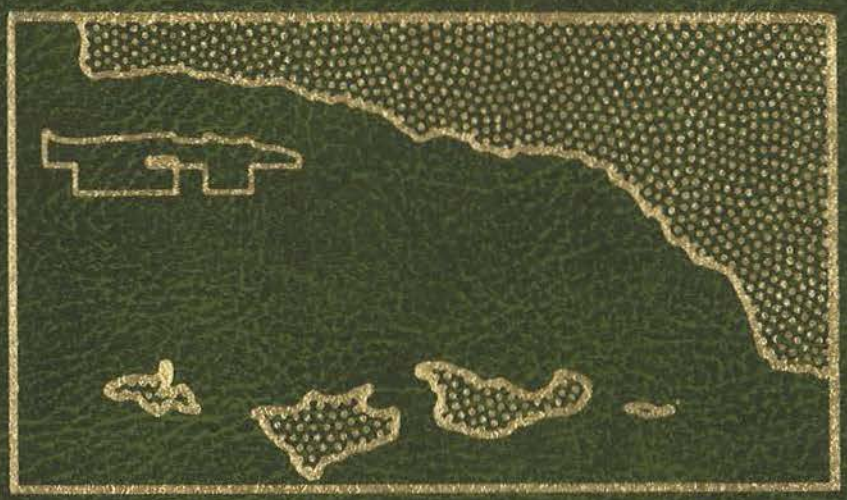
SUPPLEMENTAL PLAN OF OPERATIONS

SANTA YNEZ UNIT



HUMBLE OIL & REFINING COMPANY

UNIT OPERATOR

APPENDIX V

0004

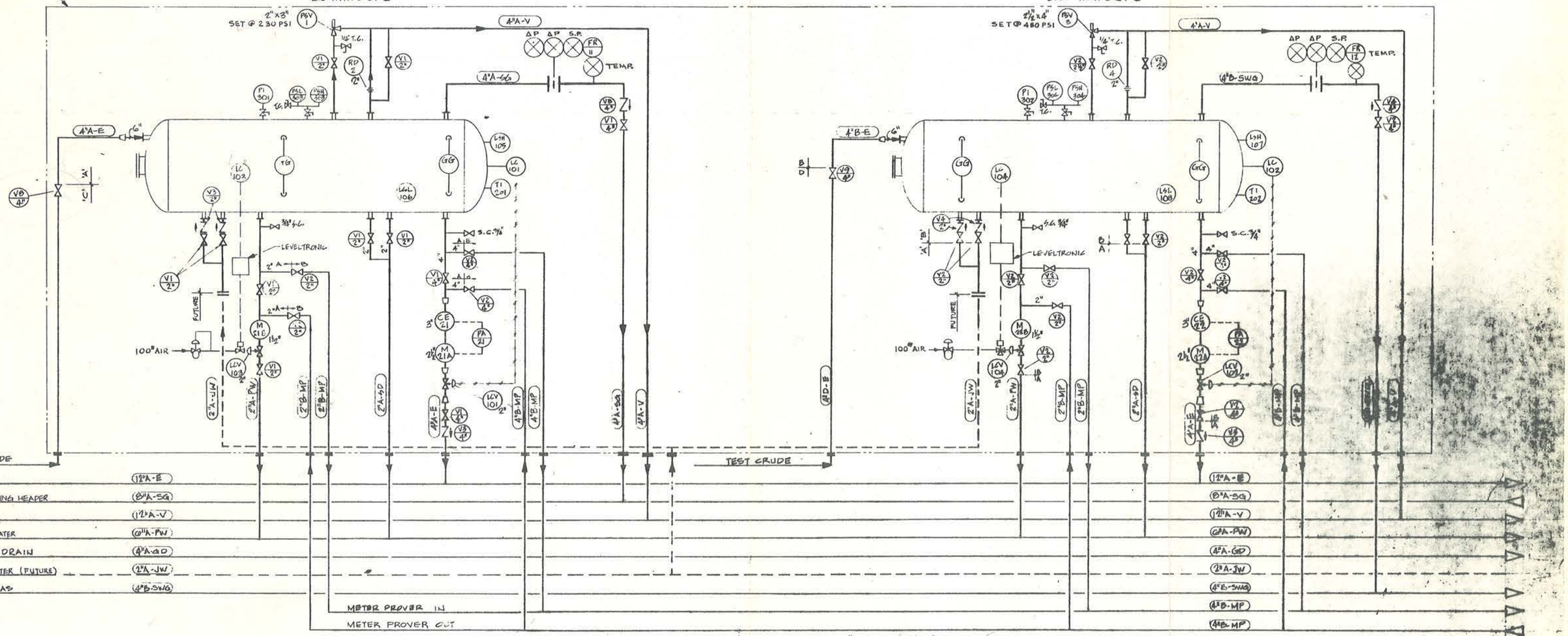
V-2A

TEST SEPARATOR
48" O.D. x 15'-0" S/S
275 PSIG D.P. @ 100°F
55 TO 85 PSIG O.P. @ 60°F
5 MBOPD
2.0 MMSCFD

V-2B

TEST SEPARATOR
48" O.D. x 15'-0 S/S
500 PSIG D.P. @ 100°F
250 TO 350 PSIG O.P. @ 60°F
5 MBOPD
2.0 MMSCFD

PACKAGED SEPARATORS



LEGEND

- (LC) — LEVEL CONTROL
- (LSH) — LEVEL SHUTDOWN, HIGH
- (LSL) — LEVEL SHUTDOWN, LOW
- (LCV) — LEVEL CONTROL VALVE
- (PSH) — PRESSURE SHUTDOWN, HIGH
- (PSL) — PRESSURE SHUTDOWN, LOW
- (M) — LIQUID METER
- (CE) — CAPACITANCE ELEMENT
- (PA) — NET OIL ANALYZER
- (⊗) — TRANSDUCERS
- (PSV) — PRESSURE SAFETY VALVE
- (RD) — RUPTURE DISC
- (TI) — TEMPERATURE INDICATOR
- (PI) — PRESSURE INDICATOR
- (GG) — GAGE GLASS
- (FR) — FLOW RECORDER
- — ELECTRICALLY OPERATED VALVE
- — PANEL MOUNTED INSTRUMENT (GENERAL)

(4"B-MP) PIPELINE IDENTIFICATION
4" IS SIZE - PIPING IS CLASS 'B' SPECIFICATION -
MP - METER PROVER PIPING

- E — EMULSION
- JW — JET WATER
- PW — PROCESS WATER
- SD — SAND DRAWOFF
- V — VENT OR RELIEF PIPING
- SG — SOUR GAS
- SWG — SWEET GAS
- MP — METER PROVER
- GD — GRAVITY DRAIN

CONSTRUCTION TYPE Class 1 B Design Grade-B

VALVE IDENTIFICATION

- (V1 4") — 150# ANSI RF FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG.# 800171 WITH NO 20A TRIM (OR EQUAL)
- (V2 2") — 300# ANSI RF FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG.# 800371 WITH NO. 20A TRIM (OR EQUAL)
- (V3 2") — 150# ANSI R.F. STEEL BODY WAFER CHECK VALVE, S.S. TRIM, VITON A SEAL, MISSION DUO-CHECK OR EQUAL
- (V4 4") — 300# ANSI R.F. STEEL BODY WAFER CHECK VALVE, S.S. TRIM, VITON A SEAL, MISSION DUO-CHECK OR EQUAL
- S.C. — ¾" 800# SCREWED STEEL BODY GATE VALVE OS&Y, BB 316 SS TRIM, SMITH 800 (OR EQUAL)
- T.C. — DRAGON 5507 OR 5707
- (V8 4") — 600# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON 800601 WITH NO. 20A TRIM (OR EQUAL)
- (V9 4") — 900# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON 800901 WITH NO. 20A TRIM (OR EQUAL)

GEOLOGICAL SURVEY
RECEIVED
AUG 15 1972
LOS ANGELES

NO.	DATE	REVISIONS	BY	CHK.	APPD.

NO.	DATE	REVISIONS	BY	CHK.	APPD.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

TEST SEPARATORS V-2A & V-2B
PIPING & INSTRUMENTATION DIAGRAM
SPEC. NO. 10-084-WTU

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.E. | DESIGN SECTION | SCALE NONE
DIRECTOR | APPROVED | DATE 7-22-71
084-101

4"-B-OIL METER PROVER
2"-B-WATER METER PROVER
2"-B-WATER METER PROVER
4"-B-OIL METER PROVER
4"x2½" RED.
3"x2½" RED.
3"x2" RED.
4"x2" RED.
2"-A-SAND DRAINOFF
4"-A-EMULSION OUTLET
2"-A-PRODUCED WTR. OUTLET (BELOW)
4"-B GAS OUTLET
4"-A-RELIEF OUTLET
6"-B-EMULSION INLET (BELOW)
2"-A-JETTING WTR. INLET
4"-A-GAS OUTLET (ABOVE)
2"-A-PRODUCED WATER (BELOW)
4"-A-RELIEF OUTLET
4"-A-EMULSION OUTLET (BELOW)
4"x2" RED.
4"x3" RED.
PLAN VIEW
4"-A-RELIEF OUTLET
6"-B-EMULSION INLET
℄ V-2B
4"-A-RELIEF OUTLET
4"-A-GAS OUTLET
4"-B-GAS OUTLET
2"-A-SAND DRAINOFF
4"-A-EMULSION INLET
℄ V-2A
4"-A-EMULSION OUTLET
4"x4"x3" RED. TEE
2"-A-SAND DRAINOFF
2"-A-PRODUCED WTR. OUTLET
2"-A-PRODUCED WTR. OUTLET
H.P. TEST SEPARATOR V-2B
L.P. TEST SEPARATOR V-2A
2"-B-WATER METER PROVER
2"-B-WATER METER PROVER
4"-B OIL METER PROVER
4"-B OIL METER PROVER
TOP OF SKID
6"-B-EMULSION INLET
2"-A-JETTING WTR. INLET
4"-A-RELIEF OUTLET
4"-A-GAS OUTLET
2"-A-JETTING WTR. INLET
6"-A-EMULSION INLET
4"-A-EMULSION OUTLET
2"-A-PRODUCED WATER OUTLET
4"x3" RED.
4"x2" RED.
2½"x2" RED
2½" 300# ASA RFWN FLGS.
8"-300# ASA RFWN FLANGES
3"x2½" RED.
4"x3" SWAGE (TOE-DLE)
ELEVATION
NOTE: SEE DETAIL OF VESSEL V-2A FOR PARTIAL PLAN
ELEVATION
NOTE:
SEE DWG NO 084-104 FOR PNEUMATIC AND ELECTRICAL INSTRUMENTATION AND CONTROL DETAILS.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

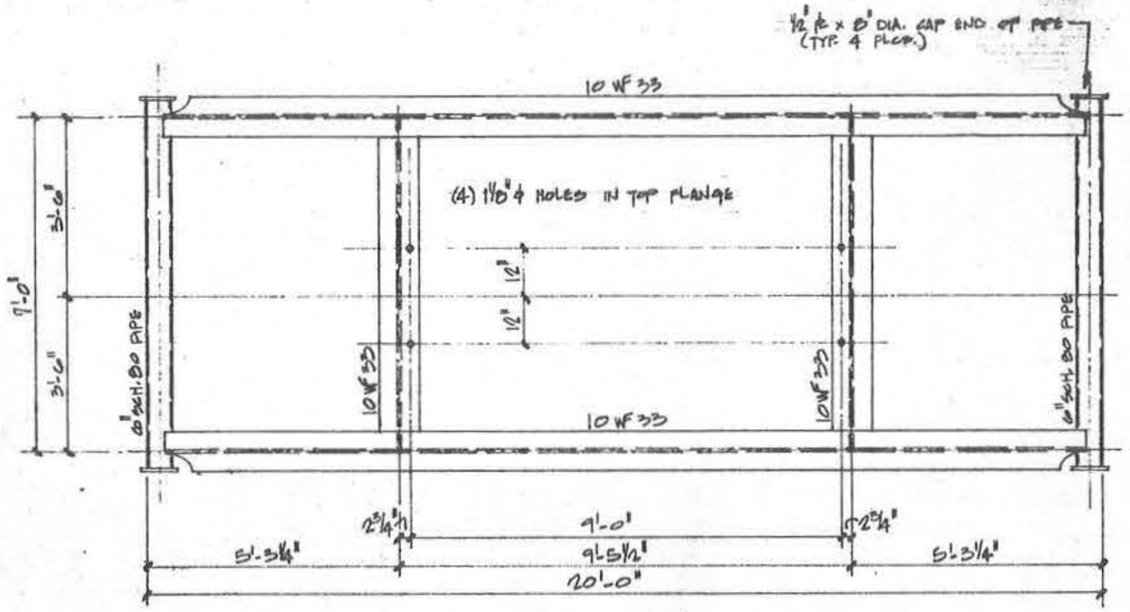
TEST SEPARATORS V-2A, V-2B
PIPING PLAN & ELEVATIONS
SPEC NO 10-084 WTU

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

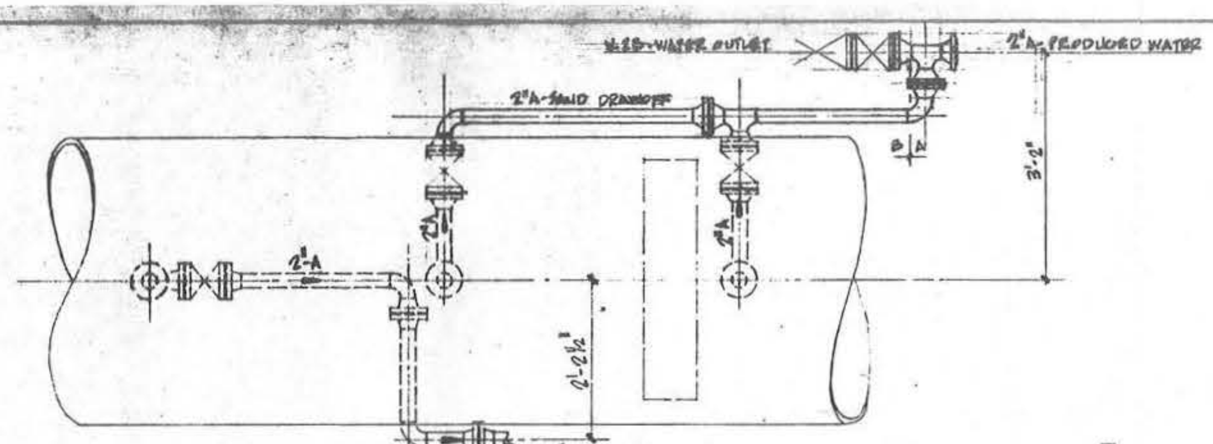
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN RM
CHECKED
EXPER. SECTION
APPROVED
SCALE 3/4"=1'-0"
DATE 4-14-71

084-102

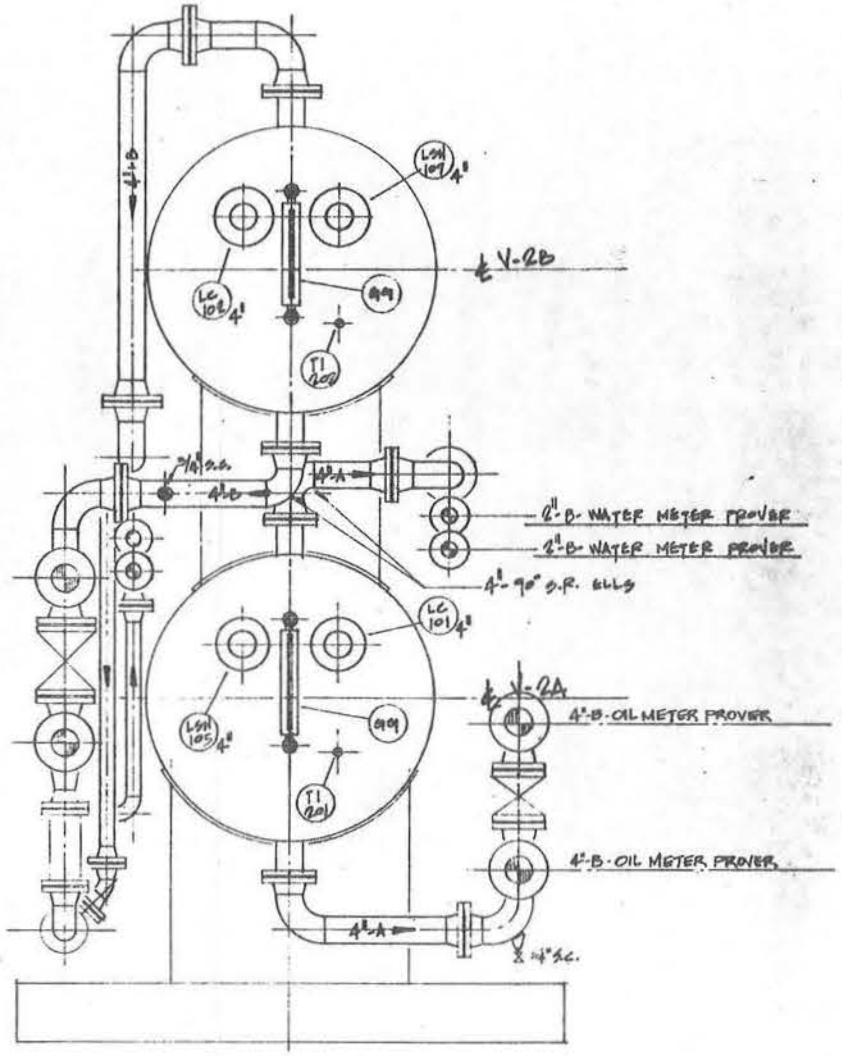


SKID PLAN

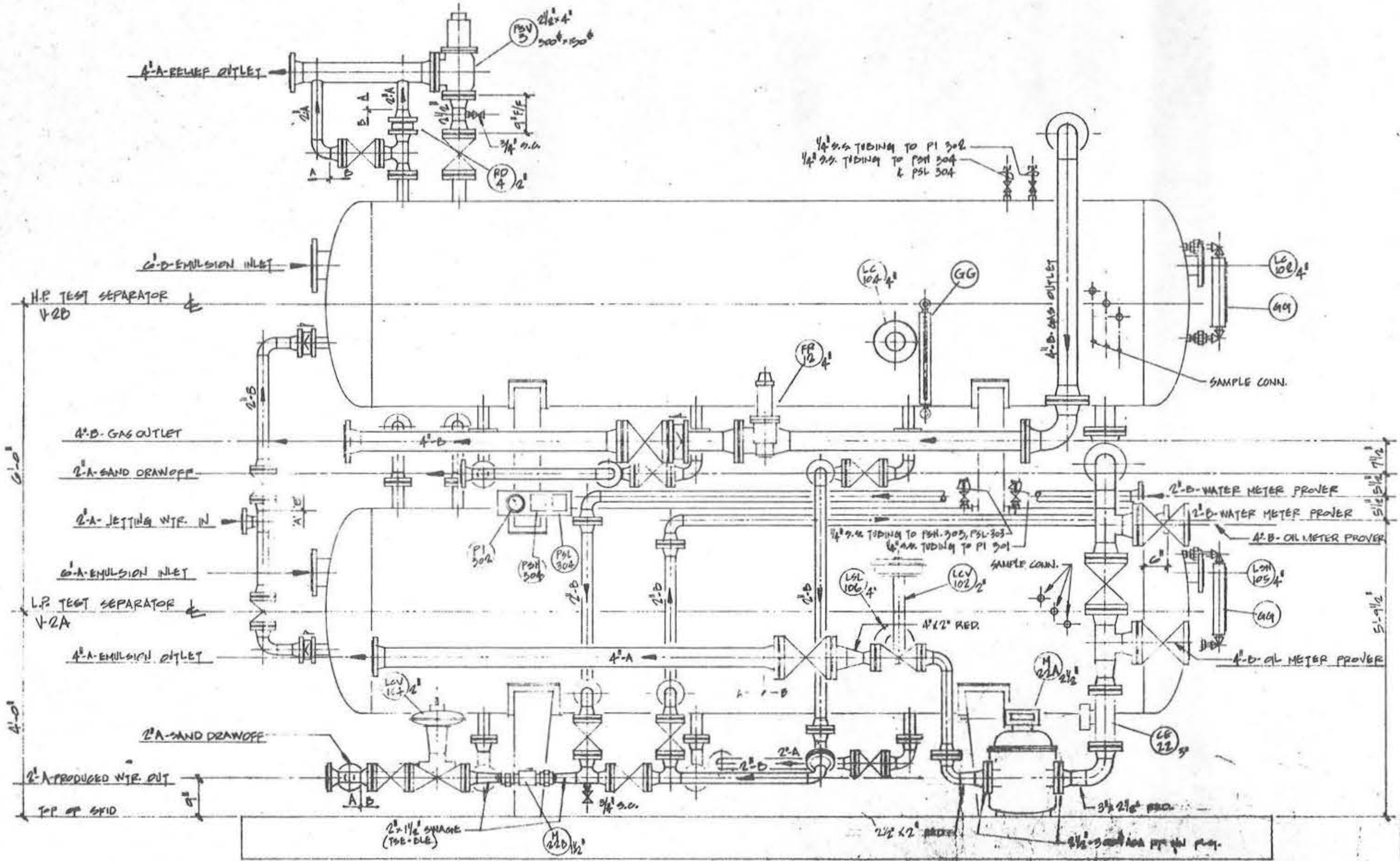


DETAIL ① 102

PARTIAL PLAN- VESSEL V-2A



ELEVATION D/102



ELEVATION

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

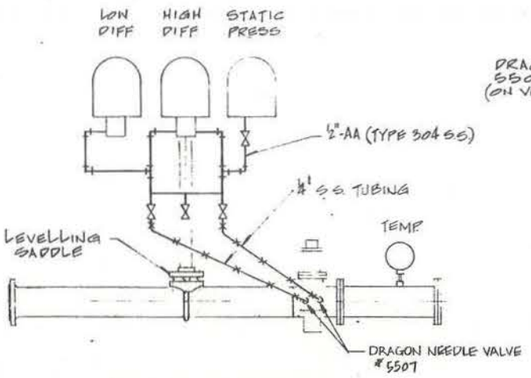
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

TEST SEPARATORS V-2A, V-2B
PIPING ELEVATIONS
SPEC. NO. 10-084 WTU

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

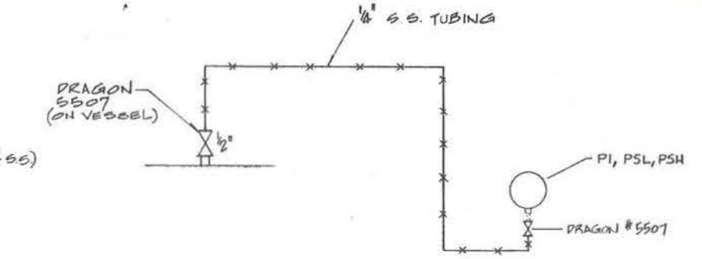
DRAWN R.M.
CHECKED
ENGR. SECTION
APPROVED
SCALE 3/4" = 1'-0"
DATE 6-14-71

084-103

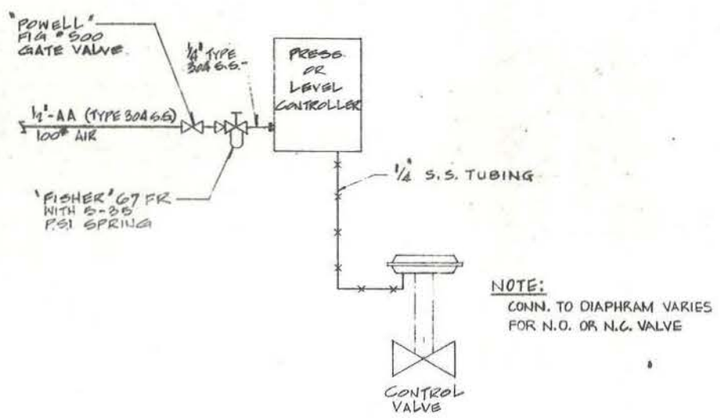


TYPICAL CONNECTIONS
ORIFICE METER TUBE

MOUNT & ASSEMBLE TRANSDUCERS, TUBING FITTINGS, PIPE & MANIFOLDS FURNISHED WITH BARTON METER.

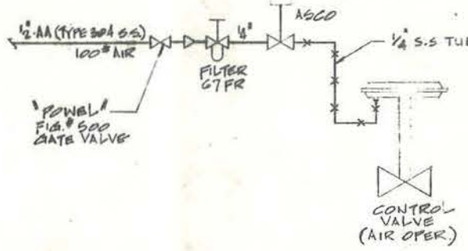


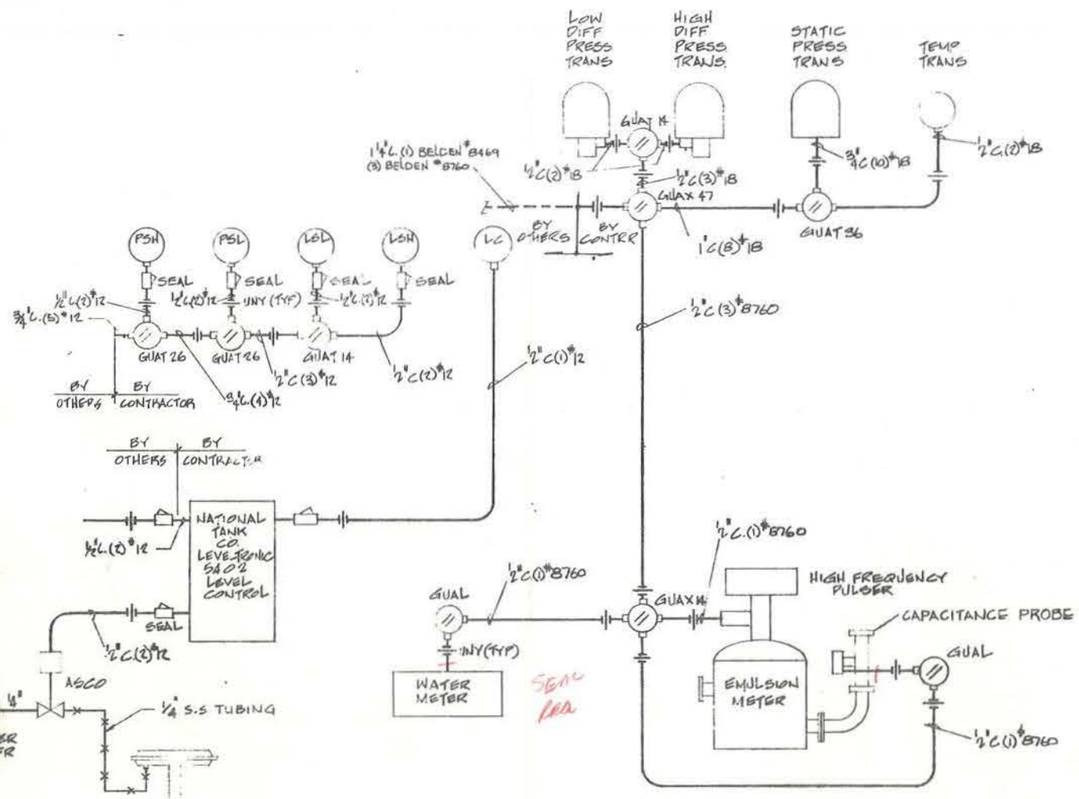
TYPICAL PRESS INDICATOR, HIGH/LOW PRESS SHUT-DOWN



NOTE:
CONN. TO DIAPHRAM VARIES FOR N.O. OR N.C. VALVE

TYPICAL LIQUID LEVEL OR PRESS. CONTROL VALVE





ELECTRICAL CONDUIT CONNECTIONS
TYPICAL FOR V-2A & V-2B

LEGEND

→→→ — STAINLESS STEEL TUBING ASTM A 269 SEAMLESS WITH IMPERIAL TYPE 316 S.S HI-SEAL FITTINGS

NOTE:—
INSTALL ½" GALVANIZED CLASS AA PIPING TO ALL PNEUMATIC INSTRUMENTS & CONTROLLERS P.E TO ONE CONNECTION POINT FOR EXTERNAL SOURCE

NO	DATE	REVISIONS	BY	CHK	APPR	NO	DATE	REVISIONS	BY	CHK	APPR

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

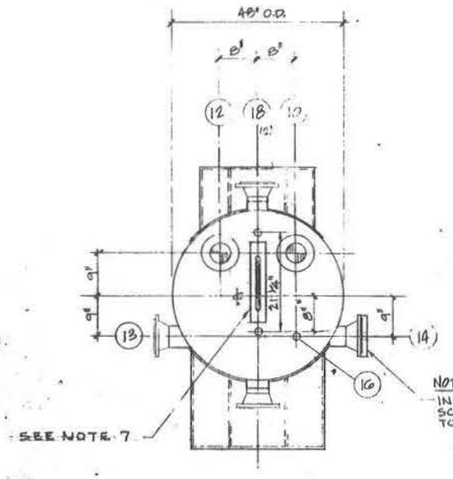
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

TEST SEPARATORS V-2A & V-2B
INSTRUMENTATION DETAILS
SPEC NO. 10-084-WTU

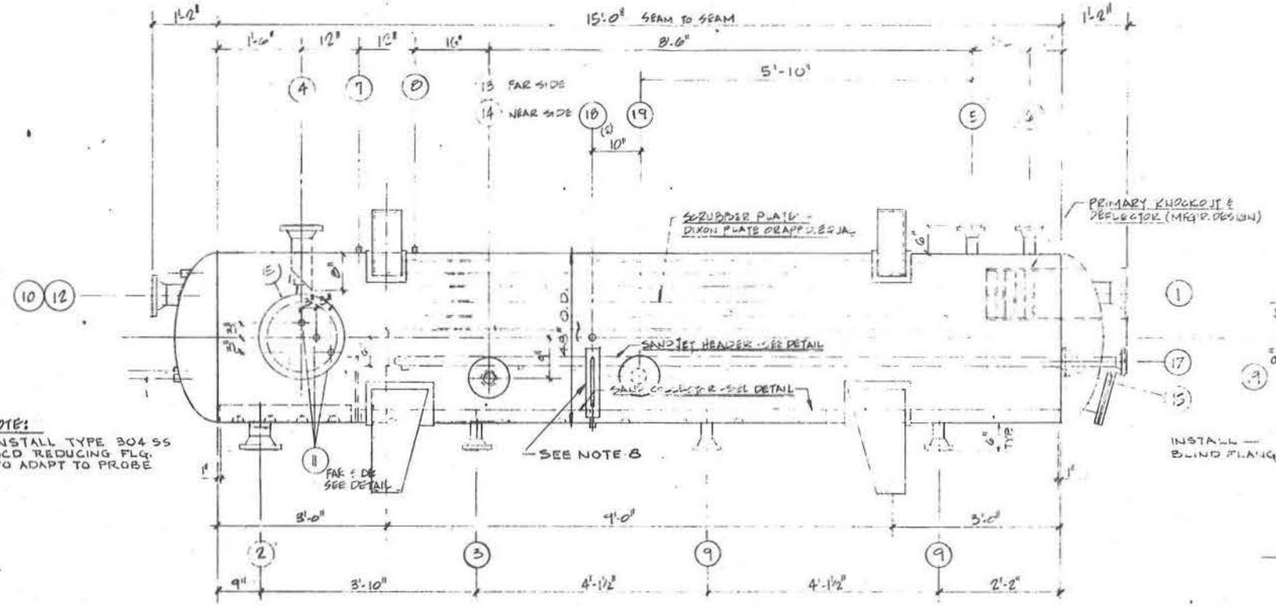
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN LW | ENGR SECTION | SCALE —"=1'-0"
CHECKED | APPROVED | DATE 10-10-67

084-104

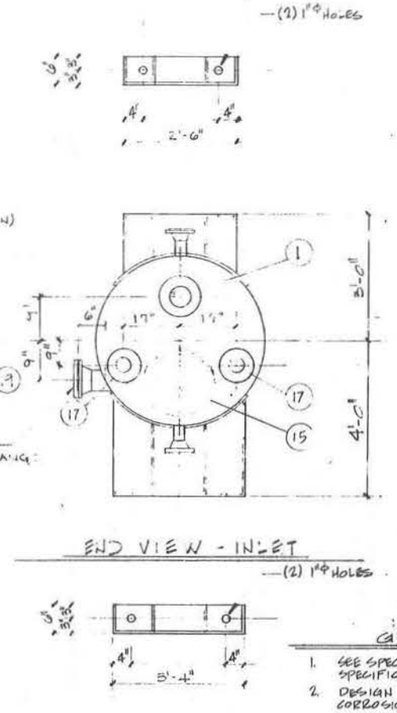


END VIEW - CONTROLS

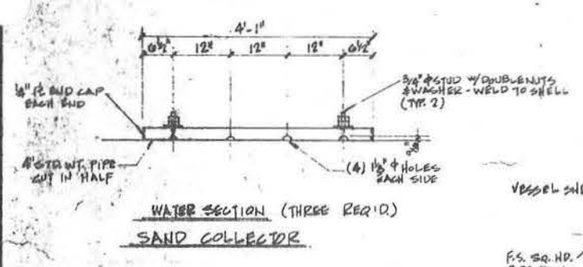


SIDE ELEVATION

NO SCALE

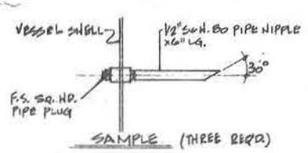


END VIEW - INLET

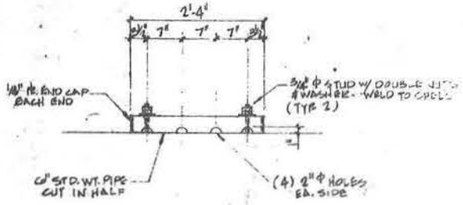


WATER SECTION (THREE REQ'D)

SAND COLLECTOR

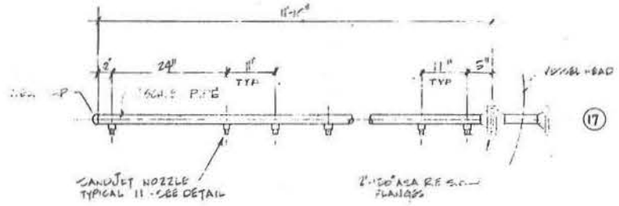


SAMPLE (THREE REQ'D)

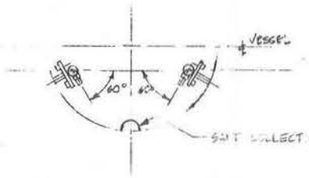


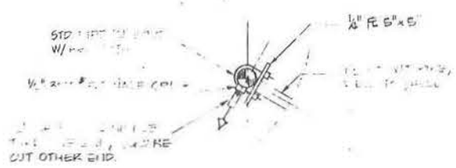
OIL SECTION (ONE REQ'D)

SAND COLLECTOR



SAND JET HEADER (TWO REQ'D.)





TYPICAL SAND JET NOZZLE

GENERAL NOTES

1. SEE SPECIFICATION NO. 10-084-WTU51 FOR SPECIFICATIONS
2. DESIGN PRESSURE 275 PSIG @ 100°F. w/ ⅛" CORROSION ALLOWANCE. ASME CODE SEC. VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO 10-084-C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO. 10-084-C2
5. FLANGE BOLTS TO BE ASTM B7 w/ HEAVY HEX NUTS
6. GASKETS ON INTERNALS TO BE ⅛" J-M 600 (OR EQ.)
7. FURNISH AND INSTALL DANIEL 92TL GAGE GLASS WITH TWO ¾" IS VALVES, USE ¾" X XH NIPPLES. SUPPORT GAGE AT MIDPOINT OFF OF VESSEL SHELL.
8. FURNISH AND INSTALL DANIEL 91TL GAGE GLASS WITH TWO ¾" IS VALVES, USE ¾" X XH NIPPLES. SUPPORT GAGE AT MIDPOINT OFF OF VESSEL SHELL.

NOZZLE SCHEDULE

NO.	SIZE	RATING	DESCRIPTION
1	6"	150# ASA R.F.	FLG'D EMULSION INLET
2	4"	"	FLG'D EMULSION OUTLET
3	2"	"	FLG'D. WATER OUTLET
4	4"	"	FLG'D. GAS OUTLET
5	2"	"	FLG'D. RELIEF
6	2"	"	FLG'D. RUPTURE DISC
7	½"	3000# F.S. C.P.G.	SCR'D. PRESSURE INDICATOR
8	½"	"	SCR'D. HIGH PRESSURE SHUTDOWN
9	2"	150# ASA R.F.	FLG'D. SAND DRAWOFF 2 REQ'D
10	4"	"	FLG'D. OIL LEVEL CONTROL
11	½"	3000# F.S. C.P.G.	SCR'D. SAMPLE CONNECTION 3 REQ'D
12	4"	150# ASA R.F.	FLG'D HIGH LEVEL SHUTDOWN
13	4"	"	FLG'D. LOW LEVEL SHUTDOWN
14	4"	"	FLG'D INTERFACE CONTROL *
15	16"	150# ASA R.F.	FLG'D. MANWAY W/ BLIND FLG & DAVIT
16	⅜"	3000# F.S. C.P.G.	SCR'D. TEMPERATURE INDICATOR
17	"	150# ASA R.F.	FLG'D SAND JETS - SEE DETAIL - 2 REQ'D
18	⅝"	3000# F.S. C.P.G.	SCR'D GAGE GLASS 4 REQ'D.
19	4"	150# ASA R.F.	CATHODIC PROT. ANODE W/ BLIND FLG

* W/ TYPE 304 S.S. ADAPTER FLG

NO.	DATE	REVISIONS	BY	CHK.	APPR.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

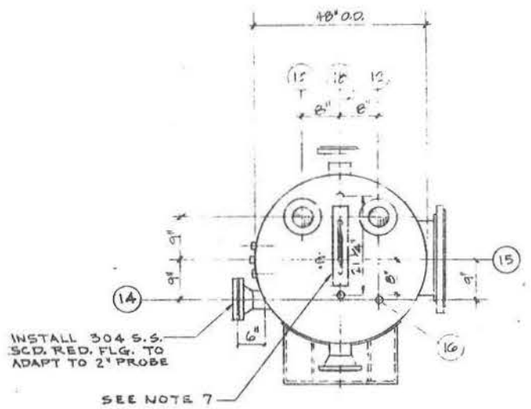
V-2A-L.P. TEST SEPARATOR
SPEC. NO. 10-084-WTU

HOBBS-BANNERMAN CORPORATION
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

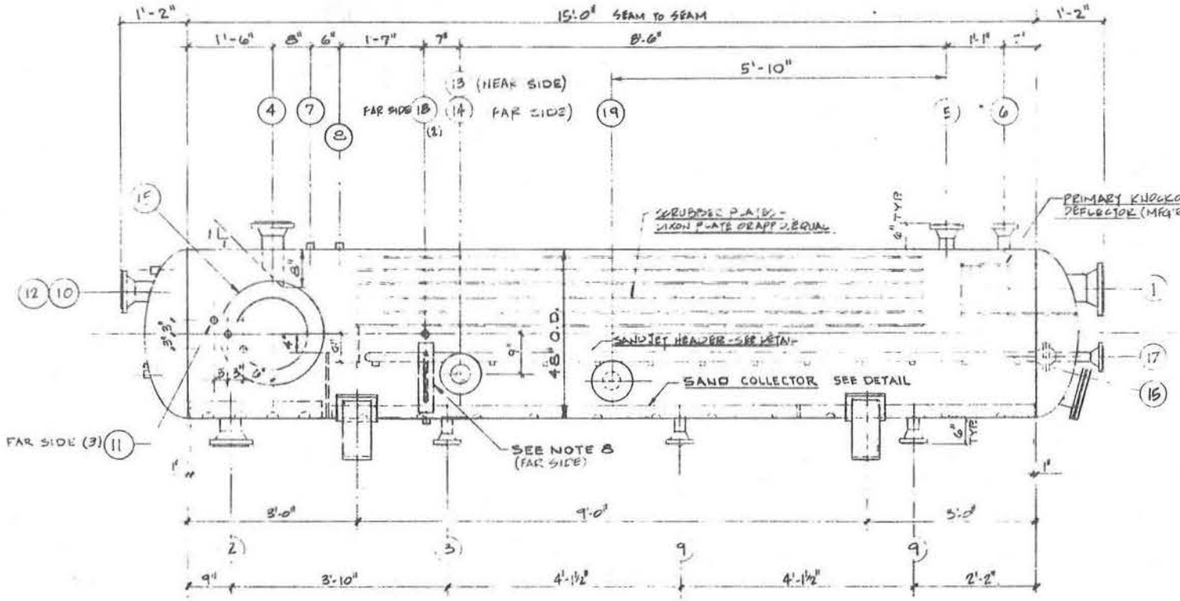
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN TR | ENGR. SECTION | SCALE NOTED
CHECKED | APPROVED | DATE 12-22-70

084-105

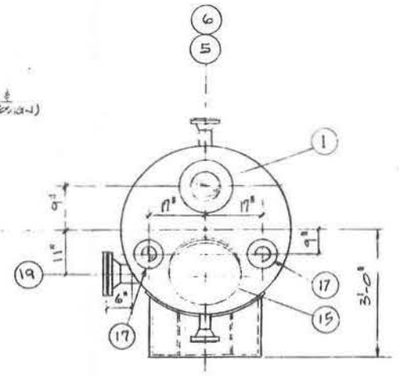


END VIEW - CONTROLS

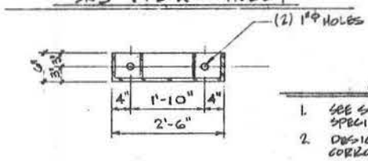


SIDE ELEVATION

NOT TO SCALE

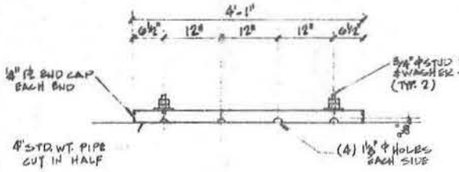


END VIEW - INLET



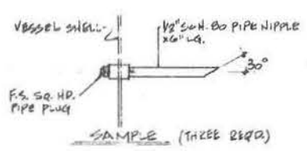
GENERAL NOTES

1. SEE SPECIFICATION NO. 10-084-WTU-1 FOR SPECIFICATIONS
2. DESIGN PRESSURE 300 PSIG @ 100°F W/ ⅛" CORROSION ALLOWANCE. ASME CODE SECT VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO. 10-084-C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO. 10-084-C2
5. FLANGE BOLTS TO BE A193 B7 W/ HEAVY HEX
6. GASKETS ON INTERNALS TO BE ⅛" [illegible]
7. FURNISH AND INSTALL DANIEL 921TL GAGE GLASS WITH TWO ¾" IS VALVES. USE ¾"XXH NIPPLES. SUPPORT GAGE AT MIDPOINT OFF OF VESSEL SHELL.
8. FURNISH AND INSTALL DANIEL 911TL GAGE GLASS WITH TWO ¾" IS VALVES. USE ¾"XXH NIPPLES. SUPPORT GAGE AT MIDPOINT OFF OF VESSEL SHELL.

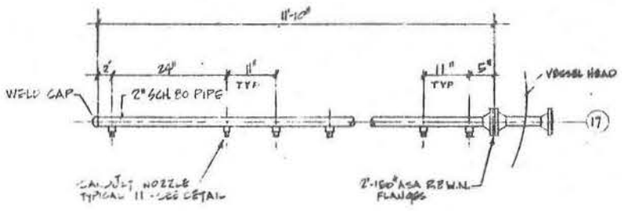


WATER SECTION (THREE REQ'D.)

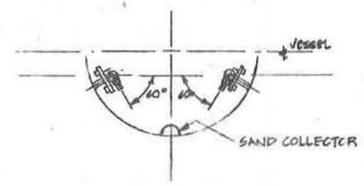
SAND COLLECTOR

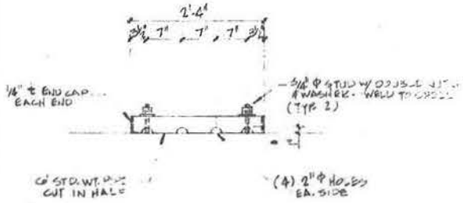


SAMPLE (THREE REQ'D)



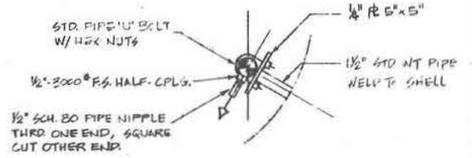
SAND JET HEADER (TWO REQ'D)





O.L. SECTION (ONE REQ'D.)

SAND COLLECTOR



TYPICAL SAND JET NOZZLE

NOZZLE SCHEDULE

	NO.	SIZE	RATING	DESCRIPTION
	1	6"	300# ASA R.F.	FLG'D EMULSION INLET
	2	4"	"	FLG'D EMULSION OUTLET
	3	2"	"	FLG'D. WATER OUTLET
	4	4"	"	FLG'D GAS OUTLET
	5	2½"	"	FLG'D RELIEF
	6	2"	"	FLG'D RUPTURE DISC
	7	½"	Bonney's 6000	SCRD. PRESSURE INDICATOR.
	8	½"	"	SCRD. HIGH PRESSURE SHUTDOWN
	9	2"	300# ASA R.F.	FLG'D. SAND DRAWOFF 2 REQ'D
	10	4"	"	FLG'D. OIL LEVEL CONTROL
	11	½"	3000# F.S. CPLG.	SCRD. SAMPLE CONNECTION 3 REQ'D
	12	4"	300# ASA R.F.	FLG'D. HIGH LEVEL SHUTDOWN
	13	4"	"	FLG'D LOW LEVEL SHUTDOWN
*	14	4"	"	FLG'D INTERFACE CONTROL
2 REQ.	15	16"	300# ASA R.F.	FLG'D MANWAY W/BLIND FLG'D DR
	16	⅜"	3000# F.S. CPLG.	SCRD. TEMPERATURE INDICATOR
	17	2"	300# ASA R.F.	FLG'D SAND JETS - SEE DETAIL 2
	18	⅝"	3000# F.S. CPLG.	SCRD GAGE GLASSES 4 REQ'D.
INSTALL BLIND FLANGE	19	4"	300# ASA R.F.	CATHODIC PROT. ANODE

* W/TYPE 304 SS ADAPTER FLG.

NO.	DATE	REVISIONS	BY	CHK.	APPR.	NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

V-28-H.P TEST SEPARATOR

SPEC. NO. 10-084-WTU

DRAWN TR | DESIGN SECTION | APPROVED

HOBBS-BANNERMAN CORP.
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

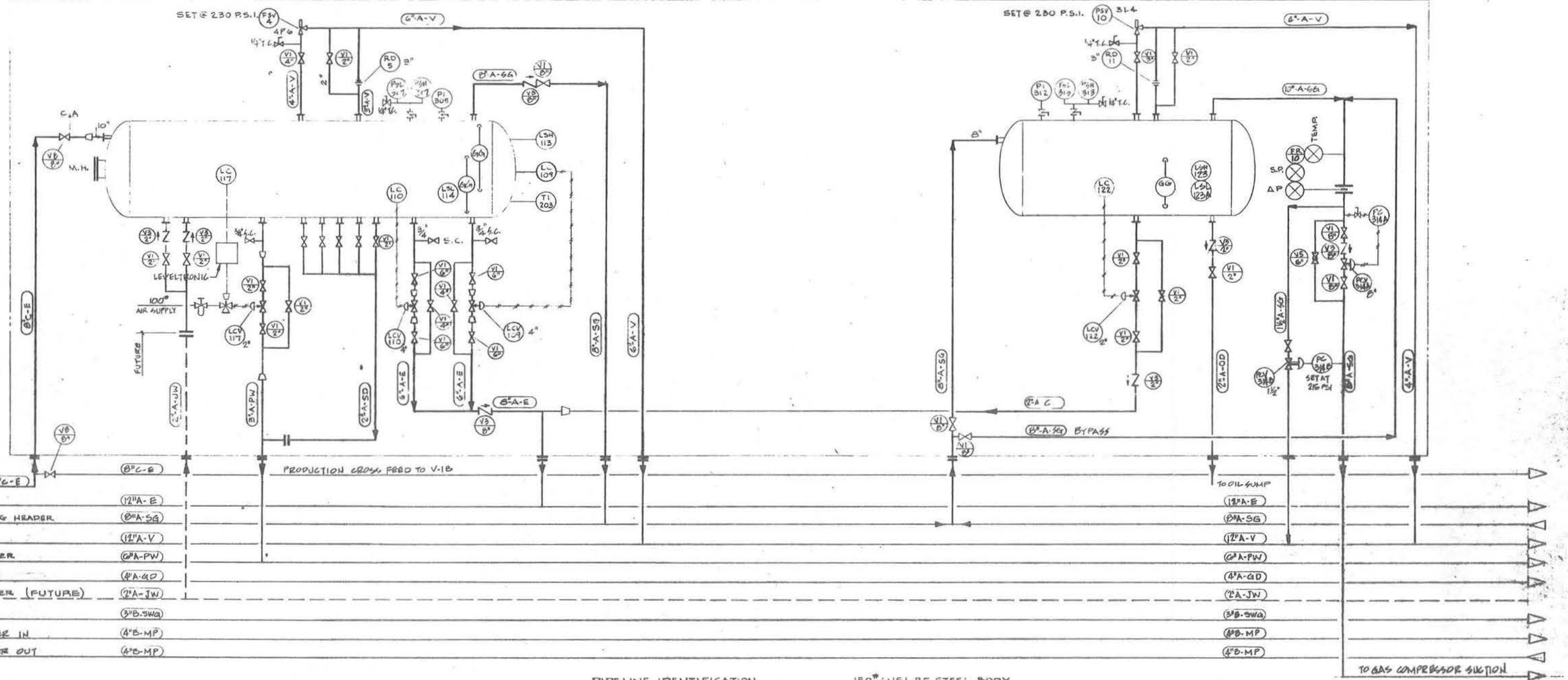
SCALE NOTED
DATE 12-22-70

084-106

V-1A
PRODUCTION SEPARATOR
84" O.D. x 30'-0 S/S
275 PSIG D.P. @ 100° F
55 to 85 PSIG O.P. @ 60° F
30 MBOPD
14 MMSCFD

V-3
GAS SCRUBBER
48" O.D. x 15'-0" S/S
275 PSIG D.P. @ 100° F.
85 PSIG O.P. @ 60° F.
28 MMSCFD

PACKAGED VESSELS



LEGEND

- (LC) — LEVEL CONTROL
- (LSH) — LEVEL SHUTDOWN, HIGH
- (LSL) — LEVEL SHUTDOWN, LOW
- (LCV) — LEVEL CONTROL VALVE
- (PSH) — PRESSURE SHUTDOWN, HIGH
- (PSL) — PRESSURE SHUTDOWN, LOW
- (PC) — PRESSURE CONTROLLER
- (PCV) — PRESSURE CONTROL VALVE
- (⊗) — TRANSDUCER
- (PSV) — PRESSURE SAFETY VALVE
- (RD) — RUPTURE DISC
- (TI) — TEMPERATURE INDICATOR
- (PI) — PRESSURE INDICATOR
- (GG) — GAGE GLASS
- (FR) — FLOW RECORDER
- (M) — ELECTRICALLY OPERATED VALVE
- (—) — PANEL MOUNTED INSTRUMENT (GENERAL)

PIPELINE IDENTIFICATION
(4"B-MP) 4" IS SIZE - PIPING IS CLASS 'B' SPECIFICATION — MP - METER PROVER PIPING

- E — EMULSION
- JW — JET WATER
- PW — PRODUCED WATER
- SD — SAND DRAWOFF
- V — VENT OR RELIEF PIPING
- SWG — SWEET GAS
- SG — SOUR GAS
- C — CONDENSATE OR OIL
- MP — METER PROVER
- OD — OIL DRAIN
- GD — GRAVITY DRAIN
- VR — VAPOR RECOVERY

(V1 4") — 150# ANSI RF STEEL BODY BALL VALVE, WRENCH OPERATED. FULL OPENING, CAMERON FIG. 800171 WITH 'GA TRIM (4" SIZE SHOWN)

(V2 2") — 300# ANSI RF STEEL BODY BALL VALVE, WRENCH OPERATED FULL OPENING, CAMERON FIG. 800371 WITH 'GA TRIM (2" SIZE SHOWN)

(V3 2") — 150# ANSI RF STEEL BODY WAFER CHECK VALVE, S.S. TRIM, VITON 'A' SEAL, MISSION DUO-CHECK (OR EQUAL)

(V4 2") — 300# ANSI RF STEEL BODY WAFER CHECK VALVE, S.S. TRIM, VITON 'A' SEAL MISSION DUO-CHECK (OR EQUAL)

S.C. — 3/4" 800# SCREWED STEEL BODY GATE VALVE OS & Y, BB 316 SS TRIM, SMITH 800 (OR EQUAL)

T.C. — DRAGON 5507 OR 5707

(V5 4") — 150# ANSI RF STEEL BODY GLOBE VALVE, PACIFIC FIG. 163 WITH #1 TRIM (OR EQUAL).

(V6 8") — 600# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG. 860601 WITH NO. 'GA TRIM (OR EQUAL)

NO.	DATE	REVISIONS	BY	CHK.	APPR.	NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

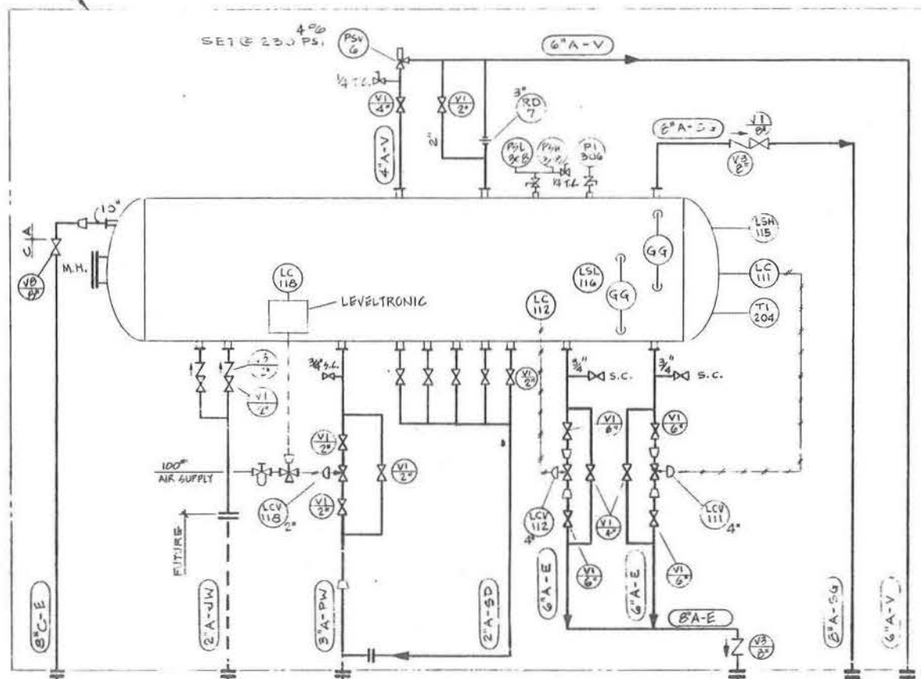
PRODUCTION SEPARATOR V-1A GAS SCRUBBER V-3
PIPING & INSTRUMENTATION DIAGRAM
SPEC NO 10-084 PSU

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.E. | CHECKED | EXPR. SECTION | APPROVED | SCALE NONE | DATE 7-22-71 | 084-107

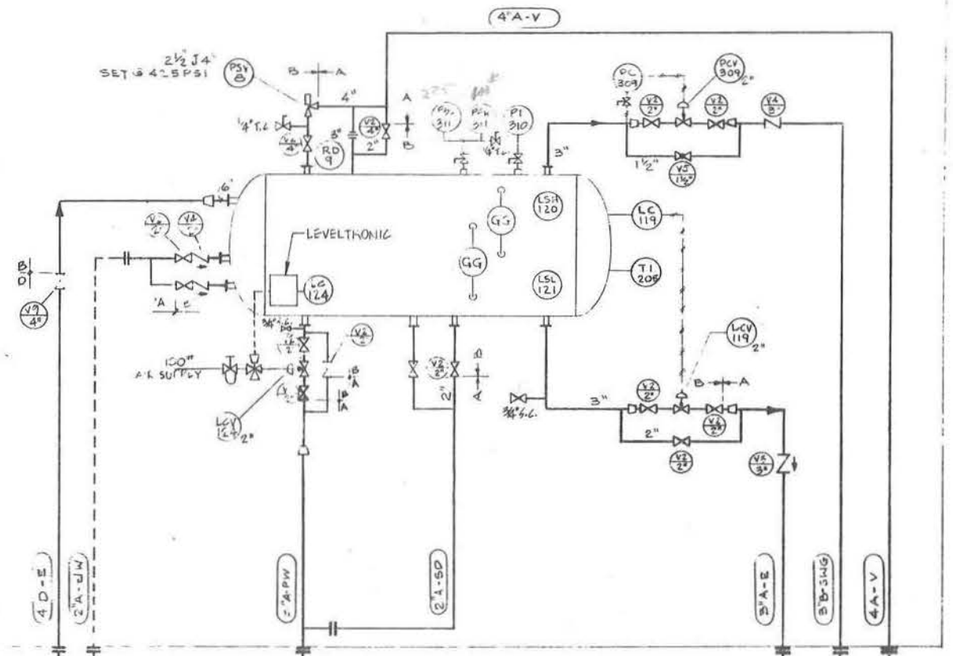
V-1B
PRODUCTION SEPARATOR
84" O.D. x 30'-0" S/S
275 PSIG D.P. @ 100°F
85 PSIG O.P. @ 60°F
30 MBOPD
14 MMSCFD

PACKAGED SEPARATORS



CROSS FEED FROM V-1A PRODUCTION HEADER
EMULSION (12"A-E)
GAS GATHERING HEADER (8"A-SG)
RELIEF (12"A-V)
PROCESS WATER (6"A-PW)
GRAVITY DRAIN (4"A-GD)
JETTING WATER (FUTURE) (2"A-JW)
SWEET GAS (3"A-SWG)
METER PROVER (4"B-MP)
METER PROVER (4"B-MP)

V-1C
SANDSTONE SEPARATOR
48" O.D. x 15'-0" S/S
500 PSIG D.P. @ 130°F
350 PSIG O.P. @ 60°F
5.0 MBOPD
5.0 MMSCFD



PRODUCTION HEADER
(12"A-E)
(12"A-V)
(6"A-PW)
(4"A-GD)
(2"A-JW)
(3"B-SWG)
(4"B-MP)
(4"B-MP)

LEGEND
- (LC) — LEVEL CONTROL
- (LSH) — LEVEL SHUTDOWN, HIGH
- (LSL) — LEVEL SHUTDOWN, LOW
- (LCV) — LEVEL CONTROL VALVE
- (PSH) — PRESSURE SHUTDOWN, HIGH
- (PSL) — PRESSURE SHUTDOWN, LOW
- (PC) — PRESSURE CONTROLLER
- (PCV) — PRESSURE CONTROL VALVE
- (PSV) — PRESSURE SAFETY VALVE
- (RD) — RUPTURE DISC
- (TI) — TEMPERATURE INDICATOR
- (PI) — PRESSURE INDICATOR
- (GG) — GAGE GLASS
- (FR) — FLOW RECORDER

(4"B-MP) PIPELINE INDENTIFICATION
4" IS SIZE - PIPING IS CLASS 'B'
SPECIFICATION — MP - METER PROVER PIPING

- E — EMULSION
- JW — JET WATER
- PW — PROCESS WATER
- SD — SAND DRAW OFF
- V — VENT OR RELIEF PIPING
- SWG — SWEET GAS
- SG — SOUR GAS
- MP — METER PROVER
- GD — GRAVITY DRAIN
- OD — OIL DRAIN
- VR — VAPOR RECOVERY

(V1 4") — 150# ANSI RF STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG BC0371 WITH 20A TRIM (4" SIZE SHOWN)

(V2 2") — 300# ANSI RF STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG BC0371 WITH 20A TRIM (2" SIZE SHOWN)

(V3 2") — 150# ANSI RF STEEL BODY WAFER CHECK VALVE, 316 TRIM, VITON A SEAL MISSION DUO-CHECK (OR EQUAL)

(V4 2") — 300# ANSI RF STEEL BODY WAFER CHECK VALVE, 316 TRIM, VITON A SEAL, MISSION DUO-CHECK OR EQUAL

S.C. — 3/4" 900# SCREWED STEEL BODY GATE VALVE OS & Y, BB BIG 50 TRIM, SMITH 3402 (OR EQUAL)

T.S. — [illegible] 5507 CK 5707

(1/2" 1½") — 300# ANSI R.F. STEEL BODY GLOBE VALVE, PACIFIC FIG. 165 W/ #1 TRIM (OR EQUAL)

(1½" 2") — 600# ANSI R.F. FLANGED, STEEL BODY, FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG. BOC601 WITH NO. 20A TRIM (OR EQUAL)

(1½" 2") — 900# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG. BC0301 WITH NO. 20A TRIM (OR EQUAL)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

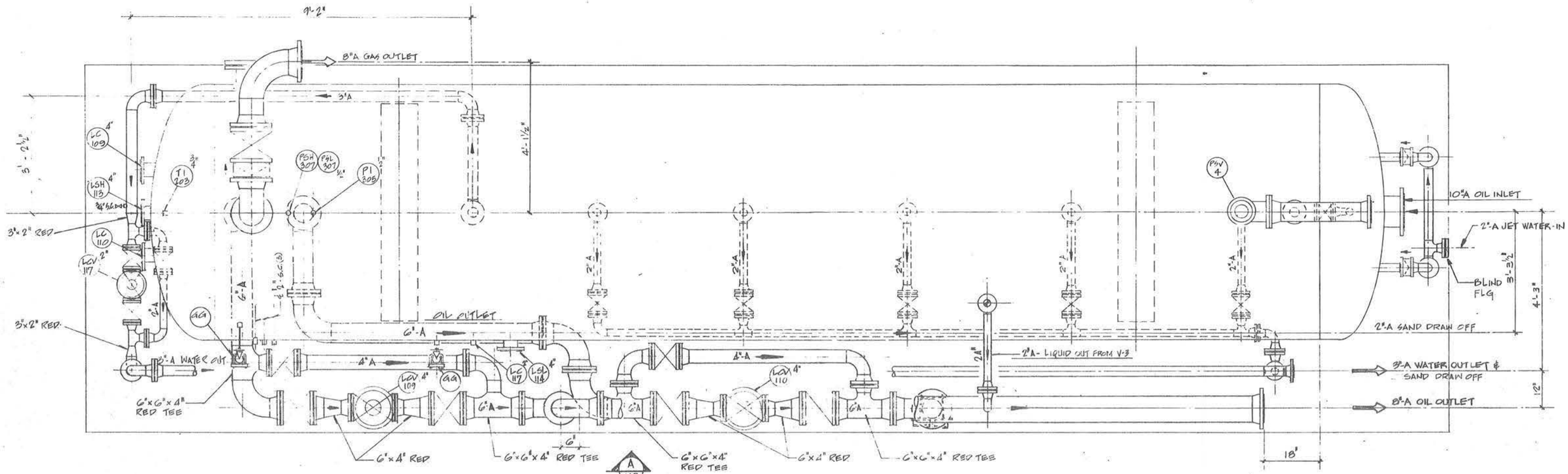
V-1B & V-1C SEPARATOR
PIPING & INSTRUMENTATION DIAGRAM
SPEC NO 10-084 PSU

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

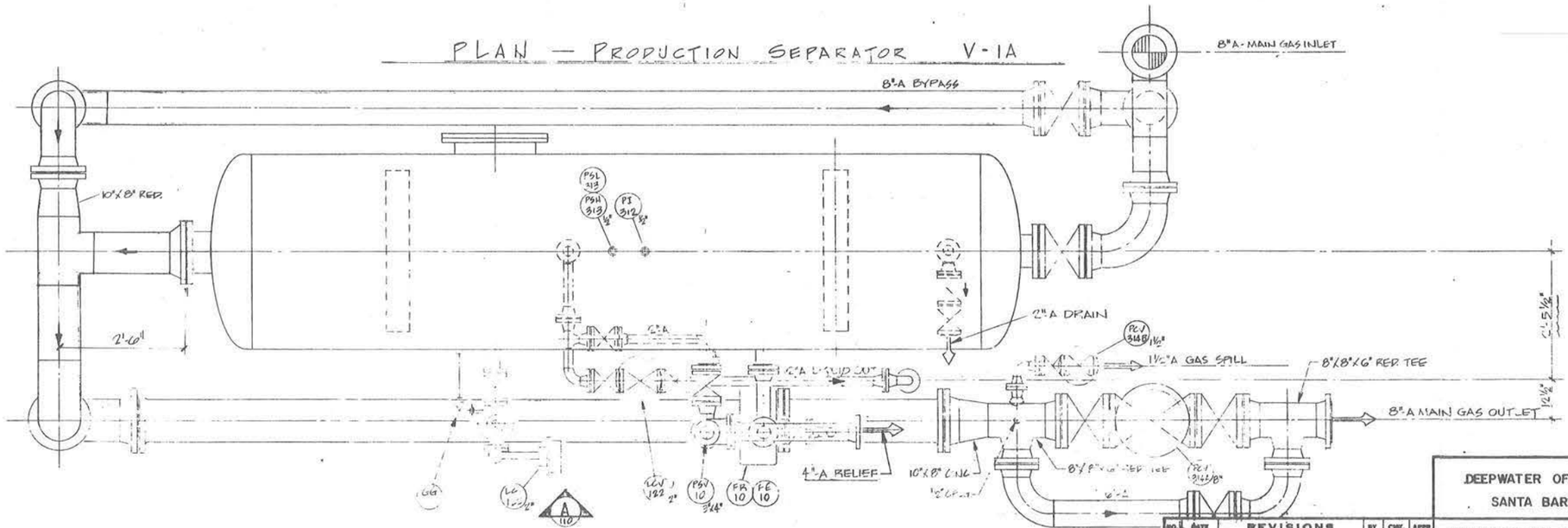
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.B. | ENGR. SECTION | SCALE 1/8" 1/8"
CHECKED | APPROVED | DATE 1-22-71

084-108



PLAN — PRODUCTION SEPARATOR V-1A



PLAN — GAS SCRUBBER V-3

NOTE:

SEE DWG. NR 084-118 FOR PNEUMATIC & ELECTRICAL INSTRUMENTATION AND CONTROL DETAILS

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

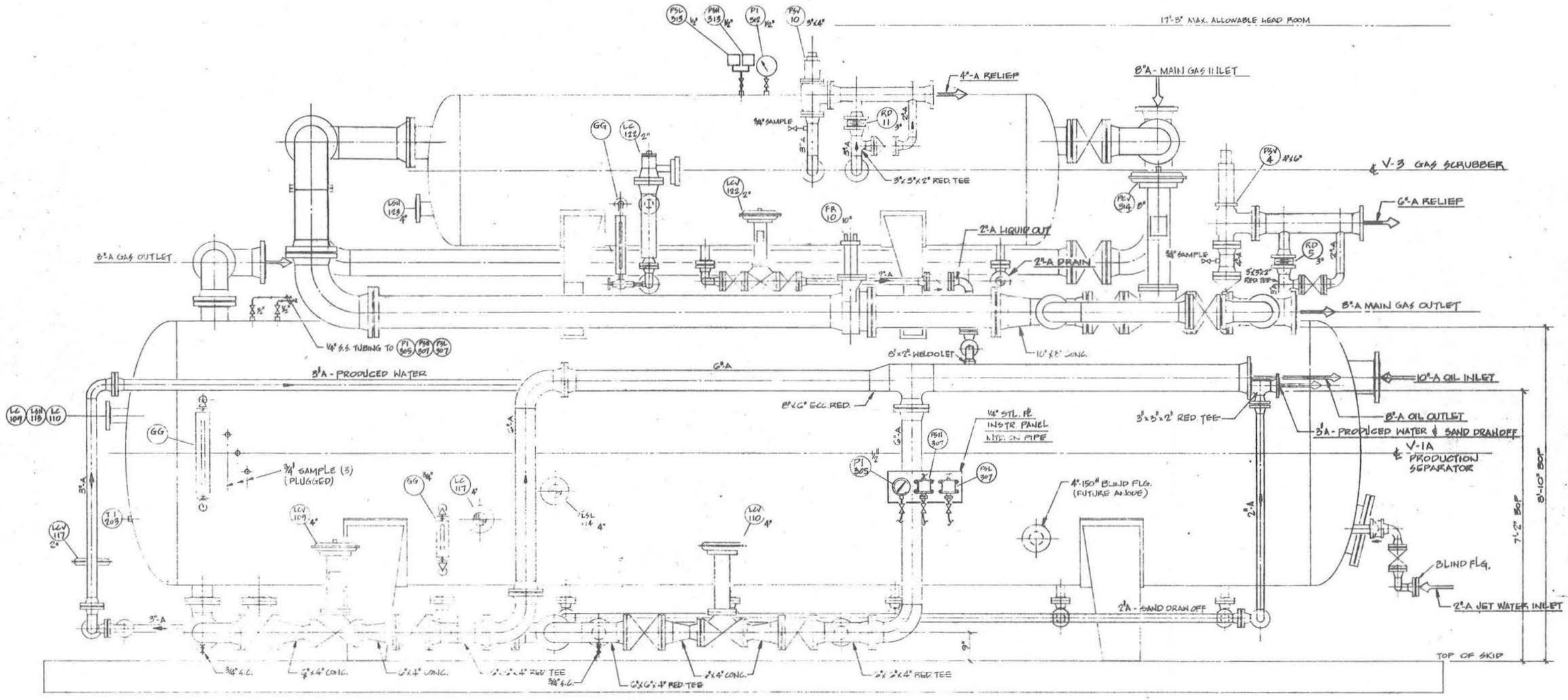
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

GAS SCRUBBER V-3, PRODUCTION SEPARATOR V-1A
PIPING PLAN
SPEC. NO. 10-084 PSU

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN V. REED-SMITH
ENGR. SECTION
CHECKED
APPROVED
SCALE 3/8" = 1'-0"
DATE 10-27-70

084-109



ELEVATION (A/109)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

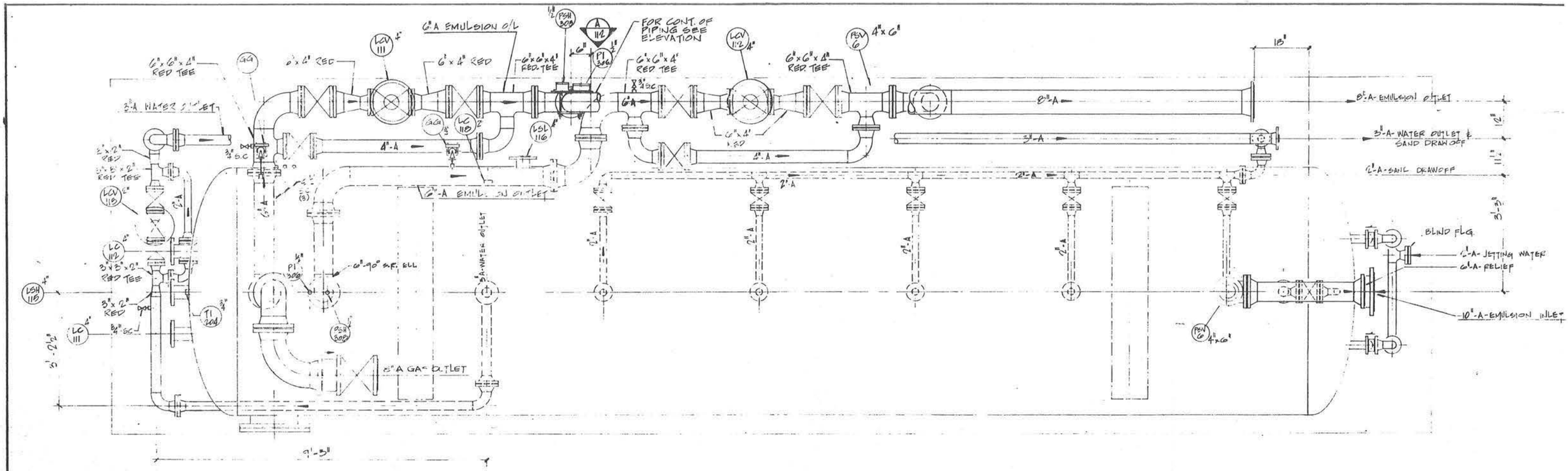
GAS SCRUBBER V-3, PRODUCTION SEPARATOR V-1A
PIPING ELEVATION
SPEC. NO. 10-084 PSU

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

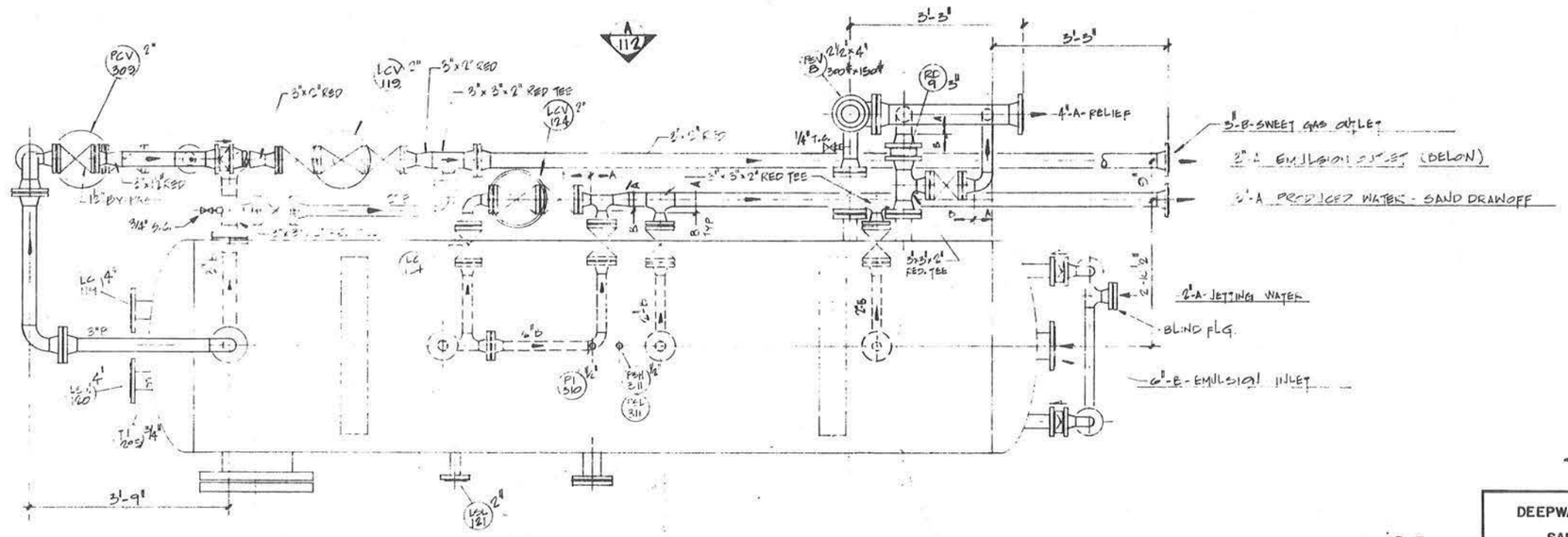
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: ENGR. SECTION:
CHECKED: APPROVED:
SCALE 3/16"=1'-0" DATE 7-22-71

084-110



PLAN - PRODUCTION SEPARATOR V-1B



PLAN - SANDSTONE SEPARATOR V-1C

NO.	DATE	REVISIONS	BY	CHK.	APPD.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SANDSTONE SEPARATOR V-1C & PRODUCTION SEPARATOR V-1B PIPING PLAN
SPEC NO. 10-084 PSU

DESIGN V. WEBSTER | ENGR. SECTION | APPROVED

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

SCALE 3/4" - 1'-0" | DATE 12-22-70

084-111

MAXIMUM ALLOWABLE HEADROOM 17'-8"

4"-A- RELIEF

(PSV) 4½"x4" 300#x150#

3"-B-SWEET GAS OUTLET

3"-B

3"x1½" RED.

3"x3"x1½" RED. TEE

6"-B-EMULSION INLET

¼" T.C.

A — B

℄ SANDSTONE SEPARATOR V-1C

(PSV) 4"x2"

6"-A- RELIEF

BLIND FLG

2"-A- JETTING NTR.

¼" T.C.

3"x3"x2" RED. TEE

3"-A-EMULSION OUTLET

3"-A-PRODUCED WATER (BEHIND) & SAND DRAW OFF

3"x3"x2" RED TEE

3"x2" RED.

3"-A-PRODUCED WATER

3"-A-EMULSION OUTLET

3"x3"x2" RED TEE

8"-A GAS OUTLET

8"-90° S.R. ELL

¼" S.S. TUBING TO

10"-A-EMULSION INLET

3"-A PRODUCED WATER

8"-A-EMULSION OUTLET

8"x8"x6" RED TEE

3"x3"x2" RED TEE

8"x6" ECC. RED.

6"-A

3"-A-PRODUCED WATER

℄ PRODUCTION SEPARATOR V-1B

½"-A-SAMPLE CONN. (3) (PLUGGED)

¼" STL. TB. WITH PIPING

11'-2" B.O.P.

BLIND FLG

2"-A-JETTING NTR.

3"-A SAND DRAWOFF

TOP OF S.K.D.

6"x6"x4" RED. TEE

6"x4" RED.

6"x6"x4" RED. TEE

6"x6"x4" RED. TEE

6"x4" RED.

3/4" S.C.

ELEVATION A/111

NO.	DATE	REVISIONS	BY	CHK.	APPR.

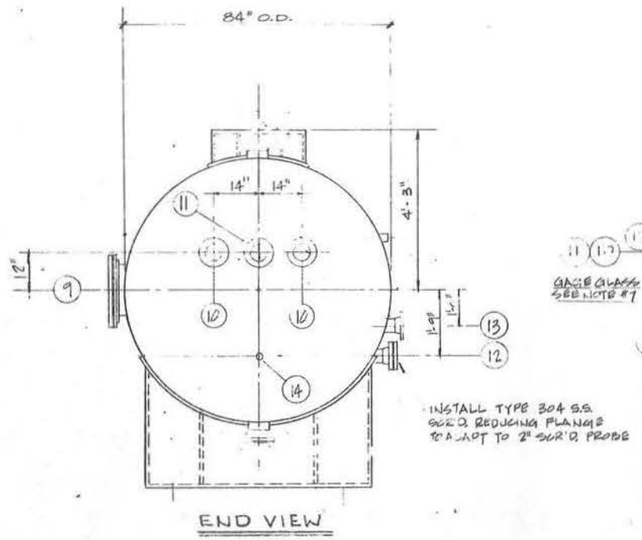
DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

SANDSTONE SEPARATOR V-1C & PRODUCTION SEPARATOR V-1B PIPING ELEVATION
SPEC. NO 10-084 PSU

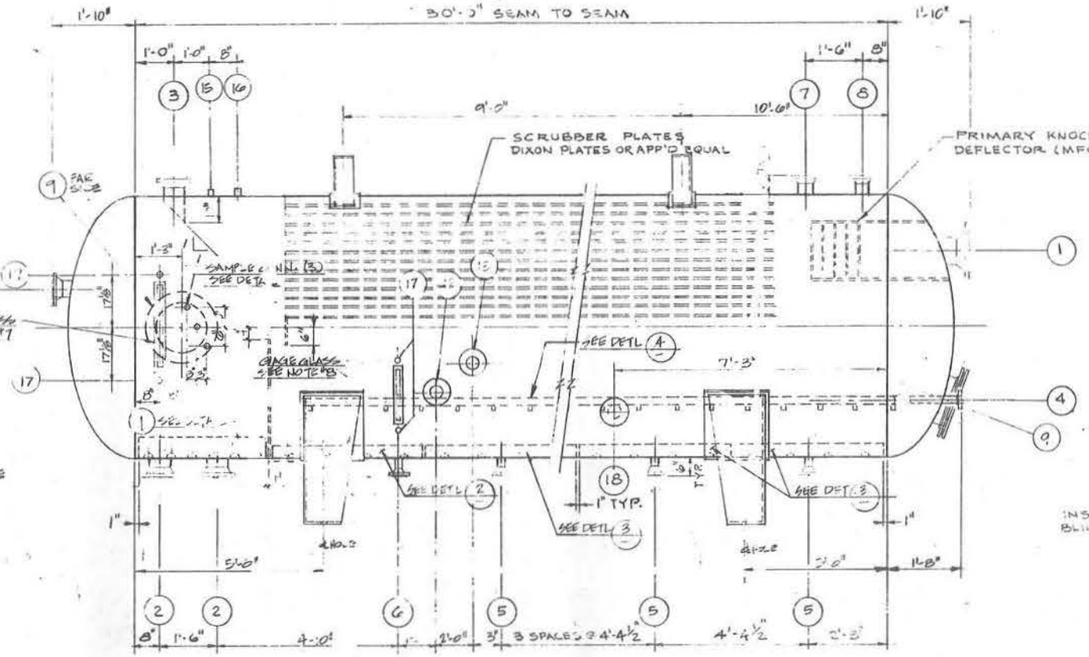
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN D. WEBSTER | DESIGN SECTION | SCALE 3/4"=1'-0" | .084-112
CHECKED | APPROVED | DATE 7-22-71

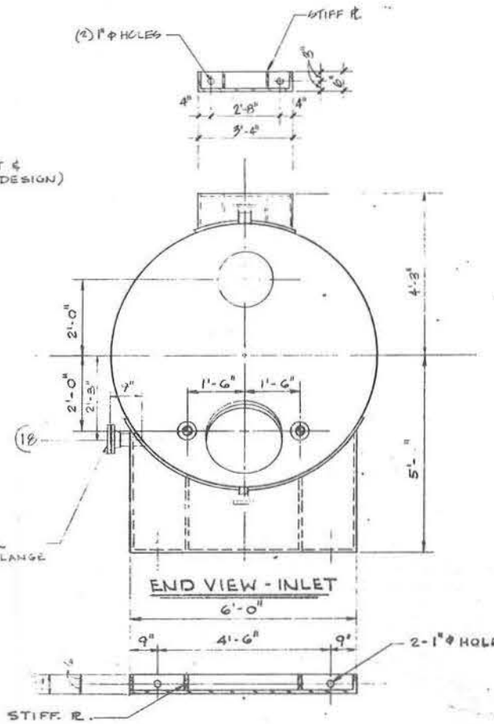


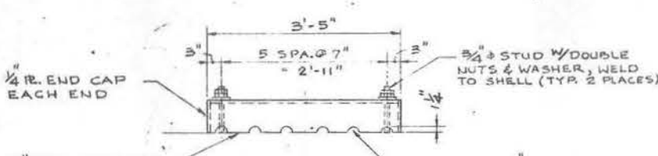
INSTALL TYPE 304 S.S. SCH. 80 REDUCING FLANGE TO A.NOT TO 2" SCH'D PROBE

END VIEW

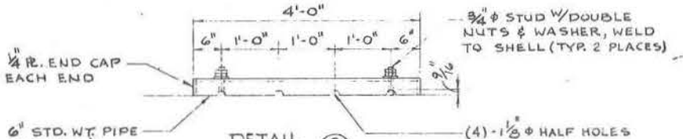


ELEVATION

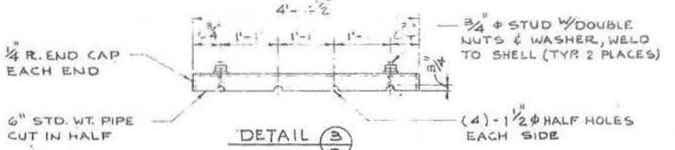




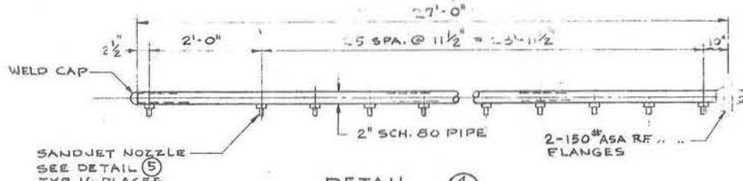
DETAIL (1)
OIL SECTION
SAND COLLECTOR
(ONE REQD)
¾" = 1'-0"



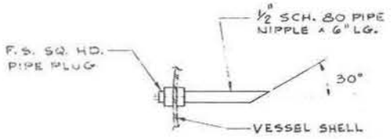
DETAIL (2)
WATER DRAW OFF
SAND COLLECTOR
(ONE REQD)
¾" = 1'-0"



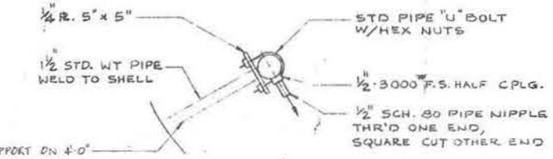
DETAIL (3)
WATER SECTION
SAND COLLECTOR
(-REQD)



DETAIL (4)
SAND JET HEADER - TWO REQ'D



SAMPLE
(-REQD)
N.T.S.



DETAIL (5)
1½" = 1'-0"

GENERAL NOTES:

1. SEE SPECIFICATION NO. 10-084 FOR SPECIFICATION
2. DESIGN PRESSURE 275 PSIG @ 100°F W/⅛" CORROSION ALLOWANCE, ASME CODE SECT. VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO. 10-084-C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO. 10-084-C2
5. FLANGE BOLTS TO BE ASTM B-7 W/HEAVY HEX NUTS
6. GASKETS ON INTERNALS TO BE ⅛" D-M40 (OR EQ.)

GENERAL NOTES (CONT'D)

7. FISHER & INSTA-- DANIEL GAGE GLASS NO. 92TL W/(2) TYPE '15' GAUGE VALVES & XXH ¾" PIPE NIPPLES
8. FISHER & INSTA-- DANIEL GAGE GLASS NO. 42TL W/(2) TYPE '15' GAGE VALVES & ¾" XXH PIPE NIPPLES

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION
1	10"	150# ASA RF	OIL INLET
2	6"	"	OIL OUTLET (OTIS)
3	-	"	GAS OUTLET
4	6"	"	SAND JET
5	6"	"	WATER DRAW OFF
6	¾"	"	WATER DRAW OFF
7	¾"	"	LEVEL
8	¾"	"	[illegible]
9	1"	"	[illegible]
10	1"	"	[illegible]
11	1"	"	[illegible]
12	1"	"	HIGH LEVEL [illegible]
13	4"	150# ASA RF	LOW LEVEL SHUTDOWN
14	¾"	3000# F.S.	CPLG. TEMP. INDICATOR
15	½"	3000# F.S.	CPLG. HIGH PRESS SHUTDOWN
16	½"	3000# F.S.	CPLG. PRESSURE INDICATOR
17	½"	3000# F.S.	CPLG. GAGE GLASS (4 REQ'D)
18	4"	150# ASA RF	CATHODIC PROT. ANODE W/BLIND FLANGE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PRODUCTION SEPARATOR V-IA

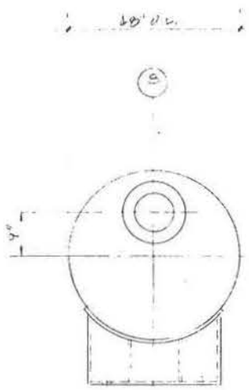
SPEC. NO. 10-084 PSU

HOBBS-BANNERMAN CORPORATION
ENGINEERS —— CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

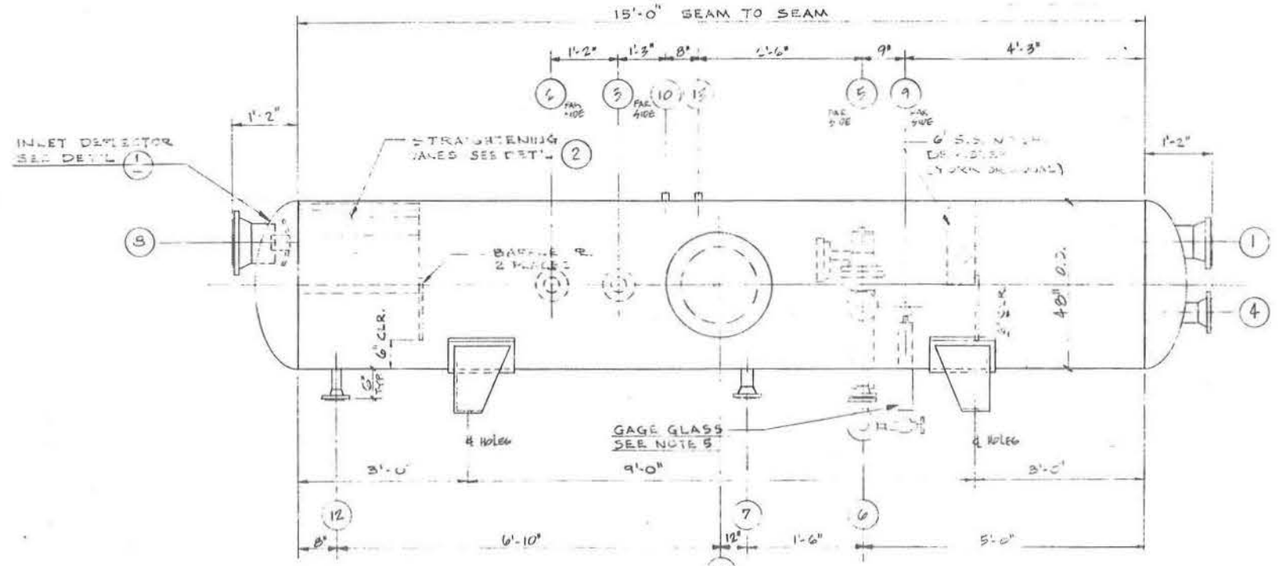
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.E. | ENGR. SECTION | SCALE NOTED
CHECKED | APPROVED | DATE 1-7-71

084-113

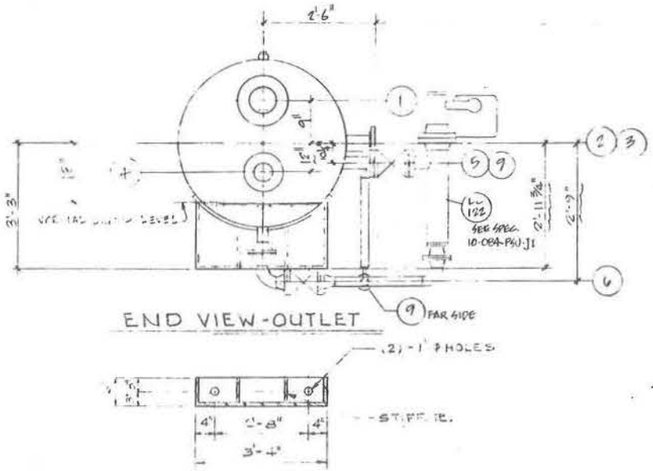


END VIEW-INLET

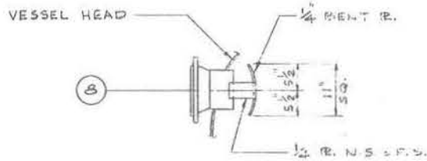


SIDE ELEVATION

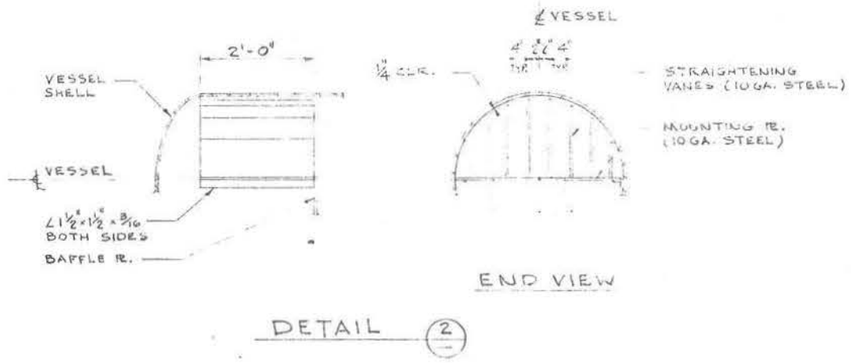
NO SCALE



END VIEW-OUTLET



DETAIL (1)



END VIEW

DETAIL (2)

GENERAL NOTES

1. SEE SPECIFICATION NO. 10-084 WTUSI FOR SPECIFICATIONS.
2. DESIGN PRESSURE 275 PSIG @ 100° F. W/ 1/16" CORROSION ALLOWANCE. ASME CODE PER SECT. VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO. 10-084 C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO. 10-084 C2
5. DANIEL GAGE GLASS TUBE 52 TL W/(2) - 3/4" TYPE 15 GAGE VALVES W/ 3/4" XXH PIPE NIPPLES.

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION
1	16"	150# ASA	GAS OUTLET
2	3"	"	RUPTURE DISC
3	3"	"	RELIEF
4	4"	"	HIGH LEVEL SHUTDOWN
5	2"	"	LEVEL CONTROL
6	2"	"	LEVEL CONTROL
7	2"	"	LIQUID OUTLET
8	6"	"	GAS INLET
9	3/4"	3000# F.S.	CPLG. GAGE GLASS (2 REQD)
10	1/2"	"	CPLG. PRESS. INDICATOR
11	16"	150# RSRF	FLG'D MANWAY W/COVER & DAVIT
12	2"	"	DRAIN
13	1/2"	3000# FS	CPLG. HIGH PRESSURE SHUTDOWN

NO.	DATE	REVISIONS	BY	CHK.	APPR.	NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

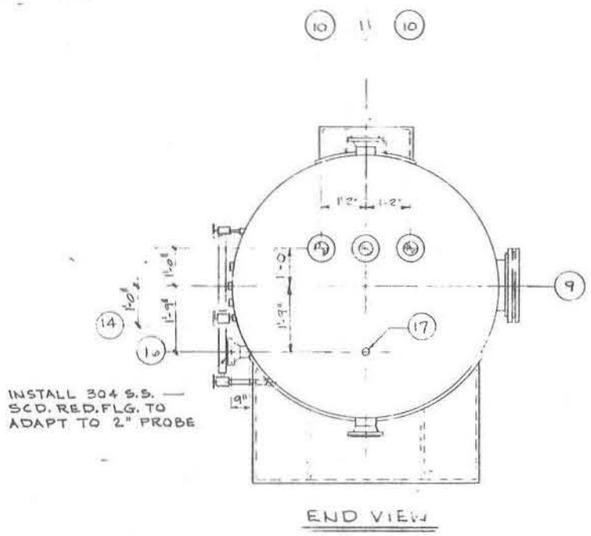
GAS SCRUBBER V-3

SPEC NO 10-084 PSU

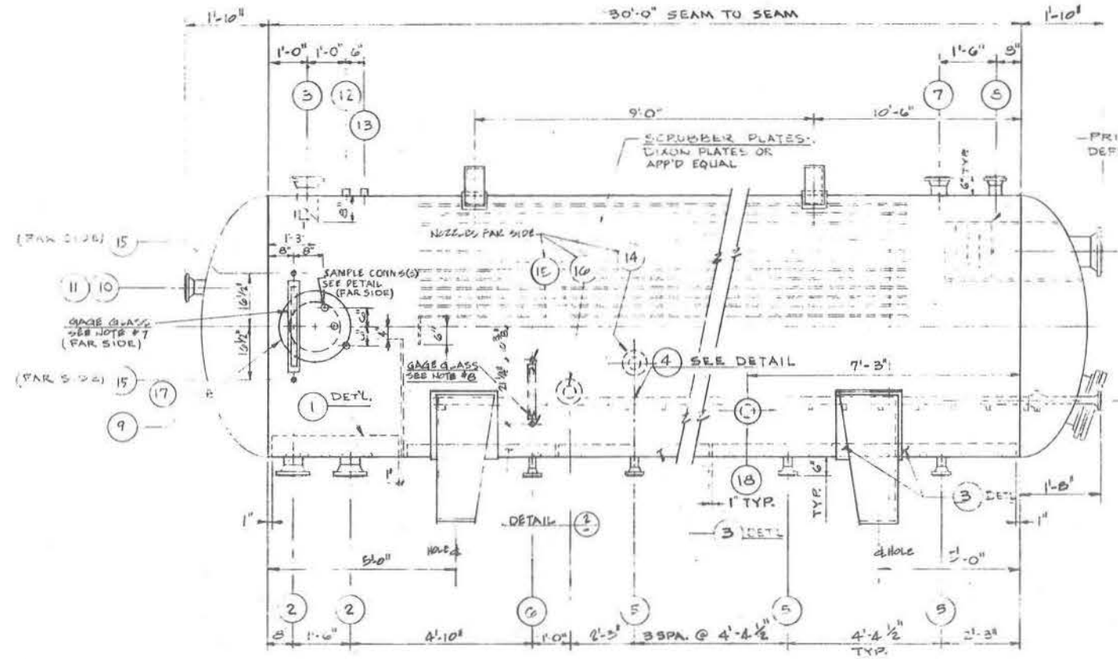
DRAWN M.E. | ENGR SECTION | SCALE 0"=1'-0" | 084-114
CHECKED | APPROVED | DATE 1-7-71

HOBBS-BANERMAN CORPORATION
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

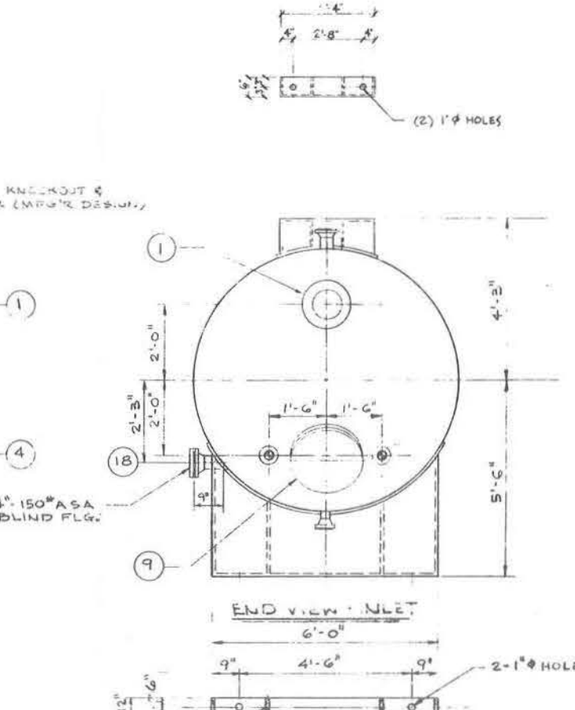
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT



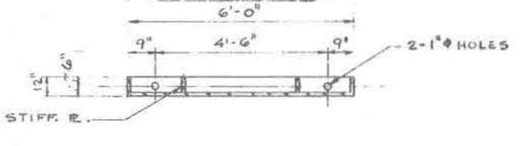
END VIEW

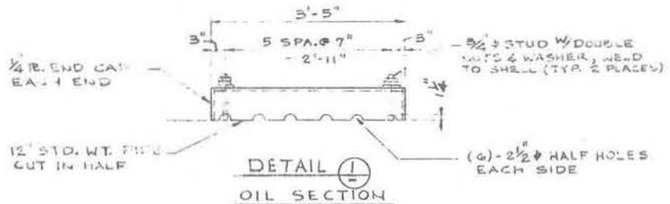


ELEVATION

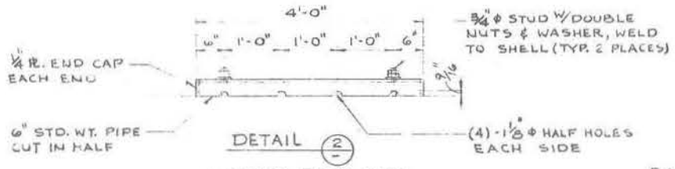


END VIEW - INLET

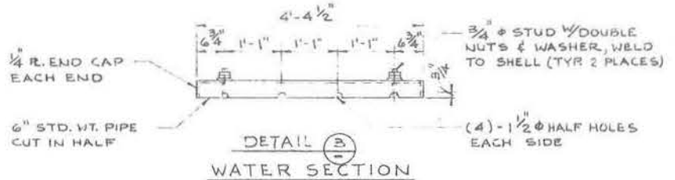




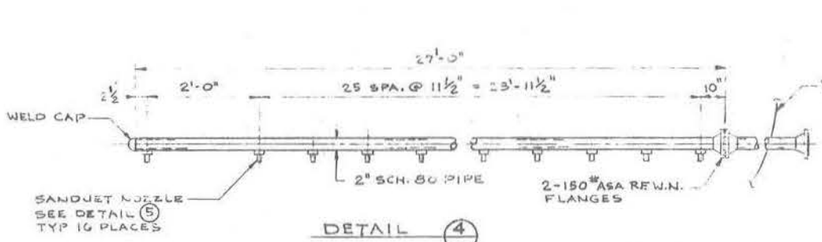
DETAIL (1) OIL SECTION SAND COLLECTOR (ONE REQ'D)
3/4" = 1'-0"



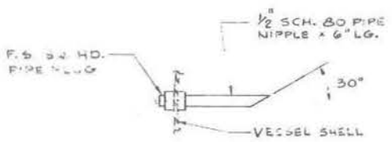
DETAIL (2) WATER DRAWOFF SAND COLLECTOR (ONE REQ'D)
3/4" = 1'-0"



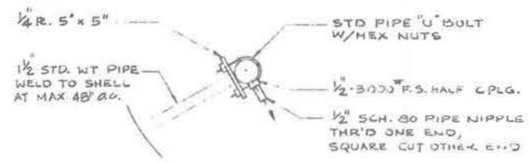
DETAIL (3) WATER SECTION SAND COLLECTOR (FIVE REQ'D)
N.T.S.



DETAIL (4) SAND JET HEADER - TWO REQ'D
3/4" = 1'-0"



SAMPLE (3 REQ'D) N.T.S.



DETAIL (5) 1 1/2" = 1'-0"

GENERAL NOTES (CON'TD.)

7. FURNISH & INSTALL DANIEL NO. 92TL GAGE GLASS W/ TWO TYPE 'IS' GAGE VALVES W/ 3/4" XXH PIPE NIPPLES.
8. FURNISH & INSTALL DANIEL NO. 42TL GAGE GLASS W/ TWO TYPE 'IS' GAGE VALVES W/ 3/4" XXH PIPE NIPPLES.

GENERAL NOTES:

1. SEE SPECIFICATION NO. 10-084-PSU1 FOR SPECIFICATION
2. DESIGN PRESSURE 275 P.S.I.G AT 100°F W/ 1/16" CORROSION ALLOWANCE. ASME CODE SECT. VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO. 10-084C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO. 10-084C2
5. FLANGE BOLTS TO BE ASTM B-7 W/HEAVY HEX NUTS
6. GASKETS ON INTERNALS TO BE 1/16" G-M60 (OR EQ.)

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION	
1	10"	150# ASA RF	OIL INLET	
2	6"	"	OIL OUTLET	(2-REQ'D)
3	8"	"	GAS OUTLET	
4	2"	"	SAND JETS	(2-REQ'D)
5	2"	"	SAND DRAWOFF	(5-REQ'D)
6	3"	"	WATER OUTLET	
7	4"	"	RELIEF	
8	3"	"	RUPTURE DISC.	
9	16"	"	FLG MANWAY W/ COVER & DAVIT	(2-REQ'D)
10	4"	"	LEVEL CONTROL	(2-REQ'D)
11	4"	"	HIGH LEVEL SHUTDOWN	
12	1/2"	3000# F.S.	CPLG. PRESS. IND.	
13	1/2"	"	CPLG HIGH PRESS SHUTDOWN	
14	4"	150# ASA RF	LOW LEVEL SHUTDOWN	
15	3/4"	3000# F.S.	CPLG. GAGE GLASSES	(4-REQ'D)
* 16	4"	150# ASA RF	FLG. INTERFACE CONTROL	
17	3/4"	"	CPLG THERMOWELL	
18	4"	150# ASA RF	CATHODIC PROT. ANODE W/ BLIND FLG.	

* W/ S.S. SCRD. ADAPTER FLG.

NO.	DATE	REVISIONS	BY	CHK.	APPR.	NO.	DATE	REVISIONS	BY	CHK.	APPR.

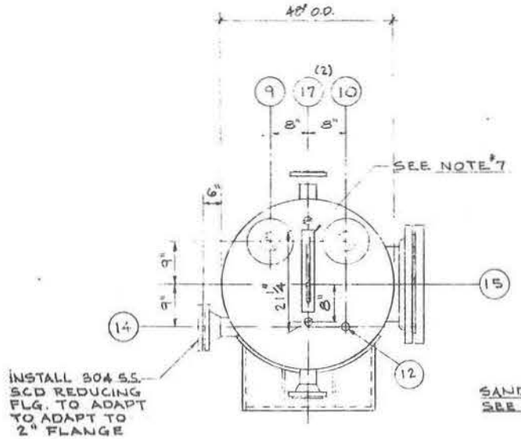
DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

V-IB PRODUCTION SEPARATOR
SPEC. NO. 10-084 PSU

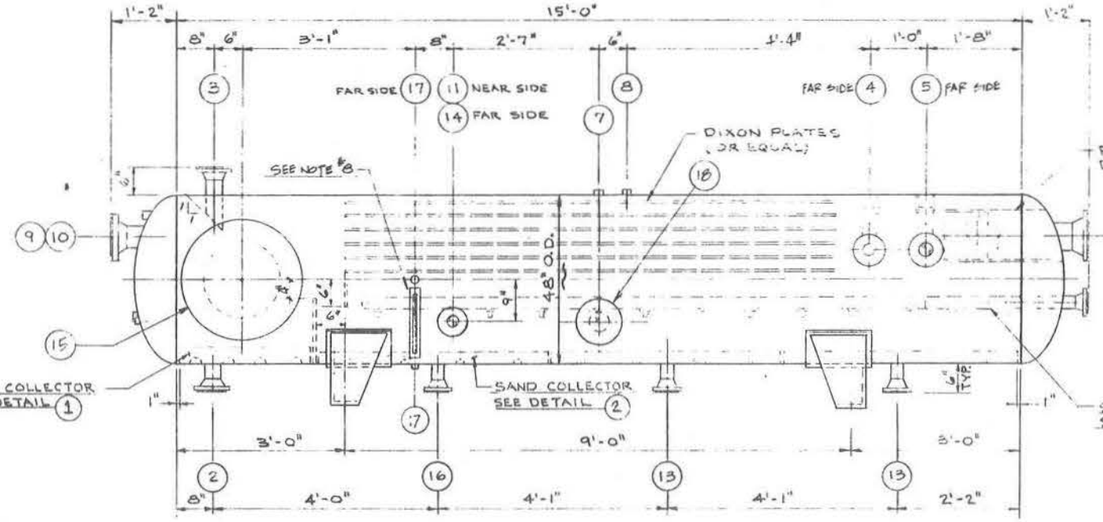
HOBBS-BANNERMAN CORPORATION
ENGINEERS — CONSTRUCTORS
SANTA FE SPRINGS, CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

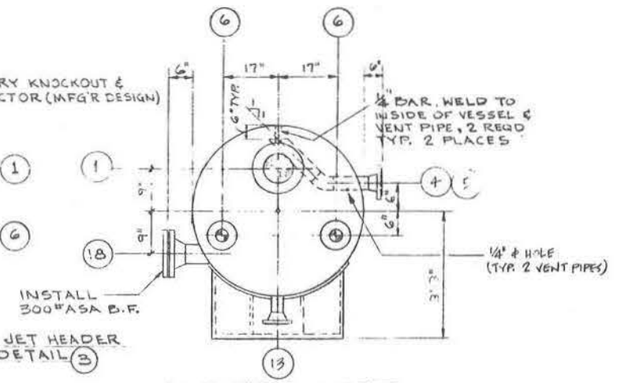
DRAWN M.E. | ENGR. SECTION | SCALE NOTED | 084-115
CHECKED | APPROVED | DATE 1-7-71



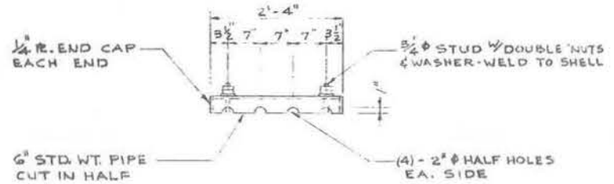
END VIEW



SIDE ELEVATION

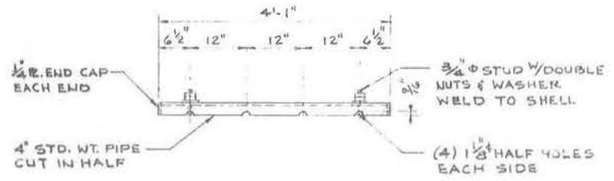


END VIEW - INLET



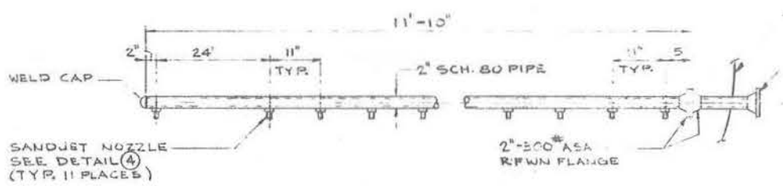
DETAIL (1) ¾" = 1'-0"

OIL SECTION - SAND COLLECTOR
ONE REQD



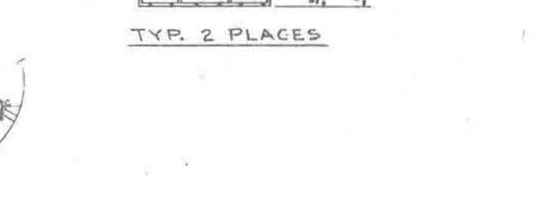
DETAIL (2) ¾" = 1'-0"

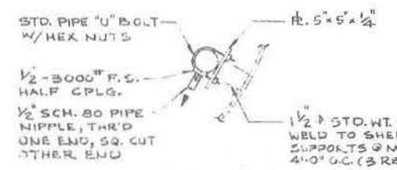
WATER SECTION - SAND COLLECTOR
THREE REQD



DETAIL (3) ¾" = 1'-0"

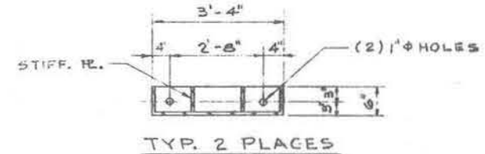
SAND JET HEADER (TWO REQD)





DETAIL (4) 1½" = 1'-0"

TYPICAL SAND JET NOZZLE



TYP. 2 PLACES

GENERAL NOTES:

1. SEE SPECIFICATION NO 10-084 FOR SPECIFICATIONS.
2. DESIGN PRESSURE - 500 PSIG @ 100°F W/⅛ CORROSION ALLOWANCE. ASME CODE PER SECT. VIII
3. VESSEL TO BE INTERNALLY COATED PER SPECIFICATION NO 10-084 C1
4. VESSEL TO BE EXTERNALLY COATED PER SPECIFICATION NO 10-084 C2
5. FLANGE BOLTS TO BE ASTM B-7 W/HEAVY HEX NUTS.
6. GASKETS ON INTERNALS TO BE U-M60 (OR EQ.)
7. FURNISH AND INSTALL DANIEL 42 TL GAGE GLASS WITH TWO ¾" 1S VALVES, USE ¾" XXH NIPPLES. SUPPORT GAGE AT MIDPOINT FROM VESSEL SHELL.
8. FURNISH AND INSTALL DANIEL 91 TL GAGE GLASS WITH TWO ¾" 1S VALVES, USE ¾" XXH NIPPLES. SUPPORT GAGE AT MIDPOINT FROM VESSEL SHELL.

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION
1	6"	300# ASA RF	OIL INLET
2	3"	"	OIL OUTLET
3	3"	"	GAS OUTLET
4	2½"	"	RELIEF
5	3"	"	RELIEF RUPTURE DISC
6	2"	"	SAND JETTING 2 REQD
7	½"	3000# F.S.	CPLG. PRESS. INDICATOR
8	½"	"	CPLG. HIGH PRESS. SHUTDOWN
9	4"	300# ASA RF	LEVEL CONTROL
10	4"	"	HIGH LEVEL SHUTDOWN
11	2"	"	LOW LEVEL SHUTDOWN
12	¾"	3000# F.S.	CPLG. TEMP. INDICATOR
13	2"	300# ASA RF	SAND DRAW-OFF 2 REQD
14	4"	"	F-12 INTERFACE CONTROL *
15	16"	300# ASA RF	FLG'D. MANWAY W/BLIND FLG. & DAVIT
16	2"	"	PRODUCTION WATER OUTLET
17	¾"	3000# F.S.	GAGE GLASS 4 REQD
18	4"	300# R.F.	CATHODIC PROT. ANODE W/ PKG. F.S.

* W/ VICKERS ADAPTER FLG.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SANDSTONE PRODUCTION V-IC

SPEC NO 10-084 PSU

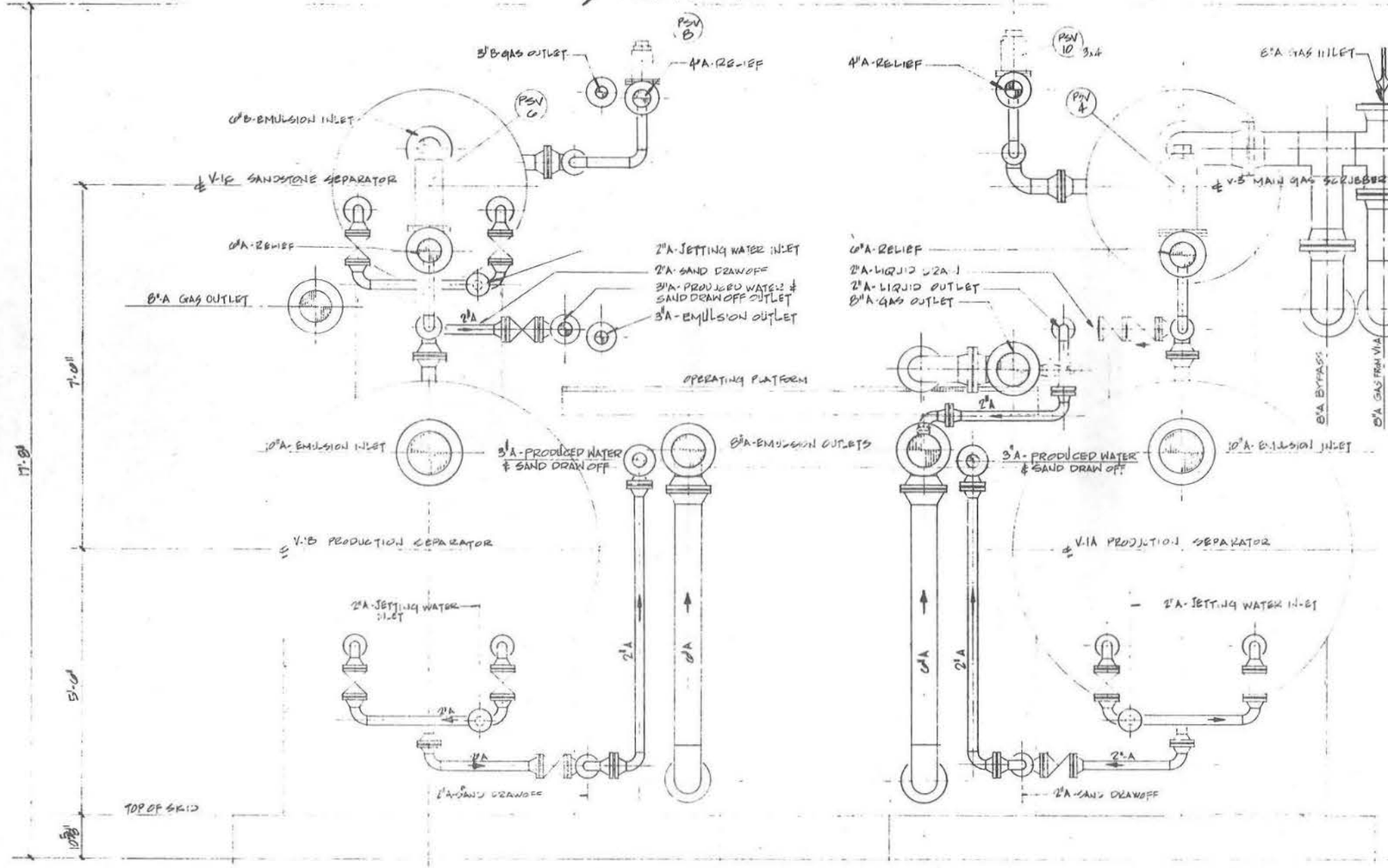
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

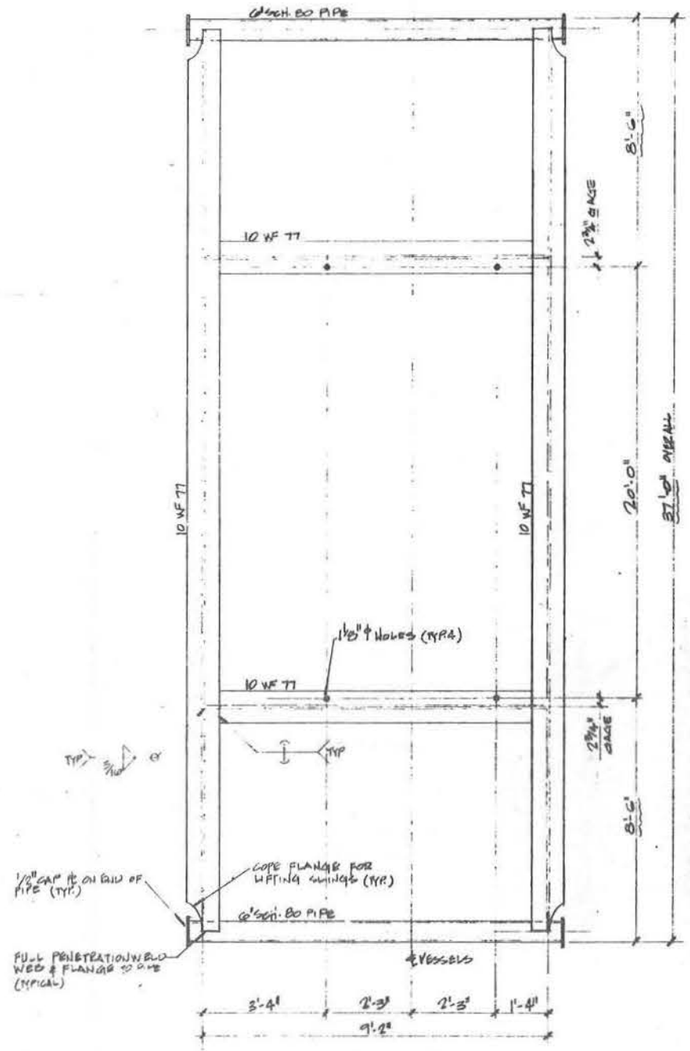
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: L.L.E. | DWG. SECTION | SCALE: NONE | 084-116

CHECKED | APPROVED | DATE: 1-7-71

MAXIMUM OVERHEAD CLEARANCE ON PLATFORM





V-1A, V-3 & V-1B, V-1C
SKID BASE (TWO REQ'D)
NO SCALE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

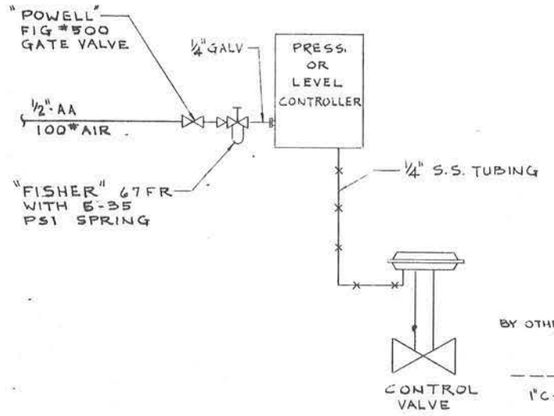
DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

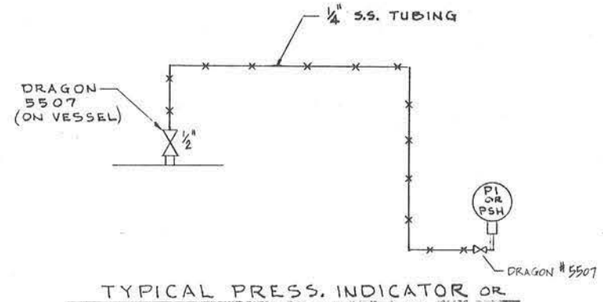
PRODUCTION SEPARATORS V-1A, V-1B, V-1C & GAS SCRUBBER V-3 PIPING ELEVATION
SPEC NO. 10-084 PSU

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

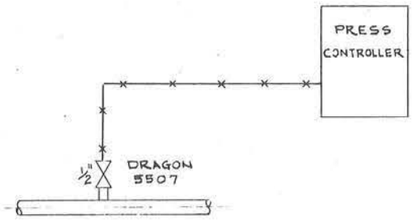
DRAWN TR | DSGN. SECTION | SCALE 3/4"=1'-0" | 084-117
CHECKED | APPROVED | DATE 7-22-71



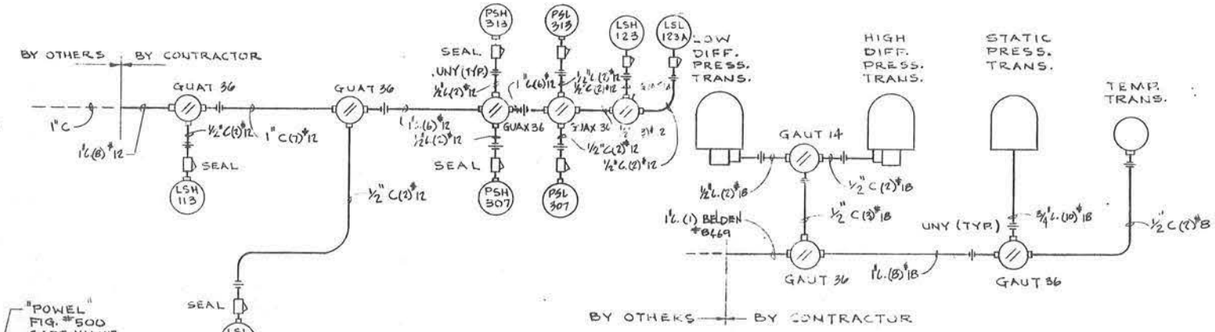
TYPICAL LIQUID LEVEL OR PRESSURE CONTROL VALVE

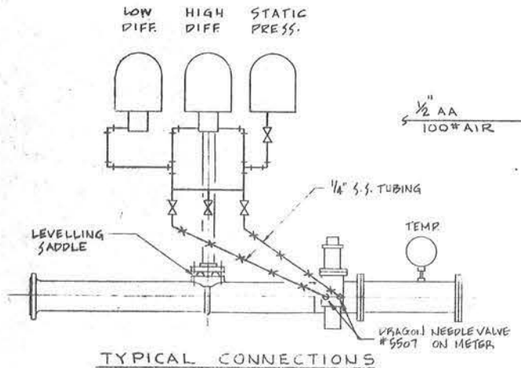


TYPICAL PRESS. INDICATOR OR HIGH/LOW PRESSURE SHUT-DOWN



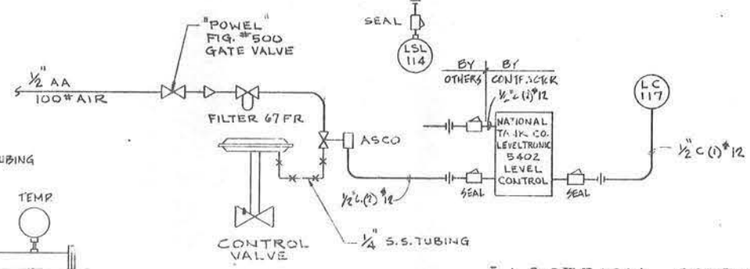
TYPICAL PRESSURE CONTROLLER PIPING



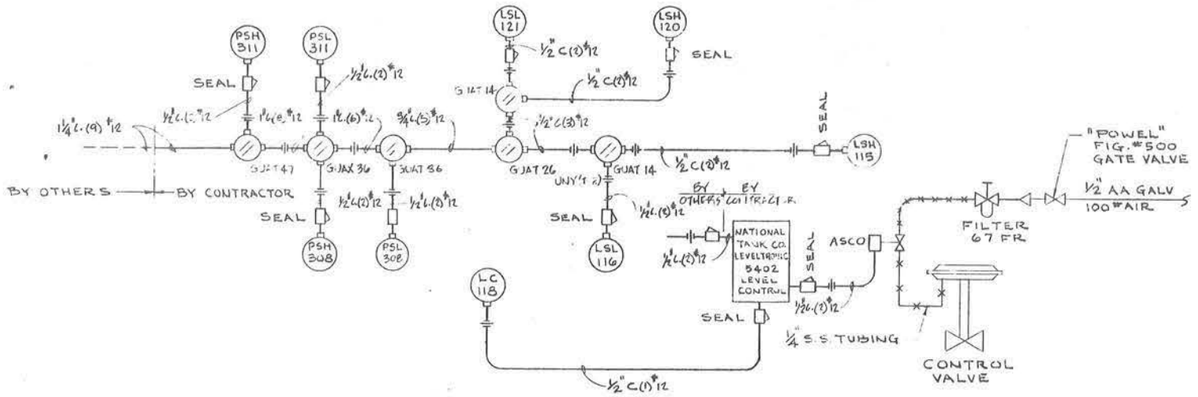


TYPICAL CONNECTIONS ORIFICE METER TUBE

MOUNT & ASSEMBLE TRANSDUCERS, TUBING, FITTINGS, PIPE & MANIFOLDS FURNISHED WITH BARTON METER.



ELECTRICAL CONDUIT CONNECTIONS FOR V-1A & V-3



ELECTRICAL CONDUIT CONNECTIONS. FOR V-1C & V-1B

LEGEND

—×—×—×— STAINLESS STEEL ASTM A269 SEAMLESS WITH IMPERIAL TYPE 316SS. HI-SEAL FITTINGS.

NOTE:

INSTALL 1/2" GALVANIZED CLASS AA PIPING TO ALL PNEUMATIC INSTRUMENTS & CONTROLLERS, PIPE TO ONE CONNECTION POINT FOR EXTERNAL SOURCE.

NO.	DATE	REVISIONS	BY	CHK.	APPD.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

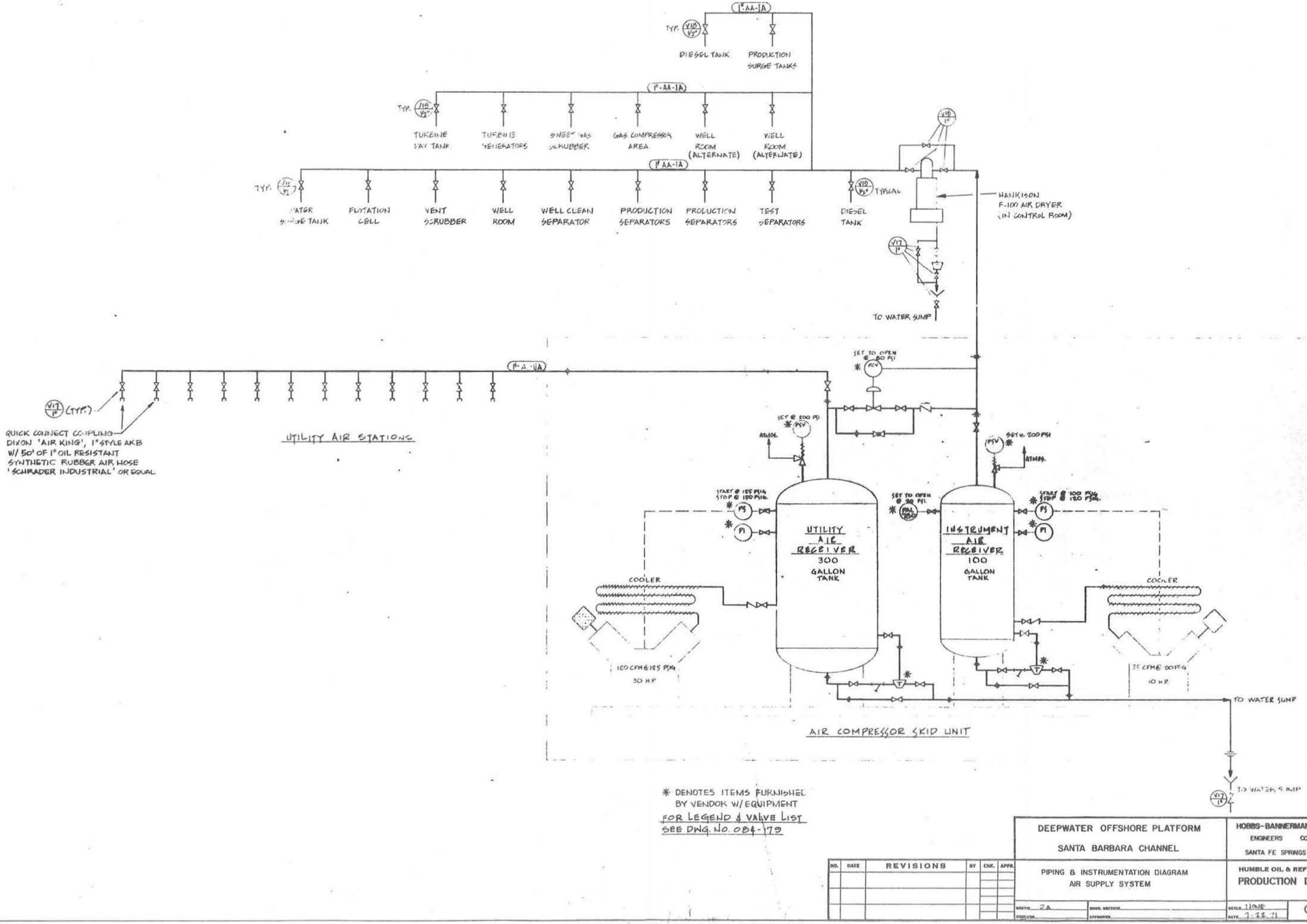
PRODUCTION SEPARATOR & GAS SCRUBBER INSTRUMENTATION DETAILS
SPEC NO. 10-084 PSU

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.E. | CHECKED | DIVISION SECTION | APPROVED | SCALE NONE | DATE 5-11-71

084-118



* DENOTES ITEMS FURNISHED BY VENDOR W/ EQUIPMENT

FOR LEGEND & VALVE LIST SEE DWG. NO. 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PIPING & INSTRUMENTATION DIAGRAM
AIR SUPPLY SYSTEM

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: ZA | SUPER. INSPECTION: | SCALE: NONE
CHECKED: | APPROVED: | DATE: 7-22-71

084-119

REV. 1

T-2A
CLEAN WATER SURGE TANK
200 BBL. API 650 WELDED 9'-2 3/4" O.D. x 16'-1" HIGH

T-2
WATER SURGE TANK
200 BBL. API 650 WELDED
9'-2 3/4" O.D. x 16'-1" HIGH

FLOTATION UNIT
25,000 BPD

P-21A, P-21B
EFFLUENT PUMPS

FROM DRILLING DECK CUTTING WASH (6"A-PW)

VENT

OVERFLOW

SKIMMER

SOLENOID OPERATED SAND DRAWOFF VALVES

* FURN. W/ UNIT

FUEL GAS (1½"A-FG)

P-21A

P-21B

TURBIDITY METER & ALARM — IN MAIN CONTROL ROOM

DRAIN

OIL DRAIN (6"A-OD)

VAPOR RECOVERY (4"A-VR)

EMULSION (6"A-E)

PROCESS WATER (4"A-PW)

GRAVITY DRAIN (4"A-GD)

JETTING WATER (2"A-JW)

FUTURE

JETTING WATER

DIESEL FUEL OVERFLOW (3"A-DF)

DECK DRAINS (12"A-GD)

FROM VENT SCRUBBER (10"A-E)

BARGE LOADING FUTURE

MLLW ELEV

DISPOSAL TUBE 24"x250'

NOTE.
FOR LEGEND & VALVE LIST
SEE DWG # 084-179

V-8
RECOVERED OIL SUMP TANK
5'-0" DIA. x 8'-0" S/S

P-5A & P-5B
OIL SUMP PUMPS

V-7
DRAIN SUMP TANK
5'-0" DIA. x 15'-0" S/S

P-1A & P-1B
WATER SUMP PUMPS
250 GPM EACH

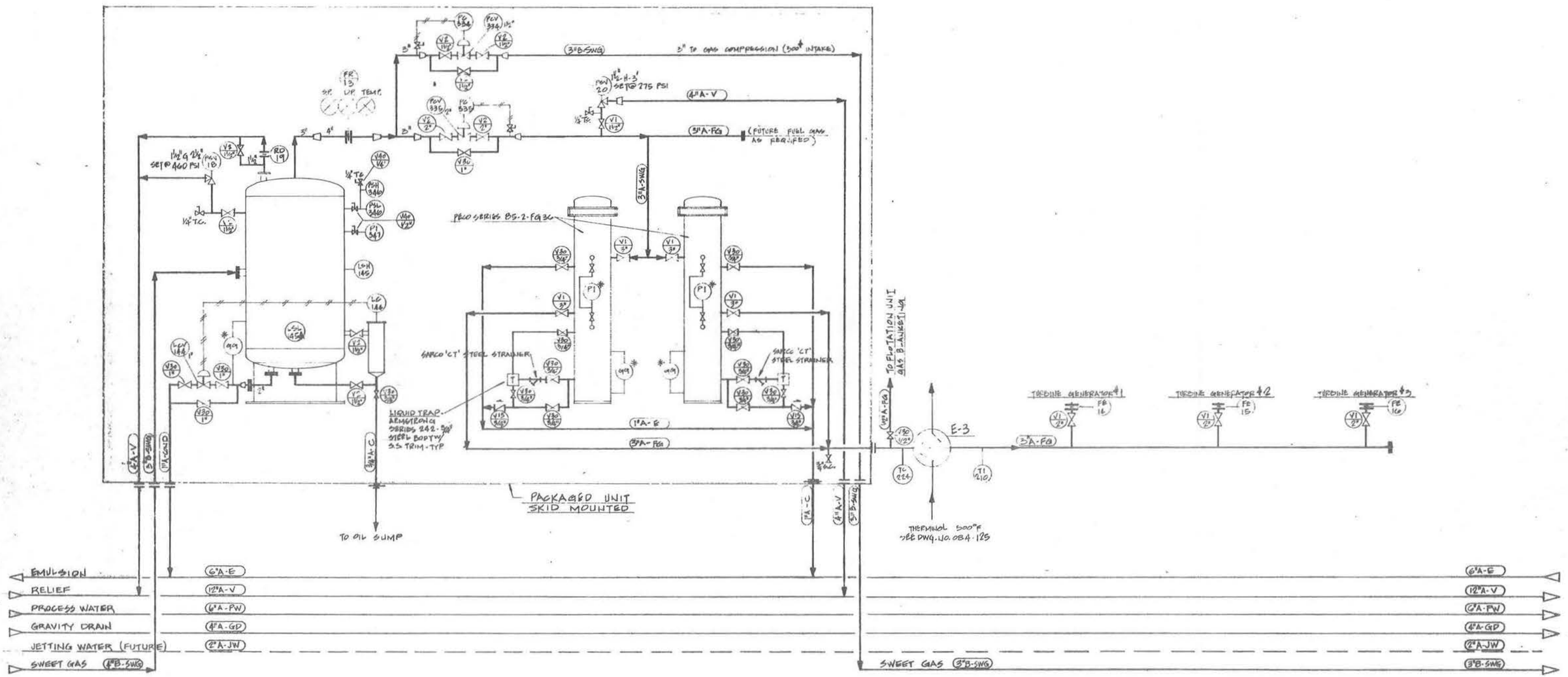
DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL	HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
PIPING & INSTRUMENTATION DIAGRAM DRAIN & WATER CLEANING SYSTEM	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN JSG · CHECKED · BRGR. SECTION · APPROVED · SCALE NONE · DATE 7-22-71	084-120

REV. 1

V-5
SWEET GAS SCRUBBER
DESIGN PRESS: 500 PSIG
5 MMSCFD 24" O.D. x 6 FT.

F-1A F-1B
FILTER SEPARATORS
DESIGN PRESS. 200 PSIG
1 MMSCFD

E-3
FUEL GAS HEATER
22,000 BTU/HR



NOTE: * INDICATES ITEMS FURNISHED WITH EQUIPMENT

FOR LEGEND & VALVE LIST SEE DWG 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
SWEET GAS SYSTEM

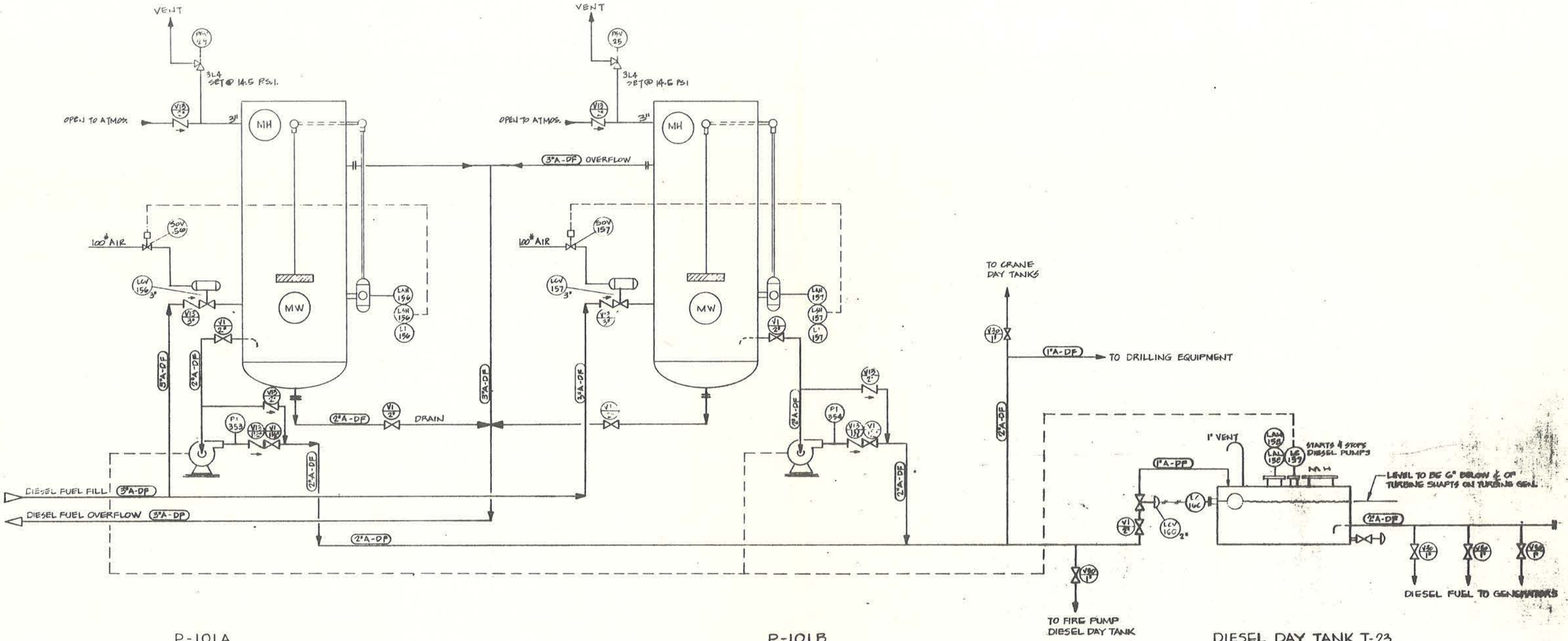
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN TR | CHECKED | DSGN. SECTION | APPROVED
SCALE NONE
DATE 7-22-71
084-121

CRANE PEDESTAL
DIESEL TANK #1

CRANE PEDESTAL
DIESEL TANK #2



P-101A
DIESEL PUMP

P-101B
DIESEL PUMP

DIESEL DAY TANK T-23
TURBINE GENERATORS
24" OD. x 20'-0" LONG

FOR LEGEND & VALVE LIST
SEE DWG 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
DIESEL FUEL SYSTEM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSG | DESIGN SECTION | SCALE 1/2"=1'-0"
CHECKED | APPROVED | DATE 1-2-71

084-122

REV. 1

E-1A, E-1B, E-2A
CRUDE OIL HEATERS

V 4A
PRODUCTION SURGE
144" O.D. x 9'-0" SS
DESIGN: 50 PSI @ 100°F

V 4B
PRODUCTION SURGE
144" O.D. x 9'-0" SS
DESIGN: 50 PSI @ 100°F

V 4C
PRODUCTION SURGE
144" O.D. x 9'-0" SS
DESIGN 50PSI@100°F

E1A
18" O.D.

E1B
18" O.D.

E-2A
18" O.D.

SKID MOUNTED
NOTE: SEE DWG. NO. 084-125 FOR HEATING SYSTEM

10"Δ E 2 PASS

#1 TEST HEADER

PACKAGED UNIT
SKID MOUNTED

1" INSULATION

FUTURE THERMINOL HEAT TRACING (TYPICAL)

FUT 22 THERMINOL HEAT TRACING (TYPICAL)

INTERFACE

EMULSION (12"A-E)
TEST CRUDE TO V-2A (4"C-E)
RELIEF (12"A-V)
PROCESS WATER (6"A-PW)
GRAVITY DRAIN (8"A-GD)
JETTING WATER (3"A-JW)
SWEET GAS (3"B-SWG)
METER PROVER (4"B-MP)
METER PROVER (4"B-MP)

(10"A-VR)
(10"A-E)
(6"A-E)
(12"A-V)
(6"A-PW)
(8"A-GD)
(2"A-JW)
(3"B-SWG)
(4"B-MP)
(4"B-MP)

MATCHLINE DWG 084-127

* DENOTES ITEMS FURNISHED W/ EQUIPMENT
SEE DWG. NO. 084-179 FOR LEGEND & VALVE LIST

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

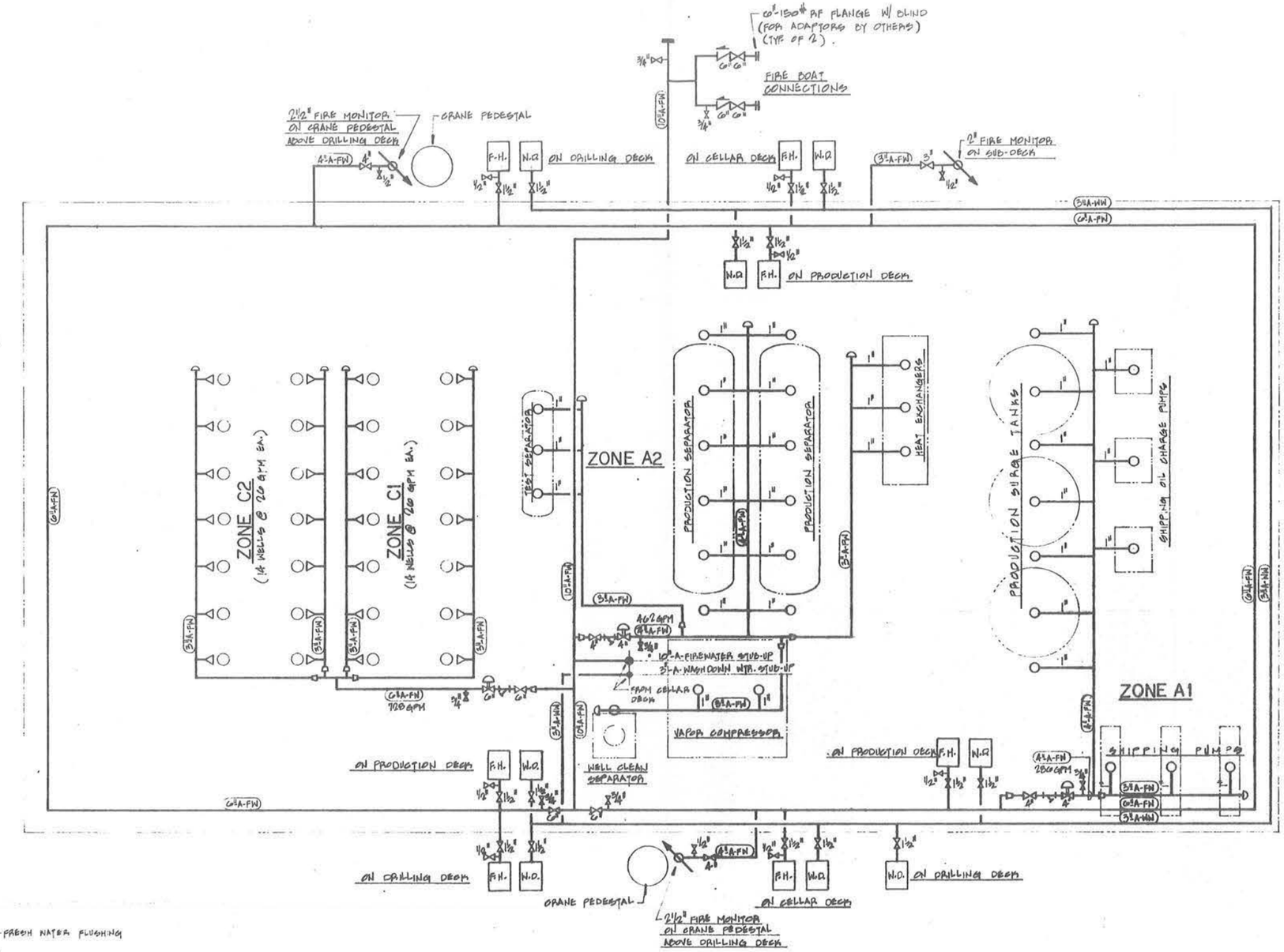
PIPING & INSTRUMENTATION DIAGRAM
PRODUCTION SURGE TANKS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN J.G.G.
CHECKED
ENGR. SECTION
APPROVED
SCALE NONE
DATE 7-22-71

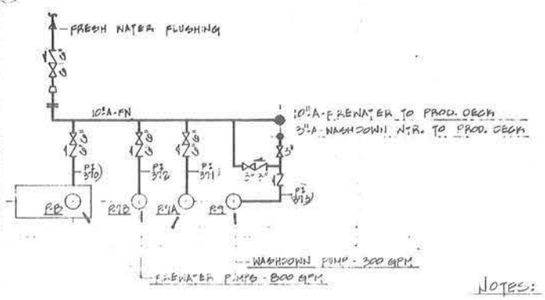
084-123



PRODUCTION DECK PLAN

LEGEND — SEE SPECIFICATION M-054 FPE FOR EQUIPMENT & VALVE SYMBOLS

- SPRAYING SYSTEMS OR "FULL-JET" SPRAY NOZZLE No 3/4" HHGW 22 GPM.
- 3/4" ELKHART FOR NOZZLE NO-C WITH BALL SWIVEL JOINT & LOCK HANDLE. ALL BRONZE PLATED BRASS, SET FOR 20 GPM.
- FIRE MONITOR - ELKHART & SYR-CO. 2½" TO BE 500 GPM W/ 1½" NOZZLE. 2" TO BE 170 GPM W/ 1" NOZZLE.
- F.H. FIRE HOSE STATION (500 GPM) — ALL HOSE REEL STATIONS TO BE SUPPLIED WITH TYPE A 1½" HOSE RACK 100 FT. 1" BRONZE WASHDOWN HOSE, ADJUSTABLE FOG NOZZLE & SHUT OFF VALVE
- W.Q. WASHDOWN STATION
- AUTOMATIC VALVE
- STRAINER



CELLAR DECK - PARTIAL PLAN
FIRE PUMP AREA

Notes:

1. INSTALL START-STOP PUSHBUTTON FOR R1A & R1B AT ALL MONITORS & FIRE HOSE STATIONS.

INSTALL START-STOP PUSHBUTTON FOR R9 AT ALL WASHDOWN HOSE STATIONS.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PIPING & INSTRUMENTATION DIAGRAM
FIRE PROTECTION SYSTEM

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JM | ENGR. SECTION | SCALE 1" = 10'
CHECKED | APPROVED | DATE 2-25-75

084-124

REV: 1

T-20
THERMINOL EXPANSION TANK
36"O.D. x 8'-0" S/S

TURBINE EXHAUST HEAT EXCHANGERS

E-5A
5.15 MM BTU/HR.
DESIGN PRESSURE
150 PSI @ 600°F

E-5B
5.15 MM BTU/HR
DESIGN PRESSURE
150 PSI @ 600°F

E-5C
5.15 MM BTU/HR
DESIGN PRESSURE
150 PSI @ 600°F

3/4" CROSBY JR-C SET @ 200 PSIG

TURBINE EXHAUST GASES

SKID MOUNTED PACKAGED UNIT
* DENOTES ITEM FURNISHED W/HEAT EXCHANGER

CRUDE OIL HEATERS

E-2A
1.83 MMBTU/HR
D.P. 270 PSI @ 110°F

E-1A
5.5 MMBTU/HR
DP 150 PSI @ 600°F

E-1B
5.5 MMBTU/HR
DP 150 PSI @ 600°F

FROM WELL TEST HEADER #1

TO V-2A TEST SEPARATOR

FROM V-1A & V-1B SEPARATORS

2" THK. INSULATION ON CHANNEL & COVERS (TYP. 3 EXCHANGERS)

SKID MOUNTED

NOTE: SEE DWG. NO. 084-123 FOR OIL SYSTEM

NOTE:
EXPANSION TANK TO BE ABOVE HIGHEST POINT OF REMAINDER OF THE SYSTEM

2" VENT

1½" INSULATION

1½" THK. INSUL.

2" FILL CONNECTION

P-20A - P-20B
THERMINOL CIRCULATING PUMPS
300 GPM @ 50 PSI ΔP EACH

FUEL GAS TO TURBINE GENERATORS

FUEL GAS FROM FILTERS F-1A & F-1B (SEE DWG 084-121)

F-3
FUEL GAS HEATER
22 MBTU/HR

GLYCOL REGENERATER
.250 MM BTU/HR

8'-0"

1" SCH. 40 PIPE

BOBB NO. R 400-E BRASS FLOAT VALVE W/ BRASS STEM & COPPER FLOAT BALL

POTABLE WATER MAKE-UP

6" AIR GAP

18" DIA. x 24" TANK

¾"-800# BALL MANUFACTURING CO SERIES B FLOW SWITCH WITH MICRO SWITCH SP DT. BRASS BODY & TRIM EXPL PROOF ENCLOSURE CLASS I GP D FOR OUTDOOR SERVICE SET TO ACTUATE ON DECREASING P.D. @ 3 GPM

VELL & GOSSET SERIES 1510 TYPE 'B' CENTRIFUGAL PUMP 30' HD. 10 GPM. W/ EXPL. PROOF MOTOR CLASS I, GRP D ½ HP 115V-1Φ 1750 RPM

THERMINOL CIRCULATING PUMPS - JACKET WATER SYSTEM

FOR LEGEND & VALVE LIST SEE DWG 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

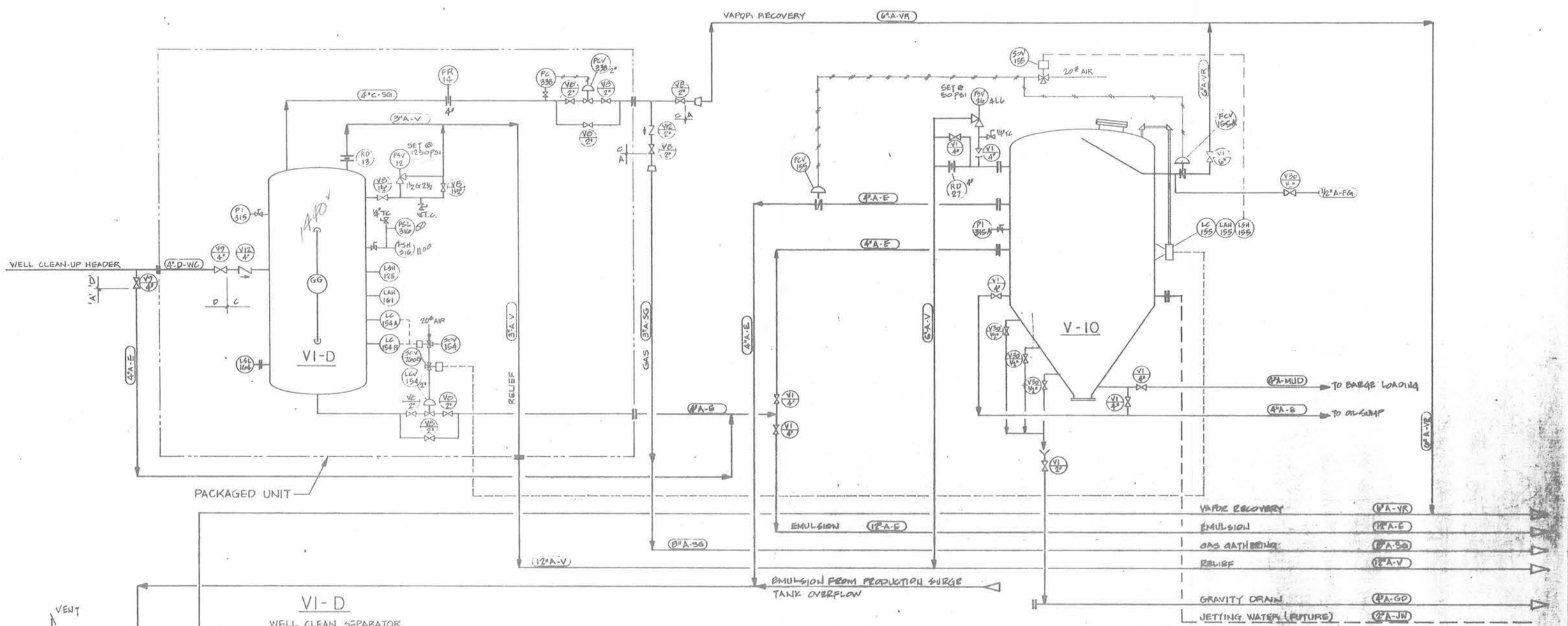
PIPING & INSTRUMENTATION DIAGRAM
CRUDE OIL & FUEL GAS HEATING SYSTEM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: ME
CHECKED:
ENGR. POSITION:
APPROVED:
SCALE: NONE
DATE: 7-22-71

084-125



VI-D

WELL CLEAN SEPARATOR

30" O.D. x 10'-0" SEAM/SEAM
1440 PSIG D.P. @ 100° F
85-1000 PSIG O.P.E 60°F
5 MBOPD
5 MMSCFD

V-10

WELL CLEAN SURGE TANK

10'-0" O.D. x 7'-6" SEAM/SEAM
50 P.S.I.G. M.A.W.P. @ 100°F

EMERGENCY SURGE TANK T-22

500 BBL
8' HIGH x 10' WIDE x 35' LONG

FOR LEGEND & VALVELIST SEE DWG. 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
WELL CLEAN SEPARATOR & TANK

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSA | ENGR. SECTION | SCALE 3/4"=1'-0"
CHECKED | APPROVED | DATE

084-126

REV. 1

P-4B
CRUDE OIL SHIPPING PUMP

P-4D
CRUDE OIL SHIPPING PUMP

P-4F
CRUDE OIL SHIPPING PUMP

12"C-E

PSV 21 2½ J4 SET @ 1440 PSI

PSV 22 2½ J4 SET @ 1440 PSI

PSV 23 2½ J4 SET @ 1440 PSI

FCV 120 1½"

FCV 121 1½"

FCV 122 1½"

6"B-MP

6"B-MP

METER PROVER

1" INSULATION

PNEUMATIC RELAYS SELECT HIGHEST INPUT MOORE 585 3-15 PSI

P-4A
CRUDE OIL BOOSTER PUMP

P-4C
CRUDE OIL BOOSTER PUMP

P-4E
CRUDE OIL BOOSTER PUMP

6"A-E

10"A-E

1" INSULATION

FUTURE THERMINOL HEAT TRACING (TYPICAL)

12"A-E

VENT

DRAIN

TO OIL SUMP

PIG LAUNCHER

INSULATING FLANGES

* (PSL) TO BE REPLACED AS REQ'D AS ADDITIONAL WELLS ARE BROUGHT INTO PRODUCTION

FROM LG-126

FROM LG-127

MATCH LINE DWG. NO. 084-123

EMULSION	6"A-E
EMULSION	12"A-E
RELIEF	12"A-V
PROCESS WATER	6"A-PW
GRAVITY DRAIN	4"A-GD
JETTING WATER (FUTURE)	2"A-JW
SWEET GAS	3"B-SWG
METER PROVER	4"B-MP
METER PROVER	4"B-MP

12"C-E PIPELINE
6"A-E
12"A-V
6"A-PW
4"A-GD
2"A-JW
3"B-SWG

* DENOTES FURNISHED & MOUNTED ON THE PUMP

FOR LEGEND & VALVE LIST SEE DWG. 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

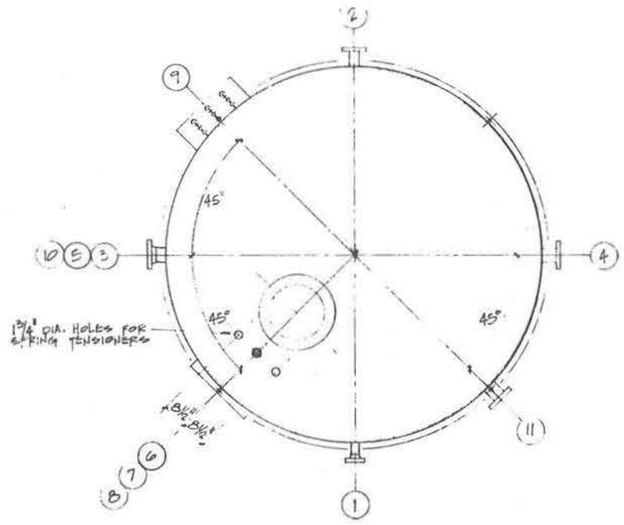
PIPING & INSTRUMENTATION DIAGRAM
CRUDE OIL SHIPPING PUMPS

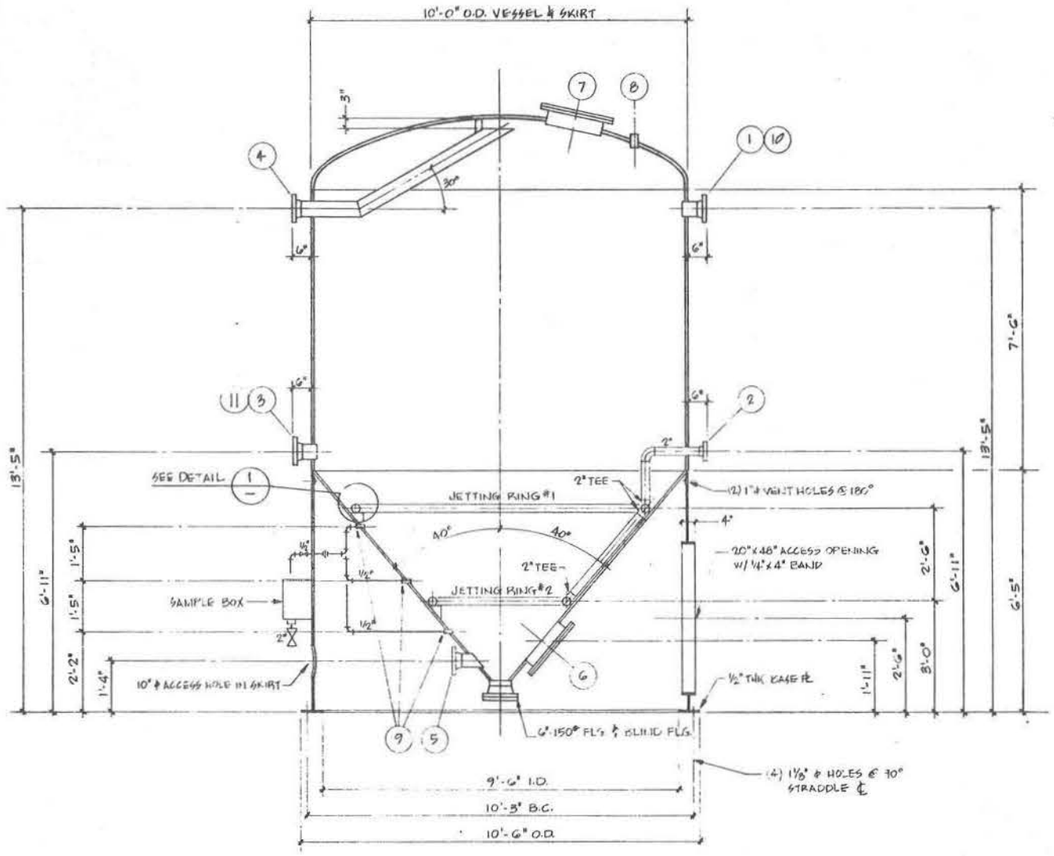
DRAWN TZ | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

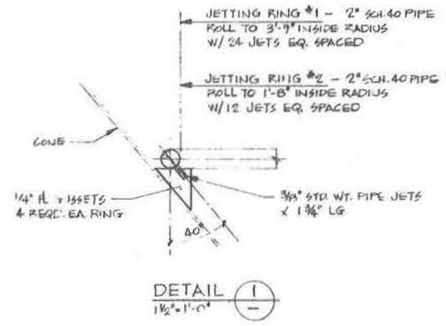
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-127





NOZZLE SCHEDULE			
No	QTY.	SIZE & RATING	
1	1	4"-150# R.F.	INLET
2	1	2"-150# R.F.	JETTING WATER INLET
3	1	4"-150# R.F.	OIL OUTLET
4	1	4"-150# R.F.	TANK VAPORS
5	1	4"-150# R.F.	OUTLET
6	1	16"	MANWAY
7	1	18"	MANWAY
8	3	1½"-3000# F.S. SOL	TANK GAUGE VAREC FIG # 2500
9	3	½"-3000# F.S. CPLG.	SAMPLE CONNECTIONS
10	1	4"-150# R.F.	RELIEF VALVE
11	1	4"-150# R.F.	EMERGENCY DUMP



DETAIL 1
1½" = 1'-0"

DESIGN NOTES

DESIGN PRESSURE - 50 PSI @ 100°F IN ACCORDANCE WITH ASME CODE SECTION VIII WITH 1/16" CORROSION ALLOWANCE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

WELL CLEAN TANK V-10

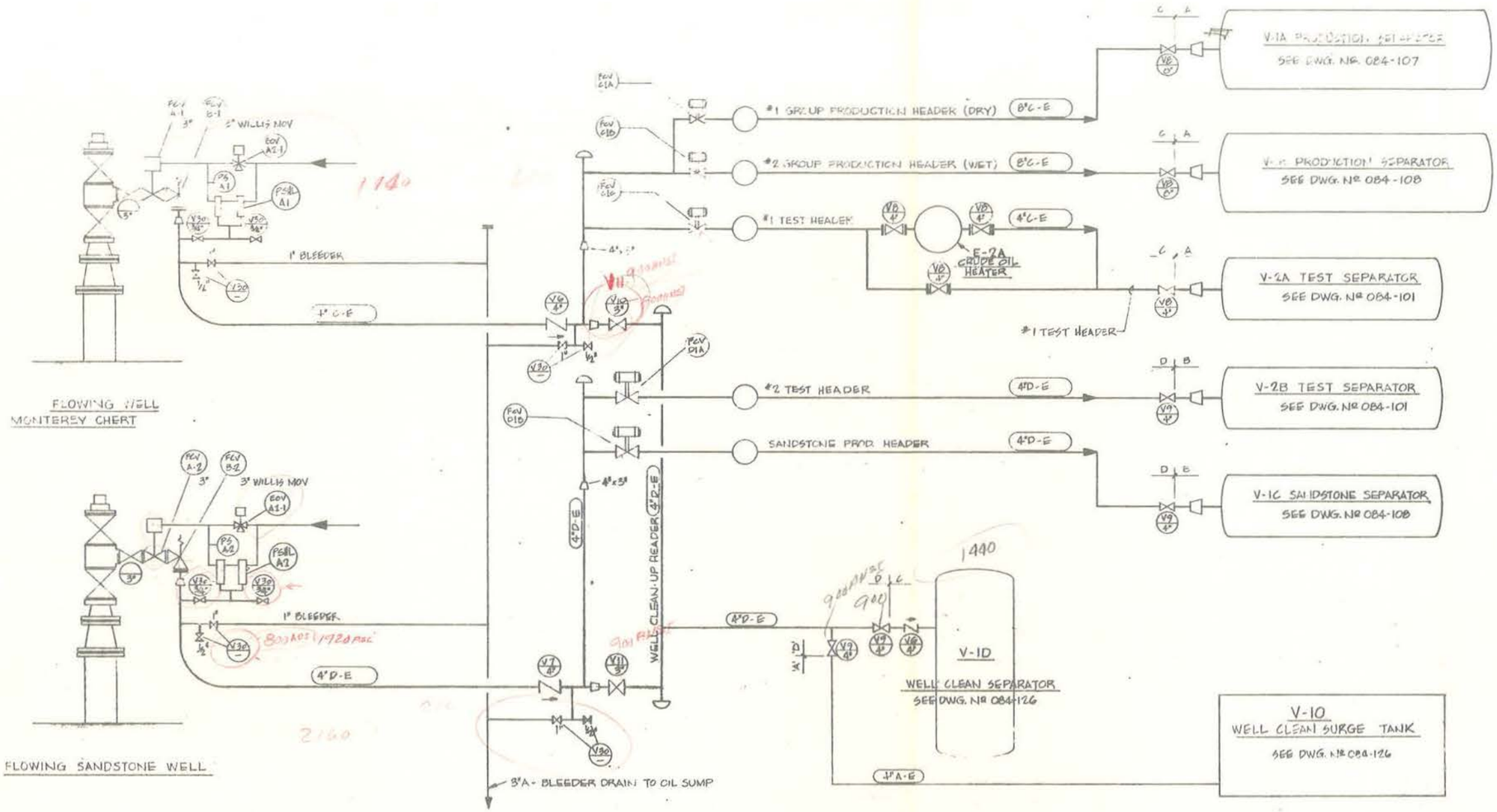
DRAWN JSG
CHECKED
ENGR. SECTION
APPROVED
SCALE ½" = 1'-0"
DATE 7-22-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-128

STEVE COURTNEY



Class A = 275 psi Class AA - 125 psi
Class B = 720 psi
Class C = 1440 psi
Class D = 2160 psi

FOR LEGEND & VALVE LIST
SEE DWG 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPD.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
WELL HEAD MANIFOLD

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

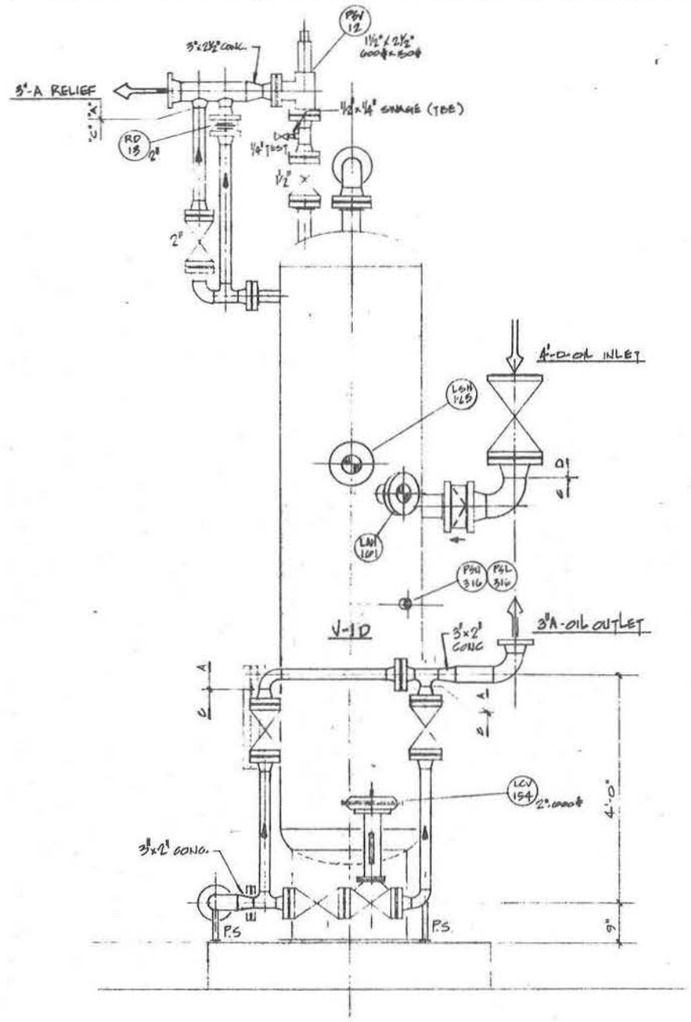
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JAG SCALE NONE
DATE 7-22-71

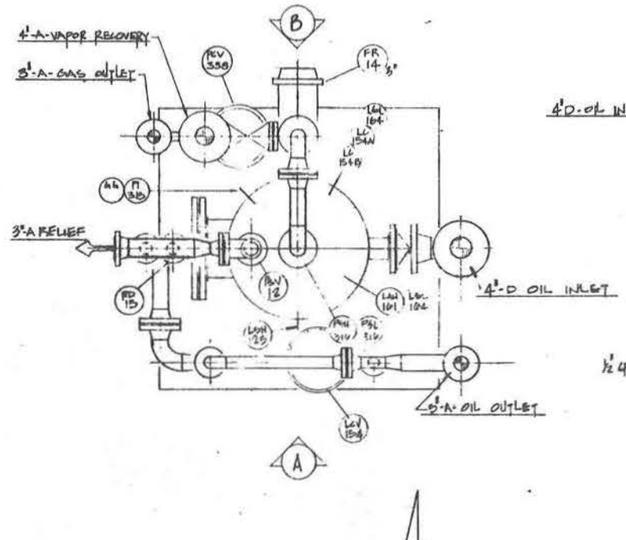
084-129

REV. 1

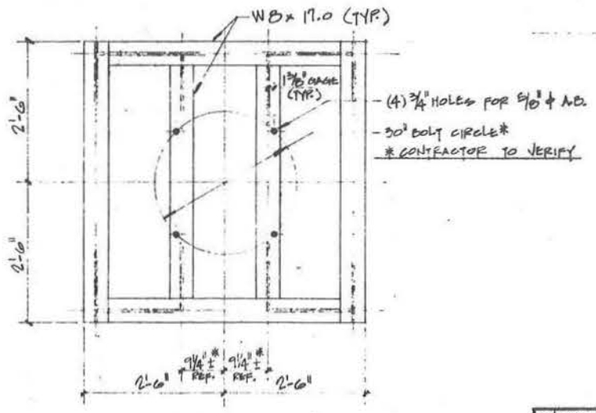
MAX. ALLOWABLE HEAD ROOM 17'-8"



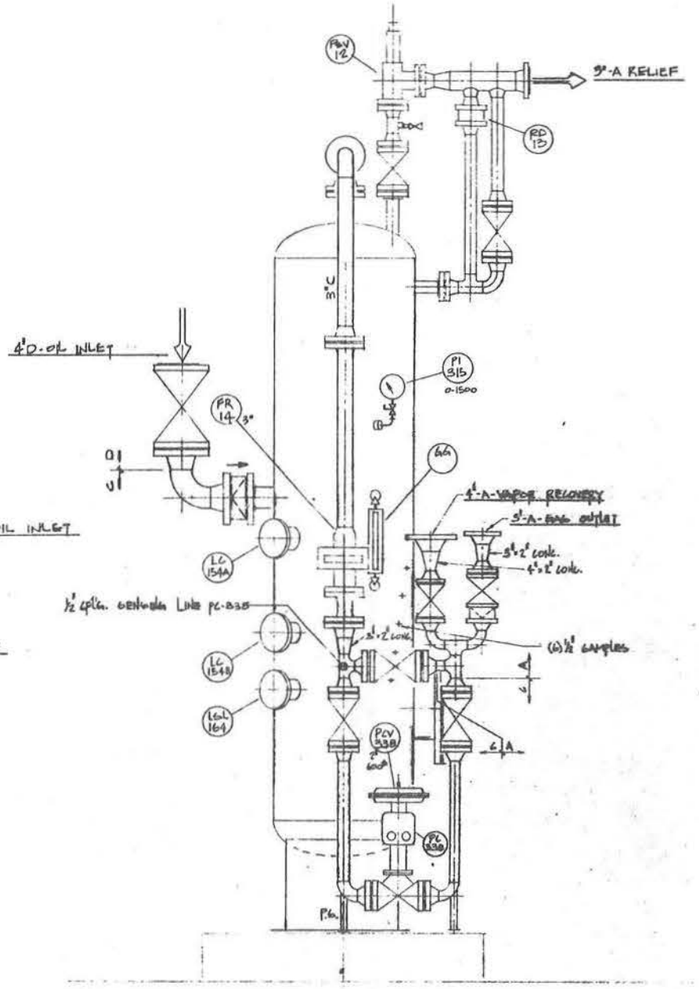
ELEVATION A
3/8" = 1'-0"



PLAN
3/8" = 1'-0"



SKID BASE DETAIL
PLAN VIEW 3/4" = 1'-0"



ELEVATION B
3/8" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

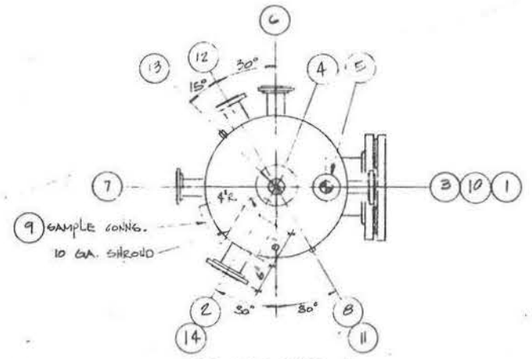
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

WELL CLEAN SEPARATOR
PIPING PLAN & ELEVATIONS

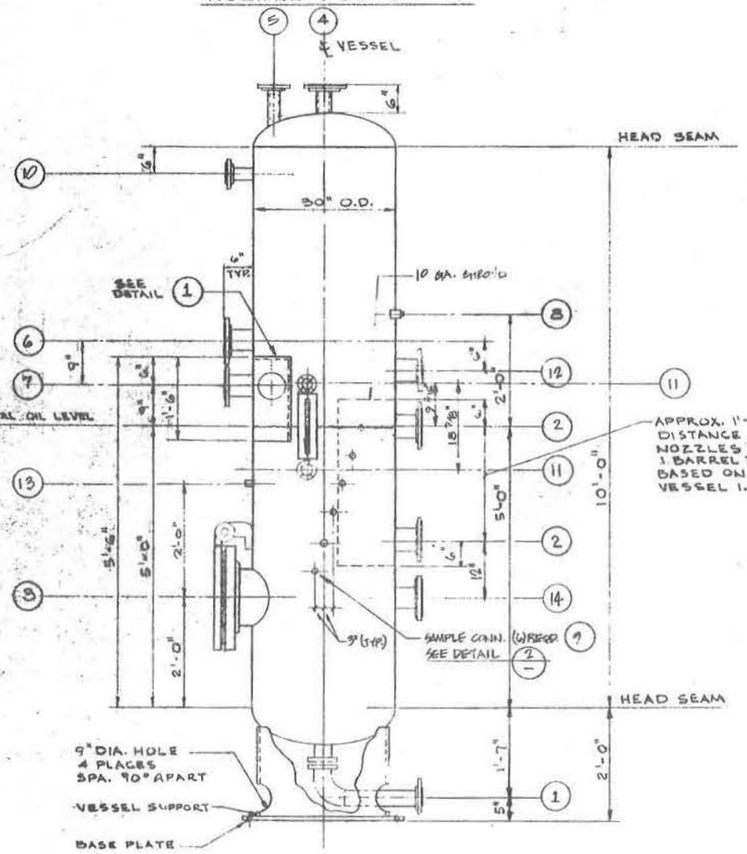
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN D.W. | DESIGN SECTION | SCALE 3/8"=1'-0"
CHECKED | APPROVED | DATE 7-22-71

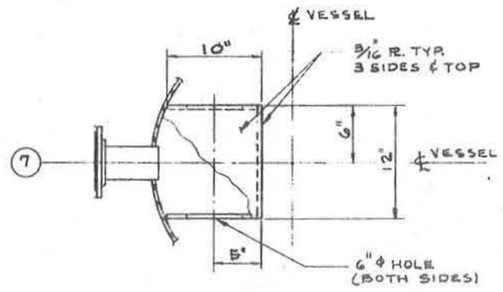
084-130



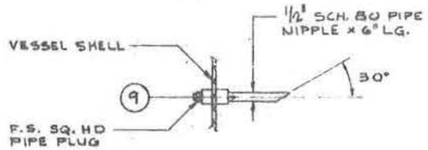
PLAN VIEW
NOZZLE ORIENTATION



ELEVATION
WELL CLEAN SEPARATOR
3/4" = 1'-0"



DETAIL 1
1½" = 1'-0"



DETAIL 2
N.T.S.
SAMPLE (6 REQD)

NOTES

1. DESIGN PRESSURE 1440 P.S.I.G. @ 100°F IN ACCORDANCE WITH ASME CODE SECTION VIII OPERATING PRESSURE 85-1000 PSIG @ 60° WITH 1/16" CORROSION ALLOWANCE.
2. GAGE GLASS TO BE DANIELS 917L W/2 3/4" 16 GAGE VALVES W/ 3/4" XXH NIPPLES.

NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	3"	600# ANSI RF	OIL OUTLET
2	4"	"	LEVEL CONTROL (TWO REQD)
3	16"	"	MANWAY W/COVER & DAVIT
4	3"	"	GAS OUTLET
5	1½"	"	RELIEF
6	4"	"	HIGH LEVEL SHUTDOWN
7	4"	"	OIL INLET
8	½"	3000# F.S.	PRESSURE INDICATOR
9	½"	3000# F.S.	SAMPLE CONN. 6 REQD
10	2"	600 ASA RF	RUPTURE DISC
11	¾"	3000# F.S.	GA. GLASS CONN. 2 REQD
12	4"	600# ANSI RF	HIGH LEVEL ALARM
13	½"	3000# F.S.	HIGH/LOW PRESSURE SHUTDOWN
14	4"	600# ANSI RF	LOW LEVEL SHUTDOWN

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

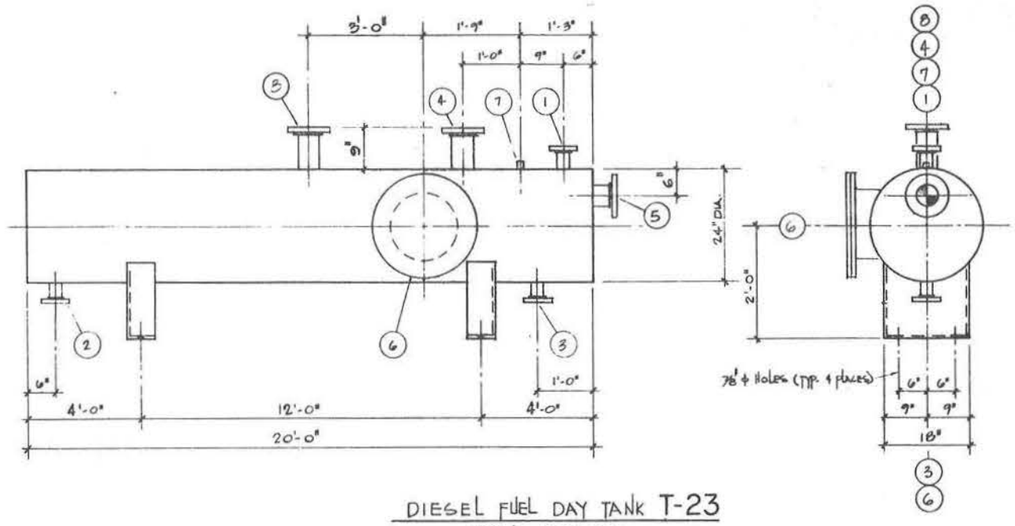
WELL CLEAN SEPARATOR V-ID

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN M.E. | ENGR. SECTION | SCALE 3/4" = 1'-0"
SUBMITTED | APPROVED | DATE 7-22-71

084-131



DIESEL FUEL DAY TANK T-23

TURBINE GENERATORS

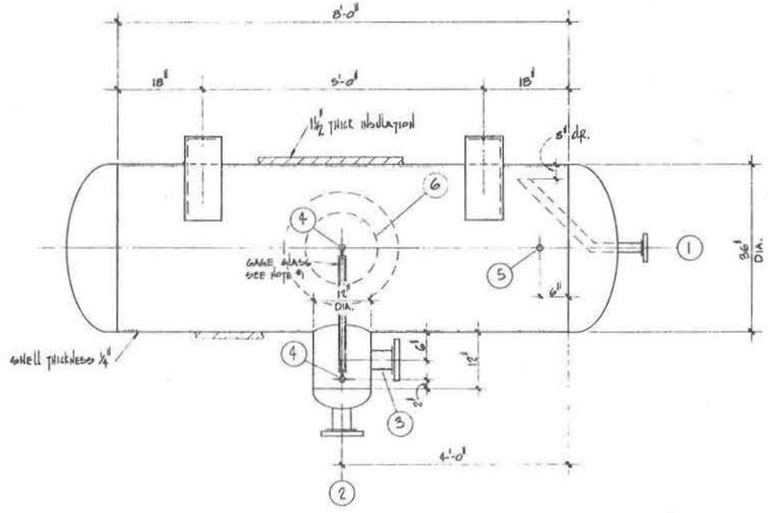
NOZZLE SCHEDULE			
NO	QTY.	RATING	DESCRIPTION
1	1	2"-150# R.F.	INLET
2	1	2"-150# R.F.	OUTLET
3	1	2"-150# R.F.	DRAIN
4	1	4"-150# R.F.	LOW LEVEL ALARM
5	1	4"-150# R.F.	HIGH LEVEL SHUTOFF
6	1	16"-150# R.F.	MANWAY
7	1	1"-3000# CPLG	VENT
8	1	4"-150# RF	HIGH LEVEL ALARM

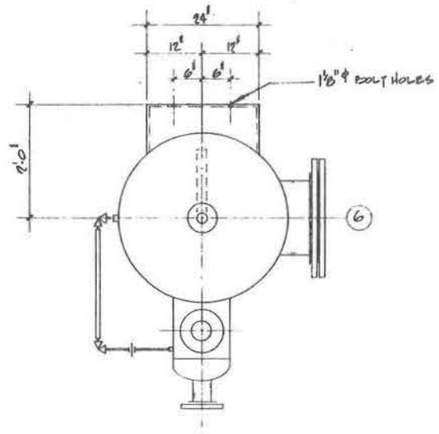
NOTES:

1. ALL NOZZLE FLANGES TO BE 150# ASA R.F. ASTM A-181 GR. 60 SCH. 40 BORE W/ 6" PROJECTION (EXCEPT AS NOTED).
2. ALL BOLTS TO BE ASTM A-193 GR. B-7 STUDBOLTS W/ASTM A-194 CLASS 2 HEAVY HEX NUTS.
3. GASKETS TO BE FLEXITALLIC STYLE CG, TYPE 304 S.S. AND ASBESTOS.
4. ALL CPLG'S. TO BE 3000# MS. HALF COUPLING W/ SCREWED SOLID BAR STOCK PLUG.

DESIGN CONDITIONS

ASME CODE SECTION VIII MIN. METAL THICKNESS 3/16" CERTIFICATION NOT REQUIRED TEST AT 80 PSIG





THERMINOL EXPANSION TANK

T-20

NOZZLE SCHEDULE			
No.	QTY.	RATING	DESCRIPTION
1	1	2"-150# R.F.	VENT
2	1	4"-150# R.F.	INLET/OUTLET
3	1	4"-150# R.F.	Low Level SHUTDOWN
4	2	¾"-3000# F.C.	CPLG. GAGE GLASS
5	1	1"-3000# F.C.	CPLG. RETURN INLET
6	1	16"-150# F.F	MANWAY

NOTES

1. GAGE GLASS TO BE DANIEL 73FL WITH 4 TYPE 15 GAGE VALVES & ¾" XXH NIPPLES.
2. ALL FLANGES TO BE 150# ASA R.F. ASTM A-181 SCH. 40 BORE.
3. ALL BOLTS TO BE ASTM A-193 GR. B-7 STUDBOLTS W/ ASTM A-194 CLASS 2 HEAVY HEX NUTS.
4. GASKETS TO BE FLEXITALLIC STYLE CG, TYPE 304 S. S. AND ASBESTOS

DESIGN CONDITIONS

ASME CODE SECTION VIII MIN METAL THICKNESS 3/16" CERTIFICATION NOT REQUIRED TEST @ 30 PSIG

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

SANTA BARBARA CHANNEL

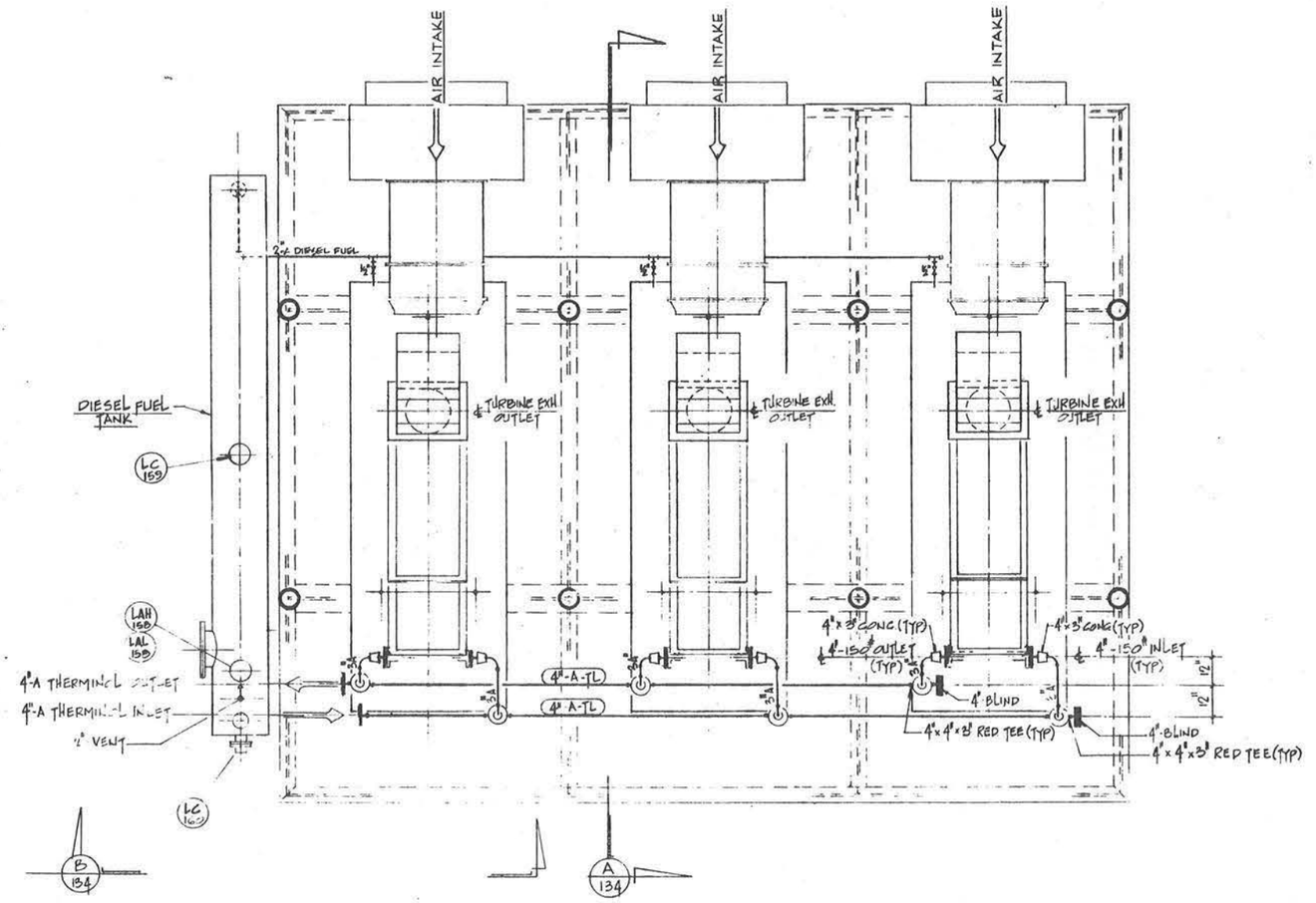
DIESEL FUEL TANK T 23 &
THERMINOL EXPANSION TANK T 20

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN RWP | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

084-132



NO.	DATE	REVISIONS	BY	CHK.	APPR.

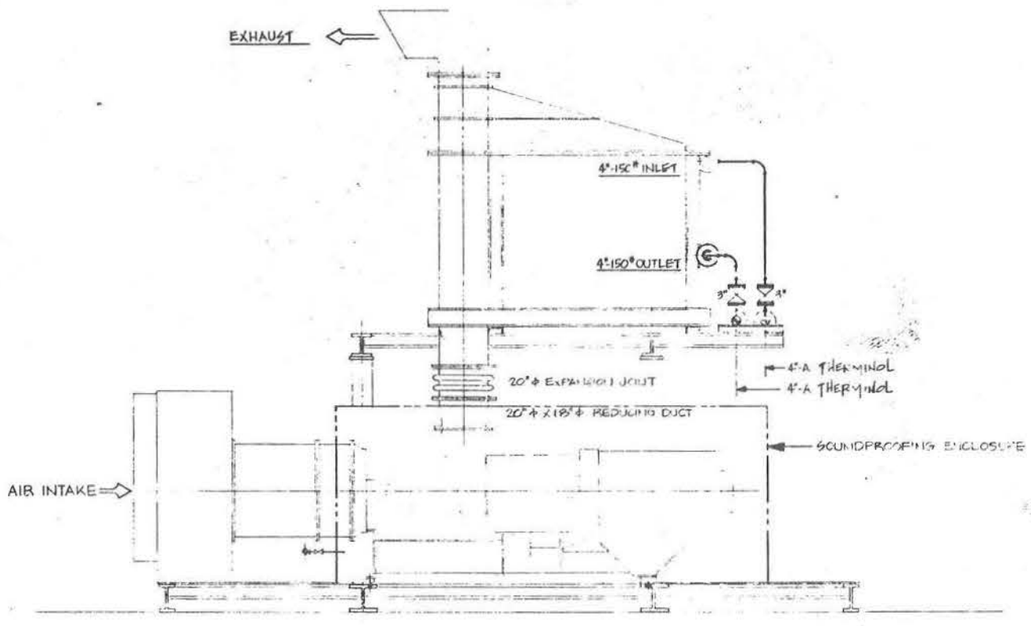
DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

TURBINE GENERATORS
PIPING PLAN

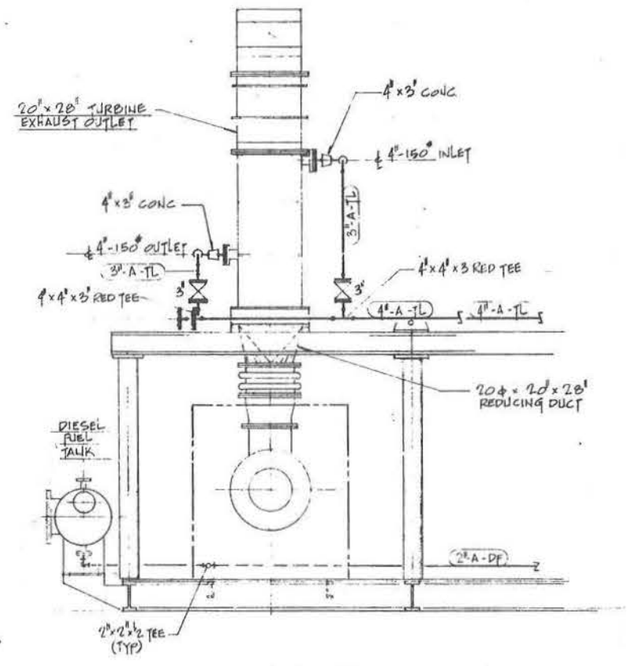
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION · DEPARTMENT

DRAWN JSG | ENGR. REVIEWED | SCALE 3/8"=1'-0" | 084-13
CHECKED | APPROVED | DATE 7-22-71



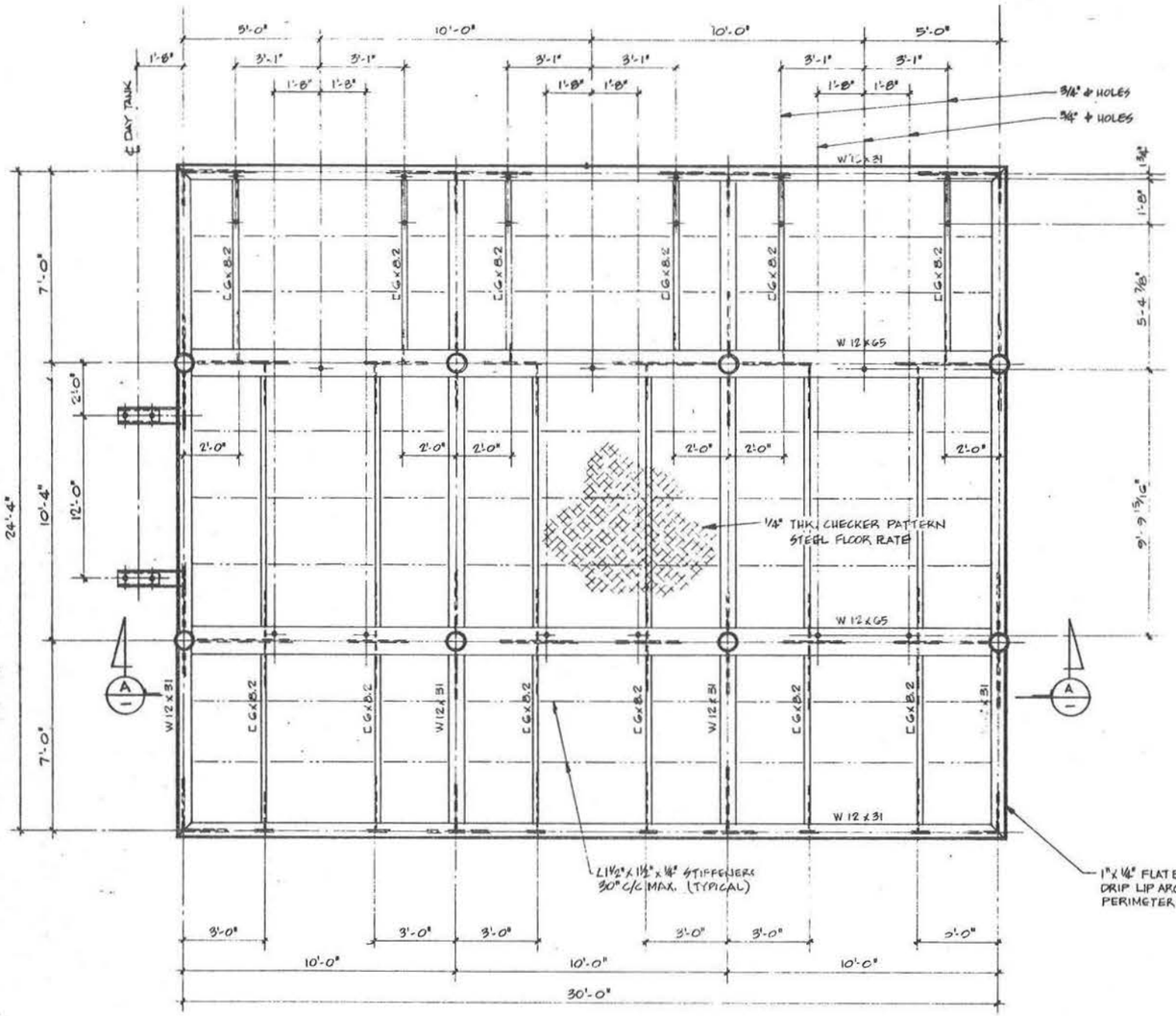
SECTION (A / 133)



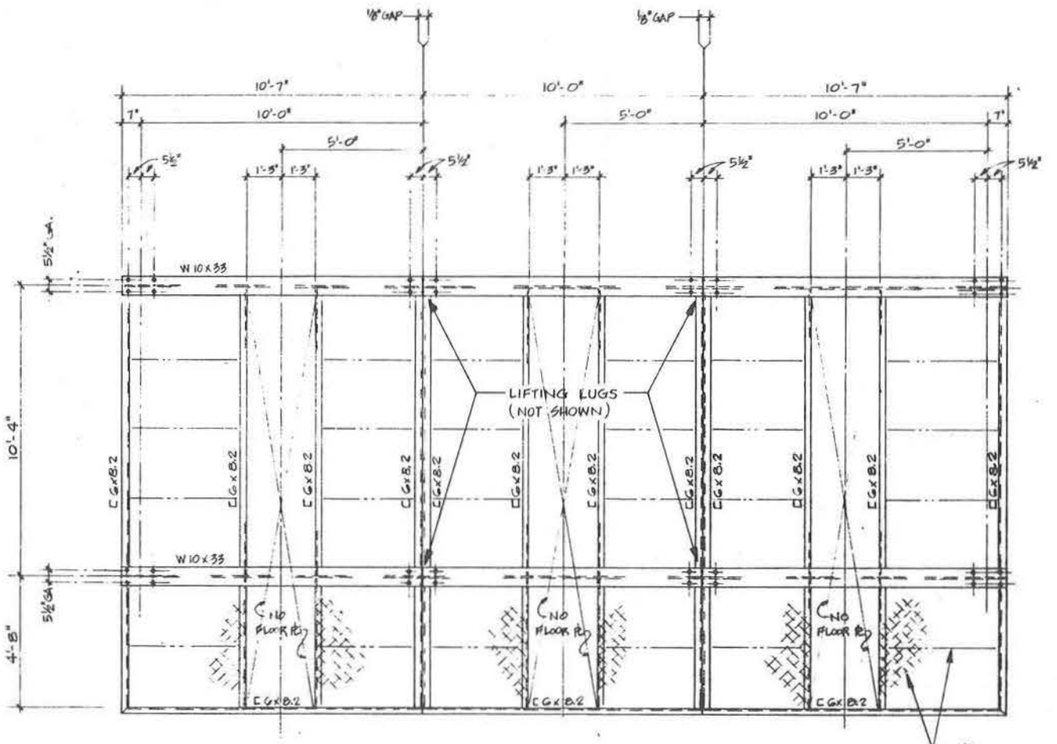
SECTION (B / 133)

DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL	HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
TURBINE GENERATORS PIPING SECTIONS	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN JSG · DESIGN SECTION · SCALE 3/8"=1'-0"	
CHECKED · APPROVED · DATE 7-27-71	084-134

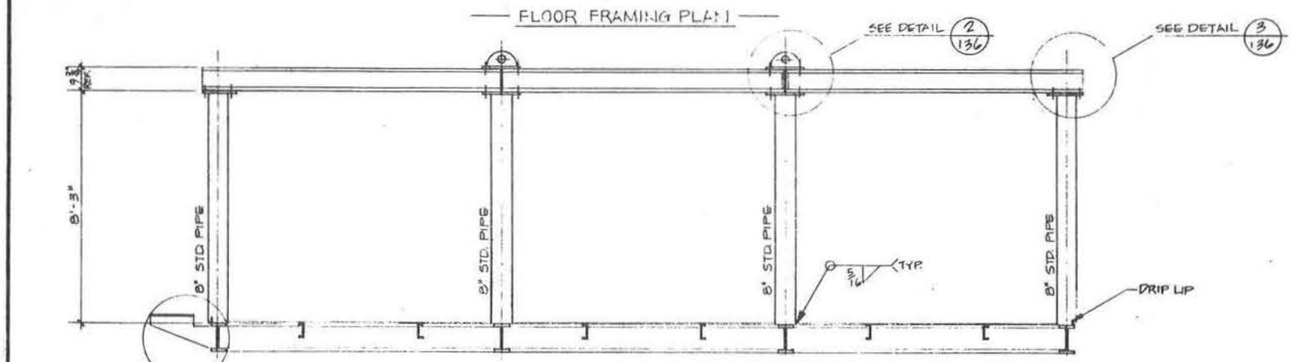
NO.	DATE	REVISIONS	BY	CHK.	APPR.



FLOOR FRAMING PLAN



UPPER FRAMING PLAN



SECTION A/—

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

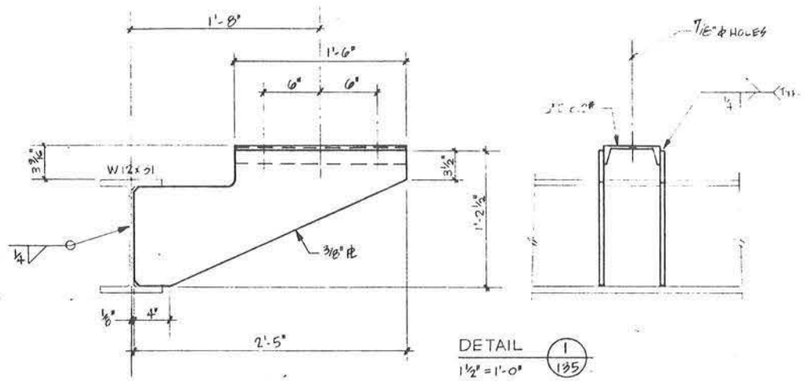
TURBINE GENERATORS
SKID FRAMING PLAN & SECTIONS

DRAWN JSG | DWG. SECTION | SCALE 3/8"=1'-0"
CHECKED | APPROVED | DATE 7-22-71

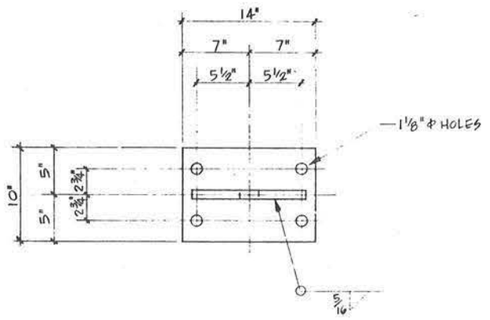
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

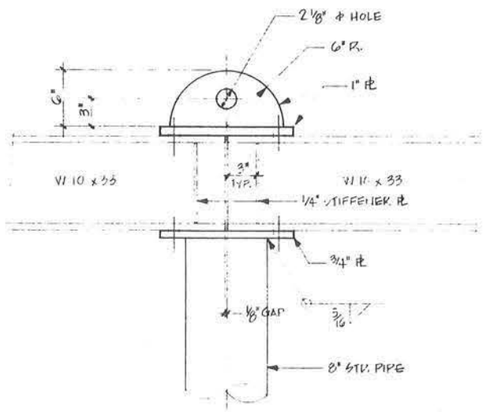
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-135

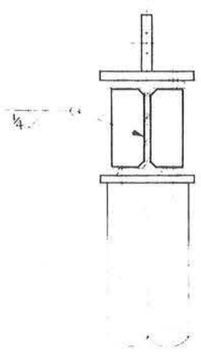


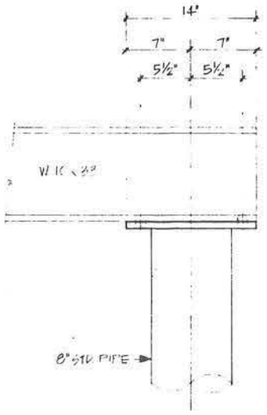
DETAIL 1 / 135
1 1/2" = 1'-0"



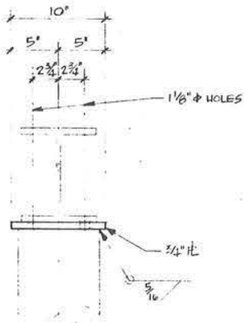


DETAIL 2 / 135
1 1/2" = 1'-0"





DETAIL 3 / 135
1 1/2" = 1'-0"



NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

TURBINE GENERATORS
SKID FRAMING DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSG | ENGR. SECTION | SCALE NOTED | 084-136
CHECKED | APPROVED | DATE 7-12-71

GAS DEHYDRATION SYSTEM SKID

SWEET GAS SCRUBBER SKID

12"A-V

6"A-V

12"A-V

8"A-V GAS CONTROL EQUIPMENT

8"A-V VAPOR COMPRESSORS

12"A-V

12"A-V MAIN GAS COMPRESSORS

6"A-V TEST SEPARATORS V-2A & V-2B

PRODUCTION SEP. 6"A-V V-1A

GAS SCRUBBER 4"A-V V-3

SANDSTONE SEP. 4"A-V V-1C

PRODUCTION SEP. 6"A-V V-1B

10" TO DISPOSAL TUBE

6"A-V

6"A-V

4"A-V

PRODUCTION SURGE VESSELS
V-4A, V-4B & V-4C

PROD. SURGE VESSELS VAPOR (4"A-V)

4"A-V WELL CLEAN SEPARATOR V-1D

12"A-V

6"A-V WELL CLEAN TANK

6"A-V

12"A-V

6"A-V

ELECTRIC IGNITER

MOLECULAR SEAL

FLARE BOOM

1" ORIFICE IN ORIFICE UNION FOR VENT STACK PURGE

PCV 380

PCV 380A

PCV 380B

LCV 162A

PI 381

SOV 102A

LAH 163

LC 167

LCV 162

3/4"A-FG

1"A-FG

1"

MOUNT ON TOP OF PIPE

FAN

14" FLARE LINE

INSTALL FLANGES FOR FUTURE ORIFICE

2"A-DRAIN

TO OIL SUMP

100# AIR

V-6
VENT SCRUBBER
8'-0" ϕ x 15'-0" S/S

TO OIL SUMP

FOR LEGEND & VALVE LIST SEE DWG NO 084-179

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

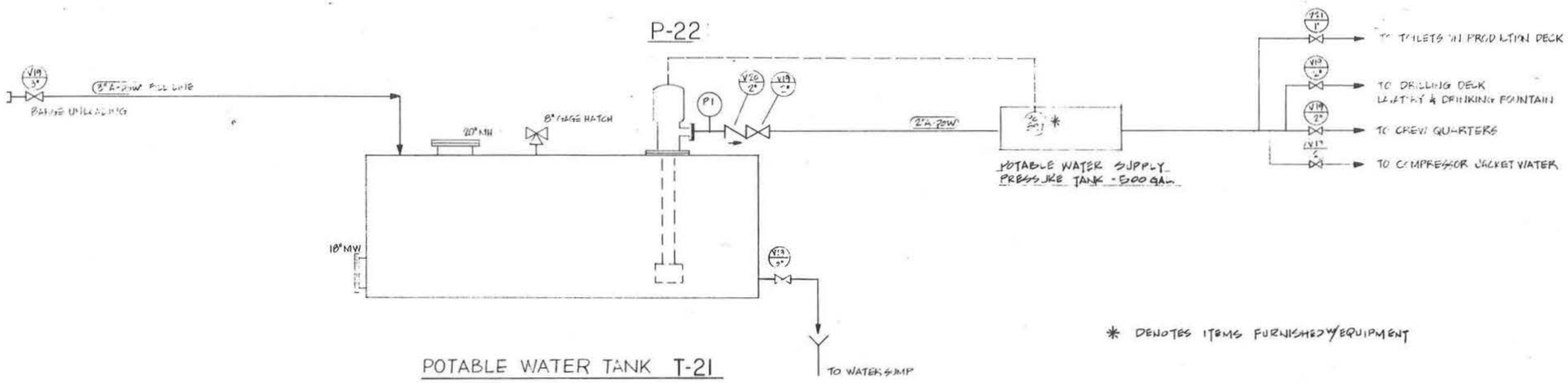
PIPING & INSTRUMENTATION DIAGRAM
VENT SYSTEM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN T.H. | ENGR. SECTION | SCALE 1"=1'-0"
CHECKED | APPROVED | DATE 7-26-71

084-138



POTABLE WATER TANK T-21

500 BBL.
10' WIDE / 8'-11 x 35' LG.

* DENOTES ITEMS FURNISHED W/EQUIPMENT

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

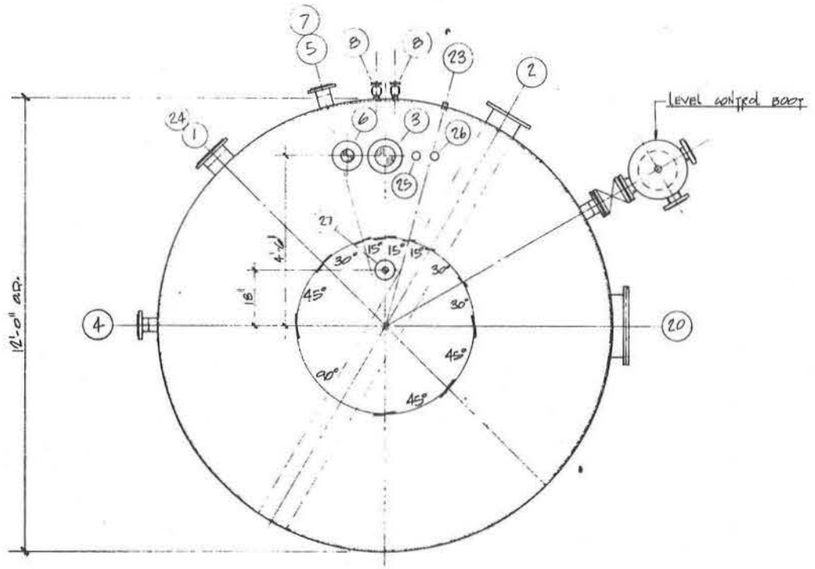
PIPING & INSTRUMENTATION DIAGRAM
POTABLE WATER

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

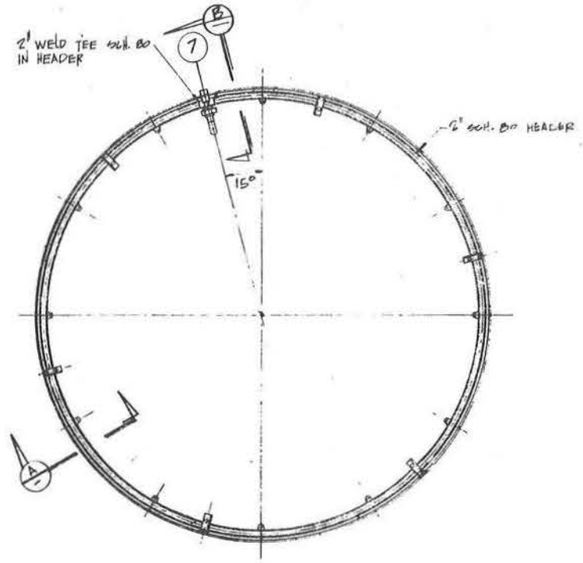
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN J.F. | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

084-139

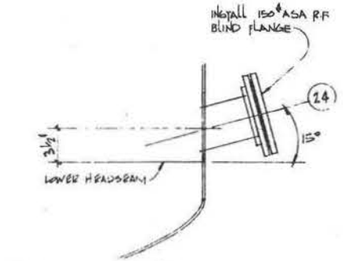


NOZZLE ORIENTATION PLAN
1/2" = 1'-0"



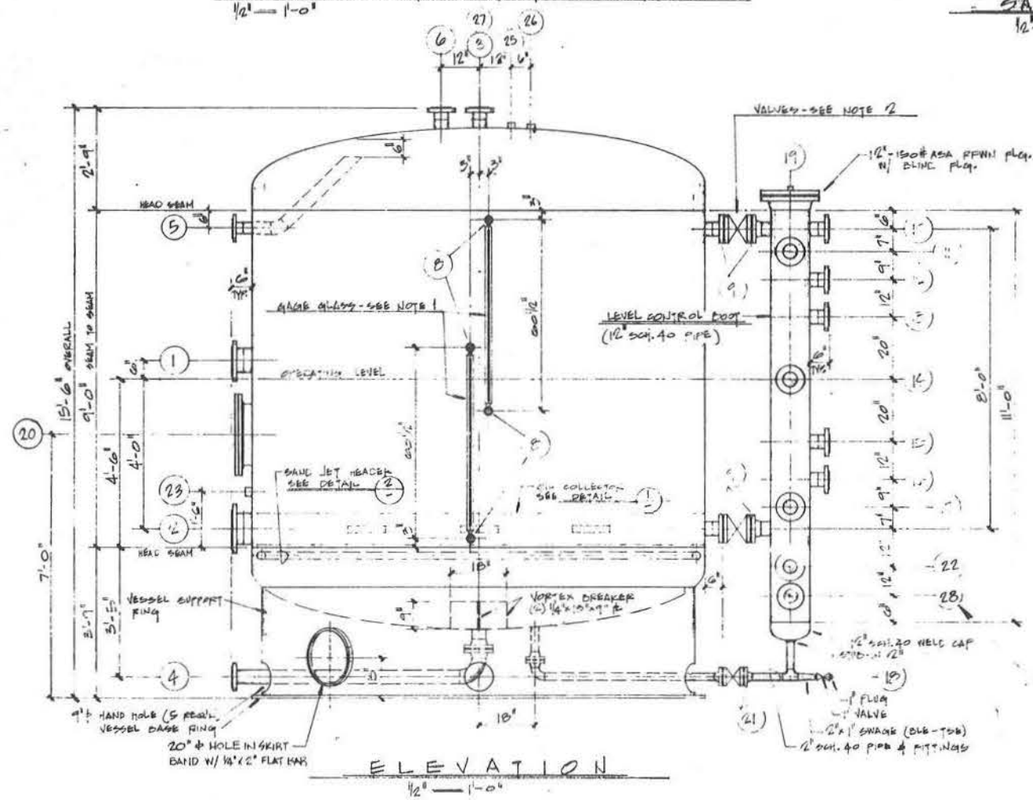
SAND JET HEADER PLAN
1/2" = 1'-0"

DETAIL (2)



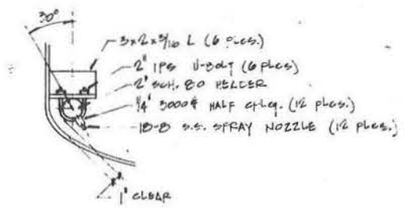
DETAIL (3)
1½" = 1'-0"

NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	8"	150# ASA	OIL INLET
2	10"	"	OIL OUTLET
3	6"	"	GAS OUTLET
4	3"	"	DRAIN
5	4"	"	RELIEF
6	4"	"	RUPTURE DISC CONN.
7	2"	3000# F.S.	SAND JET
8	3/4"	3000# F.S.	GAGE GLASS (TYP. 4)
9	4"	150# ASA	BOOT CONN. (TYP. 4)
10	4"	"	LEVEL SHUTDOWN HIGH
11	4"	"	LEVEL ALARM HIGH
12	4"	"	LEVEL SWITCH
13	4"	"	LEVEL SWITCH
14	4"	"	LEVEL CONTROL
15	4"	"	LEVEL SWITCH
16	4"	"	LEVEL SWITCH
17	4"	"	LEVEL SHUTDOWN LOW
18	1"	—	DRAIN
19	3/4"	3000# F.S.	BLEED
20	20"	150# ASA	SHELL MANWAY (W/DAVIT)
21	2"	150# ASA	BOOT BOTTOM CONN. (TYP. 2)
22	4"	"	INTERFACE LEVEL CONTROL
23	3/4"	3000# F.S.	TEMP. INDICATOR
24	4"	150# ASA	ANODE - SEE DETAIL (5)
25	1/2"	3000# F.S.	PRESSURE SHUTDOWN, HIGH
26	1/2"	3000# F.S.	PRESSURE INDICATOR
27	2"	150# ASA	TANK VAPOR CONNECTION
28	3"	"	LEVEL INDICATOR

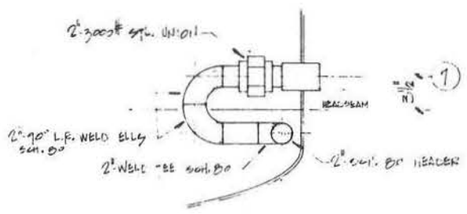


ELEVATION
1/2" = 1'-0"

NOTE: INSTALL BLIND FLG. ON NOZZLE NO. 28 TANK V-4B ONLY.



SECTION (A)
1½" = 1'-0"



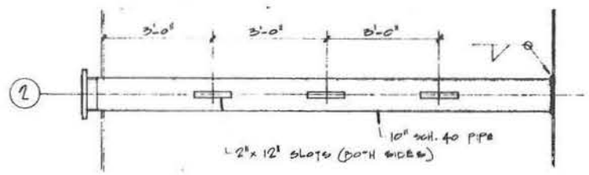
SECTION (B)
1½" = 1'-0"

GENERAL NOTES:

1. GAGE GLASS TO BE DANIEL 94TL W/ (2) ¾" IS GAGE VALVES & ¾" X X H SHORT NIPPLES (2 REQ'D)
2. LEVEL CONTROL BOOT BLOCK VALVES TO BE 150# WKM R.F. FLG'D OR 2000# SCR'D. STEEL BODY BALL VALVE, WRENCH OPERATED, REGULAR PORT, STAINLESS STEEL BALL & STEM, TEFLON SEATS. (SIZE & TYPE AS SHOWN)
3. ALL FLANGES TO BE 150# ASA R.F. ASTM A-181 SCH. 40 BORE.
4. ALL BOLTS TO BE ASTM A-193 GR B-7 STUDBOLTS W/ASTM A-194 CLASS 2 HEAVY HEX NUTS.
5. GASKETS TO BE FLEXITALLIC STYLE CG, TYPE 304 S.S. AND ASBESTOS.

DESIGN CONDITIONS

50 PSIG AT 150°F IN ACCORDANCE WITH ASME CODE SECTION VIII WITH 1/16 MIN. CORROSION ALLOWANCE.



DETAIL (1)
OIL COLLECTOR
½" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PRODUCTION SURGE VESSELS V 4A, V 4B

DRAWN RM | CHECKED | ENGR. SECTION | APPROVED

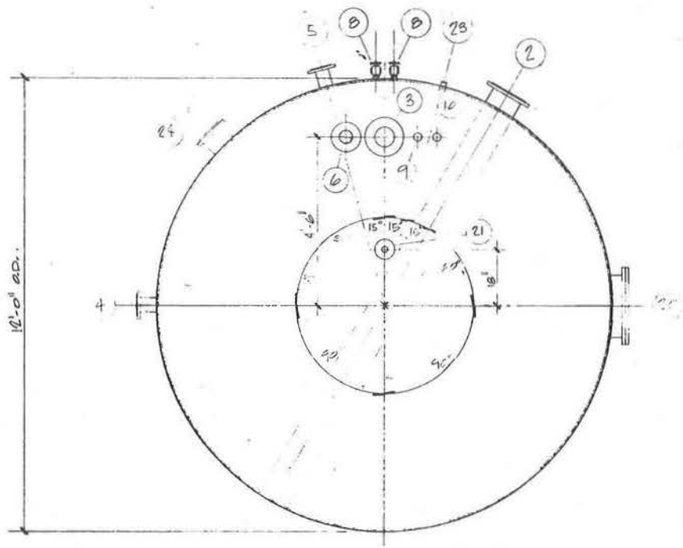
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

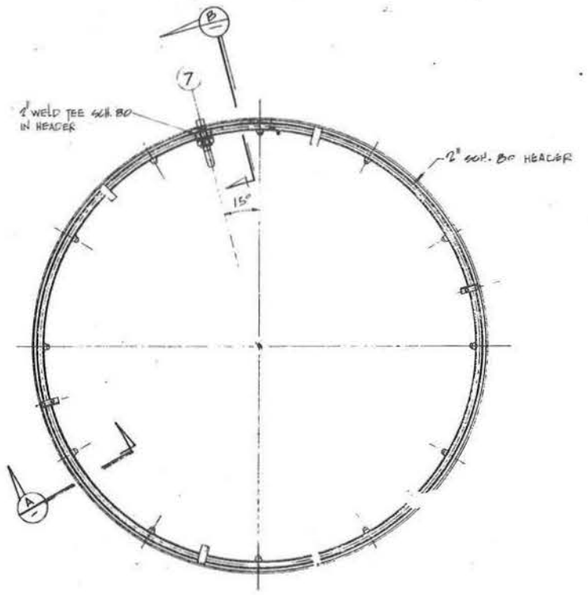
SCALE NOTED | DATE 7-22-71

084-140

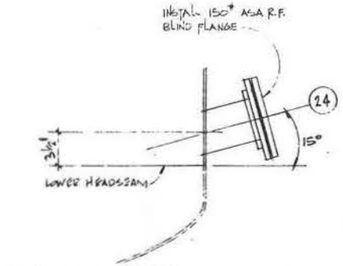
NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	[illegible]	[illegible]	[illegible]
2	10"	150# ANSI R.F.	OIL OUTLET
3	6"	"	GAS OUTLET
4	[illegible]	"	DRAIN
5	4"	"	RELIEF
6	4"	"	RUPTURE DISC CONN.
7	2"	3000# F.S.	SAND JET
8	3/4"	3000# F.S.	GAGE GLASS (TYP. 4)
9	[illegible]	[illegible]	[illegible]
10	[illegible]	3000# F.S.	[illegible]
11	—	—	—
12	—	—	—
13	—	—	—
14	—	—	—
15	—	—	—
16	—	—	—
17	—	—	—
18	—	—	—
19	—	—	—
20	20"	150# ANSI R.F.	SHELL MANWAY (W/DAVIT)
21	4"	150# ANSI R.F.	[illegible]
22	—	—	—
23	3/4"	3000# F.S.	TEMP. INDICATOR
24	4"	150# ANSI	ANODE — SEE DETAIL (3)



NOZZLE ORIENTATION PLAN
1/2" = 1'-0"



SAND JET HEADER PLAN
1/2" = 1'-0"
DETAIL (2)



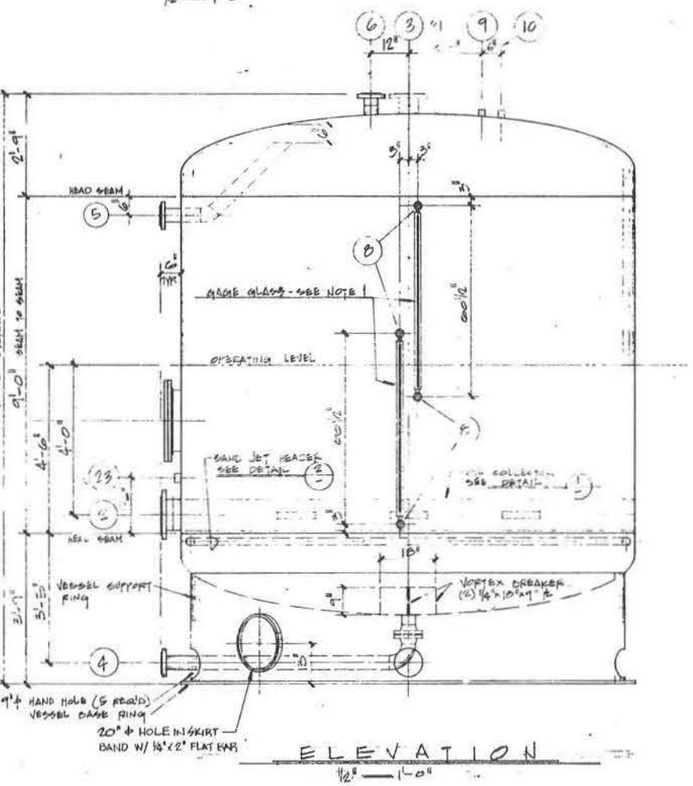
DETAIL (3)
1/2" = 1'-0"

GENERAL NOTES:

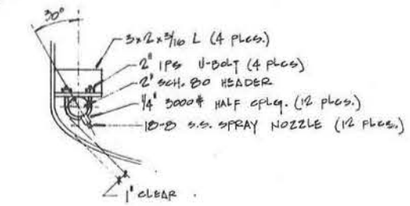
1. GAGE GLASS TO BE DANIEL 94TL W/ (2) 3/4" IS GAGE VALVES & 3/4" XXH SHORT HANDLES (2 REQ'D)
2. ALL FLANGES TO BE 150# ANSI R.F. ASTM A-181 SCH. 40 BORE.
3. ALL BOLTS TO BE ASTM A-193 GR. B-7 STUDBOLTS W/ ASTM A-194 CLASS 2 HEAVY HEX NUTS.
4. GASKETS TO BE FLEXITALLIC STYLE CG, TYPE 304 S.S. AND ASBESTOS.

DESIGN CONDITIONS

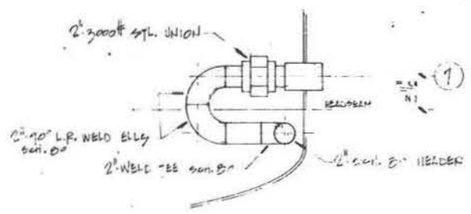
50 PSIG AT 150°F IN ACCORDANCE WITH ASME CODE SECTION VIII WITH 1/8" MIN. CORROSION ALLOWANCE.



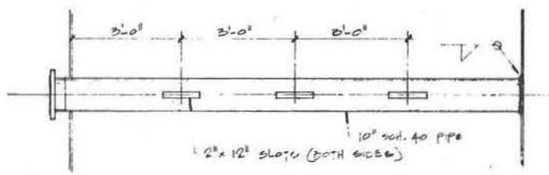
ELEVATION
1/2" = 1'-0"



SECTION (A)
1 1/2" = 1'-0"



SECTION (B)
1 1/2" = 1'-0"



DETAIL (1)
OIL COLLECTOR
1/2" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

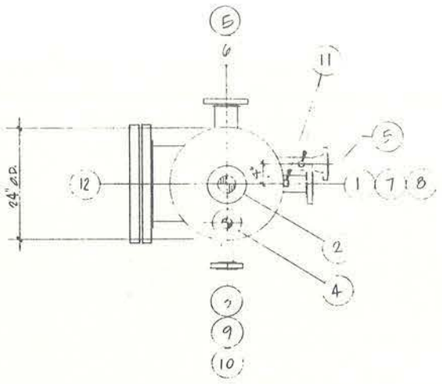
PRODUCTION SURGE VESSEL V 4C

DRAWN F.M.
CHECKED
ENGR. SECTION
APPROVED
SCALE NOTED
DATE 7-22-71

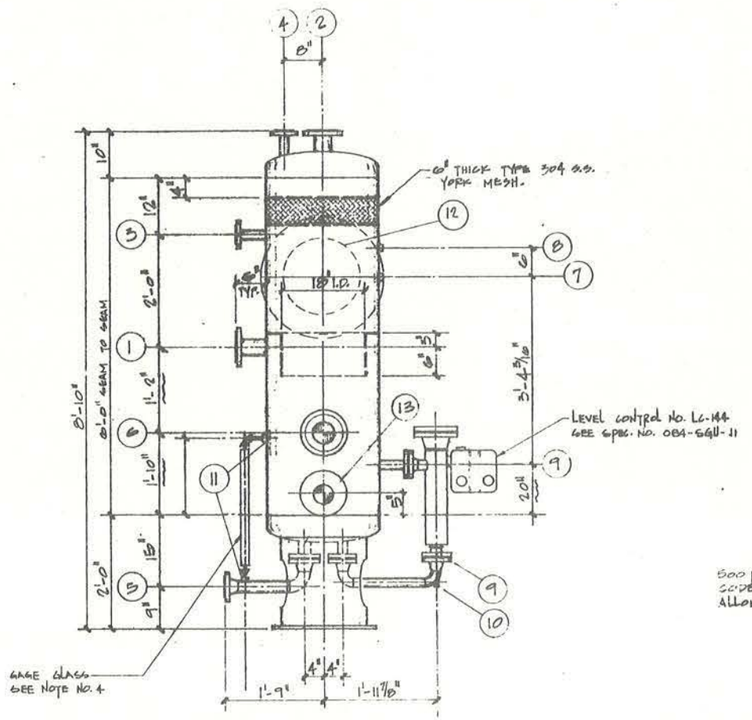
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-141



TRUE NOZZLE ORIENTATION



ELEVATION
3/4"=1'-0"

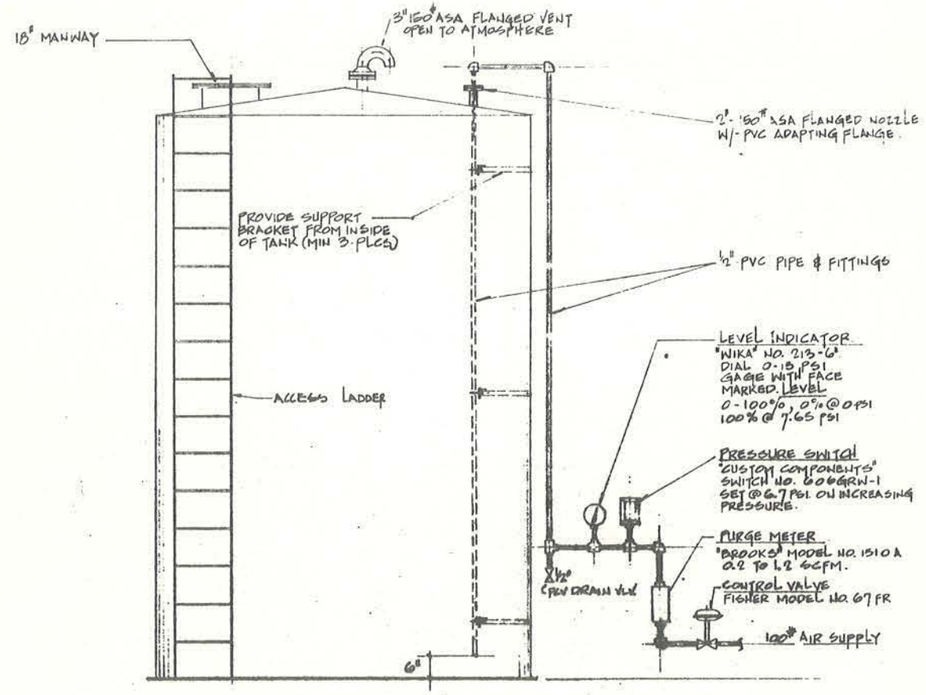
NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	3"	300# ASA RF	GAS INLET
2	3"	300# ASA RF	GAS OUTLET
3	1½"	300# ASA RF	RELIEF
4	1½"	300# ASA RF	RUPTURE DISC
5	2"	300# ASA RF	DRAIN
6	4"	300# ASA RF	HIGH LEVEL SHUTDOWN
7	½"	3000# F.S.	HIGH PRESSURE SHUTDOWN
8	½"	3000# F.S.	PRESSURE INDICATOR
9	1½"	300# ASA RF	LEVEL CONTROL (2-REQ'D)
10	¾"	3000# F.S.	DRAIN
11	¾"	3000# F.S.	GAGE GLASS (2-REQ'D)
12	16"	300# ASA RF	MANWAY W/DAVIT
13	4"	300# ASA R.F.	LOW LEVEL SHUTDOWN

DESIGN CONDITIONS

500 PSIG @ 100°F IN ACCORDANCE WITH ASME CODE SECTION VIII WITH 1/16" MIN. CORROSION ALLOWANCE.

GENERAL NOTES

1. ALL FLANGES TO BE 300# ASA R.F. ASTM A181 SCH. 40 BORE.
2. ALL BOLTS TO BE ASTM A-193 GR. B-7 STUD BOLTS WITH ASTM A-194 CLASS 2 HEAVY HEX. NUTS
3. GASKETS TO BE FLEXITALLIC STYLE CG. TYPE 304 S.S. & ASBESTOS
4. GAGE GLASS TO BE



ELEVATION
ACID STORAGE TANK
T-24
10'-0" O.D. x 15'-0" HIGH

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SWEET GAS SCRUBBER V-5 &
ACID TANK T-24

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

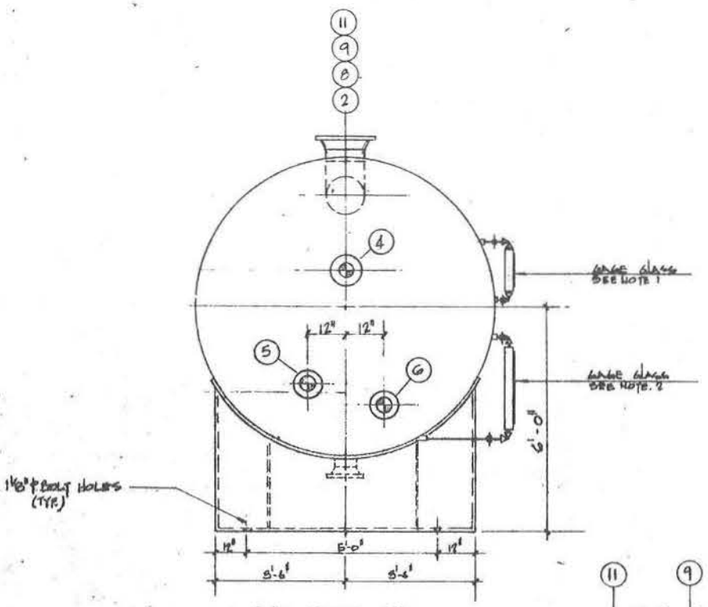
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: RM
DESIGNED:
ENGR. SECTION:
APPROVED:
DATE:

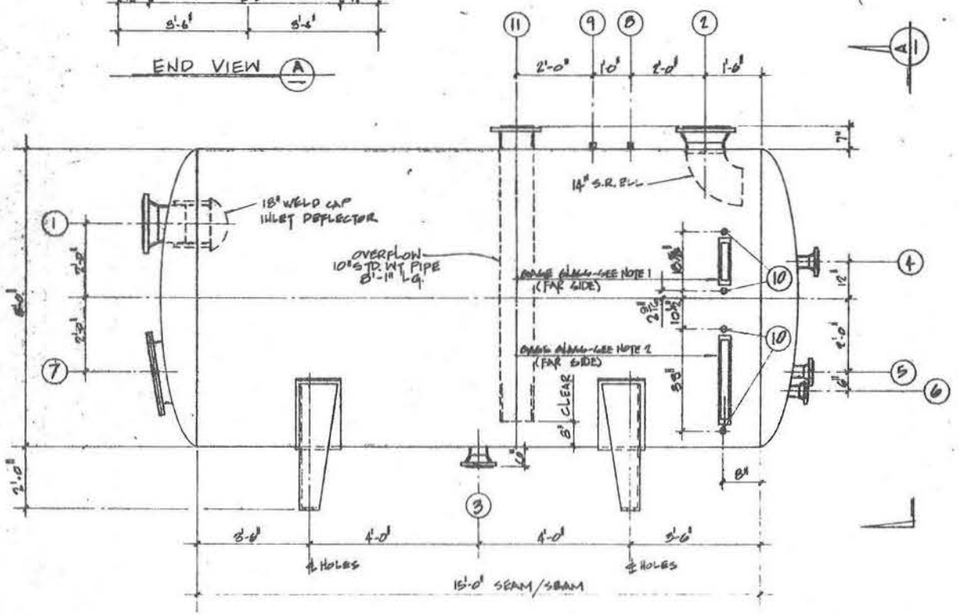
084-142

REV. 1

NOZZLE SCHEDULE			
NO	SIZE	RATING	DESCRIPTION
1	14"	150# ASA RF	VENT INLET
2	14"	"	VENT OUTLET
3	6"	"	LIQUID OUTLET
4	4"	"	HIGH LEVEL SHUTDOWN
5	4"	"	HIGH LEVEL ALARM
6	4"	"	LEVEL CONTROL
7	24"	"	FLG. MANWAY W/COVER & DAVIT
8	½"	3000# ES. SPLG.	PRESSURE INDICATOR
9	½"	"	(PLUGGED)
10	⅝"	"	GAUGE GLASSES (4-REQ'D)
11	10"	150# ASA RF	EMERGENCY OVERFLOW



END VIEW (A)



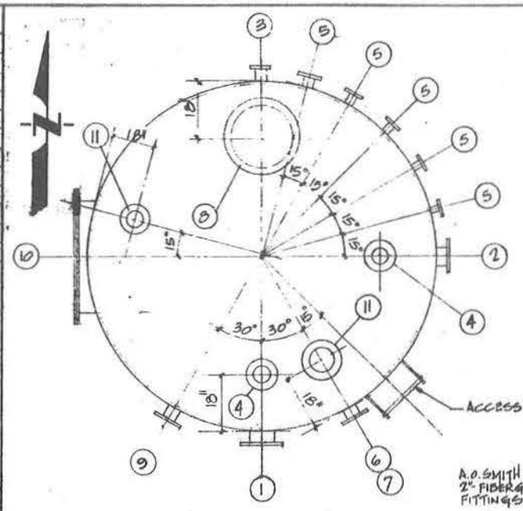
ELEVATION

VENT SURGE TANK V-6

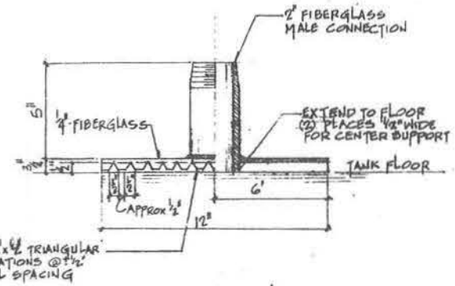
½" = 1'-0"

GENERAL NOTES:

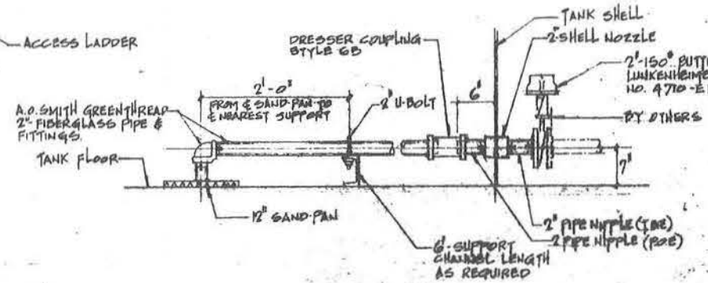
1. GAUGE GLASS TO BE DANIEL 91 TL WITH (2) ¾" GAGE VALVES CAT. NO. 16. USE ¾" XXH NIPPLES
2. GAUGE GLASS TO BE DANIEL 9271 -DITTO-
3. ALL FLANGES TO BE 150# ASA R.F. ASTM A-181 SCH 40 BORE.
4. ALL BOLTS TO BE ASTM A-193 GR. B-7 STUDBOLTS W/ ASTM A-194 CLASS 2 HEAVY HEX NUTS.
5. GASKETS TO BE FLEXITALLIC STYLE CG, TYPE 304 S.S. AND ASBESTOS.
6. DESIGN PRESSURE — 25 PSIG @ 100°F IN ACCORDANCE W/ ASME CODE SECTION VIII W/ 1/16" CORROSION ALLOWANCES.



ORIENTATION PLAN

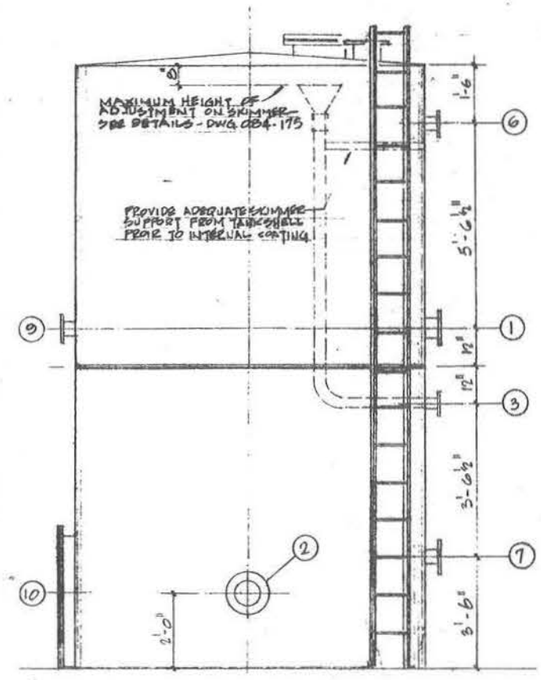


SAND-PAN DETAIL



SAND-PAN SUPPORT & FITTINGS (5-REQ'D)

NOTE:
ALL PIPE & FITTINGS INSIDE TANK TO BE A.O. SMITH GREENTHREAD

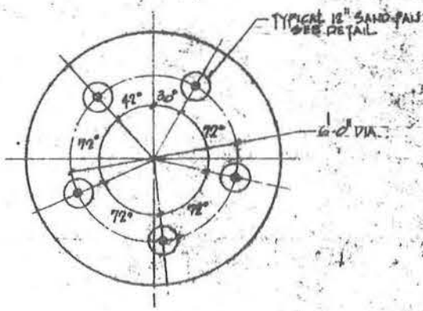


ELEVATION

WATER SURGE TANK - T-2

2-RING - 220 BBL, 8'-2 3/4" DIA X 16'-1" HT.

½" = 1'-0"



SAND-PAN LOCATION PLAN

N.T.S.

NOZZLE SCHEDULE				
NO	SIZE	RATING	DESCRIPTION	QTY
1	6"	150# ASA RF	WATER INLET	1
2	8"	"	WATER OUTLET	1
3	3"	"	SKIMMER (SEE DETAIL DWG. 004-175)	1
4	6"	"	VAPOR RECOVERY	1
5	2"	"	SAND DRAWOFF	5
6	4"	"	LEVEL ALARM - HIGH	1
7	4"	"	LEVEL ALARM - LOW	1
8	20"	API 650	ROOF MANHOLE	1
9	4"	150# ASA RF	LEVEL CONTROL	1
10	24"x36"	API 650	SHELL CLEANOUT	1
11	4"	125# ASA FF	VACUUM RELIEF HATCH	1

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

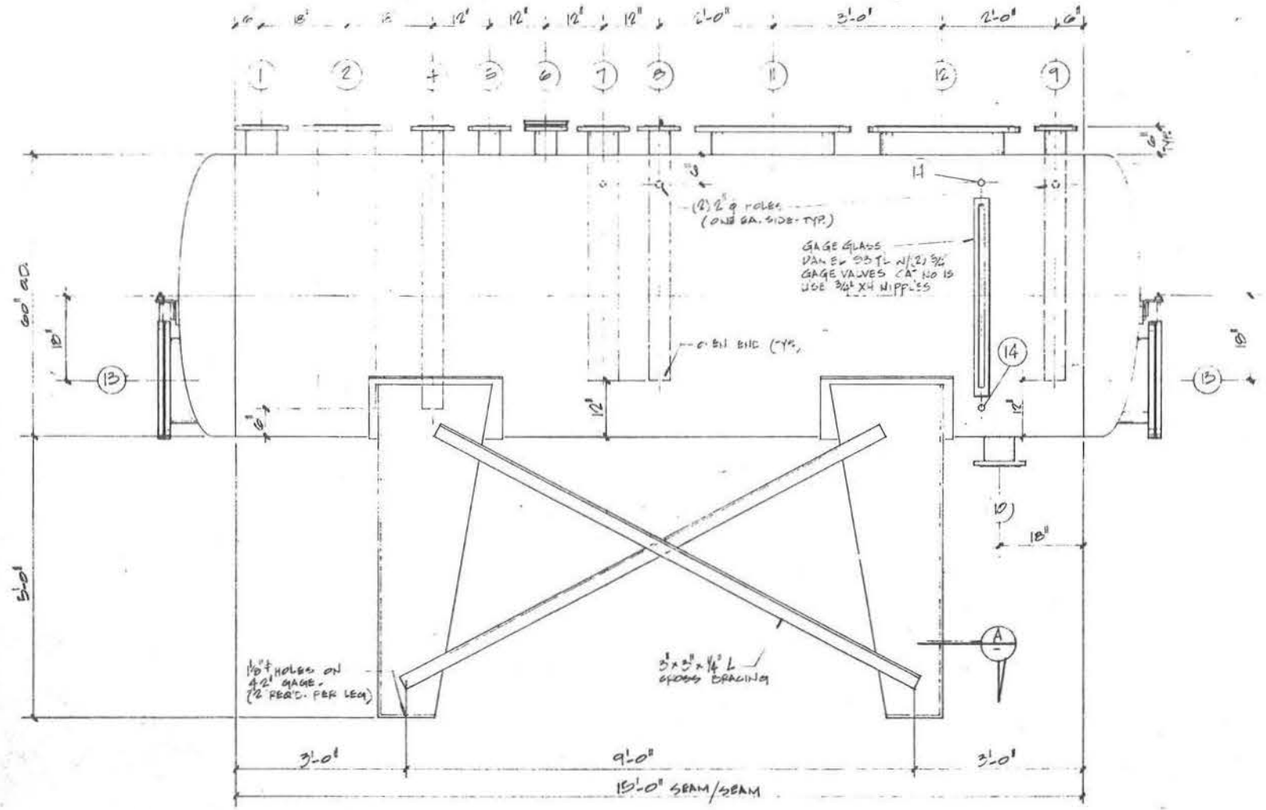
NO.	DATE	REVISIONS	BY	CHK.	APPR.

VENT TANK V-6 &
WATER SURGE TANK T-2

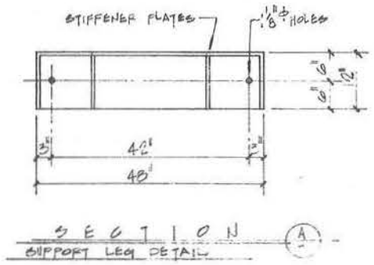
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: [illegible] DESIGN SPEC. NO.:
CHECKED: APPROVED:
SCALE: None DATE: 7-22-70

004-143



WATER SUMP V-7
ELEVATION

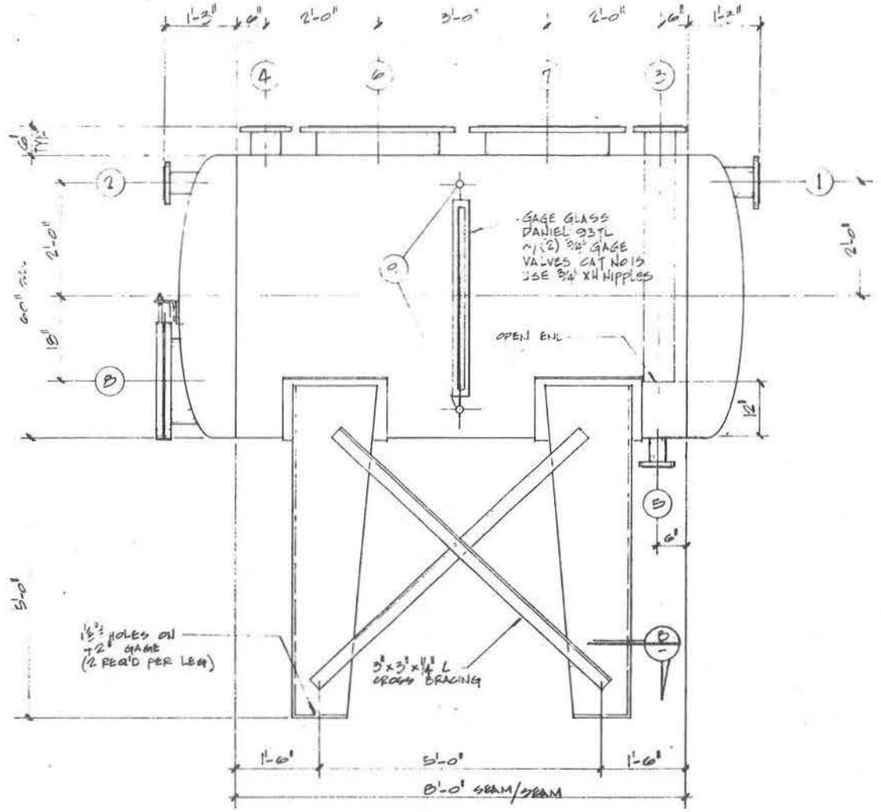


SECTION A
SUPPORT LEG DETAIL

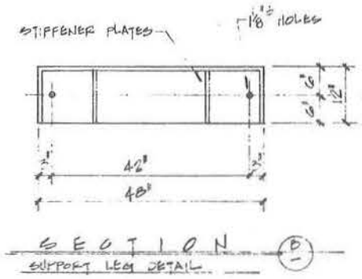
NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	6"	150# ASA RF	VAPOR RECOVERY
2	12"	"	DECK-DRAIN INLET
3	-	-	-
4	4"	"	GRAVITY-DRAIN INLET
5	6"	"	OIL-SUMP-OVERFLOW INLET
6	3"	"	W/ BLIND FLANGE
7	6"	"	OVERFLOW-TO-OILSPOSAL-TYPE OUTLET
8	4"	"	LEVEL CONTROL & ALARM
9	4"	"	LEVEL CONTROL & ALARM
10	6"	"	DRAIN
11	26"	*	PUMP CONNECTION
12	26"	*	PUMP CONNECTION
13	20"	API STD.	MANWAY W/ DAVIT (TYP OF 2)
14	¾"	2000# FS CPLG	GAGE GLASS (TYP 2 PLCS)

* "TUBE TURN" PART NO 705 CLASS 75 WELD-NECK FLANGE.

DESIGN NOTES
DESIGN PRESSURE 25 PSIG @ 100°F.
CONSTRUCTION IN ACCORDANCE W/ ASME CODE SECTION VIII W/ 1/16" CORROSION ALLOWANCE



OIL SUMP V-8
ELEVATION



SECTION B
SUPPORT LEG DETAIL

NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	6"	150# ASA RF	OIL INLET
2	6"	"	OVERFLOW
3	4"	"	LEVEL CONTROL
4	4"	"	LEVEL CONTROL
5	3"	"	DRAIN
6	26"	*	PUMP CONNECTION
7	26"	*	PUMP CONNECTION
8	20"	API STD.	MANWAY W/ DAVIT
9	¾"	2000# FS CPLG	GAGE GLASS (TYP 2 PLCS)

* "TUBE TURN" PART NO 705 CLASS 75 WELD-NECK FLANGE.

DESIGN NOTES
DESIGN PRESSURE 25 PSIG @ 100°F.
CONSTRUCTION IN ACCORDANCE W/ ASME CODE SECTION VIII W/ 1/16" CORROSION ALLOWANCE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

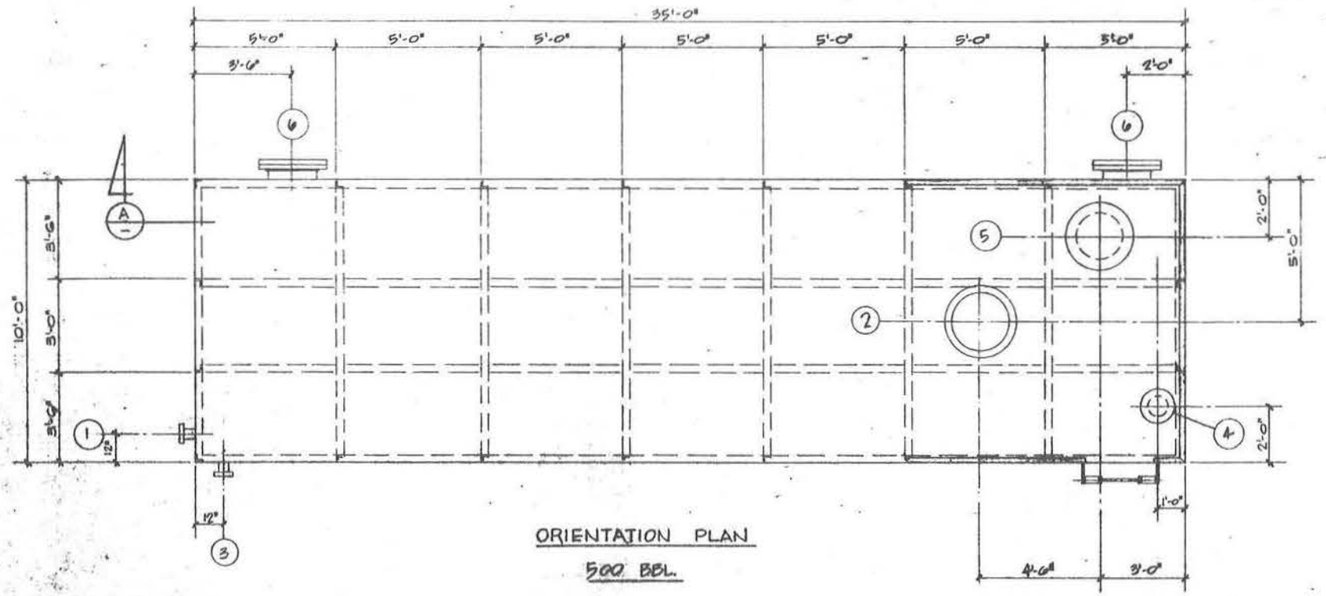
WATER SUMP V-7 & OIL SUMP V-8

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN KM
CHECKED
EXPL. SECTION
APPROVED
SCALE 3/4" = 1'-0"
DATE 7-22-71

084-144



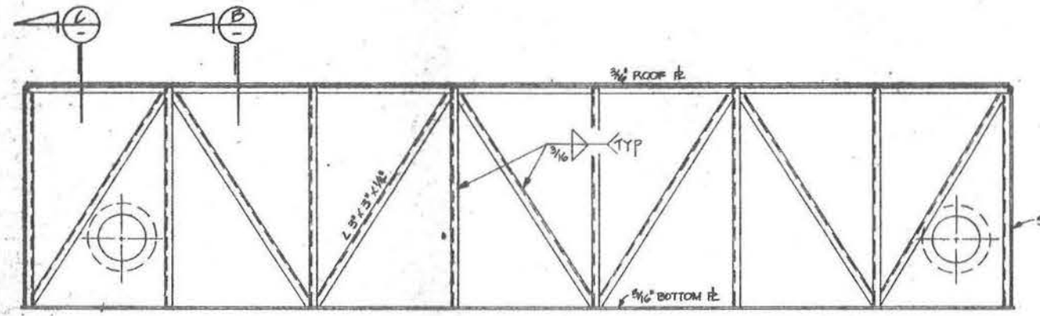
ORIENTATION PLAN

500 BBL.

N

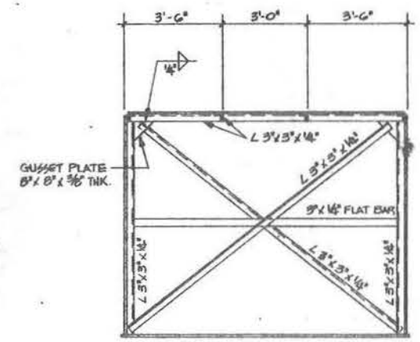
NOZZLE SCHEDULE			
NO.	SIZE	RATING	DESCRIPTION
1	3"	150# ASA	INLET
2	26"	*	MANWAY
3	3"	150# ASA	DRAIN
4	8"	API-12B	VENT & GAUGE HATCH
5	20"	API-650	STD. ROOF MANHOLE, W/ BOLTED COVER
6	20"	API-650	STD. SHELL MANHOLE, W/ BOLTED COVER

* TUBE TURN PART NO. 705 CLASS 75 WELD NECK FLANGE



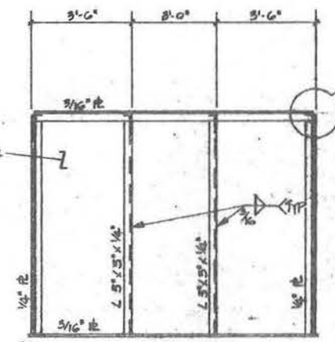
TYPICAL SIDE WALL

SECTION (A)



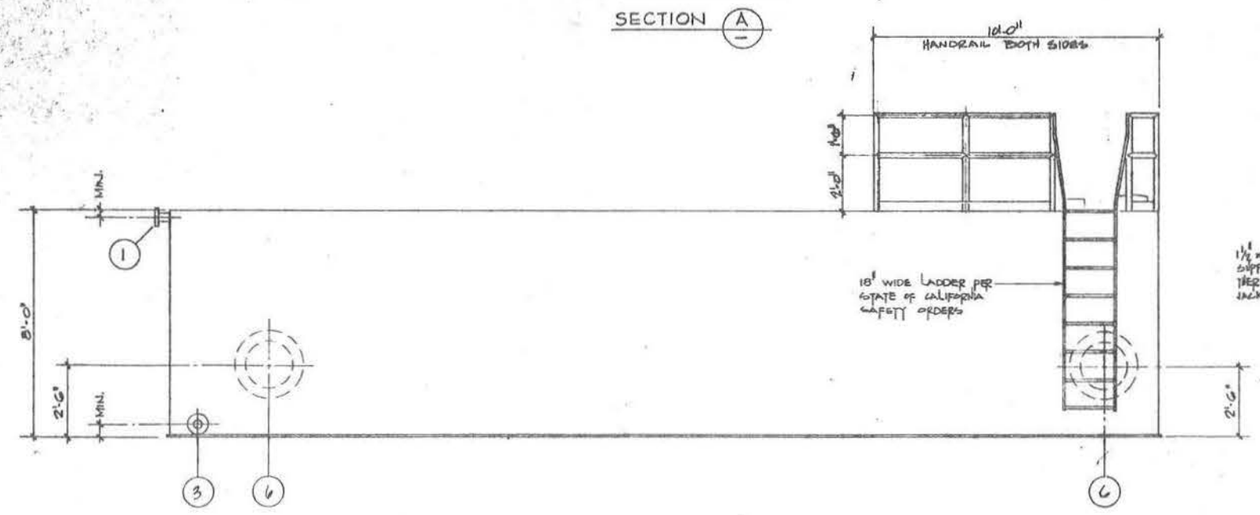
TYPICAL CENTER TRUSS (6-REQ'D)

SECTION (B)

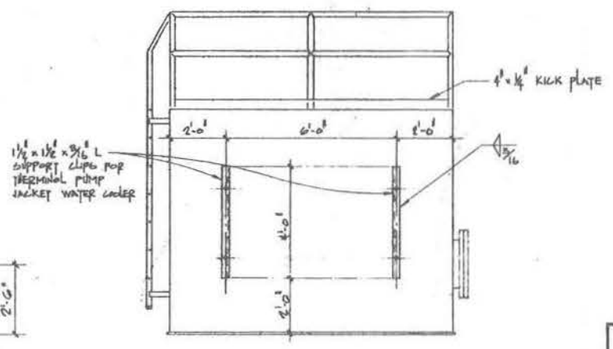


TYPICAL END WALL

SECTION (C)



SIDE ELEVATION



END ELEVATION

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

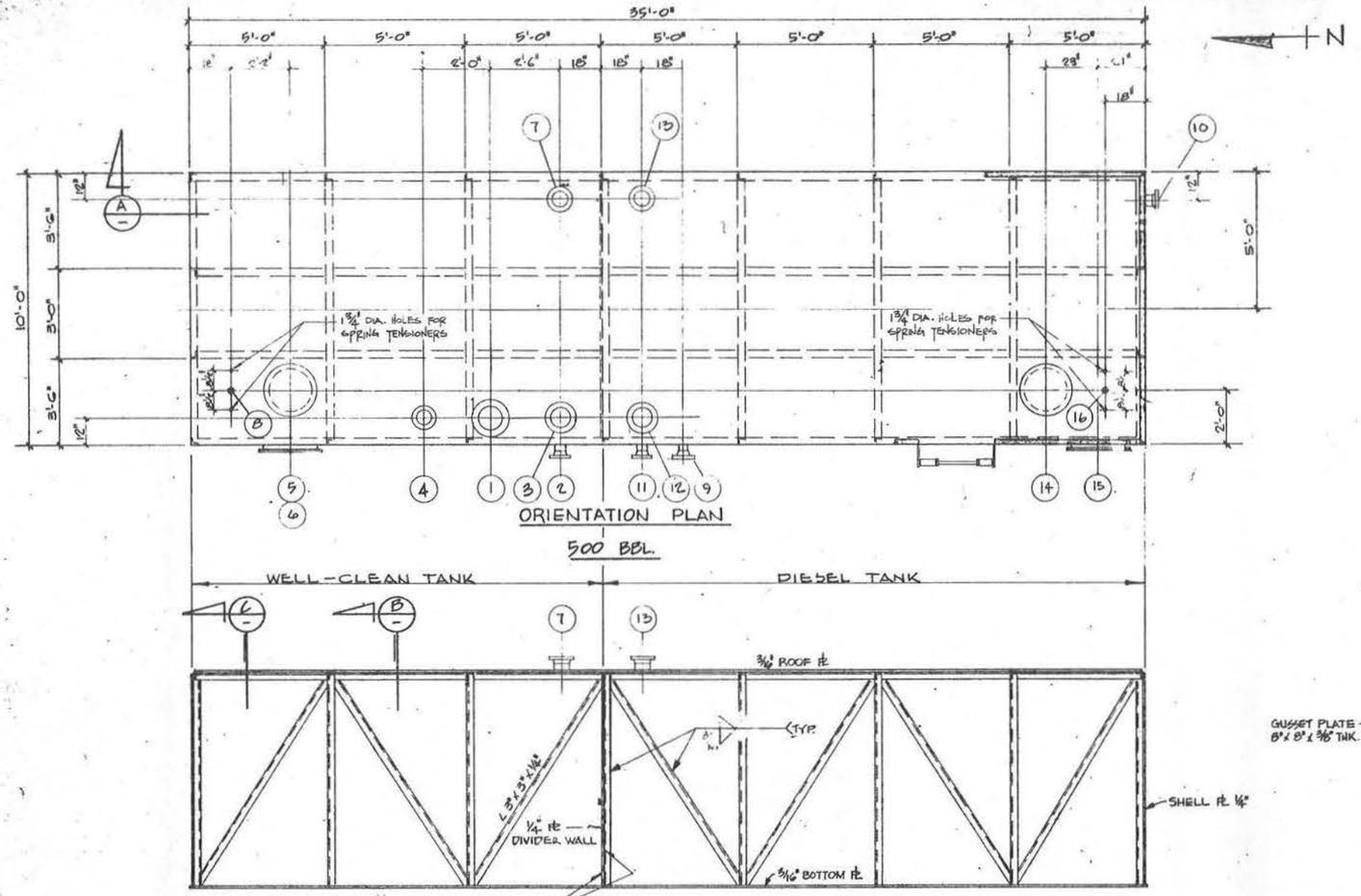
POTABLE WATER TANK T-21

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSG | ENGR. SECTION | APPROVED | SCALE 3/8"=1'-0" | DATE 7-22-71

084-148



NOZZLE SCHEDULE				
	NO.	SIZE	RATING	DESCRIPTION
WELL-CLEAN TANK	1	12"	150# ASA	INLET
	2	4"	〃	OUTLET
	3	—	〃	VAPOR RECOVERY
	4	4"	API-12B	VENT & GAUGE HATCH
	5	20"	API-650	STD. ROOF MANHOLE, W/ BOLTED COVER
	6	—	API-650	24" x 36" FLUSH TYPE CLEANOUT
	7	6"	150# ASA	EQUALIZER VENT
	8	1½"	3000# CPLG.	FISHER 2500 LEVEL GAUGE
DIESEL TANK	9	8"	150# ASA	INLET
	10	2"	〃	OUTLET
	11	4"	〃	DRAIN
	12	4"	API-12B	VENT & GAUGE HATCH
	13	6"	150# ASA	EQUALIZER VENT
	14	20"	API-650	STD. ROOF MANHOLE W/BOLTED COVER
	15	—	API-650	24" x 36" FLUSH TYPE CLEANOUT
	16	1½"	3000# CPLG.	FISHER 2500 LEVEL GAUGE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

EMERGENCY SURGE TANK T 22

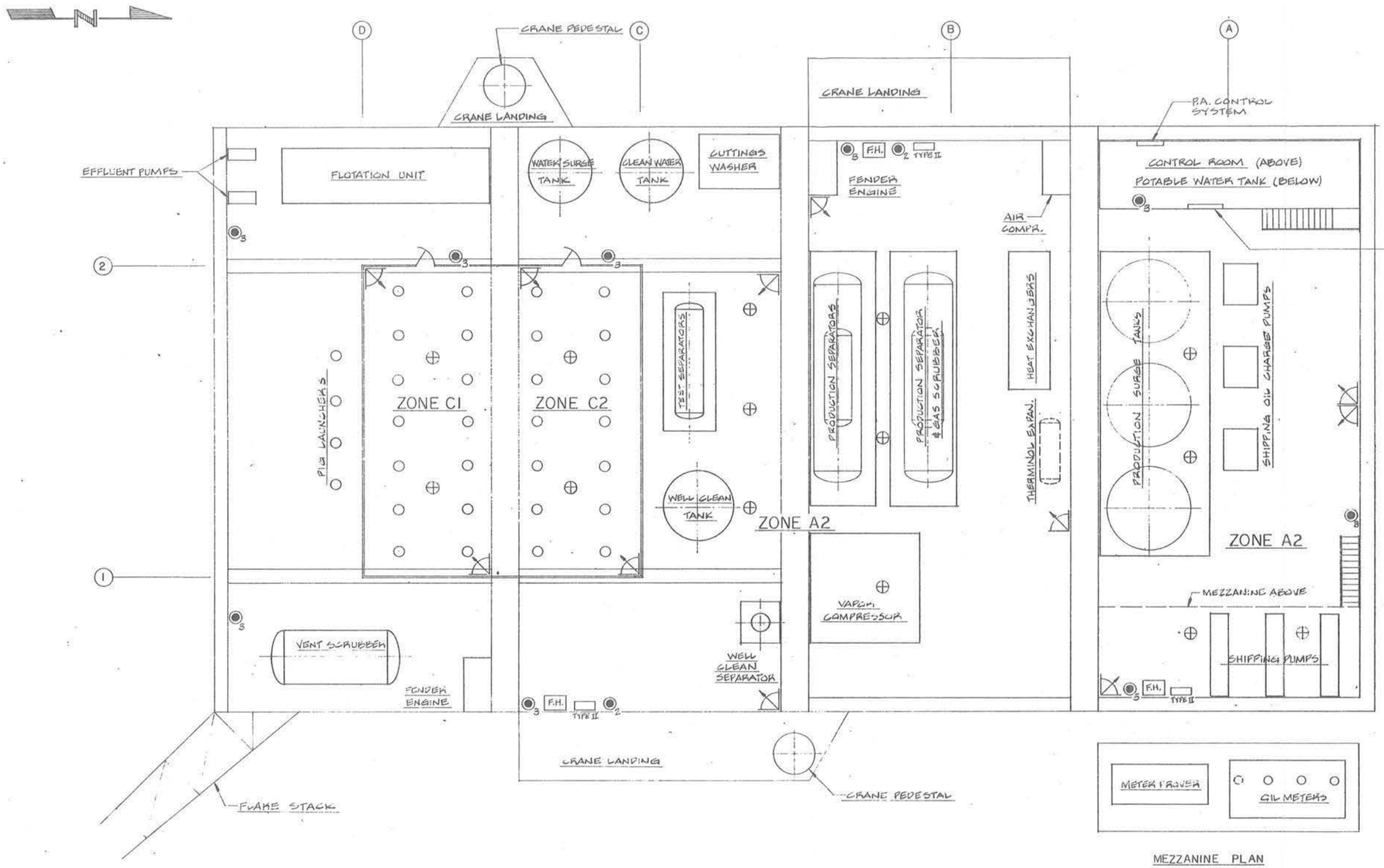
HOBBS-BANNERMAN CORP.
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN BB | CHECKED | APPROVED

SCALE 3/8"=1'-0" | DATE 7-22-71

084-146



MEZZANINE PLAN

LEGEND

1	100# CO_2 EXTINGUISHER
2	150# DRY CHEMICAL EXTINGUISHER
3	20# DRY CHEMICAL EXTINGUISHER
	GAS DETECTOR
	FIRE DETECTOR
TYPE II	EMERGENCY SHUTDOWN PANEL SEE DETAIL "2" DWG. 084-358
F.H.	FIRE HOSE REEL W/ 100 FOOT HOSE

NO.	DATE	REVISIONS	BY	CHK. / APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SAFETY & EMERGENCY SYSTEM PLAN
PRODUCTION DECK

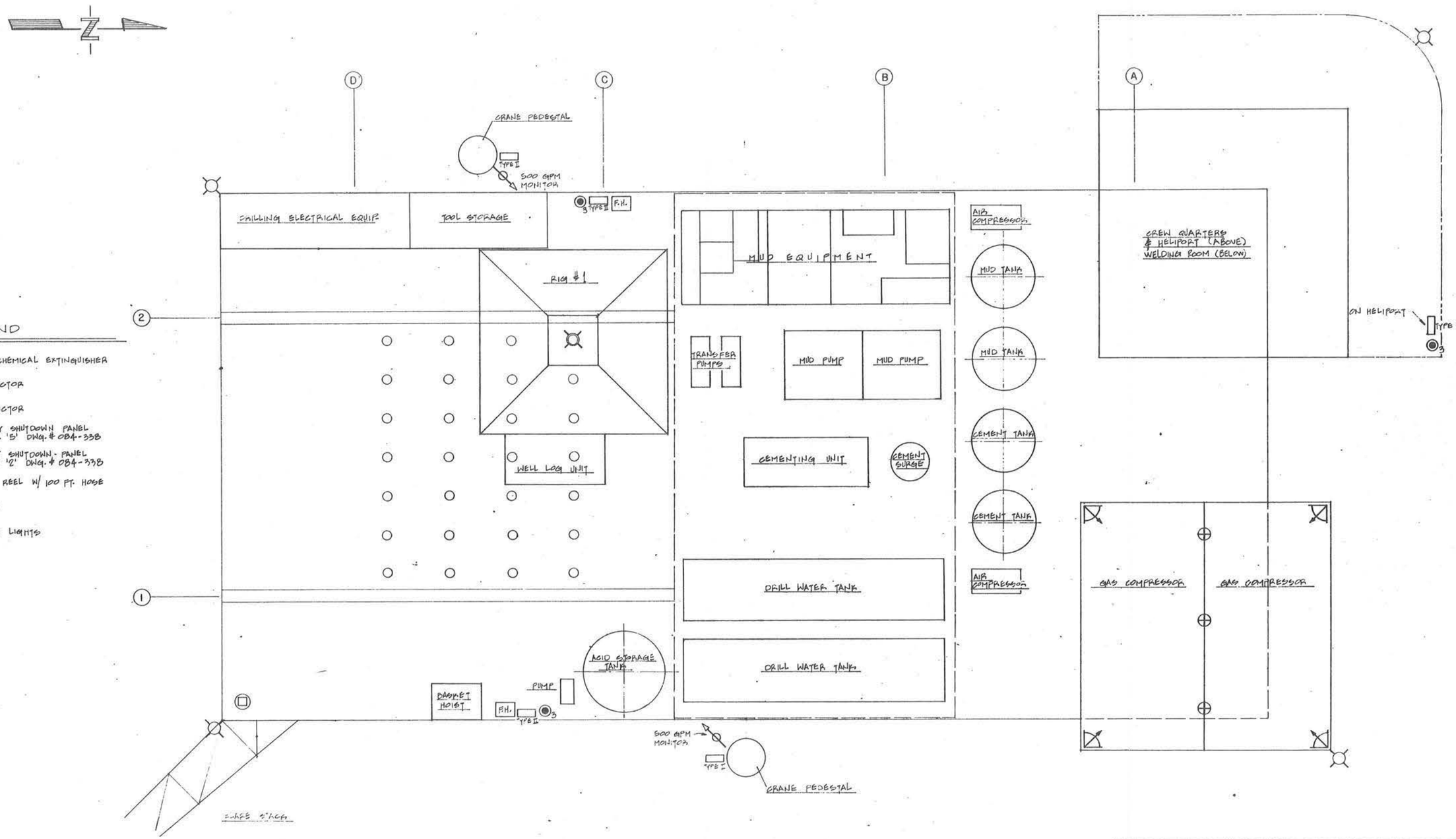
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN ELC | ENGR. SECTION | SCALE 3/32" = 1'-0"
CHECKED | APPROVED | DATE 5-25-71

084-147

REV. 1



LEGEND

- 20# DRY CHEMICAL EXTINGUISHER
- GAS DETECTOR
- FIRE DETECTOR
- TYPE I — EMERGENCY SHUTDOWN PANEL SEE DETAIL '5' DWG. # 084-338
- TYPE II — EMERGENCY SHUTDOWN PANEL SEE DETAIL '2' DWG. # 084-338
- F.H. — FIRE HOSE REEL W/ 100 FT. HOSE
- FOG HORN
- NAVIGATION LIGHTS

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SAFETY & EMERGENCY SYSTEM PLAN
DRILLING DECK

DRAWN RM | ENGR. SECTION | SCALE 1" = 20'-0"
CHECKED | APPROVED | DATE 5-24-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

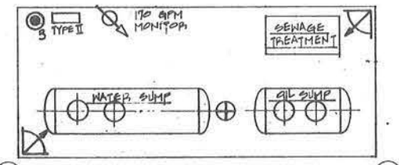
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-147A

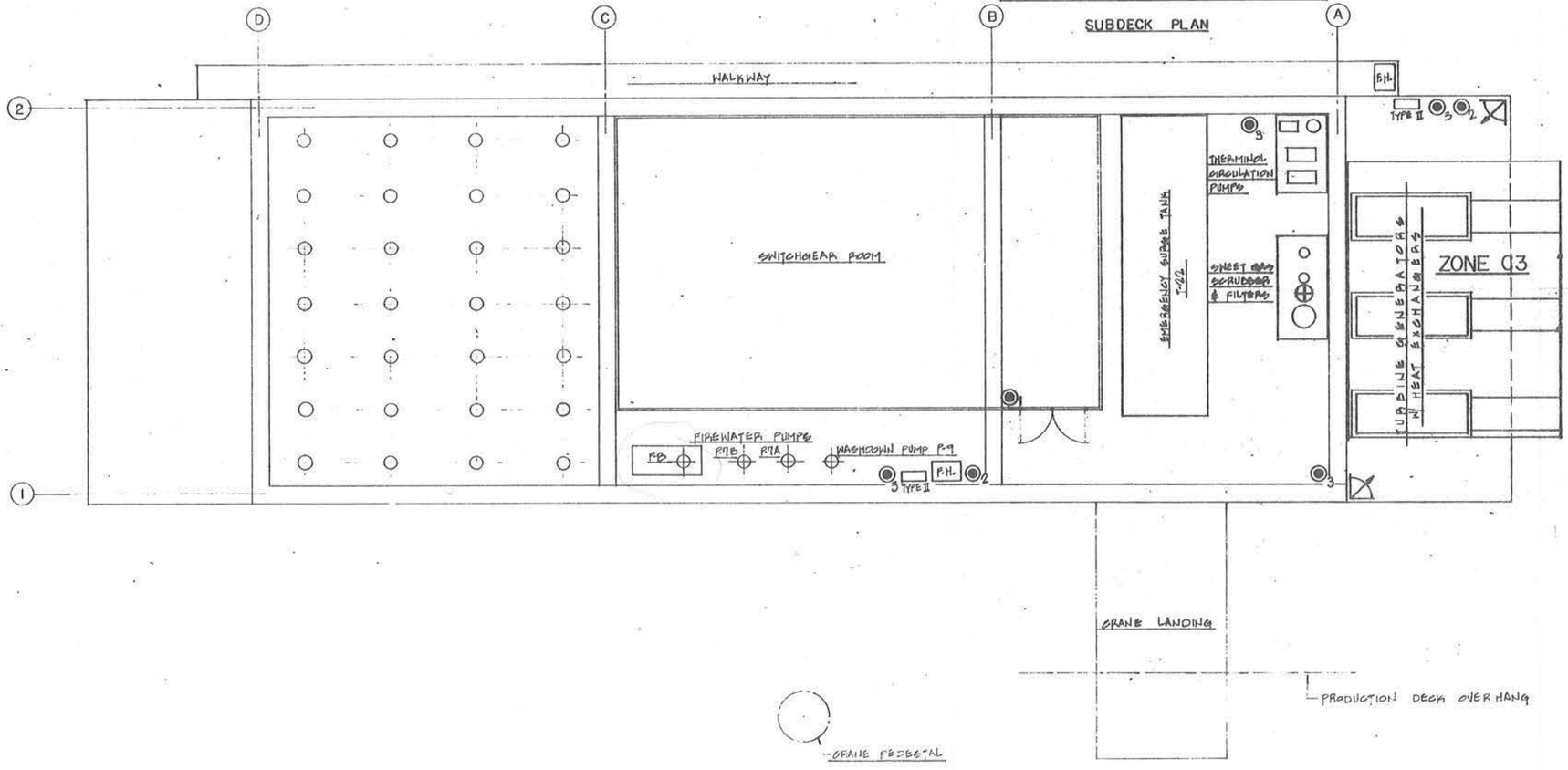
REV. 1

N

CRANE PEDESTAL



SUBDECK PLAN



LEGEND

- 100# CO_2 EXTINGUISHER
- 150# DRY CHEMICAL EXTINGUISHER
- 20# DRY CHEMICAL EXTINGUISHER
- GAS DETECTOR
- FIRE DETECTOR
- TYPE II — EMERGENCY EXTINCTION PANEL SEE DETAIL '2' DWG. # 084-338
- F.H. — FIRE HOSE REEL W/ 50 FT. HOSE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATEORM
SANTA BARBARA CHANNEL

SAFETY & EMERGENCY SYSTEM PLAN
CELLAR DECK

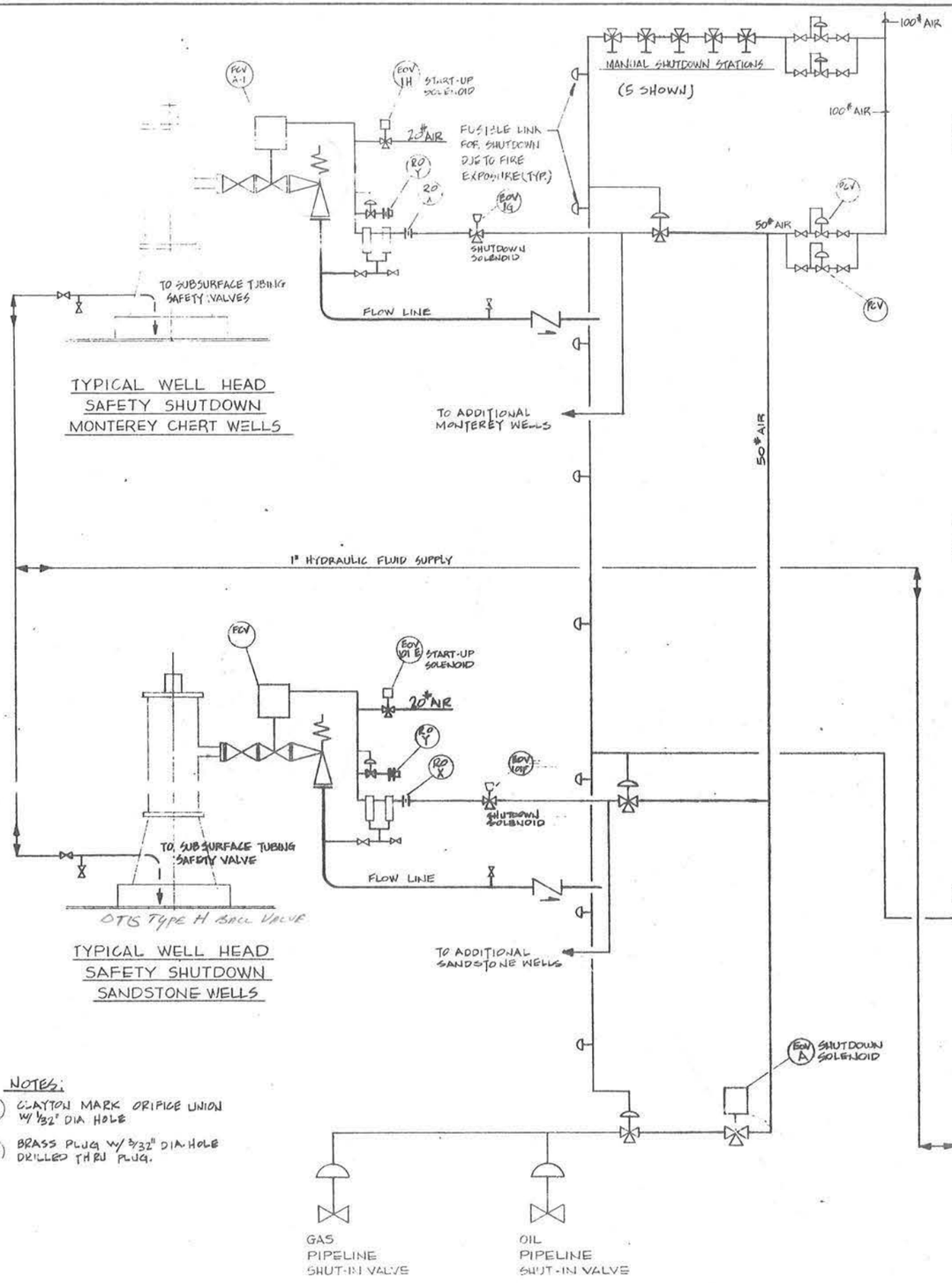
DRAWN RH | ENGR. SECTION | SCALE 3/8" = 1'-0"
CHECKED | APPROVED | DATE 5-24-72

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-147 B

REV. 1



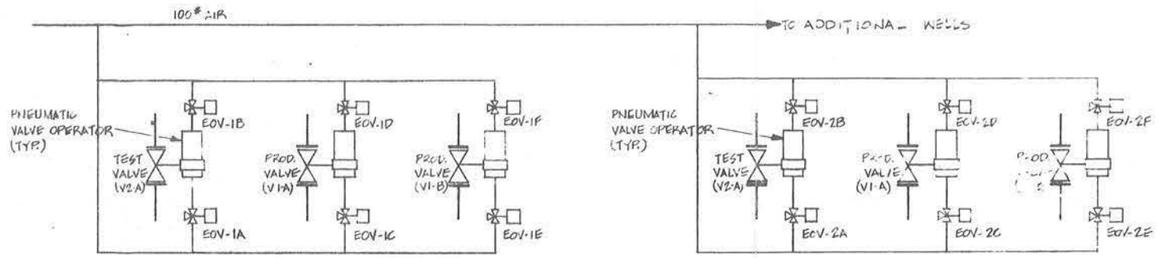
TYPICAL WELL HEAD
SAFETY SHUTDOWN
MONTEREY CHERT WELLS

TYPICAL WELL HEAD
SAFETY SHUTDOWN
SANDSTONE WELLS

NOTES:

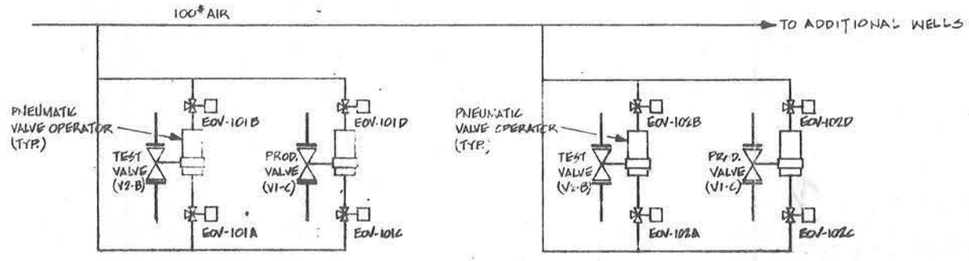
(RO X) CLAYTON MARK ORIFICE UNION W/ 1/32" DIA HOLE

(RO Y) BRASS PLUG W/ 3/32" DIA HOLE DRILLED THRU PLUG.



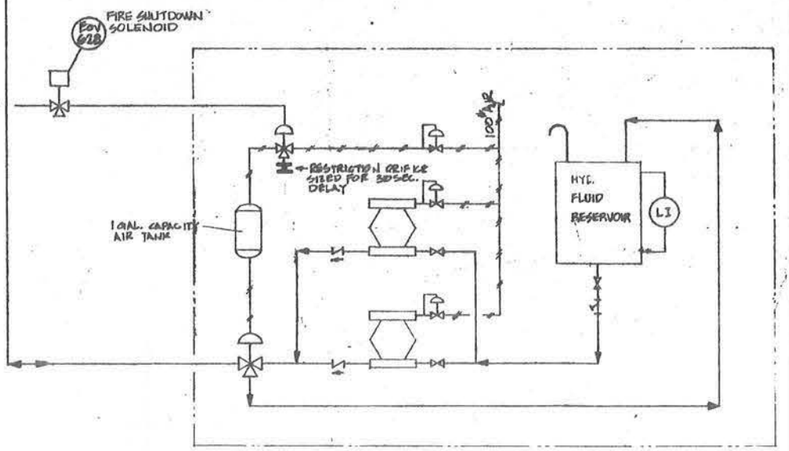
WELL #1 WELL #2

MONTEREY CHERT PRODUCTION
TO TEST SWITCHING HEADER
TYPICAL



WELL #1 WELL #2

SANDSTONE PRODUCTION
TO TEST SWITCHING HEADER
TYPICAL



HYDRAULIC POWER UNIT
FOR SUBSURFACE TUBING SAFETY VALVES

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

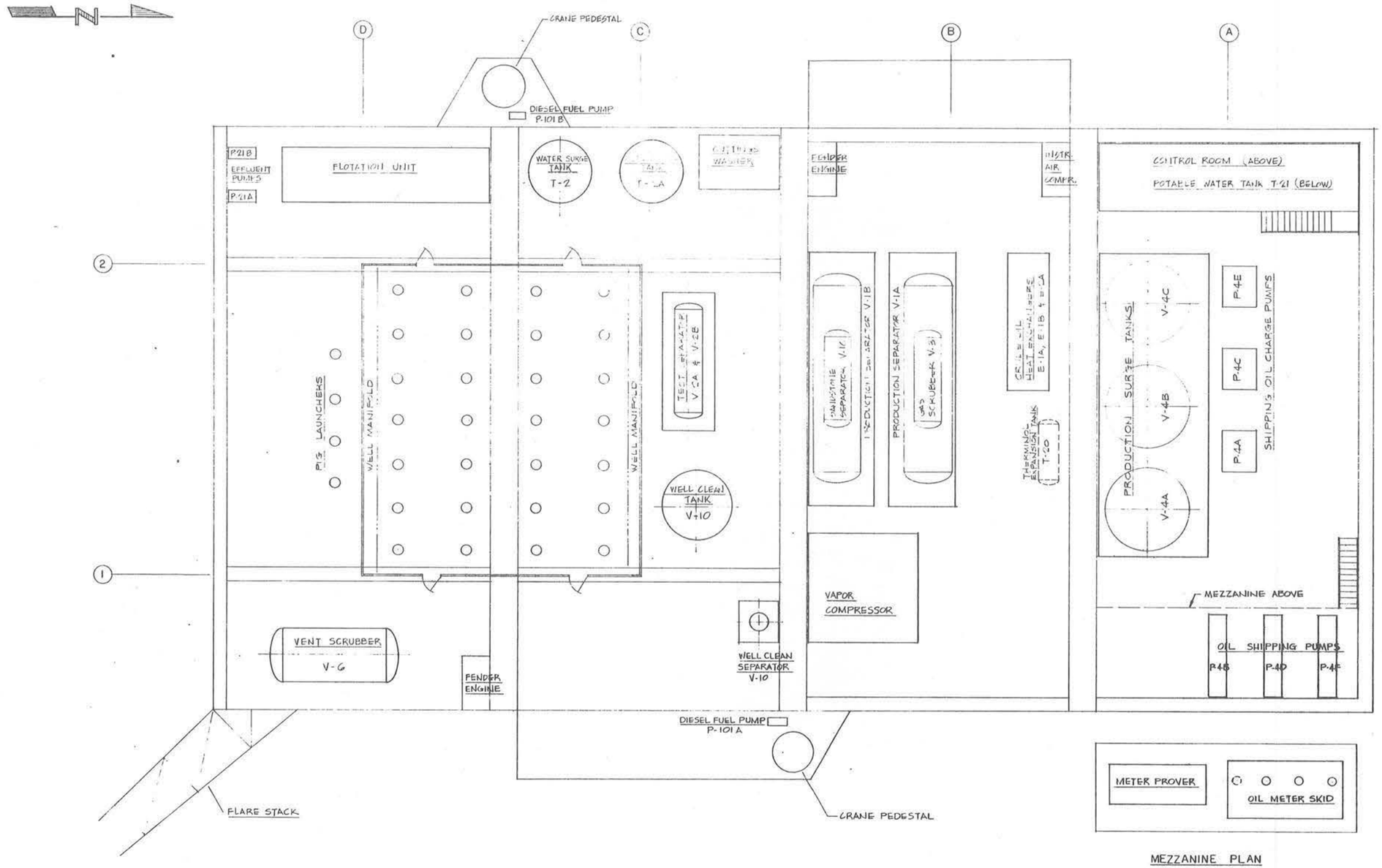
PLATFORM SHUT-IN
PNEUMATIC SYSTEM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN	JSG	DOBB. SECTION	SCALE	NONE	084-148
CHECKED		APPROVED	DATE	2-11-71	

REV. 1



MEZZANINE PLAN

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

EQUIPMENT LOCATION PLAN
PRODUCTION DECK

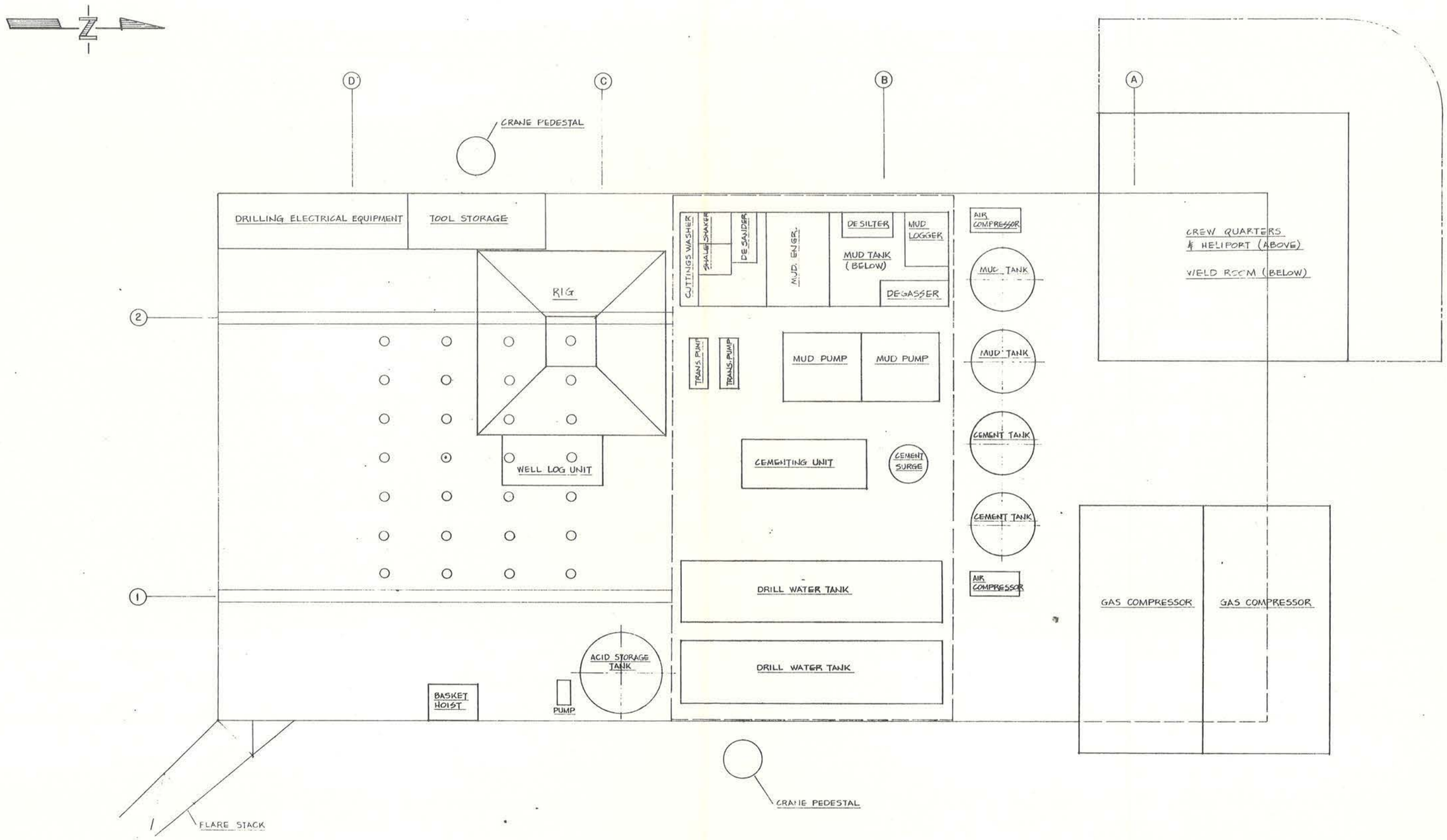
DRAWN W.C.H. ENGR. SECTION SCALE 1/8" = 1'-0"
CHECKED APPROVED DATE 2-15-68

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-149

REV. 1



NO.	DATE	REVISIONS	BY	CHK.	APPR

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

EQUIPMENT LOCATION PLAN
DRILLING DECK

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN ... ENGR SECTION ... SCALE 1" = 10'-0"
CHECKED ... APPROVED ... DATE 5-22-57

084-149A

REV. 1

N

CRANE PEDESTAL

SEWAGE TREATMENT UNIT

WATER SUMP V-7

OIL SUMP V-8

SUBDECK PLAN

D C B A

2

WALKWAY

DIESEL FUEL DAY TANK T-23

THERMOLOW FIRE PUMPS

EMERGENCY SURGE TANK T-22

F-1A F-1B V-5

INLET GAS SCRUBBER & FILTERS

TURBINE GENERATORS & HEAT EXCHANGERS

SWITCHGEAR ROOM

FUEL GAS HEATER

FIRE PUMPS

WASHDOWN PUMP

P-8 P-7B P-7A P-9

1

PRODUCTION DECK OVERHANG

CRANE PEDESTAL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

EQUIPMENT LOCATION PLAN
CELLAR DECK

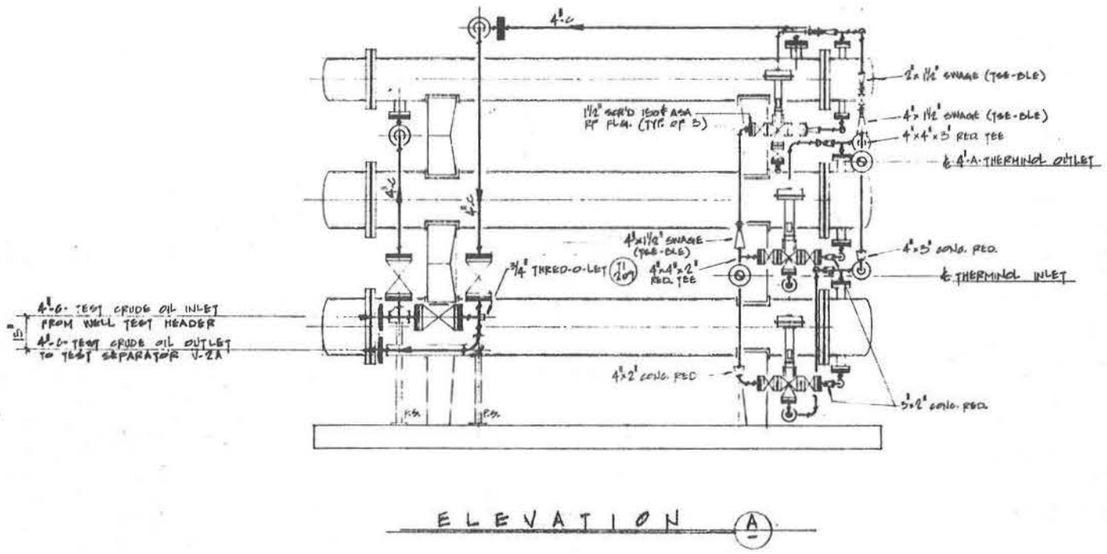
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

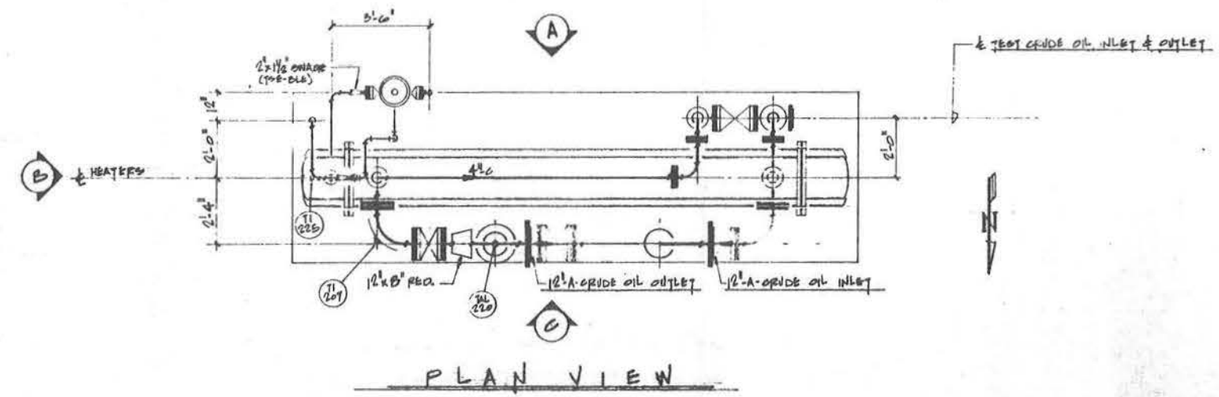
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

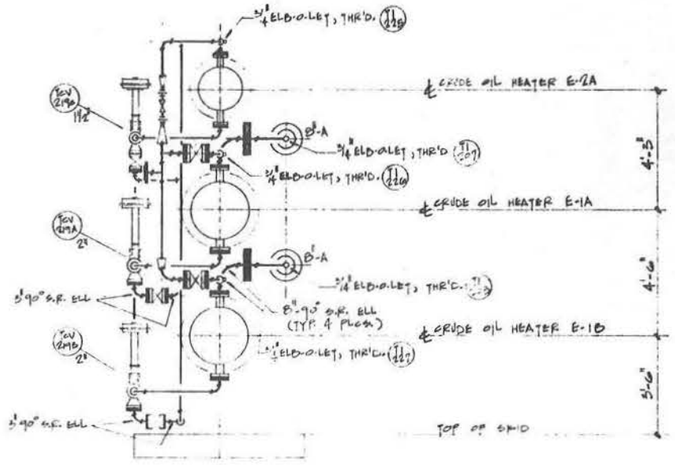
DRAWN T.S. ENGR. SECTION
CHECKED APPROVED
SCALE 1/8" = 1'-0" DATE 5-23-75

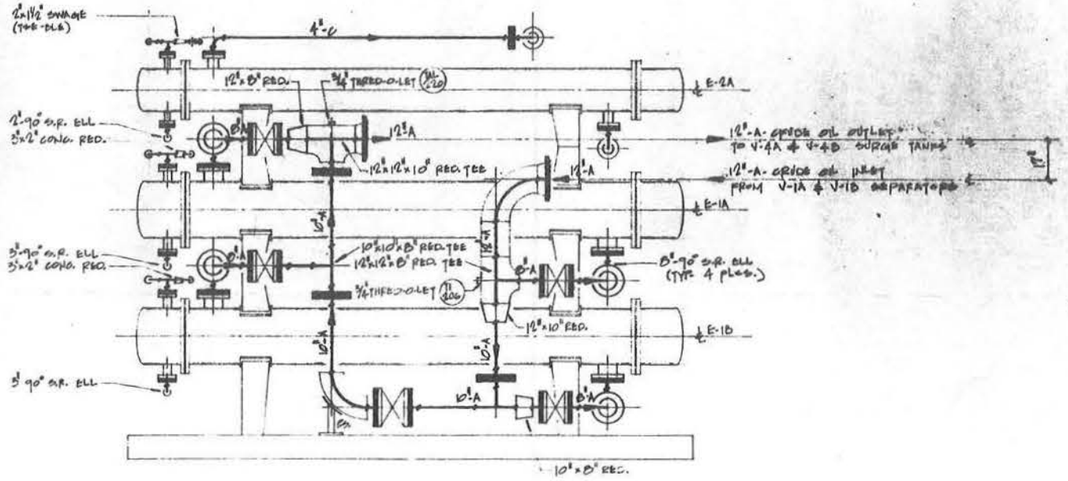
084-149 B

REV. 1









NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

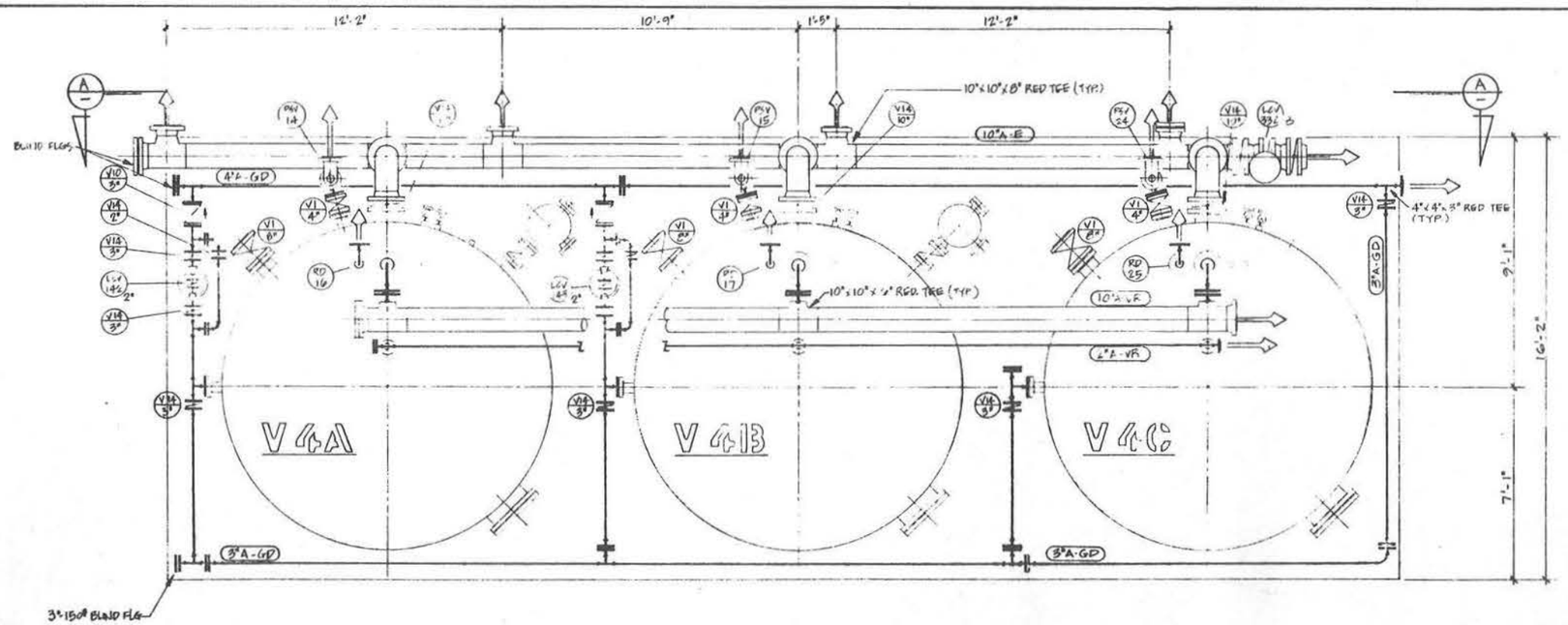
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

CRUDE OIL HEATERS E1A, E1B, & E2A
PIPING PLAN & ELEVATIONS

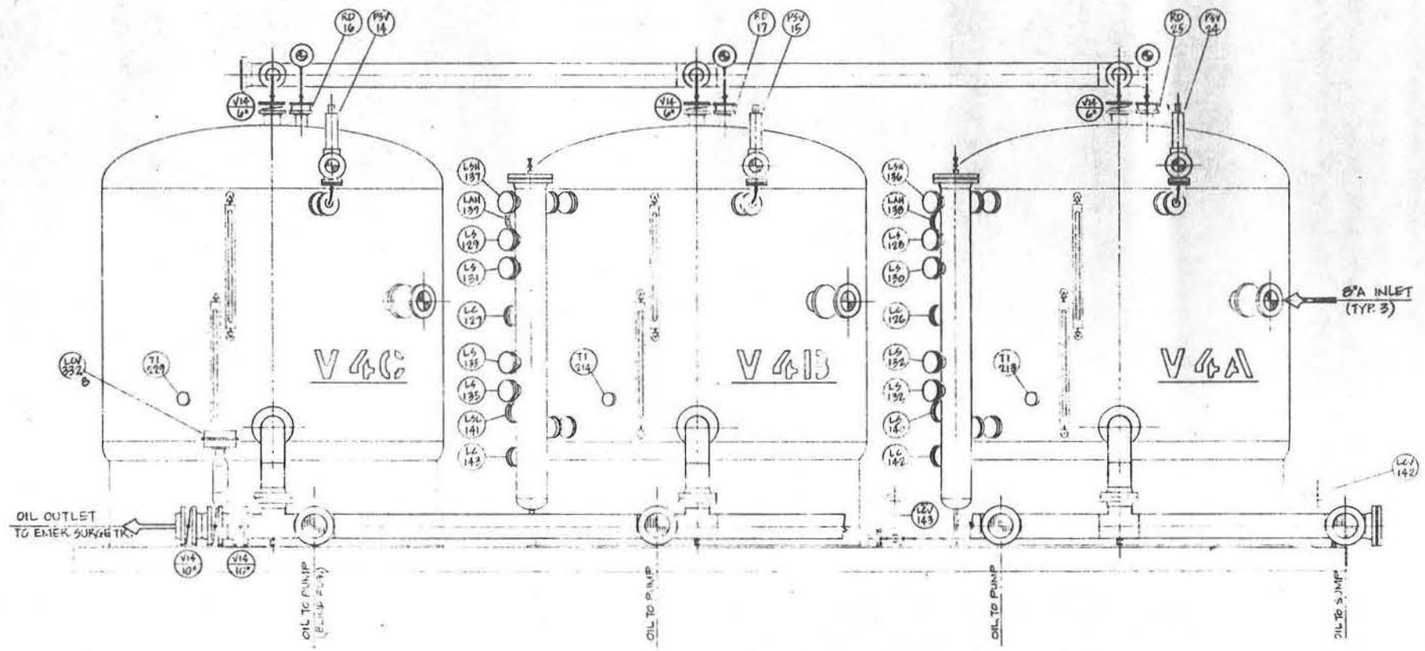
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN EM
CHECKED
ENGR. SECTION
APPROVED
SCALE 3/8" = 1'-0"
DATE 7-22-71

084-165



PIPING PLAN



ELEVATION (A)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

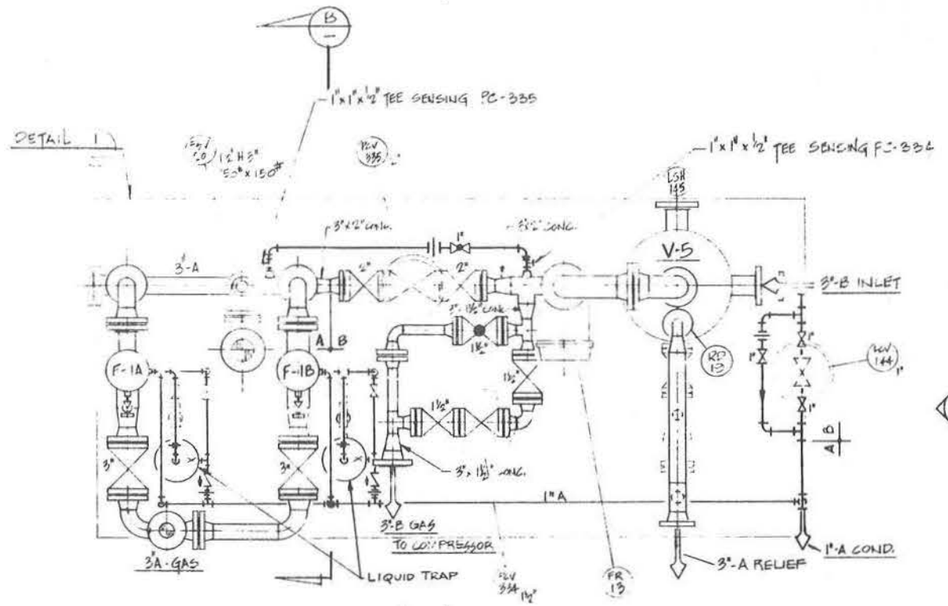
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PRODUCTION SURGE VESSELS V-4A, V-4B, V-4C
PIPING PLAN & ELEVATION

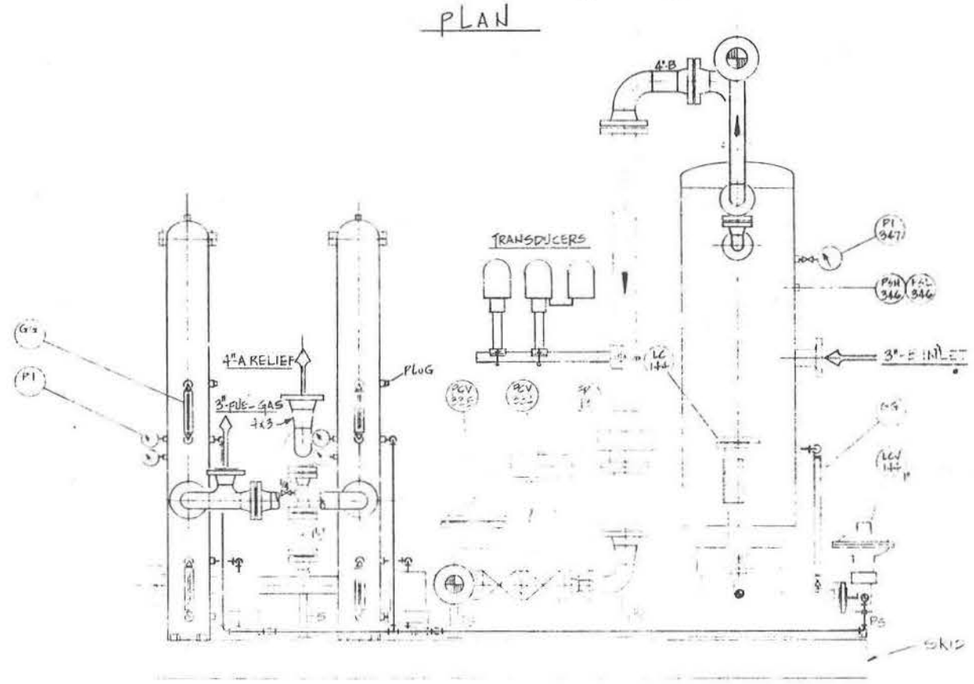
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: GRANDLAND
CHKD. DETAIL:
CHECKED:
APPROVED:
SCALE: 3/16" = 1'-0"
DATE: 7-22-71

084-166



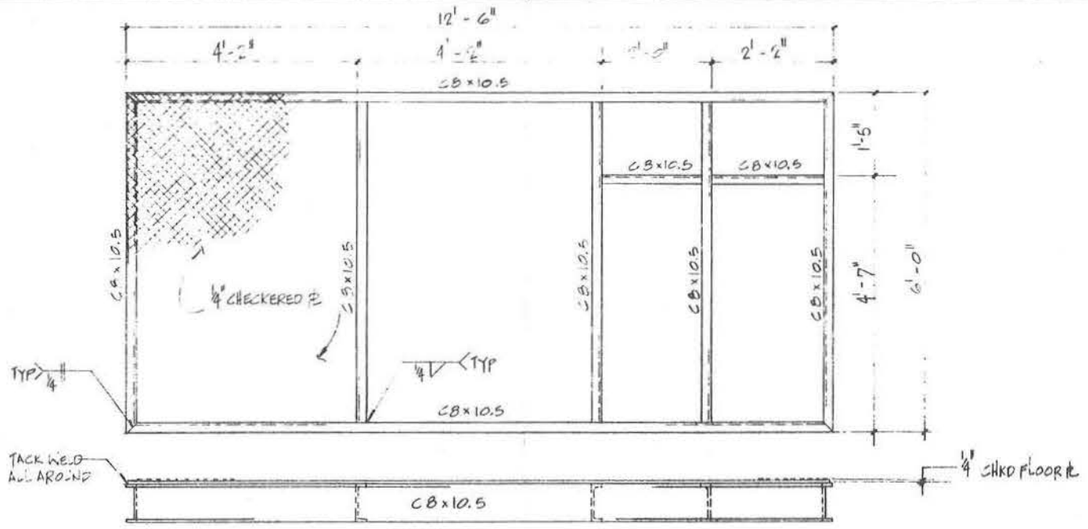
PLAN



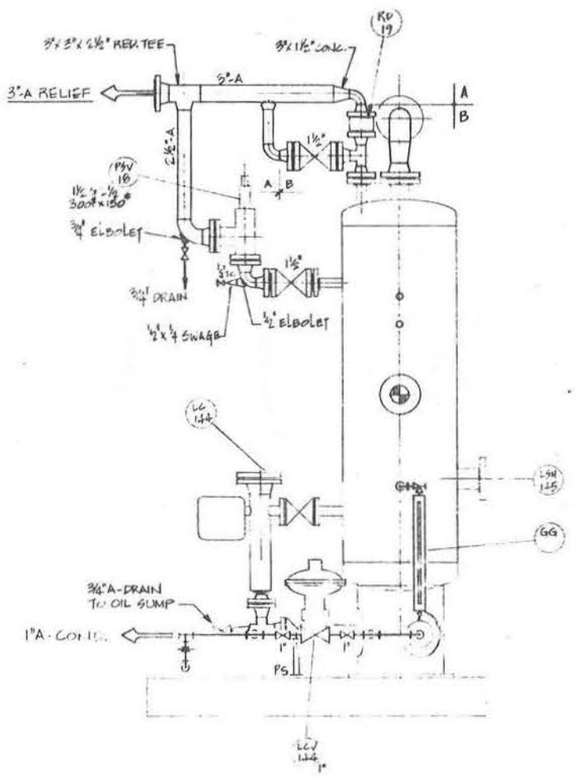
F-1A F-1B
FILTER SEPARATOR

V-5
SWEET GAS SCRUBBER

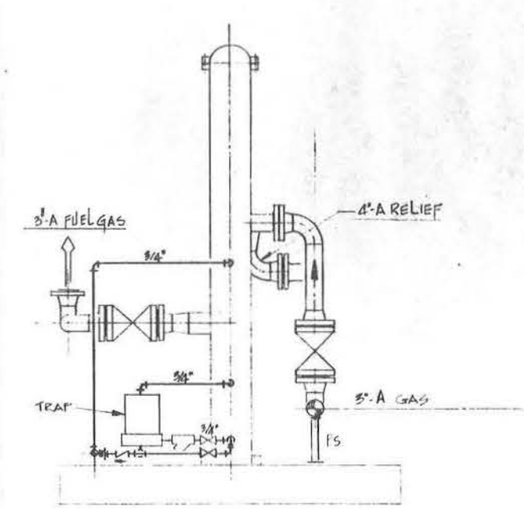
ELEVATION



SKID-DETAIL (1)



SECTION (A)



SECTION B

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

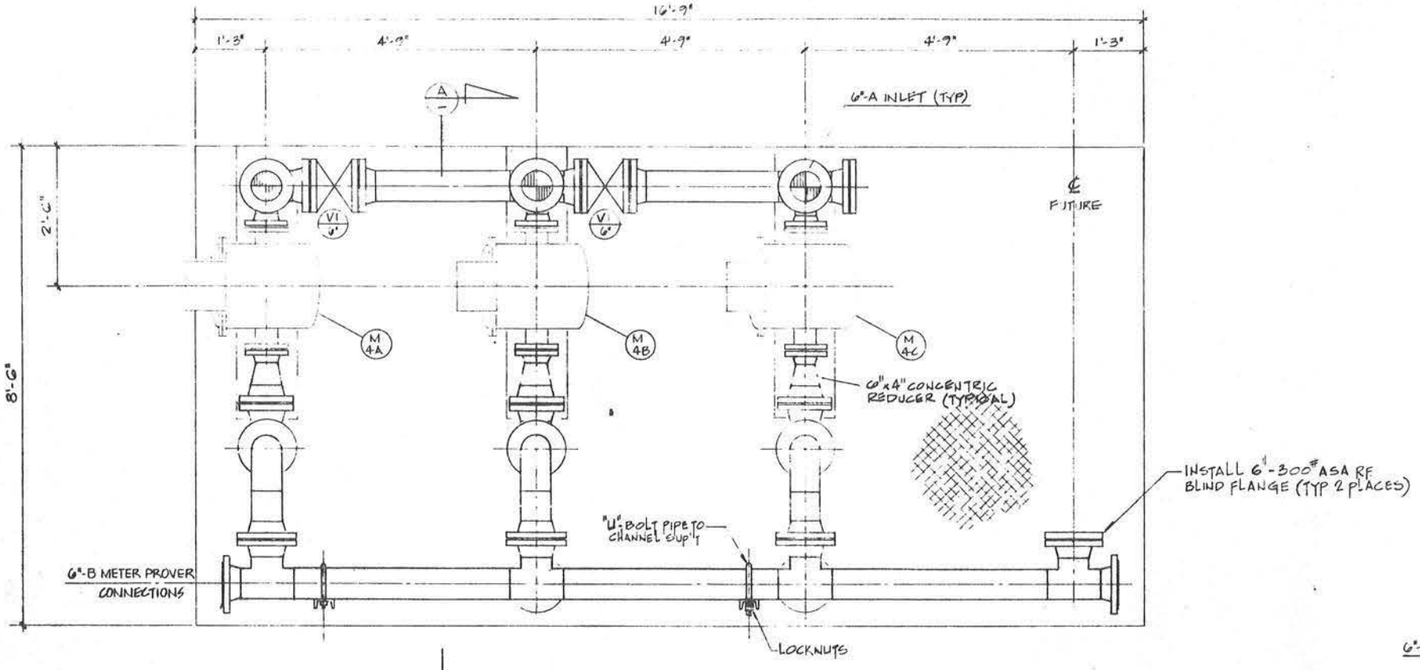
SWEET GAS SCRUBBER & FILTERS
PIPING PLAN & SECTIONS

DRAWN JSG
CHECKED
DESIGN. SECTION
APPROVED
SCALE 3/4"=1'-0"
DATE 7/22-71

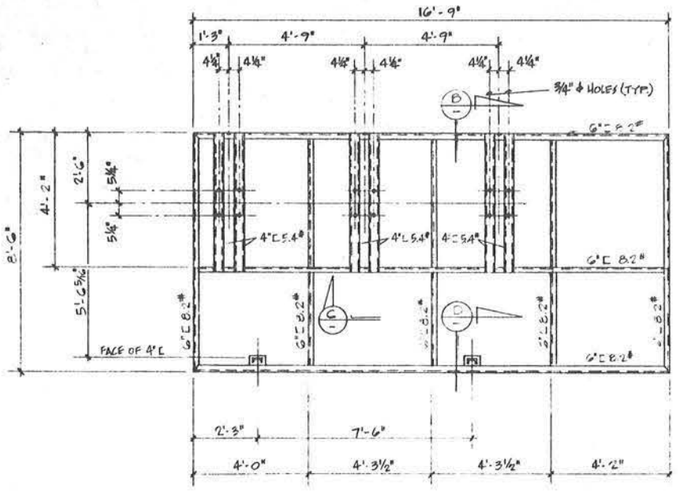
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

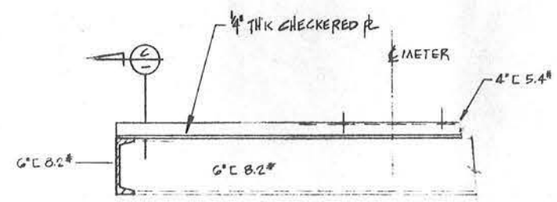
084-167



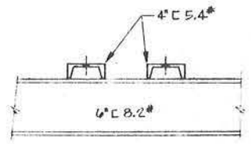
— PLAN —



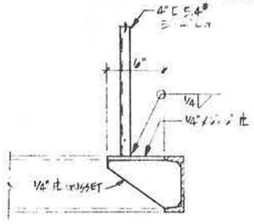
PLAN — METERING SKID BASE
3/8" = 1'-0"



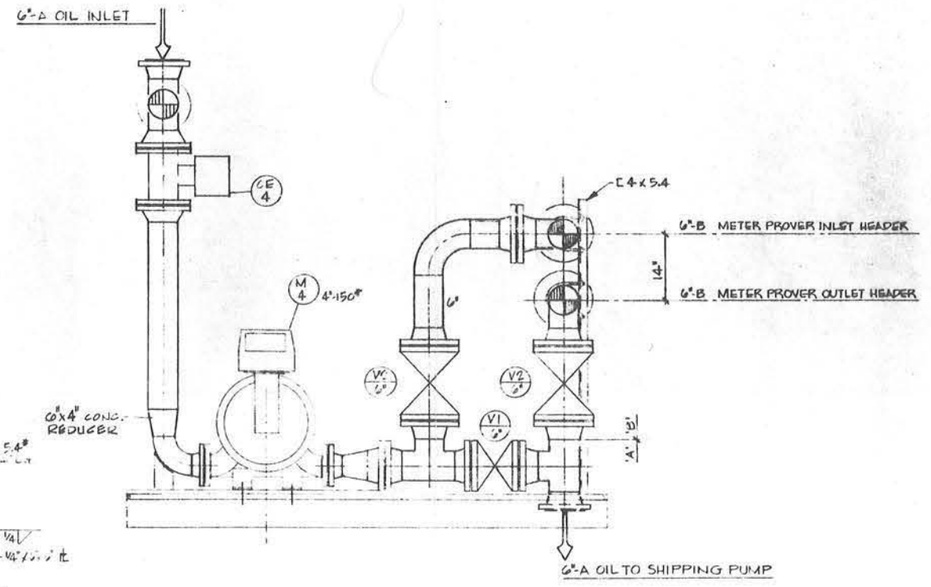
SECTION B
1½" = 1'-0"



SECTION C
1½" = 1'-0"



SECTION D
1½" = 1'-0"



SECTION A

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

CRUDE OIL METERING SKID
PIPING PLAN & SECTIONS

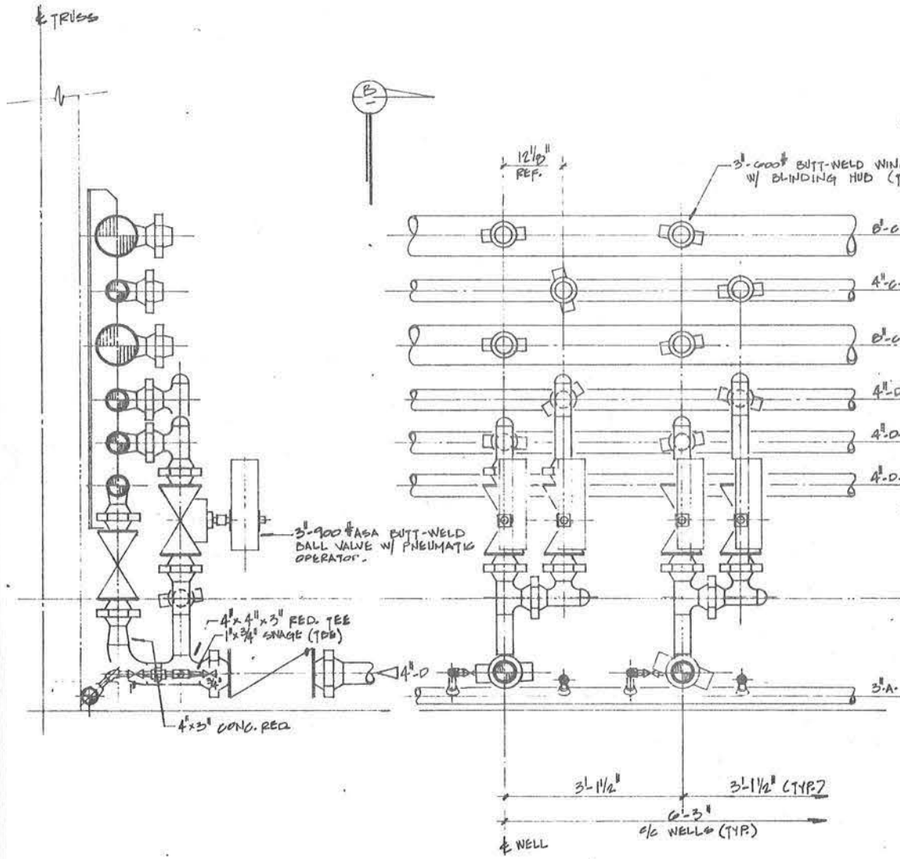
DRAWN JSG | ENGR. SECTION | CHECKED | APPROVED

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

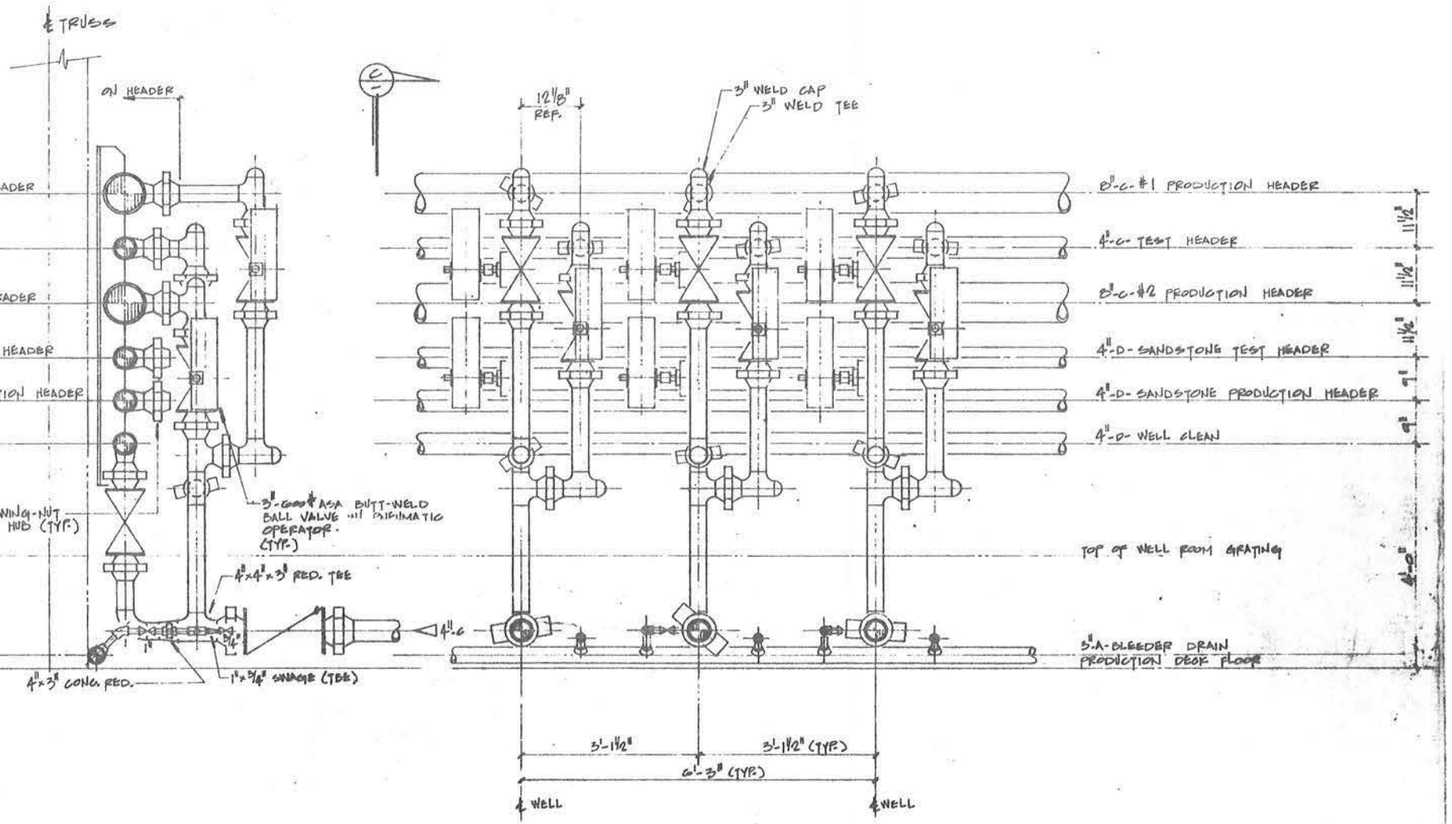
SCALE 3/4" = 1'-0" | DATE 7-22-71

084-168



SECTION (B) ELEVATION (A/102)

SANDSTONE WELLS



SECTION (C) ELEVATION (A/102)

MONTEREY CHERT WELLS

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

WELLHEAD MANIFOLD ASSEMBLY

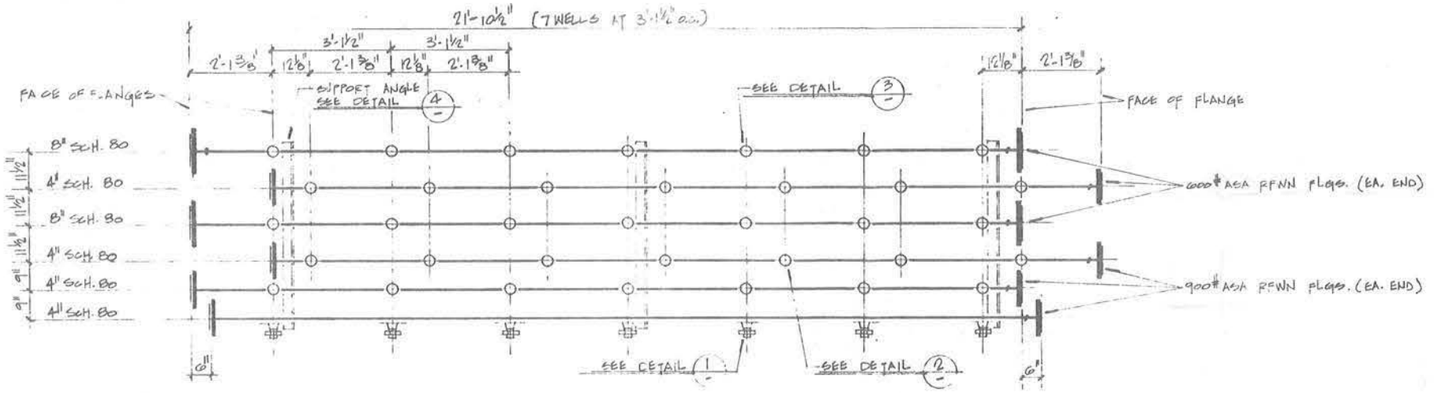
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

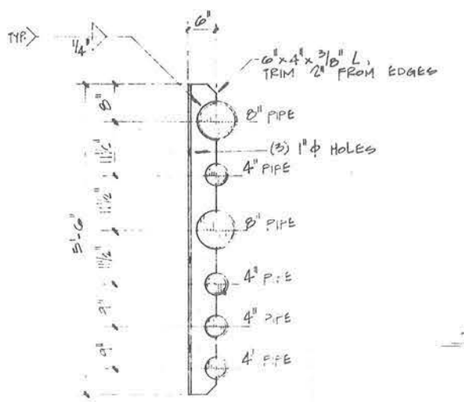
NO.	DATE	REVISIONS	BY	CHK.	APPR.

DRAWN FM | ENGR. SECTION | SCALE 3/4" = 1'-0" | 084-169
CHECKED | APPROVED | DATE 7-22-71

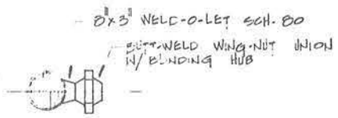
REV. 1



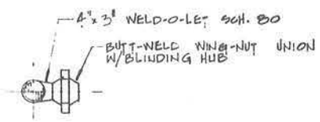
WELLHEAD MANIFOLD SPOOL —
(ONE REQUIRED PER ROW OF DRILLING WELLS)
½" = 1'-0"



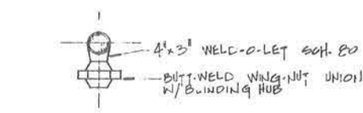
DETAIL (4)
PIPE SUPPORT BRACKET
3/4" = 1'-0"



DETAIL (3)
TYPICAL 8" HEALER CONNECTION
3/4" = 1'-0"



DETAIL (2)
TYPICAL 4" HEADER CONNECTION



DETAIL (1)
3/4" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

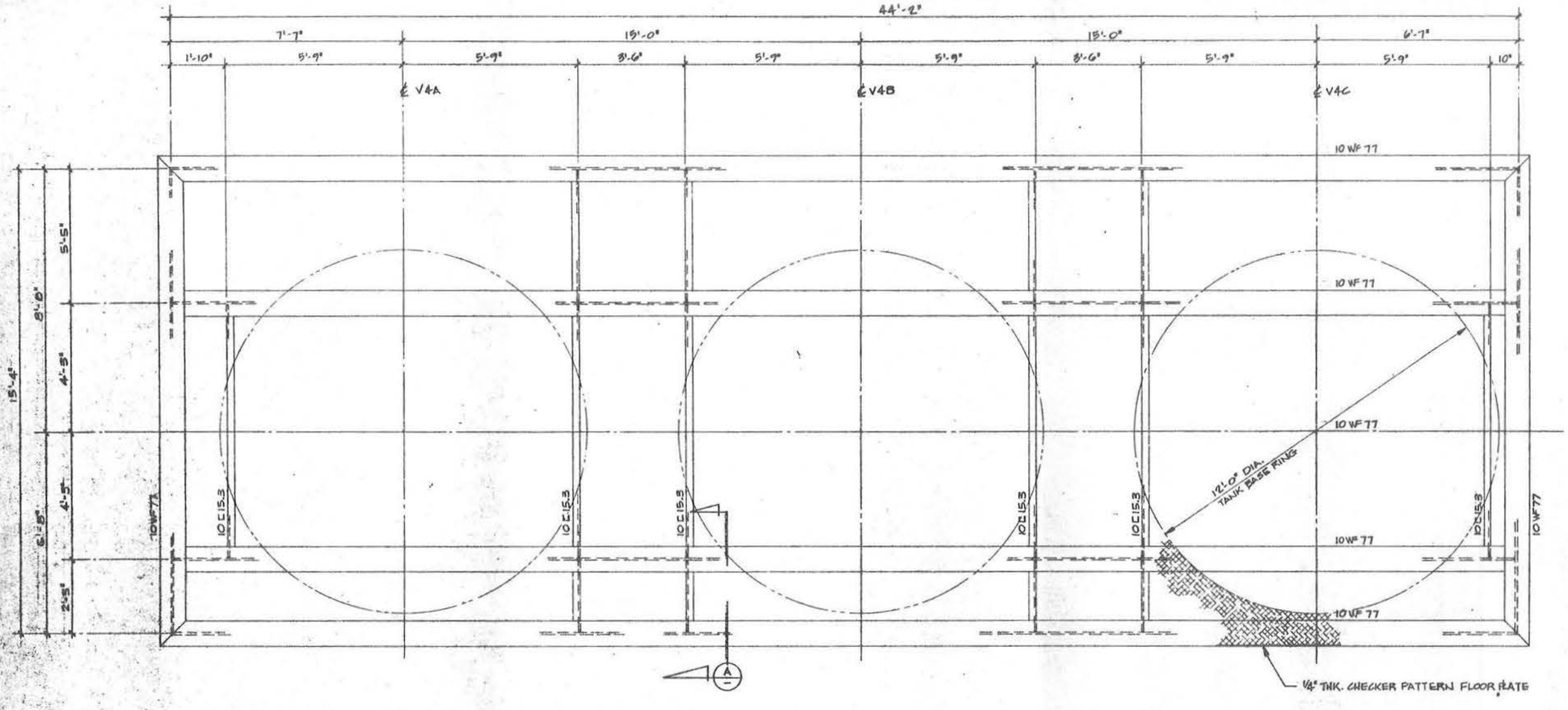
WELLHEAD MANIFOLD HEADER SPOOLS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

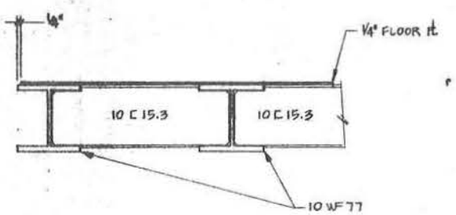
DRAWN: L.M. | ENGR. SECTION: | SCALE: NOTED | 084-170
CHECKED: | APPROVED: | DATE: 7-2-

REV. 1



BASE FRAMING PLAN

1/2" = 1'-0"



SECTION (A)

1" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

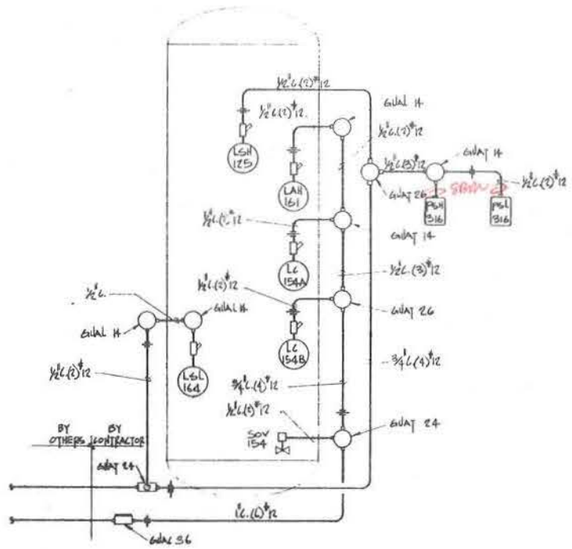
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PRODUCTION SURGE TANKS
SKID FRAMING DETAILS

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

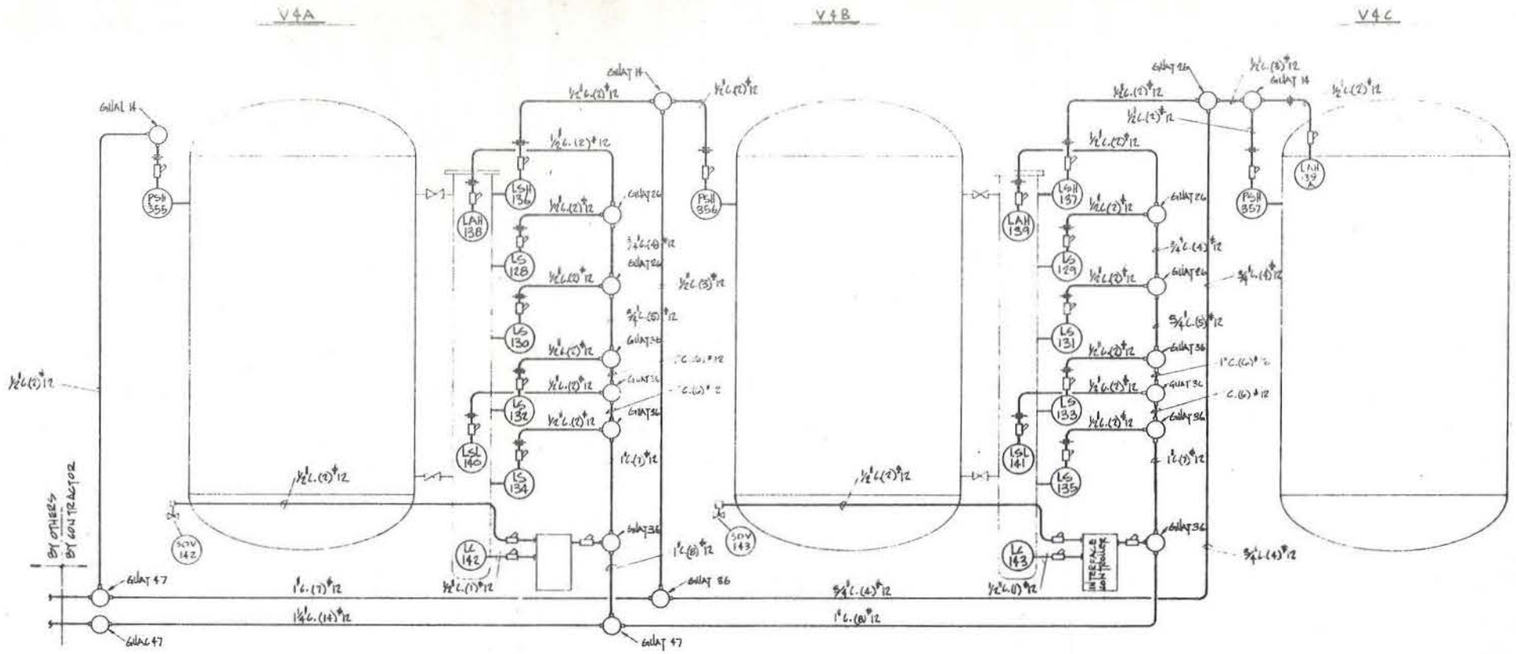
DRAWN: GRAMSTAD
CHECKED:
APPROVED:
DATE: 7-12-71

084-171



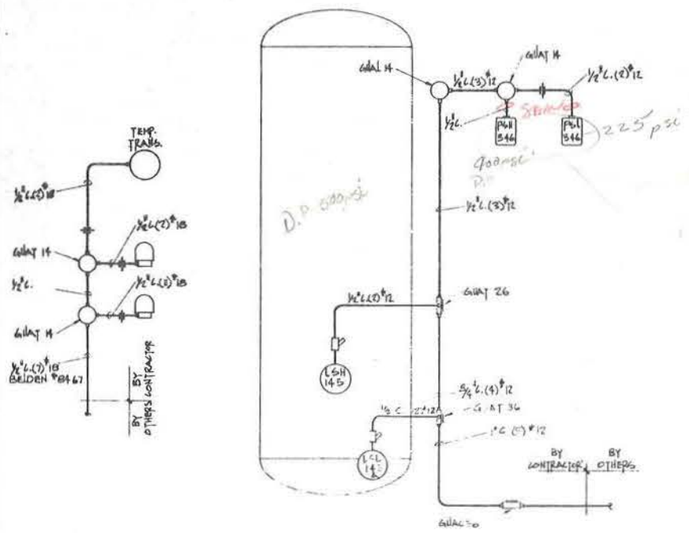
WELL CLEAN SEPARATOR

DETAIL (2)



PRODUCTION SURGE TANKS

DETAIL (1)



SWEET GAS SCRUBBER

DETAIL (3)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

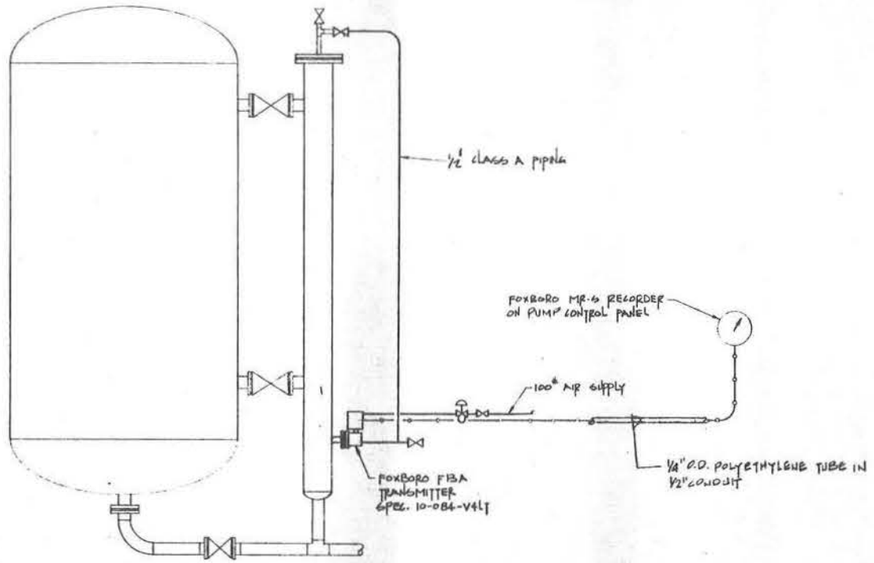
SKID MOUNTED PACKAGED EQUIPMENT
ELECTRICAL DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA.

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

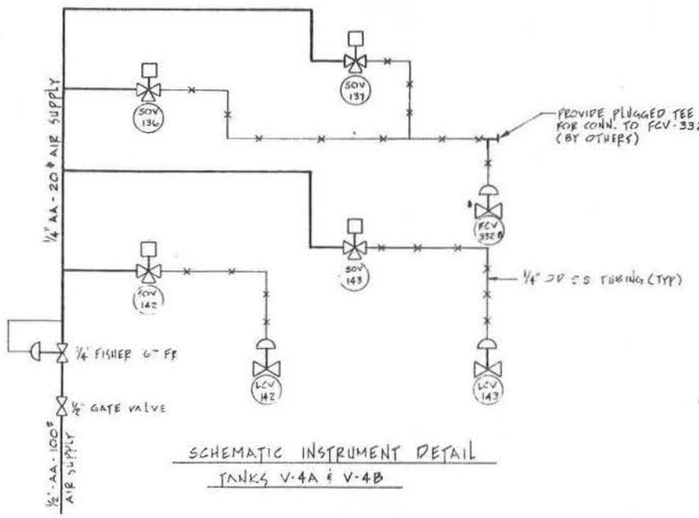
DESIGN PWE | DWG. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

084-172

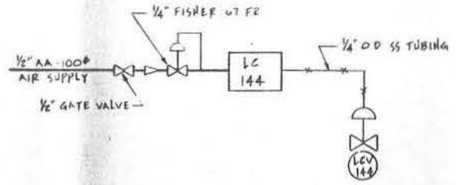


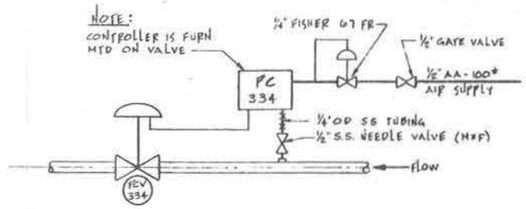
V4A
TANK
BOOT

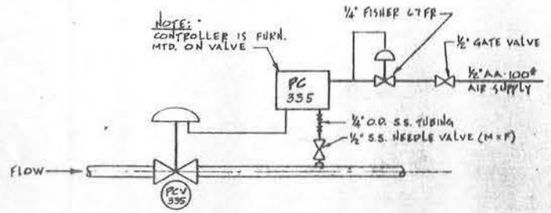
SCHEMATIC HOOK-UP
LIQUID LEVEL INDICATOR
CRUDE SURGE TANK V4A



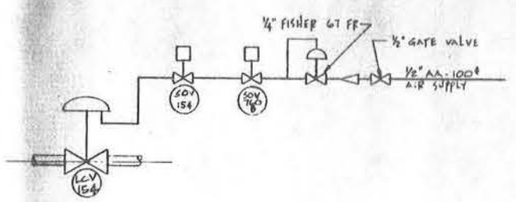
SCHEMATIC INSTRUMENT DETAIL
TANKS V-4A & V-4B

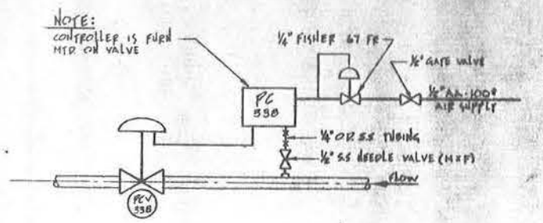






SWEET GAS SCRUBBER V-5
PNEUMATIC DETAILS





V-10
WELL CLEAN SEPARATOR
PNEUMATIC DETAILS

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

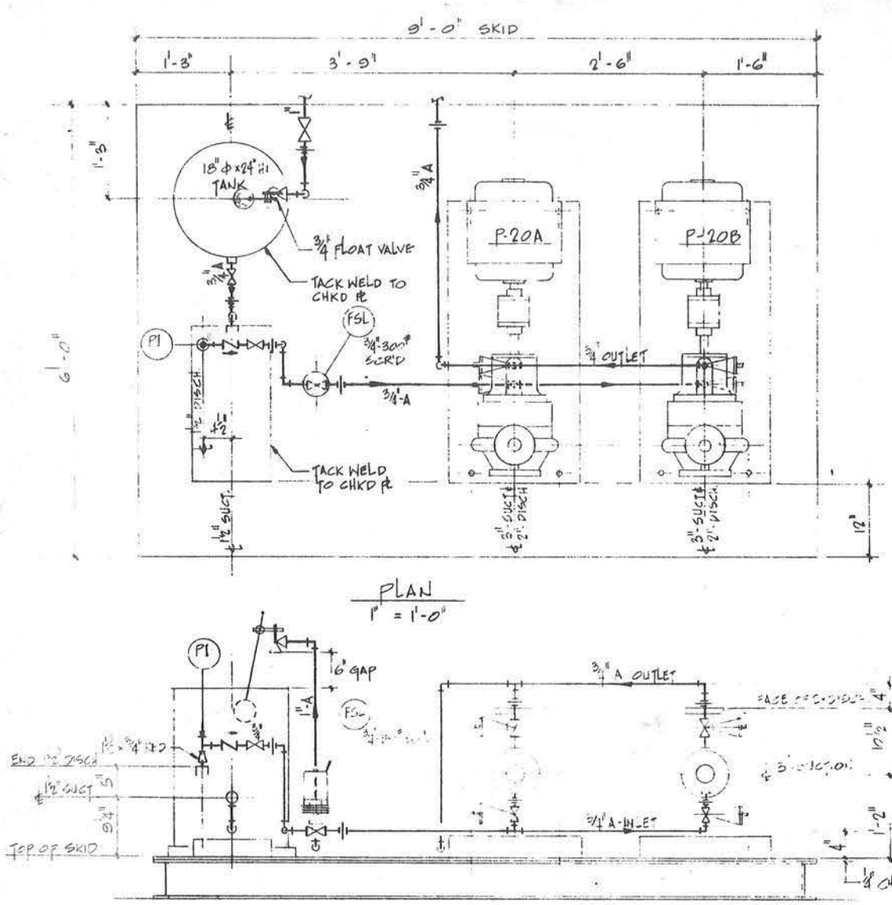
NO.	DATE	REVISIONS	BY	CHK.	APPR.

PNEUMATIC INSTRUMENTATION DETAILS

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

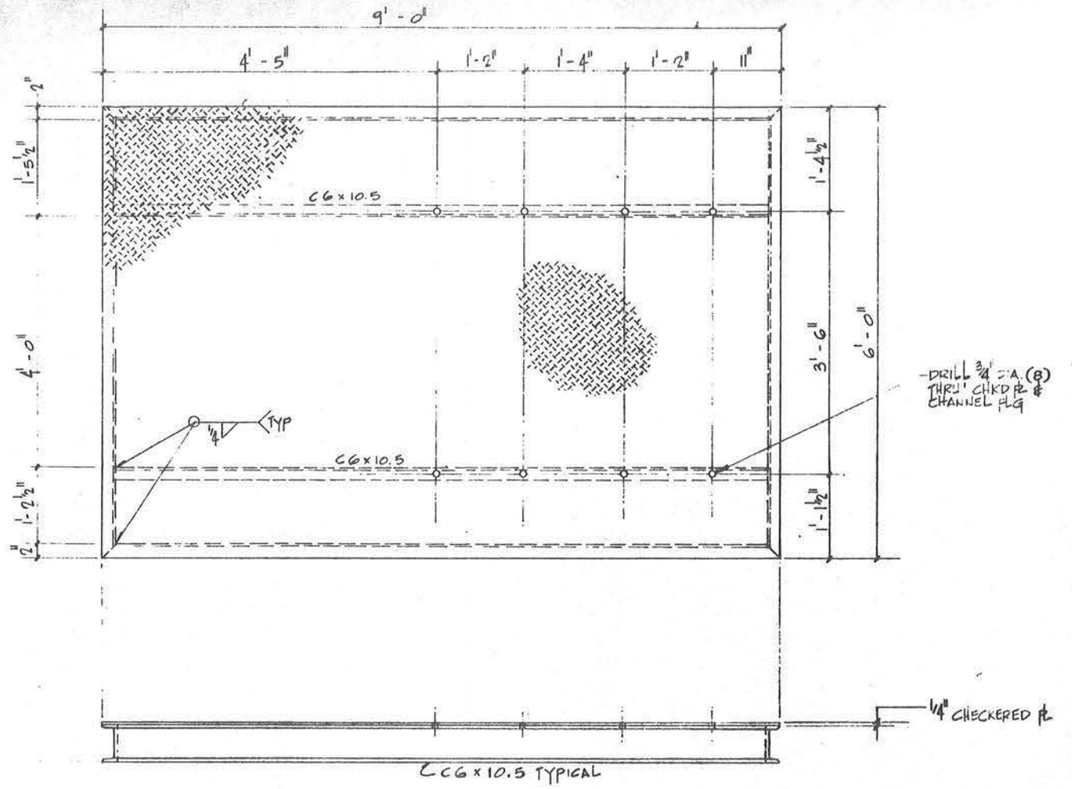
DRAWN D.A. | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

084-173



PLAN
1" = 1'-0"

ELEVATION



SKID DETAIL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

THERMINOL CIRCULATION PUMPS
SKID PIPING PLAN & DETAILS

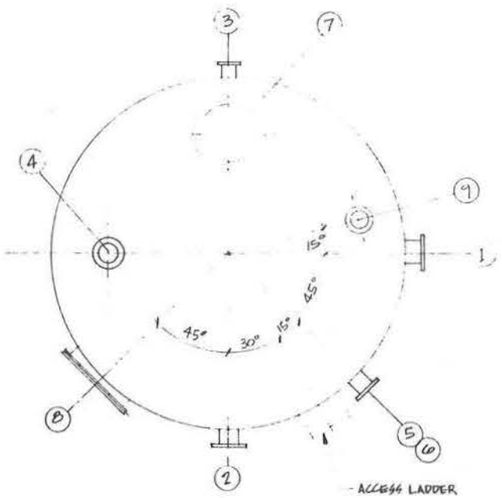
DRAWN PW | DESIG. SECTION | SCALE 1" = 1'-0"
CHECKED | APPROVED | DATE 7-22-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

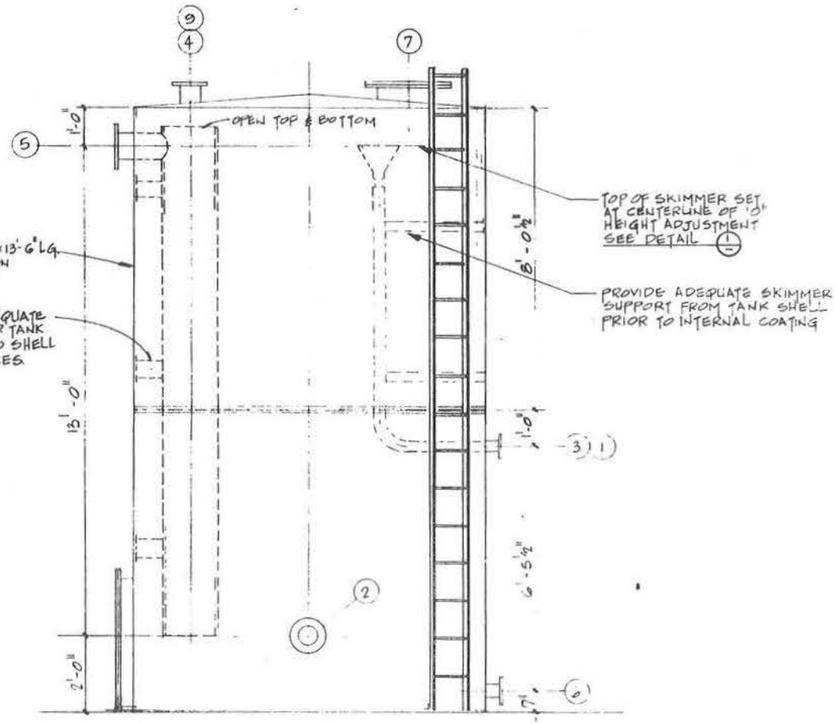
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-174

NOZZLE SCHEDULE			
NO	SIZE	RATING	DESCRIPTION
1	6"	150# ASA RF	WATER INLET
2	6"	150# ASA RF	WATER OUTLET
3	3"	150# ASA RF	SKIMMER (SEE DETAIL)
4	6"	150# ASA RF	VAPOUR RECOVERY
5	6"	150# ASA RF	OVERFLOW
6	4"	150# ASA RF	DRAIN
7	20"	API 650	ROOF MANHOLE
8	24"x20"	API 650	SHELL CLEANOUT
9	4"	125# MSA F.F.	VACUUM RELIEF VALVE



ORIENTATION PLAN

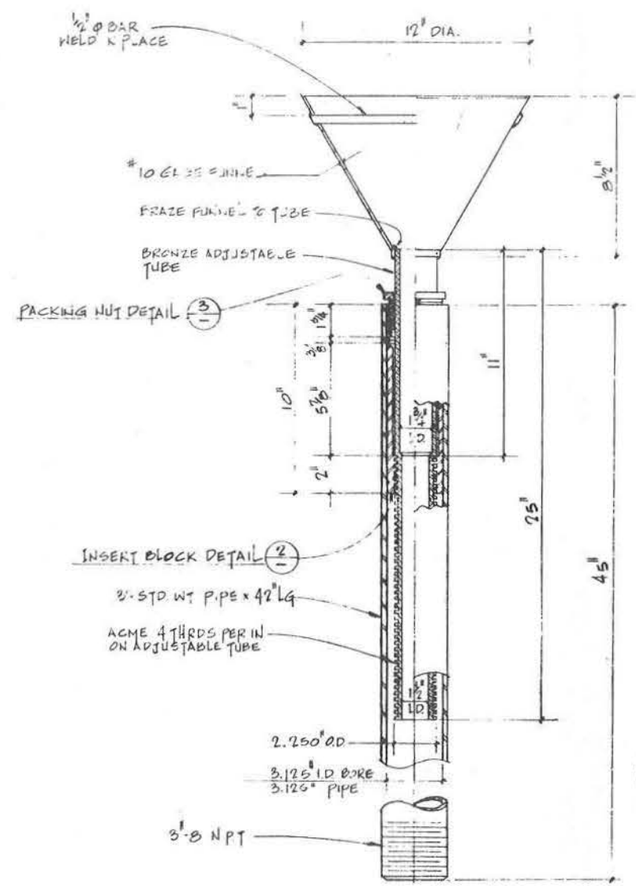


ELEVATION

CLEAN WATER SURGE TANK T-2A

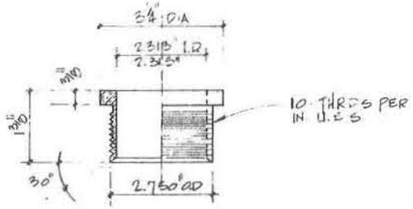
2-RING - 200 BBL 9'-2¾" DIA. x 16'-1" HIGH

½" = 1'-0"



OIL SKIMMER ASS'Y DETAIL (1/—)

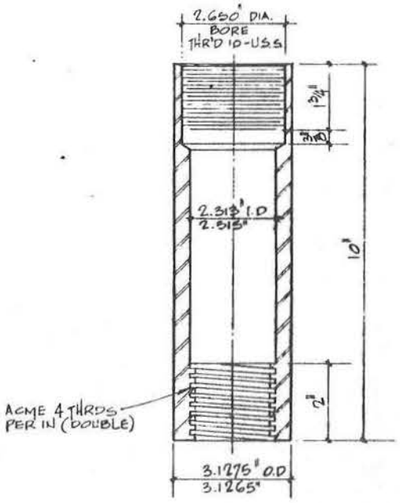
3" = 1'-0"



PACKING NUT DETAIL (3/—)

6" = 1'-0"

MAT'L :- BRONZE



INSERT BLOCK DETAIL (4/—)

6" = 1'-0"

MAT'L :— S.A.E. 1020 STEEL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

CLEAN WATER SURGE TANK T-2A

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN D.W. | ENGR. SECTION | APPROVED | SCALE AS NOTED | DATE 7-22-71

084-175

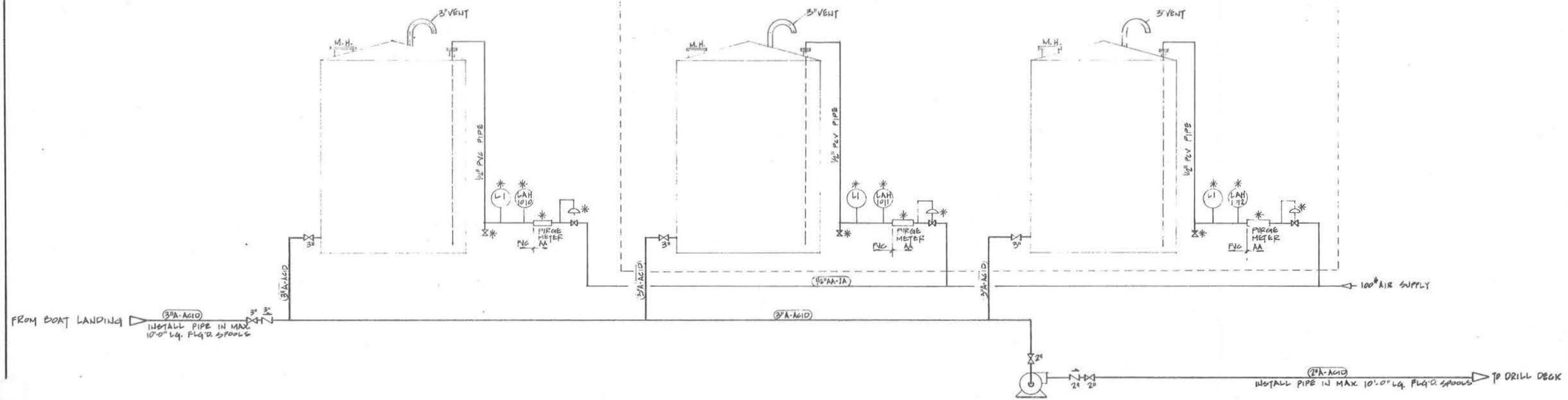
T-24

ACID STORAGE TANK
10'-0" O.D. x 15'-0" HIGH

ADDITIONAL TANKS IF REQUIRED

ACID STORAGE TANK
10'-0" O.D. x 15'-0" HIGH

ACID STORAGE TANK
10'-0" O.D. x 15'-0" HIGH



P-24

NOTES

* DENOTES ITEMS FURNISHED W/ TANK

1. GATE VALVES 2" & LARGER - LUNKENHEIMER "L A-FLO" NATURAL RUBBER LINED W/ NATURAL NATURAL RUBBER DIAPHRAGM, FLANGED ENDS, CAST IRON BODY
   2" FIG NO. 5510-59-001
   3" FIG NO 5510-61-001
2. CHECK VALVES TO BE - TUBE-TAINI PVC WITH FVC FLANGED ENDS MADE FROM GASKET-END VALVE, SCH 80 PVC PIPE AND TUBE-TAINI PVC FLANGES. CEMENT TO BE FOR HYDROCHLORIC ACID SERVICE.
3. GATE VALVES 1½" & SMALLER TO BE - TUBE-TAINI PVC.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PIPING & INSTRUMENTATION DIAGRAM
ACID STORAGE SYSTEM

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: Tom | EAGE SECTION | SCALE: 1/2" = 1'-0" | 084-176
CHECKED: | APPROVED: | DATE: 1-65

REV. 1

PC	PRESSURE CONTROLLER
PI	PRESSURE INDICATOR
PS	PRESSURE SWITCH
PR	PRESSURE RECORDER
PAL	PRESSURE ALARM, LOW
PAH	PRESSURE ALARM, HIGH
PSL	PRESSURE SHUTDOWN, LOW
PSH	PRESSURE SHUTDOWN, HIGH
PSV	PRESSURE SAFETY VALVE
PCV	PRESSURE CONTROL VALVE

LC	LEVEL CONTROLLER
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
LAL	LEVEL ALARM, LOW
LAH	LEVEL ALARM, HIGH
LSL	LEVEL SHUTDOWN, LOW
LSH	LEVEL SHUTDOWN, HIGH
LCV	LEVEL CONTROL VALVE

FE	FLOW ELEMENT, GAS
FI	FLOW INDICATOR
FR	FLOW RECORDER
FSL	FLOW SHUTDOWN, LOW
FCV	FLOW CONTROL VALVE

TC	TEMPERATURE CONTROLLER
TI	TEMPERATURE INDICATOR
TAL	TEMPERATURE ALARM, LOW
TSH	TEMPERATURE SHUTDOWN, HIGH
TCV	TEMPERATURE CONTROL VALVE

GG	GAGE GLASS
RD	RUPTURE DISC
CE	CAPACITANCE ELEMENT
M	LIQUID METER
PA	NET OIL ANALYZER
EOV	ELECTRICALLY OPERATED VALVE
⊗	TRANSDUCER, DIFFERENTIAL PRESSURE
⊗	TRANSDUCER, STATIC PRESSURE
⊗	TRANSDUCER, TEMPERATURE
RO	RESTRICTION ORIFICE

A-V PIPELINE IDENTIFICATION

LINE SIZE 4"
PIPING CLASS 'A'
PIPING SPEC. 'V'

C	CONDENSATE
DF	DIESEL FUEL
DG	DRY GAS
E	EMULSION
FG	FUEL GAS
FW	FIREWATER
GD	GRAVITY DRAIN
GY	GLYCOL
JW	JETTING WATER
MP	METER PROVER
MUD	MUD TO BARGE LOADING
OD	OIL DRAIN
PW	PROCESS WATER
POW	POTABLE WATER
SG	SOUR GAS
SWG	SWEET GAS
TL	THERMINOL
V	VENT, RELIEF
VR	VAPOR RECOVERY
WC	WELL CLEANUP
WW	WASHDOWN WATER
UA	UTILITY AIR

V1 150# ANSI R.F. FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG.# B00171 WITH NO 20A TRIM (OR EQUAL)

V2 300# ANSI R.F. FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG.# B00371 WITH NO. 20A TRIM (OR EQUAL)

V3 150# ANSI R.F. STEEL BODY WAFER CHECK VALVE, SS. TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)

V4 300# ANSI R.F. STEEL BODY, WAFER CHECK VALVE, S.S. TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)

V5 150# USAS R.F. FLGD. STEEL BODY GLOBE VALVE, PACIFIC FIG. N2163 WITH #1 TRIM (OR EQUAL)

V6 600# ANSI R.F. FLGD. STEEL BODY SWING CHECK VALVE, WITH 316 S.S. TRIM & REMOVABLE SEATS. FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)

V7 900# ANSI R.F. FLGD. STEEL BODY SWING CHECK VALVE WITH 316 S.S. TRIM & REMOVABLE SEATS. FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)

V8 600# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# B00501 WITH NO. 20A TRIM (OR EQUAL)

V9 900# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# B00901 WITH NO. 20A TRIM (OR EQUAL)

V10 600# ANSI BUTTWELD END STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# B00602 WITH NO. 20A TRIM (OR EQUAL)

V11 900# ANSI BUTTWELD END STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# B00902 WITH NO. 20A TRIM (OR EQUAL)

V12 600# ANSI R.F. WAFER CHECK VALVE, STAINLESS STEEL BODY & TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)

V13 150# ANSI R.F. FLGD. STEEL BODY, SWING CHECK VALVE, FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)

V14 150# R.F. WAFER, BUTTERFLY VALVE, LUG TYPE, LEVER OPERATED, LEMCO FIG. 2154-5122512 (OR EQUAL)

V15 600# SCREWED, STEEL BODY, BALL CHECK VALVE, VOIT SERIES 701 (OR EQUAL)

V16 125# SWING CHECK VALVE, C.I. BODY, 316 S.S. TRIM, REMOVABLE SEAT, FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)

V17 150# SCREWED BRONZE GATE VALVE LUNKENHEIMER FIG. 3151 (OR EQUAL)

V18 150# SCREWED STAINLESS STEEL GATE VALVE PACIFIC FIG. 55 (OR EQUAL)

V19 125# FLANGED C.I. BODY GATE VALVE WITH RISING STEM, BRONZE TRIM LUNKENHEIMER FIG 1641 (OR EQUAL)

V20 125# FLANGED C.I. BODY SWING CHECK VALVE WITH BRONZE TRIM LUNKENHEIMER FIG. 1790 (OR EQUAL)

V21 225# W.O.G. SCREWED CAST IRON GATE VALVE, WITH RISING STEM, BRONZE TRIM LUNKENHEIMER FIG. NO. 1640 (OR EQUAL)

V22 150# R.F. FLGD. FGD. STEEL GATE VALVE, B-B, O.S.&Y., 11-13% CR. TRIM LUNKENHEIMER FIG. 1751-B2

V30 800# SCRD. BOLTED BONNET FORGED STEEL BODY GATE VALVE, O.S. & Y. WITH 316 S.S. TRIM SMITH FIG. 800 (OR EQUAL)

V40 BAR STOCK NEEDLE VALVE DRAGON #5507, OR 5707 (OR EQUAL)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

LEGEND & VALVE LIST

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSG
CHECKED
ENGR. SECTION
APPROVED
SCALE NONE
DATE 7-22-71

084-179

SWITCHING MANIFOLD

30,000 BOPD & 12,000 BWPD (MAX.) @ 85 PSIG & 100°F

30,000 BOPD & 12,000 BWPD (MAX.) @ 85 PSIG & 100°F

MONTEREY-CHERT WELL

HEATER E-2A

FLOTATION SEPARATOR V-1A

PRODUCTION SEPARATOR V-1B

TEST SEPARATOR V-2A

SIZED @ 1/2 MM

5000 BOPD
2000 BWPD
1.25 MMSCFD

2 1/2' x 23 MM.

.4 MMSCFD OF GAS @ 85 PSIG & 60°F

30,000 BOPD @ 85 PSIG & 60°F

12,000 BWPD @ 85 PSIG & 60°F

14 MMSCFD OF GAS @ 85 PSIG & 60°F

30,000 BOPD @ 85 PSIG & 60°F

12,000 BWPD @ 85 PSIG & 60°F

GAS: 28 MMSCFD @ 85 PSIG & 60°F

CONDENSATE

CONDENSATE

GAS SCRUBBER V-3

SWEET GAS SCRUBBER V-5

FUEL GAS 5MMSCFD @ 50 PSIG & 60°F

GAS TO WELL FOR GAS LIFT 10 MMSCFD @ 3000 PSIG

FUTURE SALES TO GAS LINE 15,000 PSIG

GAS COMPRESSION & DEHYDRATION PACKAGE

28MMSCFD @ 60 PSIG & 60°F

VAPOR COMPRESSOR

VAPORS

PRODUCTION SURGE TANK V-4A

PRODUCTION SURGE TANK V-4B

PRODUCTION SURGE TANK V-4C

50 PSI

EMULSION: 60,000 BOPD (MAX) @ 50 PSIG & 60°F

60,000 BOPD (MAX) @ 50 PSIG & 100°F HEATERS E-1A & E-1B

5MMSCFD OF GAS @ 350 PSIG & 60°F

GAS: 5MMSCFD OF GAS @ 350 PSIG & 60°F

CRUDE OIL BOOSTER PUMPS P-4A P-4C P-4E

CRUDE OIL SHIPPING PUMPS P-4B P-4D P-4F

PS 4362 1300 PSI

PSC 363 100 PSI

EMULSION TO SHORE 60,000 BOPD @ 1000 PSIG & 100°F

SWITCHING MANIFOLD

5,000 BOPD & 2,000 BWPD (MAX.) @ 350 PSIG & 100°F

2,000 BWPD @ 350 PSIG & 60°F

SANDSTONE WELL

SANDSTONE SEPARATOR V-1C

TEST SEPARATOR V-2B

5,000 BOPD @ 350 PSIG & 60°F

WATER: 29,000 BWPD (MAX) @ 15 PSIG & 60°F

WATER SURGE TANK T-1

FLOTATION CELL

CLEAN WATER TANK T-2A

EMERGENCY SURGE TANK T-2B

VENT SCRUBBER V-6

TO FLARE STACK

EMERGENCY OVERFLOW TO DISPOSAL TUBE

WATER TO DISPOSAL TUBE 24,000 BWPD @ 0 PSIG & 100°F

DRAINS

GRAVITY DRAINS

WELL-CLEAN SEPARATOR V-1D

WELL-CLEAN SURGE TANK V-10

OIL SUMP V-7

WATER SUMP V-8

OIL

VAPORS

WATER

OIL TO BARGE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

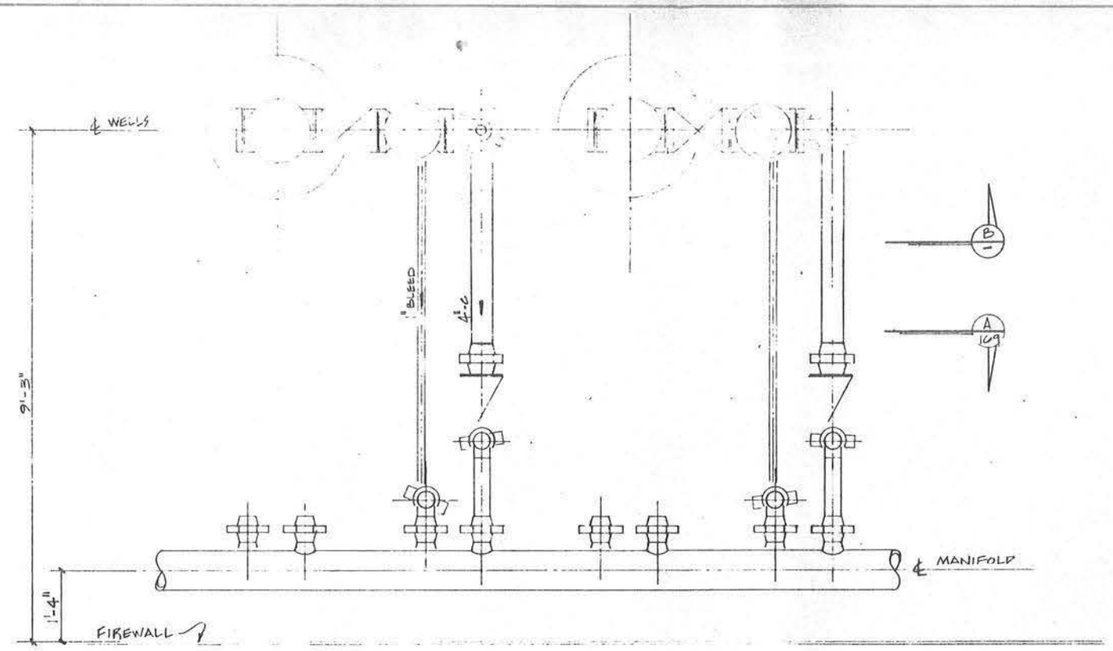
PROCESS FLOW DIAGRAM

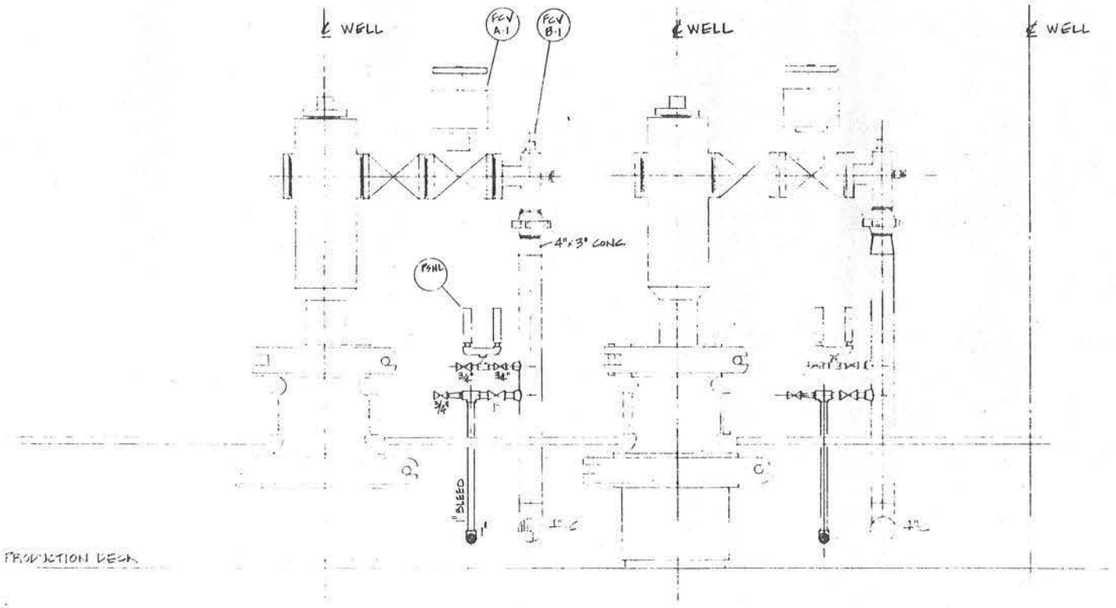
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN ____ ENGR. SECTION ____ SCALE ____ 084-180
CHECKED ____ APPROVED ____ DATE ____

REV. 1





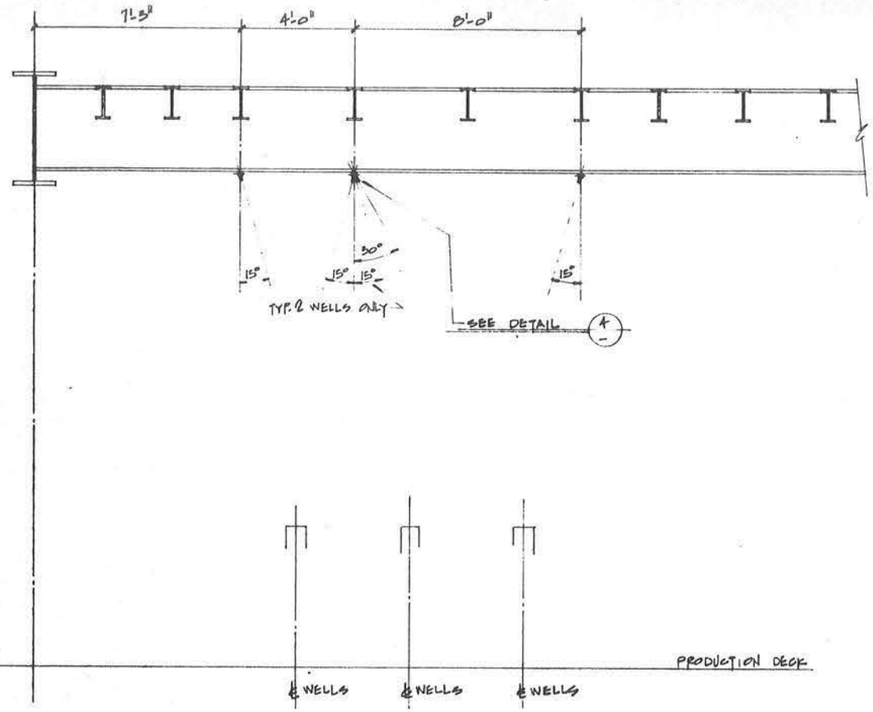
SECTION (B)

DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL	HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
WELLHEAD PIPING PLAN & SECTIONS	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT

NO.	DATE	REVISIONS	BY	CHK.	APPR.

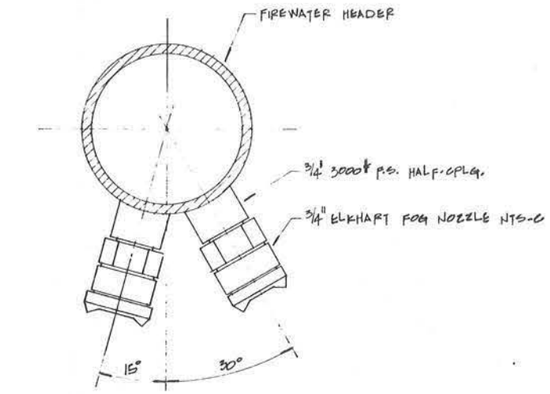
DRAWN GRAMSTAD ENGR. SECTION
CHECKED APPROVED
SCALE 3/4"=1'-0" DATE 7-22-71

084-182

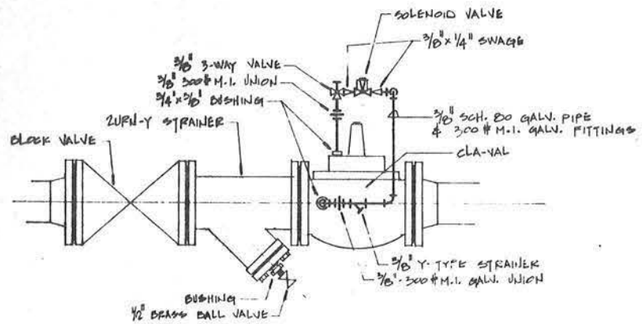


TYPICAL SECTION
FIREWATER HEADERS IN WELL ROOM

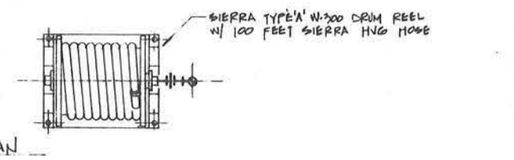
3/8" = 1'-0"



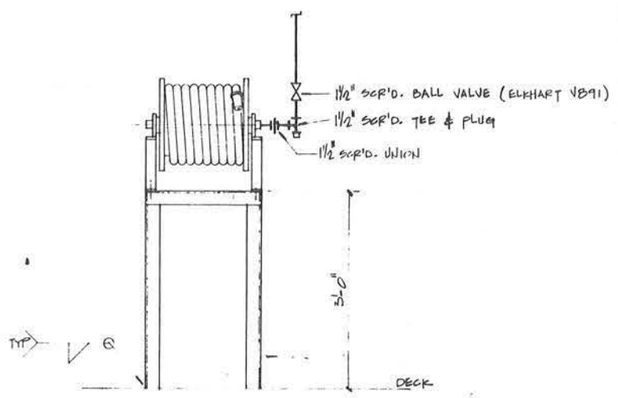
DETAIL 4
SEE PLAN, DWG. # 084-124 FOR SPINKLER HEAD LOCATIONS



DETAIL 1
FIREWATER CONTROL STATION 4' OR 6' AS PER DWG. # 084-124 (156)



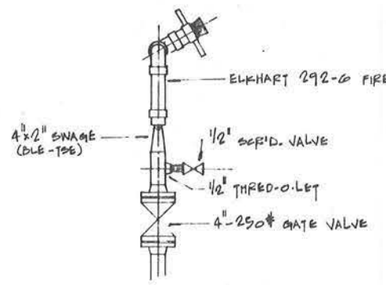
PLAN



ELEVATION

- 3x3x1/4 L FRAMEWORK & LEGS. CONTINUOUS WELD FABRICATION. DRILL (4) HOLES AS REQ'D. FOR HOSE REEL MOUNTING.

DETAIL 2
FIRE HOSE STATION WASHDOWN HOSE STATION (150)



DETAIL 3
FIRE MONITOR STATION (181)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

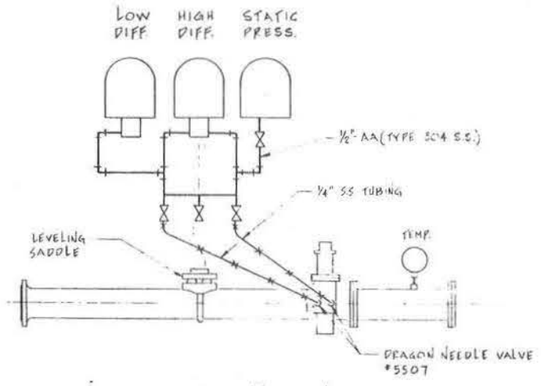
FIREWATER PROTECTION SYSTEM
PIPING & INSTRUMENTATION DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

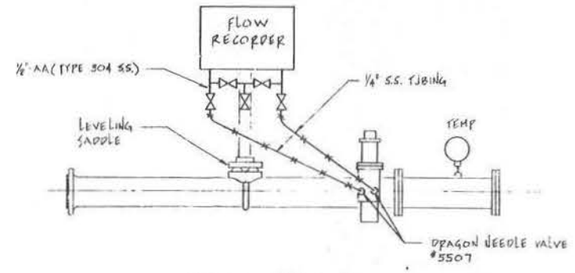
DRAWN MURPHY | CHECKED | APPROVED | DATE 7-22-71 | SCALE NOTED

084-185

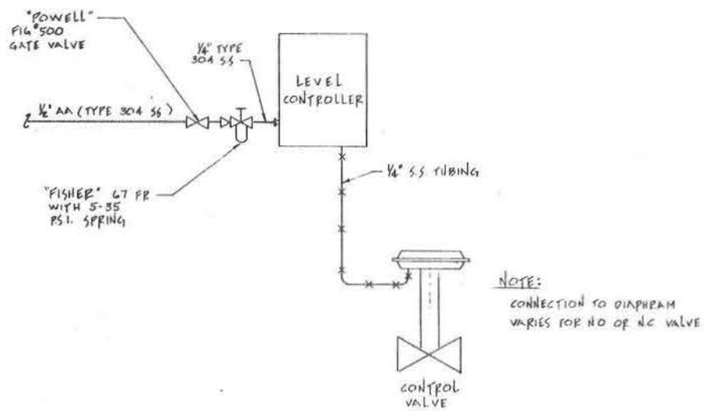


TYPICAL CONNECTIONS
ORIFICE METER TUBE

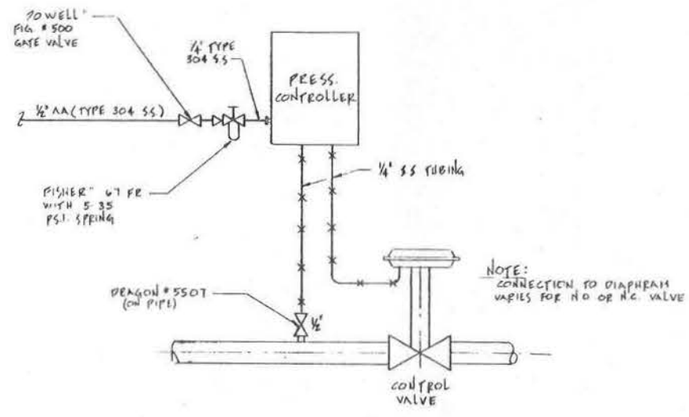
MOUNT & ASSEMBLE TRANDUCERS, TUBING FITTINGS, PIPE & MANIFOLDS FURNISHED WITH BARTON METER.



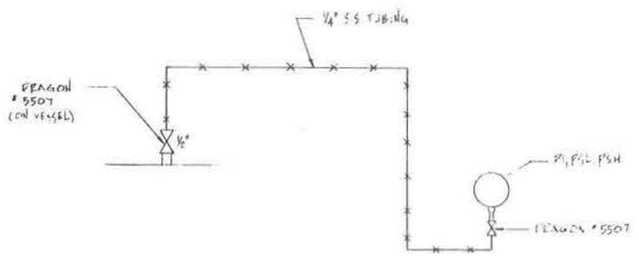
TYPICAL CONNECTIONS
ORIFICE METER TUBE FLOW RECORDER



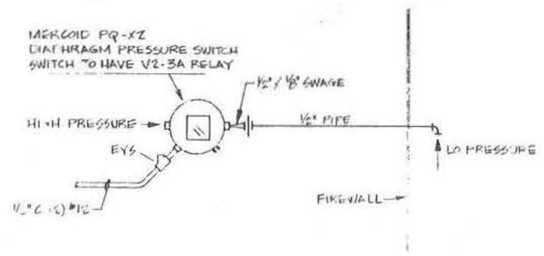
TYPICAL LIQUID LEVEL control VALVE



TYPICAL PRESSURE control VALVE



TYPICAL PRESS. INDICATOR, HIGH/LOW PRESS SHUTDOWN



SWITCH GEAR & WELDING ROOM
LOW PRESSURE ALARM

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

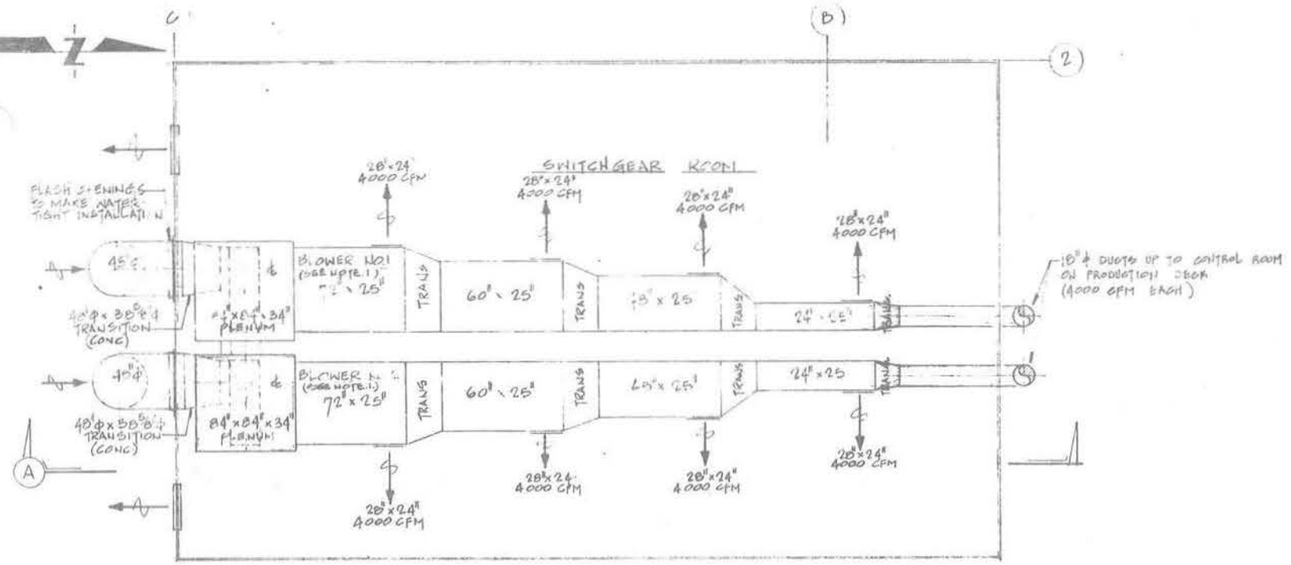
INSTRUMENTATION DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

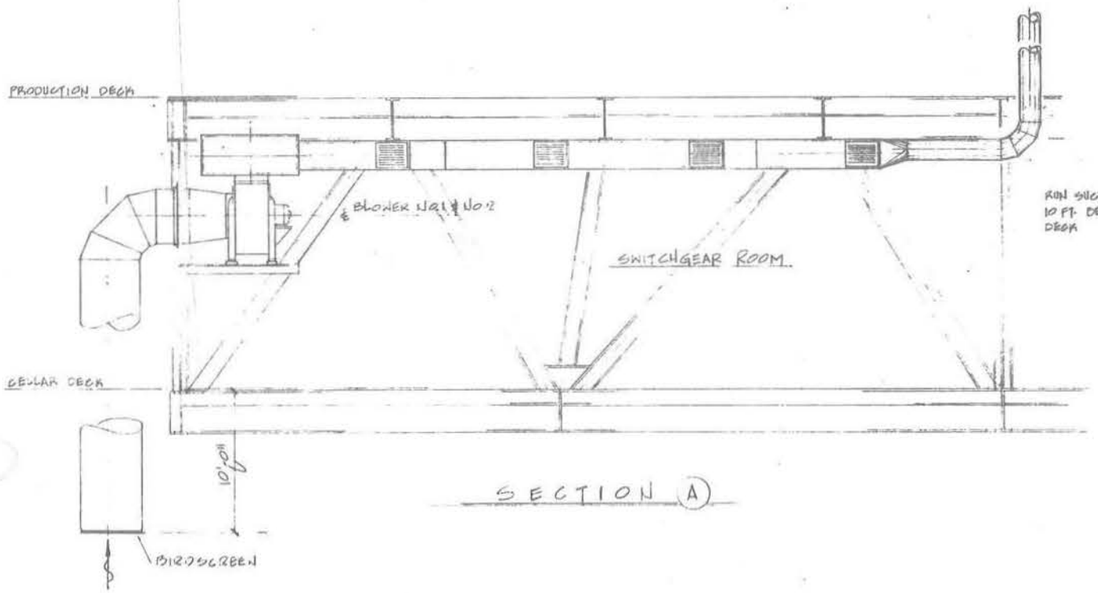
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN DJA | DIVR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

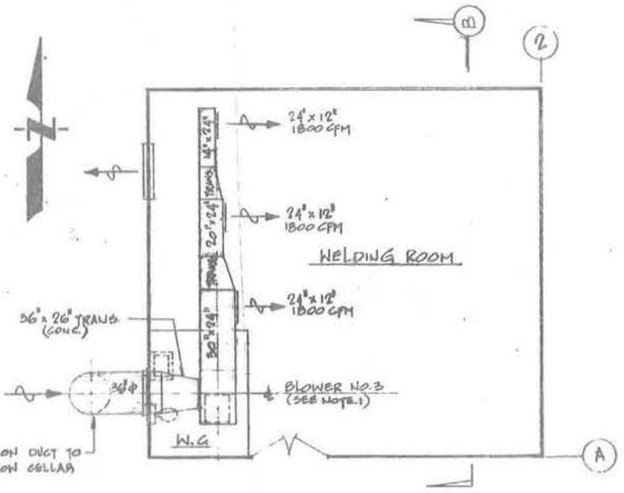
084-186



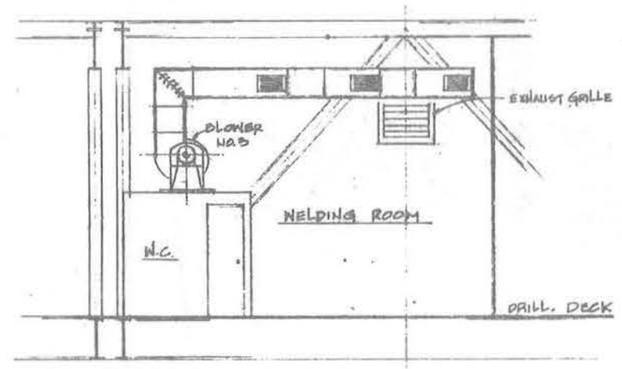
PLAN



SECTION (A)



PLAN



SECTION (B)

NOTES :—

1. BLOWERS NO1 & 2 — TO BE DIRECT CONNECTED CENTRIFUGAL FAN ALUMINUM AIR FOIL W/ 56½" DIA. WHEEL. RATED CAPACITY- 20,000 CFM @ ½" W.G., 15 HP MOTOR 685 RPM. ILG NO. D-DCS-365
   BLOWER NO.3 — TO BE DIRECT CONNECTED CENTRIFUGAL FAN ALUMINUM AIR FOIL W/ 24½" DIA WHEEL. RATED CAPACITY 5470 CFM @ ½" W.G. 1 HP MOTOR 685 RPM. ILG NO. D-DCS-245
2. SUPPLY GRILLES - TO BE ANODIZED EXTRUDED ALUMINUM ADJUSTABLE. U.S REGISTER CO. NO. AG.-192 L

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PURGE AIR BLOWERS
PLANS & SECTIONS

DRAWN P.WEBSTER | DESIGN SECTION | CHECKED | APPROVED

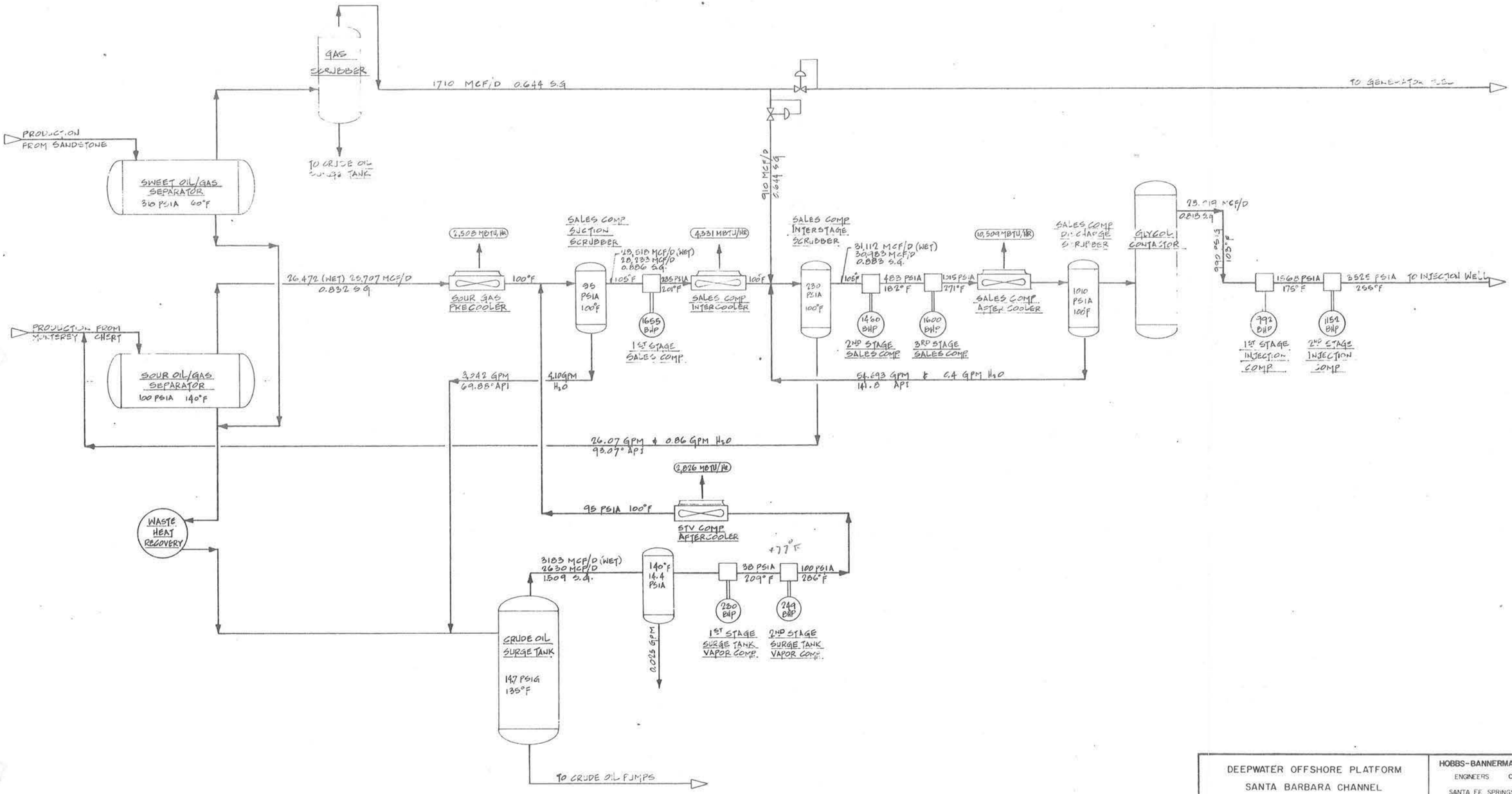
SCALE 3/4" = 1'-0" | DATE 7-24-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

084-187

REV. 1



NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

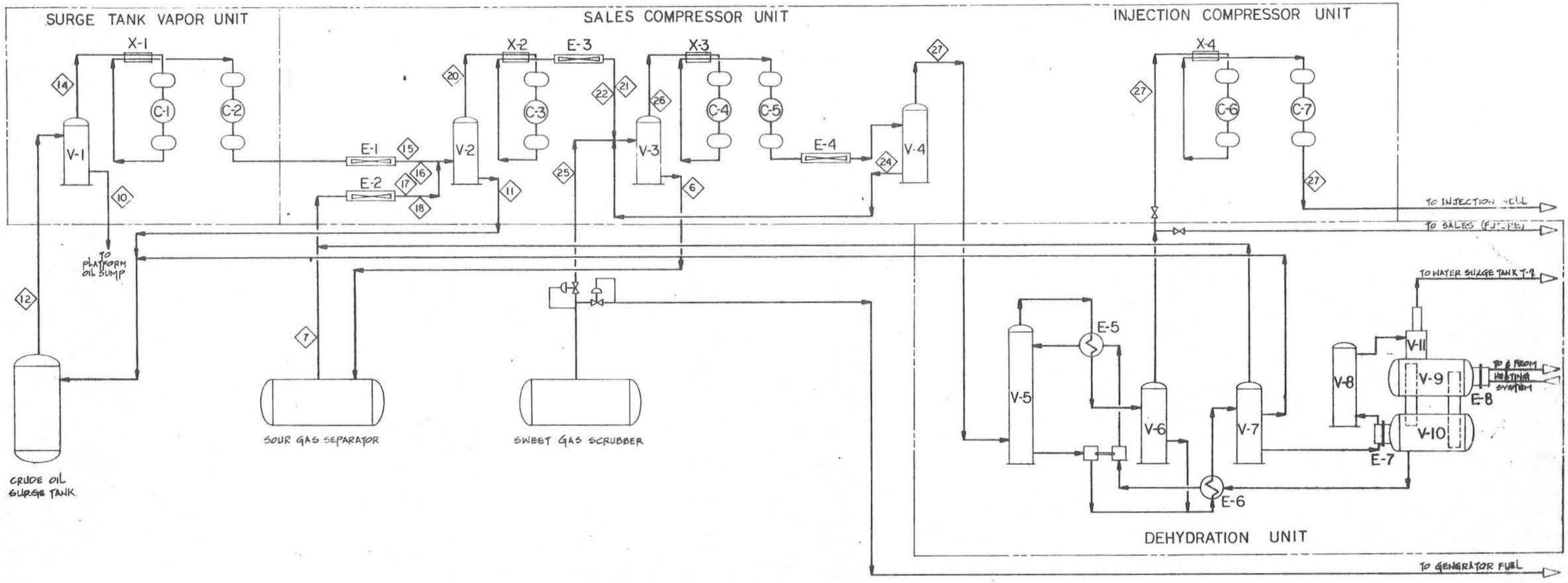
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

SIMPLIFIED PROCESS FLOW DIAGRAM FOR GAS HANDLING FACILITIES

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRWN. | ENGR. SECTION | CHECKED | APPROVED | 084-190

REV. 1



STREAM NUMBER, NAME→	1 STKVAP	2 LIQZXY	3 VAPZXY	5 ZXV	6 ZXL	7 SOURGS	8 VAPS.3	9 LIQS.3	11 LIQSUC	20 VAPSUC	22 LIQS.1	21 VAPS.1	26 SUTCMP	25 IPSCRL	24 IPSCRV	27 LIQS.2	27 VAPS.2
PRESSURE, PSIA =	14.70	14.40	14.40	95.00	95.00	100.00	95.00	95.00	95.00	95.00	230.00	230.00	310.00	230.00	230.00	1010.00	1010.00
TEMPERATURE, DG F =	135.15	135.00	135.00	100.00	100.00	140.00	100.00	100.00	100.00	100.00	100.00	100.00	60.00	100.00	100.00	100.00	100.00
TOTAL RATE, MOL/DAY=	6933.16	1.38	6931.79	5617.50	1314.29	67757.81	67740.28	17.52	273.47	74416.12	1388.04	73028.08	2399.01	2767.26	81663.67	7809.54	75854.12
TOTAL RATE, LBS/HR=	12623.88	11.29	12612.60	8043.47	3969.13	68029.60	67938.32	91.28	1963.13	79573.06	4334.35	75238.74	1863.56	8215.79	87054.14	14164.20	72889.98
TOTAL AVG. MOL WT.=	43.70	196.78	43.67	36.93	72.48	24.10	24.07	125.00	93.83	25.66	76.94	24.73	18.64	71.25	25.58	43.53	23.69
LIQUID AVG GAL/MOL=	0.000	26.160	0.000	0.000	13.743	0.000	0.000	15.056	16.016	0.000	13.970	0.000	0.000	13.564	0.000	10.085	0.000
LIQ. RATE, GAL/MIN=	0.000	.025	0.000	0.000	12.544	0.000	0.000	.232	3.042	0.000	13.466	0.000	0.000	26.066	0.000	54.693	0.000
LIQUID API GRAVITY=	0.000	25.334	0.000	0.000	52.195	0.000	0.000	46.337	69.880	0.000	60.484	0.000	0.000	93.070	0.000	141.821	0.000
LIQ.-REID VP, PSIA=	0.000	10.087	0.000	0.000	88.860	0.000	0.000	81.431	51.210	0.000	117.062	0.000	0.000	1395.820	0.000	816.978	0.000
GAS RATE, MCF/DAY=	2630.4	0.0	2629.8	2131.2	0.0	25706.5	25699.6	0.0	0.0	28232.6	0.0	27706.0	910.2	0.0	30982.02	0.0	28019.4
VAP PSEUDO TC,DG F=	157.6	0.0	157.4	107.8	0.0	-32.4	-32.5	0.0	0.0	-16.6	0.0	-24.3	-85.9	0.0	-15.1	0.0	-33.1
VAP PSEUDO PC,PSIA=	622.0	0.0	622.0	646.6	0.0	677.7	677.8	0.0	0.0	673.3	0.0	676.5	672.4	0.0	673.9	0.0	679.4
VAP MOL WT, LBS =	43.70	0.00	43.67	36.93	0.00	24.10	24.07	0.00	0.00	25.66	0.00	24.73	18.64	0.00	25.58	0.00	23.09
GAS GRAVITY (AIR=1)=	1.50863	0.00000	1.50759	1.27488	0.00000	.83188	.83098	0.00000	0.00000	.88598	0.00000	.85364	.64363	0.00000	.88325	0.00000	.81774
COMPONENT	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC	MOL FRAC
C-1	.75891	.00315	.75836	.31699	.01094	.72554	.72553	.06222	.02170	68467	.06148	.69665	.82384	.06320	.67323	.27338	.71547
C-2	.13320	.00259	.13322	.14861	.02729	.15777	.15779	.01389	.01513	.09228	.02224	.09336	.12456	.02244	.09487	.10383	.09311
C-3	.25772	.01273	.25757	.28243	.15036	.08417	.08413	.03926	.04552	.01344	.03126	.00926	.02422	.03144	.10919	.27186	.04076
IC-4	.03461	.00351	.03460	.03347	.03856	.00810	.00810	.00243	.00706	.00096	.00539	.00128	.00155	.00539	.01210	.03771	.00407
NC-4	.12373	.01580	.12376	.11936	.14018	.02635	.02635	.00719	.02549	.00135	.01336	.00383	.00203	.01337	.04127	.14601	.01403
IC-5	.03617	.01055	.03618	.03433	.04778	.00771	.00771	.00244	.00673	.00026	.00749	.00083	.00026	.00749	.01255	.05474	.00396
NC-5	.04031	.01648	.04028	.03784	.05324	.00726	.00727	.00221	.00216	.00010	.00619	.00018	.00004	.00619	.01151	.05853	.00355
C-6	.03870	.05656	.03871	.03668	.07327	.00260	.00260	.00147	.00651	.00005	.00360	.00007	.00001	.00360	.00655	.03155	.00165
C-7	.02471	.08211	.02472	.02341	.10641	.00415	.00415	.00410	.01816	.00031	.01010	.00032	.00019	.01010	.02312	.12135	.00380
SC8	.01199	.06883	.01200	.01135	.09227	.00202	.00202	.00198	.01449	.00030	.01004	.00030	.00009	.01004	.02059	.10424	.00135
SC9	.00600	.05774	.00601	.00568	.07743	.00101	.00101	.00099	.01214	.00015	.00841	.00015	.00004	.00841	.01724	.08741	.00067
SC10+	.00001	.01921	.00001	.00001	.02577	.00000	.00000	.00000	.00404	.00000	.00280	.00000	.00000	.00280	.00574	.02908	.00000
C10+	.00001	.00130	.00001	.00001	.00175	.00000	.00000	.00000	.00027	.00000	.00019	.00000	.00000	.00019	.00039	.00197	.00000
N2	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
H2S	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
CO2	.02744	.00343	.02745	.02372	.00403	.03016	.03017	.00624	.00783	.00217	.00407	.00217	.00152	.00407	.00439	.00771	.00439
TOTALS	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	.99999	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

EQUIPMENT IDENTIFICATION LIST

COMPRESSORS:
- C-1 1st Stage, Surge Tank Vapors, Unit A
- C-2 2nd Stage, " " " A
- C-3 1st Stage, Sales Gas " " A
- C-4 2nd Stage, " " " A
- C-5 3rd Stage, " " " A
- C-6 1st Stage, Injection Gas " " A
- C-7 2nd Stage, " " " A

VESSELS:
- V-1 Surge Tank Vapor Suction Scrubber
- V-2 Sales Gas Suction Scrubber, Unit A
- V-3 Sales Gas Discharge Scrubber, Unit A
- V-4 Sales Gas Discharge Scrubber, Unit A
- V-5 Glycol Contactor
- V-6 Contactor Reboiler
- V-7 Glycol Flash Tank
- V-8 Glycol Filter
- V-9 Glycol Reboiler
- V-10 Glycol Surge Tank
- V-11 Glycol Still

HEAT EXCHANGERS:
- E-1 S.T.V. Cooler
- E-2 Sour Gas Reboiler
- E-3 Sales Gas Reboiler
- E-4 Sales Gas Reboiler
- E-5 Lean/Rich Glycol Exchanger
- E-6 Glycol Reboiler
- E-7 Glycol Surge Tank Heater
- E-8 Glycol Still Heater

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

GENERAL PROCESS FLOW DIAGRAM FOR GAS COMPRESSION DEHYDRATION FACILITIES

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN D. WEBSTER DIVISION SECTION
CHECKED APPROVED
SCALE NONE
DATE 7-22-71

084-191

S.T.V COMPRESSOR DISCHARGE

SWEET GAS SUPPLY HEADER — 910 MCF/D 235 PSIA 60°F S.G. = 0.644

SOUR GAS SUPPLY HEADER — 26,472 MCF/D S.G. = 0.830 (WET)

3,103 MCF/D S.G. = 1.355 (WET)

PURGE

E-1
706.5 MBTU/HR
S.T.V DISCHARGE

E-2
627 MBTU/HR
SOUR GAS PREC. COOLER

E-3
1083 MBTU/HR
SALES GAS INTER. COOLER

E-9
652.65 MBTU/HR
J.W. COOLER

E-4
2,627 MBTU/HR
SALES GAS DISCH. COOLER

286°F
100°F
201°F
120°F
M.I.F.F. (SEE DWG NO 084-199)
27°F
(FUTURE)

TO CENTRAL CONTROL ROOM

TO VAPOR COMPRESSOR SECTION

HI PRESS. SELECTOR RELAY

AUTOMATIC EQUALIZER VALVE

SET @ 100#
SET @ 50#
SET @ 220#
SET @ 270#
SET @ 490#
SET @ 1100#
SET @ 1000#
SET @ 185#
SET @ 600#
SET @ 750#
SET @ 2000#
SET @ 4350#
SET @ 4000#

7,130 MCF/D S.G. = 0.685

X-2

95 PSIA 100°F

135 PSIA 201°F

C-3
16⅛" x 10½"
400# MWP
FIRST STAGE SALES

7,778 MCF/D S.G. = 0.685

X-3

430 PSIA 100°F

483 PSIA 182°F

C-4
11" x 10½"
1000# MWP
SECOND STAGE SALES

C-5
6¾" x 10½"
1200# MWP
THIRD STAGE SALES

1,015 PSIA 271°F

1010 PSIA 100°F

EMERGENCY AUTOMATIC SHUTDOWN

7,005 MCF/D S.G. = 0.818

X-4

1468 PSIA 175°F

8525 PSIA 255°F

C-6
4½" x 10½"
3500# MWP
FIRST STAGE INJECTION

C-7
4" x 10½"
6000# MWP
SECOND STAGE INJECTION

EMERGENCY AUTOMATIC BLOWDOWN

TO INJECTION WELL

FROM UNIT NO. B

TO UNIT NO. B

V-2
36"OD x 10'-0" S.P.S.
150# MWP
SUCTION SCRUBBER

0.7 GPM HC 60.9° API
1.02 GPM H_2O

V-3
30"OD x 10'-0" S.P.S.
400# MWP
INTERSTAGE SCRUBBER

6.2 GPM HC 93.1° API
2.21 GPM H_2O

V-4
24"OD x 10'-0" S.P.S.
1100# MWP
DISCHARGE SCRUBBER

13.73 GPM HC 141.8° API
0.1 GPM H_2O

TO SOUR GAS SEPARATOR

TO SALES TANKS

TO DEHYDRATION 28,013 MCF'D S.G. = 0.818

FROM DEHYDRATION

SENIOR FITTING

TO SALES (FUTURE)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

MECHANICAL FLOW DIAGRAM
SALES-INJECTION COMPRESSOR UNITS
GAS HANDLING FACILITIES

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN WEX-TEX. CHKD. SECTION
CHECKED APPROVED
SCALE NONE DATE 7-22-71

084-192

TO CHOKE TEE

FROM SINGLE GAS SCRUBBER 450 - 510 PSIA

TO CENTRAL CONTROL PANEL

PURGE

FROM GAS SUPPLY LINE

T1

P

FROM OIL SURGE TANKS 2,630 MCF/D 1505 SG

FROM WATER SETTLING TANKS AND BLANKET GAS SYSTEM

T1 FT

P

C.C.

SET @ 1 PSIG

P-L

SET @ +1 PSIG

P-H

V-1

14.4 PSIA 55°F

20 MCF/D (DRY)

318.3 BBL/D (WET)

1.605 SG (DRY)

1.355 SG (WET)

P1

H.L E/P

T1

L.H

LC

C.C.

GG

LSL

W.S

TO PLATFORM OIL SUMP

36" OD x 1'-2" S.SEAM TO SEAM 150# MWP

S.T.V. COMPRESSOR SUCTION SCRUBBER

TO STV DISTANCE PIECE (SEE DWG 084-196)

PURGE

P1

X-1

C.C.

TO DISCHARGE PIPE VENTS

T1 140°F

C-1

21¼" DIA x 9" STROKE

250# MWP

T.H

T1

U

PURGE

P1

X-1

140°F

T1

C-1

21¼" DIA x 9" STROKE

250# MWP

T.H

T1

U

38.0 PSIA 209°F

1,815 MCF/D (DRY)

1,592 BBL/D (WET)

SET @ 150 PSIG

J.T.C.

TO CRANKCASE BREATHER (SEE UNIT 'A')

P1 PAH T1

C-2

16¼" DIA x 9" STROKE

400# MWP

T1

T.H

U

P1

SET @ 105 PSIG

J.T.C.

EQUALIZER

BLOWDOWN

PAH

PSH

100 PSIA 280°F

TO SALES INJECTION COMPRESSORS

TO FLARE LINE TO KNOCK OUT DRUM

CRANKCASE BREATHER (TYPICAL)

P

SET @ 500 PSIG

J.T.C.

38.0 PSIA 209°F

P1 PAH T1

C-2

16¼" DIA x 9" STROKE

400# MWP

T1

T.H

U

P1

EQUALIZE

BLOWDOWN

SET @ 105 PSIG

J.T.C.

100 PSIA 286°F

INTERSTAGE AND DISCHARGE RELIEF VALVE SETTINGS DETERMINED BY MAXIMUM ROD LOAD LIMITS.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLAFORM

SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION

ENGINEERS CONSTRUCTORS

SANTA FE SPRINGS CALIFORNIA

MECHANICAL FLOW DIAGRAM
SURGE TANK VAPOR COMPRESSOR UNITS
GAS HANDLING FACILITIES

HUMBLE OIL & REFINING COMPANY

PRODUCTION DEPARTMENT

DRAWN J. WEISSINGER ENGR. SECTION

CHECKED APPROVED

SCALE NONE

DATE 7-11-71

084-193

TO & FROM UNIT "B" STV COMPR

DISTANCE PIECE VENTS

1" DISTANCE PIECE BLANKET GAS

10.6 GPM/152.6°F JACKET WATER TO COOLERS

10.6 GPM COLD JACKET WATER FR COOLERS 120°F

1.0 GAL/DAY LUBE OIL MAKE-UP

TO & FROM MAIN COMPRESSOR DECK

SET @ 50#

SET @ 15 PSIG

230-310 PSIA

6"

PURGE GAS FROM SWEET GAS SUPPLY (SEE DWG 084-193)

1"

1" TO

18.6 GPM 159°F

TCV

DISTANCE PIECE VENTING

TO CYLINDER LUBE POINTS

FSL

LEVEL CONT

MECH LUBE PUMPS

MICRO FILTER

RELIEF TO CRANKCASE

TI

TAH

VS

HOTS

C-1

C-2

TO MAIN BEARING HEADER

@ 12.0 GAL

GG

LEVEL CONT

SLO-FLOW

5.3 GPM 120°F

14.3 GPM 159°F

LC

PS

8.9 GPM

1.0 GPM

4.3 GPM 120°F

LUBE-OIL COOLER

2 HP MOTOR

1.0 GPM 126°F

150°F

8' DIA

J.W. CHEM INJECTOR

EDGE TYPE FILTER

PSL

PI

TC

ELECTRIC IMMERSION HEATER

18.6 GPM 150°F

½ HP MOTOR J.W. PUMP

J.W. SURGE TANK

TO PLATFORM WATER DRAIN SUMP

V-1

STV. SUCTION SCRUBBER

(SEE DWG NO. 084-193)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION

ENGINEERS CONSTRUCTORS

SANTA FE SPRINGS CALIFORNIA

UTILITY FLOW DIAGRAM

SURGE TANK VAPOR COMPRESSOR UNITS

GAS HANDLING FACILITIES

HUMBLE OIL & REFINING COMPANY

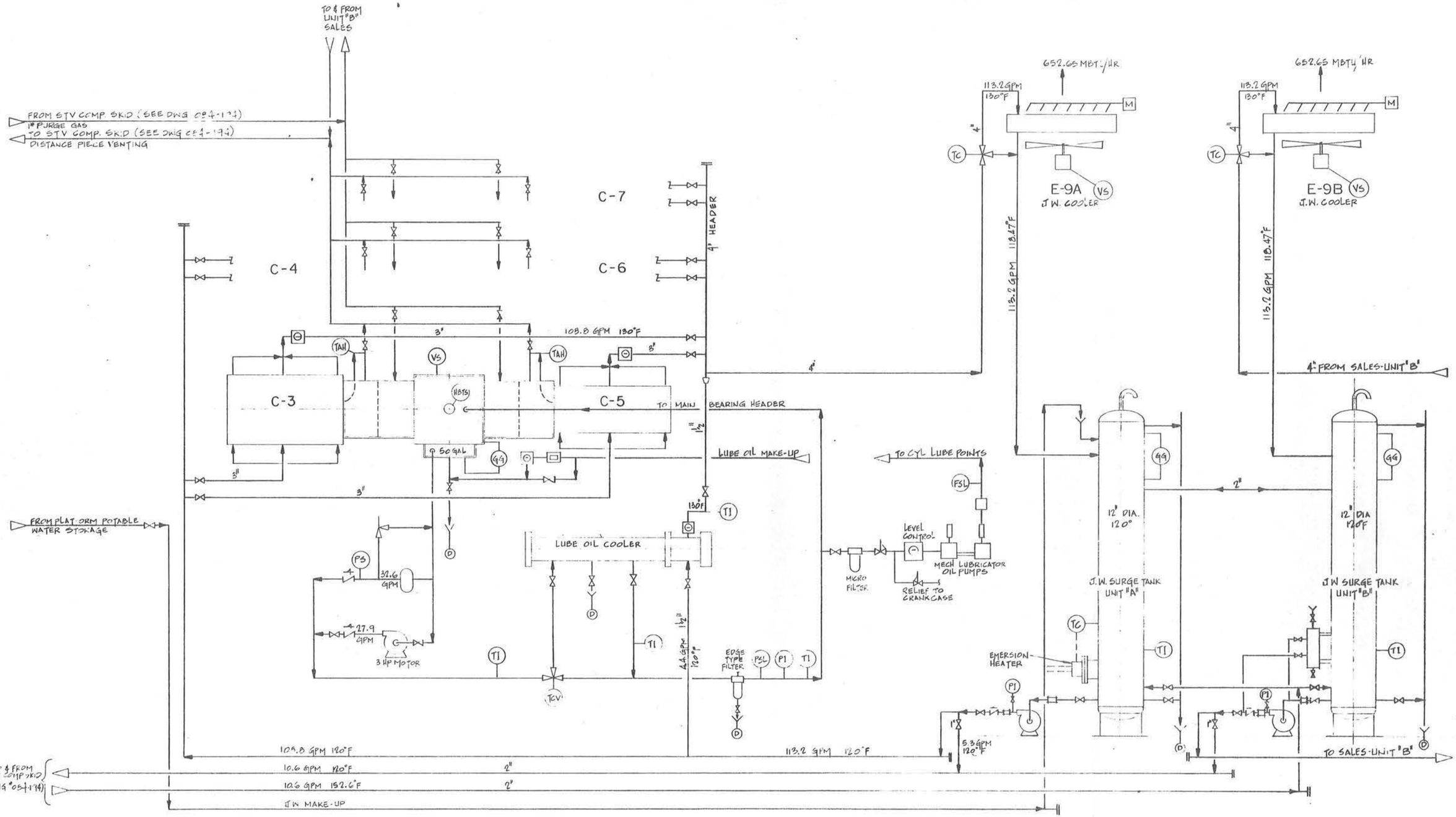
PRODUCTION DEPARTMENT

DRAWN D. WEBSTER ENGR. SECTION

CHECKED APPROVED

SCALE None DATE 7-22-71

084-194



NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

UTILITY FLOW DIAGRAM
SALES-INJECTION COMPRESSOR UNITS
GAS HANDLING FACILITIES

DRAWN D WEBSTER | ENGR. SECTION
CHECKED | APPROVED

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

SCALE NONE
DATE 7-22-71

084-195

SWEET GAS SUPPLY FOR PURGE GAS

INSTRUMENT AIR SUPPLY HEADER

TO SOUR GAS SCRUBBER V-3

FROM SALES GAS DISCHARGE SCRUBBERS

TO INJECTION SUCTION (FUTURE SALES)

28,019 MCF/D
100°F
1005 PSIA

E-5
GAS/GLYCOL COOLER

V-5
36'-0" x 20'-0" ± 5'-0"
1100# MWP
GLYCOL CONTACTOR

SET @ 1120#

1005 PSIA
102°F (±)

V-6
36'-0" x 12'-0" ± 5'-0"
1100# MWP
RESIDUE SCRUBBER

SET @ 150#

EMERGENCY AUTOMATIC BLOWDOWN

STRIPPING

100 PSIA
150°F (±)

V-7
24" OD x 8'-0" ± 3'-0"
150# MWP
GLYCOL FLASH TANK

STRIPPING COLUMN

V 11

SET @ 10#

E-8 REBOILER HEATER

V-9
REBOILER CHAMBER

TO & FROM THERMINOL HEATING SYSTEM

FILL

V-8
FILTER

V-10
GLYCOL SURGE TANK

GLYCOL-GLYCOL EXCHANGER E-7

225°F (-)

E-6
GLYCOL/GLYCOL COOLER

KIMROY PUMP & SPARE

4 GPM 175°F (-)

¼" DRAINER

TO CRUDE OIL SURGE TANK

TO WATER SURGE TANK T-2

DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL	HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
MECHANICAL FLOW DIAGRAM DEHYDRATION UNIT GAS HANDLING FACILITIES	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN D. WEBSTER · CHECKED · ENGR. DIRECTION · APPROVED · SCALE NONE · DATE 7-22-71	084-196

NO.	DATE	REVISIONS	BY	CHK.	APPR.

MAIN POWER TRANSFORMER
10,000 KVA
34.5KV/4160V

34.5 KV LOAD BREAK DISCONNECT SWITCH 600A

3000A/3000AF I.M.

3000 A BUS 4160 VOLTS 3φ 60 Hz

V
A.
Hz

600A TYPE CLG

700

600 A TYPE CLG

700

600A TYPE CLG

1750 GAS #1 COMPRESSOR

1750 GAS #2 COMPRESSOR

1750 GAS #3 COMPRESSOR

1750 GAS #4 COMPRESSOR

3000 P.W. #1

3000 P.W. #2 OPTIONAL

ELECTRICAL INTERLOCK

1200 A BUS 4160 VOLTS 3φ 60 Hz

1200 A BUS 4160 VOLTS 3φ 60 Hz

1200A/1200AF I.M.

7500 KVA 4160/2300

ELECTRICAL INTERLOCK

2000 A BUS 2300 VOLTS 3φ 60 Hz

70A TYPE CLG

WELL #1 100

WELL #2 100

WELL #3 100

WELL #4 100

WELL #5 100

WELL #6 100

WELL #7 100

WELL #8 100

WELL #9 100

WELL #10 100

NOTE
TYPICAL FOR ADDITIONAL WELLS AS REQ'D

1200 A BUS 4160 VOLTS 3φ 60 Hz

200A TYPE CLG

1000 KVA 4160 V TURBINE GENERATOR

1000 KVA 4160 V TURBINE GENERATOR

1000 KVA 4160 V TURBINE GENERATOR (STAND-BY)

45 KVA 4.16KV/120/208V

150A/150AF I.M.

2ℓ-2½"c (3) #2 CU

90A TYPE CLG

P-4B CRUDE SHIPPING PUMP 500

P-4D CRUDE SHIPPING PUMP 500

P-4F CRUDE SHIPPING PUMP 500

ALTERNATE METHOD TO SACRIFICIAL ANODES

225 KVA 4.16KV/208

500 KVA 4.16KV/480

2ℓ-(3) #6 CU EACH

2-3½"c (3) 350 MCM CU EACH

150A/150AF I.M.

110 KVA

CONNECT ONE TRANSFORMER ONLY AT A TIME DEPENDING ON THE POWER REQUIREMENTS OF THE CATHODIC PROTECTION UNITS.

CATHODIC PROTECTION UNITS

1200A BUS 4160 VOLTS 3φ 60Hz

350A PROVISIONS FOR MANUAL SWITCH OVER

70A TYPE CLG

90 AMP

VAPOR #1 COMPRESSOR 250

VAPOR #2 COMPRESSOR 250

200A TYPE CLG

1500 KVA 4160/480

1800A/2000AF

480V 3φ 60Hz 1800A BUS

cont. on DWG. 084-302

24 CKT MAIN PANEL BOARD 100 KVA 480/120/208

150A T.M.

METER PROVER VALVE CONTROL

50A M.L.P. M.O.

P-5A THERMAL CIRCULATION PUMP 20

P-5B THERMAL CIRCULATION PUMP 20

P-7A F.SEWATER PUMP 100

P-7B FIREWATER PUMP 100

P-9 WASHDOWN PUMP 40

P-4A CRUDE OIL BOOSTER PUMP 100

P-4C CRUDE OIL BOOSTER PUMP 100

P-4E CRUDE OIL BOOSTER PUMP 100

P-101A DIESEL FUEL PUMP 10

P-101B DIESEL FUEL PUMP 10

INSTRUMENT AIR COMPRESSOR 30

INSTRUMENT AIR COMPRESSOR 10

AGITATOR DRIVE 10

AGITATOR DRIVE 10

AGITATOR DRIVE 10

AGITATOR DRIVE 10

BALE DRIVE ½

BALE DRIVE ½

P-8A OIL SUMP PUMP 5

P-8B OIL SUMP PUMP 5

P-1A WATER SUMP PUMP 15

P-1B WATER SUMP PUMP 15

P-6 DISPOSAL TUBE PUMP 10

POTABLE WATER PUMP 2

WATER PUMP 10

OILY OIL PUMP 10

BLOWER #1 15

BLOWER #2 15

FLOTATION UNIT

SWITCHGEAR ROOM

24 CKT EMERGENCY PANEL BOARD

AUTOMATIC TRANSFER SWITCH

(VOLTAGE SENSING LINE)

NOTE: ALL CONTACTORS AND BREAKERS ARE THE 3 POLE TYPE UNLESS OTHERWISE NOTED.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL SINGLE-LINE DIAGRAM SHT 1

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN R.W.B. CHECKED ENGR. SECTION APPROVED SCALE NONE DATE 6-1-71

084-301

REV. 1

Information Redaction Statement

Pursuant to the Freedom of Information Act (5 U.S.C. 552) and its implementing regulations (43 CFR Part 2) and as provided in 30 CFR 550.199(b), some information has been redacted from this document and was deleted from the public information copy of this submission.

Proprietary Information Redacted

Not for Public Release

LEGEND

- (V) — VOLTMETER
- (A) — AMMETER
- (G) — GROUND DETECTOR
- 400A / 400AF T.M. — MOLDED CASE CIRCUIT BREAKER 3 POLE 400 AMP CONTINUOUS CURRENT RATING, 400 AMP FRAME THERMAL MAGNETIC
- 3000A / 3000AF T.M. — ELECTRICALLY OPERATED AIR CIRCUIT BREAKER 3000 AMP CONTINUOUS CURRENT RATING, 3000 AMP FRAME THERMAL MAGNETIC
- 30A M.C.P. M.O. — COMBINATION MOTOR STARTER WITH 30 AMPERE CONTINUOUS CURRENT RATING, MOTOR CIRCUIT PROTECTOR WITH MAGNETIC ONLY TRIP AND SIZE 2 STARTER
- (20) — 20 HORSEPOWER MOTOR
- 600A — COMBINATION MOTOR STARTER WITH DISCONNECT SWITCH AND CURRENT LIMITING POWER FUSES AND MAGNETIC CONTACTOR
- (300) — 3000 HORSEPOWER MOTOR

CONT. ON DWG. 084-301

480 V 3Φ 60Hz 1800AMP BUS

225A / 225AF T.M. — 3#350 MCM — 150 KVA — CREW QUARTERS

15A / 150AF — #6 (3) #12 — 2 KVA — BATTERY CHARGE

50A MCP M.O. — 3#3 + 3#12 — 25 HP — P.W.P. A

50A MCP M.O. — 3#8 + 3#12 — 25 HP — P.W.P. B

7A MCP M.O. — #6 + 3#12 — 1 HP — BLOWER #2

30A 150AF — #10 — 15 HP — WATER "TREATING" SET

7A MCP M.O. — #6 + 3#12 — 1/2 HP — BATTERY WATER

50A MCP M.O. — 3#8 + 3#12 — 15 — FAN #1

50A MCP M.O. — 3#8 + 3#12 — 15 — FAN #2

GAS COMPRESSOR #1

7A MCP M.O. — #6 + 3#12 — 2 HP — ENGINE WATER

50A MCP M.O. — 3#6 + 3#12 — 15 — FAN #1

50A MCP M.O. — 3#8 + 3#12 — 15 — FAN #2

GAS COMPRESSOR #2

7A MCP M.O. — #6 + 3#12 — 1 — ACID PUMP

7A MCP M.O. — #6 + 3#12 — 2 — LUBE OIL PUMP #1

7A MCP M.O. — #6 + 3#12 — 2 — LUBE OIL PUMP #2

STV COMPRESSOR

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL SINGLE-LINE DIAGRAM SHT 2

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN F.W.D. | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 12-14-61

084-302

REV: 1

BATTERY WITH CHARGER
24 V DC

V-1A
PRODUCTION SEPARATOR (MONTEREY CHERT)

V-1B
PRODUCTION SEPARATOR (MONTEREY CHERT)

V-1C
PRODUCTION SEPARATOR (SANDSTONE)

V-5
SWEET GAS SCRUBBER

V-2A
TEST SEPARATOR (MONTEREY CHERT)

V-2B
TEST SEPARATOR (SANDSTONE)

24 V DC

V-1D
WELL CLEAN SEPARATOR

V-10
WELL CLEAN TANK

V-4A
CRUDE SURGE TANK

V-4B
CRUDE SURGE TANK

V-4C
CRUDE SURGE TANK

115 V AC
PUMP CONTROL PANEL

SHIPPING PUMPS

OIL PIPELINE

P-4B
SHIPPING PUMP

P-4D
SHIPPING PUMP

P-4F
SHIPPING PUMP

GAS & FIRE DETECTORS AND LEAK DETECTION

24 VDC

EMERGENCY SURGE TANK HIGH LEVEL SHUTDOWN

V-3
MAIN GAS SCRUBBER

MONTEREY CHERT WELL SHUTDOWN

SANDSTONE WELL SHUTDOWN

OIL & GAS PIPELINE SHUTDOWN

'TEST OVERRIDE' SWITCHES (LOCKABLE OPEN)

MASTER SHUTDOWN FIRE DETECTORS

MASTER SHUTDOWN GAS DETECTORS

LOCKING SWITCH LOCK OPEN

OIL TEST ALARM

LEAK DETECTOR

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

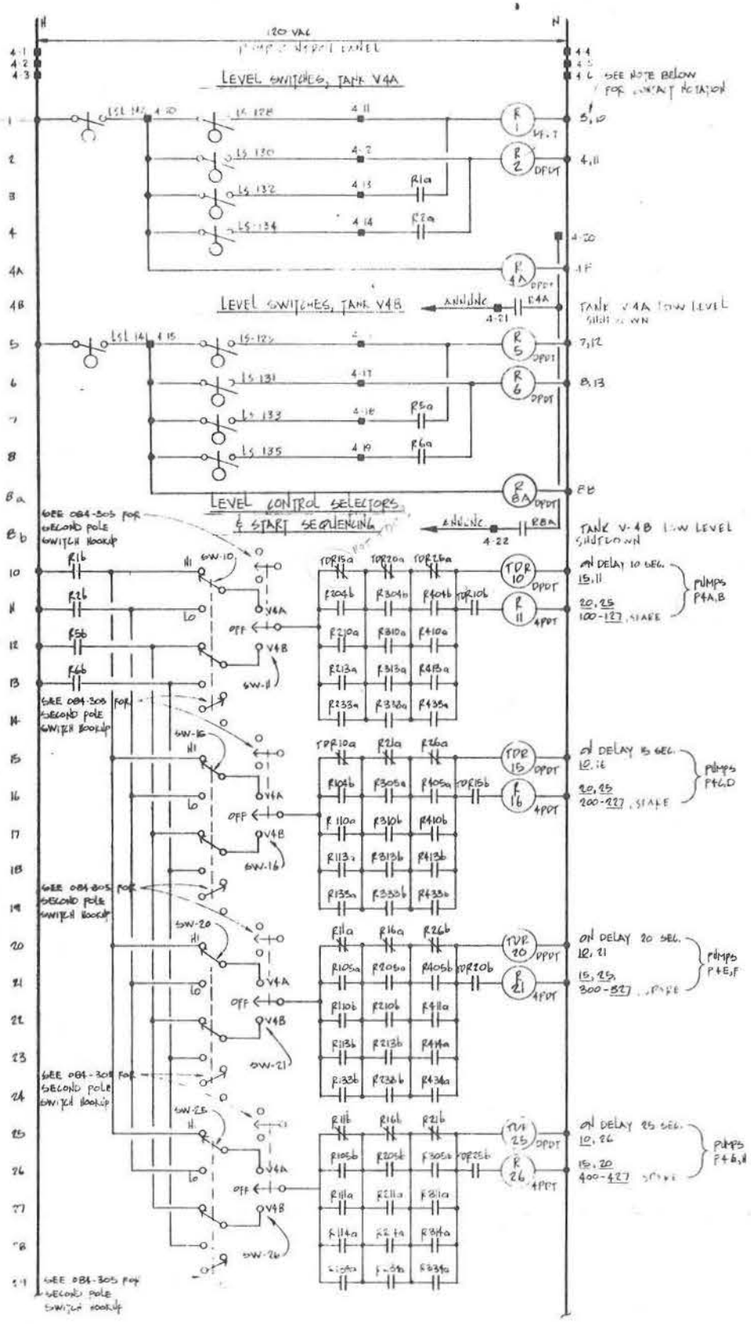
PRODUCTION SHUT-IN ELECTRICAL SYSTEM

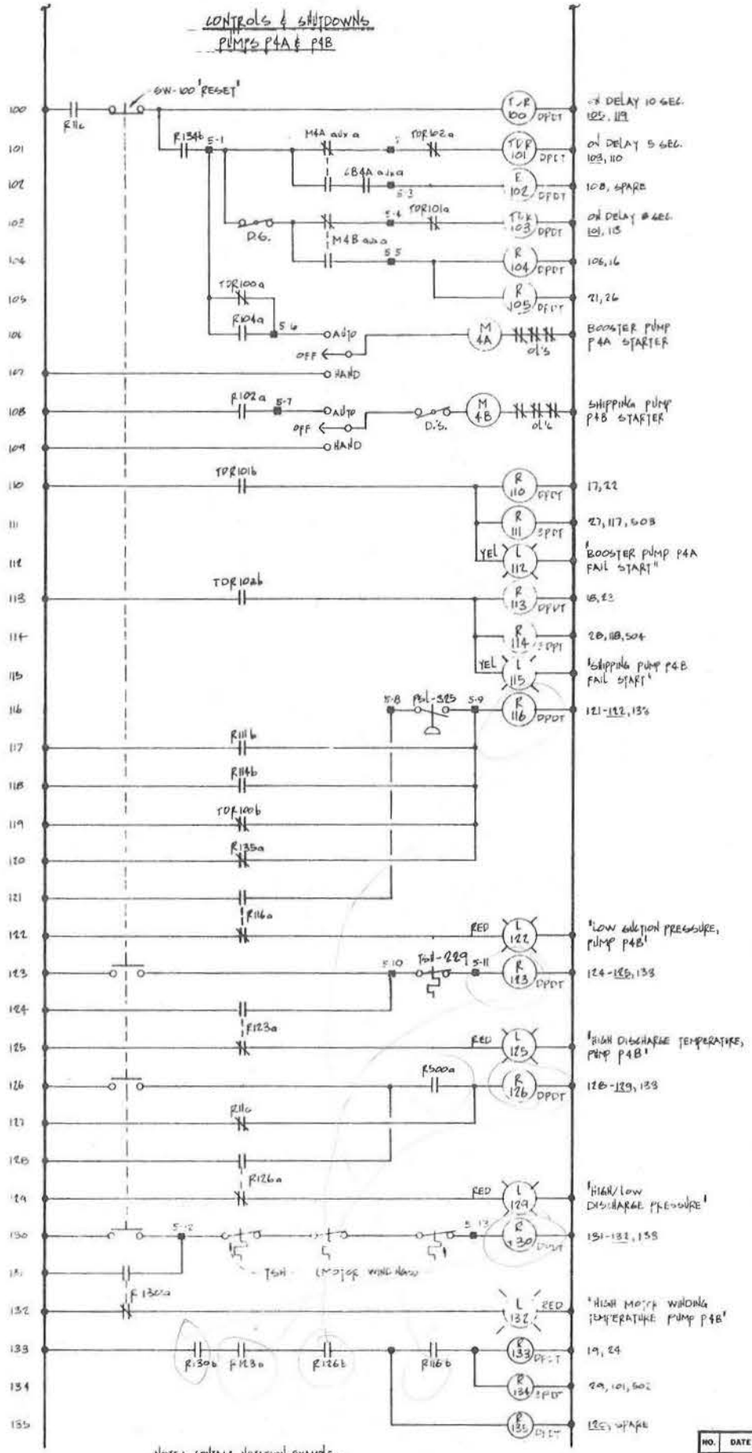
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

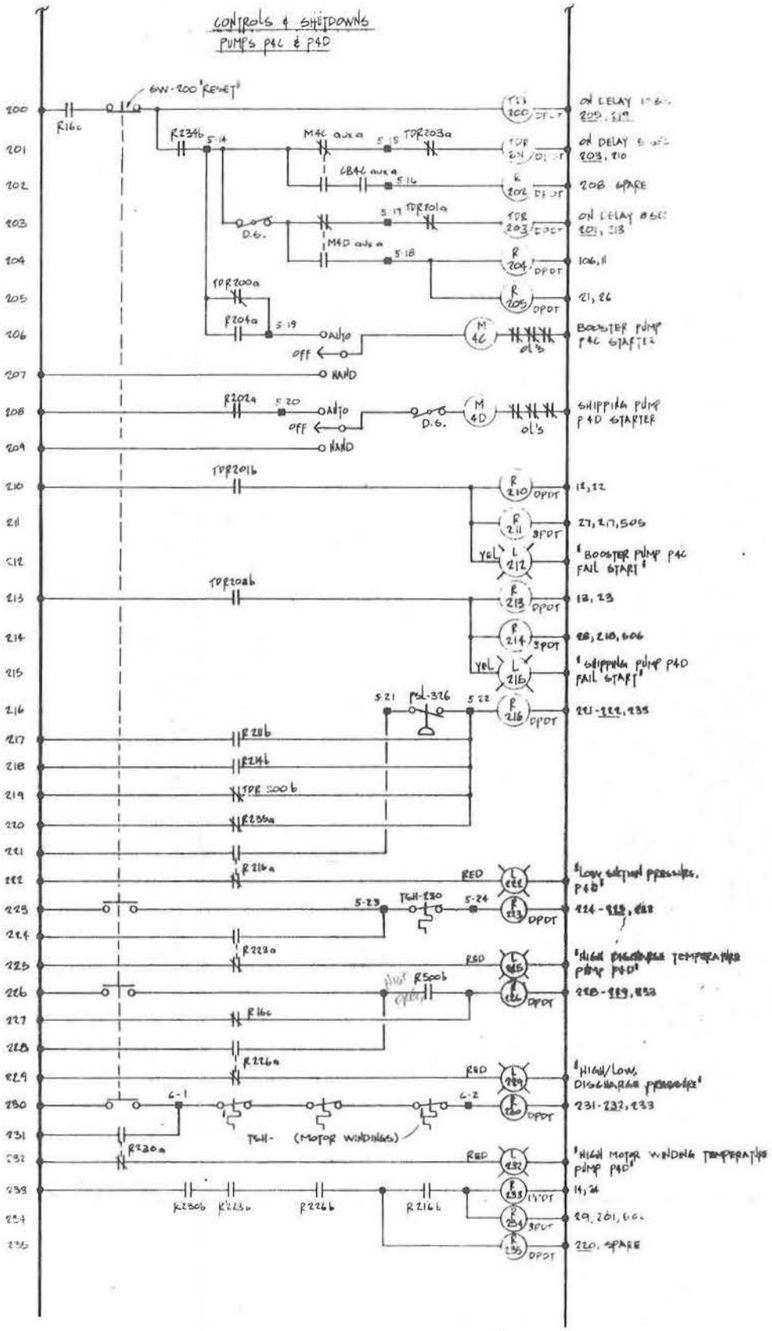
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN GRAMSTAD
CHECKED
ENGR. SECTION
APPROVED
SCALE NONE
DATE 7-22-71

084-303







NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SHIPPING PUMPS-ELECTRICAL
CONTROL SCHEMATIC DIAGRAM SHT. 1

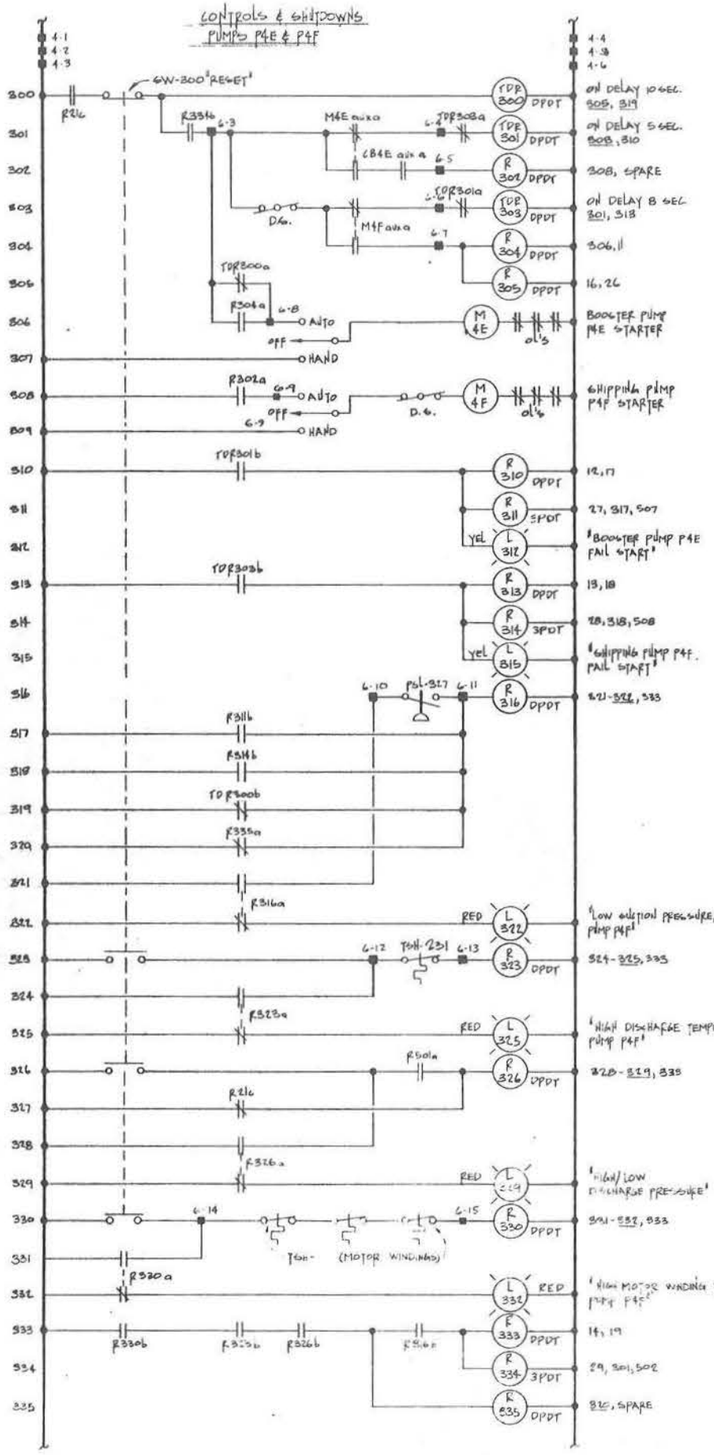
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

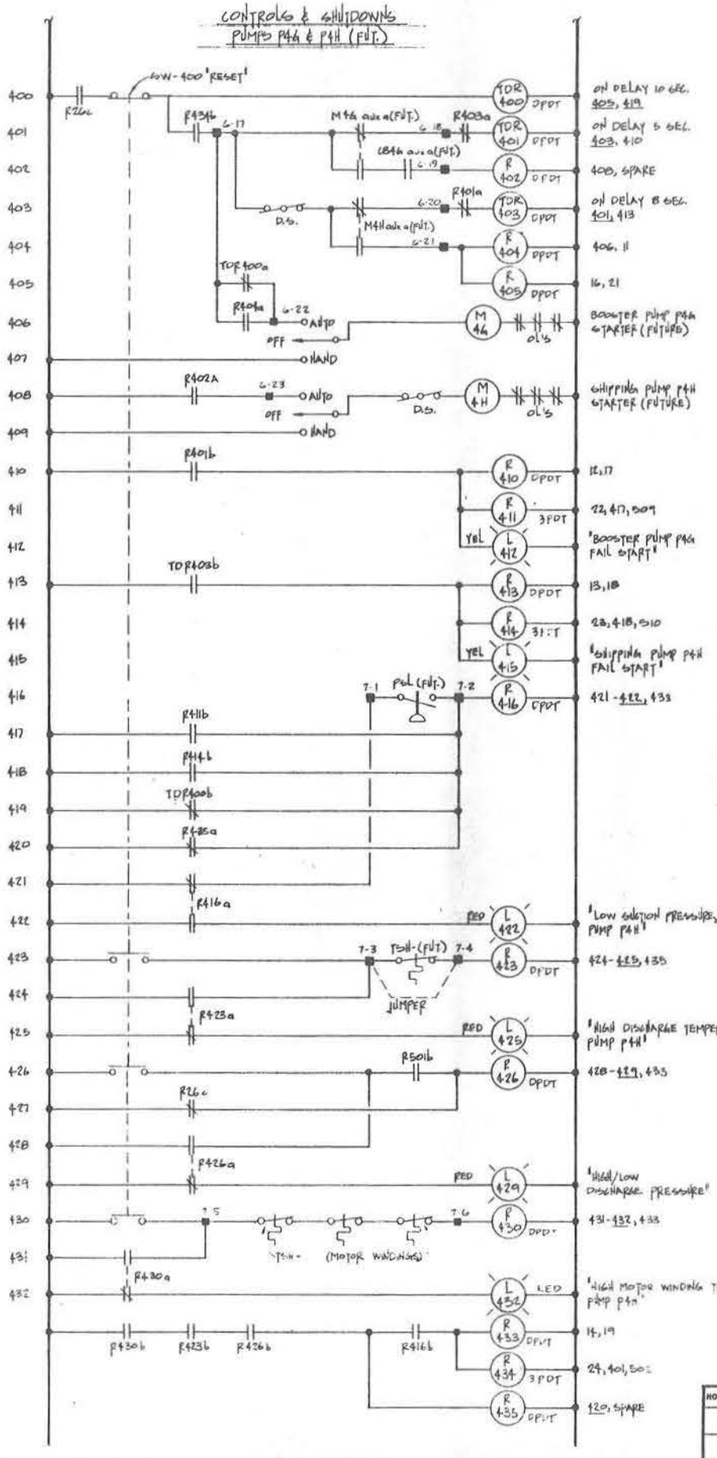
DRAWN R.W.D. | CHECKED | CONST. SECTION | APPROVED | SCALE NONE | DATE 6/10/71

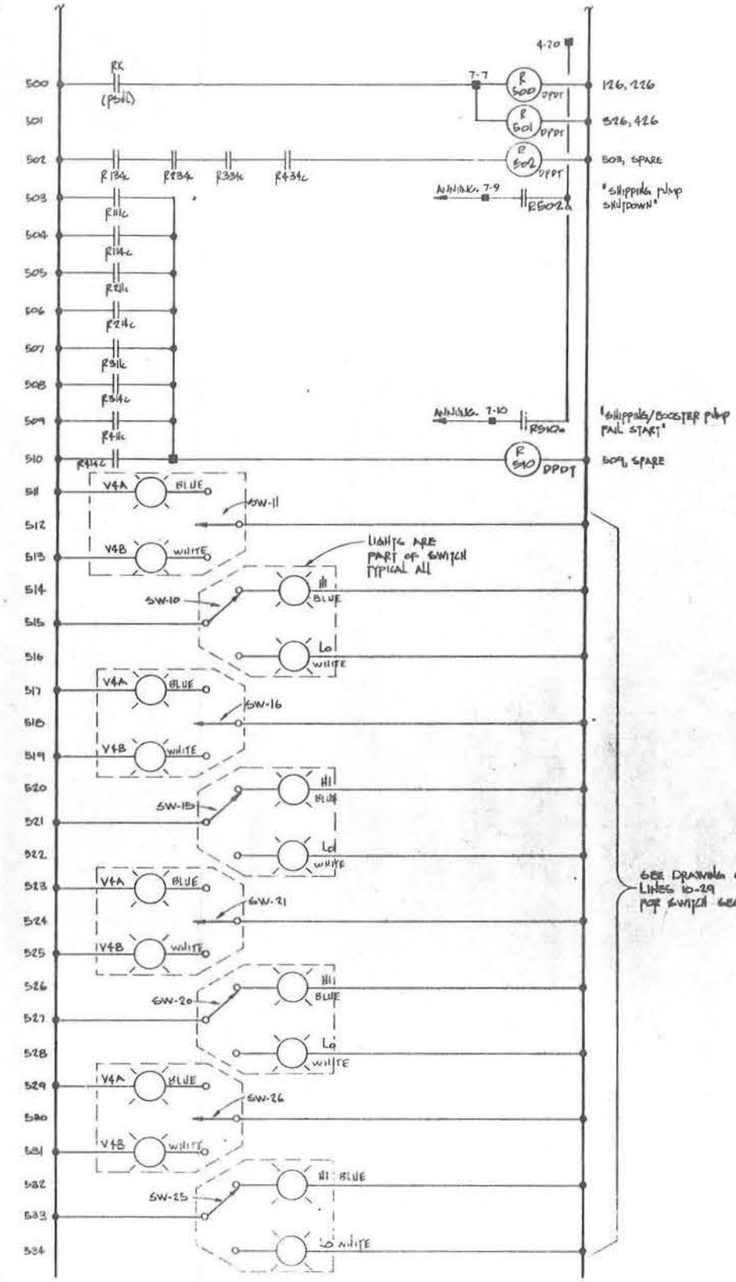
084-304

CONTROLS & SHUTDOWNS
PUMPS P4E & P4F



CONTROLS & SHUTDOWNS
PUMPS P4G & P4H (FUT.)





FIRE DETECTOR UNIT CONNECTIONS

B-1, B-2, B-3 — 120 VAC — ANNUNCIATOR NEUTRAL — B-16 — B-4, B-5, B-6, N

601 — 10A — UNIT 'A' LI, LH2 — FIRE DETECTOR UNIT 'A' (ZONES A1, A2)
602 — 6A — BI, B2
603 — FS, F5 — SOV 605 — ZONE A1 EXTINGUISHER VALVE OPERATOR
604 — F6, F6 — SOV 606 — ZONE A2 EXTINGUISHER VALVE OPERATOR
605 — TB, EI — B-7 — R 605 DPDT — 629, SPARE
606 — F, E2 — B-8 — R 606 DPDT — 630, SPARE
607 — 10A — UNIT 'B' LI, LE2
608 — 6A — BI, B2
609 — F6, F5
610 — T6, T5 — SOV 610 — ZONE B1 EXTINGUISHER VALVE OPERATOR
611 — TB, EI — B-9 — R 611 DPDT — 631, SPARE
612 — F, E2 — B-10 — R 612 DPDT — 634, SPARE
613 — 10A — UNIT 'C' LI, LE2 — FIRE DETECTOR UNIT 'C' (ZONES C-1, C-2, C-3, C-4)
614 — 6A — BI, B2
615 — F5, F5 — SOV 615 — ZONE C1 EXTINGUISHER VALVE OPERATOR
616 — T5, T6
617 — TB, EI — B-11 — R 617 DPDT — 632, SPARE
618 — F, E2 — B-12 — R 618 DPDT — 635, SPARE
619 — E3D — B-13 — R 619 DPDT — 636, SPARE
620 — E4D — B-14 — R 620 DPDT — 636, SPARE
621 — (LOCK OPEN) SW-621 "FIRE THEFT"
622 — SW-622 "FIRE RESET" — R 622 DPDT — 623, 624
623 — R 623 DPDT — 625, 640
R-622a
R-622b
R-623a
626 — R 626 DPDT — 630
627 — TDR 676 — R 629 — R 627 DPDT — 631
628 — B-15 — EOV 615 — FIRE & GAS DETECTOR SUBSURFACE SHUT-IN
629 — R-605a — R 629 3PDT — 621, 632, 628
630 — R-606a — "FIRE DETECTOR MALFUNCTION" R-626
631 — R-611a — ZONES A-1, A-2, B-1, C-1 — "FIRE DETECTOR ALARM" R-627
632 — R-617a — "FIRE EXTINGUISHER SYSTEM ENERGIZED" R-629
633 — R-618a — R 633 DPDT — 640, 653, 665
634 — R-619a — FUTURE USE - ZONES B-2, C-3, C-4, C-2
635 — R-620a

FIREWATER PUMP CONTROLS

640 — R-623b — R-633a — B-K
641
642 — 9-1 — STOP — SW-642 — START — TYPICAL FOR EACH SHUTDOWN PANEL
643
644
645
646
647
648
649 — STOP — SW-649 — START
650 — STOP — START — 9-4 — M 7A — OLS — PUMP P7A STARTER
9-2 — 9-3 — SW-650 (IN PANEL) — M7A aux a — M7A aux a — 627A aux a — 9-5 — TDR 652 DPDT — ON DELAY 2 SEC. 666, SPARE
651
652
653 — R-633b
654 — STOP — SW-654 — START — TYPICAL FOR EACH SHUTDOWN PANEL
655
656
657
658
659
660
661 — STOP — SW-661 — START
662 — STOP — START — 9-7 — M 7B — OLS — PUMP P7B STARTER
9-8 — SW-662 (IN PANEL) — M7B aux a — M7B aux a — 627 aux a — 9-8 — TDR 654 DPDT — ON DELAY 2 SEC. 667, SPARE
663
664
665 — 9-9 — R 633b — 9-10 — FOR FUTURE PUMP P7C — 9-11 — TDR 655 DPDT — ON DELAY 2 SEC. 668, SPARE
666 — TDR 652a — R 1106 — R 1006 DPDT — 667
667 — TDR 664a — ANNUNC. — "FIREWATER PUMP P7A START" R1006
668 — TDR 665a — 9-12 — SOV 668 — PUMP P-8 AUTO START
669 — R 1106

GAS DETECTORS

120 VAC — 24 VDC (+) — 24 VDC — B-6

670 — UNIT #1
671
672 — UNIT #2
672A
673 — UNIT #3
673A
674 — UNIT #1 — UNIT #2 — UNIT #3 — DPDT R 674 — 678
675 — DPDT R 675 — 679
676 — DPDT TDR 676 — OFF DELAY 30 SEC. 681, 627
677 — DPDT R 677 — 680
678 — ANNUNC. — R 674 — "GAS DETECTOR MALFUNCTION"
679 — ANNUNC. — R 675 — "GAS DETECTOR ALARM" LOW "LEL"
680 — ANNUNC. — R 677 — "GAS DETECTOR SHUTDOWN" HIGH "LEL"
681

PLATFORM SHUTDOWN

R 629 TDR 676 — 9-13 — 9-14 — "MASTER SHUTDOWN, GAS DETECTORS" (SEE 084-305) — "MASTER SHUTDOWN, FIRE DETECTORS" (SEE 084-303)

10-1, 10-2, 10-3 — B-16 — 10-4, 10-5, 10-6
682 — LAH-139A — 10-7 — R 682 DPDT — 683
683 — ANNUNC. — R 682 — HIGH LEVEL TANK V4-E
684 — FAH-1 — 10-8 — R 684 DPDT — 685
685 — ANNUNC. — R 684 — GAS SPARKING ALARM
686 — 10-9 — R 686 DPDT — 687
687 — ANNUNC. — R 686 — NAVIGATION LIGHTS MALFUNCTION
688 — 10-10 — R 688 DPDT — 689
689 — ANNUNC. — R 688 — FOG HORN MALFUNCTION
690 — 10-11 — R 690 DPDT — 691
691 — ANNUNC. — R 690 — CATHODIC PROTECTION UNIT MALFUNCTION
692 — PAL-692 — 10-12 — R 692 DPDT — 693
693 — ANNUNC. — K 692 — LOW PRESSURE ALARM SWITCHGEAR ROOM
694 — 10-13 — R 694 DPDT — 695
695 — ANNUNC. — R 694 — SUBMERS B-E PUMP MALFUNCTION
696 — FAH 342A — 10-14 — R 696 DPDT
697 — ANNUNC. — R 696 — [illegible] ALARM [illegible]
698 — IAH-163 — 10-15 — R 698 DPDT
699 — ANNUNC. — R 698 — [illegible]
700

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

FIRE & GAS DETECTOR SYSTEM
ELECTRICAL CONTROL SCHEMATIC DIAGRAM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN RNS — ENGR. SECTION — SCALE None — 084-306
CHECKED — APPROVED — DATE 7-22-71

REV. 1

DRAIN SYSTEM

120 VAC

FLOTATION CELL AGITATOR STARTERS

FLOTATION CELL RAKE STARTERS

WATER SUMP PUMP P1A STARTER

'HIGH LEVEL DRAIN SUMP'

WATER SUMP PUMP P1B STARTER

DIGESTAL TUBE OIL PUMP P-2 STARTER

OIL SUMP PUMP P5A STARTER

'HIGH LEVEL OIL SUMP'

OIL SUMP PUMP P5B STARTER

'HIGH LEVEL WATER SURGE TANK'

'LOW LEVEL WATER SURGE TANK'

HIGH LEVEL DISPOSAL TUBE

CRUDE OIL HEATING SYSTEM AND PRODUCTION SURGE TANKS

'EXCHANGER ESA DOWN'

ESA DIVERTER VALVE OPERATOR

'EXCHANGER ESB DOWN'

ESB DIVERTER VALVE OPERATOR

'EXCHANGER ESC DOWN'

ESC DIVERTER VALVE OPERATOR

'LOW LEVEL THERMINOL EXPANSION TANK'

THERMINOL PUMP P20A STARTER

THERMINOL PUMP P20B STARTER

'LOW DISCHARGE TEMPERATURE CRUDE OIL HEATERS'

LEV-141 OPERATOR

LEV-143 OPERATOR

LEV-154 OPERATOR

WELL CLEAN SEPARATOR AND SURGE TANK

DIESEL FUEL SYSTEM

DIESEL FUEL TRANSFER PUMP P10A STARTER

DIESEL FUEL TRANSFER PUMP P10B STARTER

MISCELLANEOUS SYSTEMS

TYPICAL FOR EACH WASHDOWN HOSE REEL STATION

WASHDOWN PUMP P-9 STARTER

'HIGH LEVEL TANK V6A'

'HIGH LEVEL TANK V6B'

'HIGH LEVEL WELL CLEAN SEPARATOR'

'HIGH LEVEL WELL CLEAN TANK'

'INLET VALVE CLOSED DIESEL TANK #1'

'HIGH LEVEL DIESEL TANK #1'

'INLET VALVE CLOSED DIESEL TANK #2'

'HIGH LEVEL DIESEL TANK #2'

'HIGH LEVEL TANK'

'LOW LEVEL TANK'

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

MISCELLANEOUS SYSTEM
ELECTRICAL CONTROL SCHEMATIC DIAGRAM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

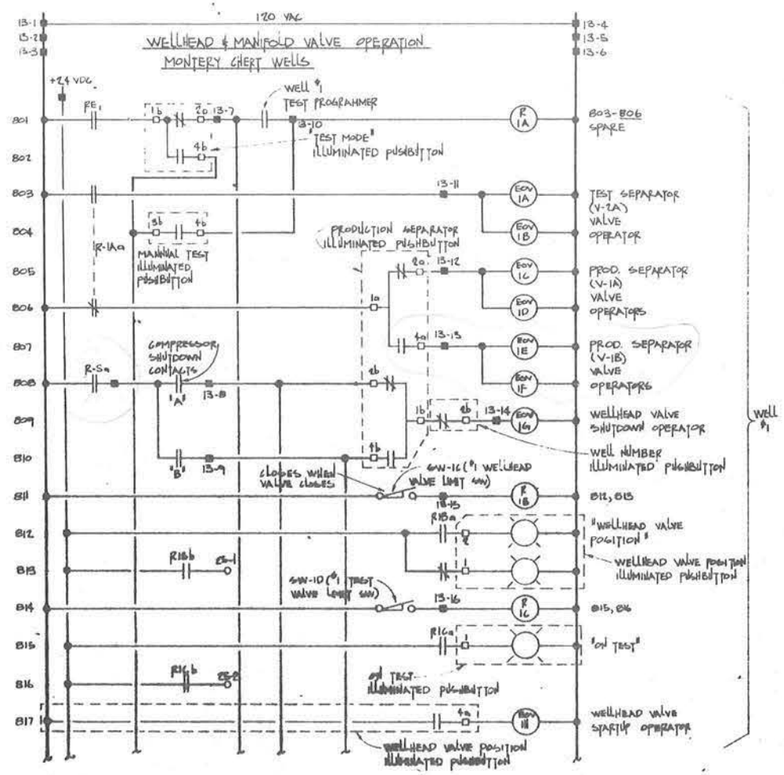
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

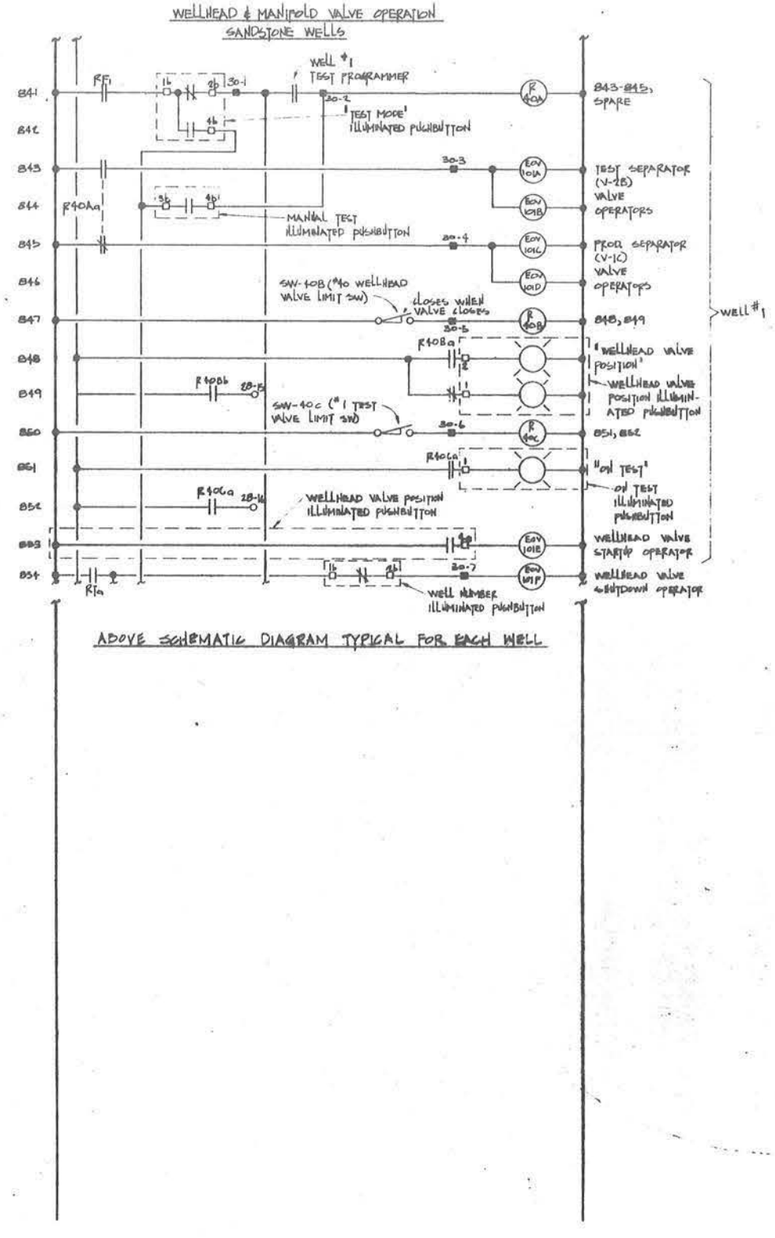
DRAWN 2WB | ENGR. SECTION | CHECKED | APPROVED | DATE 1 JUNE 71

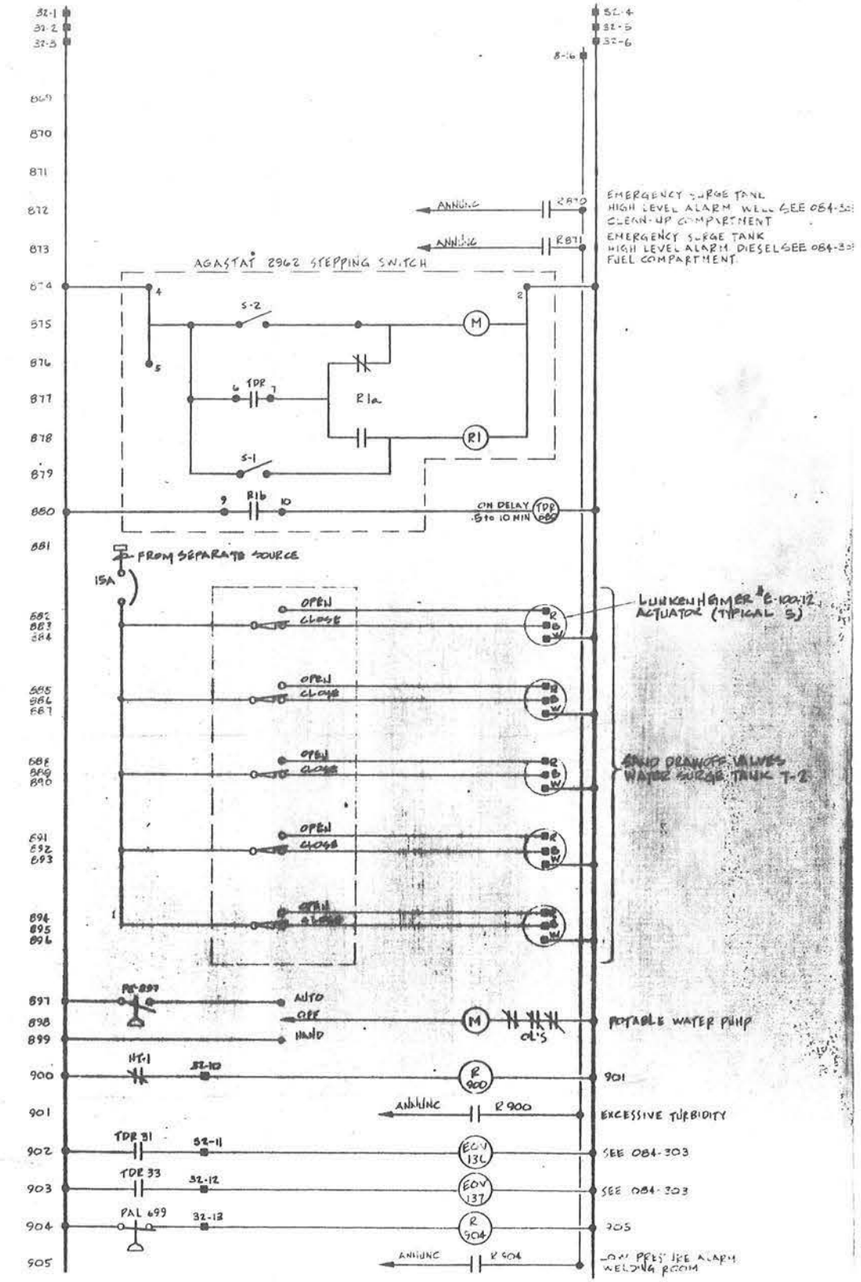
084-307

REV: 1

NO.	DATE	REVISIONS	BY	CHK.	APPR.



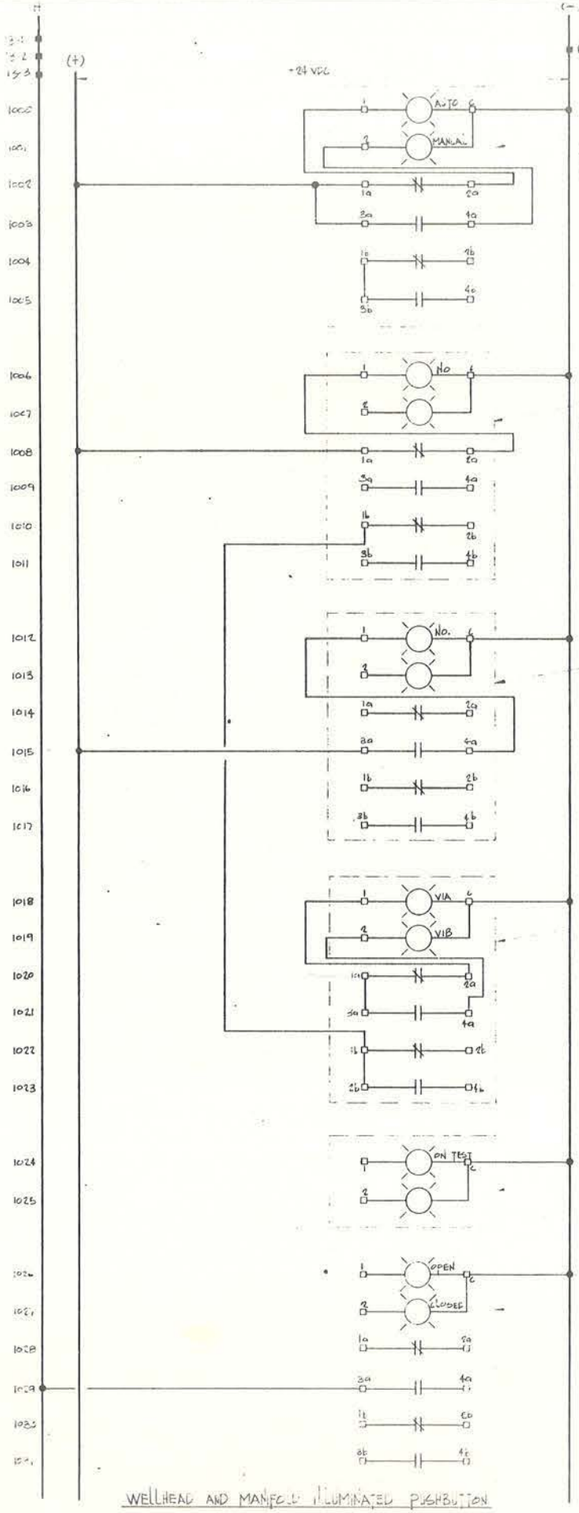




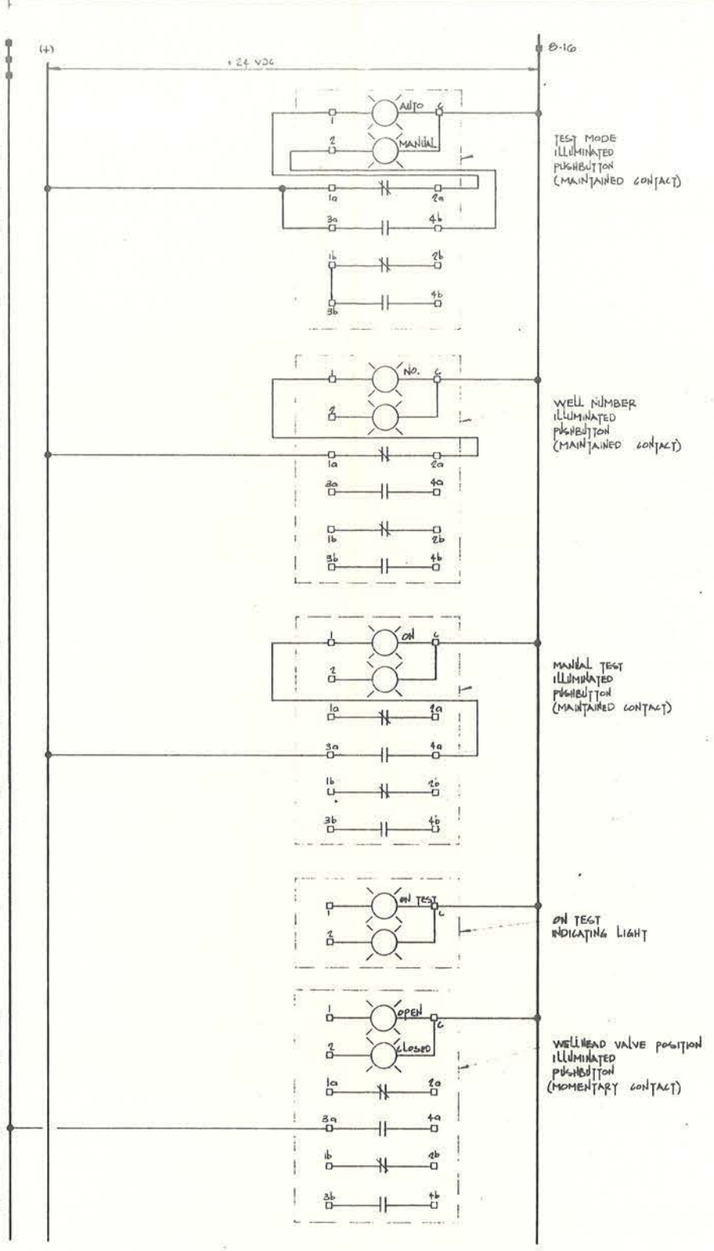
DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL	HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
WELLHEAD & MANIFOLD SWITCHING ELECTRICAL CONTROL SCHEMATIC DIAGRAM	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN R.M.D. ENGR. SECTION SCALE N. NB CHECKED APPROVED DATE 4-3	084-308

NO.	DATE	REVISIONS	BY	CHK.	APPR.

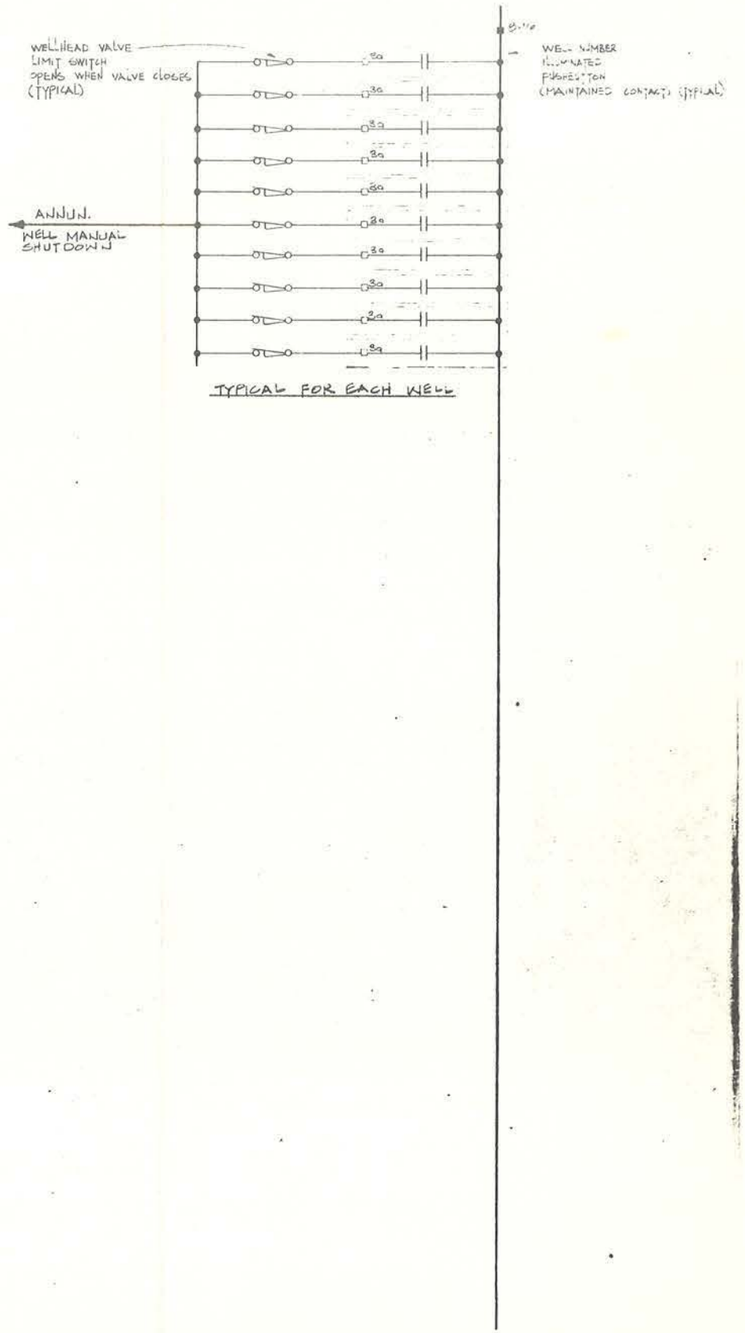
REV. 1



WELLHEAD AND MANIFOLD ILLUMINATED PUSHBUTTON
MONTERY CHERT WELLS
WELL #1 SHOWN - TYPICAL ALL WELLS



WELLHEAD AND MANIFOLD ILLUMINATED PUSHBUTTONS
SANDSTONE WELLS
WELL #1 SHOWN - TYPICAL ALL WELLS



TYPICAL FOR EACH WELL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

WELLHEAD MANIFOLD SWITCHING
ELECTRICAL CONTROL SCHEMATIC DIAGRAM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN | ENGR. SECTION | SCALE
CHECKED | APPROVED | DATE

084-309

REV. 1

3" TYPICAL

MONTEREY CHERT TEST OVERRIDE OFF ON — (1)

SANDSTONE PRESSURE CUTOUT OFF ON — (2)

RESET — (3)

FIRE SYSTEM TEST OFF ON — (4)

FIRE SYSTEM RESET — (5)

EMULSION & WATER CHART RECORDER — (6)

SWEET & SOUR GAS CHART RECORDER — (7)

EMULSION — (8)

GAS MEASUREMENT GAS SCRUBBER V-3 — (9)

GAS MEASUREMENT SWEET GAS SCRUBBER — (10)

TEST SEPARATOR V-2A — (11)

TEST SEPARATOR V-2B — (12)

SANDSTONE TEST OVERRIDE OFF ON — (13)

PIPELINE TEST OVERRIDE OFF ON — (14)

WATER PRODUCTION — (15)

8"

WELL TEST UNIT MONTEREY CHERT WELLS — (16)

WELL TEST UNIT SANDSTONE WELLS — (17)

3"

NAMEPLATE — TEST MODE

GREEN — AUTO

AMBER — MANUAL

ILLUMINATED PUSHBUTTON — (18E)

3" TYP

METEK PROVER TOTALIZER — (19)

FIRE PUMP P-7A START - STOP — (20)

FIRE PUMP P-7B START - STOP — (21)

FIRE PUMP P-8 START - STOP — (22)

EMERGENCY WELL SHUT-IN — (23)

METERS NORMAL PROVE — (24)

M-4A
M-4C
M-4E
M-4G
M-21A
M-21B
M-22A
M-22B
1¼"
— (25)

"COMPRESSOR RUNNING" INDICATING LIGHT (GREEN)

START BUTTON

STOP BUTTON

— (26)

GREEN (TYP.)
RED (TYP.)
AMBER (TYP.)

SPARE

ANNUNCIATORS

FIRE DETECTOR CONTROL UNITS

GAS DETECTOR UNITS

NUMBER AS REQUIRED

NUMBER AS REQUIRED

PNEUMATIC PANEL

12'-0"

3" TYPICAL

GAS COMPRESSOR #1 — (27)

GAS COMPRESSOR #2 — (28)

GAS COMPRESSOR #3 — (29)

GAS COMPRESSOR #4 — (30)

ANNUNCIATOR SCHEDULE

HIGH PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1A	HIGH LEVEL ALARM WELL CLEAN SEPARATOR	LOW LEVEL ALARM WATER SURGE TANK	GAS, FIRE OR LEAK DETECTOR MANUAL TEST
LOW PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1A	HIGH LEVEL SHUTDOWN WELL CLEAN TANK	HIGH LEVEL DAY TANK	TEST OVERRIDE ON
HIGH LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1A	HIGH LEVEL WELL CLEAN TANK	LOW LEVEL DAY TANK	SUBMERSIBLE PUMP MALFUNCTION
LOW LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1A	HIGH OR LOW PRESSURE MAIN GAS SCRUBBER V-3	HIGH LEVEL ALARM DRAIN SUMP	HIGH LEVEL CRUDE SURGE TANK V-4C
HIGH PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1B	HIGH LEVEL SHUTDOWN MAIN GAS SCRUBBER V-3	HIGH LEVEL ALARM OIL SUMP	GAS STACKING ALARM
LOW PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1B	HIGH PRESSURE SHUTDOWN SWEET GAS SCRUBBER	HIGH LEVEL ALARM DISPOSAL TANK	NAVIGATION LIGHTS MALFUNCTION
HIGH LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1B	LOW PRESSURE SHUTDOWN SWEET GAS SCRUBBER	LOW DISCHARGE TEMPERATURE CRUDE OIL HEATERS	FOG HORN MALFUNCTION
LOW LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1B	HIGH LEVEL SHUTDOWN SWEET GAS SCRUBBER	LOW LEVEL THERMINOL EXPANSION TANK	CATHODIC PROTECTION UNIT MALFUNCTION
HIGH PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1C	HIGH PRESSURE SHUTDOWN CRUDE SURGE TANK V-4A	EXCHANGER E-5A DOWN	LOW PRESSURE ALARM SWITCH GEAR ROOM
LOW PRESSURE SHUTDOWN PRODUCTION SEPARATOR V-1C	HIGH LEVEL SHUTDOWN CRUDE SURGE TANK V-4A	EXCHANGER E-5B DOWN	LOW LEVEL SHUTDOWN SWEET GAS SCRUBBER
HIGH LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1C	LOW LEVEL SHUTDOWN CRUDE SURGE TANK V-4A	EXCHANGER E-5C DOWN	LOW LEVEL SHUTDOWN MAIN GAS SCRUBBER
LOW LEVEL SHUTDOWN PRODUCTION SEPARATOR V-1C	HIGH LEVEL ALARM CRUDE SURGE TANK V-4A	INLET VALVE CLOSED DIESEL TANK #1	HIGH LEVEL SHUTDOWN EMERGENCY SURGE TANK
HIGH PRESSURE SHUTDOWN TEST SEPARATOR V-2A	HIGH PRESSURE SHUTDOWN CRUDE SURGE TANK V-4B	HIGH LEVEL DIESEL TANK #1	HIGH PRESSURE ALARM PIPELINE
LOW PRESSURE SHUTDOWN TEST SEPARATOR V-2A	HIGH LEVEL SHUTDOWN CRUDE SURGE TANK V-4B	INLET VALVE CLOSED DIESEL TANK #2	HIGH LEVEL ALARM VENT SCRUBBER
HIGH LEVEL SHUTDOWN TEST SEPARATOR V-2A	LOW LEVEL SHUTDOWN CRUDE SURGE TANK V-4B	HIGH LEVEL DIESEL TANK #2	EXCESSIVE TURBIDITY ALARM
LOW LEVEL SHUTDOWN TEST SEPARATOR V-2A	HIGH LEVEL ALARM CRUDE SURGE TANK V-4B	MALFUNCTION TURBINE GENERATORS	LOW PRESSURE ALARM WELDING ROOM
HIGH PRESSURE SHUTDOWN TEST SEPARATOR V-2B	HIGH PRESSURE SHUTDOWN CRUDE SURGE TANK V-4C	LOW PRESSURE INSTRUMENT AIR	EMERGENCY SURGE TANK HIGH LEVEL ALARM WELL CLEAN-UP COMPARTMENT
LOW PRESSURE SHUTDOWN TEST SEPARATOR V-2B	HIGH OR LOW PRESSURE SHIPPING PUMP P-4B	MALFUNCTION FIRE DETECTORS	EMERGENCY SURGE TANK HIGH LEVEL ALARM DIESEL FUEL COMPARTMENT
HIGH LEVEL SHUTDOWN TEST SEPARATOR V-2B	HIGH OR LOW PRESSURE SHIPPING PUMP P-4D	SHUTDOWN FIRE DETECTORS	WELL MANUAL SHUTDOWN
LOW LEVEL SHUTDOWN TEST SEPARATOR V-2B	HIGH OR LOW PRESSURE SHIPPING PUMP P-4F	FIRE EXTINGUISHER SYSTEM ENGAGED	GAS COMPRESSOR MALFUNCTION
HIGH PRESSURE SHUTDOWN WELL CLEAN SEPARATOR V-1D	SHUTDOWN SHIPPING PUMP	FAIL TO START FIREWATER PUMP	HIGH LEVEL ALARM SEWAGE TREATMENT UNIT
LOW PRESSURE SHUTDOWN WELL CLEAN SEPARATOR V-1D	FAIL TO START SHIPPING OR BOOSTER PUMP	MALFUNCTION GAS DETECTORS	PIPELINE LEAK
HIGH LEVEL SHUTDOWN WELL CLEAN SEPARATOR V-1D	HIGH OR LOW PRESSURE OIL PIPELINE	ALARM GAS DETECTORS	
LOW LEVEL SHUTDOWN WELL CLEAN SEPARATOR V-1D	HIGH LEVEL ALARM WATER SURGE TANK	SHUTDOWN GAS DETECTORS	

1¾"

NAMEPLATES — WELL NO. — MANUAL TEST — PRODUCTION SEPARATOR — ON TEST — WELLHEAD VALVE POSITION

ILLUMINATED PUSHBUTTONS (TYP.) — 2 — ON — BLUE V-1A, WHITE V-1B — ON TEST — RED CLOSED, GREEN OPEN

NUMBER (AS REQ'D.) (GREEN) — (AMBER) — (AMBER)

— (31)

1¾"

NAMEPLATES — WELL NO. — MANUAL TEST — ON TEST — WELLHEAD VALVE POSITION

ILLUMINATED PUSHBUTTONS (TYP.) — 22 — ON — ON TEST — RED CLOSED, GREEN OPEN

NUMBER (AS REQ'D.) (GREEN) — (AMBER) — (AMBER)

— (32)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

MAIN CONTROL PANEL
ELEVATION & NAMEPLATE SCHEDULE

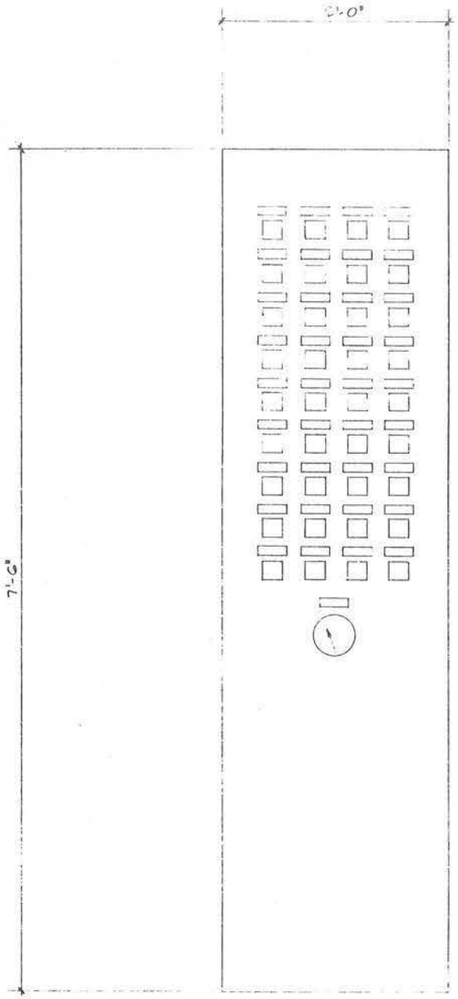
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

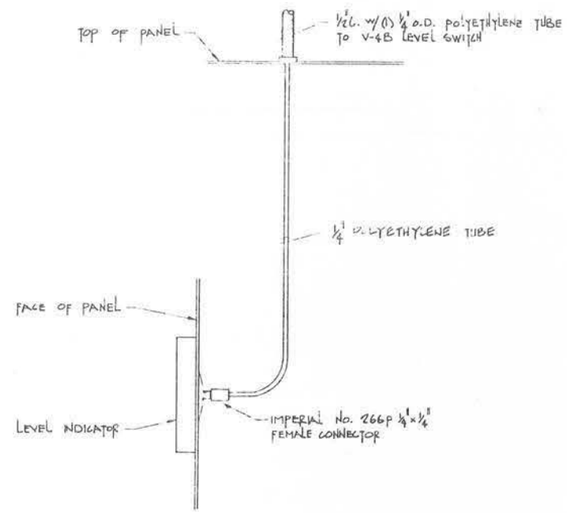
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN GRAHAM/TAO — DESIGN, SECTION — SCALE 3/4" = 1'-0"
CHECKED — APPROVED — DATE 7-22-71

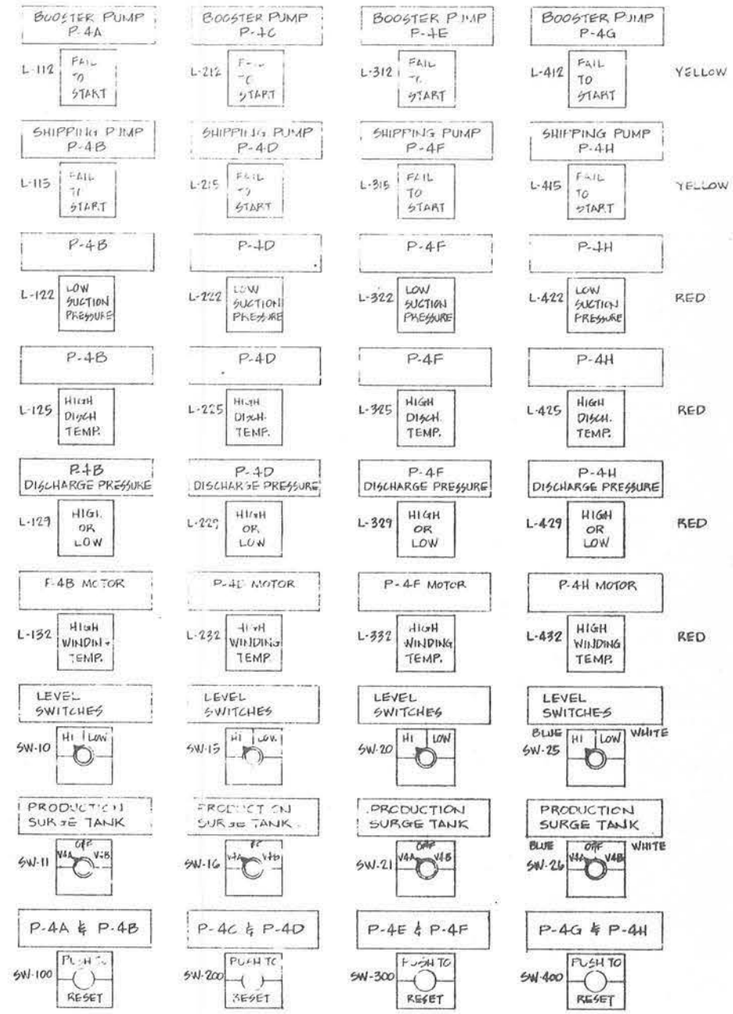
084-310

REV. 1





LEVEL INDICATOR PNEUMATIC HOOK-UP DETAIL



LEVEL INDICATOR TANK V-4B

NO.	DATE	REVISIONS	BY	CH.	APPR

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

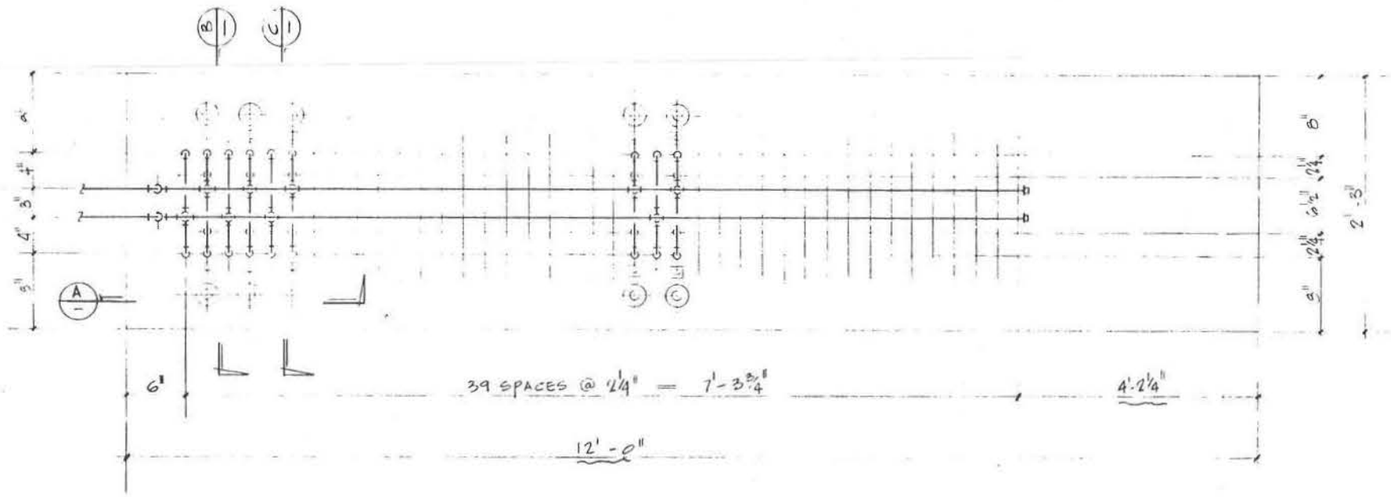
PUMP CONTROL PANEL
ELEVATION & NAMEPLATE SCHEDULE

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

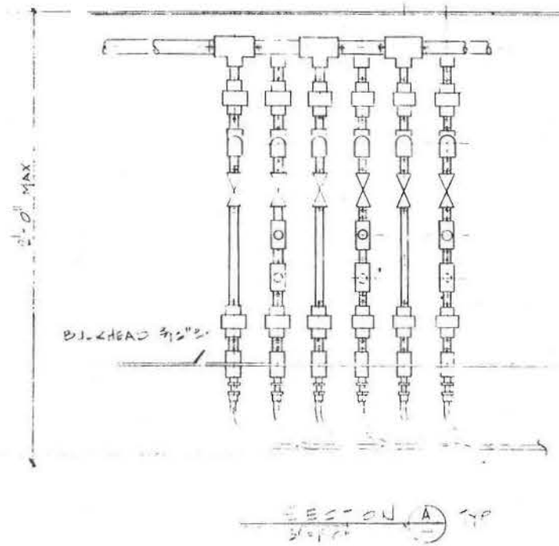
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN J. GRANSTAD
CHECKED
ENGR. SECTION
APPROVED
SCALE NOTED
DATE 7-27-71

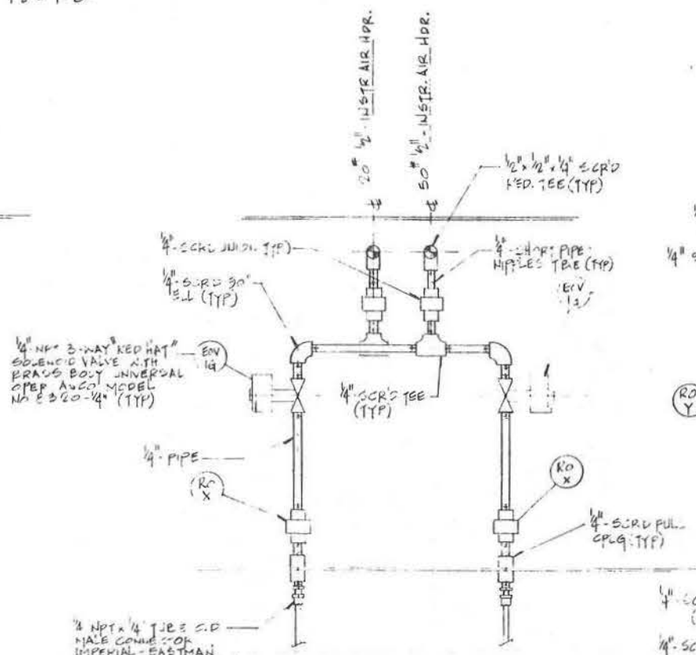
084-311



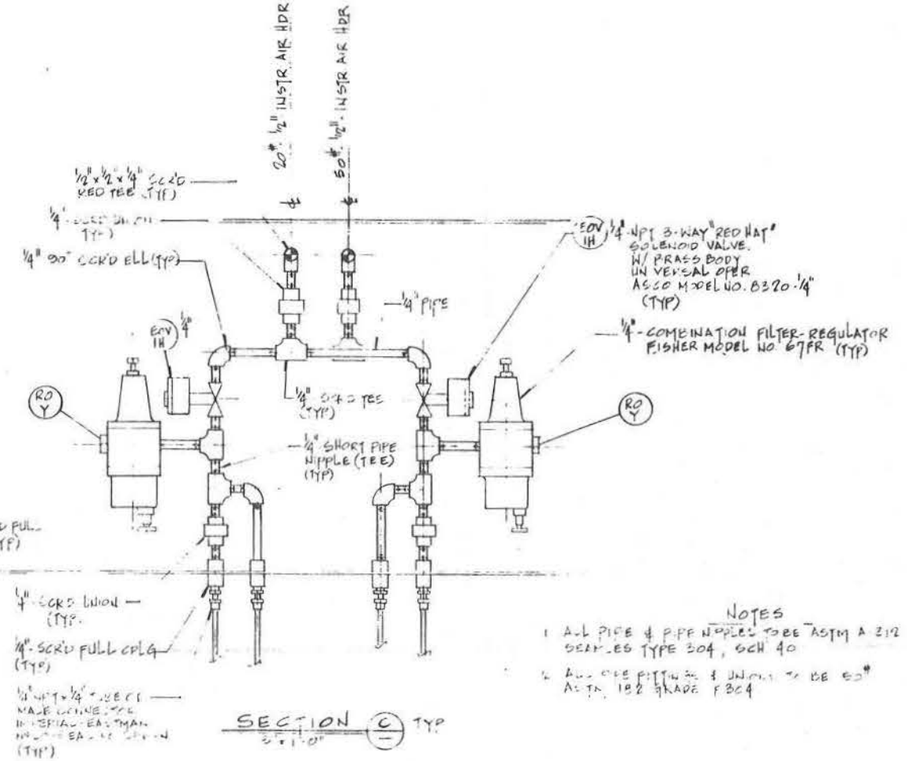
PLAN VIEW
1½" = 1'-0"



SECTION (A) TYP
3/4" = 1'-0"



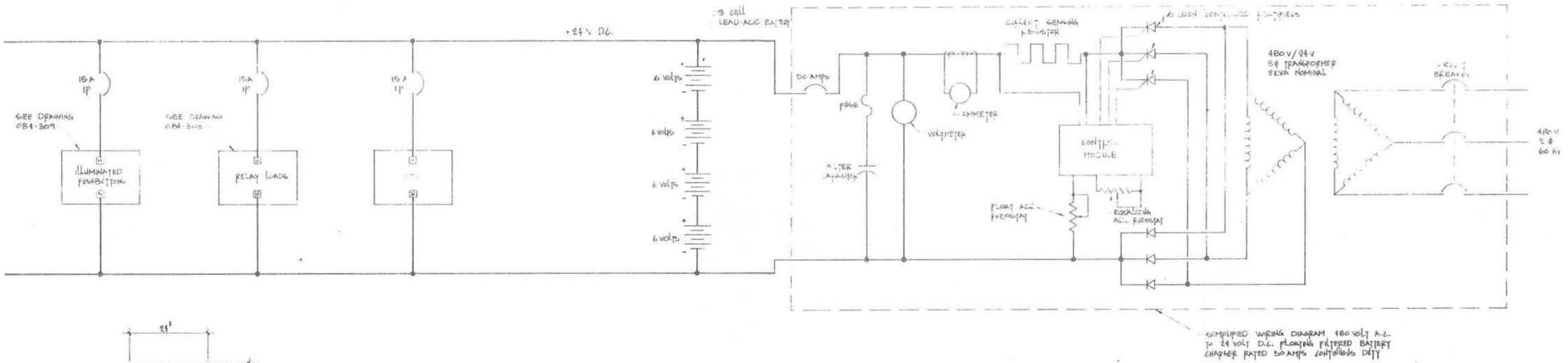
SECTION (B) TYP
3" = 1'-0"



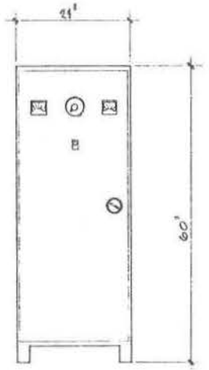
SECTION (C) TYP
3" = 1'-0"

NOTES
1. ALL PIPE & PIPE NIPPLES TO BE ASTM A 312 SEAMLESS TYPE 304, SCH 40
2. ALL PIPE FITTINGS & UNIONS TO BE 150# ASTM 182 GRADE F304

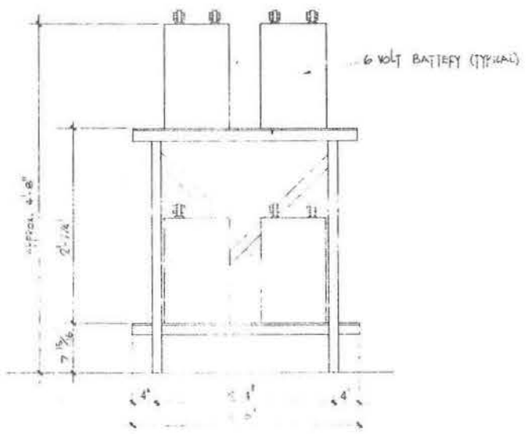
		DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL		HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA	
NO.	DATE	REVISIONS	BY CHK. APPR.	MAIN CONTROL PANEL PNEUMATIC DETAILS	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
				DRAWN D.WESTER ENGR. SECTION CHECKED APPROVED	SCALE NOTED DATE 1-22-71 084-312



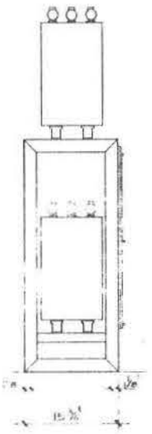
SIMPLIFIED WIRING DIAGRAM 480 VOLT A.C. TO 24 VOLT D.C. FLOATING FILTERED BATTERY CHARGER RATED 50 AMPS CONTINUOUS DUTY

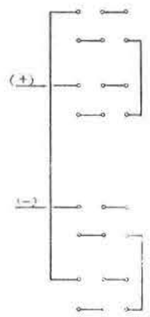


24 VOLT BATTERY CHARGER



BATTERY RACK AND BATTERY





BATTERY TERMINAL CONNECTIONS

NO.	DATE	REVISIONS	BY	CK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

24 VOLT DC POWER SUPPLY SYSTEM

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN S.V.E. | ENGR. SECTION | SCALE NONE | 084-313
CHECKED | APPROVED | DATE 4/25/71

SEE DWG 084-315 FOR CONTINUATION

120 VAC

33-1
33-2
33-3
(+)

33-4
33-5
33-6

CAPACITANCE PROBE

NET WATER CONTACT CLOSURE

NET OIL CONTACT CLOSURE

FLOW RATE 4-20 MA

NET OIL ANALYZER EMULSION

TURBINE METER

BBL WATER CONTACT CLOSURE

FLOW RATE 4-20 MA

FLOW ANALYZER WATER PROTECTION

D.P. TRANSDUCER

STATIC PRESS. TRANS. 1204

TEMP. TRANSDUCER

TOTALIZER CONTACT CLOSURE

4-20 MA FLOW RATE

1272 M FLOW COMPUTER GAS SCRUBBER V-3

1272 M FLOW COMPUTER SWEET GAS SCRUBBER V-5

SEE DWG 084-315 FOR CONTINUATION

CAPACITANCE PROBE

NET WATER CONTACT CLOSURE

NET OIL CONTACT CLOSURE

FLOW RATE 4-20 MA

NET OIL ANALYZER TEST SEPARATOR V-2A

1272 M FLOW COMPUTER TEST SEPARATOR V-2A

HIGH D.P.

LOW D.P.

STATIC PRESS. DANIEL 1204

TEMP. TRANS 1204

TOTALIZER CONTACT CLOSURE

4-20 MA FLOW RATE

WATER FLOW TOTALIZER TEST SEPARATOR V-2A

FLOW TOTALIZER CONTACT CLOSURE

SEE DWG 084-315 FOR CONT

NET OIL ANALYZER TEST SEPARATOR V-2B

CAPACITANCE PROBE

NET WATER CONTACT CLOSURE

NET OIL CONTACT CLOSURE

FLOW RATE 4-20 MA

1272 M FLOW COMPUTER TEST SEPARATOR V-2B

HIGH D.P.

LOW D.P.

STATIC PRESS. DANIEL 1204

TEMP. TRANS 1204

TOTALIZER CONTACT CLOSURE

4-20 MA FLOW RATE

WATER FLOW TOTALIZER TEST SEPARATOR V-2B

FLOW TOTALIZER CONTACT CLOSURE

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

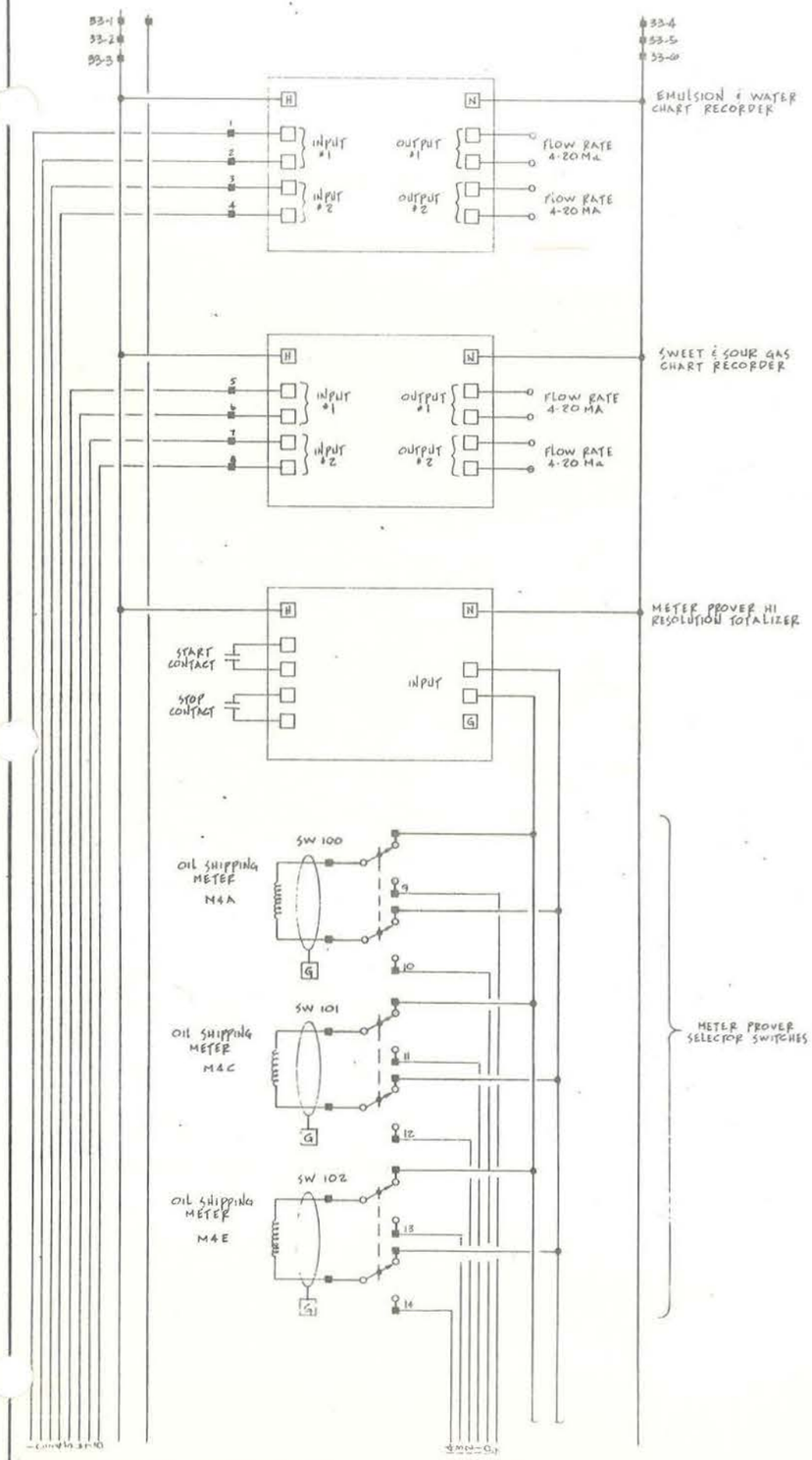
MISCELLANEOUS SYSTEMS
ELECTRICAL CONTROL SCHEMATIC DIAGRAM

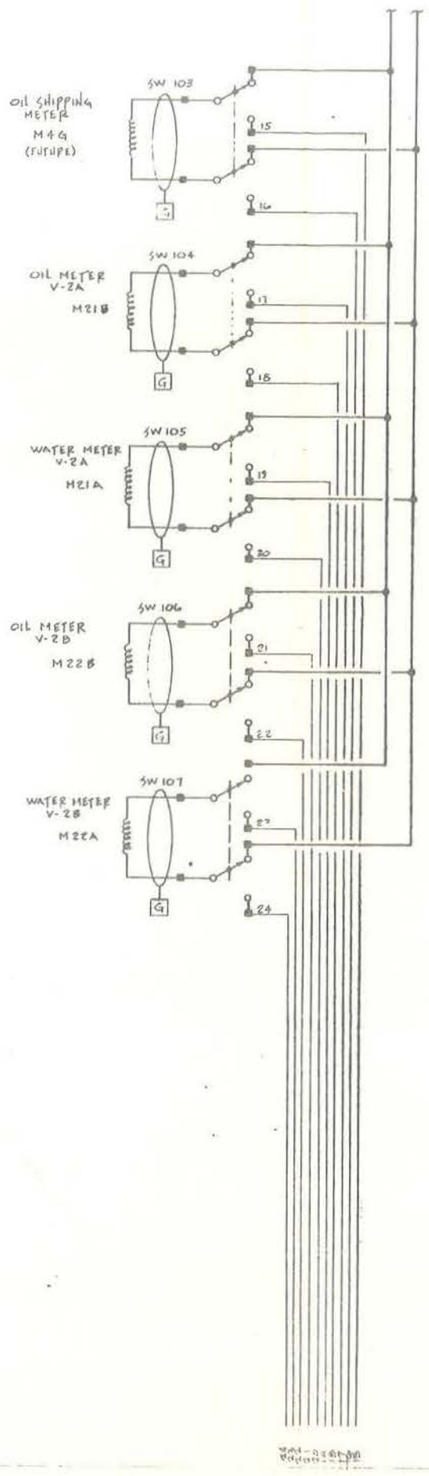
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

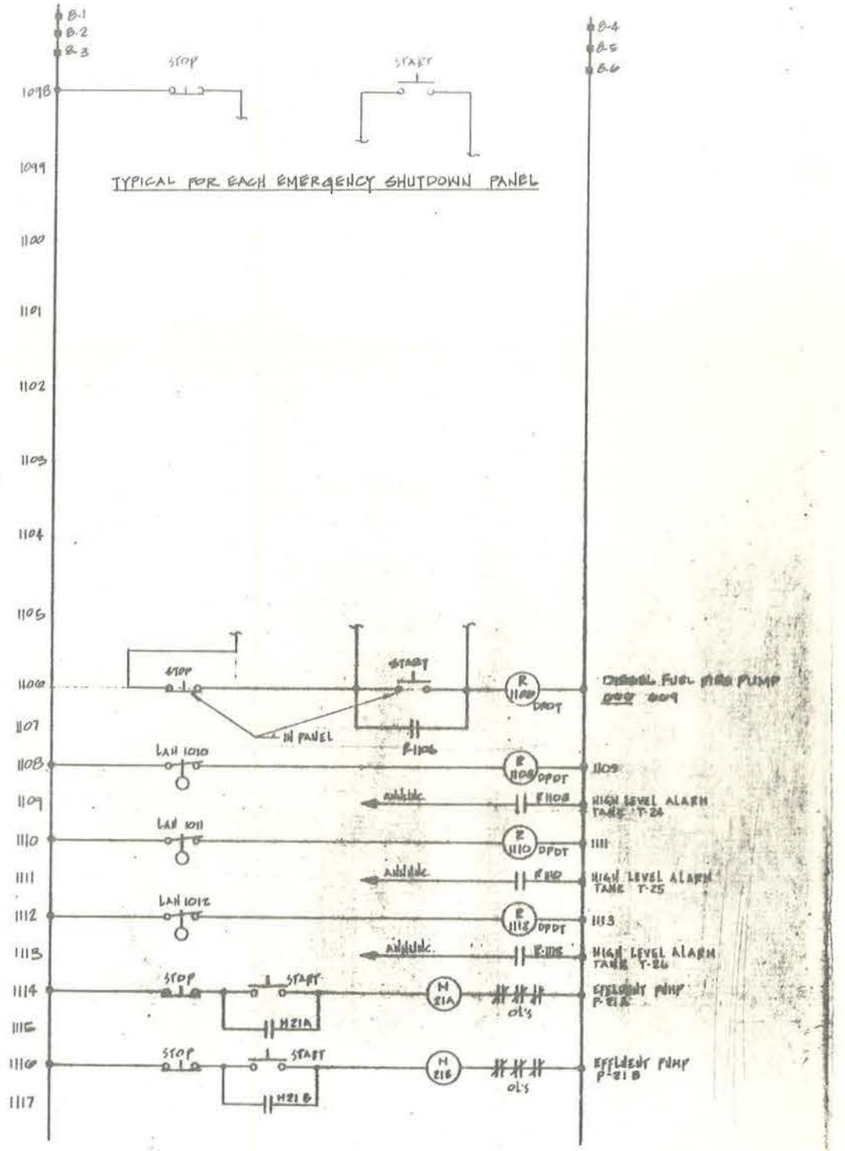
NO.	DATE	REVISIONS	BY	CHK.	APPR.

DRAWN S.W.C.
CHECKED
ENGR. SECTION
APPROVED
SCALE NONE
DATE 7-21-61

084-314







NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

MISCELLANEOUS SYSTEM
ELECTRICAL CONTROL SCHEMATIC

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN V.R.A. | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

084-315

REV: 1

PRESSURE SWITCH
OPENS ON INCREASING PRESSURE

PRESSURE SWITCH
CLOSES ON INCREASING PRESSURE

LEVEL SWITCH
OPENS ON INCREASING LEVEL

LEVEL SWITCH
CLOSES ON INCREASING LEVEL

FLOW SWITCH
OPENS ON INCREASING FLOW

FLOW SWITCH
CLOSES ON INCREASING FLOW

TEMPERATURE SWITCH
OPENS ON INCREASING TEMPERATURE

TEMPERATURE SWITCH
CLOSES ON INCREASING TEMPERATURE

NORMALLY OPEN RELAY CONTACT
RELAY IS DE ENERGIZED AND SITTING "ON THE SHELF."

NORMALLY CLOSED RELAY CONTACT
RELAY IS DE ENERGIZED AND SITTING "ON THE SHELF."

NORMALLY OPEN PUSHBUTTON
PUSH TO CLOSE

NORMALLY CLOSED PUSHBUTTON
PUSH TO OPEN

DOUBLE POLE SELECTOR SWITCH WITH MECHANICAL LINK.
WHEN TOP SWITCH CLOSES, BOTTOM SWITCH OPENS.

DOUBLE POLE SELECTOR SWITCH WITH MECHANICAL LINK
WHEN TOP SWITCH CLOSES, BOTTOM SWITCH CLOSES.

RSOR
OPENS WHEN DOOR OPENS

CAM TYPE SWITCH
CLOSES WHEN CAM ROTATES

SINGLE POLE SELECTOR SWITCH
TURN TO CLOSE

SINGLE POLE SELECTOR SWITCH
TURN TO OPEN

OL'S — MOTOR CONTACTOR THERMAL OVERLOADS
OPEN ON INCREASING CURRENT

AUTO / OFF / HAND — HAND-OFF-AUTOMATIC SELECTOR SWITCH

10-1 — TERMINAL BLOCK CONNECTION
TERMINAL BLOCK 10, TERMINAL CONNECTION 1.

5A — FIVE AMPERE FAST BLOWING FUSE

(L) — INDICATING LIGHT

(R) — RELAY COIL

(TDR) — TIME DELAY RELAY COIL

(M) — MOTOR CONTACTOR COIL

(SOV) — SOLENOID OPERATED VALVE COIL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

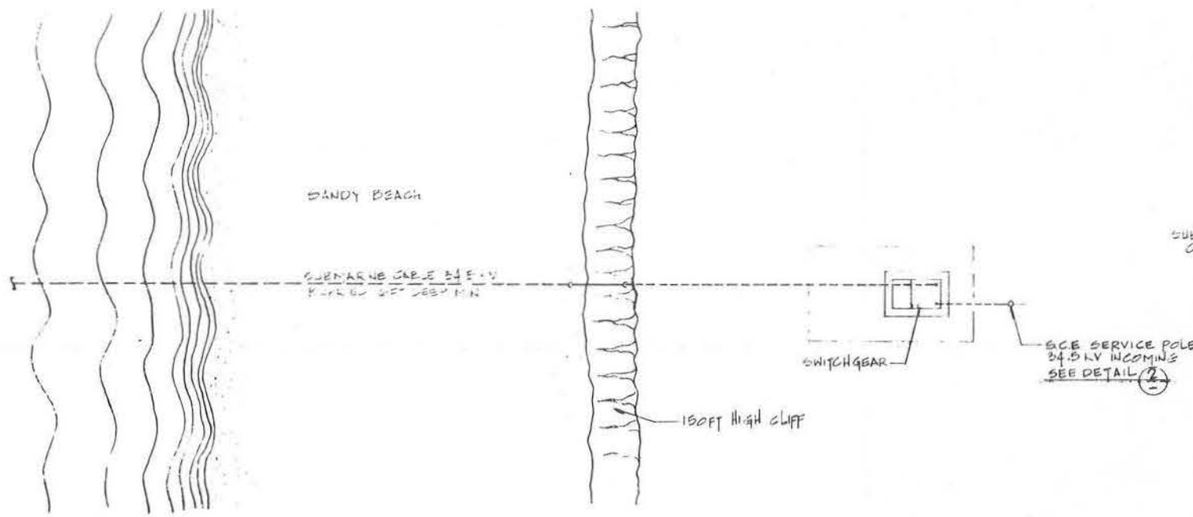
ELECTRICAL SYMBOLS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

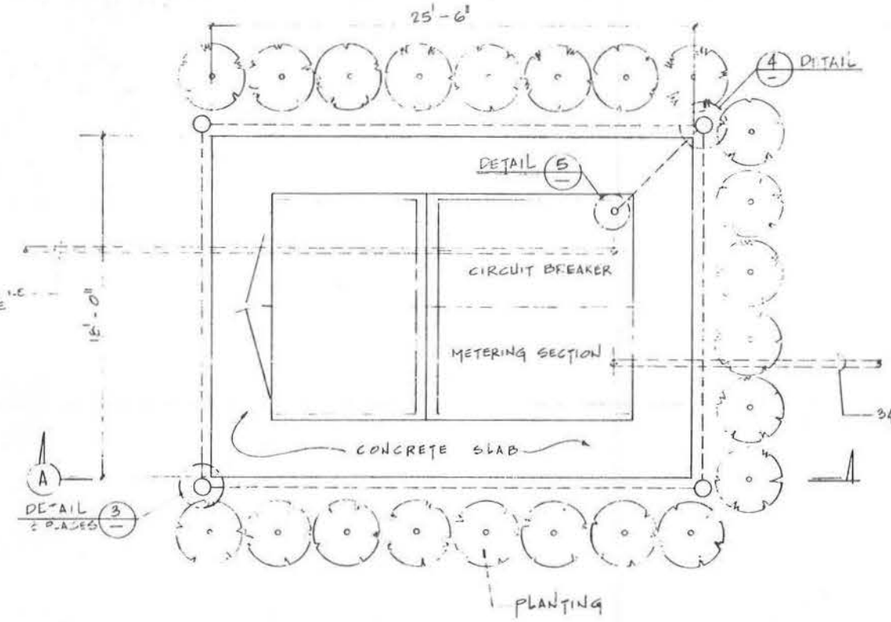
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN DOA | CHECKED | EXAM. SECTION | APPROVED | SCALE NONE | DATE 7-22-71

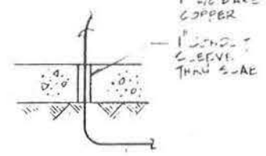
084-316

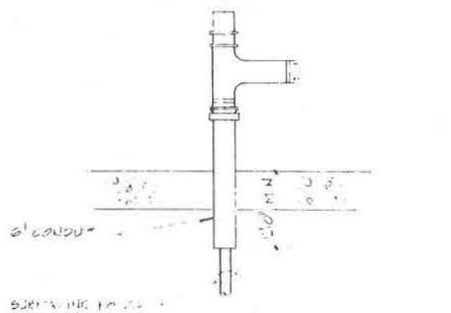


PLOT PLAN
1" = 80'

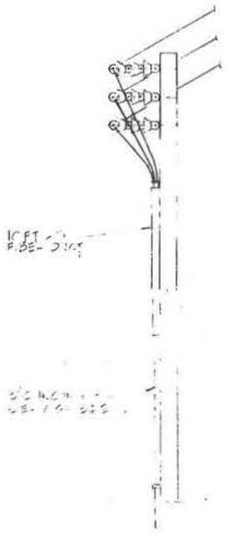


PLAN
1/4" = 1'-0"

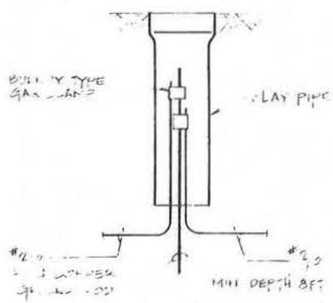




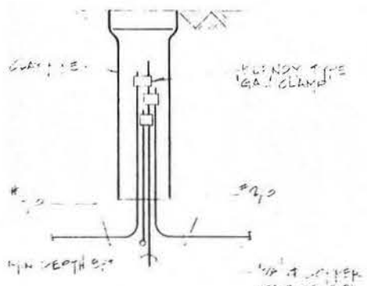
DETAIL 1



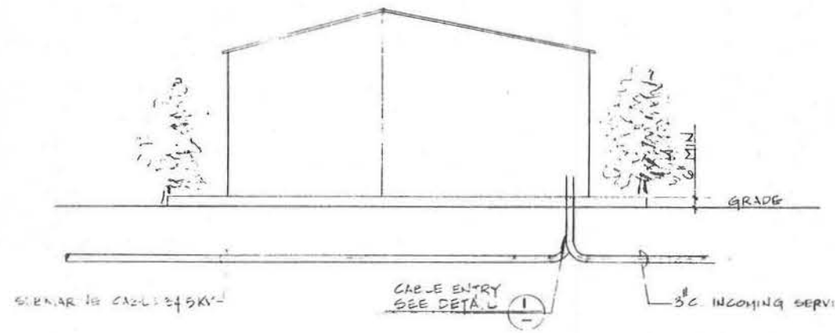
DETAIL 2



DETAIL 3
(TYPICAL 2)



DETAIL 4



SECTION A
1/2" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

SUBSTATION ARRANGEMENT FOR OFFSHORE METERING

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

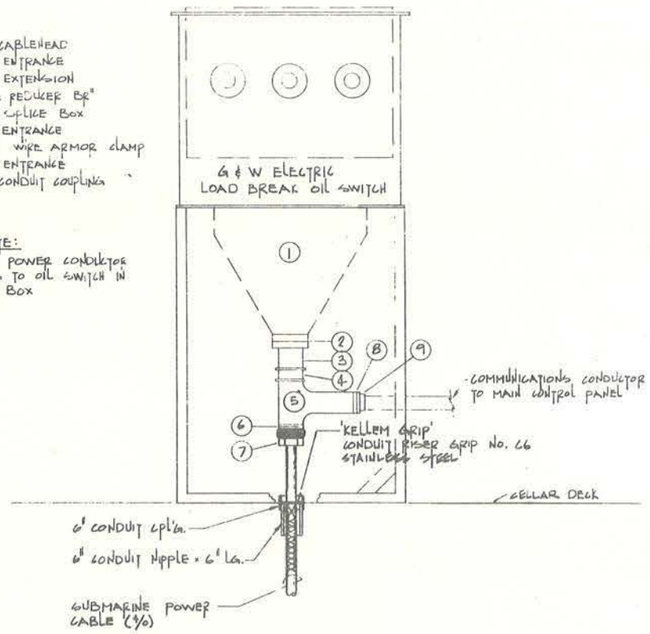
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: WEESTEK
CHECKED:
ENGR. SECTION:
APPROVED:
SCALE: NOTED
DATE: 7-22-71

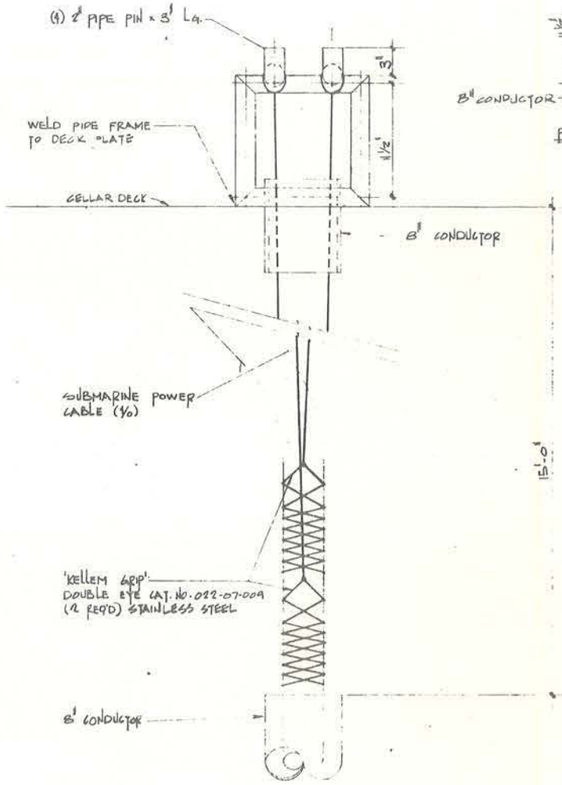
084-318

1. 3/c CABLEHEAD
2. DP" ENTRANCE
3. EE" EXTENSION
4. BASE REDUCER BR"
5. E74 SPLICE BOX
6. DP' ENTRANCE
7. WAF WIRE ARMOR CLAMP
8. DP' ENTRANCE
9. 6' CONDUIT COUPLING

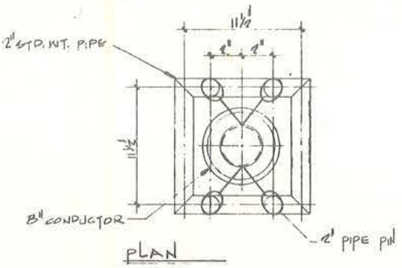
NOTE:
GROUND POWER CONDUCTOR SHIELDS TO OIL SWITCH IN SPLICE BOX



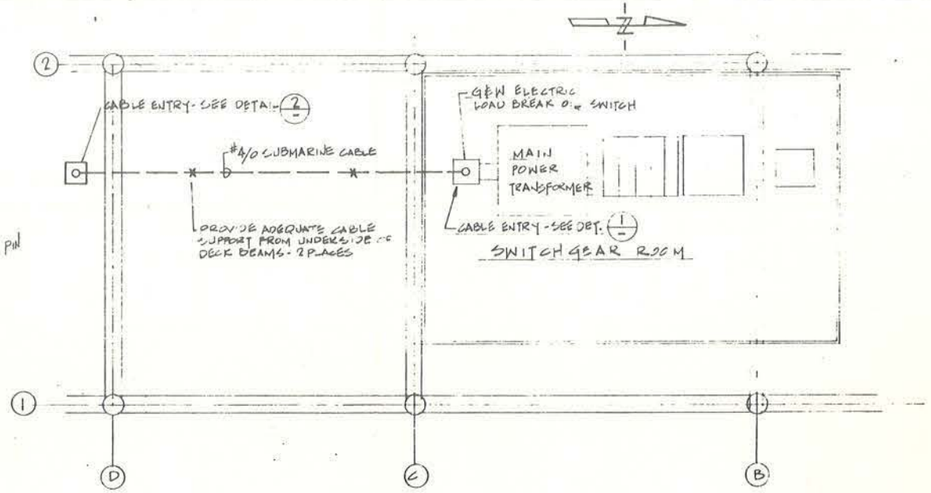
SUBMARINE CABLE ENTRY TO LOAD BREAK SWITCH
DETAIL (1/-)



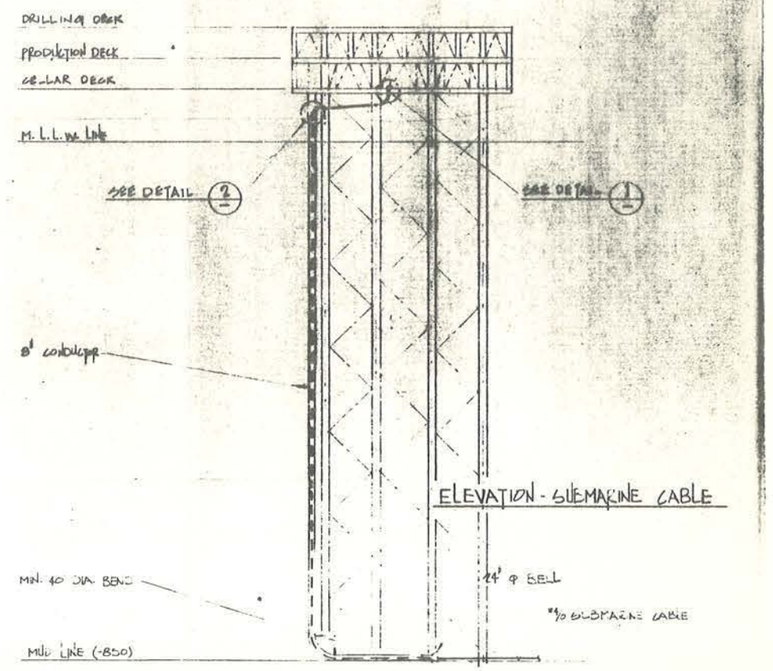
DETAIL (2/-)



PLAN



SUBMARINE CABLE ENTRY - PLAN



ELEVATION - SUBMARINE CABLE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

345 KV SUBMARINE POWER CABLE FEEDER DETAILS

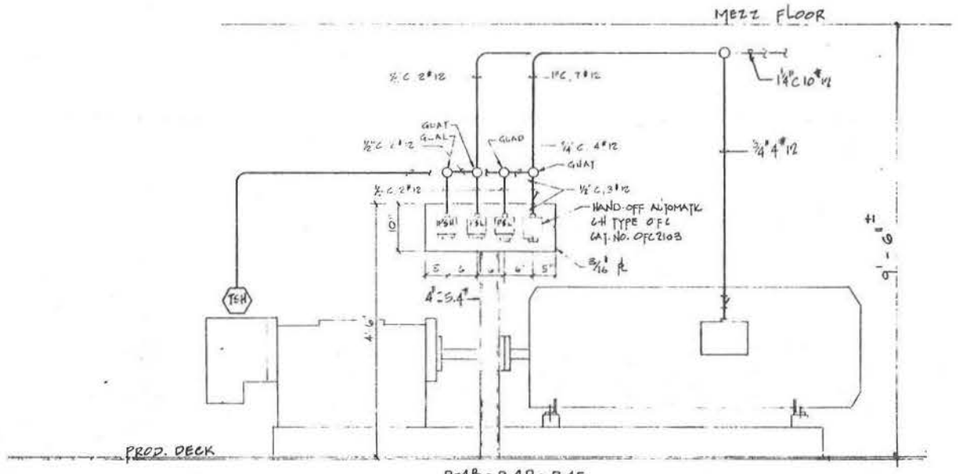
DRAWN EVE | ENGR. SECTION | APPROVED | CHECKED | SCALE 3/16" | DATE July 7,

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

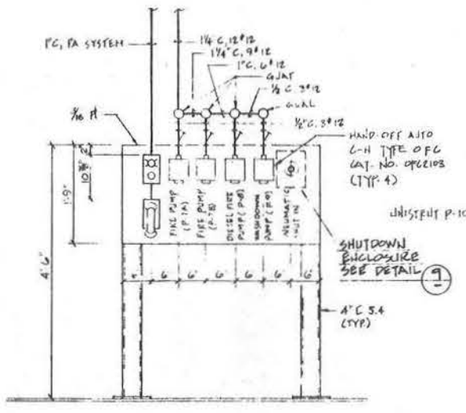
084-319

REV. 1



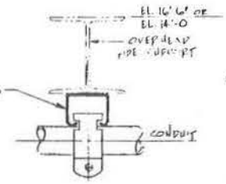
SHIPPING PUMP CONTROL PANEL
(TYPICAL 3)

DETAIL 1 / 323



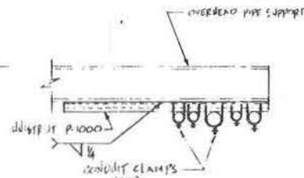
EMERGENCY SHUTDOWN PANEL - TYPE II

DETAIL 2 — 3/4" = 1'-0" — 321 THRU 329



CONDUIT SUPPORT

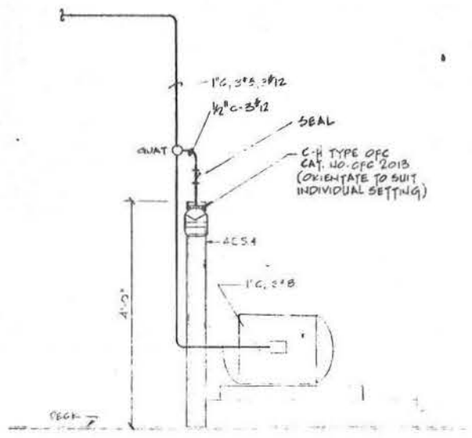
DETAIL 3 — N.T.S.



CLAMP SCHEDULE	
CONDUIT SIZE	CLAMP NO
1/2"	P-1111
3/4"	P-1112
1"	P-1113
1 1/4"	P-1114
1 1/2"	P-1115
2"	P-1117
2 1/2"	P-1118
3"	P-1119
3 1/2"	P-1120
4"	P-1121

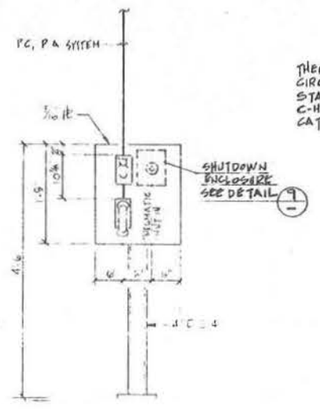
1" HIGH WHITE LETTERING

8"x6"x4" DEEP HINGED COVER NEMA I ENCLOSURE HOFFMAN NO. A6N64 PAINT RED



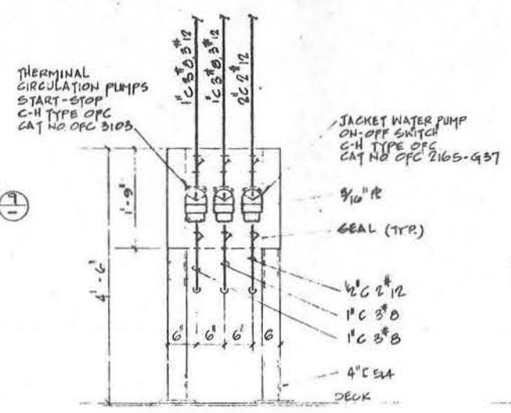
WATER EFFLUENT PUMPS

DETAIL 4 — 1/4" = 1'-0"



EMERGENCY SHUTDOWN PANEL - TYPE I

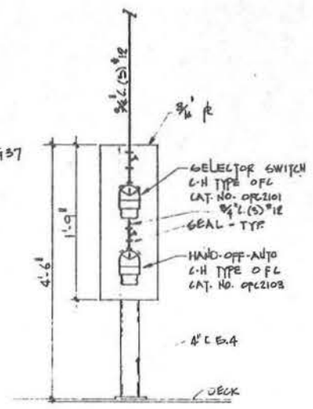
DETAIL 5 — 3/4" = 1'-0" — 321 THRU 329



THERMINOL PUMPS & JW. PUMP

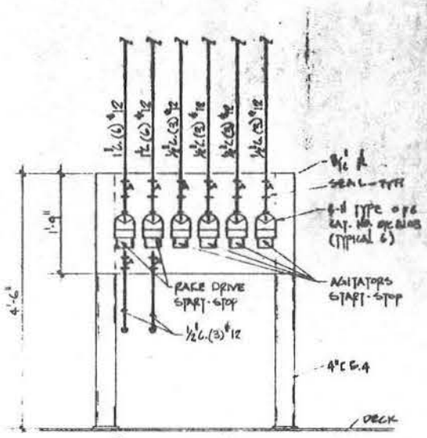
DETAIL 6 — 3/4" = 1'-0" — 326

DETAIL 9



DIESEL TRANSFER PUMPS

DETAIL 7 — 3/4" = 1'-0" — 323-324



FLOTATION UNIT

DETAIL 8 — 3/4" = 1'-0" — 327

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL DETAILS

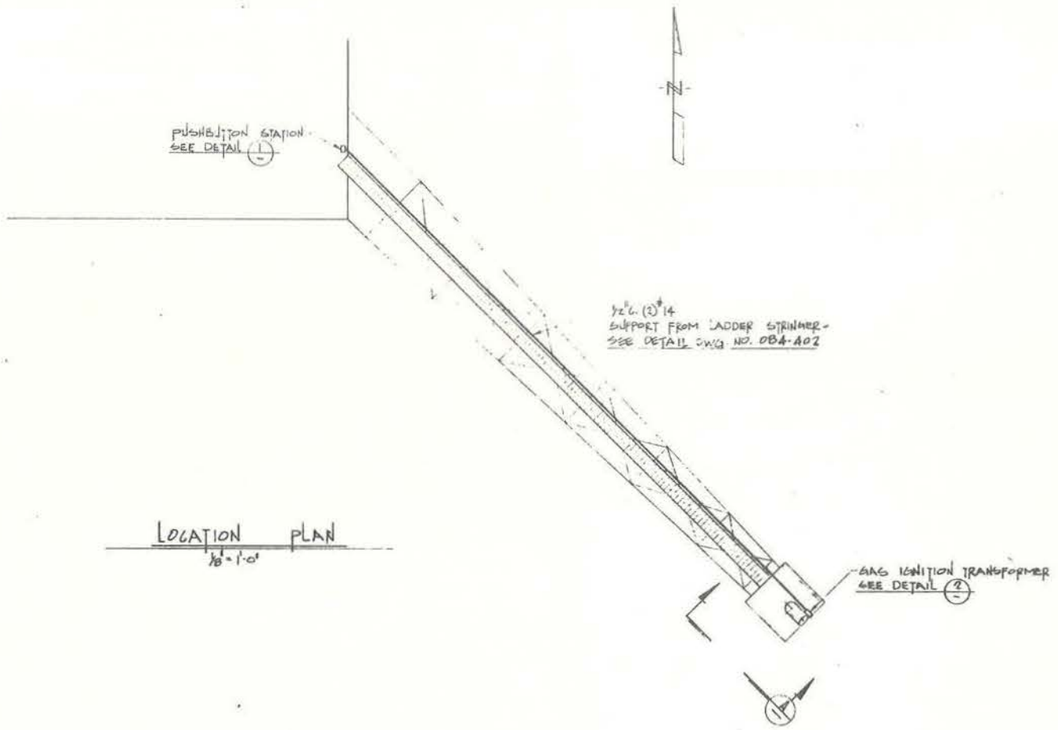
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

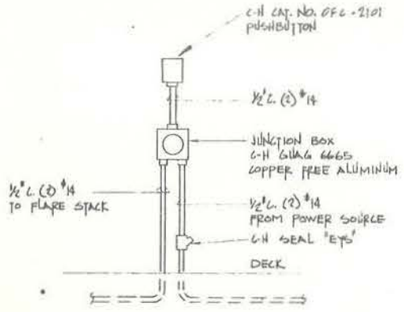
NO.	DATE	REVISIONS	BY	CHK.	APPR.

DRAWN RDA. CHKD. SECTION CHKD. APPROVED SCALE NOTED DATE 7-22-71

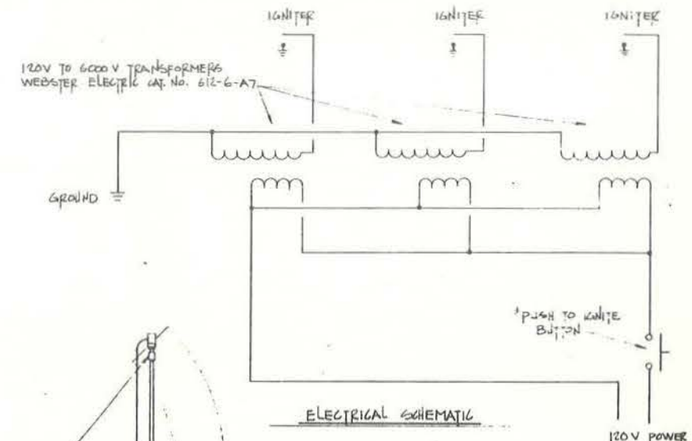
084-338



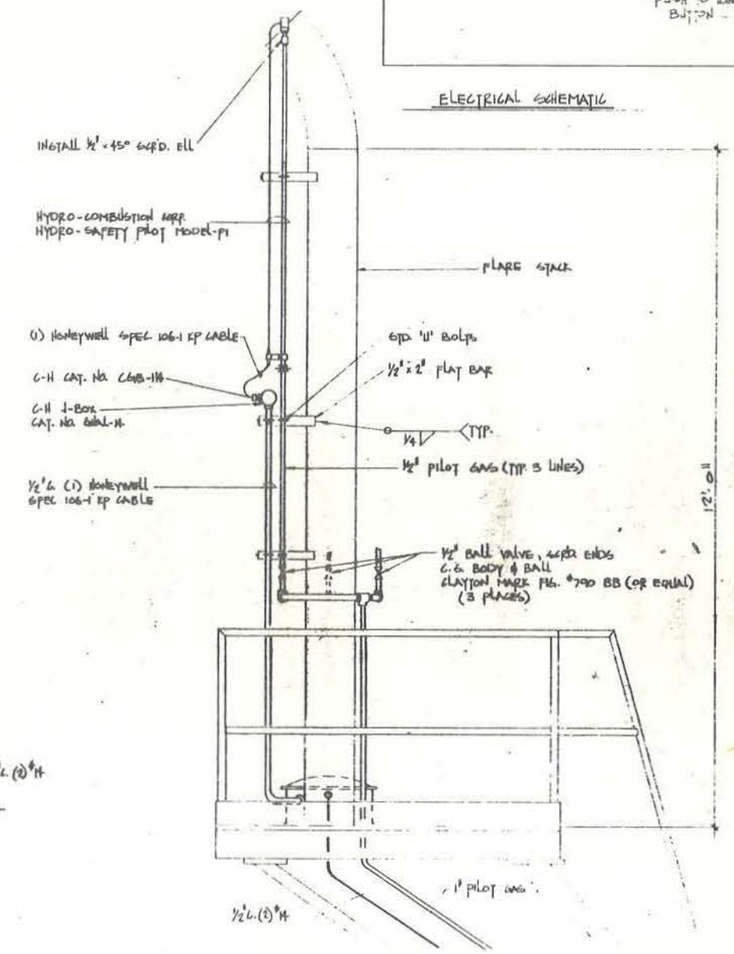
LOCATION PLAN
⅛" = 1'-0"



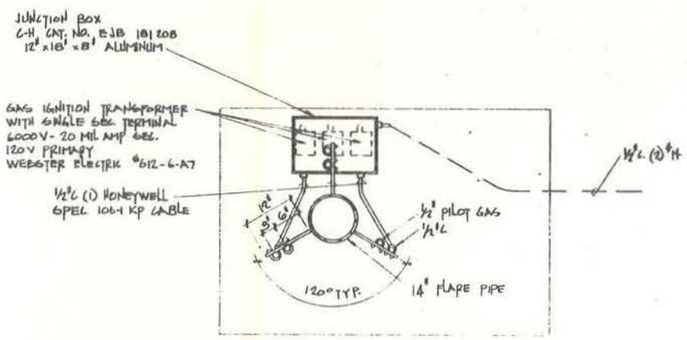
DETAIL 1
N.T.S.



ELECTRICAL SCHEMATIC



SECTION A
¾" = 1'-0"



DETAIL 2
¾" = 1'-0"

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

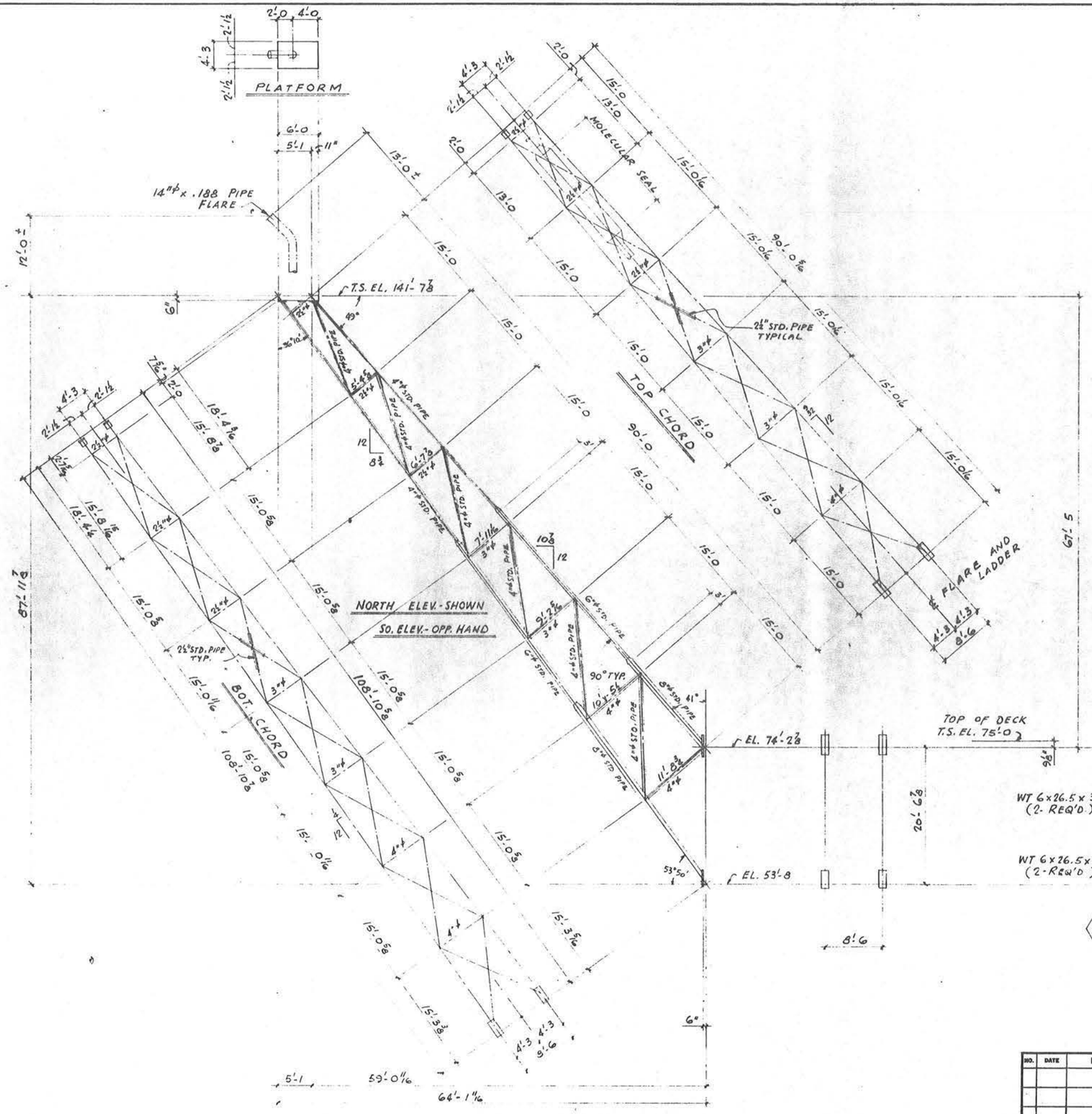
FLARE STACK
ELECTRICAL DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN E. BEITZ | CHECKED | ENGR. SECTION | APPROVED | SCALE AS SHOWN | DATE | 084-340

REV. 1



GENERAL NOTES

1. ALL DESIGN, WORKMANSHIP & MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE UNIFORM BUILDING CODE, 1971 EDITION; INDUSTRIAL SAFETY ORDERS OF THE STATE OF CALIFORNIA AND THE U.S. GOVERNMENT.
2. FABRICATION & ERECTION SHALL CONFORM TO THE REQUIREMENTS OF THE MANUAL OF STEEL CONSTRUCTION; AISC SEVENTH EDITION.
3. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36
4. STEEL PIPE SHALL BE GRADE "B" AND CONFORM TO ASTM A53 OR API 5L.
5. ALL SHOP CONNECTIONS SHALL BE WELDED OR ¾"ϕ HIGH STRENGTH BOLTS (A 325-X) UNLESS OTHERWISE SHOWN OR NOTED ON THE DRAWINGS.
7. ALL STRUCTURAL STEEL AND MISC. IRON SHALL RECEIVE ONE SHOP COAT OF PAINT PER SPEC. 10-08+C2.
8. ALL WELDS UNLESS OTHERWISE SHOWN OR NOTED SHALL BE FULL PENETRATION WELDS. WELDS SHALL BE CONTINUOUS. (NO SKIPWELDING)

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

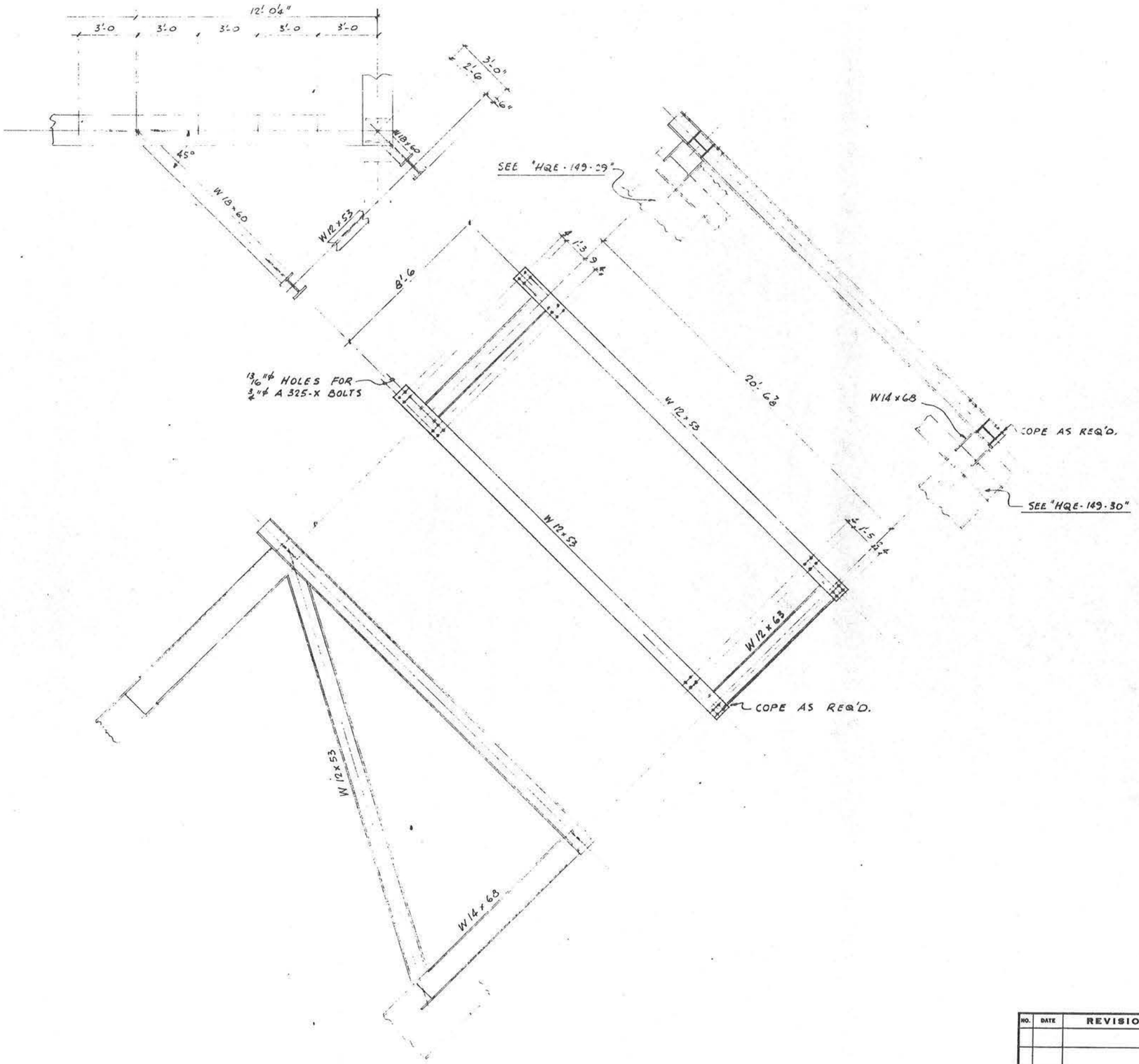
RIGID FLARE STACK
STRUCTURAL LAYOUT

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN EJL | DESIGN. SECTION | SCALE 1/8"=1'-0"
CHECKED | APPROVED | DATE 7-22-71

084-400



NOTES

1. FOR GENERAL NOTES SEE DRAWING
2. PLATFORM FRAMING MEMBERS & ELEMENTS MUST BE REINFORCED (AS REQUIRED) TO RESIST:
   HORIZONTAL FORCE OF 58^{k} AT EACH CONNECTION
   VERTICAL FORCE OF 12^{k} AT EACH CONNECTION
3. ALL WELDS TO BE FULL PENETRATION WELDS.

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

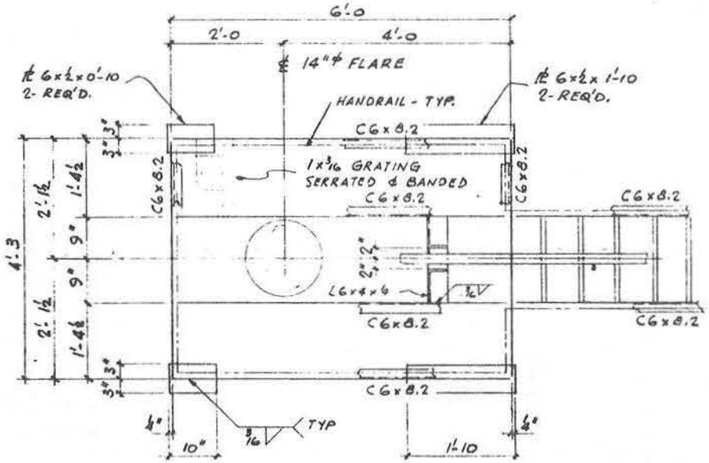
RIGID FLARE STACK
STRUCTURAL DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

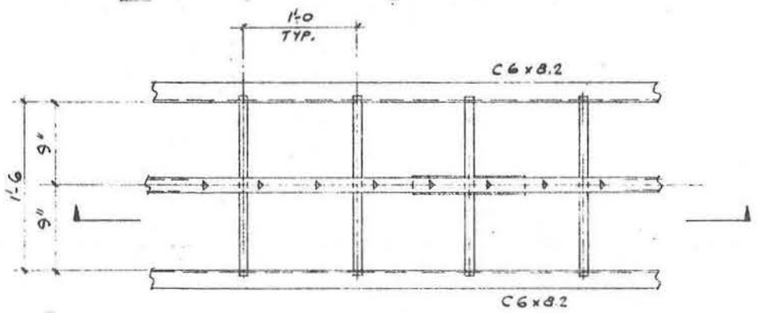
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN EL | ENGR. SECTION | SCALE 3/8"=1'-0"
CHECKED | APPROVED | DATE 7-22-71

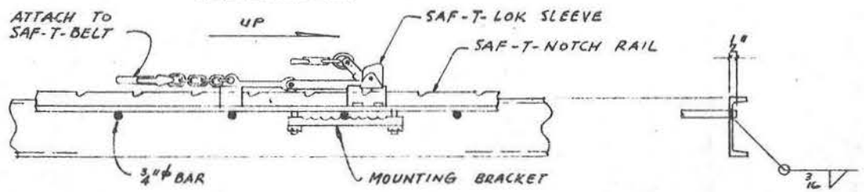
084-401



PLAN - T.S. ELEV. 141'-7⅞"



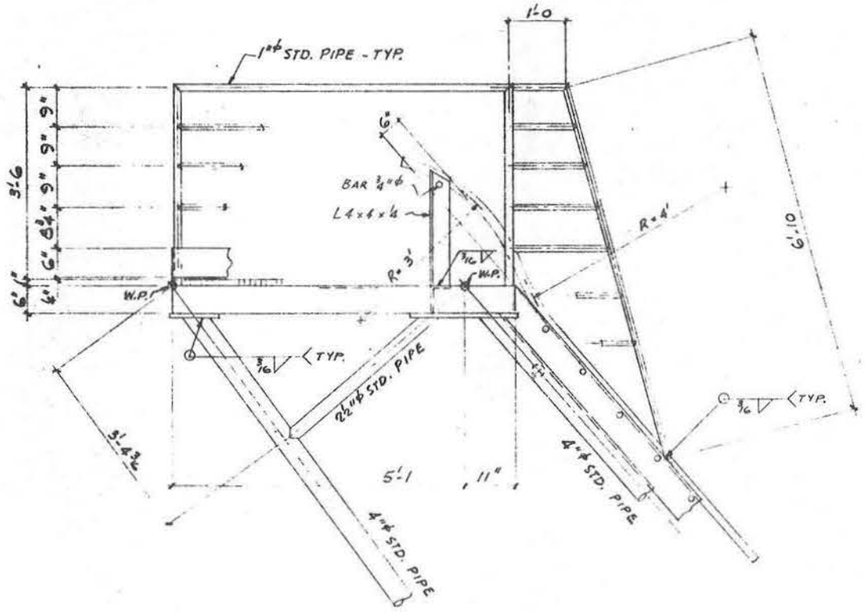
PLAN



SECTION

LADDER & SAF-T-CLIMB DETAIL

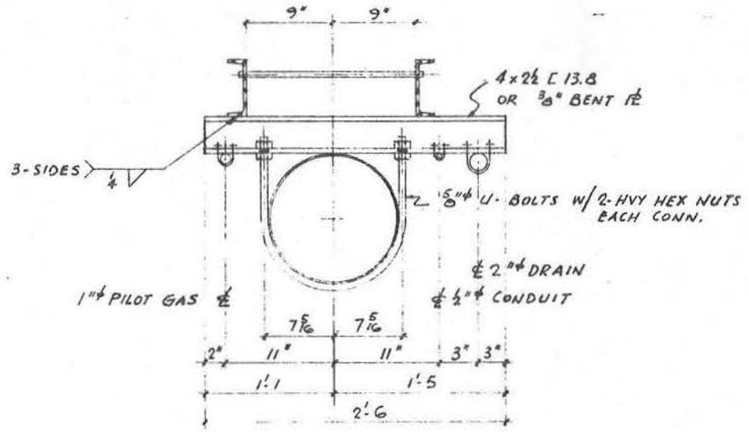
1½" = 1'-0



ELEVATION

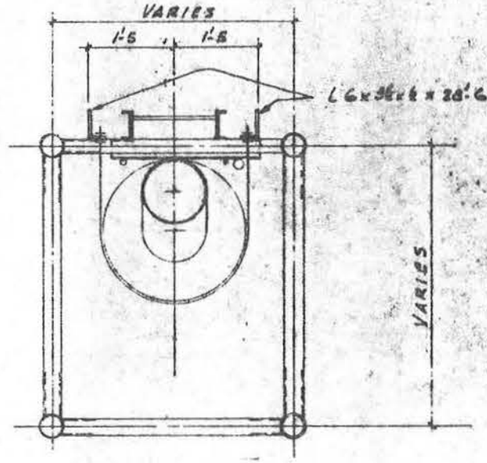
FLARE MAINTENANCE PLATFORM

¾" = 1'-0



TYPICAL · PIPE SUPPORT

1½" = 1'-0



MOLECULAR SEAL SUPPORT

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

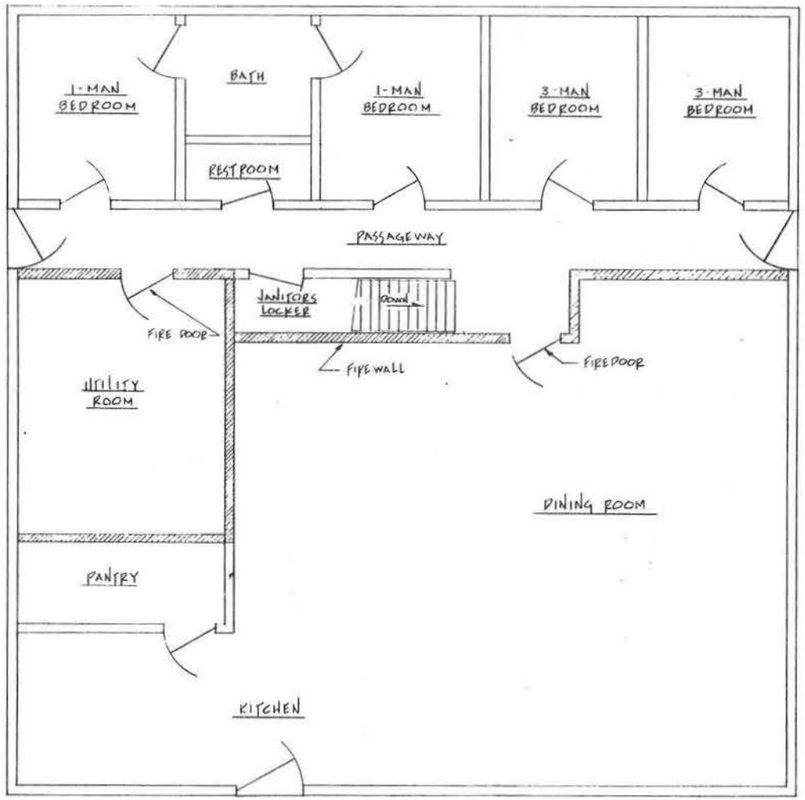
RIGID FLARE STACK
STRUCTURAL DETAILS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

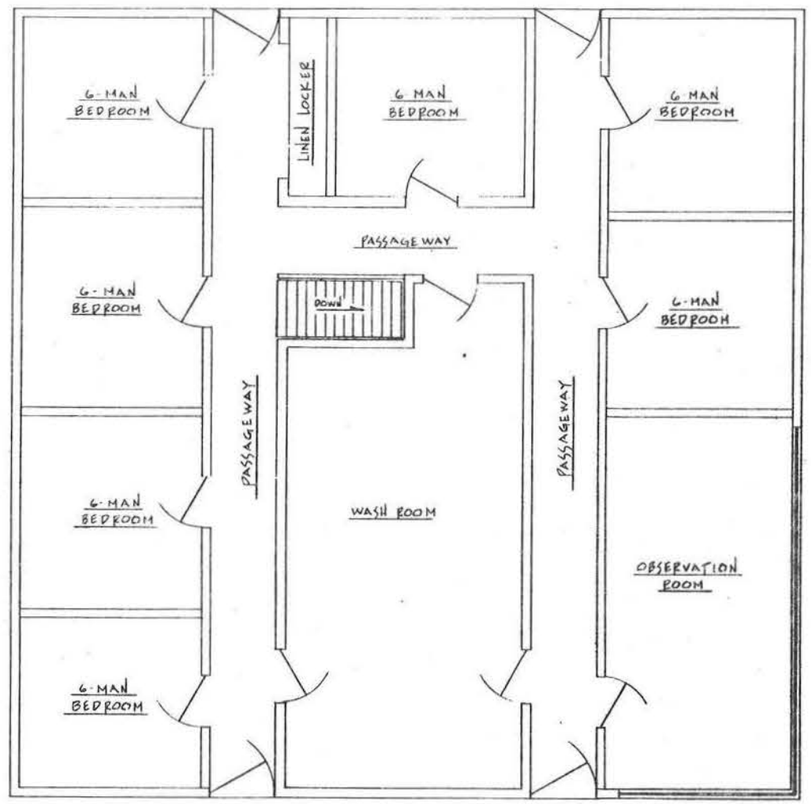
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DESIGN D.L. | DWG. SECTION | ENGINEER | APPROVED | SCALE 1½"=1'-0 | DATE 7-22-71

084-402



FIRST FLOOR PLAN



SECOND FLOOR PLAN

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

CREWS QUARTERS
FLOOR PLAN

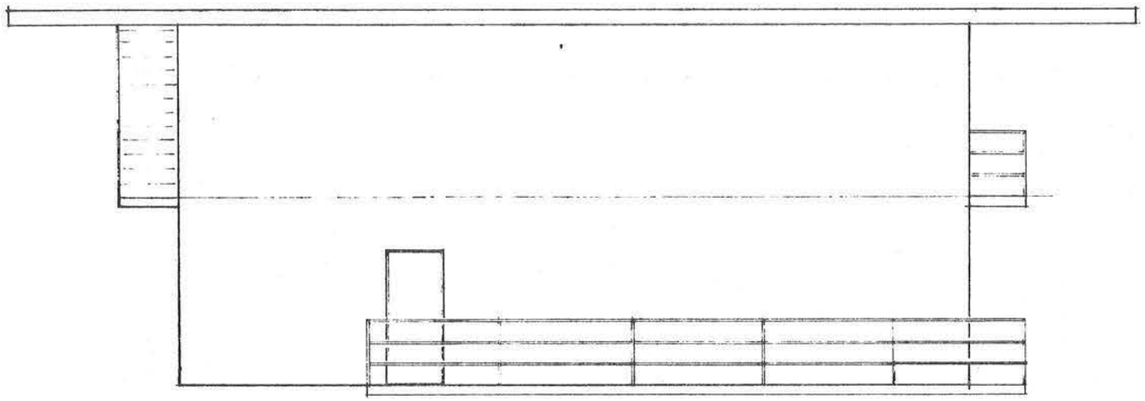
DRAWN DDA
CHECKED
DESIGN, SECTIONS
APPROVED

SCALE 1/4" = 1'-0"
DATE 7-22-71

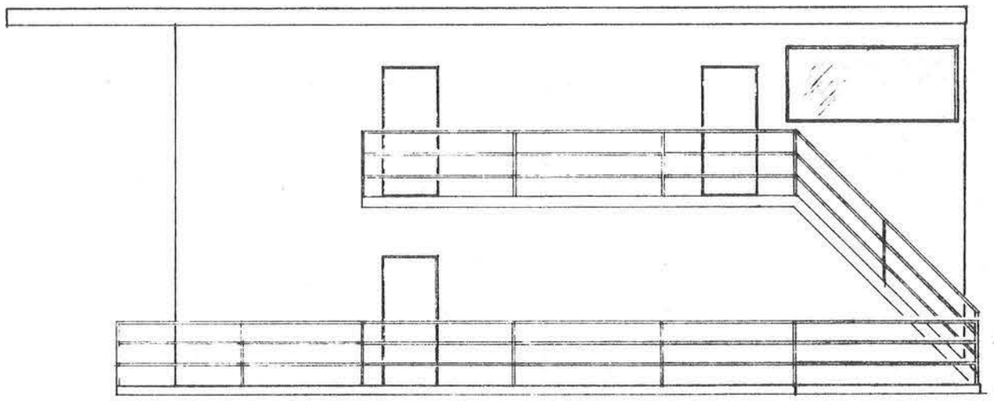
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

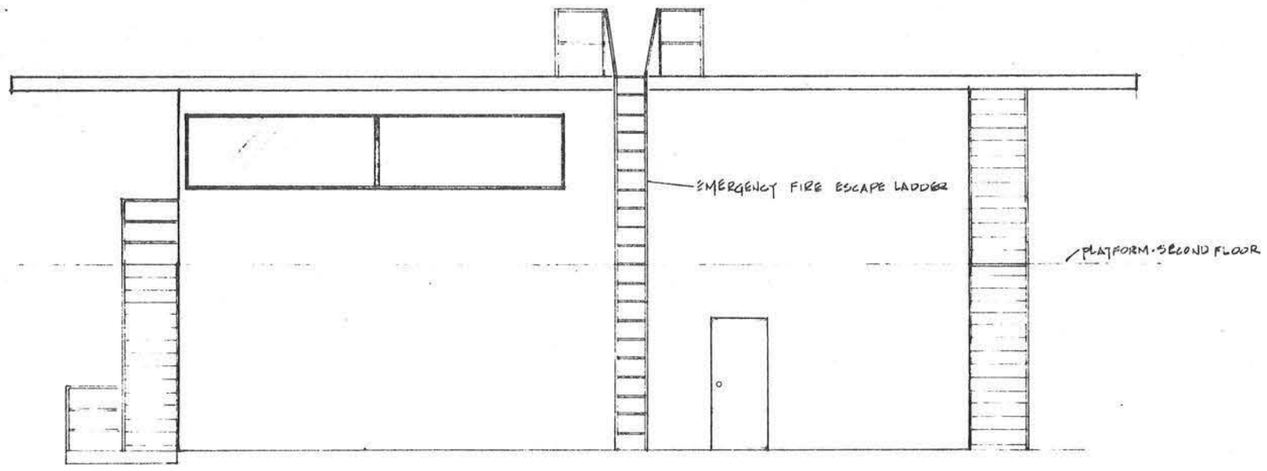
084-403



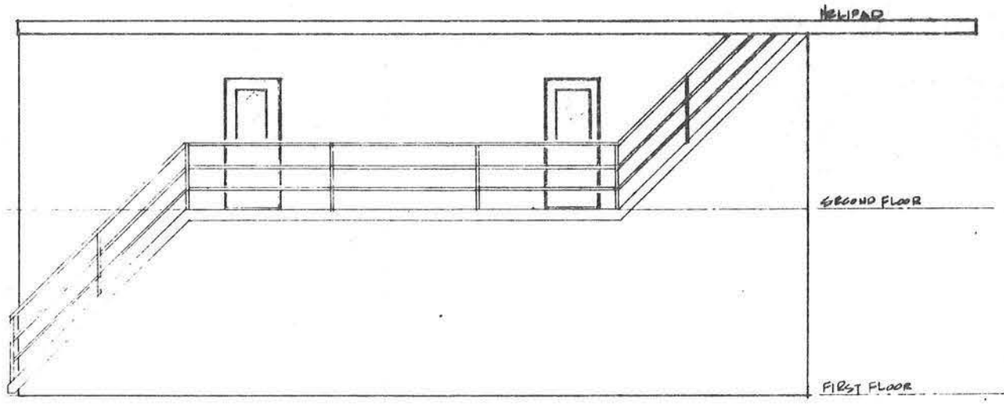
WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION



NORTH ELEVATION

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORE
SANTA BARBARA CHANNEL

CREWS QUARTERS
EXTERIOR ELEVATIONS

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: TZAUCH | ENGR. SECTION: | SCALE: 1/8" = 1'-0"
CHECKED: | APPROVED: | DATE: 7-22-71

084-404

INDEX

CUSTOMER	PROJECT NO.	REVISION NO.	DATE	SHEET OF
HUMBLE OIL & REFINING COMPANY	10-154			1 3
LOCATION		REVISION DATE	PROJECT ENGINEER	ACCT. NO.
OFFSHORE VESSEL				

EQUIPMENT NO.	SPEC. NO.	DESCRIPTION	REMARKS	SECT. NO.	VENDOR
V-1	10-154-FS	FLOWSPLITTER	12'-0" O.D. x 50'-0" S/S 150 psig D.P. @ 250°F	2.1	
V-2A	10-154-HT	HEATER TREATER	12'-0" O.D. x 50'-0" S/S 150 psig D.P. @ 250°F	2.3	
V-2B	10-154-HT	HEATER TREATER	12'-0" O.D. x 50'-0" S/S 150 psig D.P. @ 250°F	2.3	
V-2C	10-154-HT	HEATER TREATER	12'-0" O.D. x 50'-0" S/S 150 spig D.P. @ 250°F	2.3	
V-2D	10-154-HT	HEATER TREATER	12'-0" O.D. x 50'-0" S/S 150 psig D.P @ 250°F	2.3	
P1A	10-154-P1A	EFFLUENT WATER PUMP	750 gpm @ 65 ft. diff. head 25HP	3.2	
P1B	10-154-P1A	EFFLUENT WATER PUMP	750 gpm @ 65 ft. diff. head 25HP	3.2	
P5A	10-154-P5A	OIL SUMP PUMP	15 gpm @ 100 psi ΔP 5HP	3.1	
P5B	10-154-P5A	OIL SUMP PUMP	15 gpm @ 100 psi ΔP 5HP	3.1	
T-1	T-2	CLEAN WATER SURGE TANK	9'-2 3/4" O.D. x 16'-1" High API 650 Welded	3.1	

CUSTOMER	PROJECT NO.	REVISION NO.	DATE	SHEET OF
HUMBLE OIL & REFINING COMPANY	10-154			2 3
LOCATION		REVISION DATE	PROJECT ENGINEER	ACCT. NO.
OFFSHORE VESSEL				

EQUIPMENT NO.	SPEC. NO.	DESCRIPTION	REMARKS	SECT. NO.	VENDOR
T-2	T-2	WATER SURGE TANK	9'-2 3/4" O.D. x 16'-1" High API 650 Welded	3.1	
T-3	10-154-T3	OIL SUMP	5'-0" O.D. x 8'-0" S/S 25 psig D.P. @ 100°F	3.1	
T-4	T-2	SALT WATER COOLING TANK	9'-2 3/4" O.D. x 16'-0" High API 650 Welded	3.1	
	10-154-FLOU	FLOTATION UNIT	8'-0" x 30'-0" 25,725 B/D	3.2	
GC-1A	10-154-GC-1	VAPOR COMPRESSOR	50 MSCFD @ 5 psig	4.0	
GC-1B	10-154-GC-1	VAPOR COMPRESSOR	50 MSCFD @ 5 psig	4.0	
E1A	10-154-E1A	EMULSION HEATER	24" O.D. x 20'-0" Lg. Max. 275 psig @ 100°F	2.2	
E1B	10-154-E1A	EMULSION HEATER	24" O.D. x 20'-0" Lg. Max. 275 psig @ 100°F	2.2	
E1C	10-154-E1A	EMULSION HEATER	24" O.D. x 20'-0" Lg. Max. 275 psig @ 100°F	2.2	
E1D	10-154-E1A	EMULSION HEATER	24" O.D. x 20'-0" Lg. Max. 275 psig @ 100°F	2.2	

CUSTOMER	PROJECT NO.	REVISION NO.	DATE	SHEET OF
HUMBLE OIL & REFINING COMPANY	10-154			3 3
LOCATION OFFSHORE VESSEL		REVISION DATE	PROJECT ENGINEER	ACCT. NO.

EQUIPMENT NO	SPEC. NO.	DESCRIPTION	REMARKS	SECT. NO.	VENDOR
E2A	10-154-E2A	DRY OIL COOLER	24" O.D. x 20'-0" Lg. Max. 240 psig D.P. @ 200°F	2.2	
E2B	10-154-E2A	DRY OIL COOLER	24" O.D. x 20'-0" Lg. Max. 240 psig D.P. @ 200°F	2.2	
E2C	10-154-E2A	DRY OIL COOLER	24" O.D. x 20'-0" Lg. Max. 240 psig D.P. @ 200°F	2.2	
E2D	10-154-E2A	DRY OIL COOLER	24" O.D. x 20'-0" Lg. Max. 240 psig D.P. @ 200°F	2.2	

Forecast Data

Pursuant to the Freedom of Information Act (5 U.S.C. 552) and its implementing regulations (43 CFR Part 2) and as provided in 30 CFR 550.199(b), the information contained in this section is deleted from the public information copy of this submission.

Proprietary

Not for Public Release

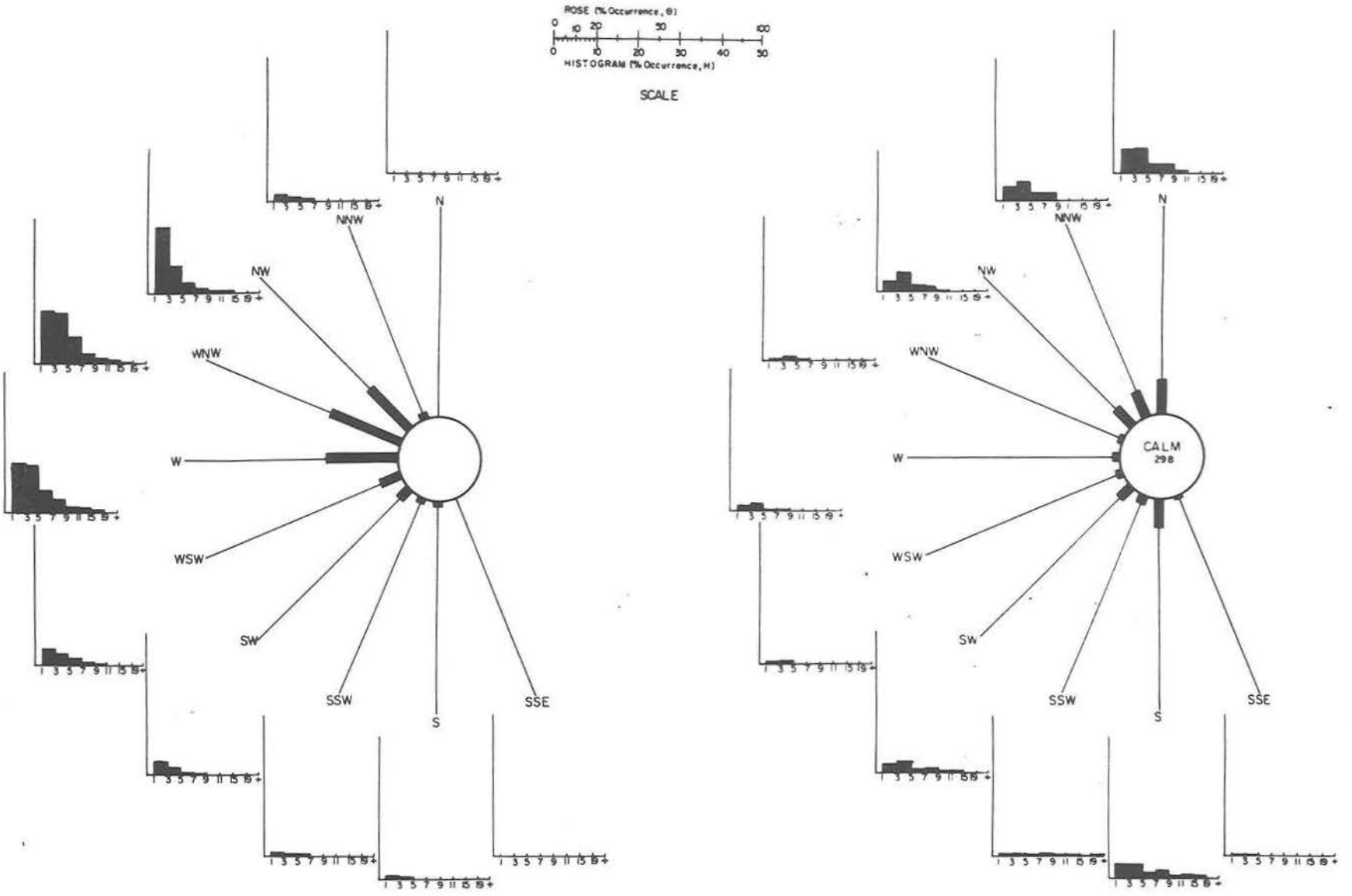


FIGURE: 4

AVERAGE ANNUAL SWELL ROSE FOR STATION I

AVERAGE ANNUAL SEA ROSE FOR STATION I

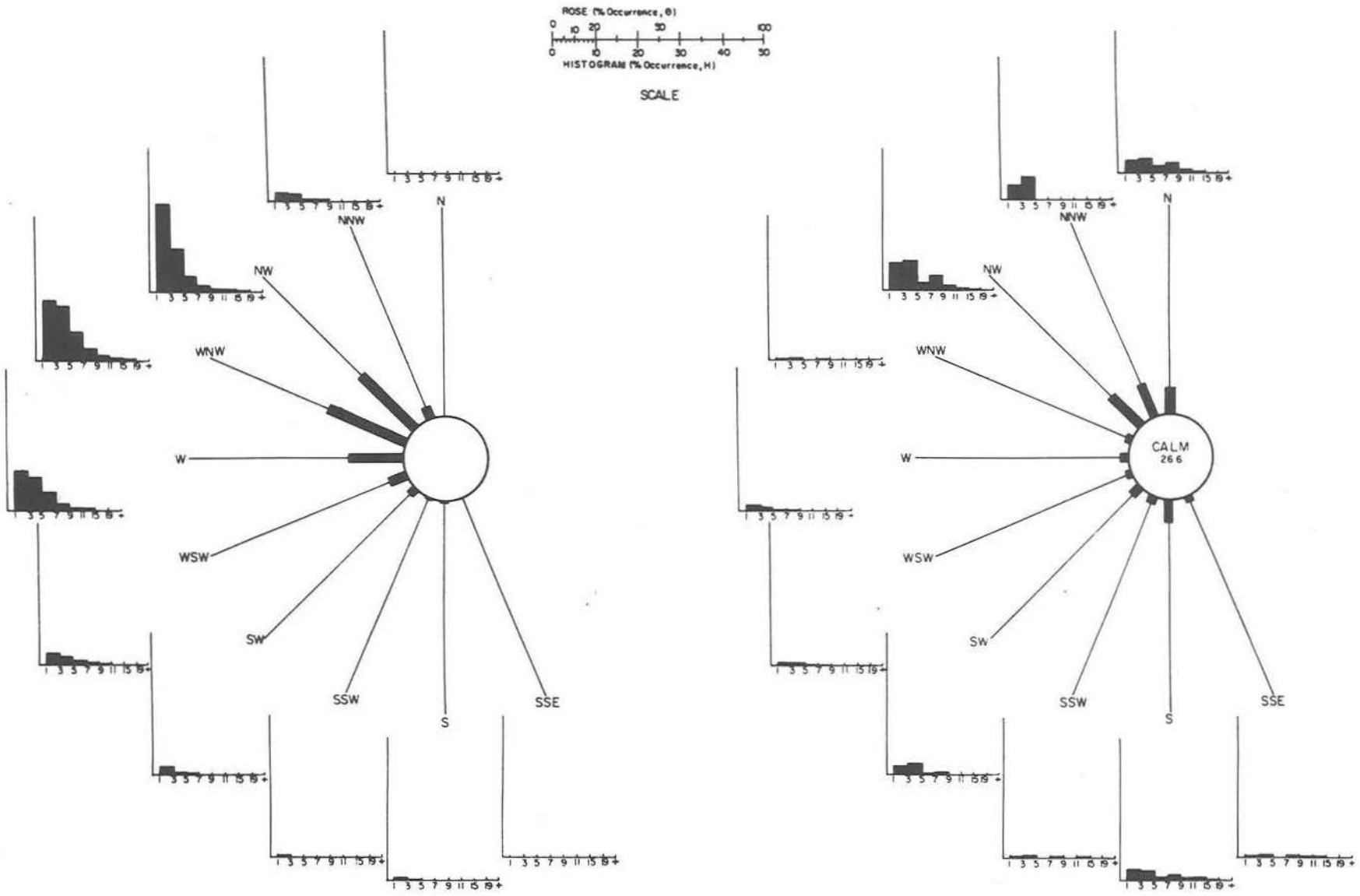
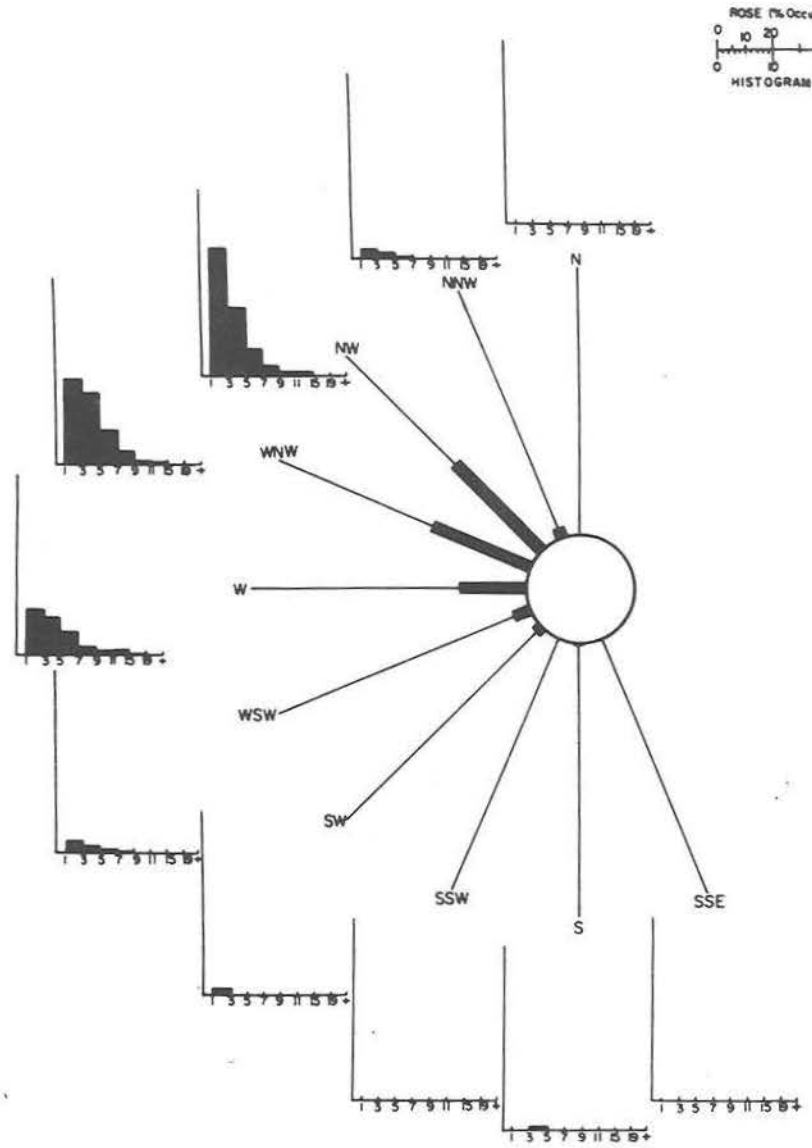
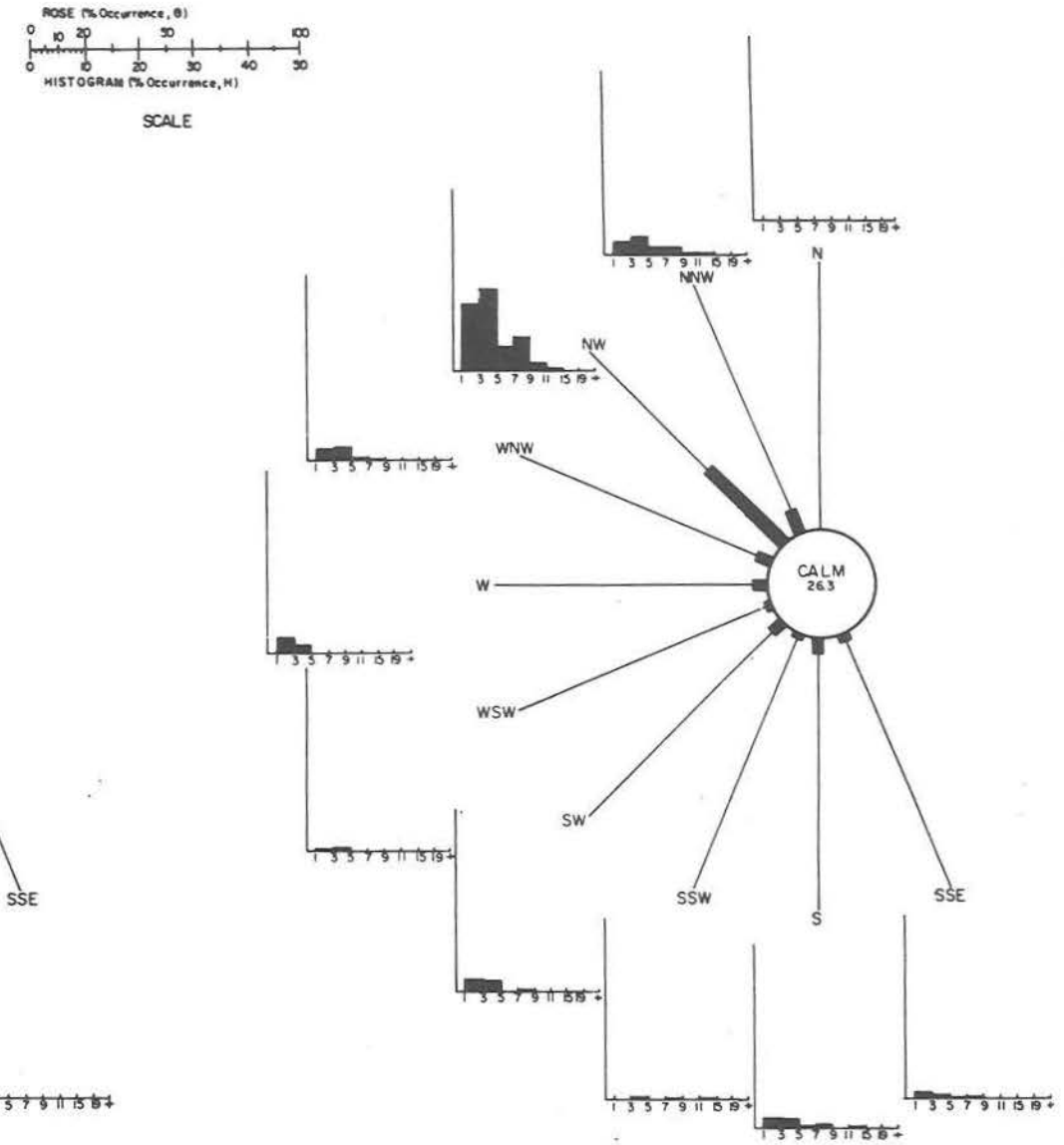


FIGURE: 5

AVERAGE ANNUAL SWELL ROSE FOR STATION 2

AVERAGE ANNUAL SEA ROSE FOR STATION 2





SCALE

FIGURE: 6

AVERAGE ANNUAL SWELL ROSE FOR STATION 3

AVERAGE ANNUAL SEA ROSE FOR STATION 3

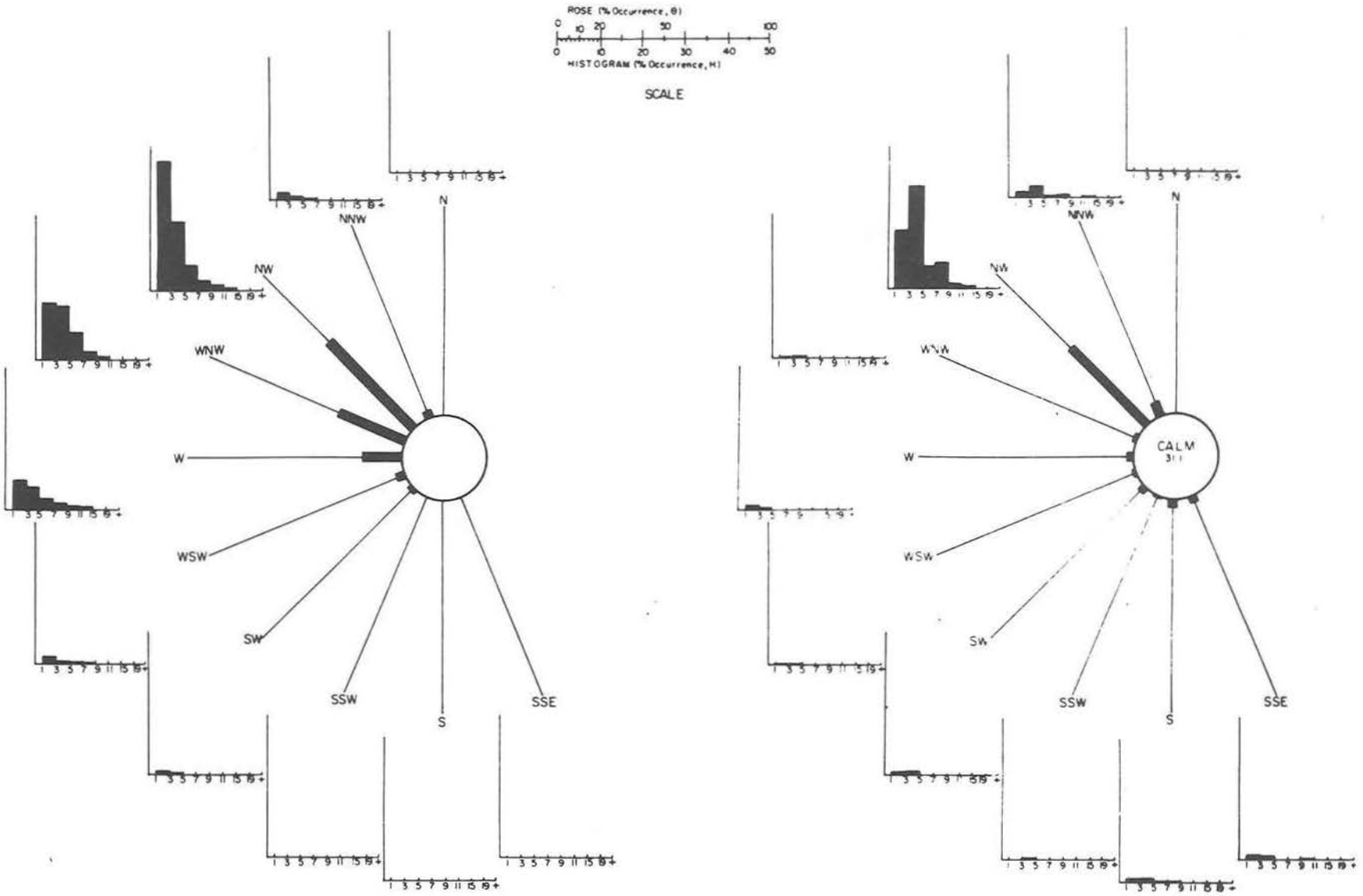


FIGURE: 7

AVERAGE ANNUAL SWELL ROSE FOR STATION 4

AVERAGE ANNUAL SEA ROSE FOR STATION 4

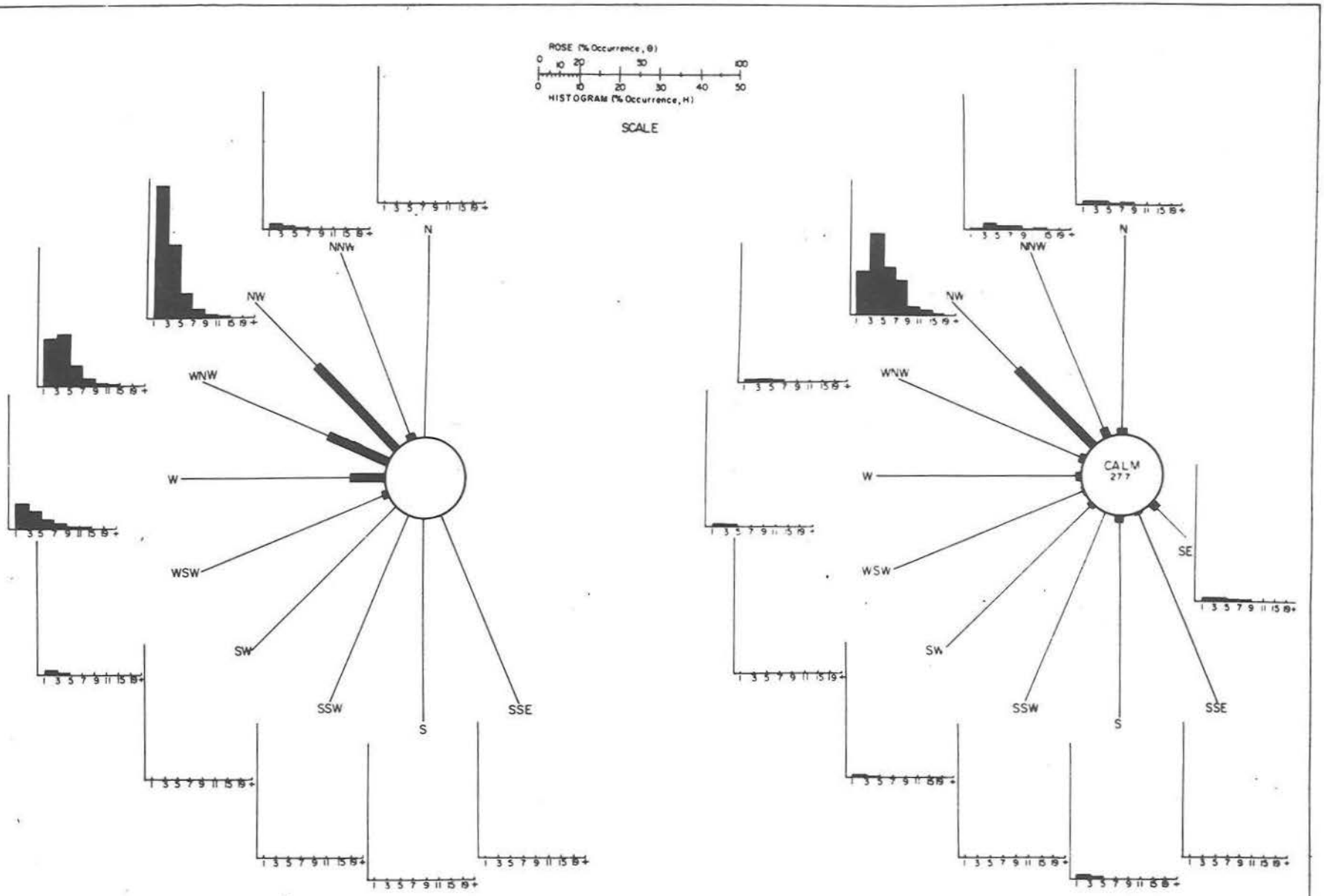


FIGURE: 8

AVERAGE ANNUAL SWELL ROSE FOR STATION 5

AVERAGE ANNUAL SEA ROSE FOR STATION 5

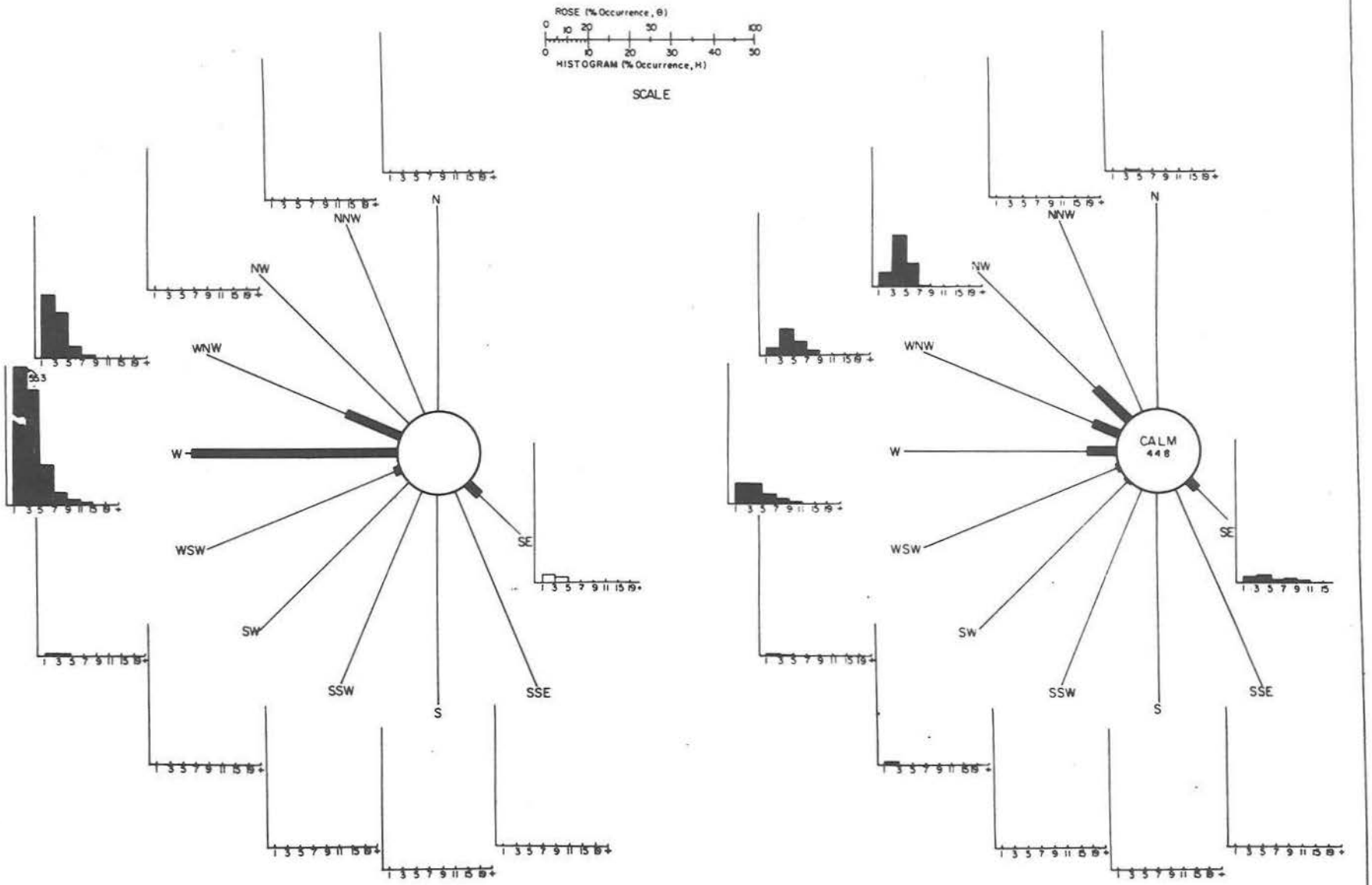


FIGURE: 9

AVERAGE ANNUAL SWELL ROSE FOR STATION 6

AVERAGE ANNUAL SEA ROSE FOR STATION 6

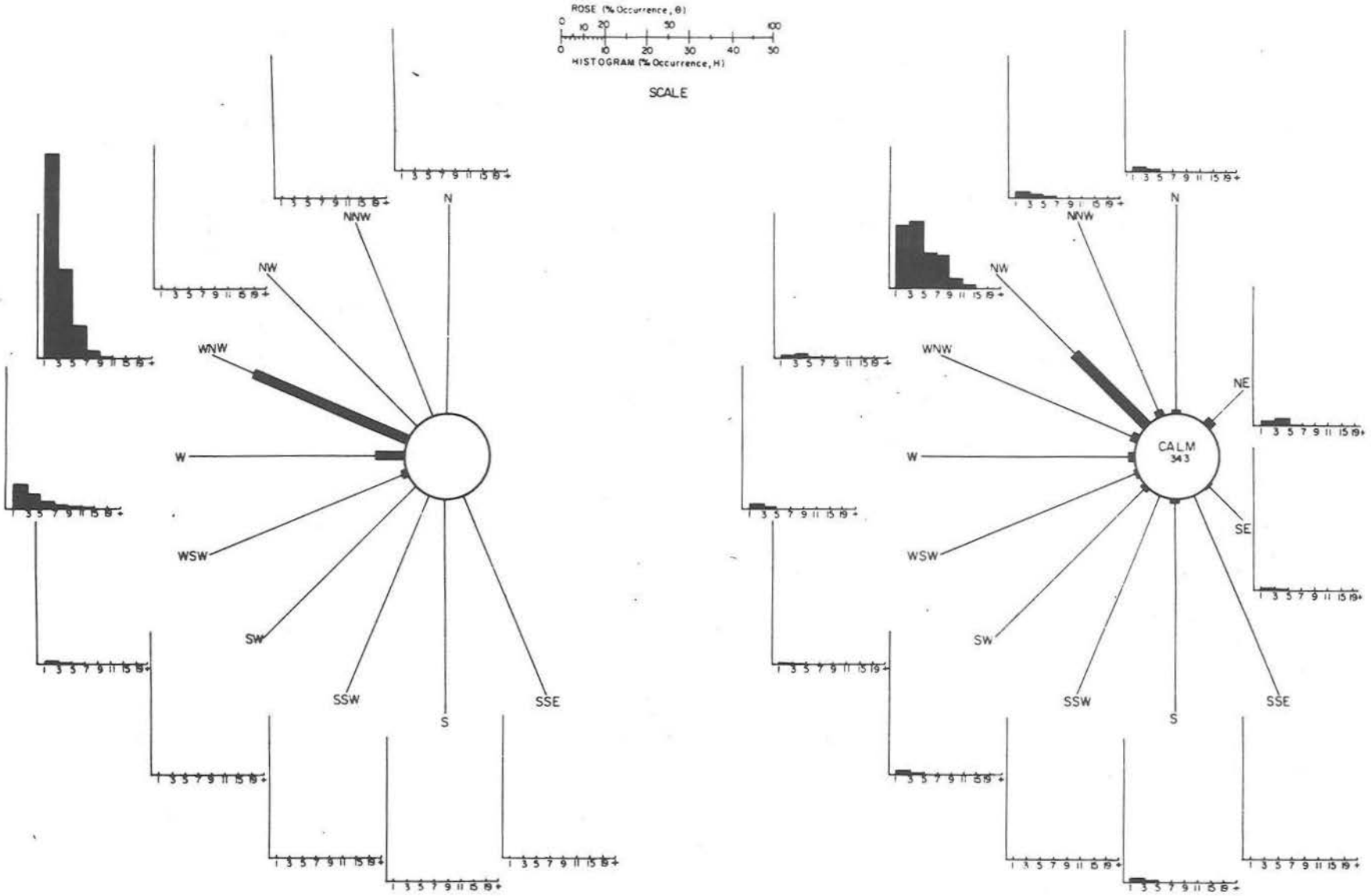


FIGURE: 10

AVERAGE ANNUAL SWELL ROSE FOR STATION 7

AVERAGE ANNUAL SEA ROSE FOR STATION 7

SUPPLEMENTAL PLAN OF OPERATIONS

SANTA YNEZ UNIT

APPENDIX 6.2

Storm Wave Study, Santa Barbara Channel

Oceanographic Services, Inc.

Report #166-2

March, 1969

OCEANOGRAPHIC SERVICES, INC.

OSI#166-2
March 1969
Santa Barbara, California

Prepared For

ESSO PRODUCTION RESEARCH

Submitted By

OCEANOGRAPHIC SERVICES, INC.

STORM WAVE STUDY

SANTA BARBARA CHANNEL

Richard Kent

Approved: Richard Kent, President

TABLE OF CONTENTS

LIST OF FIGURES

STORM WAVE STUDY

SANTA BARBARA CHANNEL

Part 1

PROCEDURES USED TO PREPARE STORM WAVE DATA

It is obvious that the best wave data input for the design of a structure at a given location would be derived from a very long series of wave measurements made at that location. Unfortunately, however, this circumstance essentially never occurs; it is, in fact, a truly rare event that any directly-measured data have been taken at or even near the design site.

The next best procedure involves the use of wave forecasting technology and a long series of meteorological maps to procure the needed information. This approach, when applied by skilled forecasters who have had a great deal of practicing experience in the exact area of interest, yields excellent results. Fortunately,

this is the case for the Santa Barbara Channel area, where OSI forecasters have been working continuously since 1956.

Sources of Data

For this task, the following sources of data were used:

1. Meteorological maps and wave records. Oceanographic Services, Inc., 1956 - 1968.

2. Meteorological maps. U. S. Weather Bureau, Los Angeles, California, 1940 - 1956.

3. Meteorological maps. California Institute of Technology, 1940 - 1950.

4. Historical weather maps, daily synoptic series. U. S. Weather Bureau, 1899 - 1956.

5. Newspaper accounts. Los Angeles and Santa Barbara papers, 1890 - 1956.

Data Filtering Process

The task of selecting the final ten sets of extreme storm wave data at the five study locations involved three consecutive filtering operations.

In the first operation, the long-term, continuous series of meteorological maps(see item 4 above)plus OSI records were carefully reviewed and all storms capable of producing high waves at the study locations dated and subjectively categorized in terms of relative severity. These specific storms then were checked in newspaper records, etc., to determine if they were sufficiently unusual to merit mention. Conversely, newspaper records covering the period 1899 - 1956* were reviewed, and where mention of unusually severe storm conditions existed, a cross-check into the corresponding set of meteorological maps was made. Through this feedback procedure, all important storms affecting the study area during the period 1899 - 1968 were dated and categorized for the next, finer, filtering operation.

As one would expect, the first filtering step produced a very large number of storms for further examination – about 400 in this case.

* Not necessary beyond 1956 since OSI wave records for the area began in that year.

In the second, more refining, filtering process, those factors intimately affecting storm wave characteristics at each site were evaluated. The overall procedure was as follows:

1. The exposure of each site, to the various selected storms was resolved. As expected, each site was different. For example, Station 1 is exposed to storm waves from the southwest whereas Station 4 is not, etc. This evaluation also included considerations of refraction due to bottom effects. Here, each station is located in a depth that eliminates direct refractive effects; however, in the case of Stations 1 and 5, it is possible for open ocean waves arriving from the west northwest and southwest directions respectively, to refract around the shallow portions of the adjacent points of land, just enough to be redirected into the deep water leases.

2. Following definition of the wave exposure and refraction indices for all five stations, each of the initially filtered storms then was rated in terms of its wind velocity field, its duration, and its distance from the target area.

This classifying process, coupled with considerations of the exposure and refraction indices, provided the twenty most severe storms at each site from which a further refining, filtering analysis would yield the desired ten, most severe, storm set.

Because several of the stations exhibit similar exposures, several of the severe storms resulting from the second filtering operation were common to those stations.

In the third and final filtering process, each of the twenty storms derived from filter process #2 was analyzed in detail using wave forecast technology. In the analysis, use was made of the Pierson-Neumann-James (PNJ) theory, aspects of which may be found in Reference 8.

Without going into detail on the PNJ theory, it is worthwhile to note that the theory involves the concept that winds generate an infinite number of wave components of various amplitudes and frequencies, superposition of which gives a certain energy, and hence wave height, in space. This method pretty much referred to as the wave "spectral" theory, has been used by OSI forecasters in the Santa Barbara Channel since 1956 and has yielded good results.

Application of the PNJ forecasting theory to the twenty-storm series resulted in a tabulation of significant wave characteristics in terms of height,* period, and direction as a function of time at each station. From these detailed wave data (twenty sets), the ten most severe were selected at each station, and are presented in this report.

As can be seen from the tables of wave data, several trains of waves frequently existed simultaneously in time at each station. This simultaneity feature is the normal circumstance existing during severe storms in the Santa Barbara Channel.

One complexing aspect of these simultaneous wave trains, is that involving methods of combining the several individual trains of energy into a single wave. The physics of the subject is not well-known when the directions and periods differ very much. A common practice, so long as the waves are not oppositely directed, is to apply the root-mean-square technique for combining these simultaneously-existing energies without consideration of period. To a great extent, any such procedure is, we feel, related to the specific application and associated risk factor. Accordingly, it is normal practice for OSI to provide the componentized wave

* Significant wave height is defined as the average of the upper one-third of wave heights.

train data to the user, without combining them into a single "wave."

Part 2

METEOROLOGICAL SITUATIONS PRODUCING SEVERE STORM WAVES

There are basically three different meteorological situations which give rise to extreme storm waves in the Santa Barbara Channel. However, due to the east-west orientation of the Santa Barbara coast line (Figure 1) and the Channel Islands to the south, there are varying degrees of protection afforded to specific areas within the channel for each of the above situations. This aspect will be treated quantitatively in the next section. In the following paragraphs, the three basic meteorological patterns will be described briefly.

1. Cyclogenesis Near the Coast (Southeast Sea and Southwest Swell)

Very often the most intense winter storms intensify rapidly only a few hundred miles southwest of Point Conception. In combination with high-pressure over the plateau, strong pressure gradients result in gale or hurricane force, east southeast winds blowing through the entire length of the Santa Barbara Channel. Such a storm, March 1905, is illustrated in Figure 2. Two other fetch areas are important wave producers in the storm: 1) The southerly winds in the warm sector

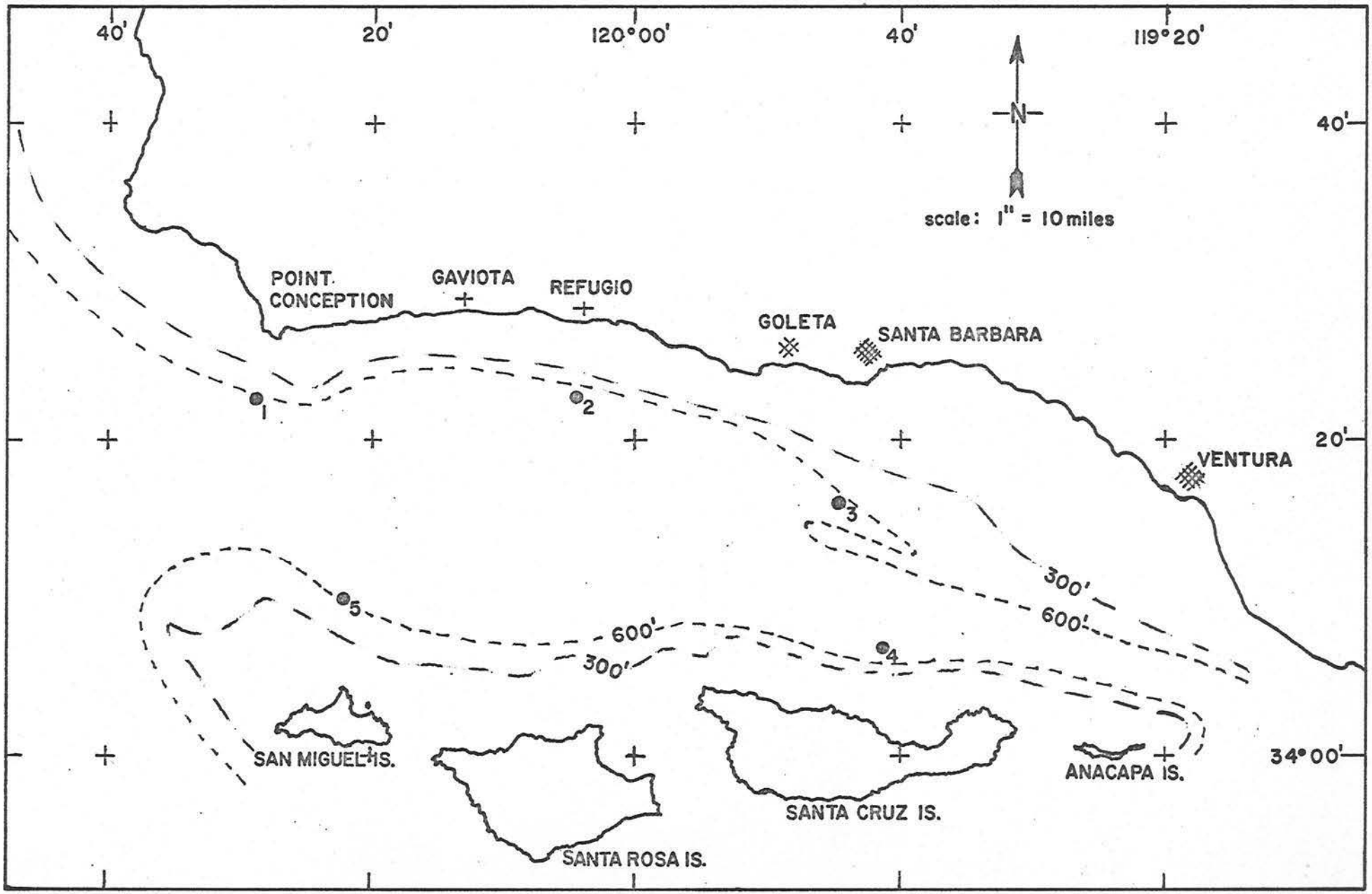


FIGURE 1

LOCATION OF HINDCAST SITES

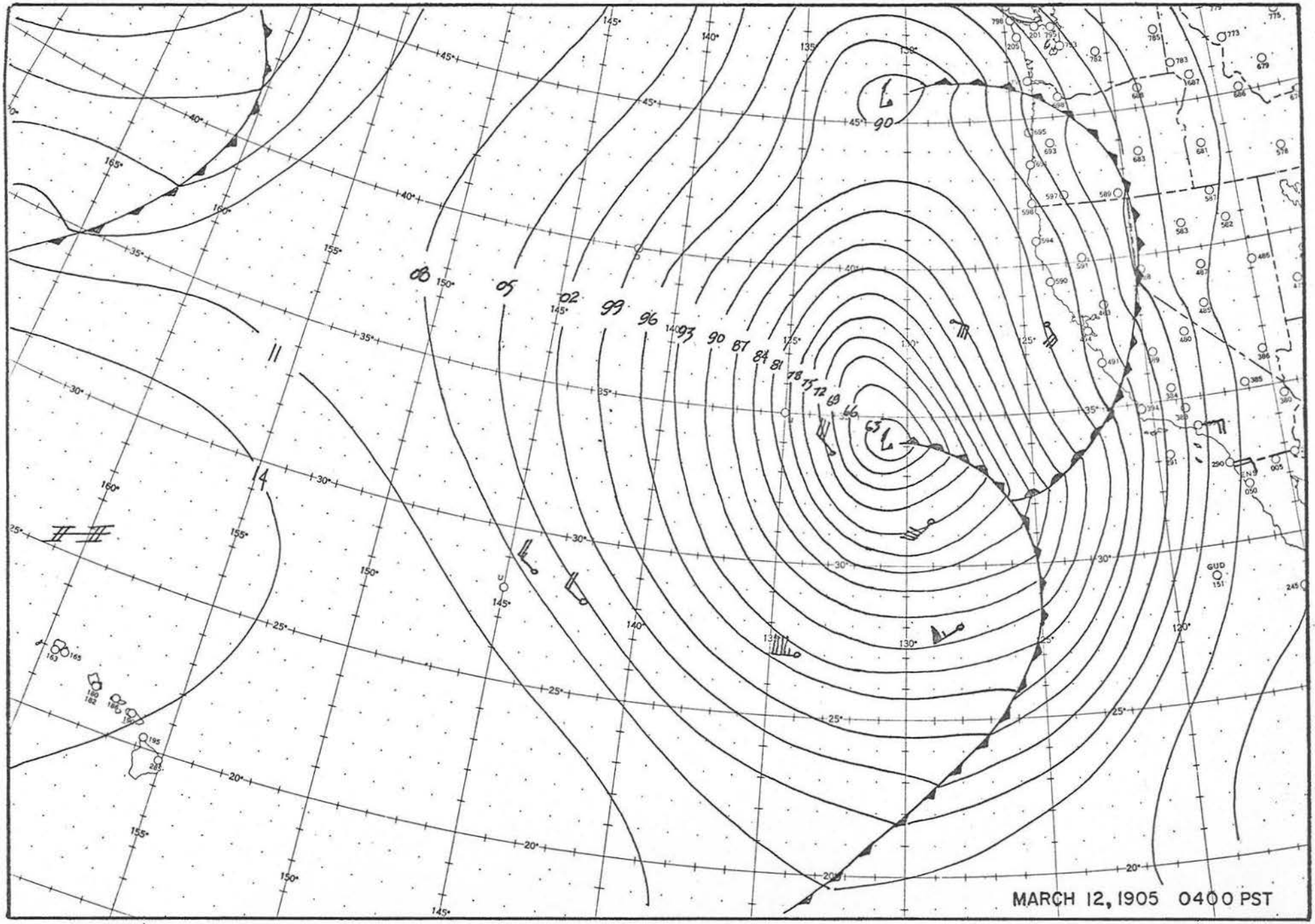


Figure 2

CYCLOGENESIS NEAR THE COAST

preceding the cold front; 2) The southwesterly winds in the cold air behind the cold front. The latter has the greatest potential for producing the highest waves owing to the fact that the storm center moved northeastward allowing for a much greater effective fetch length.

Though this particular storm type is a common one and can be expected to occur frequently, it is rare that the storm track is so far south and the low so intense as in the March 1905 storm. Station 1 is most vulnerable to this type of storm due to its unobstructed exposure to the southwest. In the 1905 storm, the southwest wind fetch moved directly to Station 1, and resulted in a significant wave height of 27.5 ft.

2. Cyclogenesis in Mid-Pacific (Westerly Swell)

Usually, the intense extratropical cyclones forming in the mid and western Pacific stall, or move northeastward before strong westerly winds blowing in the southwest quadrant of these storms generate exceptionally high waves, especially when the fetch is long and/or the storm has been moving directly toward the coast. However, because of the large decay distances involved, very rarely are waves high enough by the time they reach the Santa Barbara Channel to qualify among the maximum ten storms. An exception to this was the

storm of April 1958, which is shown in Figure 3. This storm is exceptional in its wind speed, duration, and fetch length, and produced waves ranging from 17 to 24.5 ft. at the study sites.

If, however, the arrival of this westerly swell should coincide with strong west to northwest winds along the California coast, then exceptionally high waves are generated. This combination of events is especially important at Stations 3 and 4.

3. Nevada Low (Northwest to West Sea and Swell)

Frequently, particularly during spring, large cold air masses aloft, move from Western Canada and Alaska southward into Utah, Nevada, and Arizona. Cyclogenesis occurs on the surface with deep low-pressure centers usually forming in the area of Southern Nevada. In coordination with the Pacific high, which is located but a few hundred miles offshore, this low produces a very high-pressure gradient along the California coast. Winds are further intensified as the core of maximum winds in the jet stream moves southeastward around the low.

Because of the exposure to the northwest, many of the ten

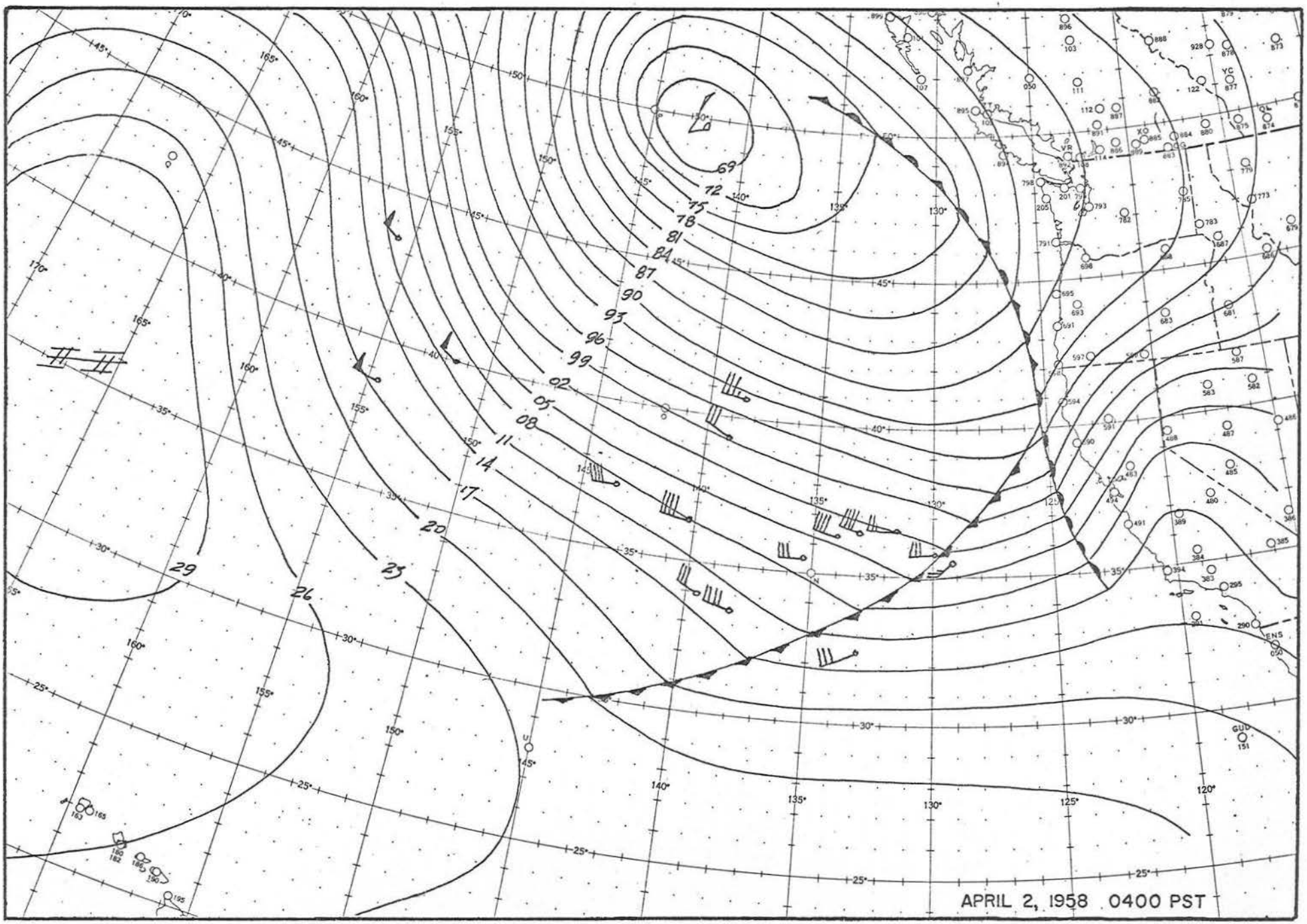
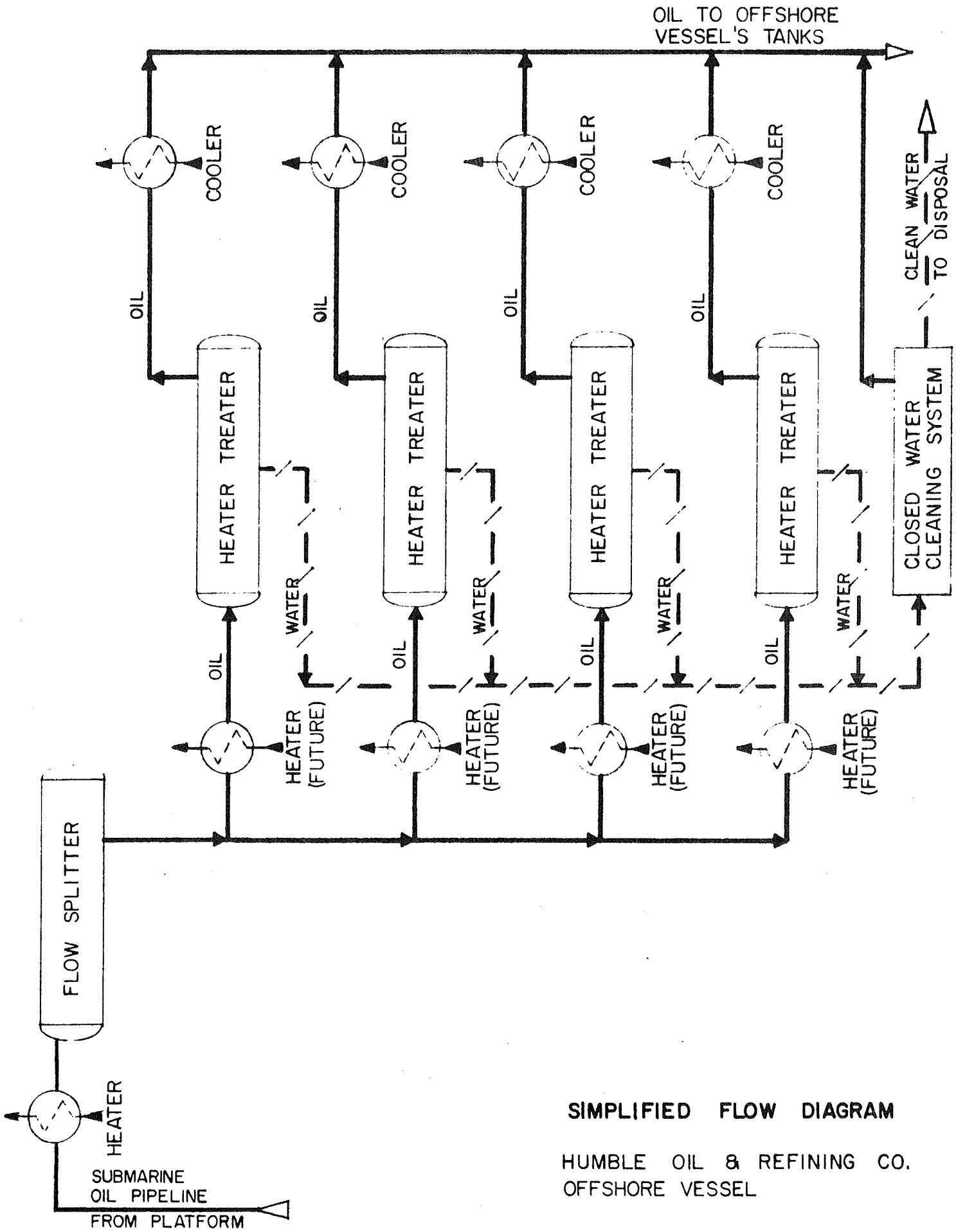


Figure 3

CYCLOGENESIS IN MID-PACIFIC

1.1 PRODUCTION FACILITIES



SIMPLIFIED FLOW DIAGRAM

HUMBLE OIL & REFINING CO.
OFFSHORE VESSEL

GENERAL DESCRIPTION OF PRODUCTION FACILITIES

OFF-SHORE CRUDE OIL TREATING & STORAGE

SANTA BARBARA CHANNEL

1.0 GENERAL

This description applies to facilities to be installed on an offshore vessel for use in treating crude oil produced from the Santa Barbara Channel deep water platform.

1.1 This report deals with facilities from the pipeline connections on the offshore vessel to delivery of oil to the offshore vessel's tanks. Water cleaning and delivery of vapors to the offshore vessel's incineration are included. The offshore vessel's equipment and utilities are included to the point of connection to service the described facility.

2.0 OIL TREATING FACILITIES

The overall scheme of the oil treating facilities including water cleaning and disposal is shown on the Process Flow Diagram Drawing 154-200.

2.1 Wet oil containing approximately 10% water is received from the submarine pipeline at a maximum rate of 40,000 B/D of net oil. The emulsion is heated by exchange with hot oil leaving the heater treaters. It is metered at approximately 95°F and fed to the Flow Splitter. The emulsion is heated to 110°F by steam coils inside the flow splitter, free water is removed and the emulsion is split four ways and fed to a heater treater on each leg. The emulsion is heated to 160°F by steam coils in the heater treater. Future exchangers for steam heating the crude will allow use of treating temperatures up to 225°F. The heater treaters are operated at 75 psig to prevent vapors from being released in the treaters. The treaters also have an electrical coalescing and precipitation section. The heater treaters run full of liquid and have no gas pad. Oil from the heater treater is cooled by heat exchange with the flow splitter feed and then further cooled to 95°F by use of salt water exchangers. Cooling the oil to 95°F will reduce vapor break-out in the offhsore vessel's tanks to a very low quantity. Tank vapors released will be collected and burned in an incinerator.

3.0 WATER CLEANING

The produced water is cleaned by skimming the flotation of oil in a four stage flotation unit. Clean water is recirculated thru the system to improve its quality. The water cleaning system is designed for 25,000 B/D maximum throughput which is more than twice the peak volume of water anticipated. Thus, the recirculation should exceed 100% of the feed rate at all times. Cleaned water is disposed of into the sea after passing thru up to ten stages of gravity separation and skimming in the offhsore vessel's tanks. The water can also be stored and transported off the vessel if required.

4.0 GAS SYSTEM

Gas emission from the flow splitter, if any, is released to the ship's oil tanks. All oil containing tanks and vessels are tied to the vapor recovery system which collects the vapors and directs them to the offshore vessel's incinerator. Excess vapors from the water tanks are collected thru a blower and piped to the incinerator.

1.2 SAFETY SHUT-IN FACILITIES

SAFETY SHUT-IN SYSTEM

The pipeline to the offshore vessel is equipped with a spring loaded fail safe block valve at the vessel. This valve automatically closes when high or low pressure occurs at the pipeline outlet. High or low pressure in the flow splitter and high or low level in the vessel will close the valve. Energization of the fire or gas detector will close the valve automatically.

The feed lines to each heater treater are equipped with spring loaded fail safe block valves. High or low pressure or low level in the heater treater will close the individual block valve feeding that heater treater.

The pipeline to the offshore vessel is also equipped with a pipeline leak detector which is designed to detect any leaks by comparing the output of the platform shipping meters with the meter on the vessel. The signal from the meters on the platform would be radioed to the offshore vessel via a reliable microwave link. If the detector detected a leak a signal would be sent to the platform which would automatically shut-in the oil pipeline valve and sound an alarm. At the same time the detector would shutin the pipeline valve on the offshore vessel.

Manual shut-in stations are provided at strategic locations to provide the operator with easy access to shut-in the pipeline valve. Fusable links are provided in the pneumatic control lines to shut-in the pipeline valve upon fire exposure. A manual shut-in control is also mounted in the main control panel.

Humble Job
H-B Job 10-154

Specification
10-154-FD

SPECIFICATION
FIRE DETECTOR UNITS

1.0 GENERAL

This specification applies to the purchase of one Thomas A. Edison Industries Type 613 U/V fire detector signaling systems complete with 8 explosion proof fire detector heads for Class 1, Group D location. The units are to be equipped with continuous automatic test equipment and malfunction alarms. One contact for remote malfunction alarm shall be furnished for each cabinet. Contacts for these remote alarms shall be normally closed and open on the alarm condition. The extinguisher circuits on the system shall be furnished with 4 heads on each circuit for separate zone control.

The extinguisher circuit contacts shall be normally open and closed on the alarm conditions after 2 to 6 seconds delay (adjustable). All items shall be in accordance with Edison Publication No. 1109 Specification for Fire Protective Signaling System, Types 612 and 613 (8 pages)

2.0 GUARANTEE

The supplier and manufacturer shall guarantee the units to meet all requirements of these specifications and that the equipment is free of defects in design, material, and workmanship for 12 months after the delivery date.

3.0 SHIPMENT

The supplier shall package, ship and be responsible for safe arrival of all items at the destination stated in Humble's Request for Quotation.

Humble Job
H-B 10-154

Specification 10-154-GDU

GAS DETECTOR SYSTEM

1.0 GENERAL

This specification applies to the purchase of combustible gas detector units for use on an offshore vessel used to treat oil from a deepwater platform in the Santa Barbara Channel. The units are to comply with the latest edition of Federal OCS Order No. 8 in addition to all other Federal and State of California Safety laws and safety orders. The units are to be used to monitor accidental gas leaks on the vessel and provide warnings and safety shutdown of equipment as required for safety. The units are continuously exposed to wet salt air atmosphere. The sensing heads are to be located in a Class 1, Division 1, Group D, hazardous location. The control panel is to be located inside a control room classified as non-hazardous.

2.0 BASIC REQUIREMENTS

2.1 Sensors

Ten sensors are required. The sensors shall be explosion proof, Class 1, Group D. Underwriters Laboratory labels are desired if available. Equipment bearing the UL label shall be given preference in the selection. The sensors shall be satisfactory for operation in atmosphere containing hydrogen sulphide gas in concentrations of 10,000 ppm or more without lowering the sensitivity and accuracy of the units. The sensors shall be equipped with stainless steel internal metal diffusers (or approved equal) since brass and similar materials are not suitable for the type of exposure. The sensors shall be for methane gas, however, the sensors shall be the type that are safe to operate in hydrogen atmosphere.

2.2 The control cabinet shall be for mounting in standard 19 inch rack. The cabinet shall have a meter to indicate the highest LEL reading of the channels in the cabinet. Each channel will be for one sensor. They shall be two stage units adjustable to alarm at, or less than, 20% LEL and alarm and actuate shutdown contacts at, or below, 50% LEL. The detecting units shall continuously monitor the presence of combustible gas. Each channel shall have alarm and malfunction lights. One malfunction alarm contact shall be furnished for the remote alarm. The cabinet shall have a selector switch to manually select the channel to read out on the meter. The LEL settings shall be adjustable from the control panel. Alarms and shutdowns shall be active on all channels during the adjustment of one. All alarm and shutdown lights shall remain on until manually reset at the cabinet. The cabinet shall have a low alarm light and reset buttons and a high alarm (shutdown) light and reset button.

The cabinet shall have its own DC power supply for use with 115 VAC, 60 hertz power. A "power on" light and "system ready" light shall be in the cabinet. The circuits shall be all solid state with plug-in circuit boards.

The cabinet shall have one set of dry contacts for remote alarm for the following: (1) low alarm on any channel in the cabinet, (2) high alarm on any channel in the cabinet and (3) malfunction of any channel or power supply on the readout module. High LEL shutdown dry contacts for each channel shall be furnished in both cabinets. These contacts shall be for 5A, 115V, 60 hertz and contacts in (1) and (2) shall be closed under normal conditions and open on alarm conditions.

The cabinet shall be designed to automatically take 24V DC power supply from purchaser's battery upon failure of cabinet power supply. The power supply failure shall actuate the malfunction alarm.

2.3 Calibration Equipment. Furnish all necessary adapters, connectors, standard gas samples with regulation mixing and control equipment to field calibrate the gas detector units.

3.0 TECHNICAL DATA

The following data shall be supplied in 3 copies with the quotation:

(1) Cabinet picture front, side and rear views.

(2) Dimensional drawings of cabinet and sensors.

(3) Circuit and connection diagrams.

(4) Complete description of the functioning of the unit with confirmation that all items specified herein are included.

(5) Additional optional equipment with price.

(6) Manufacturer's complete specification for the sensors, the cabinet, and the test equipment.

(7) All necessary data for OCS Order No. 8 application for Installation of the detectors.

Six copies of above final data in addition to installation, operating and maintenance instructions and parts lists shall be provided by the supplier.

4.0 GUARANTEE

The supplier and manufacturer shall guarantee the units to meet all requirements of these specifications and that the equipment is free of defects in design, material and workmanship for 12 months after the delivery date.

5.0 SHIPMENT

The supplier shall package, ship and be responsible for safe arrival of all items at the destination stated in Humble's Request for Quotation.

CODE REFERENCES

The following is a list of codes that are referenced in this report:

1: United States, Department of Interior Geological Survey, Conservation Division, Branch of Oil and Gas Operations, Pacific Region Outer Continental Shelf Orders No. 1, thru and including No. 10

2: California Administrative Code, Title 8, General Industrial Safety Orders, Petroleum Safety Orders for Drilling and Production, Fired and Unfired Pressure Vessels.

3: California Administrative Code Title 24, Part 3, Basic Electrical Regulations, State Building Standards Electrical Code.

4: International Conference of Building Officials, Uniform Building Code and Uniform Plumbing Code and Uniform Mechanical Code, latest editions. Uniform Building Code - Standards (latest edition).

5: American Institute of Steel Construction, Manual of Steel Construction and codes referenced therein.

6: American Society of Testing Materials Standards, Part One - Ferrous Metals and Part Two - Non-Ferrous Metals latest edition.

7: National Electrical Code - latest edition.

8: United States Government Department of Labor, Occupational Safety and Health Administration, Title 29, Part 1910 (standards for sound levels).

9: American Society of Mechanical Engineers ASME Code for Unfired Pressure Vessels Section VIII.

10: American Petroleum Institute Standard 650 (latest edition) for Welded Steel Tanks for Oil Storage.

11: American National Standards Institute ANSI (formerly American Standards Association ASA) Code for Pressure Piping ANSI (ASA or USAS) B31.3 Petroleum Refinery Piping (latest edition).

12: Manufacturers Standardization Society for Valve and Fitting Industry.

13: Standards of the National Electrical Manufacturers Association.

14: Standards of the Institute of Electrical and Electronic Engineers.

15: Standards of Insulated Power Cable Engineers Association.

16: American Petroleum Institute
Reciprocating Compressors for General Refinery Service
API Standard 618.

17. United States Coast Guard "Rules and Regulations for Tank Vessels" Sub Chapter D, CG 123.

1.5 POLLUTION CONTROL EQUIPMENT

POLLUTION CONTROL

Provisions are made on this facility to prevent pollution of air and water as follows:

(1) All tanks, vessels, and other equipment are completely sealed to prevent emission of gases or vapors. A vapor recovery system collects all vapors and gases and they are burned in the offshore vessel's boilers.

(2) All water is processed thru a gravity separator and skimmer, then a 4 stage flotation unit to remove oil, then to a clean water gravity separator and skimmer. The water at this point is 50% recirculated thru the closed cleaning system described above. Clean water is then sent to the offshore vessel's tanks. A turbidity meter is provided to continuously monitor the water at this point and alarm when detectable turbidity occurs. Up to 10 tanks will be used in series as skimmers and gravity separators for cleaning the water. Finally the clean water will be put into the sea thru the vessel's sea chest.

(3) Oil spills and leaks will be contained by the vessel and handled by the vessel's bilge and stripper pumps. No oil spills will be allowed to run off the decks into the sea.

2.1 FLOW SPLITTER

FLOW SPLITTER VI

(One Req'd)

1.0 GENERAL

This specification applies to the design and construction of a flow splitter unit complete for use on an offshore vessel used as an oil treating and storage facility for the production from a Humble deep-water platform in the Santa Barbara Channel. The equipment is for outside service in wet salt air atmosphere. The area is classified as hazardous Class 1, Division 1. The vessel has the following maximum motion during continued operation in rough seas, (1) heave - 3 foot at 6 seconds interval, (2) pitch - 3^{o} and (3) roll - 3^{o}. The vessel shall be to withstand 10 feet heave at 6 seconds interval with 5^{o} pitch and 8^{o} roll during rough seas with operations discontinued.

2.0 DESIGN BASIS

The flow splitter also serves as a heater and free water knock out. The oil is 20^{o} API gravity. The emulsion feed to the unit contains 10% water. The viscosity of the emulsion is 10,000 SSU at the inlet temperature of 95^{o}F and 5,000 SSU at the outlet temperature of 110^{o}F. The design net oil rate is 40,000 B/D or 44,000 B/D emulsion. The vessel's steam supply at 160 psig saturated is available for heating. Heating coils shall be provided in the flow splitter to heat the above feed from 95^{o}F to 110^{o}F. The design, however, shall be to transfer a minimum of 5,000,000 BTU/HR into the emulsion.

The flow splits shall be four completely equipped with provisions for adding two splits in the future by adding only external equipment which will not require entering or opening the vessel.

All items shown on Drawing 154-202, as the flow splitter package, shall be included in the work.

The design pressure of the vessel is 150 psig @ 250^{o}F with 1/16" corrosion allowance on all surfaces except the heating coils. The heating coils shall have 1/8" corrosion (minimum) allowance. All internal surfaces of the vessel except heating surfaces shall be protectively coated in accordance with Specification 10-154-C1.

The crude oil contains sour gas with as much as one percent hydrogen sulphide and three percent carbon dioxide.

3.0 CONSTRUCTION

The vessel shall be constructed in accordance with the ASME Code Section VIII with corrosion allowances specified in Par. 2. The unit shall consist of all items shown on Drawing 154-202 within the shaded area for the flow splitter package. All instruments and controls shall be as specified on the attached data sheets. All oil, gas and water piping shall be Class A as described in the attached Specification 10-154. All piping to conform to ANSI Code for Refinery Piping B31.3 Latest Edition. All piping shall be run plumb and square and of first class appearance. All welds are subject to radiographic inspection by Humble. Acceptability of welds to be in accordance with ASME Code Section VIII Par. UW52. Defects to be repaired and reexamined at supplier's expense.

Instrument air piping to comply with attached Specification 10-154 for Class AA piping. Process and air connections to instruments shall be Class A piping or 304 stainless steel tubing, .030" minimum wall with Imperial Hi-Seal stainless steel fittings. All instrumentation tubing to be continuously supported in steel channel or on rigid pipe. All tubing bends to be made with benders. All tubing runs to be plumb and square.

Valves are to be as listed on the drawings.

The entire assembly is to be mounted on a fabricated steel skid adequate for four point marine type handling. Access ladders shall be provided for access of all controls and instruments.

All piping shall be tested. Process piping shall be isolated from instruments and vessels and hydrostatically tested at 413 psig. Drain completely dry and seal all piping systems for shipment.

All electrical work shall comply with the State of California, Title 24 regulations for electrical work. All shall be for Class 1, Division 1. All conduit and fittings shall be copper free type satisfactory for salt air exposure. Fittings to be Crouse-Hinds GUA or GOU type. Wire to be stranded copper #14 gauge (minimum) type TW. All wiring shall be complete with one junction box for external connections. Terminations shall be provided with terminal blocks. All wire to be labeled at all j-boxes and at both ends with Brady or equal labels.

PIPELINE SHUTIN VALVE

FCV - 30

(1 required)

1.0 GENERAL

This specification applies to the purchase of a [illegible] size, full opening, 1440 psi WOG, forged steel ball valve with ANSI 900 RF flanged connections and corrosion-resistant trim; with pneumatic, cylinder - type, spring return, 90° rotary actuator and actuator mounting adapter.

2.0 VALVE

Valve shall be a Cameron ball valve figure 800901-7-20, or approved equal.

3.0 ACTUATOR

The actuator shall be scotch - yoke type, with all moving parts submerged in a sealed oil bath. Actuator shall be suitable for operation in either a vertical or horizontal position. All bearing surfaces shall be coated with a permanent, lubricating and protective material. Actuator shall be weatherproof, with protective coating and corrosion-resistant construction suitable for marine exposure. Actuator shall be sized to break, stroke and close valve against 1,440 psi differential pressure with 100 psig operating air. Construction shall permit actuator to be safely disassembled in the field without special equipment. Actuator mounting adapter shall have provisions for mounting actuator either in line with or at right angles to the run of the valve. Actuator shall have a three-way, normally closed, solenoid valve with explosion proof and watertight (NEMA 4, 7, 9) solenoid enclosure, 120 VAC, single phase, 60 H_z operation, and 125 psi allowable operating pressure differential with air. Solenoid valve shall be mounted and piped to actuator cylinder. With solenoid valve deenergized, cylinder shall be vented and valve shall be spring-closed. Actuator shall be a Matryx model 104-SR, Bettis model 746A-2SR, or approved equal.

4.0 INFORMATION REQUIRED WITH BIDS

Bidders shall submit a fully dimensioned assembly drawing, with all parts identified and shown in functional clarity.

5.0 SHIPMENT

Supplier shall be responsible for packaging, shipment and safe arrival of the valve assembly at the destination stated in Humble's request for quotation. All shipping containers shall be piece-marked and tagged "FCV-30".

6.0 GUARANTEE

Supplier and manufacturer shall guarantee the unit to meet all requirements of this specification and to be free of defects in material and workmanship for 12 months after the delivery date. Defects or deficiencies shall be corrected at no additional cost to the purchaser.

EMULSION METER M-1

1.0 GENERAL

This specification applies to the purchase of equipment to measure free water and emulsion.

2.0 EQUIPMENT

The meter shall be an A. O. Smith W-170 double case with cast steel housing and standard trim. The safe working pressure of the meter shall be 300 psig @ 100°F. The meter shall be equipped with a gallons-to-barrels adaptor and large numeral, vertical face with six integer wheels and a decimal wheel in 1/10 barrels (A. O. Smith Form 169100). It shall be equipped with a 10,000 pulse per barrel transmitter with phone jack connecter. All electrical to be for Class 1, Division 1.

3.0 GUARANTEE

The supplier and manufacturer shall guarantee that their equipment meets this specification, their published catalog data, and that the equipment shall be free of defects in material and workmanship for a period of twelve months after first service date. The guarantee shall fully cover field or factory costs due to defects.

4.0 SHIPMENT

Supplier shall be responsible for packaging, shipment and safe arrival of meter at destination stated in Humble's Request for Quotation.

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SPECIFICATION

LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	LC 103 △	LSL 104 △	LSH 101 △	
MAKE OR APPROVED EQUAL	NATIONAL TANK CO.		FISHER	
TYPE	ELECT. CONDUCTIVITY		2800	
MODEL	5402		252V	
MOUNTING	MPT		FLG'D.	
INDICATING OR RECORDING				
INTERFACE OR LEVEL	INTERFACE		LEVEL	
COMMODITY	OIL/WATER		CRUDE OIL	
SPECIFIC GRAVITY AT 60°	.93/1.00		.93	
OPERATING PRESS. / TEMP	95psi / 110°F		95psi / 110°F	
MINIMUM DESIGN PRESS. / TEMP	150psi / 200°F		150psi / 200°F	
BODY MATERIAL	* STL.		STL.	
CONNECTIONS	2" PIPE THDS.		4"-150# RF	
PROBE	* 58	SAME AS LC 103	SPDT SWITCH	
PROBE DIMS. SUBJECT TO CHECK BY NAT'L.	A = 8" B = 1/2" C = 8" D = 4"		EXPL. PROOF ENCLOSURE CLASS I GRP. D	
AUTOMATIC RESET				
FLOAT MATERIAL / SIZE			316 S.S. / 3"x10"	
MANUAL CONTROL BYPASS				
CHART NO / SIZE				
CHART DRIVE / REVOLUTIONS				
AS LEVEL RISES CONTROL PRESSURE			CONTACTS OPEN	
SPECIAL CONSTRUCTION & NOTES	* STAINLESS STEEL WETTED PARTS			
OPERATES WITH	LCV-103			
SERVICE	FLOWSPLITTER V-1 INTERFACE	FLOWSPLITTER V-1 INTERFACE	FLOW SPLITTER V-1 HIGH LEVEL	
VESSEL NO				
PLANT NO				
PURCHASE ORDER NO				

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SPECIFICATION — CONTROL VALVES

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

			PCV 305 △		PCV 306 △		PCV 307 △		TCV 202 △	
IDENTIFICATION TAG NO										
MAKE OR APPROVED EQUAL			FISHER		FISHER		FISHER		FISHER	
TYPE			12EP WITH THROTTLE TRIM		REGULATOR		GLOBE		GLOBE	
MODEL					95H		6007 EO		6007 ED	
SIZE	TYPE CONNECTIONS		2"	150# RF	1"	N.P.T	6"	150# RF	3"	150# RF
BODY MATERIAL	RATING		STL	275#	STL.		STL	275#	STL	275#
INNER VALVE TRIM MATL			S.S.		S.S. & S.S. DIA.		**STD. TRIM #1		**STD. TRIM #1	
INNER VALVE SIZE	TYPE		1/2"	MICRO-FORM	9/16"		7"	EQUAL %	37/16"	EQUAL %
TOP WORKS			SIZE 4				SIZE 50*		SIZE 40*	
FINS							NOTE: VISCOSITY @ 95°F = 9,000 SSU			
POSITIONER	BOOSTER RELAY									
POSITIONER BYPASS	W GAGES									
AIR FILTER & REDUCER										
COMMODITY			NAT. GAS		INERT GAS		CRUDE OIL		STEAM	
FLOW TEMPERATURE, °F			110°F		60°F		95°F		370°F	
PRESSURE PSIG	IN	OUT	85	10	150	95	35	10	160	150
SPEC GRAVITY H2O 1.0	@ 60°F	@ FLOW TEMP					.93			
SPEC GRAVITY @ 60° AIR 1.0	@ 60°F	@ FLOW TEMP.	.80		1.00					
GPM @ 60°	NORM. FLOW	MAX CAP.					1320			
SCF HR	NORM. FLOW	MAX. CAP.	16,700		4160					
# HR	NORM. FLOW	MAX. CAP.							5,000	
VALVE POSITION ON AIR FAILURE			CLOSES		CLOSES		CLOSES		CLOSES	
CV			REQ'D. 1600 ACTUAL 193				REQ'D 350 ACTUAL 394		REQ'D ** ACTUAL 224	
SPECIAL CONSTRUCTION & NOTES					70-150 psi REDUCED PRESS RANGE		*MAX. ΔP = 260 3-15 psi signal		*MAX. ΔP = 520 psi 3-15 psi signal	
** 4 Loss-S. PLUG 17-4PH S.S. CAGE										
OPERATES WITH			PC 305		PC 306		PC 307		TIC 202	
SERVICE			FLOWSPLITTER V-1 BACK PRESSURE		FLOWSPLITTER REPRESSURING		OIL LINE BACK PRESSURE		FLOWSPLITTER V-1 STEAM CONTROL	
LINE NO.										
PLANT NO.										
PURCHASE ORDER NO.										

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SPECIFICATION — PRESSURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO		PI 304 △		PI 308 △		PR 300 △					△
MAKE OR APPROVED EQUAL		WIKA		WIKA		BARTON					
TYPE		PRESS. GAGE		PRESS. GAGE		RECIEVER RECORDER					
MODEL		233		233		242					
MOUNTING	LOCATION	1/2" NPT	BOTTOM	1/2" NPT	BOTTOM						
INDICATING OR RECORDING		INDICATING		INDICATING		RECORDER					
NORMAL PRESSURE @ TEMP.		95psig	110°F	35psig	95°F	100psig	80°F				
PRESSURE ELEMENT RANGE		0-300psi		0-100 psi		0-1500psi					
PRESSURE ELEMENT TYPE AND MATERIAL		BOUR.	316 S.S.	BOUR.	316 S.S.	HELIX	316 S.S.				
DIAL SIZE		4".		4"							
THROTTLING RANGE											
AUTOMATIC RESET											
RATE ACTION											
AIR FILTER & REDUCER											
MANUAL CONTROL BYPASS											
CHART SIZE	NO										
CHART DRIVE	REVOLUTION					SPRING	24 HR.				
INDICATING SCALE RANGE						0-1500psi					
AS PRESSURE INCREASES OUTPUT SIGNAL											
LOCATION OF PRESSURE TAP						BACK					
PULSATION DAMPENER		NO		NO							
SPECIAL CONSTRUCTION & NOTES		GLYCERIN FILLED		GLYCERIN FILLED		CHARTOMATIC PEN					
OPERATES WITH SERVICE		FLOWSPLITTER V.I PRESS. IND.		OIL LINE TO SHIP'S TANKS		OIL PIPELINE					
PLANT NO											
PURCHASE ORDER NO											

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SPECIFICATION — PRESSURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	PSH 301 △	PSL 301 △	PSL 302 △	PSH 303 △
MAKE OR APPROVED EQUAL	CUSTOM COMPONENTS	CUSTOM COMPONENTS	CUSTOM COMPONENTS	CUSTOM COMPONENTS
TYPE	PRESS. SWITCH	PRESS. SWITCH	PRESS. SWITCH	PRESS. SWITC
MODEL	6006GCRW-4	6006GCRW-1	6006GCRW-1	6006GCRW-
MOUNTING LOCATION	SURFACE	SURFACE	SURFACE	SURFACE
INDICATING OR RECORDING	—	—	—	—
NORMAL PRESSURE @ TEMP.				
PRESSURE ELEMENT RANGE				
PRESSURE ELEMENT TYPE AND MATERIAL	DIA. 347 S.S.	DIA. 347 S.S.	DIA. 347 S.S.	DIA. 347 S.
REQUIRED SUPPRESSION				
ADJUSTABLE RANGE	175-375 psi INCREASING	40-100 psi DECREASING	40-100 psi DECREASING	60-120 psi INCREASING
ELECT. CONN.	1/2"-14 NPT	1/2"-14 NPT	1/2"-14 NPT	1/2"-14 NP
PRESS. TAP	1/2"-14 FPT	1/2"-14 FPT	1/2"-14 FPT	1/2"-14 FP
DEAD BAND	40 ± 25 psi	20 ± 10 psi	20 ± 10 psi	20 ± 10 p
MANUAL CONTROL BYPASS				
CHART SIZE NO.				
CHART DRIVE REVOLUTION				
INDICATING SCALE RANGE				
AS PRESSURE INCREASES OUTPUT SIGNAL	CONTACTS OPEN	CONTACTS CLOSE	CONTACTS CLOSE	CONTACTS OPEN
LOCATION OF PRESSURE TAP	LOWER	LOWER	LOWER	LOWER
PULSATION DAMPENER	NO	NO	NO	NO
SPECIAL CONSTRUCTION & NOTES	FACTORY SET @ 240 psi INCREASING	FACTORY SET @ 55 psi DECREASING	FACTORY SET @ 50 psi DECREASING	FACTORY SE @ 110 psi INCREASIN
	4500 psi PROOF CASE	4500 psi - PROOF CASE	4500 psi - PROOF CASE	4500 psi - PROOF CAS
OPERATES WITH	FCV 30	FCV 30		
SERVICE	OIL PIPELINE HIGH PRESS. SHUT DOWN	OIL PIPELINE LOW PRESS. SHUT DOWN	FLOWSPLITTER V-1 LOW PRESS. SHUT DOWN	FLOWSPLITTE V-1 HIGH PRES SHUT DOWN
PLANT NO.				
PURCHASE ORDER NO.				

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SPECIFICATION — PRESSURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	PC 305 △	PC 307 △	△	△
MAKE OR APPROVED EQUAL	FISHER	FISHER		
TYPE	WIZARD II	WIZARD II		
MODEL	4150	4150		
MOUNTING / LOCATION	ON PCV 305	ON PCV 307		
INDICATING OR RECORDING				
NORMAL PRESSURE @ TEMP	95psi / 110°F	35psi / 95°F		
PRESSURE ELEMENT RANGE	0-200	0-100		
PRESSURE ELEMENT TYPE AND MATERIAL	BOUR. / 316 S.S.	BOUR. / 316 S.S.		
REQUIRED SUPPRESSION	—	—		
THROTTLING RANGE	3-100%	3-100%		
AUTOMATIC RESET	NO	NO		
RATE ACTION	NO	NO		
AIR FILTER & REDUCER	YES	YES		
MANUAL CONTROL BYPASS	NO	NO		
CHART SIZE / NO.				
CHART DRIVE / REVOLUTION				
INDICATING SCALE RANGE				
AS PRESSURE INCREASES OUTPUT SIGNAL	INCREASES (3-15 psi signal)	INCREASES (3-15 psi signal)		
LOCATION OF PRESSURE TAP	BACK	BACK		
PULSATION DAMPENER	NO	NO		
SPECIAL CONSTRUCTION & NOTES	YOKE MOUNT ON PCV 305	YOKE MOUNT ON PCV 307		
OPERATES WITH	PCV 305	PCV 307		
SERVICE	FLOWSPLITTER V-1 BACK PRESSURE	OIL LINE BACK PRESSURE		
PLANT NO				
PURCHASE ORDER NO.				

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SPECIFICATION

RELIEF VALVES

REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			PSV 10	△		△		△				
MAKE OR APPROVED EQUAL			CROSBY									
TYPE			JB-25									
MODEL			4P6									
BODY MATERIAL			STEEL									
PIPE SIZE	IN	OUT	4"	6"								
CONNECTIONS	IN	OUT	150# RF	150# RF								
TRIM MATERIAL	SPRING		S.S.	STL.								
LIFTING GEAR	GAG		NO	NO								
CALCULATED ORIFICE AREA SQ IN			5.55									
SELECTED ORIFICE AREA & LETTER			6.379	P								
DESIGN PRESSURE OF ASSOCIATED EQUIP PSIG			275									
OPERATING PRESSURE OF ASSOCIATED EQUIP												
RELIEVING PRESSURE PSIG			275									
BACK PRESSURE PSIG			0									
DIFFERENTIAL OR FACTORY SET PRESSURE PSI			275									
FLOW TEMPERATURE °			80°F									
MW OR S.G. AT FLOW TEMP			0.95 S.G.									
DESIGN CAPACITY MAX	GPM		1320									
	SCFH											
	#/HR.											
BASIS OF SELECTION			OIL + 10% WTR.									
VESSEL AREA EXPOSED TO FIRE												
COMMODITY			CRUDE oil									
% OVER PRESSURE			10%									
SPECIAL CONSTRUCTION & NOTES			Visc. = 20,000 SSU									
SERVICE			PIPE LINE RELIEF									
LINE OR VESSEL NO												
PLANT NO												
PURCHASE ORDER NO												

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SPECIFICATION

RELIEF VALVES

REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB N 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG N			△	PSV 12 △	RD 13 △	△
MAKE OR APPROVED EQUAL				CROSBY	CONTINENTAL DISC. CORP.	
TYPE				JB-25	RUPTURE DISC ASSEMBLY	
MODEL				4PC6	KBA +ASS'Y #7	
BODY MATERIAL				STEEL	316 SS	
PIPE SIZE	IN	OUT		4" 6"	4" 4"	
CONNECTIONS	IN	OUT		150# RF 150# RF	150# RF 150# RF	
TRIM MATERIAL	SPRING			S.S. STL.	— —	
LIFTING GEAR	GAG			NO NO	— —	
CALCULATED ORIFICE AREA SQ IN				7.300	—	
SELECTED ORIFICE AREA & LETTER				6.379 P*	— —	
DESIGN PRESSURE OF ASSOCIATED EQUIP PSIG				150	150	
OPERATING PRESSURE OF ASSOCIATED EQUIP				95	95	
RELIEVING PRESSURE PSIG				130	150	
BACK PRESSURE PSIG				0	0	
DIFFERENTIAL OR FACTORY SET PRESSURE PSI				130	150	
FLOW TEMPERATURE F				95°		
MW OR S.G. AT FLOW TEMP				.95 S.G.	95°	
DESIGN CAPACITY MAX	GPM			1320	1320	
	SCFH					
	# HR					
BASIS OF SELECTION				OIL +10% WTR.	OIL +10% WTR.	
VESSEL AREA EXPOSED TO FIRE						
COMMODITY				CRUDE OIL	CRUDE OIL	
% OVER PRESSURE				10%		
SPECIAL CONSTRUCTION & NOTES				*RUPTURE DISC TAKES EXCESS VISC.: 9,000 SSU.	VISC.: 9,000 SSU	
SERVICE				FLOWSPLITTER V-1 RELIEF	FLOWSPLITTER V-1 RELIEF	
LINE OR VESSEL NO						
PLANT NO						
PURCHASE ORDER NO						

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SPECIFICATION — CONTROL VALVES

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-164

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.			LCV 103 △		△		△					
MAKE: OR APPROVED EQUAL			FISHER									
TYPE			GLOBE									
MODEL			667 ES									
SIZE	TYPE CONNECTIONS		2"	150#RF								
BODY MATERIAL	RATING		ESTL.	275#								
INNER VALVE TRIM MAT'L			STD. TRIM #1**									
INNER VALVE SIZE	TYPE		1/2"	MICRO-FORM								
TOP WORKS			SIZE 40*									
FINS												
POSITIONER	BOOSTER RELAY											
POSITIONER BYPASS	W/GAGES											
AIR FILTER & REDUCER												
COMMODITY			OIL FIELD BRINE									
FLOW TEMPERATURE, °F			110°									
PRESSURE, PSIG	IN.	OUT	50	15								
SPEC GRAVITY $H_2O = 1.0$	@ 60°F	@ FLOW TEMP	1.0									
SPEC. GRAVITY @ 60° AIR = 1.0	@ 60°F	@ FLOW TEMP										
GPM @ 60°	NORM. FLOW	MAX. CAP.	292									
SCF HR	NORM. FLOW	MAX. CAP.										
# HR	NORM. FLOW	MAX. CAP.										
VALVE POSITION ON AIR FAILURE			CLOSES									
Cv			CALC. 49.0 ACTUAL 183									
SPECIAL CONSTRUCTION & NOTES			* MAX. ΔP = 1440 psi 3-15psi signal									
OPERATES WITH			LC 103									
SERVICE			FLOW SPLITTER V-1 WATER DRAW-OFF									
LINE NO.												
PLANT NO.												
PURCHASE ORDER NO.												

** 416 S.S. PLUG
17-4PH S.S. CAGE

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SPECIFICATION

TEMPERATURE INSTRUMENTS

REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION ~~OFFSHORE~~ VESSEL

IDENTIFICATION TAG NO	TIC 202 △	△	△	△
MAKE OR APPPOVED EQUAL	ROBERTSHAW			
TYPE	PNEUMATIC			
MODEL	DT-150-A11			
MOUNTING	SURFACE			
INDICATING OR RECORDING	INDICATING			
STANDARDIZATION				
NORMAL CONTROL OR RECORDING POINT	110°F			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE	0.5%-200%			
AUTOMATIC RESET	NO			
RATE ACTION	NO			
AIR FILTER & REDUCER	YES			
MANUAL CONTROL BYPASS	YES			
CHART SIZE NUMBER				
CHART DRIVE REVOLUTIONS				
NUMBER OF POINTS				
TYPE BULB	CLASS VA SAMA STD. 316 S.S.			
ELEVATION OF BULB ABOVE INSTRUMENT				
TUBING MATERIAL & LENGTH	TYPE 316 S.S. 15 FT.			
TUBING COMPENSATION	NO			
AS TEMPERATURE RISES OUTPUT SIGNAL	DECREASES			
	0-30 PSI OUTPUT			
SPECIAL CONSTRUCTION & NOTES				
OPERATES WITH	TCV 202			
SERVICE	FLOWSPLITTER V-1 STEAM CONTROL			
PRIMARY ELEMENT LOCATION				
PLANT NO				
PURCHASE ORDER NO				

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2.2 HEAT EXCHANGERS

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SPECIFICATION — HEAT EXCHANGER — 10-154-E1A REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

SERVICE OF UNIT SPLITTER FEED VS H.T. OUTLET ITEM NO E1A THRU E1D

SIZE TYPE AEL CONNECTED IN (4 REQD.)

SURFACE UNIT — SQ FT NET SHELLS — N T 1 SURFACE SHELL — NET SQ FT

PERFORMANCE OF ONE UNIT

		SHELL SIDE	TUBE SIDE
FLUID CIRCULATED		WET CRUDE OIL	CRUDE OIL
TOTAL FLUID ENTERING	# HR		
TOTAL VAPOR	# HR		
TOTAL LIQUID	# HR	150,000	138,000
TOTAL STEAM	# HR		
TOTAL NON-CONDENSABLES	# HR		
FLUID VAPORIZED OR CONDENSED	# HR		
STEAM CONDENSED	# HR		
GRAVITY LIQUID SP. GR.		.95	.95
VISCOSITY LIQUID		20,000 SSU @ 80°	150 SSU @ 160°F
MOLECULAR WEIGHT VAPORS		10,000 SSU @ 95°	1160 SSU @ 95°F
SPECIFIC HEAT LIQUIDS		0.55	0.50
LATENT HEAT VAPORS			
TEMPERATURE IN	°F	80	160
TEMPERATURE OUT	°F	95	142
OPERATING PRESSURE	PSIG		
NUMBER OF PASSES			
VELOCITY	FT SEC		FT SEC
PRESSURE DROP	ALLOWED PSI / PROPOSED PSI		PROPOSED PSI
DESIGN VISCOSITY CENTIPOISE	°F		°F

HEAT EXCHANGED BTU HR 1,240,000 MTD 68° F

TRANSFER RATE SERVICE CLEAN FOULING RESISTANCE

CONSTRUCTION

DESIGN PRESSURE		275	# SQ IN	240	# SQ IN
TEST PRESSURE		413	# SQ IN	413	# SQ IN
DESIGN TEMPERATURE		100	°F	200	°F

TUBES C.S. O.D. 1" GA. 14 LENGTH 20' PITCH SQUARE

SHELL C.S. I.D. THICKNESS

SHELL COVER C.S. FLOATING HEAD COVER C.S.

CHANNEL C.S. CHANNEL COVER C.S.

TUBE SHEETS STATIONARY C.S. FLOATING C.S.

BAFFLES - CROSS C.S. TYPE THICKNESS SPACING

BAFFLE LONG — TYPE THICKNESS

TUBE SUPPORTS THICKNESS

GASKETS JM-60 OR S.S. JACKETED ASBESTOS

CONNECTIONS SHELL IN 6" OUT 6" SERIES

CHANNEL IN 6" OUT 6" SERIES

CORROSION ALLOWANCE SHELL SIDE 1/16" TUBE SIDE 1/16"

CODE REQUIREMENTS AP ASME VIII TEMA CLASS C CODE SPEC

WEIGHTS - EACH SHELL BUNDLE FULL OF WATER

NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X.R.)

REMARKS ESTIMATED U = 8
ESTIMATED SURFACE 2300 FT² OR 460 TUBES

DATE BY CHECKED ENGINEER PROJ ENG

BY DATE

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SHEET 1 OF 1

SPECIFICATION — HEAT EXCHANGER — 10-154-E2A REV

CUSTOMER HUMBLE OIL & REFINING CO. — 10-154

PLANT LOCATION OFFSHORE VESSEL

SERVICE OF UNIT DRY OIL COOLERS — ITEM NO. E2A THRU E2D

SIZE — TYPE AEL — CONNECTED IN (4 REQD.)

SURFACE UNIT — NET SQ FT SHELLS UNIT — SURFACE SHELL — NET SQ FT

PERFORMANCE OF ONE UNIT

	SHELL SIDE	TUBE SIDE
FLUID CIRCULATED	10,000 B/D CRUDE OIL	SEA WATER
TOTAL FLUID ENTERING # HR		
TOTAL VAPOR # HR		
TOTAL LIQUID # HR	138,000	163,000 (324 GPM)
TOTAL STEAM # HR		
TOTAL NON-CONDENSABLES # HR		
FLUID VAPORIZED OR CONDENSED # HR		
STEAM CONDENSED # HR		
GRAVITY LIQUID	.95 SP. GR. —	1.01 API
VISCOSITY LIQUID	300 SSU @ 142° F	1.0 F
MOLECULAR WEIGHT VAPORS	1600 SSU @ 95° F	
SPECIFIC HEAT LIQUIDS	0.50 BTU #	1.0 BTU #
LATENT HEAT VAPORS	BTU #	BTU #
TEMPERATURE IN	142 F	60 F
TEMPERATURE OUT	95	80 F
OPERATING PRESSURE	PSIG	PSIG
NUMBER OF PASSES		
VELOCITY	SF	FT SEC
PRESSURE DROP	CALC PERMISSIBLE PSI	PSI CALC PERMISSIBLE PSI
DESIGN VISCOSITY (CENTIPOISES)	F	F

HEAT EXCHANGED BTU HR 3,250,000 — MTD —— 47° F

TRANSFER RATE SERVICE CLEAN — FOULING RESISTANCE .001

CONSTRUCTION

DESIGN PRESSURE	240	# SQ IN	100	# SQ IN
TEST PRESSURE	413	# SQ IN	150	# SQ IN
DESIGN TEMPERATURE	200	F	100	F

TUBES SMLS. 316 SS — 1" OD — 16 BWG — LENGTH 20' — PITCH

SHELL C.S. — ID OD — THICKNESS

SHELL COVER C.S. — FLOATING HEAD COVER

CHANNEL 316 S.S. LINED — CHANNEL COVER 316 SS LINED

TUBE SHEETS STATIONARY 316 SS — FLOATING

BAFFLES CROSS C.S. — TYPE — THICKNESS — SPACING

BAFFLE LONG —— — TYPE — THICKNESS

TUBE SUPPORTS C.S. — THICKNESS

GASKETS JM-60

CONNECTIONS SHELL IN 6" — OUT 6" — SERIES

" CHANNEL IN 4" — OUT 4" — SERIES

CORROSION ALLOWANCE SHELL SIDE 1/16" — TUBE SIDE 0

CODE REQUIREMENTS ASME SECT. VIII — TEMA CLASS C — CUST SPEC

WEIGHTS EACH SHELL — BUNDLE — FULL OF WATER

NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R.)

REMARKS ESTIMATED U = 35
ESTIMATED SURFACE = 2000 FT.² OR 400 TUBES

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HOBBS-BANNERMAN CORP.

SANTA FE SPRINGS CALIFORNIA

SHEET ___ OF ___

SPECIFICATION — RELIEF VALVES — REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			PSV 11A △	PSV 11B △	PSV 11C △	PSV 11D △
MAKE OR APPROVED EQUAL			CROSBY			
TYPE			JB-25			
MODEL			4J3			
BODY MATERIAL			STEEL			
PIPE SIZE	IN	OUT	2"	3"		
CONNECTIONS	IN	OUT	150# RF	150# RF		
TRIM MATERIAL	SPRING		S.S.	STL.		
LIFTING GEAR	GAG		NO	NO		
CALCULATED ORIFICE AREA SQ. IN			1.280			
SELECTED ORIFICE AREA & LETTER			1.287 J			
DESIGN PRESSURE OF ASSOCIATED EQUIP. PSIG			275			
OPERATING PRESSURE OF ASSOCIATED EQUIP				SAME AS PSV 11A	SAME AS PSV 11A	SAME AS PSV 11A
RELIEVING PRESSURE PSIG			275			
BACK PRESSURE PSIG			0			
DIFFERENTIAL OR FACTORY SET PRESSURE PSI			275			
FLOW TEMPERATURE °F			95°			
MW OR S.G. AT FLOW TEMP			0.95 S.G.			
DESIGN CAPACITY MAX	GPM		330			
	SCFH					
	#/HR					
BASIS OF SELECTION			OIL + 10% WTR			
VESSEL AREA EXPOSED TO FIRE						
COMMODITY			CRUDE OIL			
% OVER PRESSURE			10%			
SPECIAL CONSTRUCTION & NOTES			Vibr. ≤ 3,000 CPM			
SERVICE			HEATER E1A RELIEF	HEATER E1D RELIEF	HEATER E1C RELIEF	HEATER E1D RELIEF
LINE OR VESSEL NO						
PLANT NO						
PURCHASE ORDER NO						

THIS SPECIFICATION CONSTITUTES ALL THE MATERIAL, LABOR AND ACCESSORIES AS SHOWN ON THE PURCHASE ORDER

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HOBBS-BANNERMAN CORP.

SANTA FE SPRINGS, CALIFORNIA

SHEET ___ OF ___

REV.

SPECIFICATION

TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	TI 200 △	TI 210 △	△ △
MAKE OR APPROVED EQUAL	WESTON	W'	SAME AS TI 200
TYPE	BI-METAL		
MODEL	4500		
MOUNTING	1/2" NPT BACK		
INDICATING OR RECORDING	INDICATING		
STEM LENGTH	6"		
DIAL SIZE	5" S.S.		
TEMPERATURE RANGE	0-200°F	25-125°F	
THROTTLING RANGE			
AUTOMATIC RESET			
RATE ACTION			
AIR FILTER & REDUCER			
MANUAL CONTROL BYPASS			
CHART SIZE NUMBER			SAME AS TI 200
CHART DRIVE REVOLUTIONS			
NUMBER OF POINTS			
THERMOCOUPLE	316 S.S. 3/4" MPT WESTON No. 96132-124		
TUBING MATERIAL & LENGTH			
TUBING COMPENSATION			
AS TEMPERATURE RISES OUTPUT SIGNAL			
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS 1 GROUP D		
OPERATES WITH			
SERVICE	EMULSION HEATERS INLET	CRUDE OIL COOLERS WTR. INLET	
PRIMARY ELEMENT LOCATION			
PLANT NO			
PURCHASE ORDER NO.			

DATE

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SANTA FE SPRINGS CALIFORNIA

SHEET 09

REV.

SPECIFICATION

TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	TI 201A △	TI 201B △	TI 201C △	TI 201D △
MAKE OR APPROVED EQUAL	WESTON			
TYPE	BI-METAL			
MODEL	4500			
MOUNTING	1/2" NPT BACK			
INDICATING OR RECORDING	INDICATING			
STEM LENGTH	6"			
DIAL SIZE	5" S.S.			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE		SAME AS TI 201A	SAME AS TI 201A	SAME AS TI 201A
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART SIZE / NUMBER				
CHART DRIVE / REVOLUTIONS				
NUMBER OF POINTS				
THERMOWELL	316 S.S. 3/4" MPT WESTON No. 96133-124			
TUBING MATERIAL & LENGTH				
TUBING COMPENSATION				
AS TEMPERATURE RISES OUTPUT SIGNAL				
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS 1 GROUP D			
OPERATES WITH				
SERVICE	OIL TEMP. E-1A OUTLET	OIL TEMP. E-1B OUTLET	OIL TEMP. E-1C OUTLET	OIL TEMP. E-1D OUTLET
PRIMARY ELEMENT LOCATION				
PLANT NO.				
PURCHASE ORDER NO.				

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REV

SPECIFICATION

TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	TI 204A △	TI 204B △	TI 204C △	TI 204D △
MAKE OR APPROVED EQUAL	WESTON			
TYPE	BI-METAL			
MODEL	4500			
MOUNTING	1/2" NPT BACK			
INDICATING OR RECORDING	INDICATING			
STEM LENGTH	6"			
DIAL SIZE	5" S.S.			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE		SAME AS TI 204A	SAME AS TI 204A	SAME AS TI 204A
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART SIZE / NUMBER				
CHART DRIVE / REVOLUTIONS				
NUMBER OF POINTS				
THERMOWELL	316 S.S. 3/4" MPT WESTON No. 901337-124			
TUBING MATERIAL & LENGTH				
TUBING COMPENSATION				
AS TEMPERATURE RISES OUTPUT SIGNAL				
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS 1 GROUP D			
OPERATES WITH SERVICE	COOLER E2A INLET	COOLER E2B INLET	COOLER E2C INLET	COOLER E2D INLET
PRIMARY ELEMENT LOCATION				
PLANT NO.				
PURCHASE ORDER NO.				

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SANTA FE SPRINGS CALIFORNIA

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SPECIFICATION

TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	TI 205A △	TI 205B △	TI 205C △	TI 205D
MAKE OR APPROVED EQUAL	WESTON	SAME AS TI 205A	SAME AS TI 205A	SAME AS TI 205A
TYPE	BI-METAL			
MODEL	4500			
MOUNTING	1/2" NPT BACK			
INDICATING OR RECORDING	INDICATING			
STEM LENGTH	6"			
DIAL SIZE	5" S.S.			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE				
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART SIZE / NUMBER				
CHART DRIVE / REVOLUTIONS				
NUMBER OF POINTS				
THERMOWELL	316 S.S. 3/4" MPT WESTON			
ELEVATION OF BULB ABOVE INSTRUMENT				
TUBING MATERIAL & LENGTH	No. 960133-124			
TUBING COMPENSATION				
AS TEMPERATURE RISES OUTPUT SIGNAL				
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS 1 GROUP D			
OPERATES WITH SERVICE	COOLER E2A OUTLET	COOLER E2B OUTLET	COOLER E2C OUTLET	COOLER E OUTLET
PRIMARY ELEMENT LOCATION				
PLANT NO.				
PURCHASE ORDER NO.				

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2.3 HEATER TREATERS

HOBBS–BANNERMAN CORP.

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SHEET ___ OF ___

SPECIFICATION

TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. SPEC. NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	TI 211A △	TI 211B △	TI 211C △	TI 211D
MAKE OR APPROVED EQUAL	WESTON	SAME AS TI 211A	SAME AS TI 211A	SAME AS TI 211A
TYPE	BI-METAL			
MODEL	4500			
MOUNTING	1/2" NPT BACK			
INDICATING OR RECORDING	INDICATING			
STEM LENGTH	6"			
DIAL SIZE	5" S.S.			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE				
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REGULATOR				
MANUAL CONTROL BYPASS				
CHART SIZE NUMBER				
CHART DRIVE REVOLUTIONS				
NUMBER OF POINTS				
THERMOCOUPLE	316 S.S. 3/4" MPT WESTON No. 960133-124			
TUBING COMPENSATION				
AS TEMPERATURE RISES OUTPUT SIGNAL				
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS I GROUP D			
OPERATES WITH SERVICE	CRUDE OIL COOLER E2A WATER OUTLET	CRUDE OIL COOLER E2D WTR. OUTLET	CRUDE OIL COOLER E2C WTR. OUTLET	CRUDE OIL COOLER E2D WTR OUTLET
PRIMARY ELEMENT LOCATION				
PLANT NO.				
PURCHASE ORDER NO				

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HEATER TREATERS

V2A THRU V2D
(4 req'd)

1.0 GENERAL

This specification applies to the design and construction of four heater treater units complete for use on an offshore vessel used as an oil treating storage facility for the production from a Humble deepwater platform in the Santa Barbara Channel. The equipment is for outside service in wet salt air atmosphere. The area is classified as hazardous Class 1, Division 1. The vessel has the following maximum motion during continued operation in rough seas, (1) heave - 3 foot at 6 seconds interval, (2) pitch - 3^{o} and (3) roll - 3^{o}. The vessel shall be to withstand 10 feet heave at 6 seconds interval with 5^{o} pitch and 8^{o} roll during rough seas with operations discontinued.

2.0 DESIGN BASIS

The heater treaters are to reduce the water content of the oil to less than 2%. The oil is 20^{o} API gravity. The emulsion feed to the unit contains 10% water. The viscosity of the emulsion is 4,000 SSU at the inlet temperature of 110^{o}F. The dry oil viscosity is 150 SSU at the outlet temperature of 160 F. The design net oil rate is 10,000 B/D or 11,000 B/D of emulsion. Vessel's steam supply at 160 psig saturated is available for heating. Heating coils shall be provided in the heater treaters to heat the above feed from 110^{o}F to 160^{o}F. The design, however, shall be to transfer a minimum of 6,000,000 BTU/HR into the emulsion.

The heater treaters are to operate without a gas pad and at an operating pressure of 75 psig to prevent gas break out.

All items shown on drawing 154-202 as the heater treater packages shall be included in the work.

The design pressure of the vessel is 150 psig @ 200^{o}F with 1/16" corrosion allowance on all surfaces except the heating coils. The heating coils shall have 1/8" corrosion (minimum) allowance. All internal surfaces of the vessel except heating surfaces shall be protectively coated in accordance with Specification 10-154-C1.

The crude oil contains sour gas with as much as one percent hydrogen sulphide and three percent carbon dioxide.

The heater treaters shall be equipped with Petreco (or approved equal) electrical coalescing system with electrodes adjustable externally on the vessel. The system shall be 100KVA single phase, 480V, 60 Hz.

3.0 CONSTRUCTION

The vessel shall be constructed in accordance with the ASME Code Section VIII with corrosion allowances specified in Par. 2. The unit shall consist of all items shown on Drawing 154-202 within the shaded area for the Heater Treater Packages. In addition, the supplier shall furnish all necessary sampling connections with sample box and drain. All instruments and controls shall be as specified on the attached data sheets. All oil, gas and water piping shall be Class A as described in the attached Specification 10-154. All piping to conform to ANSI Code for Refinery Piping B31.3 latest edition. All piping shall be run plumb and square and of first class appearance. All welds are subject to radiographic inspection by Humble. Acceptability of welds to be in accordance with ASME Code Section VIII Par. UW52. Defects to be repaired and reexamined at supplier's expense.

Instrument air piping to comply with attached Specification 10-154 for Class AA piping. Process and air connections to instruments shall be Class A Piping or 304 stainless steel tubing, .030" minimum wall with Imperial Hi-Seal stainless steel fittings. All instrumentation tubing to be continuously supported in steel channel or on rigid pipe. All tubing bends to be made with benders. All tubing runs to be plumb and square.

Valves are to be as listed on the drawings.

The entire assembly is to be mounted on a fabricated steel skid adequate for four point marine type handling. Access ladders shall be provided for access of all controls and instruments.

All piping shall be tested. Process piping shall be isolated from instruments and vessels and hydrostatically tested at 413 psig. Instrument air lines to be tested with dry air at 100 psig. Drain completely dry and seal all piping systems for shipment.

All electrical work shall comply with the State of California, Title 24 regulations for electrical work. All shall be for Class 1 Division 1 All conduit and fittings shall be copper free type satisfactory for salt air exposure. Fittings to be Crouse-Hinds GUA or GOU type. Wire to be stranded copper #14 gauge (minimum) type TW. All wiring shall be complete with one junction box for external connections. Terminations shall be provided with terminal blocks. All wire to be labeled at all j-boxes and at both ends with Brady or equal labels.

Humble Job
H-B Job 10-154

Specification 10-154-FCV-31

HEATER TREATER SHUTIN VALVES

FCV - 31 A, B, C & D

(4 required)

1.0 GENERAL

This specification applies to the purchase of four 6" size, full opening, 275 psi WOG, forged steel ball valves with ANSI 150 RF flanged connections and corrosion-resistant trim; with pneumatic, cylinder-type, spring return, 90° rotary actuator and actuator mounting adapter.

2.0 VALVES

Valves shall be Cameron ball valve figure 800101-20, or approved equal.

3.0 ACTUATOR

The actuator shall be scotch-yoke type, with all moving parts submerged in a sealed oil bath. Actuator shall be suitable for operation in either a vertical or horizontal position. All bearing surfaces shall be coated with a permanent, lubricating and protective material. Actuator shall be weatherproof, with protective coating and corrosion-resistant construction suitable for marine exposure. Actuator shall be sized to break, stroke and close valve against 275 psi differential pressure with 100 psig operating air. Construction shall permit actuator to be safely disassembled in the field without special equipment. Actuator mounting adapter shall have provisions for mounting actuator either in line with or at right angles to the run of the valve. Actuator shall have a three-way, normally closed, solenoid valve with explosion proof and watertight (NEMA 4, 7, 9) solenoid enclosure, 120 VAC, single phase, 60 Hz operation, and 125 psi allowable operating pressure differential with air. Solenoid valve shall be mounted and piped to actuator cylinder. With solenoid valve deenergized, cylinder shall be vented and valve shall be spring-closed. Actuator shall be a Bettis Model CB-725-SR, or approved equal.

4.0 INFORMATION REQUIRED WITH BIDS

Bidders shall submit a fully dimensioned assembly drawing, with all parts identified and shown in functional clarity.

5.0 SHIPMENT

Supplier shall be responsible for packaging, shipment and safe arrival of the valve assembly at the destination stated in Humble's request for quotation. All shipping containers shall be tagged with valve numbers.

6.0 GUARANTEE

Supplier and manufacturer shall guarantee the unit to meet all requirements of this specification and to be free of defects in material and workmanship for 12 months after the delivery date. Defects or deficiencies shall be corrected at no additional cost to the purchaser.

HOBBS-BANNERMAN CORP.

SANTA FE SPRINGS CALIFORNIA

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SPECIFICATION — RELIEF VALVES

REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			PSV 14A △	RD 15A △	PSV 14B △	RD 15A △
MAKE OR APPROVED EQUAL			CROSBY	CONTINENTAL DISC CORP		
TYPE			JB-25	RUPTURE DISC ASSEMBLY		
MODEL			2J3	KBA+ ASSY 7		
BODY MATERIAL			STEEL	316 S.S.		
PIPE SIZE	IN	OUT	2"	3"	3"	3"
CONNECTIONS	IN	OUT	150# RF	150# RF	150# RF	150# RF
TRIM MATERIAL	SPRING		S.S.	STL.	—	—
LIFTING GEAR	GAG		NO	NO	—	—
CALCULATED ORIFICE AREA SQ IN			1.750		—	
SELECTED ORIFICE AREA & LETTER			1.287 J *		—	—
DESIGN PRESSURE OF ASSOCIATED EQUIP PSIG			150	150		
OPERATING PRESSURE OF ASSOCIATED EQUIP			75	75		
RELIEVING PRESSURE PSIG			130	150		
BACK PRESSURE PSIG			0	0		
DIFFERENTIAL OR FACTORY SET PRESSURE PSI			130	150		
FLOW TEMPERATURE F			160°	160°		
MW OR S G AT FLOW TEMP			.95 S.G.	.95 S.G.		
DESIGN CAPACITY MAX	GPM		330	330		
	SCFH					
	# HR					
BASIS OF SELECTION			OIL + 10% WTR.	OIL + 10% WTR.		
VESSEL AREA EXPOSED TO FIRE						
COMMODITY			CRUDE OIL	CRUDE OIL		
OVER PRESSURE			10%			
SPECIAL CONSTRUCTION & NOTES			*RUPTURE DISC TAKES EXCESS VISC.: 4,000 SSU	VISC.: 4,000 SSU		
SERVICE			HEATER TREATER V2A RELIEF	HEATER TREATER V2A RELIEF	HEATER TREATER V2B RELIEF	HEATER TREATER V2 RELIEF
LINE OR VESSEL NO						
PLANT NO						
PURCHASE ORDER NO						

SAME AS PSV 14A

SAME AS RD 15A

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HOBBS-BANNERMAN CORP.

SANTA FE SPRINGS CALIFORNIA

SHEET ___ OF ___

SPECIFICATION — RELIEF VALVES — REV

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	PSV 14C △	RD 15C △	PSV-14D △	RD 15D △
MAKE OR APPROVED EQUAL				
TYPE				
MODEL				
BODY MATERIAL				
PIPE SIZE — IN				
PIPE SIZE — OUT				
CONNECTIONS — IN				
CONNECTIONS — OUT				
TRIM MATERIAL — SPRING				
LIFTING GEAR — GAG				
CALCULATED ORIFICE AREA SQ IN	SAME AS PSV 14A	SAME AS RD 15A	SAME AS PSV 14A	SAME AS RD 15A
SELECTED ORIFICE AREA & LETTER				
DESIGN PRESSURE OF ASSOCIATED EQUIP PSIG				
OPERATING PRESSURE OF ASSOCIATED EQUIP				
RELIEVING PRESSURE PSIG				
BACK PRESSURE PSIG				
DIFFERENTIAL OR FACTORY SET PRESSURE PSI				
FLOW TEMPERATURE °F				
MW OR S.G. AT FLOW TEMP				
DESIGN CAPACITY MAX — GPM				
DESIGN CAPACITY MAX — SCFH				
DESIGN CAPACITY MAX — #/HR				
BASIS OF SELECTION				
VESSEL AREA EXPOSED TO FIRE				
COMMODITY				
% OVER PRESSURE				
SPECIAL CONSTRUCTION & NOTES				
SERVICE	HEATER TREATER V2C RELIEF	HEATER TREATER V2C RELIEF	HEATER TREATER V2D RELIEF	HEATER TREATER V2 RELIEF
LINE OR VESSEL NO				
PLANT NO				
PURCHASE ORDER NO				

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SANTA FE SPRINGS CALIFORNIA

SHEET ___ OF ___ REV.

SPECIFICATION — CONTROL VALVES

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			LCV 1066A △	LCV 1066B △	LCV 1066C △	LCV 1066D △
MAKE OR APPROVED EQUAL			FISHER	SAME AS LCV-1066A	SAME AS LCV-1066A	SAME AS LCV-1066A
TYPE						
MODEL			125P			
SIZE	TYPE CONNECTIONS		2"	150#RF		
BODY MATERIAL	RATING		STL.	275#		
INNER VALVE TRIM MAT'L			SS/440C			
INNER VALVE SIZE	TYPE		1"	TAPER		
TOP WORKS			SIZE 4			
FINS						
POSITIONER	BOOSTER RELAY					
POSITIONER BYPASS	W/GAGES					
AIR FILTER & REDUCER						
COMMODITY			OIL FIELD BRINE			
FLOW TEMPERATURE, °F			160°			
PRESSURE PSIG	IN.	OUT	50	15		
SPEC GRAVITY $H_2O = 1.0$	@ 60°F	@ FLOW TEMP.	1.0			
SPEC GRAVITY @ 60° AIR = 1.0	@ 60°F	@ FLOW TEMP.				
GPM @ 60°	NORM. FLOW	MAX. CAP.	90.0			
SCF HR	NORM. FLOW	MAX. CAP.				
#/HR	NORM FLOW	MAX. CAP				
VALVE POSITION ON AIR FAILURE			CLOSES			
Cv			CALC. 15.8 ACTUAL 19.3			
SPECIAL CONSTRUCTION & NOTES						
OPERATES WITH			LC 1066A	LC 1066B	LC 1066C	LC 1066D
SERVICE			HEATER TREATER V2A WATER DRAW-OFF	HEATER TREATER V2B WATER DRAW-OFF	HEATER TREATER V2C WATER DRAW-OFF	HEATER TREATER V2D WATER DRAW-OFF
LINE NO						
PLANT NO						
PURCHASE ORDER NO						

DATE

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SANTA [illegible] SPRINGS [illegible] FORMER

SHEET [illegible] OF [illegible]

SPECIFICATION — CONTROL VALVES

CUSTOMER: HUMBLE OIL & REFINING CO. — JOB NO: 10-154

PLANT LOCATION: OFFSHORE VESSEL

IDENTIFICATION TAG NO	TCV 203A △	TCV 203B △	TCV 203C △	TCV 203D △
MAKE OR APPROVED EQUAL	FISHER			
TYPE	GLOBE			
MODEL	667 ED			
SIZE / TYPE CONNECTIONS	3" / 150# RF			
BODY MATERIA / RATING	STL / 275			
INNER VALVE TRIM MAT'L	STD. TRIM #1 *			
INNER VALVE SIZE / TYPE	3 7/16" / EQUAL %			
TOP WORKS	** SIZE 40			
FINS				
POSITIONER / BOOSTER RELAY				
POSITIONER BYPASS / W/GAGES				
AIR FILTER & REDUCER				
COMMODITY	STEAM	SAME AS TCV 203A	SAME AS TCV 203A	SAME AS TCV 203A
FLOW TEMPERATURE °F	370°F			
PRESSURE PSIG IN / OUT	1600 psi / 150 psi			
SPEC. GRAVITY AIR = 1.0 @ 60°F / @ FLOW TEMP				
SPEC GRAVITY @ 60° AIR 1.0 @ 60°F / @ FLOW TEMP				
GPM @ 60° NORM FLOW / MAX CAP				
SCF HR NORM FLOW / MAX CAP				
#/HR NORM FLOW / MAX CAP	5,000			
VALVE POSITION ON AIR FAILURE	CLOSES			
CV	CALC. 74 ACTUAL 224			
SPECIAL CONSTRUCTION & NOTES	** MAX ΔP = 520 psi 3-15 psi signal			
	* 416 S.S. PLUG 17-4PH S.S. CAGE			
OPERATES WITH	TIC 203A	TIC 203B	TIC 203C	TIC 203D
SERVICE	HTR. TRTR V2A STEAM CONTROL	HTR. TRTR. V2B STEAM CONTROL	HTR. TRTR V2C STEAM CONTROL	HTR. TRTR. V2 STEAM CONTROL
LINE NO.				
PLANT NO.				
PURCHASE ORDER NO.				

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HOBBS-BANNERMAN CORP.

SANTA FE SPRINGS CALIFORNIA

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SPECIFICATION — PRESSURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO.	PSH 307A △	PSH 307B △	PSH 307C △	PSH 307D △
MAKE OR APPROVED EQUAL	CUSTOM COMPONENTS			
TYPE	PRESS. SWITCH			
MODEL	60060GRW-0			
MOUNTING / LOCATION	SURFACE			
INDICATING OR RECORDING	—			
NORMAL PRESSURE @ TEMP				
PRESSURE ELEMENT RANGE				
PRESSURE ELEMENT TYPE AND MATERIAL	DIA. 347 S.S.			
REQUIRED SUPPRESSION				
ADJUSTABLE RANGE	20-80 PSI	SAME AS PSH 307A	SAME AS PSH 307A	SAME AS PSH 307A
ELECT. CONN.	1/2"-14 NPT			
PRESS. CONN.	1/2"-14 FPT			
DEAD BAND	10±6 PSI			
MANUAL CONTROL BYPASS				
CHART SIZE / NO				
CHART DRIVE / REVOLUTION				
INDICATING SCALE RANGE				
AS PRESSURE INCREASES OUTPUT SIGNAL	CONTACTS OPEN			
LOCATION OF PRESSURE TAP	LOWER			
PULSATION DAMPENER	NO			
SPECIAL CONSTRUCTION & NOTES	FACTORY SET @ 30 PSI INCREASING 4500-PSI-PROOF CASE			
OPERATES WITH	FCV 31A	FCV 31B	FCV 31C	FCV 31D
SERVICE	HEATER TREATER V2A HIGH PRESS. SHUTDOWN	HEATER TREATER V2B HIGH PRESS. SHUTDOWN	HEATER TREATER V2C HIGH PRESS. SHUTDOWN	HEATER TREATER V2 HIGH PRES SHUTDOWN
PLANT NO.				
PURCHASE ORDER NO.				

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SPECIFICATION

LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	LSL 105A △	LSL 105B △	LSL 105C △	LSL 105D △
MAKE OR APPROVED EQUAL	FISHER			
TYPE	2800			
MODEL	252V			
MOUNTING	FLG'D.			
INDICATING OR RECORDING				
INTERFACE OR LEVEL	LEVEL			
COMMODITY	CRUDE OIL			
SPECIFIC GRAVITY AT 60°	.93			
OPERATING PRESS. / TEMP	75psi / 160°F	SAME AS LC 105A	SAME AS LC 105A	SAME AS LC 105A
MINIMUM DESIGN PRESS. / TEMP	150psi / 200°F			
BODY MATERIAL	STL			
CONNECTIONS	4"-150# RF			
FINS REQUIRED	NO			
FLOAT MATERIAL / SIZE	316 S.S. / 3"x10"			
PILOT-RIGHT OR LEFT HAND				
THROTTLING RANGE				
AUTOMATIC RESET	SPDT SWITCH			
AIR FILTER & REDUCER	EXPL. PROOF			
MANUAL CONTROL BYPASS	ENCLOSURE			
CHART NO / SIZE	CLASS I / GRP. D			
CHART DRIVE / REVOLUTIONS				
AS LEVEL RISES CONTROL PRESSURE	CONTACTS CLOSE			
SPECIAL CONSTRUCTION & NOTES				
OPERATES WITH	FCV 31A	FCV 31B	FCV 31C	FCV 31D
SERVICE	HTR. TRTR. V2A LOW LEVEL	HTR. TRTR. V2B LOW LEVEL	HTR. TRTR. V2C LOW LEVEL	HTR. TRTR. V2 LOW LEVEL
VESSEL NO				
PLANT NO				
PURCHASE ORDER NO				

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SANTA FE SPRINGS, CALIFORNIA

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SPECIFICATION

LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

		LC-1060A △	LC-1060B △	LC-1060C △	LC-1060D △
IDENTIFICATION TAG NO					
MAKE OR APPROVED EQUAL		NATIONAL TANK CO.			
TYPE		ELECT. CONDUCTIVITY			
MODEL		5402			
MOUNTING		MPT			
INDICATING OR RECORDING					
INTERFACE OR LEVEL		INTERFACE			
COMMODITY		OIL/WATER			
SPECIFIC GRAVITY AT 60°		.93/1.00			
OPERATING PRESS.	TEMP	75psi / 160°F			
MINIMUM DESIGN PRESS.	TEMP	150 psi / 200°F			
BODY MATERIAL		* STL.			
CONNECTIONS		2" PIPE THDS.			
PROBE		* 58	SAME AS LC 1060A	SAME AS LC 1060A	SAME AS LC 1060A
PROBE DIMS.		A = 8"			
SUBJECT TO		B = 1/2"			
CHECK BY NAT'L.		C = 8"			
AUTOMATIC RESET		D = 4"			
AIR FILTER & REDUCER					
MANUAL CONTROL BYPASS					
CHART NO	SIZE				
CHART DRIVE	REVOLUTIONS				
AS LEVEL RISES CONTROL PRESSURE					
SPECIAL CONSTRUCTION & NOTES EXPL.-PROOF HOUSING ALL UNITS		* STAINLESS STEEL WETTED PARTS			
OPERATES WITH		LCV 1060A	LCV 1060B	LCV 1060C	LCV 1060D
SERVICE		HTR. TRTR. V2A INTERFACE	HTR. TRTR. V2B INTERFACE	HTR. TRTR V2C INTERFACE	HTR. TRTR. V2D INTERFA
VESSEL NO					
PLANT NO					
PURCHASE ORDER NO					

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LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	LSL 107 A △	LSL 107 B △	LSL 107 C △	LSL 107 D △
MAKE OR APPROVED EQUAL	NATIONAL TANK CO.			
TYPE	TELECT. CONDUCTIVITY			
MODEL	5402			
MOUNTING	MPT			
INDICATING OR RECORDING				
INTERFACE OR LEVEL	INTERFACE			
COMMODITY	OIL/WATER			
SPECIFIC GRAVITY AT 60°	.93/1.00			
OPERATING PRESS. / TEMP	75psi / 160°F			
MINIMUM DESIGN PRESS. / TEMP	150psi / 200°F			
BODY MATERIAL	* STL			
CONNECTIONS	2" PIPE THDS.			
PROBE	* 58	SAME AS LSL 107A	SAME AS LSL 107A	SAME AS LSL 107A
PROBE DIMS SUBJECT TO CHECK BY NAT'L.	A = 8" B = 1 1/2" C = 8" D = 4"			
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART NO / SIZE				
CHART DRIVE / REVOLUTIONS				
AS LEVEL RISES CONTROL PRESSURE				
SPECIAL CONSTRUCTION & NOTES	* STAINLESS STEEL WETTED PARTS			
OPERATES WITH	FCV 31 A	FCV 31 B	FCV 31 C	FCV 31 D
SERVICE	HTR. TRTR. V2A INTERFACE	HTR. TRTR V2B INTERFACE	HTR. TRTR V2C INTERFACE	HTR. TRTR. V2D INTERFACE
VESSEL NO				
PLANT NO				
PURCHASE ORDER NO				

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SPECIFICATION

TEMPERATURE INSTRUMENTS

REV

CUSTOMER HUMBLE OIL & REFINING CO.

PLANT LOCATION OFFSHORE VESSEL

JOB NO 10-154

IDENTIFICATION TAG NO	TIC 203A △	TIC 203B △	TIC 203C △	TIC 203D △
MAKE OR APPROVED EQUAL	ROBERTSHAW	SAME AS TIC 203A	SAME AS TIC 203A	SAME AS TIC 203A
TYPE	PNEUMATIC			
MODEL	DT-150-A11			
MOUNTING	SURFACE			
INDICATING OR RECORDING	INDICATING			
STANDARDIZATION				
NORMAL CONTROL OR RECORDING POINT	1600°F			
TEMPERATURE RANGE	0-200°F			
THROTTLING RANGE	0.5%-200%			
AUTOMATIC RESET	NO			
RATE ACTION	NO			
AIR FILTER & REDUCER	YES			
MANUAL CONTROL BYPASS	YES			
CHART SIZE NUMBER				
CHART DRIVE REVOLUTIONS				
NUMBER OF POINTS				
TYPE BULB	CLASS VA SAMA STD. 316 S.S			
TUBING MATERIAL & LENGTH	TYPE 316 S.S. 15 FT.			
TUBING COMPENSATION	NO			
AS TEMPERATURE RISES OUTPUT SIGNAL	DECREASES 6-30 PSI OUTPUT			
SPECIAL CONSTRUCTION & NOTES				
OPERATES WITH	TCV 203A	TCV 203B	TCV 203C	TCV 203D
SERVICE	HTR. TRTR. V2A STEAM CONTROL	HTR. TRTR V2B STEAM CONTROL	HTR. TRTR. V2C STEAM CONTROL	HTR. TRTR V2D STEAM CONTROL
PRIMARY ELEMENT LOCATION				
PLANT NO				
PURCHASE ORDER NO				

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SPECIFICATION — TEMPERATURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-054

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	TI 2066A △	TI 2066B △	TI 2066C △	TI 2066D △
MAKE OR APPROVED EQUAL	WESTON	SAME AS TI 2066A	SAME AS TI 2066A	SAME AS TI 2066A
TYPE	BI-METAL			
MODEL	4500			
MOUNTING	1/2" NPT BACK			
INDICATING OR RECORDING	INDICATING			
STEM LENGTH	6"			
DIAL SIZE	5" S.S.			
TEMPERATURE RANGE	20-240°F			
THROTTLING RANGE				
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART SIZE | NUMBER				
CHART DRIVE | REVOLUTIONS				
THERMOCOUPLE	316 S.S. 3/4" MPT WESTON No. 96133-124			
TUBING MATERIAL & LENGTH				
TUBING COMPENSATION				
AS TEMPERATURE RISES OUTPUT SIGNAL				
SPECIAL CONSTRUCTION & NOTES	EXPLOSION-PROOF CLASS I GROUP D			
OPERATES WITH SERVICE	OIL OUTLET HTR. TRTR. V2A	OIL OUTLET HTR. TRTR V2B	OIL OUTLET HTR TRTR V2C	OIL OUTLET HTR. TRTR. V2D
PRIMARY ELEMENT LOCATION				
PLANT NO.				
PURCHASE ORDER NO				

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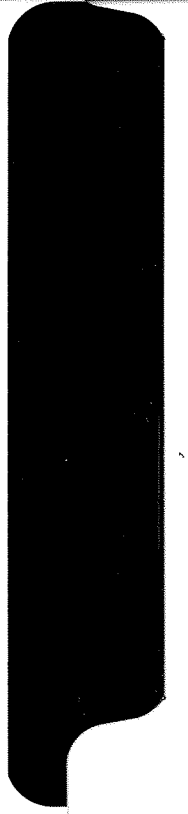


3.1 SURGE TANKS & SUMPS

Humble Job
H-B Job 10-154

Specification T-2

ATMOSPHERIC PRESSURE SURGE TANKS

T-1 Clean Water Surge Tank
T-2 Water Surge Tank
T-4 Salt Water Cooling Tank

1.0 GENERAL

This specification applies to the design and construction of the above tanks. The tanks are to be used on a Humble Oil and Refining Co. offshore vessel taking oil production from an offshore platform. The tanks are to be all welded construction. Welding and fabrication details are to comply with API Standard 650. Ladders, platforms and handrails to comply with State of California and Federal Safety Regulations.

2.0 CONSTRUCTION

T-1, T-2 and T-4 shall comply with API 650 welding and fabrication details. Tanks shall be as shown on Drawings 154-207, 154-208 & 154-209

The tanks are to be furnished completely assembled f.o.b. trucks or barges at the jobsite specified on the Humble Request for Quotation. All exterior and interior seams shall be continuously sealed to provide for proper application of the protective coatings to protect against rusting, corrosion and contamination. Each tank shall be tested by filling with water prior to shipment.

3.0 PROTECTIVE COATINGS

All tank external surfaces including ladders and other appurtenances shall be coated in accordance with the attached Specification 10-154-C2

All internal surfaces of tanks T-1, T-2 and T-4 shall be coated internally in accordance with Specification 10-154C1.

4.0 DRAWINGS

Supplier shall submit three (3) copies of shop drawings for approval prior to starting fabrication. Purchaser reserves the right to change nozzle and appurtenance orientation and location until approval of these drawings.

5.0 GUARANTEE

Supplier shall guarantee the equipment furnished to be free of defects in material and workmanship for twelve (12) months after delivery date. Defects or defeciencies not meeting these specifications are to be corrected at the supplier's expense.

SPECIFICATION

OIL SUMP T3

1.0 GENERAL

This specification applies to the design and construction of the above vessel. The vessel is to be used on a Humble Oil and Refining Co. offshore vessel which takes production from an offshore platform. The vessel is to be constructed in accordance with ASME Code Section VIII.

2.0 CONSTRUCTION

The vessel shall be constructed as shown on Drawing 154-209 The design pressure is 25 psig at 100°F with 1/16" corrosion allowance.

All joints and connections both externally and internally shall be continuously seal welded. Welds internally shall be ground smooth prior to coating.

3.0 PROTECTIVE COATING

The vessel and appurtenances shall be coated externally in accordance with the attached Specification 10-154-C2 and coated internally in accordance with Specification 10-154-C1.

4.0 DELIVERY

The vessel shall be delivered f.o.b. trucks or barges at the jobsite specified in the Humble Request for Quotation.

5.0 DRAWINGS

Supplier shall submit three (3) copies of shop drawings for approval prior to fabrication. The purchaser reserves the right to change the location of nozzles and appurtenances until the approval of these drawings.

6.0 GUARANTEE

The supplier shall guarantee the vessel to meet the requirements of this specification and to be free of defects in material and workmanship for a period of 12 months from the delivery date. Defects or deficiencies shall be corrected at no additional cost to Humble.

Humble Job
H-B Job 10-154

Specification 10-154-P5A

OIL SUMP PUMPS

P5A & P5B

(Two Req'd)

1.0 GENERAL

This specification applies to the purchase of two sump pumps for pumping viscous crude oil from an offshore vessel oil sump tank. The crude oil is wet and contains some sand and grit. The crude oil also contains H_2S and CO_2. The pumps are located in a hazardous location classified as Class 1, Group D. The exterior of the units is exposed continuously to wet salt air atmosphere.

2.0 DESIGN & CONSTRUCTION

The pumps shall be designed and constructed to pump a minimum of 15 gallons per minute of 100,000 SSU crude oil at 0.93 specific gravity with a differential pressure of 100 psi. The motor shall be a minimum of 5 hp with separate or integral gears to drive the pump at the design speed (approximately 500 RPM). The pump shall be a Worthington 1½ GR with cast iron case and gears, asbestos lead packing, and steel shaft.

The motors to be for 440 volt, 3 phase, 60 Hz power. Motors are to be explosion proof for Class 1, Group D with UL label. The motor and coupling are to be mounted on a steel flange to match a 26" Class 75 mating flange (Tube Turn Part No. 705). The gear motor is to be mounted so that the suction is 48" below the flange face. The arrangement shall be as shown on the attached sketch. The mounting assembly and equipment shall be adequate for operation of the sump tank at 14.5 psig. The pump discharge piping shall be 3" IPS terminated in a 3" 150# ASA RF flange. The pump shaft extension shall be designed for the full gear motor output torque. The pump support column shall be adequate to maintain alignment of the equipment for long bearing life.

3.0 TECHNICAL DATA

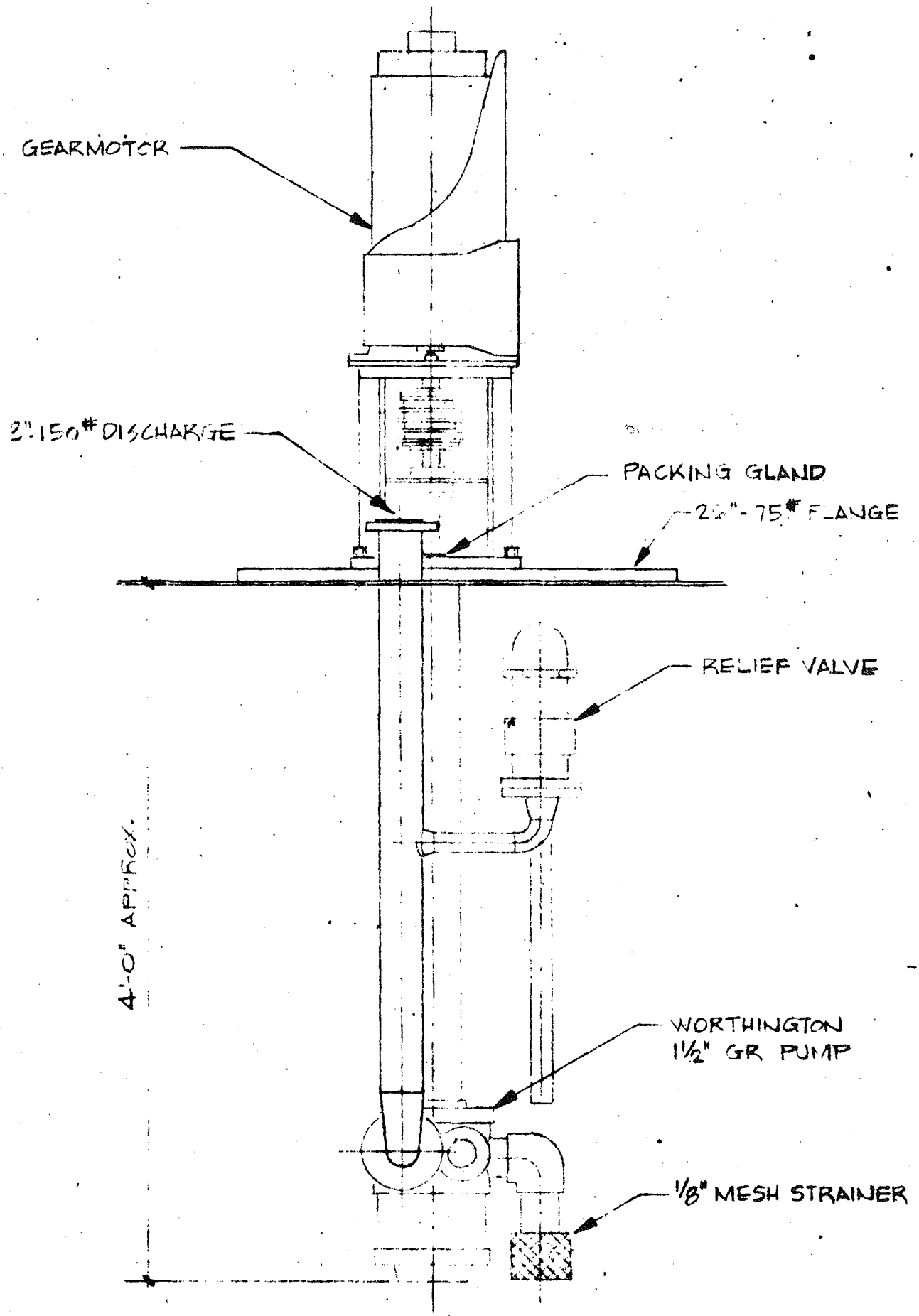
Supplier to submit certified drawings for approval before starting fabrication of the units. Six copies of final drawings, parts list, installation , maintenance and operating instructions shall be furnished upon shipment of units.

4.0 GUARANTEE

Supplier and manufacturer shall guarantee the equipment to meet these specifications and to be free of defects in material and workmanship for 12 months after the delivery date. Deficiencies of defects shall be corrected at the expense of the supplier.

5.0 SHIPMENT

Supplier shall package and ship and be responsible for safe arrival of the units at the destination specified in the Humble Request for Quotation.


GEARMOTOR
2"-150# DISCHARGE
PACKING GLAND
2½"-75# FLANGE
RELIEF VALVE
4'-0" APPROX.
WORTHINGTON
1½" GR PUMP
⅛" MESH STRAINER

Humble Job
H-B Job 10-154

Specification 10-154-M100

PRODUCED WATER METER

(One Req'd - Mark M100)

This specification applies to the purchase of one Halliburton 4" 150# RF flanged turbine meter for metering water at 100 to 1200 gpm. Meter body to be either 316 SS or lined steel. The lining to be Tube-Kote TK21 15 mils thick (or approved equal). The meter is to be for outdoor service in salt air atmosphere in a Class I Division 1 Group D hazardous location. A Halliburton Model 60FB flow analyzer shall be furnished to read out the meter output in barrels and tenths. The flow totalizer is to be flush mounted on the main control panel in a non-hazardous location. The power supply is 115 VAC, 60 Hertz. The flow totalizer shall be equipped with a flow rate indicator and D.C. output signal proportional to flow rate. The output signal shall be 4-20MA.

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SPECIFICATION

LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			LC-150 △		LAH 151 △		LAL 152 △		△	
MAKE OR APPROVED EQUAL			FISHER		FISHER		SAME AS LAH 151			
TYPE			2500		2800					
MODEL			249 V		252 V					
MOUNTING			4"-150# R.F.		4"-150# R.F.					
INDICATING OR RECORDING			—		—					
INTERFACE OR LEVEL			LEVEL		LEVEL					
COMMODITY			CRUDE OIL & BRINE		CRUDE OIL & BRINE					
SPECIFIC GRAVITY AT 60°			.80 TO 1.02		.80 TO 1.02					
OPERATING PRESS.	TEMP		0	60°F	0	60°F				
MINIMUM DESIGN PRESS.	TEMP		2 oz.	120°F	2 oz.	120°F				
BODY MATERIAL			STL.		STL.					
CONNECTIONS			4"-150# R.F.		4"-150# R.F.					
FINS REQUIRED										
FLOAT MATERIAL	SIZE		316 SS	3"X14"	316 SS	3"X10"				
PILOT-RIGHT OR LEFT HAND			(LATER)		—					
THROTTLING RANGE			0-10 0-100		—					
AUTOMATIC RESET			NO		—					
AIR FILTER & REDUCER			YES		—					
MANUAL CONTROL BYPASS			NO		—					
CHART NO	SIZE		3-15	PSI	—	—				
CHART DRIVE	REVOLUTIONS		BOUR.	TUBE	—	—				
AS LEVEL RISES CONTROL PRESSURE			INCREASES		CONTACTS OPEN		CONTACTS CLOSE			
SPECIAL CONSTRUCTION & NOTES			COAT ALL STEEL WETTED PARTS PER SPEC. 10-154 C1		SPDT SWITCH WITH EX. PROOF CL. 1 GP. D		SAME AS LAH 151			
OPERATES WITH			LCV-150							
SERVICE			WATER SURGE TANK		WATER SURGE TANK					
VESSEL NO			T-2		T-2					
PLANT NO										
PURCHASE ORDER NO										

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SPECIFICATION — RELIEF VALVES — REV.

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO		PSV-50 △	PSV-51 △	△	△
MAKE OR APPROVED EQUAL		VAREC	SAME AS PSV-50		
TYPE					
MODEL		* FIG. 2000			
BODY MATERIAL		ALUM.			
PIPE SIZE	IN	4"	4"		
	OUT	4"			
CONNECTIONS	IN	FLG. 125#	FLG. 125#		
	OUT				
TRIM MATERIAL	SPRING	STD.			
LIFTING GEAR	GAG**	—			
CALCULATED ORIFICE AREA SQ IN		—			
SELECTED ORIFICE AREA & LETTER		—	—		
DESIGN PRESSURE OF ASSOCIATED EQUIP PSIG		3 oz.			
OPERATING PRESSURE OF ASSOCIATED EQUIP		ATMOS.			
RELIEVING PRESSURE PSIG		3 oz.			
BACK PRESSURE PSIG		1 oz.			
DIFFERENTIAL OR FACTORY SET PRESSURE PSI		** 2 oz.			
FLOW TEMPERATURE °F		100° F			
MW OR S G AT FLOW TEMP		.85			
DESIGN CAPACITY MAX	GPM	10,000			
	SCFH				
	#/HR				
BASIS OF SELECTION					
VESSEL AREA EXPOSED TO FIRE					
COMMODITY					
OVER PRESSURE					
SPECIAL CONSTRUCTION & NOTES		* FURNISH W/ PIPED OUTLET ** VACUUM SETTING IS 1/2 oz.			
SERVICE		CLEAN WATER SURGE TANK	WATER SURGE TANK		
LINE OR VESSEL NO		T-1	T-2		
PLANT NO					
PURCHASE ORDER NO					

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SPECIFICATION

LIQUID LEVEL INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO		LAH LC 155 △		LAH LC 156 △		△		△	
MAKE OR APPROVED EQUAL		MAGNETROL		SAME AS LAH/LC 155					
TYPE		A-103 F							
MODEL		TANDEM							
MOUNTING	FLANGE	4"-150# RF							
INDICATING OR RECORDING		—							
INTERFACE OR LEVEL		LEVEL							
COMMODITY		CRUDE OIL							
SPECIFIC GRAVITY AT 60°		.80 TO .95							
OPERATING PRESS.	F° TEMP	0	60°						
MINIMUM DESIGN PRESS.	TEMP	15	120°						
BODY MATERIAL		STL.							
CONNECTIONS	USAS	4"-150# R.F.							
FINS REQUIRED		—							
FLOAT MATERIAL	SIZE	PORC.	2 9/16" x 3 3/4"						
PILOT-RIGHT OR LEFT HAND		—							
THROTTLING RANGE		—							
AUTOMATIC RESET		—							
AIR FILTER & REDUCER		—							
MANUAL CONTROL BYPASS		—							
CHART NO	SIZE	4PDT MICRO SWITCHES							
CHART DRIVE	REVOLUTIONS								
AS LEVEL RISES CONTROL PRESSURE									
SPECIAL CONSTRUCTION & NOTES		EXPL. PROOF HOUSING CL. 1 GR. D.							
OPERATES WITH		P-5A		P-5B					
SERVICE		OIL SUMP		OIL SUMP					
VESSEL NO		T-3		T-3					
PLANT NO									
PURCHASE ORDER NO									

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SPECIFICATION — PRESSURE INSTRUMENTS

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO. 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	PI-350 △	PI-351 △	PI-352 △	PI-353 △
MAKE OR APPROVED EQUAL	WIKA		WIKA	
TYPE	PRESS. GA.		PRESS. GA.	
MODEL	233		233	
MOUNTING / LOCATION	1/2" MPT / LOWER		1/2" MPT / BOTTOM	
INDICATING OR RECORDING	IND.		IND.	
NORMAL PRESSURE @ TEMP	30 / 100°F		40 / 60°F	
PRESSURE ELEMENT RANGE	0-60		0-60	
PRESSURE ELEMENT TYPE AND MATERIAL	BOURD. / 316 SS		BOURD. / 316 SS	
DIAL SIZE	4".		4"	
THROTTLING RANGE				
AUTOMATIC RESET				
RATE ACTION				
AIR FILTER & REDUCER				
MANUAL CONTROL BYPASS				
CHART SIZE / NO				
CHART DRIVE / REVOLUTION				
INDICATING SCALE RANGE				
AS PRESSURE INCREASES OUTPUT SIGNAL				
LOCATION OF PRESSURE TAP				
PULSATION DAMPENER				
SPECIAL CONSTRUCTION & NOTES	GLYCERIN FILLED		GLYCERIN FILLED	
OPERATES WITH	P1-A	P1-B		
SERVICE	EFFLUENT PUMP FROM FLOTATION UNIT	EFFLUENT PUMP FROM FLOTATION UNIT	DISCHARGE OIL PUMP P-5A OIL SUMP TANK T-3	DISCHARGE OIL PUMP P-5B OIL SUMP TANK T-3
PLANT NO				
PURCHASE ORDER NO				

SAME AS PI-350

SAME AS PI-352

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3.2 FLOTATION UNIT

Humble Job
H-B Job 10-154

Specification 10-154-FLOU

SPECIFICATION

OIL RECOVERY FROM WASTE WATER FLOTATION UNIT

1.0 GENERAL

This specification applies to the design, construction and initial operational supervision of equipment for removal of suspended oil from oil field produced water. The unit is to be installed on an offshore vessel taking oil production from an offshore platform. The location is classified as hazardous Class 1, Division 1, Group D. The unit is continuously exposed to wet salt air atmosphere. The water is very corrosive. The unit is for continuous service and must be dependable since down time of this unit curtails production from the platform.

2.0 DESIGN CONDITIONS

The influent water may contain up to 200 ppm of suspended oil in addition to 50 ppm fine solid particles, sand and grit. The unit shall reduce the non-soluble oil to 10 ppm or less with chemical treatment and to 25 ppm or less without chemical treatment. The required maximum thru put is 25,000 barrels per day.

The unit shall automatically compensate for 100% change in flow rate (at rated capacity) while meeting the above performance on oil removal.

The water contains hydrogen sulphide and carbon dioxide and is very corrosive to carbon steel. All wetted parts shall be protectively coated, made of type 316 ss, or made of rubber or suitable plastic materials.

3.0 EQUIPMENT

The unit shall be a Wemco Depurator (or approved equal) as manufactured by Wemco Division of Envirotech, 721 North B Street, Sacramento, California. The unit is their machine #10 rated at 25,725 B/D. The unit consists of a self supporting steel tank skid mounted. It contains four cells in series; each cell is equipped with a 10 hp explosion proof motor, belt drive, belt housing, neoprene rubber rotor and dispenser. The shafts shall be 316 ss where exposed to the water or gas. The entire assembly is to be gas tight and equipped with a breather valve. Unit is to be connected to the platform vapor recovery system. The unit is to be equipped with a Fisher 2500-249 V liquid level control with reset action and 3-15 psi bourdon tube. Float to be 3" x 14" 316 ss. Trim to be 316 ss.

*

Similar 4 stage mechanical flotation unit manufactured by National Tank is also acceptable.

All internal parts of carbon steel or cast iron shall be coated with Humble Epoxy Mastic Coating in accordance with Specification 10-154-C1. All external metal surfaces shall be coated with Humble Rust Ban in accordance with Specification 10-154-C2.

All equipment items other than those described above shall be as stated in WEMCO Data Sheets F8-D2, F8-D3, F8-D3.1, F8-D302, F8-D302.1, F8-D200, F8-D201, F8-D203, F8-D204; as shown on Dwgs. 52650-3, and as shown on Lithoprint F8-L1.

4.0 TECHNICAL DATA AND SERVICE

The supplier shall furnish technical field service to aid in starting-up and trimming the unit for optimum performance.

The manufacturer shall furnish 6 copies of the following within 14 days of the order date:

(1) Certified dimensional outline drawings.
(2) Cross sectional drawings showing details of internals.
(3) Parts list.
(4) Installation, maintenance and operating instructions.

5.0 SHIPMENT

Supplier shall be responsible for packaging, shipping and safe arrival of all equipment to destination specified by Humble in the "Request for Quotation".

6.0 GUARANTEE

The supplier and manufacturer shall guarantee the equipment to meet all of the requirements of these specifications and the manufacturer's data sheets referenced. They shall guarantee the equipment to be free of defects in material and workmanship for a period of 12 months from first service date. Inadequate performance or defective equipment construction shall be corrected at no cost to Humble.

ADDENDUM #1

The Varec 2000 vapor vent valve shall be special type with flanged pressure vent connection suitable for piping vented gas into the main vapor system.

The supplier shall include, in the bid price, field engineering services for two days as specified in Par. 4.0. State in the quotation basis for charges for additional services requested by Humble.

Humble Job
H-B Job 10-154

10-154-P1A

EFFLUENT WATER

PUMPS P1A & P1B

1.0 GENERAL

This specification applies to the purchase of two pumping units for use in pumping produced water from the flotation unit to the clean water surge tank. The pumps are to be used on an offshore vessel in a hazardous location classified as Class 1, Division 1, Group D. The pumps are exposed continuously to wet salt air atmosphere. The water contains H_2S and CO_2.

2.0 DESIGN & CONSTRUCTION

The pumps shall be capable of pumping at the rate of 750 gpm with a differential head of 65 feet. The motors shall be explosion proof Class 1 Group D with UL label. The motors shall be non-overloading to end of curve. The pump shall be a Worthington 4CNG 84 with all Worthite construction (or approved equal). The pump shall be frame mounted type complete with steel base, motor, coupling, coupling guard and all necessary oil lubrication equipment. The base shall be adequate to maintain the pump alignment when mounted on a relatively flexible steel deck.

3.0 TECHNICAL DATA

Bidders shall submit 3 copies of the following with their quotation:

(1) Head-capacity curves showing efficiency, horsepower and NPSH
(2) Cross-sectional drawings showing all materials of construction.
(3) Dimensional outline drawings.
(4) Manufacturer catalog number and description of motor, coupling, lubrication equipment and all other accessory items.
(5) Pump data sheet.

Suppliers shall furnish 6 copies of the same final certified data plus operating, installation and maintenance instructions complete with detail parts list.

4.0 SHIPMENT

Supplier shall package and be responsible for safe arrival of the pumping units at the destination specified in the Humble Request for Quotation.

ADDENDUM: All exterior steel and cast iron surfaces shall be coated in accordance with Specification 10-154-C2

5.0 GUARANTEE

The supplier and the manufacturer shall guarantee the equipment to meet all requirements of this specification and to be free of defects in material and workmanship for 12 months after the delivery date. Defects or deficiencies shall be corrected at the expense of the supplier.

Humble Job
H-B Job 10-154

Specification 10-154-TM

TURBIDITY METER

1.0 GENERAL

This specification covers the design requirements for a turbidity meter to be used to measure the turbidity of the effluent water discharge from a flotation unit on an offshore vessel which takes oil production from an offshore platform. The sensing head will be located in a Class I Division I Group D hazardous area. The indicating unit will be located inside in an area classified as non-hazardous.

2.0 DESIGN AND RATINGS

The instrument shall detect contamination in the effluent water by measuring the change in the clarity of the water by continuously scanning the process stream with two photocells and comparing the light transmittance of the water with the light scattering effect resulting from contamination with suspended solids.

2.1 Sensing Head

The sensing head shall be constructed of 316 stainless steel and shall have maximum operating temperature of 75°C. The sensing head shall handle a flow rate of 750 GPM and shall have 4" 150# ASA R.F. flanges. Maximum operating pressure shall be150 psi. The instrument shall have a sensitivity range of 0-500 JTU (Jackson Turbidity Units).

2.2 Indicator

The indicator unit shall use all transistorized circuity encased in a portable weatherproof metal cabinet. The unit shall be for use on 120 volt A.C. 60 Hz electrical power. A large liner scale meter with six position range selector shall be used to read turbidity in JTU's. An adjustable alarm relay with time delay shall be used to give an alarm when the turbidity reaches a preset point. This alarm shall have a dry contact closure output. A 0-5VDC output shall be provided for remote indication.

The sensing head and indicator shall be manufactured by Keene Corporation and shall be their Model 861B or approved equal.

3.0 GUARANTEE

The manufacturer shall guarantee the equipment to be free of defects for a period of one year from the date of acceptance.

HOBBS–BANNERMAN CORP.

SANTA FE SPRINGS CALIFORNIA

SHEET ___ OF ___ REV

SPECIFICATION — CONTROL VALVES

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			FCV-153 △		△		△	△
MAKE OR APPROVED EQUAL			FISHER					
TYPE			DOUBLE R/L					
MODEL			9110					
SIZE	TYPE CONNECTIONS		8"	125# R.F.				
BODY MATERIAL	RATING		C I	125#				
INNER VALVE TRIM MAT'L			316 S.S. SHAFT BUNA-N-SEAT					
INNER VALVE SIZE	TYPE		8"	BF				
TOP WORKS			* 656-60					
FINS			—					
POSITIONER	BOOSTER RELAY		—					
POSITIONER BYPASS	W/GAGES		—					
AIR FILTER & REDUCER			—					
COMMODITY			OILFIELD BRINE H_2S, CO_2					
FLOW TEMPERATURE °F			100° F					
PRESSURE PSIG	IN	OUT	3	2				
SPEC GRAVITY H_2O 1.0	@ 60°F	@ FLOW TEMP						
SPEC GRAVITY @ 60° AIR 1.0	@ 60°F	@ FLOW TEMP						
GPM @ 60°	NORM FLOW	MAX CAP		750				
SCF HR	NORM FLOW	MAX CAP						
# HR	NORM FLOW	MAX CAP						
VALVE POSITION ON AIR FAILURE			OPENS					
Cv								
SPECIAL CONSTRUCTION & NOTES			* 6-30 PSI SPRING					
OPERATES WITH			FC-153					
SERVICE			WATER TO FLOTATION UNIT					
LINE NO								
PLANT NO								
PURCHASE ORDER NO.								

BY DATE

DATE

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SANTA FE SPRINGS CALIFORNIA

SHEET OF REV

SPECIFICATION — CONTROL VALVES

CUSTOMER HUMBLE OIL & REFINING CO. JOB NO 10-154

PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO			PCV 350 △		LCV 150 △		LCV 154 △	PCV 351 △	
MAKE OR APPROVED EQUAL			FISHER		FISHER		SAME AS LCV-150	VAREC	
TYPE			95 H		DOUBLE P/L			VAC. LINE	
MODEL					9110			FIG. 180	
SIZE	TYPE CONNECTIONS		1/2"	SCRD	6"	150# RF		2"	FLG.
BODY MATERIAL	RATING		STL	300#	*STL.	275#		ALUM.	50#
INNER VALVE TRIM MAT'L			S.S. DIAPH.		BUNA-N			18-8 SS.	
INNER VALVE SIZE	TYPE		3/8"	ORIF.	6"	BF		—	—
TOP WORKS			—		656-30			STD.	
FINS			—						
POSITIONER	BOOSTER RELAY		—	—					
POSITIONER BYPASS	W/GAGES		—	—					
AIR FILTER & REDUCER			—						
COMMODITY			SWEET GAS		OIL FIELD BRINE				
FLOW TEMPERATURE °F					120° F				
PRESSURE PSIG	IN	OUT	150	20	2#	0		0	-3
SPEC GRAVITY H₂O = 1.0	@ 60°F	@ FLOW TEMP		.70		1.02			
SPEC. GRAVITY @ 60° AIR = 1.0	@ 60°F	@ FLOW TEMP						.8	
GPM @ 60°	NORM FLOW	MAX CAP.				730			
SCF HR	NORM FLOW	MAX. CAP.	200	400					583
# HR	NORM FLOW	MAX. CAP							
VALVE POSITION ON AIR FAILURE			—		CLOSES				
CV					CALC. 5200 ACT. 7800				
SPECIAL CONSTRUCTION & NOTES * DUCTILE IRON IS ACCEPTABLE			STAINLESS STEEL DIAPHRAM		316 SS STEM & BUNA'N' SEALS			SET TO START OPENING AT +1/10" H2O WITH FULL OPENING AT 5/10" H2O	
OPERATES WITH					LC-150				
SERVICE			PRESSURE RED. TO FLOTATION F.I.		WATER SURGE TANK LEVEL		FLOTATION LEVEL	VAPOR AT RECOVERY	
LINE NO.					T-2				
PLANT NO.									
PURCHASE ORDER NO.									

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SPECIFICATION — **FLOW INSTRUMENTS** — REV

CUSTOMER: HUMBLE OIL & REFINING CO. — JOB NO: 10-154

PLANT LOCATION: OFFSHORE VESSEL

IDENTIFICATION TAG NO	FC-153 △	PRIMARY ELEMENT DATA	FE153 △
MAKE OR APPROVED EQUAL	BARTON	PLATE MATERIAL & THICKNESS	316 S.S. 1/8"
TYPE	FLOW CONTROLLER	USED IN FITTING SIZE: TYPE & RATING	8"-300# R.F.
MODEL	335	TYPE TAPS	FLANGE
MOUNTING	PIPE	PIPE I.D. / ORIFICE I.D.	SCH. 40 / 6.25
PRESSURE RATING	500 PSI	PRESSURE / TEMPERATURE	2-5 / 100°F
INDICATING OR RECORDING	IND.	SPECIFIC GRAVITY @ 60°	1.02
DIFFERENTIAL RANGE	20"	SP. GR. @ FLOW TEMP.	
THROTTLING RANGE	1-400 %	NORMAL RATES: GPM @ 60°	
AUTOMATIC RESET	YES .02 TO 70 RPS	NORMAL RATES: MSCF DAY	
AIR FILTER & REDUCER	YES	NORMAL RATES: # HR	
MANUAL CONTROL BYPASS	NO		
CHART SIZE / NO	—	MAXIMUM RATES: GPM @ 60°	750
CHART DRIVE / REVOLUTIONS	—	MAXIMUM RATES: MSCF DAY	
NUMBER OF PENS	—	MAXIMUM RATES: # HR	
SPRING RANGE / MATERIAL	—		
METER MANIFOLD	—	CENTIPOISE @ FLOW TEMP.	1
MERCURY	—	METER DIFFERENTIAL RANGE	20"
PULSATION DAMPENER	—	STATIC SPRING RANGE	—
COMMODITY	OILFIELD BRINE H_2S, CO_2	CHART TYPE / PRESSURE BASE	—
FLOW PRESSURE	2-5 PSI	SP. GR. OF SEAL LIQUID	NO
AS FLOW INCREASES CONTROL PRESSURE	INCREASES	COEFFICIENT @ STD. COND.	
		UNITS OF COEFFICIENT	
SPECIAL CONSTRUCTION & NOTES	316 S.S. BELLOWS & WETTED PARTS; 6-30 PSI SPRING	LINE NO / FLG OR FTG NO	
		TYPE OF COEFFICIENT	
OPERATES WITH	FCV-153		
SERVICE	FLOW TO FLOTATION UNIT	SPECIAL CONSTRUCTION & NOTES	BETA RATIO .785 TO KSG ΔP TO MIN.
PLANT NO.			
PURCHASE ORDER NO.			

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SANTA FE SPRINGS, CALIFORNIA

SHEET ___ OF ___ REV

SPECIFICATION — PRIMARY FLOW DEVICES

JOB NO. 10-154

CUSTOMER HUMBLE OIL & REFINING CO.
PLANT LOCATION OFFSHORE VESSEL

IDENTIFICATION TAG NO	FI-L	△	△	△	△
MAKE OR APPROVED EQUAL	* BROOKS SIZE 7				
FLOW ELEMENT TYPE	ROTAMETER				
BODY MATL RATING	STL 275				
CONNECTION SIZE TYPE	1" FLGD R.F.				
PRESSURE TAPS TYPES & SIZE					
PLATE MATERIAL & THICKNESS					
PIPE ID STROKE ID					
FLOW PRESS FLOW TEMP	20 100°F				
COMMODITY	SWEET GAS				
SPEC FL GRAVITY @ 60°	0.70				
SP GR @ FLOW TEMP					

		NORMAL	MAXIMUM
BPD @ 60°			
MSCF DAY			
# HR	SCFH	200	400

VISCOSITY IN CENTIPOISE @ FLOW TEMPERATURE

METER RANGE	STATIC SPRING RANGE	
CHART TYPE	PRESSURE BASE	

TYPE MEASURING ELEMENT

UNITS OF COEFFICIENT

NOM COEFF @ STD COND

ACTUAL COEFF @ STD COND

SPECIAL CONSTRUCTION & NOTES: * MODEL 7-3623

SERVICE: GAS TO FLOTATION UNIT

LINE NO

PLANT NO

PURCHASE ORDER NO

DATE

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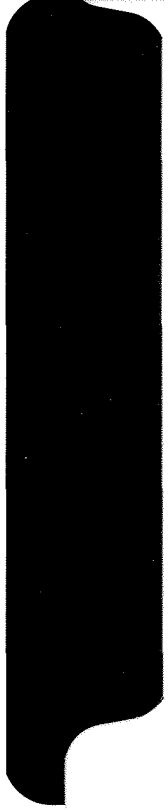
BY DATE



Humble Job
H-B Job 10-154

Specification 10-154-GC-1

PACKAGED VAPOR COMPRESSORS

GC-1A and GC-1B

1.0 GENERAL

This specification applies to the design and construction of two complete compressor units mounted on a single skid complete with compressor motors, scrubber piping, controls and electrical connections. The unit is to be used on an offshore vessel used to treat oil from the Humble deepwater platform in the Santa Barbara Channel. The unit operates in a hazardous location classified as Class I Division 1 Group D.

2.0 PROCESS DESIGN AND CONTROLS (Compressor Skids)

Each compressor shall be capable of delivering a minimum 50 MSCFD of gas from 5" Hq vacuum suction pressure at 90°F to 5 psig discharge pressure. The compressors shall be Root Blower Model XA Size 33 or equal. A scrubber shall be provided for the suction of the units. The scrubber to be designed for 50 psig working pressure with 1/16" C/A ASME Code Section VIII. The scrubber capacity shall be a minimum of 100 MSCFD at 5" Hq vacuum.

Scrubber is to be equipped with a demister and with automatic drain. A blow case type trap shall be provided to deliver the liquid at 5 psig maximum pressure using gas from discharge. The automatic drain valves shall have double block and by-pass valves on both units so traps can be serviced without removing the compressors from service.

3.0 INSTRUMENTS AND CONTROLS (Compressor Skids)

In addition to the automatic scrubber drains specified in Par. 2.0 each scrubber shall be equipped with: (1) Daniel or Penberthy steel body reflex gauge glasses with steel, check type, gauge valves; (2) Magnatrol TF 62 type, steel body explosion proof high level shutdown switch with SPDT microswitches, and UL Label for Class 1, Groupe D hazardous locations.

The compressor suction scrubber is to be equipped with a Crosby (or equal) steel body relief valve. The discharge of each compressor shall also be equipped with a similar relief valve. All relief valves to be set at 50 psig. The scrubber relief valve shall be sized to handle 100 MSCFD minimum gas rate at 150°F.

All items shown on Drawing 154-205 as compressor package shall be included on the unit.

The discharge header of each compressor shall be equipped with SS thermowells suitable for use with Weston or Dillon type dial thermometers.

All items containing gas or liquid hydrocarbons shall have steel or ductile iron housings and/or enclosures.

4.0 CONSTRUCTION (Compressor Skids)

The units shall be completely assembled on a structural steel skid base. All piping and manifolding shall be furnished from suction scrubber to discharge of compressor. Drain piping shall be furnished piped to edge of skid. Relief valve piping shall be furnished piped to one external relief line connection. All pneumatic controls (if any) and instrument tubing shall be installed. Instrument air at 100 psig is available for use, and if used, air piping shall be piped to one connection for each skid.

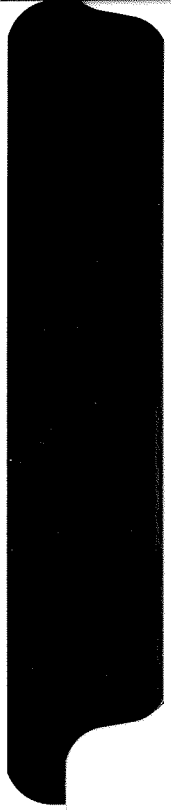
All piping shall conform to the attached Specification 10-154 for Class A piping. All piping shall be air tested for leaks at 1¼ times the design pressure or at the maximum safe test pressure of the compressor cylinders.

The scrubber shall be designed, constructed, tested and certified in accordance with the ASME Code, Section VIII, Latest Edition for a minimum of 50 psig at 150°F with a corrosion allowance of 1/16". The vessel shall have a metal thickness of less than ¼". The compressors shall be equipped with 440 volt, 3 phase, 60 cycle squirrel cage induction motors for use in Class 1, Division 1 hazardous locations.

The compressors shall be belt driven with static proof type V-belts. Belt guards shall be furnished on all drives conforming to State of California Safety Orders. The maximum design compressor speed shall be 500 rpm.

5.0 PROTECTIVE COATINGS

All piping shall be protectively coated externally with Tube Kote TK-21 (or equal) applied after sandblast to white metal. The scrubber shall be internally coated in accordance with Specification 10-154-C1. All external steel surfaces shall be coated in accordance with Specification 10-154-C2.



MAIN CONTROL PANEL

1.0 GENERAL

This specification covers the design and fabrication requirements for a main control panel to be used on an offshore vessel. The panel shall contain the relays, switches, indicating lights and monitoring equipment as shown on the schematic and as specified below. Each item shall be arranged on the face of the control panel as shown on Drawing 154-213. Each item shall have an engraved plastic nameplate, 1/4" white letters on black background, worded as shown on the schematic for each item.

2.0 PANEL ENCLOSURE

The panel enclosure shall be dust-proof, of all steel construction with adequate framing and panel thickness to prevent warping or buckling. Top, bottom, sides and front to be continuously enclosed. The bottom shall have provisions for bolting to a metal plate deck. The rear shall be enclosed the full height and width with one double door, with adequate hinges, locking hasp and gaskets to insure dust tightness. The entire cabinet shall be sandblasted to white metal and coated inside and out with zinc rich primer and two coats of epoxy paint, 10-12 mils total dry film thickness; manufacturer and top coat color to be Socony Paint Products Company #2062. Panel dimensions shall be 6'-6" H x 4'-0" W x 27" D.

3.0 WIRING METHODS

All wiring in the panel shall be type "TW", #16 AWG minimum size. Larger wire shall be used where shown on the schematic. Wiring shall be routed so that wires are contained in wireways or gutters to the maximum extent. Wiring outside of wireways shall be neatly bundled and supported. Each wire shall be labeled at terminations and intermediate points. Wiring shall not be spliced between terminations.

There shall be one or more terminal strips for external connections as shown on the schematic. Terminal strip points shall have pressure type connections. Terminal strips shall be located in close proximity to the conduit entry in top of the panel.

4.0 RELAYS, PUSHBUTTONS AND SWITCHES

The relays shall be mounted neatly and in a modular fashion so as to be accessible and readily removable from the rear of the panel. Each relay shall be labeled with the identifying number shown on the schematic.

120 VAC DPDT relays (10 req'd) shall be Potter Brumfield KRP11AG with 120 VAC 10A contacts.

120 VAC 3PDT relays (25 req'd) shall be Potter Brumfield KRP14AG with 120 VAC 10A contacts.

120 VAC DPDT time delay relay (TDR103) shall be Agastat off delay type Cat. No. 2422AD with 120 VAC 10A contacts.

The "Reset" pushbutton shall be an Allen-Bradley Type 800T momentary pushbutton, Cat. No. 800T-A2A.

The "Fire System Test" selector switch shall be an Allen-Bradley Type 800T cylinder lock selector switch, Cat. No. 800TH31B.

The "Fire System Reset" pushbutton shall be an Allen-Bradley Type 800T momentary pushbutton, Cat. No. 800T-A2A.

5.0 ANNUNCIATOR

Provide two Visi-Con Mark V-18 annunciator designed for exact status and continuous monitoring of switches devices as listed on the control schematics. The Visi-Con Mark V annunciator shall operate on 24 volts A.C., shall be completely factory-wired and totally front accessible so that it may be mounted in a separate control panel. Each annunciator shall contain standard locally available, transparent, sealed plug-in relays; integral flasher circuit; alarm horn contacts; dim, test acknowledge and silence switches; and an integral ground detector and light indicator designed to show any grounds in the wiring. In addition, each system is designed to operate ungrounded and is to be used with normally closed or normally open monitor switches.

Legend nameplates shall be translucent, engraved plastic with black lettering. They shall be illuminated continuously and arranged in a single, vertical row to simplify scanning. Two levels of backlighting for legend plates shall be provided to suit ambient lighting conditions. Each information point shall be equipped with separate green, red, and amber lights concealed behind translucent material and adjacent to the respective illuminated legend nameplates. Red, green and amber lights shall be arranged in vertical columns to immediately isolate norman, abnormal and acknowledged conditions.

The unit shall be equipped with a first out option for all points whose function will be to show which point created an alarm first. The first outage will show red, subsequent outages will go directly to amber.

One 120V/24V transformer shall be furnished with the annunciators.

One RS-2 audible horn shall be furnished and will be mounted remotely.

The nameplate engraving and arrangement is shown on Drawing 154-213.

6.0 Items furnished by Humble but mounted and wired by panel manufacture:

(1) One Edison fire detector unit Model 613
(2) One Sieger Model 1300 gas detector
(3) One Halliburton Model 60 FB flow analyzer
(4) One Keene turbidity meter readout unit.

7.0 The panel manufacturer shall furnish and install an Edwards clock with front adjustable reset.

8.0 The panel manufacturer shall furnish and install a 3 way manual pneumatic shutin valve 1/4" NPT connections. Valvair or equal.

9.0 The panel fabricator shall conduct a complete functional checkout and test of all panel components, when the panel is complete and ready for delivery. The action of all external switches and devices, in accordance with the schematic wiring diagrams shall be simulated for this test. The test shall be witnessed by the Humble representative. The panel fabricator shall provide six (6) copies of the schematic diagram with any changes in terminal strip labeling.

10.0 The following drawings must accompany this specification:

154-212
154-213

POWER EQUIPMENT

1.0 GENERAL

This specification applies to the design and fabrication of an integrated lineup of indoor, three phase, 60 Hz, electrical power equipment consisting of 480V motor starters as shown on the attached single-line diagram and as specified below.

2.0 LOCATION

The equipment will be installed on an offshore vessel taking oil production from an offshore drilling platform near Santa Barbara.

3.0 CODES AND ORDINANCES

The entire electrical assembly shall comply with the requirements of the State of California Electrical Safety Orders and the National Electric Code and the requirements of the United States Coast Guard. Where a conflict occurs, the more stringent code applies.

4.0 480 VOLT MOTOR STARTERS

4.1 This specification covers the design and fabrication requirements for a low voltage motor control center assembly. The assembly shall be complete and ready for operation and shall comply with this specification. Assemblies shall consist of rigid, free standing, metal enclosed, dead-front vertical sections. All equipment shall be installed, maintained and operated from the front.

4.2 Design and Ratings

Motor Control Centers: For 480 volt, three phase, 60 cycle, three wire power system. Design shall be NEMA Type B. The MCC shall include the main power service breaker, and the combination motor starters as shown on the attached single-line drawing and as follows:

4.2.1 Main power service breaker shall be fixed-mount type, 600 ampere frame size, 600 volt rated, three pole, moulded case circuit breaker with interchangeable three phase overcurrent trip device providing inverse time delay trip on overload and instantaneous trip with major fault currents. The breaker shall have a

minimum interrupting capacity of 14,000 amperes symmetrical. The breaker shall have an external front mounted operating handle and trip button. Operating handle shall have a position indicator and provision for locking in "off" position. The breaker shall be Westinghouse type LA or equal.

4.2.2 Feeder breakers for the heater treater power transformers shall be 400 ampere frame, 22,000 amperes interrupting capacity. Westinghouse or equal.

4.2.3 Combination motor starters for 480 volt, three phase motors shall be the circuit breaker type with 600 volt rated, three pole, moulded case circuit breakers having a minimum interrupting capacity as indicated, with adjustable three phase overcurrent trip devices.

All motor starters shall be magnetic, full voltage, single direction type with three (one per phase) thermal overloads. Minimum starter size shall be NEMA Size 1. One SPDT auxiliary contact in addition to the motor coil holding contact shall be provided. Starters shall have a front operated overload reset button and front mounted green indicating Light connected to be "on" when the starter is energized. Starter coils to be for 120V, 60 Hz electrical power.

All combination starters shall have a breaker external mounted operating handle with position indicator and provisions for locking in the "off" position. A "stop" push button shall be included on all starters.

All starters shall be the plug-in type, capable of installation or removal with buses energized.

4.2.4 Main bus continuous rating shall be 600 amperes and shall be braced to withstand 22,000 amperes interrupting capacity.

4.2.5 All breakers shall have an interrupting capacity of 14,000 amperes symmetrical minimum.

4.2.6 120 volt control power shall be furnished externally.

5.0 GENERAL CONSTRUCTION

5.1 Enclosures: All enclosures shall be NEMA, Type 1 construction with all compartment doors gasketed with neoprene sponge rubber.

5.2 Equipment Identification: All equipment shall be identified with engraved plastic name plates (black with white letters) attached to door. Terminal blocks shall be clearly labeled. See attached single line diagram for engraving data.

5.3 Equipment Arrangements: The vendor shall determine the best arrangement for his design, the space limitations shown and shall include a sketch of his proposed arrangement with his proposal. Top and bottom conduit get-a-way shall be provided.

5.4 Standards: All equipment and assemblies shall be designed and fabricated in accordance with the latest NEMA, IEEE and ASA Standards. All standard NEMA items not specifically called out shall nevertheless be included.

6.0 SPECIFICATIONS AND DRAWINGS

These specifications are intended to cover all equipment, material and standards of workmanship to be employed in the work shown on the drawings, called for in the specifications, or reasonably implied by the terms thereof. The drawings and specifications are intended to supplement one another and any part of the work that may be mentioned in the one and not represented in the other shall be alone the same as if it had been mentioned or represented in both. Work or material of a minor nature which may not be specifically mentioned but which may reasonably be assumed as necessary for completion of the work, shall be performed, or furnished the same as if shown or mentioned.

7.0 INFORMATION TO BE SUPPLIED BY BIDDER/VENDOR

Bidders shall supply with the quotation three (3) copies of outline dimensional drawings and complete descriptive literature with the necessary information to completely evaluate the quotation. It is intended that this data will be used to prepare final installtion drawings while the equipment is being manufactured. Physical dimensions, conduit stubup space and an equipment layout will be necessary to make the quotation acceptable. The selected vendor shall supply ten (10) copies of the wiring diagrams, parts lists, installation instructions and operating and maintenance instructions within three (3) weeks of receipt of order.

ELECTRICAL WORK

1.0 GENERAL

The Contractor shall furnish all material (except that which is enumerated in Specification 10-154-WS as Humble furnished items) and complete all work described herein and shown on the plans. All work to comply with Title 24 of the California Administrative Code and the National Electric Code, latest edition.

2.0 SCOPE OF WORK

The Contractor's work includes the hookup of all power feeders to all motors shown on the single-line diagram, Drawing No. 154-211. The hookup includes the setting of the new motor control center in the vessel's power equipment room and the running of feeders to motors previously mentioned. The Contractor shall also be responsible for supplying all conduit and wire to all control stations and shutdown devices from either the new motor control center or the main control panel as shown on Drawing 154-213. The Contractor shall be responsible for setting the main control panel (furnished by Humble) and connecting all conductors to all external devices as shown on the Electrical Schematic Diagram, Drawing No. 154-212. It is intended that the Contractor make all electrical items completely functional.

3.0 MATERIALS

The Contractor shall use all new materials, first quality, approved by UL wherever standards have been established by that agency, and shall meet these specifications and other requirements on the plans. It is intended that the Contractor shall furnish and install all items of material required for a complete installation.

3.1 Conduit

All conduit shall be rigid metal conduit with a copper content of less than 4/10 of 1%.

3.2 Conductors

All conductors shall be aluminum and shall have thermoplastic insulation type TW unless specified otherwise in the plans.

Type THW is specified in most large conductors. All wire less than #12 size shall be copper with the type of insulation specified. Some power conductors which do not leave the switchgear room are specified as copper to reduce conduit size. Conductor connections of dissimilar metals, example copper to aluminum, shall be made with cadium plated connectors or some other method approved by Humble.

3.3 Connectors

Wire connectors shall be the pressure type (solderless). All connectors shall be insulated or they shall be properly taped where necessary.

3.4 Junction Boxes

All junction boxes shall have screwed covers and shall be suitable for use in a Class I, Division I, hazardous area. The junction boxes shall be made of copper free aluminum. Exception: All junction boxes in the pressurized rooms shall be Crouse-Hinds T, X, or L series with gasketed covers.

3.5 Control Stations

All hand-off-auto selector switches, start-stop pushbuttons and miscellaneous selector switches shall be Crouse-Hinds Series OFC or approved equal.

4.0 ELECTRICAL CONSTRUCTION

The installations shall conform to the latest applicable rules of the NEC, State and local codes. The workmanship shall be of the highest grade. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of Humble Oil.

4.1 The conduit system installation shall meet or exceed the requirements of the NEC. Minimum size of conduit shall be ½". Field-made bens and off sets shall be made with an approved hickey or conduit bending machine. Changes in direction of runs shall be made with bends or cast metal fittings. Raceways as installed shall be entirely free of obstructions. All conduit shall be reamed, burrs removed, and cleaned for proper introduction of wires and cables.

4.2 Wiring in cabinets or panels shall be neatly arranged, cut to proper length and surplus wire removed. All wires and circuits shall be properly labeled; at both ends and in all junction boxes Brady or equal labels shall be used.

Tests

After the electrical system installation is completed, and the motors checked for proper rotation, the Contractor, in the presence of the Humble Engineer, shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with these specifications and plans.

5.0 GUARANTEE

All equipment, material and workmanship to be furnished under this section shall be guaranteed by the Contractor in writing for a period of one year from the date of acceptance..

ALARM AND CONTROL SCHEDULE

SHEET 1 OF ____

SITE: OFFSHORE VESSEL
DATE: ____
REV: ____

ABNORMAL CONDITION	LOCATION	SENSOR		ACTION	RESULT
		NO.	MFGR.		
LOW PRESSURE	OIL PIPELINE	PAL 301	Custom Component	Deenergizes Electric Circuit	Alarm Audible & Visual
	FLOW SPLITTER, FWKO V1	PSL 302	Custom Component	Deenergizes Electric Circuit	Closes FCV/30 Alarm Audible & Visual

ALARM AND CONTROL SCHEDULE

SHEET 2 OF ____

SITE: OFFSHORE VESSEL
DATE: ____
REV: ____

ABNORMAL CONDITION	LOCATION	SENSOR		ACTION	RESULT
		NO.	MFGR.		
HIGH PRESSURE	OIL PIPELINE	PSH 301	Custom Component	Deenergizes Electric Circuit	Closes FCV/30 Alarm Audible & Visual
	FLOW SPLITTER, FKWO V1	PSH 303	Custom Component	"	"
	HEATER TREATER V-2A	PSH 307A	"	"	Closes FCV/31A Alarm Audible & Visual
	HEATER TREATER V-2B	PSH 307B	"	"	Closes FCV/31B Alarm Audible & Visual
	HEATER TREATER V-2C	PSH 307C	"	"	Closes FCV/31C Alarm Audible & Visual
	HEATER TREATER V-2D	PSH 307D	"	"	Closes FCV/31D Alarm Audible & Visual

ALARM AND CONTROL SCHEDULE

SHEET 3 OF ____

SITE: OFFSHORE VESSEL
DATE: ____
REV: ____

ABNORMAL CONDITION	LOCATION	SENSOR NO.	SENSOR MFGR.	ACTION	RESULT
HIGH LEVEL	FLOW SPLITTER, FWKO V1	LSH 101	Fisher 2800-252V	Deenergizes Electric Circuit	Closes FCV/30 Alarm Audible & Visual
	WATER SURGE TANK T2	LAH 151	Fisher 2800-252V	"	Alarm Audible & Visual
	OIL SUMP TANK t-3	LAH 155	"	"	"
	"	LAH 156	"	"	"

ALARM AND CONTROL SCHEDULE

SHEET 4 OF ____

SITE: OFFSHORE VESSEL
DATE: ____
REV: ____

ABNORMAL CONDITION	LOCATION	SENSOR NO.	SENSOR MFGR.	ACTION	RESULT
LOW LEVEL	FLOW SPLITTER, FWKO V1	LSL 104	National Tank Leveltronic #5204	Deenergizes Electric Circuit	Closes FCV/30 Alarm Audible & Visual
	HEATER TREATER V2A	LSL 105A	Fisher 2800-252V	"	Closes FCV/31a Alarm Audible & Visual
	"	LSL 106A	National Tank Leveltronic #5204	"	"
	HEATER TREATER V2B	LSL 105B	Fisher 2800-252V	"	Closes FCV/31B Alram Audible & Visual
	"	LSL 106B	National Tank Leveltronic #5204	"	"
	HEATER TREATER V2C	LSL 105C	Fisher 2800-252V	"	Closes FCV/31C Alarm Audible & Visual
	"	LSL 106C	National Tank Leveltronic #5204	"	"
	HEATER TREATER V2D	LSL 105D	Fisher 2800-252V	"	Closes FCV/31D Alarm Audible & Visual
	"	LSL 106C	National Tank Leveltronic #5204	"	"
	WATER SURGE TANK T2	LAL 152	Fisher 2800-252V	"	Alarm Audible & Visual

ALARM AND CONTROL SCHEDULE

SHEET 5 OF ____

SITE: OFFSHORE VESSEL
DATE: ____
REV: ____

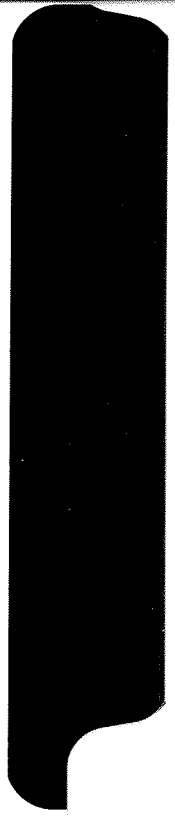
ABNORMAL CONDITION	LOCATION	SENSOR		ACTION	RESULT
		NO.	MFGR.		
MISCEL-LANEOUS	DISCHARGE OF FLOTATION UNIT	Excessive Turbidity	Keene	Deenergizes Electric Circuit	Alarm Audible & Visual
	OIL PIPELINE	Leak Detector		"	Closes oil pipeline valve, Alarm audible & visual

Humble Job
H-B Job 10-154

Specification 10-154-EOV

SOLENOID VALVES

All electrically operated valves marked EOV or solenoid operated valves marked SOV on the drawings shall be 1/4" stainless steel body, soft seat, explosion proof, water tight, for universal operation, ASCO Catalog No. 8320114 with 115VAC or 24VDC coils as required for the circuit application.



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SPECIFICATION PIPING

CUSTOMER HUMBLE OIL & REFINING COMPANY **JOB NO.** 10154

PLANT LOCATION OFF-SHORE VESSEL

CLASS A

Commodities: Oil and Gas

150 lb. ANSI Standard-Raised Face-Carbon Steel

MAXIMUM TEMPERATURE:

500° F.

MAXIMUM PRESSURE:

275 P.S.I. @ 100°F.
150 P.S.I. @ 500°F.

PIPE: ASTM A-53 Gr. A or B

2" and larger schedule 40 seamless beveled ends.
1½" and smaller schedule 80 threaded and coupled.

FITTINGS:

2" and larger to be ASTM A-234 Gr. WPA buttweld schedule 40'.
1½" and smaller to be 3000 lb. forged steel screwed, ASTM A-105 Gr. 2

FLANGES:

2" and larger 150 lb. USAS RF weld neck ASTM A-181 Gr. 1 schedule 40 bore. Flanges connecting to equipment and special items are to match those connections in rating, size, bore, etc. Use flat faced flanges where indicated on drawings. All faces to be serrated.

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GASKETS:

Flexitallic Style CG or Spirotallic 912, Type 304 SS and asbestos.

BOLTING:

Studbolts, ASTM A-193 Grade b-7 full threaded with 2 ASTM A-194 Class 2 heavy pattern Hex. nuts.

UNIONS:

1½" and smaller 3000 lb. forged steel screwed, ASTM A-105 GR. 2, steel to steel integral seat.

PLUGS:

1½" and smaller - screwed solid bar stock.

SPECIFICATION PIPING

REV

CUSTOMER HUMBLE OIL & REFINING COMPANY JOB NO. 10-154

PLANT LOCATION OFF-SHORE VESSEL

(CLASS A)

BRANCH CONNECTIONS:

Use butt weld tees, 3000# F.S. couplings, or 3000# Bonney Weld-O-Lets (or Thread-O-Lets for 1½" and smaller). Non-reinforced stub-ins are acceptable on relief header. Stainless steel tubing to be used beyond ' valve on instrument connections (See Instrument Piping Spec.).

VALVES:

Valves to be as shown on the drawings or valve list.

Fabrication to be in accordance with ANSI Code B31.3, Section V. All welds subject to radiograph inspection by owner. Acceptability is in accordance with ASME Code Section VIII, Paragraph UW-51, latest edition.

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SPECIFICATION PIPING

CUSTOMER HUMBLE OIL & REFINING CO. **JOB NO.** 10-154

PLANT LOCATION OFF SHORE VESSEL

CLASS AA

Commodities: Instrument Air

PRESSURE RATING:

125 psi @ 100° F.

FITTINGS:

2" and smaller to be screwed, 150# ASTM A182 GR F304
(Laddish or Equal)

UNIONS:

2" and smaller to 150# screwed ASTM 182 GR. F304
(Laddish or Equal)

VALVES:

Gate Valves to be Powell Fig. 1832 200# screwed end Gate Valve Type 316 S.S. (or equal)
Check Valves to be Powell Fig. 1847 200# screwed end swing check valve, Type 316 S.S.

PIPE:

ASTM A-312 Seamless Type 304, Schedule 40

NOTE:

(1) Use Teflon tape on thread make-up of all joints.

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SPECIFICATION PIPING

REV

CUSTOMER HUMBLE OIL & REFINING COMPANY **JOB NO.** 10154

PLANT LOCATION OFF-SHORE VESSEL

CLASS B

Commodities: Oil and Gas

300 lb. ANSI Standard-Raised Face-Carbon Steel

MAXIMUM TEMPERATURE:

500°F.

MAXIMUM PRESSURE:

720 P.S.I. @ 100°F.
675 P.S.I. @ 350°F.

All items same as Class A except flanges. All flanges to be 300 lb. USAS RF weld neck ASTM A-181 GR. 1.

VALVES:

Valves to be as shown on drawing or listed on the valve list.

FABRICATION:

Same as Class A.

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SPECIFICATION PIPING

CUSTOMER HUMBLE OIL & REFINING COMPANY **Job No.** 10-154

PLANT LOCATION OFF-SHORE VESSEL

CLASS C:

Commodities: Oil and Gas

600-lb.ANSI Standard-Raised Face-Carbon Steel

MAXIMUM TEMPERATURE:

500°F.

MAXIMUM PRESSURE:

1440 psi @ 100°F.
1250 PSI @ 500°F.

PIPE:

2" and larger to be ASTM A-53 Grade B schedule 80 seamless.
1½" and smaller ASTM A-53 GR A or B schedule 80.

FITTINGS:

ASTM A-234 GR. WPA
Schedule 80 for 2" and larger sizes and
Schedule 80 for 1½" and smaller.

FLANGES:

600 lb. USAS Raised face, serrated, welding neck, with bore to fit pipe
ASTM A-105 GR. 1 or 2.

GASKETS:

Flexitallic Style CG or Spirotallic 912, Type 304 SS and asbestos.

BRANCH CONNECTIONS:

Use 3000# Bonney Weld-O-Lets, 3000# couplings, or butt weld tees.
Threaded connections to be used only to connect instruments.
Use all 3000# F.S.fittings and schedule 160 nipples to block valve.
Stainless steel tubing to be used beyond block valve on instrument connections. (See instrument piping specification).

VALVES:

Valves to be as shown on drawings or valve list.

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SPECIFICATION PIPING

REV

CUSTOMER HUMBLE OIL & REFINING COMPANY

JOB NO. 10-154

PLANT LOCATION OFF-SHORE VESSEL

(CLASS C)

BOLTING:

Studbolts, ASTM A-193 Grade B7 full threaded with 2 ASTM A-194 Class 2H heavy pattern hex nuts.

Fabrication to be in accordance with USAS Code for pressure piping B31.3, Section V. All welds subject to radiograph inspection by owner. Acceptability is in accordance with ASME Code Section VIII, Paragraph UW-51, Latest Edition.

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SPECIFICATION PIPING

REV

CUSTOMER HUMBLE OIL & REFINING COMPANY **JOB NO.** 10-154

PLANT LOCATION OFF-SHORE VESSEL

CLASS D (CLASS D)

Commodities: Oil & Gas.
900 lb. USAS Standard raised-face carbon steel.

MAXIMUM TEMPERATURE:

500°F.

MAXIMUM PRESSURE:

2160 psig. @ 100°F (900# ASA Standard).

PIPE: ASTM A-53 GR. B, seamless:

2" thru 6": Schedule 80 seamless, beveled ends.
1½" and smaller: Schedule 80 threaded and coupled.

FITTINGS:

2" and larger: ASTM A-234 GR. WPA buttweld Schedule 80.
1½" and smaller: 3000# forged steel screwed, ASTM A-105 Gr. 2.

FLANGES:

900# USAS RF, ASTM A-105 GR. 1 or 2, welding neck, bore to match pipe. Flanges connecting to equipment and special items are to match those connections in rating, size, bore, etc. Use flat-face flanges where indicated on drawings. All faces to be serrated.

GASKETS:

Flexitallic style CG or spirotallic 912, type 304 s.s. and asbestos.

BOLTING:

Studbolts, ASTM A-193 GR. B-7, full threaded, with two ASTM A-194 Class 2H heavy pattern nex nuts.

BRANCH CONNECTIONS:

Use 3000# Bonney weld-o-lets, 3000# couplings, or butt-weld tees. Threaded connections to be used only to connect instruments. Use all 3000# F.S. fittings and Schedule 160 nipples to block valve. Stainless steel tubing to be used beyond block valve on instrument connections. (See Instrument Piping Specification.)

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SPECIFICATION PIPING

REV

CUSTOMER HUMBLE OIL & REFINING COMPANY JOB NO. 10- 154

PLANT LOCATION OFF-SHORE VESSEL

(CLASS D)

VALVES:

Valves to be shown on drawings or valve lists.

FABRICATION:

In accordance with USAS Code for pressure piping B31.3, Section V. All welds subject to radiograph inspection by Owner. Acceptability is in accordance with ASME Code Section VIII, Paragraph UW-51, latest edition.

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EPOXY-EPOXY MASTIC COATING

1. TYPE OF SYSTEM: 10 Mil Epoxy-Epoxy Mastic System.

2. TYPE OF SURFACE: Black or galvanized steel.

3. TEMPERATURE LIMITATIONS: Up to 225° F.

4. REFERENCES.

4.1 The grades of surface preparation and application procedures used in these specifications are described in detail in the following Steel Structures Painting Council Specifications, and reference may be made to them.

4.1.1 Solvent Cleaning: SSPC SP-1-63.

4.1.2 White Metal Blast Cleaning: SSPC SP-5-63, using 16- to 35-mesh Silica sand, and 80 - 10 psi Nozzle pressure.

4.1.3 Shop, Field, and Maintenance Painting: SSPC PA-1-53T.

5. STANDARD SCHEDULE. (All Humble Products)

	Min. Dry Film Thickness (Mils)	Min. Drying Time Per Coat (Hr.)
5.1 Black or galvanized steel surfaces:		
1st coat: Epoxy Primer 6666	2.0	8-12
2nd coat: Epoxy Mastic 6664	6.0	8-12
3rd coat: Epoxy Finish 6671	2.0	8-12
5.2 Minimum dry film thickness in 3 coats	10	

5.3 Do not exceed 72 hours drying time between coats.

5.4 The bottom chime on all bolted tanks must be caulked with fiber glass reinforced epoxy prior to the application of the coating system.

6. SURFACE PREPARATION.

6.1 For new work, remove all oil and grease by Solvent Cleaning, and clean all welds. Follow by White Metal Blast Cleaning. On galvanized surfaces, blast to roughen byt not remove the galvanizing, then remove protruding particles of galvanizing by power buffing without destroying the anchor pattern.

6.2 For maintenance work, clean areas to be spot patched using methods specified in Paragraph 6.1. Remove all loose, cracked, or nonadherent coating. Remove all foreign matter from surface of existing sound coating before adding refresher coat.

7. APPLICATION.

7.1 Storage, mixing, straining, thinning, and application of paint shall be in accordance with manufacturer's recommendations. Remove all paint spatter and overspray from surfaces not intended to be painted.

7.2 For new work, apply not less than three coats, as specified in Paragraph 5, to a final total dry film thickness of not less than 10.0 mils as measured by an Elcometer or Mikrotest dry film gauge. If 10.0 mils are not obtained in three coats, add additional finish coats until a minimum of 10.0 mils is obtained. A stripe coat of Epoxy Primer 6666 shall be brushed on all edges, welds, and crevices before the first prime coat is applied.

7.3 For maintenance work, spot patch and apply an overall refresher coat. For spot patching, apply the same number of coats and film thickness specified for new work in Paragraph 7.2. For refresher coat, apply one finish coat over the existing sound coating. In either case, the finish coat shall match the color of the existing finish coat.

7.4 Contractor shall check the entire coated surface with a Tinker & Rasor M-1 holiday detector, or approved equal. Areas containing holidays shall receive additional finish coats until holiday-free.

8. SAFETY

8.1 Take proper precautions before cleaning surfaces in areas where fire or explosion hazards exist. Ground all air-moving and spray equipment. Keep sources of ignition 150 feet up wind from open containers of paint and solvents and openings in tanks and pipelines. Dispose of waste so as not to cause property damage or bodily injury.

SPECIFICATIONS FOR APPLICATION OF COATINGS TO EXTERNAL SURFACES

1.0 SCOPE AND NATURE OF WORK

1.1 All work shall be performed in strict accordance with these specifications. All phases of the work shall be available at all times for observation by a representative of Humble. Inspection is at the option of the purchaser. Notify Humble 7 days before starting coating work and submit detailed schedule of work.

2.0 SURFACE PREPARATION

2.1 Remove deposits of oil and grease by solvent cleaning in accordance with methods outlined in Steel Structures Painting Council Specification SP 1-63.

2.2 Grind smooth all rough welds and sharp steel edges; remove all weld spatter and welding flu.

2.3 Sandblast all surfaces to be coated to near white as defined by the Steel Structures Painting Council in "Surface Preparation Specification No. 10", to provide a surface free from all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter.

2.4 After sandblasting, all dust shall be removed from the prepared surfaces preparatory to the application of coating by brushing, wiping with clean, dry rags, or by other acceptable methods.

2.5 Since blasted surfaces rust rapidly, the coating must be applied as soon as possible after blasting. Do not allow blasted surfaces to remain uncoated overnight. If any rust forms on the surface or oil, grease or other organic matter contacts the surface prior to application of coating, the surface shall be reblasted.

3.0 MIXING

All mixing, straining, and thinning of coating shall be in accordance with the manufacturer's printed instructions and recommendations.

4.0 STANDARD SCHEDULES

4.1 External Coating System

Apply Humble Rust Ban 191 to minimum dry film thickness of 3 mils. Apply Rust Ban 195 curing solution and wash and scrub thoroughly to remove all white salt deposition.

5.0 APPLICATION

All material shall be applied in accordance with detailed instructions by the manufacturer.

6.0 INSPECTION

6.1 Each coat shall be inspected prior to the application of the next coat. Areas found to show signs of improper application shall be repaired or recoated in accordance with the manufacturer's recommendations.

6.2 Dry film thickness shall be determined by the Elcometer Thickness gauge or comparable instrument.

6.3 Surface preparation and application of all coatings shall be subject to the approval of the Field Inspector.

6.4 Supplier to notify purchaser seven days prior to starting coating work giving complete schedule of the coating so that purchaser may inspect any or all of the work at his option.

7.0 GUARANTEE

Supplier to guarantee the coatings to be free of defects in workmanship and material and to meet the requirements of this Specification. He will repair or replace any defective or substandard work, revealed within 12 months of the first service date, at no cost to Humble.

WORK BY PRIME CONTRACTOR

1.0 GENERAL

This specification applies to the work and material to be furnished by the Prime Contractor. The Prime Contractor is the contractor selected by Humble Oil and Refining Company to be responsible for the overall assembly of facilities on the offshore vessel and also the final assembly check out and testing at the offshore site. The offshore vessel is to be located near Santa Barbara approximately 9 miles off shore. The assembly of the facilities on the vessel is to be done at a location stated in the Humble Request for Quotation.

2.0 SCOPE OF WORK BY PRIME CONTRACTOR

Prime Contractor shall be responsible for the coordination of all work. He shall review all supplier's drawings and do necessary final engineering to adapt the final selected equipment to the facility. He shall adapt the facilities by designing and installing all necessary structures, structural supports, braces, hangers, access platforms and walkways. He shall be responsible for field checking all as-built equipment prior to planning its installation to assure dimensional fit up. Prime Contractor shall receive, unload, store if necessary, and make final assembly of all equipment items furnished by Humble. He shall be fully responsible and accountable for all material and equipment delivered to him by Humble. The Prime Contractor shall make all necessary provisions to secure the equipment for safe transport to the offshore site. He shall assume the cost of repairs to equipment or material not properly protected.

The Prime Contractor shall furnish all work, material and equipment except that furnished by Humble, necessary to complete the work described in the specifications herein, the specifications referenced herein, the specifications referenced herein and shown on the drawings listed herein. The material and equipment furnished by Humble is described in Par. 4. The Prime Contractor is responsible for compliance with all Federal, State and local codes, laws and regulations at the fabricating site and at the final offshore jobsite.

All work to be designed and constructed to withstand forces generated by the maximum vessel movements during rough seas: 10 feet of heave at a 6 second interval, 5^{o} pitch and 8^{o} roll.

3.0 WORK, MATERIAL AND EQUIPMENT BY HUMBLE

Humble Oil & Refining Company shall furnish only the following:

(1) Ten copies of these Specifications and Drawings

(2) Installation permits from Federal Government and State of California (if required)

(3) All heat exchangers described in Section 2.2

(4) Flow Splitter complete with instruments and controls as described in Section 2.1

(5) Four Heater Treaters with instruments and controls as described in Section 2.3

(6) Flotation Unit as described in Section 3.2

(7) All pumps with motors as described in Sections 3.1 and 3.2

(8) All tanks with instruments as described in Section 3.1

(9) All instruments and control valves listed in the Specifications

(10) All electrical switchgear as described in Section 5.0

(11) Main control panel as shown on the Drawing No. 154-213

(12) Packaged compressor unit as described in Section 4.0

(13) Fire and gas detectors as described in Section 1.3

4.0 EQUIPMENT LAYOUT, LOCATING AND SETTING

The equipment location and layout shall comply with the locations shown on the drawings. Minor location changes to adapt for the final equipment selections will be allowed, however, these must be approved by the Humble Engineer. The Prime Contractor shall design and install the equipment attachments and anchors to the vessel structure. The Prime Contractor shall coordinate the final nozzle and appurtenance orientation on vessel, and equipment to assure proper fit-up. The Prime Contractor shall design and install additional structural supports for equipment as needed.

The Prime Contractor shall make final alignment of all running equipment at the offshore site to assure proper conditions for operation without damage to the equipment. The final cleaning, servicing and preparation for operation is the Prime Contractor's work.

5.0 PIPING AND INSTRUMENTATION

Specification 10-154-WS-P, Section 8.0 applies to this work. Contractor to make all piping layout drawings and submit for approval by Humble.

6.0 ELECTRICAL WORK

The electrical work is described in the attached Electrical Work Specification 10-154-EWS (Section 8.0). Contractor to make detailed electrical layout drawings and submit for approval by Humble.

The Prime Contractor shall be responsible to check the layout against the final selected equipment and make necessary modifications to adapt. The complete electrical control and power systems shall be checked out and put into operation as part of the Prime Contractor's work.

7.0 PROTECTIVE COATING

The Prime Contractor shall protectively coat piping as described in Specification 10-154-PC-7 (Section 8.0) and 10-154-C2.

8.0 Thermal insulation shall be provided by the Prime Contractor as described in Specification 10-154 PVHI (Section 8.0).

PIPING AND INSTRUMENT WORK

1.0 GENERAL

The piping and instrument work is defined by the Piping and Instrument Diagrams. The Prime Contractor shall provide all piping as indicated on the P & I Diagrams.

2.0 PIPING SUPPORTS, HANGERS, BRACKETS, CLIPS AND ANCHORS are to be designed, furnished and installed by Prime Contractor in accordance with Specification 10-154-WS-S. Provisions shall be made on pipe and conduit supports for installation of 20% additional future pipes and conduits. The layout of these supports is subject to approval by the Humble Engineer prior to starting the detail design. Design loads shall provide for pipes full of water and conduits with the specified conductors.

3.0 All piping work shall conform to the ANSI Code for Pressure Piping Petroleum Refinery Piping ANSI B31.3, latest edition. Piping materials shall conform to the class indicated on the P & I Diagrams and shown in the Piping Specifications in Section 7.0.

4.0 All piping welds are subject to radiographic inspection by inspectors as directed by Humble. The initial inspection will be paid for by Humble. Repairs and re-inspection costs are to be paid by the Prime Contractor. The acceptability of welds is in accordance with ASME Code, Section VIII, Par. UW-52.

5.0 All piping is to be hydrostatically tested at 150% of its design pressure as determined by the highest setting of any relief valve or rupture disc in the system. Only potable grade water shall be used for testing. All equipment and instruments shall be isolated prior to the tests. All tests shall be held for a minimum of one hour. Pressure recorders shall be used and a record shall be kept of each test. After final test all piping shall be drained and dried by passing warm air through the piping.

6.0 Instrument tubing materials shall conform to those shown on the drawings. All tubing shall be continuously supported in steel channels or firmly attached to piping runs. All tubing bends shall be neatly made with tubing benders.

7.0 All instruments shall be as directed in the data sheets and/or on the specification sheets.

8.0 The Prime Contractor shall use only those craftsmen that are fully qualified and whose trades are normally engaged in piping and instrument installation. The work shall be first class in all respects including appearance. Humble reserves the right to refuse acceptance of any piping or instrument installations due to poor appearance. All piping to be run plumb and square.

STRUCTURAL STEEL

AND MISCELLANEOUS IRON WORK

1.0 GENERAL

1.1 Prime Contractor shall design, furnish material and construct:

(1) All piping and electrical conduit supports including main pipeways, hangers, anchors, brackets, clips and miscellaneous attachments to make the work a complete job. Pipeway and conduit supports shall be a maximum of 10 feet specaing along pipeways and conduit runs.

(2) Main facility structure which shall be layed out and designed to full satisfaction of Humble Oil Company with provisions to prevent spills from entering sea. All necessary access stairs, handrails and platforms are included in the work.

(3) Platforms, walkways and handrails as indicated and required by State of California Safety Orders.

2.0 DESIGN AND CONSTRUCTION

Design and construction shall comply with the following:

(1) State of Calfiornia Safety Orders
(2) United States Coast Guard Regulations
(3) AISC Code (latest edition)
(4) Uniform Building Code (latest edition) except wind load to be 30 psf.
(5) The structure shall be designed for roll, pitch and heave as specified by the Naval Architect.

Shop drawings shall be submitted in triplicate to the Humble Engineer for approval prior to starting the fabrication work.

2.1 All welds shall be continuously seal welded to eliminate crevices that cannot be properly protected with the protective coating.

2.2 All edges and corners shall be ground to a minimum of 1/8" radius prior to coating.

2.3 All steel work shall be protectively coated in accordance with Specification 10-154-C2.

PROTECTIVE COATING OF PIPING

1.0 GENERAL

This specification applies to Humble's offshore vessel near Santa Barbara. Its purpose is to define what piping on the vessel is to be coated and reference to the specifications for that work.

"Piping" as used herein means pipe, valves, flanges, bolts and fittings.

2.0 PIPING TO BE COATED EXTERNALLY

All piping on the vessel is to be coated externally in accordance with Specification 10-154-C2 except stainless steel piping.

3.0 PIPING TO BE COATED INTERNALLY

The following piping shall be internally coated:

Piping shown on the P & I Diagrams as "E" emulsion, "SW" salt water, "PW" process water, "SG" sour gas, "VR" vapor recovery. The protective coating shall be Tube-Kote TK21, 12 to 15 mils thick heat cured epoxy (or approved equal). All welds to be ground smooth prior to application of coating. Surface preparation to be same as Specification 10-154-C2.

4.0 PIPING NOT TO BE INTERNALLY COATED

The following piping shown on the P & I Diagrams shall not be internally coated:

Steam piping and air piping.

THERMAL INSULATION

1.0 GENERAL

This specification applies to installing thermal insulation for Humble offshore vessel near Santa Barbara, California. The piping and equipment to be insulated and the insulation thickness are shown on the piping and instrument drawings. The work includes but is not necessarily limited to the following:

(1) Steam and condensate piping and equipment
(2) Heater Treaters (4)

Some piping and equipment is internally coated and welding to these items for insulation anchors is forbidden.

2.0 PIPING INSULATION

2.1 Piping is defined as all pipe, valves, fittings, flanges and instrument connections.

2.2 No insulation should be applied until all items are cleaned and tested. Pipe insulation shall be applied with staggered circumferential joints. Pipe insulation shall be wired on with annealed wire, either black or galvanized, spaced approximately 6" O.C. for piping 6" and smaller and on 9" centers for larger pipe in the following gauges:

Piping 12" and under - 16 gauge
Piping larger than 12" - 14 gauge

The wires should be drawn taut to imbed them flush with the face of the insulation, firmly twisted, the excess ends cut off and the twisted ends bent over and imbedded in the insulation. Bands may be substituted for wire if desired.

All cracks, voids and joints in the pipe insulation should be filled with cement either trowelled or palmed on.

Good application practice dictates that piping and equipment insulation, located either indoors or outdoors, be completely finished as soon as possible after roughing in.

2.3 Pipe bends and long and short radius ells may be insulated with mitred segments of pipe insulation. Dimensions of mitred segments for long and short radius ells are shown in reference tables in this manual.

Individual mitred segments may be prefabricated into ell covers by cementing together to form two half covers. A cement finish should be applied over insulation on bends and ells, after it has been securely wired on, to give a smooth, even surface.

Fittings and valve bodies under 2½" in size may be insulated with insulating cement applied in approximately ½" thick layers to a thickness equal to that of adjacent insulation.

For piping 3" and larger, the entire surface of screwed and welded fittings and valves (including bonnet) and the bodies of flanged fittings and valves may be insulated with block insulation ½" thinner than adjacent insulation. The blocks shall be securely wired in place and finished with a total of ½" of insulating cement applied in two layers.

Flanged fittings and valves may be insulated in a manner similar to flange insulation.

Flanges, Flanged Fittings and Valves

For permanent type flange covers, either sectional pipe insulation of proper size to fit the outside diameter of the flange or block insulation lags shall be used to cover the flange. The flange insulation shall be ½" thinner than the adjacent pipe insulation, allowing for ½" of cement finish, and should extend approximately 2" over the ends of the pipe insulation. Annular spaces between flanges and pipe insulation may be filled with rings or collars of blocks or insulating cement. The flange insulation shall be wired on and finished with ½" of insulating cement trowelled to a smooth even surface.

2.4 Sheet Metal Jackets

Insulated lines are to be finished with a metal jacket. Metal jackets consist of aluminum. Flat aluminum half hard in roll form of .016" and heavier thicknesses with an integral vapor barrier and should be cut and machine rolled

to the proper "stretch out" to allow for a 2" or 3" horizontal lap. Aluminum should be secured to pipe insulation with stainless steel bands and seals either ½" or 3/4" wide by .015" or .020" thickness. Spacing for bands on pipe insulation averages 9" to 12". End or circumferential laps in jackets should be a minimum of 2".

Finishes on Bent Pipe, Fittings, Valves and Flanges

Fittings, valve and flange insulation shall be finished with either a fibrated asphalt emulsion or a canvas. Generally where a waterproof felt finish is applied on piping, the pipe bend, fitting, valve and flange insulation is finished with a fibrated asphalt emulsion trowelled on to a total wet thickness of ¼" which shrinks when dry to 1/8" thick. Where this finish comes in contact with straight pipe insulation, such as on bends or ells, the mastic finish should extend under the felt several inches. The mastic finish may be reinforced with 1" galvanized 19 gauge mesh wire or asphalt impregnated glass fabric.

Prefabricated aluminum fitting covers may be substituted for the above fitting finish.

3.0 EQUIPMENT INSULATION

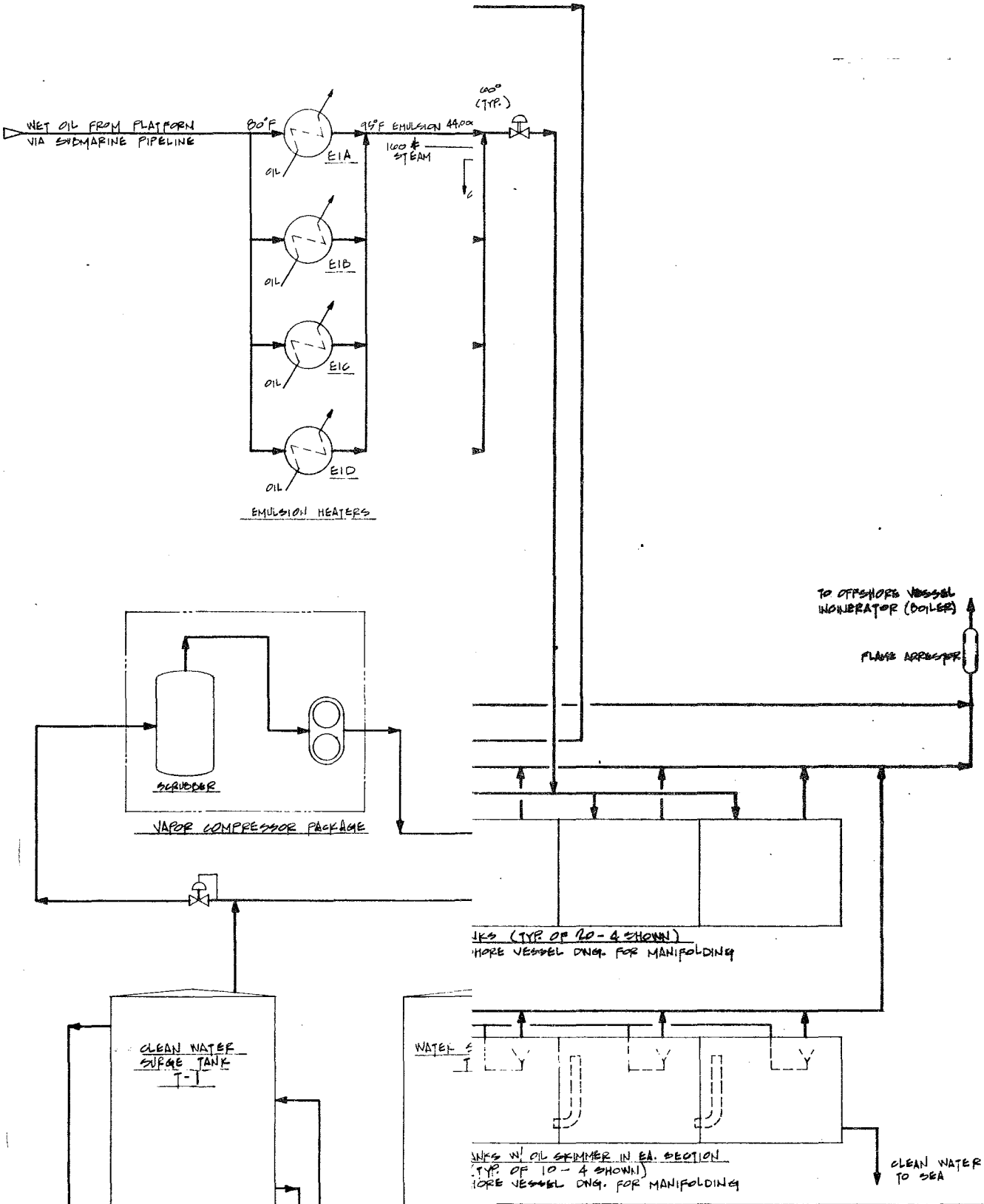
All vessels, ducts, exchangers, etc., requiring insulation on which pipe insulation cannot be used shall be insulated with block insulation in thicknesses and types as recommended under various sections of this manual.

Blocks shall be applied in staggered joint construction held temporarily in place with applicator's rubber bands, or springs and securely wired or banded on approximately 9" centers with black annealed wire or steel bands. The gauge of the wire or the width and gauge of the bands will vary with the size of the equipment and the service which it performs. Blocks shall be closely fitted in place and all joints painted with insulating cement. When equipment is insulated cold or before being put into service, allowances should be made for expansion to prevent excessive strain on the wires or bands securing the blocks.

On vessels, exchangers, etc., which are 54" in diameter and under, blocks should be used to insure the block insulation conforming closely to the curvature of the vessel. On equipment over 54" in diameter, a 6" wide flat block may be used. Should 12" wide blocks be used, they may require scoring on the underside to give proper fit depending on diameter of vessel.

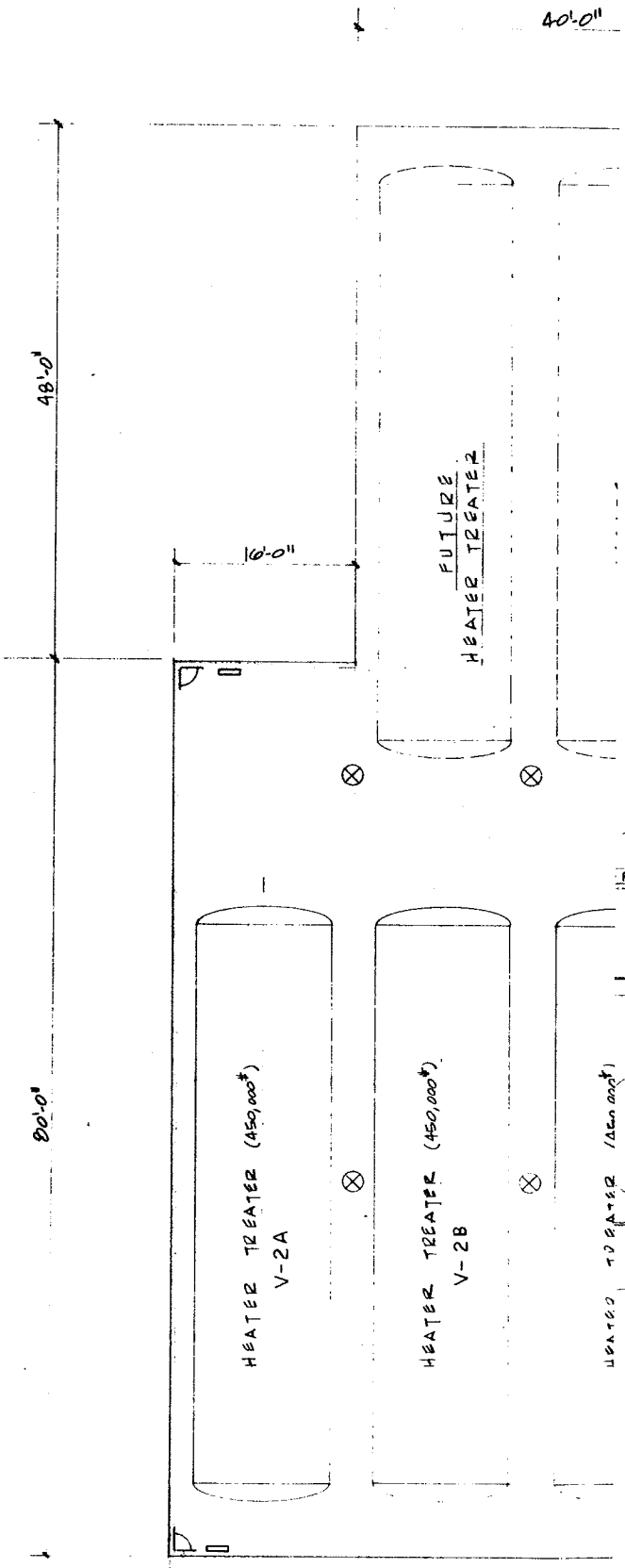
DRAWING LIST

154-200	Process Flow Diagram
154-201	Equipment Layout
154-202	Piping and Instrumentation Diagram Crude Oil System
154-203	Piping and Instrumentation Diagram and Water Cleaning System
154-204	Piping and Instrumentation Diagram Salt Water Cooling System
154-205	Piping and Instrumentation Diagram Tank Vapors System
154-206	Legend and Valve List
154-207	Clean Water Surge Tank T-1
154-208	Water Surge Tank T-2
154-209	Oil Sump Tank T-3 Salt Water Cooling Tank T-4
154-211	Electrical Single Line Diagram
154-212-1	Electrical Control Schematic Diagram
154-212-2	Electrical Control Schematic Diagram
154-213	Main Control Panel Elevation and Nameplate Schedule
154-214	Electrical Symbols



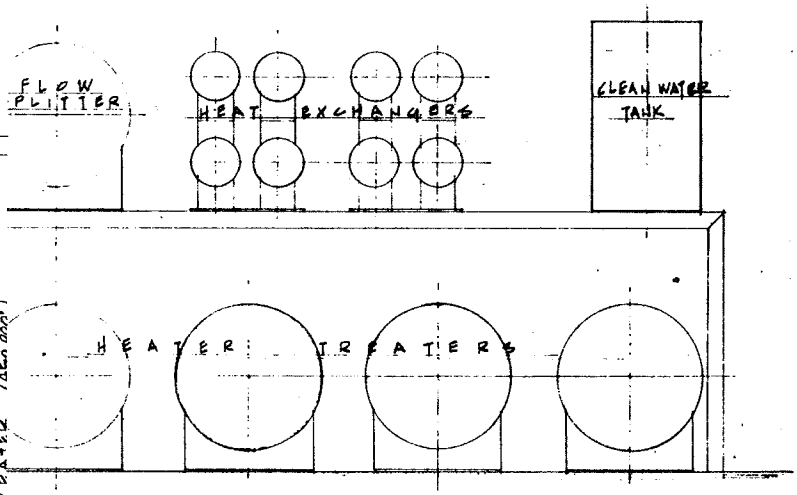
DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL		HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
APPR.	PROCESS FLOW DIAGRAM OFFSHORE VESSEL	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN: M CHECKED:	ENGR. SECTION APPROVED:	SCALE: NONE DATE: 8-13-71

154-200



PLAN - LOWER

1/8" = 1'-0"



ELEVATION

1/8" = 1'-0"

DEEPWATER OFFSHORE PLATFORM SANTA BARBARA CHANNEL		HOBBS-BANNERMAN CORPORATION ENGINEERS CONSTRUCTORS SANTA FE SPRINGS CALIFORNIA
EQUIPMENT LAYOUT OFFSHORE VESSEL	APPR.	HUMBLE OIL & REFINING COMPANY PRODUCTION DEPARTMENT
DRAWN TIZ CHECKED	ENGR. SECTION APPROVED	SCALE NOTED DATE 8-17-71

154 - 201

V-1 FLOWSPLITTER, FWKO, & HEATER DESIGN PRESS. 150 psig @ 250°F
12' ϕ x 50' Lg.

V-2A HEATER TREATER
DESIGN PRESS. 150 psig @ 250°F
12' ϕ x 50' LG.
V-2B, V-2C, & V-2D IDENTICAL

PIG RECEIVER

OIL FROM PIPELINE
80°F, 20,000 BPD

E-1A

E-1B

E-1C

E-1D

EMULSION HEATERS
E-1A, E-1B, E-1C, & E-1D
5,000,000 BTU/HR. EA.

E-2A

E-2B

E-2C

E-2D

COOLERS
E-2A, E-2B E-2C, E-2D

COOLING SALT WATER IN & OUT
SEE DWG. NO. 154-204

RELIEF TO OFFSHORE VESSEL TANKS

150# NITROGEN OR INERT GAS

TREATING CHEMICAL INJECTION

FUTURE

FUTURE HEAT EXCHANGERS E3A THRU E3D

STEAM TRAP - 1" ARMCO TROLEX # 614

STRAINER 1" CARGO TYPE 'GT'

1" INSULATION

1½" INSULATION
1½" P.P. INSULATION

* DENOTES ITEMS TO BE SPECIFIED & FURNISHED BY VESSEL SUPPLIER.

OIL TO OFFSHORE VESSEL TANKS

PRODUCED WATER
160 PSIG STEAM
CONDENSATE

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
CRUDE OIL SYSTEM
OFFSHORE VESSEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN RM | ENGR. SECTION | CHECKED | APPROVED | DATE 8-12-71 | SCALE NO. 1 | 154-202

PC	PRESSURE CONTROLLER
PI	PRESSURE INDICATOR
PS	PRESSURE SWITCH
PR	PRESSURE RECORDER
PAL	PRESSURE ALARM, LOW
PAH	PRESSURE ALARM, HIGH
PSL	PRESSURE SHUTDOWN, LOW
PSH	PRESSURE SHUTDOWN, HIGH
PSV	PRESSURE SAFETY VALVE
PCV	PRESSURE CONTROL VALVE

LC	LEVEL CONTROLLER
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
LAL	LEVEL ALARM, LOW
LAH	LEVEL ALARM, HIGH
LSL	LEVEL SHUTDOWN, LOW
LSH	LEVEL SHUTDOWN, HIGH
LCV	LEVEL CONTROL VALVE

FE	FLOW ELEMENT, GAS
FI	FLOW INDICATOR
FR	FLOW RECORDER
FSL	FLOW SHUTDOWN, LOW
FCV	FLOW CONTROL VALVE

TC	TEMPERATURE CONTROLLER
TI	TEMPERATURE INDICATOR
TAL	TEMPERATURE ALARM, LOW
TSH	TEMPERATURE SHUTDOWN, HIGH
TCV	TEMPERATURE CONTROL VALVE

GG	GAGE GLASS
RD	RUPTURE DISC
CE	CAPACITANCE ELEMENT
M	LIQUID METER
PA	NET OIL ANALYZER
EOV	ELECTRICALLY OPERATED VALVE
⊗	TRANSDUCER, DIFFERENTIAL PRESSURE
⊗	TRANSDUCER, STATIC PRESSURE
⊗	TRANSDUCER, TEMPERATURE
RO	RESTRICTION ORIFICE

A-V	PIPELINE IDENTIFICATION LINE SIZE 4" PIPING CLASS 'A' PIPING SPEC. 'V'
C	CONDENSATE
DF	DIESEL FUEL
DG	DRY GAS
E	EMULSION
FG	FUEL GAS
FW	FIREWATER
GD	GRAVITY DRAIN
GY	GLYCOL
JW	JETTING WATER
MP	METER PROVER
MUD	MUD TO BARGE LOADING
OD	OIL DRAIN
PW	PROCESS WATER
POW	POTABLE WATER
SG	SOUR GAS
SWG	SWEET GAS
TL	THERMINOL
V	VENT, RELIEF
VR	VAPOR RECOVERY
WC	WELL CLEANUP
WW	WASHDOWN WATER
UA	UTILITY AIR
STM.	160# SATURATED STEAM
SW	SALT WATER

V1	150# ANSI R.F. FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG. # 800171 WITH NO 20A TRIM (OR EQUAL)
V2	300# ANSI R.F. FLGD. STEEL BODY BALL VALVE, WRENCH OPERATED, FULL OPENING, CAMERON FIG. # 800371 WITH NO. 20A TRIM (OR EQUAL)
V3	150# ANSI R.F. STEEL BODY WAFER CHECK VALVE, SS. TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)
V4	300# ANSI R.F. STEEL BODY, WAFER CHECK VALVE, S.S. TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)
V5	150# USAS R.F. FLGD. STEEL BODY GLOBE VALVE, PACIFIC FIG. N2163 WITH #1 TRIM (OR EQUAL)
V6	600# ANSI R.F. FLGD. STEEL BODY SWING CHECK VALVE, WITH 316 S.S. TRIM & REMOVABLE SEATS. FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)
V7	900# ANSI R.F. FLGD. STEEL BODY SWING CHECK VALVE WITH 316 S.S. TRIM & REMOVABLE SEATS. FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)
V8	600# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# 800601 WITH NO. 20A TRIM (OR EQUAL)
V9	900# ANSI R.F. FLGD. STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# 800901 WITH NO. 20A TRIM (OR EQUAL)
V10	600# ANSI BUTTWELD END STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# 800602 WITH NO. 20A TRIM (OR EQUAL)
V11	900# ANSI BUTTWELD END STEEL BODY FULL OPENING BALL VALVE, WRENCH OPERATED, CAMERON FIG.# 800902 WITH NO. 20A TRIM (OR EQUAL)
V12	300# ANSI R.F. WAFER CHECK VALVE, STAINLESS STEEL BODY & TRIM, VITON 'A' SEAL, MISSION DUO-CHEK (OR EQUAL)
V13	150# ANSI R.F. FLGD. STEEL BODY, SWING CHECK VALVE, FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)
V14	150# R.F. WAFER, BUTTERFLY VALVE, LUG TYPE, LEVER OPERATED, LEMCO FIG. 2154-5122312 (OR EQUAL)
V15	600# SCREWED, STEEL BODY, BALL CHECK VALVE, VOGT SERIES 701 (OR EQUAL)
V16	125# SWING CHECK VALVE, C.I. BODY, 316 S.S. TRIM, REMOVABLE SEAT, FRANK WHEATLY 'FRANK-FLO' (OR EQUAL)
V17	150# SCREWED BRONZE GATE VALVE LUNKENHEIMER FIG. 3151 (OR EQUAL)
V18	150# SCREWED STAINLESS STEEL GATE VALVE PACIFIC FIG. 55 (OR EQUAL)
V19	125# FLANGED C.I. BODY GATE VALVE WITH RISING STEM, BRONZE TRIM LUNKENHEIMER FIG 1641 (OR EQUAL)
V19a	125# FLANGED C.I. BODY SWING CHECK VALVE WITH BRONZE TRIM LUNKENHEIMER FIG. 1790 (OR EQUAL)
V21	225# W.O.G. SCREWED CAST IRON GATE VALVE, WITH RISING STEM, BRONZE TRIM LUNKENHEIMER FIG. NO. 1640 (OR EQUAL)
V25	150# R.F. FLGD. FGD. STEEL GATE VALVE, B-B, OS&Y, 11-13% CR. TRIM LUNKENHEIMER FIG. 1751-B2
V30	900# SCRD. BOLTED BONNET FORGED STEEL BODY GATE VALVE, O.S.&Y. WITH 316 S.S. TRIM SMITH FIG. 800 (OR EQUAL)
V40	BAR STOCK NEEDLE VALVE DRAGON #5507, OR 5707 (OR EQUAL)

900 ASA

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

LEGEND & VALVE LIST
OFFSHORE VESSEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN JSG | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 7-22-71

154-206

T-1
CLEAN WATER SURGE TANK
200 BBL. API 650 WELDED

T-2
WATER SURGE TANK
200 BBL. API 650 WELDED

100# AIR

TO VAPOR COMPRESSOR

TO OFFSHORE VESSEL TANK

SKIMMER

SKIMMER

OVERFLOW

FLOTATION UNIT
25,000 B/D

* DENOTES ITEMS FURNISHED W/ UNIT

TURBIDITY PROBE

TURBIDITY METER & ALARM

(5) SAND DRAWOFF VALVES

2"-150# B'FLY VLV. W/ LUNKENHEIMER OPERATOR 4710-E100-12 (TYP.)

FUTURE CONN.

P-1A

P-1B

EFFLUENT PUMPS
25,000 B/D EACH

PRODUCED WATER

TO OFFSHORE VESSEL TANK

P-5A

P-5B

TO SEA TUBE

TO SHIP'S TANK

T-3
RECOVERED OIL SUMP TANK
5'-0" ϕ x 8'-0" S/S

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

PIPING & INSTRUMENTATION DIAGRAM
DRAIN & WATER CLEANING SYSTEM
OFFSHORE VESSEL

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN TK | ENGR. SECTION | SCALE NONE
CHECKED | APPROVED | DATE 8-12-71

154-203

T4
200 BBL.
SALT WATER COOLING TANK
2-RING API 650 WELDED

6"A-SW

E2A CRUDE OIL COOLER

E2B CRUDE OIL COOLER

E2C CRUDE OIL COOLER

E2D CRUDE OIL COOLER

OPEN TOP TANK

OIL DETECTOR

2" NPT

12"

10"

6"

18" PIPE

SOV 90 N.O.

SOV 91 N.C.

FCV 32

FCV 33

* 6" CLAYTON, CAST BRONZE, 150# ASA RF FLG'D. FIG. 100 GLOBE VALVE W/ NAVAL BRASS TRIM. EQUIPPED AS ALL CLAYTON 1826 VALVES EXCEPT WITH 316 OR 304 S.S. TUBING, VALVES, STRAINER & SOLENOID WETTED PARTS.

SALT WATER FROM OFFSHORE VESSEL'S PUMPS

6"-1102 gpm FIREWATER SUPPLY

FLOWSPLITTER

VAPOR COMPRESSOR

3"

4"
412 gpm

HEAT EXCHANGERS

HEAT EXCHANGERS

UPPER LEVEL

HEATER TREATER

3"

4"
750 gpm

HEATER TREATER

4"

HEATER TREATER

3"

HEATER TREATER

OIL SUMP

SPRAYING SYSTEMS CO. "FULL JET" SPRAY NOZZLE # 3/4" H40W 22 GPM (TYPICAL ALL NOZZLES)

LOWER LEVEL

RETURN SALT WATER TO OFFSHORE VESSEL'S DISPOSAL THRU SEA CHEST

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
SALT WATER COOLING SYSTEM
OFFSHORE VESSEL

DRAWN RMYOE | ENGR. SECTION | SCALE NONE

CHECKED | APPROVED | DATE 8-17-71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

154-204

VAPOR COMPRESSORS

SCRUBBER

TO INCINERATOR

FLAME ARRESTOR

2"A-SG

TO OFFSHORE VESSEL INCINERATOR

PSV

PSH

PI

6"A-VR

LSH

T

2"A-E

PACKAGED UNIT

2"A-E

6"A-VR

VAPORS TO OFFSHORE VESSEL INCINERATOR

8"A-V

OIL TANKS - (TYPICAL 20 TANKS - 4 SHOWN)

BY HUMBLE OIL PRODUCTION DEPT.

BY HUMBLE OIL MARINE DEPT.

OFFSHORE VESSEL TANKS

TO SKIMMING PUMP

WATER TANKS - (TYPICAL 10 TANKS - 4 SHOWN)

WATER SURGE TANK

CLEAN WATER TANK

FLOTATION UNIT

WATER CLEANING SYSTEM
SEE DWG. NO. 154-203

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM

SANTA BARBARA CHANNEL

PIPING & INSTRUMENTATION DIAGRAM
TANK VAPORS SYSTEM
OFFSHORE VESSEL

DRAWN TJR

CHECKED

ENGR. SECTION

APPROVED

SCALE NONE

DATE 8-12-71

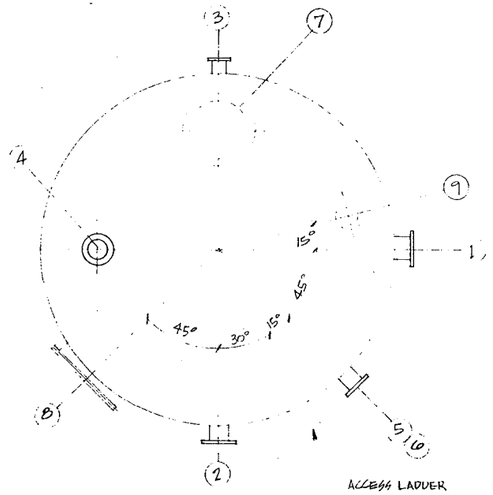
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

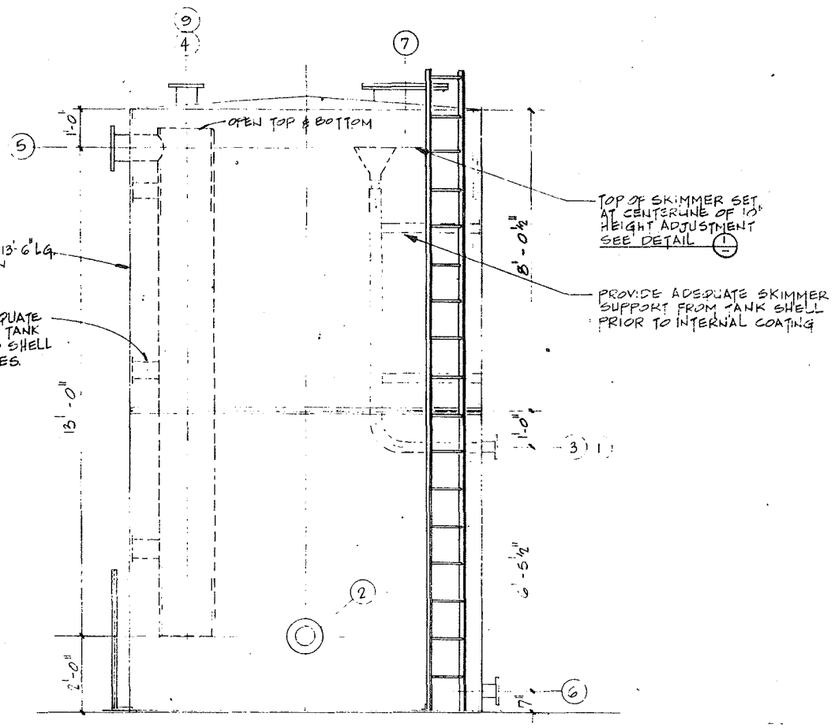
154-205

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION
1	6"	150# ASA RF	WATER INLET
2	6"	150# ASA RF	WATER OUTLET
3	3"	150# ASA RF	SKIMMER (SEE DETAIL)
4	6"	150# ASA RF	VAPOUR RECOVERY
5	6"	150# ASA RF	OVERFLOW
6	4"	150# ASA RF	DRAIN
7	20"	API 650	ROOF MANHOLE
8	24"x20"	API 650	SHELL CLEANOUT
9	4"	125# ASA F.F.	VACUUM RELIEF VALVE



ORIENTATION PLAN

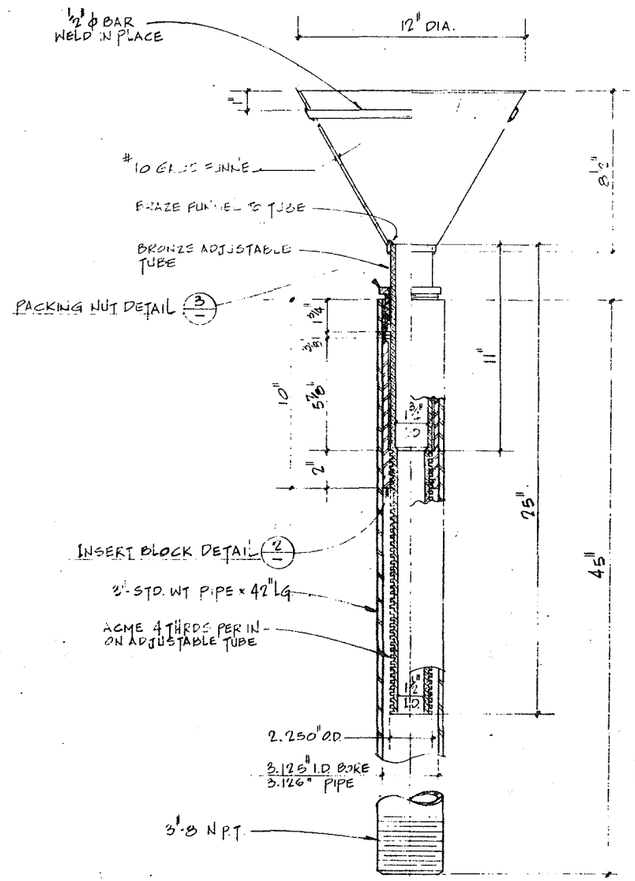


ELEVATION

CLEAN WATER SURGE TANK T-1

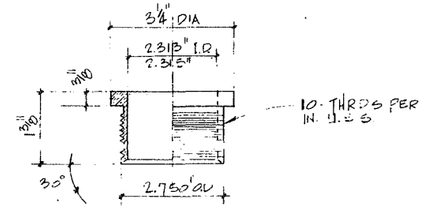
2-RING - 200 BBL. 9'-2¾" DIA. x 16'-1" HIGH

½" = 1'-0"



OIL SKIMMER ASS'Y DETAIL 1

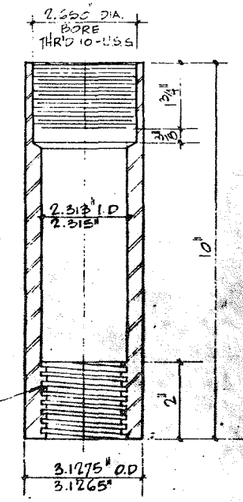
3" = 1'-0"



PACKING NUT DETAIL 3

6" = 1'-0"

MAT'L :- BRONZE



INSERT BLOCK DETAIL 4

6" = 1'-0

MAT'L :— S.A.E. 1020 STEEL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

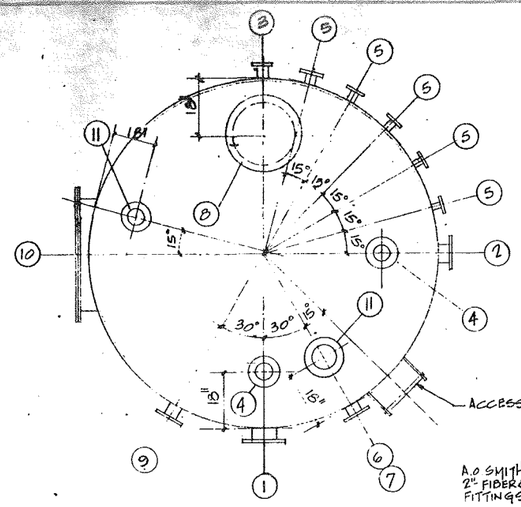
CLEAN WATER SURGE TANK T-1
OFFSHORE VESSEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

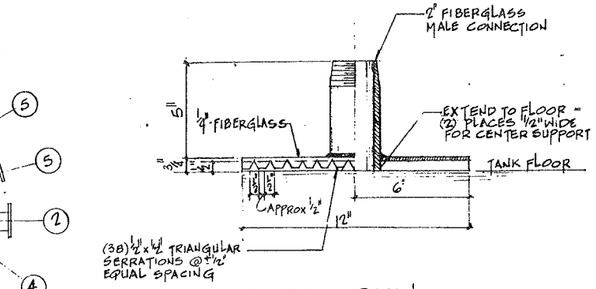
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAFT. | ENGR. SECTION
CHECKED | APPROVED
SCALE: AS NOTED
DATE: 7-22-71

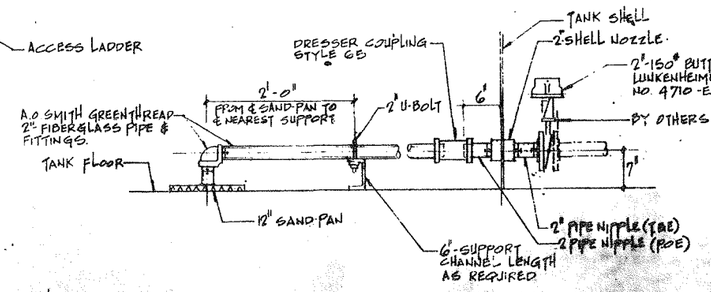
154-207



ORIENTATION PLAN

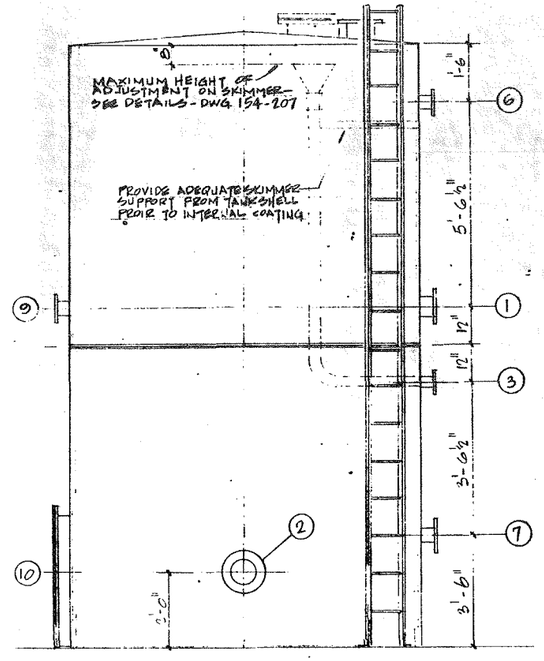


SAND-PAN DETAIL



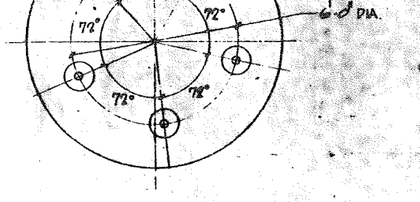
SAND-PAN SUPPORT & FITTINGS (5 REQ'D)

NOTE
ALL PIPE & FITTINGS INSIDE TANK TO BE A.O. SMITH GREENTHREAD



ELEVATION

WATER SURGE TANK - T2
O-RING - 222 EBL, 8'-2 3/4" DIA X 16'-1" HI
½" = 1'-0"



SAND-PAN LOCATION PLAN
N.T.S.

NOZZLE SCHEDULE

NO	SIZE	RATING	DESCRIPTION	QTY
1	6"	150# ASA RF	WATER INLET	1
2	8"	"	WATER OUTLET	1
3	3"	"	SKIMMER (SEE DETAIL DWG. 154-207)	1
4	6"	"	VAPOR RECOVERY	2
5	2"	"	SAND DRAWOFF	5
6	4"	"	LEVEL ALARM - HIGH	1
7	4"	"	LEVEL ALARM - LOW	1
8	20"	API 650	ROOF MANHOLE	1
9	4"	150# ASA RF	LEVEL CONTROL	1
10	24"x36"	API 650	SHELL CLEANOUT	1
11	4"	125# ASA FF	VACUUM RELIEF HATCH	1

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

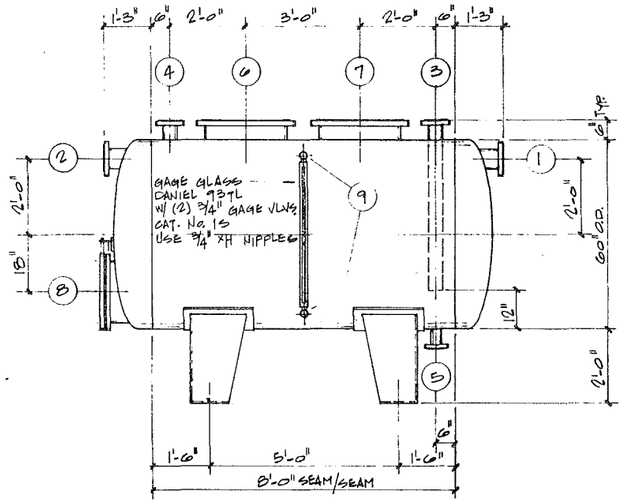
WATER SURGE TANK T-2
OFFSHORE VESSEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN: EWB
CHECKED:
ENGR. SECTION:
APPROVED:
SCALE: NOTED
DATE: 7-22-71

154-208

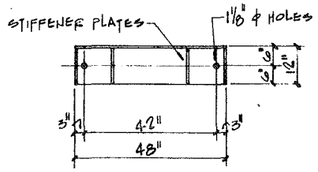


OIL SUMP TANK T-3
ELEVATION
1/2" = 1'-0"

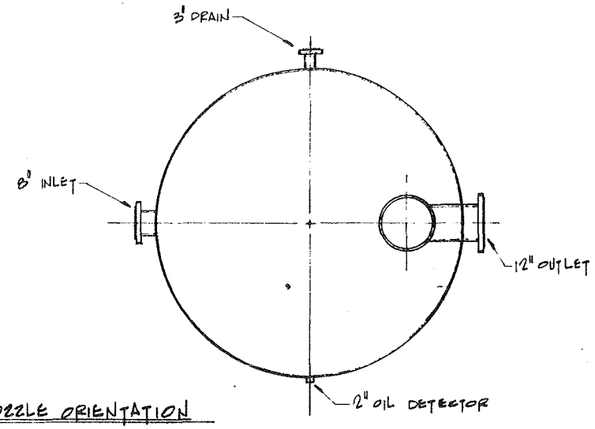
NOZZLE SCHEDULE

NO.	SIZE	RATING	DESCRIPTION
1	6"	150# ASA RF	OIL INLET
2	6"	"	OVERFLOW
3	4"	"	LEVEL CONTROL
4	4"	"	LEVEL CONTROL
5	3"	"	DRAIN
6	26"	*	PUMP CONNECTION
7	26"	*	PUMP CONNECTION
8	20"	API STD.	MANWAY W/ DAVIT
9	3/4"	2000# F.S. OPT'L	GAGE GLASS (TYP. 2 PLCS.)

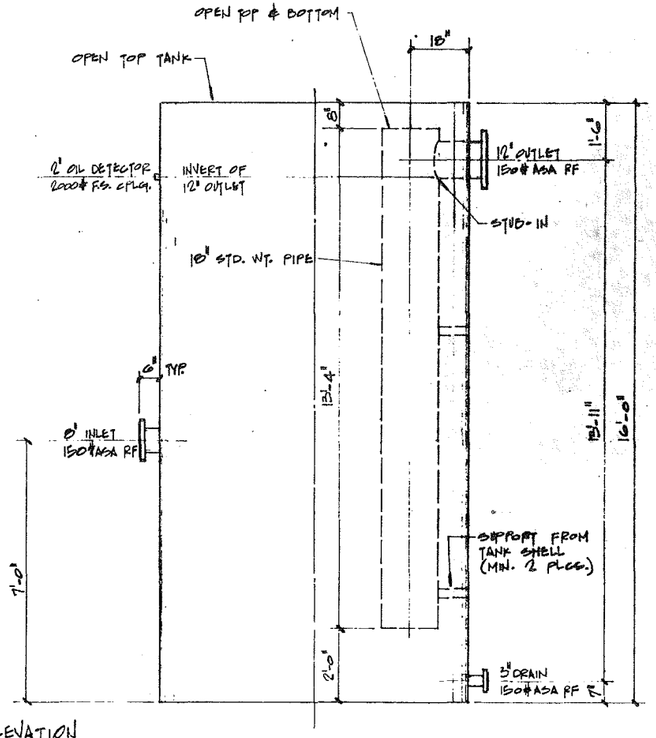
* "TUBE TURN" PART NO. 705 CLASS 7B WELD-NECK FLANGE.



SUPPORT LEG DETAIL



NOZZLE ORIENTATION



SALT WATER COOLING TANK T-4
200 BBL 2 RING API 650 WELDED
1/2" = 1'-0"

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

NO.	DATE	REVISIONS	BY	CHK.	APPR.

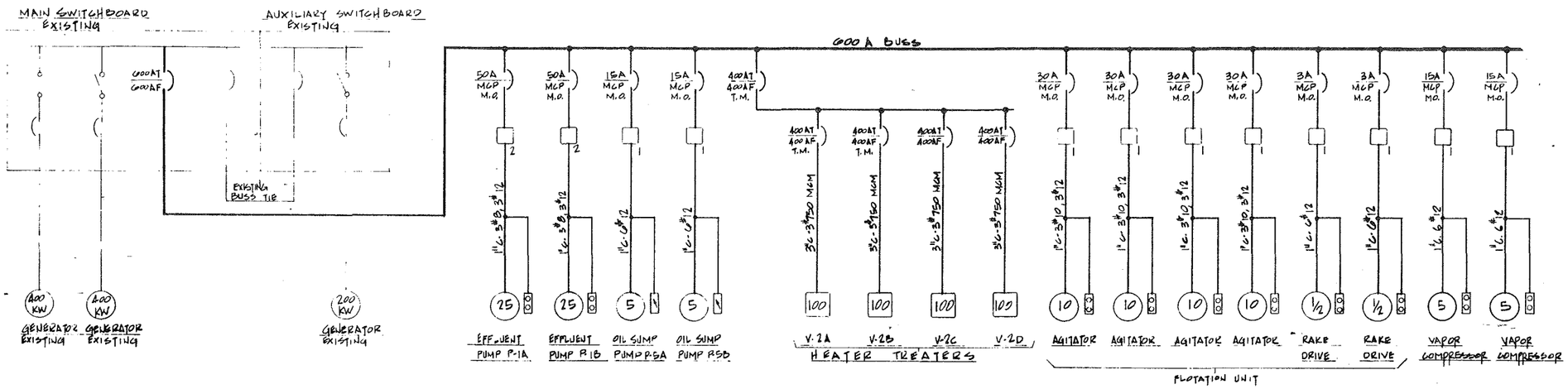
OIL SUMP TANK T-3
SALT WATER COOLING TANK T-4
OFFSHORE VESSEL

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN RM | ENGR. SECTION | APPROVED | CHECKED | SCALE NOTED | DATE 8-13-71

154-209

CONNECTED LOAD = 463 AMPS



LEGEND

400A 400AF T.M. — MOULED CASE CIRCUIT BREAKER 3 POLE 400 AMP CONTINUOUS CURRENT RATING, 400 AMP FRAME THERMAL MAGNETIC

30A MCP M.O. — COMBINATION MOTOR STARTER WITH 30 AMPERE CONTINUOUS CURRENT RATING, MOTOR CIRCUIT PROTECTOR WITH MAGNETIC ONLY TRIP AND SIZE 2 STARTER

20 — 20 HORSEPOWER MOTOR

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL
SINGLE LINE DIAGRAM
OFFSHORE PLATFORM

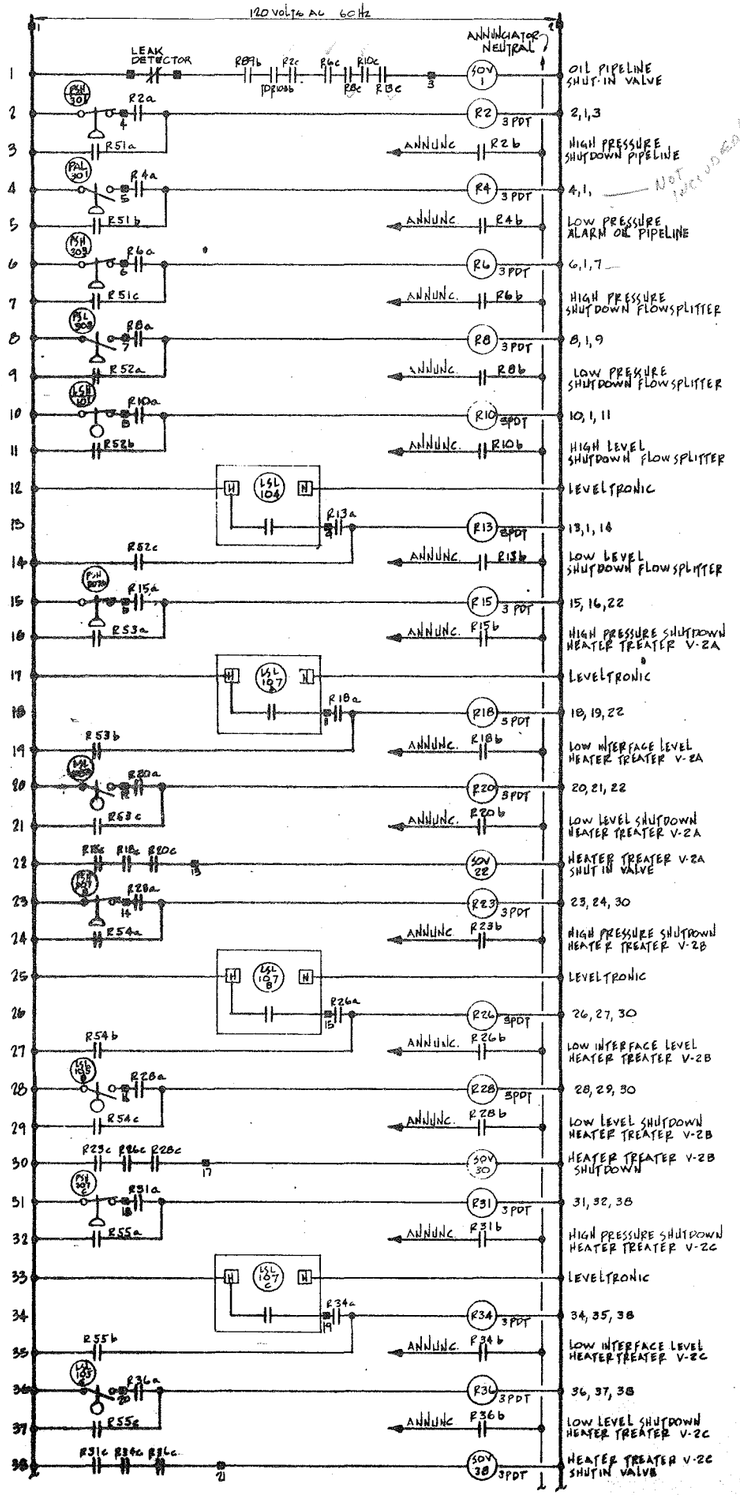
DRAWN TR
CHECKED
ENGR. SECTION
APPROVED

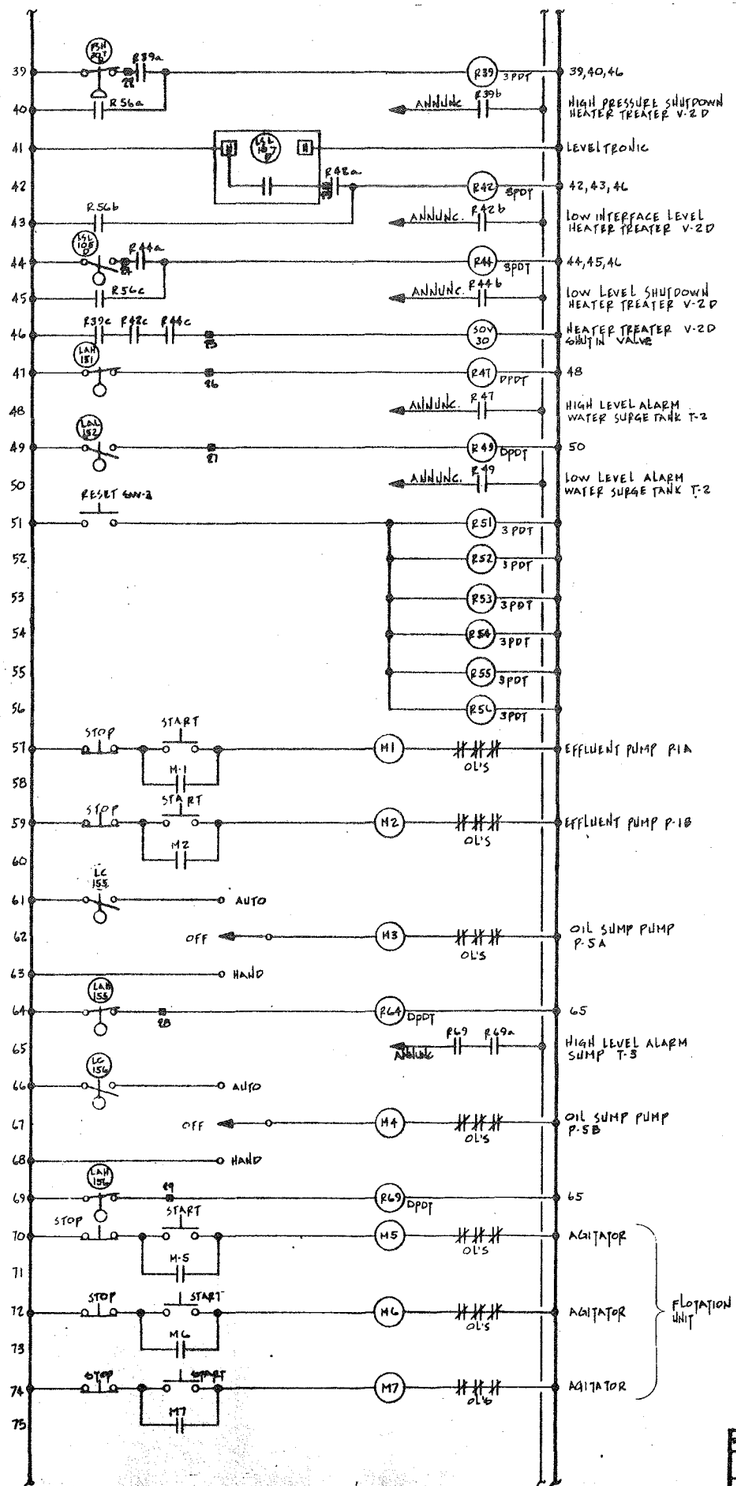
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

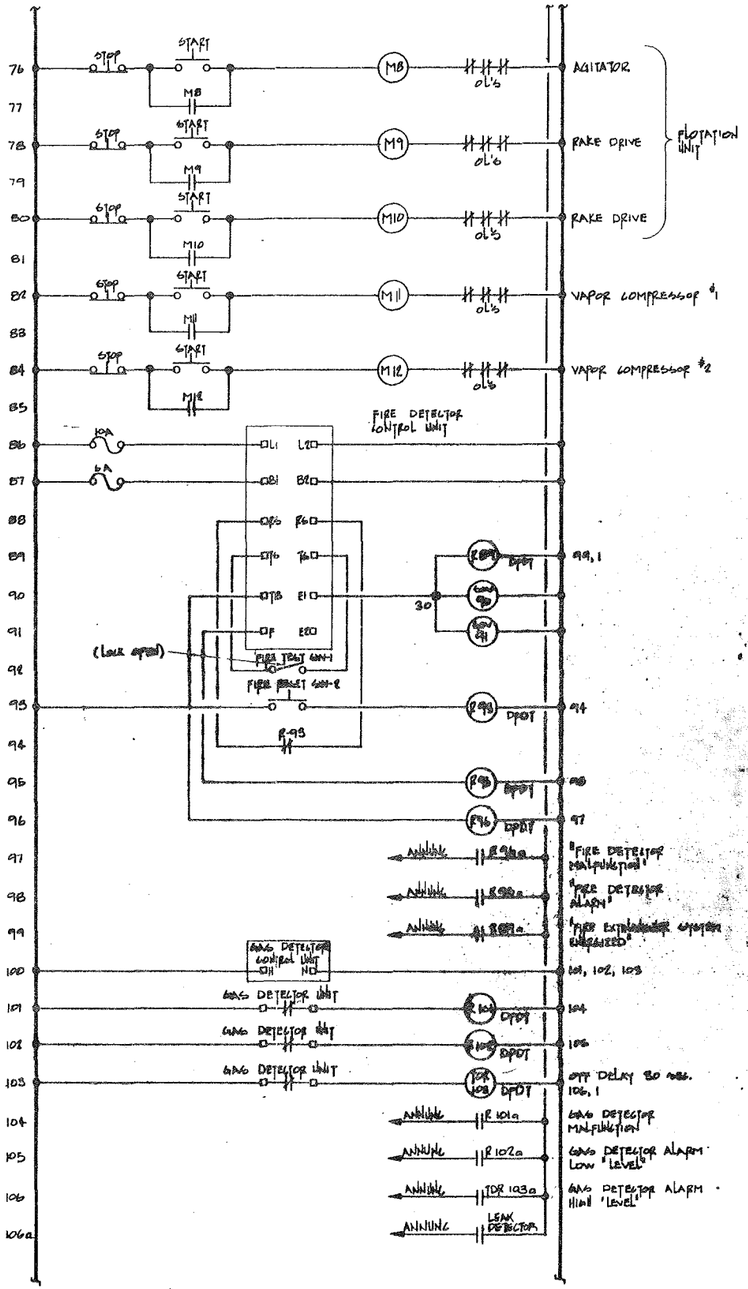
HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

SCALE NONE
DATE 2-18-71

154 - 211







NO.	DATE	REVISIONS	BY	CHK.	APPD.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL CONTROL SCHEMATIC DIAGRAM
OFFSHORE VESSEL

DRAWN R.A.
CHECKED
APPROVED

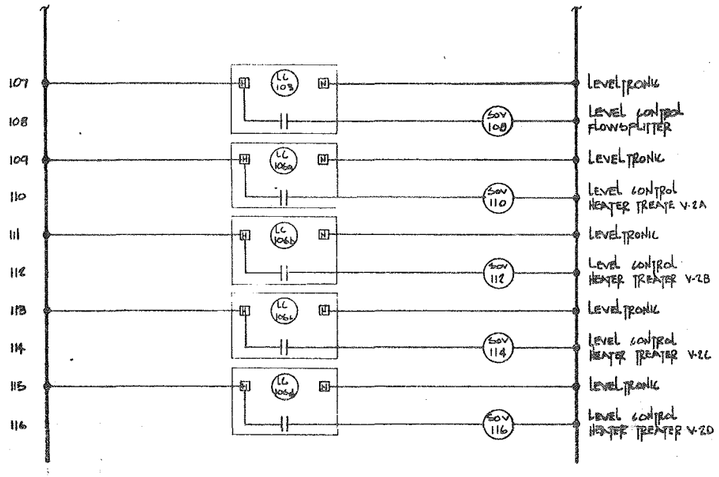
HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

SCALE NONE
DATE 8-13-71

154-212

SHEET 1 OF 2



NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL CONTROL SCHEMATIC DIAGRAM
OFFSHORE VESSEL

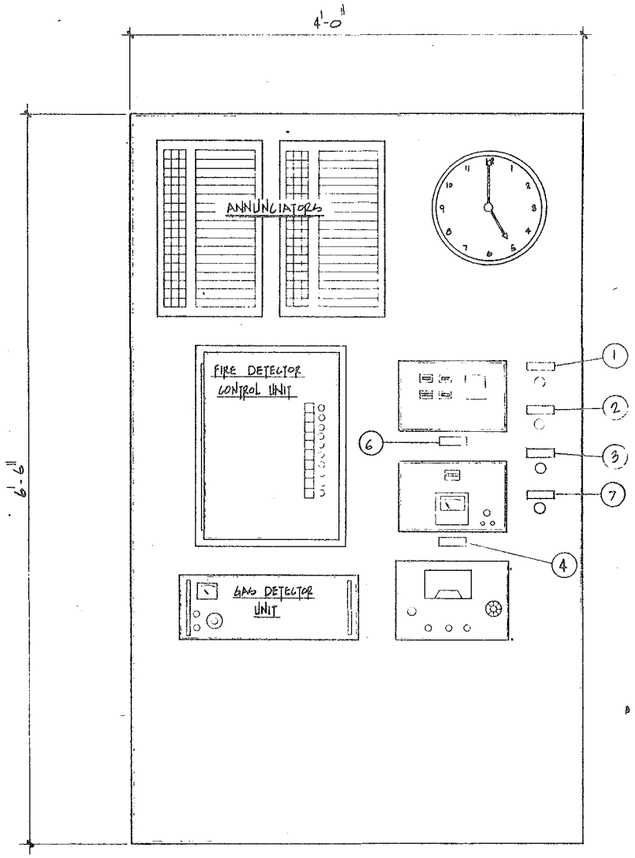
DRAWN ENGR. SECTION
CHECKED APPROVED
SCALE DATE

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

154-212

FIRE SYSTEM TEST OFF ON	FIRE SYSTEM RESET	RESET	WATER PRODUCTION	TURBIDITY METER	PIPELINE LEAK DETECTOR	MANUAL PIPELINE SHUT-IN VALVE
(1)	(2)	(3)	(4)	(5)	(6)	(7)



ELEVATION

ANNUNCIATOR SCHEDULE

HIGH PRESSURE SHUTDOWN OIL PIPELINE	HIGH LEVEL ALARM WATER SURGE TANK T-2
LOW PRESSURE ALARM OIL PIPELINE	LOW LEVEL ALARM WATER SURGE TANK T-2
HIGH PRESSURE SHUTDOWN FLOWSPLITTER	PIPELINE LEAK
LOW PRESSURE SHUTDOWN FLOWSPLITTER	
HIGH LEVEL SHUTDOWN FLOWSPLITTER	
LOW LEVEL SHUTDOWN FLOWSPLITTER	
HIGH PRESSURE SHUTDOWN HEATER TREATER V-2A	
LOW INTERFACE LEVEL HEATER TREATER V-2A	
LOW LEVEL SHUTDOWN HEATER TREATER V-2A	
HIGH PRESSURE SHUTDOWN HEATER TREATER V-2B	
LOW INTERFACE LEVEL HEATER TREATER V-2B	
LOW LEVEL SHUTDOWN HEATER TREATER V-2B	
HIGH PRESSURE SHUTDOWN HEATER TREATER V-2C	
LOW INTERFACE LEVEL HEATER TREATER V-2C	
LOW LEVEL SHUTDOWN HEATER TREATER V-2C	
HIGH PRESSURE SHUTDOWN HEATER TREATER V-2D	
LOW INTERFACE LEVEL HEATER TREATER V-2D	
LOW LEVEL SHUTDOWN HEATER TREATER V-2D	

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

MAIN CONTROL PANEL
ELEVATION & NAMEPLATE SCHEDULE
OFFSHORE VESSEL

DRAWN RWB | ENGR. SECTION | SCALE 1"=1'-0"
CHECKED | APPROVED | DATE 8/19/71

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

154-213

PRESSURE SWITCH
OPENS ON INCREASING PRESSURE

PRESSURE SWITCH
CLOSES ON INCREASING PRESSURE

LEVEL SWITCH
OPENS ON INCREASING LEVEL

LEVEL SWITCH
CLOSES ON INCREASING LEVEL

FLOW SWITCH
OPENS ON INCREASING FLOW

FLOW SWITCH
CLOSES ON INCREASING FLOW

TEMPERATURE SWITCH
OPENS ON INCREASING TEMPERATURE

TEMPERATURE SWITCH
CLOSES ON INCREASING TEMPERATURE

NORMALLY OPEN RELAY CONTACT
RELAY IS DE-ENERGIZED AND SITTING "ON THE SHELF."

NORMALLY CLOSED RELAY CONTACT
RELAY IS DE-ENERGIZED AND SITTING "ON THE SHELF."

NORMALLY OPEN PUSHBUTTON
PUSH TO CLOSE

NORMALLY CLOSED PUSHBUTTON
PUSH TO OPEN

DOUBLE POLE SELECTOR SWITCH WITH MECHANICAL LINK.
WHEN TOP SWITCH CLOSES BOTTOM SWITCH OPENS.

DOUBLE POLE SELECTOR SWITCH WITH MECHANICAL LINK
WHEN TOP SWITCH CLOSES, BOTTOM SWITCH CLOSES.

D.S.
DOOR SWITCH
OPENS WHEN DOOR OPENS

CAM TYPE SWITCH
CLOSES WHEN CAM ROTATES

SINGLE POLE SELECTOR SWITCH
TURN TO CLOSE

SINGLE POLE SELECTOR SWITCH
TURN TO OPEN

O.L.'S
MOTOR CONTACTOR THERMAL OVERLOADS
OPEN ON INCREASING CURRENT

AUTO
OFF
HAND
HAND-OFF-AUTOMATIC SELECTOR SWITCH

10-1
TERMINAL BLOCK CONNECTION
TERMINAL BLOCK 10, TERMINAL CONNECTION 1.

5A
FIVE AMPERE FAST BLOWING FUSE

L
INDICATING LIGHT

R
RELAY COIL

10T
TIME DELAY RELAY COIL

M
MOTOR CONTACTOR COIL

SOV
SOLENOID OPERATED VALVE COIL

NO.	DATE	REVISIONS	BY	CHK.	APPR.

DEEPWATER OFFSHORE PLATFORM
SANTA BARBARA CHANNEL

ELECTRICAL SYMBOLS
OFFSHORE VESSEL

HOBBS-BANNERMAN CORPORATION
ENGINEERS CONSTRUCTORS
SANTA FE SPRINGS CALIFORNIA

HUMBLE OIL & REFINING COMPANY
PRODUCTION DEPARTMENT

DRAWN DOA
CHECKED
ENGR. SECTION
APPROVED
SCALE NONE
DATE 7-22-71

154-214