BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
SVG EXHIBIT No. 3
CASE 977

TAPACITO FIELD

Interference Test #1

Producing Wells:

Jicarilla 1-E	SW/4 16-26-4
Jicarilla 3-E	NE/4 15-26-4
Jicarilla 4-E	NE/4 22-26-4

Shut in:

Jicarilla 2-E	SW/4 15-26-4

Month	SICP	SITP	Monthly Production	Cumulative Production
January 1956	1090	1087.5	0	
February 1956	1088	1086	72,787	
March 1956	1089.5	1086.5	95,289	168,076
April 1956	1089.5	1087.5	140,648	308,724
May 1956	1089	1086	170,881	479,605
June 1956	1088.5	1085.5	145,098	624,703
July 1956	1086	1083	135,196	759,899
August 1956	1083	1080	145,782	905,681
September 1956	1079	1077	134,289	1,039,970
October 1956	1072.5	1074.5	121,394	1,161,364
November 1956	1070	1068	79,830	1,241,194
December 1956	1068	1066	99,256	1,340,450

TAPACITO FIELD

Interference Test #2

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
SUG EXHIBIT No. 4
CASE 977

Producing Wells:

Jicarilla 2-D	SW/4 29-26-3
Jicarilla 5-D	SW/4 30-26-3

Shut in:

Jicarilla 4-D	NE/4 30-26-3

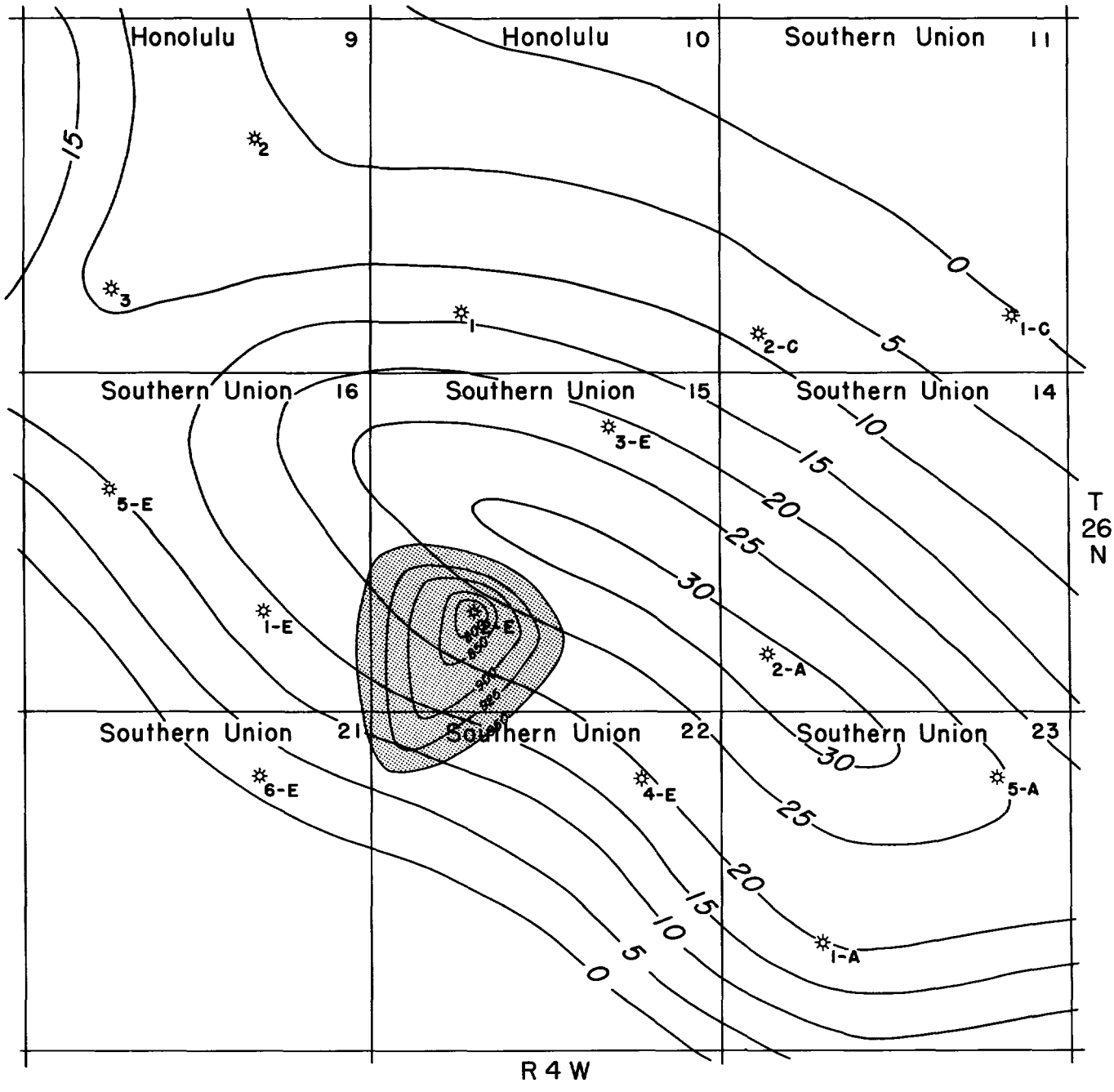
Month	SICP	SITP	Monthly Production	Cumulative Production
November 1956				60,455*
December 1956	1065	1064	56,278	116,733
January 1957	1065	1064	58,555	175,288
February 1957	1065	1064	47,744	223,032
March 1957	1065½	1064½	47,571	270,603
April 1957	1066	1064½	37,901	308,504
May 1957	1066	1064½	47,147	355,651
June 1957	1065½	1063½	37,819	393,470

*Cumulative for 2-D well only, 4-D well on production in December 1956.

ISOPACHOUS MAP OF MICROLOG POROSITY

TAPACITO PICTURED CLIFFS GAS POOL
SOUTHERN UNION JICARILLA "E" AREA

RIO ARRIBA CO., NEW MEXICO



CALCULATED PRESSURE DISTRIBUTION
IN VICINITY OF SOUTHERN UNION JICARILLA NO. 2-E

ASSUMING UNIFORM PERMEABILITY

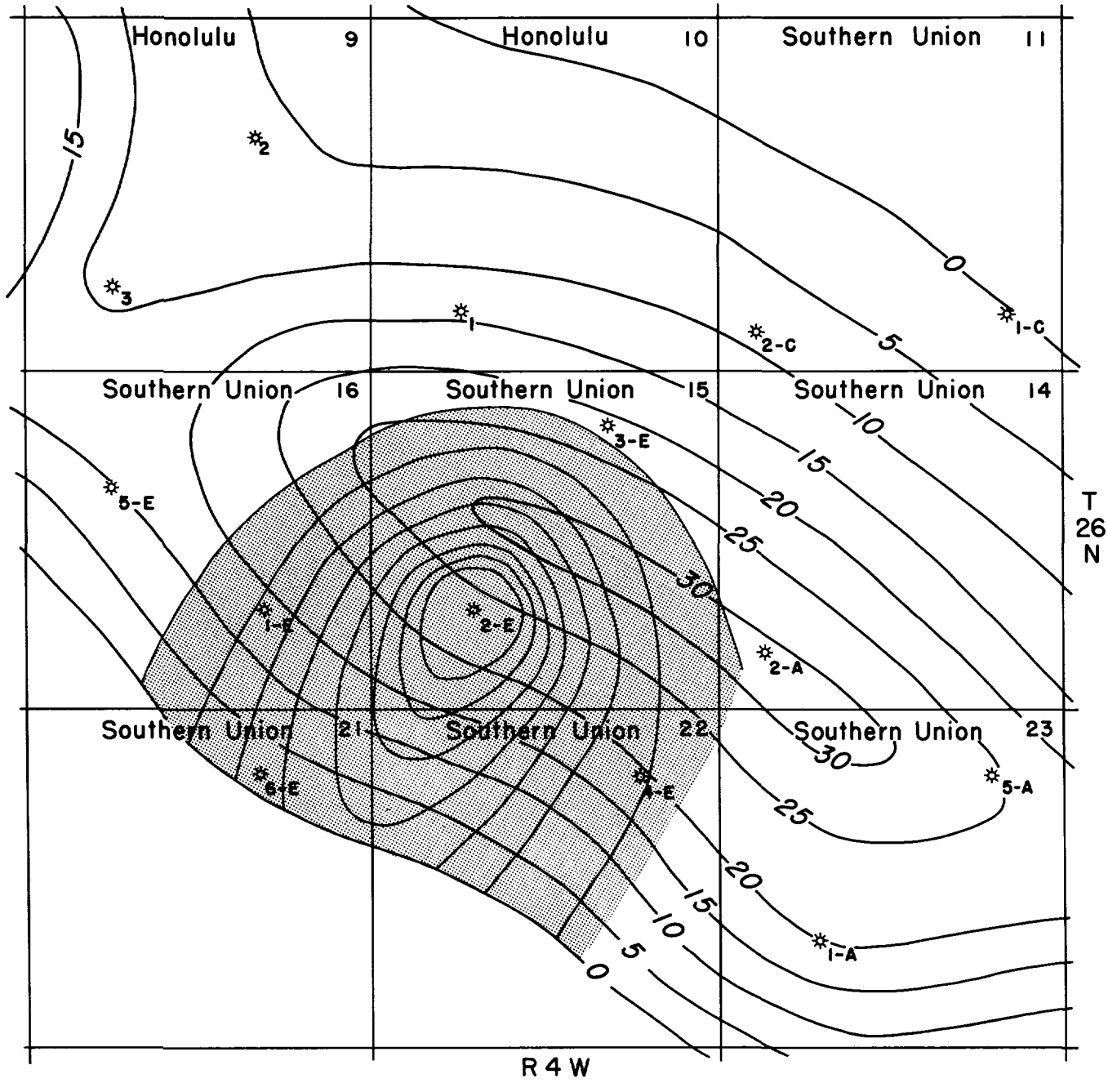
BASED ON EQUATION OF DARCY'S LAW FOR RADIAL, HORIZONTAL GAS FLOW

HUMBLE EXHIBIT NO. 3

ISOPACHOUS MAP OF MICROLOG POROSITY

TAPACITO PICTURED CLIFFS GAS POOL
SOUTHERN UNION JICARILLA "E" AREA

RIO ARRIBA CO., NEW MEXICO



CALCULATED PRESSURE DISTRIBUTION
IN VICINITY OF SOUTHERN UNION JICARILLA NO. 2-E

ASSUMING VARYING PERMEABILITY

BASED ON COMPUTER SOLUTION OF UNSTEADY STATE EQUATION FLUID FLOW

HUMBLE EXHIBIT NO. 4

EQUATION OF DARCY'S LAW FOR RADIAL, HORIZONTAL GAS FLOW

Case 977

$$q_{gw} = \frac{0.0447\pi\, K_g\, H\, 144\, (P_d^2 - P_w^2)}{1000 \mu_g\, P_w\, \ln \frac{r_d}{r_w}}$$

OR

$$\ln \frac{r_d}{r_w} = \frac{0.0447\pi\, K_g\, H\, 144\, (P_d^2 - P_w^2)}{1000 \mu_g\, P_w\, q_{gw}}$$

WHERE

q_{gw} = Rate of gas flow into well bore, cubic feet/day at bottom hole flowing conditions

K_g = Permeability to gas, millidarcys

H = Net pay thickness, feet

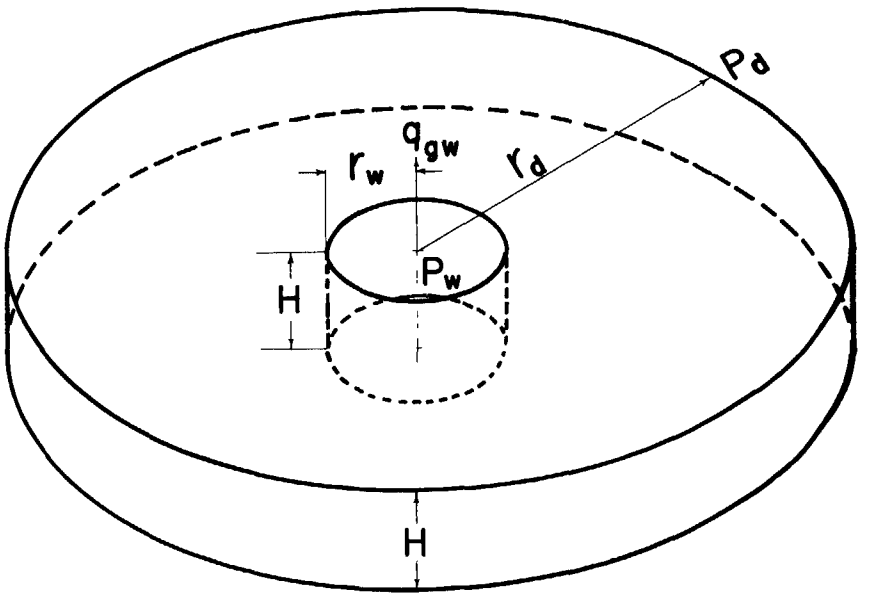
P_d = Pressure in reservoir at distance r_d from well bore, psia

P_w Pressure in well bore, psia

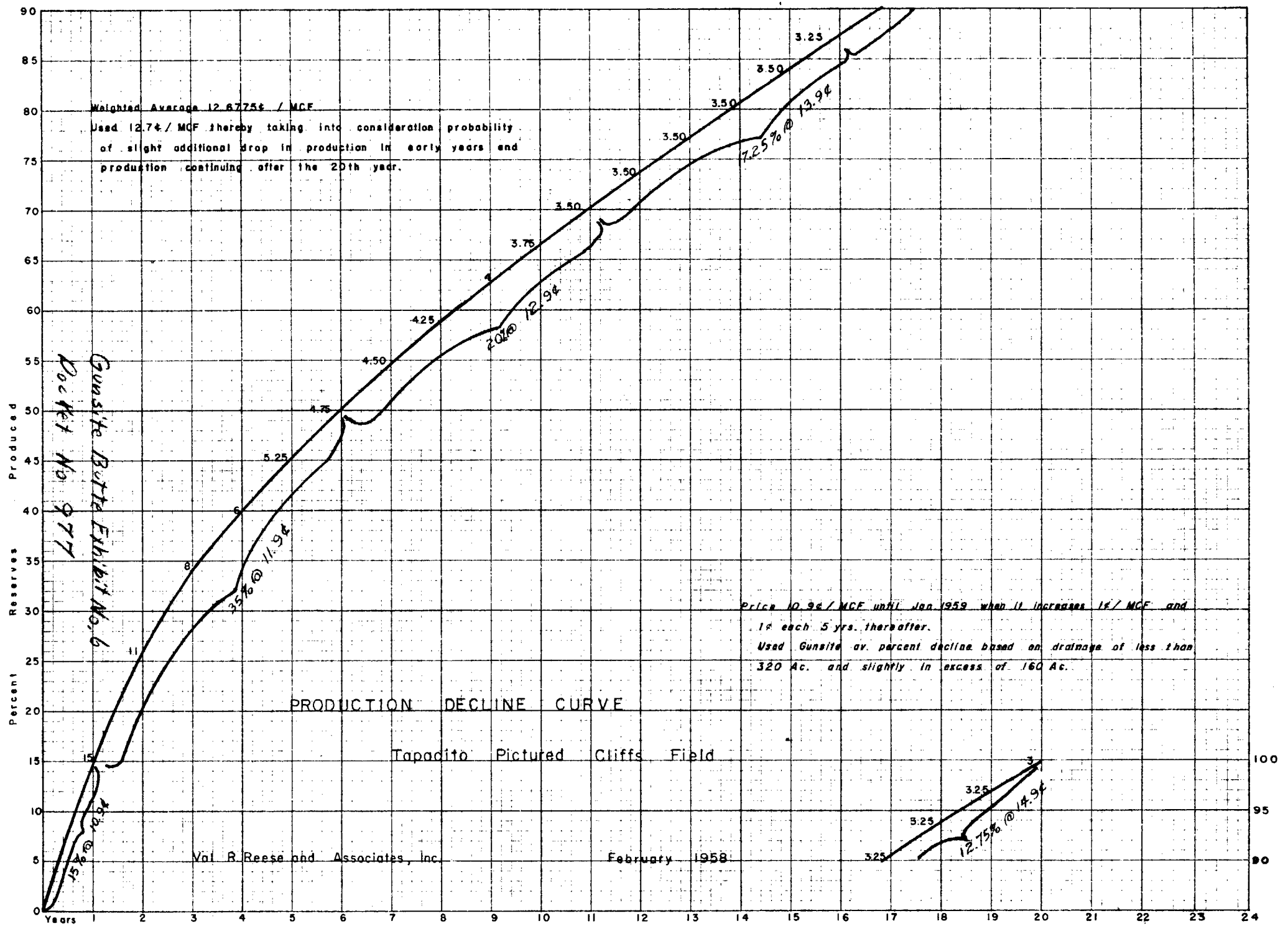
μ_g Viscosity of gas, centipoises

r_d = Drainage radius, feet

r_w = Effective well bore radius, feet



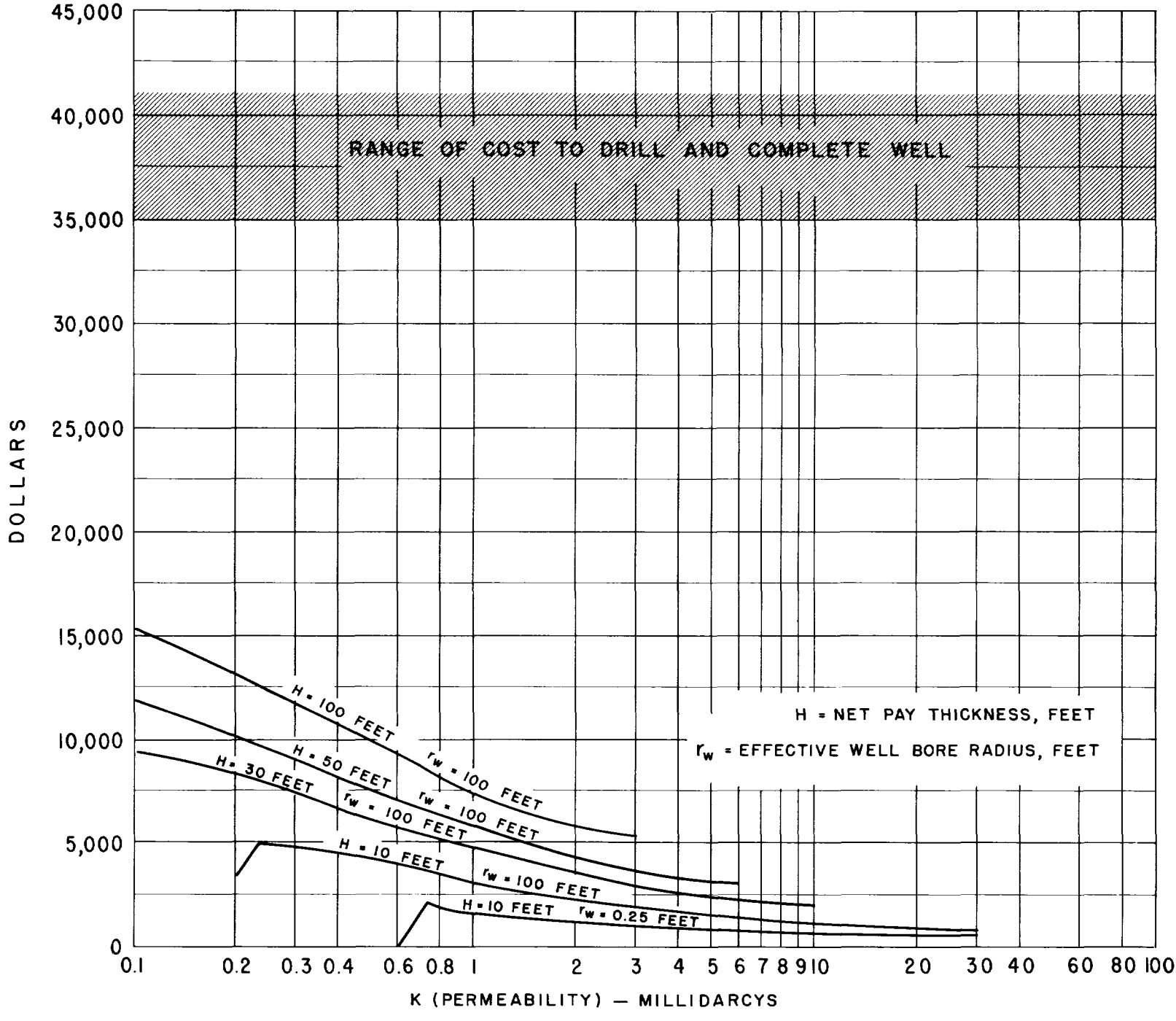
HUMBLE EXHIBIT NO. 1


Gunsite Butte Exhibit No. 6
Docket No. 977
Weighted Average 12.6775¢ / MCF
Used 12.7¢ / MCF thereby taking into consideration probability of slight additional drop in production in early years and production continuing after the 20th year.
Price 10.9¢ / MCF until Jan. 1959 when it increases 1¢ / MCF and 1¢ each 5 yrs. thereafter.
Used Gunsite av. percent decline based on drainage of less than 320 Ac. and slightly in excess of 160 Ac.
PRODUCTION DECLINE CURVE
Tapacito Pictured Cliffs Field
Val R Reese and Associates, Inc.
February 1958
Percent Reserves Produced
Years
3.25
3.50
3.75
4.25
4.50
4.75
5.25
6
8
11
15
20
3.25
3.50
3.50
3.50
3.50
3.75
4.25
4.50
4.75
5.25
6
8
11
15
20
7.25% @ 13.9¢
20% @ 12.9¢
35% @ 11.9¢
15% @ 10.9¢
3.25
3.25
3.25
3
12.75% @ 14.9¢

INDICATED NET VALUE OF ADDITIONAL GAS RECOVERABLE UNDER 160 ACRE SPACING AS COMPARED TO 320 ACRE SPACING

TAPACITO PICTURED CLIFFS GAS POOL
RIO ARRIBA COUNTY, NEW MEXICO

BASED ON NET GAS PRICE OF 10.4 ¢/Mcf AFTER ROYALTY AND SEVERANCE TAXES



HUMBLE EXHIBIT NO. 2

Calculation of Recoverable Gas

Tapacito Pictured Cliffs Field
Rio Arriba County, New Mexico

February, 1958

Acres within field	21,600	
Average depth of formation	3,800	Ft.
Net sand thickness	28.4	Ft.
Porosity of sand	15.3	%
Water saturation of sand	38.3	%
Oil saturation of sand	.4	%
Calculated bottom hole pressure	1,190	psig
Reservoir temperature	109	°F
Compressibility factor	.865	
Gas per acre-foot originally in place	352	MCF
Gas per acre-foot remaining at 100 psia abandonment	26	MCF
Recoverable gas per acre-foot	326	MCF
Recoverable gas per acre	9,258	MCF
Total recoverable gas	199,972,800	MCF

$$43{,}560 \times .153 \times .613 \times \frac{1190 + 12}{14.73} \times \frac{520}{109 + 460} \times \frac{1}{.865} = 352{,}266 \text{ cu. ft. or } 352 \text{ MCF}$$

$$43{,}560 \times .153 \times .613 \times \frac{100}{14.73} \times \frac{520}{569} \times \frac{1}{.987} = 25{,}685 \text{ cu. ft. or } 26 \text{ MCF}$$

Gunsite Butte Exhibit No. 2
Docket No. 477

Gunsite Butte Uranium Corporation

Calculation of Return on Investment
Undrilled 160 Acre Locations

February, 1958

Average sand thickness	30.75	
Recoverable gas per acre-foot	326	MCF
Recoverable gas per acre	10,024	MCF
Average price of gas*	12.7	¢ per MCF
Royalty interest	12.5	%
Production and ad valorem taxes	6	%
Well spacing	160	acres
Well cost	$35,000	

10,024 x 160 x $.127 = $203,688 total value of recoverable gas from 160 acres

$203,688 x .94 x .875 = $167,533 net value of gas from 160 acres

Return on well investment 4.79 to 1.00

* The average price of the gas recoverable during a 20 year production period from a 160 acre well site is estimated using the graph entitled "Production Decline Curve - Tapacito Pictured Cliffs Field."

Gunsite Butte Exhibit No. 7
Docket No. 977

DERIVATION OF FORMULA
TO CALCULATE THE RELATIVE UNRECOVERABLE RESERVES
AT DEPLETION FOR 160 AND 320 ACRE SPACING

The pressure distribution in a radial flow system will be given by the following for isothermal conditions

$$P^2 = \frac{(P_e^2 - P_w^2)\log r/r_w}{\log r_e/r_w} + P_w^2$$

or

$$P = \left[\frac{(P_e^2 - P_w^2)\log r/r_w}{\log r_e/r_w} + P_w^2\right]^{1/2}$$

Since the system is considered to be radial flow to the well, the pressure at any point on a concentric circle to the well bore would be described by inserting the radius of that circle in the above equation.

To evaluate the reserves under the area drained by the well, the reserves at each point in the reservoir can be described by the equation

$$\Delta R = Ph\phi\,\Delta A$$

$$\Delta A = 2\pi r \Delta r$$

Therefore by reducing this equation to its differential form and intergrating over the limits of the radius of drainage, the reserves in the area drained by the well can be described as a function of the pressure at the edge of drainage (Pe) and at the well (Pw). The integral is as follows

$$\int_0^R dR = \int_{r_w}^{r_e} 2\pi h\phi r p\, dr$$

Since p is a function of r as stated in the equation from Muskat for steady state pressure distribution, the complete equation is as follows

$$\int_0^R dR = 2\pi h\phi \int_{r_w}^{r_e} r\left[\frac{(P_e^2 - P_w^2)}{\log r_e/r_w}\log r/r_w + P_w^2\right]^{1/2} dr$$

The problem proposed was the two methods of draining the reservoir, the first by drilling wells on 160 acre spacing and the second by drilling wells on 320 acre spacing. The answer to this problem is what is the increase in recoverable reserves by use of the 160 acre spacing as opposed to the 320 acre spacing. Disregarding the assumption that the closer spacing might decrease the total time required to deplete the reservoir, we have made this study to show that at some time in the future, the reservoir pressures will be reduced by depletion to the point where the remaining reserves will be uneconomical to produce. This reservoir pressure will be approximately the same for both types of spacing as would be proved by the equation of deliverability given by Muskat as Equation (3), Section 11.3.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 19
CASE 477

$$Q = \frac{\pi h k}{\mu} \frac{(P_e^2 - P_w^2)}{\log r_e/r_w}$$

$$\frac{Q160}{Q320} = 1 + \frac{\log \sqrt{2}}{\log r_e/r_w} = 1.0434 \qquad \left(\frac{r_e}{r_w}\right)_{160} = 2980$$

Therefore, the ratio of reserves remaining in the reservoir under each type of spacing could be calculated by the following equation

$$\frac{R_{160}}{R_{320}} = \frac{\int_{r_w}^{r_e} r \left[\frac{(P_e^2 - P_w^2)}{\log r_e/r_w} \log r/r_w + P_w^2\right]^{1/2} dr}{\int_{r_w}^{r_e\sqrt{2}} r \left[\frac{(P_e^2 - P_w^2)}{\log r_e\sqrt{2}/r_w} \log r/r_w + P_w^2\right]^{1/2} dr}$$

Solving this equation the solution is as follows

$$\frac{R_{160}}{R_{320}} = \left[\frac{\log \sqrt{2}\, r_e/r_w}{\log r_e/r_w}\right]^{1/2} e^{\frac{2P_w^2 \log\sqrt{2}}{P_e^2 - P_w^2}} \frac{\sum_0^\infty \frac{2^n\left[1-\left(\frac{P_w}{P_e}\right)^{2n+3}\right]}{n!(2n+3)}\left[\frac{\log r_e/r_w}{1-P_w^2/P_e^2}\right]^{n+3/2}}{\sum_0^\infty \frac{2^M\left[1-\left(\frac{P_w}{P_e}\right)^{2n+3}\right]}{n!(2n+3)}\left[\frac{\log \sqrt{2}\, r_e/r_w}{1-P_w^2/P_e^2}\right]^{n+3/2}}$$

NOMENCLATURE

P - pressure at a distance or from the well

Pe - pressure at the edge of drainage

Pw - pressure at the well bore

r - distance from the center of the well bore

re - radius of the area of drainage

rw - radius of the well bore

h - thickness of the producing zone

f - porosity of the producing zone

k - permeability

μ - viscosity

Subscript

160 - with reference to 160 acre spacing

320 - with reference to 320 acre spacing

(3)

TABULATION OF RESERVES ON PRODUCING WELLS
TAPACITO PICTURED CLIFFS FIELD
RIO ARRIBA COUNTY, NEW MEXICO
FEBRUARY, 1958

Well	Location	Comp. Date	TD	IP	Del.	Sand thick.	Cum. Prod.	Reserves/ Ac.	Reserves/ 320 Ac.	% Reserves Produced
El Paso Natural Gas										
6	SW/4 31-27- 4	9- 7-56	4249 4180PB	4,957		33	22,298	10,758	3,442,560	.65
8	SW/4 32-27- 4	9- 4-56	4007 3966PB	1,787		35	3,427	11,410	3,651,200	.09
9	SW/4 33-27- 4	9- 4-56	4095 4075PB	2,621		41	---	13,366	4,277,120	0
18	SW/4 36-27- 5	11- 1-56	5860 5820PB	23,258		41	162,235	13,366	4,277,120	3.79
20	NE/4 35-27- 5	6- 1-57	5807 5745PB	8,719		40	133,681	13,040	4,172,800	3.20
Gunsite Butte Uranium										
1	NW/4 4-25- 3	10-17-55	3926	10,154		30	292,288	9,780	3,129,600	9.34
2	NE/4 5-25- 3	11- 6-55	3879	7,179		39	142,309	12,714	4,068,480	3.50
Honolulu Oil Corp.										
1	SW/4 10-26- 4	9- 1-55	3589	19,300	1033	30	351,603	9,780	3,129,600	11.23
2	NE/4 9-26- 4	1- 7-56	3933	3,800	687	31	249,074	10,106	3,233,920	7.70
3	SW/4 9-26- 4	7-17-56	3911 3890PB	40,102		26	586,930	8,476	2,712,320	21.64
4	SW/4 4-26- 4	10-15-56	4045 4020PB	1,356		30	57,038	9,780	3,129,600	1.82
6	SW/4 3-26- 4	9-21-56	3729	2,145		27	33,694	8,802	2,816,640	1.20
Magnolia Petroleum Co.										
1	SW/4 19-26- 3	9-21-55	3930	4,501		25	90,070	8,150	2,608,000	3.45
1	SW/4 7-26- 3	11- 6-55	3635	834		24	15,780	7,824	2,503,680	.63

Gunsite Butte Docket No. 4727 Exhibit No. 3

TABULATION OF RESERVES ON PRODUCING WELLS (contd.)

Well	Location	Comp. Date	TD	IP	Del.	Sand thick.	Cum. Prod.	Reserves/ Ac.	Reserves/ 320 Ac.	% Reserves Produced
Northwest Production										
1	SW/4 33-26- 3	8-10-56	4107	3,873		28	209,522	9,128	2,920,960	7.17
2	NE/4 33-26- 3	3-13-57	6448	2,612		26	77,134	8,476	2,712,320	2.84
3	SW/4 34-26- 3	9-27-57	6260 6252PB	1,261		25	25,231	8,150	2,608,000	.97
5	SW/4 28-26- 3	7-10-57	6219	1,990		24	8,439	7,824	2,503,680	.34
Northwest Production Jic. N										
1	SW/4 8-26- 4	8- 9-56	3672	36,257		26	350,122	8,476	2,712,320	12.91
3	SW/4 5-26- 4	5-21-57	4111 4109PB	37,388		43	104,400	14,018	4,485,760	2.33
5	SW/4 6-26- 4	6- 4-57	6152	12,717		30	249,807	9,780	3,129,600	7.98
6	NE/4 7-26- 4	5- 3-57	3924	8,637		20	295,336	6,520	2,086,400	14.16
7	NE/4 8-26- 4	8-23-56	6216 6200PB	5,516		40	339,618	13,040	4,172,800	8.14
9	NE/4 6-26- 4	4-29-57	4045	4,420		37	164,428	12,062	3,859,840	4.26
Southern Union Gas Jic. A										
1	SW/4 23-26- 4			3,989	1517	32	464,741	10,432	3,338,240	13.92
2	SW/4 14-26- 4	5- 5-54	3619	4,955	1568	33	304,430	10,758	3,442,560	8.84
4	SW/4 13-26- 4	7-28-55	3915	4,892	483	26	66,430	8,476	2,712,320	2.45
5	NE/4 23-26- 4	7-28-55	3870	7,298	1497	33	258,450	10,758	3,442,560	7.51
Southern Union Gas Jic. B										
1	SW/4 4-25- 3	10- 4-57	3860 3820PB	10,154		33	16,097	10,758	3,442,560	.47
2	NE/4 25-26- 4	12-12-56	6050 6010PB	150		26	4,416	8,476	2,712,320	.16

Gunsite Butte Exhibit No. 3
Docket No. 977

TABULATION OF RESERVES ON PRODUCING WELLS (contd.)

Well	Location		Comp. Date	TD	IP	Del.	Sand thick.	Cum. Prod.	Reserves/ Ac.	Reserves/ 320 Ac.	% Reserves Produced
Southern Union Gas Jic. C											
2	SW/4	11-26- 4			4,768		30	76,235	9,780	3,129,600	2.44
Southern Union Gas Jic. E											
1	SE/4	16-26- 4	7- 8-54	3465	3,134	2537	20	801,826	6,520	2,086,400	38.43
2	SW/4	15-26- 4	6-21-55	3478	7,712		26	166,996	8,476	2,712,320	6.16
3	NE/4	15-26- 4			6,793	1490	32	335,277	10,432	3,338,240	10.04
4	NE/4	22-26- 4	7- 5-55	3504	5,546	2576	26	59,281	8,476	2,712,320	2.19
5	NE/4	16-26- 4	8-14-56	3541 3510PB	36,660		29	402,681	9,454	3,025,280	13.31
Southern Union Gas Jic. D											
1	NW/4	32-26- 3	6-21-55	3884	326	253	24	73,535	7,824	2,503,680	2.94
2	SW/4	29-26- 3	6- 7-55	3821	6,754	585	22(16½)	133,101	7,172	2,295,040	5.80
3	SE/4	32-26- 3	9-10-56	4080	19,191		28	145,731	9,128	2,920,960	4.99
5	SW/4	30-26- 3	8- 6-56	3934 3920PB	18,158		32	509,604	10,432	3,338,240	15.27
Southern Union Gas Jic. H											
2	NE/4	17-26- 4	8- 6-56	3480 3470PB	935		17	22,483	5,542	1,773,440	1.27
Southern Union Gas McCroden Fed.											
1	SW/4	3-25- 3	8-14-56	3848 3830PB	4,280		29	40,510	9,454	3,025,280	1.34
1-A	NE/4	9-25- 3	7-18-56	3760 3740PB	8,872		27	47,082	8,802	2,816,640	1.67
						Total		7,893,370		133,112,320	
						Average			9,674		5.93

Note: Cumulative production is to 12-1-57 as taken from the New Mexico Oil & Gas Engineering Committee Annual Report and USGS.
The reserves per acre are calculated using 326 Mcf as the average recoverable gas per acre-foot and the net pay sand thickness as shown on the isopachous map (Map #1)

TABULATION OF RESERVES ON PRODUCING WELLS
CONNECTED TO SOUTHERN UNION GAS COMPANY'S SYSTEM
TAPACITO PICTURED CLIFFS FIELD
RIO ARRIBA COUNTY, NEW MEXICO

Operator & Wells	Location	Connection Date	Sand Thickness	Micro Log Sand Thickness	Reserve/ 320 Acre Gross	Reserve/ 320 Acre Net M.L.	Cumm. Prod. 2-28-58	% Reserve Produced Gross	% Reserve Produced M.L.	Days Produced	% Gross 320 Acre Reserve Produced/ 365 Days	% M.L. 320 Acre Reserv Produced/ 365 Days
Honolulu Oil Corporation												
Jicarilla 1	SW/4 10-26-4	1-23-56	30	14	3,129,600	1,460,480	387,632	12.39	26.54	451	10.03	21.48
Jicarilla 2	NE/4 9-26-4	3-5-56	31	7	3,233,920	730,240	270,204	8.36	37.00	390	7.82	34.62
Jicarilla 3	SW/4 9-26-4	11-6-56	26	9	2,712,320	938,880	741,432	27.34	78.97	267	37.37	107.96
Jicarilla 4	SW/4 4-26-4	1-22-57	30	8	3,129,600	834,560	67,973	2.17	8.14	254	3.12	11.70
Jicarilla 6	SW/4 3-26-4	1-23-57	27	0	2,816,640	0	37,011	1.31	---	230	2.08	---
Southern Union Gas Company												
Jicarilla 1-A	SW/4 23-26-4	1-25-56	32	21	3,338,240	2,190,720	536,845	16.08	24.51	444	13.22	20.15
Jicarilla 2-A	SW/4 14-26-4	2-16-56	33	31	3,442,560	3,233,920	361,271	10.49	11.17	354	10.82	11.52
Jicarilla 4-A	SW/4 13-26-4	3-10-56	26	8	2,712,320	834,560	81,391	3.00	9.75	279	3.92	12.76
Jicarilla 5-A	NE/4 23-26-4	3-30-56	33	25	3,442,560	2,608,000	264,029	7.67	10.12	312	8.97	11.84
Jicarilla 2-C	SW/4 11-26-4	5-21-57	30	8	3,129,600	834,560	109,753	3.51	13.15	193	6.64	24.87
Jicarilla 1-D	NW/4 32-26-3	1-12-56	24	12	2,503,680	1,251,840	89,475	3.57	35.53	402	3.24	32.26
Jicarilla 2-D	SW/4 29-26-3	3-30-56	22	16	2,295,040	1,669,120	151,672	6.61	9.09	476	5.07	6.97
Jicarilla 3-D	SE/4 32-26-3	2-5-57	28	18	2,920,960	1,877,760	260,762	8.93	13.89	184	17.71	27.55
Jicarilla 5-D	SW/4 30-26-3	12-11-56	32	22	3,338,240	2,295,040	601,514	18.02	26.21	435	15.12	21.99
Jicarilla 1-E	SE/4 16-26-4	2-16-56	20	14	2,086,400	1,460,480	883,488	42.34	60.49	546	28.30	40.44
Jicarilla 2-E	SW/4 15-26-4	12-11-56	26	23	2,712,320	2,399,360	212,308	7.83	8.85	250	11.43	12.92
Jicarilla 3-E	NE/4 15-26-4	3-29-56	32	21	3,338,240	2,190,720	353,715	10.60	16.15	448	8.64	13.16
Jicarilla 4-E	NE/4 22-26-4	2-16-56	26	20	2,712,320	2,086,400	827,174	30.50	39.65	559	19.91	25.89
Jicarilla 5-E	NW/4 16-26-4	2-15-57	29	17	3,025,280	1,773,440	568,902	18.80	32.08	229	29.97	51.13
Jicarilla 2-H	NE/4 17-26-4	4-30-57	17	2	1,773,440	208,640	40,867	2.3	19.59	165	5.09	43.34
McCrodan 1	SW/4 3-25-3	2-6-57	29	26	3,025,280	2,712,320	119,338	3.94	4.40	143	10.06	11.23
McCrodan 1-A	NE/4 9-25-3	2-5-57	27	16	2,816,640	1,669,120	113,367	4.02	6.80	165	8.89	15.04
McCrodan 1-B	SW/4 4-25-3	11-21-57	33	18	3,442,560	1,877,760	88,676	2.58	4.72	89	10.58	19.36

Reserve figures are based on MCF/AF supplied by Gunsite Butte, Witness Val R. Reese.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 2
CASE

TABULATION OF RESERVES ON PRODUCING WELLS CONNECTED TO SOUTHERN UNION GAS COMPANY'S SYSTEM
TAPACITO PICTURED CLIFFS FIELD, RIO ARRIBA COUNTY, NEW MEXICO

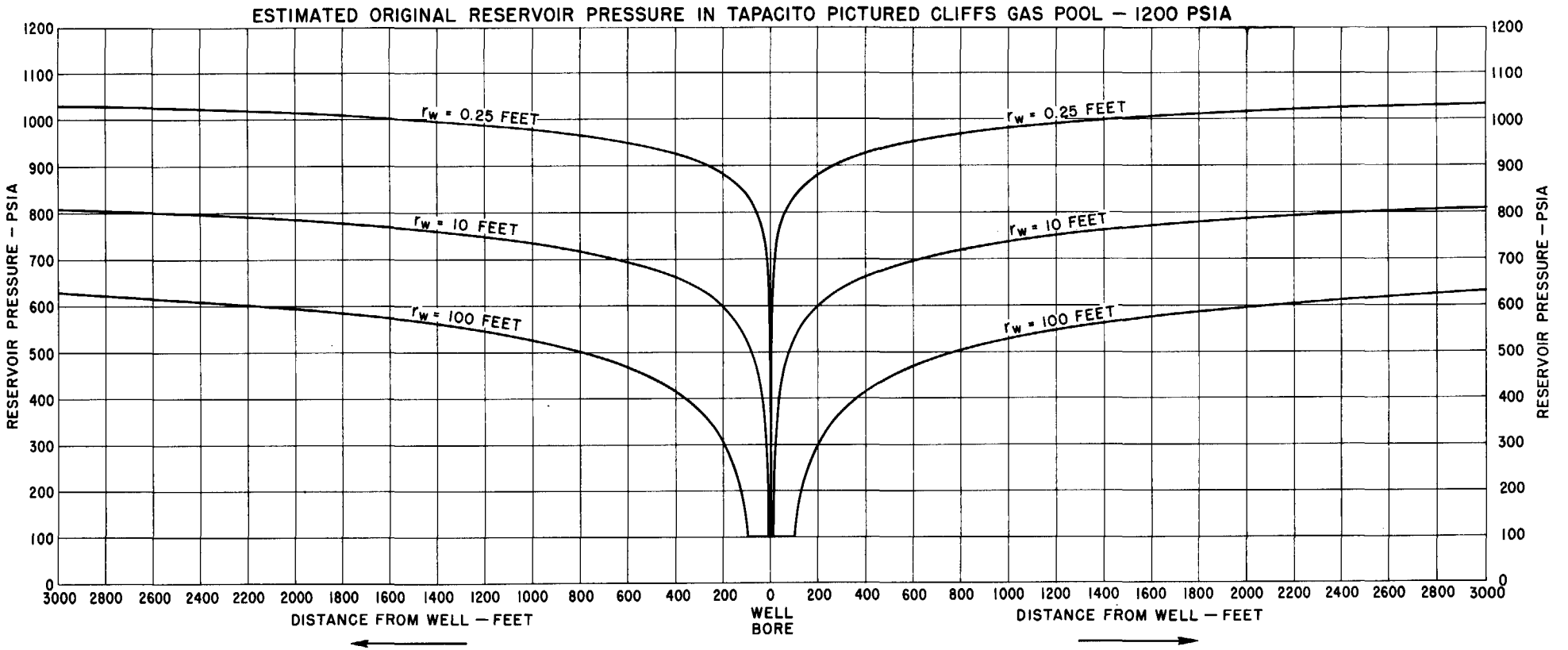
Operator & Well	Reserve/320 Acre*	Cumm. Prod. 2-28-58	% Reserve Produced	Days Produced	% Reserve Produced/365 Days
Honolulu Oil Corporation					
Jicarilla 1	2,033,920	387,632	19.06	451	15.42
Jicarilla 2	1,016,960	270,204	26.57	390	24.87
Jicarilla 3	1,307,520	741,432	56.71	267	77.52
Jicarilla 4	1,162,240	67,973	5.85	245	8.41
Jicarilla 6	---	37,011	---	230	---
Southern Union Gas Company					
Jicarilla 1-A	3,050,880	536,845	17.60	444	14.47
Jicarilla 2-A	4,503,680	361,271	8.02	354	8.27
Jicarilla 4-A	1,162,240	81,391	7.00	279	9.16
Jicarilla 5-A	3,632,000	264,029	7.27	312	8.51
Jicarilla 2-C	1,162,240	109,753	9.44	193	17.85
Jicarilla 1-D	1,743,360	89,475	5.13	402	4.66
Jicarilla 2-D	2,324,480	151,672	6.53	476	5.01
Jicarilla 3-D	2,615,040	260,762	9.97	184	19.76
Jicarilla 5-D	3,196,160	601,514	18.82	435	15.79
Jicarilla 1-E	2,033,920	883,488	43.44	546	29.04
Jicarilla 2-E	3,341,440	212,308	6.35	250	9.27
Jicarilla 3-E	3,050,880	353,715	11.59	448	9.44
Jicarilla 4-E	2,905,600	827,174	28.47	559	18.59
Jicarilla 5-E	2,469,760	568,902	23.03	229	36.71
Jicarilla 2-H	290,560	40,867	1.41	165	3.12
McCroden 1	3,777,280	119,338	3.16	143	8.06
McCroden 1-A	2,324,480	113,367	4.88	165	10.79
McCroden 1-B	2,615,040	88,676	3.39	89	13.90

*Based on 454 MCF/AF

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. _____
CASE _____

PRESSURE – DRAINAGE RADIUS PROFILE FOR EXAMPLE WELL AT ECONOMIC LIMIT

CONDITIONS:
- ECONOMIC LIMIT ON GAS PRODUCTION = 100 SMCF/D AT 100 PSIA BOTTOM HOLE FLOWING PRESSURE
- NET PAY THICKNESS = 10 FEET
- PERMEABILITY TO GAS = 1 MILLIDARCY
- GAS VISCOSITY = 0.014 CENTIPOISES
- EFFECTIVE WELL BORE RADIUS = r_w, FEET

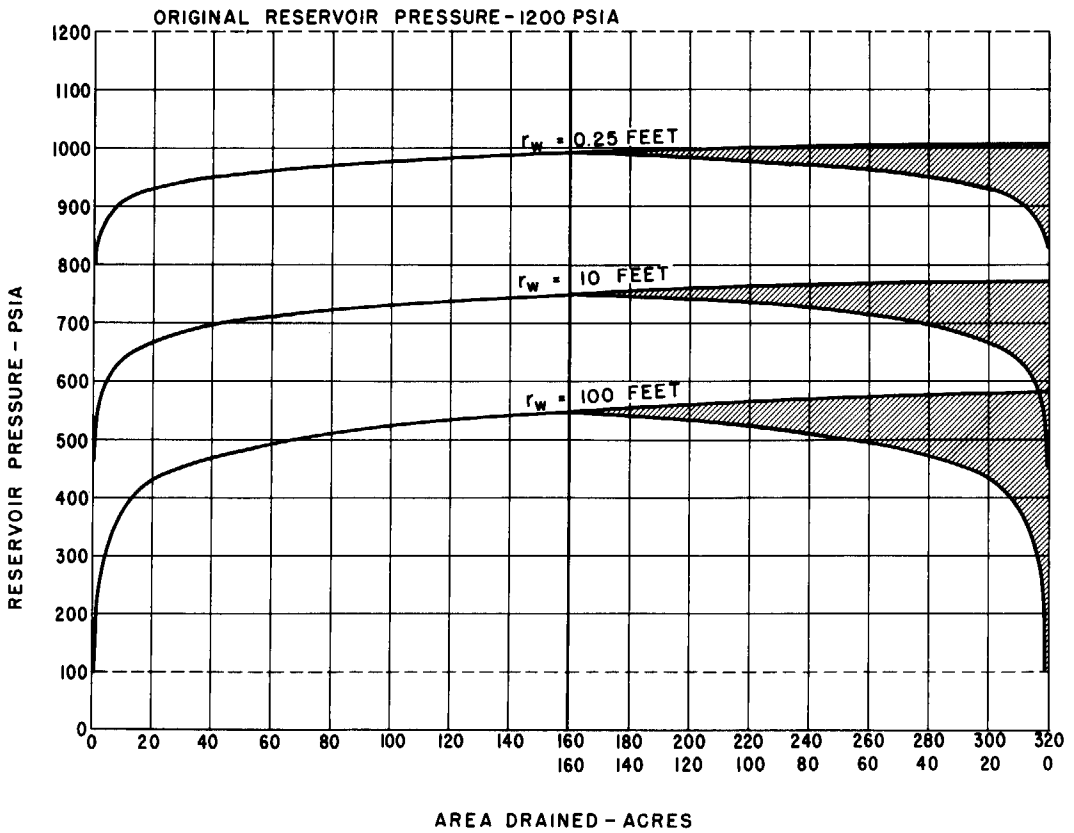


HUMBLE EXHIBIT NO. _____

PRESSURE – DRAINAGE AREA PROFILE FOR EXAMPLE WELL AT ECONOMIC LIMIT

TO ILLUSTRATE QUANTITY OF GAS RECOVERABLE WITH 160 AND 320 ACRE SPACING

CONDITIONS: ECONOMIC LIMIT ON GAS PRODUCTION = 100 SMCF/D AT 100 PSIA BOTTOM HOLE FLOWING PRESSURE
NET PAY THICKNESS = 10 FEET
PERMEABILITY TO GAS = 1 MILLIDARCY
GAS VISCOSITY = 0.014 CENTIPOISES
EFFECTIVE WELL BORE RADIUS = r_w, FEET



RECOVERY FACTOR - FRACTION OF GAS IN PLACE	160 ACRES	320 ACRES	DIFFERENCE
r_w = 0.25	0.2361	0.2182	0.0179
r_w = 100	0.6745	0.6398	0.0347

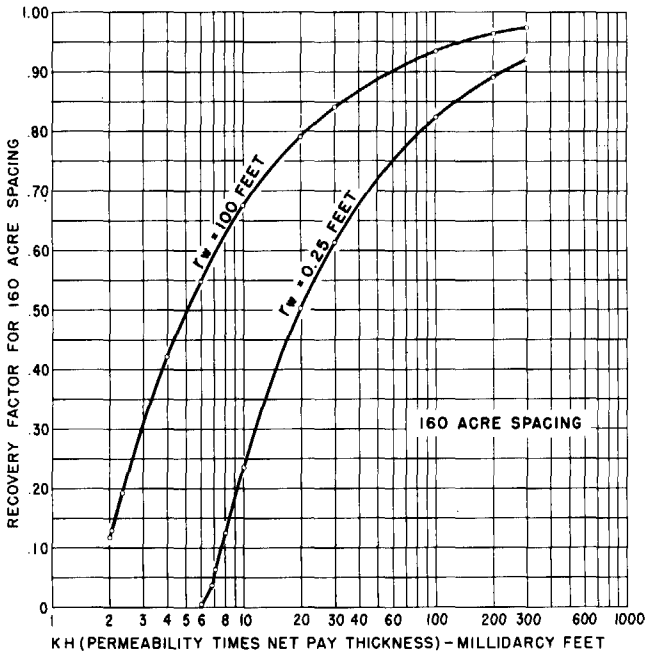
LEGEND

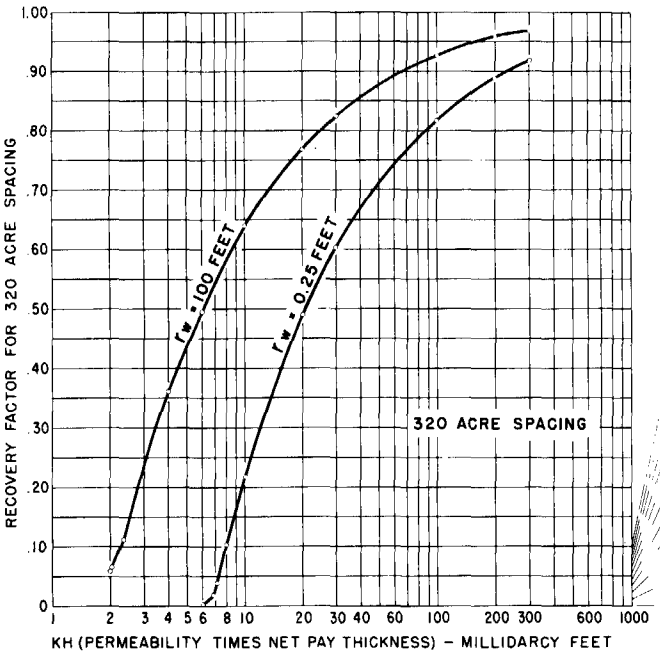
INDICATION OF ADDITIONAL QUANTITY OF GAS RECOVERABLE WITH 160 ACRE SPACING AS COMPARED TO 320 ACRE SPACING.

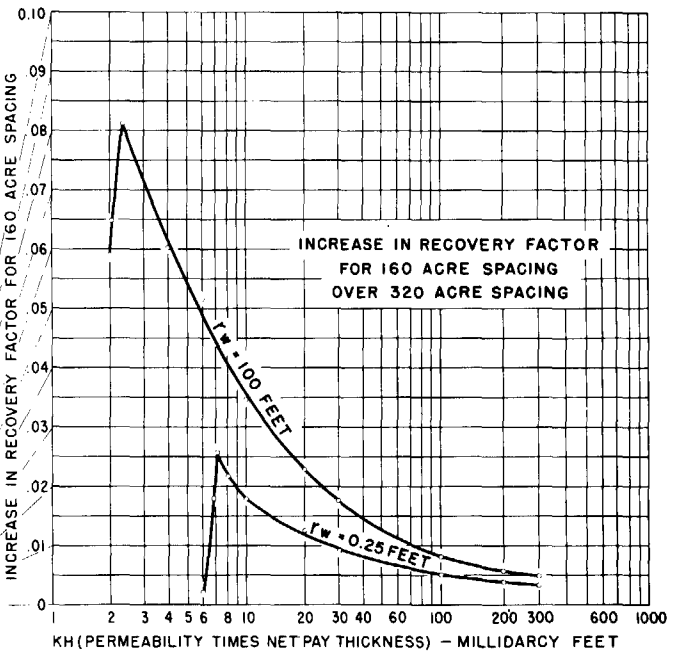
HUMBLE EXHIBIT NO. _____

RELATIONSHIP OF RECOVERY FACTOR TO FUNCTION OF PERMEABILITY TIMES NET PAY THICKNESS

r_w = EFFECTIVE WELL BORE RADIUS, FEET





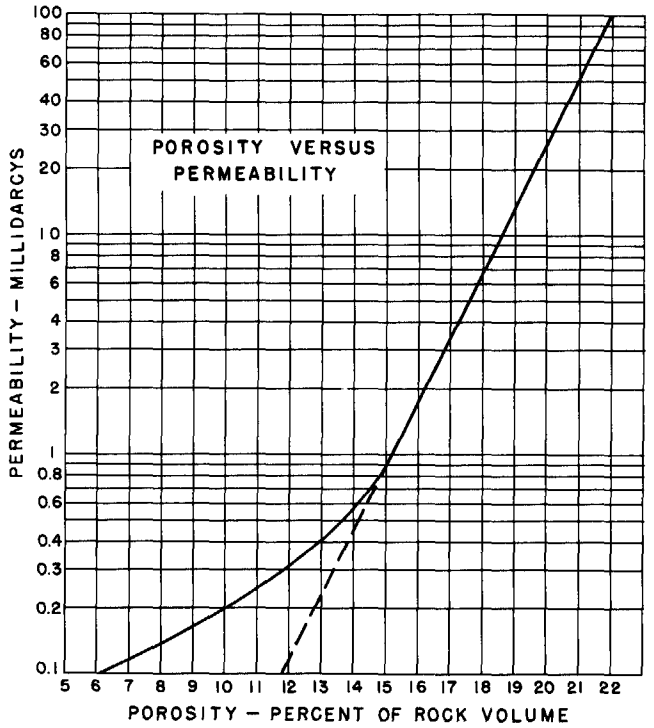


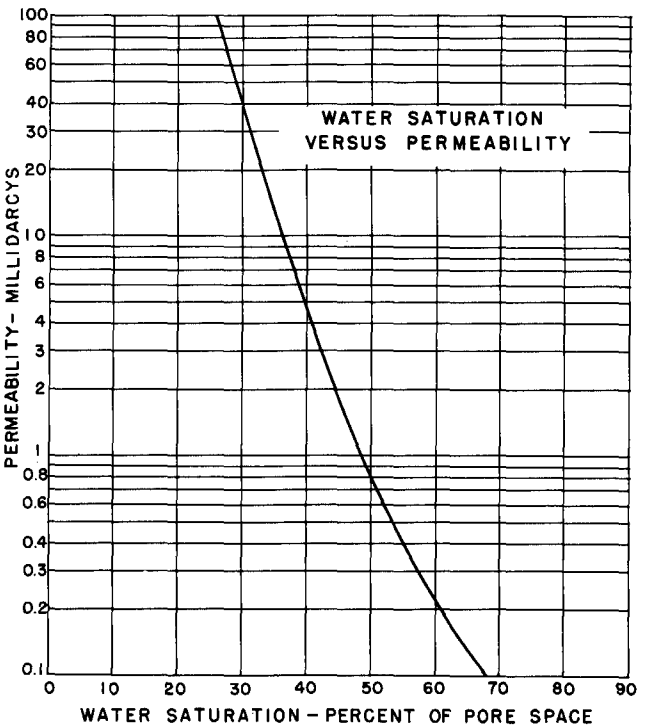
HUMBLE EXHIBIT NO. _____

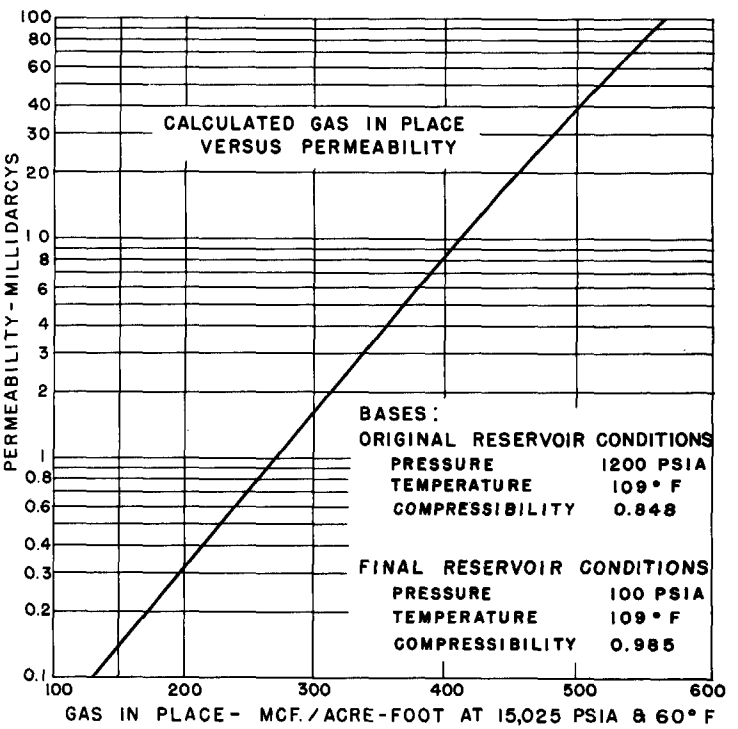
RELATIONSHIP OF POROSITY, WATER SATURATION AND GAS IN PLACE TO FORMATION PERMEABILITY

TAPACITO PICTURED CLIFFS GAS POOL

RIO ARRIBA COUNTY, NEW MEXICO







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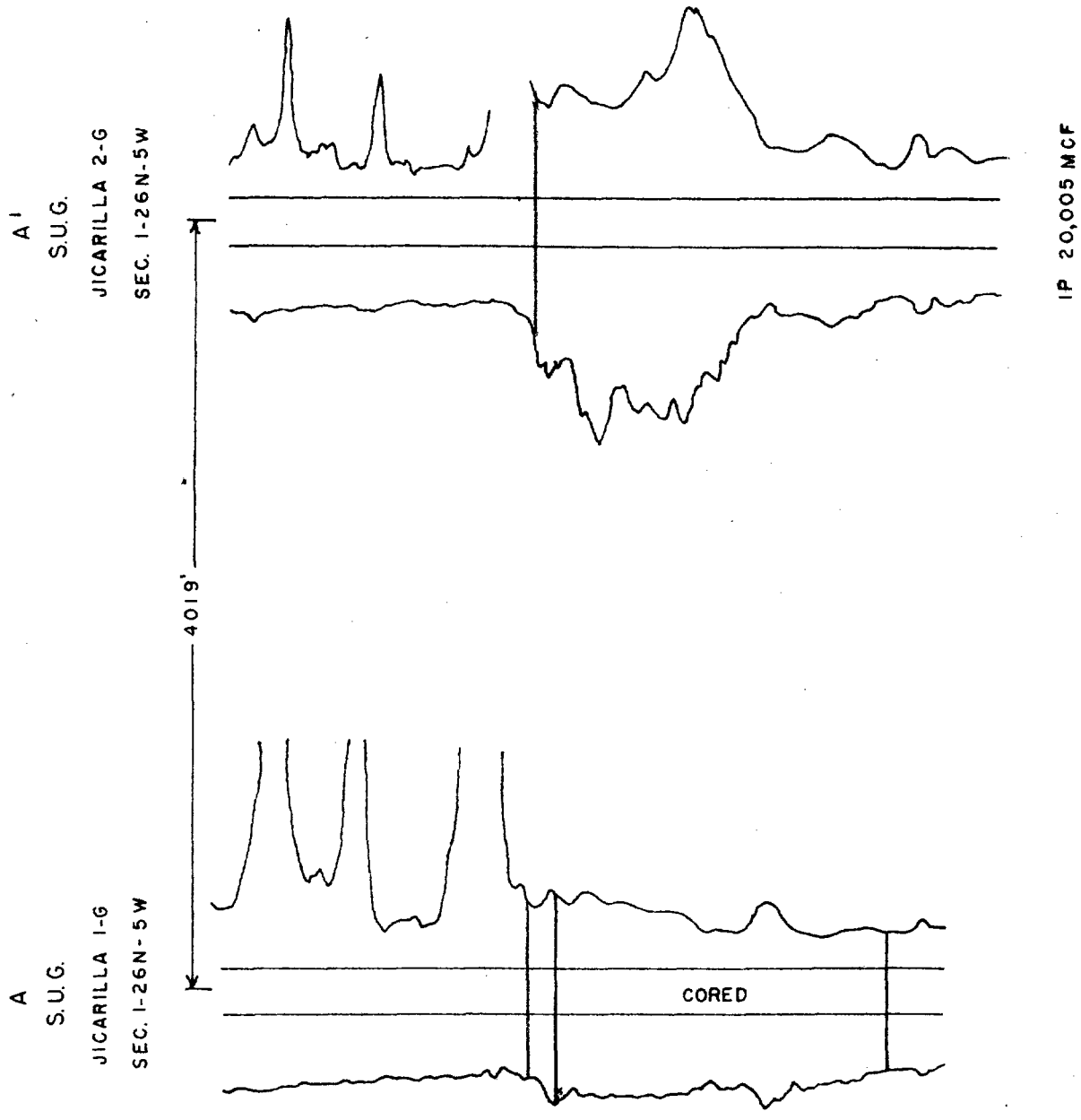
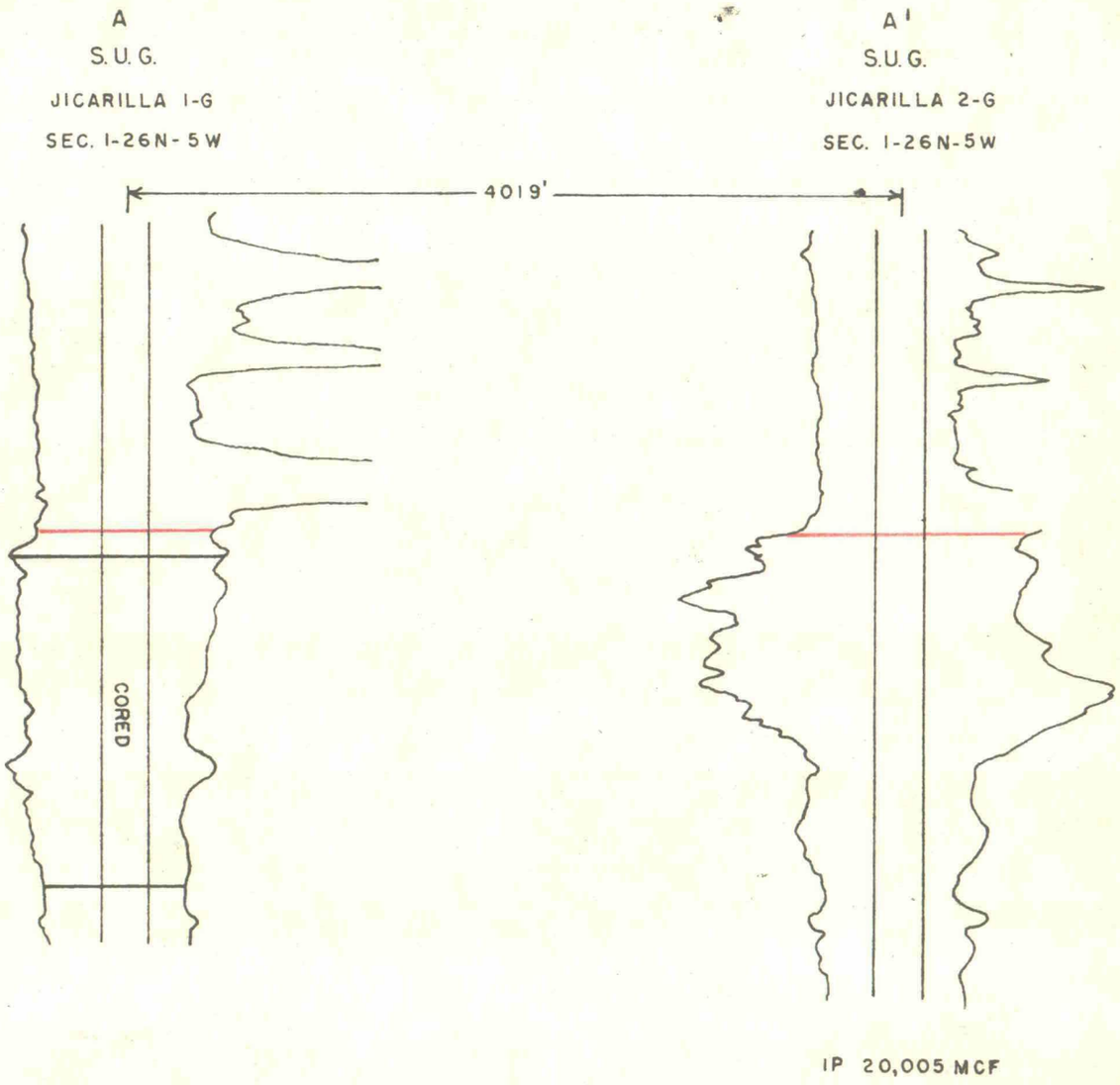
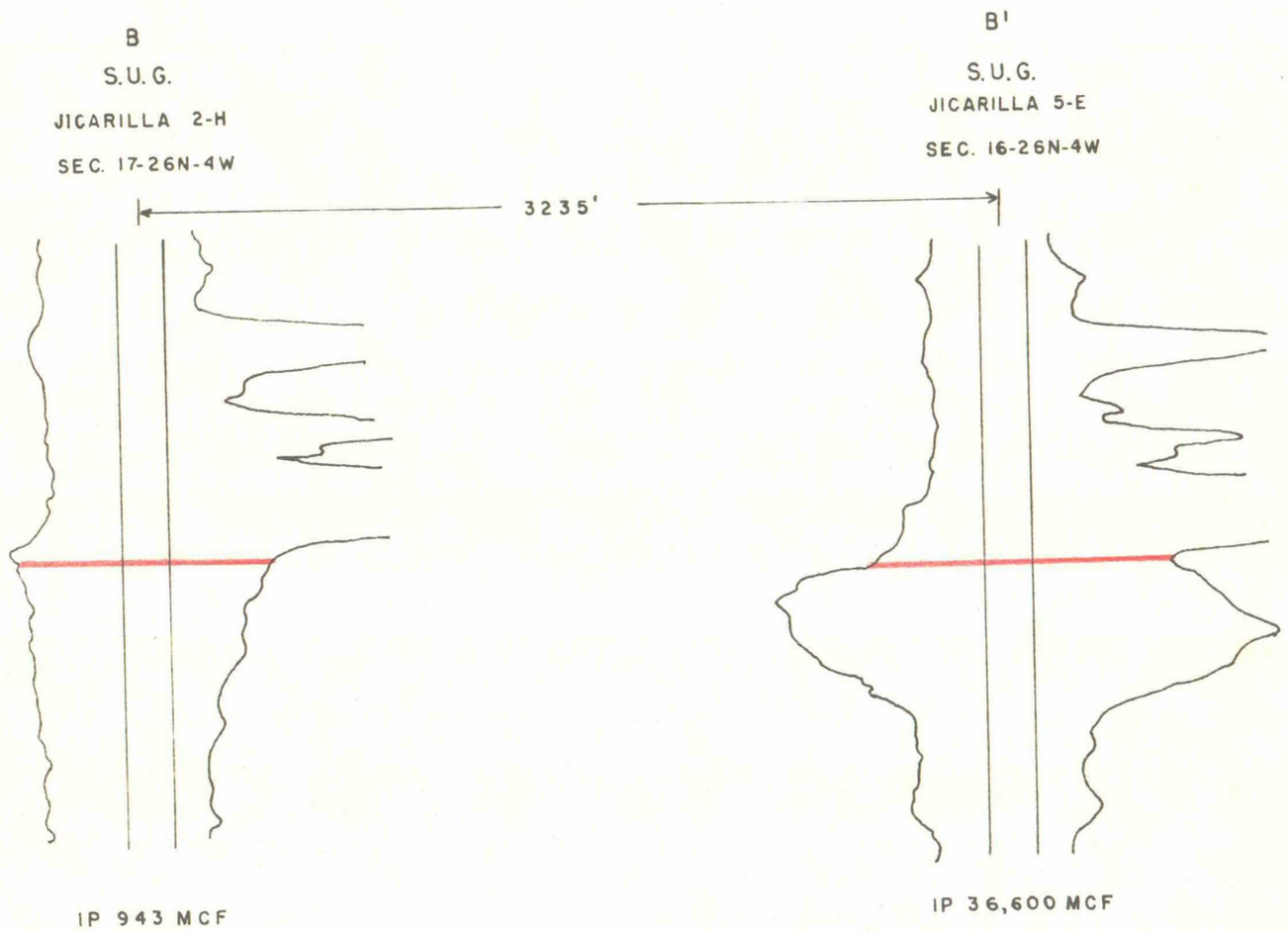

A'
S.U.G.
JICARILLA 2-G
SEC. 1-26N-5W
IP 20,005 MCF
4019'
A
S.U.G.
JICARILLA 1-G
SEC. 1-26N-5W
CORED

So. U. Ex 4


A
S.U.G.
JICARILLA 1-G
SEC. 1-26N-5W
A'
S.U.G.
JICARILLA 2-G
SEC. 1-26N-5W
4019'
CORED
IP 20,005 MCF


B
S.U.G.
JICARILLA 2-H
SEC. 17-26N-4W
3235'
B'
S.U.G.
JICARILLA 5-E
SEC. 16-26N-4W
IP 943 MCF
IP 36,600 MCF

SUG 5 R

C

S.U.G.

JICARILLA 1-A

SEC. 23-26N-4W

S.U.G.

JICARILLA 1-B

SEC. 26-26N-4W

C'

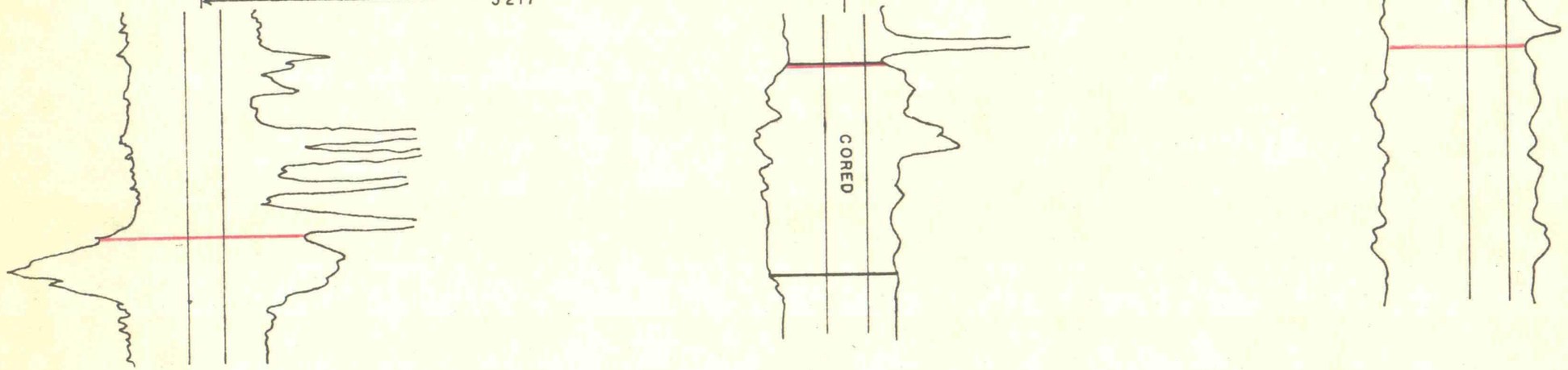
S.U.G.

JICARILLA 2-B

SEC. 25-26N-4W

3217'

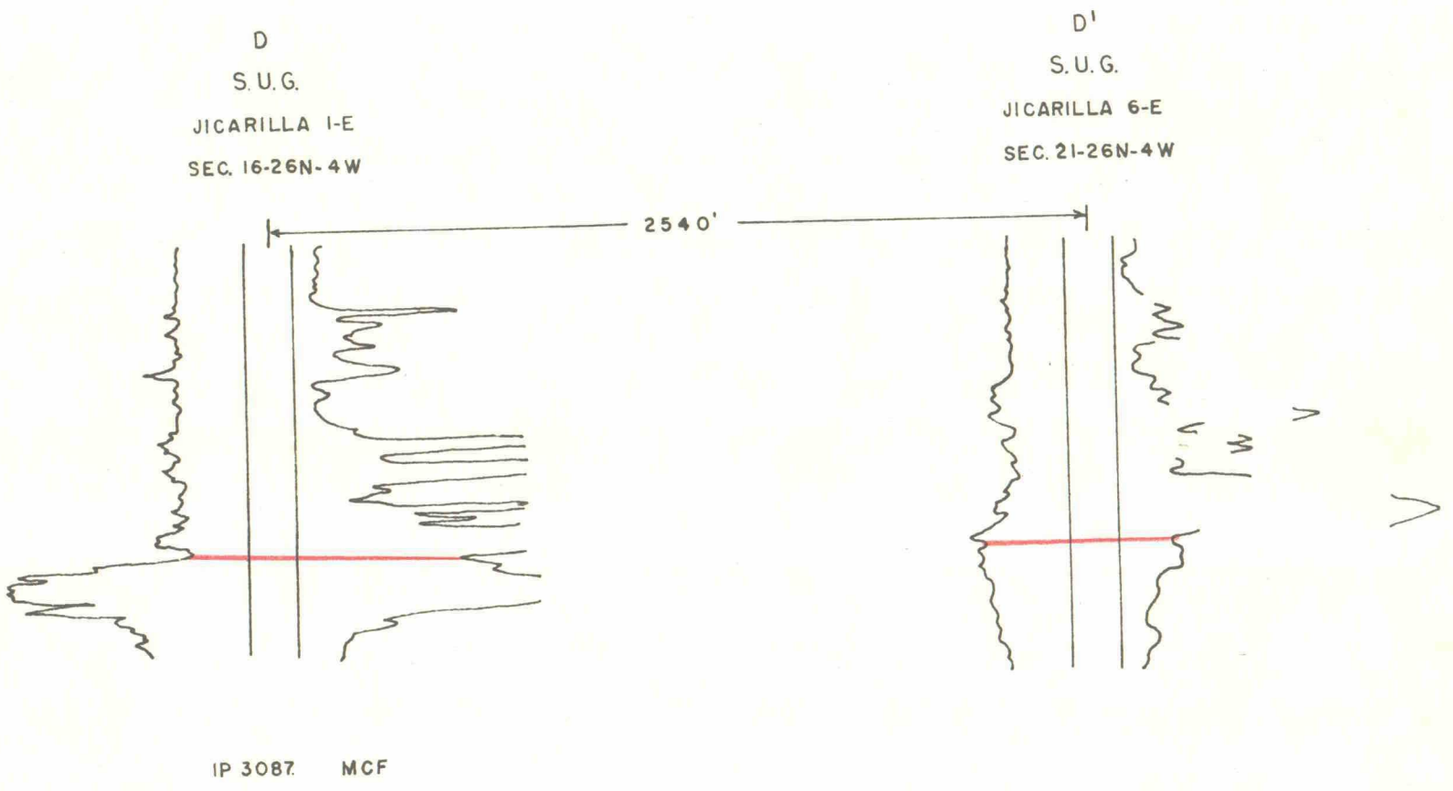
6142.5'



IP 3989 MCF

IP T.S.T.M.

SUG 6R


D
S. U. G.
JICARILLA 1-E
SEC. 16-26N-4W
D'
S. U. G.
JICARILLA 6-E
SEC. 21-26N-4W
2540'
IP 3087 MCF

SUG 7 R

NEW MEXICO OIL CONSERVATION COMMISSION
CRUDE OIL PURCHASERS' NOMINATIONS, MARCH, 1958

SOUTHEAST NEW MEXICO

Continental	4,220			
Malco	11,000	-	70	
Famariss	10			
Atlantic	4,640	-	255	
Cactus	2,283	-	19	
Cities Service	13,086			
Gulf	21,000	-	3,500	
Magnolia	17,450	-	1,115	
Phillips	965			
Shell	34,700			
Indiana	35,000	-	3,000	
Sinclair	25,900			
Texas Co.	27,000	-	1,000	
Tidewater	3,500	-	200	
McWood	3,626	+	546	
Permian	1,546	+	191	
Ibex	373	+	28	
Total Southeast New Mexico				206,299 - 8,394

NORTHWEST NEW MEXICO

El Paso	5,200	+	200	
Shell	400	-	225	
Gulf	480			
Four States	50	-	135	
Oriental	67	+	2	
Vanadium	28	-	3	
Total Northwest New Mexico				6,225 - 161

TOTAL NEW MEXICO NOMINATIONS 212,524 - 8,555

Bureau of Mines estimate of demand for New Mexico crude, March, 1958: 280,000 barrels per day.

ir/

Hearing 2-13-58

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 6
CASE 977

TAPACITO FIELD

Interference Test #2

Producing Wells:

Jicarilla 2-D	SW/4 29-26-3
Jicarilla 5-D	SW/4 30-26-3

Shut in:

Jicarilla 4-D	NE/4 30-26-3

Month	SICP	SITP	Monthly Production	Cumulative Production
November 1956				60,455*
December 1956	1065	1064	56,278	116,733
January 1957	1065	1064	58,555	175,288
February 1957	1065	1064	47,744	223,032
March 1957	1065½	1064½	47,571	270,603
April 1957	1066	1064½	37,901	308,504
May 1957	1066	1064½	47,147	355,651
June 1957	1065½	1063½	37,819	393,470
July 1957	1065	1063	37,819	431,289
August 1957	1064½	1062½	55,395	486,684
September 1957	1063½	1061½	62,571	549,255
October 1957	1061½	1060	40,876	590,131
November 1957			25,315	615,446
December 1957	1058½	1057	40,427	655,873
January 1958	1057½	1055	44,781	700,654
February 1958	1056	1054		

Bottom Hole Pressures

October 8, 1957

Jicarilla 2-D - Flowing Bottom Hole Pressure	-	599
Jicarilla 4-D - Shut in Bottom Hole Pressure	-	1199
Jicarilla 5-D - Flowing Bottom Hole Pressure	-	610

January 30, 1958

Jicarilla 2-D - Flowing Bottom Hole Pressure	-	753
Jicarilla 4-D - Shut in Bottom Hole Pressure	-	1193
Jicarilla 5-D - Flowing Bottom Hole Pressure	-	693

*Cumulative for 2-D well only, 5-D well on production in December 1956.