDGE DR.

EL PASO, TEXAS 79905

ip Via AIR PRT. PRIORITY ONE

Bill of Lading – Upon shipment, send original copy of your B/L referenced with our order number to:
Chevron U.S.A. Inc., P.O. Box 7945, San Francisco, CA 94120

☐ Prepay freight for your account.

☒ Ship collect — endorse your B/L for delivering carrier to collect from us at the address indicated below:

Chevron U.S.A. Inc.

☒ P.O. Box W
Concord, CA 94524

Chevron U.S.A. Inc.

☐ P.O. Box J

Concord, CA 94524

☐ Prepay and charge on invoice. Declare actual value.
(UPS, Federal Express or Parcel Post only.)

[illegible]

.238/FT.

Terms NET 30

☒ Not for Resale ☐ For Resale ☐ Tax Exempt

S.W. ALTON

Charge to **2110-18-300**

GREG JORDAN

Approved

CHEV B8 5623

C- 53171

in for placement

T. E. SHERILL

915-775-3238

Telephone _____

Extension

By

BILL OF MATERIAL

JOB 14-188: REROUTE N^o 4 CU

DATE 9/2/82

CW LINES

DRG. No.

SHEET

ORDER No. BM-82046

NOTIFY MTM UPON DELIVERY

APPRO. JOB No. 9113-05-300

ENGR: MTM

MATERIAL REQ'D AT DEST'N BY

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	130	FT	8-IN PIPE, SMLS, SCH 30, CS,	
			BEW, X-TRU-COATED, DRL	
2	4	EA	8-IN ELBOW, STD WT, CS, BW,	
			90-DEG LR	
3	2	EA	12-IN X 8-IN REDUCER, STD WT,	
			CS, BW, CONC	
4	3	EA	$\frac{3}{4}$ -IN BOSS, 6000 LB, CS, SW	
5	3	EA	$\frac{3}{4}$ -IN PLUG, CS, PE	
6			WRAPPED COATING - P-2A	
			PER STD DWG N ^o GB-L69318-16	
	5	GAL	STD PRIMING SOLUTION	
	5	CU.FT	ASPHALT ENAMEL	
	5	ROLL	15-LB ASBESTOS FELT	
			(75-FT LONG X 9-IN WIDE ROLLS)	
			END USE: UNDERGROUND	
			COOLING WATER LINE	
			MTM 9/2/82	
			Ex. date if necessary to	
			meet above delivery date.	
			SPK 11/1/82	

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List No. BM-82069, SUPP. NO. 1 Accounting Charge No. DRV33-9172-03

List No. BM-82069, SUPP. NO. 1 Accounting Charge No. DRV33-9172-03

DATE REQUIRED: TGU - S/D Date 9-21-82

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (~~NO~~)

-4

BILL OF MATERIAL

JOB 16-584 BUTANE LINE JUMPOVER DATE 9-9-82

DRG. No. _____ SHEET _____ ORDER No. BM-82055

* NOTIFY ENGINEER UPON
DELIVERY

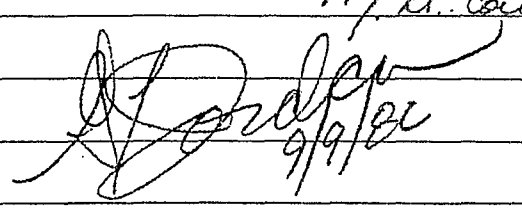
APPRO. JOB NO BL01-B116-15-360

SUPP. #1

M. D. COUTEGAN x356

MATERIAL REQ'D AT DEST'N BY 9-10-82 *

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	EA PAR	2" ORIFICE FLANGES 300 lb.	
			C.S. RF. WN SCH. 40	
2	2	EA LF	3" PIPE SMLS SCH 40 C.S. BFW	
3	1	EA.	1 1/2" x 3/4" ELBOLET XS CS SW BW	
4	1	EA.	2" TEE STRT CS BW SCH. 40	
5	6	EA LF	1 1/2" PIPE SMLS CS SCH 80 BW	
6	2	EA.	1 1/2" FLANGE WN FS 300# RF SCH. 80	
7	3	EA.	1 1/2" ELBOW 90° LR BW SCH. 80 CS	
8	1	EA.	2" x 1 1/2" REDUCER CONC. CS SCH. 80 BW	
9	1	EA.	1 1/2" GASKET 300# RF. 304/ASB SPIRAL WND	
10	4	EA.	3/4" φ x 3 1/2" LG. STUD BOLTS B7 W/2 HEX NUTS	
11	1	EA.	3/4" GATE VALVE 800# CS M-F/SW-SCRD BB.	
12	1	EA.	3/4" BOSS 6000# CS SW	
13	2	EA.	3" FLANGE 300# CS RF WN SCH. 40	
14	2	EA.	2" GASKET 300# ^{RF} 304/ASB SPIRAL WND	
15	1	EA.	3" GASKET 300# ^{RF} 304/ASB SPIRAL WND	
16	16	EA.	3/4" φ x 4" LG STUD BOLTS B7 W/2 HEX NUTS	
17	1	EA.	3" GATE VALVE 300# C.S. RF. 12CR TB	
18	1	EA.	3/4" PLUG C.S. SCRD.	
 9/9/82				9-9-82
END USE: PIPING FOR BUTANE LINE				CHEV B8 5627
JUMPOVER				

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LIST OF MATERIALS

Job No. 16-584List No. BM-82055Accounting Charge No. BFLOI - 8116 - 15-36Draftsman HENRY DOMINGUEZ @ 388DATE REQUIRED: 9-10-82 Date 8-30-82Engineer: MDCLead Engr: GLV

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
✓ 1	L11EA2A	1	2"	PIPE SMLS SCH 40 CS BFW	SHOP	
✓ 2	L11EA2A	38	3"	PIPE SMLS SCH 40 CS BFW		
✓ 3	L50MAIBC	1	2"	ELBOW STD WT CS BW 90-DEG LR		
✓ 4	L50MAIBC	6	3"	ELBOW STD WT CS BW 90-DEG LR		
✓ 5	L55MAIDA	1	3" x 2"	REDUCER STD WT CS BW CONC		
✓ 6	L40FA3DE	1	3"	FLANGE 300LB CS RF WN SCH 40		
✓ 7	L61FGC	2	3"	GASKET 300LB 304/ASB SPIRAL WND		
✓ 8	L62OBM	16	3/4" x 4" LG.	STUD BOLT B-7 W/2 NUTS		
✓ 9	L20FA3DA	1	3"	GATE VALVE 300LB CS RF BB 12 CR		
✓ 10	L36NBDU	2	2" x 3/4"	ELBOLET XS CS SW	RLBM-80786X	
✓ 11	L20KAZ7	4	3/4"	GATE VALVE 800LB CS M-F/SW SCRD	STOCK	
✓ 12	L370ABW	4	3/4"	PLUG CS SCRD		
✓ 13	L36VBDS	2	3/4"	BOSS 6000 LB CS SW		
14						
15						
16						
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27						
28						
29	T. F. SHERRILL					
30	SEP 8 1982					
31						
32						

END USE: PIPING FOR BUTANE
LINE JUMPOVER AT 2ND STREET PIPEWAY

RLBM-80786X KEENAN C/P W/TYLER 9/8/82
80753X GRANT " " CHARLIE "
6000X KEENAN " " TYLER "

CHEV B8 5628

LIST OF MATERIALS

Job No. 16-584

List No. BM-82055

Accounting Charge No. BFL01-8116-15-360

Draftsman MPM/HJ @ 388

DATE REQUIRED: 9-10-82 Date 8-27-82

Engineer: MDC

Lead Engr: GLJ

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
✓ 1	L11EA2A	5'	2"	PIPE SMLS SCH 40 CS BFW	SHOP	
✓ 2	L11EA2A	56'	3"	PIPE SMLS SCH 40 CS BFW	STOCK	
3	L21FA3DA	1	2"	GLOBE VLV 300 LB CS RF 12 CR TR	RLBH-80786X	
✓ 4	L50MAIBC	2	2"	ELBOW STD WT CS BW 90-DEG LR	STOCK	
✓ 5	L50MAIBC	5	3"	ELBOW STD WT CS BW 90-DEG LR		
✓ 6	L51MAI	1	2"	TEE STD WT CS BW		
✓ 7	L51MAI	1	3"	TEE STD WT CS BW		
✓ 8	L42FA3DE	1 PR	3"	ORIF FLGS 300 LB CS RF WN SCH 40		
✓ 9	L55MAIDA	1	3" x 2"	REDUCER STD WT CS BW CONC		
10	L20KA8HD	2	1/2"	GATE VALVE 800 LB M-F/SCRD BOTH ENDS	RLBH-80753X	
✓ 11	L370ABW	2	1/2"	PLUG CS SCRCD	STOCK	
12						
13						
✓ 14	L40FA3DE	3	2"	FLANGE 300 LB CS RF WN SCH 40	STOCK	
✓ 15	L40FA3DE	6	3"	FLANGE 300 LB CS RF WN SCH 40		
✓ 16	L61FGC	3	2"	GASKET 300 LB 304/ASB SPIRAL WND		
✓ 17	L61FGC	4	3"	GASKET 300 LB 304/ASB SPIRAL WND		
✓ 18	L62OBM	24	5/8" x 3 1/4" LG	STUD BOLT B-7 W/2 NUTS		
✓ 19	L62OBM	24	3/4" x 4" LG	STUD BOLT B-7 W/2 NUTS		
✓ 20	L62OBM	8	5/8" x 4 3/4" LG	STUD BOLT B-7 W/2 NUTS		
21	L79B02	1	12'	CHAIN NO 2-0, 6 GA. 'ELWELL' STRAIGHT LINK	RLBH-6000X	
22	L79B05	1	9" DIA	WHEEL CHAIN VALVE OPERATOR UNIV. TYPE	79-D	
23						
24						
25						
26						
27						
28						
29						
30						
31	T. E. SHERRILL			END USE: PIPING FOR BUTANE		

W. H. Courtney 9-1-82

[Signature] 9/1/82

CHEV B8 5629

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LIST OF MATERIALS

Job No. 16-584List No. BM-82055Accounting Charge No. BFLOI - 8116 - 15-36Draftsman HENRY DOMINGUEZ @ 388DATE REQUIRED: 9-10-82 Date 8-30-82Engineer: MDCLead Engr: GLU

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L11EA2A	1	2"	PIPE SMLS SCH 40 CS BFW		
2	L11EA2A	38'	3"	PIPE SMLS SCH 40 CS BFW		
3	L50MAIBC	1	2"	ELBOW STD WT CS BW 90-DEG LR		
4	L50MAIBC	6	3"	ELBOW STD WT CS BW 90-DEG LR		
5	L55MAIDA	1	3"x 2"	REDUCER STD WT CS BW CONC		
6	L40FA3DE	1	3"	FLANGE 300LB CS RF WN SCH 40		
7	L61FGC	2	3"	GASKET 300LB 304/ASB SPIRAL WND		
8	L62OBM	16	$\frac{3}{4}" \times 4" LG$	STUD BOLT B-7 W/2 NUTS		
9	L20FA3DA	1	3"	GATE VALVE 300LB CS RF BB 12 CR		
10	L36NBDU	2	$2" \times \frac{3}{4}"$	ELBOLET XS CS SW		
11	L20KAZ7	4	$\frac{3}{4}"$	GATE VALVE 800LB CS M-F/SW SCRD		
12	L370ABW	4	$\frac{3}{4}"$	PLUG CS SCRD		
13	L36VBDS	2	$\frac{3}{4}"$	BOSS 6000 LB CS SW		
14						
15						
16				<i>M. H. Dominguez</i> 9-1-82		
17				<i>J. J. Dominguez</i> 9/18/82		
18						
19						
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21						
22				END USE: PIPING FOR BUTANE		
23				LINE JUMPOVER AT 2 ND STREET PIPEWAY		
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CHEV B8 5630

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LIST OF MATERIALS

Job No. 16-584List No. BM-82055Accounting Charge No. BFL01-8116-15-360Draftsman MPM/HD @ 388DATE REQUIRED: 9-10-82 Date 8-27-82Engineer: MDCLead Engr: GLT

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11EA2A	5'	2"	PIPE SMLS SCH 40 CS BFW		
2	L11EA2A	96'	3"	PIPE SMLS SCH 40 CS BFW		
3	L21FA3DA	1	2"	GLOBE VLV. 300 LB CS RF 12 CR TR		
4	L50MAIBC	2	2"	ELBOW STD WT CS BW 90-DEG LR		
5	L50MAIBC	5	3"	ELBOW STD WT CS BW 90-DEG LR		
6	L51MAI	1	2"	TEE STD WT CS BW		
7	L51MAI	1	3"	TEE STD WT CS BW		
8	L42FA3DE	1 PR	3"	ORIF FLGS 300LB CS RF WN SCH 40		
9	L55MAIDA	1	3" x 2"	REDUCER STD WT CS BW CONC		
10	L20KA8HD	2	1/2"	GATE VALVE 800 LB M-F/SCRD BOTH ENDS		
1	L37OABW	2	1/2"	PLUG CS SCRCD		
12						
13						
14	L40FA3DE	3	2"	FLANGE 300LB CS RF WN SCH 40		
15	L40FA3DE	6	3"	FLANGE 300 LB CS RF WN SCH 40		
16	L61FGC	3	2"	GASKET 300 LB 304/ASB SPIRAL WND		
17	L61FGC	4	3"	GASKET 300 LB 304/ASB SPIRAL WND		
18	L62OBM	24	5/8" x 3 1/4" LG	STUD BOLT B-7 W/2 NUTS		
19	L62OBM	24	3/4" x 4" LG	STUD BOLT B-7 W/2 NUTS		
20	L62OBM	8	5/8" x 4 3/4" LG	STUD BOLT B-7 W/2 NUTS		
21	L79B02	1	12'	CHAIN NO 2-0, 6 GA. 'ELWELL' STRAIGHT LINK		
22	L79B05	1	9" DIA	WHEEL CHAIN VALVE OPERATOR UNIV. TYPE 79-D		
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END USE: PIPING FOR BUTANE

CHEV B8 5631

BILL OF MATERIAL

JOB Replace D-3913 - PH 39 Feed Filter DATE 1/10/83

DRG. No. _____ SHEET _____ ORDER No. BM 83004

APPRO. JOB No. 0139-XV-750

Quote

~~MATERIAL~~ REQ'D AT DEST'N BY 1/24/83 DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	Ea	Please Provide quotes for the filter below below: (Please have drawings of filter included w/quote) Wire Filter Type 18/8 SST Vessel - Carbon Steel per ASME Code Design Press. Int 250 psig @ 650°F Ext 250 psig @ 650°F Head Gasket - Asbestos Pressure loss through vessel 1 psig Self Cleaning unit required - Stationary cleaner blade & filter cartridges w/ motorized rotation Connections: Inlet & Outlet 300# RF 6" Side Drain ≥ 1" Dump Drain ≥ 2" Pressure Connections on inlet & outlet Nozzles Degree of Filtration 0.003" Liquid - Diesel Max Flow Rate 500 gpm End Use: Replace D-3913^{PH 39} Feed Filter Carlos B. Hernandez 1/10/83	

CHEV B8 5632

BILL OF MATERIAL

JOB _____

DATE 7/9/82

DRG. No. _____ SHEET _____

ORDER No. BM 93213

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
11	200	ea	1 1/2" OD x 3/4" ID - Std set Flat Washers 100, 910 & 915 '25.	
12	150	ea	2" Ring Clamps - Tapped for 3/4" OD Bolt	
13	20	ea	4" Ring Clamps - Drilled with 3/4" hole	
14	300	ea	Flathead "A" Washers - for 1/2" x 1/2" x 1/2"	
15	200	ea	3/4" OD - 2" Long metal rod - 1/2" x 1/2" x 1/2" w/ 2 nuts	
16	500	P.C.	Washers, Tapped - 1/4" x 1/4" w/ 1/4" hole	
			Standard - 1/4" x 1/4" Clips - 1/4" x 1/4" x 1/4"	

CHEV B8 5633

SHEET 1 OF 1 SHEETS

QUOTATION FOR PRODUCTS FROM: FISHER CONTROLS COMPANY

MARSHALLTOWN, IOWA 50158

Reply To: VINSON SUPPLY COMPANY, P.O. Box 3629, Odessa, Texas 79760 (Phone: 915-337-5211)

Sales Representative: VINSON SUPPLY COMPANY

Date Quoted: MAY 25, 1983

Quoted To: CHEVRON U.S.A., INC.
P.O. BOX 20002
EL PASO, TEXAS 79998
ATTN: T.E. SHERRILL

OUR QUOTATION NUMBER

05/83/13-F

PLEASE REFER TO THIS NUMBER WHEN ORDERING

QR-BM-83310

YOUR REFERENCE NUMBER

Page 1 of 1

ESTIMATED DELIVERY (Number of weeks after receipt of your order)

ITEM NO.	QTY.	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1.	1	1" Fisher Type 667EZ DCV, 300# ANSI RF Flanged Steel Body, 1/4" 316SS M-Form Trim #129, Teflon Asb. Packing, Travel Indicator Size 34 Actuator 3-15# Range, Fail Closed, Yoke Mounted 3582 Valve Positioner 3-15# Input To Give 3-15# Output C/W Bypass & Gauge W/67AFR Airset. Attachments: F.O.B. - Odessa, Texas TERMS - Net 30 Days <i>Rec'd 5/27/83 JKS</i>	\$1,130.94	\$1,130.94

CHEV B8 5634

2-3

This quotation shall remain in effect for 30 days from the date hereof, unless sooner terminated by notice to you and shall not be binding upon Fisher Controls until acknowledged by Fisher following your acceptance.

All orders placed by you, and any shipments made by Fisher Controls as a result of such order, shall be subject to the terms and conditions above and on the reverse side hereof, notwithstanding any inconsistent or additional terms that may be embodied in your purchase order.

Sales Representative Vinson Supply Company

By James F. Seward

Title Fisher Inside Sales

VINSON SUPPLY COMPANY

QUOTATION FOR PRODUCTS FROM FISHER CONTROLS COMPANY

MARSHALLTOWN, IOWA 50158

Reply To: VINSON SUPPLY COMPANY, P.O. Box 3629, Odessa, Texas 79760 (Phone: 915-337-5211)

Sales Representative: VINSON SUPPLY COMPANY

Date Quoted: MAY 25, 1983

Quoted To: CHEVRON U.S.A., INC.
P.O. BOX 20002
EL PASO, TEXAS 79998
ATTN: T.E. SHERRILL

OUR QUOTATION NUMBER

05/83/13-F

PLEASE REFER TO THIS NUMBER WHEN ORDERING

QR-BM-83310

YOUR REFERENCE NUMBER

Page 1 of 1

ESTIMATED DELIVERY (Number of weeks after receipt of your order)

ITEM NO.	QTY.	DESCRIPTION	UNIT PRICE	TOTAL PRICE	
1.	1	1" Fisher Type 667EZ DCV, 300# ANSI RF Flanged Steel Body, 1/4" 316SS M-Form Trim #129, Teflon Asb. Packing, Travel Indicator Size 34 Actuator 3-15# Range, Fail Closed, Yoke Mounted 3582 Valve Positioner 3-15# Input To Give 3-15# Output C/W Bypass & Gauge W/67AFR Airset.	\$1,130.94	\$1,130.94	2-3
Attachments:					
F.O.B. - Odessa, Texas					
TERMS - Net 30 Days					
CHEV B8 5635					

This quotation shall remain in effect for 30 days from the date hereof, unless sooner terminated by notice to you and shall not be binding upon Fisher Controls until acknowledged by Fisher following your acceptance.

All orders placed by you, and any shipments made by Fisher Controls as a result of such order, shall be subject to the terms and conditions above and on the reverse side hereof, notwithstanding any inconsistent or additional terms that may be embodied in your purchase order.

Sales Representative Vinson Supply Company

By James F. Seward

Title Fisher Inside Sales

VINSON SUPPLY COMPANY

JOB REPLACE ³⁸⁻ PRC-105

DATE JUNE 7, 1983

DRG. No. _____ SHEET _____

ORDER NO. BM 33310 SUPP 3

APPRO. JOB NO. 0123-KK-360

UFS 240

MATERIAL REQ'D AT DEST'N BY WINE 24, 1933 FIRM

SHEET OF SHEETS

CONTROL VALVE CONSTRUCTION

SECTION A

TECHNICAL REQUIREMENTS

1.0 SCOPE

This Specification covers Company's minimum requirements for the design, fabrication and inspection of all valves used for control, except gate valves.

Air-operated diaphragm actuators, piston actuators and control valve positioning devices are also covered by this Specification.

Electric-operated control valves shall meet the requirements of this Specification insofar as they are applicable.

2.0 BODY

2.1 Valve bodies and bonnets shall conform to the following material specifications, as applicable:

Carbon Steel	Castings	ASTM-A216, Gr WCB
	Forgings	ASTM-A105, Gr II
Carbon $\frac{1}{2}$ Mo	Castings	ASTM-A217, Gr WC1
	Forgings	ASTM-A182, Gr F1
$1\frac{1}{4}$ Cr $\frac{1}{2}$ Mo	Castings	ASTM-A217, Gr WC6
	Forgings	ASTM-A182, Gr F11
5 Cr $\frac{1}{2}$ Mo	Castings	ASTM-A217, Gr C5
	Forgings	ASTM-A182, Gr F5
9 Cr-1 Mo	Castings	ASTM-A217, Gr C12 (9 Chrome)
	Forgings	ASTM-A182, Gr F9
Hastelloy B of C	Castings	ASTM-A494
304 SS	Castings	ASTM-A351, Gr CF8
	Forgings	ASTM-A182, Gr 304
Monel	(Manufacturer's Standard)	
316 SS	Castings	ASTM-A351, Gr CF8M
	Forgings	ASTM-A182, Gr F316
347 SS	Castings	ASTM-A351, Gr CF8C
	Forgings	ASTM-A182, Gr 347

Acceptable material substitutes are:

- (a) 316 SS in place of 304 SS or 9 Cr or 9 Cr-1 Mo.
- (b) 5 Cr in place of $1\frac{1}{4}$ or $2\frac{1}{4}$ Cr (on flanged valves only).

- 2.2 Body bolting and packing-flange studs shall conform to the following specifications:

ASTM-A193 - Alloy Steel Bolting for High Temperature Service.
ASTM-A194 - Carbon and Alloy Steel Nuts and Bolts for High Pressure and High Temperature Service.

Except that studs and nuts for Austenitic Stainless Steel and Nickel Alloy Valves shall be of the same nominal chemistry as the valve body.

- 2.3 All flanged connections and pressure-temperature ratings shall conform to ANSI B16.5, except as follows:

- (a) Flanged valves, 4 inch size and smaller shall have rating at least 300 lb for steel bodies and 250 lb for iron bodies.
- (b) Flange facings for "raised" and "flat faced" flanges shall be "smooth - 250 AARH maximum" in accordance with MSS-SP-6. A 250 RMS smooth finish is an acceptable alternate as judged by comparison with Visual Standards such as "General Electric Standard Roughness Specimens."
- (c) "Flangeless" type bodies such as wafer-butterfly, ball, etc., shall have body rating and facing that meets pipe specification. These valves shall be furnished with thru bolt-studs and nuts.
- (d) Threaded-end valves shall have internally tapered threads in accordance with ANSI B2.1 and minimum body rating of 600 lb in steel or 250 lb in iron.

Threaded valves shall be allowed only in body sizes $1\frac{1}{2}$ inch and less.

- (e) "Welded-on" flanges and similar fabricated body constructions are only acceptable by prior agreement with COMPANY.
- 2.4 End Connections shall be 1-inch minimum except when the line size is smaller. Odd body sizes, such as $1\frac{1}{4}$, $2\frac{1}{2}$ and 5-inch shall not be used.
- 2.5 Face-to-face dimensions shall conform to ANSI B16.10 (equal to ISA RP 4.1.1F) wherever practical.
- 2.6 Globe valves shall have a bolted-bonnet with confined gasket. Gasket material shall be the manufacturers standard providing it meets the requirements specified on the purchase specification sheet attached to the Agreement to which this Specification applies.
- 2.7(a) Extension-bonnets shall be provided where specified. Where possible valves in these services shall be provided with packing and

lubricant designed to withstand the process fluid temperature, without consideration of the possible radiation losses due to an extension bonnet.

- 2.7(b) Bellows-seal type bonnets shall be provided where specified. As a precaution against bellows failure, the bonnet shall be provided with "back-up" packing to seal the valve stem and bonnet, and a plugged pressure test connection.
- 2.8 Lubricators and isolating valves shall be furnished with all valves requiring stem lubrication.

One year's supply of lubricant shall be furnished with each lubricator.

- 2.9 Direction of flow shall be cast or stamped on the valve body.

3.0 TRIM

- 3.1 Globe valves having "cage" type trim shall meet the following minimum requirements:

- (a) Controlled compression type gaskets used as a pressure seal between adjoining portions of the trim, or body and trim, shall not be subject to inner valve seat loading and unloading.
- (b) Cage and plug shall be hard stainless steel as a standard. Coefficients of thermal expansion for cage and plug shall be similar, so that required clearances are maintained over the range of operating temperatures.
- (c) Reduced trim for two nominal sizes smaller than valve body size shall be available as a standard option.
- (d) Valve stem shall be threaded and pinned to the valve plug. It shall be hardened stainless steel as standard, having a finish of 8 micro inches RMS or less.
- (e) Flow characteristic shall be obtained by means of "shaped cage ports" rather than a "shaped plug with rectangular ports."

- 3.2 Globe valves having conventional plug and seat rings shall meet the following minimum requirements:

- (a) Double seated valves shall be top and bottom guided.
- (b) Single seated valves shall be top and bottom guided; or top guided only, providing the guide post has sufficient diameter to provide lateral stability to the valve plug.

- (c) Plug and seat rings shall be hard stainless steel as standard.
- (d) Hardened guide material shall be 350 HBN minimum, with a differential hardness not less than 125 HBN between sliding metal surfaces.
- (e) Valve stem shall be threaded and pinned to the valve plug. It shall be hardened stainless steel as standard having a finish of 8 micro inches or less.

The plug shall be reversible in the field by removal of the pin and valve stem.

- (f) Bonnet and bottom flange, where supplied, shall be interchangeable so as to permit reversal of the valve action without additional parts or alterations.

3.3 Ball control valves shall meet the following minimum requirements:

- (a) The ball plug shall rotate through 90° and its surface shall be wiped clean by the shearing action of a seal ring, to prevent accumulation of solids and damage to the ball surface.
- (b) The ball shall be designed to control flow in either direction. The seal ring shall provide reasonable shut-off when pressure is applied to the body in the reverse direction.
- (c) Ball shaft shall be 17-4PH hardened stainless steel as a standard. The ball plug shall be 316 SS with a polished chromium-plated surface as standard. Other trim parts shall be hardened SS unless specified otherwise.
- (d) Spline type connection shall be provided between ball plug, shaft and actuator. Shear pins or keys are not acceptable.
- (e) Ball plug position shall be indicated by an engraved marking or mechanical indicator connected to the ball shaft.

3.4 Butterfly control valves shall meet the following minimum requirements:

- (a) Heavy duty flangeless 'wafer' construction shall be standard.
- (b) Shaft shall be 17-4PH hardened stainless steel with plain stainless steel inboard bushings and bronze outboard sleeve bearings. Provision shall be made for bearing lubrication.

In cases where the pressure drop across the vane is high, where extension bonnets are supplied, or for valves that have special tight shut-off features such as elastomer lining, outboard bearings shall be of the precision roller type.

- (c) Butterfly valves shall normally be installed with the shaft in the horizontal plane. Thrust bearings designed to support the weight of shaft and vane shall be provided where the shaft is not so mounted.
- (d) Shaft shall have spline or keyway connection with actuator that will allow valve action to be easily changed.
- (e) Vane position shall be indicated by an engraved mark on the end of the shaft.
- (f) Vane shall be carbon steel unless specified otherwise.
- (g) Vane shall be pinned to the shaft so that excessive vane torque will shear the pins before rupture of vane or shaft.

4.0 PACKING AND LUBRICATION

4.1 Recommended stem or shaft packing and lubricants are as follows:

<u>Service</u>	<u>Packing</u>	<u>Lubricant</u>
Air	Garlock 256 or John Crane 6AM	Rockwell 234
Ammonia	Garlock 144, Raybestos Manhattan 122S	Rockwell 421 or 147
Asphalt & Tars	Garlock 256 or 144	Rockwell 555
Aromatic Solvents (as benzene, toluene, etc.) to 600F	Garlock 256 or 144	Rockwell 755
Chlorine Liquid and Chlorine Gas	John Crane C-98	Rockwell 188
Hydrocarbon Liquids to 600F. LPG, fuel & lube oil, crude distillates	Garlock 256 or 144 John Crane 6AM	Rockwell 555

Service	Packing	Lubricant
Gasoline, Kerosene, mineral oil, naphthas	Garlock 256 or 144	Rockwell 357
Hydrocarbon gas	Garlock 256	Rockwell 555 or 386
Hydrochloric Acid and Hydrochloric Acid - Hydrocarbon Mixtures	John Crane C-98	Rockwell 921
Hydrofluoric Acid 50 to 100%	John Crane 704	Rockwell 799
Nitric Acid (0 to 80%) to 140F	John Crane 704	Rockwell 921
Phenol	John Crane 704	Rockwell 921
Phosphoric Acid (70-100%) to 250F	John Crane 704	Rockwell 921
Salt Water	Garlock 256	Rockwell 234
Sodium Hydroxide to 425F	John Crane 704 or C-98	Rockwell 421, 147 or 921
Steam (Superheated) -Limits 1200°F/2000PSI	John Crane 177-AI	
Steam to 125 psig	Garlock 145	Rockwell 234
Steam between 125 to 600 psig	Garlock 256	Rockwell 921
Sulfuric Acid (75% to fuming) 40 to 100F	John Crane 704	Rockwell 921
Water - Fresh, Cooling Tower	Garlock 256	Rockwell 234
Hydrogen	Raybestos Manhattan 1228	Rockwell 555

Brief description of packing materials follow:

- John Crane 6AM: - Braided asbestos with monel wire insert. Asbestos core with dry graphite lubricant. Maximum temperature: 850°F

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- | | |
|--------------------------|---|
| John Crane 177-A1 | - Closely braided asbestos with inconel wire insert.
Long fibre asbestos core with flake graphite lubricant
Max. temperature: 1200°F
Max. pressure : 2000 PSI |
| John Crane C-98 | - Braided asbestos yarn impregnated with teflon
Temperature: -100°F to + 600°F |
| John Crane 704 | - Pure Teflon braid, no lubricant within the packing.
Temperature: -100°F to + 500°F |
| Garlock 256 | - Long fibre asbestos yarn with copper wire insert.
Impregnated throughout with petroleum lubricant.
Graphite coated surface.
Maximum Temperature: 700 F |
| Garlock 144 | - Woven asbestos cloth wrapped over a rubber core.
Cloth is impregnated with rubber (except outside
surface) and a glycerol lubricant. Graphite coated
surface.
Max. temperature: 600°F |
| Raybestos Manhattan 122S | - Asbestos cloth wrapped over a rubber core. Cloth is
lubricated, and surface coated with flake graphite.
Max. temperature: 600°F |

NOTE: The above packing numbers are for Coiled Packing. Preformed-Ring packing is preferred when installed at factory.

- 4.2 Stuffing box shall have a bolted packing flange and for valves requiring stem lubrication, a Lantern Ring shall be provided. Lantern Ring material must be compatible with the process fluid and shall not cause scoring of valve stem.

5.0 ACTUATORS

- 5.1 Actuators shall be designed to move the valve over its full stroke and be sized for the maximum pressure drop and line pressure shown on the purchase specification sheet attached to the Agreement to which this Specification applies.
- 5.2 In the opening direction, a travel limit stop shall be engaged before the valve plug reaches its travel limit. The "stop" shall be designed to absorb any force transmitted to it. In the closing direction, the valve plug shall seal before the actuator reaches its travel limit.
- 5.3 Actuator characteristic shall be linear, at least over the working portion of its range.

Actuator performance shall be as follows:

- (a) Stem position error shall not exceed $\pm 5\%$ of rated travel.
- (b) Hysteresis shall not exceed 5% of rated travel.
- 5.4 Valve stem position shall be indicated on a graduated scale with the words "OPEN" and "CLOSED" at the stem travel limits. The indicating pointer shall be directly connected to the stem.
- 5.5 Spring and diaphragm actuators shall be of the enclosed spring type. They shall preferably be direct acting and designed to stroke nominally 3 to 15 PSIG when in operation. Other ranges are only acceptable by prior agreement with the Company.
- 5.6 Actuators shall have a positive action on failure of the operating medium, unless otherwise specified. This may be obtained by use of springs or auxiliary volume tanks used in conjunction with relays. Mechanical "fail-safe" devices are not acceptable.
- 5.7 Actuator size shall not be less than the manufacturers standard size for a given valve.
- 5.8 Handwheels, when specified, shall be of the side mounted type except for butterfly or ball valves which shall have shaft mounted handwheels.

Handwheels shall preferably not require use of a clutch or gear shift and shall be continuously connected type capable of moving the valve in either direction. The neutral position of travel shall be clearly marked.

Without exception, handwheel operation shall be "clockwise rotation closes valve" and, "counterclockwise rotation opens valve."

6.0 ACCESSORIES

- 6.1 Pneumatic positioners, relays, transducers, etc. furnished with control valve shall be mounted and connected by the supplier using size 3/8 inch stainless steel or PVC coated copper tubing. Tubing fittings are to be compression type, stainless steel for stainless steel tubing and brass for PVC coated copper tubing.
- 6.2 Pneumatic valve positioners shall have full by-pass assembly except for split range pneumatic positioners, or where spring/diaphragm range is other than 3-15 PSIG. Each positioner shall be supplied complete with supply, input and output air gauges.
- 6.3 Electro-pneumatic positioners, transducers, and valves provided with pneumatic relays or solenoid valves shall be provided with an output air gauge to measure diaphragm pressure.
- 6.4 Each control valve shall be furnished with a permanently attached, corrosion resistant nameplate bearing the following information:
 - (a) Manufacturer's name, model number and serial number
 - (b) Body and trim size
 - (c) Body and trim materials
 - (d) Trim type
 - (e) Body and flange rating
 - (f) Valve action on air failure
 - (g) Bench setting and operating range
 - (h) Tag number and Purchase Order number

In addition, each valve shall have a tag indicating the packing material and lubricant.

7.0 INSPECTION AND TESTING

- 7.1 Valve body shall pass a hydrostatic pressure test after assembly at the manufacturers works. Test pressure for steel bodies shall be according to ANSI B16.5. Test pressure for cast iron, brass or bronze bodies shall be two times the nominal body rating.

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- 7.2 Where specified, castings that require radiograph testing shall meet ASTM Standard No. E-71, Class 2 for castings up 2 inches in thickness or ASTM Standard No. E-186-67 for heavy walls 2 to 4 inches in thickness.
- 7.3 Where specified, castings that require dry powder magnetic particle inspection shall meet ASTM Standard E-109-03.
- 7.4 Where specified, castings that require dye penetrant inspection shall meet ASTM Standard E-165.

CONTROL VALVE CONSTRUCTION

SECTION B

GENERAL REQUIREMENTS - PURCHASING

1.0 GUARANTEE

VENDOR guarantees that the control valves furnished hereunder meets the requirements set forth in this Agreement and are free of defects in design, materials and workmanship for a period of one year after the date the equipment is placed in operation (but not more than eighteen months after date of delivery). If any item of design, materials or workmanship does not meet this guarantee and VENDOR is notified thereof, VENDOR shall, at his own expense, promptly make such alterations, repairs and replacements as may be necessary to meet this guarantee with the least overall loss of operating time to COMPANY.

BILL OF MATERIAL

JOB 48110-389

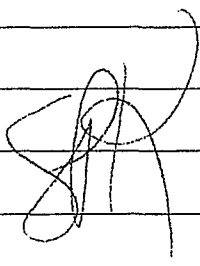
DATE 6/8/83

DRG. No. _____ SHEET _____

ORDER No. 83330

INJCT - 010 - XX - 360
APPRO. JOB No. 010 - XX - 360

MATERIAL REQ'D AT DEST'N BY 6/15/83

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	2	FT	1"-SCH 160 SMLS STL PIPE	
2	1	EA	1"-800# SCRD GATE VALVE, STELLITE TRIM, # L2OKA DMF	
3	1	EA	2"-600# RF BLD FLG	
4	1	EA	2"-600# RF FLG, WN:	
5	1	EA	2"x10" WELDOLET, XS, CS, BW	
6	1	EA	1" STL PIPE CAP, BW, SCH 160	
7	1	EA	2" 600#, 304/ABS SPIRAL WND GASKET	
8	8	EA	5/8"x4" STUD BOLTS W/NUTS	
9	1	EA	3/4"x1" LONG SCRD THERMO WELL	
10	1	EA	1 1/2"-600# RF BLDFLG	
11	1	EA	1 1/2"-600# RF, FLG , WN	
12	1	EA	1 1/2"x10" WELDOLET, XS, CS, BW WELDING	
13	4	EA	3/4"x4" STUD BOLTS W/NUTS	
14	1	EA	1 1/2" 600#, 304/ABS SPIRAL WND GASKET	
			 6/8/83	
				CHEV B8 5649
			END USE; CONDENSATE INJECTION TO 400# STM LINE	

CHEV B8 5649

SHEET / OF / SHEETS



Chevron U.S.A. Inc.

Contract

Contract Number C-15-060-83

Chevron U.S.A. Inc. hereafter referred to as **COMPANY**, and the undersigned, hereafter identified as **CONTRACTOR**, hereby mutually agree on July 26, 19 83, that **CONTRACTOR** shall perform for **COMPANY**, at or near the

El Paso Refinery, County of El Paso, State of Texas

the work set forth in Specification No. ~~xxxxxx~~ ~~xxxxxx~~

of repairing refractory in the Gas Oil Unit Furnace as outlined in Satco, Inc. memo to Kevin Walker dated 7-25-83; Addendum No. 1 dated October 1981 (Pages A1 to A15, including Appendices BI and BII); the Contract Terms and Conditions (Pages 1-4), Right-to-Audit Clause (Page 5), Certificate of Nonsegregated Facilities (Page 6), Utilization of Minority Business Enterprises (Page 7), attached hereto, are part ~~as an improvement to real property of COMPANY by affixing thereto whatever materials are involved therein so as to become an~~ ~~integral part of such real property, under the Terms and Conditions hereof, and in accordance with the above specification,~~ ~~which Terms and Conditions and Specification, attached hereto, are part of this Agreement.~~

of this Agreement. Reference Contract C-15-033-83 for current Certificate of Insurance.

COMPANY shall pay **CONTRACTOR**, in accordance with statements prepared by **CONTRACTOR** a compensation of \$3,885.00 (Three Thousand Eight Hundred Eighty-five and no/100 Dollars)

The work shall be commenced July 27, 1983
diligently prosecuted, and completed August 8, 1983

A payment and performance bond in terms and executed by a surety company satisfactory to **COMPANY** shall be furnished to **COMPANY** in the sum of
(No bond required unless an amount is entered above.)

CONTRACTOR

Satco, Inc.

By

And

Witness

CONTRACTOR'S State License No. _____

(Where required by State Law)

Communications to **CONTRACTOR** should be addressed to the attention of Mr. Jimmy Bamber

Satco, Inc.

P. O. Box 80023

Baton Rouge, LA 70898

Chevron U.S.A. Inc.

By

And

Send Invoices to:

Invoice Desk, Refinery Accounting
Chevron U.S.A. Inc.

P. O. Box 20002

El Paso, TX 79998

Communications to **COMPANY** should be directed to the attention of Mr. L. A. Wilson, Chief Engineer

Chevron U.S.A. Inc.

P. O. Box 20002

El Paso, TX 79998

Facility Completed

Superintendent or Foreman

Invoice No.

Date

Amount

Date Received

Charge Account No.

Job No.

2122-09-290

Remarks

Note: If **CONTRACTOR** is incorporated, execution shall be by an authorized officer of the corporation and corporate seal affixed and attested to by the Secretary. If **CONTRACTOR** is not incorporated, signatures should be witnessed by an employee of **COMPANY**, if practicable; if not, by a disinterested party.

CHEV B8 5650

GO-279-WOI (CD-1-77)
Printed in U.S.A.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

INTENT

1.0 The work shall be performed by CONTRACTOR without delay, in a workmanlike manner, in accordance with the good practice of the trades involved; and completed, ready to serve in the manner indicated or manifestly implied, irrespective of whether or not full details of such workmanship, practices or completeness are contained herein. Unless otherwise provided herein, equipment which CONTRACTOR may be required to furnish for the work, shall be safe and sound and of the most suitable type, size, and quality for the purpose intended. The following provisions shall also be observed throughout the duration of the project.

1.1 Errors and Omissions

The specifications and drawings are not complete in every detail and CONTRACTOR shall comply with their true intent taken as a whole, and shall not avail himself of any errors or omissions to the detriment of the work. Should any error, omission or discrepancy appear in drawings, specifications and instructions, CONTRACTOR shall notify COMPANY at once, and COMPANY will issue instructions to be followed. Anything not indicated on the drawings or specified in the specifications which is necessary for full and faithful completion of the work shall be provided and incorporated at the expense of CONTRACTOR to the same extent as though fully set forth in both the drawings and the specifications.

1.2 Utilities

COMPANY will furnish without charge, in moderate quantities, industrial fresh water and 110 V electricity at nearest point of supply to working site. Connections and extensions from this point to CONTRACTOR'S work area shall be provided and installed by CONTRACTOR.

1.3 Housekeeping

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material, and at the completion of the work, the site shall be cleared of all debris, leftover tools, consumable supplies, and material. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work, the cost of such work shall be for CONTRACTOR'S account and may be deducted from the sums due or to become due CONTRACTOR.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

1.4 Completion

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this specifications and is accepted by COMPANY Representative.

COMPANY
REPRESENTATIVE

- 2.0 A COMPANY Representative will be assigned to represent COMPANY in all matters relative to CONTRACTOR'S activities in the Refinery. All questions concerning the performance of CONTRACTOR'S work shall be referred to COMPANY Representative.

2.1 CONTRACTOR'S Representative

CONTRACTOR shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Representative.

RESPONSIBILITY
FOR INFORMING
EMPLOYEES

- 3.0 CONTRACTOR shall acquaint all of its employees and sub-contractors with all specific instructions pertinent to the work to be performed under this Agreement.

WORKING
HOURS

- 4.0 CONTRACTORS are expected to work the same hours as the COMPANY maintenance force, unless special arrangements are made.

PASSES

- 5.0 Contact the COMPANY Representative prior to the start of work to arrange for Refinery passes for each CONTRACT employee. Badges are assigned to individual employees and are not transferrable.

- 5.1 The CONTRACTOR shall be solely responsible for the badges issued to his employees and final payment on the contract will be delayed until all badges are returned. In the case of loss of a badge, a report should be made to the COMPANY Representative immediately, including badge number, time and place of loss, and circumstances surrounding the loss.

- 5.2 CONTRACTOR shall ascertain from COMPANY Representative the gate through which CONTRACTOR'S employees shall enter and leave the Refinery.

- 5.3 CONTRACTOR'S employees will be admitted to COMPANY'S premises only if they display a badge.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 5.4 Every CONTRACTOR vehicle must display a valid vehicle pass supplied by the main gate guard.
- 5.41 CONTRACTOR'S vehicles will normally be allowed in the Refinery only for the purpose of delivering workmen, equipment, or supplies to the job site. Where work location and circumstances warrant, CONTRACTOR'S vehicles may be allowed in the Refinery to transport CONTRACTOR'S authorized management personnel for inspection of the work. Prior COMPANY approval must be obtained from the COMPANY Representative for the use of any CONTRACTOR vehicle in the Refinery. CONTRACTOR'S vehicles may be searched when entering and leaving Refinery. A vehicle pass will be issued to each vehicle entering the Refinery. This pass serves as vehicle identification.
- 5.42 CONTRACTOR'S vehicles will not leave the Refinery with any COMPANY tools or equipment, color code orange, until the driver has had the vehicle's contents duly inspected by the COMPANY Representative, or the Storehouse Supervisor, and has acquired an approved "Pass Out Slip for Loaned Equipment", Form CW-3031, which permits passage through the Main Gate.
- 5.43 The Main Gate Guard may inspect all CONTRACTOR vehicles' contents prior to leaving the Refinery.
- 5.44 CONTRACTOR shall supply transportation for all of its employees from the gate to the job site and return. The COMPANY Representative will designate the routes and parking areas to be used by CONTRACTOR'S motor vehicles in the Refinery. CONTRACTOR shall observe all the COMPANY'S traffic regulations.
- 5.45 CONTRACTOR shall identify the foremen of any sub-contractors working for CONTRACTOR to the Gate Guard and COMPANY Representative.
- 5.46 A CONTRACTOR employee arriving late must go to the Main Gate Guard as he cannot enter the Refinery without a pass badge. The COMPANY Representative will arrange entry for these people with the guard.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

DRIVING AND
PARKING

- 6.0 CONTRACTOR shall drive carefully and observe posted Refinery speed limits and traffic signs.
- 6.1 Maximum speed limit anywhere within the Refinery is 20 M.P.H. Speed limits will vary from 5 M.P.H. to 20 M.P.H. Be alert for the posted speed limit for each area and drive within the limit at all times.
- 6.2 Stop at all stop signs. A full, complete stop is required.
- 6.3 Stop at all railroad crossings.
- 6.4 Respect barricades and roped-off areas. Do not enter these closed areas.
- 6.5 If vehicle is not equipped with a backup alarm (beeper type), or if CONTRACTOR is unable to obtain a COMPANY Representative to control traffic while backing, CONTRACTOR shall provide a guide to control traffic while backing the vehicle. In addition, backing speed shall be limited to 10 M.P.H. All of these provisions are required to avoid injury to walking personnel who might not hear a vehicle backing.
- 6.6 Be alert for pedestrians. Many areas have heavy foot traffic.
- 6.7 Be alert for emergency vehicles, such as fire trucks, ambulances, and others.
- 6.8 Be prepared to stop for hazards, such as accidental leaks of hazardous vapors or liquids. Do not enter these areas. If a hazardous area is initially discovered when inadvertently entered, turn off the engine immediately, walk quickly out of the area, report the incident to the nearest COMPANY employee, and from a safe distance, restrict others from driving into the hazardous area.
- 6.9 Watch for clearance in restricted or congested areas, and observe proper clearance near overhead pipeways, powerlines, and above ground pipeways.
- 6.10 CONTRACTOR'S motorized equipment shall be parked within the Refinery only within areas designated by the COMPANY Representative. CONTRACTOR'S employees' privately owned vehicles are not permitted within the Refinery.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 6.11 CONTRACTOR'S employees' privately owned vehicles will be parked in the CONTRACTOR'S parking lot located Southwest of the Refinery Storehouse just off Trowbridge Drive. CONTRACTOR'S employees' privately owned vehicles will not be parked in the angle parking spaces, off Trowbridge Drive, in front of the Refinery proper, unless prior arrangements are made with the Company Representative.
- 6.12 The COMPANY assumes no responsibility for damages to cars, trucks or other vehicles which belong to CONTRACTOR, sub-contractors or CONTRACTOR'S employees when driven or parked on COMPANY property.

**MOTORIZED
EQUIPMENT**

- 7.0 CONTRACTOR'S motorized equipment shall be equipped with mufflers in good condition and wiring in good order before the equipment shall be allowed to enter the Refinery. All battery boxes shall be covered and all gasoline lines and carburetors free from leakage.
- 7.1 Operation of motorized equipment must comply with OSHA Rules and Regulations paragraph 1910.95 entitled "Occupational Noise Exposure". Motorized equipment noise shall be limited so that the equipment cannot be heard over normal background noise, or to a maximum of sixty-five (65) dba at the Refinery periphery, whichever is limiting.
- 7.2 COMPANY requires that pedestrians and property be protected from trucks and motorized equipment having limited rear vision from the cab, when this equipment is backing up. When equipment such as high body trucks, vacuum trucks, earth moving trucks, cranes, and other heavy motorized equipment is in frequent use in the Refinery, it shall be equipped with a backup alarm (beeper type), automatically actuated when the vehicle is moving backwards. See condition requirement in Section 6.5 of this Instruction if vehicle is not equipped with a backup alarm.
- 7.3 Unsafe vehicles will not be allowed in the Refinery.
- 7.4 Vehicles shall never be left unattended with the engine running.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 7.5 CONTRACTOR vehicles that are to remain in the Refinery for the duration of the contract must be permanently and visibly marked for easy identification, from near and far.
- 7.6 Unmarked CONTRACTOR vehicles, including rental units by COMPANY from CONTRACTOR, that are frequently in and out of the Refinery, will receive a window permit from the Main Gate Guard when it enters the Refinery and must display this sign in the window at all times while in the Refinery. These signs will designate a vehicle as CONTRACTOR, Visitor, etc.
- MATERIAL DELIVERIES 8.0 CONTRACTOR shall notify COMPANY Representative in advance of expected material deliveries. If material deliveries are to be made to a job site, a vehicle badge will be issued to the driver to permit entry when he arrives at the Refinery.
- TRUCKING 9.0 Without limiting the generality of any other provision of this Addendum, all trucking on COMPANY'S premises shall be in accordance with all laws covering fastening of loads, use of red warning flags, etc., applicable to such trucking or, in the absence thereof, all such laws which would be applicable to such trucking if it were on public roadways.
- DELINEATING OPERATING FACILITIES 10.0 If planning to use heavy earth moving, trucking or hoisting equipment, CONTRACTOR shall, with the assistance of COMPANY Representative, survey the work area and travel routes to determine any live facilities in or near the areas where heavy equipment will be operating. Piping, electrical poles and guys, pumps, and any other operating facilities shall be delineated by connecting rope strands no closer than 10 feet from such live facilities. If necessary to operate heavy equipment within this designated area, CONTRACTOR shall advise COMPANY Representative of the work required within this area, the type of equipment which will be operating, and the duration of such work, and shall obtain approval of COMPANY Representative before proceeding. The delineator-barricade shall be replaced following these operations if heavy equipment is still operating in the vicinity and shall not be removed until completion of the heavy equipment portions of the work.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

10.1 Under no circumstances may a crane lift and carry men or material to and from a worksite without specific approval from the COMPANY Representative.

10.11 When stationary picks are made, CONTRACTOR must have the position of the crane and location of the outriggers approved by the COMPANY Representative. Rigging and hoisting diagrams may be required at COMPANY Representative's discretion in accord with Refinery Instruction No. 1407. (Available upon request).

ENTERING
OPERATING
UNITS

11.0 CONTRACTOR'S employees shall not enter operating areas or operating units other than at the location where work assigned to them is being performed. CONTRACTOR'S vehicle must not leave the main roadways until the vehicle entry permit has been cleared and safety precautions explained by the Company Representative. CONTRACTOR'S employees shall not operate any valves or other equipment in operating areas or units unless advised to do so by COMPANY Representative. When work requires frequent visits in and out of operating areas or units, the Company Representative will advise the Unit Operator of CONTRACTOR activities. For safety reasons, the CONTRACTOR must advise the Unit Operator when he enters an area and when he leaves.

11.1 The Sulphur Recovery areas, Plants No. 05, 71, 72, 59, and 75 have special entry and departure requirements, and signs are posted to this effect. Personnel and vehicle entry permit must be obtained from the unit operator in charge everytime the SRU areas are entered or departed. DO NOT walk or drive through the SRU areas to get to the Control House to obtain an entry permit. Return the personnel or vehicle entry permit to the Unit Operator in charge when departing from the SRU areas.

RAILROAD
CLEARANCES

12.0 CONTRACTOR shall maintain a clearance of 10 feet-0 inches on either side of the centerline of all railroad tracks.

POWER LINES

13.0 Underground cables and conduits are covered in most cases with red concrete. CONTRACTOR shall not disturb these facilities without permission of COMPANY Representative.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 13.1 CONTRACTOR shall maintain legal clearance of at least 10 feet from overhead power lines and shall provide warning signs on apparatus as required.
- 13.2 CONTRACTOR shall provide walking guide when moving heavy equipment under electrical power lines.
- DOCTOR,
HOSPITAL, AND
AMBULANCE
- 14.0 CONTRACTOR shall provide all necessary first aid, ambulance, and hospital services in case of accident or injury to its employees, and require that its sub-contractors do likewise.
- 14.1 Appendix BII of this Addendum, "CONTRACTOR'S Hospital, Doctor, and Ambulance Service Designation Forms", shall be completed by CONTRACTOR and returned to COMPANY prior to beginning work. CONTRACTOR shall require that its sub-contractors do likewise.
- 14.2 All injuries sustained by the employees of CONTRACTOR or its sub-contractors while on COMPANY premises shall be reported immediately to COMPANY Representative. If COMPANY Representative cannot be immediately contacted, and the injury sustained requires an ambulance or emergency vehicle, the CONTRACTOR shall find the nearest phone, dial 444, and follow instructions of the dispatcher.
- PROTECTIVE
EQUIPMENT
- 15.0 CONTRACTOR'S employees shall wear long sleeve shirts, ANSI-approved hard hats and ANSI-approved industrial safety glasses when working in operating plants and maintenance or construction areas where COMPANY personnel are required to wear same.
- 15.1 The COMPANY Representative will advise CONTRACTOR of special types of eye protection and other personnel protection required in unusually hazardous areas such as acid and caustic areas. This protective equipment, i.e., goggles, face shields, rubber gloves, etc., will normally be provided by the CONTRACTOR. COMPANY may provide large and/or expensive equipment such as acid suits, rubber boots, etc., or as otherwise directed in the specifications.
- 15.2 If the work to be performed requires coveralls, they will be provided by CONTRACTOR.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

15.3 CONTRACTOR shall require its employees to use other personnel protective equipment wherever specified by the COMPANY Representative or whenever the situation is such that additional protective equipment is necessary.

USE OF
RESPIRATORY
EQUIPMENT

16.0 CONTRACTORS, including supervision, who are required to work in areas where respiratory equipment is frequently used, or may be used to perform a specific job, must be reasonably clean shaven. In addition, CONTRACTORS, including supervision, who are required to work in areas where "Escape Paks" are provided for safe exit during an emergency, must be reasonably clean shaven. Reasonably clean shaven, in this sense, means no facial hair shall affect or hinder the tight seal of a gas or "Escape Pak" mask.

MATCHES AND
LIGHTERS

17.0 The carrying of "strike anywhere" matches in the Refinery is prohibited. It is also required that any cigar or cigarette lighter carried within the Refinery must have flint, steel, and operating mechanism enclosed in such a manner as to prevent the possibility of accidental lighting or sparking. Disposable butane lighters are prohibited within the Refinery. CONTRACTOR shall be responsible for strict adherence to these orders by its employees or the employees of its sub-contractors.

SMOKING

18.0 Smoking is prohibited in the Refinery except in specifically approved areas at established times. COMPANY Representative will designate these areas and advise these times prior to CONTRACTOR'S beginning work in the Refinery.

FIRES AND FIRE
EQUIPMENT

19.0 CONTRACTORS shall not use or move fire fighting equipment, except that which is assigned for CONTRACTOR's use. Keep space around fire hydrants, extinguishers, hose houses, etc., clear at all times.

19.1 In case of fire:

19.11 Call local 444 and report location of fire.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 19.12 Evacuate the area of a major fire sensibly. Do not panic. Escape routes should not be up-wind or down-wind of the fire or its sources.
- 19.13 Attempt to extinguish fires in an incipient stage, which were started by CONTRACTORS, using a CONTRACTOR'S firewatch.
- 19.14 Clear the burning area and move away from fire fighting activities as soon as Refinery personnel arrive to extinguish the fire.
- 19.15 Remove CONTRACTOR equipment and employees from the area.

GOOD HOUSE-KEEPING

- 20.0 Maintain the premises in which CONTRACTORS are working in a neat and orderly manner. Maintain a general level of cleanliness during the execution of work instead of leaving all cleaning to the end of the job.

INCIDENTAL HAZARDS

- 21.0 Prevent hazards to others resulting from upturned nails, unguarded excavations, falling objects, etc.

SAFETY CODES, STANDARDS, AND LAWS

- 22.0 CONTRACTOR shall perform all work in strict conformance with all safety codes, standards and laws which are applicable to the work being done. In case of conflict between safety codes, standards and laws, the most stringent shall apply.

LICENSES

- 23.0 CONTRACTOR shall conform to all laws, ordinances and regulations relating to taxes and other public charges against his operations or equipment.

REFINERY PERMITS, WRITTEN APPROVALS

- 24.0 CONTRACTOR shall request a written permit through the COMPANY Representative at least one day before starting certain work. CONTRACTOR employees working as a supplement to COMPANY personnel, under a COMPANY Supervisor, shall request a written permit through the COMPANY Supervisor for whom they are working. An approved copy of the permit must be on the job site during progress of any of the following:
 - 24.1 Smoking permits.
 - 24.2 Entering tanks, vessels, other enclosures such as fire-boxes, tank basins, or unauthorized areas.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 24.3 Walking or working upon tank roofs or windgirders.
- 24.4 Using a torch, welding electrode, melting pot, forge, electric motor, soldering iron, or any open flame.
- 24.5 Working or or adjacent to public streets or highways.
- 24.6 Starting excavations of any kind, including cutting fire-walls, earthen or brick, and placing fill.
- 24.7 Sandblasting, guniting, or spray application.
- 24.8 Closing walkways, roads, or restricting traffic. (Proper warning signs shall be used).
- 24.9 Using radioactive materials.
- 24.10 Using motorized equipment in process areas or tank basins. This includes all types or equipment or activity that could provide a source of ignition.
- 24.11 Disposing of rubbish. Rubbish is segregated and disposed of according to strict guidelines. Prior to all rubbish disposal, contact the COMPANY Representative for permit and disposal instructions.

REMOVING
MATERIAL OR
EQUIPMENT
FROM REFINERY

- 25.0 Except for waste removal, whenever CONTRACTOR'S property, or COMPANY property on CONTRACTOR'S conveyance, is to be taken outside the Refinery, the CONTRACTOR's Representative shall request authorization in writing from COMPANY Representative to remove such material and/or equipment. This authorization or release shall be given to the guard at the gate where exit is obtained. Form CW-2453, "Pass Out Slip for Materials or Equipment", and/or form CW-3031, "Pass Out Slip for Loaned Equipment", permits removal from the Refinery. Company Representative will arrange for the permit through Storehouse Supervisor.

ORAL
APPROVALS

- 26.0 CONTRACTOR shall obtain oral approval from COMPANY Representative before:

- 26.1 Using gasoline engines.

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ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- 26.2 Working on existing pipe and drainage lines or equipment.
- 26.3 Connecting to or using utilities such as compressed air, steam, water or electricity.
- 26.4 Moving cranes, tractors or heavy equipment through the Refinery.
- 26.5 Operating cranes or similar equipment near process units and overhead power or pipelines.
- 26.6 Walking or working upon any roofs over buildings or equipment. (Attention is further called to the specific hazard of breaking through roofs or corrugated asbestos construction.)
- 26.7 Fueling gasoline-driven equipment on Refinery property.
- 26.8 Repairing CONTRACTOR'S equipment on Refinery property.
- 26.9 Working any time at variance with a regular schedule.
- 26.10 Starting construction of temporary buildings.
- 26.11 Storing or using inflammables, such as gasoline, oil, paint, oxygen/acetylene bottles, etc.

STOPPAGE
OF WORK

- 27.0 CONTRACTOR shall stop work when so instructed by COMPANY Representative. Work stoppage may be due to CONTRACTOR'S work methods, conditions causing the areas to be unsafe, or for any other reason. CONTRACTOR shall stop work in an emergency situation, or when so instructed by any COMPANY employee who deems a hazardous situation has developed in the CONTRACTOR'S work area.

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- | | | |
|--------------------------------|------|--|
| QUALIFIED
WELDERS | 28.0 | CONTRACTOR shall use only welders who have been qualified in accordance with COMPANY Engineering and Maintenance Instruction EP-2200, "Qualification of Welders". The COMPANY Representative in conjunction with Inspection Section will arrange for welder qualification tests if required. |
| CRAFT
INSPECTION | 29.0 | CONTRACTOR shall be solely responsible for thorough craft inspection during the work and the quality of the work. COMPANY may inspect the work during its progress to satisfy COMPANY that CONTRACTOR'S employees are properly qualified in their respective crafts and that workmanship of CONTRACTOR'S employees is of an acceptable grade. |
| PHOTOGRAPHS | 30.0 | Only COMPANY photographers are permitted to carry cameras or take pictures within the Refinery. If progress or finished construction photographs are desired, a written request should be made to the Company Representative describing the photograph proposed and the end use of same. |
| DRINKING
WATER | 31.0 | CONTRACTOR shall supply drinking water for its employees. COMPANY Representative will denote potable drinking water sources for CONTRACTOR use. Fire hydrants and wash down stations shall not be used for drinking water. |
| TOILET
FACILITIES | 32.0 | CONTRACTOR shall furnish chemical toilets, or acceptable substitute, for the use of its employees during peak work periods. COMPANY Representative shall decide work which constitutes peak periods. |
| USE OF
COMPANY
EQUIPMENT | 33.0 | If at any time CONTRACTOR desires to use COMPANY owned staging, tools, etc., CONTRACTOR may request in writing the equipment or material desired. The request must state the date, time, location, and length of time the equipment will be needed. CONTRACTOR must also submit a subsequent document stating he has inspected and accepted the equipment, materials, tools, etc., as being of first-class quality, prior to using. CONTRACTOR must also state he assumes full responsibility for the adequacy and safety of such equipment and will reimburse the COMPANY the full replacement cost of the material, equipment, tools, etc., if for any reason it is not returned to COMPANY in the same condition it was when taken out. This includes losses, thefts, damages, breakage, etc. If there is a statement in the CONTRACT and/or SPECIFICATIONS regarding the use of company equipment, it will take precedent over this paragraph. |

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- | | |
|--|--|
| DAMAGE TO
COMPANY
EQUIPMENT OR
PROPERTY | 34.0 CONTRACTOR shall promptly notify COMPANY Representative in the event that CONTRACTOR or its sub-contractors damage COMPANY equipment or property. |
| VISITORS | <p>35.0 All visitors must be approved for entry into the Refinery on a "Visitors Approval for Refinery Entrance" pass form, available from the Main Gate Guard or the Receptionist in the Administration Building. Visitors to Contractor shall be escorted while in the Refinery by the CONTRACTOR'S Representative. CONTRACTOR shall arrange the time for the meeting directly with the visitor, shall obtain the COMPANY Representative's approval on the visitors pass form, and shall delivery the approved pass form to the Main Gate Guard or to the Receptionist in the Administration Building, whichever point of entry into the Refinery has been designated. CONTRACTOR'S Representative shall meet the visitor at the designated entry point for accompaniment through the Refinery.</p> <p>35.1 COMPANY will log all visitors in and out of the Refinery. The log will indicate time of entrance, location and nature of business in the Refinery, person visited, and time of exit.</p> |
| ALCOHOLIC
BEVERAGES
OR CONTAINERS | <p>36.0 The possession of or consumption of alcoholic beverages on COMPANY property is prohibited.</p> <p>36.1 The possession of alcoholic beverage containers, even if they are empty, on COMPANY property is prohibited.</p> |
| LANGUAGE
BARRIER | 37.0 For safety's sake, and to prevent the possibility of confusion, all CONTRACTOR supervisors must be able to speak English when working with, or in the same area of, COMPANY employees. There must also be at least <u>one</u> English-speaking person in all working crews at all times. |
| CONTRACT
CHANGES | 38.0 COMPANY will use "Change" form, GO-283, to request CONTRACTOR to perform work in addition to that work specified by the original contract agreement. The "Change" form requires COMPANY approval at the appropriate authority level prior to the commencement of extra work. |

ADDITIONAL PROVISIONS FOR THE PERFORMANCE OF WORK

- APPENDICES 39.0 Appendix BI, "CONTRACTOR Representative's Certificate" form, attached hereto, shall be completed and signed by CONTRACTOR'S Representative and COMPANY'S Representative prior to commencement of work by CONTRACTOR. This form certifies CONTRACTOR'S knowledge and understanding of Addendum No. 1 "Additional Provisions for the Performance of Work", and all other applicable Refinery and Safety rules and regulations relative to CONTRACTOR'S work under the contract agreement. The completed and signed certificate will be kept in the contract file.
- 40.0 Appendix BII, "CONTRACTOR'S Hospital, Doctor, and Ambulance Service Designation Form", attached hereto, shall be completed by CONTRACTOR and returned to COMPANY prior to commencement of work by CONTRACTOR. The signed original will be kept in the Contract File. CONTRACTOR will retain a copy in his possession at all times as will the Company Representative.
-


Chief Engineer

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CONTRACTOR REPRESENTATIVE'S CERTIFICATE

CONTRACT NO. C-15-060-83
BETWEEN: CHEVRON U.S.A. INC.

AND

SATCO INC

On this date I personally reviewed with D.W. Jones,
COMPANY Representative for Chevron U.S.A., Inc., on the job covered by the
above contract, the ADDENDUM labeled "Additional Provisions for the Performance
of Work" and received a copy of same. I also received sufficient extra copies
of the said ADDENDUM for each sub-contractor on this job with instructions to
give each sub-contractor a copy and to review the ADDENDUM in detail with each
sub-contractor.

I have specifically reviewed the requirements that all personnel under my
supervision in the Refinery are required to wear ANSI approved safety helmets,
ANSI industrial safety glasses, long sleeves, outer garments and adequate foot-
wear for the work being performed. In addition, I have reviewed the following
safety rules and procedures with the COMPANY Representative.

GENERAL SAFETY RULES

Personal Safety	<u>✓</u>
Good Housekeeping	<u>✓</u>
Traffic Rules	<u>✓</u>
Smoking Areas	<u>✓</u>
First Aid	<u>✓</u>
Fire	<u>✓</u>

EQUIPMENT SAFETY RULES

Electrical Equipment	<u>✓</u>
Furnaces	<u>✓</u>
Confined Spaces	<u>✓</u>
Sandblasting	<u>✓</u>
Hand and Power Tools	<u>✓</u>
Hoists and Rigging	<u>✓</u>
Portable Ladders	<u>✓</u>
Life Lines and Belts	<u>✓</u>
Scaffolds	<u>✓</u>
Storage Tanks	<u>✓</u>
Barricades	<u>✓</u>
Welding & Burning	<u>✓</u>
Warning Signs	<u>✓</u>

(Date) 7-28-88

(Signed) D.W. Jones

Revised 10/81

WORK PERMITS AND WORK PROCEDURES

Purpose

Types:

Work	<u>✓</u>
Burning & Welding	<u>✓</u>
Excavation	<u>✓</u>
Road Closing	<u>✓</u>
Hydrant	<u>✓</u>
Fresh Air	<u>✓</u>
Vehicle entry tank basin	<u>✓</u>
Entry Permits Vessels	<u>✓</u>
Hot Taps	<u>✓</u>
Rubbish Disposal	<u>✓</u>

TAGGING PROCEDURES

Purpose

Types:

Operators Yellow Tag	<u>✓</u>
Mechanics Blue/Black Tag	<u>✓</u>
Electrician Red/White Tag	<u>✓</u>
Entry Grn/Yellow Tag	<u>✓</u>
Green Gas Test Tag	<u>✓</u>

(Signed) [Signature]

CONTRACTOR Representative

(Forward original to Engineering Steno.
Engineering Steno to place in contract
file.)

CONTRACTOR'S HOSPITAL, DOCTOR, AND AMBULANCE SERVICE DESIGNATION FORM

CONTRACT NO. C-15-080-83
BETWEEN: CHEVRON U.S.A., INC.

AND

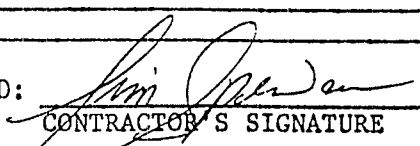
SATCO INC

In the event of a medical emergency, involving one or more of my employees,
please contact the following:

	<u>HOME</u>	<u>BUSINESS</u>
Name, address, and phone number of hospital:	<u>NOT APPLICABLE</u>	<u>SAM 2</u>
Name, address, and phone number of doctor:		<u>SAM 2</u>
Name, address, and phone number of ambulance service:	<u>NOT APPLICABLE</u>	<u>SAM 2</u>
Name, address, and phone number of CONTRACTOR'S contact:		<u>SAM 2</u>
		<u>JIM SPERISER</u>
		<u>859-6381</u>

Additional instructions or remarks: _____

DATE: 7-28-83

SIGNED: 
CONTRACTOR'S SIGNATURE

NOTE: CONTRACTOR shall complete information, sign, and return to COMPANY contract originator along with CONTRACTOR'S signed contract. COMPANY contract originator will forward signed form to Engineering Steno. Engineering Steno will place in contract file. CONTRACTOR Representative and COMPANY Representative should have a copy in their possession at all times.

TERMS AND CONDITIONS

1. PERFORMANCE OF THE WORK

1.1 Definitions

- 1.11 The term "work" as used in this Agreement means, unless the context otherwise requires, all work to be performed by CONTRACTOR under this Agreement.
- 1.12 The term "Facility" as used in this Agreement means the product of the work, such as an improvement to real property, designs or data.
- 1.13 The term "material" or "materials" as used in this Agreement means all material, supplies and equipment to be incorporated into the Facility.
- 1.14 The term "affiliate" as used in this Agreement means Standard Oil Company of California or any company in which Standard Oil Company of California owns directly or indirectly at least 51 percent of the shares entitled to vote at a general election of directors.
- 1.15 The terms "indemnitee" and "indemnities" as used in this Agreement mean respectively COMPANY, one of its affiliates or the agent or employee of COMPANY or one of its affiliates and all of them.
- 1.16 The terms "subcontractors" and "vendors" as used in this Agreement mean subcontractors or vendors of any tier.

- 1.2 Independent Contractor: CONTRACTOR shall be an independent contractor, maintaining complete control over CONTRACTOR's men and operations.
- 1.3 Specifications: CONTRACTOR shall perform the work, including the provision of materials, in accordance with the specifications and exhibits (if any) which are a part of this Agreement and such additional drawings and explanations as COMPANY may provide to CONTRACTOR from time to time to detail and illustrate the work.
- 1.4 Permits: Unless otherwise provided in this Agreement, CONTRACTOR shall secure all permits, make all cash and other deposits, provide all bonds and give all notices required by law in connection with the work.
- 1.5 Items to be Provided by CONTRACTOR: Unless otherwise provided in this Agreement, CONTRACTOR shall provide all materials, utilities, consumable supplies, tools, construction equipment, and labor, including supervision, necessary for the completion of the work.
- 1.6 Safety Measures: CONTRACTOR shall perform the work in accordance with safe practices, taking all reasonable precautions to protect the Facility and adjacent facilities, workmen and the public and providing, where reasonably necessary, barriers, guards, temporary bridges, lights and watchmen. While on the premises of COMPANY or its affiliates all of COMPANY's safety rules shall be strictly observed; in particular, smoking shall be limited to such locations and occasions as are specifically authorized in writing by COMPANY. CONTRACTOR shall not perform or permit any act on the premises of COMPANY or its affiliates which involves a fire or explosion hazard, including welding, torch cutting and disposal of debris by burning, without prior written consent of COMPANY.
- 1.7 Suppliers
 - 1.71 COMPANY may nominate bidders for the supply of certain items of material. CONTRACTOR shall request bids on these items from the nominees, and may obtain such other bids as CONTRACTOR may elect.
 - 1.72 COMPANY may have available for sale certain materials not products of COMPANY. CONTRACTOR shall purchase such materials offered by COMPANY and its designated affiliates as long as such material is suitable and is competitively priced.
 - 1.73 When the work includes purchasing certain materials, CONTRACTOR shall be fully responsible for ordering, expediting, receiving and safeguarding (subject to the provisions of Section 5.3 of these Terms and Conditions) all such materials, and for conducting all competitive bidding by and negotiations with the vendors thereof and for paying for materials and enforcing of warranties, unless otherwise provided in this Agreement.
- 1.8 Labor
 - 1.81 CONTRACTOR shall employ labor from that available in the vicinity of the work, and in accordance with the terms of employment prevailing in that vicinity, to the extent that it is practicable and consistent with the timely and efficient prosecution of the work.
 - 1.82 CONTRACTOR shall use all reasonable efforts to avoid any disturbances in the existing labor situation which will adversely affect the business of COMPANY, its affiliates or other contractors working in the area.
- 1.9 Carriers: In connection with transportation of purchased materials, CONTRACTOR shall give consideration to, but shall not be limited to, use of carriers recommended by COMPANY.

2. COMPENSATION

- 2.1 Changes: COMPANY may make "changes" by adding to, omitting or deviating from the requirements of this Agreement. In the event COMPANY issues any written directive which is not identified as a Change but which CONTRACTOR considers to be a Change, CONTRACTOR shall so notify COMPANY in writing within 10 days after receipt of such directive. If no such timely notice is given, CONTRACTOR shall proceed in accordance with such directive without any adjustment in compensation. If COMPANY originally identifies the directive as a Change, or if CONTRACTOR gives such timely notice and COMPANY agrees that such directive is a Change, CONTRACTOR shall within 10 days after giving such notice or after receipt of the directive advise COMPANY of its proposed adjustment in compensation and COMPANY and CONTRACTOR shall attempt to agree in writing on an appropriate adjustment in compensation resulting from the Change. After such agreement is reached, CONTRACTOR shall proceed with the Change. However, if such notice is given or if COMPANY originally identified the directive as a Change, and in either instance COMPANY and CONTRACTOR fail to agree on whether or not such directive is a Change or fail to agree on an appropriate adjustment in compensation, then COMPANY may issue a written request for CONTRACTOR to proceed in accordance with such directive without such agreement. CONTRACTOR shall comply with such written request, but such compliance shall not prejudice either party's claim that the directive is a Change or, as the case may be, claim for an appropriate adjustment in compensation. After the written request to proceed is issued, any adjustment which is to be made to the compensation shall be determined in accordance with the Exhibit--Compensation Adjustment.
- 2.2 Taxes: CONTRACTOR shall pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, all State, Federal and other payroll taxes, including contributions and taxes assessed against employees on wages earned in connection with the work, and CONTRACTOR shall make all reports required by governmental authorities. CONTRACTOR shall also pay, and CONTRACTOR's compensation provided for hereunder includes an allowance for, any and all other taxes now or hereafter imposed by any governmental authority upon, measured by or incident to the performance of this Agreement or the purchase, storage, use or consumption by CONTRACTOR of materials, utilities, consumable supplies, tools or construction equipment used in the performance of this Agreement, unless the applicable laws specifically provide that such tax be paid by COMPANY.
- 2.3 Acceptance of Facility: Where provision is made by law for recording Notice of Completion, COMPANY may indicate its Acceptance of the Facility by recording such Notice; otherwise Acceptance shall be on the date COMPANY gives written notice to

CONTRACTOR that it is satisfied that the Facility has been completed in accordance with all requirements contained in this Agreement. Acceptance by COMPANY or payment hereunder shall in no way relieve CONTRACTOR of any obligation or liability under this Agreement.

2.4 Terms of Payment

2.41 At the end of each calendar month during the progress of the work, and upon completion of the work, CONTRACTOR shall be entitled to receive 85% of the compensation provided herein for that part of the work performed, including provision of materials, during that month. CONTRACTOR shall be entitled to receive the balance 35 days after Acceptance, provided that there are no undischarged or unsecured liens, attachments or claims in connection with the work. COMPANY may require, as a condition to payment of the balance, that CONTRACTOR submit evidence by receipted bills, releases and waivers of lien rights or otherwise, that all costs incurred by CONTRACTOR and his subcontractors (if any) in connection with the work have been paid.

2.42 Whenever CONTRACTOR is entitled to payment as provided above, COMPANY or CONTRACTOR (as specified on the first page [facing sheet] of this Agreement) shall prepare a statement of amounts so payable. Such statement shall be itemized and in such form as COMPANY and CONTRACTOR agree provided that such statement shall show the total compensation for that part of the work performed, including provision of materials, to the date of the statement, less 15% (except in the statement of the balance) and less previous payments. COMPANY shall pay CONTRACTOR the amount so payable, subject to COMPANY's audit of the statement, and subject to the provisions of Section 2.41 of these Terms and Conditions dealing with final payment of the balance, by check mailed within 20 days after the date payable or, when statement prepared by CONTRACTOR is received after the date payable, within 20 days after receiving CONTRACTOR's statement.

3. DELAYS

3.1 Site Readiness: CONTRACTOR shall ascertain from COMPANY that the site is ready before sending materials or workmen thereto.

3.2 Delays, Suspensions and Extensions: COMPANY may require CONTRACTOR to suspend performance hereunder completely or partially for whatever length of time COMPANY may elect. The time for completion shall be extended by each period that CONTRACTOR is delayed by (a) COMPANY or another independent contractor who is directly responsible to COMPANY (unless such delay is due to CONTRACTOR's default, for example, as provided in Sections 4.1 and 4.2 of these Terms and Conditions); (b) an act of God or the elements; (c) any other cause beyond CONTRACTOR's reasonable control; or (d) a labor disturbance.

3.3 Damages Due to Delays and Suspensions: COMPANY shall not be liable for any damages, direct, consequential or otherwise, suffered by CONTRACTOR due to delays and suspensions, but where CONTRACTOR is not in default CONTRACTOR shall be entitled to reimbursement for reasonable direct costs caused by delays and suspensions to the extent such delays and suspensions are caused by COMPANY and other independent contractors who are directly responsible to COMPANY. CONTRACTOR shall be obligated to proceed with the work notwithstanding a dispute on reimbursement; such action shall not prejudice either party's claim with respect to reimbursement.

4. INSPECTION, CONDEMNATION, STOPPING WORK

4.1 Inspection

4.11 Inspection by COMPANY: COMPANY may visit and inspect the work and materials, or any part thereof, at all times, and CONTRACTOR shall provide safe and proper facilities therefor. CONTRACTOR shall at all times during working hours keep a competent man in the immediate vicinity of the work areas to receive communications from COMPANY and to supervise the performance of this Agreement. When COMPANY determines that a work area is unsafe, COMPANY may stop the part of the work affected until the unsafe condition is corrected.

4.12 Inspection by CONTRACTOR: Whenever any part of CONTRACTOR's work depends on existing work or work or material provided by COMPANY or others, CONTRACTOR shall inspect and measure such other work or material and promptly notify COMPANY of each defect or discrepancy in such other work or material which may render it unsuitable for proper execution of CONTRACTOR's work or proper functioning of the Facility. If CONTRACTOR fails to notify COMPANY's representative of any such defect or discrepancy before performing CONTRACTOR's dependent work, and such defect or discrepancy would have been discovered in the course of a reasonably thorough visual inspection and measurement, COMPANY may condemn the work or material involved and CONTRACTOR shall correct such defect or discrepancy on the same basis as if it were defective work by CONTRACTOR under Section 4.2 of these Terms and Conditions.

4.2 Condemnation: COMPANY may condemn materials provided by CONTRACTOR and all parts of CONTRACTOR's work which are unsound or defective or fail in any way to conform with the requirements of this Agreement. CONTRACTOR shall begin to remove and replace such materials or work within 24 hours after receiving notice thereof from COMPANY. CONTRACTOR shall bear all costs involved in the removal and replacement of such materials and work and in the repair and replacement of any other materials and work necessarily damaged by such removal and replacement. If CONTRACTOR is requested by COMPANY to uncover any part of the Facility for inspection, the cost of uncovering and covering any such part not specifically requiring inspection under this Agreement shall be borne by COMPANY unless the part so uncovered is not in compliance with the requirements of this Agreement.

4.3 Taking Over and Stopping Work

4.31 Should CONTRACTOR default in any way in the performance of this Agreement, including failing, refusing or neglecting to supply sufficient material to be supplied by CONTRACTOR hereunder, or tools, or properly skilled workmen to complete the work with reasonable diligence, for 5 days after written notice of such default to CONTRACTOR, COMPANY may, at any time thereafter, take over and complete the work. The cost to COMPANY of completing the work shall be deducted from the unpaid part of CONTRACTOR's compensation. If such cost exceeds any such amount, CONTRACTOR shall reimburse COMPANY for such excess cost. The action by COMPANY of taking over and completing the work shall not constitute a waiver of or election among any other rights or remedies that COMPANY may have against CONTRACTOR.

4.32 Should CONTRACTOR or its creditors seek relief under any insolvency law, or CONTRACTOR be adjudged a bankrupt, COMPANY may at any time thereafter terminate this Agreement and take over and complete the work as provided in Section 4.31 of these Terms and Conditions, except that any payments due from CONTRACTOR to subcontractors or vendors in connection with the work may be made by COMPANY to such subcontractors or vendors, and be deducted from the amounts otherwise due to CONTRACTOR.

4.33 COMPANY may, in its absolute discretion, stop the work at any time, but where CONTRACTOR is not in default, COMPANY shall pay CONTRACTOR for all parts of the work done, including materials provided, in conformity with the requirements of

this Agreement, plus an amount for reasonable and verified costs of CONTRACTOR incurred in preparation for the parts of the work not yet performed and in shutting down his operations hereunder, plus an amount for a reasonable part of the profit CONTRACTOR would otherwise have earned; provided, that the amounts payable under this Section 4.33 shall in no event exceed the unpaid part of CONTRACTOR's compensation.

LIABILITY

- 5.1 **General Liability:** CONTRACTOR shall indemnify and save harmless the indemnitees from and against any and all loss, damage, injury, liability, and claims thereof for injury to or death of a person, including an employee of CONTRACTOR or an indemnitee, or for loss of or damage to property (except property subject to Sections 5.2 and 5.3 of these Terms and Conditions), resulting directly or indirectly from CONTRACTOR's performance of this Agreement, including, but not limited to, the use by CONTRACTOR of staging or other equipment provided by COMPANY or others, regardless of the negligence of, and regardless of whether liability without fault is imposed or sought to be imposed on, one or more of the indemnitees, except to the extent that such indemnity is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement and except where such loss, damage, injury, liability or claim is the result of active negligence or willful misconduct of an indemnitee and is not contributed to by any act of, or by any omission to perform some duty imposed by law or contract on, CONTRACTOR, its subcontractor or either's agent or employee.
- 5.2 **Liability for Property of COMPANY and its Affiliate:** CONTRACTOR shall be liable to COMPANY and its affiliates for any loss of or damage to the property of COMPANY and its affiliates (other than the property subject to Section 5.3 of these Terms and Conditions) resulting directly or indirectly from CONTRACTOR's performance of this Agreement, regardless of the negligence of COMPANY, its agents, employees, and affiliates, except to the extent that such liability is void or otherwise unenforceable under applicable law in effect on or validly retroactive to the date of this Agreement; provided, however, that CONTRACTOR's liability under this Section 5.2 shall be limited to the applicable insurance which CONTRACTOR carries or has others carry and which shall not be less than that provided in Section 6 of these Terms and Conditions.
- 5.3 **Liability for the Facility and Materials:** CONTRACTOR shall exercise due care and diligence in the performance of this Agreement and in the care and protection of the Facility and materials. At COMPANY's option, CONTRACTOR shall reconstruct, repair or replace any part of the Facility or materials lost or damaged by any cause whatsoever, including but not limited to those referred to in Section 3.2 of these Terms and Conditions, wherever said loss or damage occurs including loss or damage to materials while in transit. In such event COMPANY shall reimburse CONTRACTOR for the costs of such reconstruction, repair or replacement in excess of \$1,000 for each occurrence or in excess of the coverage of any applicable insurance which CONTRACTOR may elect to carry or have others carry, whichever is greater, except costs incurred in reconstruction, repair and replacement of work or materials subject to condemnation by COMPANY prior to loss or damage (whether or not such condemnation was effected) under Section 4.2 of these Terms and Conditions, and except costs incurred in order to meet the guarantee(s), if any, contained elsewhere in this Agreement. CONTRACTOR also shall be paid a reasonable profit on that part of such reconstruction, repair or replacement for which cost reimbursement is made. COMPANY shall not be liable for loss or damage to construction equipment, tools, temporary structures, temporary excavations or supplies owned or used by CONTRACTOR or its subcontractors.
- 5.4 **Compliance with Laws and Regulations:** CONTRACTOR shall comply with all laws, regulations, decrees, codes, ordinances, resolutions, and other acts of any governmental authority, including Federal and State labor and tax laws, which are applicable to this Agreement and CONTRACTOR's performance hereunder, and shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from CONTRACTOR's failure to do so.
- 5.5 **Liens:** CONTRACTOR shall discharge at once or bond or otherwise secure against all liens and attachments which are filed in connection with the work and shall indemnify and save COMPANY, its affiliates, and the owners of the premises on which the work is performed harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens and attachments.
- 5.6 **Patent Rights:** CONTRACTOR shall indemnify and save COMPANY and its affiliates harmless from and against any and all loss, damage, injury, liability and claims thereof for any patent infringement resulting directly or indirectly from CONTRACTOR's performance of the work, including provision of material and designs by CONTRACTOR, and use of tools and other equipment by or for CONTRACTOR in any connection therewith.
- 5.7 **Costs and Attorneys' Fees:** CONTRACTOR shall promptly pay (a) to any indemnitee all costs and attorneys' fees incurred by such indemnitee resulting directly or indirectly from any and all loss, damage, injury, liability and claims for which CONTRACTOR is obligated to indemnify such indemnitee pursuant to Sections 5.1, 5.4, 5.5 or 5.6 of these Terms and Conditions, and (b) to COMPANY all costs and reasonable attorneys' fees in any legal action in which COMPANY or its affiliate prevails, in whole or in part, brought against CONTRACTOR based on a breach of this Agreement.

INSURANCE

- 6.1 **Insurance Required:** Without in any way limiting CONTRACTOR's liability pursuant to Section 5 of these Terms and Conditions, CONTRACTOR shall maintain the following insurance.
 - 6.11 **Worker's Compensation and Employers' Liability Insurance** as prescribed by applicable law, including insurance covering liability under the Longshoremen's and Harbor Workers' Act and the Jones Act, if applicable.
 - 6.12 Without in any way affecting CONTRACTOR's obligations pursuant to Section 6.11 of these Terms and Conditions, if marine work is to be performed hereunder, **Protection and Indemnity Insurance**, including coverage for injuries to or death of masters, mates and crews of vessels used in the performance of this Agreement. The limits of liability of such insurance shall not be less than \$500,000 per occurrence.
 - 6.13 **Comprehensive General Bodily Injury Liability Insurance.** Such insurance shall include the following coverages: Broad Form Contractual Liability, Personal Injury Liability, Completed Operations, and Products Liability. The limits of liability of such insurance shall be not less than \$500,000 per occurrence.
 - 6.14 **Broad Form Property Damage Liability Insurance.** Such insurance shall include the following coverages: Broad Form Contractual Liability, Completed Operations, and Products Liability, and shall expressly cover property of COMPANY and its affiliates other than that referred to in Section 5.3 of these Terms and Conditions. The limits of liability of such insurance shall be not less than \$100,000 per occurrence.
 - 6.15 **Automobile Bodily Injury and Property Damage Liability Insurance.** Such insurance shall extend to owned, non-owned, and hired automobiles used in the performance of this Agreement. The limits of liability of such insurance shall be not less than \$250,000 per person/\$500,000 per occurrence for Bodily Injury and \$100,000 per occurrence for Property Damage.
- 6.2 **Policy Endorsements:** The above insurance shall include a requirement that the insurer provide COMPANY with 30 days' written notice prior to the effective date of any cancellation or material change of the insurance. The insurance specified in Section 6.11 of

these Terms and Conditions shall contain a waiver of subrogation against the indemnitees. The insurance specified in Sections 6.12, 6.13, 6.14 and 6.15 of these Terms and Conditions shall

- (a) name the indemnitees as additional insureds;
- (b) provide that said insurance is primary coverage with respect to all insureds; and
- (c) contain a Standard Cross Liability Endorsement or Severability of Interest Clause.

6.3 Evidence of Insurance: CONTRACTOR shall—before commencing the work—provide COMPANY with certificates or other documentary evidence of the above insurance, satisfactory to COMPANY. Form GO-279-12 may be used for this purpose.

7. ASSIGNMENT: Neither this Agreement nor money due CONTRACTOR hereunder shall be assigned, sublet or transferred in whole or in part by CONTRACTOR, except with the prior written consent of COMPANY, and any attempt to do so without such written consent shall be void.

8. CONTRACTOR'S UNDERSTANDING: Subject to any express provisions elsewhere in this Agreement, it is understood that CONTRACTOR as a result of careful examination, is satisfied as to the nature and location of the work, the conformation and structure of the ground, the character, quality and quantity of the materials to be used, the character of temporary equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which could in any way affect the work under this Agreement. No representations by or oral agreement with any agent or employee of COMPANY, either before or after the execution of this Agreement, shall affect or modify any of CONTRACTOR's rights or obligations hereunder.

9. RENEGOTIATION ACT OF 1951: If Section 104 applies to this Agreement, this Agreement shall be deemed to contain all of the provisions required by said Section. Content of 10 is superceded by Right-to-Audit Clause, Page 5, attached.

10. RECORDS: CONTRACTOR and its subcontractors and vendors shall maintain true and correct sets of records in connection with the work and all transactions related thereto. CONTRACTOR and its subcontractors and vendors shall retain all such records for a period of not less than twenty-four (24) months after Acceptance of the Facility.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR shall give or receive any commission, fee, rebate, or gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without COMPANY's prior written agreement. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor in connection with the work and all transactions related thereto for the sole purpose of determining whether there has been compliance with this paragraph.

If CONTRACTOR's compensation under this Agreement is determined in whole or in part on a reimbursement of costs basis, the costs to be reimbursed shall be only those reasonably necessary to perform the work in an efficient manner in accordance with the time schedule required. COMPANY may from time to time and at any time after the date of this Agreement until twenty-four (24) months after Acceptance of the Facility, make an audit of all records of CONTRACTOR and its subcontractors and vendors in connection with all costs reimbursable under this Agreement. Such audit may also cover CONTRACTOR's procedures and controls with respect to the costs to be reimbursed. Upon completion of this audit COMPANY shall pay CONTRACTOR any compensation due CONTRACTOR hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR as shown by the audit shall be returned to COMPANY. Items not covered by reimbursement but by such compensation as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors to require, in all agreements in connection with the work and all transactions related thereto, that the parties to the provisions of this Section.

1. HEADINGS: Headings of Sections and other parts of this Agreement are for quick reference only and are not to be construed as part of this Agreement. In some instances a Section or part contains provisions not covered by the heading thereof; in other instances, a Section or part contains provisions that are described in the heading of another Section or part.

2. LICENSING OF CONTRACTORS: The following applies to any person who engages in the business or acts in the capacity of a contractor within California:

Contractors are required by law to be licensed and regulated by the Contractor's State License Board. Any questions concerning a contractor may be referred to the registrar of the board whose address is:

CONTRACTOR'S STATE LICENSE BOARD
1020 N STREET
SACRAMENTO, CALIFORNIA 95814

3. WAIVER: The right of either party to require strict performance shall not be affected by any prior waiver or course of dealing.

4. CERTIFICATION: CONTRACTOR hereby certifies that it will fully comply with Executive Order 11246, as amended by Executive Order 11375, and the rules and regulations issued thereunder, which are hereby incorporated by reference as appropriate. CONTRACTOR commits itself to such compliance upon execution of this Agreement.

5. AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS: The regulations issued under the Rehabilitation Act of 1973 in Title 41, Chapter 60, Part 60-741 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Rehabilitation Act of 1973.

6. AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA: The regulations issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1974 in Title 41, Chapter 60, Part 60-250 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Vietnam Era Veterans' Readjustment Assistance Act of 1974.

7. Certificate of Nonsegregated Facilities Clause: The Certificate of Nonsegregated Facilities, Form GO-279-2, signed by CONTRACTOR and attached hereto as Page 6, is part of this Agreement.

8. Utilization of Minority Business Enterprises: The Utilization of Minority Business Enterprises, Form GO-279-5, attached hereto as Page 7, is part of this Agreement.

RIGHT-TO-AUDIT CLAUSE

SUPERCEDES CONTENT IN PARAGRAPH 10 OF CONTRACT TERMS AND CONDITIONS
FOR GO-277 SERVICE ORDERS AND
GO-278, GO-279 AND PD-52 CONTRACTS

RECORDS AND AUDITS: CONTRACTOR and its subcontractors and vendors of any tier shall maintain true and correct records in connection with the work and all transactions related thereto and shall retain all such records for at least 24 months after Acceptance.

No director, employee or agent of CONTRACTOR or of any subcontractor or vendor of CONTRACTOR of any tier shall give or receive any commission, fee, rebate, gift or entertainment of significant cost or value in connection with the work, or enter into any business arrangement with any director, employee or agent of COMPANY or any affiliate other than as a representative of COMPANY or its affiliate, without prior written notification thereof to COMPANY. CONTRACTOR shall promptly notify COMPANY of any violation of this paragraph and any consideration received as a result of such violation shall be paid over or credited to COMPANY. Additionally, if any violation of this paragraph occurring prior to the date of this Agreement resulted directly or indirectly in COMPANY's consent to enter into this Agreement with CONTRACTOR, COMPANY may, at COMPANY's sole option, terminate this Agreement at any time and, notwithstanding any other provision of this Agreement, pay no compensation or reimbursement to CONTRACTOR whatsoever for any work done after the date of termination. Any representative(s) authorized by COMPANY may audit any and all records of CONTRACTOR and any such subcontractor or vendor for the sole purpose of determining whether there has been compliance with this paragraph.

COMPANY may from time to time and at any time after the date of this Agreement until 24 months after Acceptance make an audit of all records of CONTRACTOR and its subcontractors and vendors of any tier in connection with payments made on a cost reimbursement basis. Such audit may also cover CONTRACTOR's procedures and controls with respect to such reimbursable costs. Upon completion of this audit, COMPANY shall pay CONTRACTOR any compensation due hereunder as shown by the audit. Any amount by which the total payment by COMPANY to CONTRACTOR exceeds the amount due CONTRACTOR as shown by the audit shall be returned to COMPANY. Items of compensation such as fixed percentages or fixed lump sums shall not be subject to audit under this paragraph.

CONTRACTOR shall assist COMPANY in making the above audits.

CONTRACTOR shall require, and shall require all subcontractors and vendors of any tier to require, in all agreements in connection with the work the agreement of the parties to the provisions of this Section.

CERTIFICATE OF NONSEGREGATED FACILITIES

CONTRACTOR certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. CONTRACTOR understands that the phrase "segregated facilities" includes facilities which are in fact segregated on a basis of race, color, creed, or national origin, because of habit, local custom, or otherwise. CONTRACTOR understands and agrees that maintaining or providing segregated facilities for his employees or permitting his employees to perform their services at any locations, under his control, where segregated facilities are maintained is a violation of the Equal Opportunity Clauses required by Executive Order No. 11246 of September 24, 1965, and the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968). CONTRACTOR further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clauses; that it will retain such certifications in its files, and that it will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities as required by the May 9, 1967, order on Elimination of Segregated Facilities, by the Secretary of Labor (32 F.R. 7439, May 19, 1967), and as required by the regulations of the Secretary of Labor set out in 33 F.R. 7804 (May 28, 1968) and as they may be amended, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clauses. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semi-annually or annually).

SATCO

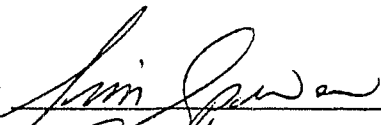
CONTRACTOR OR COMPANY

P.O. Box 80023

ADDRESS

Baton Rouge, La. 70898

CITY, STATE, & ZIP CODE

BY 

TITLE Sept.

DATE 7-28-83

Return to:

Attention:

CHEV B8 5673

UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The CONTRACTOR agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American Aleuts. CONTRACTORS may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

CHEV B8 5674

SATCO, INC.

Refractory and Corrosion Proof Systems

P. O. BOX 80023
BATON ROUGE, LA. 70898

504/291-0352

MEMO

TO C. E. MOORE

CHEURON, EL PASO

SUBJECT Refractory lining in furnace

DATE 7-21-83

As per "Shutdown Extra Work" sheet presented, we can remove all loose castable discussed and replace these voids with 6# density KACWOOL blanket secured with 304 SS INSULTWIST PINS 6" thick and patch the remaining cracks discussed with loose KACWOOL bulk and SAIRSET MORTAR. We will supply all materials and labor for a cost of \$3,800.00 Labor only cost is \$2,700.00 NOTE: CHEURON to weld pins in place.

SIGNED

[Signature]

REPLY

DATE

SIGNED

☐ NO REPLY NECESSARY ☐ PLEASE REPLY ☐ TELEPHONE ☐ RETURN ENCLOSED MEMO WITH REPLY

SATCO, INC.

Refractory and Corrosion Proof Systems

P. O. BOX 80023
BATON ROUGE, LA. 70898

504/291-0352

MEMO

TO KEVIN WALKER

Chiron. El Paso, Texas

3196-3-2

SUBJECT Fiber repairs in FURNACE

DATE 7-25-83

We propose to REMOVE All loose castables discussed and REPAIR in the following MANNER: CHEORAN is to weld 304 SS - 6" INSULTWIST PINS in designated by us areas. After this is done, A COAT OF SARKSET will be placed applied to surface to be insulated. Three (3) layers of two (2) inch blanket will be installed and secured by the pins and washers provided by us. After all blanket is stalled, A spray coat of "Ridgidizer" will be applied for wind - Resistance purposes. All crack - packing will be done with loose bulk KAOXO^{SIGNED} and A SARKSET mortar mixed in to REPLY insure A good bond. Note: Ridgidizer was not included in the first quote, PLEASE MAKE AN adjustment of \$85.00 including labor time if Ridgidizer is required. Total cost \$3,885.00 JKW

Ami Gendron

DATE _____

SIGNED

☐ NO REPLY NECESSARY ☒ PLEASE REPLY ☐ TELEPHONE ☐ RETURN ENCLOSED MEMO WITH REPLY

~~Baffle Walls: To remove and replace both baffle walls in the manner discussed in the furnace (6" in ward) the cost to Chevron is for all labor, supervision, & materials some to \$2200.00~~

CHEV B8 5676

A. P. GREEN REFRACTORIES CO.

EXICO, MISSOURI 65265 U.S.A.

Subsidiary of United States Gypsum Company

PRELIMINARY TECHNICAL DATA

MIZZOU CASTABLE Plus

60% Alumina Castable

Manufactured at Mexico, Missouri; Oak Hill, Ohio;
Philadelphia, Pennsylvania; and Sulphur Springs, Texas

MAXIMUM RECOMMENDED TEMPERATURE -----	3000°F	1650°C
QUANTITY REQUIRED - Net -----	132 lb/ft ³	2.12 g/cc
QUANTITY IN PLACE -----	lb/ft ³	g/cc
Cured and Then Dried at 220°F (105°C) -----	138	2.21
Heated at 1500°F (815°C) and Then Cooled -----	132	2.12
WATER REQUIRED FOR MIXING -----	Approximately	
Per 100 Pounds (45.4 kg) -----	1 gal (US)	3.8 liters
MAXIMUM TIME FROM ADDING WATER TO PLACING MATERIAL Minutes -----	20	
PERMANENT LINEAR CHANGE - ASTM C113		
Expansion or Shrinkage		
Cured and Then Dried at 220°F (105°C) -----	Nil	
Heated at 1500°F (815°C) and Then Cooled ----	0.1% Shr	
Heated at 2000°F (1095°C) and Then Cooled ---	0.2% Shr	
Heated at 2500°F (1370°C) and Then Cooled ---	1.0% Exp	
Heated at 2900°F (1595°C) and Then Cooled ---	2.0% Exp	
MODULUS OF RUPTURE - ASTM C133 -----	lb/in ²	kg/cm ²
Cured and Then Dried at 200°F (105°C) -----	750	53
Heated at 1500°F (815°C) and Then Cooled -----	340	24
Heated at 2000°F (1095°C) and Then Cooled -----	370	26
Heated at 2500°F (1370°C) and Then Cooled -----	600	42
COLD CRUSHING STRENGTH - ASTM C133 -----		
Cured and Then Dried at 200°F (105°C) -----	2800	195
Heated at 1500°F (815°C) and Then Cooled -----	1500	105
Heated at 2000°F (1095°C) and Then Cooled -----	1500	105
Heated at 2500°F (1370°C) and Then Cooled -----	2100	150
PARTICLE SIZE - ASTM C92		
Retained on 4 Mesh Tyler Screen (4.70 mm opening)		
Wet Analysis -----	Less Than 5%	

CHEV B8 5677

(Continued)

A. P. GREEN REFRACTORIES CO.

MEXICO, MISSOURI 65265 U.S.A.

Subsidiary of United States Gypsum Company

"HEAT-UP" SCHEDULE TO 2500° F.

MIZZOU CASTABLE VERSUS MIZZOU CASTABLE PLUS

- CONDITIONS -

1. BOTH TAKE 24-HOUR MINIMUM HYDRAULIC CURE
2. START AT AMBIENT AIR TEMPERATURE OF 50° F. FOR HEAT-UP
3. 9" LINING

MIZZOU CASTABLE

AT SCHEDULE B (75° F./HR.)

50° F. TO 250° F.	-	2.7 HOURS
HOLD AT 250° F.	-	4.5 HOURS
250° F. TO 500° F.	-	3.3 HOURS
HOLD AT 500° F.	-	4.5 HOURS
500° F. TO 1000° F.	-	6.7 HOURS
HOLD AT 1000° F.	-	4.5 HOURS
1000° F. TO 2500° F.	-	20.0 HOURS
HOLD AT 2500° F.	-	<u>1.0</u> HOUR

TOTAL 47.2 HOURS

MIZZOU CASTABLE PLUS

AT 300° F./HR.

FROM 50° F. TO 2500° F.	-	8.2 HOURS
HOLD AT 2500° F.		<u>1.0</u> HOUR
TOTAL		9.2 HOURS

NOTE: IF LOST PRODUCTION WAS WORTH \$1,000/HOUR FOR THIS EXAMPLE, SAVINGS WOULD AMOUNT TO \$38,000. ALSO, FUEL AND "HEAT-UP" MONITORING COSTS WOULD BE SUBSTANTIALLY REDUCED.

MIZZOU CASTABLE Plus

THERMAL CONDUCTIVITY

At a Mean Temperature of	Btu-in ft ² hr °F	kcal-m m ² hr °C
400°F (205°C) -----	4.46	0.55
800°F (425°C) -----	4.67	0.58
1200°F (650°C) -----	4.88	0.61
1600°F (870°C) -----	5.10	0.63
2000°F (1095°C) -----	5.32	0.66
2400°F (1315°C) -----	5.54	0.69

CHEMICAL ANALYSIS

Calcined Basis

Silica - SiO ₂ -----	31.5 - 34.5%
Alumina - Al ₂ O ₃ -----	58.5 - 61.5%
Iron Oxide - Fe ₂ O ₃ -----	1.0 - 2.0%
Lime - CaO -----	2.5 - 3.5%
Magnesia - MgO -----	0.1 - 0.6%
Titania - TiO ₂ -----	1.0 - 2.0%
Alkalies - Na ₂ O + K ₂ O -----	0.3 - 0.8%

These results cannot be taken as maximum or minimum requirements for specification purposes.

May 2, 1983

CHEV B8 5679

LIST OF MATERIALS

Job No. 138-096

List No. 83681

Accounting Charge No. GAUGE 2138-06-570

Draftsman CARLOS HERMOSILLO

DATE REQUIRED: 10-14-83 Date 10-13-83

Engineer: JBS

Lead Engr: VAS

* PLT 38 S/D

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	LIIGAIA	2'	1 1/2"	PIPE SMLS SCH 80 CS PE		
2		6'	3/4"			
3	L20KAZ7	2	3/4"	GATE VLV. 800LB. CS M-F/SW-SCRD		
4	L20KAIMD	1	3/4"	SW 12CR WELDED		
5	L370ABW	1	3/4"	PLUG CS SCRD.		
6	L61BGC	2	3/4"	GASKET 150LB. 304/ASB SPIRAL WND		
7	L620BM	8	1/2" x 2 1/4"	STUD BOLT B-7 W/2 NUTS		
8	L31SBD	2	3/4"	TEE 3000LB CS SW		
9	L36SBDs	1	1 1/2"	BOSS 3000LB. CS SW		
10	L35GBEQ	2	1 1/2" x 3/4"	SWAGE NIPPLE SCH 80 CS PE CONC		
11	L40BA3DG	4	1 1/2"	FLANGE 150LB. CS RF WN BORE SCH 80		
12		2	6" □	MONEL SCREEN 8 MESH 25 GA		
13	L370AEW	1	3/4"	PLUG CS PE		
14						
15						
16						
17				EST. COST \$400		
18				AIR FREIGHT AUTHORIZED		
19				END USE: LEVEL GAUGE RELOCATION		
20				ON D-3852		
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

Jeffrey B. Salazar
10/13/83

Vernon A. Sotn
10/13/83

Job No. 138-096Lst No. 03681Accounting Charge No. GAUGE 2138-06-570Draftsman CARLOS HERMOSILLODATE REQUIRED: 10-14-83 Date 10-12-83Engineer: JBSLead Engr: VAS

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	LIIGAIA	(2)	1 1/2"	PIPE SMLS SCH 80 CS PE	Shop	
2		(6)	3/4"			
3	L20KAZ7	(2)	3/4"	GATE VLV. 800LB. CS M-F/SW-SCRD	Stock	
4	L20KAIMD	(1)	3/4"	SW 12CR WELDED		
5	L370ABW	(1)	3/4"	PLUG CS SCRD		
6	L61BGC	(2)	3/4"	GASKET 150LB. 304/ASB SPIRAL WND		
7	L620BM	(8)	1/2" x 2 1/4"	STUD BOLT B-7 W/2 NUTS		
8	L31SBD	(2)	3/4"	TEE 3000LB CS SW		
9	L36SBDs	1	1 1/2"	BOSS 3000LB. CS SW	RLBH-80786 X	
10	L35GBEQ	2	1 1/2" x 3/4"	SWAGE NIPPLE SCH 80 CS PE CONC		
11	L40BA3DG	(4)	1 1/2"	FLANGE 150LB. CS RF WN BORE SCH 80	Stock	
12		2	6" #	MONEL SCREEN 8 MESH 25 GA	RLBH-8368/NO	
13	L370AEW	(1)	3/4"	PLUG CS PE	USE 3/4" DR STOCK	
14				KEENAN 10/13/83		
				FUTURE ALLOYS 10/13/83		
16						
17				EST. COST \$400		
18				AIR FREIGHT AUTHORIZED		
19				END USE: LEVEL GAUGE RELOCATION		
20				ON D-3353		
21						
22						
23				Jeffrey B Salazar		
				10/13/83		
24						
25				Vernon A. Jot		
26				10/13/83		
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31				T. E. SHERBILL		
				OCT 13 1983		
33						
34						
35						

CHEV B8 5681

10/13/33

LIST OF MATERIALS

Job No. 138-096

List No. 83660

Accounting Charge No. DRAIN 138-06-570

Draftsman CARLOS HERMOSEILLO

DATE REQUIRED: 10-14-33 Date 10-13-33

Engineer: JBS

Lead Engr: VAS

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11EA2A	(6)	2"	PIPE SMLS SCH 40 CS EFW	Stock	
2	L20BA3CA	(3)	2"	GATE VLV. 150LB. CS RF 12CR TR		
3	L43BA3	(1)	2"	BLIND FLG 150LB CS RF		
4	L61BGC	(6)	2"	GASKET 150LB 304/SSB SPIRAL WND.		
5	L51MAI	(2)	2"	TEE STD. WT CS BW		
6	L35GBEQ	(1)	2' x 1"	SWAGE NIPPLE SCH 80 CS PE	RUBIN-80786K	
7	L40BA3DE	(5)	2"	FLG. 150LB. CS RF WN BORE SCH 40	Stock	
8	L620BM	(24)	5/8" x 3"	STUD BOLT B-7 W/2 NUTS		
9	L20KAZ7	(1)	3/4"	GATE VLV 800LB CS MF/SW-SCRD		
10	L36SBDS	(1)	3/4"	BOSS 3000LB. CS BW		
11	L57MAIR	(1)	4"	CAP STD. WT. CS BW		
12				REC'D 10/13/33		
13						
14						
15						
16				EST. COST \$900		
17				AIR FREIGHT AUTHORIZED		
18				END USE: BRINE DRAIN MODIFICATIONS		
19				ON D-3853		
20						
21				Jeffrey B. Salazar		
22				10/12/33		
23						
24				Vernon A. S. S.		
25				10/13/33		
26						
27						
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32				T. E. SHERRILL		
33				UOI 10/30		
34				3.20 PM		
35						

CHEV B8 5682

LIST OF MATERIALS

Page 1 of 2

Job No. 18-489

List No. BM-83848

Accounting Charge No. FRCOI-6119-01-360

Draftsman MM 2388

DATE REQUIRED: 12-14-83 Date 12-11-83

Engineer: MDC

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L11GAIA	(90)	1 1/2"	PIPE SMLS SCH 80 CS	BM-83848	STOCK
2	L20KAIND	2	1 1/2"	GATE VALVE CS 12CRTR 800# SW	RLBM-80787X	
3	L21JADF	1	1 1/2"	GLOBE VALVE CS 600# S.W., 12 CR.	KEENAN	
4	L20KABHD	2	1 1/2"	GATE VALVE CS 800# M-F/NPT-NPT	JOHN A. 12/12	
5	L20KAIND	(2)	3/4"	GATE VALVE CS 800# 12CRTR SW	STOCK	
6	L40FA3DG	(2)	1"	FLANGE WN FS 300# RF SCH 80		
7	L42FA3DG	(1PL)	1 1/2"	ORIFICE FLANGES 300# RF FS SCH 80		
8	L35GBEQ	1	2" X 1 1/2"	SWAGE NIPPLE CS CONC. SCH 80 PE	RLBM-80786X	
9	"	2	1 1/2" X 3/4"	" " " " " "	KEENAN	
10	L30SBDB	8	1 1/2"	ELBOW 90° FS 3000# SW		
	"	1	3/4"	" " " " " "		
	L35GBEQ	2	1 1/2" X 1"	SWAGE NIPPLE CS CONC SCH 80 PE		
13	L315BD	4	1 1/2"	TEE STRGHT FS 3000# SW		
14	L370ABW	(2)	1 1/2"	PLUG FS NPT	STOCK	
15	"	(2)	3/4"	" " "		
16	LG1FGC	(2)	1 1/2"	GASKET 300# RF 304/ASB SPIRAL WND		
17	"	(2)	1"	" " " " " " "		
18	LL20BM	4	5/8" X 7 1/4"	STUD BOLT B-7 W/ 2 HEX NUTS	RLBM-80766X 12/14/83 BOSCO BOB	
19	"	(4)	3/4" X 1 1/4"	" " " " " "	STOCK	
20		20'	L313X 1/4"	STRUCT. STL ANGLE	RLBM-6027X RAMSEY	
21		4	L46X 1/4"	" " PLATE	YOLI 12/14/83	
22		(5)	1 1/2"	PIPE U-BOLT CLAMP	STOCK	
23		1	1"	CONTROL VALVE 300# (SEE ATTACHED)		
24	L55MAIDA	1	3" X 1 1/2"	REDUCER CONC STD WT CS BW	RLBM-80786X	
25	L55MAIH	1	3" X 1 1/2"	WELDOLET FS STD WT BW		
26	L20FA3DA	(1)	3"	GATE VALVE CS 300# AF 12CR TR	STOCK	
27	L40FA3DE	(2)	3"	FLANGE WN FS 300# RF SCH 40	STOCK	
	L50MAIBC	(1)	3"	ELBOW 90° LR CS STD WT BW		
	LG1FGC	(2)	3"	GASKET 800# RF 304/ASB SPIRAL WND		
30	LG20BM	(16)	3/4" X 4"	STUD BOLT B-7 W/ 2 HEX NUTS		
31						

C.O. ~~Office~~ S/D LIST OF MATERIALS Page 1 of 2

Job No. B-439 List No. BM-83849 Accounting Charge No. UMP-01-6119-01-360
 Draftsman _____ DATE REQUIRED: 12-14-83 * ^{Frm} Date 12-11-83
 Engineer: MDC Lead Engr. SPK FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MR. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	E D
1	L11EA2A	(130)	2"	PIPE SMLS CS SCH 40 BFW	Stock	
2	L20KA27	(3)	3/4"	GATE VLV CS 800# MF / SW-NPT	↓	
3	L20FA3DA	3	2"	GATE VLV CS 300# RF 12CATL	RLBH-80787K KEENAN JOHN	
4	L21FA3DA	1	2"	GLOBE VLV " " " " " "	12/12/83	
5	L11EA2A	1	1 1/2"	PRESS. CONT. VLV (SEE ATTACHED)		
6	L40FA3DE	7	2"	FLANGE WN FS 300# SCH 40 RF	RLBH-80786K KEENAN	
7	L36V8DS	(2)	3/4"	BOSS 6000# FS SW.	Stock	
8	L36V8AS	(1)	3/4"	" " " NPT	↓	
9	L36N8DU	(1)	3/4 x 2"	ELBOLLET FS XS SW	↓	
10	L50MNBCL	(8)	2"	ELBOW CS STD WT BW 90° LR	Stock	
11	L51MAT	(2)	2"	TEE STRGHT CS STD WT BW	↓	
12	L370ABW	(2)	3/4"	PLUG FS NPT	Stock	
13	L35GBM8	2	2 x 1 1/2"	SWAGE NIPPLE CONC CS SCH 80 TSE-BLE	RLBH-80786K	
14	L61F5C	(7)	2"	GASKET 300# RF 809/ASB SPIRAL WND	Stock	
15	L620BM	(56)	5/8 x 3/4	STUD BOLT B7 W/2 HEX NUTS	↓	
16	L11EA2A	(12)	3"	PIPE SMLS CS SCH 40 BFW	Stock	
17	L3X3X1/4	4		STRUCT. STL ANGLE		
18		(1)	2"	PIPE U'-BOLT CLAMP	Stock	
19	L11GA1A	(16)	3/4"	PIPE SMLS CS SCH 80 PE	↓	
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W. C. STEPHENSON
DEC 1 1983

W. C. STEPHENSON
DEC 1 1983

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LIST OF MATERIALS

Job No. 18-439List No. BM-83875Accounting Charge No. NH302-6119-01-360Draftsman WAM 6388DATE REQUIRED: 12-19-83* Date 12-16-83Engineer: MCLead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	ES. DE. DA.
1	L11EA2A	60'	2"	PIPE SMLS CS SCH 40 BFW		
2	L40FA3DE	3	2"	FLANGE WN 300# FS SCH 40 RF		
3	L50MA1BC	8	2"	ELBOW 90° LR CS BW STD WT		
4	L35GB1M9	1	2" X 1 1/4"	SWAGE NIPPLE CS CONC SCH 80 BLE + TSE		
5	L61FGC	2	2"	GASKET 300# RF 304/ASB SPIRAL WND		
6	L620BM	16	5/8 X 3/4	STUD BOLT D-7 W/2 HEX NUTS		
7		8'	L4 X 4 X 1/4"	STRUCT. STL ANGLE		
8		2	6" X 15" X 1/4"	" " PLATE		
9		3	2"	PIPE U-BOLT CLAMP		
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W.D. County 12-15-83
 J. Rasch 12/16

LIST OF MATERIALS

Job No. 18-439

List No. BM-33876

Accounting Charge No. 6119-01-360

Draftsman MAM

DATE REQUIRED: 12-19-83 * FIRM Date 12-16-83

Engineer: MC

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	E D
1	L116AIA	35	1 1/2"	PIPE SMLS CS SCH 80		
2	L20A1MD	5	1 1/2"	GATE VALVE CS 300 # 12 CR TR SW		
3	L40FA3DG	4	1 1/2"	FLANGE WN FS RF 300 # SCH 80		
4	L30SBDB	8	1 1/2"	ELBOW 90° CS 3000 # SW		
5	L31SBD	4	1 1/2"	TEE STRIGHT CS 3000 # SW		
6	L35GBGQ	2	2 X 1 1/2"	SWAGE NIPPLE CS CONC SCH 80 TLE-BSE		
7	L35GBNG	6	1 1/2 X 1 1/4	" " " " " " PLE-TSE		
8	"	1	1 1/2 X 3/4	" " " " " " PLE-TSE		
9	L34SBAH	1	1 1/2"	COUPLING CS 3000 # NPT		
10	"	1	3/4"	" " " "		
11	L36VBAS	3	3/4"	BOSS 6000 # FS NPT		
12	LWIF6C	2	1 1/2"	GASKET 300 # RF 304 / ASB SPHAL WND		
13	L620BM	8	3/4 X 3 1/2	STUD. BOLT B-7 W/ 2 HEX NUTS		
14		2	2"	ANGLE VALVE		
15		1	2"	SPECIAL CHECK VALV		
16		1	2 X 5 1/2	NIPPLE CS SCH 40		
17		1	1 1/4"	ANGLE VALVE		
18		1	3/4"	RELIEF VALVE		
19		1	1 1/4"	" " " "		
20		2	1 1/2"	GLOBE VALVE		
21		2	1 1/2 X CL	NIPPLE CS SCH 80 NPT		
22		2	1 1/2	PLUG CS NPT		
23		1	1 1/2 X 1 1/4	REDUCING FS BUSHING NPT		
24		1	1 1/4	SPECIAL CONNECTOR		
25		1	3/4"	PLUG FS NPT		
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28				<i>M. J. Cantegre</i> 12-16-83		
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LIST OF MATERIALS

Page 1 of 2

No. JB - 439

List No. BM-83848

Accounting Charge No. FRC01-6119-01-360

Draftsman MM C388DATE REQUIRED: 12-14-83 Date 12-11-83Engineer: M.D.C.Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11GA1A	90'	1 1/2"	PIPE SMLS SCH 80 CS	BM-83848	
2	L20KA1MD	2	1 1/2"	GATE VALVE CS 12CRTR 800# SW		
3	L21JA1DF	1	1 1/2"	GLOBE VALVE CS		
4	L20KA3HD	2	1 1/2"	GATE VALVE CS 800# M-F / NPT-NPT		
5	L20KA1MD	2	3/4"	GATE VALVE CS 800# 12CRTR SW		
6	L40FA3DG	2	1"	FLANGE WN FS 300# RF SCH 80		
7	L42FA3DG	1PL	1 1/2"	ORIFILE FLANGES 300# RF FS SCH 80		
8	L35GBEA	1	2" X 1 1/2"	SWAGE NIPPLE CS CONC. SCH 80 PE		
9	"	2	1 1/2" X 3/4"	" " " " " "		
0	L30S8DB	8	1 1/2"	ELBOW 90° FS 3000# SW		
1	"	1	3/4"	" " " " " "		
	35GBEA	2	1 1/2" X 1	SWAGE NIPPLE CS CONC SCH 80 PE		
3	L31SBD	4	1 1/2"	TEE STRGHT FS 3000# SW		
4	L370ABW	2	1 1/2"	PLUG FS NPT		
5	"	2	3/4"	" " " "		
6	L61FGC	2	1 1/2"	GASKET 300# RF 304/ASB SPIRAL WND		
7	"	2	1"	" " " " " " " "		
8	L620BM	4	5/8" X 7 1/4"	STUD BOLT B-7 W/ 2 HEX NUTS		
9	"	4	3/4" X 4 1/4"	" " " " " " "		
0		20'	L3X3X 1/4"	STRUCT. STL ANGLE		
1		4	6X6X 1/4"	" " PLATE		
2		5	1 1/2"	PIPE U-BOLT CLAMP		
3		1	1"	CONTROL VALVE 200# (SEE ATTACHED)		
4	L55MAIDA	1	3" X 1 1/2"	REDUCER CONC STD WT CS BW		
5	L56MAIH	1	3" X 42"	WELDOLET FS STD WT BW		
6	L20FA3DA	1	3"	GATE VALVE CS 300# AF 12CRTR		
7	L40FA3DE	2	3"	FLANGE WN FS 300# RF SCH 40		
8	L50MAIBC	1	3"	ELBOW 90° LR CS STD WT BW		
	L61FGC	2	3"	GASKET 300# RF 304/ASB SPIRAL WND		
0	L620BM	16	3/4" X 4"	STUD BOLT B-7 W/ 2 HEX NUTS		
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BILL OF MATERIAL

JOB 18-439 NH₃ INJECTION FAC. DATE 12-11-83

DRG. No. _____ SHEET _____ ORDER No. BM-83848

APPRO. JOB NO. FRC01-6119-01-300

M.I.D. COUNTEGAN X 356 MATERIAL REQ'D AT DEST'N BY 12-14-83 * FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
23	1	EA.	CONTROL VALVE - 1" - 300# - CAMFLEX II 3500Z SERIES w/ FL FULL TRIM $C_v = \underline{13.6}$ - CRITICAL FLOW FACTOR $C_f = 0.88$ - FLOW TO OPEN - <u>35-35#02</u> - Model No. POSITIONER 4000 SERIES Model No. <u>4612</u>	
31	1	EA.	BARTON MODEL 202A FLOW RECORDER (12" CHART) HOUSING MAT'L: FORGE STL. A.I.S.I. C-1018 SWP: 1,000 PSI D/P RANGE: 2 1/8" O.D. S.S. BELLONS PIPE MOUNTED	0-15 PSI TO 0-75 PSI
			* AIR FREIGHT & O/T AUTHORIZED TO MEET DELIVERY DATE (12-14-83) <i>[Signature]</i> 12/11/83 <i>M.I. Countegan</i> 12-11-83	
32	10 (OR MINIMUM)	EA	FOLIO OR EQUAL 12" CIRCULAR CHART PAPER No. 398246 w/ RANGE 0-90°	
			END USE: NEW CIV. FOR NH ₃ INJECTION @ FCC FLUE GAS	

SHEET 2 OF 2 SHEETS

FILE

LIST OF MATERIALS

Job No. 18-439

List No. BM-83850

Accounting Charge No. STM01-6118-01-360

Draftsman CARLOS HERMOSILLO @ 388

DATE REQUIRED: _____ Date 240

Engineer: MDC

Lead Engr. SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO) _____

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11GATA	150'	$\frac{3}{4}$ "	PIPE SMLS SCH 80 CS PE		
2	L21KAIME	2	$\frac{3}{4}$ "	GLOBE VLV 800LB CS SW 12CR/STEL		
3	L40BA3DG	8	$\frac{3}{4}$ "	FLANGE 150LB CS RF WN BORE SCH 80		
4	L305BDB	11	$\frac{3}{4}$ "	ELBOW 3000LB CS SW 90-DEG		
5	L61BGC	4	$\frac{3}{4}$ "	GASKET 150LB 304/ASB SPIRAL WND		
6	L620BM	16	$\frac{1}{2}$ " ϕ x $2\frac{1}{4}$ "	STUD BOLT B-7 W/2 NUTS		
7	L01C2	400'	$\frac{1}{2}$ " O.D.	TUBING, SOFT COPPER, SMLS, .035" WALL THK		
9	L80A5AHC	4	$\frac{1}{2}$ " O.D. x $\frac{1}{2}$ "	CONNECTOR - STRAIGHT, TUBE TO FEMALE NPT, BRASS, COMPRESSION TYPE, "CRAWFORD SWAGELOK" #810-7-8		
12	L35GBMQ	4	$\frac{3}{4}$ " x $\frac{1}{2}$ "	SWAGE NIPPLE SCH 80 CS BLE/TSE		
13	L70AII	2	$\frac{3}{4}$ "	STEAM TRAP, IMPULSE, SW, SS, 4 TO 600 PSI @ 750°F, THERMODYNAMIC, W/ BUILT-IN STRAINER & BLOW-OFF VLV, 'YARWAY' SERIES 720 OR EQUAL		
17	L81D5IH	2	$\frac{1}{2}$ " O.D.	TEE, ALL TUBE, COMPRESSION TYPE, BRASS, CRAWFORD SWAGELOK OR EQUAL		
19	NI	550'	1" THK.	1" THK SECTIONAL TYPE MODERATE TEMPERATURE PIPE INSULATION PER STD. DWG GB-N99993-1		
22		2'	L3"x3"x $\frac{1}{4}$ "	ANGLE A36		
23		2	$\frac{3}{4}$ "	U-BOLT PER STD. DWG. GB-M99657		
26				<i>M. J. Cantley</i> 12-13-83		
27				<i>R. Asch</i> 12/13/83		
32				END USER: STEAM TRACING & INSULATION FOR NEW NHTA INJECTION FACILITY		

CHEV B8 5689

LIST OF MATERIALS

Job No. 18-439

List No. BM-83876

Accounting Charge No. 6119-81-360

Draftsman MAH

DATE REQUIRED: 12-19-83 * F.R.M. Date 12-16-83

Engineer: MC

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.
1	L116MA	(35)	1 1/2"	PIPE SMLS CS SCH 80	Stock
2	L20KAIMD	5	1 1/2"	GATE VALVE CS 800 # 12 CL TR SW	RLBM-80786X KEENAN JOHN A
3	L40FA30G	(4)	1 1/2"	FLANGE WN FS RF 300 # SCH 80	Stock
4	L30SBDB	8	1 1/2"	ELBOW 90° CS 3000 # SW	RLBM-80786X
5	L31SBD	4	1 1/2"	TEE STRGHT CS 3000 # SW	KEENAN
6	L35GBGQ	2	2x1 1/2"	SNAGE NIPPLE CS CONC SCH 80 TLE-BSE	
7	L35GBNG	6	1 1/2x1 1/4	" " " " " " PLE-TSE	
8	"	1	1 1/2x3/4	" " " " " " PLE-TSE	
9	L34SBAH	(1)	1 1/2"	COUPLING CS 3000 # NPT	Stock
10	"	(1)	3/4"	" " " "	
11	L36VBAS	(3)	3/4"	BOSS 6000 # FS NPT	
12	L61F6C	(2)	1 1/2"	GASKET 800 # RF 304/ASB SPIRAL WND	
13	L620BM	(8)	3/4x3 1/2	STUD BOLT B-7 W/2 HEX NUTS	
14		2	2"	ANGLE VALVE	BY OTHERS
15		1	2"	SPECIAL CHECK VALV.	
16		1	2x5 1/2	NIPPLE CS SCH 40	
17		1	1 1/4"	ANGLE VALVE	
18		1	3/4"	RELIEF VALVE	
19		1	1 1/4"	" "	
20		2	1 1/2"	GLOBE VALVE	
21		2	1 1/2xCL	NIPPLE CS SCH 80 NPT	
22		2	1 1/2	PLUG CS NPT	
23		1	1 1/2x1 1/4	REDUCING FS BUSHING NPT	
24		1	1 1/4	SPECIAL CONNECTOR	
25		1	3/4"	PLUG FS NPT	
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W. J. Conway 12-16-83

[Signature] 12/16/83

LIST OF MATERIALS

Job No. 18-439

List No. BM-83875

Accounting Charge No. NH302-6119-01-360

Draftsman WPM 6388

DATE REQUIRED: 12-19-83 Date 12-16

Engineer: MC

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

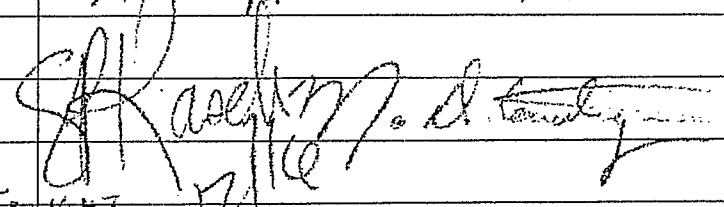
MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.
1	L11EA2A	(60)	2"	PIPE SMLS CS SCH 40 BFW	STOCK
2	L40FA3DE	3	2"	FLANGE WN 300# FS SCH 40 RF	RENNAN RLBM-80786X
3	L50MA1BC	(8)	2"	ELBOW 90° L& CS BW STD WT	
4	L35GBMQ	1	2" x 1 1/4"	SWAGE NIPPLE CS CONC SCH 80 BLE + TSE	JOHN A. 12/10 RLBM-80786X
5	L61FGC	(2)	2"	GASKET 300# RF 304/ASD SPIRAL WND	STOCK
6	L620BM	(16)	5/8 x 3/4	STUD BOLT D-7 W/2 HEX NUTS	↓
7		8'	L4 x 4 x 1/4	STRUCT. STL ANGLE	RLBM-6027X
8		2	6" x 15" x 1/4	" " PLATE	RAMSEY SP Vol 1 12/1
9		(3)	2"	PIPE 'U'-BOLT CLAMP	STOCK
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W.D. County 12-15-83
Hersch 12/16

BILL OF MATERIAL

JOB 15-437 N113 INJECTION DATE 12-16-83
 DRG. No. _____ SHEET _____ ORDER No. BM-83881
 APPRO. JOB No. ^{INSUL} 117 11-24

M.D. CORNIGLIANO 43560 MATERIAL REQ'D AT DEST'N BY 12-17-83 FPM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	75	LF	1" THK INSULATION - NI - FOR 2" PIPE SECTIONAL TYPE MODERATE TEMPERATURE PIPE INSULATION (CALCIUM - SILICATE)	RLDM-83881/NC W.A. SELLE C/P AVILA 12/19/83
2	50 50	LF	1 1/2" THK. INSULATION NI - FOR 1 1/2" PIPE SECTIONAL TYPE MODERATE TEMPERATURE PIPE INSULATION (CALCIUM - SILICATE)	
3	30	LF	1" THK INSULATION - NI - FOR 3" PIPE SECTIONAL TYPE MODERATE TEMPERATURE PIPE INSULATION (CALCIUM - SILICATE)	
4	(3)	EA.	3/4" PLUG FS NPT	Stock
5	(2)	EA.	3/4" x 1/4" REDUCING BUSHING FS NPT	
 K. AIRPORT 10/1 AUTHORIZED TO MEET DELIVERY DATE				12-16-83
END USE: N113 INJECTION FACILITY				CHEV B8 5692

LIST OF MATERIALS

Page 1 of 1

Job No. B-439

List No. BM-83849

Accounting Charge No. JMP-01-6119-01-360

Draftsman

DATE REQUIRED: 12-14-83 * 12-11-83

Engineer: MDC

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	E.D.
1	L11EA2A	130'	2"	PIPE SMLS CS SCH 40 BFW		
2	L20KA27	3	3/4"	GATE VLV CS 800# MF/SW-NPT		
3	L20FA3DA	3	2"	GATE VLV CS 300# RF 12CATL		
4	L21FA3DA	1	2"	GLOBE VLV " " " " " "		
5		1	1 1/2"	PRESS. CONT. VLV (SEE ATTACHED)		
6	L40FA3DE	7	2"	FLANGE WN FS 300# SCH 40 RF		
7	L36VBDS	2	3/4"	BOSS 6000# FS SW.		
8	L36VBAS	1	3/4"	" " " NPT		
9	L36NB0U	1	3/4 x 2"	ELBOW ET FS XS SW		
10	L50MA1BC	8	2"	ELBOW CS STD WT BW 90° LR		
11	L51MA1F	2	2"	TEE STRGHT CS STD WT BW		
12	L370ABW	2	3/4"	PLUG FS NPT		
13	L35GBM9	2	2 x 1 1/2"	SWAGE NIPPLE CONC CS SCH 80 TSE-BLE		
14	L61F5C	7	2"	GASKET 300# RF 809/ASB SPIRAL WND		
15	L620BM	56	5/8 x 3 1/4	STUD BOLT B-7 W/2 HEX NUTS		
16	L11EA2A	12'	3"	PIPE SMLS CS SCH 40 BFW		
17		4'	L3X3X1/4	STRUCT. STL ANGLE		
18		1'	2"	PIPE U-BOLT CLAMP		
19	L11GA1A	16'	3/4"	PIPE SMLS CS SCH 80 PE		
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CHEV B8 5693

BILL OF MATERIAL

JOB 18-439 NH₃ INJECTION FACILITY DATE 12-11-83

DRG. No. _____ SHEET _____ ORDER No. BM-83849

APPRO. JOB No. JMPO1-6119-01-300

M.D. COUNTRYMAN x356 MATERIAL REQ'D AT DEST'N BY 12-14-83* FIRM

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
<u>5</u>	<u>1</u>	<u>EA.</u>	<u>1 1/2" - 300# FISHER OR EQUAL</u>	
			<u>TYPE 95H PRESSURE REGULATOR</u>	
			<u>w/</u>	
			<u>1 1/16" ORIFICE</u>	
			<u>(INLET) P₁ MAX = 234.2 PSIG</u>	
			<u>(OUTLET) P₂ MAX = 32.2 PSIG</u>	
			<u>T_{MAX} = 100°F</u>	
			<u>T_{MIN} = 20°F</u>	
			<u>CAST STEEL</u>	
			<u>AND ALL METAL DIAPHRAGM & SEAT</u>	
* AIR FREIGHT & O/T AUTHORIZED TO MEET DELIVERY DATE (12-14-83* FIRM)				
<u>M.D. Countryman</u> 12-11-83 <u>St. Paul</u> 12/11/83				
END USE: <u>NEW PRESSURE REGULATOR</u> <u>FOR NH₃ INJECTION FAC. @ FCC FLUE GAS</u>				

SHEET 2 OF 2 SHEETS

Work Requisition

To Maintenance Planner RONNIE JONES

Plt. or Section PLANT 31

Equip. No. or Description D-3103 COALESCER

Equip. Ready NOW Priority _____

Maintenance Job No.		Engineer's Job File No.	
		<u>131-07</u>	
Req.	Shop Order	Job. No.	Item
<u>PACKS</u>	<u>0131</u>	<u>XX</u>	<u>250</u>

Material Ordered on BM-84391

Compl. Date JUNE 22, 1984

Operators — Check Safety and Hazards before Equipment Release									
Permits:	Fire ()	Excavation ()	Gas Test ()	Cold ()	Entry Tag (See below) ()	Protective Clothing ()	Hot Work ()	Hot Tap Form ()	Motor Vehicle ()
Hazards:	Acid ()	Catalyst ()	Caustic ()	Asbestos ()	H2S ()	CL2 ()	Other ()	Date	Opr. Mech.
Equipment Released Per Refinery Instruction 1113									
Work Finished and Accepted by Operators									

Instructions: D-3103, THE DIESEL SALT DRIER #1 HEAD ON COALESCER, EXCELSIOR PACKS NEED TO BE REPLACED. PLEASE PERFORM THE FOLLOWING WORK:

- 1) FABRICATE A NEW ASBESTOS SHEET GASKET WITH DIMENSIONS 1/4" THICK X 48" ID X 50 15/16" OD.
- 2) REMOVE D-3103 HEAD AND REPLACE OLD EXCELSIOR PACKS WITH NEW ONES ORDERED ON BM-84391.
- 3) INSTALL NEW GASKET & BOLT UP HEAD.

CALL JCL X228 WITH QUESTIONS.

Tags:	Operators - Yel./Blk.	Entry - Yel./Grn.	Mechanics - Wht./Blk.				
Blind ()	Valve ()	Gas Test Inspn. - Grn.	Electricians - Wht./Blk.				
Special Work:	Util. Conn. ()	Rigging ()	Safety Relief ()				
X-Ray ()	Cover Sewers ()	Test AT _____	PSIG				
Distribution	Area Supv.	Maint. Plan	Equip. Insp.	Lead Engr.	Engr.	IMI	Other
Copies	<u>2</u>	<u>6</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>ORIS</u>
Initial/Date	<u>BLW</u>	<u>RMJ</u>	<u>KRA</u>	<u>SPK</u>	<u>JCL</u>		<u>CAW</u>

Engr. JCL Ph. 228 Ld. Engr. SPK Date 6/6/84 Appro. BLW Date 6/6/84

K

LIST OF MATERIALS

No. _____ BM — _____

Accounting Charge No.

ian HENRY DOMINGUEZ @ 388

DATE REQUIRED: _____ Date

r: JCH Lead Engr.: KDB

Lead Engr.: KDB

[illegible]

CHEV B8 5696

K

leer's _____ BM — _____
 Accounting Charge No. _____
 sman HENRY DOMINGUEZ @ 388
 DATE REQUIRED: _____ Date _____
 leer: JCH Lead Engr.: KDB

1
2
3
4

K

LIST OF MATERIALS

Accounting Charge No. _____

DATE REQUIRED: _____ Date 12-20-84

Lead Engr.: KDB

[illegible]

CHEV B8 5698

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CHEV B8 5699

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J

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LIST OF MATERIALS ATTACHMENT 2

Job No. 16-537List No. BM-7015Accounting Charge No. BYPAS-0116-570

Draftsman _____

DATE REQUIRED: 2/5/82 Date 1/25/82Engineer: RRK

Lead Engr. _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO) _____

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	LDIFA	25'	$\frac{3}{8}$ "	TUBING - COPPER	Stock	
2	L35GBEQ	2	$\frac{3}{4}$ " x $\frac{3}{8}$ "	SWAGE NIPPLE SCH 80 CS TBE		
3	L20KAOMD	4	$\frac{3}{4}$ "	GATE VALVE 800# CS SCRD 12CR WELD		
4	L70AII	2	$\frac{3}{4}$ "	STEAM TRAP SW YARWAY MODEL TYPE #720	RLBH-80769X	
5	L303BAB	3	$\frac{3}{4}$ "	ELBOW 3000 LB CS SCRD 90 DEG	Stock	
6	L315BA	1	$\frac{3}{4}$ "	TEE 3000 LB CS SCRD		
7	L20KA8HD	2	$\frac{3}{4}$ "	GATE VALVE 800 LB CS M-F/TEE	RLBH-50507X	
8	L370ABH	2	$\frac{3}{4}$ "	PLUG CS SCRD	Stock	
9	LHGAIA	20'	$\frac{3}{4}$ "	PIPE SMLS SCH 80 CS ME		
10	L42BA3DS	8	$\frac{3}{4}$ "	FLANGE 150 LB CS RF VAN SCH 80	RLBH-50515X	
11	LG18TA	4	$\frac{3}{4}$ "	GASKET 150 LB ASP COMP RF RING	Stock	
12	LG20EM	16	$\frac{1}{2}$ " x $2\frac{1}{4}$ " LG	STUB BOLT B-7 V.2-NUTS		
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22				RLBH-80769X G.S.T. C/P RICHARD 1-27-82		
23				" 50507X KEENAN " DALE "		
24				" 50515X " " " "		
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31				T. E. SHERRILL	CHEV B8 5701	
32				JAN 26 1982		
33						

RRK 1/25/82

G. L. JORDAN
JAN 28 1982

LIST OF MATERIALS ATTACHMENT 2

Job No. 16-537

List No. BM-7015

Accounting Charge No. BYPAS-0116-570

Draftsman _____

DATE REQUIRED: 2/5/82 Date 1/25/82

Engineer: RRK Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO) _____

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	LDIFA	25'	$\frac{3}{8}$ "	TUBING - COPPER		
2	L35GBEQ	2	$\frac{3}{4}$ " x $\frac{3}{8}$ "	SWAGE NIPPLE SCH 80 CS TBE		
3	L20KAOMD	4	$\frac{3}{4}$ "	GATE VALVE 800# CS SCRD 12CR WELD		
4	L70A11	2	$\frac{3}{4}$ "	STEAM TRAP SW YARWAY MODEL TYPE #720		
5	L30SBAB	3	$\frac{3}{4}$ "	ELBOW 3000 LB CS SCRD 90 DEG		
6	L315BA	1	$\frac{3}{4}$ "	TEE 3000 LB CS SCRD		
7	L20KA8HD	2	$\frac{3}{4}$ "	GATE VALVE 800 LB CS M-F/TBE		
8	L370AEW	2	$\frac{3}{4}$ "	PLUG CS SCRD		
9	LIIGAIA	20'	$\frac{3}{4}$ "	PIPE SMLS SCH 80 CS PE		
10	L40BA3DG	8	$\frac{3}{4}$ "	FLANGE 150 LB CS RF WN SCH 80		
11	LG1BTA	4	$\frac{3}{4}$ "	GASKET 150 LB ASP COMP RF RING		
12	LG20BM	16	$\frac{1}{2}$ " x $2\frac{1}{4}$ "	STUB BOLT B-7 W/2-NUTS		
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G. L. JORDAN
JAN 26 1982

BILL OF MATERIAL

JOB 16 537

DATE Jan 14 1982

DRG. No. _____ SHEET _____

ORDER No. BM-9952 Supp #1

Keep with ~~in~~ Box - 9952 until

APPRO. JOB No. BYPA-011-570

Kenneth X-355

MATERIAL REQ'D AT DEST'N BY Jan 22, 1982

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
37	#	EA	1/2" Flanges 150# CS RF SCRD sch 80 Bore	
38	2	ea	1/2" Gasket 150# ASB Comp RF Ring	
39	8	ea	1/2" x 2 1/4" Long Stud Bolts B-7 1/2 nuts	
				Total Cost of THIS B.M. \$86. ⁰⁰
			BRLK 1/14/82	
			N/S 1/14/82	

CHEV B8 5703

SHEET / OF / SHEETS

LIST OF MATERIALS ATTACHMENT 2

Job No. 16-537

List No. 6M-7015

Accounting Charge No. BYA. 10-0-571

Draftsman _____

DATE REQUIRED: 2/5/82 Date 1/25/82

Engineer: RRK

Lead Engr. _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO) _____

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	1011FA	25'	3/4"	TUBING - COPPER		
2	1012BRT	2	3/4" x 1/2"	SWAGE NIPPLE SCH 40 CS TEE		
3	1013A2ND	4	3/4"	GATE VALVE 800 LB CS SCH 40 CS TEE		
4	1014H	2	3/4"	STEAM TRAP SW VALVE MODEL #720		
5	1015BRT	3	3/4"	ELBOW 800 LB CS SCH 40 CS TEE		
6	1016BRT	1	3/4"	TEE 800 LB CS SCH 40 CS TEE		
7	1017BRT	2	3/4"	GATE VALVE 800 LB CS SCH 40 CS TEE		
8	1018BRT	2	3/4"	PLUG CS SCH 40 CS TEE		
9	1019A	20'	3/4"	PIPE 800 LB CS SCH 40 CS TEE		
10	1020BRT	8	3/4"	FLANGE 150 LB CS SCH 40 CS TEE		
11	1021A	4	3/4"	FLANGE 150 LB CS SCH 40 CS TEE		
12	1022BRT	16	1/2" x 2 1/4"	STUD 150 LB CS SCH 40 CS TEE		
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RRK 1/25/82

G. L. JORDAN
JAN 28 1982

CHEV B8 5704

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LIST OF MATERIALS

List No. BM 7112Accounting Charge No. STSPR-2118-13-360Ph. 388DATE REQUIRED: 2/22/82 Date 1-28-82Lead Engr. G.L.J./DRV

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
			BM 7112		
1	80ft.	2"	5mls. Stl. Pipe Sch 40		
4	40ft.	6"	" " " "		
1C	30	2"	Stl. 90° B.W. Elbow LR. Std Wt.		
1C	4	6"	" " " "		
	1	6"	" B.W. Tee Std. Wt.		
1R	2	6"	" B.W. Pipe Cap Std. Wt.		
7	14	3/4"	800# Stl. Gate Valve M.F./SW-Scd		
CA	2	6"	300# C.S. Flg. S.T. Gate Valve Blt. Bnt.	BM 9995	
CA	10	2"	150# C.S. Flg. 1/6" R.F. Gate Valve Blt. Bnt.		
DA	10	2"	" Check "		
CA	4	4"	300# C.S. Flg. S.T. Gate Valve Blt. Bnt.	BM 9995	
	20	2"	150# F.S. W.N. Flg. 1/6" R.F. Sch 40		
DE	2	6"	300# F.S. W.N. Flg. S.G. R.F. Sch 40	BM 9995	
A	10	6"x2"	Weldolet F.S. Red B.W. Std. Wt.		
C	20	2"	150# Spiral Wound Gasket		
D	8	3"	300# Stl. Clad Gasket for ST & SG		
NI	120	5/8"x3"	Stud Bolt Gr B7 w/2 Hex Nuts		
M	40	5/8"x3 1/2"	" " " "		
1H	12	3/4"	6000# Stl. Weld Boss. S.W.		
3W	10	3/4"	Scd. Stl. Bar Stock Plug Rd. Hd.		
IDA	4	3"x2"	Stl. Conc. Red. B.W. Std. Wt.		
DA	4	4"x2"	" " " "		
DA	2	6"x2"	" " " "		
ICA	4	3"	300# C.S. Flg. S.T. Gate Valve Blt. Bnt.	BM 9995	
DE	4	3"	300# F.S. W.N. Flg. S.G. Sch 40	BM 9995	
DE	4	4"	" " " "	BM 9995	
D	8	4"	300# Stl. Clad Gasket for ST & SG		
D	2	6"	" " " "		
	2	6"x3/4"	Elbolet F.S. S.W. X 5		
M	64	3/4"x4 1/4"	Stud Bolt Gr B7 w/2 Hex Nuts		
BM	64	3/4"x4 1/2"	" " " "		
2M	48	3/4"x5"	" " " "		

WORK REQUISITION

TO : MAINTENANCE PLANNER

PLANT #18 FCC

JOB No. <u>18-404</u>		ENGR. <u>E.B. Williams</u>	
REQ No.	TYPE	COST CENTER	JOB No. ITEM No.
<u>EBU 12-2118-18-150</u>			

EQUIP. NO. OR DESCRIPTION Platform extension on First level of reactor section MATERIAL ORDERED ON BM 7656

EQUIP. READY REQUIRED COMPLETION DATE PRE-FCC S/D

INSTRUCTIONS: The following work is required to extend the D-1801 first level platform for access to valves on new stripping steam piping.

Shop Work

- 1) Fabricate platform as shown on attached dwg AD-18-32876. Material ordered on BM 7656
- 2) Inspection department to inspect welds.
- 3) Remove rust & scale from platform.
- 4) Apply LZI primer to a thickness of 2 mils
- 5) Apply Black Graphite Enamel to a thickness of 1.5 mils.

Note: field purchase primer & paint
(cont.)

CHEV B8 5706

DISTRIBUTION : MAINTENANCE PLANNER - 4, OPERATIONS - 2 GMH
INSPECTION - 1 (GMH) LEAD ENGR. - 1 (EBW), DRV
ENGR - 1 EBW, KRL OTHERS, DJP-2

APPROVALS:
LEAD ENGR. D.R. J. 2/26
OPERATIONS BLW 2/26
CHIEF ENGR.

ENGR E.B. Williams PHONE 355 DATE 2/26/82

WORK REQUISITION

TO : MAINTENANCE PLANNER

PLANT _____

EQUIP NO. OR
DESCRIPTION _____

EQUIP.
READY _____ REQUIRED COMPLETION DATE _____

JOB No.		ENGR. BRUCE WILLIAMS		
REQ No.	TYPE	COST CENTER	JOB No.	ITEM No.

MATERIAL ORDERED ON BM-7656

INSTRUCTIONS: _____

Field Work

1) Install platform in location
shown on dwg PA-18-14621

2) Reuse existing ladder.

3) Touch up bare metal with paint where field welds have been
made.

CHEV B8 5707

DISTRIBUTION : MAINTENANCE PLANNER - 4, OPERATIONS - 2
INSPECTION - 1 LEAD ENGR. - 1
ENGR - 1, OTHERS, _____

ENGR E.B.W. PHONE _____ DATE _____

APPROVALS :
LEAD ENGR. _____
OPERATIONS _____
CHIEF ENGR. _____



Chevron U.S.
P.O. BOX 20002
EL PASO, TX. 79998

Purchase Order

Prefix and Order Number

RLM1-8194A

Important: Show above prefix and order number on all invoices, shipping papers, packages and correspondence

Date Required at Destination

713/928-3357

Issuing **EL PASO, TEXAS** Date **MARCH 12,** 19 **82**

To **ESCH & ASSOCIATES**
P.O. BOX 10516
HOUSTON, TX.

Invoice in QUADRUPLICATE to: Chevron U.S.A. Inc., P.O. Box 9250 9300, Concord, CA 94524

Ship to **Chevron U.S.A. Inc.**

Show Prefix & Purchase Order No

RLM1-8194A

REFINERY STOREHOUSE

6501 TROWBRIDGE

EL PASO, TX. 79905

Ship Via **AIR FRT.**

Bill of Lading - Upon shipment, send original copy of your B/L referenced with our order number to:
Chevron U.S.A. Inc., P.O. Box 7945, San Francisco, CA 94120

☐ Prepay freight for your account.

☒ Ship collect - endorse your B/L for delivering carrier to collect from us at the address indicated below:

☐ Chevron U.S.A. Inc.
P.O. Box W
Concord, CA 94524

☐ Chevron U.S.A. Inc.
P.O. Box J
Concord, CA 94524

☐ Prepay and charge on invoice. Declare actual value.
(UPS, Federal Express or Parcel Post only.)

Item No.	Quantity	Stock Number	Description of Material
			CONF PHONE W/LARRY 3-12-82 "DO NOT DUPLICATE"
1	3		EA. 5" DIAL THERMOMETERS 0-250°F FOR 24" STEM BACK MOUNTED.

\$54.00 / EA.

Terms **NET 30**

☒ Not for Resale ☐ For Resale ☐ Tax Exempt

S.W. SHIPPING POINT

Charge to **8113-29-300**

Quotations obtained from	Price				F.O.B. Point	Delivery
	Item 1	Item 2	Item 3	Item 4		

GREG L. JORDAN

Approved

C- 53053

Person for placement **CHEV B8 5708**

T. E. SMERRILL

915-775-3233

Telephone

Extension

By

H

J

K

LIST OF MATERIALS

Job No. 113-476List No. BM-7263

Accounting Charge No. _____

Draftsman MM @ 388DATE REQUIRED: 2/22/82 FILED
Date

Engineer: _____

Lead Engr: GLJ

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11GAIA	300'	1 1/2"	PIPE SMLS CS SCH 80 PE		
2	L40BA3CA	1	1 1/2"	GATE VLV 150# RF CS RF		
3	L370ABW	6	1 1/2"	PLUG CS SCD		
4	L618TA	4	1 1/2"	GASKET 150# RF ASB COMP		
5	L40BA3DG	4	1 1/2"	FLANGE 150# RF FS WN SCH 80		
6	L31SBA	6	1 1/2"	TEE 3000# SCD CS		
7	"	1	3/4"	TEE " " "		
8	L30SBAB	12	1 1/2"	ELBOW 3000# " "		
9	L35GBMQ	1	1 1/2" x 3/4"	SWAGE NIPPLE CS SCH 80 BLE-TSE		
10	L5CNAIH	1	1 1/2" x 10"	WELDOLET SCH 80 CS BW		
11	L620DM	16	1/2" x 2 3/4"	STUD BOLT B-7 W/2 HEX NUTS		
12	L11EA2A	20'	3"	PIPE SCH 40 SMLS CS		
13		20'	5/8" x 11.5	STRUCT. STL 'T' STAX 11.5 (SHEET PILING)		
14	L11GAIA	3'	3/4"	PIPE SMLS CS SCH 80 PE		
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16						
17				G. L. JORDAN		
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31					CHEV B8 5709	
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BILL OF MATERIAL

JOB 113-470

DATE

2/18/82

DRG. No.

SHEET

ORDER NO

BM7203

APPRO. JOB NO 8113-29-360

GLJX386

MATERIAL REQ'D AT DEST'N BY

FEB 22, 1982

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1500	LF	THERMUM SHAPTRACE w/1/2" O.D COPPER TUBING AND FEF K-4 CHANNEL	ENGRD. RLBM-6114X- EQUIP. C/P MARTIN 2-17-82
2	1500	LF	1 1/2" THICK SECTIONAL INSULATION - 5" DIAMETER OWENS CORNING KAYLO 10 OR EQUAL (TO INSULATE 1500 FEET OF PIPE) JMI2	RLBM-80767X G.S.T. C/P RICHARD 2/17/82
3	300	LF	DITTO #2 EXCEPT 1 1/2" DIAMETER (TO INSULATE 300 FEET OF PIPE)	
4	16	EA	O.D. 16" CORRUGATED ALUMINUM W/MOISTURE BARRIER NOTE: NO PAPER - 100' ROLLS - EPOXY COAT.	RLBM-7203
5	5800	LF	1/2" X 0.015" TYPE 302 S.S. STRAPPING	
6	3800	EA	TYPE 302 S.S. BUCKLE FOR 1/2" X 0.015" STRAPPING	CHEV B8 5710

SHEET 1 OF 2 SHEETS

T. E. SHERRILL

FEB 18 1982

Authorization to Perform Work
MFG-2649X

Contract No. C-15-011-81 Dated 4/1/81 Expiration Date 3/31/82
Authorization No. TM-7X Dated 3/18/82
Company CHEVRON U.S.A.
Contractor JACK WHISLER, INC., 1001 WALL STREET, EL PASO, TX 79915

Contractor is hereby authorized to perform the following work in connection with the above designated contract, all applicable provisions of which shall apply to the work herein authorized:

INSULATE 93 TANK ROOF, USING $1\frac{1}{2}$ " TOTAL THICKNESS
FIBERGLASS INSULATION WITH A 12 # DENSITY, AND
WEATHER PROOFED WITH TWO LAYERS OF 15 # ASBESTOS
ROOFING FELT, AND HOT ROOFING ASPHALT. FINAL COAT
OF ASPHALT WILL HAVE GRAVEL APPLIED.
(PER SKETCH "93 TANK ROOF")

Work is to be completed by MARCH 31, 1982 (In no case is date to exceed 3 weeks beyond authorization date above)

Company Representative JUAN DIAZ @X- _____ Shop Order No. 8113-29
(Must be filled in before authorization is signed)
Originator G.L. JORDAN @X- 386 Authorized by JALU. GONZALEZ 3/15

Above work completed (Date) _____ Signed _____
Remarks _____ Company Representative

Estimated Amount of Original Contract 230,000
" " " Previous Authorization 32,691
" " " This Authorization 5,000
" " " Authorizations To Date 37,691

CHEV B8 5711

STOREHOUSE STOCK AUTHORIZATION MFG-6600

No.

Operating Department

Operating Division

Plant 39 Diesel Hydrofiner

Jan 26 1982

INCREASE ☐ CHANGE ☒ RELEASE ☐

MATERIALS TO BE STOCKED BY STORES SECTION/GROUP
FOR REASONS CHECKED ACCORDING TO BASIC CONSIDERATIONS
SHOWN ON REVERSE SIDE OF THIS SHEET

Storehouse

E.B. Williams X-225 Engr.

STOCK NUMBER	QUANTITY	DESCRIPTION OF MATERIAL	FOR ITEMS NOW IN STOCK				NEW AUTHORIZED STOCK		Inventory Classification	UNIT PRICE	CHANGE IN STOCK VALUE	
			Present	Maximum	Recommended Disposition	Hold	Release	Minimum	Maximum		Actual	Authorized Maximum
		Items 1-3 for E-3902										
		Manf. Brown Fintube Comp										
	2	Sealing ring						2	4			
		dwg. no. B29001-13										
		Mat. Steel, C-1010, C-1015										
	1	Cover gasket						1	2			
		dwg. no. B22001-3										
		Mat. Garlock #7021										
	2	Fintube gasket						2	4			
		dwg. no. B23007-18										
		Mat. sprl. wind.										
		316 S.S. V/Ash filler										
		End Use: Replacement										
		gaskets for E-3902										
TOTAL CHANGE - ALL SHEETS												

APPROVED

Requested by

(Signature of local Operating Department Representative)

Supervisor, Stores Section

STOREHOUSE STOCK AUTHORIZATION MFG-6600

INCREASE ☐ CHANGE ☒ RELEASE ☐

MATERIALS TO BE STOCKED BY STORES SECTION/GROUP
FOR REASONS CHECKED ACCORDING TO BASIC CONSIDERATIONS
SHOWN ON REVERSE SIDE OF THIS SHEET

Storehouse
E.B. Williams
Engr.

Operating Department
Operating Division
Plant 39 Hydrofiner
Jan 26 1982

STOCK NUMBER	QUANTITY	DESCRIPTION OF MATERIAL	FOR ITEMS NOW IN STOCK				NEW AUTHORIZED STOCK		Inventory Classification	UNIT PRICE	CHANGE IN STOCK VALUE	
			Present	Maximum	Recommended Disposition	Hold Release	Minimum	Maximum			Actual	Authorized Maximum
		Items 1-3 for E-3905										
		Manf. Brown Flintube Comp										
	4	Sealing ring						4	6			
		dwg no. 829001-2										
		Mat. Solid Copper										
	2	Cover gasket						2	3			
		dwg no 822001-1										
		Mat. Gasket # 7021										
	4	Flintube gasket						4	6			
		dwg no. 823007-21										
		Mat. Sprl wa. 304 S.S										
		W/ash Cilled										
		End Use: Replacement										
		gaskets for E-3905										
APPROVED												
TOTAL CHANGE - ALL SHEETS												

RECEIVED BY
DATE
RECEIVED BY
DATE

STOREHOUSE STOCK AUTHORIZATION MFG-6600

No.

Operating Department

Operating Division

Plant #39 Hydrofiner

Jan 26 1982

INCREASE ☐ CHANGE ☒ RELEASE ☐

MATERIALS TO BE STOCKED BY STORES SECTION/GROUP
FOR REASONS CHECKED ACCORDING TO BASIC CONSIDERATIONS
SHOWN ON REVERSE SIDE OF THIS SHEET

Storehouse
E.B. Williams X-225 Engr.

STOCK NUMBER	QUANTITY	DESCRIPTION OF MATERIAL	FOR ITEMS NOW IN STOCK			NEW AUTHORIZED STOCK		Inventory Classification	UNIT PRICE	CHANGE IN STOCK VALUE	
			Present	Maximum	Minimum	Recommended Disposition	Minimum	Maximum		Actual	Authorized Maximum
		Items 1-2 For E-3907									
		Manf. Brown FinTube Comp									
	4	Sealing rings						4			
		dwg no B-23004-3									
		Mat. Solid copper									
	2	Cover gasket						2			
		dwg no B22001-3									
		Mat Gasket #7021									
		End Use: Replacement gaskets for E-3907									
TOTAL CHANGE - ALL SHEETS											

APPROVED

Requested by

K

19✓

DATE 3/9/82

ORDER No. 8100

APPRO. JOB No. 8113-27-24

THM/312

MATERIAL REQ'D AT DEST'N BY 3/9/82
DATE

93 TANK RESID LINE

CHEV B8 5717

BILL OF MATERIAL

JOB 93 TANK

DATE 3/22/82

DRG. No. _____ SHEET _____

ORDER No. 8575

APPRO. JOB NO. 8113-29-300

RGL/311

MATERIAL REQ'D AT DEST'N BY 3/26/82 OR SOONER →

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	EA	O-250°F DIAL THERMOMETER 5" W/12 INCH STEM BACK MOUNTED	
2	3	EA	O-250°F DIAL THERMOMETER 5" W/48 INCH STEM BACK MOUNTED DELIVERY ON ITEM #2 ASAP *	
MZ 3/21/92 JH Proctor A/22/82				
END USE: 93 TK				

CHEV B8 5718

End mit: 93 TK

SHEET / OF / SHEETS

REQUEST FOR PRODUCTION

NO. 19

ARNER LEWIS COMPANY DIVISION OF FRAM CORPORATION BILL OF MATERIALS	MODEL NO.	DESIGN	SSURE	NO. REQ.	JOB NO.
	HPK-300	425		1	WS. 7742
	DO RATING	CONTRACT NO.		CODE	
				A.S.M.E.	

UNIT QUANT	DESCRIPTION	PART NO.	WEIGHT	ISSUED	UNIT PRICE	EXTN.
1	FL 2" x 72" x 73 1/2" LG.	A-212 GR "B" RM	7524			
1	FL 2" x 32 1/8" x 73 1/2" LG	" " " " RM	329.1			
1	FL 2" x 16 3/4" x 17 3/4" LG	" " " " RM	524			
1	24 O.D. x 1/2 THK ELLIP HO. W72 SF	" " " " "	1050			
1	12 3/4 O.D. x 1/2 THK ELLIP HO W72 SF	" " " " "	270			
1	24" PRESSURE VESSEL WELD NECK FLG. W7 SMALL		1930			
	TONGUE & GROOVE	A-181				
1	24" BLIND FLG W7 SMALL T & G	A-181	4790			
2	FL 4" x 6 1/2" x 6 1/2"	A-212 GR "B" RM	59			
2	PIPE - 3" SCH. 160 (.438) SMLSS. x 6 1/8 LG	A-53 GR "B" RM	143			
2	FLANGE - 3" SER. 30 SMALL GROOVE	A-181	260			
1	FL 3" x 4" x 17 3/8 LG	A-7 RM	7.4			
2	FL 3" x 7" x 17 3/8 LG	A-7 RM	24.1			
3	BAR 4" x 3" x 26 1/2"	RM	11.2			
1	PIPE 12" X-HVY. (.500) SMLSS x 26 1/2 LG.	A-53 GR "B" RM	144.1			
2	1 STD. WELD BOSS	DWG #A-2951 A-105 GR "B"	1.7			
3	4 STD. WELD BOSS	" " " " " "	3.0			
7	1 STD. WELD BOSS	" " " " " "	4.5			
3	1 1/2 STD WELD BOSS	" " " " " "	1.7			
4	ANGLE 1 1/2" x 1 1/2" x 3" x 1 1/2"	RM	1.7			
1	BAR 8" x 1" x 71 1/2 LG	RM	2.5			
1	FLOOR GRATING 8" x 1" x 22 1/2 O.D.	RM	18.3			
2	REPACK	DWG #A-SK-62-1383 & B/M	500			
3	GASKET - 1/8 THK x 23 1/8 I.D. x 24 1/8 O.D. ASS. SER. SHT		1.7			
4	NAME PL. BRKT	DWG #A-2192	.8			
5	NAME PL.	DWG #A-9656 SHT 3 NP107	.3			
6	DAVIT ASS'Y.	" #C-9656 SHT. 4 & B/M	39.7			
7	FL 3" x 10 1/4" x 21 LG	A-7 RM	45.7			
8	FL 3" x 3 1/2" x 21 LG	" RM	15.6			
9	FL 3" x 3 1/8" x 4 3/8 LG	" RM	2.9			

CHEV B8 5720

NOTE: FLG. TUBE TURN FOR 425 PSI @ 450°F.

06-271

D-622

D-1941

CEP

1509

7055

SHEET 1

DRAWN BY DATE
G.B. 12-11-62

CHECKED BY
Bose

B/M NO.
C-9656 SHT 2

22

GASCOLL UNIT

CHEV B8 5721

INDEX OF MATERIAL ORDERS FOR PURCHASE ORDERS
EL PASO GAS-OIL UNIT

PROJECT, W.O. 8204-172
 PLANT

ORDER NO.	MATERIAL	SUPPLIER
PE-122-E-2	Heat Exchanger E-2210	Jon. A. Coy Co.
-3	Heat Exchanger E-2211	Jon. A. Coy Co.
PE-122-G-1	Horizontal Centrifugal Pump P-2206	United Centrifugal Pump
-14	Spare Parts for P-2206	United Centrifugal Pump
PE-122-J-3	Ind. Press. Gage PI-22-601	Leighton Stone
-6	Press. Relief Valve PSV-22-601 & 602	Crosby Valve
-7	Flow Transmitter FRT-22-601, 602 & 603	Brown Inst.
-8	Pneumatic Control Valve PRC-22-601, 602 & 603	P.S. - Teft
-9	Pneumatic Controller	Foxboro
-10	Dial Thermometer TI-22-605	Pacific Coast Instruments
-15	Orifice Plates	Shaler
-16	Thermowells	O'Brien Iron
-16	Ind. Receiver Gages PRG-22-601, 602, 603	Leighton Stone
PE-22-I-10	Valve Chains & Wheels	Pacific Valve
PE-122-M-15	Hangers, Rods & Clevis	Grinnel Co.
		CHEV B8 5722

PURCHASE ORDER INDEX

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-G-1	Fractionating Column C-2201	McNamar Boiler & Tank Co.
C-6	Side Cut Stripper C-2202	McNamar Boiler & Tank Co.
C-10	Bolting for Bubble Cap Assembly, C-2201	Howard Supply Co.
C-11	Bolting for Tray Appurtenances, C-2202	Howard Supply Co.
C-12	Tray Appurtenances for C-2201	A-Ace Foundry, Ltd. B-Gregg Iron Foundry
C-13	Bubble Cap Tray Appurtenances, C-2202	Gregg Iron Foundry
C-15	H ₂ S Stripper C-2203	Berkeley Steel Construction Co
C-16	Bolting for Alloy Bubble Cap Assembly, C-2201	Coast Industrial Supply Co.
C-55	Alloy Plate	Standard Oil
C-56	Alloy Plate	Standard Oil

CHEV B8 5724

Drawing No. GE-22-9859
Sheet 1 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-D-14	Overhead Receiver D-2201	McNamar Boiler & Tank Co.
D-19	Steam Blowdown Drum D-2202	Berkeley Steel Construction Co.

Drawing No. GE-22-9859
Sheet 2 of 16

CHEV B8 5725

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-E-2	Heat Exchangers	Southwestern Engineering Co.
E-3	Air Coolers	Hudson Engineering Corp.
E-4	Residium Cooler E-2205	Southwestern Engineering Co.
E-21	Overhead After Cooler E-2209	The Griscom-Russell Co.

Drawing No. GE-22-9859
Sheet 3 of 16

CHEV B8 5726

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-F-5	Feed Heater F-2201	The Lummus Co.
F-34	Furnace Tubes	A-Bethlehem Supply Co. B-Texas Tube Inc. C-Howard Supply Co. D-Associated Piping & Engineering Co. E-Southwest Fabricating & Welding F-Standard Oil - Richmond Construction Office
F-46	Steel Pipe for F-2201	Standard Oil - Richmond Construction Office
F-71	Tubing for F-2201	A-Tube Sales B-Crane Co. C-Associated Piping

Drawing No. GE-22-9859
Sheet 4 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-G-7	Centrifugal Pumps & Motor Drivers	United Centrifugal Pump Division
G-8	Steam Turbine Drivers for Centrifugal Pumps	Worthington Corp.
G-9	Direct Acting Steam Pumps	Worthington Corp.
G-18	Steam Turbine Driver for Centrifugal Pump	Dean Hill Pump Co.
G-24	Steam Turbine GT-2201A	Elliot Company
G-33	Steam Jet Ejector	Schutte-Koerting Co.
G-1031	Pump Packing	Durametallie Co.

Drawing No. GE-22-9859
Sheet 5 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-J-25	Control Valves	A-Standard Oil Taft B-Kieley-Mueller Co.
J-26	Temperature Controller TCV-2201	Taylor Instrument Co.
J-27	Hand Control Valves	Climax Control Division
J-35	Relief Valves	A-La Habra B-Crosby Steam & Gage
J-36	Flow Instruments	Fisher & Porter Co.
J-37	Temperature Controllers	Brown Instrument Co.
J-38	Level Indicators	Fisher Governor Co.
J-39	Flow Instruments	Brown Instrument Co.
J-40	Temperature Indicators	Brown Instrument Co.
J-41	Temperature Alarms	Marshall-Newell Co.
J-42	Pressure Transmitters	Republic Supply Co.
J-43	Pressure & Temperature Instruments	Minneapolis Honeywell Regulator Co.
J-44	Flow & Level Instruments	Brown Instrument Co.
J-47	Flow Alarm	Mercoid Corp.
J-48	Level Alarm	Johnson Engineering Co.
J-49	Control Valves	Kieley-Mueller Co.
J-51	Pressure Gages	Marshall-Newell Co.
J-52	Pressure Gage	Standard Oil Of Texas, El Paso
J-53	Automatic Pump Starters	Taylor Instrument Co.
J-54	Well Type Manometer	Meriam Instrument Co.
J-57	Flow Transmitter	Foxboro Instrument Co.
J-58	Dial Thermometers	Anchor Equipment Co.
J-59	Dial Thermometer	Standard Oil of Texas, El Paso

Drawing No. GE-22-9859
Sheet 6 of 16

CHEV B8 5729

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-J-60	Thermocouple Assemblies	A-Jensen Instrument Co. B-Standard Oil Richmond
J-61	Level Gages & Gage Valves	Strahman Valves
J-62	Ammonia Expansion Valve	A. W. Cash Co.
J-63	Instrument Air Regulator	Fisher Governor Co.
J-64	Pressure Controller	Mason-Neilan Co.
J-65	Instrument Air Filter	Leighton Stone Corp.
J-66	Thermocouple Protection Tubes	Standard Oil Richmond
J-67	Air Switch	Brown Instrument Co.
J-68	Orifice Plates	John T. Shaler
J-69	Instrument Housing	Standard Oil of Texas
J-70	Name Plates	W. A. Vetter
J-1019	Instrument Panel Board	Darbyshire Steel Co.
J-1043	Instrument Housing	Moran Furnace & Sheet Metal
J-1046	Pulsation Dampeners	Ashcroft Instrument Co.

Drawing No. GE-22-9859
Sheet 7 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-L-45	Piping Spools	Midwest Piping Supply Co.
L-1002	Valve Chain Wheels	Babbitt Steam Specialty Co.
L-1004	4-way Plug Cocks	Vinson Supply Co.
L-1008	Flanged Valves	Zerk Hardware Co.
L-1009	Weld & Screwed Pipe Fittings	A-Western Forge & Flange Co. B-Oil Well Supply Co. C-El Paso Pipe & Supply Co.
L-1010	Spectacle Blinds & Orifice Flanges	A-Western Forge & Flange Co. B-Ramsey Steel Co. C-Darbyshire Steel Co.
L-1011	Asbestos Composition & Gaskets	G. S. Thompson Co.
L-1012	Flange Bolts	Gulf Supply Co.
L-1015	Pipe Wrapping	Primer Rust Roofing Co.
L-1018	Valves, Steam Separators & Fittings	A-El Paso Pipe & Supply Co. B-Gulf Supply Co. C-The Swartwout Co. D-Western Supply Co. E-Zerk Hardware Co. F-A. V. Cash Valve Co.
L-1024	Welding Reducer & Flanges	Gulf Supply Co.
L-1025	Steam Traps	Landes Zachary Peterson
L-1027	Welding Fittings	El Paso Pipe & Supply Co.
L-1030	Welding Fittings	A-Geo. Thomson Co. B-Babbitt Steam Specialty C-El Paso Pipe & Supply Co.
L-1033	Pipe & Fittings	A-Geo. Thomson Co. B-Hills Iron Works C-Darbyshire Steel Co. D-Swartwout Co. E-Gulf Supply Co. F-L. B. Foster Co.
L-1036	Valves	Geo. Thomson Co.
L-1038	Pipe, Fittings & Valves	A-Geo. Thomson Co. B-Hills Iron Works C-Babbitt Steam Specialty D-Gulf Supply Co. E-El Paso Pipe & Supply Co. F-M & H Refrigeration

Order No.

Description

Supplier

PAT-22-L-1045

Instrument Pipe & Fittings

L-1047

Steam Traps

Landes Zachary Peterson

L-1048

Brass Tubing Fittings

Drawing No. GE-22-9859
Sheet 9 of 16

CHEV B8 5732

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-M-1006	Platforms & Ladders	Darbyshire Steel Co.
M-1014	Structural Steel & Mesh	Darbyshire Steel Co.
M-1016	Fabricated Structural Steel	Ramsey Steel Co.
M-1021	Structural Steel	Darbyshire Steel Co.
M-1023	Heat Exchanger Davits	Ramsey Steel Co.
M-1032	Structural Steel	A-Darbyshire Steel Co. B-Neff Buckner Holt C-McMaster-Carr Supply Co.
M-1040	Pipe Supports	A-Houston Fabricating Co. B-Ramsey Steel Co.
M-1041	Steel & Bolts	A-Ramsey Steel Co. B-Darbyshire Steel Co. C-El Paso Machine Works D-Houston Fabricating Co.
M-1049	Steel for Pipe Supports	

Drawing No. GE-22-9859
Sheet 10 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-N-1022	Insulation for Vessels & Lines	Willard A. Selle
N-1026	Laykold Insulating Material	American Bitumulus & Asphalt Co.

Drawing No. GE-22-9859
Sheet 11 of 16

CHEV B8 5734

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-P-23	Motor Control Center	Graybar Electric Co.
P-28	Cast Iron Junction Box	Westinghouse Electric Co.
P-29	Junction Box Materials	Westinghouse Electric Co.
P-30	Lighting Transformer	General Electric Co.
P-31	Alarm Panel	Penalarm Products, Inc.
P-32	Lighting Panel	Westinghouse Electric Co.

Drawing No. GE-22-9859
Sheet 12 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-Q-22	Anchor Bolts	Star Iron Works
Q-72	Color Hardener	Gordon & Co.
Q-1001	Anchor Bolts	Ramsey Steel Co.
Q-1005	Levelling Plates	Ramsey Steel Co.
Q-1007	Reinforcing Mesh & Angle	A-Darbyshire Steel Co. B-Ramsey Steel Co. C-Neff Buckner Holt D-El Paso Machine Works
Q-1013	Machine & Anchor Bolts	El Paso Machine Works
Q-1017	Machine & Anchor Bolts	A-Ramsey Steel Co. B-Darbyshire Steel Co.
Q-1039	Anchor Bolts & Cinch Anchors	Zork Hardware Co.
Q-1042	Floor Hardener	Sika Chemical Corp.

Drawing No. GE-22-9859
Sheet 13 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-R-1020	Transite & Accessories	Southwestern Sash & Door
R-1028	Control Room Table	Crawford Sash & Door

Drawing No. GE-22-9859
Sheet 14 of 16

<u>Order No.</u>	<u>Description</u>	<u>Supplier</u>
PAT-22-S-1029	Paint	A-W. P. Fuller Co. B-Cheesman-Elliott Co. C-E.I. DuPont DeNemours D-Socony Paint Products
S-1037	Grating	Irving Subway Grating
S-1044	Hoses & Racks	A-Geo. S. Thomson Co. B-Gulf Coast Fabricating Co.

Drawing No. GE-22-9859
Sheet 15 of 16

Order No.

Description

Supplier

PAT-22-T-1034

Lubricants

A-Standard Oil of Texas
B-Geo. Thomson Co.

Drawing No. GE-22-9859
Sheet 16 of 16

CHEV B8 5739

20

POLYMER

PLANT

ON

CHEV B8 5740

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G

INDEX OF MATERIAL ORDERS FOR R-250 Process - III Phase PROJECT, W.O. 8482-20
Polymer Plant No. 1 PLANT 20

[illegible]

INDEX OF MATERIAL ORDERS FOR R-250 Program - El Paso PROJECT, W.O. 8332-20
Polymer Plant No. 1 PLANT 20

ORDER NO.	MATERIAL	SUPPLIER
PY-202-4	Heat Exchangers E-2001, E-2006	J. C. Mahoney, Inc.
PY-202-7	Air Cooled Heat Exchangers E-2010 and E-2014	Criscent-Russell Company
PY-202-10	Fia Tube Exchangers E-2003, E-2012 and E-2017	Brown Fin Tube Company
PY-202-12	Reactor Quench Jets E-2004, E-2006, E-2007	The Jet-Vac Corporation
PY-202-21	Hot Wash Water Heater E-2016	Croll-Reynolds Company
PY-202-41	Heat Exchangers E-2008, E-2009, E-2015	California Steel Products Divn. Adco Industries Inc.
PY-202-42	Heat Exchanger E-2004	Alco Products, Inc.
PY-202-43	Heat Exchangers E-2007, E-2011	Southwestern Engineering Co.
PY-202-45	Depressurizer Reboilers E-2012, E-2013	Southwestern Engineering Co.
PY-202-12	Hot Water Heater E-2015	Schutte and Koerting Company
PY-202-1	Feed and Recycle Pumps and Drivers P-2002, P-2003	Pacific Pumps, Inc.
PY-202-2	Condensate Injection Pumps P-2001, P-2004A, P-2003A, P.C.U	Cimonda Machinery Company
PY-202-17	Acid Fill Pump and Driver P-2004, MP-2004	Worthington Corporation
PY-202-19	Reactor Wash Pump P-2005 and Driver MP-2005	Pearless Pump Division Food Machinery & Chemical Co.
PY-202-22	Reactor Effluent P-2006	The Jet-Vac Corporation
PY-202-34	Acid Water Pumps P-2001, P-2004A and Drivers MP-2001, MP-2004A	Pearless Pump Division Food Machinery & Chemical Co.
PY-202-35	Effluent Pumps and Drivers P-2005, P-2006A, P-2007, P-2007A	United Centrifugal Pumps
PY-202-46	Chemical Circulating Pumps P-2011, P-2011A, MP-2011, MP-2011A	Pearless Pump Division Food Machinery & Chemical Co.
PY-202-47	Acid Pump Pump P-2014 and Motor Driver MP-2014	Lawrence Pumps Inc.
PY-202-48	Reagent Transfer Pump P-2012	Dean Bros. Pumps Inc.
PY-202-57	Centrifugal Pump and Driver P-2015, MP-2015	Ingersoll-Rand Company
PY-202-78	Fresh Water Booster Pump P-2013	United Centrifugal Pumps P&S - El Segundo
PY-202-79	Butt Out Pump P-2006	Worthington Corporation
PY-202-110	MEA Handling Pump	Geo. S. Thomson Company, Ltd.
		CHEV B8 5742

INDEX OF MATERIAL ORDERS FOR R-250 Program - El Paso PROJECT, W.O. 2014-20
Polymer Plant No. 1 PLANT 20

ORDER NO.	MATERIAL	SUPPLIER
PY-20J-13	Instrument Control Panel	Emco, Inc.
PY-20J-18	Differential Pressure Transmitter	Raytheon Flow Meter Company
PY-20J-20	Field Flow Recorders	The Nichols Company
PY-20J-23	Temperature Transmitters (Gas Bulb)	Taylor Instrument Company
PY-20J-24	Transmitters for Board Flow Instruments	Torren Instrument Company
PY-20J-26	Pressure Transmitters (Oil Range)	Leitch-Stone Corporation
PY-20J-27	Field Temperature Indicator Controller	Allen Instrument Division
PY-20J-28	API Vent Valves	George E. Thompson Company
PY-20J-29	Field Pressure Controllers (Non-Ind.) for APS's	McDonnell-Pittman Company
PY-20J-30	Level Switches (Field Alarms)	Johnson, Smith & Co. Company
PY-20J-31	Gaze Glasses	Johnson, Smith & Co. Company
PY-20J-32	Level Transmitters and Controller	George E. Thompson Company
PY-20J-33	Control Valves	Miller Valve Company
PY-20J-36	Thermocouple Assemblies	Trinity Equipment Corporation
PY-20J-39	Field Pressure Gages	Raytheon Flow Meter Company
PY-20J-54	Field Mounted Blind Pressure Controller	McDonnell-Pittman Company
PY-20J-55	Rotameter Type Flow Indicator	Raytheon Flow Meter Company
PY-20J-56	Relief Valves	George E. Thompson Company
PY-20J-58	Differential Pressure Transmitter	Raytheon Flow Meter Company
PY-20J-59	Local Flow Controller	The Nichols Company
PY-20J-60	Dial Thermometers	Trinity Equipment Corporation
PY-20J-61	Float Valve	Fluor Corporation Company
PY-20J-62	Thermocouple Assemblies and Thermometer Wells	Trinity Equipment Corporation
PY-20J-63	Temperature Switch (Filled Tube System)	Torren Instrument Company
PY-20J-84	Differential Pressure Indicating Receivers	George E. Thompson Company
PY-20J-88	Orifice Plates	J. T. Shuler
PY-20J-92	Field Mounted Receiver Gages	Leitch-Stone Corporation

INDEX OF MATERIAL ORDERS FOR R-250 Program - El Paso PROJECT, W.O. 8332-20
Polymer Plant No. 1 PLANT 20

ORDER NO.	MATERIAL	SUPPLIER
PY-20K-124	Hoists and Trolleys	A- Stewart Engrg. & Equip. Co. B- Wright Hoist Div.
PY-20K-131	Roller Conveyor	Mathews Conveyor Company
PY-20K-140	Canvas Tubing for Quartz Handling Equipment	Simpson & Fisher
PY-20K-145	Drop Chutes for Quartz Handling	Gar - Bro Mfg. Co.
PY-20K-146	Quartz Handling Equipment	Davis Metal Products Co.
PY-20L-44	Fabricated Alloy Steel Piping	Gulf Coast Fabricating Company
PY-20L-50	Alloy Steel Pipe and Fittings	A- P&S - Richmond, California B- Tube Sales C- Charles S. James Company D- Pacific Pipe Company E- Pacific Metals Company, Ltd. F- Associated Steel Company
PY-20L-70	Lead-Lined Pipe and Fittings for Acid Waste	The Bunker Hill Company
PY-20L-72	Spectacle Blinds	A- Western Forge & Flange B- O'Brien Iron Works
PY-20L-73	Alloy Flanges	A- P&S, Richmond, California B- P&S, El Segundo, California C- Western Forge & Flange Co.
PY-20L-86	Stainless Piping Material	A- P&S, Richmond, California B- P&S, El Segundo, California C- Hawley Forge & Mfg. Co. D- O'Brien Iron Works E- Gilmore Steel & Supply Co. F- Global Packing Company G- Perry Kilsley, Inc. H- Electrical Steel Foundry J- Coast Valve and Company K- Tav Holbrook, Inc.
PY-20L-87	Alloy Pipe and Fittings	A- P&S, Richmond, California B- O'Brien Iron Works C- Walter L. Duhig Company D- Pacific Metals Company E- Gilmore Steel & Supply Co. F- Associated Steel Company
PY-20L-101	Funnels and Drip Pans	Fraser & Johnston
PY-20L-108	Reactor Bottoms Sample Cooler	Kewanee-Ross Corporation
PY-20L-109	Mixing Nozzle	Duriron Company
		CHEV B8 5745

Polymer Plant No. 1 PLANT 20

CHEV B8 5746

INDEX OF MATERIAL ORDERS FOR R-250 Program - El Paso PROJECT, W.O. 8332-20
Polymer Plant No. 1 PLANT 20

ORDER NO.	MATERIAL	SUPPLIER
PY-20M-36	Fabricated Structural Steel	Campbell Steel Company
PY-20X-M77	Flat Steel Bars	Ramsey Steel Company
PY-20M-80	Drivits for Heat Exchangers E-2007 and E-2011	Darbyshire Steel Company, Inc.
PY-20X-M89	Bearing Plate for D-2011	Ramsey Steel Company
PY-20M-91	Fabricated Structural Steel	Ramsey Steel Products, Inc.
PY-20X-M93	Structural Steel Brackets	Ramsey Steel Company
PY-20X-M107	Flat Bar and Angle	Darbyshire Steel Company, Inc.
PY-20X-M113	Pipe Supports and Hangers	United Pipe Fabrication Company
PY-20M-148	MEA Drum Enclosure	Davis Metal Products Company
PY-20M-150	Pipe Clamps, Shoes & Anchors	Industrial Hardware & Supply Company
PY-20X-N97	Reinforcing Mesh for Fireproofing	Darbyshire Steel Company, Inc.
PY-20P-66	Pull Boxes and Terminal Boxes	A- General Electric Supply Co. B- Westinghouse Elec. Supply Co.
PY-20P-67	Concrete Pull Box Cover	Ramsey Steel Company
PY-20P-68	Welding Station	Westinghouse Electric Supply Co.
PY-20P-69	Nameplates and Tags	A- H.M. Nutter Company B- Acme Engraving
PY-20P-83	Miscellaneous Electrical Items	A- P&S, Richmond, California B- Graybar Electric Company C- Westinghouse Elec. Supply Co.
PY-20P-111	Telephone Enclosure and Pipe	Associated Piping & Engineering Company

PLANT 20

CHEV B8 5749

CHARGE NUMBER	JOB NO.	ORIGIN			PRIORITY	EQUIP NO.	WORK DESCRIPTION	ASSIGNED TO	OK'D					
		OPR.	INSP.	ENGR.					OPR.	ENGR.				
49262 -001							<u>'C'-COLUMNS CONTINUED</u>							
	20	X	X				TRAY 12 - RAISE BOWED-UP SECTIONS NORTH HALF OF TRAY; REMOVE & STRAIGHTEN SOUTH HALF OF TRAY SECTIONS; STRAIGHTEN BOWED DOWN CORNERS; REPLACE ASBESTOS GASKETING, REPLACE MISSING TRAY HOLDOWN MEMBERS & RE-SECURE TRAY.							
	21	X	X				TRAY 13 - RAISE BOWED-UP SECTIONS OF TRAY, REPLACE ASBESTOS GASKETING, REPLACE MISSING HOLDOWN MEMBERS & RE-SECURE TRAY.							
	22	X	X				TRAY 14 - RAISE BOWED-UP SECTIONS OF TRAY, REPLACE ASBESTOS GASKETING, REPLACE MISSING HOLDOWN MEMBERS & RE-SECURE TRAY.							
	23	X	X				REPLACE MISSING KORN VAPOR ASSEMBLIES, TRAYS 12 THRU 15 PER INSPECTOR & DLR W/R 22-040							
	24	X	X				TRAYS 16 & 17 - REPLACE TRAYS, TRAY SUPPORT RINGS, DOWN CORNERS & DRAW BOX BELOW TRAY 17. PER DLR W/R 22-040							
	25	X	X				STRIP LINE SHELL FROM JUST ABOVE TRAY 15 UP TO JUST BELOW TRAY 18, USING TYPE 410 S.S. MATERIAL. PER DLR W/R 22-040							
	26	X	X				TRAY 18 - REPLACE ALL CORRODED BUBBLE CAP BOLTS PER INSPECTOR INSTRUCTIONS.							
	27	X	X				TRAY 19 & 20 - TIGHTEN LOOSE BUBBLE CAPS. REPLACE APPROX 10 CAPS (EACH TRAY) PER IN- SPECTOR.							
	28	X	X				REPAIR OR REPLACE ALL RAMS HORNS PER INSPECTOR INSTRUCTIONS. NOTE: THERE IS A POSSIBILITY ALL RAMS HORNS WILL BE RE- PLACED, USING ALLOY MATERIALS PER DLR W/R 22-040 All C/S							
29							C2203 H2S STRIPPER, TRY WASHING ON RUN. PRE S/D							

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LIST OF MATERIALS

38-077

List No. BM-9763 SUPP Accounting Charge No. JKW-31-0158-30

H. DOMINGUEZ

DATE REQUIRED:

Date 8-14-81

J. K. WALKER Lead Engr: LAW

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES, (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
ΔIA	25	1 1/2"	PIPE SMLS. SCH. 80 CS PE		
SBD	3	1 1/2"	TEE 3000 LB. CS. SW.		
MAI	1	2"	TEE 3000 LB. CS. STD. WT.		
GBSQ	1	2" x 1 1/2"	SWAGE NIPPLE SCH. 80 CS. FLE-BSE		
GBSQ	2	1 1/2" x 3/4"	SWAGE NIPPLE SCH. 80 CS. FLE-BSE		
SEDB	3	1 1/2"	ELBOW 3000 LB. CS. SW. 90-DEG.		
SEDE	1	3/4"	ELBOW 3000 LB. CS. SW. 90-DEG.		
KAIMD	2	3/4"	GATE VLV. 800 LB. CS. SW. 12 CR. WELDED		
ΔABW	4	3/4"	PLUG CS. SCRD.		
ΔBAG	2	1 1/2"	FLANGE 150 LB. CS. SCRD. 1/2" R.F.		
ΔBAG	2	3/4"	FLANGE 150 LB. CS. SCRD. 1/6" R.F.		
BTA	3	1 1/2"	GASKET 150 LB. ASB. COMP RFRING		
BTA	2	3/4"	GASKET 150 LB. ASB. COMP RFRING		
WBM	12	1/2" x 2 3/4"	STUD BOLT B-7 W/2 NUTS		
WBM	8	1/2" x 2 1/4"	STUD BOLT B-7 W/2 NUTS		
3	1	5-2 7/8"	GAGE GLASS MODEL 4TLO	BM-9763	
	1	3/4"	STANDARD PIPE CLAMP		
	1	6	STANDARD PIPE CLAMP		
	5	7/8 DIA	DOUBLE EYE ROD		
	2	3/4"	GATE VALVE - SERIES 320	BM-9763	
			OFFSET PATTERN		
ΔIA	5	3/4"	PIPE SMLS. SCH. 80 CS. PE		
	1	1 1/2"	STANDARD U-CLAMP W/2 NUTS		
WEDG	2	3/4"	BOSS 6000 LB. CS. SW.		
KAZ7	2	3/4"	GATE VALVE 800 LB. CS. M-F/SW-SCD. BLT. BNT		
ΔABDQ	4	1 1/2"	FLANGE 150 LB. CS. WN BORE SCH. 80 RF		
ΔABDQ	2	2"	FLANGE 150 LB. CS. WN BORE SCH. 80 RF		
ΔA	2	2"	GASKET 150 LB. ASB. COMP RFRING		
WBM	8	1/2" x 2 3/4"	STUD BOLT B-7 W/2 NUTS		
ΔABAG	2	2"	FLANGE 150 LB. CS. SCRD. R.F. BORE SCH. 80		
KAIMD	3	1 1/2"	GATE VLV. 800 LB. CS. SW. 12 CR. WELDED		
ΔABDQ	2	3/4"	FLANGE 150 LB. CS. WN BORE SCH. 80 RF		

CHEV B8 5758

Shirley W. Cook
2-1-81
12-1-81
12-1-81

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LIST OF MATERIALS

38 (27)

List No. BMS 5759

Accounting Charge No. VBS LC 01000000 300

DATE REQUIRED: MAR 1964

Part: J&K

Lead Engr. 5759

FOLLOW-UP PER ENGR. INSTR. EP 2088 (P. 5) (10)

ITEM NO.	QTY	SIZE	DESCRIPTION	SOURCE
1 GAIA	1'	3/4"	PIPE ENDS SCH 80 CS PE	
EAZA	60'	2"	PIPE ENDS SCH 40 CS BFW	
BA3CA	2	1"	GATE VLV 150# RF 12CRTR	
"	2	1 1/2"	" " " " "	
"	2	2"	" " " " "	
KAET	5	3/4"	GATE VLV 300# M-F / SW - SCH 12CRTR	
BA3CG	4	1"	FLANGE WN FS 150# RF SCH 80	
"	3	1 1/2"	" " " " " " "	
"	1	2"	" " " " " " SCH 40	
FA3DG	1	1 1/2"	FLANGE WN FS 300# SMALL GASKETS SCH 80	
AIBC	8	2"	ELBOW 90° LR CS STL WT BW	
VAIBC	1	1 1/2"	" " " " " SCH 80 "	
BIYBD	2	3/4"	TEE 6000# FS SW	
TI MAI	2	2"	TEE STRAIGHT CS STL WT BW	
ENBLD	1	2X3/4	ELBOW LET FS XS SW	
ETBES	2	3/4"	BOSS 6000# FS SW	
56NAIH	2	2X1"	WELDLET XS CS BW	
"	2	2X1 1/2"	" " " " "	
35GGQ	2	1X3/4	SWAGENIFFLE SCH 80 BLE-FSE CS CONC.	
5NAIH	2	2X1 1/2	REDUCER CS SCH 80 CONC. BFW	
3NAIH	2	2"	CAP STL WT CS BW	
33ADG	4	3/4"	PLUG FS SCH 80	
318GC	4	1"	GASKET 150# RF 304, ALL SPIRAL WELD	
"	5	1 1/2"	" " " " " "	
"	1	2"	" " " " " "	
"	1	1 1/2"	GASKET 300# SM T & S 304 CONC.	
3210	1	1/2 X 3/4	STUD BOLT B7 W/2 HEX NUTS	
"	10	3/8 X 3	" " " " " "	
"	4	3/4 X 3/4	" " " " " "	

CHEV B8 5759

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LIST OF MATERIALS

38-089

List No. BM-83029

Accounting Charge No. VBS LC-0133-XR-360

an 712171 & 388

DATE REQUIRED: IMMEDIATELY Date 1/14/83

r: JBS

Lead Engr: SPK

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
GAIA	1'	3/4"	PIPE SMALL SCH80 CS PE		
EAZA	60'	2"	PIPE SMALL SCH40 CS BFW		
BABCA	2	1"	GATE VLV 150# RF 12CRTR		
"	2	1 1/2"	" " " " "		
"	2	2"	" " " " "		
AZ7	5	3/4"	GATE VLV 800# M-F / SW - SCRD 12CRTR		
BABDG	4	1"	FLANGE WN FS 150# RF SCH80		
"	3	1 1/2"	" " " " " " "		
"	6	2"	" " " " " SCH40		
CA5DG	1	1 1/2"	FLANGE WN FS 300# 'SMALL GROOVE' SCH80		
IBC	8	2"	ELBOW 90° LR CS STD WT BW		
VAIBC	1	1 1/2"	" " " " " SCH80 "		
VBBD	2	3/4"	TEE 6000# FS SW		
MAI	2	2"	TEE STRGHT CS STD WT BW		
ENBDU	1	2x3/4	ELBOLET FS XS SW		
VBDS	2	3/4"	BOSS 6000# FS SW		
GNATH	2	2x1"	WELDOLET XS CS BW		
"	2	2x1 1/2"	" " " " "		
SBGR	2	1x3/4	SWAGENIPPLE SCH80 BLE-PSE CS CONC.		
NAIDA	2	2x1 1/2	REDUCER CS SCH80 CONC BW		
MAIR	2	2"	CAP STD WT CS BW		
WABW	4	3/4"	PLUG FS SCRD		
BGC	4	1"	GASKET 150# RF 304/ASS SPIRAL WND		
"	5	1 1/2"	" " " " " " "		
"	6	2"	" " " " " " "		
"	1	1 1/2"	GASKET 300# SAI T & F 304 CANO		
"	1/2	1/2 x 3/4	STUD BOLT 87 W/2 HEX NUTS		
"	10	1/8 x 3	" " " " " "		
"	4	1/4 x 3/4	" " " " " "		

CHIEF ENR 5750

Honeywell

PROCESS CONTROL DIVISION/FORT WASHINGTON

Quotation

DATE

8-24-81

BR

PLEASE REFER TO THIS QUOTATION
NUMBER WHEN ORDERING.

933 - 447186

QUOTATION TO:

Chevron U.S.A., Inc.
6501 Trowbridge
P.O. Box 20002
El Paso, Texas 79998

CUSTOMER

REFERENCE

Control Valve BM-9759-QR

ORDERS SHOULD BE MAILED TO

Honeywell Inc. PCD
3301 Cardisle, N.E.
Albuquerque, NM 87110
PHONE NO.:
(505) 884-1070

WE SUBMIT THE FOLLOWING QUOTATION

1 ea. Honeywell Inc. 9200 cage valve, cast steel, 3" flanged
17-4PH trim CV62, teflon/asbestos packing
Model 85920008-021-412-43-73-01-01 \$1576.00 each

Alternate: Same as above but 2" with CV53 if it will fit in line
Model 85920006-021-402-43-31-01-01 \$1162.00 each

Specifications S810-9201 Attached.

F.O.B. Ft. Washington, PA

Terms: Net 30 Days

Delivery: Ship 6 Weeks ARO

R.R.K. AUG 28 1981

T. E. SHERRILL

AUG 27 1981

Prices quoted include standard packaging only. Shipments requiring special wooden boxes, crates, export packaging or other special handling will be quoted separately. Prices quoted are firm, unless marked (*). Marked (*) items are not of our manufacture and therefore will be billed at prices in effect at the time of shipment. As a condition of our firm price policy, you must accept shipment and invoicing of any order based on this quotation as soon as we are able to ship.

PAGE 1 OF 1 PAGE(S)

FOR FURTHER DETAILED
INFORMATION REFER TO
ATTACHED SPECIFICATION

PRICES QUOTED ARE F.O.B. SHIPPING POINT

HONEYWELL INC.

PROCESS CONTROL DIVISION/FORT WASHINGTON

PAGE # _____ SHIPMENT ARO AT FACTORY _____

PER _____

SUBJECT TO OUR STANDARD TERMS AND CONDITIONS ON REVERSE SIDE CHEV B8 5761

CUSTOMER COPY

Figure 1

BILL OF MATERIAL

JOB 16-530

DATE 6/29/81

DRG. No. _____ SHEET _____

ORDER No. BM 9701

For #6 Shutdown

APPRO. EBW02-2116-14-360
JOB No. _____

EBW X-225

MATERIAL REQ'D AT DEST'N BY 6/29/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	4" x 6" weldolet std w/ CS BW	
2	1	ea	4" flg. 150 [#] C.S. RF WN Bore Sch 40	
3	16	ea	5/8" x 3 1/2" Stud bolts B-7 w/2 Hex nuts	
4	2	ea	4" gasket 150 [#] Asb comp RF ring	
5	1	ea	4" gate vlv 150 [#] C.S. RF 12Cr Tr	
6	1	ea	7" Blind 150 [#] C.S. R.F. Spectacle	
			End Use: 4" Tie-in off back pressure controller at #6 C.V.	
			EBW 6/29/81 (LRP 6/29/81)	

CHEV B8 5762

LIST OF MATERIALS

1000 ... 1960

Accounting Charge No. 7890 - 1st 1st 1st

34

DATE REQUIRED 4/30/81 - Date 6-30-81

Rev. J. M. D. Lord, Esq., 4/11

PLA COMP/UP PER ENGR. REGISTRATION (YES) (NO)

QTY	UNIT	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST DEL DATE
11A	100'	1"	PIPE CMLS SCH 80 CS FE		
ADME	1	1"	GLOBE VAL. 800# CS SCH 80 12CF LTEL		
ABCS	2	2"	FLG. 150# CS W/ RF EDGE SCH 80		
	4	1"			
WFER	1	3/4"	WAGE NIPPLE 100' OF SCH 80 FFE		
EDDS	3	1"	ELBOW 800# CS SW 90° LEG		
PAZ	2	2"	BLIND FLG. 150# CS RF		
ED			TEE 800# CS SCH 80 SW		
GGC	1	3/4"	GASKET 150# CS AL W/ 12 304/AGE		
LEM	4	1/2" x 1/4"	STUD 1 LTR 8-7 W/ 2 NUTS		
	5	1/2" x 1/4"			
GGC	2	1"	GASKET 150# CS AL W/ 12 304/AGE		
11A	4	3/4"	PIPE CMLS SCH 80 CS FE		
ADME	1	3/4"	GATE VAL 800# CS 12" BORD 12CF WELD		
18GC	2	2"	150# Spiral V Joint GASKET		
UBM	8	5/8" x 3"	Stud Bolt C & B 7 W/ 2 Hex Nuts		
ABZ	1	1"	GATE VAL 800# CS 12" BORD 12CF WELD		
	1		GASKET 150# CS RF		
WFER	1	1"	WAGE NIPPLE 100' OF SCH 80 FFE		
EDDS	1	1"	ELBOW 800# CS SW 90° LEG		
PAZ	1	2"	BLIND FLG. 150# CS RF		
ED	1	2"	TEE 800# CS SCH 80 SW		

BILL OF MATERIAL

JOB 16-440

DATE 3/23/81

DRG. NO. #650

SHEET #6

ORDER NO. BM-9148

APPRO. JOB NO. VI360-2116-14-360

FRW X-225

MATERIAL REQ'D AT DEST'N BY 5/1/81 Firm

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	6" X 1" Weldolet Sch 40 304L S.S. B.W.	
2	1	ea	1" 300# Flanges 304L S.S. Sch 40 Bore 1/4" R.F. W.N.	
3	1	ea	1" 300# gate valve 304L S.S. 1/4" R.F. Bolted Bonnet, 12Cr Trim For hot oil service	
4	1	ea	1" 300# blind flange 304L S.S. 1/4" R.F.	
5	8	ea	1/2" ϕ X 2 1/2" Stud bolts w/ 1/2 Hex Nuts	
6	2	ea	1" gasket 300# spiral 304/ Ash spiral wnd.	
End Use Install viscosity				
EJBW 3/23/81				
<i>[Signature]</i>				

CHEV B8 5764

WORK REQUISITION TO 8 MAINTENANCE PLANNER

PLANT _____

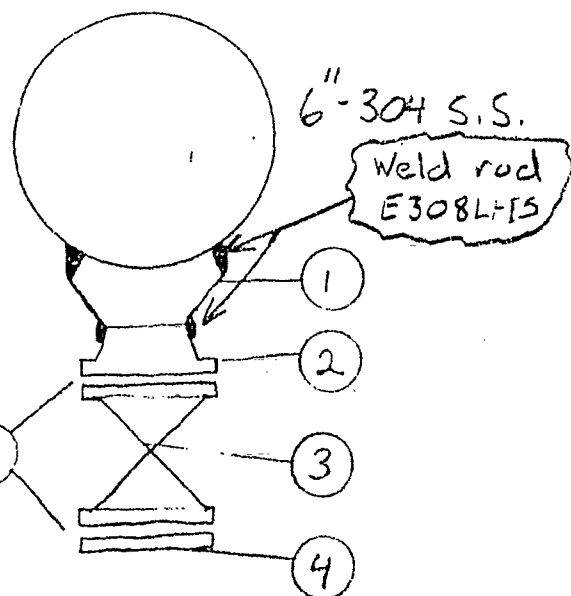
EQUIP. NO. OR
DESCRIPTION _____

EQUIP.
READY _____ REQUIRED COMPLETION DATE _____

JOB No.		ENGR.		
REQ No.	TYPE	COST CENTER	JOB No.	ITEM No.
V 1500-2 116-14-360				

MATERIAL ORDERED ON _____

INSTRUCTIONS: _____



CHEV B8 5765

Material

- 1 6"X1" Weldolet Sch 40 304L SS B.W.
- 2 1" 300[#] Flanges 304L S.S. Sch 40 Bore, 1/16" R.F., W.N.
- 3 1" 300[#] gate valve, 304L S.S. 1/16" R.F., Bolted Bonnet, 12 Cr Trin for hot oil service
- 4 1" 300[#] blind flange 304L S.S. 1/16" R.F.
- 5 1/2" Ø X 2 1/2" Stud bolts W/2 Hex Nut
- 6 1" gasket 300[#] 304/Ash spiral wound.

DISTRIBUTION :

MAINTENANCE PLANNER - 4, OPERATIONS - 2
INSPECTION - 1 (CWW) LEAD ENGR. - 1 (R.A.B.),
ENGR - 1, OTHERS, _____

APPROVALS:

LEAD ENGR. _____
OPERATIONS _____
CHIEF ENGR. _____

ENGR. _____ PHONE _____ DATE _____

BILL OF MATERIAL

JOB E-1611 Blow Down

DATE 5/5/81

DRG. No. _____ SHEET _____

ORDER No. 9440

Deliver To BOB KINTONE SD AREA

APPRO. JOB No. RL610-2116-14.

RGL/311

MATERIAL REQ'D AT DEST'N BY 5/6/81 Finn

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	20	LF	1" ^{SEND MIL TEST REPORTS} SMCS pipe, Sch 80 Boiler Plate CS	RLBM-80777X
2	20	LF	1 1/2" ^{MIL TEST REQD.} SMCS pipe, Sch 80, Boiler Plate CS	↓
3	1	EA	1 1/2" GATE VALVE 800 LB SW CS 12 CA TR	RLBM-50507X
4	1	EA	1" GATE VALVE	↓
5	(4)	EA	1" ELBOWS, 3000 LB CS SW 90°	
6	(1)	EA	1 1/2" ELBOW, 3000 LB CS SW 45°	
7	(1)	EA	1 1/2" Tee, STRAIGHT 3000 LB CS SW	
8	2	EA	1" FLANGE, 600 LB, CS RF WN Sch 80	RLBM-80752X
9	(1)	EA	1" Gasket, 600 LB 304/304S Spiral Wound	
10	(4)	EA	5/8" x 3 1/4" STUD BOLTS B-7 W/NUTS	
11	(6)	EA	1 1/2" LI-BOLTS (Nominal Pipe diameter)	
12	3	EA	4" x 3" x 1/4" STEEL PLATE per A-285 C & C FIX	RLBM-9440 NC
13	3	EA	4" x 12" x 1/4" "	↓
14	2	EA	1 1/2" CAP, 3000 LB CS SW	RLBM-80752X
15	1	EA	1 1/2" x 1" SWAGE NIPPLE Sch 80 CS B&B	↓
16	1	EA	1 1/2" x 1" Reducing Tee 3000 LB CS SW	↓
			Net 2-1/31	RLBM-80777X KEENAN cp DALE 5/6/61
				" 50507X " " " "
				" 80752X " " " "
				" 9440 NC UNITED ROLLING
				cp CHARLES TURNER 5/6/61
			END 456 : E-1611 Blow Down	

SHEET 1 OF 1 SHEETS

CHEV B8 5766

MFG. 334 (25M 2.53)
PRINTED IN U.S.A.

Keywords:

Let us first consider the case of a single

BYPRO-CHP 14 360

DATE RECEIVED:

Date 5-1-51

Naam:

Lead Engr:

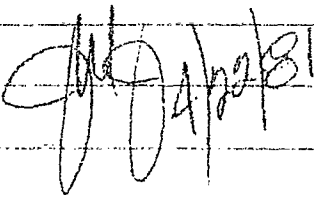
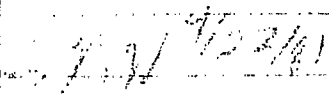
FOLLOW-UP PER ENGR INSTR EP 2068 (RES) (NO)

CHEV B8 5767

BILL OF MATERIAL

JOB _____ DATE _____
 DRG. No. _____ SHEET _____ ORDER No. _____
 APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY _____ DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
12	2	ea	2" x 1/2" Reduc. Coupling	
13	1	ea	2" x 1/2" Reduc. Tee	
14	2-5	ft	1/2" pipe	
14	2	ea	1" Tee 90° C.S. SW	
15	1	ea	2" pipe 20' x 1/2" C.S. PF	
				
				
End Use of Material Material will be used for _____				

BILL OF MATERIAL

JOB 100-100 DATE 10/1/70
 DRG. No. 100-100 SHEET 1 ORDER No. 100-100
 APPRO. JOB No. 100-100

MATERIAL REQ'D AT DEST'N BY 100-100

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	1" pipe with 30 radii	
2	1	ea	2" x 1/2" x 3/4" radii	
3	1	ea	10 x 3" weldolet std wt	
4	1	ea	3" 300° Flg C.S. RF	
5	1	ea	3" gate 300° 1/2" A/B	
6	8	ea	3/4" x 4" std bolt	
7	1	ea	3" blind flg C.S. RF	
8	2	ea	2" 300° WN Flg C.S.	
9	1	ea	2" gate 1/2" 300°	
10	2	ea	3" gate 300° 1/2" A/B	
11			3/4" x 3/4" std bolt	

BILL OF MATERIAL

JOB 16705 DATE 5/31/74
 DRG. No. 151 SHEET 46 ORDER No. 24 1661
 APPRO. JOB No. 211/19 20570

MATERIAL REQ'D AT DEST'N BY 6/1/74

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(2)	EA	2 1/2" x 1/2" x 1/2" 400 600	STOCK
2	4	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
3	(1)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	CP. DATE 6/1/74 STOCK
4	(6)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
5	(3)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
6	2	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
7	(14)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	STOCK
8	(42)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
9	(2)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
10	(1)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
11	(2)	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	
12	1	EA	2 1/2" x 1/2" x 1/2" 120 120 PLBM-50507X KE-100	PLBM-80752X

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB D-1603

DATE 5/31/81

DRG. No.

SHEET

ORDER No

APPRO

JOB No

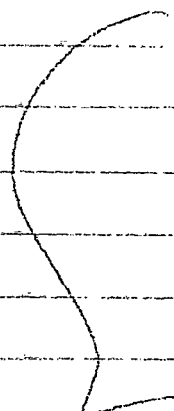
4116-14-570

ENGR: PRK KSS

MATERIAL REQ'D AT DEST'N BY

6/1/81

DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	2" 150# FLANGED FS RF GATE VALVE	ALBA-50507X REC-1 CP DMC 6/1/81
2	(2)	ea	2" 150# WN FLANGE SCH 40 BRF RF	STOCK 
3	(2)	ea	2" 150# 15B COMP RING CLASKEYS	
4	(8)	ea	7/8" x 3" STUDS WITH 2 HEV NUTS GRADE B-7	
JH 5/31/81				

CHEV B8 5771

CHEV B8 5771

BILL OF MATERIAL

JOB DATE 5/1/51

DRG. No. SHEET ORDER No. 9716

APPRO. JOB No.

MATERIAL REQ'D AT DEST'N BY

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	1	ea	24" x 2" PL 'OT CB	
2	1	ea	4" x 4" x 1/2" PL	
3	1	ea	4" x 4" x 1/2" PL	
4	1	ea	4" x 4" x 1/2" PL	
5	1	ea	4" x 4" x 1/2" PL	
6	1	ea	4" x 4" x 1/2" PL	
7	4	ea	24" x 2" PL 'OT CB	RLBM-80752X KLENN C/P DATE 6/1/51
8	2	ea	4" x 4" x 1/2" PL	RLBM-50507X KLENN
9	1	ea	4" x 4" x 1/2" PL	
10	1	ea	4" x 4" x 1/2" PL	
11	1	ea	4" x 4" x 1/2" PL	
12	1	ea	4" x 4" x 1/2" PL	
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14	1	ea	4" x 4" x 1/2" PL	
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100	1	ea	4" x 4" x 1/2" PL	

K

HHRLF-2129-03-360
e No.

Accounting Charge No

DATE REQUIRED:

Date _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)⁴

4.

SPECIFICATION NO. EP-432-J
OVERHEAD CONDUIT BANK - PLANT 33 ISOLATION
EL PASO REFINERY

SECTION 1 - GENERAL REQUIREMENTS

1.0 SCOPE OF WORK

- 1.1 CONTRACTOR shall provide all utilities, tools, construction equipment, labor, including supervision and inspection, and all items of a consumable nature that are required for construction of an overhead conduit bank for Plant 33 Isolation, at the Chevron U.S.A. Inc., El Paso Refinery as detailed by this Specification, including the drawings and other attachments listed in the Appendix.

This work includes but is not limited to: Erection of 7 overhead conduit supports made of channel iron; construction of a rack with concrete footings to support 2 new terminal boxes, including installation of the 2 boxes; installation of 3 more boxes to existing stanchions, and; installation of the wiring and tubing needed to operate an entire plant, making all connections except the final connections to operating lines.

- 1.2 In addition, CONTRACTOR shall provide concrete and forms, and all painting material required.

2.0 WORK, MATERIAL AND UTILITIES BY COMPANY OR OTHERS

2.1 Material by COMPANY

COMPANY will provide the following material to be incorporated into the Facility:

- A) Channel Iron
- B) Steel Plates
- C) Terminal Boxes
- D) Conduit
- E) Concrete Anchor Bolts
- F) Machine Bolts
- G) Rebar
- H) Junction Box

2.2 Construction Utilities by COMPANY

- 2.21 COMPANY will provide electrical energy to CONTRACTOR at either 480-volts, 3-phase, or 120/240 volts, Single-phase suitable disconnect switches and all materials for extension of service to CONTRACTOR's work areas shall be provided and installed by CONTRACTOR.
- 2.22 COMPANY will provide drinking water for CONTRACTOR's containers at a location designated by COMPANY's Representative.

3.0 SEQUENCE OF WORK

The sequence of work shall be as mutually agreed between the COMPANY and CONTRACTOR and shall be consistent with the facing sheet of the Agreement.

4.0 INTENT

The installations shall be complete in every respect, constructed in accordance with generally accepted, current good practices of the several trades involved and the detailed requirements of this Specification and ready to serve in the manner expressed or implied herein, regardless of whether or not full details of such completeness or practices are contained herein.

The specifications and drawings are not complete in every detail and CONTRACTOR shall comply with their true intent taken as a whole, and not avail himself of any errors or omissions to the detriment of the work. Should any error, omission or discrepancy appear in the drawings, specifications and instructions, CONTRACTOR shall notify COMPANY at once, and COMPANY will issue instructions to be followed. If CONTRACTOR proceeds prior to receiving such instructions, necessary corrections shall be at CONTRACTOR's expense. Anything not indicated on the drawings or outlined in the specification which is necessary for full and faithful construction of the installations in accordance with the true intent of this agreement or anything indicated on the drawings but not outlined or vice versa, shall be provided and incorporated at the expense of CONTRACTOR to the same extent as though fully set forth in both the drawings and the specification.

5.0 COMPANY REVIEW AND APPROVAL

COMPANY's review of, approval of, or agreement to the performance of certain items of work or the provisions of certain material shall in no way relieve CONTRACTOR of full responsibility for the performance of such work, or for the adequacy of such material. All such reviews, approvals or agreements shall be obtained through COMPANY's Construction Representative, or in a manner previously approved in writing by COMPANY's Construction Representative.

SECTION 2 - GENERAL CONDITIONS AND PERFORMANCE OF WORK

6.0 PRECEDENCE

- 6.1 The following items shall take precedence in the order listed in the event of conflict.
- A) Facing Sheet of Agreement
 - B) Terms and Conditions
 - C) Refinery Instruction No. 1404
 - D) This Specification
 - E) Construction Drawings in Appendix A.1, attached in this Specification
 - F) Standard Specifications
 - G) Standard Drawings
 - H) Reference Drawings and Specifications, Engineering Instructions, Recommended Practices and Refinery Instructions in Appendix.
- 6.2 As used in the standard specifications attached hereto: (a) "Purchaser" shall mean COMPANY; (b) "Supplier" or "Vendor" shall mean CONTRACTOR; and (c) "Purchaser's Inspector" shall mean COMPANY Construction Representative.
- 6.3 Unless otherwise expressly provided in this Specification, (a) any data, specifications, material, and work or any other matter which is covered by this Agreement which the standard specifications require to be provided by COMPANY shall instead be provided by CONTRACTOR; (b) any provisions of the standard specifications requiring COMPANY to inspect certain material or work shall mean that COMPANY has an option, rather than the obligation, to so inspect such material or work; (c) any warranty or guarantee provisions contained in the standard specifications shall be of no effect and the warranty and guarantee provisions of this Specification, if any, shall apply; and (d) any item of material, work, inspection or testing to be furnished at extra expense to COMPANY pursuant to the standard specifications shall be furnished under this Specification at no increase in CONTRACTOR's compensation.

All provisions in the standard specifications concerning compensation or payment to CONTRACTOR in case of delay shall be of no effect, and the provisions of the Terms and Conditions and of this Specification shall apply.

In the engineering instructions, reference to COMPANY's personnel shall be of no effect, and CONTRACTOR's personnel shall perform all activities which are to be performed under the engineering instructions, except as otherwise provided elsewhere in this Specification.

Where standard specifications on materials contain sections covering COMPANY's normal requirement for purchasing and field erection, these sections shall be of no effect except as otherwise expressly stated in this Specification.

7.0 FIELD REPRESENTATIVES

7.1 COMPANY's Representative

COMPANY will maintain a representative in the field pursuant to Section 4.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

Examples of his functions are to:

- A) Establish and maintain field liaison between CONTRACTOR's Construction Representative and COMPANY.
- B) Provide materials to CONTRACTOR as provided in this Specification.
- C) Review CONTRACTOR's construction schedule.
- D) Provide drawings and other detailed information.
- E) Explain drawings and specifications as required.
- F) Make such inspections as COMPANY may desire in order to check the quality and progress of the work.
- G) Review and approve field changes or material substitutions, or any other matter where COMPANY's approval or agreement is required by this Specification.
- H) Negotiate with CONTRACTOR's Construction Representative the adjustment in compensation arising from a change.

7.2 CONTRACTOR's Construction Representative

CONTRACTOR shall maintain a Construction Representative in the field at all times who shall act in full charge of CONTRACTOR's work and maintain field liaison between CONTRACTOR and COMPANY's Construction Representative.

CHEVRON U.S.A. INC.
ENGINEERING DEPARTMENT - EL PASO, TEXAS

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8.0 OTHER CONTRACTS

COMPANY reserves the right to let other contracts or perform other services in connection with CONTRACTOR's work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs.

9.0 SCHEDULE

CONTRACTOR shall maintain a detailed construction schedule for all phases of the work.

9.1 The construction schedule shall indicate, for each portion of the Facility, the date of the start of the work thereon, job progress and completion date. Completion dates on such construction schedule shall agree with any dates set forth in Section 3.0 of this Specification, if any, and on the Facing Sheet of this Agreement.

9.2 COMPANY's Construction Representative will review the schedule with CONTRACTOR's Construction Representative at periodic interval to verify that the Facility is progressing as scheduled. Modifications to the schedule which affect the completion dates established in the schedule must be approved in writing by both CONTRACTOR and COMPANY.

10.0 PLANT REGULATIONS

Prior to the commencement of work, CONTRACTOR shall become familiar with the plant regulations specified in the attached Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery and the following regulations. CONTRACTOR shall be responsible for compliance with these regulations during the execution of his work.

10.1 Electrical Safety Requirements

CONTRACTOR shall provide and use ground fault circuit interrupters for personnel protection at all construction sites (including areas inside existing plants) on all 120 volt single phase 15 and 20 amper receptacle outlets.

Hubbell type GFP or Porta-Power Pak Inc. Model 72 series are typical of acceptable portable receptacle units.

Ground fault circuit interrupters shall not be used in areas where flammable vapors are present.

It is essential that the polarity of the conductors in all cords, plugs and receptacles supplying single pole portable ground fault circuit interrupter units be properly maintained to insure proper operation of the units.

10.2 Work Space and Storage Area

COMPANY will assign space in the general vicinity of the CONTRACTOR work for CONTRACTOR's office, work space and storage area.

11.0 TEMPORARY CONSTRUCTION FACILITIES

11.1 CONTRACTOR shall provide and install all necessary temporary facilities including, but not limited to, tool rooms, locker rooms, toilets, office and storehouse. All temporary installations shall be subject to approval by COMPANY prior to installation.

11.2 In addition, CONTRACTOR shall provide all necessary temporary equipment and material including, but not limited to, shoring, concrete forms, bracing, ladders, scaffolding, staging, drop cloths and tarpaulines.

11.3 CONTRACTOR shall maintain all temporary facilities, material and equipment in a safe and adequate manner and remove them immediately upon completion of the work requiring their presence.

12.0 SURVEYING

CONTRACTOR shall perform all surveying necessary from base lines and bench marks established by COMPANY. The accuracy for all grades, elevations, and plumbing of any structures and location of facilities described in this Specification shall be the responsibility of CONTRACTOR.

13.0 EXCAVATION AND BACKFILL

Earthwork shall be in accordance with applicable paragraphs of Specification EG-581. CONTRACTOR shall haul any excess excavated material to a location designated by COMPANY's Construction Representative.

14.0 GRADING

CONTRACTOR shall rough-grade the work areas as shown on rough-grading drawings. CONTRACTOR shall return area grades as shown on these drawings to a tolerance of plus or minus 0.1 foot. Additional finish grading and/or slope protection will be performed by others.

15.0 DELIVERY AND HANDLING OF COMPANY PROVIDED MATERIALS

- 15.1 Materials furnished by COMPANY will be available to CONTRACTOR at the Refinery Storehouse. CONTRACTOR shall provide the necessary labor and equipment for handling and transporting materials.
- 15.2 CONTRACTOR shall be responsible for keeping all material in good condition until Acceptance of the Installations, subject to Section 5.3 of the Terms and Conditions.
- 15.3 Upon completion of the Installations, CONTRACTOR shall provide COMPANY ~~an~~ inventory of all remaining material which was provided by COMPANY including the quantity, description, and the item number for each item. When directed by COMPANY, CONTRACTOR shall transport the remaining material to the location on COMPANY's premises designated by COMPANY.
- 15.4 CONTRACTOR's requests for withdrawal of COMPANY-furnished material and equipment shall be based on quantities shown on drawings or lists of materials furnished by COMPANY. CONTRACTOR shall obtain approval from COMPANY's Representative before materials in excess of the quantities shown on the drawings or lists of materials will be issued.
- 15.5 CONTRACTOR shall (a) be responsible for keeping all materials and equipment in good condition until the completed Installations are accepted by COMPANY, including taking any necessary steps such as painting, greasing, installation of rust preventive oil, as covering, etc., to protect all equipment externally and internally from mechanical damage or damage from the elements, temperature (b) be held accountable for surplus materials furnished by COMPANY, items received from COMPANY and to be returned, and for shortages or damages to equipment and materials furnished by COMPANY.
- 15.6 CONTRACTOR shall promptly check bills of material or drawings for any errors which would result in shortages and shall notify COMPANY in writing if there are any such errors or if the listed are insufficient to meet his anticipated needs. Delays caused by CONTRACTOR's failure to discover and promptly report such errors or that the equipment and materials listed are insufficient to meet his anticipated needs shall not constitute a basis for extension of time of completion under Section 3.2 or a basis for reimbursement under Section 3.3 of the Terms and Conditions.

16.0 DRAWINGS AND DIMENSIONS

COMPANY will provide to CONTRACTOR two copies of all pertinent standard drawings, standard specifications, reference drawings, and construction drawings.

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17.0 INSPECTION AND TESTING

17.1 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR's employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall in no way relieve CONTRACTOR of full responsibility for the work hereunder.

17.2 Welding Inspection and Qualification

- 17.21 CONTRACTOR shall arrange for welding qualification tests at his expense at El Paso Testing Company, Inc., 2315 Myrtle Street, El Paso, Texas 79901, phone 532-3831, or other approved testing firm, in accordance with Engineering and Maintenance Instruction EP-2200. Welders shall be required to pass qualification tests before performing any operation. COMPANY reserves the right to require additional qualification tests during construction if it has any doubt about the competence of welders. COMPANY shall be allowed to witness tests and to examine test coupons. If additional tests are required and passed by welders, cost of retesting will be borne by COMPANY; if failed, cost of retesting shall be borne by CONTRACTOR.
- 17.22 The required qualification tests shall be the "Pipe Test for Qualification of Metal Arc Welders" as described in Appendix I of Engineering Instruction No. EP-310. Welds shall be made in seamless pipe conforming to ASTM Specs. A-106 or A-53 or API Spec. 5-L. Weld rods shall be Type E-6010 mild steel electrodes.
- 17.23 The face and root bend specimens shall be tested in the guided bend test jig described in Fig. Q-7 of the ASME Boiler and Pressure Vessel Code, Section IX, Welding Qualifications.
- 17.24 The convex surface of the bend specimens shall be examined for cracks or other open defects. Any specimen in which a crack or open defect is present, after bending, exceeding 1/8" measured in any direction shall be considered as having failed. Cracks which originate along the edges of the specimen during testing and that are minor in extent shall not be considered unless there is definite evidence that they result from slag inclusions or other internal defects.

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- 17.25 The fractured surfaces of the nick-break test shall show complete penetration throughout the entire thickness of the weld, absence of oxide or slag inclusions, and a degree of porosity not to exceed six gas pockets per square inch of the total area of the weld surface exposed in the fracture, the maximum dimension of any such pocket not to be in excess of 1/16".
- 17.26 If the welder fails in one of the test positions, he may be allowed to take an immediate retest by making two test pieces in the failed position. Both of the test pieces shall pass the test requirements. If the welder fails in more than one position, he shall not be allowed to take a retest.
- 17.27 Upon passing the qualification tests, CONTRACTOR shall assign each welder an identification number. This number shall thereafter be used by the welder to identify his work by stamping it alongside each completed weld with steel stencils.
- 17.28. At the option of the COMPANY's Lead Equipment Inspector, CONTRACTOR's welders need not pass the welding qualification tests if they can present suitable and acceptable evidence of having passed the appropriate ASME Performance Qualification Tests as described in Section IX of the ASME Boiler and Pressure Vessel Code.
- 17.29 COMPANY will perform (random or 100%) radiography of welds in accordance with Section 7.0 of Specification No. EG-2505 to verify that the overall quality of workmanship is in accordance with COMPANY standards as set forth in Specification No. EG-2505. Welds so inspected shall be repaired or replaced by CONTRACTOR at no increase in CONTRACTOR's compensation if the weld fails to meet said standards. All of COMPANY's radiographs will be available to CONTRACTOR for his review and use to the extent he desires to verify that all requirements of Section 17.1 above are met.

17.3 Electrical Inspection and Testing

CONTRACTOR shall inspect wiring, cables, motors, controllers, and lighting and test grounding, all in accordance with Specification No. EG-1675.

17.4 Concrete Samples

COMPANY may perform compression and slump tests on concrete. CONTRACTOR shall furnish samples taken in accordance with ASTM Specifications as may be requested for the following tests and inspections:

17.41 Compression Tests: 3 cylinders from each 10 cu. yd. of structural concrete placed each day.

17.42 Slump Tests: Periodic samples daily during pouring of concrete.

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18.0 Cleaning Up

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material and, at the completion of the work, the site shall be cleared of all debris, left-over tools, consumable supplies, and material which may have accumulated in the performance of the work. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work; the cost of such work shall be for CONTRACTOR's account and may be deducted from the sums due or to become due CONTRACTOR.

19.0 Completion

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this Specification.

SECTION 3 - CONSTRUCTION

This Section amplifies the construction details for some portions of CONTRACTOR's work. The provisions are generally applicable to all the facilities covered by this Specification.

20.0 STEEL WORK

20.1 Fabrication

Structural steel fabrication shall conform to Specification EG-398.

20.2 Erection

CONTRACTOR shall erect all steel work. All work shall comply with latest editions of the AISC Code of Standard practice for steel building and bridges, AISC Specification for design, fabrication, and erection of structural steel for buildings and AWS Standard Code for Arc and Gas Welding in Building Construction.

Structures, platforms, stiles, stairs and ladders shall be fabricated per Specification EG-398 as complete as practicable, consistent with the economy of handling and shipping the assembled unit.

20.3 Welders

Field welding on steel work shall be done by welders who are qualified as specified in Section 17.2 of this Specification.

21.0 ELECTRIC POWER AND LIGHTING

21.1 Scope of Work

A) CONTRACTOR shall perform all electrical work required for construction of the facilities as shown on the drawings and as described in the Specification.

B) Installation of electrical facilities will be in accordance with Specification No. EG-1675.

22.0 CONCRETE WORK

22.1 Scope of Work

CONTRACTOR shall provide and be responsible for all concrete work.

22.2 Methods

Placing and curing concrete shall be in accordance with Specification EG-850.

Material and fabrication of reinforcing shall conform to Specification EG-516, unless otherwise specified on the drawings.

22.3 Properties

Ready-Mix concrete shall be in accordance with ASTM Specification C-94.

If field mix concrete is used, materials to be used and the procedure to be followed in proportioning and mixing Portland Cement Concrete in the field shall conform with Specification EG-851. Consistency and workability shall be in accordance with Specification EG-851 with a minimum ultimate compressive strength of 3000 psi after 28 days of curing, maximum aggregate size 3/4-inch, slump 3 to 5 inches.

Method of measuring materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

22.4 Anchor Bolts

All anchor bolts securing machinery or equipment, shall be provided with sleeves in accordance with Drawing GB-Q68922. After setting equipment, these sleeves shall be filled with grout. Anchor bolts shall be accurately placed and securely tied to avoid movement during concrete placement.

22.5 Special Techniques

CONTRACTOR shall consult COMPANY's Construction Representative before using such special techniques as, for example, precasting pipeway stations, or pumping structural concrete.

23.0 PAINTING

All exposed metal surfaces of piping, structures, supports, drums and exchangers shall be painted as follows:

23.1 Surface Preparation - Wire brush surface to conform to Steel Structural Painting Council Standard SSPC SP#.

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23.2 Primer - LZ1 primer - low lead, brush, roll or spray.

23.3 Paint - Aluminum paint - Hanley Sunfoe 17-010, or equal, applied according to manufacturers recommendations.

The terminal boxes shall be painted with a finishing coat only, a grey enamel shall be used.

Randall R. Worin 2/24/81
Engineer

Samuel J. Jones 2/24/81
Lead Engineer

CHEVRON U.S.A. INC.
ENGINEERING DEPARTMENT - EL PASO, TEXAS

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Appendix A

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A.1 CONSTRUCTION DRAWINGS

<u>Drawing Number</u>	<u>Title</u>
PD-38-32411	Stub-Up Plan and Elevations of Terminal Boxes at Control House
PD-38-32425	Terminal Connection Diagram - Thermocouples
PD-38-32427	Overhead Plot Plan and Elevations
PD-38-32428	Schematic Conduit Layout
PD-38-32430	Plan and Elevations of Overhead Conduit in Terminal Boxes
PD-38-32431	Plan and Elevations of Thermocouple and Instrument Terminal Boxes
PD-38-32432	Plan and Elevation of Terminal Box for Pneumatic Instruments
PD-38-32433	Connection Diagram Alarm Terminal Box
PD-38-32434	Conduit and Wire Schedule

A.2 STANDARD SPECIFICATIONS

<u>Specification Number</u>	<u>Title</u>
EG-398-H	Steel Fabrication
EG-516-C	Reinforcing Steel Fabrication
EG-581	Clearing, Grading and Earthwork
EG-850-C	Placing and Curing Concrete
EC-851	Concrete Proportioning and Mixing
EG-1048-A	Small Tools and Equipment
EG-1049-C	Supplies
EG-1675-E	Installation of Electrical Facilities - General Requirements

A.3 STANDARD DRAWINGS

<u>Drawing Number</u>	<u>Title</u>
GB-Q-68922-13	Anchor Bolts
GA-P-99935-2	Standard Conduit Support and Electrical Equipment Connection Details

A.4 REFINERY AND ENGINEERING INSTRUCTIONS

<u>Number</u>	<u>Title</u>
1404	Instruction to Contractors Working Within the Refinery
EP-2200	Qualification of Welders

BILL OF MATERIAL

JOB 33-276

DATE Feb 5, 1981

DRG. No. PD-38-32116

SHEET 15

ORDER No. BM-8991

APPRO. JOB No. JW442-6173-01-30

Kodima X-355

*** FIRM**
MATERIAL REQ'D AT DEST'N BY Feb 16, 1981

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	40	ft	3" Pipe Smls Sch 40 CS BFW	
2	6	ea	3" Elbow Std. Wt CS BW 90° LR	
3	1	ea	8" Elbow Std Wt CS BW 90° LR	
4	1	ea	3"x2" Reducer Std Wt CS BW Conc	
5	1	ea	8"x4" Reducer Std Wt CS BW Conc	
6	1	ea	4"x3" Reducer Std Wt CS BW Conc	
7	1	ea	2" Flange 150 # CS RF WN Sch 40	
8	1	ea	8" Blind Flange 150 # CS RF WN	
9	1	ea	2" Gasket 150 # ASB Comp RF Ring	
10	1	ea	8" Gasket 150 # ASB Comp RF Ring	
11	4	ea	5/8" ϕ x 3" Std Bolt B7 1/2 nuts	
12	8	ea	3/4" ϕ x 4" Std Bolt B7 1/2 nuts	

SHEET 1 OF 2 SHEETS

CHEV B8 5788

MFG. 334 (25M 2-53)
PRINTED IN U.S.A.

BILL OF MATERIAL

JOB 33-276

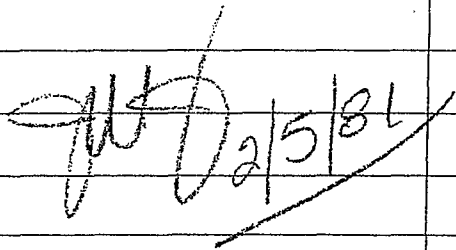
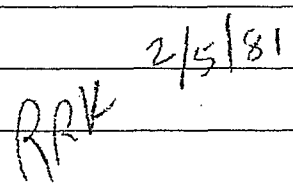
DATE _____

DRG. No. _____ SHEET _____

ORDER No. BM 8791

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY Feb 16/1981

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	2	ea	3" Flange 150# CS RF WN S140	
14	1	ea	3" Gate Valve 150# CS RF 12G Tr	
15	2	ea	3" Gasket 150# Asb Comp RF Ring	
16	8	ea	5/8" ϕ x 3 1/2" Stud Bolt B7 1/2 nuts	
				
				
End use: Jacket Water rerouted D-3852 Isolation of P14 33				

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

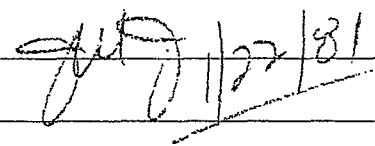
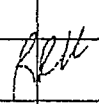
DRG. No. P0-13-29921 SHEET 26

ORDER No. BM-8937

APPRO. JOB No. 26035-617301-360

Kooiman X-355

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	140	ft	3" pipe SMLS Sch 40 BFLW	
2	4	ea	3" Elbow Std Wt CS BW 90° LR	
3	1	ea	4" x 3" Reducer Std Wt CS BW Conc	
4	2	ea	3" Flange 300# CS RF WN Sch 40 bore	
4	2	ea	3" Flange 300# CS RF WN Sch 40 bore	
5	2	ea	3" Gasket 300# 304/ASB Spiral WND	
6	8	ea	3/4" ϕ x 4" Stud Bolt BT W/2 hex nuts	
 1/22/81				
 1/22/81				
E. J. USE: Some fuel gas (Isolation of H32)				

BILL OF MATERIAL

JOB 33-276

DATE _____

DRG. No. _____ SHEET _____

ORDER No. BM-8935

APPRO. JOB No. _____

Logan X-355

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	2	ea	2" Elbow St Wt CS B4 90° LR	
14	1	ea	2" x 1 1/2" Reducer 8000 XS CS BW Conc	
15	1	ea	2" Flange 150# CS RF WN Sch 40 Bore	
16	1	ea	1 1/2" Flange 300# CS RF WN Sch 80	
17	1	ea	2" Gasket 150# ASB Comp RF Ring	
18	1	ea	1 1/2" Gasket 150# ASB Comp RF Ring	
19	4	ea	5/8" x 3" Stud Bolt B-7 w/2 nuts	
20	4	ea	3/4" x 3 1/2" Stud Bolt B-7 w/2 nuts	
21	1	ea	1 1/2" x 1" Swage Nipple Sch 80 CS TR	
22	1	ea	1" Coupling 3000# CS Scr	
APR 12/81 <i>[Signature]</i> 1/22/81				CHEV B8 5791

Full use: Nat Gas (Pl+ 33 IS Station) SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 33-276

DATE 1-23-81

DRG. No. PD-13-29921 SHEET 21

ORDER No. BM-8933 (p.1)

APPRO. JOB No. 21031-6173-01-360

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	550	ft	4" Pipe SmIs Sch 40 CS BFW	
2	16	ea	4" Elbow Std Wt CS BW 90° LR	
3	1	ea	4" Flange 150# CS RF WN Sch 40 bore	
4	8	ea	3/4" Boss 6000 # CS Scr'd	
5	8	ea	3/4" Plug CS Scr'd	
6	1	ea	4" Gate VLV 150# CS RF 12 cr Tr	
7	2	ea	4" Gasket 150# Asb Comp RF ring	
8	16	ea	Std bolt B-7 w/2 hex nuts 5/8" ϕ x 3 1/2"	
9	1	ea	6" Flange 150# CS RF WN Sch 40 bore	
10	1	ea	6" Gasket 150# Asb Comp RF ring	
11	8	ea	3/4" x 3 3/4" Std bolt B7 w/2 hex nuts	
12	1	ea	6" x 4" Reducer Std Wt CS B/W Eccentric	

(cont)

SHEET 1 OF 2 SHEETS

CHEV B8 5792

MFG. 334 (25M 2-531)
PRINTED IN U.S.A.

BILL OF MATERIAL

JOB _____ DATE 1-23-81

DRG. No. _____ SHEET _____ ORDER No. BM-8933 (p.2)

APPRO. JOB No. 21031-6173-01-360

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	1	ea	3/4" Boss 6000# CS SW	
14	1	ea	3/4" Gate VLV 800# CS - Male end SW - Female NPT - 12 cr, Welded br	
			JMT 1/23/81	
			RRK 1/23/81	
			End use: Feed line Pit. 38 (Pit 33 isolation)	

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

DRG. No. PD-13-29921 SHEET 20

ORDER No. BM-8932

APPRO. JOB No. 20030-6173-01-36

Kroiman X-355

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	520	ft	2" pipe Smls Sch 40 CS BFW	
2	12	ea	2" Elbow Std Wt CS BW 90° LR	
3	1	ea	2" Flange 150# C.S. RF WN Sch 40 bare	
4	4	ea	3/4" Boss 6000# CS Srd	
5	1	ea	3/4" Boss 6000# CS SW	
6	1	ea	3/4" Gate VLV 800# CS one end M/c PE and one end Female NPT B/t B/t 12 Cr. Trim	
7	1	ea	2" Gasket 150# ASB comp RF Ring	
8	4	ea	5/8" ϕ x 3" Std Bolt B-7 1/2 hex nuts	
9	4	ea	3/4" Plug C.S. Srd	
10	1	ea	2" Elbow St Wt CS BW 45° LR KRL 1/22/81 SMT 1/22/81	

End Use: 120" utility air (#37 isolation)

SHEET / OF SHEETS

BILL OF MATERIAL

JOB 33-276

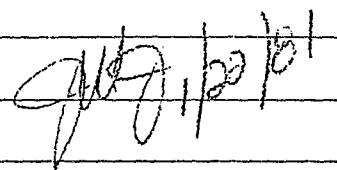
DATE 1-22-81

DRG. No. _____ SHEET _____

ORDER No. BM-8931 (p 2)

APPRO. JOB No. 19029-6173-01-360

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
12	24	ea	5/8" ϕ x 3 1/2" Stud bolt B7 w/2 nuts	
13	1	ea	4" Gasket 150# Asb comp RF ring	
14	12	ea	3/4" Plug (S Scr) d	
15	1	ea	4"x3" Flange reducing 150# CS RF WN Sch 40 bore	
16	1	ea	3" x 1 1/2" Swage Nipple S 80 CS BLE/TSE Conc.	
17	1	ea	3" Flange 300# CS RF WN Sch 40 bore	
18	1	ea	3" Gasket 300# Asb comp RF Ring	
19	8	ea	3/4" ϕ x 4" Stud bolt B-7 w/2 nut	
RRV 1/22/81 				
End	see:		Fuel gas to K.O. drum (Plt 30 isolation)	CHEV B8 5795

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

DRG. No. PD-13-29921 SHEET 17

ORDER No. BM-8929

APPRO. JOB No. 17017-6173-01-360

Kooiman X-355

MATERIAL REQ'D AT DEST'N BY 2-16-81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	670	ft.	3" Pipe Smls Sch 40 C.S. BFW	
2	19	ea	3" Elbow STD WT C.S. BW 90° LR	
3	1	ea	3" Elbow STD WT C.S. BW 45° LR	
4	2	ea	3" Flange 300# C.S. RF WN Sch 40 Bore	
5	7	ea	3/4" Boss 6000# C.S. Scr'd	
6	1	ea	3/4" Boss 6000# C.S. SW	
7	1	ea	3/4" Gate VLV 800# C.S. One end male PE, one end female NPT B/t Bnt 12 cr. trim	
8	7	ea	3/4" Plug C.S. Scr'd.	
9	2	ea	3" Gasket 300# 304/ASB Spiral Wnd.	
10	24	ea	3/4" x 4" Std Bolt G. BT w/2 nuts	CHEV B8 5796

End Use: #38 provided to Stg.

APR 1/20/81

SHEET 1 OF 1 SHEETS

BILL OF MATERIAL

JOB 33-276

DATE 1-22-81

DRG. NO. PD-38-32231 SHEET 2

ORDER NO. BM-8924 (p.1)

APPRO. JOB NO. FG022-6173-01360

Koodimar x-355

MATERIAL REQ'D AT DEST'N BY 2-16-81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	80	ft	Pipe 3" SmIs Sch 40 C.S. BFW	
2	15	ft	2" Pipe SmIs Sch 40 LS BFW	
3	4	ea	2" Elbow Std Wt CS BW 90° LR	
4	9	ea	3" Elbow Std Wt CS BW 90° LR	
5	1	ea	4" Elbow Std Wt CS BW 90° LR	
6	1	ea	6" x 4" Red Ell Std Wt CS BW 90° LR	
7	4	ea	3" Flange 150# CS RF WN Sch 40 Bore	
8	1	ea	4" x 3" Red. Flange 150# CS RF WN Sch 40 Bore	
9	1	ea	4" x 2" Elbolet Red. St. Wt C.S. BLVD ^{BW}	
10	4	ea	3" Gasket 150# ASB Comp RF Ring	
11	2	ea	4" Gasket 150# ASB Comp RF Ring	
12	32	ea	5/8" ϕ x 3 1/2" Std bolt B7 w/2 hex nuts	CHEV B8 5797

JOB 33-276

DATE _____

DRG. No. _____ SHEET _____

ORDER No. BM-8924(p.2)APPRO. JOB No. FG022-6173-01-360MATERIAL REQ'D AT DEST'N BY 2-16-81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
13	1	ea	4" Flange 150# CS RF WN Sch 40 Bore	
14	1	ea	6" Flange 150# CS RF WN Sch 40 Bore	
15	1	ea	6" Flange 150# CS RF Slip On	
16	1	ea	6" Blind Flange 150# CS RF	
17	1	ea	6" Gasket 150# AS6 Comp RF Ring	
18	8	ea	3/4" ϕ x 3 3/4" Stud bolt B-7 w/2 nuts	
19	1	ea	3" Gate VLV 150# CS RF 12 Cr tr. blt brt	
20	1	ea	3/4" Boss 6000 # CS Scr	
21	1	ea	2" x 3/4" Elbolet 3000# CS Scr Red.	
22	2	ea	3/4" Plug CS Scr.	
RRK 1/22/81 <i>[Signature]</i> 1/22/81				
End use: Fuel bal from k.o. Drum (p14 33 Isolation)				

CHEV B8 5798

SHEET 2 OF 2 SHEETS

BILL OF MATERIAL

JOB 16-444

DATE 2/17/81

DRG. NO. PC-16-299530 SHEET 41

ORDER NO. BM 9037

#6 S/O

Back V--2116-14-3000

APPRO. JOB NO. _____

BW 225

5/4/81 *Firm except item 12

MATERIAL REQ'D AT DEST'N BY

~~DATE~~ ~~DATE~~

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	50	ft	Smals C.S. Pipe Sch ⁴⁰ 40 10"	
2	6	ea	10" C.S. 90° B.W. Elbow L.R. Std. Wt.	
3	4	ea	10" C.S. 45° B.W. Elbow L.R. Std. Wt.	
4	2	ea	3" 150° F.S. WN Flg ^{1/4} " R.F. Sch 40	
5	6	ea	10" 150° FS WN Flg P.F. Sch 40 40	
6	1	ft	3" Smals C.S. Pipe Sch 40	
7	2		^{3/4} " 6000° C.S. Weld Boss Threaded	
8	2		3" 150° x ^{1/4} " thk Asb Camp Gasket	

CHEV B8 5799

BILL OF MATERIAL

JOB _____ DATE _____

DRG. No. _____ SHEET _____ ORDER No. BM - 7037

APPRO. JOB No. _____

MATERIAL REQ'D AT DEST'N BY _____ DATE _____

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
9	6	ea	16" 150" x $\frac{1}{2}$ " + hk Full Flue Ash Comp Gasket	
10	8	ea	$\frac{5}{8}$ " ϕ x $3\frac{1}{2}$ " Stud Bolt Gr B7 w/2 Hex Nuts	
11	72	ea	$\frac{7}{8}$ " ϕ x $4\frac{1}{2}$ " Stud Bolt Gr B7 w/2 Hex Nuts	
12	1	ea	10" 200 [#] WOLs Semi stl Valve Flg P.F. Fig 3439 attached (attached) 4 way 4 port 90° Turn - Two Position Rockwell - Norstrom w/ worm gear operated Cast Iron Body Delivery 3/1/81 Firm EBW 3/1/81 Back WASH Weld Vap. In. 1.0 Back valve 3.0 exchanger	

CHEV B8 5800

CONSTRUCTION CO., INC.

Box 27169 • El Paso, Texas 79926
(915) 778-0676

Industrial
Maintenance
and
Construction

CONTRACT CHECKED
C-15-035-82

No 749

Date Sept.22, 1982

O. K.

TO Chevron U.S.A., Inc.
P.O. Box 20002
El Paso, Texas 79998

SHIP TO

RECEIVED

SEP 27 1982

H. N. EU

Terms Net 10 Days

Charge No.	Description	Amount
Contract # C-15-035-82 Job # 0135-250	Liner Replacement on D-3509	XXXXXXXXXX
Contract # C-15-035-82 Change # 01, Dated 9-7-82	Sandblast/Weld repairs to Drum	XXXXXXXXXX

Job Completed: <i>M. V. County</i>	Date: <i>9-28-82</i>
Mfg. Approval For Payment:	Date:
Finance Applied By: <i>BMA</i>	Date: <i>9-27-82</i>
Rel. my Commission	
	FD. Class
	FD. No.
	Date:
	Conty/Sy #
	Misc.
	2&3
5503910822	

Contract Number 035
C-15-032-82
Change Number 01 Date 9-7-82

Company CHEVRON USA INC.

Contractor TIMMONS CONSTRUCTION INC.
The requirements of the above-designated Contract are changed as follows:

CONTRACTOR SHALL STAGE, SANDBLAST THE INTERIOR,
AND PERFORM WELDING REPAIRS TO THE DRUM
D3905, AS DIRECTED BY THE COMPANY REPRESENTATIVE.

ESTIMATE BY	
ORIGINAL CONTRACT AMOUNT	_____
CHANGE TO DATE	<u>0</u>
TOTAL TO DATE	_____
THIS CHANGE	_____
ESTIMATED FINAL AMOUNT	_____

RECEIVED
SEP 10 1982
H. N. EUGENIC

COMPANY and CONTRACTOR agree that CONTRACTOR's compensation shall be adjusted as follows: _____

THE VALUE OF THIS CHANGE SHALL BE \$ ~~_____~~

This adjustment covers the entire compensation for the Change set forth above and includes, but it is not limited to compensation for all engineering, material, equipment, subcontracts, labor, overhead, profit, changes in scheduling and delays resulting, directly or indirectly, from the Change.

CONTRACTOR By [Signature] COMPANY By [Signature]

Work Completed: Signed M. N. Counteyas Date 9-28-82
Invoice No. _____ Date _____ Amount _____ Date Rec'd. _____
Charge Account No. 0135-250
Charge Job No. _____
Remarks _____ CHEV B8 5802

OF CONTRACT PAYMENTS

Kepron U. S. A. Inc

TRACTOR Timmons Const. Co. Inc. CONTRACT NO. C-15-035-82

CONTRACT DESCRIPTION Repairs to Drum D3509

CONTRACT PERIOD - FROM 8-19-82 TO 9-1-82

CONTRACT AMOUNT - TIME & MATL. _____ FIXED PRICE ~~_____~~ Ch. #1

APPROVED BY-LOCALLY _____ SAN FRANCISCO _____

[illegible]

CHEV B8 5803

THIS IS AN ACCOUNTING RECORD. DO NOT
DEFACE WITH SIGNATURES OR STAMPS.
PLEASE RETURN TO VOUCHER DESK.

ELP-2423 (7-81)

CONTRACT NO. C-15-035-82

APW NO. _____

JOB No. 35-096

TELEPHONE BID AWARD AND REGRETS

Mr. GARLAND TIMMONS, of TIMMONS CONSTRUCTION CO. was informed by me on 8 / 10 / 82 at 1:00 ^{a.m.} P.M. that they were the successful bidder on the job of: D-3509 LINER REPLACEMENT -
JOB INVOLVING THE REMOVAL OF AN EXISTING SARAN
LINER AND THE INSTALLATION OF A NEW FIBERGLASS
LINER (INCLUDING ALL LABOR AND MATERIALS).

MR. GARLAND TIMMONS has agreed to pick up and acknowledge their price for this job ~~at 2:45 a.m.~~ at 2:45 ^{a.m.} p.m. on 8 / 10 / 82 and start work at that time. (8-16-82)

I called the unsuccessful Contractors and informed them of the low bid award on the above named job.

<u>COMPANY NAME</u>	<u>CONTACT</u>	<u>DATE</u>	<u>TIME</u>
<u>JACK WHISLER</u>	<u>NASH GARDEA</u>	<u>8-10-82</u>	<u>11:10 A.M.</u>
<u>WYLER INDUSTRIAL WORKS</u>	<u>E.W. MCGLOTHLIN</u>	<u>8-10-82</u>	<u>11:15 A.M.</u>
<u>SAL RODRIGUEZ</u>	<u>SAL RODRIGUEZ</u>	<u>8-10-82</u>	<u>11:20 A.M.</u>
<u>CHEVRON USA (MAINTENANCE)</u>	<u>L. E. PETERS</u>	<u>8-10-82</u>	<u>——</u>
_____	_____	_____	_____
_____	_____	_____	_____

SIGNED: Matt H. Courtney

DATE: 8-10-82

MEMORANDUM GO-144

LAW

8-17 1982

M:

GLT / MDC

ECT:

D-3509 LINER REPLACEMENT

OUR FILE: 35-096

TELEPHONE BID AWARD AND REGRETS SUPPLEMENT #1

YOUR FILE:

THIS CONTRACT WAS AWARDED TO TIMMONS CONSTRUCTION
IN ANTICIPATION OF THE CONTRACT (C-15-035-82) BEING
SIGNED DUE AGAIN TO THE URGENCY OF THE JOB.

W. J. Countey 8-17-82

CHEV B8 5805

CONTRACT NO. C-15-035-82

~~APW NO.~~ _____

JOB No. 35-096

TELEPHONE BID INVITATION

The following Contractors were invited to bid on the job of: D-3509

LINER REPLACEMENT - JOB INVOLVING THE REMOVAL
OF AN EXISTING SARAN LINER AND THE INSTALLATION
OF A NEW FIBERGLASS LINER (INCLUDING ALL LABOR
AND MATERIALS).

I (MARTIN D. COUNTEGAN) called the following Contractors today,

8 / 10 / 82 and invited them to bid on the above named job. They were
told that a job walk meeting would be held at _____ a.m.
_____ p.m. on 8/10/82.

The Contractors were asked to meet at the lobby in the Administration Building.

The Contractors invited were:

	COMPANY NAME	CONTACT	DATE	TIME
*	<u>JACK WHISLER, INC.</u>	<u>NASH GARDEA</u>	<u>8-10-82</u>	<u>11:10 A.M.</u>
*	<u>WYLER INDUSTRIAL WORKS</u>	<u>E.W. MCGLOTHLIN</u>	<u>8-10-82</u>	<u>11:15 A.M.</u>
*	<u>SAL RODRIGUEZ</u>	<u>SAL RODRIGUEZ</u>	<u>8-10-82</u>	<u>11:20 A.M.</u>
	<u>TIMMONS CONSTRUCTION</u>	<u>GARLAND TIMMONS</u>	<u>8-9-82</u>	<u>10:00 A.M.</u>
#	<u>CHEVRON USA (MAINTENANCE)</u>	<u>L.E. PETERS</u>	<u>8-10-82</u>	<u>_____</u>
	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

- ALL TELEPHONED CONTRACTORS
REFUSED TO BID.

Signed: Martin D. Countegan

- SEE SUPPLEMENT #1 (TELEPHONE BID INVITATIONS) Date: 8-10-82

MEMORANDUM GO-144

LAW

8-17 1982

M:

GLT/MDC

ECT:

D-3509 LINER REPLACEMENT

OUR FILE: 35-096

- TELEPHONE BID INVITATION SUPPLEMENT #1

YOUR FILE:

* THE REASON WHY THE FOLLOWING CONTRACTORS DID NOT HAVE A BID FOR THE D-3509 LINER REPLACEMENT PROJECT WAS DUE TO THE FACT THAT THEY DID NOT HAVE THE EXPERTISE TO HANDLE THE JOB.

- 1) JACK WHISLER
- 2) NYLER INDUSTRIAL WORKS
- 3) SAL RODRIGUEZ

PER L.E. PETERS (MAINTENANCE), JOB WOULD NOT BE COMPLETE FOR LESS THAN \$5,500⁰⁰.
(BALL PARK BID)

ALSO, THIS JOB WAS ESTIMATED (NOT BID) FROM AN OUTSIDE CONTRACTOR, JERRY SATROW (SATRO CO.) FOR \$14,000⁰⁰.

NOTE! THIS JOB WAS BID OUT TO LOCAL CONTRACTORS DUE TO THE URGENCY OF THE JOB.

M. J. Lountz 8-17-82

CHEV B8 5807



Chevron U.S.A. Inc.

Contract

Contract Location MANUFACTURING - EL PASO, TEXAS		Date AUGUST 10, 1982	Contract Number C-15-035-82
CONTRACTOR's Name and Address TIMMONS CONSTRUCTION CO., INC. NORTH LOOP & TEXACO POST OFFICE BOX 27169 EL PASO, TEXAS 79926		Send invoices in quadruplicate. All correspondence and invoices must show above Contract Number and be addressed to the undersigned COMPANY at: CHEVRON U.S.A., INC. POST OFFICE BOX 20002 EL PASO, TEXAS 79998	

CONTRACTOR is requested to perform the work and furnish the materials described below, for which COMPANY agrees to pay
~~FOR THE SERVICES LISTED BELOW ON THE "DESCRIPTION OF WORK AND MATERIALS TO BE FURNISHED" SECTION.~~

NOTE - CONTRACTOR'S ADDITIONAL DOCUMENTS; PLEASE REFER TO CONTRACT NUMBER C-15-001-81.

Final payment is to be made upon submission to COMPANY of evidence, by receipted bills or otherwise that all costs incurred for the work have been paid.
CERTIFICATION: CONTRACTOR hereby certifies that it will fully comply with Executive Order 11246, as amended by Executive Order 11375, and the rules and regulations issued thereunder, which are hereby incorporated by reference as appropriate. CONTRACTOR commits itself to such compliance upon execution of this Agreement.
AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS: The regulations issued under the Rehabilitation Act of 1973 in Title 41, Chapter 60, Part 60-741 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Rehabilitation Act of 1973.
AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA: The regulations issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1974 in Title 41, Chapter 60, Part 60-250 of the Code of Federal Regulations are incorporated herein by reference unless this Agreement is exempted by Federal Law, Rules, Regulations or Orders of the Secretary of Labor issued pursuant to said Vietnam Era Veterans' Readjustment Assistance Act of 1974.

CONTRACTOR agrees:
To commence work on or before AUGUST 19, 1982. To perform the work and furnish the materials in accordance with plans and specifications furnished by COMPANY. To use only material of the best description and quality unless COMPANY shall give specific instructions in writing to the contrary. To complete the Facility on or before SEPTEMBER 1, 1982 and upon completion to leave the premises in good order and condition. To conform to the TERMS AND CONDITIONS on the reverse side hereof, which are hereby made a part of this Agreement.
Any Changes to the requirements of this Agreement must be authorized in writing by

Location of Work
EL PASO REFINERY, EL PASO, TEXAS Appropriation or Job Number
0135 - 250

Description of Work and Materials to be Furnished
TIMMONS CONSTRUCTION SHALL FURNISH ALL NECESSARY LABOR, EQUIPMENT, MATERIALS AND SUPERVISION TO PERFORM THE FOLLOWING WORK ON D-3509:
1) REMOVE ALL EXISTING SARAN LINING 100% INTERIOR, INCLUDING NOZZLES, MANWAYS AND BOILERMAKERS.
2) SANDBLAST TO WHITE METAL AND APPLY ONE (1) COAT OF POLYESTER PRIMER TO 100% INTERIOR.
3) GRIND ALL SHARP CORNERS TO RADIUS AND APPLY POLYESTER PUTTY TO SHARP ANGLES TO FORM ROUNDED RADII.
4) APPLY TWO (2) LAYERS OF 1 1/2 OZ. FIBERGLASS MAT, IMPREGNATED 100% WITH VINYL ESTER RESIN TO 100% INTERIOR, INCLUDING NOZZLES, MANWAYS AND BOILERMAKERS.
5) APPLY A GEL COAT OF VINYL ESTER, CURE, ELECTRIC-HOLIDAY TEST, GRIND, AND PATCH ALL WOUNDS.
RE-TEST AND APPLY A 5% WAX-VINYL ESTER TOP COAT FOR TOTAL FINISH OF APPROX. 100 - 125 MILS.

Accepted: **TIMMONS CONSTRUCTION CO., INC.**
(Contractor)
[Signature]
Please sign duplicate copy and return to COMPANY.
CONTRACTOR's State License No. (where required by State Law):
Superintendent or Foreman
Chevron U.S.A. Inc.
(Company)
[Signature]
By

Invoice Number	Date	Amount	Date Received	Charge Account Number	Job Number
				0135 - 250	35 - 096



TIMMONS CONSTRUCTION CO., INC.

P.O. BOX 27169

• EL PASO, TEXAS 79926

Attention: Mr. Marty Countegan

Chevron U.S.A., Inc.
P.O. Box 20002
El Paso, Texas 79998

CHEV B8 5809



EL PASO, TEXAS 79926
(915) 778-0532

August 10, 1982

Attention: Mr. Marty Countegan

Re: Bid D-3509 Liner Replacement

We propose to furnish all necessary labor, equipment, materials and supervision to perform the following work on D-3509.

- All of the above for the lump sum of

Trusting the foregoing meets with your approval, we are

TIMMONS CONSTRUCTION COMPANY, INC.

CHEV B8 5810



TIMMONS CONSTRUCTION CO., INC.

P. O. BOX 27169
(915) 778-0676

EL PASO, TEXAS 79926
(915) 778-0532

Industrial
Maintenance
and
Construction

August 10, 1982

Chevron U.S.A., Inc.
P.O. Box 20002
El Paso, Texas 79998

Attention: Mr. Marty Countegan

Re: Bid D-3509 Liner Replacement

Gentlemen:

We propose to furnish all necessary labor, equipment, materials and supervision to perform the following work on D-3509.

1. Remove all existing Saran Lining 100% interior, including nozzles.
2. Sandblast to white metal and apply one (1) coat of Polyester primer to 100% interior.
3. Grind all sharp corners to radius and apply Polyester putty to sharp angles to form a coved radius.
4. Apply two (2) layers of 1½ oz. Fiberglass mat, impregnated 100% with Vinyl Ester Resin to 100% interior, including nozzles, manways, and boilermakers.
5. Apply a Gel coat of Vinyl Ester, cure, Electric-Holiday Jeep, grind, and patch all voids, re-Jeep and apply a 5% wax-Vinyl Ester Top Coat for a total finish of approximately 100-125 mils.

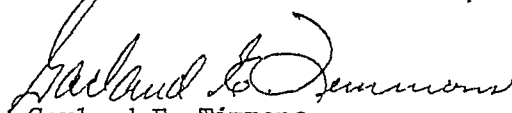
All of the above for the lump sum of

THREE THOUSAND SIX HUNDRED EIGHTY TWO DOLLARS (\$ 3,682.00)

Trusting the foregoing meets with your approval, we are

Sincerely,

TIMMONS CONSTRUCTION COMPANY, INC.


Garland E. Timmons
President

CHEV B8 5811

GET/fh

LIST OF MATERIALS

Job No. 10-349

List No. BM-9773

Accounting Charge No. 0110-00-290

Draftsman H. DOMINGUEZ

DATE REQUIRED: 9/28/81 Date 8-18-81

Engineer A.S.

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
1	L11GA1A	(26)	1 1/2"	PIPE SMLS SCH 80 CS PE	STOCK	
2	L30SBDB	(7)	1 1/2"	ELBOW 3000 LB CS SW 90°	✓	
3	L20KA1MD	2	1 1/2"	GATE VALVE 800 LB CS SW 12CR WELDED	RLBM-50752X	
4	L79B01	(1)	17'-0"	CHAIN-MACHINE, NO. 2, 9 GA. ELWELL	SURPLUS	
5				STRAIGHT LINK, 46-B		
6	L79B03	(1)	5 3/4"	WHEEL-CHAIN, VALVE OPERATOR, UNIVERSAL	SURPLUS	
7				TYPE, PACIFIC VALVE PART NO. 46-B.	✓	
8	L30SBDA	(1)	1 1/2"	ELBOW 3000 LB CS SW 45°	STOCK	
9	L51MA1	(1)	3"	TEE STD WT CS BW	✓	
10	L40JA3DG	2	1 1/2"	FLANGE 600 LB CS RF WN BORE SCH 40	RLBM-50752X	
11	L61JGC	(2)	1 1/2"	GASKET 600 LB 304/ASB SPIRAL WIND	STOCK	
12	L620BM	(4)	3/4" x 4 1/2"	STUD BOLT B-7 W/2 NUTS		
13	L40BA3C	(3)	3"	FLANGE 150 LB CS RF SLIP-ON		
14	L40BA3DE	(2)	3"	FLANGE 150 LB CS RF WN BORE SCH 40		
15	L61BTA	(3)	3"	GASKET 150 LB ASB COMP RF RING		
16	L620BM	(12)	5/8" x 3 1/2"	STUD BOLT B-7 W/2 NUTS	✓	
17	L55MAIDA	1	3" x 1 1/2"	REDUCER STD WT CS BW CONC	RLBM-50752X	
18	L55MAIDI	1	2" x 1 1/2"			
19	L51MA1	(1)	2"	TEE STD WT CS BW	STOCK	
20	L40BA3C	(2)	2"	FLANGE 150 LB CS RF SLIP-ON		
21	L40BA3DE	(2)	2"	FLANGE 150 LB CS RF WN BORE SCH 40		
22	L61BTA	(2)	2"	GASKET 150 LB ASB COMP RF RING		
23	L620BM	(8)	5/8" x 3 1/2"	STUD BOLT B-7 W/2 NUTS	✓	
24	N15	26'	1 1/2"	1 1/2" THICK SECTIONAL TYPE HIGH TEMP		
25				PIPE INSULATION		
26	N15	2'	2"			
27	N15	2'	3"			
28	L48BA3	(1)	3"	BLIND FLG 150 LB CS RF	STOCK	
29	L36VBD5	(2)	3/4"	BOSS 6000 LB CS SW		
30	L20KAZ7	(2)	3/4"	GATE VALVE 800 LB CS M-F/SW-SCRD		
31	L370ABW	(2)	3/4"	PLUG CS SCRD	✓	
32	RLBM-50752X			KEENAN C/P 7/24/81		
33	E. SHERRILL			END USE: RELOCATE FUEL OIL		
34	AUG 24 1981			SHUT OFF VALVES	1/11/81	
35						

CHEV B8 5812

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LIST OF MATERIALS

Job No. 10-349List No. BM-9799Accounting Charge No. 0110-00-290Draftsman HENRY DOMINGUEZDATE REQUIRED: 9/21/81 Date 9/9/81Engineer: V.A.S.Lead Engr: GGT

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

MK. NO.	ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
1	L11GATA	30'	1 1/2"	PIPE SMLS SCH 80 CS PE		
2	L34GAHJ	2	1" x 6" LG	NIPPLE SCH 80 CS TOE-POE		
3	L20KA1MD	2	1 1/2"	GATE VALVE 800 LB CS SW 12CR WELDED		
4	L30SBDB	4	1 1/2"	ELBOW 3000 LB CS SW 90-DEG		
5	L31SBD	2	1 1/2"	TEE 3000 LB CS SW		
6	L56MAIH	1	2" x 1 1/2"	WELDOLET STD WT CS BW		
7	L40BA3DG	2	1"	FLANGE 150 LB CS RF WN BORE SCH 80		
8	L43BA3	2	1"	BLIND FLANGE 150 LB CS RF		
9	L61BTA	2	1"	GASKET 150 LB ASB COMP RF RING		
10	L620BM	8	1/2" x 2 1/2" LG	STUD BOLT B-7 W/2 NUTS		
11	N15	30'	1 1/2"	1 1/2" THICK SECTIONAL TYPE HIGH TEMP		
12				PIPE INSULATION		
13	L55MAIDA	1	2" x 1"	REDUCER STD WT CS BW CONC.		
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LIST OF MATERIALS

10-399

List No. BM-9773

Accounting Charge No. 0110-60-290

an H. DOMINGUEZ

DATE REQUIRED: 9/28/81 Date 8-18-81

r: V.A.S.

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

1

2

3

4

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P.O. No.	EST. DEL. DATE
GAIA	26'	1 1/2"	PIPE SMLS SCH 80 CS PE		
SBDB	7	1 1/2"	ELBOW 3000 LB CS SW 90°		
KAIMD	2	1 1/2"	GATE VALVE 800 LB CS SW 12CR WELDED		
BOI	1	17'-0"	CHAIN-MACHINE, NO. 2, 9 GA. ELWELL		
			STRAIGHT LINK, 46-B		
BO3	1	5 3/4"	WHEEL-CHAIN, VALVE OPERATOR, UNIVERSAL		
			TYPE, PACIFIC VALVE PART NO. 46-B.		
SBDA	1	1 1/2"	ELBOW 3000 LB CS SW 45°		
MAI	1	3"	TEE STD WT CS BW		
JA3CG	2	1 1/2"	FLANGE 600 LB CS RF WN BORE SCH 40		
IC	2	1 1/2"	GASKET 600 LB 304/ASB SPIRAL WIND		
2OBM	4	3/4" x 4" LG	STUD BOLT B-7 W/2 NUTS		
BA3C	3	3"	FLANGE 150 LB CS RF SLIP-ON		
BA3DE	2	3"	FLANGE 150 LB CS RF WN BORE SCH 40		
ETA	3	3"	GASKET 150 LB ASB COMP RF RING		
2OBM	12	5/8" x 3 1/2" LG	STUD BOLT B-7 W/2 NUTS		
MAIDA	1	3" x 1 1/2"	REDUCER STD WT CS BW CONC		
MAIDI	1	2" x 1 1/2"	↓		
MAI	1	2"	TEE STD WT CS BW		
BA3C	2	2"	FLANGE 150 LB CS RF SLIP-ON		
BA3DE	2	2"	FLANGE 150 LB CS RF WN BORE SCH 40		
ETA	2	2"	GASKET 150 LB ASB COMP RF RING		
2OBM	8	5/8" x 3 1/2" LG	STUD BOLT B-7 W/2 NUTS		
3	26'	1 1/2"	1 1/2" THICK SECTIONAL TYPE HIGH TEMP		
			PIPE INSULATION		
3	2'	2"	↓		
3	2'	3"	↓		
BA3	1	3"	BLIND FLG 150 LB CS RF		
BD5	2	3"	BOSS 6000 LB CS SW		
KAZ7	2	3"	GATE VALVE 800 LB CS M-F/SW-SCRD		
OABW	2	3"	PLUG CS SCRD		

CHEV B8 5814

(BILL OF MATERIAL)

JOB 16-505

DATE 9/23/81

DRG. No. SHEET

ORDER No. BM-9819

Hold in Interim Storage

APPRO. JOB No. N6J04-0116-250

RRK x-855

MATERIAL REQ'D AT DEST'N BY 10/9/81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	3	ea	long welding neck, FS, 1/16 RF, 150#, 3", Sch 40	
2	3	ea	gate valves, full ported, flanged, 1/16" RF, CS, Cr Trim, bolted bonnet with seat flush, boss tapered and threaded 1/2" NPT, 150#, 3"	
3	6	ea	Flange, WN, FS, 1/16" RF, 150#, 3", Sch 40	
4	2	ft	Smls STL pipe Sch 40 3"	
5	3	ea	Boss bono # CS SW 1/2"	
6	9	ea	gasket, Asb Comp, 3", 150#, RF	
7	24	ea	std bolts B-7 w/2 nuts 5/8" x 3 1/2"	
8	12	ea	std bolts B-7 w/2 nuts 5/8" x 3 3/4"	
9	3	ea	blind flange CS RF 150# 3"	
10	1	ca	Plastic tool (1) gillo, kit includes Parts I, II, III	

Rev 9/23/81 End use: Parco samplers plant 16

SHEET 1 OF 1 SHEETS

G. Jordan
G. JORDAN
PRINTED IN U.S.A.

#10 2/10

BILL OF MATERIAL

JOB 116-505

DATE 3/24/81

DRG. No. SHEET

ORDER No. BM-9201

APPRO. JOB No. N6104-2116-14-250

LLT X259

MATERIAL REQ'D AT DEST'N BY 5/1/81

DATE

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
6	15	EA	GASKET, Comp AB, 3" 150#, RF	
7	40	EA	STUD BOLTS B-7 W/ZNDS 5/8" X 3 1/2"	
8	20 20	EA	STUD BOLTS B-7 W/ZNDS 5/8" X 3 3/4"	
9	5	EA	BLIND FLANGE, CS, RF, 150#, 3"	
10	1	EA	PLACITE 4005 (1) one GALLON KIT KIT INCLUDES PARTS T, II, AND 3 ORDER FROM ENGINEERED EQUIPMENT CO. + USE PERCO Sampler CHIEF	

SHEET 7 OF 2 SHEETS

10, 15, 16

CHEV B8 5816

MFG. 334 (25M 2-53)
PRINTED IN U.S.A.

February 12, 1981

Contract No. C-15-022-81

T&R Mechanical Contractors, Inc.
4013 Taylor Street
El Paso, Texas 79930

Attention: Mr. R. M. Youngblood

Gentlemen:

Two copies of our proposed Contract No. C-15-022-81, which covers "Pipe Work - Plant 33 Isolation" at the El Paso Refinery, are attached.

If you are in agreement with the terms of this contract, please indicate your acceptance by signing and affixing your corporate seal, or have witnessed in accordance with instructions on the face of the contract, and return one copy.

Very truly yours,

L. R. Shanks
Chief Engineer

RRK/gs

Attach.

RRK 2/12/81

[Handwritten signature] 2/12/80

Albert Teran
Foreman

T&R Mechanical Contractors, Inc.

4013 Taylor
El Paso, Tex. 79930

13 February 1981



T&R Mechanical Contractors, Inc. intends to man the Plant 33 Isolation project with a work force of one foreman, five qualified welders and an equal number of pipefitters and/or apprentices. Laborers will also be provided as necessary. Addition or subtraction of workers will be made as progress warrants.

- Feb 17 - Familiarize men with job, set up fab area with Chevron representative, transport material, begin fuel gas from knockout drum.
- Feb 18 - Continue fg ^{from} to ko drum, begin fg to ko drum, begin jacket water, transport material, ditchwork for jacket water.
- Feb 19 - Continue fg from ko drum, continue fg to ko drum, continue jacket water, ditchwork for jacket water.
- Feb 20 - Continue fg from ko drum, continue fg to ko drum, continue jacket water, begin instrument air, begin 110# steam.
- Feb 23 - Continue fg from ko drum, continue fg to ko drum, finish jacket water, continue instrument air, continue steam.
- Feb 24 - Complete fg from ko drum, continue fg to ko drum, continue instrument air, continue steam.
- Feb 25 - Complete fg to ko drum, finish instrument air, continue steam, completely do condensate from water jacket cooler.
- Feb 26 - Finish steam, test up to tie in fg (2 lines) and instrument air, begin condensate to water jacket cooler.
- Feb 27 - Continue condensate to water jacket cooler, begin utility air, test steam to tie in, begin nitrogen.
- Mar 2 - Continue condensate to water jacket cooler, continue nitrogen, continue utility air, begin hydrogen sulfide, begin plant 38 product.
- Mar 3 - Continue condensate to water jacket cooler, continue nitrogen, continue utility air, continue hydrogen sulfid, continue plant 38 product.
- Mar 4 - Finish condensate to water jacket cooler, continue nitrogen, finish utility air, continue hydrogen sulfide, ~~begin natural gas~~, continue plant 38 product.

Phone: (915)-562-8444 or (915)-566-7194

- Mar 5 - Begin sulfide chemical injection, finish nitrogen, finish hydrogen sulfide, begin natural gas, continue plant 38 product.
- Mar 6 - Continue sulfide chemical injection, begin feed to plant 38, continue natural gas, continue plant 38 product.
- Mar 9 - Cold cut and move ko drum, tie in instrument air, tie in jacket water, tie in steam, prepare for concrete foundation.
- Mar 10 - Tie in both fg lines, finish steam and jacket water, test, prepare for concrete foundation.
- Mar 11 - Continue plant 38 product, finish sulfide chemical injection, continue natural gas, continue feed to plant 38, pour foundation.
- Mar 12 - Finish natural gas, finish plant 38 product, continue feed to plant 38.
- Mar 13 - Finish feed to plant 38, and miscellaneous.

T&R MECHANICAL CONTRACTORS, INC.
4013 Taylor
El Paso, Texas 79930

PIPE WORK - PLANT 33 ISOLATION
Contract # C-15-022-81

CHANGE 1

- A) 2/26/81 - Add dummy leg to fuel gas line
1 welder, 1 fitter - 2 hrs ea regular time @ \$16.28/hr \$ 65.12
- B) 3/ 6/81 - Add to Jet-A desulfurizer feed, 120' of 4" pipe and
necessary fittings
1 welder, 1 fitter - 6 hrs ea regular time @ \$16.28/hr \$ 195.36
- C) 3/12/81 - Reroute fuel gas from knockout drum to miss conduit
bank as instructed by engineer
1 welder, 1 apprentice (6th period) - 3.5 hrs ea @
1 1/2 overtime (3.5 hrs x \$22.21/hr = \$77.74
3.5 hrs x \$17.00/hr = \$59.50) \$ 137.24
- D) 3/12/81 - Begin reroute of fuel gas from knockout drum to miss
existing platform
1 welder, 1 apprentice (6th period) - 2 hrs ea regular time
(2 hrs x \$16.28/hr = \$32.56
2 hrs x \$12.54/hr = \$25.08) \$ 57.64
- E) 3/13/81 - Reroute fuel gas to knockout drum to miss existing platform
and reroute relief from knockout drum for tie in to knockout
drum drain
1 welder, 1 fitter - 6.5 hrs ea @ 1 1/2 overtime (\$22.21/hr) \$ 288.73
- F) 3/13/81 - Reflange hydrogen sulfide sour gas line in five places
using fresh air equipment and resteam as required by
operators and test fuel gas due to delay caused by
rerouting fuel gas lines as instructed by engineer
3 fitters, 6 hrs ea @ 1 1/2 overtime (\$22.21/hr) \$ 399.78
- G) 3/13/81 - Replace 3/4" valve on existing line at hydrogen sulfide
tie in
1 welder, 1 fitter - 1 1/2 hrs ea regular time @ \$16.28/hr \$ 48.84
- H) 3/13/81 - Add supports on 1" and 2" condensate lines and on 3/4"
instrument air line
1 welder, 1 fitter - 4.5 hrs ea regular time @ \$16.28/hr \$ 146.52
- I) 3/16/81 - Add supports on 6" steam line, 1" condensate line, and
3/4" instrument air line
2 welders, 1 apprentice (2nd period), 1 foreman fitter,
4 hrs ea regular time
(8 hrs x \$16.28/hr = \$130.24
4 hrs x \$ 9.53/hr = 38.12
4 hrs x \$17.33/hr = 69.32) \$ 237.68

Change 1
Page 2

- J) 3/16/81 - Begin dismantle of 6" relief loop station by gas and oil control house
 2 welders, 1 apprentice (2nd period), 1 foreman fitter -
 2 hrs ea @ regular time
 (4 hrs x \$16.28/hr = \$65.12
 2 hrs x \$ 9.53/hr = \$19.06
 2 hrs x \$17.33/hr = \$34.66
 Boom truck - no charge \$ 118.84
- K) 3/17/81 - Dismantle 6" station by gas and oil control house
 2 welders, 1 apprentice (2nd period), 1 foreman fitter -
 3 hrs ea @ regular time
 (6 hrs x \$16.28/hr = \$97.68
 3 hrs x \$ 9.53/hr = \$28.59
 3 hrs x \$17.33/hr = \$51.99
 Boom truck - no charge \$ 178.26
- L) 3/17/81 - Add supports for new lines at north end of new pipeway
 1 welder, 1 foreman fitter - 2 hrs ea @ regular time
 (2 x \$16.28/hr = \$32.56
 2 x \$17.33/hr = \$34.66) \$ 67.22
- M) 3/19/81 - Add 3/4" yard air and repair yard air valve
 2 fitters - 6 hrs ea @ regular time @ \$16.28/hr \$ 195.36
- N) EQUIPMENT RENTAL AND FUEL CHARGES

Welding machines

3/13/81	10 hrs		
3/16/81	4 hrs	Rental 18 hrs x \$.86/hr	\$ 15.48
3/17/81	2 hrs	Fuel cost 18 hrs x \$.70/hr	\$ 12.60
3/19/81	2 hrs		
	<u>18 hrs</u>		

Oxygen-Acetylene Rigs

3/13/81	10 hrs		
3/16/81	4 hrs	Rental 14 hrs x \$.38/hr	\$ 5.32
	<u>14 hrs</u>		

Pickup truck

3/13/81	10 hrs		
3/16/81	4 hrs	Rental 19 hrs x \$.82/hr	\$ 15.58
3/17/81	5 hrs	Fuel cost 19 hrs x \$.70/hr	<u>\$ 13.30</u>
	<u>19 hrs</u>		

TOTAL, CHANGE 1

\$2,198.87

T&R MECHANICAL CONTRACTORS, INC.
4013 Taylor
El Paso, Texas 79930

PIPE WORK - PLANT 33 ISOLATION
Contract # C-15-022-81

CHANGE 2

3/7/81 - Overtime pay for Saturday worked due to rain-outs during week.

<u>Classification</u>	<u>O.T. hrly - Reg. hrly Rate</u>	<u>No. of Men</u>	<u>Hrs. Each</u>	
General foreman	\$6.48	1	8	\$ 51.84
Fitter foreman	\$6.34	1	8	\$ 50.72
Journeymen	\$5.93	13	8	\$616.72
Apprentice (1st period)	\$2.97	1	8	\$ 23.76
Apprentice (5th period)	\$4.16	2	8	\$ 66.56
Operator	\$4.96	1	8	\$ 39.68
Operator	\$4.96	1	6.5	\$ 32.24
Laborer	\$3.42	1	8	<u>\$ 27.36</u>
				\$908.88

Change

Contract Number C-15-022-81

Change Number 1

Date MARCH 27, 1981

Company CHEVRON USA INC

Contractor T & R MECHANICAL CONTRACTOR, INC.

The requirements of the above-designated Contract are changed as follows:

1. ADD DUMMY LEG TO FUEL GAS LINE 65.12
2. ADD 120 ft OF 4 INCH PIPE TO PLT 38 FEED 195.36
3. REROUTE FUEL GAS FROM KNOCKOUT DRUM
NEAR CONDUIT 137.34
4. REROUTE FUEL GAS FROM KNOCKOUT DRUM
NEAR PLATFORM. 57.64
5. REROUTE FUEL GAS TO KNOCKOUT DRUM TO MISS
EXISTING PLATFORM AND REROUTE RELIEF
FROM KNOCKOUT DRUM FOR TIE IN TO DRAIN 288.73
6. REFLANGE H₂S SOUR GAS LINE IN 5 PLACES 399.78
7. REPLACE 3/4" VALVE ON EXISTING LINE AT
HYDROGEN SULFIDE TIE IN 48.84

COMPANY and CONTRACTOR agree that CONTRACTOR's compensation shall be adjusted as follows: INCREASE

\$1192.81 (ONE THOUSAND ONE HUNDRED NINETY-TWO and 8/100 Dollars)

This adjustment covers the entire compensation for the Change set forth above and includes, but it is not limited to compensation for all engineering, material, equipment, subcontracts, labor, overhead, profit, changes in scheduling and delays resulting, directly or indirectly, from the Change.

CONTRACTOR

By R. M. Youngblood

COMPANY

By L. R. Shanks / C. R. Retalby 3/30/81

Work Completed: Signed _____ Date _____

Invoice No. _____ Date _____ Amount _____ Date Rec'd. _____

Charge Account No. _____

Charge Job No. _____

Remarks _____

CHEV B8 5823

Change

Contract Number C-15-022-81

Change Number 2

Date MARCH 30, 1981

Company CHEVRON U.S.A. INC.

Contractor T & R MECHANICAL CONTRACTOR, INC.

The requirements of the above-designated Contract are changed as follows:

1. ADD SUPPORT ON 1" AND 2" CONDENSATE LINES AND ON 3/4" 146.52
INSTRUMENT AIR LINE
2. ADD SUPPORTS ON 6" STEAM LINE, 1" CONDENSATE LINE, AND 237.68
3/4" INSTRUMENT - AIR LINE
3. DISMANTLE 6" RELIEF LOOP STATION BY GAS AND OIL 118.84
CONTROL HOUSE
4. DISMANTLE 6" STATION BY GAS OIL CONTROL HOUSE 178.26
5. ADD SUPPORTS FOR NEW LINES AT NORTH END OF 67.22
NEW PIPEWAY
6. ADD 3/4" YARD AIR AND REPAIR YARD AIR VALVE, 195.36
7. EQUIPMENT RENTAL AND FUEL CHARGES 62.28

COMPANY and CONTRACTOR agree that CONTRACTOR's compensation shall be adjusted as follows: INCREASE

\$1006.16 (ONE THOUSAND - SIX and 16/100 DOLLARS)

This adjustment covers the entire compensation for the Change set forth above and includes, but it is not limited to compensation for all engineering, material, equipment, subcontracts, labor, overhead, profit, changes in scheduling and delays resulting, directly or indirectly, from the Change.

CONTRACTOR

COMPANY

By _____

By LR Shanks / CR Patching 3/30/81

Work Completed: Signed _____ Date _____

Invoice No. _____ Date _____ Amount _____ Date Rec'd. _____

Charge Account No. _____

Charge Job No. _____

Remarks _____

CHEV B8 5824

Change

Contract Number C-15-022-81

Change Number 3

Date MARCH 27, 1981

Company CHEVRON USA INC

Contractor T & R MECHANICAL CONTRACTOR, INC

The requirements of the above-designated Contract are changed as follows:

1. OVERTIME PAY FOR SATURDAY WORKED DUE TO RAIN-OUTS DURING THE WEEK OF MARCH 2 - 7.

COMPANY and CONTRACTOR agree that CONTRACTOR's compensation shall be adjusted as follows: INCREASE

\$908.88 (NINE HUNDRED-EIGHT and 88/100 DOLLARS)

This adjustment covers the entire compensation for the Change set forth above and includes, but it is not limited to compensation for all engineering, material, equipment, subcontracts, labor, overhead, profit, changes in scheduling and delays resulting, directly or indirectly, from the Change.

CONTRACTOR

COMPANY

By _____

By L R Shanks / C.R. Pataky 3/30/81

Work Completed: Signed _____ Date _____

Invoice No. _____ Date _____ Amount _____ Date Rec'd. _____

Charge Account No. _____

Charge Job No. _____

Remarks _____

CHEV B8 5825

LIST OF MATERIALS

16-432

List No. BM 9191

Accounting Charge No. Prov-2116-14-570

G.T.A. PH. 388

DATE REQUIRED: 4/10/61 Date 2-2-61

EBW

Lead Engr: _____

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

1

ITEM NO.	QUAN.	SIZE	DESCRIPTION	SOURCE STOCK OR P. O. No.	EST. DEL. DATE
SAIA	4ft	1"	Sm/s Stl. Pipe Sch. 80		
GAIA	6ft	3/4"	" " " "		
EAZA	10ft	2"	" " " 40		
SEDB	1	3/4"	3000# FS SW. 90 Elbow		
SEPB	1	1"	" " " "		
SED	1	1 1/2"	" " " Tee		
GBER	1	1" x 3/4"	Stl. Ecc Snaged Flange Sch 80		
SEER	1	1 1/2" x 3/4"	" " " " BPE		
GBER	1	2" x 1 1/2"	" " " " BPE		
MAID	1	2"	Stl. 90° B.W. Elbow L.R. Sch 40		
BABDE	3	2"	150# FS W.N. Flg 1/16" R.F. Sch 40		
BABDG	2	3/4"	150# FS " " " " 80		
BAB3	1	3"	150# FS Blind Flg 1/16" R.F.		
B3	1	3"	300# " " " "		
BTA	1	3/4"	150# x 1/16" thk. Asb. Comp Gasket		
BTA	1	3"	" " " " "		
FGC	1	2"	150# Spiral Wound Gasket		
FGC	1	3"	300# " " " "		
DBW	4	1/2" x 2 1/4"	Stud Bolt Gr B.W. 1/2" x 2 1/4"		
DBW	4	3/8" x 3 1/2"	" " " " "		
DBW	16	7/16" x 3"	" " " " "		
DBW	8	3/4" x 4"	" " " " "		
ABW	1	3/4"	300# Std Stl. Gate Valve Bll. Bnt.		
ABW	1	3/4"	Std Stl. Ball Valve Bll. Bnt.		
AIA	8ft	3/4"	Sm/s Stl. Pipe Sch 80		
BAB	14	3/4"	150# Std M1 90° Elbow		
BAB	2	3/4"	150# Std M1 90° Elbow		
BAB	2	3/4"	150# Std M1 Union		
BAB	2	3/4" x 3"	Sm/s Stl. Pipe Flange Sch 80		
BAB	2	3/4"	300# Stl. Weld Bolt, Threaded		
BAB	2	2"	150# FS Blind Flg 1/16" R.F.		
BAB	2	2"	150# x 1/16" thk. Asb. Comp Gasket		

2

3

4

K

-484

List No. BM-9640

Accounting Charge No. 116102-2116-14-570

an MPM @ 38.8

DATE REQUIRED: _____ Date 2/18/81

r: GLJ

Lead Engr: JWJ

FOLLOW-UP, PER ENGR. INSTR. EP-2068 (YES) (NO)

[illegible]

K

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

2-4198

List No. BM-9038

Accounting Charge No. NLJ02-2116-14-570

DATE REQUIRED: _____ Date 6/18/81

FOLLOW-UP PER ENGR. INSTR. EP-2068 (YES) (NO)

Lead Engr: JW2

[illegible]

1

-2-

3

1640

DRG. No. D-2225 SHEET 26

ORDER No. 50-1043

APR 30 2 10 PM '54

DATE

Caroline

CHAS Jones to D-H-15

SHEET OF SHEETS

BILL OF MATERIAL

JOB 16-184

DATE 2/15/81

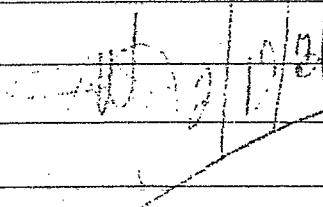
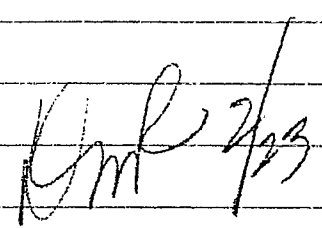
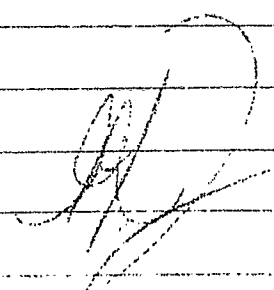
DRG. No. 1013-21/21 SHEET 27

ORDER No. DM-7037

APPRO. JOB No. N6702-2116-14-570

6123 - 237

MATERIAL REQ'D AT DEST'N BY 3/2/81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	(3)	LF	PIPE SMIS, SCH 40, CS. BW, 4"	
2	(2)	EA	FLANGE, WN, SCH 40 RF, CS, 150# 4"	
3	(2)	EA	GASKET, 150#, RF, ASB COMP, 4"	
4	(16)	EA	STUD BOLT B-7 W/2 NUTS 5/8" x 3 1/2"	
 END USEL. CCLC Upgrade				 2/23
				

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BILL OF MATERIAL

JOB NO. 776

DATE 2/10/81

DRG. NO. 100-1111 SHEET 26

ORDER NO. BUL-776R

APPRO. JOB NO. 100-211-14

MATERIAL REQ'D AT DEST'N BY 3/12/81

ITEM	QUANTITY	UNIT	DESCRIPTION	REMARKS
1	45	LF	PIPE, SMILS CS, SCH 40, DW, 4"	
2	1	LF	" " " " " " 3"	
3	5	EA	ELBOW, 90° LR, CS, STD WT, BW, 4"	
4	1	EA	FLANGE, 150# WN RF SCH 40, CS, 3"	
5	1	EA	FLANGE, 150# WN, RF SCH 40, CS, 4"	
6	1	EA	GASKET, 150# COMP, RF, 150#, 3"	
7	2	EA	GASKET, 150# COMP, RF, 150#, 4"	
8	20	EA	STUD BOLTS B-7 W/2 NUTS 3/8" x 3 1/2"	
9	1	EA	CONC. DIV. FLG, RF, CS, 150#, 12" DIA, 4"	
			END USE:	
			46 TUBES 10. TR 32	

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SHEET / OF / SHEETS

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ENGINEERING DEPARTMENT - EL PASO, TEXAS

SPECIFICATION NO. EP-418-Q

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SPECIFICATION NO. EP-418-Q
FOUNDATION WORK - PLANT 33 ISOLATION
EL PASO REFINERY

SECTION I - GENERAL REQUIREMENTS

1.0 SCOPE OF WORK

CONTRACTOR shall provide all tools, construction equipment, labor including supervision and inspection, and all items of a consumable nature that are required for construction of foundations and pipeway stanchions for the isolation of the Platformer Plant at the Chevron U.S.A. Inc. El Paso Refinery as detailed by this specification, including the drawings and other attachments listed in the appendix.

This work includes, but is not limited to;

- a. Excavation for foundations
- b. Placing of concrete forms, reinforcing steel and concrete
- c. Construction of stanchions and supports to widen an existing pipeway.

2.0 WORK, MATERIALS AND UTILITIES BY COMPANY AND OTHERS

COMPANY will provide the following material: W-shapes, angle iron, channel iron, reinforcing rods, steel plate, anchor bolts.

COMPANY will provide industrial fresh water and 80 psig air at nearest point of supply to working site. Suitable couplings and all materials for extension of service to CONTRACTOR'S work areas shall be provided by CONTRACTOR.

CONTRACTOR shall provide concrete and forms and all painting material required.

3.0 SEQUENCE OF WORK

The sequence of work shall be as mutually agreed between the COMPANY and CONTRACTOR and shall be consistent with the facing sheet of the agreement.

4.0 INTENT

The installations shall be complete in every respect, constructed in accordance with generally accepted, current good practices of the several trades involved and the detailed requirements of this specification and ready to serve in the manner expressed or implied herein, regardless of whether or not full details of such completeness or practices are contained herein.

The specifications and drawings are not complete in every detail and CONTRACTOR shall comply with their true intent taken as a whole, and not avail himself of any errors or omissions to the detriment of the work. Should any error, omission or discrepancy appear in the drawings, specifications and instructions, CONTRACTOR shall notify COMPANY at once, and COMPANY will issue instructions

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to be followed. If CONTRACTOR proceeds prior to receiving such instructions, necessary corrections shall be at CONTRACTOR'S expense. Anything not indicated on the drawings or outlined in the specification which is necessary for full and faithful construction of the installations in accordance with the true intent of this agreement or anything indicated on the drawings but not outlined, or vice versa, shall be provided and incorporated at the expense of CONTRACTOR to the same extent as though fully set forth in both the drawings and the specification.

5.0 COMPANY REVIEW AND APPROVAL

COMPANY'S review of, approval of, or agreement to the performance of certain items of work or the provisions of certain material shall in no way relieve CONTRACTOR of full responsibility for the performance of such work or for the adequacy of such material. All such reviews, approvals or agreements shall be obtained through COMPANY'S Construction representative, or in a manner previously approved in writing by COMPANY'S Construction representative.

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SECTION II - GENERAL CONDITIONS AND PERFORMANCE OF WORK

6.0 PRECEDENCE

6.1 The following items shall take precedence in the order listed in the event of conflict:

- a. Facing sheet of agreement
- b. Terms and Conditions
- c. Refinery Instruction No. 1404
- d. This specification
- e. Construction drawings in Appendix A.3 attached to this specification
- f. Standard specification in Appendix A.1 attached to this specification.
- g. Reference drawings and specifications, engineering instructions, recommended practices, and refinery instructions in Appendix A.2 attached to this specification.

6.2 As used in the standard specifications attached hereto:

- a. "Purchaser" shall mean COMPANY
- b. "Supplier" or "vendor" shall mean CONTRACTOR
- c. "Purchaser's Inspector" shall mean COMPANY Construction Representative.

6.3 Unless otherwise expressly provided in this specification:

- a. Any data, specifications, material and work or any other matter which is covered by this agreement which the standard specifications require to be provided by COMPANY shall instead be provided by CONTRACTOR,
- b. Any provisions of the standard specifications requiring COMPANY to inspect certain material or work shall mean that COMPANY has an option, rather than the obligation, to so inspect such material or work,
- c. Any warranty of guarantee provisions contained in the standard specifications shall be of no effect and the warranty and guarantee provisions of this specification, if any, shall apply, and
- d. Any item of material, work, inspection or testing to be furnished at extra expense to COMPANY pursuant to the standard specifications shall be furnished under this specification at no increase in CONTRACTOR'S compensation.

All provisions in the standard specifications concerning compensation or payment to CONTRACTOR in case of delay shall be of no effect, and the provisions of the Terms and Conditions and of this specification shall apply.

In the engineering instructions, reference to COMPANY'S personnel shall be of no effect, and CONTRACTOR'S personnel shall perform all activities which are to be performed under the engineering instructions, except as otherwise provided elsewhere in this specification.

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Where standard specifications on materials contain sections covering COMPANY'S normal requirement for purchasing and field erection, these sections shall be of no effect except as otherwise expressly stated in this specification.

7.0 FIELD REPRESENTATIVES

7.1 COMPANY'S Representative

COMPANY will maintain a representative in the field pursuant to Section 4.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

Examples of his functions are to:

- a. Establish and maintain field liaison between CONTRACTOR'S Construction Representative and COMPANY.
- b. Provide materials to CONTRACTOR as provided in this specification.
- c. Review CONTRACTOR'S construction schedule.
- d. Provide drawings and specifications as required.
- f. Make such inspections as COMPANY may desire in order to check the quality and progress of the work.
- g. Review and approve field changes or material substitutions, or any other matter where COMPANY'S approval or agreement is required by this specification.
- h. Negotiate with CONTRACTOR'S Construction Representative the adjustment in compensation arising from a change.

7.2 CONTRACTOR'S Construction Representative

CONTRACTOR shall maintain a construction representative in the field at all times who shall act in full charge of CONTRACTOR'S work and maintain field liaison between CONTRACTOR and COMPANY'S Construction Representative.

8.0 OTHER CONTRACTS

COMPANY reserves the right to let other contracts or other services in connection with CONTRACTOR'S work hereunder. CONTRACTOR shall afford others equitable opportunities for the introduction and storage of their materials and the execution of their work and shall properly coordinate its work with theirs.

9.0 WORK WEEK AND OVERTIME

CONTRACTOR shall pursue to field construction work on a 40-hour per week work schedule in accordance with Section 6.0 of Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery, attached.

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10.0 PLANT REGULATIONS

Prior to the commencement of work, CONTRACTOR shall become familiar with the plant regulations specified in the attached Refinery Instruction No. 1404, General Instructions to Contractors Working Within the Refinery and the following regulations. CONTRACTOR shall be responsible for compliance with these regulations during the execution of his work.

10.1 Electrical Safety Requirements

CONTRACTOR shall provide and use ground fault circuit interrupters for personnel protection at all construction sites (including areas inside existing plants) on all 120 volt single phase 15 and 20 amperes receptacle outlets.

Hubbell type GFP or Porta-Power Pak Inc. Model 72 series are typical of acceptable portable receptacle units.

Ground fault circuit interrupters shall not be used in areas where flammable vapors are present.

It is essential that the polarity of the conductors in all cords, plugs and receptacles supplying single pole portable ground fault circuit interrupter units be properly maintained to insure proper operation of the units.

10.2 Work Space and Storage Area

COMPANY will assign space in the general vicinity of the CONTRACTOR's work for CONTRACTOR's office, work space and storage area.

11.0 TEMPORARY CONSTRUCTION FACILITIES

11.1 CONTRACTOR shall provide and install all necessary temporary facilities including, but not limited to, tool rooms, locker rooms, toilets, office and storehouse. All temporary installations shall be subject to approval by COMPANY prior to installation.

11.2 In addition, CONTRACTOR shall provide all necessary temporary equipment and material including, but not limited to, shoring, concrete forms, bracing, ladders, scaffolding, staging, drop cloths and tarpaulins.

11.3 CONTRACTOR shall maintain all temporary facilities, material and equipment in a safe and adequate manner and remove them immediately upon completion of the work requiring their presence.

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12.0 SURVEYING

CONTRACTOR shall perform all surveying necessary from base lines and bench marks established by COMPANY. The accuracy for all grades and elevations of any structures and location of installations described in this specification shall be the responsibility of CONTRACTOR.

13.0 EXCAVATION AND BACKFILL

Earthwork shall be in accordance with applicable paragraphs of Specification EG-581. CONTRACTOR shall haul any excess excavated material to a location designated by COMPANY'S Construction Representative.

14.0 DELIVERY AND HANDLING OF COMPANY PROVIDED MATERIALS

- 14.1 Materials furnished by COMPANY will be available to CONTRACTOR at the Refinery Storehouse. CONTRACTOR shall provide the necessary labor and equipment for handling and transporting materials.
- 14.2 CONTRACTOR shall be responsible for keeping all material in good condition until acceptance of the installations, subject to Section 5.3 of the Terms and Conditions.
- 14.3 Upon completion of the installations, CONTRACTOR shall provide COMPANY an inventory of all remaining material which was provided by COMPANY including the quantity, description, and the item number for each item. When directed by COMPANY, CONTRACTOR shall transport the remaining material to the locations on COMPANY'S premises designated by COMPANY.
- 14.4 CONTRACTOR'S requests for withdrawal of COMPANY-furnished material and equipment shall be based on quantities shown on drawings or lists of materials furnished by COMPANY. CONTRACTOR shall obtain approval from COMPANY'S Representative before materials in excess of the quantities shown on the drawings or lists of materials will be issued.
- 14.5 CONTRACTOR shall:
 - a. Be responsible for keeping all materials and equipment in good condition until the completed installations are accepted by COMPANY, including taking any necessary steps such as painting, greasing, installation of rust preventive oil, or covering, etc., to protect all equipment externally and internally from mechanical damage or damage from the elements,
 - b. Be held accountable for surplus materials furnished by COMPANY, items received from COMPANY and to be returned, and for shortages or damages to equipment and materials furnished by COMPANY.

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14.6 CONTRACTOR shall promptly check bills of material or drawings for any errors which would result in shortages and shall notify COMPANY in writing if there are any such errors or if the listed are insufficient to meet his anticipated needs. Delays caused by CONTRACTOR'S failure to discover and promptly report such errors or that the equipment and materials listed are insufficient to meet his anticipated needs shall not constitute a basis for extension of time of completion under Section 3.2 or a basis for reimbursement under Section 3.3 of the Terms and Conditions.

15.0 DRAWINGS AND DIMENSIONS

COMPANY will provide to CONTRACTOR two copies of all pertinent standard drawings, standard specifications, reference drawings, and construction drawings.

16.0 INSPECTION AND TESTING

16.1 General

CONTRACTOR shall be solely responsible for thorough craft inspection during construction and for the quality of the work. COMPANY will make such inspection as COMPANY may desire in order to check the progress and quality of the work, to see that CONTRACTOR'S employees are properly qualified in their respective crafts, that workmanship is of an acceptable grade, and that all requirements of this Specification are being met. Such inspection or any other inspection or testing by COMPANY shall in no way relieve CONTRACTOR of full responsibility for the work hereunder.

16.2 Welding Inspection and Qualification

CONTRACTOR shall arrange for welding qualification tests at his expense at El Paso Testing Company, Inc., 2315 Myrtle Street, El Paso, Texas 79901, phone 532-3831, or other approved testing firm, in accordance with Engineering and Maintenance Instruction EP - 2200. Welders shall be required to pass qualification tests before performing and operation. COMPANY reserves the right to require additional qualification tests during construction if it has any doubt about the competence of welders. COMPANY shall be allowed to witness tests and to examine test coupons. If additional tests are required and passed by welders, cost of retesting will be borne by COMPANY; if failed, cost of retesting shall be borne by CONTRACTOR.

16.3 Concrete Samples

COMPANY may perform compression and slump tests on concrete. CONTRACTOR shall furnish samples taken in accordance with ASTM Specifications as may be requested for the following tests and inspections:

- a. Compression Tests: 3 cylinders from each 10 cu. yd. of structural concrete placed each day.
- b. Slump Tests: Periodic samples daily during pouring of concrete.

17.0 CLEANING UP

During the performance of the work, CONTRACTOR shall keep a reasonable degree of order by disposing of accumulated rubbish and waste material and, at the completion of the work, the site shall be cleared of all debris, left-over tools, consumable supplies, and material which may have accumulated in the performance of the work. Where the CONTRACTOR, after due notice, fails to keep the area of his work reasonably clean and safe, or fails to clean this area at the completion of the work, COMPANY may perform this work; the cost of such work shall be for CONTRACTOR'S account and may be deducted from the sums due or to become due CONTRACTOR.

18.0 COMPLETION

The work will be considered "complete" when CONTRACTOR has performed all work expressly stated or implied in this Specification.

19.0 STEEL WORK

19.1 Fabrication

Structural steel fabrication shall conform to Specification EG-398.

19.2 Erection

CONTRACTOR shall erect all steel work. All work shall comply with latest editions of the AISC Code of Standard Practice for steel building and bridges, AISC Specification for design, fabrication, and erection of structural steel for buildings and AWS Standard Code for Arc and Gas Welding in Building Construction.

19.3 Pipe Supports

CONTRACTOR shall fabricate, locate, and install all required pipe supports. Supports for small lines not shown on project drawings shall be field fabricated by CONTRACTOR.

19.4 Bolts and Clips

All bolts and clips required to fasten all pipe supports to structures shall be installed even though the attachments are not shown on the construction drawings.

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19.5 Welders

Field welding on steel work shall be done by welders who are qualified as specified in Section 16.2 of this Specification.

20.0 PAINTING

All exposed metal surfaces of piping, structures, supports, drums and exchangers shall be painted as follows:

20.1 Surface Preparation

Wire brush surface to conform to Steel Structural Painting Council Standard SSPC SP#.

20.2 Primer

LZI primer - low lead, brush, roll or spray.

20.3 Paint

Aluminum paint - Hanley Sunfoe 17-010 or equal, applied according to manufacturer's recommendations.

21.0 CONCRETE WORK

21.1 Scope of Work

CONTRACTOR shall provide and be responsible for all concrete work.

21.2 Methods

Placing and curing concrete shall be in accordance with Specification EG-850.

21.3 Properties

Ready-Mix concrete shall be in accordance with ASTM Specification C-94.

In field mix concrete is used, materials to be used and the procedure to be followed in proportioning and mixing Portland Cement Concrete in the field shall conform with Specification EG-851. Consistency and workability shall be in accordance with Specification EG-851 with a minimum ultimate compressive strength of 3000 psi after 28 days of curing, maximum aggregate size 3/4 inch, slump 3 to 5 inches.

Method of measuring materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

21.4 Anchor Bolts

All anchor bolts securing machinery or equipment shall be provided with sleeves in accordance with Drawing GB-Q68922. After setting equipment, these sleeves shall be filled with grout. Anchor bolts shall be accurately placed and securely tied to avoid movement during concrete placement.

21.5 Special Techniques

CONTRACTOR shall consult COMPANY'S Construction Representative before using such special techniques as, for example: precasting pipeway stanchions, or pumping structural concrete.

SECTION III/PRINCIPLES OF OPERATION

INTRODUCTION

The sectional view of the PG-PL governor (see figure 1) serves to indicate the relative position of the various governor components in the complete assembly. The connecting oil passages between parts are not necessarily in their correct location, but are simplified to facilitate their location. The lower part of the governor consists of the base and power case and the basic components of the hydraulic PG isochronous governor, which functions to maintain a constant engine speed by controlling the fuel supplied to the engine. The upper part of the governor consists of the column, cover, and related parts; it also consists of the pneumatic speed setting mechanism, and optional shutdown and protective devices where applicable.

DESCRIPTION OF OPERATION

The schematic diagram (figure 2) illustrates the essential parts of the governor and speed setting mechanism which are required to regulate fuel and control engine speed.

Speed adjusting in the governor is effected by controlling the position of the speed setting servo piston. Movement of the servo piston to a higher or lower speed setting is obtained by admitting or draining pressure oil to or from the area above the servo piston.

The flow of governor oil to or from the area above the servo piston is controlled by the speed setting pilot valve plunger - contained in a rotating bushing - which is actuated by a controlled air pressure signal or by a manual control knob.

After each speed setting change, a restoring lever connected between the servo piston rod and speed setting pilot valve plunger returns the plunger to the closed port position, stopping the flow of oil to or from the area above the servo piston, thus holding the piston at the position for the particular speed setting of the governor.

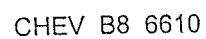
The governor drive shaft passes through the governor base into the pump drive gear, which is direct connected to the rotating pilot valve bushing. The flyweight head is secured to the upper end of the pilot valve bushing, thus providing a direct drive from the engine to the flyweights. At any speed setting of the governor, when the engine is on speed, the centrifugal force of the flyweights will balance the opposing force of the speeder spring with the flyweights in the vertical position, and the control land of the pilot valve plunger will be covering the regulating ports in the rotating pilot valve bushing.

Pressure seal grooves are supplied with pressure oil through the regulating port to prevent the oil trapped between the power piston and the buffer piston from leaking past the power piston, power piston rod and pilot valve stem. To make up leakage of the seal oil and hold the power piston in a steady state position against the power spring - when the engine is on speed with a steady load -- the pilot valve plunger will be below center enough to supply the required amount of oil through the regulating port.

The governor oil pump supplies pressure oil to the rotating pilot valve bushing, speed setting pilot valve bushing, pressure seal grooves, and to the accumulators, with excess oil (at maximum pressure) bypassing from the accumulators to the governor sump. Duplicate suction and discharge ball check valves at the pump permit rotation of the governor in either direction.

The pilot valve plunger moves up and down in the rotating pilot valve bushing to control the flow of oil to or from the power cylinder assembly. When the pilot valve plunger is centered (i.e., the control land of the plunger exactly covers the control port of the bushing), no oil flows to or from the power cylinder assembly.

The greater of two forces moves the pilot valve plunger up or down. The centrifugal force developed by the rotating flyweights is translated into an upward force which tends to



the plunger. The centrifugal force is opposed by the downward force of the speeder spring. When the opposing forces are equal, the pilot valve plunger is stationary.

With the pilot valve plunger centered and the engine running on-speed, a change in either of the two forces will move the plunger from its centered position. The plunger will be lowered (1) if the governor speed setting is unchanged but an additional load slows the engine and governor (thereby decreasing the centrifugal force developed by rotating flyweights) or (2) if the engine speed is unchanged but the speeder spring force is increased to raise the governor speed setting. Similarly, the pilot valve plunger will be raised (1) if the governor speed setting is unchanged but load is removed from the engine causing an increase in engine and governor speed (and hence, an increase in the centrifugal force developed by the rotating flyweights), or (2) if the engine speed is unchanged but the speeder spring force is reduced to lower the governor speed setting.

The thrust bearing atop the ballarm toes permits the pilot valve bushing to rotate while the pilot valve plunger does not rotate. In this way, static friction between the bushing and plunger is minimized.

There are several styles of flyweight head assemblies available. The exact model used in any one governor depends upon the application.

A "solid" head assembly is used in governors on prime movers which afford a smooth drive to the governor.

"Spring driven" and "spring driven, oil damped" head assemblies are used to filter torsional vibrations which may be imparted to the governor by the drive from the engine. (These torsional vibrations may originate from a source other than the drive itself but reach the governor through the drive connection). Unless minimized or eliminated, the flyweight head will sense these torsional vibrations as speed changes and continually adjust the fuel valve or racks in an attempt to maintain a constant speed.

Movements of the power piston are transmitted by the piston rod to the engine fuel linkage. Regulated oil pressure under the power piston is used to raise the power piston - to increase fuel - and the power spring above the power piston is used to lower the power piston to decrease fuel.

Located between the pilot valve bushing and the power piston is the buffer compensating system, consisting of the buffer cylinder and piston, the buffer springs, and the compensating needle valve. Lowering the pilot valve plunger

permits a flow of pressure oil from the pilot valve bushing into the buffer system and power cylinder to raise the power piston and increase fuel. Raising the pilot valve results in a flow of oil from the power cylinder and buffer system to the governor sump, and the power spring moves the power piston down to decrease fuel to the engine.

This flow of oil in the buffer system - in either direction - carries the buffer piston in the direction of flow, compressing one of the buffer springs and releasing the other. This action creates a slight differential in the pressures of the oil on opposite sides of the buffer piston, with the higher pressure on the side opposite the spring which is compressed. These differential oil pressures are transmitted to the areas above and below the compensating land on the pilot valve plunger, producing an upward or downward force on the compensating land which assists in re-centering the pilot valve plunger whenever a fuel correction is made.

The vertical position of the flyweights with the control land of the pilot valve covering the regulating port indicates that the engine is on-speed.

THEORY OF OPERATION

See figure 2 for the schematic diagram of the essential components of the basic governor and speed setting mechanism and the relative positions they assume when the engine is operating on-speed under steady-state conditions. Differences may exist in the actual design details of these components from one governor to another, but the scheme of operation is the same in each.

The schematic arrangement of the "direct" speed setting mechanism (governor speed increases as the control air pressure signal increases) is incorporated into the diagram of figure 2. The inset shown on figure 2 shows the "reverse" speed setting (governor speed decreases as the control air pressure signal increases) version.

The following theory of operation describes the direct speed setting mechanism. The sequence of events occurring in the governor take place more or less in a simultaneous manner, rather than step by step as described in the following paragraphs.

SPEED INCREASE

An increase in the control air pressure signal to the pneumatic receiver assembly is sensed by a bellows. Through a mechanical connection to the speed setting pilot valve plunger, the bellows movement - caused by changes

In the input signal pressure -- displaces the speed setting pilot valve plunger to change the governor speed setting. The increased pressure compresses the bellows to lower the speed setting pilot valve plunger. Pressure oil flows to the area above the speed setting servo piston to force the piston down, and thus increase the governor speed setting.

As the servo piston moves down, a restoring lever -- connected between the servo piston rod and speed setting pilot valve plunger on a ball bearing pivot -- increases the lifting force on a restoring spring attached to the restoring lever. When the lifting force of the restoring spring is equal to the downward force resulting from the increased pressure signal, the speed setting pilot valve plunger will be returned to its centered position.

Increasing the speed setting of the governor increases the downward pressure of the speeder spring on the toes of the flyweights and the flyweights move in, lowering the pilot valve plunger and opening the control port.

Opening the port in this direction admits pressure oil into the buffer system, causing the buffer piston to move to the right and transfer an equal volume of oil to the power cylinder, forcing the power piston up in the direction to increase fuel.

As the buffer piston moves in the direction of the oil flow -- from pilot valve to power cylinder -- the right buffer spring is compressed and the left spring is relieved. This produces an intermediate oil pressure on the left side of the buffer piston which is higher than the pressure of the trapped oil on the right side of the buffer piston and spring displacement.

Simultaneously with the movement of the power piston and buffer piston, the differential oil pressures on opposite sides of the buffer piston are transmitted to the upper and lower sides of the compensating land, with the higher pressure on the lower side causing an upward force on the compensating land which will increase until (added to the upward force of the flyweights) it will balance the speeder spring force, raise the pilot valve plunger enough to cover the control port, and return the flyweights to the vertical position. As soon as the control port is covered the power piston will be stopped at a new position corresponding to the increased amount of fuel needed to operate the engine at the desired higher speed. The engine is still accelerating toward the new speed setting.

As the centrifugal force of the flyweights increases to a higher value with engine acceleration, the upward oil force

at the compensating land is reduced to zero by the equalization of the oil pressures in the buffer system through the compensating needle valve. If the needle valve is correctly adjusted the oil pressures will equalize at the same rate as the increase in the centrifugal force of the flyweights, and the flyweights will remain in the vertical position, keeping the control port covered by the control land of the pilot valve, and holding the power piston stationary at the new position. Equalizing the oil pressures in the buffer system allows the buffer springs to return the buffer piston to center in the buffer cylinder.

The engine will now be running at a higher speed with an increased fuel setting.

SPEED DECREASE

A decrease in the control air pressure signal to the bellows of pneumatic receiver assembly allows the restoring spring -- attached to restoring lever -- to lift the speed setting pilot valve plunger. Oil drains from the area above the servo piston, the servo piston spring forces the piston to rise and thus decrease the speeder spring compression and lower the governor speed setting.

The restoring lever follows the movement of the servo piston, moves up and, in so doing, decreases the lifting force on the restoring spring. When the servo piston and right end of the restoring lever has moved up sufficiently to balance the upward force of the restoring spring to equal the decrease in downward force resulting from the decrease in control air pressure signal, the speed setting pilot valve plunger will have returned to its centered position.

Lowering the speed setting of the governor decreases the downward pressure of the speeder spring on the toes of the flyweights and the flyweights move out, raising the pilot valve plunger and opening the control port.

Opening the port in this direction permits oil to flow from the buffer system to the governor sump. This will lower the oil pressure in the buffer system and the power spring will force the power piston down in the direction to decrease fuel. As the buffer piston moves in the direction of the oil flow -- from power cylinder to pilot valve -- the left buffer spring is compressed and the right spring is relieved. This produces a pressure in the trapped oil, on the right side of the buffer piston which is higher than the intermediate oil pressure on the left side of the buffer piston, by an amount proportional to the displacement of the buffer piston and spring.

Simultaneously with the power piston and buffer piston

ment, these pressures will be transmitted to the compensating land, with the higher pressure now on the upper side of the land, causing a downward force which will increase until (added to the downward force of the speeder spring) it will balance the flyweight force, lower the pilot valve plunger enough to cover the control port, and return the flyweights to the vertical position. As the control port is covered the power piston will stop at a new position to correspond to the reduced amount of fuel required to operate the engine at the desired lower speed. The engine will be still decelerating toward the new speed setting.

As the centrifugal force of the flyweights decreases with engine deceleration, the downward oil force at the compensating land will again be reduced to zero by the equalization of the oil pressures in the buffer system through the compensating needle valve. With the needle valve correctly adjusted the oil pressures will equalize at the same rate as the decrease of centrifugal force in the flyweights, and the flyweights will remain in the vertical position, keeping the control port covered by the control land of the pilot valve, and holding the power piston stationary at the new position. Again, the buffer piston will be returned to center by the action of the buffer springs. The engine will now be running at a lower speed with a reduced fuel setting.

Bypass ports are provided in the buffer cylinder to facilitate large corrective movements of the power piston.

A large increase or decrease in the speed setting of the governor, or a large increase or decrease of load on the engine, will require a correspondingly large movement of the power piston to make the necessary correction to the fuel setting. Under such conditions, the buffer piston will move only far enough to the left or right to effect an opening at the bypass port (pressure or drain). Oil will then flow directly to or from the power cylinder through the bypass port without further increasing the differential oil pressure force existing on the compensating land.

As soon as sufficient governor movement and fuel correction has occurred to effect a correction of engine speed toward the speed at which the governor is set, the differential oil pressures -- still present -- will act on the compensating land to re-center the pilot valve plunger, as described in the previous paragraphs.

With a large decrease in load the power piston assembly will move to the "no fuel" position, closing the compensating passage from the power cylinder to the compensating needle valve and blocking passage of oil from the right end of the left end of the buffer cylinder, so that the needle valve cannot equalize buffer oil pressures in the usual

manner. The buffer piston will have moved off center to the left and will be held there by the oil now trapped between the power piston and the buffer piston.

The higher pressure of the oil on the right side of the buffer piston -- produced by the compression of the left buffer spring -- will act on the receiving compensating land to add to the effect of the speeder spring setting and provide a temporary higher speed setting of the governor.

As the engine decelerates to a speed slightly below this higher speed setting, the governor will respond to raise the power piston (and restore fuel supply) in the normal manner, uncovering the port to permit passage of oil through the compensating needle valve so that the governor and engine will stabilize at the speed corresponding to the actual speed setting of the governor. This minimizes possible under-speeding of the engine when a large load decrease occurs.

MANUAL SPEED SETTING

The manual speed setting mechanism can be used to adjust the speed setting of the governor to any point within the normal speed range when the control air pressure signal is not available.

With no air signal, the restoring spring holds the pneumatic low speed stop screw in contact with the restoring lever. The speed setting pilot valve plunger is thus mechanically connected to the movement of the restoring lever. The grounded loading spring which keeps the restoring lever against the ball bearing pivot continually urges the bearing and speed setting screw in the downward direction. Turning the manual speed adjusting knob clockwise (to increase the governor speed setting) lowers the stop collar under the base speed adjusting nut. The speed setting screw with the ball bearing pivot will move down with the stop collar until the high speed stop adjusting setscrew hits the high speed stop pin; further clockwise turning of the manual knob will have no effect on the speed screw position.

As the speed setting screw and the ball bearing pivot are lowered, the left end of the restoring lever pushes the pneumatic low speed adjusting screw down and, in so doing, lowers the speed setting pilot valve plunger. Oil flows to the speed setting cylinder to push the speed setting piston down and raise the governor speed setting. The downward movement of the piston raises the left end of the restoring lever to "lift" the pilot valve plunger back to center.

Turning the manual speed adjusting knob counterclockwise will raise the speed setting screw and ball bearing pivot, raise the left end of the restoring lever, and thereby lift the speed setting pilot valve plunger. As the piston moves up to decrease the governor speed setting, the restoring lever movement recenters the pilot valve plunger.

TEMPERATURE COMPENSATION

Temperature compensation on older governors is incorporated in the speed setting mechanism through a bimetal strip in the restoring lever. The temperature compensation in later governors is in the speeder spring and there is no bimetal strip.

LOSS OF PNEUMATIC SIGNAL

"DIRECT" TYPE BELLOWS. The pneumatic low adjusting screw is adjusted to contact the restoring lever when the control air signal and governor speed are at their normal

minimum. Thus, should the air signal be interrupted -- either accidentally or intentionally -- or be reduced below the pressure required for minimum speed, the restoring spring will lift the speed setting pilot valve plunger until the adjusting screw contacts the restoring lever. With the pilot valve plunger raised, the speed setting piston will move up to the low speed position. At this position, the restoring lever, turning about the ball bearing pivot and pushing down on the adjusting screw, will have recentered the pilot valve plunger. The governor will, therefore, go to minimum speed setting if the air signal is lost.

"REVERSE" TYPE BELLOWS. The pneumatic low speed adjusting screw is adjusted to just clear the restoring lever when the control air signal is at its normal maximum setting. Thus, should the air signal be interrupted -- either accidentally or intentionally -- the spring under the bellows will act to lower the speed setting pilot valve plunger and allow the governor to go to maximum speed setting.

UTILITIES 7

UTILITIES

PU-1342

ELECTRICAL

Main Power to Unit:

<u>Voltage</u>	<u>Source</u>
2300 (Circuit 55B) except C-500's	No. 90 Auto Switch Station
2300 (Circuit 85B) - C-500's	207 Substation
440	184 Substation
110 (Normal)	184 Substation
110 (Emergency - Lights and Instruments and C-500's gear oil pumps)	43 Substation

STEAM

- a. 650 PSIG - used on turbine drives on C-400 A and B Hydrogen Recycle Gas Compressors which exhaust to surface condensers E-405A and E-405B, respectively, and P-8A Platformer Reactor Charge Pump, P-3 H.B. Reactor Charge Pump and P-8B Platformer Rx - H.B. Rx Charge Common Spare Pump which exhaust to E-607 surface condenser.
- b. 125 PSIG - used on all other turbine driven and reciprocating pumps and C-401 Gulfiner Hydrogen Compressor. It is also used on all vacuum jets, as steam out to the towers and heater fireboxes, as utility steam and as snuffing and safety steam. 125 lb. steam is also connected to the discharge of the Hydrobon charge pump (P-3) and all reboiler pumps (P-2, P-7, P-600 and P-601) in case of emergency.

The 125 psig steam drivers exhaust either into the 15 psig system or E-607 Surface Condenser as follows:

15 psig Exhaust Steam

P-1B	Prefractionator Reflux Pump (Spare)
P-4	Water Injection Pump
P-6B	H.B. Stripper Reflux Pump (Spare)
P-10B	Prefractionator O.H. Pump (Spare)
P-400B	Prefractionator Charge - H.B. Stripper Charge Common Spare
P-402B	E-405A Surface Condenser Condensate Pump (Spare)
P-402D	E-405B Surface Condenser Condensate Pump (Spare)
P-603B	Depropanizer Ref.-Deb. Ref. Common Spare
P-606B	E-607 Surface Condenser Condensate Pump (Spare)
P-609B	Deb. Bottoms Pump (Spare)
P-501	Drips from V-504 Pump
C-401	Gulfiner H ₂ Compressor

E-607 Surface Condenser

P-2A	Pref. Bottoms Pump
P-2B	Pref. Bottoms - H.B. Stripper Reboiler Common Spare
P-5	H.B. Stripper Charge Pump
P-7	H.B. Stripper Reboiler Pump
P-401A	Deprop. Charge Pump
P-401B	Deprop. Charge Pump (Spare)
P-600A	Deprop. Reboiler Pump
P-600B	Deprop. Reboiler Pump (Spare)
P-601	Debut. Reboiler Pump
P-602	Debut. Reboiler Pump (Spare)

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UTILITIES PU 1342 - Continued

- c. Condensate from Surface Condensers is sent to 15 Boiler House. Condensate is also used to water wash Pref. O.H. Condensers, H.B. Effluent Condensers, and the Hydrogen Filter. It also is used for water injection.

COOLING WATER

The cooling water is supplied to the unit by 169 Cooling Tower, located west of the unit at the end of 28th Street. Other units supplied by 169 are IU 341, DCU 841-2, PU 1343 and No. 3 Gas Plant. The cooling water is supplied at 88-95°F and 40 psig normally.

FILTER WATER

Filter water supplied to the unit is used for the toilet facilities.

SALT WATER

Low pressure (20-25 psig) salt water is used for unit wash-up water and high pressure (70-80 psig), salt water is connected to the fire hydrants around the unit.

AIR

Yard air is supplied to the unit from the west battery limit, and supplies both the utility and instrument air systems on the unit. The normal operating pressure is about 90-100 psig and the instrument air branch maintains about 50 psig. In case of an air failure or reduction in instrument air pressure to 35 psig, the air compressors C-1A; C-1B and C-1C supply the instrument air needs automatically.

RWL:mkw:10-28-74

EQUIPMENT 7

PLATFORMING UNIT NO. 1342

Equipment List

Hydrobon Section

V-1	Prefractionator Column	V-409	Prefractionator Charge Fil
V-2	Prefractionator Receiver	V-410	Prefractionator Charge Fil
V-3	Hydrobon Reactor	V-411	Prefractionator Charge Fil
V-4	Hydrobon Products Separator		
V-5	Hydrobon Flash Drum		
V-6	Hydrobon Stripper Column		
V-7	Hydrobon Stripper Receiver		
V-8	Corrosion Inhibitor Tank		
V-9	Corrosion Inhibitor Tank		
V-10	Corrosion Inhibitor Tank		
E-1	Prefractionator Condensers (4)		
E-2	Prefractionator Overhead Coolers (2)		
E-3	Prefractionator Bottoms Coolers (2)		
E-4	Gas Exchanger (Hydrobon)		
E-5	Charge Exchangers (4)		
E-6	Stripper Feed Exchangers (2)		
E-7	Hydrobon Products Condensers (2)		
E-8	Hydrobon Stripper Condensers (2)		
P-1A	Prefractionator Reflux Pump		
P-1B	Prefractionator Reflux Pump (Spare)		
P-2A	Prefractionator Bottoms Pump		
P-2B	Common Spare for Pumps P-2A and P-7		
P-3	Hydrobon Reactor Charge Pump		
P-4	Water Injection Pump		
P-5	Hydrobon Stripper Charge Pump		
P-6A	Hydrobon Stripper Reflux Pump		
P-6B	Hydrobon Stripper Reflux Pump (Spare)		
P-7	Hydrobon Stripper Reboiler Pump		
P-8A	Platforming Reactor Charge Pump		
P-8B	Common Spare for Pumps P-3 and P-8A		
P-9	Corrosion Inhibitor Injection Pump		
P-10A	Prefractionator Net Overhead Pump		
P-10B	Prefractionator Net Overhead Pump (Spare)		
H-602	Prefractionator Reboiler Heater		
H-1	Hydrobon Charge Preheater		
H-2	Hydrobon Charge Heater		
H-3	Hydrobon Stripper Reboiler Heater		

Reactor Section

V-400	No. 1 Reactor
V-401	No. 2 Reactor
V-402	No. 3 Reactor
V-404	Reactor Products Separator
V-405A	Chem. or Condensate Injec. Tank
V-405B	Chem. or Condensate Injec. Tank
V-406	Fuel Gas Drum
V-407	Product Gas Drum
V-408	Compressor Suction (C-401)

Reactor Section (Continued)

E-400A Prefractionator Charge Exchanger
E-400B Prefractionator Charge Exchanger
E-401A Recycle Gas Exchanger
E-401B Recycle Gas Exchanger
E-402A Combined Feed Exchangers (8)
E-402B Combined Feed Exchangers (8)
E-403A Reactor Products Condensers (4)
E-403B Reactor Products Condensers (4)
E-405A Surface Condenser for C-400A
E-405B Surface Condenser for C-400B

P-400A Prefractionator Charge Pump
P-400B Common Spare for Pumps P-400A & P-5
P-401A Depropanizer Charge Pump
P-401B Depropanizer Charge Pump (Spare)
P-402A Surface Cond. Condensate Pump for E-405A
P-402B Sur. Cond. Condensate Pump (Spare)
P-402C Surface Cond. Condensate Pump for E-405B
P-402D Sur. Cond. Condensate Pump (Spare)
P-404 Chem. or Condensate Injec. Pump

H-400 Platforming Charge Heater
H-401 Platforming Intermediate Heater

C-400A Recycle Gas Compressor
C-400B Recycle Gas Compressor
C-401 Gulfiner Gas Compressor

Fractionation Section

V-600 Depropanizer Column
V-601 Depropanizer Receiver
V-602 Debutanizer Column
V-603 Debutanizer Receiver
V-604 Depentanizer Column-Out of Service
V-605 Depentanizer Receiver-Out of Service

E-600 Depropanizer Feed Exchangers (2)
E-601 Depropanizer Condensers (3)
E-602 Debutanizer Condensers (2)
E-603 Debutanizer Overhead Cooler
E-604 Depentanizer Condenser (2)-Out of Service
E-605 Depentanizer Overhead Coolers (2)-Out of Service
E-606 Debutanizer Bottoms Cooler
E-607 Surface Condenser

P-600A Depropanizer Reboiler Pump
P-600B Depropanizer Reboiler Pump (Spare)
P-601 Debutanizer Reboiler Pump
P-602A Depentanizer Reboiler Pump-Out of Service
P-602B Common Spare for Pumps P-601 & P-602A
P-603A Depropanizer Reflux Pump
P-603B Common Spare for Pumps P-603A and P-604
P-604 Debutanizer Overhead Pump
P-605A Depentanizer Overhead Pump-Out of Service

Fractionation Section (Continued)

P-605B Common Spare for Pumps P-605A and P-608
P-606A Surface Condenser Condensate Pump for E-607
P-606B Surface Condenser Condensate Pump (Spare)

P-608 Depentanizer Net (Rerun) Overhead Product Pump-Out of Service
P-609A Debutanizer-Depentanizer Net Bottoms Pump
P-609B Debutanizer-Depentanizer Net Bottoms Pump (Spare)

H-600 Depropanizer Reboiler Heater
H-601 Debutanizer Reboiler Heater

Hydrogen Gathering System

V-500 Hydrogen Filter
V-501 Compressor Suction Drum (C-500's)
V-503 Compressor Discharge Drum (C-500's)
V-504 Hydrocarbon Drips Drum

E-500 Compressor Discharge Cooler

P-501 Hydrocarbon Drips Pump

C-500A Hydrogen Booster Compressor
C-500B Hydrogen B oster Compressor
C-500C Hydrogen Booster Compressor

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PU 1342 EMERGENCY OPERATING PROCEDURES

1342-C-1
TEB:10-28-66

The following procedures outline general steps to be taken in some types of foreseeable emergency situations. Since it is impossible to anticipate all such situations, these instructions are general only and each emergency must be handled according to the existing conditions.

It is absolutely essential that all operating personnel, and especially all No. 1 Operators, be thoroughly familiar with the unit so that proper corrective measures can be taken without delay.

A. POWER FAILURE

1. The steam driven spares for all motor driven pumps must be put on as quickly as possible. Handle them in the following order of importance:

a. Lube and Seal Oil Pumps for Recycle Comp.:

Stm. spare for Elec. Lube or Seal Oil for Comp.

PCL - 2	PCL - 1	Lube	C-400A
PCS - 2	PCS - 1	Seal	C-400A
PCL - 4	PCL - 3	Lube	C-400B
PCS - 4	PCS - 3	Seal	C-400B

b. All reflux pumps and Prefract. Charge Pump:

Stm. spare for Elec.:

P-6B	P-6A	Hydrobon Stripper Reflux
P-1B	P-1A	Prefract. Reflux
P-400B	P-400A	Prefract. Charge
P-603B	P-603A	Deprop. Reflux

c. All steam condensate pumps from surface condensers:

Stm. spare for Elec. Cond from surface condenser

P-606B	P-606A	Pump
P-402B	P-402A	C-400A
P-402D	P-402C	C-400B

d. Pumps on products to field:

Stm. spare for Elec.:

P-609B	P-609A	Debut. Flat. to field
P-10B	P-10A	Prefract. OH to field

2. The electric driven Hydrogen Booster Compressors will stop with loss of power. Immediately switch the hydrogen to the Product Gas Drum and use the "hot line" telephone to inform the Hydrogen Maker Unit. Block in each comp.

A. POWER FAILURE (Continued)

3. Put all firing gas controllers on manual control, since the electronic temperature controllers will be out of service.

For this reason, all manual air controllers should be kept adjusted so that the air output will match the normal air output of the controller, then these instruments can be put on manual by merely flipping the transfer switch from "automatic" to "manual".

4. A complete power failure will kick off all the cooling tower fans. As soon as power is restored, the personnel in charge of the fans must reset the starting switch circuits immediately.
5. If the power is not restored within a short time, the loss of cooling tower fans will cause the water to become so hot that the unit must be shut down.

B. INSTRUMENT AIR FAILURE

1. Locate reason for failure. It could be due to several causes, including the following:
 - a. Failure in yard air distribution system outside the battery limits. Use air-jammers to supply instrument air to unit.
 - b. Failure of pressure reducing valves on instrument air system inside battery limits. Admit enough air thru the bypass valve to keep instruments on control.
 - c. Stoppage in air driers, lines, or filters. Bypass that section responsible.
2. If the air failure is complete, it will require an immediate shutdown since all regulators are air operated and all flows are measured by means of D/P cells which require air. The following steps should be taken:
 - a. Cut out all fires and put steam in fire box.
 - b. Shut down and block off Reactor Charge Pumps. Leave recycle compressors operating.

PU 1342 EMERGENCY OPERATING PROCEDURES

1342-C-3
TBB:10-28-66

B. INSTRUMENT AIR FAILURE (Continued)

2. c. Shut down unit in orderly fashion. Open bypass valves where necessary to permit flow thru lines.
- d. Block in Platformer Reactor System and Towers and leave bottled-up.
- e. Shut down Booster Comp. and switch Hydrogen to Product Gas Drum.
3. Always keep in mind that all pressure indicators in the control room are pneumatically transmitted and in the event of air failure, these are useless.

C. COOLING WATER FAILURE

1. A complete loss of cooling water would require an immediate shutdown of the entire unit.
 - a. Cut out all fires and put steam in fire boxes.
 - b. Shut down and block off Reactor Charge pumps.
 - c. Shut down unit in orderly fashion.
 - d. Keep recycle compressors running as long as possible. Without cooling water, lube and seal oil will soon get hot.
 - e. Keep reboiler pumps running until steam is in the fire boxes or as long as possible.
 - f. Block in Platformer Reactor System and Towers and leave bottled-up.
 - g. Shut down Hydrogen Booster Comp. and switch H₂ to Product Gas Drum.
 - h. Use Product Gas Drum or flare lines to reduce pressures on all vessels below pop-off pressures.

D. STEAM FAILURE

1. A partial steam failure or steam "shortage" will require all plant units to reduce steam usage depending on the severity, and the Shiftforeman will initiate the step-wise procedure:

D. STEAM FAILURE (Continued)

1. a. For PU 1342, this will usually require shutting down one compressor.
- b. Lower heater outlet temperatures 15 to 20°F on all reactor inlets.
- c. Reduce reactor charge rate to 16,000 B/D.
2. A complete steam failure will require a complete shut-down since the recycle compressors, reactor charge pumps and reboiler circulation pumps are steam driven.
 - a. Cut out all fires. Open all air doors and dampers as wide as possible to allow heaters to ventilate by natural draft.
 - b. Shut down all pumps, including Booster Comp. Switch H₂ to Prod. Gas Drum.
 - c. Block in Platformer Reactor System and Towers.
 - d. Reduce excessive pressures to vent or flare.

E. EXPLOSION, FIRE, LINE RUPTURE - ALERT FIRE DEPARTMENT

1. Cut all fires from heaters. If heater or control valves are beyond reach, use main gas valve. Put steam in fire boxes.
2. Shut down and block off Reactor Charge pumps and Hydrogen Booster Compressors.
3. Leave recycle compressors running, if possible.
4. Block the oil or gas flow to the fire or rupture.
5. Get steam hoses directed to the rupture.
6. Depressure unit to flare.

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PU 1342 EMERGENCY OPERATING PROCEDURES

1342-C-3
TEB:10-28-66

B. INSTRUMENT AIR FAILURE (Continued)

2. c. Shut down unit in orderly fashion. Open bypass valves where necessary to permit flow thru lines.
 - d. Block in Platformer Reactor System and Towers and leave bottled-up.
 - e. Shut down Booster Comp. and switch Hydrogen to Product Gas Drum.
3. Always keep in mind that all pressure indicators in the control room are pneumatically transmitted and in the event of air failure, these are useless.

C. COOLING WATER FAILURE

1. A complete loss of cooling water would require an immediate shutdown of the entire unit.
 - a. Cut out all fires and put steam in fire boxes.
 - b. Shut down and block off Reactor Charge pumps.
 - c. Shut down unit in orderly fashion.
 - d. Keep recycle compressors running as long as possible. Without cooling water, lube and seal oil will soon get hot.
 - e. Keep reboiler pumps running until steam is in the fire boxes or as long as possible.
 - f. Block in Platformer Reactor System and Towers and leave bottled-up.
 - g. Shut down Hydrogen Booster Comp. and switch H₂ to Product Gas Drum.
 - h. Use Product Gas Drum or flare lines to reduce pressures on all vessels below pop-off pressures.

D. STEAM FAILURE

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2. A complete steam failure will require a complete shut-down since the recycle compressors, reactor charge pumps and reboiler circulation pumps are steam driven.
 - a. Cut out all fires. Open all air doors and dampers as wide as possible to allow heaters to ventilate by natural draft.
 - b. Shut down all pumps, including Booster Comp. Switch H₂ to Prod. Gas Drum.
 - c. Block in Platformer Reactor System and Towers.
 - d. Reduce excessive pressures to vent or flare.

E. EXPLOSION, FIRE, LINE RUPTURE - ALERT FIRE DEPARTMENT

1. Cut all fires from heaters. If heater or control valves are beyond reach, use main gas valve. Put steam in fire boxes.
2. Shut down and block off Reactor Charge pumps and Hydrogen Booster Compressors.
3. Leave recycle compressors running, if possible.
4. Block the oil or gas flow to the fire or rupture.
5. Get steam hoses directed to the rupture.
6. Depressure unit to flare.

TBB:jdl:10-28-66

Box # 2 of 2

Operators Training Manual
443 HFAU

11-1-78

I N D E X

OPERATOR'S TRAINING MANUAL

443 HFAU

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SCHEDULED GUIDE FOR LEARNING

443 HFAU

Week 1

1. Supply employee with a unit manual.
2. Instruct new employee on procedures involving his personal safety.
 - a. Correct way to sample.
 - b. Precautions in using and treatments for chemicals or toxic materials on unit.
 - c. Locations and use of protective clothing, face shield, blankets, stretchers, gas mask, personal vats, etc.
 - d. Reporting fires.
 - e. Location of fire fighting equipment.
 - f. Tagging procedures: significance of green, orange, and yellow tags.
- * UNIT SUPERVISOR WILL REVIEW EMPLOYEE'S PROGRESS (3-DAY REVIEW)
3. Instruct employee on procedure and location of all readings taken on the unit and procedure to follow when making minor changes on unit.
 - a. Readings on the board and necessary changes with instruments.
 - b. Proper method for running boil-ways and gravities.
 - c. How to run titrations of caustic and how to make adjustments in caustic strength.
 - d. How to hold ph on cooling water and how to make necessary changes on chemical composition in tower.
 - e. Learn proper method for MARKING IBM cards.
4. Instruct employee on proper procedure for oiling and changing oil in pumps.

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)

Week 2 & 3

1. Review all safety procedures for personnel on the units.
2. Learn the "general discussion" and flow of the unit (Start Item #3).
 - a. Purpose of the unit.
 - b. Charge sources.
 - c. Products produced, destination of products, and alternate destinations.
3. Learn emergency shutdown procedure (review each week hereafter).

Week 4

1. Learn the flow of the unit and trace all feed lines to V1 Treaters, V5 Deethanizer Tower, V10 Deisobutanizer, Depropanizer, Alkylate Tower, and Caustic Treaters.
2. Learn the charges to 6441-2-3-4, 6141, and 7542.
3. Learn charge source.
 - a. H. F. Acid
 - b. Spent Acid (ASO)
 - c. Caustic
 - d. BB - Amylene
 - e. Isobutane

* AT THIS POINT, SUPERVISOR WILL REVIEW EMPLOYEE'S PROGRESS (30-DAY REVIEW)

Week 5

1. Learn the operations and function of the Accumulator, Treaters, Towers, Cooling Tower, Caustic Scrubbers, the Exhaust Steam System, 650 lb. Steam and 125 lb. Steam Systems.

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)Week 6

1. Learn the control system of the unit.
 - a. Effect of pressure.
 - b. Effect of temperature
 - c. Flow in and out of towers on product control (overpoint, endpoint, and gravity).
2. Learn the instrument control system of the following.
 - a. Caustic Treating System (443).
 - b. Feed accumulators
 - c. Deethanizer Tower
 - d. V10 and Deisobutanizer, Depropanizer, Propane Scrubber
 - e. Alkylate Splitter
 - f. Cooling and Make-Up Water and Water Pumps
 - g. Isobutane Dryer
 - h. Pump Flush
 - i. Depentanizer Tower
 - j. 7542 Mercaptan Unit
 - k. Warning Signals in Control Room (Hi-Levels, Pumps, etc.)

Week 7 & 8

1. Learn the following pumps, their locations, and their related equipment.
 - a. H. F. Acid Pumps on the unit.
 - b. Caustic Pumps by number and location.
 - c. Propane Pumps.
 - d. Fresh Feed Pumps on the unit.

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)

- e. Water Pumps and location
 - f. Alkylate Pumps
 - g. Reflux Pumps
2. Trace the flow as in the Fourth Week Item
- # learning location, function, control of each regulator and control point in unit flow.
- * AT THIS POINT, THE UNIT SUPERVISOR WILL REVIEW EMPLOYEE'S PROGRESS
- (60-DAY REVIEW)

Week 9 & 10

1. Learn the following systems on the unit. Know their function related to the unit and source of supply and trace them on the unit.
- a. Flare and Stack Lines
 - b. Natural Gas
 - c. Refinery Fuel Gas and Propane to the Ethylene Unit
 - d. 125# psi Steam System on the Unit
 - e. 15# psi Steam System on the Unit
 - f. 650# psi Steam System on the Unit
 - g. Condensate System on the Unit
 - h. Cooling Water System
 - i. Electricity (2300, 440, 110 volt system and the emergency switch over system)
 - j. Yard Air, Instrument Air (Include Air Dryers)
 - k. Utility Water
 - l. Utility Steam

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)

2. Show the relation between boilaway and gravity on each tower.
 - a. Depropanizer Tower (OH - Propane)
 - b. Deisobutanizer Tower Bottoms (Total Alky)
 - c. Alkylate Splitter Tower OH and Bottoms
 - d. 6441-2-3-4 Bottoms
 - e. 6141 Tower Bottoms
 - f. Caustic
 3. Learn the importance of communication between different units, utility suppliers (Air, Water, Electricity, Steam, and Pump Houses for charges and product destinations)
- * AT THIS POINT, THE UNIT SUPERVISOR WILL REVIEW THE EMPLOYEE'S PROGRESS.

Week 11 & 12

1. Learn actual operating procedures for:
 - a. Start-Ups
 - b. Shutdown
 - c. By-Passes
 - d. Emergency Procedures
 - (1) Loss of air
 - (2) Loss of electricity
 - (3) Loss of cooling water
 - (4) Fires
- * UNIT SUPERVISOR WILL REVIEW EMPLOYEE'S PROGRESS (90-DAY REVIEW)

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)Week 13 & 14

1. Be able to draw a flow diagram of the unit. Divide the unit up and draw sections such as:

a. 6141 Unit

- (1) Fresh Feed
- (2) Reflux and Overhead Product
- (3) Bottoms
- (4) Cooling Water System
- (5) Steam System

b. 6441-2-3-4 Unit

- (1) Fresh Feed
- (2) Reflux and Overhead Product
- (3) Bottoms
- (4) Cooling Water System
- (5) Steam System

c. 7542 Unit

- (1) Caustic System
- (2) Fresh Feed
- (3) Dirty Water System
- (4) Steam System

d. HF 443 Unit

- (1) Fresh Feed System
- (2) Caustic System
- (3) Treating System

SCHEDULED GUIDE FOR LEARNING - 443 HFAU (cont'd)

- (4) Deethanizer Overhead and Bottoms
- (5) ISO Butane and Dryers
- (6) ISO Recycle
- (7) HF Acid System
- (8) HF Acid Rerun
- (9) H-1 Heater
- (10) Deiso Overhead and Bottoms
- (11) Depropanizer Overhead and Bottoms
- (12) HF Stripper Tower Overhead and Bottoms
- (13) Flush Oil from Depropanizer Bottoms
- (14) Flush Oil from HF Stripper Bottoms
- (15) Propane Caustic Scrubber
- (16) Cooling Water System
- (17) Steam System
- (18) Air System

* AT THIS POINT, THE UNIT SUPERVISOR WILL REVIEW EMPLOYEE'S PROGRESS
(105-DAY REVIEW)

Week 15, 16, & 17

1. Be familiar with logbooks, order books, and know the importance of communication between different shifts.
2. Continue increasing knowledge of unit with the use of a training book (HF 443 Training Book). Also use the Pilot Series to increase basic knowledge.

STUDY QUESTIONS

443 HFAU

3-DAY REVIEW

1. What is the correct procedure for opening valves and catching samples?
2. What is the proper procedure for treating and protection for chemicals and gases around unit?
 - A. Caustic
 - B. HF Acid (Oral)
 - C. Sulfuric Acid
 - D. Chlorine Gas
 - E. H₂S Gas
3. What is the proper procedure for using the following:
 - A. Protective Suits
 - B. Face Shields
 - C. Location of Blankets
 - D. Gas Masks
 - E. Personal Vats
4. What is the proper procedure for reporting fires? Who reports a fire?
5. What is the purpose of the following tags:
 - A. Green Tag
 - B. Orange Tag
 - C. Yellow Tag (Gulf Form 9233)
 - D. Red Tag
 - E. Yellow Tag (Plain, Large, or Small)

STUDY QUESTIONS

443 HFAU

30-DAY REVIEW

1. What 5 streams make up charge to the unit?
2. Where do these streams come from?
3. What 5 products can the unit make?
4. Where do each of these products go?
5. What kind of acid is used on this unit and where does it come from?
6. How is the spent acid purified?
7. What is the bottoms of the Refun column called and where does it go?
8. What is the purpose of the caustic section on this unit?
9. What is the purpose of the deethanizer tower?
10. What is the purpose of the HF stripper?
11. What is the purpose of "pump flush"?
12. How is the level in V-12 (Isobutane Accumulator) controlled?
13. Where are the circulating, rerun and ASO samples caught?
What do you use to catch these samples?
14. Are you familiar with the Pilot Training Program?

STUDY QUESTIONS - 443 HFAU
30-DAY REVIEW (cont'd)

COOLING TOWER

1. How is the make-up water controlled?
2. How is the pH controlled?
3. How is the number of cycles controlled?
4. How can one tell how many fans are on?

REMOTE DEPENTANIZERS

1. What is the purpose of the depentanizers?
2. Where does the charge come from?
3. What is the bottom product and where does it go?

MERCAPTAN UNIT

1. What are the charge streams and where do they come from?
2. What is the purpose of the absorbers?
3. What is the purpose of the caustic stripper?
4. Where does the fresh caustic come from?
5. Where does the spent caustic go?

STUDY QUESTIONS443 HFAU60-DAY REVIEW

1. What is the proper method for treating caustic burns?
2. What is the proper method for treating HF Acid Burns?
3. What are the first aid and fire department phone numbers?
4. How do we determine how much chromate is put in the water?
5. How do we check and change the oil on pumps on these units, and how often should it be done?
6. How do we pick up suction on a pump that has lost suction?
7. How are the n-butanes, which can accumulate in the recycle isobutane, controlled?
8. How are the ethanes controlled in the Deethanizer Tower controlled, and why are they controlled?
9. How is the purity of the propane in the Depropanizer Tower controlled?
10. How is the flash, color, and distillation controlled on the Gulfsol-20 from the Alkylate Splitter Tower?
11. What are our primary and secondary circuits at 443?
12. What are the circuits used at the Mercaptan Unit and the Depentanizers?
13. What circuits supply the three water pumps at HFAU-443?
14. What is the purpose of the defluorinators at HFAU-443?
15. How often are air dryers switched at 443 Alky, and how are they dried?
16. How often do we switch the isobutane dryers, and how are these dryers dried?
17. How do we control the caustic circulation at the treating section of HFAU 443?

STUDY QUESTIONS - 443 HFAU
60-DAY REVIEW (cont'd)

18. What is the purpose of personnel vats on 443; what neutralizer do they contain in the acid area, and where are they located?
19. Why should we try to practice good housekeeping on the unit?
20. What is the difference between a #1, #2, and a #3 fire alarm?

STUDY QUESTIONS

443 HFAU

90-DAY REVIEW

1. Demonstrate the proper method to put an instrument on manual.
2. Demonstrate the proper method to switch pumps.
3. Demonstrate the proper method to bypass a regulator.
4. What is the proper first aid for treating caustic burns?
5. What is the proper first aid for treating HF burns?
6. How do you put the treating section and the deethanizer on total reflux?
7. Explain the flow of the caustic treating section on 443 Alky using a flow diagram.
8. Why do we put propane in the recycle isobutane?
9. How is the pressure held on V-12 accumulator?
10. Where can the off-gas from the regenerator system at 443 Alky go?
11. Where can the off-gas from the regenerator system at 7542 Mercaptan Unit go?
12. Explain the operation of all three pump flash systems at 443 Alkylations.
13. How is the overpoint controlled on our depentanizers? (High or low)
14. Why should the dirty water from the barometer condenser be pumped to the treating plant?
15. If the depropanizer bottoms flow drops off and the charge stays the same, what is taking place?
16. How is the overhead temperature in the reflux drum of the regenerator system held constant? Why must temperature be held above 212°F. on the regenerator system?

STUDY QUESTIONS - 443 HFAU
90-DAY REVIEW (cont'd)

17. How do we control the caustic strength on TK-1?
18. If all the pressures are high at the depentanizer towers overhead, how can the pressure be lowered?
19. How do we fight fires on our units?
20. What are the numbers of first aid and the fire department?

STUDY QUESTIONS
FOR ASSISTANT OPERATOR

443 HFAU

105-DAY REVIEW

I. ALKYLATION UNIT

1. What five streams make up the charge to the unit?
2. Where do these five streams come from?
3. What five products can the unit make?
4. Where can each of these products go?
5. What kind of acid is used and where does it come from?
6. How is the spent acid purified?
7. What is the bottoms of the rerun column called, and where does it go?
8. What is the purpose of the isobutane driers?
9. What is the purpose of V-2 and V-3 caustic scrubbers?
10. How is the caustic section put on circulation?
11. How is the deethanizer section put on circulation?
12. What does make-up isobutane mix with first?
13. What do these two streams mix with next?
14. Where does the overhead stream from the acid settler go?
15. Where do the depropanizer bottoms go?
16. Where does the depropanizer overhead go?
17. How is the purity of the propane product controlled?
18. What is the purpose of the HF Stripper?
19. What is the purpose of the defluorinators and the propane caustic treater?
20. What is the purpose of the light alkylate treater?

STUDY QUESTIONS FOR ASSISTANT OPERATOR - 443 HFAU (cont'd)

21. What determines how much make-up isobutane is needed?
22. Where are the circulating acid, rerun acid, and ASO samples caught?

II. COOLING TOWER

1. How is the make-up water controlled?
2. How is the pH controlled?
3. How are the number of cycles controlled?
4. How can one tell how many fans are on?
5. How is the amount of chromate controlled?

III. REMOTE DEPENTANIZERS

1. What are the numbers of the depentanizer?
2. Where does the charge come from?
3. What are the two overhead products, and where do they go?
4. What is the bottom product?

IV. REMOTE DEPROPANIZER

1. What is the number of the depropanizer?
2. Where does the charge normally come from?
3. What is the overhead product, and where can it go?
4. Where do the bottoms normally go?

V. MERCAPTAN UNIT

1. What are the two charge streams, and where do they come from?
2. What is the purpose of each of the three absorbers?
3. What is the purpose of the caustic stripper?
4. Where does the fresh caustic come from?
5. Where does the spent caustic go?

STUDY QUESTIONS FOR ASSISTANT OPERATOR - 443 HFAU (cont'd)VI. EMERGENCY PROCEDURES AND SAFETY

1. How should caustic burns be treated? (Oral)
2. How should HF Acid burns be treated? (Oral)
3. What precautions should be taken around H_2S gas?
4. What precautions should be taken around chlorine gas?
5. What precautions should be taken around ammonia gas?
6. What types of gas masks are used on the unit?
 - A. What is the yellow mask for?
 - B. What is the green canister mask for?
 - C. Air Feed Hood & Zoot Suit?
7. What is the telephone number for emergency first aid?
8. What two methods are used on the unit to fight fires?
9. Where are all fire monitors located on the unit?
10. What is the emergency procedure for reporting a fire? Who reports a fire?
11. What electrical circuits are used on these units?
 - A. 443 Alkylation
 - B. 6441-4 Depentanizers & 6141 Depropanizer
 - C. 7542 Mercaptan
12. Demonstrate proper method to put an instrument on manual and to by-pass regulator.
13. Demonstrate proper method for switching pumps.
14. Divide the unit into sections and sketch drain the flow:
 - A. Charge to the treating section
 - B. Circulating Caustic at 443.

STUDY QUESTIONS FOR ASSISTANT OPERATOR -443 HFAU (cont'd)

- C. Deethanizer on total reflux
- D. From Deiso. Tower to V-10 to Depropanizer and back
- 15. Sketch the flow at the depentanizers.
- 16. Sketch the flow at the Mercaptan Unit.
- 17. Demonstrate the procedures to follow on Emergency Shutdowns on these units.
- 18. What are the tags used on this unit, and what do they mean?

BASIC WORK RULES443 HFAU

The basic work rules listed below are presently in effect and are issued for the information, guidance and safety of employees. The list does not include all Company rules and regulations.

Each operating employee is required to abide by the following rules. Your cooperation will be appreciated.

1. Employees shall be responsible for being at their assigned work locations at their scheduled starting time.
2. Employees shall not leave their jobs without permission from their operator, except for normal personal reasons or in case of emergency.
3. Employees who are unable to report for work shall notify the Light Oil Department shift supervisor in advance of their scheduled starting time. If he cannot be contacted at 507, call the Lieutenant, Plant Security at 2265, who will contact him by radio, and the shift supervisor will call you at the number you give the Lieutenant.
4. Employees shall not smoke in the Plant, except in approved smoking areas.
5. Employees shall use only safety matches in the Plant, when matches are authorized, or approved lighters.
6. Employees shall carry out orders given by their supervisor or the person for whom they are working.

BASIC WORK RULES - 443 HFAU (cont'd)

7. Employees shall obtain leave of absence by requesting permission from their supervisor or the shift supervisor.
8. Employees shall follow safe work practices and wear protective equipment as required.
9. Employees shall not give or loan their employee identification pass to any other person.
10. Employees shall be responsible for proper use of bathhouses.
11. Employees shall not participate in horseplay.
12. Employees shall not remove Company property from the Plant without proper authorization.

HOW TO RETURN TO WORK FOLLOWING
SICKNESS OR OUTSIDE ACCIDENT

All hourly employees who are off due to sickness or outside accidents for more than one day must obtain a "Release to Return to Work" from the Medical and Health Services Division as promptly as practicable after receiving a release from a private physician. If a private physician has not been consulted, employees must obtain a "Release to Return to Work" from Medical and Health Services as soon as practicable upon being able to return to work, and if possible, prior to starting time the day they return. Employees who do not obtain a release from Medical and Health Services prior to the date they are scheduled to return to work will be subject to having their pay denied during the time they obtain their release.

Except in unusual situations, a "Release to Return to Work" may be secured from the nurse on duty. Nurses are on duty at Medical and Health during the following hours:

Monday through Friday - 6:30 AM to 12:00 Midnight

Saturdays, Sundays and Holidays - 7:00 AM to 11:00 PM

Employees may consult the Light Oil Shift Supervisor for further details.

NO SMOKING!EXCEPT AS FOLLOWS

1. During employees' working hours, they must have permission from the person to whom they report to use the smoking areas.
2. Employees are to use the smoking area most convenient to their work area.
3. Employees are not to remain in the smoking areas any longer than the time required to smoke a cigarette.
4. During work hours, employees are not to smoke more than once during the first four hours of their schedule and not more than once during the last four hours of their schedule.
5. The smoking areas will be open for employees in accordance with the following schedule:

<u>Employee Working</u>	<u>Smoking Areas Open</u>
6:00 a.m. - 2:00 p.m.	7:00 a.m. - 1:00 p.m.
2:00 a.m. - 10:00 p.m.	3:00 p.m. - 9:00 p.m.
10:00 p.m. - 6:00 a.m.	11:00 p.m. - 5:00 a.m.

In addition, an employee doubling over from one shift to the next may use the smoking area once at shift-change time.

6. It may be necessary at times to temporarily discontinue the use of a smoking area because of existing conditions. In such cases, a sign stating SMOKING TEMPORARILY DISCONTINUED will be displayed at the smoking area.
7. Temporary smoking areas may be designated on certain major shutdowns or jobs.
8. If an employee is found smoking in an unauthorized area, he will be subject to discharge.

NO SMOKING! EXCEPT AS FOLLOWS (cont'd)

9. Before leaving the area, be sure to put cigarette butts in the container provided for this purpose. Keep the shelter clean and neat.

THINK ABOUT PERSONAL SAFETY443 HFAU

Nearly all accidents are caused by someone doing something or failing to do something against their own good judgment. If they took one moment to think first, the accident would not have been caused. Accidents don't "just happen"; people cause accidents. You are entitled to be told how to prevent personal injury to yourself which is the usual result of an accident. Also, you are responsible to yourself and your fellow employees to think and work safely.

When you hear a steam leak in most cases you will be able to see it. This is not true at the Alkylate Splitter Reboilers, because they operate at 650 psi. Steam at this pressure is extremely hot and does not give the characteristic white plume of 250 psi and lower pressure steam. For this reason, a stick, rag, or piece of paper can be held near the suspected leak to locate it. Using this method still requires care and thought. Don't unwittingly place your hand where it possibly could be struck by this invisible and very hot steam.

When handling chemicals such as corrosion inhibitors and cooling tower chemicals, a hazard exists. Any one or all of the following should be expected: injury to the eyes, irritation of the skin, or penetration by absorption through the skin to injure the body. To prevent injury, you must wear a face shield or goggles and rubber gloves.

Skilled operators frequently choose to wear cotton or leather faced cotton gloves to protect their hands when performing manual work on an operating unit. Gloves can protect your hands from injury in many ways.

THINK ABOUT PERSONAL SAFETY - 443 HFAU (cont'd)Catching Liquid Samples (Hotter than 150°F.)

1. Obtain metal sample catching container.
2. Open valve on sample station and draw liquid slowly to the sewer until sample line is hot. If sample is drawn too quickly and the material is heavy, the hot liquid may blow out and flash after the cold material has been drained from the line.
3. Rinse the metal container and fill slowly.
4. When sample has cooled sufficiently that it will not break a glass bottle, pour sample into sample bottle.

NOTE: If sample station is equipped with a steam-out line, block sample line at the main process line and steam out the sample line to the sewer before liquid hardens in line.

CAUTION: Extreme care should be exercised that no moisture contacts a hot sample. Even one or two drops of water may cause sample to splatter and burn someone.

5. Place proper tag on sample.
6. Empty metal container and leave in an inverted position.

When opening a drain valve or bleeder on a line or other equipment, watch it. If it appears empty because nothing comes out, don't trust it. The moment you turn your back on it, the flow may gush out. In many cases, this has caused injury to employees, and it has been known to cause a bad fire on a unit. NEVER TURN YOUR BACK ON AN OPEN BLEEDER. If it becomes necessary for you to go elsewhere, close the valve before you leave it.

THINK ABOUT PERSONAL SAFETY - 443 HFAU (cont'd)

When handling ammonia, it is most important to keep it out of your eyes. The anhydrous ammonia that we use has an insatiable appetite for water. The ammonia vapor dissolves in the tears in our eyes and rapidly spreads around the eyeball. If you get ammonia in your eyes or on your skin, flush with copious quantities of water. Of course, this can be avoided by wearing goggles or a face shield. Be as careful in handling ammonia as any other hazardous chemical. Personal protective equipment is to be worn when working with ammonia.

Slipping and tripping hazards on an operating unit too frequently go uncorrected. When we think of a sprained back or sprained ankle, we wonder why we didn't clean up that slippery spot on the floor or coil and hang up that idle utility hose before an accident, instead of after it. Oil spills should be cleaned up and idle utility hoses placed out of the walking area. In general, good housekeeping has many advantages.

When operating valves, position your feet securely under you, use a suitable valve wrench and keep your fingers and hands away from objects that could pinch or scrape them. Valves that are difficult to operate need a suitable lubricant. Put grease in grease fittings, and pour a little oil on the stem and threads.

During a power failure when the lights go out, someone must turn on the air to start the two emergency lights in the control room. Become familiar with this emergency safety equipment.

FIRST AID AND SAFETY FOR HYDROFLUORIC ACIDDescription of Hydrofluoric Acid

Hydrofluoric Acid (HF) is a fuming, corrosive liquid at relatively cool temperatures, but its boiling point (approximately 68°F.) is often exceeded by the temperature at which it is used in the refinery. It evaporates rapidly at atmospheric pressure and temperatures above 68°F., thus, releasing a white, steam-like vapor which is very evident and has a distinct, pungent, irritating odor. Both the liquid and its vapors are extremely dangerous when improperly handled. Liquid HF will react immediately with skin upon contact, causing serious burns. The vapors are very irritating to the eyes and mucous membrane and, therefore, must be avoided.

Physiological Effects

1. Liquid HF is corrosive and attacks tissues of the skin and eyes, rapidly producing injuries resembling burns. HF vapors also are irritating to the skin, eyes, and pulmonary tissue and may produce injury as severe as that due to liquid contact.
2. The action of HF in producing injury is three-fold: a dehydrating effect, a corrosive effect, and a specific toxic effect of the fluoridation.
3. Burns due to liquid HF may be immediate or delayed, depending on the acid concentration, but in either case, the injury is very painful and is accompanied by a throbbing sensation around the affected area.
4. Immediate burns are caused by contact with liquid anhydrous HF and with aqueous solutions of HF in concentrations over 20 volume percent.
(Twenty volume percent HF or greater in water.) Pain and formation of blisters are immediate.

FIRST AID AND SAFETY FOR HYDROFLUORIC ACID (cont'd)

Delayed injuries are caused by contact with aqueous solutions of HF in concentrations less than 20 volume percent. Such low concentrations are likely to be found in acid scales, acid soluble oils, water standing near acid service equipment, on contaminated tools, equipment, and the like. The sensation of pain, and the formation of blisters from such contact may be delayed several hours.

5. Inhalation of concentrated HF vapors may produce severe pulmonary irritation, which may be followed by a delayed pulmonary congestion.

FIRST AID443 HFAU1. First Aid Supplies

In any area where there is a possibility of exposure to HF, the following first aid material should be available for immediate treatment of HF contact.

- A. Personnel Vats (filled with a saturated sodium bicarbonate solution) for neutralizing the burned area.
- B. Zephiran - Keep in fresh supply.
- C. Cotton - Surgical type.
- D. Spirits of Ammonia - Ampules preferred.

2. First Aid Treatment for Body Burns

If serious complications from HF burns on the body are to be avoided, first aid treatment must be given immediately before the affected employee leaves the unit area. (Do not use this treatment in the eye. See Eye Treatment)

- A. Saturate burned area and clothing in Personnel Vat.
- B. Proceed to shower and flush with water for 15 minutes while removing clothing.
- C. Discontinue water flushing and pat burned area with ball of cotton saturated with Zephiran solution.
- D. Do Not Rub! Do Not Break Blisters.
- E. Report to physician.

3. First Aid for HF Inhalation

- A. Remove from further exposure while taking care not to inflict burns on self or others.

FIRST AID - 443 HFAU (cont'd)

- B. Inhale weak ammonia vapor (Spirits of Ammonia) to neutralize the HF.
- C. Report to physician while intermittently inhaling ammonia.

4. First Aid for HF Eye Burns

- A. Irrigate eyes with running water for 15 minutes.
- B. Flush eyes with Dacriose Solution for 15 minutes.
- C. Add one or two drops Ophthaine in eyes to kill pain.
- D. Report to physician.

SAFETYPersonal Protective Equipment

Persons entering the unit shall wear protective clothing in accordance with the classifications listed below. Operators who are thoroughly familiar with the hazards of handling HF, condition of equipment, and existing operating conditions will be permitted in roadways only without protective clothing.

Class "A" Clothing: Eye shield (acid-safety goggles) and Neoprene, or equal, gloves (gauntlet type).

Class "A" Work: Reading meters and pressure gauges. Lubricating pumps and valves that are in good condition. Venting and purging and draining equipment or working on any equipment that has been neutralized, properly vented, and drained. All visitors will wear Class "A" clothing.

NOTE: Neoprene footwear should be worn when areas are wet and contaminated with HF.

Class "B" Clothing: Eye shield (acid-safety goggles), face shield, Neoprene gloves (gauntlet type), jumper or an apron with long sleeves.

Class "B" Work: Opening and closing valves. Taking samples. Removing packing from pumps and valves, etc.

Class "C" Clothing: Neoprene, or equal, overalls, jumper, gloves (gauntlet type), footwear (boots, arctics or overshoes), eye shield (acid-safety goggles) and face shield or air-fed hood. The air-fed hood MUST be worn when there is danger of being sprayed with HF. Neoprene footwear may be omitted when the area is dry and acid-free.

SAFETY (cont'd)

Class "C" Work: Preparing any equipment for repairs that may contain HF or acid-hydrocarbon, such as opening and closing valves that are stuck and require considerable force. Venting and purging equipment for shutdown and switching into vessels or sections of lines recently installed or open for repairs or cleaning, especially where it was not practical to apply a leak test. Making initial opening of any equipment containing acid or acid-hydrocarbon or while applying force to small lines and valves that may fail.

Class "D" Clothing: Full-coverage suit, with outside air supply, (Zootsuit).

Class "D" Work: Emergency repair and rescue work, such as closing valves and lines to and from equipment that has failed, installing blinds where conditions necessitate, and entering areas contaminated with HF, etc.

Class "C" clothing for each operator and one zootsuit should be available in the control room at all times for immediate use. It shall be the responsibility of the unit operators to keep the protective equipment in good condition and ready for use by keeping the air-mask hose connected to the airline, air-fed hoods clean and with filter cartridges, and hose connections on each hood for emergency use.

Safety Practices

1. Do not attempt to work in HF for extended periods of time. Your protective equipment affords limited protection only.

SAFETY (cont'd)

2. If HF contacts your clothing, tools, or equipment on which you are working, stop work as soon as practical and neutralize clothing, tools, and equipment before resuming work.
3. Make sure that you are familiar with first aid treatment for HF burns, also the use of neutralizing vats and barrels located within the unit area.
4. Material and equipment shall be neutralized before transferring it from the unit whenever possible. However, upon direct orders from the supervisor, large equipment may be hauled to a vat located outside the battery limits. Supervisor giving such orders will be responsible for such equipment until it is neutralized.
5. Class "B" clothing shall be worn in shops while removing packing and/or dismantling valves, pumps, and meters, even though they have been neutralized.
6. Eye shield (acid-safety goggles) shall be worn while removing scale from equipment that has been in HF service.
7. Do not place the trouser legs inside of boots or jumper tail inside of trousers. Wear glove cuffs inside the jumper sleeve when working down-handed and over the sleeves when working up-handed if there is danger of acid spills or leaks.
8. Do not use an impact wrench to loosen final bolts in flanges where acid or scale might be present. The rotating socket can throw acid or acid scale a considerable distance.
9. Do not attempt to work under drip leaks or under men making initial opening in equipment.

SAFETY (cont'd)

10. Keep portable first aid kit nearby whenever work is being performed at an elevated or remote location. Report any shortage of first aid equipment to the safety department immediately.
11. All tools that have been used on equipment containing HF must be neutralized and cleaned before being returned to the tool boxes or tool house.
12. Wash hands and face frequently to avoid possible delayed burns.
13. Do not wear clothing contaminated with HF in the control room. Keep room acid free.
14. Wash up acid spills immediately to prevent burns to feet or damage to shoes. Use low water pressure to avoid spreading acid over large areas.
15. Keep discarded waste and rubbish in closed containers.
16. Whenever possible, work on wind-ward side of equipment containing HF.
17. Keep protective clothing clean and in good order. Do not attempt to work in damaged clothing, especially damaged protective gloves.
18. Warn all persons, working below or nearby, before venting or opening equipment that may contain HF. Always open each piece of equipment as though it was under pressure. Do not take anything for granted.
19. Do not use personnel vats to neutralize tools and equipment.

GENERAL SAFETY PROCEDURES1. Footing

- a. Clean up oil spills as quickly as possible.
- b. Hold handrail when walking up and down stairs.
- c. Wear shoes with oil-proof soles and safety toes.
- d. Never run.
- e. Never walk on pipes when crossing pipe conduits.
- f. Do not use stools, cans, drums, etc., to stand on.
- g. Never step across cables or chains around the battery limits of unit; use walkways.
- h. Be sure of footing when opening and closing valves and cocks.

2. Ladders

- a. When using extension ladders, check to see that ladder operates properly before using it.
- b. Always be sure the ladder is securely footed.
- c. If possible, have someone hold ladder.
- d. Use safety chain provided on ladder.
- e. Always use proper ladder for job.
- f. Never stand on top step of stepladder.

3. Cocks

- a. Always use correct size cock wrench. Never use Stillson wrench when opening and closing cocks.
- b. Grease cock before opening or closing.
- c. Always remove cock wrench from cocks located overhead or tighten set screw on the wrench to prevent it from coming off.

GENERAL SAFETY PROCEDURES (cont'd)

4. Chemicals

- a. Employees handling chemicals should be familiar with the toxicity, flammability, and explosive characteristics of these materials.
- b. These people should wear the proper protective clothing, such as rubber gloves, face shield, or respirator depending on the chemicals handled.

WEAR SAFE CLOTHING

1. Employees shall wear clothing which affords adequate protection to the body. Items not acceptable include:
 - a. Clothing without adequate sleeve protection for the job being performed.
 - b. Short pants.
 - c. Clothing in poor repair.
2. Employees shall not wear loose clothing with unbuttoned sleeves, exposed shirttails, unconfined neckties, etc., near moving equipment.
3. Employees whose hair style may constitute a hazard when they are near moving equipment or a source of flame shall confine their hair.
4. Employees shall wear a substantial shoe which is in good condition. Sandals, canvas shoes, open-toed shoes, and any other type of shoe that fails to afford adequate protection for the feet or creates a footing hazard are not acceptable.

PROTECT YOUR HEAD

1. The Company provides approved safety helmets (hard hats).
2. Safety helmets must be worn by employees and visitors in all areas of the plant, with the following exceptions:
 - a. Offices, Control Rooms, and Guard Stations
 - b. Roadways and sidewalks when reporting to and from work location, or when in covered vehicles
 - c. Other areas approved by the Refinery Manager

Safety helmets shall be required in the above areas, or parts of the above areas, when in the opinion of the employee's supervisor, a head hazard exists. In addition, each employee shall have the responsibility of wearing his safety helmet wherever a head hazard exists.

PROTECT YOUR HEARING

1. The Company will provide approved hearing protection devices for employees.

Hearing protection must be used in all areas of the refinery where the sound level exceeds the values specified in the Occupational Safety & Health Act.

2. Signs designating noise area and permissible noise exposures have been posted on your unit.
3. In locations such as a unit which is shut down, hearing protection will not be required while equipment is idle and the noise level is below the maximum allowable, even though the area may be posted as a noise area.
4. Ear plugs, ear muffs, and pliable disposable hearing protection are available for use.

USE OF TAGS443 HFAUYellow Tags
(Gulf Form 9233)

- Are to be used for operators to indicate equipment that is not to be used or changed. The person who tags equipment shall write on the tag reason for tagging and sign his name, unit, and date. Tag is not to be removed by anyone other than person who signed tag or by a knowledgeable operator given the authority and responsibility by his supervisor.

Yellow Tags
(Plain)

- Are used on acid, caustic, and other samples that must be handled with special precautions.

Red Tags

- For electricians - Operators must not remove these tags.

White Tags
(Do Not Operate)

- For Maintenance - Operators must not remove these tags.

CAUTION: Equipment which has been tagged out with any of the above tags shall not be put in service, operated, or test-run until all tags have been removed.

Manila Tags

- For identifying samples that are sent to Laboratory.

Tags for HF

Colored tags (orange, green, and yellow) shall be used to designate status or condition of acid service equipment and to assure the safety of personnel working near or handling it.

1. Orange Tags

The orange tags shall be placed on equipment such as valves, pumps, or other equipment which cannot be removed, operated, or disturbed, because in doing so, the safety of personnel making repair,

USE OF TAGS - Cont'd

adjustments, inspection, or installations may be endangered. This equipment is to be tagged and signed by a unit operator. The tags are to be removed only by a unit operator after they are no longer required.

2. Green Tags

All HF acid service equipment, including pipe, valves, pumps, etc., which are to be removed from the unit area to repair shops, storage or salvage, will be neutralized in equipment vats on the unit.

NOTE: Valves, pumps, etc., having packing glands cannot be made acid free by dipping in a vat. Equipment of this type must be disassembled, packing removed, and each piece neutralized individually.

After neutralization, tag the equipment with a green tag, indicating that, although it may have been contaminated with HF, it is acid free and can be removed from the unit area. Shop personnel may remove these tags if repair work is required. If the equipment is to be stored or scrapped, the tags will not be removed.

3. Yellow Tags (Plain, not Gulf Form 9233)

All acid service equipment which cannot be neutralized in the unit vats because of its size, shape, material of construction, etc., must be tagged with a yellow tag by a supervisor. After the equipment has been made acid free outside the unit area, the yellow tag is to be removed by a supervisor and destroyed. He will also attach a green tag at that time.

FIRE CONTROL PLAN

TO REPORT A FIRE
DIAL 2200

SAY

"FIRE SECTION 2
443 ALKY UNIT
INDICATE 1, 2 OR 3 ALARM"

- Any person discovering a fire is responsible for reporting it.

The Fire Protection Section must be notified of all fires, regardless of their magnitude, so that precautions may be taken to assure that the fire is brought under control, extinguished, and so that the fire can be reported properly.

One-Alarm Fires

A one-alarm fire is one which would cause only minor damage to property or equipment, not endanger personnel, and may be controlled and extinguished with the personnel and equipment available within the unit.

Two-Alarm Fires

A two-alarm fire is one which would cause major damage to property and equipment, endanger the lives of some few people, and require additional assistance to control and extinguish.

FIRE CONTROL PLAN - Cont'dThree-Alarm Fires

A three-alarm fire could cause grave damage to property and equipment, seriously endanger the lives of many people, and require maximum additional assistance available to control and extinguish. (This may include community facilities in addition to refinery fire fighting equipment.)

FIREFIGHTING EQUIPMENT1. Steam Hoses

- A. Be familiar with the location of all steam hoses. There is usually at least one steam hose at each utility steam outlet.
- B. These hoses may be used on all fires except electrical. They are especially effective on pump fires.

2. Water Hoses

- A. All unit personnel should be familiar with the location of all water hoses. These are also located at each utility water connection.
- B. These hoses are effective on all fires except electrical.

3. Fire Extinguishers

- A. All unit personnel should be familiar with the location of all fire extinguishers.
- B. Each employee should know how to use each kind of extinguisher on the job.

4. Fire Monitors

- A. Be familiar with the location of all fire monitors. They are permanently mounted at different locations around the unit.
- B. All unit personnel should know how to use the fire monitors.
These fire monitors are very effective on all fires except electrical.

FIRE CONTROL PLAN - Cont'dFIRE CONTROL PLAN - NORTH AREA - LIGHT OIL DEPARTMENT1. Fire Procedure

In the event of a 2 or 3 alarm fire occurring anywhere in the refinery, the following procedure will be followed:

- A. If the fire occurs on your unit, follow unit fire control procedure.
- B. If the fire occurs in some other location between the hours of 7:30 A.M. - 4:00 P.M., Monday thru Friday, take no action until orders are issued by your foreman, shift foreman, or to comply with some request made by personnel fighting the fire, such as cutting a product stream away or anything you can do to aid in putting the fire out.
- C. If the fire occurs in some other location after 4:00 P.M. or on Saturday or Sunday, the following personnel will proceed to the location of the fire and report to the Fire Marshall in charge:
 - (a) Outside Assistant Operator at 141 AVU.
 - (b) Outside Assistant Operator at 142 AVU.
 - (c) Outside Assistant Operator at Fractionation Section on 441 Alkylation Unit.
 - (d) Roving Assistant Operator at 842 DCU.
 - (e) One Decoker Helper at 841 DCU to be designated by Head Decoker (if on the job at time of fire).
 - (f) One Decoker Helper at 842 DCU to be designated by Head Decoker (if on the job at time of fire).

FIRE CONTROL PLAN - Cont'd

- D. Depending on the location of the fire, the above listed men will either report directly to the fire or report to the Cracking Department Shift Foreman's office for transportation to locations which are remotely located.

443 HFAUAfter Reporting the Fire:

1. Notify Light Oil Department Shift Foreman.
2. Fight fire with available equipment until fire is out, or, until relieved by proper authority.
3. The Operator No. 1 is in charge of fire fighting until relieved, then, works in conjunction with the person in charge.
4. In event of fire in another area, no one from this unit will be expected to go to the fire and assist in firefighting. All HF Alkylation Unit personnel will remain on the unit and continue to operate it.

GAS MASKS

Each person is responsible for protecting himself from injury. Personnel protective equipment is provided for use when handling materials and performing work which would be hazardous. Gas masks are provided to prevent breathing injurious vapors. Know how to use them correctly. You may be required to demonstrate the capability to get a good seal with breathing apparatus. This is for your own protection.

Yellow Canister - Protects against hydrogen sulfide, acid vapors and organic (hydrocarbon) vapors.

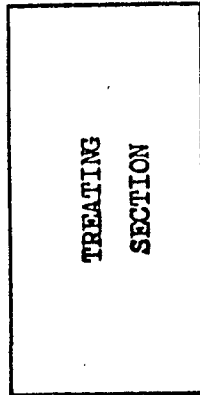
Green Canister - Protects against ammonia.

Red Canister - Protects against organic (hydrocarbon) vapors, acid gases, hydrogen sulfide, carbon monoxide, ammonia, dusts, mists, fogs and smokes.

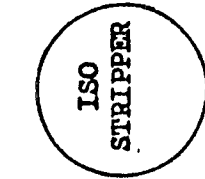
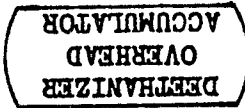
NOTE: These masks must be used in areas where oxygen is present. These canisters absorb the foul gas leaving good air to breathe.

22ND STREET

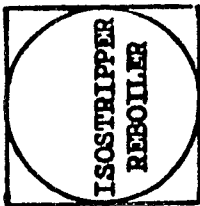
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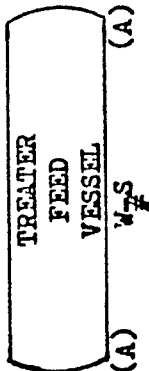


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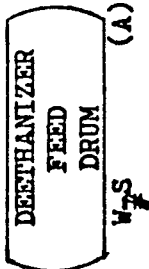
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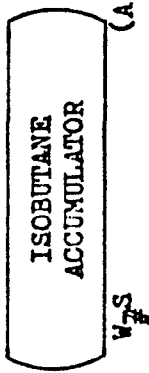
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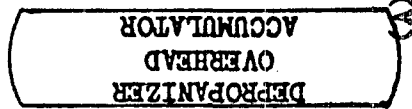
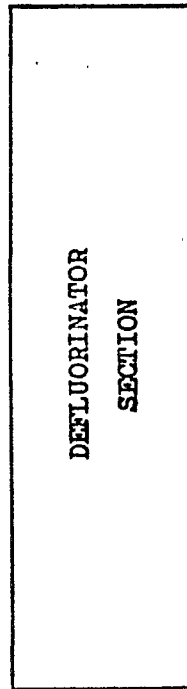


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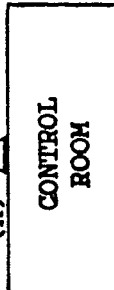
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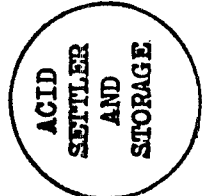


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44-3 HF ALKYLATION UNIT

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PV

PV

SYMBOLS

- + - Main Electrical Switch
- () - Hand Extinguisher
- Δ - Cart
- # - Hose Rack
- * - Fire Hydrant
- Ø - Monitor
- A - Ansul
- S - Steam
- W - Water
- X - PERSONNEL BREATHING AIR
- PV - PERSONNEL VENTS



CHEV B8 6682

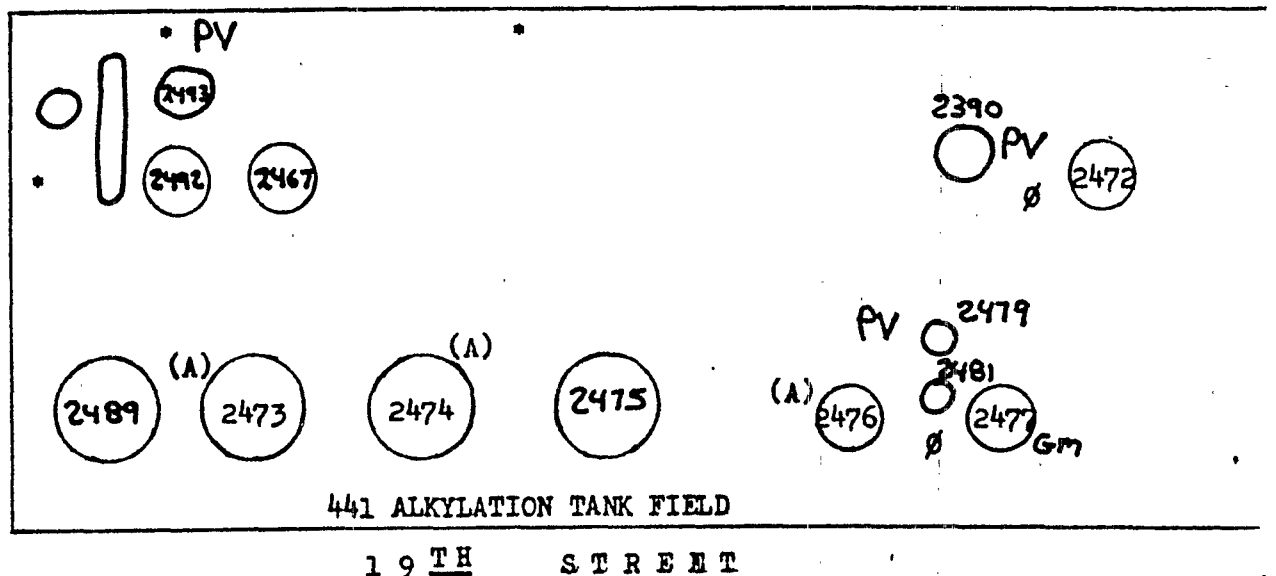
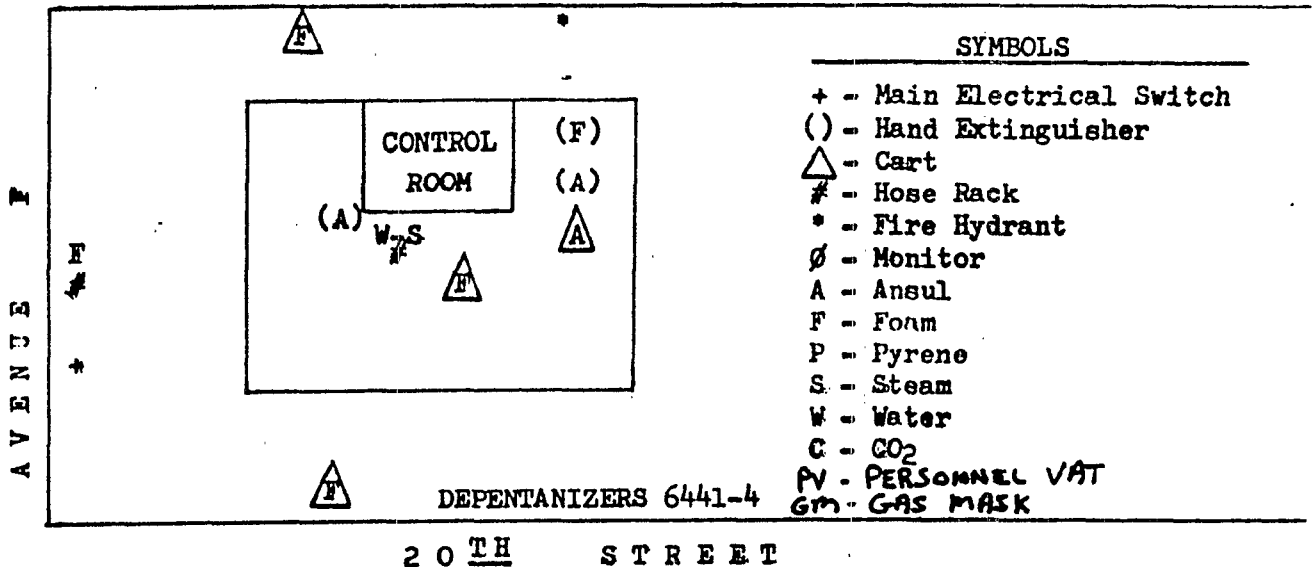
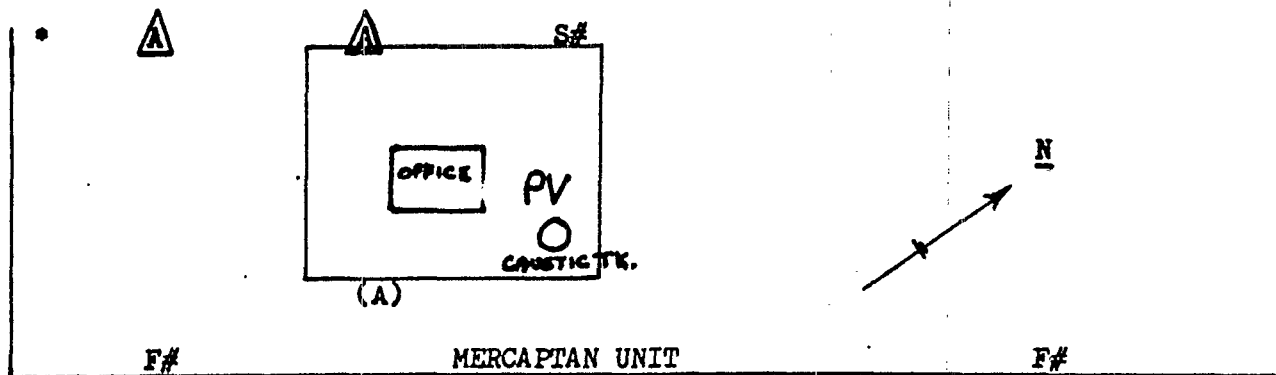
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MERCAPTAN UNIT - DEPENTANIZERS 6441-4& 441 ALKYLATION UNIT TANK FIELD

BREATHING AIR STATIONS443 HFAU

Five safety air hose stations are located throughout the acid area for quick accessibility in the event that pressurized safety equipment must be used. Each safety air hose station will have an air regulator reducing the air pressure to 50 psig.

The respiratory equipment used at HF Unit 443 consists of Class D Breathing Air which is in compliance with OSHA regulations 1910.134(a), Respiratory Protection - Air Quality. The cylinders are recommended for use where external breathing apparatus, such as "200t Suits" or "Air Fed Hoods", are used.

Our Breathing Air System consists of two breathing air stations, Station No. 1 and No. 2, each containing eight breathing air cylinders. Each station has four spare cylinders directly behind the primary air bank. Only one bank, either the primary or the secondary bank, of a station is used at any one time.

The header on each breathing air station is set for a 20 pound differential between the primary and the secondary banks. (60 psig on primary and 40 psig on secondary). Always deplete the primary bank first and make sure the indicator arrow points to the bank in service. The indicator between the primary and secondary bank must be switched manually and in no way does it control the air flow.

When the primary bank drops below 50 psig the manifold will automatically switch to the secondary bank, thereby causing an alarm to sound indicating that the primary air bank has been depleted. At this time, the indicator arrow should be switched to the secondary position and the primary air bank shut off and removed from service. The spare

CHEV B8 6684

BREATHING AIR STATIONS - Continued

cylinders behind the primary bank should be hooked up in the same manner as the primary bank and then placed in service. Switch the indicator to the primary position after the air bank has been put in service. The manifold will automatically switch back to the primary air bank until the pressure in this bank drops below 50 psig. Again an alarm should sound indicating breathing air pressure below 50 psig. At this time, watch the secondary air bank very carefully. When the air pressure falls below 40 psig, this bank is empty and the next air station should be placed in service. Switch the indicator to the primary position after the air bank has been put in service. The manifold will automatically switch back to the primary air bank until the pressure in this bank drops below 50 psig. Again an alarm should sound indicating breathing air pressure below 50 psig. At this time, watch the secondary air bank very carefully. When the air pressure falls below 40 psig, this bank is empty and the next air station should be placed in service. Follow the same procedures as before with this air station.

PURPOSE OF 443, 6141, 6441-2-3-4, 75421. The Alkylation Unit

This unit is a Hydrofluoric Acid Alkylation Process of the Phillips Petroleum Company design. This unit processes light olefins, which are too light to use as gasolines, with excess isobutane using hydrofluoric acid as a catalyst to produce alkylate. Alkylate is a gasoline-boiling range material used as a blending component in motor fuel.

The light olefin charge for this unit consists of propylene, butylene, and pentene from different process units in this refinery. Most of the isobutane required for the process will come in with the charge stock. Some will be produced by different units in this refinery and recovered on 6341, while some will be brought in from Butane Storage which is supplied from outside of the refinery.

Products made on this unit are Deethanizer off-gas for fuel, liquid propane for Ethylene units charge or fuel, and alkylate for gasoline blending. An alternate operation can fractionate heavy alkylate out of the total alkylate. The heavy alkylate is charged through a clay filter to improve the color and order for making Odorless GulfSol 20 which is used for charcoal lighter.

The olefin feed is first sent to the hydrocarbon feed treating section where the hydrogen sulfide and mercaptan sulfur are reduced to a satisfactory level. Then the light ends, ethanes and lighter, are removed and sent to fuel. The treated olefin charge should then contain no more than 20 ppm of total sulfur, 20 ppm of water, and 0.2

liquid volume percent of ethane and lighter. The operation of this section is vital to the successful operation of the HF alkylation section.

Isobutane charge is pumped to the unit from an isobutane storage sphere at SAU 441. The isobutane charge first comes into the dryers where the water is removed.

Treated olefin charge and dried isobutane charge are then combined with the recycle isobutane to make up the hydrocarbon feed to the reactors. The volume ratio of isobutane-to-contained olefin at this point will be approximately 14 to 1.

The total hydrocarbon charge is equally split into two streams and then mixes with hydrofluoric acid in mixing nozzles as it flows into the reactors. The reactors are two 42" pipes rising into the Acid Settler. The alkylation reaction of the olefins and isobutane is instantaneous.

Alkylate, excess isobutane, and HF acid come out of the reactors into the Acid Settler. The HF acid is settled in the Acid Settler, goes to coolers, and then back to the reactors. The alkylate leaves the top of the Acid Settler where part is pumped to the Depropanizer and the remainder is fed to the Isostripper Tower.

Bottoms from the Depropanizer are then charged with the remainder of the Acid Settler overhead effluent to the Isostripper Tower. Propane and lighter is removed overhead in the Depropanizer. There are two levels in the Depropanizer OH Accumulator, one hydrocarbon and the other is an HF Acid level. The HF Acid is sent back to the Acid Settler. The propane is charged to the HF Stripper Tower where the HF is removed overhead and returned to the system. It is very important to keep the HF Stripper operating satisfactorily at all times because the bottoms are the source of pump flush for the Depropanizer reflux pumps. Pump flush is to prevent HF from

damaging the seals. Propane from the bottom of the HF Stripper flows through the Defluorinators to decrease the organic flouride content in the 0 to 10 ppm level. The Deflourinators remove organic flouride and free HF. From the Deflourinators the propane flows through the Propane Caustic Treaters where any trace HF is removed. Then, the liquid propane can be sent to the Ethylene Units or vaporized and put to fuel.

The Depropanizer bottoms combine with the remainder of the Acid Settler effluent to charge the Isostripper Tower. The Isostripper Tower removes the unreacted excess isobutane overhead from the alkylate and this stream is then the recycle isobutane to the Reactors. Bottoms from the Isostripper is the product alkylate. This total alkylate can be sent straight out to gasoline blending or it can be charged to the Alkylate Splitter. The Alkylate Spiltter makes light alkylate overhead which is sent through the light alkylate caustic treater. This light alkylate caustic treater removes any trace quantity of HF. Heavy Alkylate, which is Alkylate Splitter bottoms, is then charged to a filter containing clay where the color and odor are removed and any trace HF is removed. This filtered heavy alkylate is the stock for Odorless Gulsol 20 which is used for charcoal starter fluid.

Hydrofluoric acid in the system becomes diluted with water and acid soluble oils. These contaminants are removed in the Acid Rerun section to maintain the acid purity. HF acid flows to the Acid Rerun section from the acid coolers where isobutane is used to strip the HF out of the acid soluble oil (ASO). The rerun acid comes overhead on the rerun tower and is put back into the system. The ASO comes out of the bottom of the rerun tower and is burned in a special burner inside the firebox of H-1 Heater.

Isobutane and HF acid losses should be kept to a minimum because the cost of these two items represent a sizeable portion of this unit's operating expense.

2. Remote Depentanizers 6441, 6442, 6443, and 6444

The depentanizer tower removes all hydrocarbons lighter than hexanes, C_6 's. That is, pentanes, C_5 's, and lighter. It is necessary to remove these light hydrocarbons to make the stream suitable for Platformer charge stock.

Here at HFAU 443 we have four depentanizers, 6441, 6442, 6443, and 6444- 6441 and 6442 charge undepentanizer gasoline from AVU 142 and AVU 141, respectively (Note that AVU 141 charges 6442). The undepentanized gasoline from AVU 144 is charged to 6443 and 6444. AVU 144 always charges West Texas crude but AVU 141 & 142 charges change frequently.

The overhead from all the depentanizers is charged to Debutanizer 6242 at SAU 441. The bottoms from the depentanizers goes to either PU 1341 or 1342. Changes in where the bottoms go are made by 163 PH, but one should be familiar with where these streams are going at all times.

3. Remote Depropanizer 6141

The depropanizer tower removes all hydrocarbons lighter than butanes, C_4 's. That is, all hydrocarbons Propane, C_3 's, and lighter. The remote depropanizer at 443 is designed to remove the propane from 842 Propane-Butane, C_3 - C_4 , stream to make it suitable for Neches Butane charge stock.

The propane goes overhead and is sent to the Ethylene Unit. The butane goes out the bottom and is sent to Neches Butane. The tower is controlled by holding an overpoint of $+22^{\circ}\text{F}$. on the bottoms boilaway.

4. Mercaptan Removal Unit 7542

The charge to this unit contains sulfur mostly in the form of H_2S and mercaptan compounds. The purpose of this unit is to reduce this sulfur to a minimum. The butane streams treated on this unit go to Deisobutanizer

6341 at SAU 441. Here the isobutane is removed and used as make-up isobutane for SAU 441 & HFAU 443. The H_2S and Mercaptan Sulfur compounds must be removed because the isobutane entering the alkylation units is not further treated and sulfur is very harmful to both processes.

The treatment on the Mercaptan Unit consists of treaters filled with caustic. The H_2S scrubber is a batch still operation since caustic used up (~~spent~~) by H_2S cannot be regenerated. The mercaptan scrubbers (2) are equipped with a regenerator to regenerate the caustic.

The flow is arranged so all the streams pass through one H_2S scrubber to remove all the H_2S present. The stream then flows to the Mercaptan scrubbers where the remaining sulfur is removed. This guarantees that H_2S does not reach the Mercaptan Scrubber so this caustic can be used over and over again.

GENERAL OPERATING TASKS443 HFAU

These items are intended as an aid to learning the flow of the unit and the operating tasks on the unit. The procedure manual in the control room will have some of the specific procedures in detail.

1. Know nature of HF Acid and how to safely work with it.
2. Know the safety procedures and proper use of safety equipment on the unit.
3. Know the first aid procedures.
4. Know what the yellow line is for on the unit.
5. Know what the orange paint does on the unit.
6. Know the meaning of 1, 2, or 3 alarm fires.
7. Read and be familiar with Fire Control Plan.
8. The unit should be kept in good order with regard to oil spills and general housekeeping.
9. All areas should be kept free of debris and tripping hazards.
10. Read and be familiar with the start-up procedure.
11. Read and be familiar with the shutdown procedure.
12. Read and be familiar with the emergency procedures.
13. Know the flow of the units.
14. Know the charges to the unit, where they come from, and who to contact concerning each one.
15. Know the products from the units, where they go and who to contact concerning each one.
16. Know each utility system and know where cut-off valves and switches are located.
17. Know what should be done in the event of failure of any of these systems.
18. Know what systems have emergency standby systems.

19. Know what the source of each of the utilities and who you would call concerning each of them.
20. Utility systems in use on the unit are:
 - (a) 650 PSIG steam
 - (b) 125 PSIG steam
 - (c) 20 PSIG steam
 - (d) High pressure condensate
 - (e) Low pressure condensate
 - (f) Natural gas
 - (g) Refinery fuel gas
 - (h) Yard air and instrument air
 - (i) 110 volt electricity
 - (j) 440 volt electricity
 - (k) 2300 volt electricity
 - (l) Raw water
 - (m) Filtered water
 - (n) Drinking water
21. Know how to read temperature, pressure, and level gauges.
22. Know how to fill out the Log Sheet.
23. Know how to fill out IBM cards.
24. Know how to switch instruments from automatic to manual and vice versa.
25. Know how to switch an instrument from cascade to set and vice versa.
26. Know how to control the steam on the flare.
27. Know how to make the desired mix on the Natural gas and the Refinery fuel.
28. Know how to operate the instruments on the Depentanizers, Depropanizers, and Mercaptans. Know why these instruments are electronic.

29. Know how to read the chromatographs.
30. Know in what range to operate on the chromatographs.
31. Know how to make changes to hold the chromatographs in range.
32. Know the proper way to catch samples and the proper way to tag samples for the Laboratory.
33. Know where to find the settings for all safety valves on the unit.
34. Know how to run the tests on the units.
35. Know how to take readings.
36. Know how to hand gauge a tank.
37. Know how to check accumulators and tanks for water.
38. Know how to start and switch pumps.
39. Know which pumps are steam driven and which are electric driven.
40. Know how to check for the proper amount of lubricating oil or grease.
41. Know which lubricating oils should be used.
42. Know how to unload HF Acid cars.
43. Know how to unload HF Acid trucks.
44. Be familiar with the charge and product manifolds.
45. Know how to use the N_2 system.
46. Know how to regenerate the isobutane dryers.
47. Know how to switch and regenerate the instrument air dryers.
48. Know how to light the pilots on the flare.
49. Know where to keep the water drawn off the flare stack.
50. Know where the caustic circulates in the feed treating section.
51. Know how to empty and refill the H_2S Scrubber.
52. Know how to change the circulating caustic in the feed treating section.
53. Know where the dirty water pumps are located.
54. Know the purpose of the KOH filters on the chromatographs.

55. Know how to switch the KOH filters on the chromatographs.
56. Know the purpose of the Deethanizer Tower.
57. Know where the olefin feed is mixed with the following:
 - (a) Fresh isobutane
 - (b) Recycle isobutane
 - (c) HF acid
58. Know where the recycle isobutane comes from.
59. Know where the fresh isobutane comes from.
60. Know where the recycle HF Acid comes from.
61. Know where the reaction Tee's are located and their purpose.
62. Know the function of the Acid Settler V-10.
63. Know how to find acid and hydrocarbon levels using trycocks.
64. Know the minimum and maximum number of trycocks of acid in the settler and why.
65. Know how to transfer fresh acid from V-11 Storage Drum to V-10 Acid Settler.
66. Know how to pressure up the HF Acid Storage Drum V-11.
67. Know how the Depropanizer and Isostripper get their feed.
68. Know how the level in V-12 Isobutane Accumulator is maintained.
69. Know where the total alkylate comes from.
70. Know what to do with the sight glasses in acid service. Know when and why.
71. Know how the pumps in acid service get pump seal flush.
72. Know the purpose of H-1 Heater.
73. Know how to adjust the burners on the heater.
74. Know how to light burners in the heater.

75. Know what ASO is.
76. Know where ASO comes from.
77. Know how to adjust the ASO burner in the heater.
78. Know how to control the pH of the water in the dirty water pit.
79. Know how to control the temperature of the cooling water.
80. Know how to chlorinate the cooling tower.
81. Know how the flare system operates.
82. Know the purpose of the Relief Neutralizer.
83. Know how to check the caustic in the Relief Neutralizer.
84. Know how to wash and change the caustic in the Relief Neutralizer.
85. Know the purpose of the HF Rerun Section.
86. Know how and where to catch HF Acid samples.
87. Know how to return the HF Acid in the boot of the Depropanizer Overhead Accumulaotr to V-10.
88. Know the purpose of the HF Stripper.
89. Know the purpose of the Propane Defluorinators and the Potassium Hydroxide (KOH) Treaters.
90. Know how to put propane to fuel.
91. Know how to put propane to 1241, 1242, 1943, and/or 2041 units.
92. Know how to line up the unit to make Gulfsol 20.
93. Know why the Light Alkylatic Treater must be on when making Gulfsol 20.
94. Know the procedure for placing the Gulfsol 20 filter in service.
95. Know the flow on the Depents., Deprops., and Mercaptans units and the purpose of these units.
96. Know the caustic flow on the Mercaptan Unit.
97. Know where the Depents., Deprops., and Mercaptan units can be depressed.

98. Know where the cooling water comes from to the Depents. and Deprops.
99. Know how to make VM&P Naphtha on the Depents.
100. Know how to bring in charge to the Depents. from 804 Tank.

TASKS OF ASSISTANT OPERATOR (INSIDE)443 HFAU

1. Keep constant watch on all instruments on control board and advise No. 1 Operator of any changes.
2. Record all inside readings on log sheet.
3. Answer telephone and relay messages.
4. Fill out top of log sheet at beginning of each day.
5. Fill out IBM cards each shift. Fill out range change and product change cards as necessary.
6. Make changes in flows to hold levels in strippers surge drum and charge to towers.
7. Observes reaction of all alarm lights and horns as outside assistant makes necessary changes to test each of them. Know location of each alarm and how to silence each horn. These are tested every Monday on 6-2.
8. Make all control board adjustments of temperature and pressure to assure maintaining correct operating conditions on unit.
9. Report all changes to the No. 1 Operator.
10. Rotate jobs on first Monday of each month.
11. This list is to be used as a guideline for training and does not necessarily include all job duties. Any job duties assigned by the No. 1 Operator are to be considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR (TREATING END)443 HFAU

1. Monitor level on surge drum and towers and keep water drawn off.
Work with the Assistant Operators (inside and acid end).
2. Refill supply of lubricating oil to turbine, pump, and motor bearings.
Some motors are not to be lubricated by operators. Inspect oil in bearing cases for water and/or sediment. Flush and change oil when necessary.
3. Switch air driers once a shift.
4. Change and mix caustics.
5. Switch isobutane dryers once a day on 2-10 shift.
6. Read and record on log sheet the readings observed on all outside flow, pressure, and temperature instruments.
7. Run gravities on gasoline and alkylate. Advise the No. 1 Operator and record on log sheet and IBM cards.
8. Catch, tag, and send to laboratory all samples from the unit.
9. Order sample bottles, tags, and corks from labroatory as needed.
10. Help the acid end assistant operator when needed.
11. Wash up any oil spills that might become hazardous or dangerous to work or walk in.
12. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.
13. Backflush all coolers.
14. Test all snuffing steam to safety relief valves after 4:00 p.m. each Monday.
15. Report all irregularities to the No. 1 Operator.

16. Rotate jobs on first Monday of each month.
17. This is to be used as a guide for training and does not necessarily cover all job duties. Any job duties assigned by the No. 1 Operator are to be considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR (ACID END)443 HFAU

1. Read and record on log sheet the readings observed on all outside flow instruments.
2. Check all levels on towers and accumulators.
3. Refill supply of lubricating oil to turbine pump and motor bearings.
Some motors are not to be lubricated by operators. Inspect oil in bearing cases for water and/or sediment. Flush and change oil when necessary.
4. Run PH on condensate and pump flush.
5. Switch all pumps on Monday 6-2 shift.
6. Check condition of fires in heater. Shut off burners or light burners as necessary.
7. Wash up any oil spills that might become hazardous or dangerous to work or walk in.
8. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.
9. Hang idle utility hoses on hangers provided or coil neatly near the utility shut-off valve. This includes air, steam, and water hoses.
10. Backflush water coolers.
11. Report all irregularities to the No. 1 Operator.
12. Change caustic in the caustic neutralizer.
13. Add chemicals to the cooling tower.
14. Transfer HF acid.
15. Check for HF acid leaks.
16. Rotate jobs on first Monday of each month.

17. This is to be used as a guide for training and does not necessarily include all job duties. Any job duties assigned by the No. 1 Operator are to be considered as part of these job duties.

GENERAL IDENTIFICATION OF REFINERY EQUIPMENT1. Thermometers

A. Dial Thermometers

These thermometers are usually installed in thermowells on the lines at heat exchangers indicating the temperature of the material entering and leaving the exchanger.

These thermometers are calibrated in °Fahrenheit.

B. Gravity Thermometers

These thermometers are specially made for determining the temperature of a sample in a gravity cylinder. They are constructed inside a glass tube so that they will float.

They are also calibrated in °Fahrenheit.

2. Gauges and Meters

A. Pressure Gauges

Pressure gauges are instruments used to determine the pressure at some point in the process usually on the discharge of pumps and on vessels.

These instruments are calibrated in pounds per square inch.

B. Vacuum Gauges

Vacuum gauges are instruments used to indicate negative pressure and are calibrated in inches of mercury. The vacuum gauges used in the Refinery are usually calibrated from a vacuum of 30 inches of mercury to a positive pressure of 30 pounds per square inch.

C. Gauge Tapes

Gauge tapes are used to determine the depth of a liquid in a tank. They are usually 50 feet long with a plumb bob on the end. Some

gauge tapes have a 12-inch bar on the end calibrated in inches for determining the depth of water on the bottom of a tank.

D. Meters

Meters are used to record or indicate flows, pressure, levels, and temperatures. Controllers are used to control flows, pressures, levels, and temperatures.

3. Cocks (Plug Valves)

Cocks are used throughout the Refinery for keeping various refinery streams separated. They are normally used in either the open or closed position. They are not to be used for throttling. A cock is in the open position when the rectangular ridges on the side of the plug are parallel with the direction of flow and is in the closed position when these rectangular ridges are perpendicular to the flow.

4. Valves

A. Gate Valves

A gate valve consists of either a circular or a rectangular slide in a circular case. This slide moves up or down perpendicular to the direction of flow, thus opening or closing the valve.

B. Globe Valves

A globe valve consists of a circular disc type plug which regulates the flow by fitting over a circular hole usually constructed parallel to the flow.

5. Fractionating Towers

Fractionating towers are used throughout the refinery for separating various products. These towers obtain these separations using bubble cap trays, sieve trays, valve type trays, or packing.

The separations are obtained in most towers by circulating the

bottoms liquid through a heater called a reboiler and back to the bottom of the tower just under the bottom tray. This circulating material is partially vaporized, causing vapor to rise up through the trays or packing. As the vapor rises, it starts condensing, thus forming liquid that flows across each tray back down to the bottom of the tower. This process continues until the vapor leaving the top of the tower is condensed in the overhead condenser and accumulated in the overhead receiver. Part of this overhead liquid is pumped back into the top of the tower as reflux and the remainder is pumped away as product.

A. Tray Type

The tray type tower usually contains from 10 to 60 trays of one of the types mentioned above. These trays are anywhere from 18" to 36" apart in the tower; however, the trays in each tower are usually equally spaced.

B. Packed Type

The packed type tower is filled with a ceramic-type packing usually called rasching rings. However, there are other types of packing called Intalox Saddles and Berl Saddles which are not as commonly used. There are other type of materials being used also, such as plastic. The plastic packing cannot tolerate high temperatures, such as steaming-out.

6. Receivers

A receiver is a vessel used to accumulate a liquid product from a condenser or cooler so that it can be pumped away at a relatively constant rate. They are also called accumulators on some process units.

7. Knockout Drums

A knockout drum is a vessel placed in a gas line to catch any liquid that might enter the line with the gas stream. The liquid can be drawn off of the bottom of the knockout drum.

Routine Operating Procedures

1. Checking Levels of Fractionating Towers and Receivers

- A. Note how many sections there are on the complete level glass column and observe where level is located counting from the bottom (Example: 3-1/2 glasses).
- B. Block off level glass at bottom of glass column where it is attached to the vessel.
- C. Slowly open bleeder on the bottom of the glass column and drain, observing the level at the same time as an indication as to how fast the level is coming down.
- D. Close the bleeder when all liquid has drained from the glass. If no gas is released when all liquid has drained out, then the top nozzle of the level glass entering the tower is plugged and should be called to the attention of the Operator.
- E. Slowly open bottom block valve and observe the rising liquid. If this is done too quickly, it is possible to miss the rising level.
- F. When level stops rising, then turn bottom block valve completely open.
- G. Observe level (Example: 3-1/2 glasses) and record reading.

2. Checking Reflux Receivers and Knockout Drums for Water

- A. Locate all drums to be checked for water and location of the drain.
- B. When checking knockout drums, crack open drain valve until either water or gas is observed coming from the drain. If drum contains

water, drain slowly until water is completely drained off. If drum is drained too quickly, a considerable amount of gas will be blown into the sewer between the time the water has drained out and the drain valve can be closed.

- C. Follow the same procedure on reflux receivers, except that instead of gas and water the system will contain liquid hydrocarbon and water.
- D. Never leave bleeder unattended.
- E. Close bleeder before leaving.

3. Cleaning Level Glasses

- A. Block off level glass at top and bottom and drain.
- B. Connect steam hose to bottom bleeder on level glass.
- C. Pull plug on top of level glass or open top bleeder if glass has one.
- D. Crack open steam valve and steam until glass is clean.

NOTE: If glass is very dirty, pour a small amount of detergent into the level glass and open steam just enough to bubble up through the detergent.

4. How To Read Flow Meters

- A. Examine chart closely; if chart is a square root (0-10 divisions) read the number of divisions at the point of the pen. Multiply this number of divisions times the meter factor for 1 division.

Example: Meter is reading 4.2 divisions.

Meter factor is 9 Bbl./Hr. at 1 Division.

Total Flow = 37.8 Bbl./Hr.

- B. On a combination chart (0-10 square root division markers and 0-100 linear division markers) pen pointers may be on the 0-100 scale at the time of the reading; therefore, follow along the 0-100 scale line to the 0-10 scale and read the number of division.

5. Changing of Charts on Circular Meters (such as Foxboro Model 40)

- A. Open door of instrument.
- B. Lift the inking pen with pen lifting apparatus inside the instrument on the left side. This is to prevent bumping the inking pen as the new chart is slipped into place, which would change the flow should the instrument be a flow controller.
- C. Pull out on the knob in the very center of the chart to release the chart.
- D. Slip chart to be removed out over the center knob and down and out of instrument.
- E. Wind clock by inserting instrument clock key obtained from the control room into the hole on front of the instrument designated "wind" and wind like a normal clock.
- F. Carefully slip new chart into the instrument behind the inking pen and over the center knob. Press chart lightly toward the back of the instrument to prevent it from falling out.
- G. Before securing chart into place with the center knob, slowly rotate chart until approximately the correct time as indicated on the edge of chart is directly under the point of the inking pen. Secure chart by pressing in on center knob.

Example: If it is 8:00 a.m. when the chart is being changed,
rotate chart until the 8:00 a.m. line on the chart
is directly under the point of the pen.

- H. Ease inking pen down on to chart by pressing down on pen lifting apparatus. Stop when the point of the pen touches the chart to prevent bending the pen lifting apparatus.

- I. Fill pen with ink by placing one or two drops of ink into the trough of the pen using the ink supplied in an eye dropper bottle mounted on side or back of the instrument.

Sampling

1. HF Acid Sampling Procedure

Special care and caution should be taken to prevent injury while obtaining HF acid samples. The below procedure should be followed at all times.

- (a) Wear Class "B" clothing (acid safety goggles, face shield, neoprene gloves (gauntlet type), jumper)
- (b) Wear a cartridge type respirator with R-52 cartridges.
- (c) Check acid sample bomb carefully. Make sure valve is properly attached to the body of the bomb. Check the valve to make sure it is closed. This a vacuum bomb.
- (d) Check to see that bleeder valve is open.
- (e) Remove plug from sample site and insert bomb. (Make sure that bomb is in a horizontal position. If it is not, hydrocarbons or dry gas will be obtained in the bomb.)
- (f) Open sample valve and bleed out line.
- (g) Close bleeder valve.
- (h) Open valve on bomb and obtain sample.
- (i) Close valve on bomb.
- (j) Close sample station valve.
- (k) Open bleeder valve slowly. Leave valve open.
- (l) Remove sample bomb and replace plug.

2. Catching Liquid Samples (Cold-Below 100°F)

- A. Obtain proper size bottle and cork.

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- B. Open valve on sample station and draw liquid until it is apparent that a fresh sample is being obtained.
- C. Fill sample bottle using care not to touch the mouth of the bottle against the sample station causing contamination of the sample.
- D. Place proper tag on sample.

NOTE: If color of the sample appears unusual, show sample to Operator.

3. Catching Liquid Samples (Hot 100-150°F)

- A. Obtain metal sample catching container.
- B. Open valve on sample station and draw liquid slowly until sample line is hot. If sample is drawn too quickly and the material is heavy, the hot liquid may blow out and flash after the cold material has been drained from the line.
- C. Rinse the metal container and fill slowly.
- D. When sample has cooled sufficiently that it will not break a glass bottle, pour sample into sample bottle.

NOTE: If sample station is equipped with steam-out line, block sample line at the main process line and steam out the sample line to the sewer before liquid hardens in line.

Routine Tests

1. Doctor Test for Determining Sulfur

- A. To 5 ML. of Doctor solution add 10 ML. of sample to be tested in a clean 4-oz. bottle.
- B. Stopper tightly with a clean cork and shake vigorously for approximately 15 seconds. If the Doctor solution turns a dark color H_2S is present.
- C. Remove stopper and add a pinch of dry sulfur just to cover the interface between the Doctor solution and the sample.

- D. Stopper bottle and shake for 15 seconds and allow to settle.
- E. If sulfur remains yellow, sample is free of sulfur and sweet.
- F. If sulfur turns a brown or black, the sample contains sulfur and is sour.

2. Lead Acetate Test for Determining H_2S in Gas Streams

- A. Dampen a small piece of filter paper with lead acetate solution.
- B. Hold dampened filter paper under the sample bleeder on the gas stream and blow gas on to the filter paper for 1 minute.
- C. If filter paper turns light gray, this indicates a trace of H_2S in the gas stream.
- D. Darker shades of gray indicate high concentrations of H_2S in the gas stream.

3. Boil Aways

- A. Chill a 100 ML. graduated cylinder by holding it under the sample station spigot and running some of the material to be sampled over the outside.
- B. Obtain a 100 ML. sample in the chilled graduate.
- C. Insert Boil-Away thermometer into the graduate being careful that it doesn't touch the sides or bottom of the graduate.
- D. Record the temperature at which the material begins to boil as the "Overpoint".
- E. Record the temperature of the liquid when 10 ML. has boiled away as the "90% Point".
- F. Record the temperature at 50 ML. as the "50% Point".
- G. Record the temperature at 95 ML. as the "5% Point".

NOTE: Pentane boilaways will require a hot water bath to set the graduate in to assist in making the material boil.

4. Running API Gravities on Liquid Streams

- A. Obtain full sample in tin gravity container. Use caution in obtaining samples where cooling coils are employed because these coils are usually small and get hot quickly if samples are drawn too rapidly.
- B. Place gravity container in a vertical position on weigh-up table.
- C. Lower the hydrometer gently into the sample until it has settled, then depress it about two additional scale divisions into the liquid and release. Keep the rest of the stem dry so that additional weight is not added to the hydrometer. This would affect the reading obtained. In relatively light liquids, spinning the hydrometer slightly will assist in bringing the hydrometer to rest. The hydrometer should float freely to obtain the most accurate reading.
- D. Read the level to which the liquid rises on the hydrometer scale. Read the hydrometer to the nearest scale division (Example: 59.60 API).
- E. Remove the hydrometer and insert the gravity thermometer into the cylinder until the whole mercury column is immersed. Cautiously stir the liquid with the thermometer immersed for at least one minute.
- F. Read and note the temperature.
- G. Correct the hydrometer reading to 60° using the table titled, "Reduction of Observed API Gravity to API Gravity at 60°F."

5. Titration Circulating Caustic in Charge Treating Section

- A. Obtain a sample of the circulating caustic from the sample station just down stream of LCV-2 (near TK-1).

- B. Using a 10 ML. pipette and an aspirating bulb, obtain a 10 ML. sample. Place the sample in a 100 ML. flask.
- C. Raise the level in the burette to zero using 2.5 Normal HCl from the 2-gallon jar above the table.
- D. Add several drops of Methyl Orange to the 10 ML. sample (approx. 8-10).
- E. Slowly add the 2.5 Normal HCl to the beaker using the cock at the bottom of the burette. Be sure the sample is continually mixed while the HCl is added.
- F. Continue to add the HCl until the sample changes color (orange to deep red).
- G. Record the reading from the burette to the nearest 0.1. This represents the % Sodium Hydroxide (NaOH) in the sample.
- H. Hold the %NaOH between 9-10 by adding water to TK-1 to lower the strength or by drawing water from the reflux of the Caustic Regenerator (T-1) Overhead Accumulator (V-6) at P-5 Pump.

NOTE: The purpose of titrating the caustic is to maintain the caustic strength to prevent H_2S and Mercaptans from entering the unit.

Lubrication and Lubrication Schedule

1. Lubrication of Pumps and Turbines

- A. Check lubrication schedule for proper kind of oil.
- B. Remove Tricote oiler and fill with oil and replace.
- C. Add a few drops of oil to spindle bearing lubricator at the end of the governor on the turbine.
- D. Always add oil through Tricote oiler to prevent overfilling pump or turbine bearing housings. Too much oil will cause bearings to

run hot and will also start a siphoning action along the pump shaft. This will require the addition of oil more frequently.

2. Greasing of Valves and Cocks

- A. Mix approximately one part of graphite to one part heavy oil like Endurance 127. Apply to all valve stems using a small brush. Graphite grease may be used if it is available.
- B. Use a grease gun with Gulflex "A" for greasing valve yokes.
- C. Use plug grease in a high pressure grease gun for greasing cocks.
- D. Slip end of grease gun over the grease fitting on top of cock.
- E. Pump grease into cock until full pressure is indicated on grease gun.

NOTE: The ability to pump in an excessive amount of grease without building pressure indicates that the valve is out of adjustment. This should be called to the attention of the Operator.

BRICATION SCHEDULE

Unit 443

Electric Motors

Bearings (Oil Lubricated)
Bearings (Grease by Electricians, Only)

Gulf Harmony 53
Gulfcrown Grease No. 2

Centrifugal Pumps

Bearings (Oil Lubricated)
Bearings (Grease Lubricated)

Gulf Harmony 53
Gulfcrown Grease No. 2

Turbines

Bearings

Gulf Harmony 53

Plunger Pumps

Crankcase - P3A & P3B & J1
Crankcase - P4
Force Feed Lubrication

*Gulf Security 118
Gulf E. P. Lubricant 95
Gulf Security 118

Emergency Air Compressor

Crankcase

Gulf Harmony 69

Couplings

Gear Type
Other

Gulf Transmission Lub. 140
Gulfcrown Grease No. 2

Plug Valves

Air
Gas & Oil

Gulf Plug Valve Grease L
Gulf Plug Valve Grease M

Cooling Tower

Fan Gears

Gulf Harmony 69

Comminutor

Gear Case
Motor
Extension Shaft

Gulf E. P. Lubricant 95
Gulfcrown No. 2
Gulfcrown No. 2

* * * * *

Gulf Harmony 53
Gulf Security 118
Gulf Harmony 69

Lubsters
5-Gal. Containers

Comminutor (cont'd.)

Gulf E. P. Lubricant 95
 Gulfcrown Grease No. 2

35-Lb. Pails

LUBRICATION SCHEDULE - 6141, 6441, 6442, 6443, and 6444Unit 7542Electric Motors and Generators

Bearings (Oil Lubricated)
 Bearings (Grease by Electricians, Only)

Gulf Harmony 53
 Gulfcrown Grease No. 2

Centrifugal Pumps

Bearings (Oil Lubricated)
 Bearings (Grease Lubricated)
 Seal Oil

Gulf Harmony 53
 Gulfcrown Grease No. 2
 Gulf Seneca 45

Turbines

Circulating System
 Bearings - Moore
 Bearings - Except Moore
 Gears - Coppus (Seal Oil Pumps)
 Gears - Elliott (Acid Pumps)
 Governor

Gulf Harmony 53
 Gulf Harmony 69
 Gulf Harmony 53
 Gulf Security 118
 Gulf Harmony 53
 Gulf Harmony 53

Reciprocating Pumps

Steam Cylinder
 Linkage (Oiled)
 Linkage (Greased)
 Packing

Gulf Senate 110
 Gulf Harmony 53
 Gulfcrown Grease No. 2
 Gulf Senate 110

Air Compressor

Steam Cylinder
 Air Cylinder

Gulf Senate 110
 Gulf Harmony 53

Overhead Crane

Bearings

Gulfcrown Grease No. 2

Couplings

Gear Type
 Other

Gulf Transmission Lub. 140
 Gulfcrown Grease No. 2

Unit 7542Plug Valves

Air and Water
Gas & Oil
Acid

Gulf Plug Valve Grease L
Gulf Plug Valve Grease M
Desco Valve Lubricant No.
440

* * * * *

Gulf Security 118
Gulf Seneca 49
Gulf Harmony 53
Gulf Harmony 69
Gulf Senate 110

Lubsters

Gulf Seneca 45

55-Gal. Drums

Gulfcrown Grease No. 2

55-Gal. Drums

Gulf Plug Valve Grease

5-Lb. Cartons - Gun Size

Desco Valve Lubricant

Requisition through Store-
house

COMPRESSORS, TURBINES, AND PUMPSCOMPRESSORS

There are two kinds of compressors commonly found in the Refinery. They are reciprocating and centrifugal.

1. Reciprocating

A reciprocating compressor is similar to a reciprocating pump, except instead of pumping liquid, it compresses gas. They also can be driven by steam cylinders or by a steam turbine or electric motors through a reduction gear.

2. Centrifugal

A centrifugal compressor usually consists of several impellers mounted on a single shaft similar to a multi-stage centrifugal pump. These machines are driven by steam turbines or electric motors.

The gas is discharged from each impeller wheel into the suction side of the next wheel and etc., until finally the gas from the last impeller wheel is discharged from the machine. The number of impeller wheels in a centrifugal compressor is determined by the suction and discharge pressure, the required capacity and the density of the gas being compressed.

STEAM TURBINES

Steam turbines vary in size from 5 HP to over 5,000 HP. They consist of a rotating element enclosed within a case similar to a centrifugal pump. However, the turbine operates opposite from the pump in that it takes steam at high pressure and expands it to a lower pressure through nozzles and the rotating element, thus supplying the

required power.

All steam turbines are supplied with a governor throttle valve and governor for speed control.

PUMPS

There are two general types of pumps commonly found in the Refinery. They are reciprocating and rotating.

1. Reciprocating

A reciprocating pump is a positive displacement type pump consisting usually of one or two pumping cylinders and one or two steam cylinders. The power is supplied by steam (or compressed air) entering the steam cylinders which in turn moves the liquid cylinder which pumps the materials. Electric motors can also be used to drive reciprocating pumps.

2. Centrifugal

A centrifugal pump consists of a rotating element within a casing. The impeller consists of a number of blades, either open or shrouded, mounted on a shaft that projects outside the casing and is driven by a motor or steam turbine. Centrifugal pumps may be a single or multi-stage, depending on the service. Multi-stage pumps are used for supplying liquids at high discharge pressure.

3. Other Rotating Pumps

Various kinds of positive displacement pumps have rotating elements. Both worm and gear pumps are in this group.

STANDARD PROCEDURE FOR STARTING CENTRIFUGAL PUMPS

1. General

- A. Check oil levels in bearing cases and oil cups.
- B. Establish cooling water circulation.
- C. Open pump suction valve wide open.
- D. Break discharge valve loose but leave closed.
- E. Prime pump, if necessary, by venting vapors from bleeder in discharge line. This will also serve to heat pump to operating temperature and remove water from pump casing.
- F. In case pump has a gland oil system, this should be lined up and the valves adjusted to give about 5 PSIG above suction pressure at inlet glands.
- G. As pump rotation begins, check for abnormal noises and vibrations.
- H. If turbine fails to start, check overspeed trip and reset if necessary. If discharge pressure on pump appears low, check the RPM with a Tachometer.

2. Back-Pressure Turbine Drives (Exhausting to Low Pressure Steam System)

- A. Make sure main steam and exhaust valves are open. Open casing drains to remove condensate and warm up turbine.
- B. Open turbine throttle slowly until pump just begins to roll, then quickly bring pump up to operating speed. Open throttle wide.
- C. Open discharge valve.
- D. Check lubrication and cooling systems.

3. Condensing Turbine Drives - (Exhausting to Vacuum)

- A. If surface condensers are not already in operation:

- (a) Line up water to surface condensers.
 - (b) Start condensate pump. If there is not enough condensate in cold well, a level must be established by backing condensate into the condenser or by filling with fresh water through a hose.
 - (c) Line up vacuum jets, using both jets in each stage.
- B. When there is a minimum of 18 inches of mercury vacuum on system:
- (a) Start auxiliary oil pump and check sight glasses for proper circulation.
 - (b) Open main steam valve and bleed condensate from line.
 - (c) Slowly open exhaust line valve.
 - (d) Open turbine throttle until machine just starts turning over slowly, then adjust shaft sealing steam.
 - (e) As soon as pump and turbine have warmed up, bring speed up fairly rapidly to minimum speed on governor.
 - (f) Open pump discharge valve.
 - (g) Adjust speed by means of hand speed changer knob to desired speed or discharge pressure.
 - (h) Check cooling water, lubrication and gland oil system.

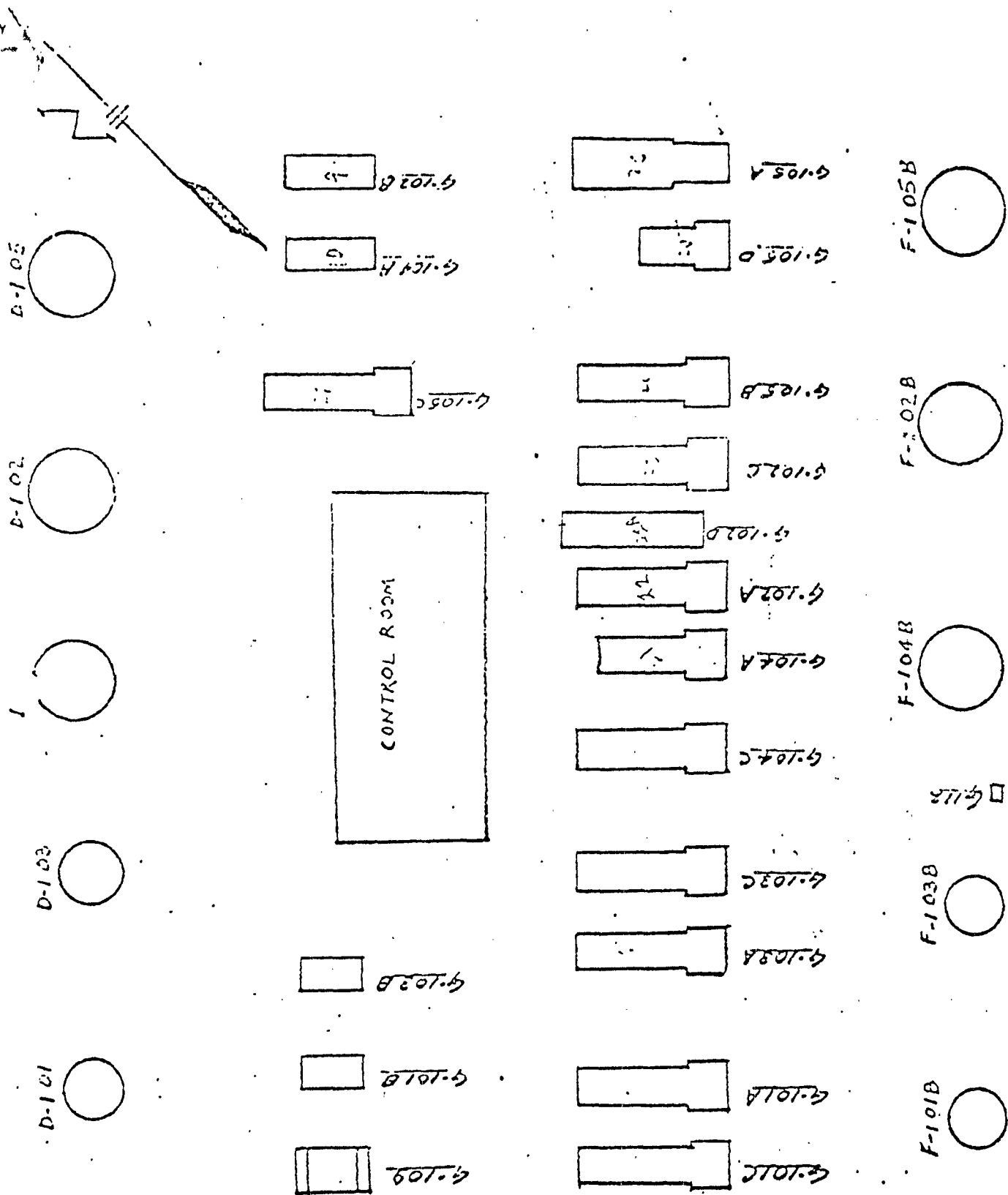
4. Electric Motor Drives

- A. Check starter switch gear box making sure main switch is on.
- B. Start motor.
- C. Open discharge valve.
- D. Check lubrication and cooling systems.

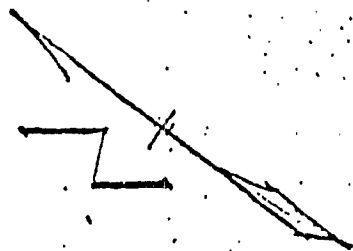
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J12
J11
J6
J6A
J3
J2
J1

CONTROL ROOM

J7
J10
J9
J5
J5A
J4

N

AVE. F

145 T.S.
C/L

22nd ST.

UNIT 7542 (MERCAPTAN)

Tk-1, by Pumps P-3A or P-3B. A distributor is used to assure that the caustic is uniformly distributed throughout the cross section of the tower.

The caustic level is controlled by LC-1 which sets the caustic flow to the caustic regenerator to maintain a level in V-3. Flow to V-3 can be bypassed to the Sand Tower Coalescer.

d. Sand Tower Coalescer, V-4

Sand Coalescer V-4 is a 16 foot vertical vessel with a 10 foot bed of sharp graded flint rock. Located just above the outlet nozzle in the bottom section is an inverted metal cone that allows the separated caustic and water to fall to the bottom of the tower where it will be drained to the sewer or the spent caustic system as often as necessary to keep the caustic and water level below the feed outlet nozzle. The bottom section of the vessel has a level gauge glass. Pressure gauges are located at the top and bottom of V-4. The readings from these gauges should be recorded. If a large pressure differential exists between the two gauges, the vessel may be stopped-up and need to be bypassed and water washed with hot water.

FRC-3 is located down stream of the Sand Tower and is reset manually to hold a level in V-1.

By using the 2 inch start-up line down stream of V-4, located on top of V-5, olefins can be recycled back to V-1. When the olefin feed leaves the bottom of V-4, it flows to V-5 Deethanizer Feed Drum.

e. Deethanizer Feed Drum V-5

The Deethanizer Feed Drum is a horizontal drum and serves as

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a surge drum for the treated olefins. P-2A and P-2B pumps the treated olefins from V-5 to the Deethanizer Tower, T-2. FRC-4 controls the charge quantity to the deethanizer. Flow to T-2 is set to hold a level in V-5. Normally FRC-4 will be set at the same rate as FRC-3 (Olefin Feed to V-5). The drum has a drain and must be drained to the sewer three to four times a shift to rid the system of caustic and water.

f. Deethanizer Tower T-2

The Deethanizer Tower will serve two purposes in preparing the feed for the Alkylation Unit: (1) removal of free, or trace, water and (2) removal of non-condensable gases lighter than propane, such as ethane and methane. Proper operation of this unit will produce a feed stock containing less than 0.2% ethane and less than 20 ppm water.

The Deethanizer Tower is a 75 foot tower with 31 trays which are numbered bottom to top. The feed to the tower can enter on the 18th, 21st or 24th tray.

The charge rate to T-2 is controlled by FRC-4. Water, which was dissolved in the olefins, will be drawn from the 30th tray and accumulated in water draw-off keg V-7. The V-7 should be checked three or four times a day for water. Water is removed from the olefin feed to minimize corrosion in the H.F. Section of the unit.

The overhead vapors of the tower pass through the shell side of the Overhead Condenser E-4 before entering the Deethanizer Overhead Accumulator D-1.

Steam to Deethanizer Reboiler E-5 is controlled by FRC-6.

Either 125 psig or 15 psig steam can be used in E-5. A board mounted air switch located just below FRC-6 is used to switch FRC-6 to 125 or 15 psig steam.

The bottom flow is controlled by LIC-4 to hold a level in the tower bottom and is measured by FR-2.

A low level in T-2 bottoms will activate board-mounted alarm LIA-1. The T-2 bottoms flow is then mixed with the fresh isobutane feed. This combined feed is mixed again with another stream, recycle isobutane. The combined stream flows to the mixing valve where it is contacted with the H.F. Acid.

A 4-inch line is provided down stream of LIC-4 for recirculating T-2 bottoms back to V-5 during start-ups.

g. Deethanizer Overhead Accumulator D-1

The Deethanizer Overhead Accumulator, D-1, is a horizontal vessel with a water leg located on the bottom side. Free water will be drained continuously by LC-6. Water may also be manually drawn-off.

PRC-1 is set to maintain 390 to 430 psig on the overhead accumulator. Non-condensable gases, metered by FR-5, go as propane to refinery fuel and the liquid in the drum is refluxed back to the top of T-2 Tower with P-6A and P-6B Pumps. Reflux is controlled by FRC-8, which is reset by LRC-1.

h. Caustic Regenerator T-1

The Caustic Regenerator is a 37 foot - 6 inch tower. Foul caustic feed from V-3 flows through the Feed Bottoms Exchanger E-2 and is controlled by LC-1. The LC-1 sets the flow to T-1 to maintain a level in the top of V-3. Caustic feed enters the

top of T-1.

The steam to Reboiler E-1 is 135 psig steam which has been reduced to 30 psig and desuperheated with steam condensate. PC-2 reduces the steam pressure and TIC-1 controls the steam flow to E-7.

Regenerated caustic flows by tower pressure from Reboiler E-1 to Caustic Exchanger E-2, through Caustic Cooler E-3 and then into Caustic Surge Tank, Tk-1. Regenerated caustic flow is regulated by LC-2, which holds a liquid level in Reboiler E-1. The overhead vapors from T-1 are condensed by Regenerator Condenser E-7 from which the stream flows to the Reflux Accumulator V-6.

i. Regenerator Reflux Accumulator V-6

The Reflux Accumulator V-6 is a 6-foot vertical vessel. The temperature of V-6 should be about 215°F and is maintained by TRC-1 which controls the quantity of overhead vapor bypassed around Condenser E-7. Mercaptan gas from V-6 can be routed to H-1 Heater or to the flare tip base of 443 Flare.

All liquid is refluxed to T-1 and is pumped with P-5A or P-5B. Flow control of reflux is maintained with LC-3 which holds the level in V-6.

3. REACTOR SYSTEM

The bottoms from the Deethanizer Tower and the outside isobutane feed are mixed together and then combined with the recycle isobutane stream to make up the total hydrocarbon feed to the reactors. This combined stream is called reactor feed.

a. Acid Coolers

The total reactor feed is split equally and then mixed with the H.F. at the exit of the acid coolers. When the reactor feed is mixed with the H.F., heat is produced by the alkylation reaction. The reaction temperature is controlled by cooling the H.F. before it is mixed with reactor feed. There are four acid Coolers; E-10A, E-10B, E-10C and E-10D which contain u-tube bundles with water flowing through the tubes. The shell of the acid cooler extends beyond the end of the u-tube bundle to allow installation of the reactor feed dispersion nozzle.

The water is pumped through the acid coolers on a once-through basis from where it flows to other uses, such as condensers, after coolers, etc. The pH of the water should be checked twice a shift so that any acid leaks can be found.

The reactors are two 42-inch pipes rising from the outlet end of the acid coolers to the Settler V-10.

b. Acid Settler V-10

The acid and reactor feed which mixed together in the reactor flow into the Acid Settler V-10, a 30 foot 6 inch vertical vessel elevated 35 feet above the acid coolers. The acid and reformed hydrocarbons separate, with the acid phase settling at the bottom. The normal operating acid level will be between 9 and 11 try-cocks from the bottom. The acid level is quite constant but decreases as acid is lost and consumed. Acid additions will be made when the acid level falls below the ninth try-cock and will be added until the level is above the eleventh

try-cock. The Acid Level Recorder LR-4 will be used to follow the acid level trend.

The acid flows down the length of the acid settler into the two 24-foot acid stand pipes and then into the acid coolers. The acid continuously circulates through this loop (reactor risers, settlers, stand pipe and acid coolers).

The hydrocarbons leave the top of the settler through a 12 inch line. The 12-inch line divides with one line going to the top of the Isostripper Tower T-5 and the other line going to the Depropanizer Charge Pumps P-14A and P-14B.

4. FRACTIONATING SYSTEM

The effluent leaves the top of V-10 and is divided into two streams, one to the suction line of the Depropanizer Charge Pumps P-14A and P-14B and the other to the Isostripper Tower, T-5. It is in these towers that the separation of the various components, propane, recycle isobutane and alkylate occur. An external source of flush is supplied to the mechanical seals on the Depropanizer Feed Pumps P-14A and P-14B, Recycle Isobutane Pumps P-13A and P-13B, and H.F. Rerun Acid Pumps P-11A and P-11B to protect the seal from damage by H.F. Acid. Flow to the seals is set and maintained by a globe valve pressure gauge combination. Flow is regulated with the globe valve to hold approximately 20 psig more pressure on the seal than the pump suction pressure. The depropanizer bottoms is used as pump flush.

The depropanizer feed rate is controlled by Flow Controller FRC-18 which adjusts the flow rate in the discharge line of P-14A or P-14B Pumps. Once set, this flow must not be changed.

The flow to the Isostripper Tower is the remaining settler effluent that does not enter the Depropanizer Tower. The depropanizer feed is preheated by exchange with the isostripper bottoms in Heat Exchanger, E-18, and then by exchange with the depropanizer bottoms in Heat Exchanger, E-17. The Depropanizer Feed Temperature Controller, TRC-5, sets a control valve which allows a portion of the isostripper bottoms to bypass E-17.

a. Depropanizer, T-6

The depropanizer feed enters the tower on the 14th Tray. The heat input to the bottom of the tower will be by means of two steam-heated exchangers or reboilers, E-19A and E-19B, which are in series. Both reboilers are 2-pass exchangers. FRC-19 actuates a butterfly valve in the exhaust steam line to the reboiler for temperature control. The depropanizer bottoms flow is controlled by a locally mounted Level Controller LRC-2, which actuates Control Valve FRC-16 to maintain a level in the bottom of the Depropanizer Tower. The bottoms flow to the top of the Isostripper Tower. The level can be checked by gauge glass and the level trend may be followed by a board-mounted level indicator.

The Depropanizer Tower has two relief valves. They are located in the bottom compartment below the first tray and relieve to the flare by way of a 10 inch line. The combined overhead vapors from the Depropanizer and the H. F. Stripper are condensed by water-cooled Condensers E-20A, E-20B, E-20C and E-20D. The Depropanizer - H.F. Stripper Accumulator D-2 is a horizontal vessel with an acid keg on the bottom and a vent gas

absorber on the top.

The pressure on the Depropanizer Tower is controlled by regulating the water rate to the Depropanizer - Stripper Condensers. When all available water is passing through the condensers and the system pressure continues to rise, the control valve in the vent gas line on top of FV-13 will open to relieve the non-condensable vapors to the acid neutralizer. The board-mounted pressure controller, PRC-6, is a split-range instrument operating both the water control valve and the vent gas control valve. It is set to operate the water valve over a 15 psig to 9 psig output air pressure range. At 9 psig, the water valve will be side open. This valve then remains open as the vent gas valve comes into operation at 8 psig. The vent gas regulator is fully open at 3 psig output air. The dead space at 8-9 psig is used to prevent venting prior to the time it is absolutely necessary.

The vent gas chiller is a packed column with an internal cooling coil. The chiller is packed with carbon raschig rings for contacting the condensed internal reflux with the non-condensable vapors. This is done to condense and recover the major portion of H.F. vapors that might be lost when venting. Cooling is supplied by expanding propane through the internal coil. This propane is then sent to the Gas Plant, 7544. The non-condensable gasses, primarily ethane, are vented to the flare. Excessive venting is an indication of improper operation of the feed deethanizer and steps should be taken immediately to correct this situation and prevent excessive acid losses. Hot cooling

water may also cause venting and can be corrected by putting more fans in service on the Cooling Tower.

In D-2, two levels are maintained in the accumulator, a hydrocarbon or upper phase and a hydrofluoric acid or the lower phase. The acid level is controlled just below the top of the acid keg by a blind level controller, LC-11. This LC-11 activates a control valve in the acid return line to V-10 Settler. The acid level can be checked by try-cocks and the level trend is recorded in the Control Room. It is very important that the acid level always be maintained between the 4th and 5th try-cock to prevent the reflux pump suction riser from feeding hydrofluoric acid to the H.F. Stripper and Depropanizer Tower.

Free H.F. fed to the H.F. Stripper will invariably be yielded out the bottom of the stripper because the reboiler is not large enough to handle this increased load. The stripper bottom is also used as pump flush to P-15A and P-15B Pumps.

Operation with no acid level at all will lead to a buildup of propane in the system. Recycling propane to V-10 will overload the fractionating system and decrease the recycle isobutane purity.

The hydrocarbon level is controlled by a blind level controller, LRC-3. This LRC-3 resets Flow Controller FRC-21 which actuates a control valve in the H.F. Stripper feed line. This level can be checked by try-cocks and the level trend followed by a board-mounted level recorder, LRC-3.

Reflux Pump P-15A or P-15B takes suction from D-2 Accumulator and supplies reflux to the depropanizer and feed to the

H.F. Stripper. These pumps are in H.F. service and have an outside source of pump flush to the seals to protect them from H.F. Propane from the bottom of the H.F. Stripper is used as flush for the reflux pump seals. Flush pressure should be maintained at approximately 20 psi higher than the pump's suction pressure.

The depropanizer reflux rate is controlled by Temperature Recorder Controller TRC-7, whose element is located on the 25th tray. The TRC-7 resets the board-mounted Reflux Flow Controller FRC-20 which actuates a control valve in the depropanizer reflux line. This control loop is very important in the operation of the depropanizer to produce specification propane product. Increasing the temperature of the feed will increase the isobutane content of the propane product and decreasing this temperature will decrease the isobutane purity.

b. H.F. Stripper

The feed to the H.F. Stripper enters on the top tray. The feed rate will normally be one and one-half to twice the bottom product of the stripper. It is very important that the bottoms flow never falls below 4 divisions. Losing the level means a loss of flush to the reflux pumps. Loss of level can be avoided by watching the propane yield on Flow Recorder FR-8. At times when the propane flow drops, just down stream of the stripper bottoms level control valve is located a 2 inch startup line which can be used to recycle propane to the reactors. This operating procedure will insure having sufficient propane in the system to keep the depropanizer and stripper operating satisfactorily.

The heat input to the column is controlled by a differential temperature recorder, DTRC-9 recording the difference in temperature between the fifth and tenth trays. This DTRC-9 resets the Flow Controller FRC-22 in the 6 inch exhaust steam line to Reboiler E-21. The reboiler is internally mounted in the tower.

The stripper pressure is controlled by a board-mounted pressure controller, PRC-5 which actuates the control valve in the overhead vapor line.

The level in the bottom of the stripper is controlled by a blind level controller, LC-9. This LC-9 actuates a control valve in the bottoms product line to the defluorinators. This level can be checked by a gauge glass column and by the level trend shown on the control board-mounted Level Recorder LR-9.

c. Isostripper T-5

The feed to the Isostripper Tower is depropanizer bottoms product and effluent from the Acid Settler V-10.

The overhead vapor stream from T-5 flows through a 24 inch line to the Overhead Condensers E-14A, E-14B, E-14C, E-14D, E-14E and E-14F. The vapors are condensed and the effluent flows through a 14 inch line to the Isostripper Accumulator V-12.

The Isostripper Accumulator V-12 is a horizontal vessel equipped with an externally mounted Level Recorder LR-13. It also has try-cocks to check the level in the vessel. Fluctuation of this level is used as the indicator of outside isobutane requirements. A decreasing level trend will require an increase in the isobutane rate and a decreasing level will require a

decrease in the outside isobutane rate.

The Recycle Pumps P-13A and P-13B take suction from the bottom of V-12 and discharge through a 10 inch line to the Isobutane Recycle After Cooler E-16. Control Valve FR-11 sets the recycle isobutane flow to the reactor. Both pumps are identical and they are equipped with mechanical seals. These seals use a pump flush from the bottom of the Depropanizer Tower.

A process chromatograph, AR-1, analyzes the recycle isobutane so that the trend of recycle isobutane purity can be followed and adjustments can be made to the isostripper operating conditions to maintain the required purity.

The heat input to the bottom of the tower is performed by the gas fired heater, H-1, which serves as the isostripper reboiler. The reboiler charge is supplied by two reboiler pumps, P-12A and P-12B. Both pumps are driven by steam turbines which use 135 psi steam.

The change rate is controlled by Flow Controller FRC-17 which actuates a control valve in the discharge line of the reboiler charge pumps. This flow rate is set.

The reboiler Furnace H-1 is a vertical cylindrical furnace and has ten parallel coils. Distribution of flow through the ten coils is regulated by means of a globe valve and flow indicator arrangement on the inlet of each coil. The flow indicators are numbered FI-2 through FI-11.

The furnace is gas fired by 12 burners. Heat input to the isostripper is controlled by the bottom tower temperature control

TRC-6 which resets a board-mounted Flow Controller FRC-7.

FRC-7 actuates a control valve in the fuel gas line to the re-boiler furnace.

The bottoms yield from the isostripper is the total alkylate product and is controlled by a blind level controller, LC-8, which actuates a control valve in the total alkylate yield line to the alkylate splitter to hold a level in the Isostripper Tower.

d. The Alkylate Splitter Tower, T-8

The material yield from the bottom of the Isostripper Tower provides the feed for the Alkylate Splitter Tower T-8. Only one feed inlet has been provided and that is located at the 15th tray level. This tower can be totally bypassed and yield total alkylate to gasoline. The only time this tower is put in service is to make alkylate bottoms or Gulf Sol 20.

The reflux to the tower is on Flow Rate Control FRC-24. The overhead product will be totally condensed in the Alkylate Splitter Condenser E-28. The Reflux and Light Alkylate Transfer Pumps P-18A and P-18B will take suction directly from the shell side of the condenser.

The tower pressure is controlled by regulating the light alkylate yield to premium gasoline with PRC-7. PRC-7 actuates a control valve in the light alkylate line. It is located in the line after the flow passes through V-16. The treater, V-16, is provided as a guard chamber to remove any traces of hydro-fluoric acid which would contaminate the light alkylate product.

The heat input to the tower is controlled by Flow Controller FRC-23 which actuates a control valve in the 650 psig steam line

to the Reboilers E-27A and E-27B.

The level in the bottom of the stripper is controlled by a Blind Level Controller LC-12 which actuates a control valve in the bottoms yield line downstream of the heavy Alkylate Pumps P-17A and P-17B.

5. PRODUCT TREATING SYSTEM

On this unit there are three product treating systems to remove organic fluorides and free H.F.

a. Propane Defluorinators

The Propane Defluorinators V-15A and V-15B are vertical vessels filled with activated alumina. Propane from the bottom of the H.F. Stripper is superheated to 400°F in passing through the Propane Heater E-26. The outlet temperature is controlled by a board-mounted temperature controller, TIC-3, which actuates a pressure control valve in the 650 psig steam line to the propane heater. The outlet pressure of the propane also controls the 650 psig steam. A pressure reader reads the outlet pressure of the propane and then reduces the steam pressure 10 psig below the propane pressure. The reason for this is, if the heater has a leaking tube, the steam will not enter into the product line. This will keep water out of the treater. The propane will flow into the steam and not cause too much damage. The pressure reader's signal to the 650 psig steam line overrides the temperature controller's signal.

The superheated propane vapors pass through the defluorinators in a series, flowing in the top and out the bottom. The first

vessel in the line of flow is referred to as the primary treater and the second as the secondary treater. The vessels are manifolded such that each vessel can operate in either position. The effluent from the secondary treater passes through the Effluent Exchanger E-25, through the Propane Condenser E-23, and into the Propane Caustic Treater.

When the hot propane is contacted with the activated alumina, the organic fluorides are decomposed to give an olefin and hydrofluoric acid. The H.F. acid then reacts with the activated alumina to give aluminum fluoride and water. The water vapor passes from the defluorinator along with the hot hydrocarbon. The defluorination reaction takes place in the primary treater while the secondary treater acts as a guard. Also, the secondary treater is ready to perform when the primary treater is spent and has to be dumped.

b. Propane Caustic Treater

After the defluorinated propane has been condensed and cooled in E-23, it flows into the propane caustic treaters for removal of traces of H.F. present in the stream.

The Propane Caustic Treaters V-14A and V-14B are vertical vessels filled with flake caustic. The propane flows up through the caustic bed. As the H.F. reacts with the KOH, potassium fluoride and water are formed. The water dissolves the potassium hydroxide and the potassium fluoride forms a thick sludge that drops to the bottoms of the treater. This sludge must be drawn off about twice a shift to prevent plugging of the caustic draw-off nozzle.

A locally-mounted pressure indicator controller, PC-9, actuates a control valve in the propane line from the treater downstream of the Propane Product Pumps P-16A and P-16B. This PC-9 holds a constant back pressure on the propane defluorinators and caustic treaters.

c. Light Alkylate Caustic Treater

The Light Alkylate Caustic Treater is a vertical vessel filled with flake potassium caustic. The light alkylate flows up through the caustic bed. As the H.F. reacts with the potassium hydroxide, potassium fluoride and water are formed. The water dissolves the potassium hydroxide, and the potassium fluoride forms a thick sludge that drops to the bottom of the treater. This sludge must be drawn off about twice a shift to prevent plugging of the caustic draw off nozzle. The only time V-16 is in service is when the Alkylate Splitter Tower is in service to make Gulf Sol 20. When making total alkylate, V-16 is bypassed.

6. H.F. RERUN SYSTEM

Taking suction from the bottom of the Acid Coolers E-10A, E-10B, E-10C and E-10D, the feed is pressured into the rerun column. The feed rate is controlled by Flow Controller FRC-14 which actuates a control valve in the feed line upstream of the Acid Feed Vaporizer E-12. The temperature of the acid out of the vaporizer is controlled by Temperature Controller TRC-4 which actuates a control valve in the 125 psig steam line to the vaporizer. There is also a Pressure Controller PC-4 which will override the temperature control to keep the steam pressure from exceeding 100 psig. The vaporized feed is

flashed in the middle section of the rerun column.

The flashed vapors are contacted with superheated stripping isobutane vapors to remove entrained oil droplets. The stripped ASO (Acid Soluble Oil) accumulates in the bottom of the column. The lower 2 to $2\frac{1}{2}$ feet of the column serves as an oil leg. The level in the oil leg is on level control by LC-7 and can be checked by means of the try-cocks. The normal operating level should be maintained between one and two try-cocks. A locally-mounted level controller, LC-7, actuates a control valve in the line downstream from the ASO oil leg to the Isostripper Reboiler Furnace H-1. The ASO is a waste product. The stripping isobutane rate is controlled by Flow Controller FRC-13 which actuates a control valve in the line upstream of the Stripping Isobutane Vaporizer E-11.

The H.F. and isobutane are flashed overhead and then condensed in the Rerun Condenser E-13. The condensed liquid, H.F. and isobutane, are dumped to the Settler V-10 by Acid Pumps P-11A and P-11B. The rerun pressure is controlled by a Pressure Controller PRC-2 which actuates a control valve in the acid line downstream from the acid pumps.

These pumps have mechanical seals and require the use of an external source of flush for protection of the seals against H.F. damage.

REMOTE ASSOCIATED EQUIPMENT

1. Remote Depentanizers 6441-2-3-4

On the west end of H.F. Unit 443, there are four depentanizers; 6441, 6442, 6443 and 6444. The charge to these towers is undepen-

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tanized gasoline from AVU 141, 142 and 144. The undepentanized gasoline from 141 can be charged in 6441 or 6442. The 142 gasoline can also be charged in 6441 or 6442. The 144 undepentanized gasoline will go to 6443 and 6444.

When charge is sent from 141 or 142, it first goes to a feed accumulator and is then pumped to the Depentanizer Tower where pentane and lighter hydrocarbons are taken out. From the overhead make, two streams are taken, the wet gas which goes to the gas plant (7944) and pentane which goes to 2477 Tank at 441 Alky. Part of the pentane overhead is pumped back to the tower as reflux.

The pentane pumped to 2477 Tank is used as charge to 6242. The depentanizer bottoms are pumped as charge stock to 1341 or 1342 where they increase the octane. All four depentanizers operate the same. Bottom samples are sent to the Laboratory on the 2-10 shift for distillation. Changes are made on the steam to the reboilers to control the overpoint of the bottoms.

When the overpoint is too low, the reboiler is fixed harder and when the overpoint is too high, the steam rate is reduced.

2. Remote Depropanizer 6141

Depropanizer 6141 is located next to Depentanizers 6441, 2, 3 and 4. This tower is to remove propane from the charge stream. Normal charge to 6141 is butane-propane from 841-2 DCU.

The overhead can go to fuel gas or to the ethylene unit. These switches are done by the gas dispatcher. The bottoms will go to Neches Pump Station as B.B. The tower is run to make the bottom product on-test. To check to see if the B. B. is on test, a boil-away is taken to check the temperature at 95 cc. It should

run between 22° to 25°F. The product is controlled by controlling the steam to the reboiler. When the boilaway is over 25°F, steam rate is decreased, and if the boilaway is below 22°F, the steam rate is raised to flash more tight ends over head.

The overhead of 6242 can also be charged to 6141. This is only done when 6142 Tower at AU 145 is down. Under these conditions, the bottoms are cut away from the Neches Station and are sent to the Mercaptan Unit from which they go to 6341 as charge.

When 6242 Tower is down, all the charge that normally goes to 2477 Tank will go to 6141. The bottoms will then be cut to the Treating Plant (97 PH) as gasoline. The charge from 841-2 DCU will be sent to 6142 Tower at 145 Still.

3. Mercaptan Removal Unit 7542

This unit is also a part of the Alkylation Unit. The purpose of this unit is to reduce sulfur in the butane streams to a minimum. The butane streams treated on this unit go to the Deisobutanizer 6341 at SAU 441. At the Mercaptan Unit, there is one stripper tower and four absorbers, of which only three are in use.

Each absorber is filled with 10% caustic and the caustic is circulated through the tower at approximately 15 BBL per hour. Caustic from the bottom of the absorber flows to a stripper tower. 15 psig steam is put in the bottom of the tower and as it flows out, the steam strips the mercaptan gas out of the caustic. The caustic then goes to an accumulator and is pumped back to the tops of the absorbers. The overhead of the stripper goes to a condenser. The non-condensable mercaptan goes to #8 Flare at 145 Still and the water is pumped to the dirty water

system.

The butane feeds enter the bottom of the absorbers, pass out the top and then to the after-settler which is a knock-out drum to trap any caustic carry over. The caustic is drained to sewer. The butanes then flow to 6341 as charge.

4. Cooling Tower Operation

Cooling Tower Schedule

<u>Monday</u>	<u>Shift</u>
Chlorinate	6-2
Wrico C-7814	Each Shift
P-2 in Service	6-2
<u>Tuesday</u>	
P-2 Out of Service	6-2
Wrico C-7814	Each Shift
<u>Wednesday</u>	
Chlorinate	6-2
Wrico C-7814	Each Shift
<u>Thursday</u>	
Wrico C-7814	Each Shift
*1st and 3rd Thursday of each month, add 9 gallons of H-212.	6-2
*Chlorine and H-212 not to be added on same day.	
<u>Friday</u>	
Chlorinate	6-2
Wrico C-7814	Each Shift
<u>Saturday</u>	
Wrico C-7814	Each Shift
<u>Sunday</u>	
Wrico C-7814	Each Shift

Cooling Tower

a. General

This Marley Cooling Tower has four fans driven by 75 HP electric motors and three electric motor driven pumps. Cooling water is pumped to HFAU - 443. In order to prevent water side fouling in the process coolers, the recirculated water is chemically treated.

b. pH Control

The pH of the water is now being maintained between 6.0 and 6.3. This pH is checked by a pH indicator in the control room, a pH recorder at the cooling tower and with the Hellige Comparator. In order to maintain this pH level, acid or caustic is fed into the cold well. Feeding 99% sulfuric acid will lower the pH. The addition of 31°Be caustic will raise the pH. The addition of either is done by opening the small valve on the respective lines. The rate of flow at any given time is determined by the amount of pH change required. Usually only a very small amount of acid or caustic is needed to keep the pH in the normal range.

c. Use of Hellige Comparator

- (1) Fill one tube to 10 cc mark with water to be tested.
- (2) Place tube with water to be tested in tester so that it is on side with colored discs.
- (3) Fill the other tube to 5 cc mark with water to be tested. Add indicator solution with eye dropper

c. Use of Hellige Comparator - Continued

- (3) to this water. Add 0.5 cc of indicator -- line on dropper near end if 0.5 cc mark (measured from tip).
- (4) Place water with indicator in tester.
- (5) Turn disc until colors match and read pH on tester.

d. Hardness Cycles (Turn-Overs)

The hardness cycles, sometimes called turn-overs, is a simple ratio of the hardness of the cooling tower circulating water to the cooling tower make-up water. At 244 Pump Station, this ratio is 4.5 - 5.0. The hardness cycles are controlled by holding about 750 to 850 microhms on the conductivity of the water spilled from the cold water header. This water spill is called "blowdown" and may vary from 60 to 80 GPM.

e. Chromate Levels

The chromate level is a measure of the amount of corrosion inhibitor in the circulating water system. The desired range is between 18 and 22 parts per million (PPM). The inhibitor used is Wrico C-7814. The inhibitor is stored in a 560-gallon tank by the cold well. To add the inhibitor to the water, it is allowed to flow into the small feeder tank by gravity. The supply line to the small feeder tank is then closed and the feed valve to the cooling tower is opened a small amount; the amount should be fed out gradually

e. Chromate Levels - Continued

over a two to six hour period and not be allowed to dump into the cold well rapidly.

f. Chlorination

All natural waters contain bacteria and algae which can grow and affect the efficiency of water equipment. The amount of slime-producing life in a cooling tower varies from day to day. To retard the growth of slimes, it is necessary to "shock treat" the system with chlorine.

The chlorine is measured through a Rotometer.

(1) Chlorine Cylinders

Chlorine will be supplied in one ton cylinders. Be sure cylinders have valves set in the vertical position, that is, one valve directly above the other. Connect to the top valve. This is very important since liquid chlorine will come out of the bottom valve and create a dangerous situation. The top valve should be chlorine gas. Connect to only one cylinder at a time. Have other pigtail connector plugged. Be sure the valve at each end of the pigtail is closed whenever tightening or disconnecting the pigtails. After connecting pigtail, put pressure on system up to pressure reducing regulator and inspect for leaks. Leaks can be found using 50% Ammonium Hydroxide from a squeeze bottle. White fumes will

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(1) Chlorine Cylinders - Continued

form when the Ammonium Hydroxide comes in contact with chlorine gas. If there is a leak in the cylinder itself, notify foreman or shift foreman and have him get in touch with Air, Steam and Water Department. In case of emergency such as a bad leak, foreman (or shift foreman) can call Pittsburgh Plate Glass Company in Lake Charles, Louisiana, Telephone: Area Code 318-436-7522.

(2) Chlorinating Procedure

The chlorinator is a simple water educator which mixes cooling tower water with gaseous chlorine and discharges the mixture into the cold well. The chlorine is measured through a Rotometer before going to the eductor. The Rotometer reads a maximum of 1,000 lbs. per day of chlorine.

- (i) Check to see that all valves are closed.
- (ii) Open water supply valve to eductor.
- (iii) Open the valves starting at the Rotometer and work back to chlorine drum.
- (iv) Start chlorination with maximum of chlorine.
- (v) Maintain maximum until chlorine residual reaches 1.4 - 2.0 PPM.
- (vi) Cut chlorine to about 600 lbs./day and adjust to maintain the residual between

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(2) Chlorinating Procedure - Continued

- (vi) 1.4 - 2.0 PPM for four hours. Check chlorine residual on hot water return every 30 minutes.
- (vii) Close first chlorine valve at the drum.
- (viii) Let eductor in the chlorinator free the system of chlorine pressure.
- (ix) Close remaining chlorine valves (starting upstream).
- (x) Turn off water to the eductor.

(3) Procedure for Checking Chlorine Residual

- (i) Place 5 Ml. of 50% Acetic Acid into Cas-serole.
- (ii) Add 100 Ml. of hot return water to the acid.
- (iii) Slowly drop Methyl Orange into solution until a pink color will not fade in 30 seconds.

No. of Drops

1	x	0.2	=	PPM Cl ₂
2			=	0.2 PPM Cl ₂
3			=	0.4 PPM Cl ₂
4			=	0.6 PPM Cl ₂
5			=	0.8 PPM Cl ₂
6			=	1.0 PPM Cl ₂
7			=	1.2 PPM Cl ₂
8			=	1.4 PPM Cl ₂
9			=	1.6 PPM Cl ₂

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(3) Procedure for Checking Chlorine Residual - ContinuedNo. of Drops

10	x	0.2	=	1.8 PPM Cl ₂
11			=	2.0 PPM Cl ₂
12			=	2.2 PPM Cl ₂
13			=	2.4 PPM Cl ₂
14			=	2.6 PPM Cl ₂
15			=	2.8 PPM Cl ₂

g. Acid and Caustic Tanks

The acid tank (No. 1628) is located on the north side of the walkway and holds 650 gallons or 147 gallons per foot of height. The caustic tank (No. 1627) is located on the south side of the walkway and holds 650 gallons or 147 gallons per foot of height. These two tanks are refilled when needed by means of a pipeline from SAU - 441. This may be arranged thru the assistant operator working in the tank field at SAU - 441. The valve at the tank to be filled must be opened to receive either acid or caustic and should never be closed while pumping is in process to prevent the breaking of lines due to excessive pressure. Call the pumper after the acid/caustic has been pumped and close the valve at the tank.

The flow from each tank is fed to the cooling tower cold well by gravity, through a small valve and discharge spigot. The flow is regulated by adjusting the valve opening to maintain a constant pH of the cooling water.

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h. Make-Up Water

Cooling tower make-up water comes from the raw water line on south side of cooling tower. The water is taken through a control valve on the north side of the cooling tower which is operated by the level/flow recorder located on the instrument panel at the cooling tower.

i. Cooling Tower Spill

Cooling water quality control makes it necessary to spill or "blowdown" some of the cooling tower water. Some water is spilled in back-flushing exchangers on the unit and dumping cooling water from pumps to the sewer. Spill at the cooling tower is adjusted to maintain a conductivity range. The spill meter is located at the cooling tower.

j. Cooling Tower Cells

The cooling tower has 4 cooling cells. Each cell is supplied with hot return water from the header on top of the tower. There is a valve to each of the 4 cells, so that water to a cell may be cut off when required.

AUXILIARY SYSTEMS443 HFAU1. INSTRUMENT AIR

Ninety-five-pound instrument air is supplied at the battery limits from the plant air system after going through the instrument air driers located on the unit. The instrument air will be clean and dry. Once a shift, each drier will be switched and regenerated.

2. COOLING WATER

The alkylation unit and the hydrocarbon feed section are designed for all process cooling and condensing to be done by water. Cooling tower water is supplied to the units by Pumps J-1, J-2 and J-3 from Pump Station 244. Water to Pump Station 244 will enter by a 6-inch line on level control. Pumps J-1 and J-3 will normally be used and Pump J-2 will be the spare. Pump J-2, at all times, will be lined up for service. On the incoming water to the unit, there is a pressure alarm set 45 pounds. When the alarm goes off, the operator will start Pump J-2 by a remote switch inside the control room. Water from the pumps is supplied to the unit at 60 psig through a 36 inch supply header and returns to the cooling tower through a 36 inch line.

Each of the condensers and coolers in acid service has block valves on the inlet and outlet for isolation in the event an acid leak occurs. Water is used on a once-through basis as cooling water in the Acid Coolers E-10A, E-10B, E-10C and E-10D.

A 16-inch by-pass line has been installed so the acid coolers can

be taken out of service for maintenance without shutting down the cooling water supply.

A pH analyzer continuously records the pH of the water from the acid coolers to assist in the detection of acid leaks in the coolers.

The pH of the water leaving all acid service condensers and coolers should be checked regularly to assure that hydrofluoric acid is not leaking into the cooling water system. In the event that an acid leak develops, caustic or soda ash should be dumped into the cooling water basin to neutralize the water until the source of the leak has been established and that section taken out of service.

The caustic will come from an 11 foot by 4 foot tank (Tank 1627), which will flow by gravity to the cooling tower. It is essential that the caustic level in Tank 1627 be up at all times. DO NOT LET LEVEL GET LOW.

Soda ash will come from sacks located in a small storage shack by H-1 Heater.

3. STEAM

Three separate steam and condensate systems are utilized for heating services.

a. 650 PSIG System

The 650 psig steam is supplied to the unit via a 4-inch header from the refinery steam systems. Process heating requirements for the following services require the use of 650 psig steam:

- (1) Alkylate stripper reboilers (E-27A and E-27B)

- (2) Propane heater (E-26)
- (3) Isobutane drier regenerator heater (E-8)

The trapped condensate from each of the exchangers is normally flashed into the HP condensate drum (V-17). The HP condensate drum is 3 feet 0 inches by 5 feet 0 inches vertical vessel. Vapors from V-17 are flashed into the 136 lb. steam system to be utilized further for heating. Condensate from the HP condensate drum (V-17) is pressured out on Level Control (LC-15) to the low pressure condensate drum (V-18).

b. 135 PSIG System

The 135 psig steam is supplied to the unit via an 8-inch header from the existing boiler house. Process heating requirements for the following services require the use of 135 psig steam.

- (1) Acid vaporizer (E-12)
- (2) Deethanizer reboiler (E-5)
- (3) Regenerator reboiler (E-1)
- (4) Isobutane vaporizer (E-11)

The condensate from each of the exchangers is trapped into the low pressure condensate drum (V-18). The low pressure condensate drum (V-18) is a 3 foot 0 inches by 6 foot by 0 inches vertical vessel. Steam vapors from V-18 enter the 15 lb. steam system. Condensate from V-18 is pressured out on Level Control (LC-16) to condensate Tank 2005 at No. 15 Boiler House.

The steam turbines driving the isostripper reboiler pumps (P-12A and P-12B) uses 135 psig steam and exhausts into the

15 psig steam header.

c. 15 PSIG System

The 15 psig steam is supplied to the unit via a 16-inch header that is tied into the plant low pressure steam system. This low pressure steam is used for the process heating requirements for the following equipment.

- (1) Depropanizer reboilers (E-19A and E-19E)
- (2) HF stripper reboiler (E-21)
- (3) Propane vaporizer (E-22)

All traps on the 15 psig steam system exhaust to the condensate storage tank. The condensate storage drum (V-19) is a vertical vessel 3 feet 6 inches by 7 feet 0 inches. Vapors from V-19 exhaust to the atmosphere. The condensate is pumped out by Pump P-19A or P-19B on Level Control (LC-17) to 2005 Tank at No. 15 Boiler House.

4. RELIEF SYSTEMS

a. Acid Relief

The acid relief system is provided for relief valves on the acid service vessels so HF can be removed from the hydrocarbon vapors in the alky unit area before entering the refinery flare header system. Reaction of HF with caustic in the acid relief neutralizer will protect all equipment and lines downstream of the neutralizer.

The acid relief neutralizer (T-3) is a 6 foot by 49 foot 6 inches vertical vessel with a 4 foot 6 inch by 12 foot baffled column top section. Two 12-inch acid relief headers

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enter the baffled section below the bottom baffle. Taking suction from the bottom of the 6 foot by 49 foot 6 inch section, the caustic circulating pump (P-10A) or its spare (P-10B) continuously pumps a 5 weight percent solution of sodium hydroxide (NaOH) over the top of the baffled column. The caustic contacts the relieved hydrocarbon vapors, reacting with the HF to produce sodium fluoride, which remains in the caustic solution. The HF-free hydrocarbon vapors pass out the top of the baffled section or dome and into the refinery flare header.

Temperature indicating points in the dome or baffled section and the caustic circulating line are provided to indicate leaking relief valves. A sudden rise in the temperature in the baffled section as compared to the caustic circulating line will be indicative that excessive quantities of HF are being released through the neutralizer. A check of the various relief valves should be made and the leaking relief valve blocked in, removed and repaired.

The normal caustic level should be carried at the top try-cock in the acid relief neutralizer. The caustic solution in the neutralizer should never be above a maximum 5 weight percent NaOH. Caustic solutions greater than 5 weight percent NaOH will tend to salt out the sodium fluoride neutralization product, plugging the neutralizer and caustic circulating piping.

The caustic solution should be used until spent to 0.2 to 0.5 weight percent NaOH as determined by laboratory anal-

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ysis. At this time the spent caustic should be pumped into the acid neutralizing pit and fresh caustic added. Fresh 5% caustic from the caustic storage tank (2491) is pumped into the neutralizer.

The following relief valves, which are equipped with a Monel Bellows to protect the relief valve spring from exposure to HF, relieve to the acid relief header.

- (1) Acid storage drum (PSV-24)
- (2) Acid settler (PSV-23)
- (3) Rerun column (PSV-26)
- (4) Isostripper accumulator (PSV-33)
- (5) HF stripper (PSV-37) -
- (6) Depropanizer stripper accumulator (PSV-40)

Each of these relief valves has a bypass valve for manual venting of the vessel to the acid relief system as required. Other systems that can be manually vented to the acid relief neutralizer include the acid tank car unloading piping, acid tank cars, acid truck unloading piping and acid trucks.

b. Hydrocarbon Relief

The hydrocarbon relief system, which is commonly referred to as the "non-acid relief system," to differentiate between it and the "acid relief system," ties into No. 13 Flare Header. The following relief valves relieve to the flare system

- (1) Deethanizer feed drums (PSV-28A, PSV-28B and PSV-28C)
- (2) Isostripper reboiler pumps discharge (PSV-27)
- (3) Depropanizer bottoms (PSV-34A and PSV-34B)

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- (4) Waterdraw keg (PSV-51)
- (5) Propane defluorinators 15A (PSV-44) and 15B (PSV-45)
- (6) Propane caustic treaters 14A (PSV-41) and 14B (PSV-42)
- (7) Deethanizer feed drum (PSV-5)
- (8) Sand tower coalescer (PSV-4)
- (9) Return isobutane filter (PSV-15)
- (10) Isobutane feed driers V-9A (PSV-16) and V-9B (PSV-17)
- (11) Mercaptan caustic scrubber (PSV-3)
- (12) Alkylate caustic treater (PSV-50)
- (13) Treater feed drum (PSV-1)
- (14) H₂S caustic scrubber (PSV-2)

c. Flare No. 13

Flare No. 13 is located across the street north of the alkylation unit. All hydrocarbons from the alkylation unit's safety valves will relieve to Flare No. 13. All liquid relieving to Flare No. 13 will first enter the Knockout Drum M-1, a horizontal vessel 11 feet by 32 feet. The hydrocarbon from the Knockout Drum M-1 will be pumped out by a steam pump (No. 1424) on level control to Tank 1242.

It is very important that the level in the knockout drum be kept on the low side, as we do not want any liquid going out the top of the flare.

5. PURGE GAS

a. 195 PSIG System

Sweet gas at 160 psig is supplied to the following vessels for transferring acid.

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- (1) Acid settler (V-10)
- (2) Acid storage drum (V-11)
- (3) Acid unloading rack
- (4) T-4 Rerun Tube

b. 45 PSIG System

Fuel gas at 45 psig is supplied to the following equipment for use in preparing the unit for turnaround.

- (1) HF stripper (T-7)
- (2) Depropanizer (T-6)
- (3) Isostripper reboiler charge line

This gas is used as a pressure source for moving liquid out of the unit at the time of shutdown. Once free of liquids, the unit is purged with the fuel gas to remove as much of the HF vapors as possible prior to injecting ammonia.

6. FUEL GAS

Fuel gas is supplied to the isostripper reboiler furnace (H-1) via a 6-inch header. Pressure is controlled at 45 psig by control valve (PC-5) in the line from the HP purge gas line

7. SEWERS AND DRAINS

a. Acid Sewers and Drains

All equipment in acid service is located within a concrete curbed area with all drains and sewers emptying into a neutralizing pit located at the east end of the alkylation unit. All surface drainage from this curbed area also drains into this neutralizing pit.

The neutralizing pit is a 6 foot by 8 foot concrete pit

in which the acid contaminated drainage is neutralized and converted to the water insoluble calcium fluoride. The acid sewer terminates in the mixing section of the neutralizing pit. The mixture is agitated with air to prevent the calcium fluoride from settling out. The level in the neutralizing pit is controlled by overflowing into the dirty water system.

Spent caustic from the acid relief neutralizer is disposed of by draining it into the mixing section of the neutralizing pit at a controlled rate.

b. Non-Acid Sewers and Drains

All equipment outside the curbed area is in "trace acid" or "non-acid" service and the drains, sewers and surface drainage from this equipment drains into the refinery sewer system.

8. ACID STORAGE AND UNLOADING

a. Acid Storage (V-11)

Acid storage drum (V-11) is an 18 foot by 24 foot vertical vessel with a capacity of approximately 380,447 pounds of HF when full. The acid level is determined by try-cocks which have been spaced at 15,862 pound increments for the purpose of determining the quantity of acid on hand and maintaining a monthly record of the HF consumed by the unit. Tank cars of HF, holding approximately 45,000 pounds per car are unloaded into the anhydrous acid storage drum to supply the batchwise unit demand.

Sweet pressure gas at 160 psig is used to unload the acid tank car as well as transfer the batchwise requirements from

- (1) Acid settler (V-10)
- (2) Acid storage drum (V-11)
- (3) Acid unloading rack
- (4) T-4 Rerun Tube

b. 45 PSIG System

Fuel gas at 45 psig is supplied to the following equipment for use in preparing the unit for turnaround.

- (1) HF stripper (T-7)
- (2) Depropanizer (T-6)
- (3) Isostripper reboiler charge line

This gas is used as a pressure source for moving liquid out of the unit at the time of shutdown. Once free of liquids, the unit is purged with the fuel gas to remove as much of the HF vapors as possible prior to injecting ammonia.

6. FUEL GAS

Fuel gas is supplied to the isostripper reboiler furnace (H-1) via a 6-inch header. Pressure is controlled at 45 psig by control valve (PC-5) in the line from the HF purge gas line

7. SEWERS AND DRAINS

a. Acid Sewers and Drains

All equipment in acid service is located within a concrete curbed area with all drains and sewers emptying into a neutralizing pit located at the east end of the alkylation unit. All surface drainage from this curbed area also drains into this neutralizing pit.

The neutralizing pit is a 6 foot by 8 foot concrete pit

in which the acid contaminated drainage is neutralized and converted to the water insoluble calcium fluoride. The acid sewer terminates in the mixing section of the neutralizing pit. The mixture is agitated with air to prevent the calcium fluoride from settling out. The level in the neutralizing pit is controlled by overflowing into the dirty water system.

Spent caustic from the acid relief neutralizer is disposed of by draining it into the mixing section of the neutralizing pit at a controlled rate.

b. Non-Acid Sewers and Drains

All equipment outside the curbed area is in "trace acid" or "non-acid" service and the drains, sewers and surface drainage from this equipment drains into the refinery sewer system.

8. ACID STORAGE AND UNLOADING

a. Acid Storage (V-11)

Acid storage drum (V-11) is an 18 foot by 24 foot vertical vessel with a capacity of approximately 380,447 pounds of HF when full. The acid level is determined by try-cocks which have been spaced at 15,862 pound increments for the purpose of determining the quantity of acid on hand and maintaining a monthly record of the HF consumed by the unit. Tank cars of HF, holding approximately 45,000 pounds per car are unloaded into the anhydrous acid storage drum to supply the batchwise unit demand.

Sweet pressure gas at 160 psig is used to unload the acid tank car as well as transfer the batchwise requirements from

the acid storage drum to the settler. The tank car unloading rack is located west of the alkylation unit, near Platforming Unit 1341. A 1-inch line supplies 185 psig gas to the unloading rack, and a 2 inch acid unloading line goes to the anhydrous acid storage drum. This 2-inch line is also used to depressure the acid tank car after unloading.

On the west end of the unit area are located facilities to unload HF trucks. The high-pressure purge gas enters in a 1-inch line through a Pressure Control (PC-12).

ELECTRICAL CIRCUITS443 HFAU

UNIT NO. 443 Alky. DATE 10-5-76
MAIN CIRCUIT 105C SUBSTATION 170
SOURCE #3 P.P.
SECONDARY CIRCUIT 72 SUBSTATION 8
EMERGENCY CIRCUIT 33C SUBSTATION _____
POSSIBLE BACKUP CIRCUIT None SUBSTATION _____
TYPE SWITCH TO EMERGENCY CIRCUIT Automatic
SWITCH LOCATED AT: 400 Auto. Switch Station

NOTE: The emergency lights are on 72 Circuit.
76 Circuit with a manual switch at 70 air comp. is a possible
backup for 72 Circ.

UNIT NO. 6441, 2, 3 & 4 Depent. DATE 10-5-76
MAIN CIRCUIT 55A SUBSTATION 120
SOURCE #2 P.P.
SECONDARY CIRCUIT None SUBSTATION _____
EMERGENCY CIRCUIT None SUBSTATION _____
POSSIBLE BACKUP CIRCUIT None SUBSTATION _____
TYPE SWITCH TO EMERGENCY CIRCUIT _____
SWITCH LOCATED AT: _____

ELECTRICAL CIRCUITS443 HFAU

UNIT NO. 6141 Deprop. DATE 10-5-76
MAIN CIRCUIT 55A SUBSTATION 120
SOURCE #2 P.P.
SECONDARY CIRCUIT None SUBSTATION _____
EMERGENCY CIRCUIT None SUBSTATION _____
POSSIBLE BACKUP CIRCUIT None SUBSTATION _____
TYPE SWITCH TO EMERGENCY CIRCUIT _____
SWITCH LOCATED AT: _____

NOTE: No backup circuit.

UNIT NO. 7542 Mercapt. DATE 10-5-76
MAIN CIRCUIT 55A SUBSTATION 120
SOURCE #2 P.P.
SECONDARY CIRCUIT None SUBSTATION _____
EMERGENCY CIRCUIT None SUBSTATION _____
POSSIBLE BACKUP CIRCUIT None SUBSTATION _____
TYPE SWITCH TO EMERGENCY CIRCUIT _____
SWITCH LOCATED AT: _____

STANDARD SHUTDOWN PROCEDURES443 HF ALKYLATION

The following comments and statements should be followed during the shutdown.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Do not block water to exchangers and coolers before all hydrocarbon liquid is drained. The cooling effect from hydrocarbon vaporizing may damage the tubes by freezing the water.
_____	_____	2. Try to maintain a low level in isostripper OH accumulator while shutting down. This will reduce the amount of isobutane that has to be put into 2489 Tank.
_____	_____	3. Drain sludge as required from light alkylate caustic treater (V-16) while pumping out isobutane.
_____	_____	4. Check low point bleeders periodically while purging.
_____	_____	5. Have the lab run a hydrocarbon analysis on deprop. bottoms going to 2489. Run samples as required. Max. allowable propane content is 16% liquid volume.

STANDARD SHUTDOWN PROCEDUREPRELIMINARY WORK443 HF ALKYLATION

The following work should be completed prior to shutdown.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Check 2" acid line on the bottom of each acid cooler to be sure that it is unstopped. (Lines will be used to pressure acid out of coolers onto storage drum.)
_____	_____	2. Have light alkylate caustic treater (V-16) filled with KOH.
_____	_____	3. a. Turn spectacle blinds to open position in the following lines:
_____	_____	(1) 2" purge gas line to acid settler (V-10).
_____	_____	(2) 2" purge gas line to depropanizer (T-6).
_____	_____	(3) 2" purge gas line to HF stripper (T-7).
_____	_____	b. Pull blank in 1: ammonia line.
_____	_____	4. Have the level in acid storage drum as low as possible (low inventory).
_____	_____	5. Have acid storage drum depressured.
_____	_____	6. Have the alkylate splitter shut down.
_____	_____	7. Have the acid rerun tower shut down (same as for C&R).
_____	_____	8. Have full strength caustic in acid relief neutralizer (5% NaOH maximum).
_____	_____	9. Have about 10-3/4" HF specification valves and 3/4" nipples to replace plugged or bad bleeders.

<u>Time</u>	<u>Initials</u>
-------------	-----------------

<u> </u>	<u> </u>	10. Have 2489 Tank ready for isobutane from 443.
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STANDARD SHUTDOWN PROCEDURE443 HF ALKYLATION

This procedure is intended to serve as a guide for a safe and orderly shutdown. When an item has been completed, record the time and initial the item.

Time Initials

- _____ 1. Notify the following personnel that you are shutting down and the approximate time of shutdown.

		<u>PHONE</u>
_____	A. Shift Foreman	507
_____	B. Gas Dispatcher	2265
_____	C. 1241 FCC	697
_____	D. 1242 FCC	691
_____	E. No. 3 Amine Unit	329
_____	F. 1542 Ethylene Unit	679
_____	G. Butane Storage	404
_____	H. 7944 Gas Plant	421
_____	I. 441 Alkylation	426
_____	J. Cracking Dept. SF	2298
_____	K. No. 15 Boiler House	383

- _____ 2. Block amylene and B-B feed to unit and work the level down in treater feed drum (V-1) and deethanizer feed drum (V-5).
- _____ 3. After levels in V-1 and V-5 are down (about _____ hours), block propylene feed to unit.

NOTE: Be sure to notify Gas Dispatcher before blocking propylene feed so he can switch propylene to storage.

- _____ 4. When treater feed pump (P-1) loses suction, shut down pump and block feed to V-5.
- _____ 5. Shut down the deethanizer charge pump (P-2) when it loses suction and block feed to tower.

<u>Time</u>	<u>Initials</u>
_____	_____

6. Continue firing deethanizer until flow to settler stops. Then block the deethanizer bottoms line to the acid settler. Cut HF stripper bottoms to acid settler at this time.

NOTE: Maintain a low level in the deethanizer overhead accumulator while shutting down but do not pump the liquid in the overhead accumulator back into the deethanizer tower until after the bottoms line has been blocked. This will prevent charging excess ethane to the settler.

- | | | |
|-------|-------|---|
| _____ | _____ | 7. Fire reboiler as required to depressure to fuel gas and then to flare. |
|-------|-------|---|

- | | | |
|-------|-------|---|
| _____ | _____ | 8. After Step No. 4 is complete, shut down caustic regeneration tower (T-1) by blocking the caustic line to and from V-3, block steam out of reboiler (E-1) and cool tower by refluxing. Pressure caustic to TK-1 and drain to sewer. |
|-------|-------|---|

- | | | |
|-------|-------|--|
| _____ | _____ | 9. As time permits, pressure caustic from V-2 and V-3 to spent caustic. Depressure V-1, V-2, V-3, V-4 and V-5 to fuel gas and then to flare. |
|-------|-------|--|

NOTE: Steam may have to be put into V-1, V-4, V-5, to prevent them from "freezing up." Do not use steam while going to fuel gas. Do not put steam in V-2 or V-3. These vessels have plastic rings in them.

Time	Initials
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
12:10	12:10
12:15	12:15
12:20	12:20
12:25	12:25
12:30	12:30
12:35	12:35
12:40	12:40
12:45	12:45
12:50	12:50
12:55	12:55
13:00	13:00
13:05	13:05
13:10	13:10
13:15	13:15
13:20	13:20
13:25	13:25
13:30	13:30
13:35	13:35
13:40	13:40
13:45	13:45
13:50	13:50
13:55	13:55
14:00	14:00
14:05	14:05
14:10	14:10
14:15	14:15
14:20	14:20
14:25	14:25
14:30	14:30
14:35	14:35
14:40	14:40
14:45	14:45
14:50	14:50
14:55	14:55
15:00	15:00
15:05	15:05
15:10	15:10
15:15	15:15
15:20	15:20
15:25	15:25
15:30	15:30
15:35	15:35
15:40	15:40
15:45	15:45
15:50	15:50
15:55	15:55
16:00	16:00
16:05	16:05
16:10	16:10
16:15	16:15
16:20	16:20
16:25	16:25
16:30	16:30
16:35	16:35
16:40	16:40
16:45	16:45
16:50	16:50
16:55	16:55
17:00	17:00
17:05	17:05
17:10	17:10
17:15	17:15
17:20	17:20
17:25	17:25
17:30	17:30
17:35	17:35
17:40	17:40
17:45	17:45
17:50	17:50
17:55	17:55
18:00	18:00
18:05	18:05
18:10	18:10
18:15	18:15
18:20	18:20
18:25	18:25
18:30	18:30
18:35	18:35
18:40	18:40
18:45	18:45
18:50	18:50
18:55	18:55
19:00	19:00
19:05	19:05
19:10	19:10
19:15	19:15
19:20	19:20
19:25	19:25
19:30	19:30
19:35	19:35
19:40	19:40
19:45	19:45
19:50	19:50
19:55	19:55
20:00	20:00
20:05	20:05
20:10	20:10
20:15	20:15
20:20	20:20
20:25	20:25
20:30	20:30
20:35	20:35
20:40	20:40
20:45	20:45
20:50	20:50
20:55	20:55
21:00	21:00
21:05	21:05
21:10	21:10
21:15	21:15
21:20	21:20
21:25	21:25
21:30	21:30
21:35	21:35

After Steps 1 through 9 are completed, install the following blanks:

Fresh Caustic
Spent Caustic
FCC Propylene Charge
Hi-Purity Propylene Charge
BB - Amylene Charge
Deethanize Off-Gas to Ethylene Plant
Mercaptan Gas to Flare

- _____ 10. As time permits, water wash V-2.
- _____ 11. As time permits, water wash V-3.
- _____ 12. As time permits, back wash V-4.
- _____ 13. After Step 6 is complete, the unit will be on re-cycle operation with isostripper bottoms going to field as alkylate. The HF stripper bottoms should be cut back to the settler as soon as the olefin feed is cut out of the settler. Propane should then be removed batch wise from the unit to storage as the depropanizer accumulator level rises. It is very important that the depropanizer accumulator level is not lost during the shutdown period.
- Good fractionation must be maintained throughout the shutdown to prevent excessive acid losses and thereby prevent spending the light alkylate caustic treater.
- _____ 14. Reduce recycle isobutane rate periodically until it is down to _____ B/H (over a three (3) hour period).
- _____ 15. Reduce depropanizer charge periodically until it is down to _____ B/H (over a three (3) hour period).

<u>Time</u>	<u>Initial</u>
-------------	----------------

- | | | |
|-------------------|-------------------|--|
| <u> </u> | <u> </u> | 16. Block the alkylate control valve as soon as the alkylate yield falls to zero. Alkylate should then be withdrawn batch wise to hold the isostripper bottoms level. This will likely occur within one hour from the time the feed is cut out, and all alkylate should be out of the system in 3 to 4 hours. As soon as it appears that all alkylate is out of the system, the fireman (FRC-7) should be placed on manual and the isostripper bottoms temperature slowly decreased. This will raise the level and allow the remaining alkylate to be sent to storage. |
|-------------------|-------------------|--|

NOTE: Be sure that alkylate is going into a running line instead of a tank. It is important that the furnace is fired manually to hold a level in the bottom of the isostripper.

- | | | |
|-------------------|-------------------|--|
| <u> </u> | <u> </u> | 17. Switch depropanizer bottoms from isostripper to 2489 Tank through 4" turnaround line from FRC-16 (depropanizer bottoms to isostripper), through light alkylate cooler (E-31), through light alkylate caustic treater (V-16), and to 2489 Tank through 4" jumpover line to isobutane line from D-3. |
| | | 18. The propanizer system and isostripper are ready to be separated. |
| <u> </u> | <u> </u> | A. Start refluxing isostripper tower using 4" turnaround line from E-16 (do this at same time that Step No. 17 is done). |

Time Initials

NOTE: Step B & C should be done simultaneously.

B. Open the 6" pump-out line from the acid settler to depropanizer charge pump suction. Do not close the valve on top of the acid settler.

C. Reduce recycle isobutane rate to acid settler until the level in acid settler drops. At the same time, block the feed to the isostripper.

NOTE: Use care not to build pressure on acid settler when blocking isostripper feed. If pressure on acid settler drops, use natural gas to maintain pressure-so depropanizer charge pump will not lose suction.

19. Shut down isostripper as follows:

A. Fire the furnace harder and increase the recycle isobutane rate to acid settler.

B. When the isostripper level gets low, stop re-fluxing tower and shut off all fires in the furnace. All of the liquid in isostripper should flash out of tower and be pumped to acid settler as recycle isobutane.

C. Roll spools on fuel gas line to furnace.

D. Any liquid remaining in isostripper will be pumped or pressured to Isobutane Tank 2489.

E. Depressure tower to flare.

20. After the isostripper is shut down and time permits, drain and gas free the isobutane driers (V-9A & B as follows:

NOTE: We are not planning to do any work on the propane defluorinators (V-15) and propane KOH Treater (V-14).

- _____ G. Depressure towers and Accumulator D-2 to flare.
- _____ 22. Pressure liquid from acid settler into acid tank cars using natural gas. Displace each acid cooler separately.
- _____ A. E-10A _____ C. E-10C _____
- _____ B. E-10B _____ D. E-10D _____
- _____ 23. After all acid has been displaced from settler and acid coolers, depressure settler to flare. Pressure acid from storage drum to acid tank cars.
- _____ 24. Lower pressure on acid storage drum by flaring.
- _____ 25. Turn the following spectacle blinds to close position:
- _____ A. 2" Unloading line
- _____ B. 4" Bottoms line (also plug bleeder and tag valve)
- _____ C. Install blanks on each propane KOH treater (V-14 A & B) and install tail pipe in relief valves.
- _____ D. Install blanks on each defluorinator (V-15 A & B) and install tail pipe on relief valves.

NOTE: After steps 13 through 24 are complete, install the following blanks at battery limits:

- _____ A. Isobutane feed
- _____ B. Heavy Alkylate
- _____ C. Light Alkylate to No-nox
- _____ D. Light Alkylate to Good Gulf
- _____ E. Propane product to ethylene
- _____ F. Refrigeration propane from V-13
- _____ G. Propane to fuel gas
- _____ H. Polymer charge
- _____ 26. After each line, tower, pump, exchanger, etc., has been drained and depressured, draw off any remaining liquid at all low point bleeders.

NOTE: All plugged bleeders must be unstopped as soon as possible after system is depressured.

GAS PURGING

NOTES: All lines in parallel flow must be purged one at a time. That is, purge through a pump for a period of time, block it off and purge through its spare. The same holds true for regulators and bypasses and exchangers.

While purging, drain all low point bleeders as required and unstop bleeders as they plug up.

After purging 4 - 5 hours, drain all water from condensers and coolers. Do not drain water before all hydrocarbon liquid is out of exchangers because of the possibility of tube damage due to freezing of water in tubes.

27. Gas purging isostripper.

A. Bring purge gas into the unit through the discharge of isostripper reboiler pump, then furnace and into the isostripper tower. Purge each coil in the furnace, one at a time.

_____	Coil "A"	_____	Coil "F"
_____	Coil "B"	_____	Coil "G"
_____	Coil "C"	_____	Coil "H"
_____	Coil "D"	_____	Coil "I"
_____	Coil "E"	_____	Coil "J"

B. Using furnace purge steam, heat the purge gas to 200°F. Do not let the purge gas pressure exceed 20 psi on isostripper.

Time	Initials
------	----------

C. Purge suction of furnace charge pumps from tower
to pumps.

_____ D. Purge 4" turnaround line from recycle isobutane cooler (E-16) to bleeder at FRC-16.

28. Acid Settler

A. Purge through:

- | | | |
|-------|-------|--|
| _____ | _____ | (1) IsoStripper OH Condensers (one bank at a time) |
| _____ | _____ | (2) OH Accumulator |
| _____ | _____ | (3) Recycle Isobutane Cooler |
| _____ | _____ | (4) Reactor Tee (one at a time) |
| _____ | _____ | (5) Into acid settler and to flare |

_____ B. Purge through the acid coolers, out the 2" HF
line to the rerun unit and to the flare.

E-10A E-10B E-10C E-10D

C. Purge isostripper charge line back to acid settler.

 D. Purge 2" line (D-2 to V-10) from acid settler to
 level control valve at D-2.

29. Acid Storage Drum

A. Use 2" natural gas connection to purge through storage drum, out the 2 four inch bottom lines to the rerun unit and to the flare.

B. Purge to flare.

30. Purging depropanizer tower

A. Purge from isostripper through depropanizer bottoms line, E-17, depropanizer reboiler and depropanizer tower. (Be sure 4" start-up line from reboiler to tower is open)

<u>Time</u>	<u>Initials</u>
-------------	-----------------

OH condensers.

OH accumulator and out to flare.

Purge vent gas absorber (V-13) to atmospher.

B. Purge P-15 (reflux pump) suction from OH accumulator to pumps. Purge P-15 discharge from depropanizer tower to check valves on pumps.

C. Purge P-14 (depropanizer charge pump) discharge from depropanizer tower through E-18 and E-17 and to atmosphere at pump check valve.

Purge P-14 suction from acid settler to pumps.

31. Alkylate System

A. Purge through isostripper bottoms line into alkylate splitter

Splitter OH Condenser.

Light Alkylate Cooler.

Light Alkylate Caustic Treater to flare.

Purge reflux line from tower to light alkylate cooler and to flare.

B. Purge through 4" turnaround line from FRC-16 to bleeder at light alkylate cooler.

32. Acid Rerun System

A. Purge from recycle isobutane line through acid vaporizer,

Isobutane stripping line,

Reflux line,

Time	Initials
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
12:10	12:10
12:15	12:15
12:20	12:20
12:25	12:25
12:30	12:30
12:35	12:35
12:40	12:40
12:45	12:45
12:50	12:50
12:55	12:55
13:00	13:00
13:05	13:05
13:10	13:10
13:15	13:15
13:20	13:20
13:25	13:25
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13:35	13:35
13:40	13:40
13:45	13:45
13:50	13:50
13:55	13:55
14:00	14:00
14:05	14:05
14:10	14:10
14:15	14:15
14:20	14:20
14:25	14:25
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14:35	14:35
14:40	14:40
14:45	14:45
14:50	14:50
14:55	14:55
15:00	15:00
15:05	15:05
15:10	15:10
15:15	15:15
15:20	15:20
15:25	15:25
15:30	15:30
15:35	15:35
15:40	15:40
15:45	15:45
15:50	15:50
15:55	15:55
16:00	16:00
16:05	16:05
16:10	16:10
16:15	16:15
16:20	16:20
16:25	16:25
16:30	16:30
16:35	16:35
16:40	16:40
16:45	16:45
16:50	16:50
16:55	16:55
17:00	17:00
17:05	17:05
17:10	17:10
17:15	17:15
17:20	17:20
17:25	17:25
17:30	17:30
17:35	17:35
17:40	17:40
17:45	17:45
17:50	17:50
17:55	17:55
18:00	18:00
18:05	18:05
18:10	18:10
18:15	18:15
18:20	18:20
18:25	18:25
18:30	18:30
18:35	18:35
18:40	18:40
18:45	18:45
18:50	18:50
18:55	18:55
19:00	19:00
19:05	19:05
19:10	19:10
19:15	19:15
19:20	19:20
19:25	19:25
19:30	19:30
19:35	19:35
19:40	19:40
19:45	19:45
19:50	19:50
19:55	19:55
20:00	20:00
20:05	20:05
20:10	20:10
20:15	20:15
20:20	20:20
20:25	20:25
20:30	20:30
20:35	20:35
20:40	20:40
20:45	20:45
20:50	20:50
20:55	20:55
21:00	21:00
21:05	21:05
21:10	21:10
21:15	21:15
21:20	21:20
21:25	21:25
21:30	21:30
21:35	21:35

B. Purge OH line through OH condenser (E-13) and
to atmosphere at P-11,

.....

Purge P-11 discharge from acid settler back
to pump.

Abstract

C. Purge ASO filter to air and through tower to flare.

D. Purge ASO line to heater.

33. HF Stripper

Figure 1

A. Purge through OH and feed line to depropanizer
OH accumulator and to flare. (Use purge gas
connection on tower.)

.....

B. Purge 2" turnaround line from HF stripper bottoms
to bleeder at recycle isobutane line.

34. After the system has been purged, block off purge gas and depressure all equipment to flare. Open purge gas into bottom of flare stack. Then

A. Remove 4" spool in main fuel gas line.

B. Remove 2" spool in high pressure purge gas line.

AMMONIA SOAK

NOTE: As ammonia flows through unit, check bleeders to be sure that all acid service equipment get ammonia soaked. Ammonia purge should follow the same path used in gas purging.

35. A. Bring ammonia gas into unit through the discharge of isostripper reboiler pump into the furnace and then into isostripper tower.

_____	Coil "A"	_____	Coil "F"
_____	Coil "B"	_____	Coil "G"
_____	Coil "C"	_____	Coil "H"
_____	Coil "D"	_____	Coil "I"
_____	Coil "E"	_____	Coil "J"

_____ B. Purge suction of furnace charge pumps from tower to pumps.

_____ C. Purge 4" turnaround line from recycle isobutane cooler (E-16) to bleeder at FRC-16.

36. Acid Settler

_____ A. Purge through:

1. Isostripper OH condensers (one bank at a time)
2. OH accumulator
3. Recycle isobutane cooler
4. Reactor tee (one at a time)
5. Into acid settler and to flare

_____ B. Purge through the acid coolers, out the 2" HF line to the rerun unit and to the flare.

_____ E-10A _____ E-10B _____ E-10C _____ E-10D

_____ C. Purge isostripper charge line back to acid settler.

_____ D. Purge 2" line (D-2 to V-10) from acid settler to level control valve at D-2.

37. Acid Storage Drum

_____ A. Purge from 2" HF line on bottom of acid coolers through both 4" lines on bottom of V-11 to flare.

38. Depropanizer Tower

_____ A. Purge from isostripper through depropanizer bottom line, E-17, depropanizer reboiler, and depropanizer tower. (Be sure 4" start-up line from reboiler to tower is open.),

_____ OH condensers,

_____ OH accumulator and out to flare,

Time	Initials
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
12:10	12:10
12:15	12:15
12:20	12:20
12:25	12:25
12:30	12:30
12:35	12:35
12:40	12:40
12:45	12:45
12:50	12:50
12:55	12:55
13:00	13:00
13:05	13:05
13:10	13:10
13:15	13:15
13:20	13:20
13:25	13:25
13:30	13:30
13:35	13:35
13:40	13:40
13:45	13:45
13:50	13:50
13:55	13:55
14:00	14:00
14:05	14:05
14:10	14:10
14:15	14:15
14:20	14:20
14:25	14:25
14:30	14:30
14:35	14:35
14:40	14:40
14:45	14:45
14:50	14:50
14:55	14:55
15:00	15:00
15:05	15:05
15:10	15:10
15:15	15:15
15:20	15:20
15:25	15:25
15:30	15:30
15:35	15:35
15:40	15:40
15:45	15:45
15:50	15:50
15:55	15:55
16:00	16:00
16:05	16:05
16:10	16:10
16:15	16:15
16:20	16:20
16:25	16:25
16:30	16:30
16:35	16:35
16:40	16:40
16:45	16:45
16:50	16:50
16:55	16:55
17:00	17:00
17:05	17:05
17:10	17:10
17:15	17:15
17:20	17:20
17:25	17:25
17:30	17:30
17:35	17:35
17:40	17:40
17:45	17:45
17:50	17:50
17:55	17:55
18:00	18:00
18:05	18:05
18:10	18:10
18:15	18:15
18:20	18:20
18:25	18:25
18:30	18:30
18:35	18:35
18:40	18:40
18:45	18:45
18:50	18:50
18:55	18:55
19:00	19:00
19:05	19:05
19:10	19:10
19:15	19:15
19:20	19:20
19:25	19:25
19:30	19:30
19:35	19:35
19:40	19:40
19:45	19:45
19:50	19:50
19:55	19:55
20:00	20:00
20:05	20:05
20:10	20:10
20:15	20:15
20:20	20:20
20:25	20:25
20:30	20:30
20:35	20:35
20:40	20:40
20:45	20:45
20:50	20:50
20:55	20:55
21:00	21:00
21:05	21:05
21:10	21:10
21:15	21:15
21:20	21:20
21:25	21:25
21:30	21:30
21:35	21:35

Purge vent gas absorber (V-13) to atmosphere.

B. Purge P-15 (reflux pump) suction from OH accumulator to pumps,

Purge P-15 discharge from depropanizer tower to
check valve on pumps.

C. Purge P-14 (depropanizer charge pump) discharge from depropanizer tower through E-18, E-17, and to atmosphere at pump,

Purge P-14 suction from acid settler to pumps.

39. Alkylate System

A. Purge through isostripper bottoms line into alkylate splitter,

Splitter OH condenser,

Light alkylate cooler,

Light alkylate caustic treater to flare.

Purge reflux line from tower to light alkylate cooler and to flare.

B. Purge through 4" turnaround line from FRC-16
to bleeder at light alkylate cooler.

40. Acid Rerun System

A. Purge from recycle isobutane line through acid vaporizer.

Isobutane stripping line,

Reflux line,

Into rerun column and to flare.

Time	Initials
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
12:10	12:10
12:15	12:15
12:20	12:20
12:25	12:25
12:30	12:30
12:35	12:35
12:40	12:40
12:45	12:45
12:50	12:50
12:55	12:55
13:00	13:00
13:05	13:05
13:10	13:10
13:15	13:15
13:20	13:20
13:25	13:25
13:30	13:30
13:35	13:35
13:40	13:40
13:45	13:45
13:50	13:50
13:55	13:55
14:00	14:00
14:05	14:05
14:10	14:10
14:15	14:15
14:20	14:20
14:25	14:25
14:30	14:30
14:35	14:35
14:40	14:40
14:45	14:45
14:50	14:50
14:55	14:55
15:00	15:00
15:05	15:05
15:10	15:10
15:15	15:15
15:20	15:20
15:25	15:25
15:30	15:30
15:35	15:35
15:40	15:40
15:45	15:45
15:50	15:50
15:55	15:55
16:00	16:00
16:05	16:05
16:10	16:10
16:15	16:15
16:20	16:20
16:25	16:25
16:30	16:30
16:35	16:35
16:40	16:40
16:45	16:45
16:50	16:50
16:55	16:55
17:00	17:00
17:05	17:05
17:10	17:10
17:15	17:15
17:20	17:20
17:25	17:25
17:30	17:30
17:35	17:35
17:40	17:40
17:45	17:45
17:50	17:50
17:55	17:55
18:00	18:00
18:05	18:05
18:10	18:10
18:15	18:15
18:20	18:20
18:25	18:25
18:30	18:30
18:35	18:35
18:40	18:40
18:45	18:45
18:50	18:50
18:55	18:55
19:00	19:00
19:05	19:05
19:10	19:10
19:15	19:15
19:20	19:20
19:25	19:25
19:30	19:30
19:35	19:35
19:40	19:40
19:45	19:45
19:50	19:50
19:55	19:55
20:00	20:00
20:05	20:05
20:10	20:10
20:15	20:15
20:20	20:20
20:25	20:25
20:30	20:30
20:35	20:35
20:40	20:40
20:45	20:45
20:50	20:50
20:55	20:55
21:00	21:00
21:05	21:05
21:10	21:10
21:15	21:15
21:20	21:20
21:25	21:25
21:30	21:30
21:35	21:35

B. Purge OH line through OH condenser and to atmosphere at P-11,

Purge P-11 discharge from acid settler back
to pump.

C. Purge ASO filter to air and through tower to flare.

D. Purge ASO line to heater.

41. HF Stripper

A. Purge through OH and feed line to OH accumulator and to flare. (Use purge gas connection on tower.)

[illegible]

B. Purge 2" turnaround line from HF stripper bottom
to bleeder at recycle isobutane line.

42. Pressure up to 3-5 psi of ammonia and soak for 8-16 hours.

43. A. After ammonia and gas are cut out of flare, purge flare with nitrogen until gas free at drip drum.

B. Then take purge gas out of flare stack and purge stack with nitrogen until gas free.

C. Cut off fires at flare and blank fuel gas line to flare. (At corner by GU 242.)

D. Blank drip drum pump (J-1).

44. After the ammonia soak period has been completed, depressure the unit to atmosphere. Do not depressure to flare.

Time Initials

CLEARANCE OF AMMONIA

- _____ 45. When the pressure is off of vessels, the top heads can be removed. Before any other head can be removed, an air sucker must be installed and turned on.
- _____ 46. A. With the air sucker operating, the bottom head will be removed permitting the ammonia vapors to be discharged at the top of each vessel.
- _____ B. Open all low point bleeders in piping and equipment in order to clear all piping and equipment.
- _____ 47. After ammonia vapors are displaced from towers, check for presence of acid. If none is present, equipment is ready for inspection.
- _____ 48. If acid is present, the vessel will have to be reclosed for further ammonia neutralizing.
- _____ 49. Install blank in ammonia line to unit.
- _____ 50. Install blank in condensate line as per unit foreman's orders.
- _____ 51. Install blank in flare line.

STANDARD SHUTDOWN PROCEDURELHSU - 6141

This procedure is intended to serve as a guide for a safe and orderly shutdown. The Operator should initial each item as it is completed and write the time so that nothing will be forgotten.

Time Initials

1. Notify the following personnel that you are shutting down and the approximate time of shutdown.

PHONE

_____	_____	A. Light Oil Shift Foreman . . .	507
_____	_____	B. Gas Dispatcher	2265
_____	_____	C. DCU-842	2109
_____	_____	D. UOP	624
_____	_____	E. AU-145	393
_____	_____	F. EU-1542	679
_____	_____	G. No. 15 Boiler House	383
_____	_____	H. SAU-441	426

2. Have Gas Dispatcher switch overhead to fuel gas.
Watch heater H-1 on HFAU-443.

3. Switch Charge 6142 at AU-145. Block charge line to unit.

4. When feed pump (G-105A) loses suction, shut down pump.

5. Continue pumping the reflux into the tower and fire the reboiler to put as much to fuel as possible.
Slowly lower the pressure on the tower to fuel gas pressure.

6. After liquid is out, block off steam to reboiler and depressure tower to fuel gas.

7. Depressure to the flare down to 5 psig.

<u>Time</u>	<u>Initials</u>	
_____	_____	8. When pressure gets to 5 psig., put tower, feed accumulator, and reflux accumulator to blowdown stack.
_____	_____	9. After depressured to blowdown stack, steam out tower, reflux accumulator, and feed accumulator to blowdown stack for a minimum of 4 hours.
_____	_____	10. The steam tower out open top manway for a minimum of 8 hours.
_____	_____	11. After steaming out, fill reflux accumulator with water and using the reflux pump, wash the tower through the reflux line and out the nozzle on bottom of reboiler to sewer.

11-1-78

CHEV B8 6791

6141 DEPROPANIZER BLANK LIST

<u>In</u>	<u>Out</u>	
_____	_____	1. 1" Stack Line from Feed Accumulator
_____	_____	2. 3" P. O. Line at Feed Accumulator
_____	_____	3. 1/2" Gas Line at Feed Accumulator
_____	_____	4. 1-1/2" Flare Line at Feed Accumulator
_____	_____	5. 1" Stack Line on Reflux Drum
_____	_____	6. 3" P. O. Line on Reflux Drum
_____	_____	7. 1/2" Gas Line on Reflux Drum
_____	_____	8. 1-1/2" Flare Line on Reflux Drum
_____	_____	9. 3" Charge Line to Feed Accumulator
_____	_____	10. 1-1/2" Bottoms Line at Mercaptan Unit
_____	_____	11. 4" Bottoms Line to UOP (South side of 7542)
_____	_____	12. 3" Reboiler Stack Line
_____	_____	13. 3" Reboiler P. O. Line
_____	_____	14. 4" G-105A Pump Suction
_____	_____	15. 4" G-105A Pump Discharge

STANDARD SHUTDOWN PROCEDURE6441 DEPENTANIZERTime Initials

1. Notify the following people that 6441 is shutting down for a two-week C&R.

		<u>PHONE</u>
_____	A. Light Oil Shift Foreman . . .	507
_____	B. 163 P. H.	327
_____	C. 441 Alkylolation Unit	426
_____	D. Gas Plant	421
_____	E. Gas Dispatcher	2265

- _____ 2. As soon as AVU 142 stops sending charge, block the charge line in conduit near the Mercaptan Unit.
- _____ 3. Put the charge meter on manual and empty the charge accumulator into D-101 Tower.
- _____ 4. As soon as the charge accumulator is empty, block the steam to the reboiler. Then stop refluxing D-101 and pump out the reflux drum to 2477 Tank.
- _____ 5. After the reflux accumulator is empty, block the B-P line south of the reboiler (valve about 8' above grade). Block off the wet gas line.
- _____ 6. Pump all liquid out of tower to Platformer Charge Stock. Then, block bottoms line in conduit west of unit.
- _____ 7. Then, depressure the charge accumulator, reflux accumulator, and D-101 Tower to blowdown.
- _____ 8. Then, steam out D-101 Tower to the blowdown stack by steaming through the tower, the overhead condenser, the overhead accumulator and out to the stack. Also, steam to the stack through the reboiler.

<u>Time</u>	<u>Initials</u>	
_____	_____	9. After steaming to the blowdown stack for four hours, have the top head on D-101 removed and steam to the atmosphere for eight hours.
_____	_____	10. Steam out the charge accumulator to the blown stack.
_____	_____	11. While steaming the tower and drums, open all bleeders and steam through bleeders.
_____	_____	12. After steaming to the atmosphere for eight hours, put water into the reflux drum and wash the tower until clean and cool. Drain the water to the sewer through the 3" drain at the reboiler.
_____	_____	13. While water washing the tower, use the bottoms pump to displace the gasoline through the bottoms line to the battery limits block valve.
_____	_____	14. While steaming the tower all heads can be 4-bolted <u>BUT DO NOT REMOVE ANY HEADS (EXCEPT D-101 TOP</u> <u>HEAD) UNTIL AFTER FIELD BLANKS HAVE BEEN INSTALLED.</u>

6441 DEPENTANIZERBLANK LIST

<u>In</u>	<u>Out</u>	
_____	_____	1. 3" Charge
_____	_____	2. 2" Feed Accumulator Gas to Flare
_____	_____	3. 2" Feed Accumulator Gas to Flare
_____	_____	4. 1-1/2" Butane-Pentane at Plug Valve
_____	_____	5. 3" Depentanized Gasoline
_____	_____	6. 3" 6443 Bottoms Transfer to 6441
_____	_____	7. 3" Suction between G-101A and G-103A
_____	_____	8. 3" Discharge between G-101A and G-103A
_____	_____	9. 3" Suction between G-101C and G-103A
_____	_____	10. 3" Discharge between G-101C and G-103A
_____	_____	11. 3" Reboiler Stack
_____	_____	12. 3" Feed Drum Pump Out
_____	_____	13. 3" Reflux Drum Pump Out
_____	_____	14. 3/4" Feed Drum Gas Line
_____	_____	15. 1" Feed Drum Gas Line
_____	_____	16. 3/4" Reflux Drum Gas Line
_____	_____	17. 1" Reflux Drum Gas Line
_____	_____	18. 3" Wet Gas

11-1-78

CHEV B8 6795

STANDARD SHUTDOWN PROCEDURE6442 DEPENTANIZERTime Initials

1. Notify the following people that 6442 is shutting down for a two-week C&R.

PHONE

_____	_____	A. Light Oil Shift Foreman . . .	507
_____	_____	B. 163 P. H.	327
_____	_____	C. 441 Alkylation Unit	426
_____	_____	D. Gas Plant	421
_____	_____	E. Gas Dispatcher	2265

2. As soon as AVU 142 stops sending charge, block the charge line in conduit near the Mercaptan Unit.

3. Put the charge meter on manual and empty the charge accumulator into D-102 Tower.

4. As soon as the charge accumulator is empty, block the steam to the reboiler. Then stop refluxing D-102 and pump out the reflux drum to 2477 Tank.

5. After the reflux accumulator is empty, block the B-P line south of the reboiler (valve about 8' above grade). Block off the wet gas line.

6. Pump all liquid out of tower to Platformer Charge Stock. Then, block bottoms line in conduit west of unit.

7. Then, depressure the charge accumulator, reflux accumulator, and D-102 Tower to blowdown.

8. Then, steam out D-102 Tower to the blowdown stack by steaming through the tower, the overhead condenser, the overhead accumulator and out to the stack. Also, steam to the stack through the reboiler.

- | <u>Time</u> | <u>Initials</u> | |
|-------------|-----------------|--|
| _____ | _____ | 9. After steaming to the blowdown stack for four hours, have the top head on D-102 removed and steam to the atmosphere for eight hours. |
| _____ | _____ | 10. Steam out the charge accumulator to the blown stack. |
| _____ | _____ | 11. While steaming the tower and drums, open all bleeders and steam through bleeders. Drain condensate at all low places. |
| _____ | _____ | 12. After steaming to the atmosphere for eight hours, put water into the reflux drum and wash the tower until clean and cool. Drain the water to the sewer through the 3" drain at the reboiler. |
| _____ | _____ | 13. While water washing the tower, use the bottoms pump to displace the gasoline through the bottoms line to the battery limits block valve. |
| _____ | _____ | 14. While steaming the tower all heads can be 4-bolted
<u>BUT DO NOT REMOVE ANY HEADS (EXCEPT D-102 TOP HEAD) UNTIL AFTER FIELD BLANKS HAVE BEEN INSTALLED.</u> |

6442 DEPENTANIZERBLANK LIST

<u>In</u>	<u>Out</u>	
<u> </u>	<u> </u>	1. 2" Overhead Line at Tie-in to 6441 O. H.
<u> </u>	<u> </u>	2. 4" Charge Line in Conduit
<u> </u>	<u> </u>	3. 4" Bottoms Line at West End of Unit
<u> </u>	<u> </u>	4. 6" Suction Line between G-102B and G-104B
<u> </u>	<u> </u>	5. Flare Line from Feed Accumulator
<u> </u>	<u> </u>	6. 3" Pump-out Line from Reflux Accumulator
<u> </u>	<u> </u>	7. 2" Flare Line from Reflux Accumulator
<u> </u>	<u> </u>	8. 3" Wet Gas Line from Reflux Accumulator
<u> </u>	<u> </u>	9. 3" Pump-out Line from Reboiler

07-5720

6443 & 6444 DEPENTANIZERS

<u>Time</u>	<u>Initials</u>
-------------	-----------------

1. Notify the following people that 6443 & 6444 are shutting down for a two-week C&R.

		<u>PHONE</u>
_____	A. Lt. Oil Shift Foreman . . .	507
_____	B. 163 P. H.	327
_____	C. 441 Alkylation Unit . . .	426
_____	D. Gas Plant	421
_____	E. Gas Dispatcher	2265

2. As soon as AVU 144 stops sending charge, block the charge line in conduit near the Mercaptan Unit.
3. Put the charge meters on manual and empty the charge accumulator into towers.
4. As soon as the charge accumulator is empty, block the steam to the reboilers. Then, cut the reflux out of towers and pump out the reflux drums to 2477 Tank.
5. After the reflux accumulators are empty, block the B-P line south of the reboiler (valve about 8' above grade). Block off the wet gas line.
6. Pump all liquid from towers to Platformer Charge Stock. Then block bottoms line.
7. Then, depressure the charge accumulator, reflux accumulators and towers to blowdown.
8. Then, steam out towers to the blowdown stack by steaming through the towers, the overhead condensers, the overhead accumulators and out to the stack.

Time Initials

- _____ 8. Also, steam to the stack through the reboilers.
- _____ 9. After steam to the blowdown stack for four hours,
have the top head on towers removed and steam to the
atmosphere for eight hours.
- _____ 10. Steam out the charge accumulator to the blown stack.
- _____ 11. While steaming the towers and drums, open all bleed-
ers and steam through bleeders.
- _____ 12. After steaming to the atmosphere for eight hours,
put water into the reflux drums and wash the towers
until clean and cool. Drain the water to the
sewer through the 3" drain at the reboilers.
- _____ 13. While water washing the towers, use the bottoms
pump to displace the gasoline from the bottoms line
to the battery limits block valve.
- _____ 14. While steaming the towers, all heads can be 4-bolted
BUT DO NOT REMOVE ANY HEADS (EXCEPT TOP HEAD) UNTIL
AFTER FIELD BLANKS HAVE BEEN INSTALLED.

6443 & 6444 DEPENTANIZERSBLANK LIST

<u>In</u>	<u>Out</u>	
_____	_____	1. 4" 6443-4 Bottoms near 22nd Street and riser.
_____	_____	2. 3" 6443-4 Bottoms to treating plant in conduit on Avenue F side.
_____	_____	3. 3" 6443-4 BP line at cock in conduit at the walk- way in the Mercaptan Unit.
_____	_____	4. 3" 6443 Reflux Accumulator pump out and stack lines at the cock next to the accumulator.
_____	_____	5. 3" 6444 Reflux Accumulator pump out and stack lines at the cock next to the accumulator.
_____	_____	6. 3" 6443 Reboiler stack line below reboiler.
_____	_____	7. 3" 6444 Reboiler stack line below the reboiler.
_____	_____	8. 6" 6443-4 Charge at 22nd Street.
_____	_____	9. 3" discharge line between G-103A and G-103C Pumps at G-103A.
_____	_____	10. 4" suction line between G-103A and G-103C Pumps at G-103A.
_____	_____	11. 6" suction line between G-102B and G-104B pumps.
_____	_____	12. 3" 6441 Bottoms jumpover to 6443 Bottoms in conduit near G-109 Pump.
_____	_____	13. 3" 6443 Reflux Accumulator wet gas line.
_____	_____	14. 2" 6443 Reflux Accumulator gas line to flare at flange nearest vessel.
_____	_____	15. 3" 6444 Reflux Accumulator wet gas line.

- _____ 16. 2" 6444 Reflux Accumulator gas line to flare at
flange nearest vessel.

The following field blanks must be installed in order
to work on No. 2 Settler at the Mercaptan Unit. All
blanks are to be installed at the Mercaptan Unit.

- _____ 1. 6" charge to No. 2 Settler at the firewall near
1837 Tank.

- _____ 2. 6" effluent from No. 2 Settler at the firewall
near 1837 Tank.

- _____ 3. 3" caustic to No. 2 Settler.

- _____ 4. 4" caustic from No. 2 Settler at flange below 2"
line on bottom of settler.

- _____ 5. 4" draw-off on bottom line to blowdown stack.

GENERAL DISCUSSION OF FLOW443 HFAU1. HYDROCARBON FEEDSa. Olefin Feed

The olefin feed stream to the H. F. Alkylation Unit is composed of hydrocarbon streams from 1241 - 1242 (Propylene - B.B. and Amylene). The three streams are combined prior to processing. The feed first flows through the alkylation feed treating section.

Trouble free operation of the H. F. Alkylation Unit is highly dependent on the operation of the feed treating at feed preparation section. In the final analysis, almost all problems arising in the H. F. Alkylation section can be traced back to poor operation in the feed treating section. Sulfur, present as hydrogen sulfide, is removed in the H₂S Treater and mercaptan sulfur is removed in the Mercaptan Caustic Treater. Proper operation of these facilities will produce a feed stock with less than 20 ppm total sulfur.

After the feed has been caustic treated, the stream will be saturated with water. The feed deethanizer performs two functions in preparing the olefin feed; removal of water and removal of ethane and lighter components. The treated olefin charge should contain no more than 20 ppm total sulfur, 20 ppm of water and 0.2 liquid volume percent of ethane and lighter.

b. Outside Isobutane Feed

Two separate isobutane streams are employed in the operation

of the Alkylation Unit, the outside isobutane as isobutane make-up and recycle isobutane as internal recycle isobutane.

The outside isobutane is pumped to the unit from Isobutane Storage Tank 2489, which 441 Alkylation Unit controls. Isobutane to this tank comes from Butane Storage, 6341 Overhead and Neches Butane.

.c. Fixed Bed Driers V9A and V9B

The outside isobutane enters a 4" line through flow control FRC-10 to the driers. The isobutane is manifolded in such a manner that one vessel will operate on process flow while the second vessel is out of service for regeneration. The driers are switched every 24 hours, at the beginning of the 2 - 10 shift.

The vessels have a 17-foot bed of alcoa aluminum which serves as a dessicant to remove the water contained in the isobutane feed. The isobutane enters the bottom of the drier and leaves the top after which it mixes with the bottoms of the De-ethanizer Tower. The level in V12 will determine the amount of isobutane make-up required.

2. HYDROCARBON FEED TREATING

When the feed stocks are delivered to the battery limits, they require additional treating facilities to reduce hydrogen sulfide and mercaptan sulfur compounds to a level satisfactory for alkylation feed. The proper operation of this section is vital for successful operation of the H. F. Alkylation Section.

a. Treater Feed Drum V-1

The treater feed drum is a horizontal vessel and normally

CHEV B8 6729

operates at about 100 to 150 psig. Charge to the treater feed drum is B.B., Amylene and Propylene. B.B. and Amylene Feed are controled by FRC-2 while the Propylene Feed is controlled by FRC-1 and PRC-8.

The B.B. and Amylene are stored in 2475 & 2476 Tanks which 441 Unit controls. The propylene charge will come straight from 1241 & 1242. Pumps PlA and PlB will pump from V-1 to H₂S Caustic Scrubber, V-2. Water must be drained three to four times a shift from V-1.

b. H₂S Caustic Scrubber V-2

The H₂S Caustic Scrubber B-2 is a vertical vessel filled with an 8 foot bed of plastic saddles.

Caustic is pumped in batches into the H₂S Scrubber with P-4 from Caustic Surge Tank Tk-1. The caustic level in V-2 should be around glasses.

When caustic is spent, 50% spent, it should be withdrawn from the bottom of the vessel and pressume to the Acid Plant as spent caustic. The olefin feed enters the bottom of V-2 through a distributing ring and flows up through the caustic and out the top to the bottom of V-3. V-2 can be bypassed to V-3 through a 4 inch line.

c. Mercaptan Caustic Scrubber V-3

The Mercaptan Caustic Scrubber, V-3, is a vertical vessel which contains three 8 foot beds of plastic saddles. Olefin feed enters the bottom of V-3 from the H₂S Caustic Scrubber and exits out the top to the top of the Sand Tower Coalescer V-4.

A continuous stream of caustic is pumped from Caustic Surge Tank,

STANDARD SHUTDOWN PROCEDUREMERCAPTAN REMOVAL UNIT 7542

The following procedure outlines the steps to be taken for a normal shurdown and for freeing theuunit of hydrocarbons and caustic. Each step should be checked off and initialed by the operator when it has been completed so that the next shift will know which steps have been completed.

Time Initials

1. Notify the following that the unit is shutting down and the approximate time the shutdown will start.

	<u>Phone</u>
a. Shift Supervisor	507
b. Gas Plant 7944	421
c. AU 145 (Depropanizer 6142)	393
d. Alkylation Unit 441	426
e. No. 15 Boiler House	383

2. Bypass or divert charge streams as follows:

7944 to 6341

6142 to 6341

NOTE: Have blanks installed as line becomes available.

3. Block off steam to caustic stripper and caustic preheater. Shut down caustic stripper and cold caustic curculation and pump caustic from stripper using J-6 and J-6A into caustic accumulator and pump accumulator to 1838 Tank using J-5 or J-5A and 2" jump over from spent caustic line to 1838 suction line.

<u>Time</u>	<u>Initials</u>
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4. Begin pumping 1838 to spent caustic using J-5A or J-4.
5. Pressure caustic from each absorber out bottom through exchangers into caustic stripper. Check bleeders on 2" caustic outlet from absorbers and do not put hydrocarbon into stripper.
 - a. Low Sulfur Absorber
 - b. High Sulfur Absorber
 - c. Gas Plant Absorber
 - d. 700 BB Absorber
6. After caustic is out of all absorbers, discontinue pumping 1838 Tank to spent caustic and resume pumping caustic from stripper to accumulator and accumulator to 1838 Tank until all caustic is out of stripper and accumulator.
7. Pump water into absorbers via 3" caustic circulating line using J-5A with fire hose tied into suction. Displace all hydrocarbon to field through after-settlers. Be sure to fill after-settlers with water also and displace until water shows up on outlet of after-settlers. 441 will line up to 2474 Tank. Block after-settlers outlet lines at indicated points.
 - a. Low Sulfur Absorber
 - b. High Sulfur Absorber
 - c. Gas Plant Absorber
 - d. 700 BB Absorber

Time	Initials
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
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12:15	12:15
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20:55	20:55
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21:05	21:05
21:10	21:10
21:15	21:15
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21:25	21:25
21:30	21:30
21:35	21:35

8. Resume pumping 1838 to spent caustic.
9. Put hot water (150°) in top of each absorber and displace water from absorbers and after-settlers to sewer. When empty, wash out with hot water for four (4) hours.
 - a. Low Sulfur Absorber
 - b. High Sulfur Absorber
 - c. Gas Plant Absorber
 - d. 700 BB Absorber
10. Drain all condensate from barometric condenser to sewer, then put steam in bottom of caustic stripper and steam out bottoms to stack and through barometric condenser, through drip drum to flare for four (4) hours. Toward end of steaming, block to flare and steam to air off drip drum.
11. After hot water displacement is completed, have top heads opened and other heads four-bolted. Wash absorbers, using J-5A and 3" circulating line unit water going to sewer is clean and free of caustic.
 - a. Low Sulfur Absorber
 - b. High Sulfur Absorber
 - c. Gas Plant Absorber
 - d. 700 BB Absorber
12. When steaming of stripper to stack is completed, block off steam and have top head opened and other heads four-bolted. Steam out through top head for

Time	Initials
10:00	10:00
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10:55	10:55
11:00	11:00
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11:45	11:45
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21:25	21:25
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21:35	21:35

two (2) hours.

13. When through washing absorbers wash stripper and caustic accumulator as follows:
 - a. Wash using J-5A and 2" fresh caustic make-up line. Open crossover off 2" make-up line into caustic header off bottom of absorbers.
 - b. Wash from J-5A through 2" make-up line, through 2" caustic header into exchangers, into pre-heater and into stripper.
 - c. Take suction off stripper with J-6 or J-6A and pump water through shell side of exchangers, through coolers and into caustic accumulator. Allow accumulator to overflow to sewer through overflow line.
 - d. Wash until water from accumulator is clean and free of caustic.
14. Have top heads on after-settlers opened and put fire hoses into heads and overflow until clean and free of caustic. Towards end of wash, have 3" blind flanges removed from bottom of each after-settler and wash to sewer until clean and free of caustic.
 - a. Low Sulfur After-Settler
 - b. High Sulfur After-Settler
 - c. Gas Plant After-Settler
 - d. 700 BB After-Settler
15. When all equipment is clean and free of caustic, drain all lines and vessels of water.
16. Pump 1837 and 1838 to spent caustic, if not completed.

STANDARD START-UP PROCEDUREHFAU-443 FIELD BLANKS

<u>In</u>	<u>Out</u>	
_____	_____	1. 3" Propylene Charge - West Battery Limits
_____	_____	2. 3" Hi-Purity Propylene Charge - West Battery Limits
_____	_____	3. 4" BB-Amylene Charge - West Battery Limits
_____	_____	4. 2" Polymer Charge - West Battery Limits
_____	_____	5. 4" Isobutane Charge - West Battery Limits
_____	_____	6. 4" Lt. Alky. Product to No.-Nox - West Battery Limits
_____	_____	7. 4" Lt. Alky. Product to Good Gulf - West Battery Limits
_____	_____	8. 2" Hvy. Alky. Product - West Battery Limits
_____	_____	9. 3" Deeth. Off-Gas to Ethylene - West Battery Limits
_____	_____	10. 3" Propane Prod. to Ethylene and 2041 - West Battery Limits
_____	_____	11. 6" Propane Prod. to Fuel - West Battery Limits
_____	_____	12. 2" Refrigeration Propane - West Battery Limits
_____	_____	13. 24" Flare Line - West Battery Limits
_____	_____	14. 4" Pump-out Line - West Battery Limits
_____	_____	15. 2" Fresh Caustic - West Battery Limits
_____	_____	16. 2" Spent Caustic - West Battery Limits
_____	_____	17. 4" Condensate Line - West Battery Limits
_____	_____	18. 2" Mercaptan Gas - West Battery Limits
_____	_____	19. 2" Ammonia to Unit
_____	_____	20. 4" Fuel Gas to Unit - East Battery Limits
_____	_____	21. 2" Fuel Gas to Unit - East Battery Limits
_____	_____	22. 2" Fuel Gas to Unit - East Battery Limits

STANDARD START-UP PROCEDURE

443 HF ALKYLATION UNIT

The following procedure is an outline to be followed for a safe and orderly start-up. The Operator is to initial each step as it is completed and record the time the step was completed.

The following rules are to be obeyed during 443 start-up.

1. All towers, vessels, exchangers and lines in HF Acid service will be purged and tested with nitrogen, then purged with natural gas.
2. The flare will not be put into service until the gas purge has been completed.
3. All process equipment in parallel flow must be purged one at a time. That is, purge through one pass with all other passes blocked.

This procedure is divided into two sections, the feeding treating section and the acid section. Both sections can be started up simultaneously, but top priority should be given to the acid section since it will consume more time.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Notify the following personnel that 443 is starting up and the approximate time.
		<u>PHONE</u>
_____	_____	A. 441 Alkylation 426
_____	_____	B. Light Oil Shiftforeman 507
_____	_____	C. Gas Dispatcher 2265
_____	_____	D. 1241 FCC 697
_____	_____	E. 1242 FCC 691
_____	_____	F. No. 3 Amine 329
_____	_____	G. 1544 Ethylene Unit 2144
_____	_____	H. Butane Storage 404
_____	_____	I. 7944 Gas Plant 421
_____	_____	J. Cracking Dept. Shiftforeman . 2298
_____	_____	K. 1746 Cumene 680
_____	_____	L. Bulk Oil Shiftforeman 318

Time	Initials
_____	_____
_____	_____
_____	_____

PHONE

M.	84 Pump House	338
N.	15 Boiler House	383
O.	No. 3 Power Plant	2263

2. The following blanks should be pulled before start-up.

_____	_____	A. Flare Line
_____	_____	B. Fresh Caustic
_____	_____	C. Spent Caustic
_____	_____	D. Condensate

3. Close all vents and bleeders in all lines.

4. Lock open all relief block valves. (Check off list)

5. Fill the cooling tower basin with water. (Do not start up cooling water pumps until after the nitrogen test has been completed and all channel head covers are in place.

6. Establish a 5% NaOH level (6 try-cocks) in the acid relief neutralizer. Then, start the caustic circulating pumps. Send a caustic sample to the Lab to confirm the caustic strength. (It must be below 5% NaOH.)

7. Pressure up the following vessels, drum, and towers with nitrogen to 25 psig. Test for leaks. Depressure to 5 psig. Pressure and depressure 2 more times.

_____	_____	A. Treater Feed Drum (V-1)
_____	_____	B. Mercaptan Scrubber (V-3)
_____	_____	C. H ₂ S Scrubber (V-2)
_____	_____	D. Sand Tower Coalescer (V-4)
_____	_____	E. Deethanizer Feed Drum (V-5)
_____	_____	F. Deethanizer Tower (T-2)
_____	_____	G. Deethanizer OH Accumulator (D-1)

8. Pressure-up the vessels listed in Step 7 with natural gas using the connections on V-2, V-3 and V-4. While gassing-up towers, do not let the

<u>Time</u>	<u>Initials</u>
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		8. pressure drop below 5 psig. (To keep from pulling a vacuum.)
--	--	---

		9. Steam out and test caustic regeneration system at 15 psi steam pressure. Then, pressure-up with natural gas to 5 psig.
--	--	---

		10. After Step 8 is completed, pull following blanks:
--	--	---

- | | | |
|--|--|--|
| | | A. Propylene Charge |
| | | B. Hi-Purity Propylene Charge |
| | | C. BB-- Amy line |
| | | D. Deethanizer off-gas to Ethylene Plant |
| | | E. Mercaptan Gas |

		11. Fill Tank 1 with 10% caustic solution.
--	--	--

		12. Establish caustic level in H ₂ S Scrubber (V-2) and Mercaptan Scrubber (V-3).
--	--	--

		13. Bring olefin charge into V-1 and establish circulation thru V-2, V-3, V-4, back to V-1.
--	--	---

		14. Start up caustic regeneration system.
--	--	---

		15. Establish level in deethanizer charge drum and start-up deethanizer tower with bottoms going back to V-5. Continue to operate the feed treating section on recycle until the acid end is ready for charge.
--	--	--

ACID SECTION

		16. Bring nitrogen into unit and test acid section.
--	--	---

Follow the nitrogen testing procedure.

		17. While the acid section is being nitrogen test,
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purge V-9 A&B Isobutane Driers using nitrogen.

Purge isobutane driers (V-9 A&B) through top to atmosphere at olefin feed line. Purge through bottom

<u>Time</u>	<u>Initials</u>
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17. of drier through E-9, D-3 to atmosphere at battery limits. Purge through isobutane heater to atmosphere.

18. As soon as the nitrogen test is complete, purge the flare header with nitrogen for one hour.

19. As soon as the nitrogen test is complete, the following blanks can be pulled:

- A. Heavy Alkylate to Field.
- B. Light Alkylate to No-Nox.
- C. Light Alkylate to Good Gulf.
- D. Acid Storage Bottoms Line (4).
- E. 2" Acid Unloading Line to Acid Storage Drum.
- F. Connect Acid Storage Relief Valve to Flare.
- G. Isobutane Feed.
- H. Isobutane Excess to 2489.

20. As soon as all channel head covers have been installed, start cooling water circulation. Vent air out of water lines at all bleeders.

GAS PURGE

Check to see that the nitrogen has been displaced from the system by having the Safety Department run an explosibility test at each bleeder. Check each bleeder as you purge and as soon as gas shows up, go to the next step.

21. After the unit has been nitrogen tested, install gas spool in 4" natural gas line to unit. (Do not install gas spools to furnace until ready to fire furnace.)

22. Bring natural gas into unit through discharge of furnace charge pump. Do not let the gas pressure

Time Initials

22. on the isostripper exceed 20 psi.

23. Purge through each furnace pass (one at a time)

into the isostripper tower.

24. Isostripper System:

A. Purge through O.H. Condensers

1. E-14 A & B

2. E-14 C & D

3. E-14 E & F

4. PRC-4

B. Purge through O.H. accumulator, recycle isobutane pumps (P-13), recycle isobutane cooler, reactor tee and into acid settler.

C. Purge suction of furnace charge pump from tower to pump.

25. Acid Settler System:

A. Purge through each acid cooler (from P-13's), through 2" line to acid rerun column.

1. E-10A

2. E-10B

3. E-10C

4. E-10D

B. Purge isostripper charge line from isostripper to acid settler.

C. Purge 2" acid line (D-2 to V-10) from acid settler to level control regulator at D-2.

D. Purge 4" turnaround line from recycle isobutane cooler (E-16) to bleeder at FRC-16.

E. Purge through both 4: lines into bottom unit to flare.

<u>Time</u>	<u>Initials</u>
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26. Depropanizer System:

A. Purge from isostripper through depropanizer bottoms line, depropanizer bottoms exchanger (E-17) and depropanizer reboiler into depropanizer tower. (Be sure 4" start-up line from reboiler to tower is open.)

1. E-20 A & B
2. E-20 C & D
3. Overhead accumulator and about to flare.
4. Purge through vent gas absorber to atmosphere (at depropanizer tower).

B. Purge reflux line from overhead accumulator to reflux pumps (p-15) and from depropanizer tower to reflux pumps.

C. Purge depropanizer charge line from tower to charge pump (P-14) and from acid settler to charge pump.

27. Alkylate Splitter Section:

A. Purge through T-5 Bottoms line into T-8.

B. Purge from T-8 through E-28, E-31, V-16 to atmosphere at battery limits.

C. Purge through 4" turnaround from FRC-16 to bleeder at E-31.

D. Purge reflux line to atmosphere at FRC-24.

E. Purge 4" turnaround line from PRC-7 to atmosphere at battery limits.

28. HF Stripper System:

A. Purge through overhead line, feed line to

<u>Time</u>	<u>Initials</u>
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- A. depropanizer overhead accumulator and to flare.
- B. Purge 2" turnaround line from stripper bottoms line to bleeder at recycle isobutane line.
- C. Purge through propane exchanger (E-25), defluorinator feed heater (E-26), bypass defluorinators (V-15), propane exchanger (E-25), propane cooler (E-23), bypass propane caustic treater (V-14) to atmosphere at battery limits.
- D. Purge through vent gas absorber (V-13) to atmosphere at battery limits.
- E. Purge fuel gas line through propane vaporizer (E-22) to atmosphere at battery limits.

29. Acid Rerun System:

- A. Purge from recycle isobutane line through acid vaporizer.

_____ Isobutane stripping line
 _____ Into rerun column and to flare.
 _____ Reflux line

- B. Purge overhead line through overhead condenser
(E-13) to atmosphere at P-11 Section.

_____ Purge from acid settler to P-11
_____ Discharge
_____ Purge ASO Filter to atmosphere,
_____ and thru tower to flare.

30. Using nitrogen, purge isobutane driers (V-9 A & B) through top to atmosphere at olefin feed line.

_____ Purge through bottom of drier through
E-9, D-3 to atmosphere at battery limits.
_____ Purge through isobutane heater to
atmosphere.

<u>Time</u>	<u>Initials</u>	
<u> </u>	<u> </u>	31. After the natural gas purge has been completed, purge thh flare header thirty (30) minutes and then light the flare.
<u> </u>	<u> </u>	32. After the unit has been pressured-up with gas, a careful lineup of the unit should be made with all process valves open for normal flow. The discharge valves on all pumps and the downstream block valves and bypasses on all control valves should be closed. Set all controllers on manual with the control valves in closed position except for the deprop-anizer condens̄er water control valve (PRC-6), which should have 5 psig output air on it.
<u> </u>	<u> </u>	33. Establish an 80% gasoline level in the isostripper by backing gasoline through PRC- <u> </u> (open on manual), E-31, E-28 and P-17 bypass into T-5. As soon as a level shows up in T-5, start the heater circulation pumps to fill the heater coils. Set the flow rate at 2,000 B/H.
<u> </u>	<u> </u>	34. After heater circulation has been established, light two burners in the furnace using the firing instructions for H-1 Isostripper Reboiler Furnace. Slowly raise the reboiler outlet temperature to 150°F by manual control. Light additional burners as required.
<u> </u>	<u> </u>	35. Start feeding approximately 280 B/H of outside isobutane to the settler through FRC-10.

<u>Time</u>	<u>Initials</u>	
_____	_____	36. Back propane into the depropanizer accumulator, bypassing the caustic treater and propane de-fluorinator, filling the propane stripper liquid full, and overflowing into the accumulator. Continue backing propane into the system until the accumulator is approximately three-fourths full.
_____	_____	37. When the settler is full, open the isostripper feed valve and feed the isostripper tower.
_____	_____	38. As soon as isobutane reaches the bottom of the isostripper fire the heater as required to hold the isostripper level.
_____	_____	39. Allow the isostripper system to pressure up to about 123 psig and then place PRC-4 in automatic control. It may be necessary to Flare V-12 to remove the natural gas.
_____	_____	40. When the tower pressures-up and a level is in the accumulator, it will be necessary to start the isobutane recycle pumps.
_____	_____	41. The recycle isobutane will raise the settler pressure, because the settler will be full of liquid. Start the depropanizer feed pumps and start charge into the depropanizer tower (T-6).
_____	_____	42. The isostripper tower is now in shape to be brought up to design conditions as fast as the heat input to the isostripper reboiler is increased, the level in the isostripper accumulator will increase, the

Time Initials

42. recycle isobutane rate may be increased, and the depropanizer feed rate increases to maintain the settler pressure.

43. As soon as a level has been established in the bottom of the depropanizer tower, open the 4" valve in the start-up line to fill the reboiler.

44. When reboilers are full, with hand control (FRC-19) start steam to the depropanizer Reboilers E-19A and E-19B, close 4" valve in start-up line, and place bottoms level on control to the isostripper tower.

45. As fast as the heat input to the depropanizer reboilers is increased, reflux to the column must be adjusted manually to maintain a level in the accumulator.

46. During this period, it may be necessary to stop the flow of outside isobutane to prevent having an excess in the system.

47. When the reflux rate to the depropanizer tower is worked up to 1,000-2,000 B/H, place the reflux on temperature control with TRC-7 and shoot for 155°F to 160°F control tray temperature. The system should have an excess of propane in it as evidenced by the increasing level in the depropanizer accumulator.

48. Manually open PRC-5 in the stripper overhead line and let the stripper come to the depropanizer system pressure.

Time Initials

- _____ 49. Close the valve in the propane line to the de-fluorinators and open the valve in the 2" start-up line to the acid coolers. Slowly pressure the propane in the stripper to the settler.
- _____ 50. When a propane level is found in the bottom of the stripper, start feeding the stripper at a rate sufficient to hold the level in the depropanizer accumulator. Raise the propane stripper pressure to 315 psig and slowly raise the reboiler steam rate to about 3,800 lb.hr., letting the bottoms recycle to the settler.
- _____ 51. The unit will now be operating on the "recycle operation" that will become quite familiar in time. At this time, it is well to begin checking and blowing all low point bleeders to get rid of any water that may be present and speed up the drying-out operation. Water is removed from the unit by fractionation and it is imperative that the unit is absolutely dry before hydrofluoric acid is brought into the system
- _____ 52. Continue to increase the heat input to the isostripper reboiler, adjusting the recycle isobutane and depropanizer feed rates to maintain the proper pressure in the settler. Raise the feed rate until it reaches 2,240 B/H and then line-out the unit at this feed rate.
- _____ 53. If it appears that the system contains excess propane

<u>Time</u>	<u>Initials</u>
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53. (a persistently increasing level in the depropanizer accumulator) send the excess to propane storage.

Any excess isobutane the 4" turnaround line to storage.

_____	_____	54. Line-up to use propane stripper bottoms as pump flush to the depropanizer reflux pumps and discontinue using the temporary 3/8" copper tubing and remove it.
-------	-------	--

_____	_____	55. As soon as convenient after placing the isostripper on a total reflux operation, start charging 30 B/H of recycle isobutane to the rerun system through the isobutane start-up line and feed vaporizer. Set the feed temperature controller to hold 290° F on the vaporizer outlet.
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_____	_____	56. Set the rerun column pressure controller at 135 psig and pump the isobutane from the rerun overhead condenser to the settler.
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_____	_____	57. Set a flow of 24 B/H recycle isobutane to the stripping isobutane vaporizer. Start steam flow through the isobutane vaporizer and set the temperature controller at 325° F.
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_____	_____	58. Continue checking all low point bleeders for water. Switch all pumps, allow hydrocarbon flow through control valve bypasses, etc., to remove water from all acid service process piping.
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_____	_____	59. Continue the recycle operation until the unit is dry. The last points to dry up will be low point
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Time Initials

59. bleeders around the depropanizer condensers and the acid boot on the depropanizer accumulator.
- _____ 60. When the system is completely dry and all instruments, pumps and equipment are functioning properly, the system is ready to be charged with HF.
- _____ 61. The acid relief neutralizer should have been placed in operation; however, the level and caustic strength should be checked to be sure it is ready in the event it is needed.
- _____ 62. While transferring acid continue to check for water on D-2 Boot Level Controller and draw water to the sewer until strong acid appears.
- _____ 63. Unload acid cars into acid storage drum. Without making any changes to the recycle operation, pressure the acid storage drum to 165 psig. Begin pressuring HF from the storage drum into the acid coolers. Continue to pressure acid into the system until the acid level in the settler shows at the eleventh try-cock. The transfer rate can be observed on the try-cocks on the acid storage drum. The pressure on the settler should be watched very closely to be sure it does not get too high. Increase the depropanizer flow to design, to hold the hydrocarbon level as acid displaced the hydrocarbon.
- _____ 64. As soon as the acid level has been established in the settler, the unit is ready to receive the olefin

11-1-78

CHEV B8 6820

Time Initials

64. feed. (The recycle operation can be continued if olefin feed is not available.) Set the olefin feed rate as required and set an estimated outside isobutane rate to balance the unit.

_____ 65. As soon as the alkylate reaches the isostripper, the bottoms composition will change rapidly and the bottoms temperature will begin to increase. Fire the reboiler as required to bring this temperature to about 370°F. Once the unit lines out, the furnace fireman can be placed on automatic control.

_____ 66. Line up to send propane through the defluorinators and caustic treater to storage.

_____ 67. When alkylate has raised the bottoms level of the isostripper, start sending alkylate to the field as total alkylate.

STANDARD START-UP PROCEDURE

6441 DEPENTANIZER

<u>Time</u>	<u>Initials</u>
10:00	10:00
10:05	10:05
10:10	10:10
10:15	10:15
10:20	10:20
10:25	10:25
10:30	10:30
10:35	10:35
10:40	10:40
10:45	10:45
10:50	10:50
10:55	10:55
11:00	11:00
11:05	11:05
11:10	11:10
11:15	11:15
11:20	11:20
11:25	11:25
11:30	11:30
11:35	11:35
11:40	11:40
11:45	11:45
11:50	11:50
11:55	11:55
12:00	12:00
12:05	12:05
12:10	12:10
12:15	12:15
12:20	12:20
12:25	12:25
12:30	12:30
12:35	12:35
12:40	12:40
12:45	12:45
12:50	12:50
12:55	12:55
13:00	13:00
13:05	13:05
13:10	13:10
13:15	13:15
13:20	13:20
13:25	13:25
13:30	13:30
13:35	13:35
13:40	13:40
13:45	13:45
13:50	13:50
13:55	13:55
14:00	14:00
14:05	14:05
14:10	14:10
14:15	14:15
14:20	14:20
14:25	14:25
14:30	14:30
14:35	14:35
14:40	14:40
14:45	14:45
14:50	14:50
14:55	14:55
15:00	15:00
15:05	15:05
15:10	15:10
15:15	15:15
15:20	15:20
15:25	15:25
15:30	15:30
15:35	15:35
15:40	15:40
15:45	15:45
15:50	15:50
15:55	15:55
16:00	16:00
16:05	16:05
16:10	16:10
16:15	16:15
16:20	16:20
16:25	16:25
16:30	16:30
16:35	16:35
16:40	16:40
16:45	16:45
16:50	16:50
16:55	16:55
17:00	17:00
17:05	17:05
17:10	17:10
17:15	17:15
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17:25	17:25
17:30	17:30
17:35	17:35
17:40	17:40
17:45	17:45
17:50	17:50
17:55	17:55
18:00	18:00
18:05	18:05
18:10	18:10
18:15	18:15
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18:25	18:25
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18:35	18:35
18:40	18:40
18:45	18:45
18:50	18:50
18:55	18:55
19:00	19:00
19:05	19:05
19:10	19:10
19:15	19:15
19:20	19:20
19:25	19:25
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19:35	19:35
19:40	19:40
19:45	19:45
19:50	19:50
19:55	19:55
20:00	20:00
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20:40	20:40
20:45	20:45
20:50	20:50
20:55	20:55
21:00	21:00
21:05	21:05
21:10	21:10
21:15	21:15
21:20	21:20
21:25	21:25
21:30	21:30
21:35	21:

1. Notify the following people that 6441 is starting up.

PHONE

A. Light Oil Shift Supervisor . . . 507

B. 163 P. H. 327

C.	441 Alkylolation Unit	426
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D. Gas Plant 421

[illegible]

2. Steam feed accumulator, reflux accumulator, and tower for a minimum of four hours. Put small amount of cooling water on coolers to keep them from overheating.

3. Steam from accumulators and tower through suction and discharge lines on all pumps to air for a minimum of four hours.

4. Steam from tower through condensers, exchangers, and coolers to the air for a minimum of four hours. Do not let bundles get too hot.

5. During steaming of unit raise pressure on tower, accumulators, exchangers and pumps to 50 psig and check for leaks.

6. After finished steaming, pressure tower, accumulators, pumps and exchangers with natural gas to 25 psig. Then depressure to flare down to 5 psig. Do this three times. Open cooling water all the way to the coolers.

7. Start some feed into feed accumulator. After establishing a level, start charging the tower.

<u>Time</u>	<u>Initials</u>	
_____	_____	8. As level comes up in reboiler, start putting steam in the reboiler and heating the tower slowly. The tower may have to be put to the flare to get the natural gas out when it first starts heating up.
_____	_____	9. Reflux the tower as level builds in reflux accumulator.
_____	_____	10. As pressure starts up on tower, send gas to gas plant.
_____	_____	11. After tower is up to normal pressure, send excess B-P's to 2477 Tank.
_____	_____	12. Cut bottoms to field.

<u>Time</u>	<u>Initials</u>	
<u> </u>	<u> </u>	8. As level comes up in reboiler, start putting steam in the reboiler and heating the tower slowly. The tower may have to be put to the flare to get the natural gas out when it first starts heating up.
<u> </u>	<u> </u>	9. Reflux the tower as level builds in reflux accumulator.
<u> </u>	<u> </u>	10. As pressure starts up on tower, send gas to gas plant.
<u> </u>	<u> </u>	11. After tower is up to normal pressure, send excess B-P's to 2477 Tank.
<u> </u>	<u> </u>	12. Cut bottoms to field.

STANDARD START-UP PROCEDURE

6443 & 6444 DEPENTANIZER

<u>Time</u>	<u>Initials</u>
10:00	W
10:05	W
10:10	W
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11:15	W
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11:35	W
11:40	W
11:45	W
11:	

1. Notify the following people that 6441 is starting up.

PHONE

A. Light Oil Shift Supervisor . . . 507

В. 163 Р. Н. 327

C. 441 Alkylation Unit 426

D. Gas Plant 421

E. Gas Dispatcher2265

2. Steam feed accumulator at mercaptan unit, reflux accumulator, and towers for a minimum of four hours. Put small amount of cooling water on coolers to keep them from overheating.

3. Steam from accumulators and tower through suction and discharge lines on all pumps to air for a minimum of four hours.

4. Steam from tower through condensers, exchangers, and coolers to the air for a minimum of four hours. Do not let bundles get too hot.

5. During steaming of unit raise pressure on tower, accumulators, exchangers and pumps to 50 psig and check for leaks.

6. After finished steaming, pressure tower accumulators, pumps and exchangers with natural gas to 25 psig. Then depressure to flare down to 5 psig. Do this three times. Open cooling water all the way to the coolers.

7. Start some feed into feed accumulator. After establishing a level, start charging the tower.

<u>Time</u>	<u>Initials</u>	
_____	_____	8. As level comes up in reboiler, start putting steam in the reboilers and heating the towers slowly. The towers may have to be put to the flare to get the natural gas out when it first starts heating up.
_____	_____	9. Reflux the towers as level builds in reflux accumulator.
_____	_____	10. As pressure starts up on the towers send gas to gas plant.
_____	_____	11. After towers are up to normal pressure, send excess B-P's to 2477 Tank.
_____	_____	12. Cut bottoms to field.

STANDARD START-UP PROCEDURELHSU - 6141

This procedure is intended to serve as a guide for a safe and orderly start-up. The Operator should initial each item as it is completed and write the time so that nothing will be forgotten.

Time Initials

1. Notify the following personnel that you are starting up and the approximate time of start-up.

PHONE

_____	_____	A. Light Oil Shiftforeman . . .	507
_____	_____	B. Gas Dispatcher	2265
_____	_____	C. DCU-842	2109
_____	_____	D. UOP	624
_____	_____	E. AU-145	393
_____	_____	F. EU-1542	679
_____	_____	G. No. 15 Boiler House	393
_____	_____	H. SAU-441	426

2. Steam feed accumulator, reflux accumulator, and tower out to the blowdown stack for a minimum of four hours. Put small amount of cooling water on coolers to keep them from overheating but not enough to hammer.
3. Steam from accumulators and tower through suction and discharge lines on all pumps to air for a minimum of four hours.
4. Steam from tower through condensers, exchangers, and coolers to the air for a minimum of four hours. Do not get the bundles too hot.
5. During steaming of unit raise pressure on tower, accumulators, exchangers and pumps to 50 PSIG and check for leaks.

<u>Time</u>	<u>Initials</u>	
_____	_____	6. After finished steaming, pressure tower, accumulators, pumps and exchangers with natural gas to 25 psig. Then depressure to flare down to 5 psig. Do this three times. Open cooling water all the way to the coolers.
_____	_____	7. Start some feed into feed accumulator. After establishing a level, start charging the tower.
_____	_____	8. As level comes up in reboiler, start putting steam in the reboiler and heating the tower slowly. The tower may have to be put to the flare to get out the natural gas when it first starts heating up.
_____	_____	9. Reflux the tower as level builds in reflux accumulator.
_____	_____	10. As pressure starts up on tower, send out-gas to fuel gas.
_____	_____	11. After the tower is up to normal pressure, have OH cut to ethylene units.
_____	_____	12. After level has been established and heat is up on the reboiler, start sending the bottoms out to UOP.

STANDARD START-UP PROCEDUREMERCAPTAN REMOVAL UNIT 7542

The following procedure outlines the proper steps to be taken for a normal start-up. As each item has been completed, the time is to be recorded with your initials so that the next shift will know which steps have been completed.

<u>Time</u>	<u>Initials</u>	
_____	_____	1. Fill Tank No. 1837 with 10% caustic.
_____	_____	2. Notify the following that the unit is starting up and the approximate time each will be affected.
_____	_____	A. Shift Foreman <u>PHONE</u> 507
_____	_____	B. Gas Plant 7944 421
_____	_____	C. AU 145 (Depropanizer 6142) . 393
_____	_____	D. 441 Alkylation 426
_____	_____	3. Fill absorbers and after-settlers with water using J-5 and J-5A to displace all air. Test the following for leaks at 70-75 psig.
_____	_____	A. High Sulfur Abs. & After-Settler
_____	_____	B. Low Sulfur Abs. & After-Settler
_____	_____	C. Gas Plant Abs. & After-Settler
_____	_____	D. 700 BB Abs. & After-Settler
_____	_____	4. While filling absorbers and after-settlers, steam- out the stripper to stack and through the baro- metric condenser, then to air from drip drum. Steam for one (1) hour to displace all air, then steam test for leaks at 20-25 psig.
_____	_____	5. Have 441 Alkylation line up gas plant line and 145 line to _____, then slowly back hydrocarbon into after-settlers and absorbers pushing water out to stack. Displace water from after-settlers first,

Time Initials

5. then absorbers. Check bleeders closely and do not allow hydrocarbon to go to stack. Proceed as follows:

_____ _____
 _____ _____
 _____ _____
 _____ _____
 _____ _____

- A. High Sulfur Abs. & After-Settler
- B. Low Sulfur Abs. & After-Settler
- C. Gas Plant Abs. & After-Settler
- D. 700 BB Abx. & After-Settler

6. When water has been displaced, begin charging absorbers with fresh caustic, displacing hydrocarbon to _____. Watch closely while filling and do not overfill the following:

_____ _____
 _____ _____
 _____ _____
 _____ _____
 _____ _____

- A. High Sulfur Absorber
- B. Low Sulfur Absorber
- C. Gas Plant Absorber
- D. 700 BB Absorber

- _____ _____ 7. When caustic levels have been established, start circulating caustic.

- _____ _____ 8. Put caustic to the stripper and bring stripper up to temperature.

- _____ _____ 9. Open water to barometric condenser and cut condenser water to dirty water system.

- _____ _____ 10. Bring charge streams through unit and hve 441 Alkylation line up to 6341 Charge.

- _____ _____ 11. Check caustic level controllers to make sure they are holding levels properly.

- _____ _____ 12. Be sure that block valves in flare line are open.

- _____ _____ 13. Run doctor test and check caustic strength as soon as possible.

EMERGENCY PROCEDURES443 HFAUa. POWER FAILURE

If the alkylation unit experienced a complete power failure, the cooling tower and the hydrocarbon treating section will go down, since they are all on Main Circuit 105-C and Emergency Circuit 33-C. The olefin charge pumps and the fresh isobutane pumps are on different circuits. The following steps should be taken immediately.

(1) The following flows will be shut off at the control board:

- (a) Fuel gas to isostripper reboiler
- (b) HF stripper steam
- (c) Drier regeneration heater steam
- (d) Rerun stripping isobutane vaporizer steam
- (e) Rerun acid vaporizer steam
- (f) Depropanizer reboiler steam
- (g) Alkylate splitter reboiler steam
- (h) Propane defluorinators steam
- (i) Deethanizer reboiler steam
- (j) Caustic regenerator reboiler steam

(2) Block the control valves for all flows listed in Step 1.

(3) Block the alkylate yield, isobutane yield, propane yield, FCC butanes from Sphere 2476, Propylene 6143, high purity propylene, and fresh isobutane at their respective control valves. On the FCC propylenes, you have 1 hour and 15 minutes in which to switch this stream out before V-1 fills up. Call the gas dispatcher and have him switch into the Bulk Oil Storage.

- (4) Close the 2-inch valves on the isostripper, depropanizer and HF stripper gauge glasses.
- (5) Block both 8-inch valves on the combiner feed and recycle entering the acid coolers.
- (6) Block the acid return line from the bottom of the isostripper accumulator acid boot.
- (7) Block the acid feed to the rerun column.
- (8) Block the stripping isobutane to the rerun column.
- (9) After all vessels have stopped relieving to the flare and power has been restored, change the caustic out in the acid relief neutralizer.
- (10) Do not attempt to start the unit until Step 9 has been completed.
- (11) Keep close watch on the level in Drum M-1.

b. WATER FAILURE

A water failure by itself, without the power going off, is very remote. Should the alkylation unit experience a complete water failure: first, remove all heat from the unit; second, block out all fresh charge; then, keep close watch on levels so as not to lose suction on reflux, recycle and transfer pumps.

The following is a guide to go by.

- (1) The following flows will be shut off at the control board.
 - (a) Fuel gas to isostripper reboiler
 - (b) HF stripper steam
 - (c) Drier regeneration heater stream
 - (d) Rerun stripping isobutane vaporizer steam
 - (e) Rerun acid vaporizer steam
 - (f) Depropanizer reboiler steam
 - (g) Alkylate splitter reboiler steam

- (h) Propane defluorinator steam
 - (i) Deethanizer reboiler steam
 - (j) Caustic regenerator reboiler steam
- (2) Block the control valves for all flows listed in Step 1.
- (3) Shut Pump P-1A or P-1B down
- (a) Block FRC-1 (high purity propylene)
 - (b) Block FRC-1 (FCC butanes from Sphere 2476)
- (4) Block the alkylate yield, isobutane yield and propane yield.
- (a) When alkylate yield is blocked, be sure to shut down Pump P-18A or P-18B.
- (5) When acid coolers have been flushed out, block out fresh isobutane.
- (6) Close 2-inch valves on the isostripper, depropanizer and HF stripper gauge glasses.
- (7) When isobutane recycle pumps (P-13A and P-13B) lose suction, shut down pumps.
- (8) Block both 8-inch valves on combination feed and recycle entering the acid coolers.
- (9) Block the acid return line from the bottom of the isostripper accumulator acid boat.
- (10) Block the acid feed to the rerun column.
- (11) Block the stripping isobutane to the rerun column.
- (12) Block the reflux to the rerun column when feed, reflux and stripping isobutane have been cut out of rerun tower. Shut down the Overhead Acid Pump P-11A or P-11B.
- (13) Before Pump P-6A or P-6B, the deethanizer reflux pump, loses suction, shut down.
- (14) If water is off for a period of more than 1 hour, block the FCC

propylenes by closing PRC-8, then call the gas dispatcher and have him switch the FCC propylenes into the Bulk Oil Storage. After the vessels have stopped relieving to the flare and cooling water has been restored, change the caustic out in the acid relief neutralizer.

Keep watch on the level in the flare knockout drum (M-1).

Do not attempt to start the unit until Step 15 has been completed.

SPECIAL OPERATING PROCEDURES443 HFAUa. UNLOADING TANK CARS OF HYDROFLUORIC ACID

NOTE: Wear class "C" clothing and have first aid supplies at hand.

- (1) Vent the Anhydrous Acid Storage Tank (V-11) to the relief neutralizer until the pressure is 50 psig or below.
- (2) Check the level of acid in the storage tank. From the tank gauge table, determine if there is sufficient room for unloading the tank car or truck of acid. Normal sized acid cars will hold approximately 45,000 pounds of acid; however, check the bill of lading on the tank car for the exact amount shipped.
- (3) Check the unloading line to be sure that the end next to the unloading rack is closed, then open the 2 inch unloading valve at the acid storage tank. The valve at the unloading rack should remain closed until the tank car dome fittings and line to this valve are in place and tested for leaks.
- (4) Be sure that the tank car is properly spotted so that the pressure gas line and acid unloading lines can be coupled to the car.
- (5) Check the hand brake on the car to be sure that it is set. The hand brake wheel is located at the end of the car and is operated from the bottom walkway. The brake is set when the wheel is turned clockwise as far as it will go (same as closing a gate valve).
- (6) Provide a derail flag on the railroad track. The flag should be placed approximately 100 feet from the car to warn switching crews of unloading procedures.

- (7) (a) Check the tank car unloading valves to be sure they are closed tightly. Check the valve stems and if they are leaking, tighten the packing nuts. These valves are located diametrically opposite, in the dome, and are on a parallel line with the length of the tank car.
- (b) Check the tank car pressure gas inlet valves; be sure they are closed tightly.
- (8) Remove the pipe plugs in both acid unloading lines and one only in the pressure gas inlet line. Couple both acid unloading lines and the pressure gas inlet to their respective openings.
- (9) Open the tank car acid unloading valves and test fittings for leaks. The tank car pressure will be approximately 30 psig. This will test the line to the remaining block valve on the unloading line. If there are no leaks, open the final block valve at the rack, which now will permit acid to be transferred to the storage tank.
- (10) Open the tank car inlet pressure gas valve. Open the 1-inch valve on the gas line. Check the gas pressure as registered on the pressure gauge (should be about 130 psig). Crack the throttling valve and allow the pressure on the inlet to the tank car to build up to about 130 psig.
- (a) The laboratory should be notified when the car first starts unloading so that if a line sample is desired, it may be obtained before completion of the unloading.
- (11) Check the gas pressure to the tank car frequently during the unloading period (approximately 3 hours) and also check the level of acid in the storage tank to be sure acid is being received and that there is ample room for the amount being unloaded. When the

car is empty, the storage tank pressure will equalize with the tank car pressure.. Therefore, it is very important not to exceed the relief valve pressure setting on the acid storage tank with the pressure applied at the tank car.

- (12) After the tank car pressure has equalized with the storage tank pressure, check the level of acid in the storage tank to be sure that the amount unloaded coincides with the amount specified by the bill of lading; if so, block in the storage tank by closing the 2 inch unloading line at the tank.
- (13) Check to be sure that the pressure gas line is blocked at the tank car, then vent the pressure off the unloading line and tank car to the relief neutralizer through the 2-inch line. After the pressure on the tank car has been reduced to approximately 5 psig, close the tank car acid unloading valves and the gas inlet valve. Bleed all pressure off the unloading lines and close the block valve on the line located on the rack walkway.
- (14) Disconnect the pipe fittings to the tank car, replace plugs, and seal the dome for shipment. Remove "DANGEROUS" placards or reverse them. Remove derail flag from the railroad track.

b. UNLOADING TRUCKS OF HYDROFLUORIC ACID

- (1) Vent the acid storage tank (V-11) to the relief neutralizer until the pressure is 50 psig or below.
- (2) Check the level of acid in the anhydrous acid storage tank (V-11) From the tank gauge table, determine the number of pounds of acid contained in the tank to be sure that there is sufficient room for unloading the truck of acid. Normal sized trucks will hold approximately 30,000 pounds of acid; however, check the bill of lading

on the truck for the exact amount shipped.

- (3) Check the unloading line to be sure that the end next to the unloading rack is closed, then open the 2-inch unloading valve at the acid storage tank. The valve at the unloading rack should remain closed until the truck dome fittings and line to this valve are in place and tested for leaks.
- (4) Be sure that the truck is properly spotted so that the pressure gas line and acid unloading lines can be coupled with the truck.
- (5) Check the hand brake on the truck to be sure that it is set and that the motor is dead and the truck is in low or reverse gear. Place chocks in front and in back of one wheel.
- (6) Check the truck unloading valve and gas pressuring valve to be sure they are closed tightly. Check the valve stems and, if they are leaking, tighten the packing nuts.
- (7) Remove the pipe plugs in acid unloading line and in the pressure gas inlet line to their respective openings.
- (8) Connect up unloading piping and gas pressuring piping, being sure that the unloading line and pressuring line are connected to the proper valves on the truck.
- (9) Open the truck acid unloading valves and test fittings for leaks. The truck pressure will be approximately 30 psig. This will test the line to the remaining block valve on the unloading line. If there are no leaks, open the final block valve on the rack, which now will permit acid to be transferred to the storage tank (V-11).

NOTE: The laboratory should be notified when the truck first starts unloading so that, if a line sample is desired, it may be obtained before completion of the unloading.

- (10) Open the truck inlet pressure gas valve. Open the 1-inch valve on the gas line. Check the gas pressure as registered on the pressure gauge (should be about 150 psig). Crack the throttling valve and allow the pressure on the inlet to the truck to build up to about 125 psig and then close the throttling valve. Check the safety valve setting on the truck and do not exceed this pressure.
- (11) Check the gas pressure to the truck frequently during the unloading period (approximately three hours) and also check the level of acid in the storage tank to be sure acid is being received and that there is ample room for the amount being unloaded. When the truck is empty, the storage tank pressure will equalize with the truck pressure. Therefore, it is very important not to exceed the relief valve pressure setting on the acid storage tank (V-11) with the pressure applied at the truck.
- (12) After the truck pressure has equalized with the storage tank (V-11) pressure, check the level of acid in the storage tank (V-11) to be sure that the amount unloaded coincides with the amount specified by the bill of lading. If so, block in the storage tank (V-11) by closing the 2-inch unloading line at the tank.
- (13) Check to be sure that the pressure gas line is blocked at the truck, then vent the pressure off the unloading line and truck to the relief neutralizer through the 2-inch vent line. After the pressure on the tank car had been reduced to approximately 5 psig, close the truck acid unloading valve and the gas inlet valve. Bleed all pressure off the unloading line and close the block valve on the unloading line.

- (14) Disconnect the pipe fittings to truck, replace plugs, and close dome.

c. CAUSTIC CHANGE IN ACID RELIEF NEUTRALIZER

The caustic (5 weight percent NaOH) in the acid relief neutralizer removes HF from the relief and vent streams. In this neutralization, the sodium hydroxide is converted to sodium fluoride. The caustic solution should be used until spent to 0.2 to 0.5 weight percent NaOH, as determined by laboratory analysis. At that time, the following procedure should be followed in changing the caustic solution.

- (1) Open the 2-inch valve in the caustic disposal line and start transferring the spent caustic to the acid neutralizing pit while continuing to circulate caustic over the neutralizer. This will require a partial closing of the 3-inch gate valve in the caustic circulating line.
- (2) Check the transfer rate by observing the caustic level with the try-cocks. When the caustic level reaches the bottom try-cock, close the valve in the circulating line and continue transferring caustic to the acid neutralizing pit until the caustic circulating pump loses suction.
- (3) Stop the caustic circulating pump when it loses suction, close the 2-inch valve in the caustic disposal line, open the 2-inch valve in the pump suction line, and drain the remaining caustic to the sewer.
- (4) As soon as all caustic had drained to the sewer, close the drain valve, open the 2-inch valve in the waterline, and fill the neutralizer to 2 to 3 try-cocks.
- (5) As soon as the water level reaches the bottom try-cock, start the caustic circulating pump, and circulate the water over the top of

the neutralizer.

- (6) With the water level at 2 to 2 try-cocks, open the steam line into the circulating line and bring the temperature of the water to 150°F.
- (7) Circulate the 150°F water over the top of the neutralizer for approximately 30 minutes. This will dissolve the sodium fluoride deposits and keep the neutralizer from plugging up.
- (8) At the end of the 30-minute circulation period, open the 2-inch drain valve and drain the hot water to the sewer. Continue the water circulation until the pump loses suction.
- (9) Stop the pump when it loses suction and drain all water from the neutralizer to the sewer.
- (10) As soon as all water has drained to the sewer, close the 2-inch drain valve, open the 2-inch valve in the caustic fill line and fill the neutralizer to the first try-cock with 5° Be' caustic.
- (11) As soon as the caustic level reaches the bottom try-cock, start the caustic circulating pump and circulate caustic over the top of the neutralizer.
- (12) Close the caustic valve as soon as the caustic level reaches the sixth try-cock.
- (13) After circulating the mixture approximately one hour, send a sample to the laboratory for analysis. In the event the caustic strength is greater than 5.0 weight percent NaOH, dump a sufficient quantity of the caustic to the spent caustic tank to allow adding the required water to reduce the solution to 5.0 weight percent NaOH.

d. CHANGING ACTIVATED ALUMINA IN PROPANE DEFLUORINATOR

Once it is determined by laboratory analysis that the activated alumina in the primary defluorinator is spent, i.e., the organic

fluorides in the propane from the primary defluorinator reach a level of 35 to 50 ppm, the following procedure should be followed for changing the activated alumina.

- (1) Open the valve in the heater inlet line to the secondary defluorinator. This will bypass the flow around the primary defluorinator.
- (2) Close the gate valve in the heater inlet line to the primary defluorinator and the two valves in the cross-over line between the defluorinators. The primary defluorinator is now isolated from the process flow.
- (3) Open the bypass around the relief valve and depressure the defluorinator to the flare header.
- (4) When the defluorinator pressure reaches 0 psig, purge the chamber well with nitrogen or gas from the bottom, up through the bed, and out the relief valve bypass.
- (5) When sufficiently purged with nitrogen or gas, close the relief valve bypass.
- (6) Blind the defluorinator in accordance with established plant practice.
- (7) Unhead the vessel and dump the hot activated alumina onto the concrete pad or directly into a hopper or truck and haul to the disposal area.
- (8) Recharge the defluorinator with 51,800 pounds of 4- to 8-mesh activated alumina and head up.
- (9) Purge all air from the defluorinator to the atmosphere with nitrogen or gas.
- (10) Remove all blinds, open the relief valve bypass, and purge the nitrogen to the flare header by opening the valve on the bottom of the defluorinator.
- (11) When the nitrogen or gas has been purged from the defluorinator,

close the relief valve bypass and allow the defluorinator to pressure up slowly to the normal operating level.

- (12) Close the valve in the bottom outlet line, open the valve in the top inlet line, and open the two valves in the cross-over piping that will place this defluorinator in the primary position.
- (13) Close the valve in the top inlet line to the old defluorinator. This places the defluorinators in series operation with the newly charged defluorinator in the primary position and the old secondary defluorinator in the secondary position.
- (14) Operate in this manner for twenty-four hours. Most of the fines in the new alumina charge will be washed out of the primary defluorinator and trapped on top of the alumina in the secondary defluorinator, thus eliminating plugging of the downstream heat exchangers.
- (15) After twenty-four hours, reverse the defluorinator positions by opening the top inlet valve on the secondary defluorinator and bottom outlet valve in the primary defluorinator, switching the two sets of cross-over valves, closing the bottom outlet valve on the old secondary defluorinator and the top inlet valve on the old primary defluorinator.
- (16) Operation should now be in series with the newly charged defluorinator in the secondary position and the old defluorinator with the fines on top in the primary position. Operation will continue in this position until such times as the primary defluorinator is spent.

The spent alumina should be dumped into a pit which is not accessible to animals or inexperienced personnel. Since some acid may be leached out by rain, deposit about a 2-inch layer of lime in the pit where the spent alumina is to be dumped and cover each dump

- (4) Check the drier regeneration condenser (E-9) to be sure that water is going through the tube side of the condenser. Normally the water will flow through the condenser at all times.
- (5) Start circulation through the regeneration system. The rate of flow, as indicated by the flow meter, should amount to 50 barrels per hour.
- (6) Open steam to the regenerator heater (E-8). The temperature on the outlet of the regenerator heater should be controlled at 350°F. As the vaporized isobutane enters the drier, which is left liquid full when it is switched, the liquid isobutane is displaced to Charge Tanks 2483, 2473 and 2474.
- (7) The isobutane filter (D-3) is provided with a 3/4-inch drain valve to drain off water that is removed during the regeneration cycle. The water level should be observed by the liquid gauge and drawn off periodically to the sewer.
- (8) As circulation of hot isobutane through the drier continues, the temperature on the outlet of the drier will rise slowly to a point of approximately the boiling point of water. The temperature of the effluent will remain fairly constant during the major portion of the regeneration cycle. When essentially all of the water is vaporized, the outlet temperature will rise and approach the temperature of the hot isobutane.

DISCUSSION OF SELF IMPROVEMENT

This section in the scheduled guide for learning is one in which the trainee is urged to continue studying to become a skilled operator.

Even after a person has been declared qualified, much remains to be learned before he can feel confident that he knows all he can learn about a unit.

You are urged to review this manual to become proficient in what you have learned to do and take advantage of opportunities for further improvement.

Among these are:

1. API Pilot Series
- *2. Correspondence Courses
- *3. College Courses
4. Periodic training in safety and firefighting
5. Departmental communications meetings
6. Training sessions on various subjects such as heaters or pumps

*Some outside courses of study qualify for Company aid.

PILOT TRAINING PROGRAM

The following PILOT Training Manuals are available to you. They are listed in the recommended order of study. These manuals are excellent to aid you in becoming a good operator. You are encouraged to check them out and use them. Your supervisor has the manuals and tests available for you on the unit.

<u>PILOT MANUAL</u>	<u>NAME OF MANUAL</u>	<u>NUMBER OF BOOKS</u>
PILOT I	Practical Distillation - Units 1 & 2 Units 3 & 4 Units 5 & 6 Units 7 & 8	4
PILOT III	Furnace Operation Units 1 & 2 Units 3 & 4	2
PILOT VI	Instrumentation for Oper- ators Unit 1 - Sections 1 & 2 Sections 3 - 5 Unit 2 - Process Control Unit 3 - Controllers & Control Modes	4
PILOT VII	Centrifugal Pumps Unit 1 - Centrifugal Pumps Unit 2 - Positive Dis- placement Pumps	3 (1) (2)
PILOT VIII	Pumps and Compressor Drivers Unit 1 - AC Motors Unit 2 - Steam Turbines Unit 6 - Steam Engines and Steam Reciprocating Pumps	3
PILOT II	Nature of Heat Unit 1 - Heat and Temper- ature Unit 2 - Heat Transfer Unit 3 - Fuels and Combustion	3

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<u>PILOT MANUAL</u>	<u>NAME OF MANUAL</u>	<u>NUMBER OF BOOKS</u>
PILOT IV	Mechanics of Fluids Unit 1 - An Introduction to Fluids Unit 2 - The Behavior of Gases Unit 3 - Statics Unit 4 - Fluids in Motion	4
PILOT V	Compressors Unit 1 - An Introduction to Compression Unit 2 - Positive Displacement Compressors	2
PILOT IX	Significance of Process Control Test	1
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Operator's Training Manual

841-2 DCU

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I N D E X

Operator's Training Manual

841 & 842 DCU

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Operator Scheduled Guide for Learning (SGL)
841 DCU

Week 1

1. Learn location and purpose of all safety equipment on unit and how to handle personal emergencies where safety is involved. Learn procedures involving personal safety.
 - a. Correct procedure to handle chemicals and other materials on unit which may be toxic or hazardous.
 - b. Learn location of and use of personal safety equipment, such as face shield, gas mask, blankets, etc.
 - c. Learn correct procedure in reporting a fire.
 - d. Learn location of fire fighting equipment such as fire extinguishers, fire hoses, etc.
 - e. Correct procedure to sample products.
 - f. Learn correct tagging procedure significance of red, yellow, and white tags.

Learn the specific duties of your job: such as sampling, weighing up, taking and recording readings, marking mark sense cards and oiling up pumps, motors, compressors, and duties of drum cycle.

*Unit supervisor will review employee's progress
 (1-week review)

- Weeks 2 and 3 2. Learn the "general discussion of unit" the purpose where the charge comes from and where the products go also alternate destinations of products and how the unit fits into the refinery's overall picture. Learn a quick and safe shutdown procedure.

- Week 4 3. Flow of the unit. Learn to tract the following: reduced crude from battery limits, through fresh feed accumulator to fractionator, through heater to the coke drum, and all products to battery limit. Learn emergency shutdown procedure for unit.
- *Unit supervisor will review employee's progress (30-day review).
- Week 5 4. Learn the operation and function of fresh feed accumulator, fractionator, stripper, absorber, blowdown scrubber, blowdown stack, blowdown pond, foul condensate and steam system.
- Week 6 5. Learn control system for the unit and the effect of pressure, temperature and flow in and out of a tower on the product quality control.
- a. Coke Drum
- b. Fractionator
- c. Absorber
- d. Charge Tanks
- Week 7 6. On the following pumps and compressors learn their function and operation. Including their related equipment.
- a. Reduced Crude Charge Pumps
- b. Fractionator Charge Pump
- c. Furnace Charge Pump
- d. Fractionator Intermediate Reflux Pumps
- e. Fractionator Top Reflux Pump
- f. All Products, Pumps, Gaso., L.G.O., and G.H.O.
- g. Coke Drum Condensate Pump

- h. Pond Pumps
- i. Compressor Seal and Lube Oil Systems
- j. Anti-Foam Pump
- k. Dirty Water

- 7. Trace the flow in Item #3 above and know location, function, sensing point and control of each regulator in the unit flow.

Week 8

- 8. Control Board - Learn the function and operation of each instrument on the control board.
- *Unit supervisor will review employee's progress (60-day review).

Week 9

- 9. Learn the following systems on the unit, know their function and relation to the unit, source of supply and be able to trace them on the unit.
 - a. Natural Gas
 - b. Refinery Fuel Gas
 - c. 125 lbs. Steam
 - d. Cooling Water
 - e. Electrical: 2300, 440 and 110 volts system also emergency system
 - f. Yard Air, instrument air, including air dryers
- 10. Be able to show the relation between each distillation cut on fractionator.
 - a. Fractionator - Gaso., Dist. Fuel and Gas Oil
- 11. Learn the source of Reduced Crude to Unit and destination of products from unit.
 - a. Learn the importance of communications between the

different units, utility supplies (air, water, electricity, steam) and pump house for products.

b. Learn who to contact for startup, shutdown or upset.

Week 10

12. Learn the use and operation of heaters on the unit:

a. Be able to purge fire boxes

b. Adjust dampers on heater

c. Fire and Operate heaters

Week 11,12

13. Learn actual operations procedures for:

a. Startup

b. Shutdown

c. Starting compressors

d. Emergency procedures (loss of air, loss of cooling water, loss of electricity, fire)

14. Divide the unit up and draw simplified flow diagrams of each section of the unit such as:

a. Reduced Crude Flow

b. Each Products flow

c. Gas Compressor

d. Pond water system

e. Steam system

f. Fuel gas system

g. 15 Flare System

15. Be familiar with log book, order book and know the importance of communication between different shifts.

16. Continue increasing your knowledge of the unit with the use of 841 DCU Training Program Book.

17. Continue your study to increase your basic knowledge of operation with the pilot series.

*Unit supervisor will review employee's progress (90-day review)

Week 13,14,15

Review all operating procedures, job tasks, study questions and safety measures. Prepare for final review.

*Unit supervisor will review employee's progress (105-day review).

Week 16,17

Continue increasing your knowledge of unit by studying Operator's Training Manual, Pilot Series, and discuss operation of unit with other operating personnel.

Operator Scheduled Guide for Learning (SGL)
842 DCU

Week 1

1. Learn location and purpose of all safety equipment on units and how to handle personal emergencies where safety is involved. Learn the procedures involving personal safety:
 - a. Correct procedures to handle chemicals and other materials on unit which may be toxic or hazardous.
 - b. Learn location of and use of personal safety equipment, such as face shields, gas masks, blankets, etc.
 - c. Learn correct procedure in reporting a fire.
 - d. Learn location of fire fighting equipment such as fire extinguishers, fire hoses, etc.
 - e. Correct procedure to sample products.
 - f. Learn correct tagging procedures, significance of red, yellow and white tags.

Learn the specific duties of your job: such as sampling, weighing up, taking and recording readings, marking mark sense cards and oiling up pumps, motors, compressors and duties of drum cycle.

*Unit supervisor will review employee's progress (1-week review).

Week 2 and 3

2. Learn the "general discussion of unit" the purpose where the charge comes from and where the products go also alternate destinations of products and how the unit fits into the refinery's overall picture. Learn safe and quick shutdown procedure.

- Week 4 3. Flow of the unit. Learn to trace the following:
reduced crude from battery limits thru fresh feed
accumulator to fractionator, thru heaters to the coke
drum, gaso. section and all products to battery limits.
Learn emergency shutdown procedures for units.
*Unit supervisor will review employee's progress
(30-day review).
- Week 5 4. Learn the operation and function of: Fresh Feed Accumulator
fractionator, stripper, absorber, sponge absorber,
blowdown oil scrubber, blowdown stack, blowdown pond,
foul condensate stripper, fuel gas scrubber, C³-C⁴
scrubber, DEA Reactivator, Gaso. Stripper, Debutanizer,
Gaso. Splitter, Inter. Gaso., steam system and 15
Flare System.
- Week 6 5. Learn control system for the units and the effect of
pressure, temperature and flow in and out of a tower on
the product quality control (end point, boilaway,
volatile combustible matter)
- a. Coke Drum
 - b. Fractionator
 - c. Amine System
 - d. Gaso. Stripper
 - e. Debutanizer
 - f. Gaso. Splitter
 - g. Inter. Gaso.
 - h. Charge Tanks

Week 7

6. On the following pumps and compressor learn their function and operation. Including their related equipment:
 - a. Reduced Crude Charge Pumps
 - b. Fractionator Charge Pumps
 - c. Furnace Charge Pumps
 - d. Fractionator Inter. Reflux Pumps
 - e. Fractionator Top Reflux Pumps
 - f. All of product pumps L.G.O. and H.G.O.
 - g. Coke Drum Condensate Pumps
 - h. Boiler Water Circulating Pumps
 - i. Pond Pumps
 - j. Compressor - Seal oil and lube oil system
 - k. Anti-Foam Pumps
 - l. Circulating Hot oil Pumps
 - m. Dirty Water
 - n. Debutanizer Reflux
 - o. Gas Splitter Reflux
 - p. Debutanizer Charge
 - q. Heavy Gaso. Product
 - r. Inter. Gaso. Product

7. Trace the flow in Item #3 above and know location, function sensing point, and control of each regulator in the unit flow.

Week 8

8. Control Board - Learn the function and operation of each instrument on the control board.
- *Unit supervisor will review employee's progress (60-day review).

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CHEV B8 6861

Week 9

9. Learn the following systems on the unit; know their function and relation to the unit, source of supply and be able to trace them on the unit.
 - a. Natural Gas
 - b. Refinery Fuel Gas
 - c. 125 lbs. steam
 - d. Cooling Water
 - e. Electrical: 2300, 440 and 110 volt system also emergency system
 - f. Yard Air, Instrument Air including Air Dryer
10. Be able to show the relation between each distillation cut on each tower:
 - a. Fractionator Tower Gasoline L.D.F. and H.G.O.
 - b. Gaso. Tower C³-C⁴ Lt. Gaso., Inter. Gaso. and Heavy Gaso.
11. Learn the source of Reduced Crude to Unit and destination of products from unit:
 - a. Learn the importance of communications between the different units, utility suppliers (air, water, electricity, steam) pumphouses for products
 - b. Learn who to contact for startup, shutdown or upset.

Week 10

12. Learn the use and operation of heaters on the unit.
 - a. Be able to purge fire boxes
 - b. Adjust dampers on heaters
 - c. Fire and operate burners

Week 11,12

13. Learn actual operations procedure for:
 - a. Startup
 - b. Shutdown

- c. Starting Compressor
 - d. Emergency Procedures (Loss of Air, Loss of Cooling Water, Loss of Electricity, Fire)
14. Divide the unit up and draw simplified flow diagrams of each section of the unit such as:
- a. Reduced Crude Flow
 - b. Each Products Flow
 - c. Gaso. Section
 - d. Gas Compressor
 - e. Pond Water System
 - f. Cooling Water System
 - g. Steam System
 - h. Amine System
 - i. Fuel Gas System
 - j. Hot Oil System
 - k. 15 Flare System
15. Be familiar with log book, order book and know the importance of communication between different shifts.
16. Continue increasing your knowledge of the unit with the use of 842 DCU Training Program Book.
17. Continue your study to increase your basic knowledge of operations with the Pilot Series.

*Unit supervisor will review employee's progress (90-day review).

Week 13, 14, 15 Review all operating procedures, job tasks, study questions, and safety measures. Prepare for final review.

*Unit supervisor will review employee's progress (105-day review).

Week 16, 17

Continue increasing your knowledge of unit by studying
Operator's Training Manual, pilot series and discuss
operation of unit with other operating personnel.

5-15-78

CHEV B8 6864

Decoker Helper Training
Scheduled Guide for Learning
841-2 DCU

Week 1

1. Learn location and purpose of all safety equipment on unit and how to handle personal emergencies where safety is involved. Learn procedures involving personal safety.
 - a. Learn location of and use of personal safety equipment, such as face shield, gas mask, ear plugs, etc.
 - b. Learn procedure in reporting a fire.
 - c. Learn location of fire fighting equipment such as fire extinguishers, fire hoses, etc.
 - d. Correct procedure to sample product.
 - e. Learn correct tagging procedure and significance of red, yellow, and white tags.

Learn the specific duties of your job such as sampling, oiling up pumps, motors, loading cars, and movement of cars.

Week 2

2. Learn the operation and function of jet water tank, ferris wheel, fines tank, sluiceway, car pullers, jet water pump, and mobile platform.
 - a. Learn the importance of communicating between coke driller and bottom helper.
 - b. Learn the use and operation of the track mobile.
 - c. Be familiar with 841-842 outline to learn.
3. Continue your study knowledge of the unit with the use of 841-842 DCU Training Program Book.

4. Learn the safe and quick shutdown procedure.
5. Continue your study to increase your basic knowledge of operation.

NOTE: Progress Review Questions to be given at approximately 30, 60, 90, and 105 days.

STUDY QUESTIONS
OPERATOR'S TRAINING MANUAL
841-2 DCU

1-WEEK REVIEW

1. If you expect to be tardy or absent who must you call? Who can approve your being absent?
2. Name tasks on your unit which require that personal protective equipment be used. What equipment?
3. Which color safety tag is for operators? Is an operator allowed to remove a red tag?
4. List the kind and location of fire-fighting equipment on your unit.
5. How would you report a fire on your unit? Who reports a fire?
6. Why would you clean up oil spills or trash on your unit or in the control room? Why would you hang up idle utility hoses on your unit?
7. What is the basic purpose of your unit? What is its charge and what products are made?
8. What are the numbers and telephone numbers of the units that supply charge to your unit?
9. What is used to pressure test the coke drums?
10. What are the tank numbers that are used to excess or make up reduce crude?
11. How do you run a gravity? What streams are tested?
12. How do you run a boil away? What streams are tested?
13. Name three units using a flare.
14. How do you catch a hot oil sample (a red-crude sample)?
15. How do you fill out a sample tag? How do you order sample bottles, tags, and corks?
16. Explain why clean bottles and corks are necessary for laboratory samples.
17. At what time each day are laboratory samples picked up?

18. How do you check pumps or turbine bearings for contaminants or water?
19. How do you figure the coke make?
20. Where are the instrument air dryers? How often do we switch them? Where is the emergency instrument air compressor? How often do we test it and how? Be able to demonstrate.
21. How do you lubricate valves and fin fan coolers?
22. How do you maintain a press on 15 Flare Line?
23. Who should wear safety hats?

STUDY QUESTIONS
OPERATOR'S TRAINING MANUAL
DECOKER HELPER
841-2 DCU

30-DAY REVIEW

1. What is 120-J used for and what type of water does it pump?
2. What pump has an auxiliary oil pump?
3. What is the purpose of the sluiceway?
4. What is the purpose of 118-J pump and where does it pump the water?
5. Where are the bottom fines pumped?
6. Where are the top fines pumped?
7. What type of equipment is used to remove top fines from fines tank?
8. Name the two types of heads used on the drill stem.
9. What type of fuel is used in the big track mobile?
10. What type of fuel is used in the small track mobile?

STUDY QUESTIONS
OPERATOR'S TRAINING MANUAL
841 & 842 DCU

30-DAY REVIEW

1. How do you switch an automatic firing instrument from automatic to manual and back to automatic? Be able to demonstrate.
2. How do you switch centrifugal pumps? How do you switch reciprocating pumps? Be able to demonstrate.
3. How do you put a regulating valve on the hand by pass? Be able to demonstrate.
4. Tell the service of pumps from 1-J to 11-J (inclusive).
5. Tell service of pumps from 12-J to 34-J (inclusive). Which ones are reciprocating?
6. List the chemicals and inhibitors used and tell which pump is used for each.
7. What is the purpose of warm-up lines on pumps such as 8-J and 108-J pumps?
8. What is the purpose of the surge drum?
9. How do you check for a false level in a tower or vessel?
10. State the temperature range for the outlet of the heater.
11. Name products from the units.
12. Name products from Gaso. Sect. 842 Unit.
13. Tell the service of pumps from 101-J to 113-J.
14. Tell the service of pumps from 114-J to 133-J.
15. Name the reflux streams to the fractionator.
16. Which reflux pumps deliver flow to more than one place? Describe.
17. Where are the charge regulators for heaters on 841 and 842 units located?
18. What chemicals are injected into the coke drums and what are their purposes?
19. When are the bearings on a pump checked for water or contaminants?

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CHEV B8 6870

STUDY QUESTIONS
OPERATOR'S TRAINING MANUAL
841-842 DCU

60-DAY REVIEW

1. What would you do in case of instrument air failure?
2. What would you do in case of a power (electric failure)?
3. What would you do in case of a cooling water failure?
4. What is the reel valve and the purpose of it?
5. When is silicone injected into a coke drum?
6. What is the minimum circulation in divisions per pass that is allowed through the coke heaters?
7. What is the ideal temperature range for 1506 and 1507 tanks?
8. What is the purpose of the surge drum?
9. Why is it very important to record and read all information in Log Book and Order Book?
10. When heating a coke drum, why pump the condensate first to the blowdown?
11. Why is it important to remember the air output of each instrument?
12. How many passes in 1-B Heater?
13. How many passes in 101 BA Heater and 101 BB Heater?
14. What should you do as soon as the W/S valve has been switched?
15. What are the products and their normal distribution?
16. What is reduced crude?

STUDY QUESTIONS
OPERATOR'S TRAINING MANUAL
841 & 842 DCU

90-DAY REVIEW

1. Why is it very important to record all information possible concerning the unit in the Log Book?
2. Describe the procedure you would use to check for leaks in the unit coolers and exchangers.
3. Describe the procedure for back flushing of water coolers.
4. Describe the safe procedure for lighting fires in a heater.
5. How often do we switch coke drums in a normal run?
6. What is the purpose of pressure testing the coke drums before starting to heat up?
7. What is the purpose of purging coke drums with steam?
8. What is the purpose of purging the heaters before firing up?
9. How can you tell if a heater is being purged?
10. How many times a shift should an assistant stillman inspect the fire box appearance for abnormal conditions?
11. What is the purpose of the fines tank?
12. Describe the procedure you would use to place a steam turbine in service. Be able to demonstrate.
13. Make a small drawing showing the pump out pump and what is connected to the suction of this pump. Be able to point out these lines and valves.
14. Describe the procedure you would use to switch a coke drum.
15. Describe the procedure you would use to heat up a coke drum.
16. Describe the procedure you would use to cool a coke drum.
17. What is safety valve setting on 841 and 842 coke drums?
18. Why is it very important to keep a close check on 15 flare?
19. What is the purpose of the blowdown pond?

20. Why is it important to keep a good level in blow down pond?
21. What is the purpose of the blow down system?
22. What is the purpose of the 201-B heater?
23. What is the purpose of the 102-B heater?

841 DELAYED COKING UNITQUESTIONS105-DAY REVIEW

1. If circulation is lost through the coking heater for an extended period of time (two minutes or longer), what are the first two things you should do? Answer in detail.
2. After circulation is lost and you have taken care of the coke heater, what is the next thing you should do?
3. When circulation is lost and all the fresh feed is cut away from the fractionator, what should you check next?
4. There are six intermitting steam injections on lines on each coke drum that were installed to stop coking or plugging of these vital lines. What are they?
5. Except for repairs, what coke drum equipment is it that you should never cut the steam off?
6. When making a drum switch, if the pressure at the W/S valve builds, what are the first two things you should do?
7. What should you do as soon as the W/S valve has been switched?
8. Before by-passing the coke drums, what temperature should the coke heater outlets be cut below?
9. When cutting from the by-pass to the coke drum, what temperature should the coke heater outlets be rising above?
10. What is the purpose of the blowdown system?
11. What is the ideal temperature range for 1506 and 1507 tanks?
12. There are four pumps with spares that must stay hot at all times. What are they?
13. When heating a coke drum, why pump the condensate first to the blowdown (via 10-J pump)?

14. Steam is injected under the coke drum safety valves to prevent coke build up. Where else, on the switch deck, is it used continually for the same reason?
15. The desired temperature of the fractionator flash section is 715°F maximum. If it is high, what are the most common adjustments that should be made to lower it and still hold the fractionator bottoms level and fresh feed rate the same?
16. What is the minimum circulation, in divisions per pass, that is allowed through the coke heater?
17. Why is it important to remember the air output of each instrument?
18. At what time is silicone injected into the coke drum?
19. What is reflux, where does it come from, and what does it do?
20. What is the first thing that should be done when the distillate fuel (LGO) stripper begins to lose its level?
21. What should be done if the distillate fuel (LGO) stripper level continues to drop after cutting the product leaving the unit?
22. Why is it important not to lose the distillate fuel (LGO) stream?
23. What is the first thing you should do if 2-J compressor shuts down?
24. What are the products on 841 and their normal distribution?
25. When starting an electric motor driven centrifugal pump, in what position would the discharge valve be?
26. When starting a steam driven centrifugal pump, in what position should the discharge valve be?
27. Why should a pump's bottom drain always be checked before the pump is put in service?
28. Why should a pump's discharge drain valve always be checked before the pump is put in service?

29. Name two adjustments of which either would raise the compression ratio of 2-J compressor.
30. What is the main purpose of the waste oil heater and flash tower?
31. There is a HGO product stream from the fractionator. What else is the unit HGO normally used for?
32. What is pressure setting on coke drum safety valves?
33. If HGO pan level begins to drop, what are three steps you should take to stop it?
34. What are the first two things you should do if for some reason you lose the charge to the fractionator?

842 DELAYED COKING UNIT

QUESTIONS

105-DAY REVIEW

1. If circulation is lost through the coking heaters for an extended period of time (two minutes or longer), what are the first two things you should do? Answer in detail.
2. After circulation is lost and you have taken care of the coke heaters, what is the next thing you should do?
3. When circulation is lost and all the fresh feed is cut away from the fractionator, what should you check next?
4. There are six intermitting steam injections on lines on each coke drum that were installed to stop coking or plugging of these vital lines. What are they?
5. Except for repairs, what coke drum equipment is it that you should never cut the steam off?
6. When making a drum switch, if the pressure at the W/S valve builds, what are the first two things you should do?
7. What should you do as soon as the W/S valve has been switched?
8. Before by-passing the coke drums, what temperature should the coke heaters outlets be cut below?
9. When cutting from the by-pass to the coke drum, what temperature should the coke heaters outlets be rising above?
10. What is the purpose of the blowdown system?
11. What is the ideal temperature range for 1511 and 1512 tanks?
12. There are six pumps with spares that must stay hot at all times. What are they?
13. When heating a coke drum, why pump the condensate first to the blowdown (via 113-J pump)?

14. Steam is injected under the coke drum safety valves to prevent coke build up. Where else, on the switch deck, is it used continually for the same reason?
15. The desired temperature of the fractionator flash section is 720°F maximum. If it is high, what are the most common adjustments that should be made to lower it and still hold the fractionator bottoms level and fresh feed rate the same?
16. What is the minimum circulation, in divisions per pass, that is allowed through the coke heaters?
17. Why is it important to remember the air output of each instrument?
18. What are the two vessels, on this unit, that steam should never be put into?
19. What is reflux, where does it come from, and what does it do?
20. What are the two first things that should be done when the distillate fuel (LGO) stripper begins to lose its level? (Never cut sponge oil unless pump suction is lost).
21. What should be done if the distillate fuel (LGO) stripper level continues to drop after cutting the product leaving the unit?
22. If 841 and 842 charge rates and fractionator top temperatures have not changed - yet 842's H.P. Separator level and its gasoline product continues to rise, where would be the two most likely places to look for the cause?
23. What is the normal (routine) way to control the C_3-C_4 E.P.?
24. What are the products on 842 and their normal distribution?
25. When starting an electric centrifugal pump, in what position should the discharge valve be?
26. When starting a steam driven centrifugal pump, in what position should the discharge be?

27. Why should a pump's bottom drain always be checked before the pump is put in service?
28. Why should a pump's discharge drain valve always be checked before the pump is put in service?
29. Name two adjustments of which either would raise the compression ratio of 104-J compressor.
30. What two reboilers, on this unit, use steam for heat?
31. There is a product HGO stream from the fractionator. What else is the unit HGO normally used for?
32. If HGO pan level begins to drop, what are three steps you should take to stop it?
33. What is pressure setting on coke drum safety valves?
34. What are the first two things you should do if for some reason you should lose the charge to the fractionator?
35. What important thing should be done if 104-J compressor shuts down and does not start quickly?

INTRODUCTION TO SECTION I

Section I is designed to introduce the new worker to the unit so that he will be able to perform the job tasks in a safe manner and learn the basic operation of the unit at the same time. A review over the section will be given at three (3) days, at one (1) week and at thirty (30) days.

BASIC WORK RULES

The basic work rules listed below are presently in effect and are issued for the information, guidance and safety of employees. The list does not include all Company rules and regulations.

Each operating employee is required to abide by the following rules. Your cooperation will be appreciated.

1. Employees shall be responsible for being at their assigned work locations at their scheduled starting time.
2. Employees shall not leave their jobs without permission from their operator, except for normal personal reasons or in case of emergency.
3. Employees who are unable to report for work shall notify the Light Oil Department shift supervisor in advance of their scheduled starting time. If he cannot be contacted at 507, call the Lieutenant, Plant Security at 2265 who will contact him by radio and the shift supervisor will call you at the number you give the Lieutenant.
4. Employees shall not smoke in the Plant, except in approved smoking areas.
5. Employees shall use only safety matches in the Plant, when matches are authorized, or approved lighters.
6. Employees shall carry out orders given by their supervisor or the person for whom they are working.
7. Employees shall obtain leave of absence by requesting permission from their supervisor or the shift supervisor.
8. Employees shall follow safe work practices and wear protective equipment as required.

9. Employees shall not give or loan their employee identification pass to any other person.
10. Employees shall be responsible for proper use of bathhouses.
11. Employees shall not participate in horseplay.
12. Employees shall not remove Company property from the Plant without proper authorization.

HOW TO RETURN TO WORK FOLLOWING
SICKNESS OR OUTSIDE ACCIDENT

All hourly employees who are off due to sickness or outside accidents for more than one day should obtain a "Release to Return to Work" from the Medical and Health Services Division as promptly as practicable after receiving a release from a private physician. If a private physician has not been consulted, employees should obtain a "Release to Return to Work" from Medical and Health Services as soon as practicable upon being able to return to work and, if possible, prior to the day they return. Employees who do not obtain a release from Medical and Health Services prior to the date they are scheduled to return to work will be subject to having their pay denied during the time they obtain their release.

Except in unusual situations a "Release to Return to Work" may be secured from the nurse on duty. Nurses are on duty at Medical and Health Services during the following hours:

Monday through Friday - 6:30 AM to 12:00 Midnight

Saturdays, Sundays and Holidays - 7:00 AM to 11:00 PM

Employees may consult the Light Oil Shift Supervisor for further details.

NO SMOKING!EXCEPT AS FOLLOWS

1. During employees' working hours, they must have permission from the person to whom they report to use the smoking areas.
2. Employees are to use the smoking area most convenient to their work area.
3. Employees are not to remain in the smoking areas any longer than the time required to smoke a cigarette.
4. During work hours, employees are not to smoke more than once during the first four hours of their schedule and not more than once during the last four hours of their schedule.
5. The smoking areas will be open for employees in accordance with the following schedule:

<u>Employee Working</u>	<u>Smoking Areas Open</u>
6:00 AM - 2:00 PM; 2:00 PM - 10:00 PM, or 10:00 PM - 6:00 AM	7:00 AM - 1:00 PM; 3:00 PM - 9:00 PM and 11:00 PM - 5:00 AM

In addition, an employee doubling over from one shift to the next may use the smoking area once at shift-change time.

6. It may be necessary at times to temporarily discontinue the use of a smoking area because of existing conditions. In such cases a sign stating SMOKING TEMPORARILY DISCONTINUED will be displayed at the smoking area.
7. Temporary smoking areas may be designated on certain major shutdowns or jobs.
8. If an employee is found smoking in an unauthorized area, he will be subject to discharge.
9. Before leaving the area, be sure to put cigarette butts in the container provided for this purpose. Keep the shelter clean and neat.

THINK ABOUT PERSONAL SAFETY

Nearly all accidents are caused by someone doing something or failing to do something against their own good judgment. If they took one moment to think first, the accident would not have been caused. Accidents don't "just happen"; people cause accidents. You are entitled to be told how to prevent personal injury to yourself which is the usual result of an accident. Also, you are responsible to yourself and your fellow employees to think and work safely.

When you hear a steam leak in most cases you will be able to see it. This is not true at the atmospheric heater charge turbines because they operate at 650 psi. Steam at this pressure is extremely hot and does not give the characteristic white plume of 250 psi and lower pressure steam. For this reason a stick, rag, or piece of paper can be held near the suspected leak to locate it. Using this method still requires care and thought. Don't unwittingly place your hand where it possibly could be struck by this invisible and very hot steam.

When handling chemicals such as corrosion inhibitors and desalting chemicals, a hazard exists. Any one or all of the following should be expected: injury to the eyes, irritation of the skin or penetration by absorption through the skin to injure the body. To prevent injury, you must wear a face shield or goggles and rubber gloves.

Skilled operators frequently choose to wear cotton or leather-faced cotton gloves to protect their hands when performing manual work on an operating unit. Gloves can protect your hands from injury in many ways.

Catching Liquid Samples (Hotter than 150° F.)

1. Obtain metal sample catching container.
2. Open valve on sample station and draw liquid slowly to the

sewer until sample line is hot. If sample is drawn too quickly and the material is heavy, the hot liquid may blow out and flash after the cold material has been drained from the line.

3. Rinse the metal container and fill slowly.
4. When sample has cooled sufficiently that it will not break a glass bottle, pour sample into sample bottle.

NOTE: If sample station is equipped with a steam-out line, block sample line at the main process line and steam out the sample line to the sewer before liquid hardens in line.

CAUTION: Extreme care should be exercised that no moisture contacts a hot sample. Even one or two drops of water may cause sample to splatter and burn someone.

5. Place proper tag on sample.
6. Empty metal container and leave in an inverted position.

When opening a drain valve or bleeder on a line or other equipment, watch it. If it appears empty because nothing comes out, don't trust it. The moment you turn your back on it the flow may gush out. In many cases this has caused injury to employees and it has been known to cause a bad fire on a unit. NEVER TURN YOUR BACK ON AN OPEN BLEEDER. If it becomes necessary for you to go elsewhere, close the valve before you leave it.

When handling ammonia it is most important to keep it out of your eyes. The anhydrous ammonia that we use has an insatiable appetite for water. The ammonia vapor dissolves in the tears in our eyes and rapidly spreads around the eyeball. If you get ammonia in your eyes or on your skin, flush with copious quantities of water. Of course, this can be

avoided by wearing goggles or a face shield. Be as careful in handling ammonia as any other hazardous chemical. Personal protective equipment is to be worn when working with ammonia.

Slipping and tripping hazards on an operating unit too frequently go uncorrected. When we think of a sprained back or sprained ankle, we wonder why we didn't clean up that slippery spot on the floor or coil and hang up that idle utility hose before an accident, instead of after it. Oil spills should be cleaned up and idle utility hoses placed out of the walking area. In general, good housekeeping has many advantages.

When operating valves, position your feet securely under you, use a suitable valve wrench and keep your fingers and hands away from objects that could pinch or scrape them. Valves that are difficult to operate need a suitable lubricant. Put grease in grease fittings, and pour a little oil on the stem and threads.

WEAR SAFE CLOTHING

1. Employees shall wear clothing which affords adequate protection to the body. Items not acceptable include:
 - a. Clothing without adequate sleeve protection for the job being performed,
 - b. Short pants,
 - c. Clothing in poor repair.
2. Employees shall not wear loose clothing with unbuttoned sleeves, exposed shirttails, unconfined neckties, etc., near moving equipment.
3. Employees whose hair style may constitute a hazard when they are near moving equipment or a source of flame shall confine their hair.
4. Employees shall wear a substantial shoe which is in good condition. Sandals, canvas shoes, open-toed shoes and any other type of shoe that fails to afford adequate protection for the feet or creates a footing hazard are not acceptable.

WEAR SAFE CLOTHING

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 - a. Clothing without adequate sleeve protection for the job being performed,
 - b. Short pants,
 - c. Clothing in poor repair.
2. Employees shall not wear loose clothing with unbuttoned sleeves, exposed shirrtails, unconfined neckties, etc., near moving equipment.
3. Employees whose hair style may constitute a hazard when they are near moving equipment or a source of flame shall confine their hair.
4. Employees shall wear a substantial shoe which is in good condition. Sandals, canvas shoes, open-toed shoes and any other type of shoe that fails to afford adequate protection for the feet or creates a footing hazard are not acceptable.

PROTECT YOUR HEAD

1. The Company provides approved safety helmets (hard hats).
2. Safety helmets must be worn by employees and visitors in all areas of the plant, with the following exceptions:
 - a. Offices, control rooms, and guard stations
 - b. Roadways and sidewalks when reporting to and from work location, of when in covered vehicles.
 - c. Other areas approved by the Refinery Manager.

Safety helmets shall be required in the above areas, or parts of the above areas, when in the opinion of the employee's supervisor a head hazard exists. In addition, each employee shall have the responsibility of wearing his safety helmet wherever a head hazard exists.

PROTECT YOUR HEARING

1. The Company will provide approved hearing protection devices for employees. Hearing protection must be used in all areas of the refinery where the sound level exceeds the values specified in the Occupational Safety and Health Act.
2. Signs designating noise area and permissible noise exposures have been posted on your unit.
3. In locations such as a unit which is shut down, hearing protection will not be required while equipment is idle and the noise level is below the maximum allowable, even though the area may be posted as a noise area.
4. Ear plugs, ear muffs, and pliable disposable hearing protection are available for use.

USE OF TAGSYellow Tags
(Gulf Form 9233)

- Are to be used for operators to indicate equipment that is not to be used or changed. The person who tags equipment shall write on the tag reason for tagging and sign his name, unit, and date. Tag is not to be removed by anyone other than person who signed tag or by a knowledgeable operator given the authority and responsibility by his supervisor.

Yellow Tags
(Plain)

- Are used on acid, caustic and other samples that must be handled with special precautions.

Red Tags

- For electricians - Operators must not remove these tags.

White Tags
(Do Not Operate)

- For Machinists - Operators must not remove these tags.

Blue)

Orange) Tags

Green)

- Not used on these units.

CAUTION: Equipment which has been tagged out with any of the above tags shall not be put in service, operated or test-run until all tags have been removed.

Manila Tags - For identifying samples that are to be sent to Laboratory.

REPORTING FIRES

A. Responsibility of Reporting

Any person discovering a fire is responsible for reporting it. The fire protection section must be notified of all fires regardless of their magnitude, so that precautions may be taken to assure that the fire is brought under control and extinguished and so that the fire can be properly reported.

B. Definition of One, Two, and Three Alarm Fires

1. One Alarm Fires

A one alarm fire is one which would cause only minor damage to property or equipment, not endanger personnel, and may be controlled and extinguished with the personnel and equipment available within the unit.

2. Two Alarm Fires

A two alarm fire is one which would cause major damage to property and equipment, endanger the lives of some few people, and require additional assistance to control and extinguish.

3. Three Alarm Fires

A three alarm fire could cause grave damage to property and equipment, seriously endanger the lives of many people, and require maximum additional assistance available to control and extinguish. (This may include community facilities in addition to refinery fire fighting equipment).

TO REPORT A FIRE

DIAL 2200

SAY

"FIRE, SECTION 2,

841 DCU

INDICATE 1, 2 OR 3 ALARM "

TO REPORT A FIRE

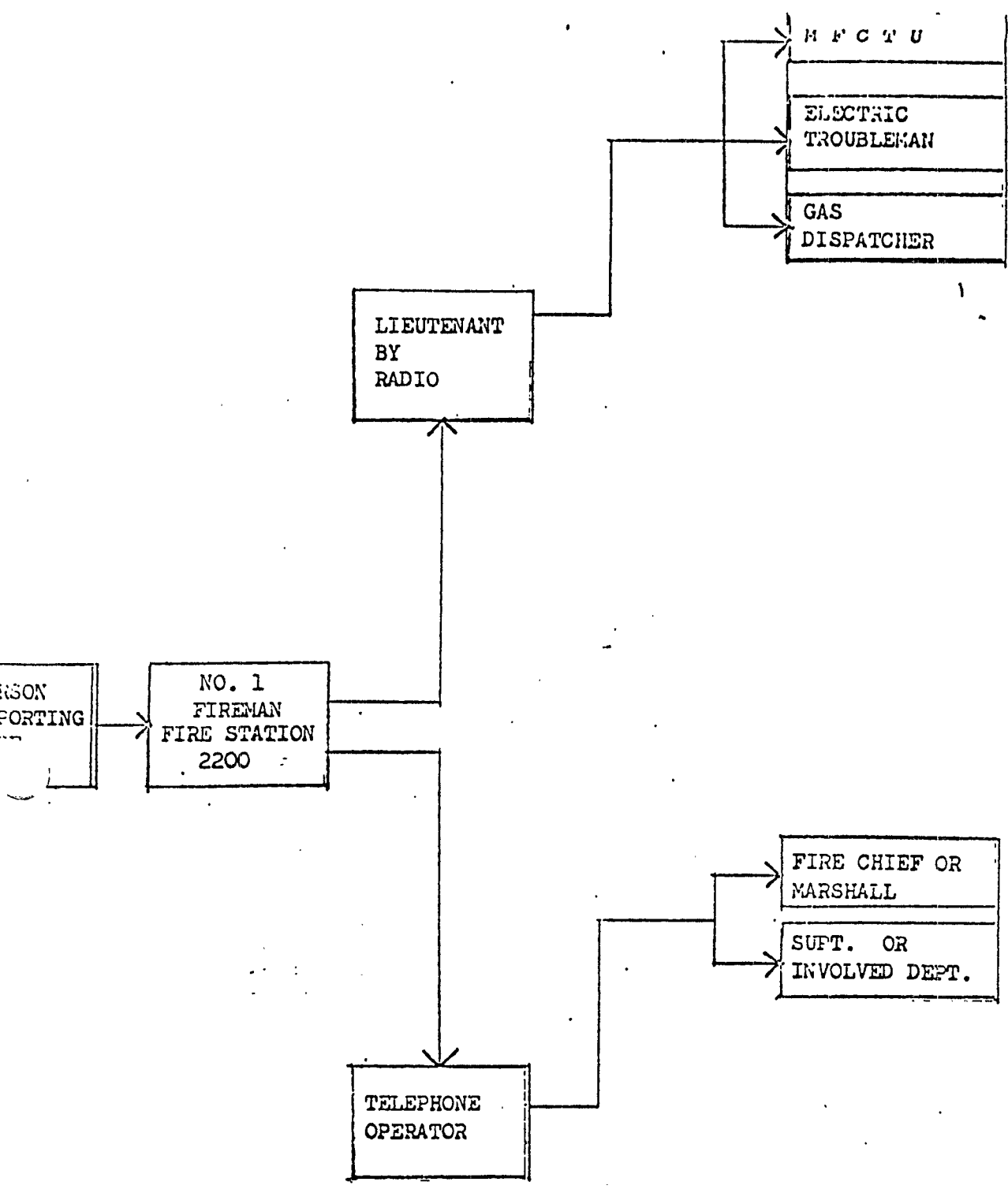
DIAL 2200

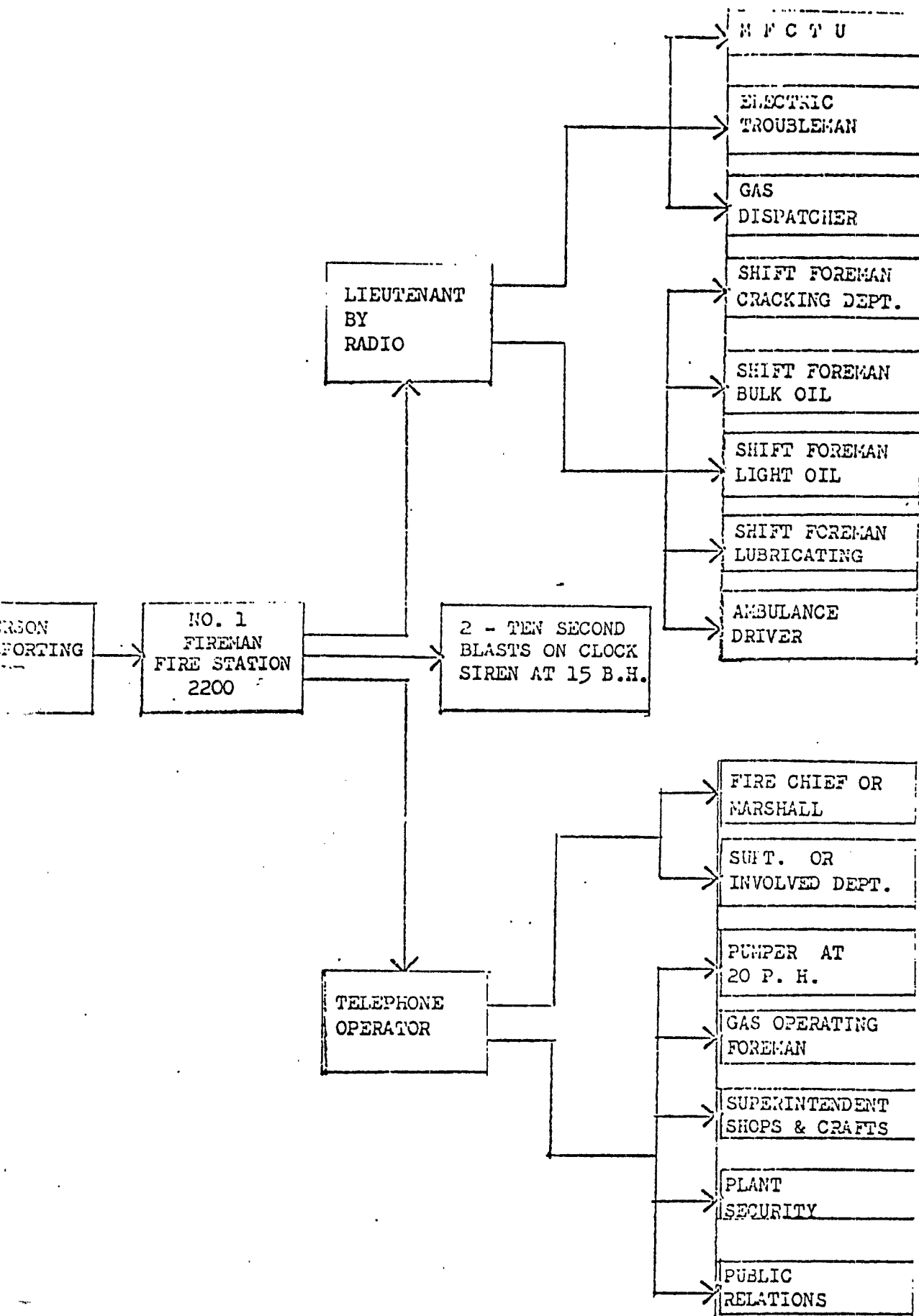
SAY

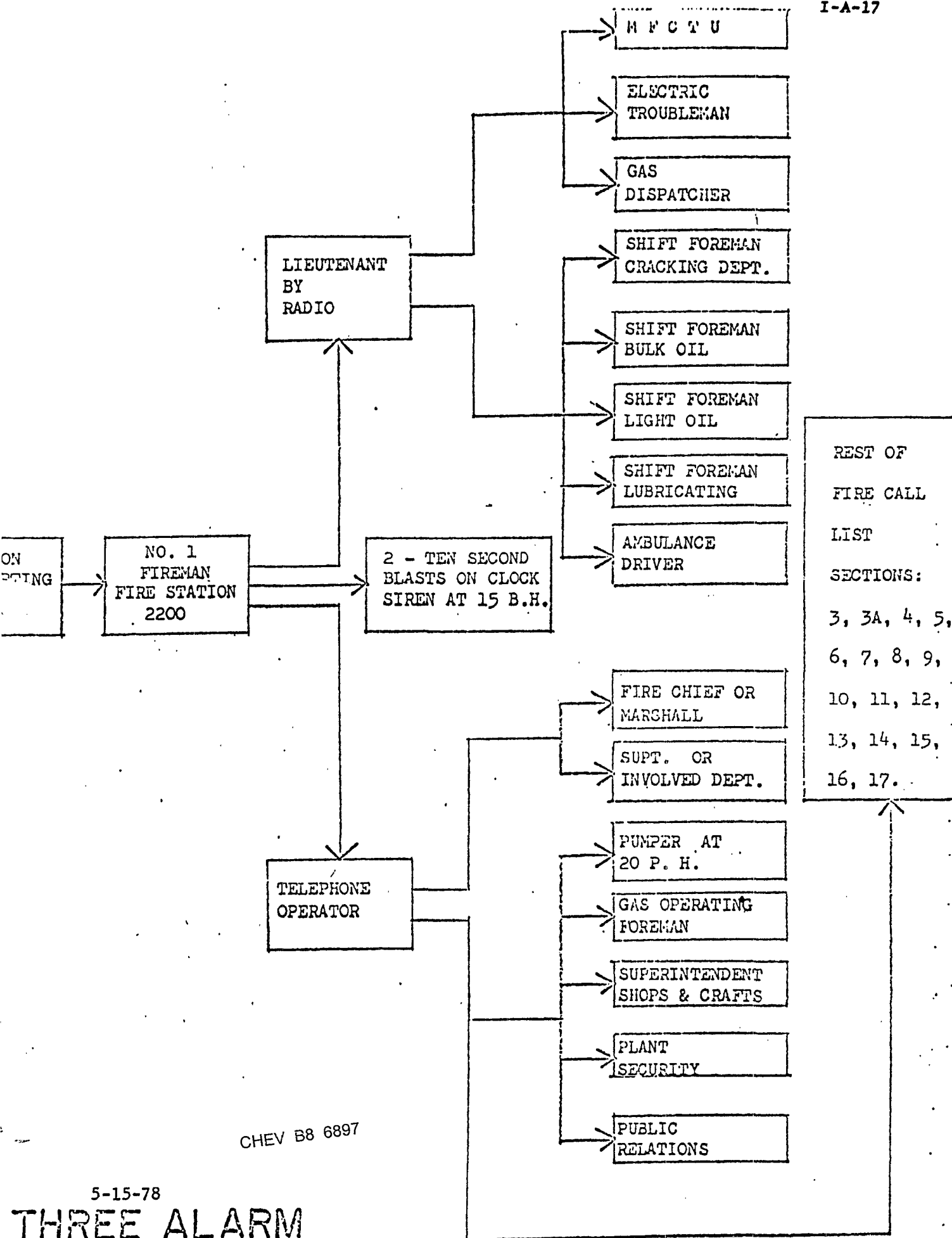
"FIRE, SECTION 2,

842 DCU

INDICATE 1, 2 OR 3 ALARM "







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THREE ALARM

FIRE CONTROL PLANNORTH AREA - LIGHT OIL DEPARTMENT

In the event a 2 or 3 alarm fire occurs anywhere in the refinery, the following procedure will be followed.

1. If the fire occurs on your unit, follow unit fire control procedure.
2. If the fire occurs in some other location between the hours of 7:30 AM - 4 PM Monday thru Friday, take no action until orders are issued by your foreman, shift foreman, or to comply with some request made by personnel fighting the fire, such as cutting a product stream away or anything you can do to aid in putting the fire out.
3. If the fire occurs in some other location after 4:00 PM or on Saturday or Sunday, the following personnel will proceed to the location of the fire and report to the Fire Marshall in charge:
 - A. Outside Assistant Operator at 141 AVU.
 - B. Outside Assistant Operator at 142 AVU.
 - C. Outside Assistant Operator at Fractionation Section on 441 Alkylation Unit.
 - D. Roving Assistant Operator at 842 DCU.
 - E. One Decoker Helper at 841 DCU to be designated by Head Decoker (if on the job at time of fire).
 - F. One Decoker Helper at 842 DCU to be designated by Head Decoker (if on the job at time of fire).
4. Depending on the location of the fire the above listed men will either report directly to the fire or report to the Cracking Department Shift Foreman's Office for transportation to locations which are remotely located.

GAS MASKS

Each person is responsible for providing himself with the proper Personnel protective equipment is provided and used when working and performing work which would be hazardous. Gas masks are provided to prevent breathing injurious vapors. Know how to use them properly. You may be required to demonstrate the capability to get acquainted with breathing apparatus. This is for your own protection.

Yellow Canister - Protects against hydrogen sulfide, sulfur dioxide vapors and organic (hydrocarbon) vapors.

Green Canister - Protects against ammonia.

Red Canister - Protects against organic (hydrocarbon) vapors, acid gases, hydrogen sulfide, carbon monoxide, ammonia, dusts, mists, fogs, and smoke.

NOTE: These masks must be used in areas where oxygen is present. These canisters absorb the bad gas leaving good air to breathe.

CAUTION: HYDROGEN SULFIDE

Hydrogen Sulfide (H_2S) is a colorless gas with the smell of rotten eggs.

Most crude oils have some sulfur in them. During processing in the refinery, this sulfur can be changed to hydrogen sulfide and become hazardous to operating personnel.

A smell of rotten eggs in the refinery should alert you to move away from the immediate area and prepare to use respiratory equipment if necessary. The odor is detectable at about 0.025 to 200 ppm. After you have been in hydrogen sulfide for a short time, it will not smell as strong. This gas tends to deaden your sense of smell and the longer you stay around it the less badly it will smell. Don't be fooled by this. The safe thing to do is to move away from this area and if it is necessary to return to it, be wearing the proper respiratory equipment.

In open air and low concentrations of hydrogen sulfide, a gas mask with a yellow or red cannister should be worn. At higher concentrations, a fresh air apparatus (such as Scott-Pac) should be worn.

CAUTION: If you go to rescue a person overcome by hydrogen sulfide you must protect yourself first. Without approved self-contained breathing apparatus, no one can assist another who has been exposed to high concentrations of hydrogen sulfide and is still in the atmospheres.

Concentrations of 700 ppm and above may result in accute poisoning. The systemic effect from absorbing hydrogen sulfide in the blood stream overshadows the irritant effects. This could bring about collapse, unconciousness and death within 2 to 15 minutes.

DON'T TAKE CHANCES. When you smell rotten eggs, move away from the smell and reenter this area only after getting and wearing suitable respiratory equipment.

SAFE PRACTICES PAMPHLET NO. 11-53
UNIFORM PROCEDURES FOR HANDLING RADIOACTIVE MATERIAL IN DENSITY GAUGES
GULF OIL COMPANY - U.S. - PORT ARTHUR REFINERY

GENERAL

I. Purpose

This pamphlet has been prepared to establish uniform procedures for working with and in the immediate vicinity of radioactive material being used at the Delayed Coking Units, so that personnel will not receive excessive amounts of radiation.

II. General

- A. Radioactive material emits radiation which is harmful to the human body when received in an excessive quantity or at an excessive rate. Radiation will penetrate wood, metal, and other materials unless they are of extremely thick layers. Exposure to any radioactive source is dependent on the activity or strength of the source, the distance from the source, the quantity of shielding material between the source and a person, and the length of time the person is exposed.
- B. The use of radioactive material in the State of Texas and permissible exposures to personnel are governed by regulations issued by the Texas State Department of Health. This pamphlet reflects applicable provisions of State Regulations.
- C. At present, licenses have been issued to us by the Texas State Department of Health authorizing the use of twelve sealed sources of Cobalt-60 in the coke drums of our Delayed Coking Units. Six 25-millicurie sources are authorized for Delayed Coking Unit 841, and six 15-millicurie sources are authorized for Delayed Coking Unit 842. These sources are used in density gauges which indicate the level of material in the coke drums.
- D. Wherever radioactive materials are being used or stored, radiation signs must be posted.
- E. Only designated persons in the Instrument Section are allowed to handle the radioactive sources. If it is necessary for other crafts to do work in the immediate vicinity of the sources, permission shall first be obtained from the unit foreman, and the Accident Prevention Division shall be notified in order to monitor the work area during the job.
- F. The Director, Accident Prevention Division has been designated to the State as the Radiation Protection Officer for the refinery. Matters concerning licensing, incidents involving the radioactive sources, reports to the State, etc., should be directed to him.
- G. When radioactive source shipments are received in the refinery, or when sources are to be prepared for shipment out of the refinery, the

Director, Accident Prevention Division shall be notified so he can advise as to proper temporary storage, warning signs, current ICC regulations for packaging, labeling, etc.

III. Definitions

- A. The terms "roentgen" and "milliroentgen" (.001 roentgen) are units of measure of intensity of radiation in air.
- B. The terms "roentgen per hour" and "milliroentgen per hour," abbreviated r/hr and mr/hr, are units of radiation dose rate.
- C. The terms "rem" (for roentgen equivalent man) or "millirem" (.001 rem), abbreviated mrem, are units of measure of effect of radiation in the body. The distinction between "roentgen" and "rem" is necessary because not all types of radiation affect the body in the same manner. However, for purposes of protection against gamma radiation, the type emitted by Cobalt-60, the rem is equivalent to the roentgen.
- D. "Maximum permissible dose" is the maximum amount of radiation that a person is permitted to receive in a stated period of time. The maximum permissible dose which has been set for industrial employees, unless certain individual exposure records are being kept, is a total of 1.25 rem per calendar quarter, or an average of about 100 mrem per week.
- E. "Survey instruments" are instruments which detect radiation and measure the dose rate in r/hr or mr/hr.
- F. "Dosimeters" and "pocket chambers" are instruments which detect radiation and register the total accumulated dose in r or mr.
- G. "Radiation area" is any area in which the radiation dose rate is more than 5 mr/hr. All radiation areas must be identified by radiation signs.

III. Installation and Removal of Sources

- A. Only certain persons in the Instrument Section who have been listed on the State license are allowed to handle the sources.
- B. Before the initial exposure of those persons to the sources, they shall have a blood count made at Medical and Health Services Division. In the event of any suspected overexposure, an additional blood count shall be made, and the Accident Prevention Division shall be notified.
- C. Dosimeters shall be worn by Instrument personnel while handling the sources. Individual records of radiation exposure shall be kept by the Instrument Section.
- D. A survey instrument to measure the radiation level in the area shall be used by the Accident Prevention Division while the sources are being handled.

- E. A practice session should be conducted before doing the job to reduce the exposure time when the radiation source is actually handled.
- F. The 30-inch handling rods for the source capsules shall be used when installing or removing the sources. The rod should be held at arm's length to put as much distance as possible between the source and the person's body.
- G. After the sources are installed in their wells in the coke drums, two locks per source shall be used to safeguard them against accidental removal. One lock shall be put through the lugs in the nozzle flanges, and another one shall secure the source in the well. The locks will be so arranged that one key will open all the locks for both units. Keys will be kept by Instrument Section supervisors, and a duplicate will be kept by the Personnel Security and Plant Protection Division.
- H. After removal of each source from its well, the source rod shall be returned to the well and be locked in place.

IV. Leak Testing of Sources

- A. Each source shall be tested for leakage of radioactive material from the sealed source capsule every six months. The leak test shall be made by a designated person from the Instrument Section.
- B. A leak test of a source consists of wiping the exterior surfaces of the source capsule with a cotton swab, according to instructions furnished by the supplier of the leak test service, and sending the swab to a radiation laboratory for analysis.
- C. If leakage of a source is indicated by the analysis, the source must be taken out of service and returned to the supplier, Ohmart Corporation, according to instructions which shall be obtained from them. The Accident Prevention Division shall be notified immediately, so it can notify the State as required by regulations.
- D. No repairs to a leaking source shall be attempted by our personnel.

V. Storage of Sources

- A. When the sources are removed from the drums, they shall immediately be placed in the lead containers in which they were shipped.
- B. The lead containers shall be stored in a steel box permanently installed in an isolated location near the Delayed Coking Units. The storage box shall be protected by guard posts and be identified with radiation signs.
- C. The lead containers and the storage box shall be kept locked with locks of the same type as those on the source wells and flanges and operable by the same key.

VI. Vessel Entry Permits for Coke Drums

- A. Before anyone enters a coke drum, the sources shall be removed from that drum.
- B. A special vessel entry permit verifying absence of radiation in the drum shall be signed by an authorized person from the Instrument Section, the member of the Accident Prevention Division who made the radiation survey, and the unit foreman. A copy of the permit form is attached as Appendix A.

VII. Emergency Situations

- A. In the event of explosion or fire affecting a coke drum, damage to a source well, or loss of a source, the affected area shall be barricaded until a radiation survey can be made.
- B. If such an emergency arises, any railroad cars into which a source could have fallen from a drum shall be held until it can be determined that they do not contain any radioactive material.
- C. The Accident Prevention Division shall be notified immediately so it can use survey instruments to determine the radiation exposure to personnel and locate the sources.
- D. The Texas State Department of Health shall be notified immediately by the Accident Prevention Division concerning any incident involving the sources or any overexposure of personnel.
- E. Unless monitoring with survey instruments shows radiation in the area to be within certain specified limits, dosimeters shall be worn by anyone who is required to be in the area.
- F. A source capsule must not under any circumstances be touched with the bare hands. It must be picked up with the source rod or with tongs and returned to its lead container.
- G. To guard against loss of a source during routine operation of the units, the following procedures shall be followed by unit operating personnel:
 - 1. Visual inspection of sources
 - a. When the operator makes his routine inspection of a drum after each coke drilling cycle, he shall also visually inspect the source locations to determine if the source well and supporting members are in place and are in apparent good condition.
 - b. Any apparent abnormality shall be reported immediately to the operating supervisor on duty at the time.

2. Observation of recording instruments

- a. The presence of the sources in their source wells is shown at all times on the recording instruments in the control room. They shall be observed regularly by the person responsible.
- b. If a point on the recording instruments registers some irregularity, or if for some other reason the instrument ceases to verify the presence of the source in the well, it shall be reported immediately to the operating supervisor on duty at the time.

3. If the visual inspection of the sources or observation of the recording instruments show any apparent situation that requires further investigation, the appropriate levels of supervision in the Light Oil Department as well as the Instrument Section and the Accident Prevention Division shall be notified. Detailed instructions to be followed in doing so are contained in a written memorandum issued by the Light Oil Department to personnel on the units.

Since dosages of radiation have a cumulative effect in the body, every effort should be made to keep radiation exposure to a minimum. At no time should a person unnecessarily expose himself to radiation.

Attachment: Appendix A

Gulf Oil Company - U.S.
Port Arthur Refinery
Accident Prevention Division

rlr
3-29-78

SPECIAL VESSEL ENTRY PERMIT FOR COKE DRUMS AT DELAYED COKING UNITS

radiation source materials were removed from No. _____ coke drum(s)
at Delayed Coking Unit No. _____ by the Instrument Section at _____
M/PM on _____.

Instrument Section

Radiation surveys of the above coke drum(s) made by the Accident Prevention
Division at _____ AM/PM on _____ show the drum(s) to be
free of radiation.

Accident Prevention Section

The above coke drum(s) may be entered for maintenance work as far as
radiation exposure is concerned.

This special permit concerns radiation exposure only. In addition, a gas
test and regular vessel entry permit must be obtained before entering a
drum.

This special permit is good for the duration of the job. The sources
shall not be replaced in a coke drum until the Maintenance Division
advises that no further entry into the drum will be made.

Operations Foreman,
Light Oil Department

DELAYED COKING UNITS 841 & 842PROCEDURE FOR CHECKING AND REPORTING THE PRESENCE OR
LOSS OF RADIOACTIVE COBALT 60 SOURCES IN COKE DRUMS

The danger of radiation from a lost or misplaced radiation source makes it imperative that a strict procedure for checking and reporting the presence of radioactive sources in the coke drum at DCU 841 and 842. Also, it is important that a procedure be established for reporting the loss of a radiation source should one occur. It is essential that the loss of a radioactive source be detected quickly so that it may be located and recovered before it leaves the coking unit area.

The Operator will make a visual inspection of the source location at the time the coke drum is inspected to determine if the angle iron support and the well holding the source are in place and look normal. Particular care should be used to insure that a full spot of light is placed on each source support during the inspection. The Operator's findings are to be recorded in the log book each day following the inspection. He will report any abnormalities to the Unit Operations Foreman, or in his absence to the Shift Foreman, as outlined in Item No. 4 below.

The presence of the radioactive source is shown at all times on the Ohmart recorder on the control board. Should any point on the recorder drop to zero, a loss of radiation source or a failure of the instrument is indicated. It is the duty of the Assistant Operator working the control board to observe the Ohmart recorder regularly for such changes.

In the event any point should not drop to zero or other abnormalities occur, the following procedure is to be followed:

1. The Assistant Operator will immediately notify the Unit Operator.

2. All railroad cars into which the radioactive source could have possibly fallen are to be held where they are until each car has been checked and declared to be free of all radioactive material by the Accident Prevention Division. Approval for moving the cars must be obtained from the Superintendent of the Light Oil Department.
3. If the heads are on the drum containing the radioactive source in question, the Operator will:
 - a. During day hours - notify the Unit Operations Foreman and the Unit Instrument Man. If the Instrument Man is unable to find instrument trouble, the Operations Foreman will notify the Area Operations Foreman. The Area Operations Foreman will notify the Department Superintendent, the Director of the Accident Prevention Division, and the Supervisor of the Instrument Section.
 - b. During evening and night shifts and on other occasions when day supervision is not in the plant - notify the Light Oil Department Shift Foreman. The Shift Foreman will procure an instrument man to check the instrument. If the instrument man is unable to find instrument trouble, the Shift Foreman will notify the Unit Operations Foreman and Area Operations Foreman. The Area Operations Foreman will notify the Department Superintendent, the Director of Accident Prevention Division, and the Supervisor of the Instrument Section.
4. If the heads are off of the drum containing the radioactive source in question, the Operator will:

- a. During day hours - notify the Unit Operations Foreman and the Zone Instrument Foreman. The Unit Operations Foreman will notify the Area Operations Foreman, who will then notify the Department Superintendent, the Director of the Accident Prevention Division and the Supervisor of the Instrument Section.
- b. During evening and night shifts and on other occasions when day supervision is not in the plant - notify the Light Oil Department Shift Foreman. The Shift Foreman will notify the Unit Operations Foreman and the Area Operations Foreman. The Area Operations Foreman will notify the Department Superintendent, the Director of Accident Prevention Division, and the Supervisor of the Instrument Section.

SAFE PRACTICE PROCEDURE FOR TRACKMOBILE OPERATION

The following procedures shall be observed when operating the trackmobile:

1. Only authorized personnel is to operate the trackmobile.
2. Use of the trackmobile is to be confined to the area of trackage for Delayed Coking Unit 841 and 842.
3. The trackmobile should be kept in a spot where it will not be bumped unnecessarily when not in use.
4. Ring bell before trackmobile is to be moved.
5. Operator should be with lead car when train is in motion.
6. Approach crossings slowly with bell ringing and sound horn.
7. Do not board cars or trackmobile while in motion.
8. Be ALERT AND USE CAUTION when coupling or uncoupling cars.
9. Do not stand between cars.
10. Do not switch cars with men in them.
11. Do not walk on tracks in front of moving cars or trackmobile.
12. Check bottoms of shoes for grit and oil to be sure of good footing at all times.
13. Have train under control at all times and be prepared to stop whenever necessary.
14. Empty cars should be chocked until needed.
15. Trackmobile steps, walks, and handrails should be kept clean and in good condition at all times.
16. Trackmobile should always be clear of all tracks when switching is being done. It should not be switched by other locomotives.

TRACKMOBILE CHECK LIST

1. Each morning:
 - A. Operators check the following items and add, if necessary. Note in log book any addition made.
 1. Fuel (Do not run out!)
 2. Oil
 3. Water in radiator
 4. Air in tires
 5. Sand in four (4) sand boxes
 - B. Check hydraulic fluid and call garage if necessary to add fluid.
 - C. Check brakes, lights, horn, bell, and report condition of equipment by noting in log book.
2. Once per week: Check battery and call garage if necessary to add water.
3. Observe the following rules before, during, and after operation:
 - A. When starting engine, be sure transmission is in neutral position.
 - B. When trackmobile is unattended set parking brake.
 - C. If green range is exceeded on transmission temperature or pressure gauges, stop trackmobile and run engine at one-half throttle until temperature reaches 160-180°. Notify Unit Foreman and Garage.
 - D. Leave keys in trackmobile. Close doors, but do not lock them.

DECOKING SCHEDULE FOR 842 DCU

I. The following schedule is to be adhered to when decoking 842 DCU.

Its objective is to eliminate unnecessary delays and to keep coke falling as continuously as possible until finished.

	<u>Elapsed Time</u>	<u>Time From 6 AM</u>
1. Unhead Drum	1 Hr.-45 Min.	7:45 AM
2. Bore Thru		
3. Change to Final Cutter		
4. Cut Cars 1 Thru 9	3 Hr.-15 Min.	11:00 AM
5. Pull Thru After 9 Full Cars	2 Hr.	1:00 PM
6. Cut Cars 10 Thru 13		
7. Finish Cutting, Polish Drum and Head Up	Soon as Possible	

If the above time schedule cannot be followed by normal cutting methods, then when starting into the fifth car it will be necessary to start reaming the hole, by moving the cutter head up and down through the whole coke bed.

II. In order for the decoking operations to become more efficient, we must become more standardized in our methods. Therefore, you are to see that each day the following things are done.

1. Each morning line up at least fifteen (15) empty cars under the coke drums.
2. Locate the hook as far back on the string as possible, so as not to have to relocate it during the day.
3. Be sure an empty car is located under the drum when boring thru.
4. After boring thru, leave water on the cutting head until pulled about two-thirds of the way up thru the coke bed.
5. When using the final cutter do not polish the drum until in the last car. Keep the cutting head down in the coke. Both the driller and the helpers on the bottom deck will be held responsible for

keeping the coke falling. The only time coke should not be falling is when there is a mechanical failure or cars are being moved under the drum.

It is intended that the above will be strictly followed. Good communication between the driller and the bottom deck is essential. Helpers on the bottom deck will be required to notify the driller any time the cutting head needs to be moved down into the coke.

6. When it is time to pull nine (9) cars thru, only pull as far as necessary to hook up big car puller. Uncouple empties and get back under drum as soon as possible. One man will then go down and use the big car puller to clear the crossing.
7. Head decokers will report to the unit foreman immediately whenever a breakdown occurs. If he is not available, report to 842 stillman.
8. Head decokers will report to unit foreman each day at 11 AM, 1 PM, and 3 PM the status of decoking for that day. For example: what car is currently being cut, any delays, if decoking is on schedule, if not, why not.
9. Such duties as cleaning the sluiceway, keeping the sump pumps running properly, relocating car puller cable (if necessary), greasing equipment, moving empty cars, etc., are to be carried out without unnecessary interruptions to decoking.
10. While the above schedule is faster than we presently cut coke, it should be considered temporary with the ultimate goal being to cut at least three (3) cars of coke per hour.

DELAYED COKING

The charge for the coking units comes from the various crude units in the refinery. In addition we also get a little charge stock from the propane deasphalting unit. 842 coking unit is designed to charge the high sulfur reduced crude from AVU 144. Usually 841 coker charges the sweet reduced crude from the other crude stills in the refinery.

Upon coming to the unit, the reduced crude either goes to the accumulator which acts as a surge drum or it goes to the storage tanks. From the accumulator the reduced crude goes through a series of exchangers into the fractionator. Some of the light components in the crude flash up the tower. The bottoms of the fractionator are pumped through the heater into the bottom of the coke drum where the coke is formed from the crude. The light components which have formed from the crude going through the heater go out the top of the coke drum back into the fractionator. After the coke drum has filled, the flow is switched to the 2nd drum. Then the first drum is cooled down. During the day the decoking crew cuts the coke out of the cool drum into coke cars with high pressure water.

The overhead off the fractionator is the gasoline. It goes through cooling fans into a low pressure separator. The gas off the low pressure separator goes through a compressor into a high pressure separator. The liquid gasoline off the low pressure separator is pumped into the discharge of the compressor. This flows into the high pressure separator. The overhead off the high pressure separator goes through the absorber and sponge absorber and then enters the amine treating section where the H_2S gas is removed. The treated gas is then used for fuel in the heaters.

The gasoline from the high pressure separator goes through a gasoline stripper, a debutanizer, a gasoline splitter, and an intermediate gasoline splitter.

The H_2S gas or acid gas, a propane-butane gas, a light gasoline, an intermediate gasoline, and heavy gasoline are the products from the gasoline treating section.

A light oil from the top part of the fractionator is pumped through some coolers and into the absorber to pick up some of the heavier ends of the gas from the high pressure separator. This oil is then pumped back to the top part of the fractionator as top reflux.

Light distillate fuel comes off the fractionator about two-thirds the way up the fractionator. It enters a stripper and then splits into two streams. One stream is cooled and is pumped away as product. The other stream goes through the sponge absorber where it picks up some of the heavier ends in the gas from the absorber. This oil is then pumped back to the top part of the fractionator.

The heavy gas oil off the fractionator splits into several streams as soon as it comes off the tower. One stream is used to control the temperature of the vapors coming off the top of the drum. Another stream is used in the hot oil circulating system. This system furnishes hot oil for some of the exchangers used in the gasoline section. Another stream of the heavy gas oil serves as intermediate reflux. The last steam goes to the field as product after passing through a stripper and some coolers.

TASKS OF ASSISTANT OPERATOR (OUTSIDE 841)

1. Monitor level on feed accumulator, high pressure separator, low pressure separator, and absorber.
2. Skim blow-down pond and check level in pond.
3. Inspect cooling water lines on pumps to be sure you have suitable flow.
4. Refill supply of lubricating oil to turbine pumps, compressor, and motor bearings. Some motors are not to be lubricated by Operators. Inspect oil in bearing case for water and sediment. Flush and change oil when necessary.
5. Turn on and off lights on unit.
6. Read and record on log sheets the reading observed on all outside flow pressure and temperature instruments.
7. Run gravities on all streams as required to hold on test.
8. Catch, tag, and send to Laboratory all samples from the unit.
9. Order sample bottles, tags, and corks from Laboratory as needed.
10. Hold temperatures on reduce crude tanks 1506-1507°F.
11. Change pumps on direction of No. 1 operator.
12. Make all changes on products manifold as directed by No. 1 operator.
13. Change charts on all outside temperature pressure and flow charts.
14. Mix antifoam.
15. Check condition of fires in heater. Shut off burners or light burners as necessary.
16. Wash up oil spills that might become hazardous or dangerous to work or walk in.
17. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.

18. Report all irregularities to the No. 1 operator.
19. Rotate jobs with inside assistant operator on first Monday of each month.
20. This is to be used as a guide for training and does not necessarily cover all job duties.

Any job duties assigned by the No. 1 operator are considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR (INSIDE) 841

1. Keep constant watch on all instruments on control board 841 and 842DCU and advise No. 1 operator of any changes.
2. Record inside reading on log sheet.
3. Answer telephone and relay messages.
4. Fill out top of log sheet at beginning of each day.
5. Fill out IBM cards each shift. Fill out range change and product change card as necessary.
6. Make changes in flow to hold levels in accumulator and fractionator.
7. Observe reaction of all alarm lights and horns. Know location of each and how to silence it.
8. Make all control board changes for changing to a product with different specifications.
9. Make all control board adjustments of temperature and pressure to assure maintaining correct operation conditions.
10. Report all changes to the No. 1 operator.
11. Rotate job with assistant operator (outside) on the first Monday of each month.
12. Assist No. 1 operator in recording changes in log book.
13. This list is to be used as a guideline for training and does not necessarily include all job duties.

Any job duties assigned by the No. 1 operator are to be considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR 842 (ROVER)

1. Monitor level in blowdown pond.
2. Monitor level in slop tanks and pump out.
3. Gauge reduce crude charge tanks.
4. Monitor the blowdown system.
5. Help out on control board during testing and warm up of coke drum.
6. Check flare drip pumps and alarm system on flare K.O. drum.
7. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.
8. Change chart at #15 flare.
9. Rotate job with heavy oil assistant operator on first Monday of each month.
10. Grease fin fan coolers on the first day of each month and record in log book.
11. Skim blow-down pond each day and elevator pit.
12. This is to be used as a guide for training and does not cover all job duties. Any job duties assigned by the No. 1 operator are to be considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR GASOLINE SECTION 842

1. Inspect cooling water lines on pumps to be sure you have suitable flow.
Flush out lines and adjust flow when necessary.
2. Read and record on log sheet the reading observed on all outside flow, pressure, and temperature instruments.
3. Turn on and off lights.
4. Refill supply of lubricating oil to pumps, compressor, and motor bearing. Some motors are not to be lubricated by operators. Flush out and change oil.
5. Run gravities and boilaways.
6. Catch, tag, and send to Laboratory and samples from unit.
7. Order sample bottles, tags, and corks from Laboratory as needed.
8. Change pumps as directed by No. 1 operator.
9. Make changes on product manifold as directed by No. 1 operator.
10. Check condition of fires in 201-B heater. Shut off burners or light burners as necessary.
11. Wash up any oil spills that might become hazardous or dangerous to work or walk in.
12. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.
13. Hang idle hoses on hangers provided or coil neatly near the utility shut off valve. This includes air, steam, and water hoses.
14. Switch air dryer on cycle schedule.
15. Check bleeds on air dryer fan stoppage.
16. Black-flush 209C and 211C water.
17. Report all irregularities to the No. 1 operator.

18. Rotate jobs with Rover assistant operator on first Monday of each month.
19. This is to be used as a guide for training and does not cover all job duties. Any job duties assigned by No. 1 operator are to be considered as part of these job duties.

TASKS OF ASSISTANT OPERATOR HVY. END. 842

1. Monitor levels in fresh feed accumulator and fractionator.
2. Inspect coke drum.
3. Test coke drum.
4. Preheat and switch coke drums.
5. Inspect cooling water lines on pumps to be sure you have suitable flow.
6. Refill supply of lubricating oil to turbine pumps and motor bearings.
Some motors are not to be lubricated by operators. Inspect oil in bearing case for water and sediment. Flush and change oil when necessary.
7. Turn on and off lights.
8. Read and record on log sheets the reading observed on all outside flow pressure and temperature instruments.
9. Run gravities on all streams as required to hold on test.
10. Catch, tag, and send to Laboratory all samples from the unit.
11. Order sample bottles, tags, and corks from Laboratory.
12. Make changes on products manifold as directed by No. 1 operator.
13. Change charts on all outside temperature, pressure, and flow charts.
14. Check condition of fires in heater shut off burners or light burners as necessary.
15. Wash up any oil spills that might become hazardous or dangerous to work or walk in.
16. Keep working area clean by performing housekeeping duties such as picking up paper towels, cups, rags, and other trash.

17. Hang idle utility hoses on hangers provided or coil neatly near the utility shut-off valve. This includes air, steam, and water hoses.
18. Report all irregularities to No. 1 operator.
19. Rotate job with Gaso. Section assistant operator on first Monday of each month.
20. This is to be used as a guide for training and does not necessarily cover all job duties. Any job duties assigned by the No. 1 operator are to be considered as part of these job duties.

TASKS OF DECOKER HELPER

1. Unhead drums.
2. Load cars.
3. Close doors on bad order cars.
4. Look after pumps in operation.
5. Move cars full and empty.
6. Grease the equipment.
7. Clean working area.
8. Operate trackmobile.
9. Head up drum.
10. Wash up coke spills.
11. Keep working area clean by performing housekeeping duties such as picking up paper.
12. Hang idle utility hoses on hangers provided or coil neatly near utility shut-off valve. This includes air, steam, and water hoses.
13. This is to be used as a guide for training and does not necessarily cover all job duties. Any job duties assigned by the head decoker are to be considered as part of these job duties.

TAKE CARE OF YOUR PUMPS

Most difficulties with pumps that can be prevented by operators are those that are caused by poor lubrication care. For bearings to function well for a long time requires good clean lube oil of the correct kind (viscosity).

Bearings that become worn due to poor lubrication soon damage a shaft and cause a pump shaft seal or packing to leak. Likewise the steam end of reciprocating pumps must have the correct lube oil to prevent wear in the steam end (of the steam valves, the steam pistons and the steam cylinders).

You can prevent these problems by carefully inspecting the condition of lube oil in your pumps regularly and refilling lubricators with the correct lube oil once each shift or more often, if necessary.

All bearing cases have a small valve installed at the bottom that will permit you to see the oil. If it is contaminated, advise the Operator No. 1. Flush out this contaminated oil with clean oil and make sure that the bearing case is refilled to the normal operating level. Good care and proper lubrication will help get reliable service for extended periods of time.

Reciprocating steam pumps require Senate 110; chemical and inhibitor pumps require Gulf Crown No. 2 Grease; and turbine pump bearings require Harmony 53. Electric motors are greased by electricians. Operators add lube oil to Trico or similar lubricators on electric motors. Learn how to add lube oil to each place on each pump and compressor.

When a bearing starts to sound noisy or cause more vibration, it is beginning to fail. Touching a noisy bearing case with the tips of the fingernails has been found to be a good way to sense vibration and aid in predicting its life expectancy.

Warm-up lines are installed on some pumps. They are small diameter lines with a valve that can regulate the flow of oil around the block valve and check valve at the discharge of a centrifugal pump. The warm oil passes backward thru the pump and out the open suction valve. Trace this flow of oil through a centrifugal pump.

Such lines on reciprocating pumps would be piped differently since oil will not pass backward through them.

To accomplish the same function in a reciprocating pump, two warm-up lines at each pump are required. Trace the flow of warm-up oil thru a reciprocating pump.

Warm-up lines serve several purposes. They keep the pump hot, they keep the pump filled with a lower viscosity warm oil, and they prevent the accumulation of water at low places around the pump. The actual location of these lines is such that the low places are swept by this warm oil.

The warm-up line valve(s) at a pump which is in service is (are) kept closed.

The warm-up line valve(s) at a pump which is idle is (are) opened just enough to keep the idle pump warm and prevent the accumulation of condensed water.

Some general rules apply to the correct manipulation of pumps.

1. The discharge valve of a centrifugal pump is to be closed when the pump is started. This unloads the driver. (There are very few exceptions). The suction valve must be open.
2. The discharge valve of a reciprocating pump, or any other positive displacement pump, must be opened before the pump is started. The suction may or may not be open at this time.

3. Before attempting to start a centrifugal pump, it may be necessary to vent vapor from top of pump case before it will start pumping. Venting should be completed before you start rolling this pump.
4. A pump which has just been started or is pumping an oil at its boiling point will frequently pump at a slow rate at first and will not pump a larger or normal flow. When you observe this with a centrifugal pump, keep the discharge valve only partially open. On a reciprocating pump, run it slowly.
5. Pumps using cooling water require that the cooling water be turned on before attempting to start the pump.
6. When starting any steam-driven equipment, bleed the condensate from the high pressure steam system before admitting steam to the machine.
7. It is also important to open the exhaust steam valve from the equipment, let steam flow backward into the equipment and bleed off all the condensate at all low places before slowly admitting a little high pressure (live) steam.
8. Admit dry, live steam slowly into any steam equipment.

While observing these eight (8) key steps in the use of pumps, learn and practice switching pumps in the presence of an experienced operator (No. 1 or A.O.). To qualify, you must be able to demonstrate your ability to switch pumps.

PROCEDURES FOR
CENTRIFUGAL PUMPS

General Starting Procedure for Centrifugal Pumps

1. Check all grease or oil bearings and be sure all points are properly lubricated.
2. Check all liquid seal connections and be sure they are lined up properly.
3. With the discharge valve closed, open the suction slightly and allow the liquid to fill the case. Vent any air or vapor out the bleeder located at the top of the case; if the liquid to be pumped is hot, let it flow until the case is warmed.
4. If the pump is turbine driven, the exhaust steam should be allowed to flow backwards through the turbine to warm it and drain condensate from all low places. Be sure the exhaust steam valve is wide open. Also, if there is a force feed or auxiliary lubricating system, be sure that all oil levels, etc., are normal.
5. Admit 125 psi (live) steam slowly to start the pump and allow it to come up to normal speed. When pump discharge pressure is up to normal, open the discharge valve slowly and watch the pressure to see that it remains normal. Opening the discharge valve suddenly will cause a sudden surge which may make the pump lose suction.

Points to Watch During Operation of Centrifugal Pumps

1. The shaft packing or seal system and all lubricating points should be inspected as frequently as practical for leakage or excessive heat.
2. Discharge pressure should be observed and any sudden drop should be investigated. This could be caused by (a) loss of suction due to

vaporization or lack of liquid; (b) overload on motor or turbine; and (c) freezing or sticking of some moving part.

3. If the driving unit stops, the discharge valve should be closed immediately. Then, attempt to find out the reason.
4. Any undue vibration or noise in the pump or motor should be checked immediately. If it cannot be eliminated the pump should be shut down and your supervisor notified.

General Shut Down Procedure for Centrifugal Pumps

1. Close the discharge valve. This reduces load on driver and prevents reverse flow through the pump if the check valve does not work.
2. Shut down the motor or turbine.
3. Leave pump full of liquid unless it has a high pour point or viscosity. Then flush pump, suction, and discharge lines out with the flushing oil provided and close the suction valve. Ordinarily the suction valve is left open so pump will be ready for immediate use.
4. Many of the process pumps in hot service are not piped with a small warm-up line from the discharge of the pump in service to the discharge of the spare pump. This allows you to keep the spare pump hot, and ready for immediate use without any warm-up period. The suction valve on the spare pump is left wide open and a small quantity of hot oil is recycled. If oil recycled is over 350°F., keep gland oil and cooling water (if provided to pump pedestal) in service.
5. If pump is to be worked on, then block all valves and drain for machinist.

General Starting Procedure for Reciprocating Pumps

1. Open discharge valve and suction valve.
2. Fill lubricator, crank in some cylinder oil, and oil valve linkage.

3. Open exhaust steam line and drain condensate from steam line and steam end of pump.
4. Open drain valves at bottom of each end of each steam cylinder to drain condensate.
5. Drain condensate from live steam, then slowly open the 125 psi (live) steam valve to admit a little steam to steam cylinders.
6. As condensate drains out of cylinders, the pistons will commence moving slowly. Set the live steam valve to keep the pump stroking very slowly until all condensate has been bled from the steam cylinders. Then, close the drain valves.
7. Bring the pump up to the desired speed.

General Shut Down Procedure for Reciprocating Steam Pumps

1. Close the steam inlet valve.
2. Close the discharge valve on the liquid end.
3. If liquid pumped is viscous and has a high pour point, flush out the suction and discharge lines with the flushing oil provided. Leave pump full of flushing oil and close suction valve.
4. Crack-open bleeders on steam end to keep condensate drained out and driver ready for use.
5. If pump is not used as a spare or must be repaired, you can block off both process and steam ends and drain.

Routine checking of most process type equipment (horizontally mounted pumps and turbines) includes the following steps:

1. A small amount of oil should be drained from the oil reservoir or cavity at each bearing, observing for water, color, and foreign matter. The Trico oiler should bubble at this time indicating that the oil inlet

line is open and returning the oil level in the reservoir to its proper preset level.

2. Oil rings should be observed through the oil hole covers to be sure they are turning. A flashlight is usually helpful to really see the oil ring.
3. Wick type oilers on turbine spindle bearings should be checked for oil content and a few drops of oil added to the governor linkage pivot pins.
4. Checking for excessive temperature or vibration may be accomplished by touching each bearing housing with the finger tips. Any change from what is normally felt should be reported.
5. Check for adequate flow through cooling water lines.
6. Check lubricator level and drop rate on reciprocating equipment and oil or grease valve linkage.

Centrifugal compressors and turbine/motor/gearbox drive sets:

1. Check lube oil and seal oil reservoirs for BS/W by opening drains and observing flow.
2. Check lube and seal pumps and drivers as noted above.
3. Check suction and discharge pressure of lube and seal oil pumps.
4. Lubricate turbine control linkage as required.
5. Check differential across lube and seal oil filters, note change from last check.
6. Check for any change in sound or vibration levels.

OPERATING PROCEDURE

FOR RESETTNG OVERSPEED TRIP

ON A TYPICAL 125 PSI STEAM TURBINE

1. Be sure exhaust steam line is open. Then close the steam throttle valve in the supply line.
2. Reset the overspeed trip mechanism on the steam turbine.
3. Begin opening the steam throttle valve. Continue opening this valve until normal operating conditions are reached.

CONTROL YOUR INSTRUMENTS

Instruments are provided to control the variables of an operating unit. To obtain the results you need, you must control the instruments. Your mastering the manipulation of instruments will make your work easier for you and more profitable for the Company.

Become familiar with the parts of control instruments that operators use. Figure A shows this on one instrument used on your unit.

When changing control mode from automatic to manual or manual to automatic, it is most important to match the pressure you plan to send to the regulator with the air pressure now going to this regulator. After you switch, it may be necessary to make a small adjustment to hold the controlled variable (flow, level, etc.) where you want it.

Learn if increasing pressure opens or pressure closes the regulator. Learn if opening or closing the regulator increases the variable you wish to control.

Ask yourself questions about this concerning the instrument you plan to manipulate. When you have the answers, you are ready to practice switching from automatic to manual and back again in the presence of an experienced operator.

OPERATING PROCEDURE

M/D Stations

I. Switching from Auto to Manual

1. Rotate the selector switch from Reg to Valve. Note the position of the control valve, as indicated by the red double-end indicator. Return switch to Reg.

2. Turn the transfer switch from AUTO to SEAL. (This switch has click stops.) Adjust the regulator until the indicator matches the valve noted in Step 1.
3. Rotate the transfer switch to the MAN position. The process is now on manual control, and the process valve may be changed by adjusting the regulator.

II. Switching from MAN to AUTO

If the process has just been changed, wait a minute or two before switching from manual to automatic.

1. Rotate the transfer switch from MAN to the SEAL position. Adjust the regulator until the red double-end indicator lines up with the process pen. This adjustment will set the control point to match the existing process valve.
2. Turn the transfer switch to AUTO.

Cascade Stations

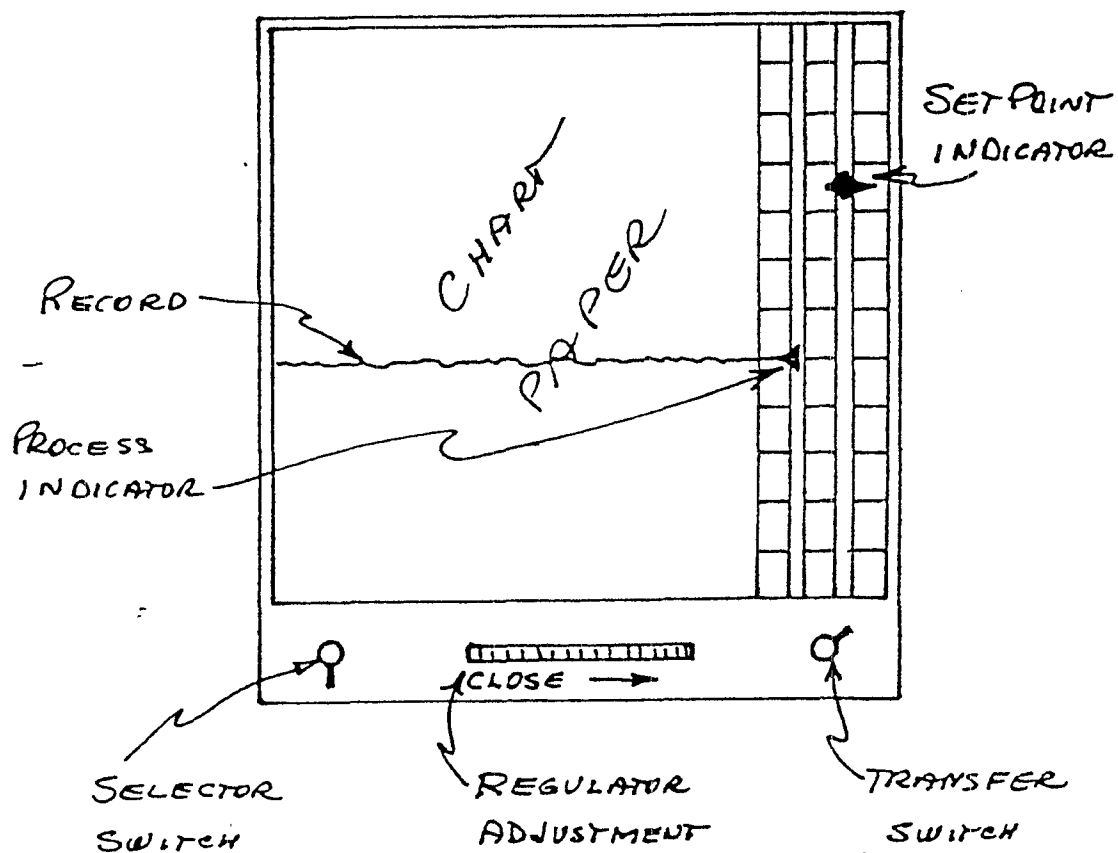
I. MAN to AUTO and AUTO to MAN same as before.

II. MAN or AUTO to CASCADE.

1. Place transfer switch in SEAL.
2. Align control point regulator with process P1.
3. Switch to CAS.

III. CASCADE to AUTO

1. Place transfer switch in SEAL.
2. Align control point regulator with process P2.
3. Switch to AUTO.

CONTROL YOUR INSTRUMENT

M/P RECORDING CONTROL STATION

FIGURE "A"

5-15-78

OPERATION OF PARTS OF UNIT

1. Operating Considerations of Coke Drums

A. Coke Drum Heating

In the coke drum operating sequence, the empty drum is preheated by vapors from the drum which is then in the final state of coking operation. By throttling the vapor line leading to the fractionator, sufficient back pressure is obtained to force hot vapors through the drum. The condensate formed in the cold drum flows to the condensate drum and then is pumped to the fractionator by a condensate pump. A strainer is provided in the suction line of the pump to remove any coke particles.

B. Steaming and Cooling Cycle

At the end of the twenty-four hour coking period, the full coke drum is switched from coking service. This drum is then steamed into the fractionator for approximately one hour using a maximum of 10,000 pounds per hour of steam. The drum is then depressured to the blowdown stack with steam rate increased to approximately 20,000 pounds per hour for one hour. Cooling water is then introduced to the drum at a low rate as steaming is continued. Water is gradually increased to a maximum with simultaneous decrease in steam. When the drum is full and top temperature is at 240°F- the drum is ready for water draining, unheading, and subsequent decoking.

2. Fractionator Operation

A. Lower Section

Below the gas oil trap out pan, the total amount of reflux is regulated, in the long run, to control the separation between

the gas oil product and the coker furnace charge.

The immediate index of control is the vapor temperature below the pan. The fundamental basis of control is the product separation. It is desirable to make a clean gas oil product with low Conradson carbon content for one thing, and likely criterion for setting the tower bottom section conditions, will be the inclusion of a small amount of recycle gas oil in the tower bottom. As an extreme limitation, the lower bottom temperature should not be allowed to get so high and the furnace charge so heavy as to bring about the possibility of coking in the bottom of the tower or furnace tubes.

The direction of the chain of effects is as follows: lowering temperature controller setting below pan, increases reflux, lowers temperature below pan, less vapor through pan, more net liquid into bottom of tower and therefore, at constant bottom level, more recycle oil in reduced crude charge.

As already mentioned, the lower section gas oil reflux is the main control on product separation and should not be lowered much below the design value. The tower level is of course, dependent on the maintenance of the reduced crude charge.

B. Upper Section

Discussion of the upper part of the fractionator will proceed from the top downward.

The end point of the tower overhead product may be varied as desired. A temperature controller, which fixes the top reflux flow, is set to hold a temperature at the top of the tower that gives desired separation between the overhead product and gas

oil side stream product. The specific criterion for control will be the back end characteristics of the overhead distillate, as indeed by ASTM endpoint, 90 percent point, or both.

The top section intermediate reflux (the flow from the fractionator pan in excess of that required for lean oil) is a secondary influence on fractionation above the pan. Intermediate reflux affects the tower top reflux and is set to give a top reflux rate that will insure proper fractionation in the upper trays.

The effect of intermediate reflux depends to a great extent on the total amount of tower cooling it produces. In turn, the amount of cooling depends on both the rate and temperature of the reflux return. Either increasing the rate at constant temperature or lowering the temperature at constant rate will increase the cooling effect. Both the rate and temperature have certain individual effects and extreme variations of either can cause tower upsets.

The only other reflux stream entering the fractionator is the rich oil flow from the absorber, which also serves as an intermediate tower reflux. This flow is reset by absorber level control, and is basically governed by the lean oil circulation rate. Lean oil rate is governed from the standpoint of the absorber.

Primary control of product endpoint is drawoff tray temperature. Steam to the gas oil stripper represents a secondary control on the front end fractionation of the gas oil product, as judged by the initial boiling point of the ASTM sample distillation and by such tests as flash point.