CASE 3291: Application of KENNEDY OIL CO. for a waterflood project, Eddy County, New Mexico.

Heard on same docket as Cases 3287 and 3290

CASE NO.
3291

Application,
Transcripts,
Small Exhibits
ETC.

(5) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Kewanee Oil Company, is hereby authorized to institute a waterflood project in the ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~ Atoka-San Andres Pool by the injection of water into the San Andres formation through ~~the following-described well in Section 13,~~ Township 18 South, Range 26 East, NMPM, Eddy County, New Mexico:

its Leavitt "5" well No 9 to be located 1680 feet from the north line and 990 feet from the West line of Section 13,

(2) That the subject waterflood project shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

DRAFT

JMD/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3291

Order No. R-~~2900~~ R-2955

APPLICATION OF KEWANEE OIL COMPANY
FOR A WATERFLOOD PROJECT, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 11, 1965, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this _____ day of August, 1965, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Kewanee Oil Company, seeks permission to institute a waterflood project in the ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~ Atoka-San Andres Pool by the injection of water into the San Andres formation through one injection well in Section 13, Township 18 ~~North~~ South, Range 26 ~~East~~ East, NMPM, Eddy County, New Mexico.

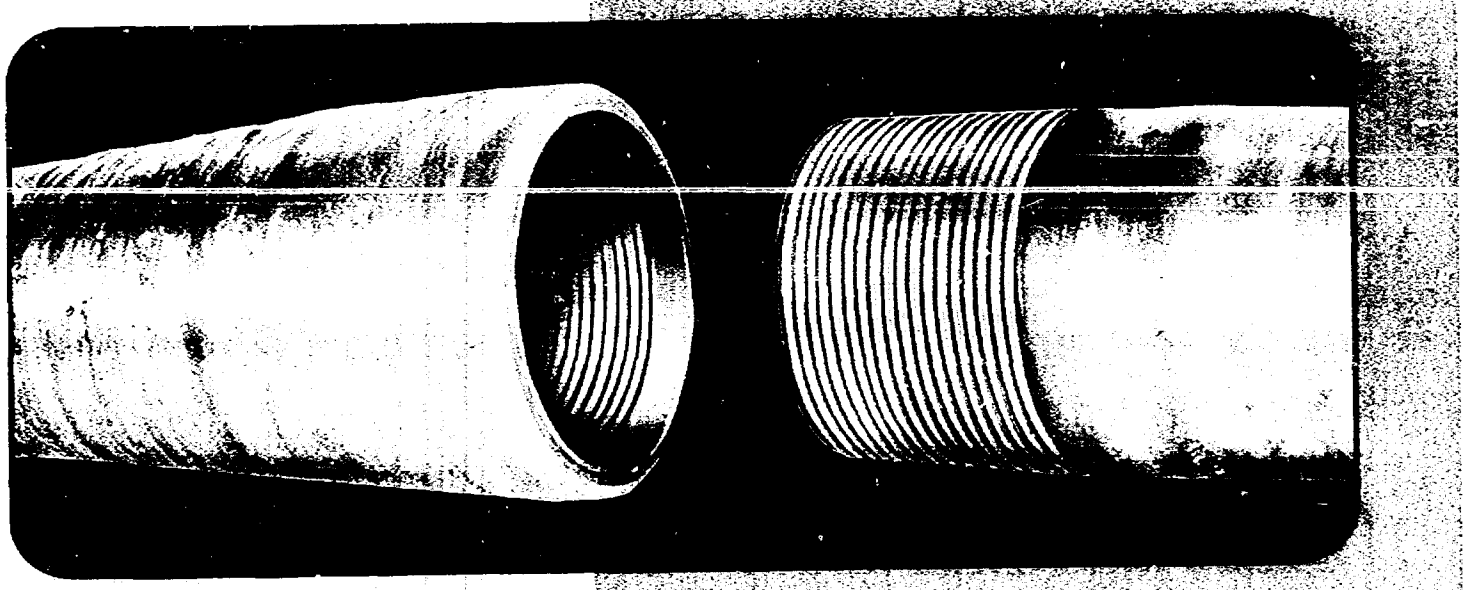
(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

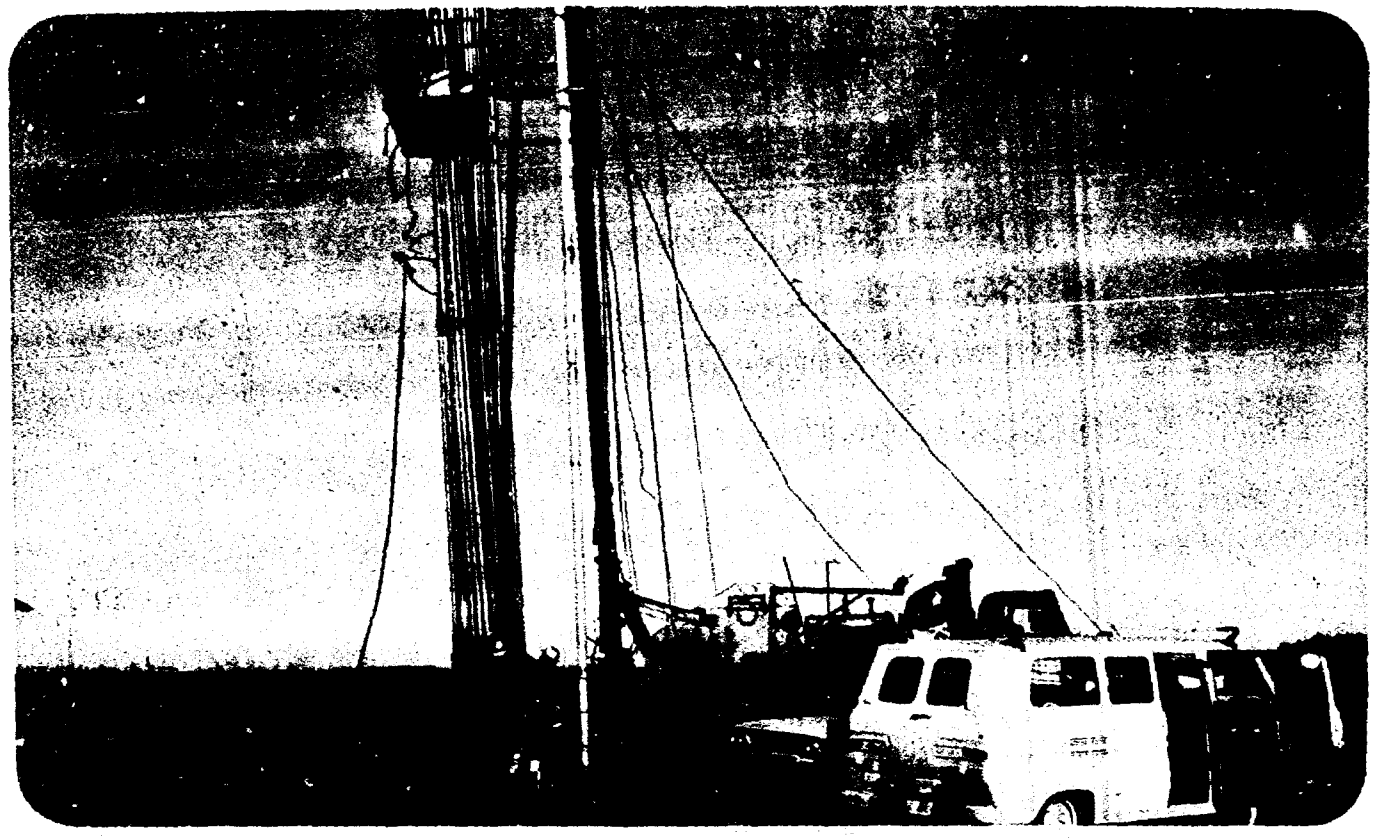
ROCK ISLAND

Charles Utz
OCC-6-1641
Ex. Pkg

Engineering Manual No. 10-64



FIELD TESTED and PROVED



History and development

Any new product must have conclusive proof of performance, and Rock Island's Fiber Glass Pipe has been subjected to rigorous testing.

It was laboratory-developed and tested early in 1957. Major field installations have been in operation for many years. Thousands of feet of Rock Island's new tubing and line pipe are now installed in many Midcontinent oil fields . . . and are proving extremely effective under conditions requiring severe corrosion or paraffin control, as well as those calling for high pulsating pressures.

It is performing in salt water disposal wells, waterflood systems, and many other types of installations.

Description

Rock Island Fiber Glass Pipe has unusual strength. This has been accomplished through a significant development which creates maximum strength through pre-stressing.

Similar in principle to pre-stressed concrete, Rock Island Fiber Glass Pipe is manufactured by pre-stressing alternate longitudinal and lateral plies of glass roving that are saturated and bonded together with epoxy resin. Maximum burst and tensile strength is developed, because this method places the load on the glass rather than on the epoxy resin.

Manufactured in light, medium, medium-heavy, and heavy-duty weights, in diameters from 1 in. to 30 in. Joints are available either in 20 ft or 30 ft lengths. All weights have integral joints and the light and medium-service weights have upset ends for added rigidity and strength.

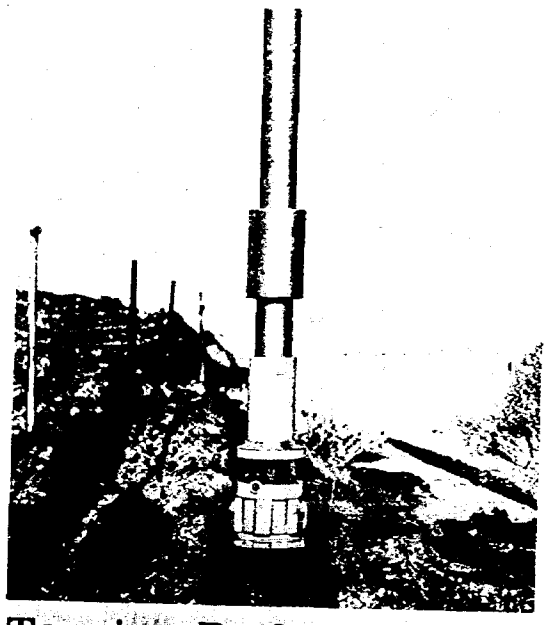
"Integral joints for MAXIMUM STRENGTH"

Rock Island Fiber Glass Pipe and Tubing are designed with integral joints with the highest tensile strength yet developed in fiber glass pipe and tubing. This new development permits much wider applications of fiber glass pipe. It permits longer strings of disposal tubing, larger submergible pumps, wider application with tension packers and makes multiple completions easier.

The pipe and tubing have Standard EUE 8-round threads, which eliminates need for special fittings and connections.

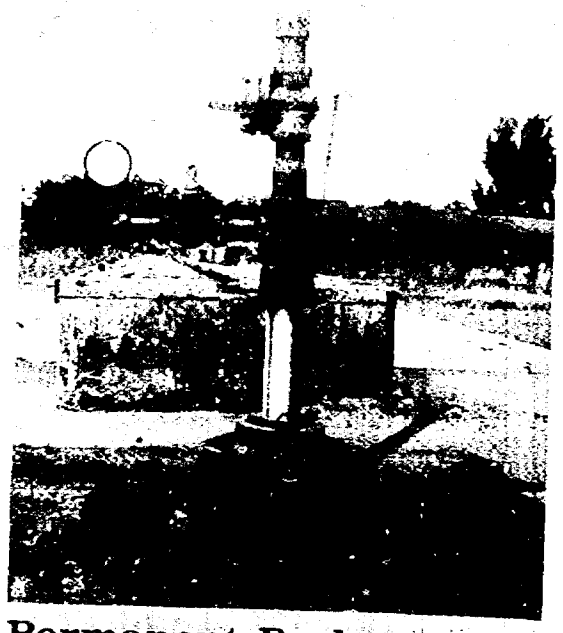
CONTENTS

I. TYPICAL OIL



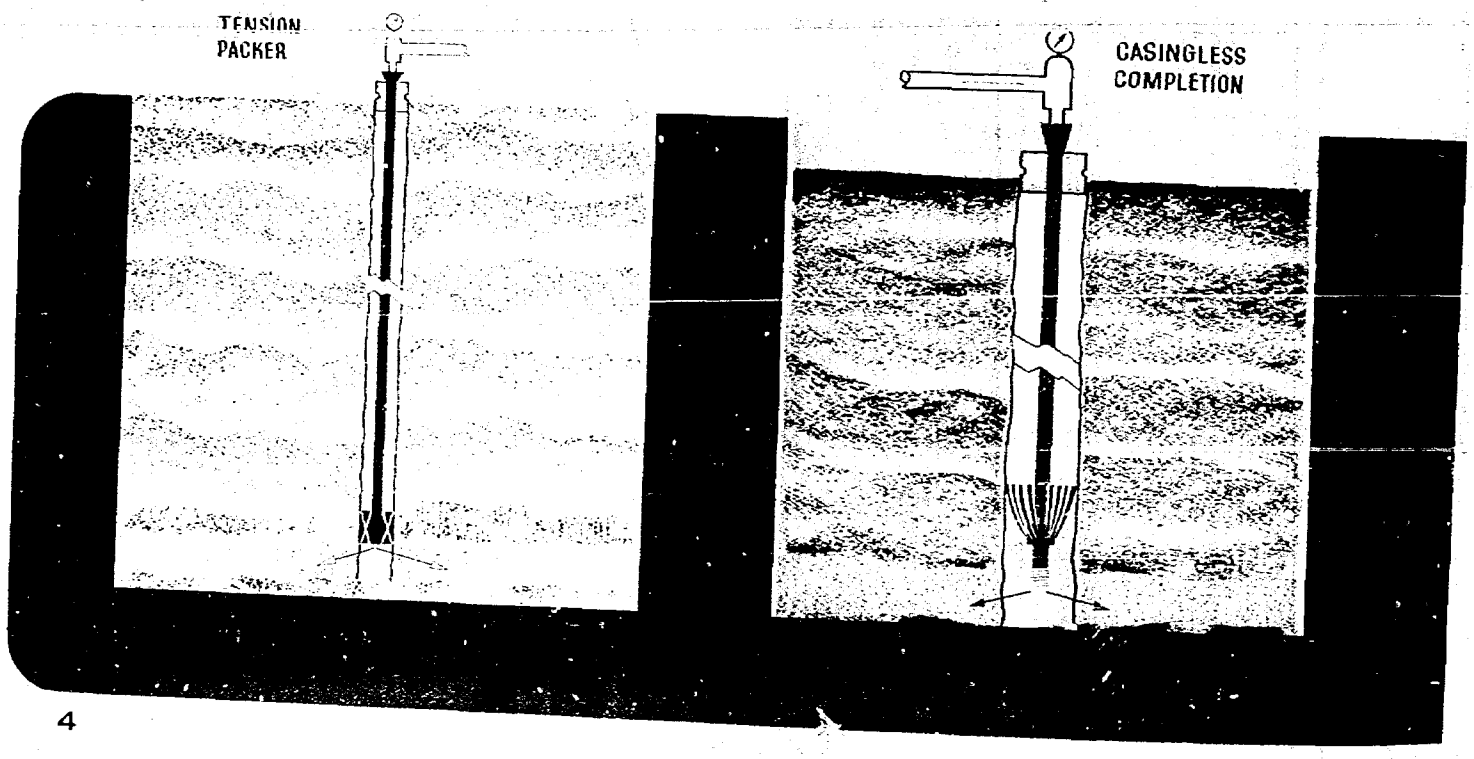
Tension Packer

2,600 ft of 2 in. heavy-duty tubing held in 7,500 lb tension with steel slips. In service since late 1961 on major oil company lease in Osage County, Oklahoma.



Permanent Packer

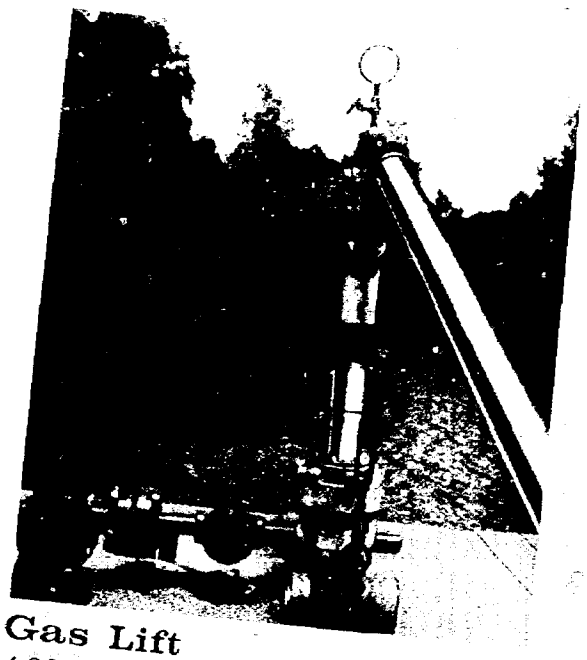
3,750 ft of 2½ in. medium-weight tubing, set in permanent packer with locater seal. Two-thirds of weight hung on slips. Well is on vacuum. In operation since late 1961 on major oil company lease near Seminole, Oklahoma.



FIELD APPLICATIONS

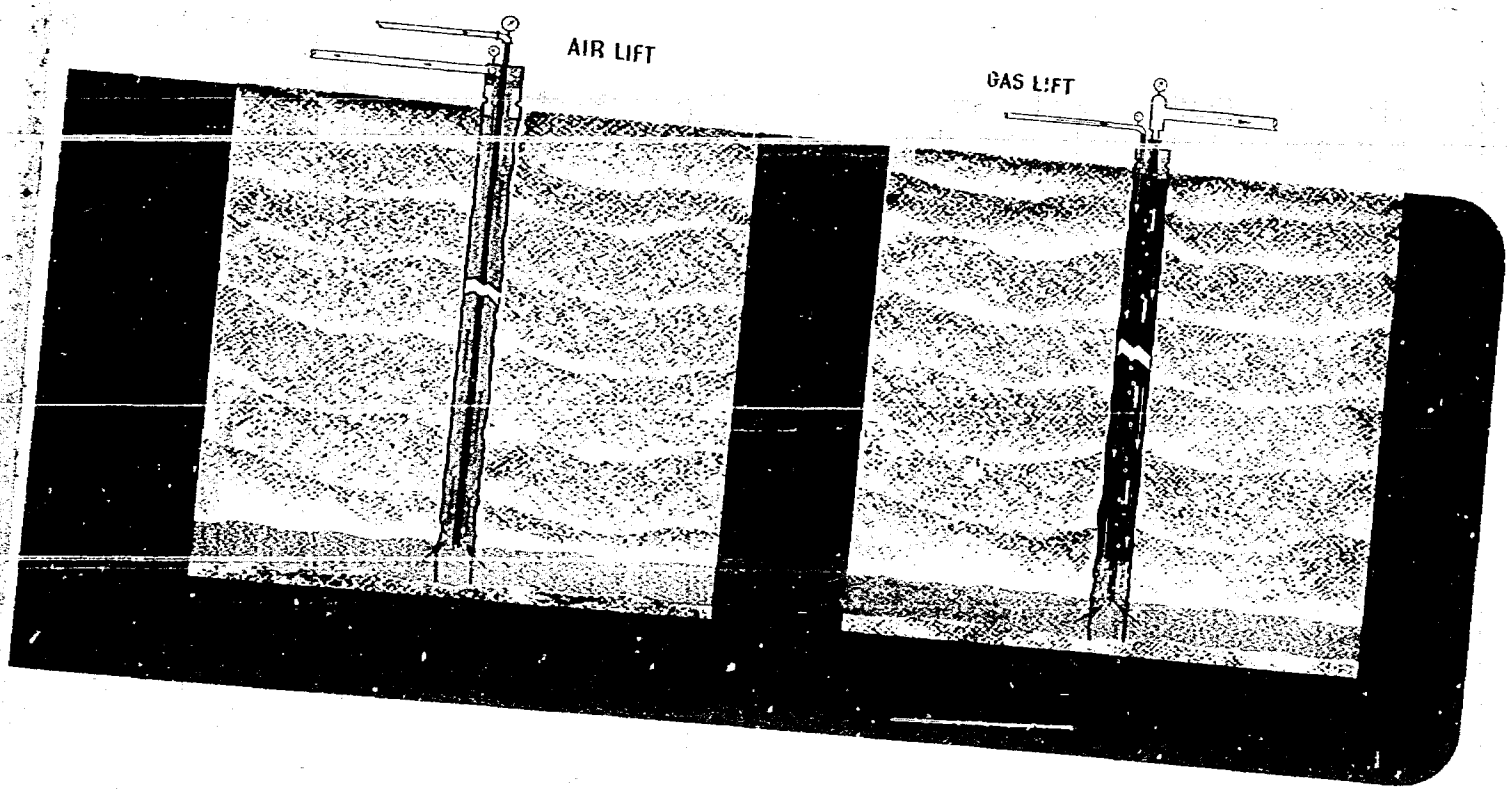
Air Lift Production

1,000 ft of 1 in. medium-service tubing, carrying 380 psi air pressure, and lifting 20,000 bbl of water daily on a major oil company lease near Wink, Texas.



Gas Lift

4,000 ft of 3 in. heavy-duty tubing, free-swinging on slips. Gas lifting at 840 lb annulus pressure through six gas lift valves and lifting 4,000 bbl of salt water at 145°F temperature. In service since March, 1962, on major oil company lease near New Orleans, Louisiana.



Line Pipe

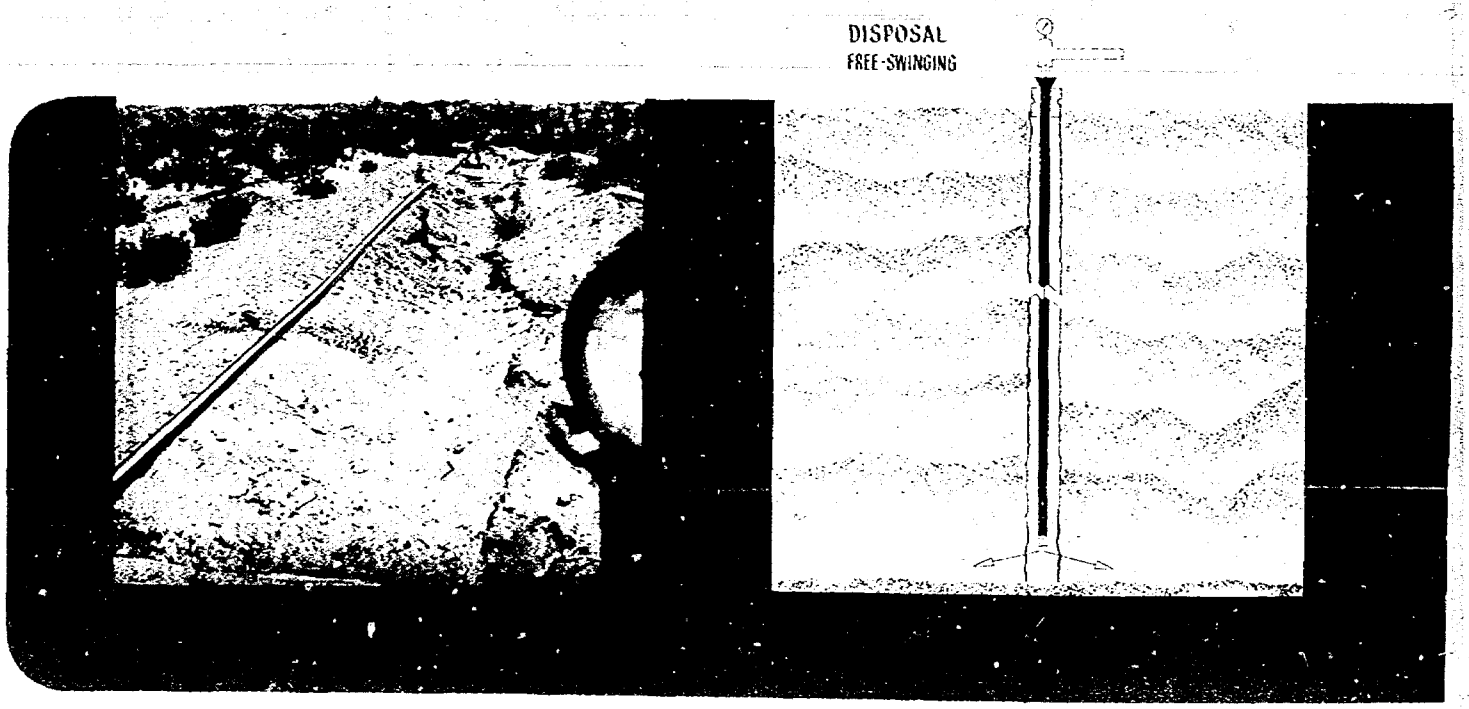
6,600 ft of 4 in. lightweight pipe picking up water from four tank batteries to a disposal well. In service since early 1961 in West Texas.

High-Pressure Injection Water Flood

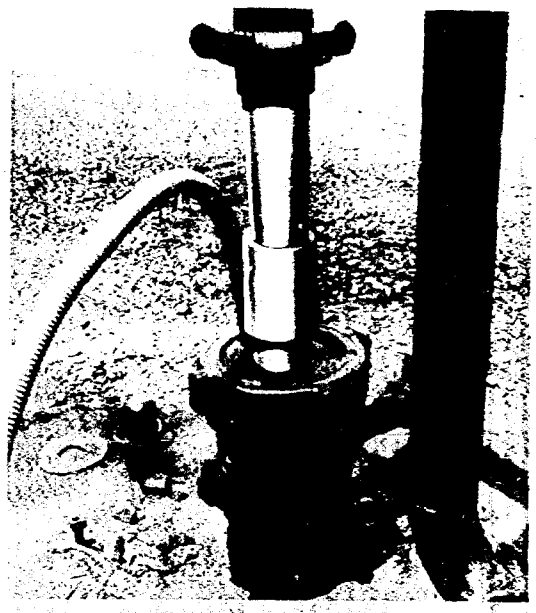
1,500 psig pressure from Multiplex pump. Temperature variation; —13° to 145°F. In service since May, 1961, near Kermit in West Texas.

Salt Water Disposal

4,200 ft of 3 in. medium-weight tubing, free-swinging on slips. Annulus loaded with hydrocarbon. Well is on vacuum in major oil company lease near St. Louis, Oklahoma. Numerous other installations since 1961.

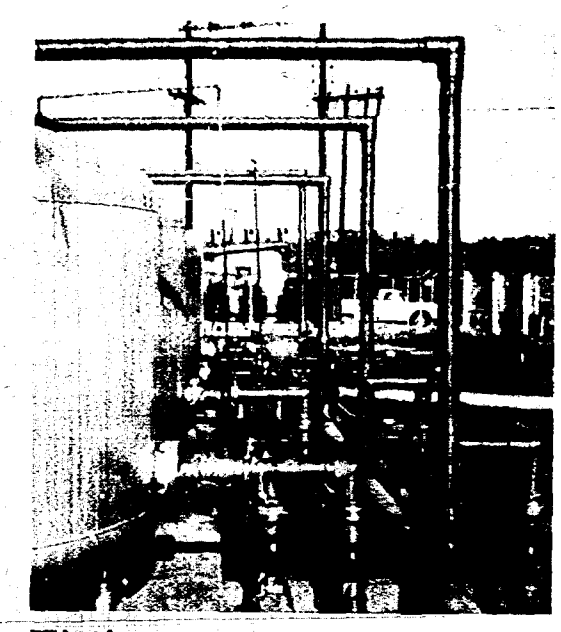


FIELD APPLICATIONS



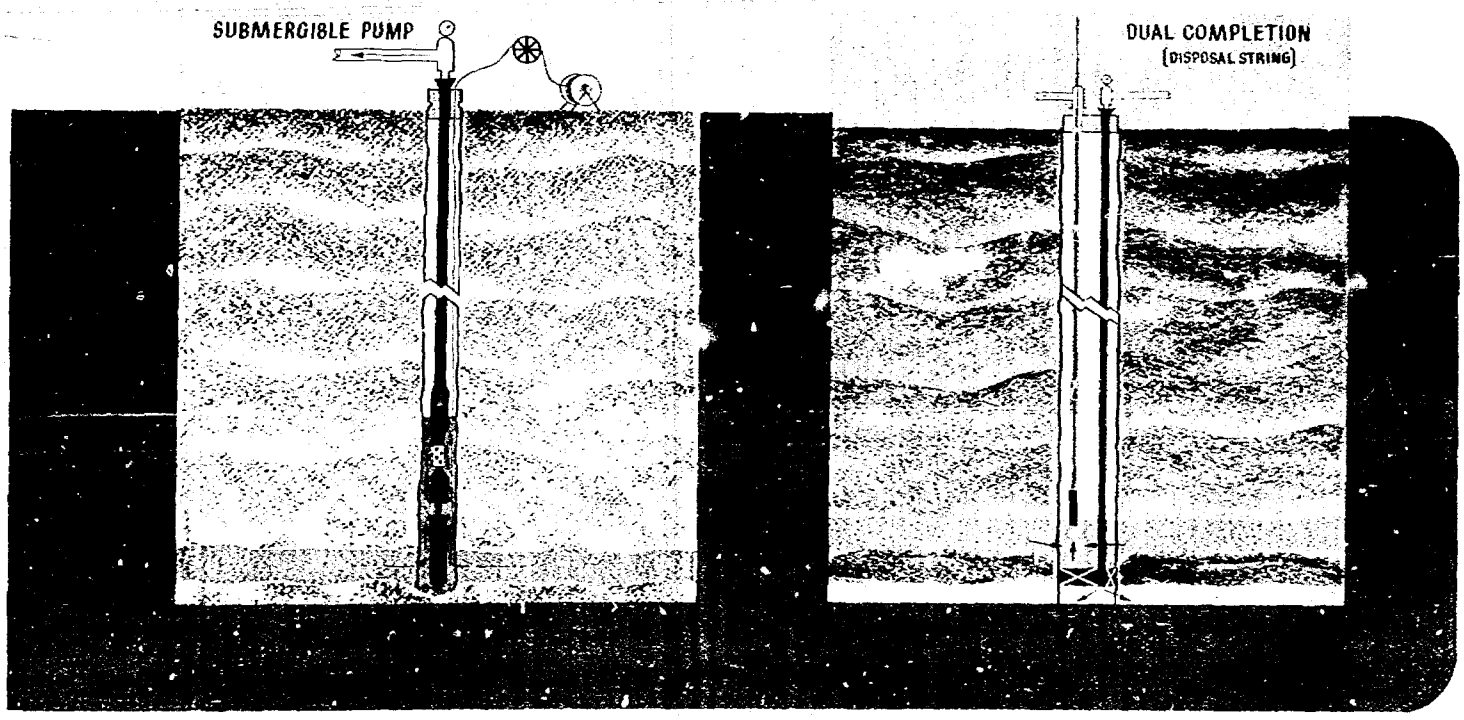
Submergible Pump

940 ft of 2½ in. heavy-duty tubing, 60 hp submergible pump. Hung in submergible pump wellhead located near Stroud, Oklahoma. In continuous service since November, 1961.

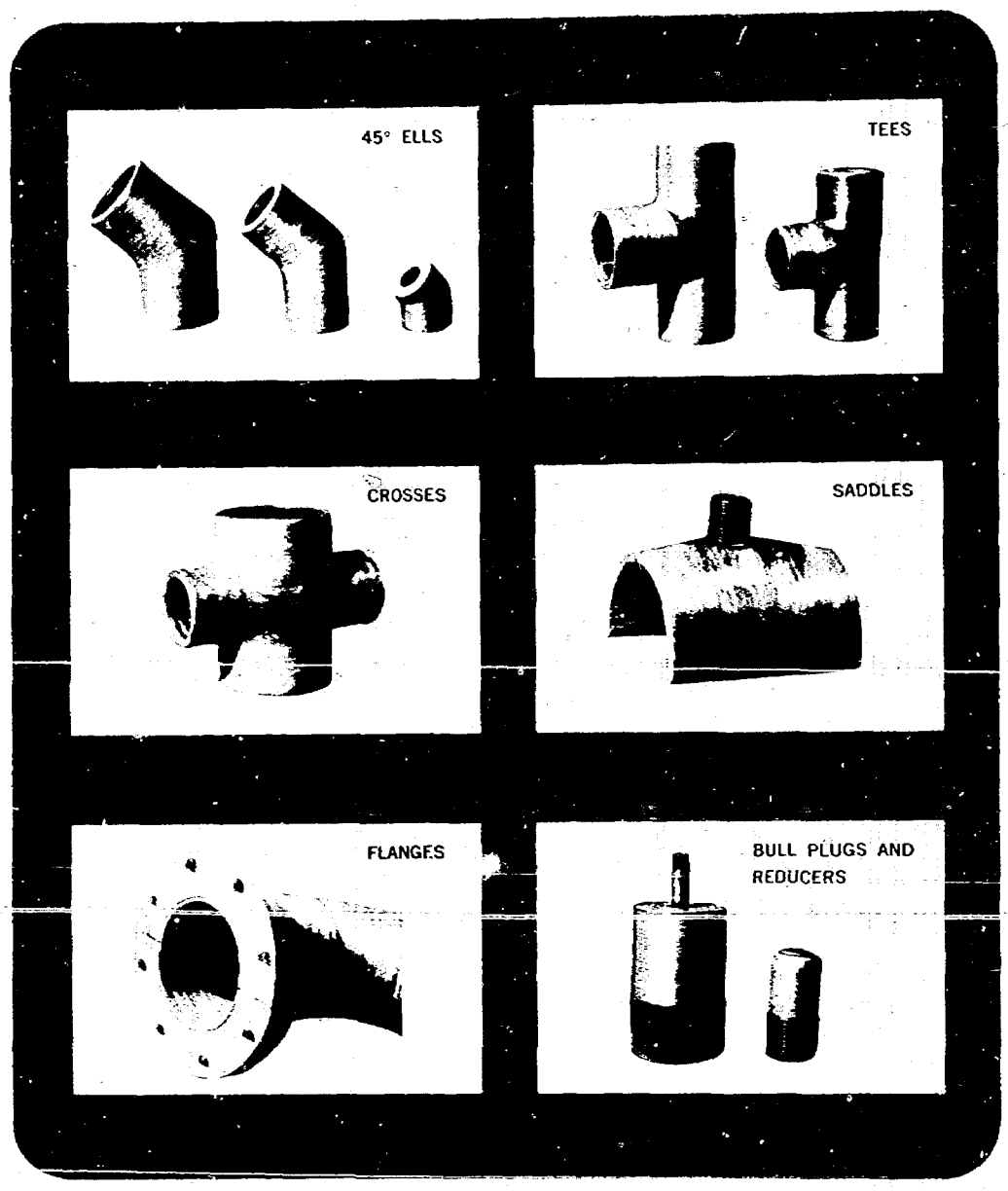


Fittings

A full line of fiber glass fittings is available in complete size and pressure ranges for your oilfield needs. Special fabrication upon request. State your needs.



II. FULL LINE OF FIBER GLASS FITTINGS



Rock Island, makers of oilfield fiber glass pipe and tubing, also provides these stock fittings for every pipe size from 1 in. to 8 in. and for pressures up to 1,500 psi. These fittings are designed for use with Rock Island pipe and tubing, and are available with EUE 8-round, 60° stub, grooved or regular API iron pipe threads. Manifolds and any other special connection used in the oilfield are custom fabricated for any hook-up with the same performance standards of Rock Island pipe and tubing.

Glass-epoxy type fittings in stock sizes from 1 in. to 8 in.

Fabricated for working pressures up to 1,500 psi.

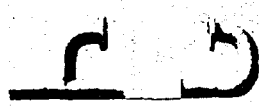
Stocked with EUE 8-round, 60° stub, grooved, or API iron pipe threads.

CUSTOM-MADE CROSSOVERS OF ALL KINDS


REDUCING CROSS

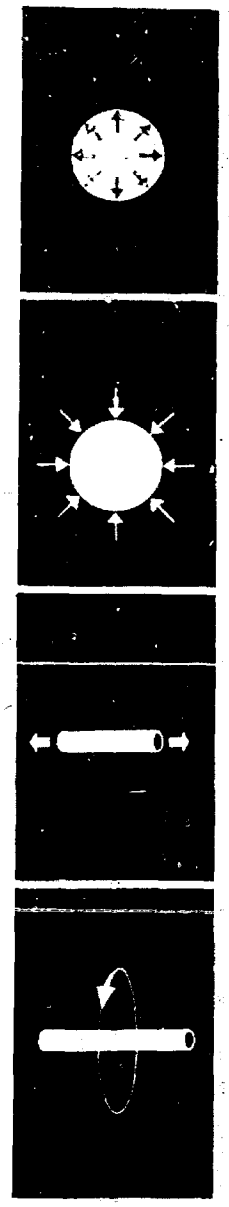

GROOVED COUPLING

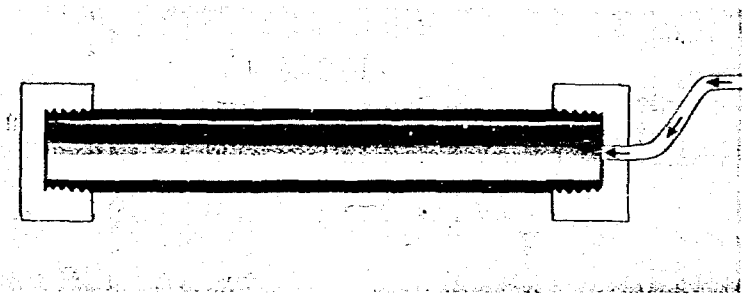

REDUCERS

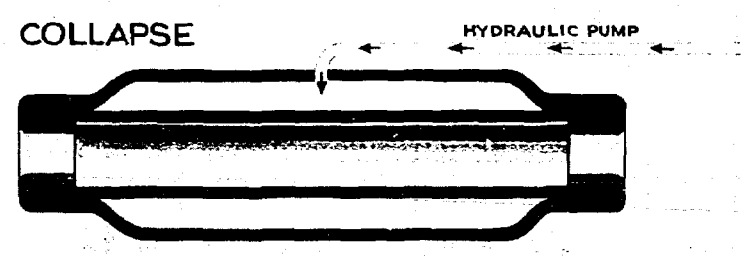

MANIFOLD

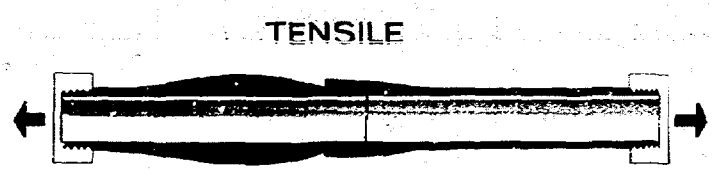
Whatever your needs, for Rock Island stock fittings or for special custom fabrication, your inquiry is welcome, and will receive immediate attention.

III. TYPICAL PIPE PROPERTIES









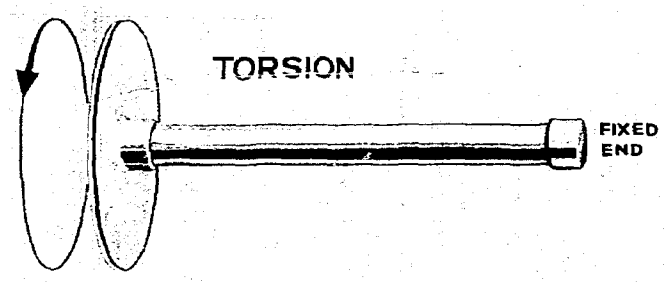


TABLE 1

Physical Properties		Mechanical Properties	
Specific gravity	2.0	Tensile strength, psi	59,900
Density, lb/cu in.	0.072	Compressive strength, psi	31,500
Thermal conductivity Btu/hr-ft²-°F/ft	0.2	Torsional strength, psi	8,200
Coefficient of thermal expansion in./in.-°F.	less than 6×10^{-6}	Impact strength, Izod, (ft-lb)/in. of notch	40
Specific heat, Btu/lb-°F	0.22	Interlaminar shear strength, psi	3,000
Maximum service temperature	200°F	Modulus of elasticity in tension, psi	2.4×10^6
Flammability	slow to self-extinguishing	Compressive modulus, psi	2.6×10^6
Water absorption %, 24 hr	0.05 - 0.1	Modulus of rigidity, psi (torsion)	0.7×10^6
		Rockwell hardness (M scale)	over 100
		Elongation at break, %	3

IV. CHEMICAL RESISTANCE DATA

Except organic acids and strong solvents like ketones, methylene chloride, toluene, etc., Rock Island pipe is very resistant to crude oils and other petroleum products, mild solvents, inorganic acids, alkalies, oxidizing agents, salt solutions, and brine. Our preliminary data on chemical resistance can be reported below:

TABLE 2

	TEMEPATURE °F	
Petroleum Products and Solvents	70	140
Crude Oils (sour and sweet)	O. K.	O. K.
Kerosene	O. K.	O. K.
Gasoline	O. K.	O. K.
Diesel Fuels	O. K.	O. K.
Motor Oils	O. K.	O. K.
Naphtha	O. K.	O. K.
Benzene	O. K.	—
Carbon Tetrachloride	O. K.	—
Salt Water	O. K.	O. K.
Water — 3% potassium dichromate	O. K.	O. K.
Water — bromine or chlorine	no	—
Acids		
Acetic, >10%	no	—
Carbonic	O. K.	—
Hydrochloric, conc.	O. K.	O. K. (Discoloration)
Hydrofluoric, 15%	O. K. (Short Duration)	—
Hydrogen Sulfide (dry & aq. soln.)	O. K.	O. K.
Nitric, 10%	O. K.	O. K.
Sulfuric, 50%	O. K.	O. K.
Phosphoric, 85%	O. K.	no
Oxalic, 5%	no	no
Alkalis		
Sodium Hydroxide, 10-50%	O. K.	O. K.
Ammonium Hydroxide	O. K.	—
Salt Solution		
Aluminum Potassium Sulfate, saturated	O. K.	—
Calcium Hypochlorite, 5%	O. K.	—
Sodium Sulfide, Saturated	O. K.	—

TABLE 3

NOMINAL SIZE		LINE PIPE OR LIGHT SERVICE						TUBING OR MEDIUM SERVICE							MEDIUM HEAVY DUTY			HEAVY DUTY					
		2"	2½"	3"	4"	6"	8"	1"	1½"	2"	2½"	3"	4"	6"	2"	2½"	3"	1"	1½"	2"	2½"	3"	4"
OD, in.		2.18	2.65	3.28	4.32	6.38	8.38	1.26	1.85	2.22	2.70	3.42	4.53	6.56	2.35	2.85	3.45	1.36	1.96	2.38	2.85	3.50	4.62
Wall Thickness, in.		0.13	0.13	0.13	0.13	0.17	0.17	0.12	0.15	0.15	0.15	0.15	0.22	0.28	0.20	0.20	0.20	0.17	0.21	0.23	0.23	0.23	0.28
ID, in.		1.92	2.39	3.02	4.06	6.04	8.04	1.02	1.55	1.92	2.40	3.12	4.09	6.00	1.95	2.45	3.05	1.02	1.55	1.92	2.39	3.04	4.06
Max. Coupling Diam., in. ± 1/64 in.		3.20	3.59	4.43	5.34	7.65	9.60	1.95	2.55	3.50	3.80	4.45	5.88	8.10	3.50	4.05	4.65	2.09	2.90	3.77	4.25	4.80	6.00
lb/ft		0.68	0.92	1.07	1.92	2.70	4.50	0.41	0.73	0.92	1.20	1.43	2.78	5.30	1.14	1.45	1.77	0.53	1.00	1.36	1.70	2.10	4.00
Thread Type EUE (Rd.)		8	8	8	8	8	8	10	10	8	8	8	8	8	8	8	8	10	10	8	8	8	8
Maximum Operating Conditions @ 100° - 150°F	Internal Pressure psig	400	300	250	200	200	200	650	600	550	550	330	450	500	1,000	1,000	800	2,000	1,500	1,500	1,500	1,500	1,500
	Collapse Pressure psig	275	100	90	75	75	—	750	500	500	330	150	200	250	750	550	450	1,250	1,000	1,000	800	800	800
	Axial Tensile lbs	4,500	4,500	5,000	5,000	7,000	—	3,000	4,000	6,000	7,500	8,000	9,000	10,000	7,500	8,500	10,000	5,000	6,000	8,500	10,000	12,000	15,000
Cross Sectional Area of Pipe Wall in. ^{2}		0.833	1.029	1.388	1.712	3.315	4.382	0.432	0.801	0.990	1.202	1.524	2.977	5.521	1.350	1.664	2.041	0.636	1.131	1.553	1.893	2.364	3.798
Inside Sectional Area, ft ^{2}		0.0201	0.0311	0.0497	0.0899	0.1990	0.2648	0.0057	0.0131	0.0201	0.0314	0.0531	0.0912	0.1963	0.0207	0.0327	0.0507	0.0057	0.0131	0.0201	0.0311	0.0504	0.0899
Cu ft/lin ft		0.0201	0.0311	0.0497	0.0899	0.1990	0.2648	0.0057	0.0131	0.0201	0.0314	0.0531	0.0912	0.1963	0.0207	0.0327	0.0507	0.0057	0.0131	0.0201	0.0311	0.0504	0.0899
*Gal/lin ft		0.1504	0.2326	0.3716	0.6725	1.4884	1.9805	0.0424	0.0980	0.1504	0.2349	0.3972	0.6822	1.4682	0.1548	0.2446	0.3792	0.0424	0.0980	0.1504	0.2326	0.3770	0.6725
Total Wt lb/ft	Pipe plus water	1.934	2.860	4.170	7.530	15.098	20.998	0.764	1.547	2.174	3.159	4.740	8.471	17.530	2.429	3.49	4.929	0.884	1.817	2.614	3.640	5.240	9.602
	**Pipe plus brine	2.053	3.045	4.466	8.001	16.269	22.565	0.797	1.625	2.299	3.346	5.058	9.012	18.692	2.552	3.681	5.229	0.917	1.895	2.733	3.825	5.544	10.134

* 1 Gal = 0.02381 bbl
** Specific gravity = 1.095

VI. ANNULAR CAPACITIES

A. Between API Casing and Rock Island Light Service Pipe

TABLE 4

CASING PIPE (in.)	Size, OD, in.	4½	5	5½	6⅝	7	7⅝	8⅝
	lb/ft, plain end	13.04	14.87	16.87	23.58	28.72	33.04	39.29
	ID, in.	3.920	4.408	4.892	5.921	6.184	6.765	7.725
2	A. Cu ft/lin ft	0.0365	0.080	0.1046	0.1653	0.1827	0.2237	0.2996
	B. Water in annulus — lb/lin ft	2.3	5.0	6.5	10.3	11.4	14.0	18.7
	C. Kerosene in annulus — lb/lin ft	1.9	4.1	5.4	8.5	9.3	14.4	15.3
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.720	1.208	1.692	3.721	2.984	3.565	4.525
	b. Annulus area, sq in.	0.4029	7.22	10.75	19.49	21.99	27.91	38.83
2½	A. Cu ft/lin ft	0.0241	0.0677	0.0922	0.1529	0.1703	0.2113	0.2872
	B. Water in annulus — lb/lin ft	1.5	4.2	5.8	9.5	10.6	13.2	17.9
	C. Kerosene in annulus — lb/lin ft	1.2	3.5	4.7	7.8	8.7	10.8	14.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.330	0.818	1.302	2.331	2.594	3.175	4.135
	b. Annulus area, sq in.	1.950	5.14	8.67	17.41	19.91	25.82	36.75
3	A. Cu ft/lin ft	———	———	0.0718	0.1325	0.1499	0.1909	0.2668
	B. Water in annulus — lb/lin ft	———	———	4.5	8.3	9.4	11.9	16.6
	C. Kerosene in annulus — lb/lin ft	———	———	3.7	6.8	7.7	9.8	13.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	———	———	0.462	1.491	1.754	2.335	3.295
	b. Annulus area, sq in.	———	———	3.39	12.13	14.62	20.54	31.46
4	A. Cu ft/lin ft	———	———	———	0.0894	0.1069	0.1479	0.2237
	B. Water in annulus — lb/lin ft	———	———	———	5.6	6.7	9.2	14.0
	C. Kerosene in annulus — lb/lin ft	———	———	———	4.6	5.5	7.6	11.4
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	———	———	———	0.581	0.844	1.425	2.385
	b. Annulus area, sq in.	———	———	———	5.14	7.63	13.55	24.47

VI. ANNULAR CAPACITIES

B. Between API Casing and Rock Island Medium Service Pipe

TABLE 5

CASING PIPE (in.)	Size, OD, in.	4½	5	5½	6⅝	7	7⅝	8⅝
	lb/ft, plain end	13.04	14.87	16.87	23.58	28.72	33.04	39.29
	ID, in.	3.920	4.408	4.892	5.921	6.184	6.765	7.725
1	A. Cu ft/lin ft	0.0538	0.0973	0.1218	0.1825	0.1999	0.2410	0.3168
	B. Water in annulus — lb/lin ft	3.4	6.1	7.6	11.4	12.5	15.0	19.8
	C. Kerosene in annulus — lb/lin ft	2.8	5.0	6.2	9.3	10.2	12.3	16.2
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.970	2.460	2.942	3.971	4.234	4.815	5.775
	b. Annulus area, sq in.	9.09	12.28	15.81	24.55	27.05	32.96	43.89
1½	A. Cu ft/lin ft	0.0438	0.0873	0.1119	0.1726	0.1899	0.2310	0.3068
	B. Water in annulus — lb/lin ft	2.7	5.4	7.0	10.8	11.8	14.4	19.1
	C. Kerosene in annulus — lb/lin ft	2.2	4.5	5.7	8.8	9.7	11.8	15.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.370	1.860	2.342	3.371	3.634	4.215	5.175
	b. Annulus area, sq in.	6.97	10.16	13.69	22.43	24.93	30.64	41.77
2	A. Cu ft/lin ft	0.0356	0.0791	0.1036	0.1643	0.1817	0.2227	0.2986
	B. Water in annulus — lb/lin ft	2.2	4.9	6.5	10.3	11.3	13.9	18.6
	C. Kerosene in annulus — lb/lin ft	1.8	4.0	5.3	8.4	9.3	11.4	15.3
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.420	0.908	1.392	2.421	2.684	3.265	4.225
	b. Annulus area, sq in.	2.45	5.64	9.17	17.91	20.41	26.33	37.25
2½	A. Cu ft/lin ft	——	0.062	0.0908	0.1515	0.1688	0.2100	0.2857
	B. Water in annulus — lb/lin ft	——	4.1	5.7	9.5	10.5	13.1	17.8
	C. Kerosene in annulus — lb/lin ft	——	3.4	4.6	7.8	8.6	10.7	14.6
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	0.608	1.092	2.121	2.384	2.965	3.925
	b. Annulus area, sq in.	——	3.92	7.45	16.19	18.69	24.61	35.53
3	A. Cu ft/lin ft	——	——	0.0669	0.1276	0.1449	0.1860	0.2618
	B. Water in annulus — lb/lin ft	——	——	4.2	8.0	9.0	11.6	16.3
	C. Kerosene in annulus — lb/lin ft	——	——	3.4	6.5	7.4	9.5	13.4
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	——	0.442	1.521	1.784	2.365	3.325
	b. Annulus area, sq in.	——	——	3.24	11.99	14.48	20.40	31.32
4	A. Cu ft/lin ft	——	——	——	0.0793	0.0966	0.1377	0.2136
	B. Water in annulus — lb/lin ft	——	——	——	4.9	6.0	8.6	13.3
	C. Kerosene in annulus — lb/lin ft	——	——	——	4.1	4.9	7.0	10.9
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	——	——	0.041	0.304	0.885	1.845
	b. Annulus area, sq in.	——	——	——	0.38	2.88	8.80	19.72

VI. ANNULAR CAPACITIES

C. Between API Casing and Rock Island Heavy-Duty Pipe

TABLE 6

CASING PIPE (in.)	Size, OD, in.	4½	5	5½	6⅝	7	7⅝	8⅝
	lb/ft, plain end	13.04	14.87	16.87	23.58	28.72	33.04	39.29
	ID, in.	3.920	4.408	4.892	5.921	6.184	6.765	7.725
1	A. Cu ft/lin ft	0.0524	0.0959	0.1204	0.1811	0.1985	0.2400	0.3154
	B. Water in annulus — lb/lin ft	3.3	6.0	7.5	11.3	12.4	15.0	19.7
	C. Kerosene in annulus — lb/lin ft	2.7	4.9	6.2	9.3	10.2	12.3	16.1
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.830	2.318	2.802	3.831	4.094	4.675	5.635
	b. Annulus area, sq in.	8.64	11.83	15.36	24.10	26.60	32.52	43.44
1½	A. Cu ft/lin ft	0.0415	0.0850	0.1096	0.1703	0.1876	0.2287	0.3046
	B. Water in annulus — lb/lin ft	2.6	5.3	6.8	10.6	11.7	14.3	19.0
	C. Kerosene in annulus — lb/lin ft	2.1	4.3	5.6	8.7	9.6	11.7	15.6
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.020	1.508	1.992	3.021	3.284	3.865	4.825
	b. Annulus area, sq in.	5.47	8.66	12.19	20.93	23.43	29.34	40.27
2	A. Cu ft/lin ft	0.0316	0.0751	0.0996	0.1603	0.1777	0.2188	0.2946
	B. Water in annulus — lb/lin ft	2.0	4.7	6.2	10.0	11.1	13.7	18.4
	C. Kerosene in annulus — lb/lin ft	1.6	3.8	5.1	8.2	9.1	11.2	15.1
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.150	0.638	1.122	2.151	2.414	2.995	3.955
	b. Annulus area, sq in.	0.91	4.10	7.63	16.38	18.87	24.78	35.71
2½	A. Cu ft/lin ft	——	0.0617	0.0862	0.1469	0.1643	0.2049	0.2812
	B. Water in annulus — lb/lin ft	——	3.9	5.4	9.2	10.3	12.8	17.5
	C. Kerosene in annulus — lb/lin ft	——	3.2	4.4	7.5	8.4	10.5	14.4
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	0.158	0.642	1.671	1.930	2.515	3.475
	b. Annulus area, sq in.	——	1.08	4.61	13.35	16.63	21.76	32.69
3	A. Cu ft/lin ft	——	——	0.0637	0.1244	0.1417	0.1828	0.2587
	B. Water in annulus — lb/lin ft	——	——	4.0	7.8	8.8	11.4	16.1
	C. Kerosene in annulus — lb/lin ft	——	——	3.3	6.4	7.3	9.4	13.2
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	——	0.092	1.121	1.384	1.965	2.925
	b. Annulus area, sq in.	——	——	0.70	9.44	11.94	17.85	28.78

VII. FRICTION HEAD LOSS THROUGH ROCK ISLAND PIPE

A. FLOW OF INCOMPRESSIBLE LIQUIDS:

Rock Island fiber glass pipe is smooth and paraffin resistant. The Hazen Williams "C" factor is very close to 150. For friction head loss calculations, a simplified equation, which is applicable for Reynolds No. between 4000 and 4.3×10^5, has been derived for Rock Island pipes

$$h_f = K \quad q^{1.8} \quad \nu^{0.2}$$

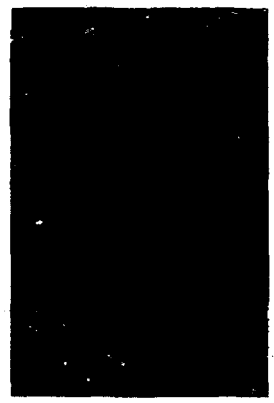
where hf — Head loss in feet of fluid per 100 feet of pipe

ν — Kinematic viscosity at a specified temperature in centistokes

— Volumetric flow rate, cfs

K — Constant, depending on Rock Island pipe size

It can be noted that only fluid viscosity is required for any head loss calculations. The viscosity data for petroleum products, and the effect of temperature, etc., are shown in Table 8 and Figs. 5-6 (p. 23) in the Appendix. Flow charts for water, brine, and crude oil are plotted in Figs. 1-3 (pp. 19-21) based on the above equation.



B. FLOW OF GASES:

1. **Low Pressure Flow:** The change of gas density in this case is not significant. The equation derived by Huff and Logan (Am. Gas. Assoc. Proc., 1935, p. 687) is relatively simple:

$$Q = \frac{2331\ (\Delta p)^{0.543} \quad d^{2.631}}{S^{0.468} \quad l^{0.543}}, \text{ cu ft/hr}$$

where

Δp = Pressure drop, inches of water

S = Specific gravity of flowing gas (air = 1 at room temperature and 30 in. of Hg.)

l = Length of pipe, ft

2. **High Pressure Flow:** The well known Weymouth formula [Trans. Am. Soc. Mech. Engrs. 34, 1091-1104, (1912)] can be simplified for Rock Island pipes by using a natural gas specific gravity of 0.6 at a flowing temperature of 60°F and 14.65 psia:

$$Q = C\left[\frac{P_1^2 - P_2^2}{L}\right]^{1/2}, \text{ cu ft/hr}$$

where

P_1 = Inlet line pressure, psia

P_2 = Outlet line pressure, psia

L = Length of line, miles

C = Constant, depending on Rock Island pipe size

A flow chart is shown in Fig. 4.

CHART 1

VIII. SELECTION OF ROCK ISLAND PIPE

—Working Example

A. DATA REQUIRED:

1. Depth of well
2. Size of casing
3. Pumping rate through tubing
4. Size of steel tubing formerly used
5. Completion method — Load requirement
6. Static level of well
7. Tubing internal pressure at the top of well
8. Type of fluid in annulus and height above static level.
9. Type of fluid in tubing

B. SELECTION PROCEDURE:

1. Maximum axial tensile, T, of tubing required:
   T, lb = lb/ft × tubing length in ft + wt of fluid in tubing*
   + tension needed for packer or pump in lb
   — wt of fluids displaced by tubing in lb

   * when submergible pump is used

2. Friction head loss through tubing:
   The proper flow chart can be used as shown in the Appendix (pp. 19-22)

3. Maximum internal pressure at the static level when the annulus is not filled:
   $P_2 = 0.433$ (Sp Gr) Y + P_1

   where
   P_1, P_2 = Fluid pressure in tubing at the top and static level of well respectively, psi
   Y = Distance between P_1 and P_2, ft
   Sp Gr = Specific gravity of fluid in tubing
   Fig. 8 on p. 25 is plotted for brine.

4. Maximum collapse pressure at the static level, when the annulus is filled:
   $P_c = 0.433$ (sp gr) X
   Sp gr = Specific gravity of fluid in annulus
   P_c = Maximum collapse pressure, psi
   X = Height of fluid in annulus above static level of well, ft
   Fig. 9 on p. 26 is for inhibited fresh water, brine, and kerosene.

5. Compare the calculated requirements of tubing with the specified maximum operating specifications of Rock Island. If the calculated values are higher than the tubing specification, frequently the operating conditions of well can be modified slightly.

6. Check the maximum coupling diameter of the selected tubing against the ID of casing to make sure enough clearance is allowed.

C. WORKING EXAMPLE:

Given:

Well — 4,400 ft
API Casing — 5½ in.
Tension Packer — 2,500 lb required for 60 durometer rubber
Flow Rate — 600-800 bbl/day
Size of steel tubing had been used — 2 in.
Internal Pressure — Vacuum to 100 psi at the top of well
Static Level — 4,000 ft from surface
Inhibited water can be used in annulus

Solution:

1. Maximum axial tensile: If the annulus is not filled, with 2 in. Rock Island heavy-duty tubing, the axial tensile can be calculated by first referring to Table 3 on p. 11 to get wt per ft of tubing (1.36) and the cross sectional area of the pipe wall (1.563 sq in.). Use a brine density of 72 lb per cu ft, hence:

$$T = 4{,}400\ (1.36) + 2{,}500 - \left(\frac{1.563}{144}\right)(4{,}400 - 4{,}000)\ 72$$
$$= 5{,}980 + 2{,}500 - 313$$
$$= 8{,}177 \text{ lb}$$

It is obvious that the buoyancy factor, 313 lb, is not significant. In most cases it can be neglected.

2. Pressure drop through 2 in. tubing: Using Fig. 2, on p. 20, the head loss is 1.5 ft/100 ft at 800 bbl/day.

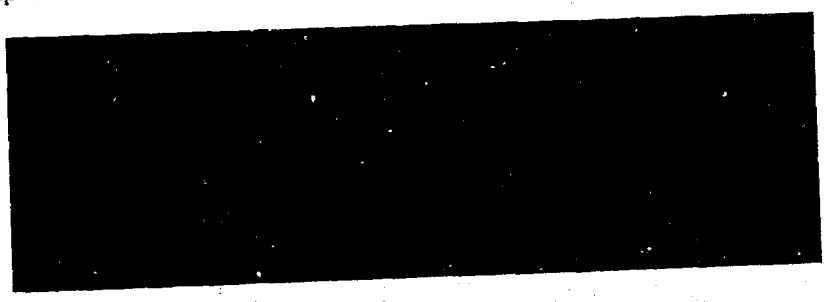
$$\text{Total head loss} = 4{,}400\left(\frac{1.5}{100}\right) = 66 \text{ ft} = 33 \text{ psi for brine of 72 lb/cu ft}$$

3. Maximum Internal Pressure: If annulus is not fiilled:

Use Fig. 8 on p. 25, when $P_1 = 100$ psi, and $Y = 4{,}000$ ft
$P_2 = 2{,}100$ psi maximum

4. Maximum collapse pressure: If annulus is filled with inhibited fresh water, use Fig. 9 on p. 26, for water, when $X = 4{,}000$ $P_c = 1.750$ psi

5. Comparison:



It is obvious that 2 in. heavy-duty Rock Island tubing does not meet the requirements completely. However, if the annulus is filled with inhibited water to 1,600 ft above static level, the same tubing will handle the situation very well. Repeating the above calculations, the following result can be obtained:

a) Maximum Internal Pressure: P_2 will remain 1,750 psi at the static level; however, this will be balanced by the fluid in the annulus in operation. The maximum internal pressure in this case can be obtained by using $Y = (4{,}400 - 2{,}000)$ from Fig. 8.

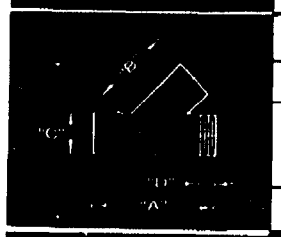
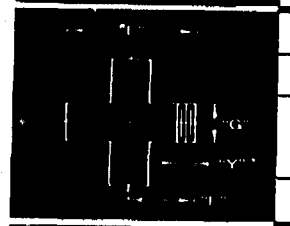
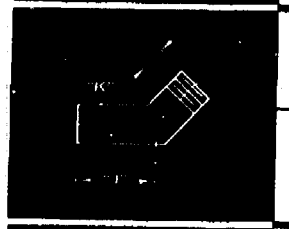
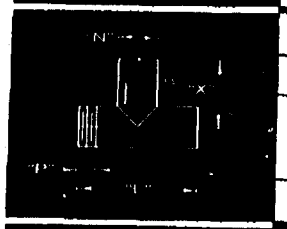
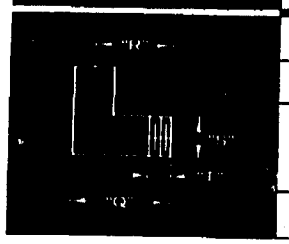
$P_2 = 1{,}300$ psi

b) Maximum Collapse Pressure: Use $X = 1{,}600$ and Fig. 9.

$P_c = 700$ psi

6. The maximum coupling diameter of Rock Island 2 in. heavy-duty tubing is 3.77 in. $\pm$ 1/16 which is well below the ID of any 5½ in. API casing.

TABLE 7

	SIZE	1 in.		1½ in.		2 in.		2½ in.		3 in.		4 in.		6 in.		8 in.	
	(in.)	IP	10 Rd	IP	10 Rd	IP	8 Rd	IP	8 Rd	IP	8 Rd	IP	8 Rd	IP	8 Rd	IP	8 Rd
	A	6⅜	6⅞	8⅛	8⅞	8⅞	10⅞	10⅛	11⅞	11⅛	13¾	12⅞	15¼	15⅞	18¼		
	B	3¾	4⅛	4⅞	5½	5⅝	6¾	6⅜	7½	7¼	8⅜	8½	9⅞	11¼	12⅜		
	C	M 2½ H 2⅝	M 2⅝ H 2⅞	M 3 H 3¼	M 3¼ H 3½	M 3½ H 3¾	M 3¾ H 4	M 4 H 4¼	M 4¼ H 4½	M 4⅝ H 4⅞	M 4⅞ H 5⅛	M 5⅛ H 5⅞	M 5⅞ H 6	L 8 M 8¼	L 8 M 8¼		
	D	1¼	1⅜	1¾	2	1½	2⅜	1¾	2½	1⅞	3	2	3	2	3¼		
	E	5	6	7	8	8	9	9	10	10	12	11	13	14	16	18	20
	F	2½	3	3½	4	4	4½	4½	5	5	6	5½	6½	7	8	9	10
	G	M 2½ H 2⅝	M 2⅝ H 2⅞	M 3 H 3¼	M 3¼ H 3½	M 3½ H 3¾	M 3¾ H 4	M 4 H 4¼	M 4¼ H 4½	M 4⅝ H 4⅞	M 4⅞ H 5⅛	M 5⅛ H 5⅞	M 5⅞ H 6	L 8 M 8¼	L 8 M 8¼	L 10 M 10¼	L 10 M 10¼
	Y	1¼	1⅜	1¾	2	1½	2⅜	1¾	2½	1⅞	3	2	3	2	3¼	2¼	3½
	J	2	2½	3	3¼	3¼	3¾	3¾	4	4	5	4¾	5	5¼	6¼		
	K	1¼	1⅜	1¾	2	1½	2⅜	1¾	2½	1⅞	3	2	3	2	3¼	2¼	3½
	L	5	6	7	8	8	9	9	10	10	12	11	13	14	16	18	20
	X	2½	3	3½	4	4	4½	4½	5	5	6	5½	6½	7	8	9	10
	N	M 2½ H 2⅝	M 2⅝ H 2⅞	M 3 H 3¼	M 3¼ H 3½	M 3½ H 3¾	M 3¾ H 4	M 4 H 4¼	M 4¼ H 4½	M 4⅝ H 4⅞	M 4⅞ H 5⅛	M 5⅛ H 5⅞	M 5⅞ H 6	L 8 M 8¼	L 8 M 8¼	L 10 M 10¼	L 10 M 10¼
	P	1¼	1⅜	1¾	2	1½	2⅜	1¾	2½	1⅞	3	2	3	2	3¼	2¼	3½
	Q	3⅝	4¼	4⅞	5½	5⅝	6¼	6⅜	7	7¼	8¼	8¼	9¼	10⅞	11⅞	13⅞	14⅞
	R	2½	3	3½	4	4	4½	4½	5	5	6	5½	6½	7	8	9	10
	S	M 2½ H 2⅝	M 2⅝ H 2⅞	M 3 H 3¼	M 3¼ H 3½	M 3½ H 3¾	M 3¾ H 4	M 4 H 4¼	M 4¼ H 4½	M 4⅝ H 4⅞	M 4⅞ H 5⅛	M 5⅛ H 5⅞	M 5⅞ H 6	L 8 M 8¼	L 8 M 8¼	L 10 M 10¼	L 10 M 10¼
	T	1¾	1⅜	1¾	2	1½	2⅜	1¾	2½	1⅞	3	2	3	2	3¼	2¼	3½

L = Light Service M = Medium Service H = Heavy-Duty

CHART 1

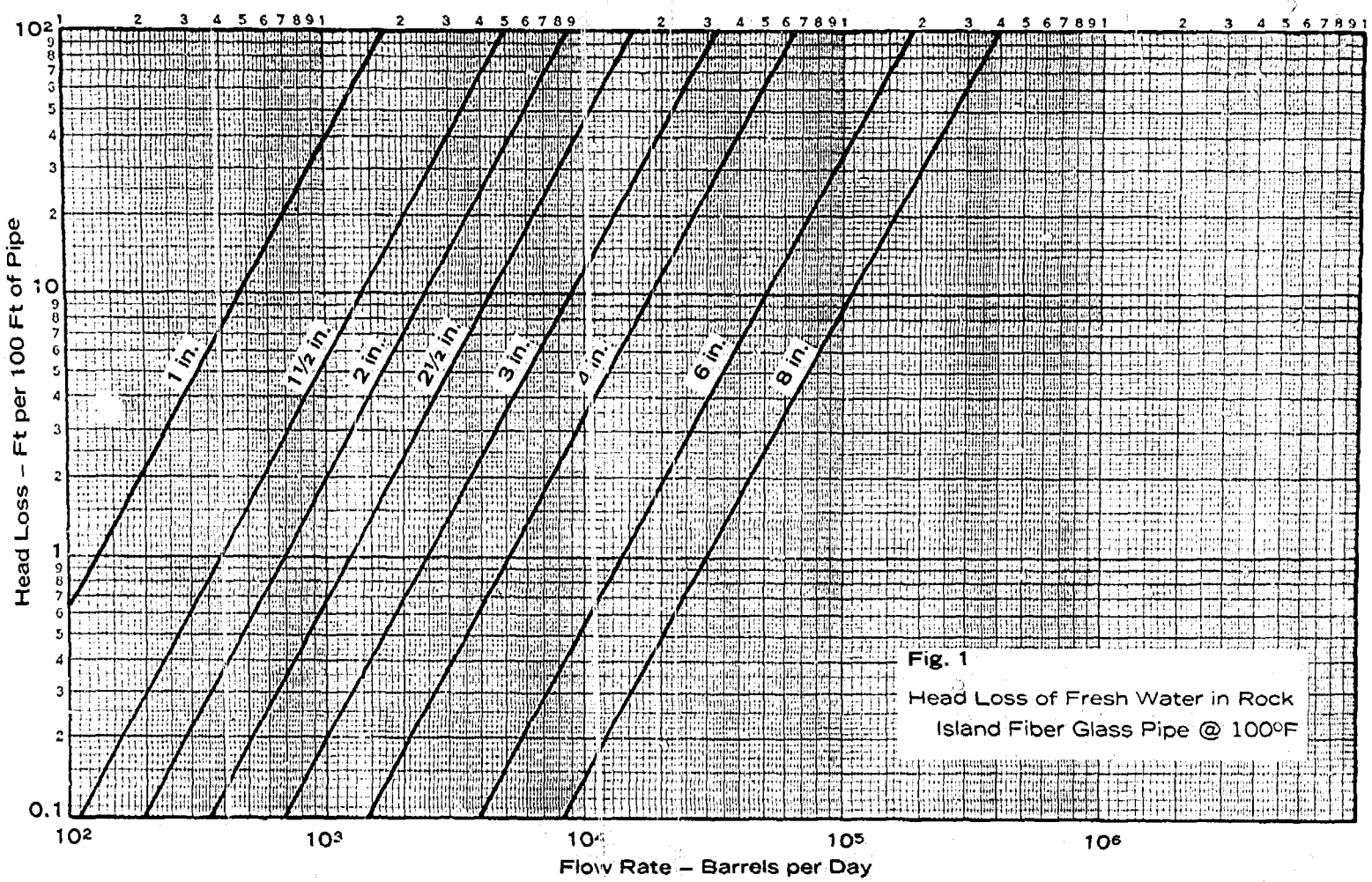


Fig. 1
Head Loss of Fresh Water in Rock Island Fiber Glass Pipe @ 100°F

X. APPENDIX

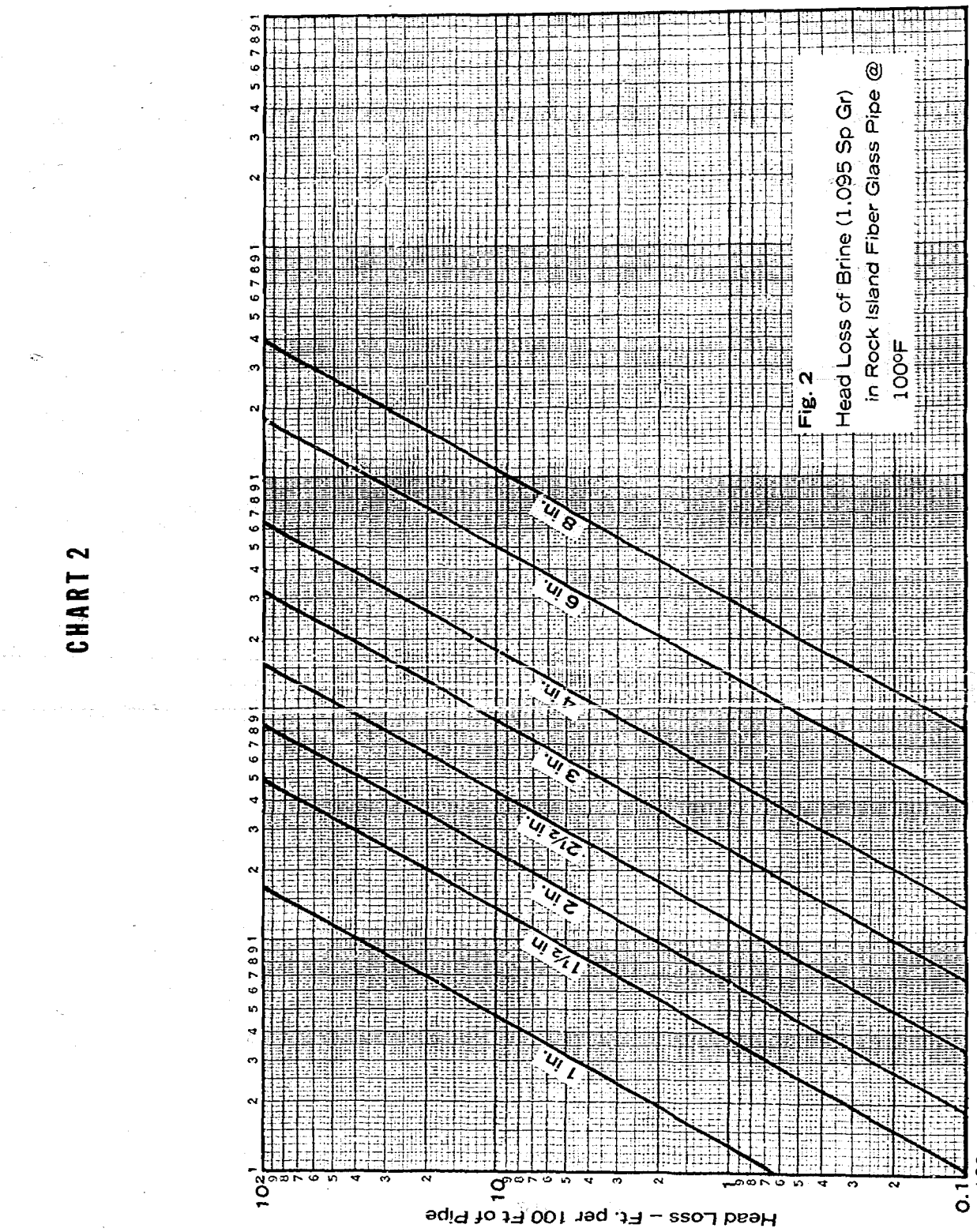


Fig. 2
Head Loss of Brine (1.095 Sp Gr)
in Rock Island Fiber Glass Pipe @
100°F

X. APPENDIX

CHART 3

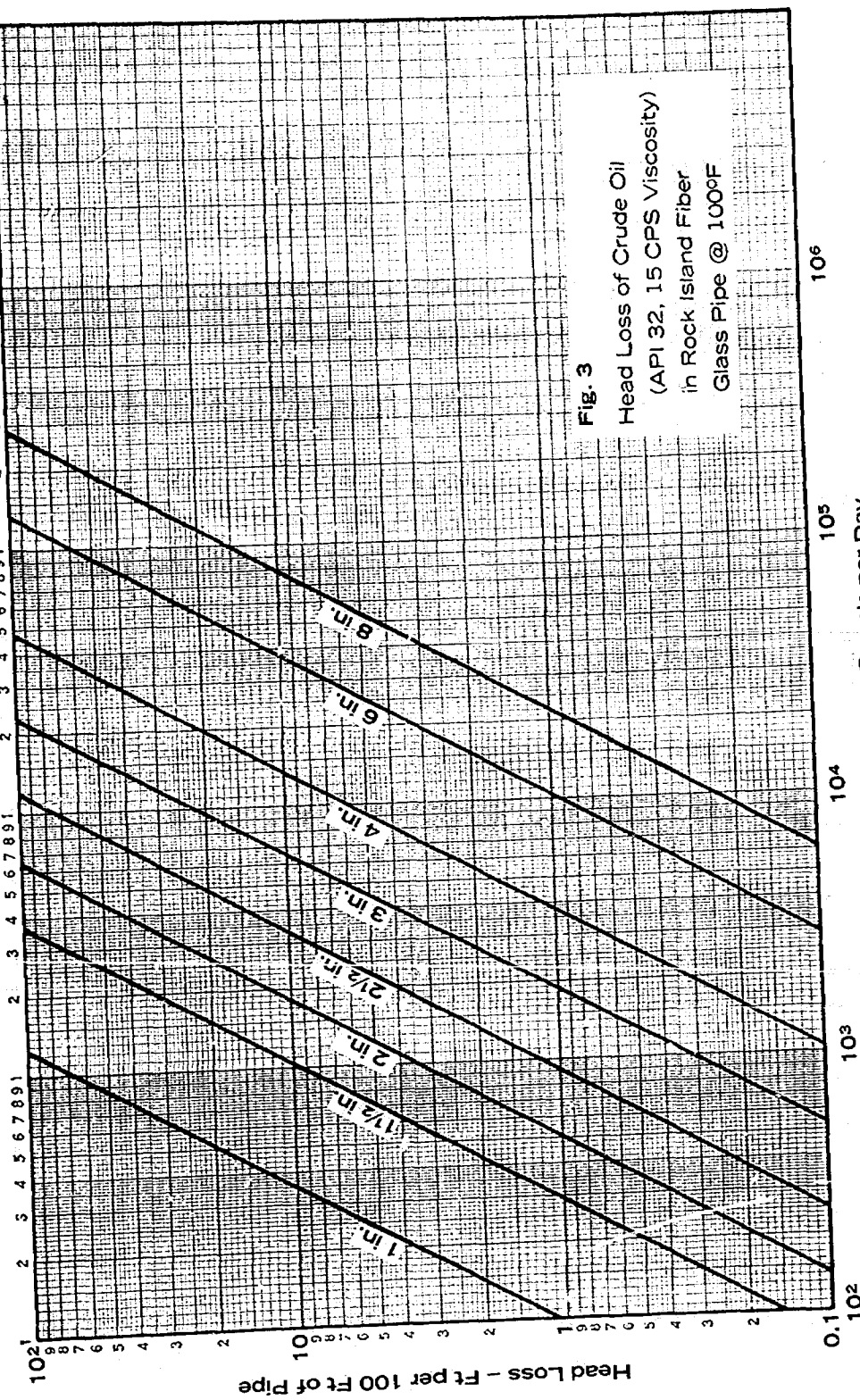


Fig. 3
Head Loss of Crude Oil
(API 32, 15 CPS Viscosity)
in Rock Island Fiber
Glass Pipe @ 100°F

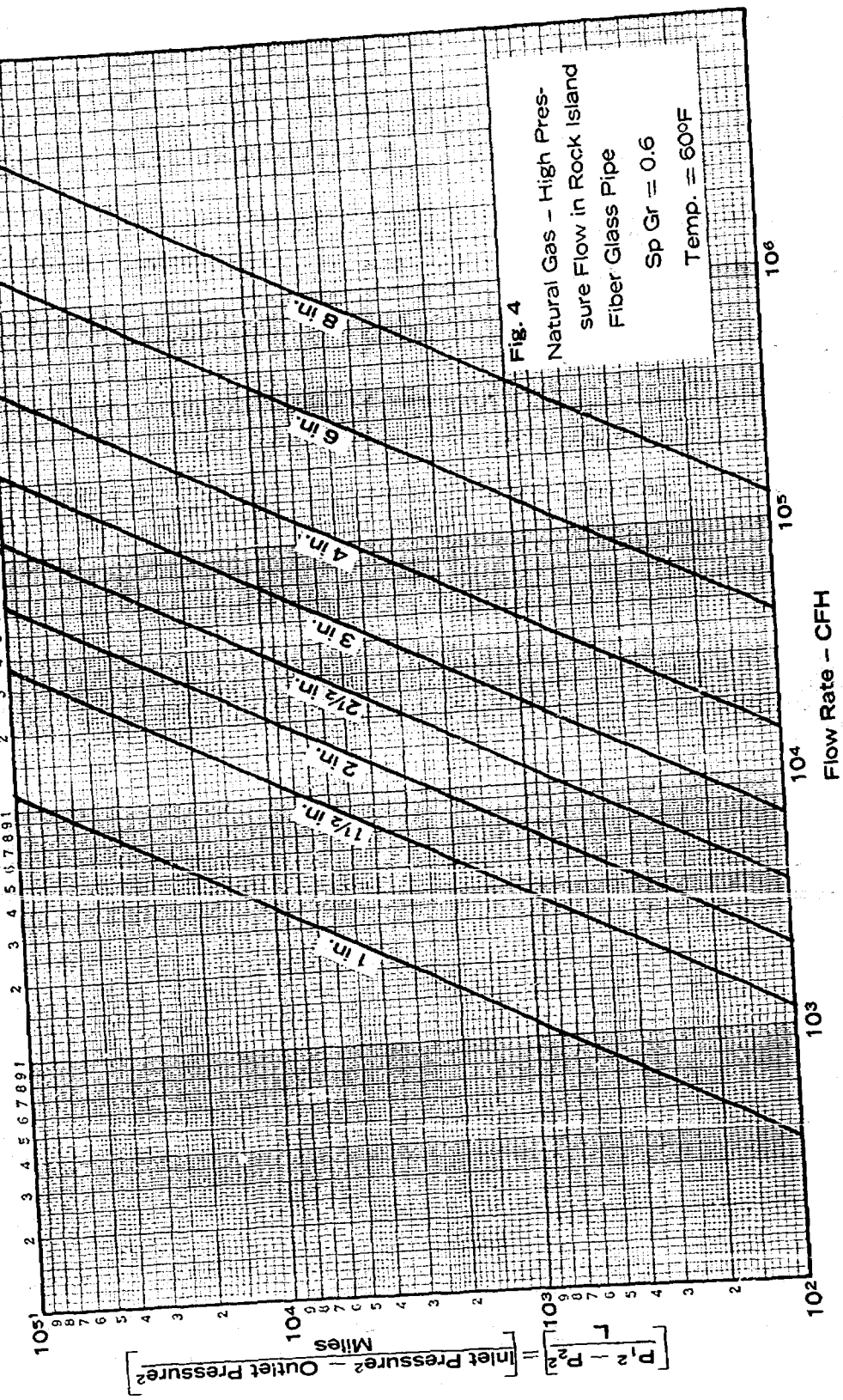
21

15

A flow chart is shown in Fig. 4.

X. APPENDIX

CHART 4



X. APPENDIX

TABLE 8

A. Viscosity and Specific Gravity Data of Petroleum Products

	Sp Gr	VISCOSITY, CENTISTOKES ★ 60°F	100°F
CRUDE OILS			
Texas, Oklahoma	0.81 - 0.916	20 - 198 @ 70°F	2.4 - 45
Wyoming, Montana	0.86 - 0.88	20 - 240 @ 70°F	6.2 - 70
California	0.78 - 0.92	20 - 1,000 @ 70°F	2.4 - 198
Pennsylvania	0.8 - 0.85	20 - 43 @ 70°F	3.8 - 17
GASOLINE	0.68 - 0.74	0.8	0.8
JET FUEL	0.74 - 0.85	2.56	2.56
KEROSENE	0.78 - 0.82	3.6	1.9
FUEL OIL			
No. 1	0.82 - 0.95	3.6	1.9
No. 2	0.82 - 0.95	7.4	4.3
No. 3	0.82 - 0.95	12.4	5.9
No. 5A	0.82 - 0.95	87.6	20.2
No. 5B	0.82 - 0.95	132.0	87.6
No. 6	0.82 - 0.95	———	1980.0
DIESEL FUEL OILS —			
No. 2D	0.82 - 0.95	12.5	6.0
No. 3D	0.82 - 0.95	25.0	10.2
No. 4D	0.82 - 0.95	132.0	29.0
No. 5D	0.82 - 0.95	1100.0	198.0
LUBRICATION OILS			
SAE 10	0.88 - 0.935	132 - 198	36 - 48
SAE 20	0.88 - 0.935	198 - 660	48 - 125
SAE 30	0.88 - 0.935	660 - 1000	125 - 176
SAE 40	0.88 - 0.935	1000 - 1320	176 - 240
SAE 50	0.88 - 0.935	1320 - 2200	240 - 400

★ Centipoises = Centistokes × (Sp Gr)

CHART 5

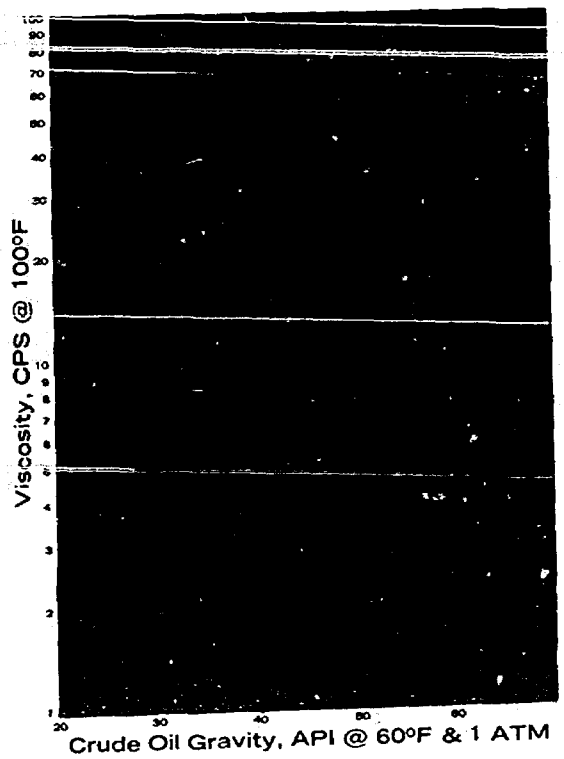
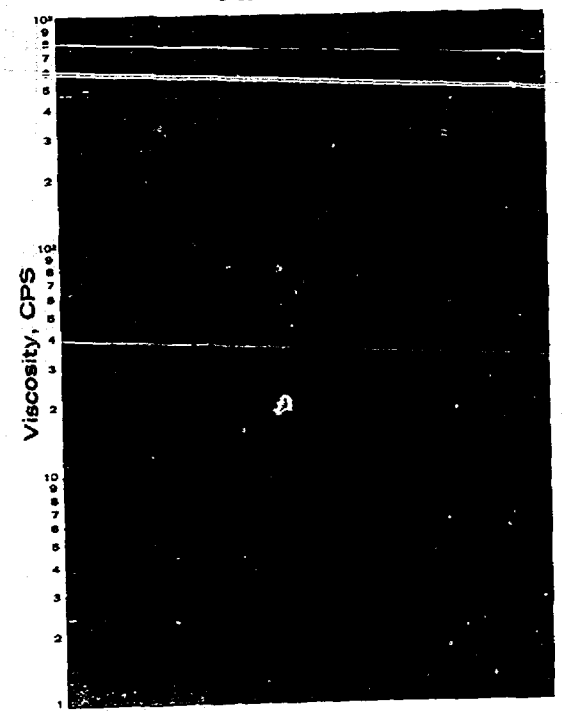


CHART 6



...is shown in Fig. 4.

X. APPENDIX

CHART 7

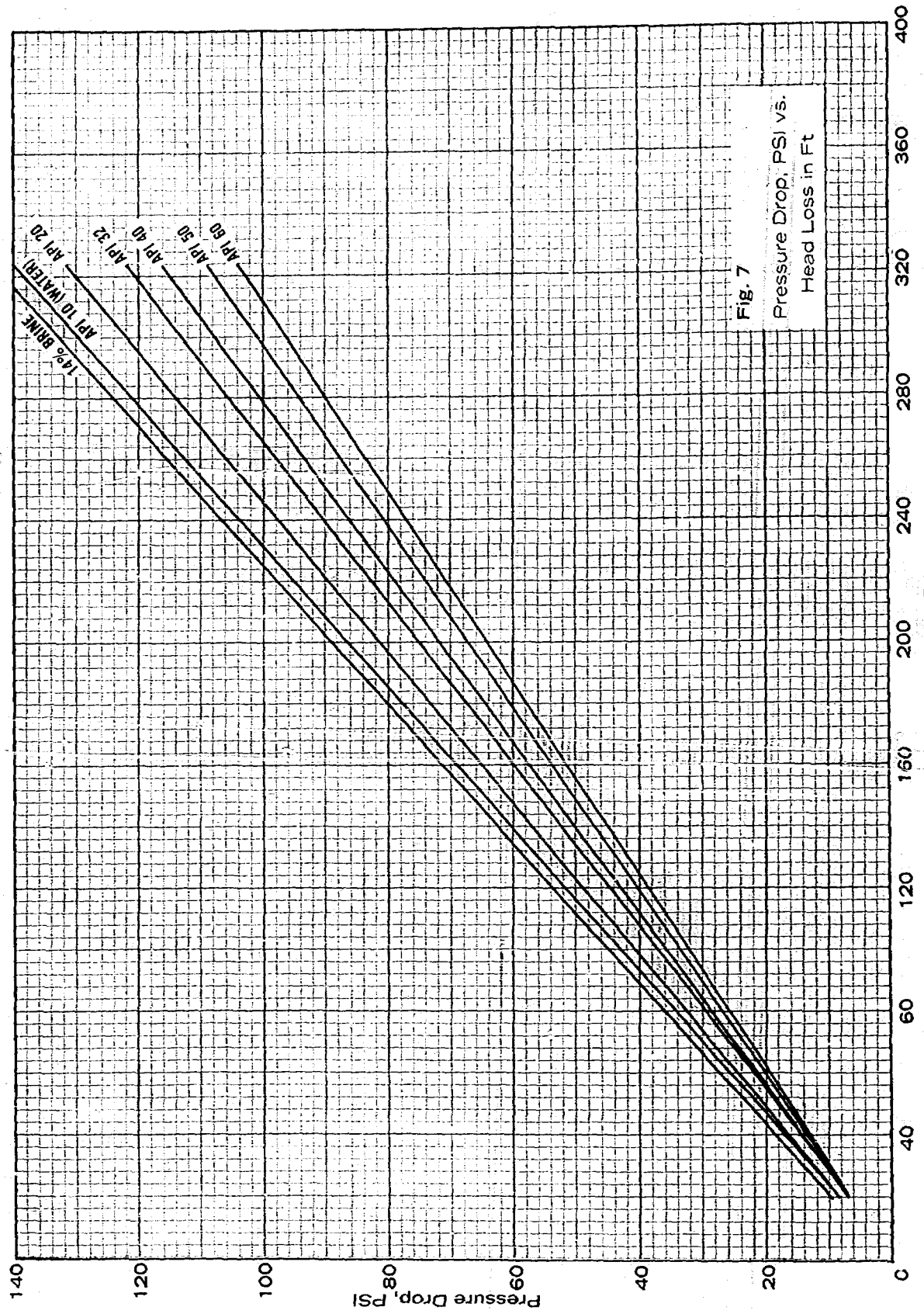


Fig. 7
Pressure Drop, PSI vs.
Head Loss in Ft

X. APPENDIX

CHART 8

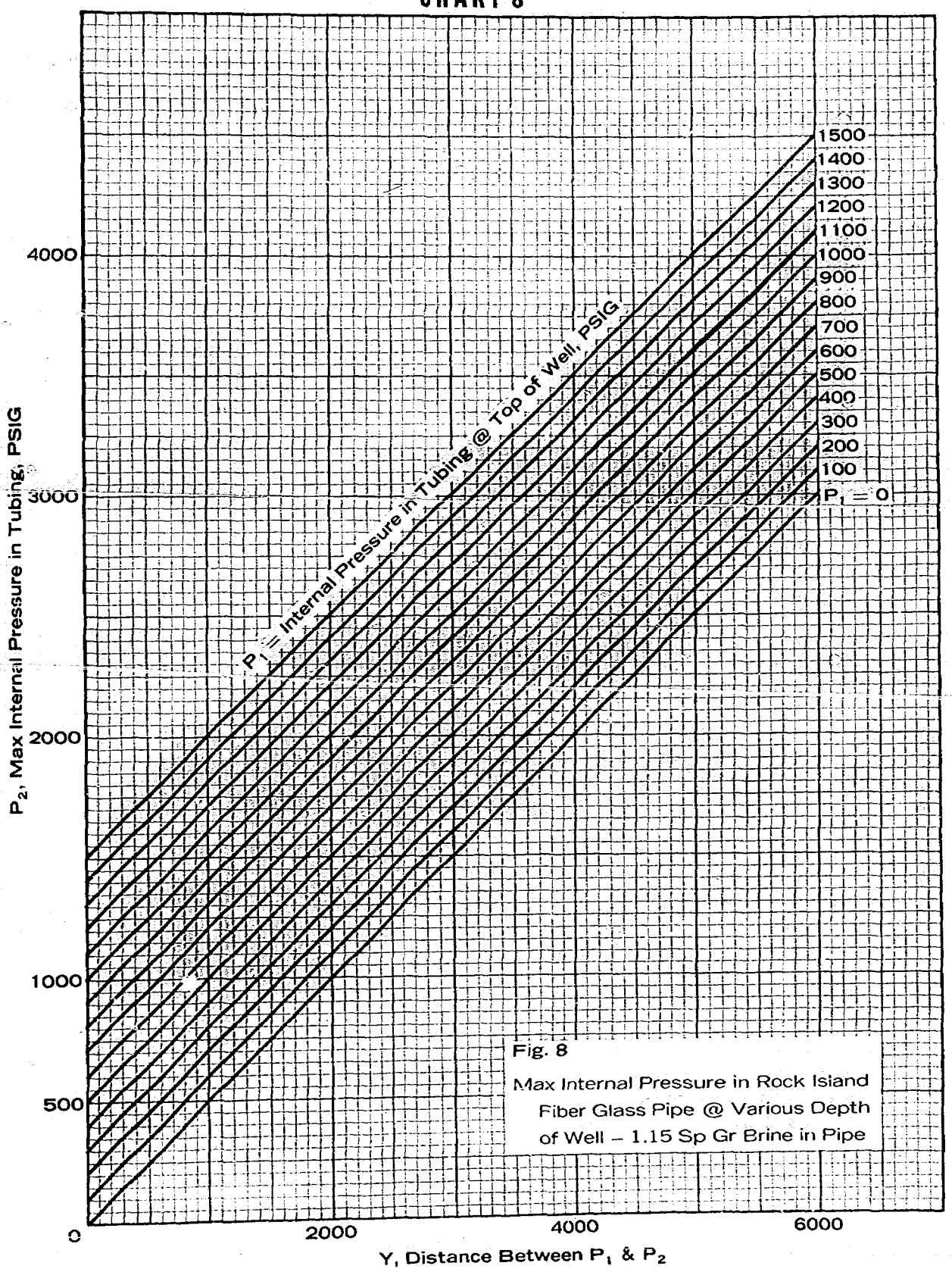


Fig. 8

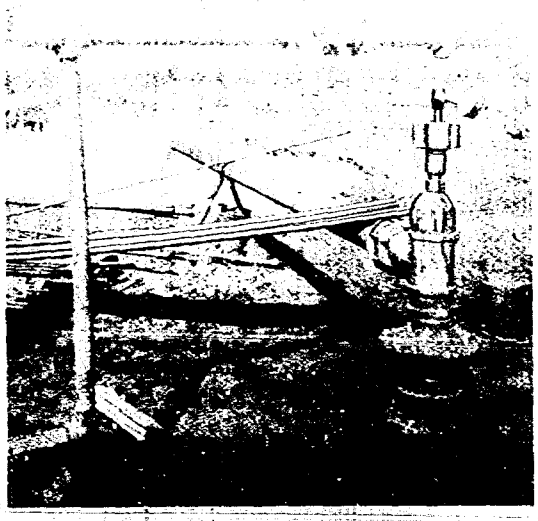
Max Internal Pressure in Rock Island Fiber Glass Pipe @ Various Depth of Well – 1.15 Sp Gr Brine in Pipe

X. APPENDIX

CONVERSION FACTORS

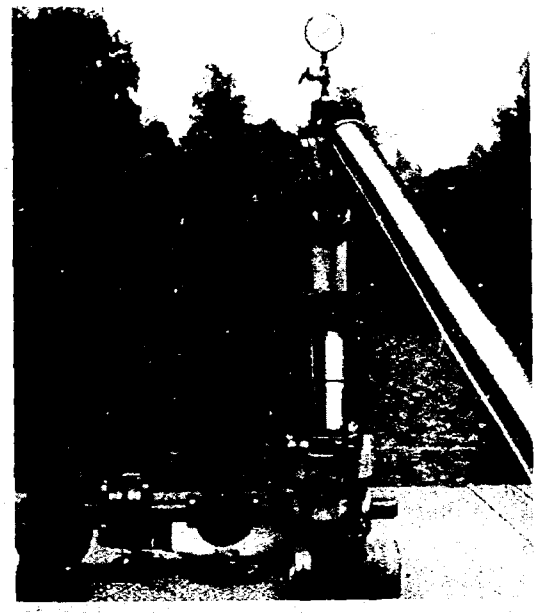
Foot pound	=	.001286	British thermal unit
Ft pound per second	=	.001818	horse-power
Gallon (U. S.)	=	.02381	barrel
Gallon (U. S.)	=	.1337	cubic feet
Gallon (U. S.)	=	231.000	cubic inches
Gallon (U. S.)	=	3.785	liters
Gallon (U. S.)	=	.8327	gallon (Imperial)
Gallon (Imperial)	=	1.2009	gallon (U. S.)
Gallon (Imperial)	=	277.274	cubic inches
Gallon per minute	=	1.429	bbl per hour
Gallon per minute	=	.1337	cu ft per minute
Gallon per minute	=	34.286	bbl per day
Grain (Avoirdupois)	=	.06480	gram
Grain per gallon	=	17.118	parts per million
Grain per gallon	=	142.86	lb per million gal
Grain per gallon	=	.01714	gram per liter
Gram	=	15.432	grains
Gram	=	.03527	ounce
Gram per liter	=	58.418	grains per gallon
Hectare	=	2.471	acres
Hectare	=	.010	square kilometer
Horse-power	=	42.44	Btu per minute
Horse-power	=	33,000.	ft-lb per minute
Horse-power	=	550.	ft-lb per second
Horse-power	=	1.014	horse-power (metric)
Horse-power	=	.7457	kilowatt
Horse-power hour	=	2,547.	British thermal unit
Inch	=	2.540	centimeters
Inch of mercury	=	1.134	feet of water
Inch of mercury	=	.4912	pound per sq in.
Inch of water @ 60°F	=	.0361	pound per sq in.
Kilogram	=	2.2046	pounds
Kilogram Calorie	=	3.968	British thermal unit
Kilogram per sq cm	=	14.223	pounds per sq in.
Kilometer	=	3,281.	feet
Kilometer	=	.6214	mile
Kilowatt	=	1.341	horse-power
Link (Surveyor's)	=	7.92	inches
Liter	=	.2642	gallon
Liter	=	1.0567	quarts
Meter	=	3.281	feet
Meter	=	39.37	inches
Mile	=	5,280.	feet
Mile	=	1.609	kilometers

FIELD APPLICATIONS



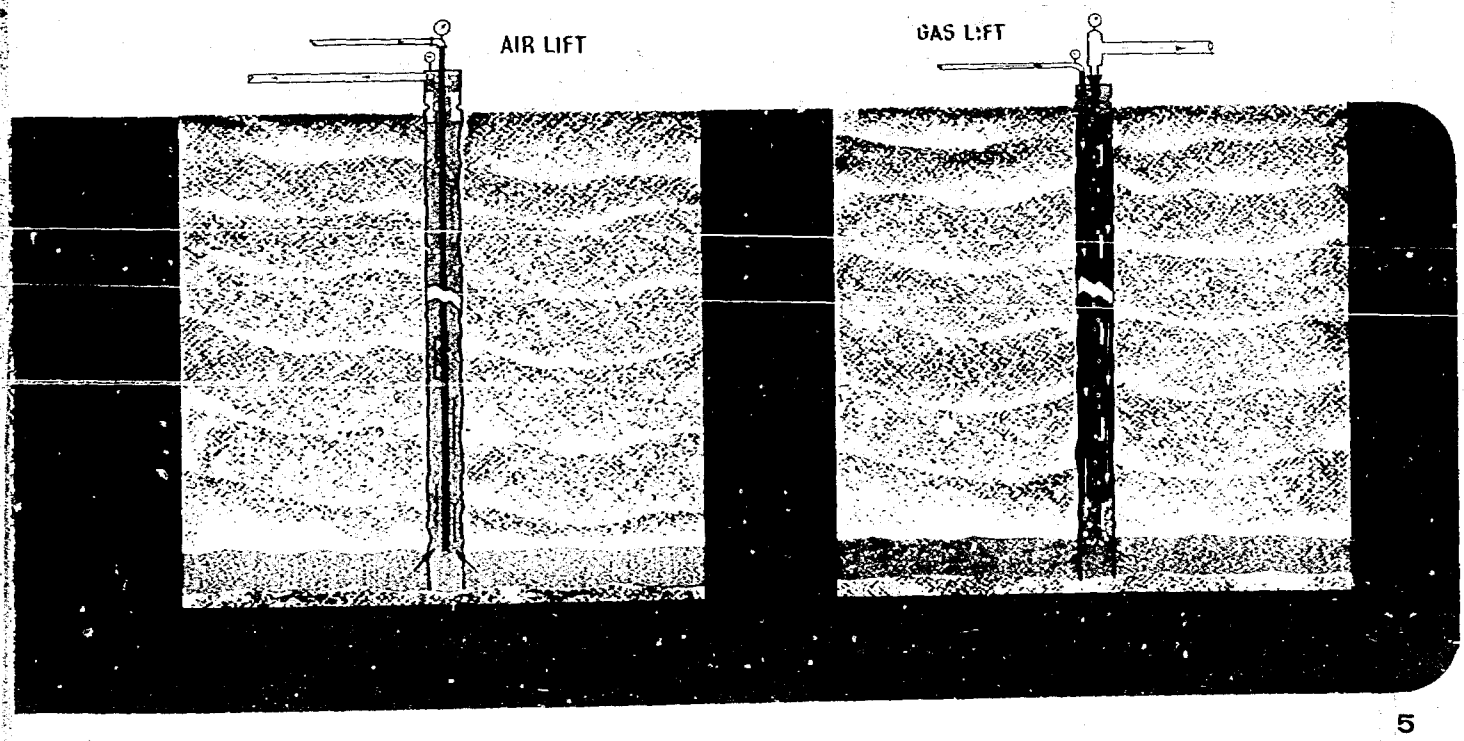
Air Lift Production

1,000 ft of 1 in. medium-service tubing, carrying 380 psi air pressure, and lifting 20,000 bbl of water daily on a major oil company lease near Wink, Texas.



Gas Lift

4,000 ft of 3 in. heavy-duty tubing, free-swinging on slips. Gas lifting at 840 lb annulus pressure through six gas lift valves and lifting 4,000 bbl of salt water at 145°F temperature. In service since March, 1962, on major oil company lease near New Orleans, Louisiana.



Line Pipe

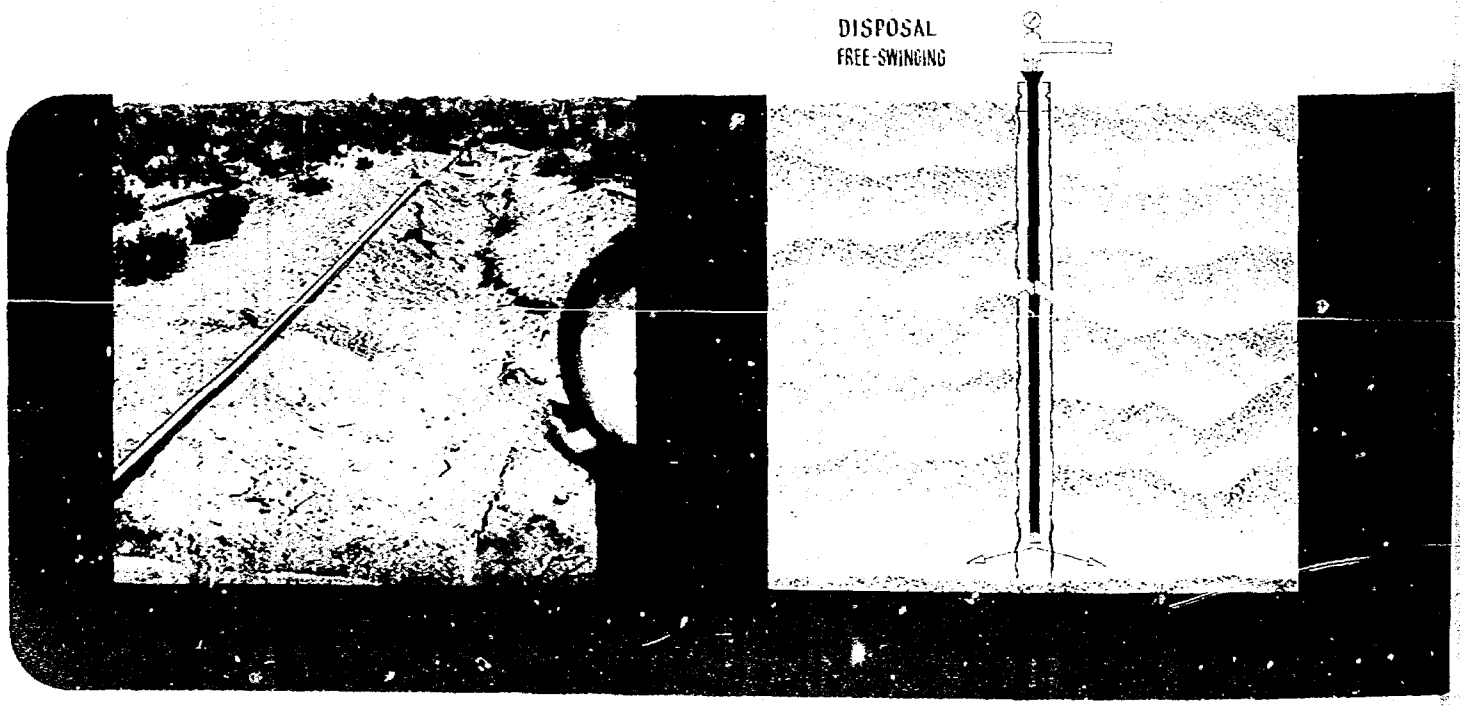
6,600 ft of 4 in. lightweight pipe picking up water from four tank batteries to a disposal well. In service since early 1961 in West Texas.

High-Pressure Injection Water Flood

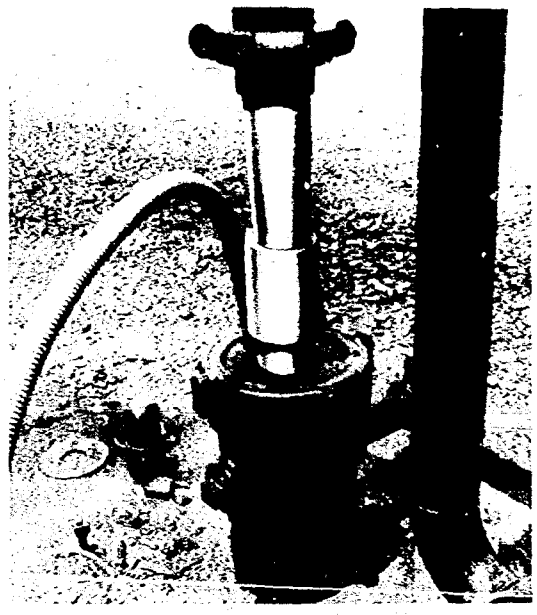
1,500 psig pressure from Multiplex pump. Temperature variation; −13° to 145°F. In service since May, 1961, near Kermit in West Texas.

Salt Water Disposal

4,200 ft of 3 in. medium-weight tubing, free-swinging on slips. Annulus loaded with hydrocarbon. Well is on vacuum in major oil company lease near St. Louis, Oklahoma. Numerous other installations since 1961.

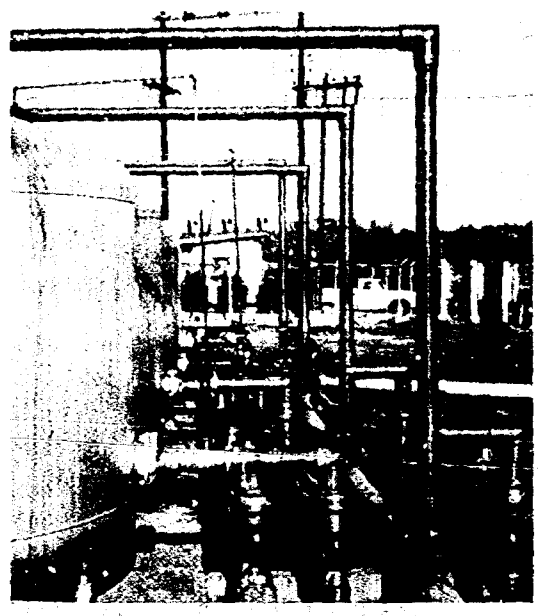


FIELD APPLICATIONS



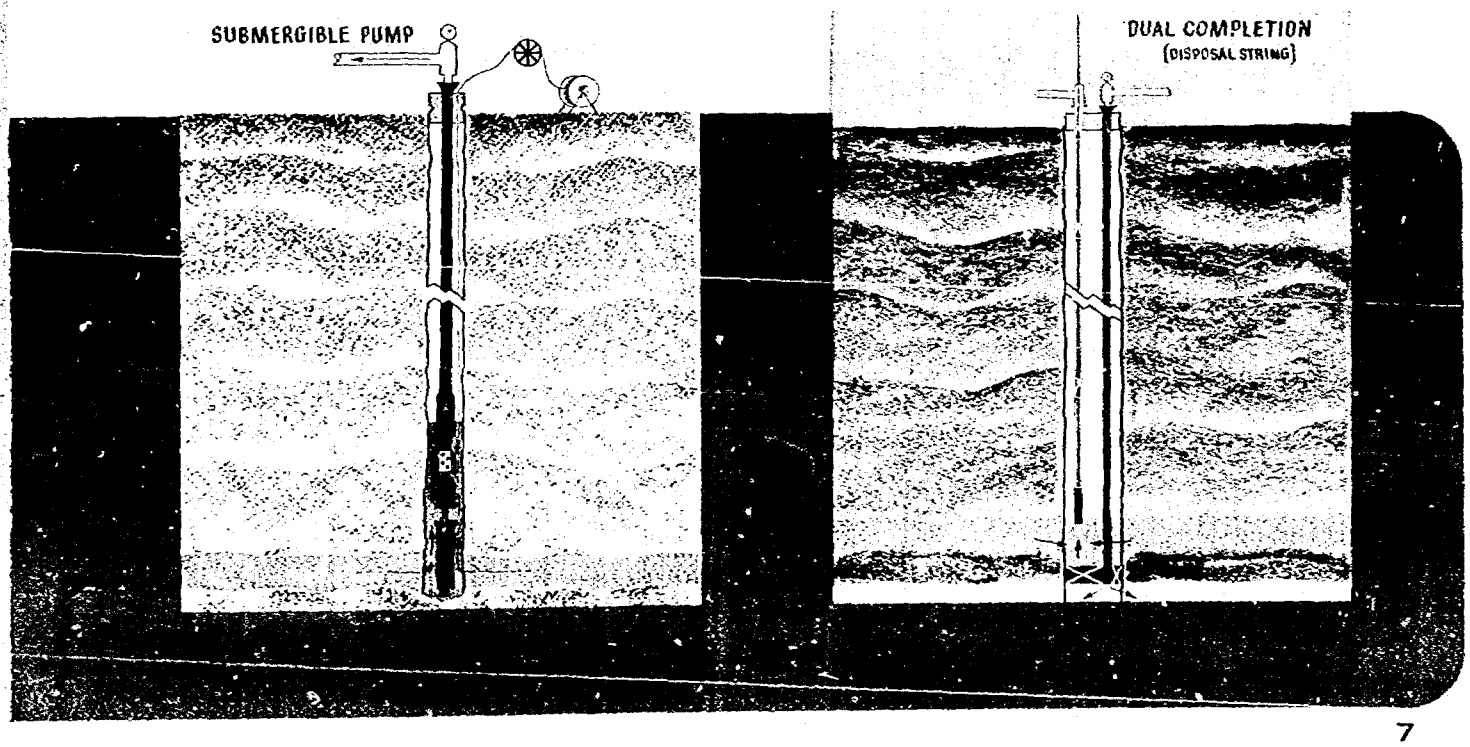
Submergible Pump

940 ft of 2½ in. heavy-duty tubing, 60 hp submergible pump. Hung in submergible pump wellhead located near Stroud, Oklahoma. In continuous service since November, 1961.

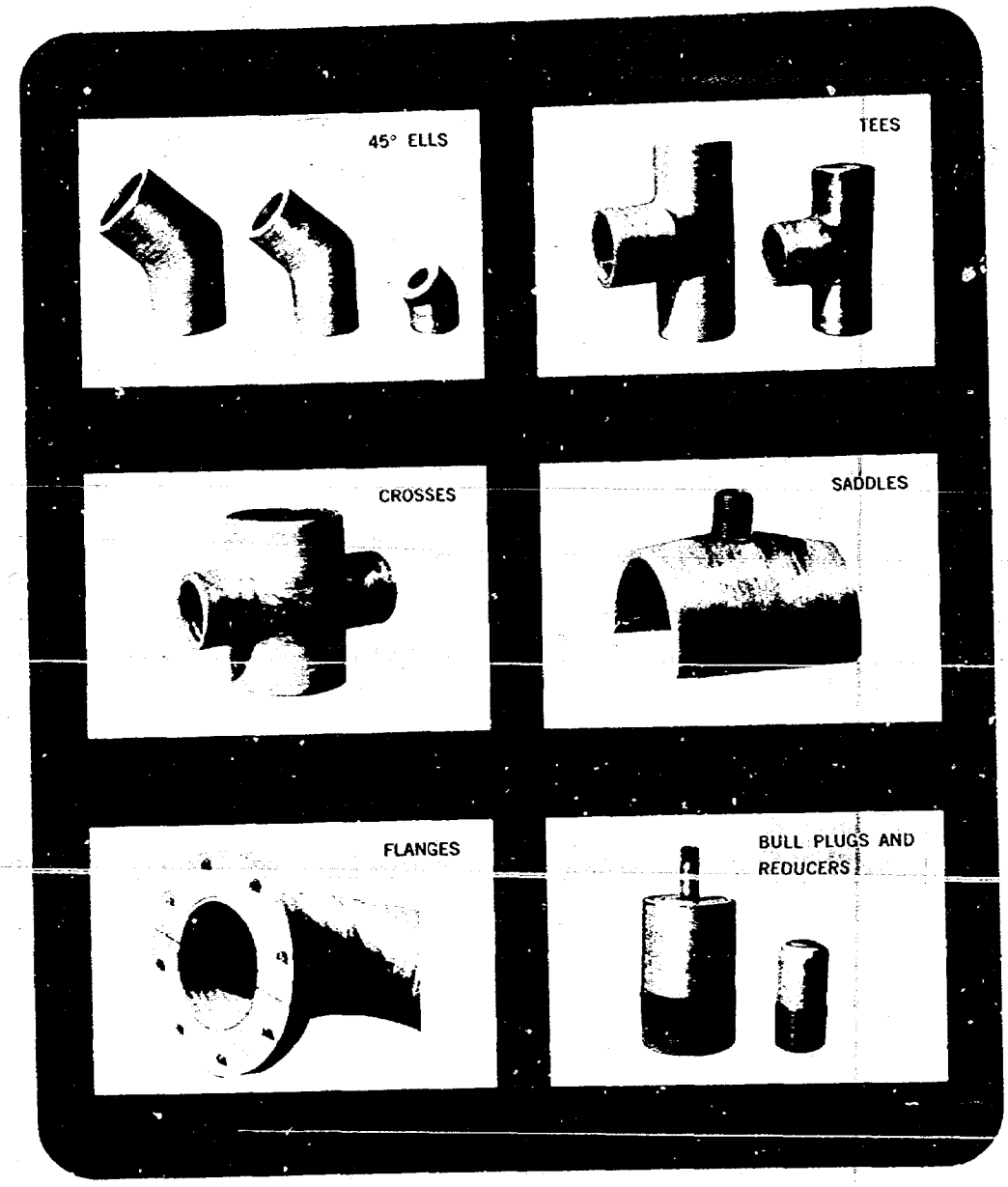


Fittings

A full line of fiber glass fittings is available in complete size and pressure ranges for your oilfield needs. Special fabrication upon request. State your needs.



II. FULL LINE OF FIBER GLASS FITTINGS



Rock Island, makers of oilfield fiber glass pipe and tubing, also provides these stock fittings for every pipe size from 1 in. to 8 in. and for pressures up to 1,500 psi. These fittings are designed for use with Rock Island pipe and tubing, and are available with EUE 8-round, 60° stub, grooved or regular API iron pipe threads. Manifolds and any other special connection used in the oilfield are custom fabricated for any hook-up with the same performance standards of Rock Island pipe and tubing.

Glass-epoxy type fittings in stock sizes from 1 in. to 8 in.

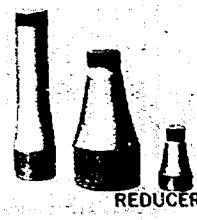
Fabricated for working pressures up to 1,500 psi.

Stocked with EUE 8-round, 60° stub, grooved, or API iron pipe threads.

CUSTOM-MADE CROSSOVERS OF ALL KINDS


REDUCING CROSS

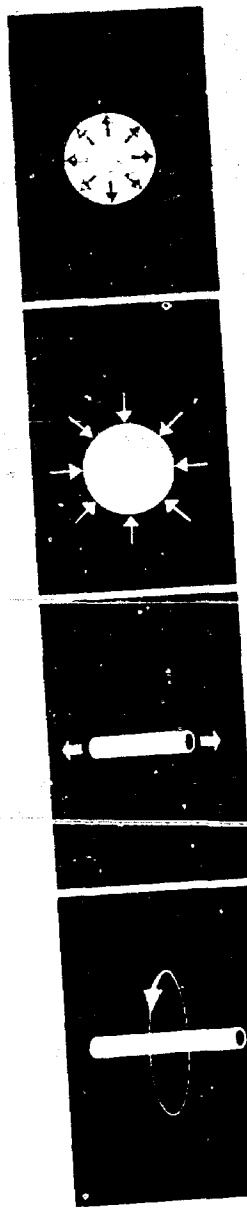

GROOVED COUPLING

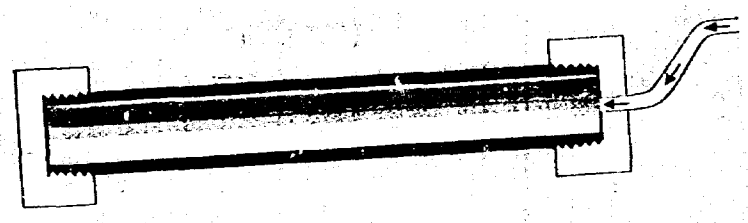

REDUCERS

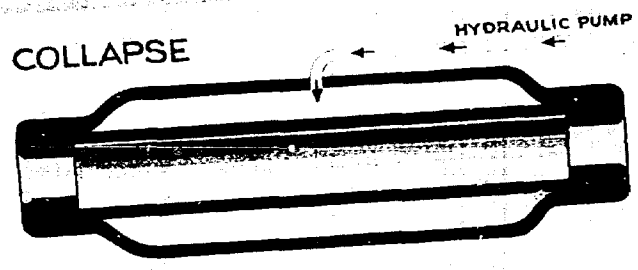

MANIFOLD

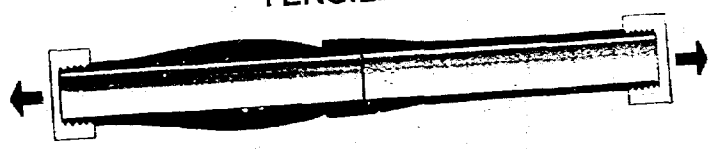
Whatever your needs, for Rock Island stock fittings or for special custom fabrication, your inquiry is welcome, and will receive immediate attention.

III. TYPICAL PIPE PROPERTIES









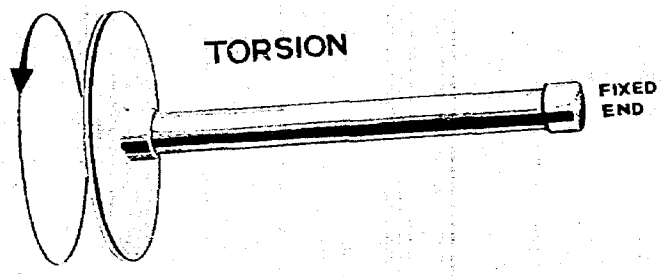


TABLE 1

Physical Properties	
Specific gravity	2.0
Density, lb/cu in.	0.072
Thermal conductivity Btu/hr-ft²-°F/ft	0.2
Coefficient of thermal expansion in./in.-°F	less than 6×10^{6}
Specific heat, Btu/lb-°F	0.22
Maximum service temperature	200°F
Flammability	slow to self-extinguishing
Water absorption %, 24 hr	0.05 - 0.1

Mechanical Properties	
Tensile strength, psi	59,900
Compressive strength, psi	31,500
Torsional strength, psi	8,200
Impact strength, Izod, (ft-lb)/in. of notch	40
Interlaminar shear strength, psi	3,000
Modulus of elasticity in tension, psi	2.4×10^{6}
Compressive modulus, psi	2.6×10^{6}
Modulus of rigidity, psi (torsion)	0.7×10^{6}
Rockwell hardness (M scale)	over 100
Elongation at break, %	3

IV. CHEMICAL RESISTANCE DATA

Except organic acids and strong solvents like ketones, methylene chloride, toluene, etc., Rock Island pipe is very resistant to crude oils and other petroleum products, mild solvents, inorganic acids, alkalies, oxidizing agents, salt solutions, and brine. Our preliminary data on chemical resistance can be reported below:

TABLE 2

	TEMEPATURE °F	
	70	140
Petroleum Products and Solvents		
Crude Oils (sour and sweet)	O. K.	O. K.
Kerosene	O. K.	O. K.
Gasoline	O. K.	O. K.
Diesel Fuels	O. K.	O. K.
Motor Oils	O. K.	O. K.
Naphtha	O. K.	O. K.
Benzene	O. K.	—
Carbon Tetrachloride	O. K.	—
Salt Water	O. K.	O. K.
Water — 3% potassium dichromate	O. K.	O. K.
Water — bromine or chlorine	no	—
Acids		
Acetic, >10%	no	—
Carbonic	O. K.	—
Hydrochloric, conc.	O. K.	O. K. (Discoloration)
Hydrofluoric, 15%	O. K. (Short Duration)	—
Hydrogen Sulfide (dry & aq. soln.)	O. K.	O. K.
Nitric, 10%	O. K.	O. K.
Sulfuric, 50%	O. K.	O. K.
Phosphoric, 85%	O. K.	no
Oxalic, 5%	no	no
Alkalis		
Sodium Hydroxide, 10-50%	O. K.	O. K.
Ammonium Hydroxide	O. K.	—
Salt Solution		
Aluminum Potassium Sulfate, saturated	O. K.	—
Calcium Hypochlorite, 5%	O. K.	—
Sodium Sulfide, Saturated	O. K.	—

TABLE 3

NOMINAL SIZE		LINE PIPE OR LIGHT SERVICE						TUBING OR MEDIUM SERVICE							MEDIUM HEAVY-DUTY			HEAVY DUTY					
		2"	2½"	3"	4"	6"	8"	1"	1½"	2"	2½"	3"	4"	6"	2"	2½"	3"	1"	1½"	2"	2½"	3"	4"
OD, in.		2.18	2.65	3.28	4.32	6.38	8.38	1.26	1.85	2.22	2.70	3.42	4.53	6.56	2.35	2.85	3.45	1.36	1.96	2.38	2.85	3.50	4.52
Wall Thickness, in.		0.13	0.13	0.13	0.13	0.17	0.17	0.12	0.15	0.15	0.15	0.15	0.22	0.28	0.20	0.20	0.20	0.17	0.21	0.23	0.23	0.23	0.28
ID, in.		1.92	2.39	3.02	4.06	6.04	8.04	1.02	1.55	1.92	2.40	3.12	4.09	6.00	1.95	2.45	3.05	1.02	1.55	1.92	2.39	3.04	4.06
Max. Coupling Diam., in. ± 1/16 in.		3.20	3.59	4.43	5.34	7.65	9.60	1.95	2.55	3.50	3.80	4.45	5.88	8.10	3.50	4.05	4.65	2.09	2.90	3.77	4.25	4.80	6.00
lb/ft		0.68	0.92	1.07	1.92	2.70	4.50	0.41	0.73	0.92	1.20	1.43	2.78	5.30	1.14	1.45	1.77	0.53	1.00	1.36	1.70	2.10	4.00
Thread Type EUE (Rd.)		8	8	8	8	8	8	10	10	8	8	8	8	8	8	8	8	10	10	8	8	8	8
Maximum Operating Conditions @ 100° - 150°F	Internal Pressure psig	400	300	250	200	200	200	650	600	550	550	330	450	500	1,000	1,000	800	2,000	1,500	1,500	1,500	1,500	1,500
	Collapse Pressure psig	275	100	90	75	75	—	750	500	500	330	150	200	250	750	550	450	1,250	1,000	1,000	800	800	800
	Axial Tensile lbs	4,500	4,500	5,000	5,000	7,000	—	3,000	4,000	6,000	7,500	8,000	9,000	10,000	7,500	8,500	10,000	5,000	6,000	8,500	10,000	12,000	15,000
Cross Sectional Area of Pipe Wall in. ²		0.833	1.029	1.388	1.712	3.315	4.382	0.432	0.801	0.990	1.202	1.524	2.977	5.521	1.350	1.664	2.041	0.636	1.131	1.563	1.893	2.364	3.798
Inside Sectional Area, ft ²		0.0201	0.0311	0.0497	0.0899	0.1990	0.2648	0.0057	0.0131	0.0201	0.0314	0.0531	0.0912	0.1963	0.0207	0.0327	0.0507	0.0057	0.0131	0.0201	0.0311	0.0504	0.0899
Cu ft/lin ft		0.0201	0.0311	0.0497	0.0899	0.1990	0.2648	0.0057	0.0131	0.0201	0.0314	0.0531	0.0912	0.1963	0.0207	0.0327	0.0507	0.0057	0.0131	0.0201	0.0311	0.0504	0.0899
*Gal/lin ft		0.1504	0.2326	0.3718	0.6725	1.4884	1.9805	0.0424	0.0980	0.1504	0.2349	0.3972	0.6822	1.4682	0.1548	0.2446	0.3792	0.0424	0.0980	0.1504	0.2326	0.3770	0.6725
Total Wt lb/ft	Pipe plus water	1.934	2.860	4.170	7.530	15.098	20.998	0.764	1.547	2.174	3.159	4.740	8.471	17.530	2.429	3.49	4.929	0.884	1.817	2.614	3.640	5.240	9.602
	**Pipe plus brine	2.053	3.045	4.466	8.001	16.269	22.565	0.797	1.625	2.293	3.346	5.058	9.012	18.692	2.552	3.681	5.229	0.917	1.895	2.733	3.825	5.544	10.134

* 1 Gal. = 0.02381 bbl
** Specific gravity = 1.095

VI. ANNULAR CAPACITIES

A. Between API Casing and Rock Island Light Service Pipe

TABLE 4

CASING PIPE (in.)	Size, OD, in.	4½	5	5½	6⅝	7	7⅝	8⅝
	lb/ft, plain end	13.04	14.87	16.87	23.58	28.72	33.04	39.29
	ID, in.	3.920	4.408	4.892	5.921	6.184	6.765	7.725
2	A. Cu ft/lin ft	0.0365	0.080	0.1046	0.1653	0.1827	0.2237	0.2996
	B. Water in annulus — lb/lin ft	2.3	5.0	6.5	10.3	11.4	14.0	18.7
	C. Kerosene in annulus — lb/lin ft	1.9	4.1	5.4	8.5	9.3	14.4	15.3
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.720	1.208	1.692	3.721	2.984	3.565	4.525
	b. Annulus area, sq in.	0.4029	7.22	10.75	19.49	21.99	27.91	38.83
2½	A. Cu ft/lin ft	0.0241	0.0677	0.0922	0.1529	0.1703	0.2113	0.2872
	B. Water in annulus — lb/lin ft	1.5	4.2	5.8	9.5	10.6	13.2	17.9
	C. Kerosene in annulus — lb/lin ft	1.2	3.5	4.7	7.8	8.7	10.8	14.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.330	0.818	1.302	2.331	2.594	3.175	4.135
	b. Annulus area, sq in.	1.950	5.14	8.67	17.41	19.91	25.82	36.75
3	A. Cu ft/lin ft	———	———	0.0718	0.1325	0.1499	0.1909	0.2668
	B. Water in annulus — lb/lin ft	———	———	4.5	8.3	9.4	11.9	16.6
	C. Kerosene in annulus — lb/lin ft	———	———	3.7	6.8	7.7	9.8	13.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	———	———	0.462	1.491	1.754	2.335	3.295
	b. Annulus area, sq in.	———	———	3.39	12.13	14.62	20.54	31.46
4	A. Cu ft/lin ft	———	———	———	0.0894	0.1069	0.1479	0.2237
	B. Water in annulus — lb/lin ft	———	———	———	5.6	6.7	9.2	14.0
	C. Kerosene in annulus — lb/lin ft	———	———	———	4.6	5.5	7.6	11.4
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	———	———	———	0.581	0.844	1.425	2.385
	b. Annulus area, sq in.	———	———	———	5.14	7.63	13.55	24.47

VI. ANNULAR CAPACITIES

B. Between API Casing and Rock Island Medium Service Pipe

TABLE 5

CASING PIPE (in.)	Size, OD, in.	4½	5	5½	6⅝	7	7⅝	8⅝
	lb/ft, plain end	13.04	14.87	16.87	23.58	28.72	33.04	39.29
	ID, in.	3.920	4.408	4.892	5.921	6.184	6.765	7.725
1	A. Cu ft/lin ft	0.0538	0.0973	0.1218	0.1825	0.1999	0.2410	0.3168
	B. Water in annulus — lb/lin ft	3.4	6.1	7.6	11.4	12.5	15.0	19.8
	C. Kerosene in annulus — lb/lin ft	2.8	5.0	6.2	9.3	10.2	12.3	16.2
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.970	2.460	2.942	3.971	4.234	4.815	5.775
	b. Annulus area, sq in.	9.09	12.28	15.81	24.55	27.05	32.96	43.89
1½	A. Cu ft/lin ft	0.0438	0.0873	0.1119	0.1726	0.1899	0.2310	0.3068
	B. Water in annulus — lb/lin ft	2.7	5.4	7.0	10.8	11.8	14.4	19.1
	C. Kerosene in annulus — lb/lin ft	2.2	4.5	5.7	8.8	9.7	11.8	15.7
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	1.370	1.860	2.342	3.371	3.634	4.215	5.175
	b. Annulus area, sq in.	6.97	10.16	13.69	22.43	24.93	30.84	41.77
2	A. Cu ft/lin ft	0.0356	0.0791	0.1036	0.1643	0.1817	0.2227	0.2986
	B. Water in annulus — lb/lin ft	2.2	4.9	6.5	10.3	11.3	13.9	18.6
	C. Kerosene in annulus — lb/lin ft	1.8	4.0	5.3	8.4	9.3	11.4	15.3
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	0.420	0.908	1.392	2.421	2.684	3.265	4.225
	b. Annulus area, sq in.	2.45	5.64	9.17	17.91	20.41	26.33	37.25
2½	A. Cu ft/lin ft	——	0.062	0.0908	0.1515	0.1688	0.2100	0.2857
	B. Water in annulus — lb/lin ft	——	4.1	5.7	9.5	10.5	13.1	17.8
	C. Kerosene in annulus — lb/lin ft	——	3.4	4.6	7.8	8.6	10.7	14.6
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	0.608	1.092	2.121	2.384	2.965	3.925
	b. Annulus area, sq in.	——	3.92	7.45	16.19	18.69	24.61	35.53
3	A. Cu ft/lin ft	——	——	0.0669	0.1276	0.1449	0.1860	0.2618
	B. Water in annulus — lb/lin ft	——	——	4.2	8.0	9.0	11.6	16.3
	C. Kerosene in annulus — lb/lin ft	——	——	3.4	6.5	7.4	9.5	13.4
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	——	0.442	1.521	1.784	2.365	3.325
	b. Annulus area, sq in.	——	——	3.24	11.99	14.48	20.40	31.32
4	A. Cu ft/lin ft	——	——	——	0.0793	0.0966	0.1377	0.2136
	B. Water in annulus — lb/lin ft	——	——	——	4.9	6.0	8.6	13.3
	C. Kerosene in annulus — lb/lin ft	——	——	——	4.1	4.9	7.0	10.9
	D. Clearance between casing and pipe coupling							
	a. Gap in inches	——	——	——	0.041	0.304	0.885	1.845
	b. Annulus area, sq in.	——	——	——	0.38	2.88	8.80	19.72

Docket No. 22-65

DOCKET: EXAMINER HEARING - WEDNESDAY - AUGUST 11, 1965

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 3283: In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the adoption of a new "Manual of Back-Pressure Testing of Gas Wells" in the State of New Mexico, said manual being an adaptation of the test manual recently adopted by the Interstate Oil Compact Commission. Modification of several existing gas well test forms and adoption of several new forms will also be considered.

A copy of the proposed testing manual, complete with tables, charts, and specimens of the various forms, is available for inspection in the Santa Fe, Hobbs, Aztec, and Artesia offices of the Commission.

CASE 3284: Application of Foster Morrell for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Willow Draw Unit Area comprising 3840 acres, more or less, of State and Federal lands in Township 20 South, Range 26 East, Eddy County, New Mexico.

CASE 3285: Application of Richfield Oil Corporation for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Avalon Unit Area comprising 11,154 acres, more or less, of Federal, State and Fee lands in Township 21 South, Ranges 25 and 26 East, Eddy County, New Mexico.

CASE 3286: Application of Skelly Oil Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Skelly Penrose "B" Unit, Langlie-Mattix Pool, Lea County, New Mexico, by the injection of water into the Queen formation through 33 injection wells in Sections 31 and 32, Township 22 South, Range 37 East, and Sections 4, 5, 6, 7, 8 and 9, Township 23 South, Range 37 East.

CASE 3287: Application of Texaco Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Langlie-Mattix Pool by the injection of water into the Queen formation through two wells in Section 21, Township 24 South, Range 37 East, Lea County, New Mexico.

CASE 3288: Application of Tenneco Oil Company for directional drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to recomplete by means of directional drilling the following wells:

TOWNSHIP 29 NORTH, RANGE 9 WEST
Florance No. 22, Unit H, Section 12

TOWNSHIP 30 NORTH, RANGE 9 WEST
Florance No. 2, Unit A, Section 20
Florance No. 3, Unit M, Section 22
Florance No. 4, Unit L, Section 10

TOWNSHIP 30 NORTH, RANGE 9 WEST - Cont'd
Florance No. 6, Unit M, Section 23
Florance No. 13, Unit B, Section 18
Florance No. 20, Unit B, Section 24
Prichard No. 1, Unit M, Section 1
Riddle No. 1, Unit B, Section 21
Riddle No. 2, Unit N, Section 17
State No. 1, Unit M, Section 32
State No. 2, Unit M, Section 16
Florance No. 8, Unit N, Section 14
Florance No. 16-X, Unit A, Section 6

TOWNSHIP 30 NORTH, RANGE 8 WEST
Florance No. 39, Unit B, Section 35
Florance No. 45, Unit G, Section 22
Florance No. 29, Unit K, Section 25
Florance No. 37, Unit H, Section 6
Florance No. 40, Unit G, Section 21
Moore No. 1, Unit N, Section 8

All of the above wells are presently completed in the Blanco-Mesaverde Pool. Applicant proposes to set a whipstock above the Mesaverde producing interval and to directionally drill recompleting said wells in the Mesaverde formation, and in some instances, to further drill to the Dakota producing interval thereby permitting dual completion of the wells to produce gas from the Blanco-Mesaverde and Basin-Dakota Gas Pools. Applicant further proposes to conduct appropriate deviation tests to ensure that none of the wells is completed nearer than 200 feet to the outer boundaries of its proration unit.

CASE 3289: Application of Kewanee Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Atoka-Grayburg Unit Area comprising 560 acres, more or less, of fee land in Sections 13 and 14, Township 18 South, Range 26 East, Eddy County, New Mexico.

CASE 3290: Application of Kewanee Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Atoka-Grayburg Pool, Eddy County, New Mexico, by the injection of water into the Grayburg formation through two injection wells in Section 13, Township 18 South, Range 26 East.

CASE 3291: Application of Kewanee Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Atoka-San Andres Pool, Eddy County, New Mexico, by the injection of water into the San Andres formation through one injection well in Section 13, Township 18 South, Range 26 East.

CASE 3092 and CASE 3093 (Reopened):

In the matter of Case No. 3092 and Case 3093 being reopened pursuant to the provisions of Orders Nos. R-2756 and R-2757, which orders established 80-acre spacing units for the Osudo-Upper Bone Spring

Pool and the Osudo-Lower Bone Spring Pool, Lea County, New Mexico, for a period of one year. The subject pools have apparently been depleted and these cases will be dismissed in the absence of evidence requiring other action.

CASE 3073: (Reopened and continued from the July 28, 1965 Examiner Hearing)

In the matter of Case No. 3073 being reopened pursuant to the provisions of Order No. R-2758, which order, as amended by Orders Nos. R-2758-A and R-2758-B, established 160-acre oil well spacing and 320-acre gas well spacing for the Tocito Dome Pennsylvanian "D" Oil Pool, San Juan County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre oil well spacing and 160-acre gas well spacing, or such other spacing as may seem proper.

CASE 3292: Application of Texaco Inc. for the creation of a new pool or in the alternative for a non-standard location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new pool for the production of oil from the Bough "B" formation in Section 14, Township 12 South, Range 34 East, Ranger Lake Field, Lea County, New Mexico. Applicant, in the alternative, seeks authority to drill its State DA Well No. 1 at an unorthodox location within 150 feet of the center of Unit K, Section 14, Township 12 South, Range 34 East, Ranger Lake Pennsylvanian Pool, Lea County, New Mexico.

(Note: The above case, at the request of the applicant, will be dismissed.)

CASE 3281 (continued from the July 28, 1965 Examiner Hearing):

Application of Samuel G. Dunn for a two-well proration unit and an unorthodox location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill and produce the second well on the 160-acre oil proration unit comprising the SW/4 of Section 26, Township 26 North, Range 1 East, Puerto Chiquito-Gallup Oil Pool, Rio Arriba County, New Mexico, the 160-acre allowable to be produced from either well in any proportion. Said second well would be drilled at an unorthodox location 1720 feet from the South line and 460 feet from the West line of said Section 26. (The SW/4 of Section 26 is currently dedicated to a well in Unit M of said section.) In the alternative, applicant seeks the creation of two non-standard 80-acre proration units comprising the N/2 SW/4 and S/2 SW/4 of said Section 26 to be dedicated to the proposed well and the existing well, respectively.

'65 JUL 28 PM

July 27, 1965

Mr. Richard S. Morris
Attorney at Law
P. O. Box 2307
Santa Fe, New Mexico

Dear Mr. Morris:

I would appreciate receiving answers to the following questions pertaining to the applications of Kewanee Oil Company which seeks permission of the Oil Conservation Commission to initiate water flood projects in the Atoka-San Andres pool and the Atoka-Grayburg pool:

(a) Atoka-Grayburg pool

Leavitt Wells No. 3 and No. 11

1. What is the exact source of water to be used for injection?

2. What is the analysis of the water proposed to be injected?

3. Will produced water be re-injected?

4. In <u>detail</u>, what is the casing, cementing and equipment program in the source water well?

5. What volumes of water will be injected at what pressures?

6. What are the minimum qualities of the fiber glass tubing to be used, by actual tests? (Give name of manufacturer and person or agencies responsible for tests).

Has this tubing received the stamp of approval from the American Petroleum Institute?

7. Describe fully the procedure for sealing the tubing joints and the test on this procedure.

8. Are the wells completed? If so, when were they completed?

9. What is the life expectancy of the project?

10. Will this be a closed system?

(B) Atoka-San Andres pool

Leavitt well No. 9S

1. What is the exact source of water to be used for injection?

2. What is the analysis of the water proposed to be injected?

3. Will produced water be re-injected?

4. In <u>detail</u>, what is the casing, cementing and equipment program in the source water well?

5. What volumes of water will be injected at what pressures?

6. What are the minimum qualities of the fiber glass tubing to be used, by actual tests? (Give name of manufacturer and person or agencies responsible for tests). Has this tubing received the stamp of approval from the American Petroleum Institute?

7. Describe fully the procedure for sealing the tubing joints and the test on this procedure.

8. Has this well been completed? If so, when was it completed?

9. What is the life expectancy of the project?

10. Will this be a closed system?

I will appreciate receiving this information prior to the hearing on this matter.

Yours truly,

S. E. Reynolds
State Engineer

By:
Frank E. Irby
Chief
Water Rights Div.

FEI/ma
cc-Oil Conservation Comm.
F. H. Hennighausen

J. O. SETH (1883-1963)

A. K. MONTGOMERY
WM. FEDERICI
FRANK ANDREWS
FRED C. HANNAHS
RICHARD S. MORRIS

JOHN G. JASPER
SUMNER G. BUELL

SETH, MONTGOMERY, FEDERICI & ANDREWS
ATTORNEYS AND COUNSELORS AT LAW
350 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501

POST OFFICE BOX 2307
AREA CODE 505
TELEPHONE 982-3876

July 20, 1965

Case 3291

New Mexico Oil Conservation
Commission
State Land Office Building
Santa Fe, New Mexico

Gentlemen:

Enclosed are three copies each of two applications by Kewanee Oil Company for approval of waterflood projects in the Atoka-Grayburg and Atoka-San Andres pools, Eddy County, New Mexico. It is my understanding that these applications will be set for hearing before an examiner on August 11, 1965.

Very truly yours,

Richard S. Morris

RSM:LHS
Encls.

cc: Mr. Frank Irby
Kewanee Oil Company

Rock Island Oil & Refining Co., Inc.

AM 5-5674 • 321 WEST DOUGLAS
WICHITA 2, KANSAS

August 9, 1965

Mr. Richard Morris
P.O. Box 2307
Santa Fe, New Mexico

Dear Mr. Morris:

At the request of Mr. J. M. Ouzts of Kewanee Oil Company, we are happy to furnish the following specification on Rock Island 2" medium heavy service fiber glass tubing:

Maximum operating conditions at temperatures to 150° F:

Pressure, psig	1,250
Collapse, psig	1,000
Axial Tensile (across threaded joint) lbs.	8,500

The minimum ultimate destructive strengths on which these operating conditions are based are at least five (5) times greater than the above. It will be noted that these operating conditions are higher than those shown for 2" medium heavy service in our Engineering Manual No. 10-64. This increase is made possible through the recent completion of extensive laboratory testing and a study of several hundred field installations made over a five year period.

The testing of Rock Island Fiber Glass Tubing has been done by Wichita State University in conjunction with Rock Island Fiber Glass' Engineering and Development section. Each joint is tested hydraulically in the final inspection to 1½ times the maximum operating pressure before it is shipped.

Rock Island Fiber Glass Tubing was developed eight years ago. The tubing was extensively field tested in our own production before being placed on the general market five years ago.

Continuous testing plus successful field applications have gained for this fiber glass pipe wide acceptance by all major oil companies. Numerous installations with tension type packers have been in service for almost four years.

Rock Island Fiber Glass Tubing has been manufactured to conform to standard oil field operating conditions. The thread on 2 inch medium heavy service tubing is the same as that on 2 inch steel upset tubing, ie, API EUE 8 rd.

The fiber glass tubing is run down hole in the same manner as steel. Steel slips and spider are used to hold the string in place while screwing on added joints. Baker Seal is one recommended compound for the threads and the threads may be torqued up by chain tong, power tong or strap wrench. Experienced service men are on all installations to assure the customer a trouble free job.

At the present time, there is an API Committee conducting a study of Reinforced Fiber Glass Pipe. This committee will make its recommendation of standards to the API upon the completion of its study. We are working with a committee of A.S.T.M. - S.P.I. on the formulation of standards for Reinforced Fiber Glass Pipe and Components.

Should you have any further questions, we will be most happy to have you call us collect in Wichita, Kansas, at WH 2-3237. I have also asked Mr. John Lehman, our Sales Representative, to contact you so that he may be of service.

Thanking you for this opportunity to be of service, I am,

Yours very truly,

V F Michael

V. F. Michael, Mgr.
Fiber Glass Pipe Division
2501 South West Street
Wichita, Kansas 67217

VFM:mw

cc: Mr. J. M. Ouzts
Kewanee Oil Company
P.O. Box 2239
Tulsa, Oklahoma 74101

John J. Lehman
2005 North "C" Street
Midland, Texas

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF KEWANEE OIL COMPANY FOR APPROVAL OF A WATERFLOOD PROJECT, ATOKA-SAN ANDRES POOL, EDDY COUNTY, NEW MEXICO

No. 3291

A P P L I C A T I O N

Comes now Kewanee Oil Company, by its attorneys, and applies to the New Mexico Oil Conservation Commission for permission to institute a waterflood project in the Atoka-San Andres pool, Eddy County, New Mexico, and in support of its application states:

1. Applicant is the operator of the Leavitt "S" lease comprising the NW¼ of Section 13, and the E½NE¼ of Section 14, T. 18 S., R. 26 E., Eddy County, New Mexico.

2. Wells producing from the San Andres formation on the above described lease are in an advanced state of depletion and are regarded as what is commonly referred to as "stripper" wells.

3. Applicant proposes to waterflood the above described lease by the injection of water into the San Andres formation through its Leavitt Well No. 9S to be located 1680 feet from the north line and 990 feet from the west line of Section 13, T. 18 S., R. 26 E., Eddy County, New Mexico.

4. Attached to and made a part of this application are the following exhibits:

Exhibit "A": Plat showing the location of the lease to be waterflooded and the producing and injection wells thereon.

Exhibit "B": Structure map of the Atoka-San Andres pool contoured on top of the Slaughter "C" producing horizon.

Exhibit "C": Graph of oil production from the Atoka-San Andres pool on the lease to be waterflooded.

Exhibit "D": Map showing ownership and development within a two mile radius of the proposed injection well.

Exhibit "E": Electric log of the proposed injection well showing the top of the San Andres formation and the top of the Slaughter "C" producing horizon.

Exhibit "F": Schematic diagram of the proposed injection well.

5. The proposed waterflood project will prevent waste and protect correlative rights.

WHEREFORE, Kewanee Oil Company requests that this application be set for hearing before the Commission or one of its examiners and that the Commission enter its order approving this application.

SETH, MONTGOMERY, FEDERICI & ANDREWS

By Richard S. Morris

P. O. Box 2307
Santa Fe, New Mexico
Attorneys for Kewanee Oil Company

CERTIFICATE OF MAILING

I hereby certify that a copy of this application, complete with all exhibits referred to therein, has been sent to Mr. Frank Irby, Office of the State Engineer, Capitol Building, Santa Fe, New Mexico, on this 20th day of July, 1965.

Richard S. Morris

Case 3291

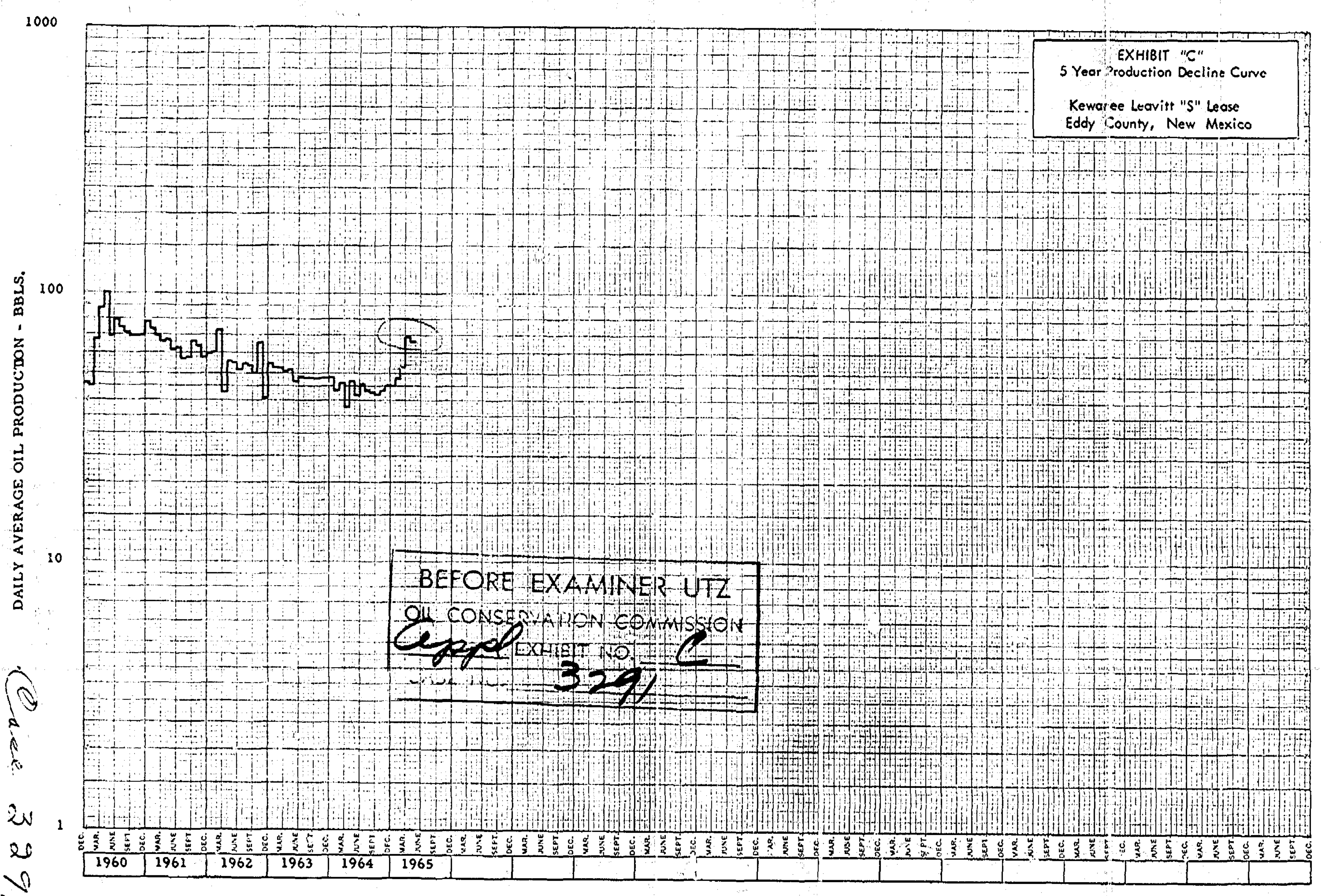
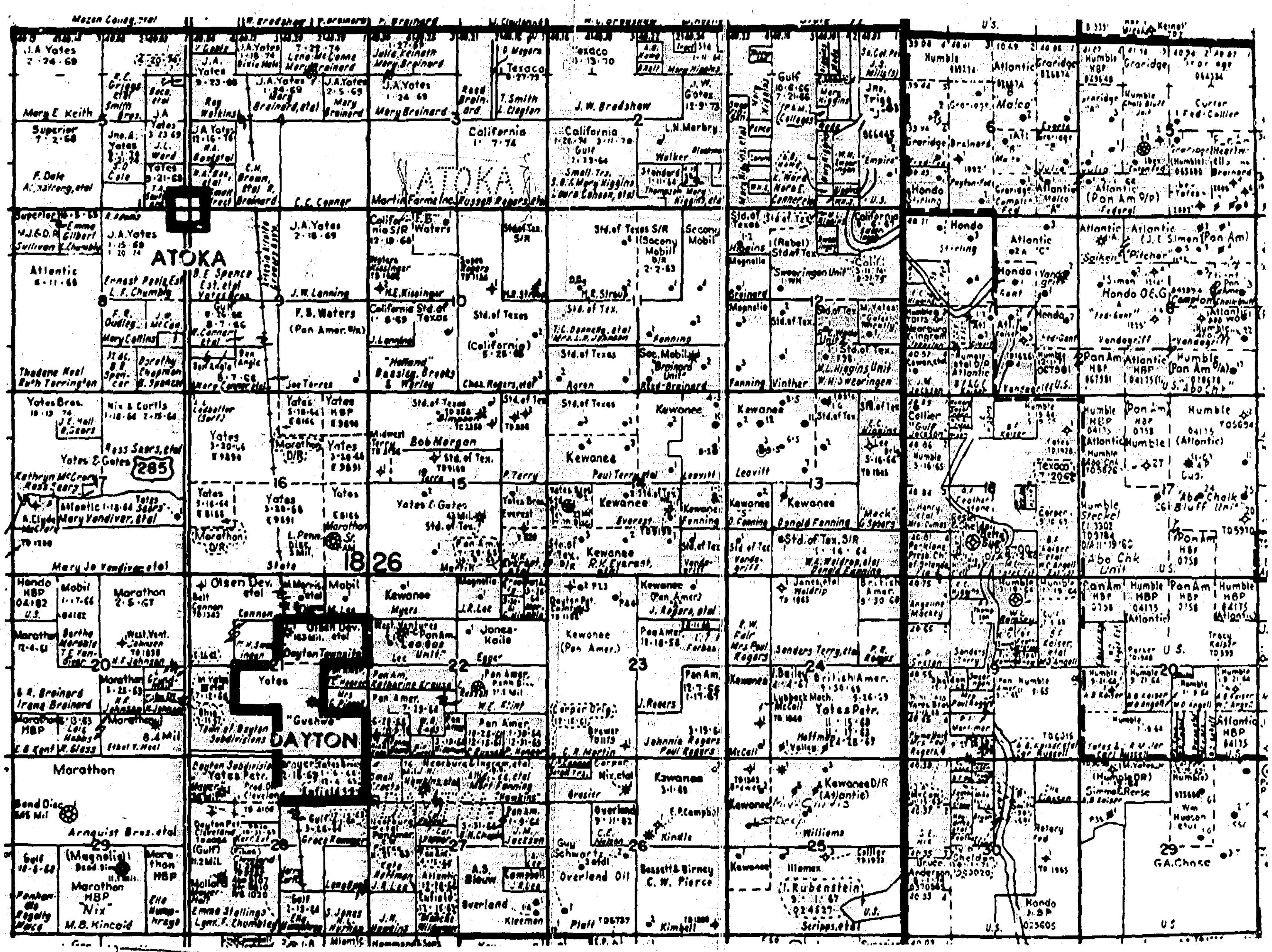


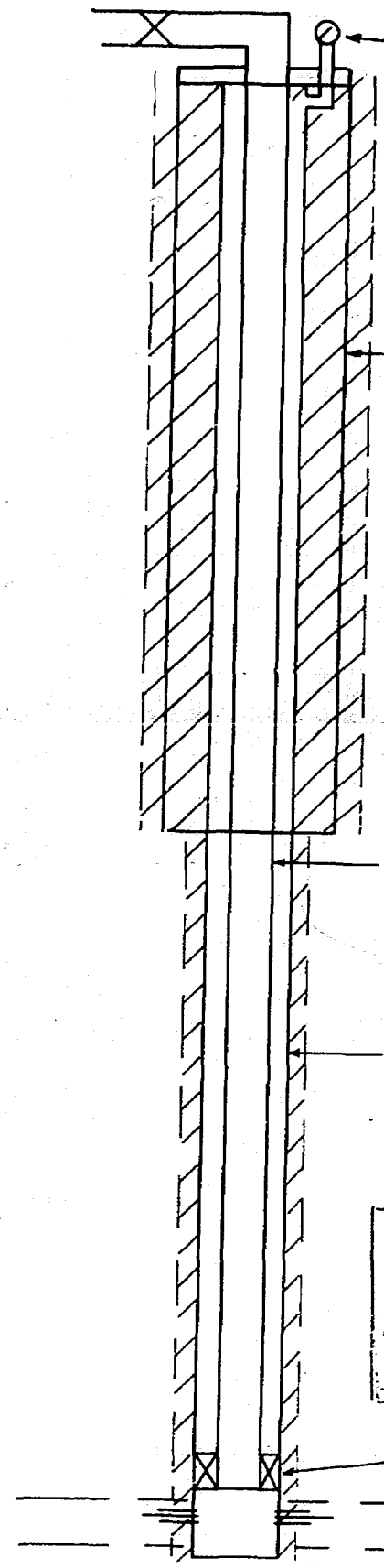
EXHIBIT "C"
5 Year Production Decline Curve
Kewanee Leavitt "S" Lease
Eddy County, New Mexico
DAILY AVERAGE OIL PRODUCTION - BBLS.
1000
100
10
1
1960
1961
1962
1963
1964
1965
BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO.
C
3291



BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Appl EXHIBIT NO. D
CASE NO. 3291

EXHIBIT "D"
Regional Ownership and Development
Atoka San Andres Field
Eddy County, New Mexico

LEAVITT S #9
SW/4 of NW/4, "E" Unit, Sec. 13, T-18-S, R-26-E



BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. F
CASE NO. 3291

KEWANEE OIL COMPANY
Atoka San Andres Field
Eddy County, New Mexico

EXHIBIT "F"
Proposed Water Injection Well

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3291
Order No. R-2955

APPLICATION OF KEWANEE OIL COMPANY
FOR A WATERFLOOD PROJECT, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 11, 1965, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 16th day of August, 1965, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Kewanee Oil Company, seeks permission to institute a waterflood project in the Atoka-San Andres Pool by the injection of water into the San Andres formation through one injection well in Section 13, Township 18 South, Range 26 East, NMPM, Eddy County, New Mexico.

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Kewanee Oil Company, is hereby authorized to institute a waterflood project in the Atoka-San Andres Pool by the injection of water into the San Andres formation through its Leavitt "B" Well No. 9 to be located 1680 feet from the North line and 990 feet from the West line of Section 13, Township 18 South, Range 26 East, NMPM, Eddy County, New Mexico.

(2) That the subject waterflood project shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

A. L. Porter
A. L. PORTER, Jr., Member & Secretary

esr/

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO

September 8, 1965

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Dear Mr. Morris:

Reference is made to Commission Order No. R-2955, recently entered in Case No. 3291, approving the Kewanee Atoka San Andres Leavitt "S" Water Flood Project.

Injection is to be through the authorized injection well which shall be equipped with 2 inch Extra Heavy fiberglass tubing and a packer set at approximately 1685 feet.

As to allowable, our calculations indicate that when the authorized injection well has been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 252 barrels per day.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate District proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. Porter, Jr.
Secretary-Director

ALP:sg

cc: Mr. Frank Irby
State Engineer Office
Santa Fe, New Mexico

Oil Conservation Commission
P. O. Drawer D D
Artesia, New Mexico

C
O
P
Y

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 2088
SANTA FE
87501

If injection is to be through the authorized injection well which shall be equipped with 2 inch Extra Heavy fiberglass tubing and a packer set at approximately 1685 feet.

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Dear Mr. Morris:
~~Gentlemen:~~

Reference is made to ~~Enclosed herewith is~~ Commission Order No. R- 2955, recently entered in Case No. 3291, approving the Kewanee Artesia San Andres Leavitt "5" Water Flood Project.

As to allowable, ~~According to~~ our calculations, indicate that when ~~all of~~ the authorized injection wells ~~have~~ has been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 252 barrels per day.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate District proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

cc: Mr. Frank Irby
OCC - Artesia