

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS. TEXAS

Page 1 of 1 File WP-3-1579 Well New Mexico Federal "NM" No. 1

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEFTH INTERVAL: Bough 9655.0-9685.0 AVERAGE TOTAL WATER BATURATION: PER DENT OF PORE SPADE FEET OF DORE REDOVERED FROM 30.0 44.4 ABOVE INTERVAL AVERAGE CONNATE WATER BATURATION: FER GENT OF FORE BRACE FEET OF CORE 13.9 44.4 (c)NOLUDED IN AVERABES 83 Max AVERADE PERMEABILITYI CIL GRAVITY: *APE 42 (e) MILLIDARGYS 900 61 Max. 1154 CRIGINAL BOLUTION SAB-DIL RATID: CUBIC FEET PER BARREL PRODUCTIVE CAPACITY: MILLIDARCY-FIET 1600 (e) 960 848 DRIDINAL FORMATION VOLUME FACTOR: BARRELS Baturated DIL PER Barrel Stock-tank Dil AVERABE POROSITY: PER DENT 4.5 (e) 1.92 CAUCULATED ORIGINAL ETOCK-TANK DIL IN PLACES SARRELE PER ACRE-FOOT AVERADE REBIDUAL DIL BATURATION: PER DENT OF PORE SPACE 7.8 101

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Piease refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL:

FEET OF GORE RECOVERED FROM ABOVE INTERVAL	AVERAGE TOTAL WATER BATURATION: PER CENT OF PORE BPACE	
PEET OF CORE Included in Averages	AVERAGE CONNATE WATER BATURATION: Pen cent of pore space	
AVERAGE PERMEABILITY: Millidaroys	DU. BRAVITY: "API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	DRIGINAL BOLUTION GAS-GIL RATIO: Gubid feet for barrel	
AVERAGE POROBITY: PER GENT	SRIMINAL FORMATION VOLUME FACTOR: BARRELS Raturated dil per sarrel stock-tank dil	
AVERADE REBIDUAL OIL BATURATION: PER CENT OF PORE BPACE	GALGULATED ORIGINAL STOCK-TANK DIL IN PLACE. Barrels per aure-foot	

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnote: for further discussion of recovery estimates.*)

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

These analyses, opisions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc., and its officers and employees assume no responsibility and make no warranty or representation as to the productivity, proper operation, or profiles who are and its officers and employees assume no responsibility and make no warranty or representation as to the productivity, proper operation, or profiles who are and its officers and employees assume to responsibility and make no warranty or representation as to the productivity, proper operation, or profiles who are the device of any oil on the mineral well or and is represented in the productivity of th

Petroleum Reservoir Engineering CORE LABORATORIES, INC.

COMPANY <u>LONE S</u> Well <u>NEW ME</u> FIELD <u>UNDESIG</u> COUNTY_ <u>RUISEV</u> LOCATION <u>DEC.20</u>	KICO FELERAL " NATED SLT -TES-R36E	NM" NO. 1		1-13-60 COUGH MATER BACE MUD# SAMPLED AS DIREC 4-9% OIL ADDED	CORES <u>LIAMOND 3 1/2"</u> TED BY CLIENT
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T C C CEPTH S S FEET 4 C FEET	HORIZONTAL MAX			YS PERCENT	OIL SATURATION X PERCENT PORE SPATE 25 50 75
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131 14. 9673.7-75.1 15. 75.1-76.7 151	<pre><>.1; <0.1; <</pre>	1.0, 0.0.73. 0.8. 0.0 94.	2. V3		9675 9675
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Comparison of Rock and Fluid of the	Properties		Care 2139
Allison, Bluitt, and South Prairie-I	?ennsylvani	an Pool	EXHIBIT No.
Rock Properties	<u>Allison</u>	Bluitt	So. Prairie- Penn.
Average Permeability - md. Range of Permeability - md.	107.2	508 6 to 6,620	131 .1 to 1035 6.9 26
Average Porosity - % Average Interstitial Water Saturation - %	5 .15 25 E	5.93	6.9
Fluid Properties	2 3E	15	26
Gravity of Stock tank oil - ^O API	48	47	46.7
Saturation pressure - psi	3150	3027	2987
Formation volume factor at sat. press			
Res bb1/STB	1.821	1.762	1.841
Viscosity of reservoir oil at sat. press cp			.165
Dissolved gas-oil ratio at sat. press CFPB		1517	1490
Reservoir temperature - ^O F	156	155	157

Net Pay By Wells	Care 2/39
South Prairie-Pennslyvanian Pool Roosevelt County, New Mexico	EXHIBIT NO. $/O$

Operator, Lease and Well	Net Pay, Feet
Cosden Petroleum Corporation	
Federal C #1 Federal D #1	11 18
Lone Star Producing Company	
New Mexico Federal "NM" #1	7

Arithmetic Average Thickness - 12'

SUMMARY Recovery and Economic Solution Gas South Prairie-Pennsy	Calculations Cher 2/37
Gross recovery of original oil in place Gross gas recovery	29,027 Bb1 (58,054 Bb1) 131,783 MCF 263,565 MCF
Total gross revenue less severance taxes Total costs	204,322 206,644
Total profit or loss	(<u>\$120,192</u>) (<u>\$38,388</u>)
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VOLUMETRIC CALCULATIONS For Oil In Place - 40 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \times \emptyset \times (1-Sw) \times h \times A}{B_0}$$

$= \frac{7758 \times 0.069 \times (1-0.26) \times 12 \times 40}{1.834}$

= 103,668 barrels

A recovery factor of 28% is believed to be reasonable for the South Prairie-Pennsylvanian Pool which would result in a recovery of:

> Recoverable Oil = 0.28 x N₁ = (0.28)(103668) = 29,027 barrels

Definition of Symbols:

 N_1 - Original oil in place per 40 acre tract, stock tank barrels

 ϕ - Porosity as a fraction, 0.069

Sw - Interstitual water saturation, fraction of pore space - 0.26

h - Net pay thickness, feet - 12

A - Area for which oil in place is being calculated - 40 acres

B₀ - Original oil formation volume factor, barrels of reservoir space per barrel of stock tank oil - 1.834

7758 - Number of barrels per acresfoot

Revenue

•

011 29,027 (1-0.125)(\$3.01) = Less severance taxes at \$0.1397/B0 Gross oil revenue less severance taxes	\$ 76,451 <u>3,548</u> \$ 72,903	
<u>Gas</u> (29,027)(1-0.125)(4540)(\$0.10) Less severance taxes at 0.0264 of value Gross gas revenue less severance taxes	\$ 11,531 <u>304</u> <u>\$ 11,227</u>	
Total Gross Revenue Less Severance Taxes	<u>\$ 84,130</u>	
Costs		
Development Drilling and completion Pumping equipment Total development costs	\$172,000 <u>30,000</u> \$202,000	
<u>Operating</u> (\$0.08)(29,027)	2,322	
Total Costs	<u>\$204,322</u>	
Loss per 40-Acre well	(\$120,192)	
<u>Conditions</u>		
Recoverable oil in place per 40 acres Average gas-oil ratio throughout life Oil price Casinghead gas price Operating costs Royalty All wells completed at same time	29,027 bbls 4,540 CFPB \$3.01/Bb1 \$0.10/MCF \$0.08/Bb1 1/8	

VOLUMETRIC CALCULATIONS For Oil In Place - 80 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

80

$$N_{1} = \frac{7758 \times \phi \times (1-Sw) \times h \times A}{B_{0}}$$

= $\frac{7758 \times 0.069 \times (1-.26) \times 12 \times 1.834}{1.834}$
= 207,336 barrels

Using the recovery factor of 28%, the recovery would be:

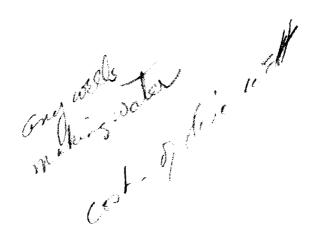
Recoverable Oil = 0.28 x N₁ = 0.28 x 207,336 = 58,054 barrels

The symbols used are the same as those used in determining the recovery for a 40-acre tract.

Economics of Drilling One Well Per a In South Prairie-Pennsylvanian Pe		HIBIT No.
Revenue		
Oil (58,054)(1125)(\$3.01) Less severance taxes at \$.1397/B0 Gross oil revenue less severance taxes	\$ 152, 399 7,096	\$ 145,803
Gas (58,054)(1125)(4540)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes	\$ 23,062 609	<u> 22,453</u>
Total Gross Revenue Less Severance Taxes		<u>\$168,256</u>
Costs		
Development Drilling and completion Pumping equipment Total development costs	\$172,000 30,000	\$ 202 ,000
<u>Operating</u> (\$.0 8)(58,054)		4,644
Total Costs		\$206,644
Loss per 80-acre well		(\$ 38,388)
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	Alt a	

SUMMARY Recovery and Economic Calc Water-Drive South Prairie-Pennsylvani		EXHIBIT No. 12
	40 Acres	80 Acres
Gross recovery of original oil in place Gross gas recovery	51,840 Bb1 77,760 MCF	103,680 Bbl 155,520 MCF
Total gross revenue less severance Taxes Total costs	\$136,820 206,147	\$273,642 210,294
Net loss or profit per well	(\$ 69,327)	\$ 63,3 48

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VOLUMETRIC CALCULATIONS For Oil in Place South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \ \phi \ (1-Sw) \ h}{B_0}$$

 $= \frac{7758 \times .069 \times (1-.26) \times 12}{1.834}$

= 2592 barrels per acre

40 Acres

ì

40 x 2592 = 103,680 barrels

80 Acres

80 x 2592 = 207,360 barrels

For a water-drive, a recovery factor of 50% is believed to be reasonable for the South Prairie-Pennsylvanian Pool. This would result in a recovery for:

40 Acres

Recoverable 0i1 = .50 x N₁ x 40
= .50 x 2592 x 40
= 51,840 barrels

80 Acres

Recoverable Oil = $.50 \times N_1 \times 80$

= .50 x 2592 x 80

- 103,680 barrels

Definition of Symbols:

N₁ - Original oil in place per acre, stock tank barrels
Ø - Porosity as a fraction, 0.069
Sw - Interstitual water saturation, fraction of pore space - 0.26
h - Net pay thickness, feet - 12
A - Area for which oil in place is being calculated - 40 acres and 80 acres
B₀ - Original oil formation volume factor, barrels of reservoir space per barrel of stock tank oil - 1.834
7758 - Number of barrels per acre-foot

Economics of Development	
South Prairie-Pennsylvanian Pool	
Roosevelt County, New Mexico	EXHIBIT No.

40 Acres

Revenue

<u>Oil</u> (51,840)(1125)(\$3.01) Less severance taxes at \$.1397/B0 Gross oil revenue less severance taxes	\$136,533 6,337	\$ 130, 196
Gas (51,840)(1125)(1500)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes Total Gross Revenue Less Severance Taxes	\$ 6,804 <u>180</u>	<u>\$ 6,624</u> <u>\$136,820</u>
Costs		
Development Drilling and completion Pumping equipment	\$172,000 <u>30,000</u>	\$202,000
<u>Operating</u> (\$.08)(51,840)		4,147
Total Costs		<u>\$206,147</u>
Loss per 40-acre well		(\$ 69,327)

80 Acres

Revenue

<u>Oil</u> (103,680)(1125)(\$3.01) Less severance taxes at \$.1397/B0 Gross oil revenue less severance taxes	\$273,067 <u>12,674</u>	\$260 , 393
Gas (103,680)(1125)(1500)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes	\$ 13,60 8 <u>359</u>	<u>\$ 13,249</u>
Total Gross Revenue Less Severance Taxes		\$273,642
Costs		
Development Drilling and completion Pumping equipment	\$172,000 30,000	\$ 202, 000
<u>Operating</u> (.08)(103,680)		8,294
Total Costs		<u>\$210,294</u>
Profit per 80-acre well		\$ 63,3 48
Conditions	40 Acres	80 Acres
Recoverable oil in place Average gas-oil ratio throughout life Oil price Casinghead gas price Operating costs Royalty All wells completed at same time	51,840 Bb1 1,500 CFPB \$3.01/bb1 \$.10/MCF \$.08/Bb1 1/8	103,680 Bb1 1,500 CFPB \$3.01/Bb1 \$.10/MCF \$.08/Bb1 1/8

Economic Comparison		
Bluitt and South Prairie-Pennsylvanian Pool	EXHIBIT No.	1

Bluitt Pool	40 acres	80 Acres
Average cost per well Average net revenue per well	\$190,000 <u>140,482</u>	\$190,000 280,963
Profit or loss per well	(\$ 49,518)	\$ 90,963
South Prairie-Pennsylvanian Pool		
Average Cost per well Average net revenue per well	\$202,000 \$132,673	\$ 202,000 \$ 265,3 48
Profit or loss per well	(\$ 69,327)	\$ 63,3 48

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SPECIAL RULES AND REGULATIONS FOR THE SOUTH PRAIRIE-PENNSYLVANIAN POOL

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RULE 1. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool or in the Pennsylvanian formation within one mile of the South Prairie-Pennsylvanian Pool, and not nearer to nor within the limits of another designated Pennsylvanian pool, shall be spaced, drilled, operated, and prorated in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool shall be located in a unit containing 80 acres, more or less, which consists of the S/2, N/2, E/2, or W/2 of a single governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quarter-quarter sections in the unit.

RULE 3. The initial well on any 80-acre unit in said pool shall be located
 within 150 feet of the center of either the SW/4 or the NE/4 of the quarter
 section on which the well is located. Any well which was drilling to or completed
 in the South Prairie-Pennsylvanian Pool prior to September 1, 1959, is granted an
 exception to the well location requirements of this Rule.

RULE 4. For good cause shown, the Secretary-Director may grant exception to the requirements of Rule 2 without notice and hearing when the application is for a non-standard unit comprising a single quarter-quarter section or lot or when the application is for the purpose of joining fractional lots not exceeding 20.49 acres each with a standard unit. All operators offsetting the proposed non-standard unit shall be notified of the application by registered mail and the application shall state that such notice has been furnished. The Secretary-Director may approve the application if, after a period of 30 days, no offset operator has entered an objection to the formation of such non-standard unit.

The allowable assigned to any such non-standard unit shall bear the same ratio to a standard allowable in the South Prairie-Pennsylvanian Pool as the acreage in such non-standard unit bears to 80 acres.

RULE 5. An 80-acre proration unit (79 through 81 acres) in the South Prairie-Pennsylvanian Pool shall be assigned an 80-acre proportional factor of 4.77 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any proportion.

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Core # 2139

12-2

CONDEN PETROLEUM COMPORATION

Federal "C" No. 1 T.D. 9.900" Cas. 5-1/2" @ 9,890" Perf. 9653'-72' Completion: 9-18-60 - Acidized with 1000 gal MCA, lat acid set on perfs 1 hr. - Max. treating press. 5400 psi Min. treating press. 2,000 psi, treated at 2 BM at 2200 psi. Symbbod 6 times and wall kicked off and began flowing. Potential Test: 9-19-60 - Flowed 282 30 & no water in 6 hrs., 28/64" Ch. T.P. 750# psi, C.P. pkr - GOR 1650 CFPB Federal "D" No. 1 T.D. 9,760* Cag. 5-1/2" @ 9,760" Perf. 9700'-05' Completion: 11-13-60 Spotted 200 gallons MEA opposite perf. There is some doubt that any acid reached the producing formation because during the completion of the well by symboling, raw unspent acid was recovered. After symbbing well kicked off and began flowing. Petential Test: 11-17-60 Flowed 190 B0 6 no water in 12 hrs, 24/64" Ch. T.P. 750 psi, C.P. pkr, GOR 1190 CFFB

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RESERVOIR DATA South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

KIHIBIT No.

1. Physical Properties of Reservoir Rock

- a. Average Porosity (Core & Log Calc.) 6.9%
- b. Average Permeability (Core) 131 md. (Range (0.1-1035)
- c. Average Interstitial Water Saturation 26%
- d. Average Net Thickness 12 ft
- 2. Lithology

Grey to tan, very fine crystalline fosiliferous limestone with pin-point to large vugs, intercrystalline perosity, and some fracturing.

3. Structural Features of Reservoir

The structure appears to be a northwest-southeast trending anticline. No original gas cap was present and the oil-water contact has not been determined.

4. Characteristics of Reservoir Fluids

a. Gravity of Stock Tank 011 - 46.7° API

- b. Saturation Pressure - 2987 psig
- c. Formation Volume Factor 1.841 @ Sat. Press.
- d. Viscosity of Reservoir 011 0.165 cp @ Sat. Press.
- c. Dissolve Gas-Oil Ratio - 1490 CFPB @ Sat. Press.

5. Pressures and Temperatures

- a. Reservoir Pressure (-5540) 3159 pais (10-1-60)
- c. Productivity Index - 7.22 BOPD/psi draw-down (Cosden-Fed "C" No. 1 10-1-60)

CORE LABORATORIES, INC.

Patrolewin Reservoir Engineering

DALLAS. TEXAS

Page 1 of 1 file WP-3-1579 Well New Mexico Federal "NM" No. 1

CORE BUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Bough 9655, 0-9685, 0

FEET OF CORE REGOVERED FROM Above Interval	4	30.0	AVERAGE TOTAL WATER BATURATION: Per deny of pore brage	44.4
FEET OF CORE Included in Averages	9944 (Marcinette State)	13,9	AVERAGE CONNATE WATER BATURATION: PER DENT OF PORE BRACE (C)	44.4
AVERAGE PERMEAB(LITY) Millidargys	Max. 900	83⊧ 61	OIL BRAVITY: "API (e)	42
PRODUCTIVE CAPACITY: Hilligarcy-feet	Max. 900	$\frac{1154}{848}$	GRIGINAL BOLUTION GAS DIL RATION (C)	1600
AVERAGE FORDSITY: PER CENT	9.000 9.0000 9.00000 9.0000 9.0000 9.0000 9.0000 9.0000 9.0000 9.0000 9.0000 9.0000 9.00000 9.0000 9.0000 9.0000 9.00000000	4.5	DR.BINAL FORMATION VOLUME FACTOR: BARRELE Baturated CH. Per Barrel Btock-tank Dil (C)	1, 92
AVERAGE RESIGUAL GIL MATURA PER CENT OF PORE BPACE	TION:	7.8	CALCUI AYED DEIGIMAL BTOCK-TANK OL IN PLACE: Barrelg Per Acre-Foot	101

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEFTH INTERVAL:

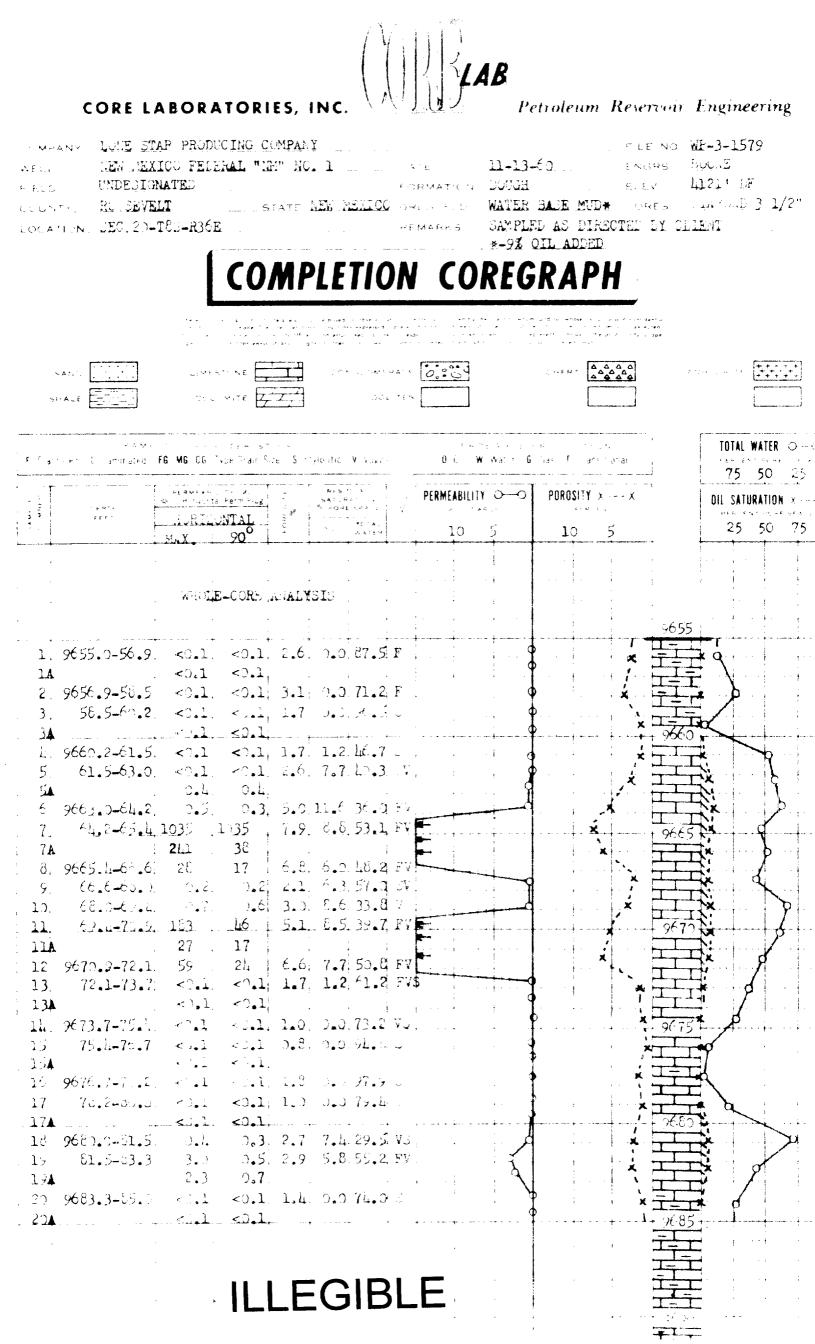
FEET OF DORE BEUDVERFÖ FROM Above interval	AVERAGE TOTAL WATER BATURATION: Per gent of Pore Bpace	
PEET OF CORE Included in Averages	AVERAGE CONNETE WATER BATURATION. Mer dent of pore space	
AVERAGE PERMEABLLITY: Millidardys	D1E 超短来录/27学: ⁹ 点符E	
PRODUCTIVE CAPACITY: Millidarey-Feet	ORIGINAL BOLLYION MAX-CIL RAYIS: Dugic firt fir yannıl	
AVERADE POROBITY: PER DANT	OPIGINAL FORMATION VOLUME FACTOR: BARRELB Baturated Gil Her Barnel Btouk tank on	
AVERAGE REBIDUAL OIL BATURATION; Per dent of pone spaue	EALDULATED GRIGINAL RTOOK-TANK OIL IN PLADE: Raraule Fer Adre-Foot	

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (Please refer to footnotes for justice discussion of recovery estimates.)

(c) Calculated (c) Estimated (m) Measured (*) Refer to attached letter.

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These analyses, outsions or interpretations are blaced on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the heat judgment of Core Laboratories. Inc. (all errors and emissions excepted); but Core Laboratories. Luc., and its officers and employees associate or even induced as maken no warranty on reconstruction as to the productivity, proper operation, or profumblements of any oil, gas or other mineral well or associate or other to report to reference of any oil, gas or other mineral well or associate on the productivity.



Comparison of Rock and Fluid Properties of the Allison, Bluitt, and South Prairie-Pennsylvanian Pool

EXHIBIT No.

Rock Properties	Allison	8 <u>Bluitt</u>	o. Prairie- Penn.
Average Permeability - md. Range of Permeability - md.	107.2	508 .6 to 6,620	131 .1 to 1035
Average Perosity - 7 Average Interstitial Water Saturation - 7	5 .15 25 E	5.93 15	6.9 26
Fluid Properties			
Gravity of Stock tank oil - ^O API Saturation pressure - psi Formation volume factor at sat, press	48 3150	47 3027	46.7 2987
Res bb1/STB Viscosity of reservoir oil at sat. press cp Dissolved gas-eil ratio at sat. press CFFB Reservoir temperature - ^O F	1.821 .19 1517 156	1 .762 1517 155	1.841 .165 1490 157

Net Pay By Wells South Frairie-Pennslyvanian Pool Roosevelt County, New Maxico

EXHIBIT No.

Operator,	Lesse	and Well	
A D D D D D D D D D D D D D D D D D D D			

Net Pay, Feet

Cosden Petroleum Corporation

Federal (; #1	11
Federal I) #1	18

Lone Star Producing Company

New Mexico Federal "NM" #1 7

Arithmetic Average Thickness - 12'

	SUMMARY Recovery and Economic Calculati Solution Gas Drive South Prairie-Pennsylvanian Po		IBIT No.	
		40 Acres	-80 Acres	
Gross recovery of o Gross gas recovery	original oil in place		58,054 Bb1 263,565 MCF	
Total gross revenue Total costs	e less severance taxes	\$ 84,130 204,322	\$168,256 206,644	
Total profit or los	88	(<u>\$120,192</u>)	(<u>\$ 38,388</u>)	

VOLUMETRIC CALCULATIONS For Oil In Place - 40 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

1

$$N_{i} = \frac{7758 \times \emptyset \times (1-Sw) \times h \times A}{B_{0}}$$

$= \frac{7758 \times 0.069 \times (1-0.26) \times 12 \times 40}{1.834}$

= 103,668 barrels

A recovery factor of 28% is believed to be reasonable for the South Prairie-Pennsylvanian Pool which would result in a recovery of:

> Recoverable 011 = 0.28 x N₁ = (0.28)(103668) = 29,027 barrels

Definition of Symbols: N_1 - Original oil in place per 40 acre tract, stock tank barrels

Porosity as a fraction, 0.069
Sw - Interstitual water saturation, fraction of pore space - 0.26
h - Net pay thickness, feet - 12
A - Area for which oil in place is being calculated - 40 acres
B₀ - Original oil formation volume factor, barrels of reservoir space per barrel of stock tank oil - 1.834

7758 - Number of barrels per acre-foot

Economics of Drilling One Well Per 40 Acres In South Prairie-Pennsylvanian Pool	EXHIBIT No.
Revenue	
011 29,027 (1-0.125)(\$3.01) = Less severance taxes at \$0.1397/BO Gross oil revenue less severance taxes	\$ 76,451 <u>3,548</u> \$ 72,903
Gas (29,027)(1-0,125)(4540)(\$0.10) Less severance taxes at 0.0264 of value Gross gas revenue less severance taxes	\$ 11,531 <u>304</u> <u>\$ 11,227</u>
Total Gross Revenue Lass Severance Taxes	<u>\$ 84,130</u>
Costs	
Development Drilling and completion Pumping equipment Total development costs	\$172,000 <u>30,000</u> \$202,000
<u>Operating</u> (\$0.08)(29,027)	2,322
Total Costs	\$204,322
Loss per 40-Acre well	(\$120,192)

Conditions

Recoverable oil in place per 40 acres	29, 027 bb1
Average gas-oil ratio throughout life	4,540 CFPB
Oil price	\$ 3.01/B b1
Casinghead gas price	\$0.10/MCF
Operating costs	\$0.08/Bb1
Royalty	1/8
All wells completed at same time	

VOLUMETRIC CALCULATIONS For Oil In Place - 80 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \times \emptyset \times (1-Sw) \times h \times A}{B_0}$$

$$= \frac{7758 \times 0.069 \times (1-.26) \times 12 \times 80}{1.834}$$

= 207,336 barrels

Using the recovery factor of 28%, the recovery would be:

Recoverable 011 = 0.28 x N₁ = 0.28 x 207,336 = 58,054 barrels

The symbols used are the same as those used in determining the recovery for a 40-acre tract.

Economics of Drilling One Well Per 80 Ac In South Prairie-Pennsylvanian Pool		XHIBIT No.
Revenue		
011 (58,054)(1125)(\$3.01) Less severance taxes at \$.1397/BO Gress eil revenue less severance taxes	\$ 152,89 9 7 ,096	\$145,803
Gas (58,054)(1125)(4540)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes	\$ 23,062 609	<u>\$ 22,453</u>
Total Gross Revenue Lass Severance Taxes		\$1 6 8,256
Costs		
Development Drilling and completion Pumping equipment Total development costs	\$172,000 <u>30,000</u>	\$ 202 , 000
<u>Operating</u> (#.08)(58,054)		<u> </u>
Total Costs		\$ 206,64 4
Loss per 80-acre well		(\$ 38,3 88)

SURMARY Recovery and Economic Calculations Water-Drive South Prairie-Pennsylvanian Pool EXHIBIT No		
	40 Acres	80 Acres
Gross recovery of original oil in place Gross gas recovery	51,840 Bb1 77,760 MCF	103,680 Bb1 155,520 MCF
Total gross revenue less severance Taxes Total costs	\$1 36,820 206,147	\$2 73,642 210,294
Net loss or profit per well	(\$ 69,327)	\$ 63,348

VOLUMETRIC CALCULATIONS For Oil in Place South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \ \phi \ (1-Sw) \ h}{B_0}$$

 $\frac{7758 \times .069 \times (1-.26) \times 12}{1.834}$

= 2592 barrels per acre

40 Acres

40 x 2592 = 103,680 barrels

80 Acres

80 x 2592 = 207,360 barrels

For a water-drive, a recovery factor of 50% is believed to be reasonable for the South Prairie-Pennsylvanian Pool. This would result in a recovery for:

40 Acres

Recoverable Oil = .50 x N₁ x 40
= .50 x 2592 x 40
= 51,840 barrels

80 Acres

Recoverable Oil = .50 x N₁ x 80

- .50 x 2592 x 80
- 103,680 barrels

Definition of Symbols:

N1 - Original oil in place per acre, stock tank barrels
Ø - Porosity as a fraction, 0.069
Sw - Interstitual water saturation, fraction of pore space - 0.26
h - Net pay thickness, feet - 12
A -- Area for which oil in place is being calculated - 40 acres and 80 acres
B₀ - Original oil formation volume factor, barrels of reservoir space per barrel of stock tank oil - 1.834
7758 - Number of barrels per acre-foot

Economics of Development	
South Prairie-Peunsylvanian Pool	
Roosevelt County, New Mexico	EXHIBIT No.

40 Acres

Revenue

$\frac{011}{(51,840)(1125)($3.01)}$		
(51,840) (1125) (\$3.01)	\$136,533	
Less severance taxes at \$.1397/BO	6,337	
Gross oil revenue less severance taxes		\$130,196
Gas		
(51,840) (1125) (1500) (\$.10)	\$ 6,80 4	
Less severance taxes at .0264 of value	180	
Gross gas revenue less severance taxes		6 6 694
Aross 9ms release ress scierader rants		<u>\$ 6,624</u>
Total Gross Revenue Less Severance Taxes		
TOTAT GROAP MEASURE TERE PEASEBUCG INXER		<u>\$136,820</u>
Costs		
<u>Development</u>		
Drilling and completion	\$172,000	
Pumping equipment	30,000	\$202,000
		<i>4202</i> ,000
Operating		
(\$.08)(51,840)		
()(),,)		4,147
Total Costs		
TAPET AABAG		<u>\$206,147</u>
Loss per 40-acre well		
The her in were wert		(\$ 69,327)

80 Acres

Revenue

<u>O11</u> (103,680)(1125)(\$3.01) Less severance taxes at \$.1397/BO Gross oil revenue less severance taxes	\$273,067 <u>12,674</u>	\$2 60,3 93
Gas (103,680)(1125)(1500)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes	\$ 13,60 8 <u>359</u>	<u>\$ 13,249</u>
Total Gross Revenue Less Severance Taxes		\$273,642
Costs		
Development Drilling and completion Pumping equipment	\$172,000 <u>30,000</u>	\$ 202, 000
<u>Operating</u> (.08)(103,680)		8,294
Total Costs		<u>\$210,294</u>
Profit per 80-acre well		\$ 63,3 48
Conditions	40 Acres	80 Acres
Recoverable oil im place Average gas-oil ratio throughout life Oil price Casimghead gas price Operating costs Royalty All wells completed at same time	51,840 Bb1 1,500 CFPB \$3.01/bb1 \$.10/MCF \$.08/Bb1 1/8	

Economic Comp Bluitt and South Prairie		EXHIBIT No.
		e e
Bluitt Poel	40 acres	80 Acres
Average cost per well Average net revenue per well	\$190,000 <u>140,482</u>	\$190,000 280,963
Profit or loss per well	(\$ 49,518)	\$ 90,963
South Prairie-Pennsylvanian Pool	- 5	
Average Cost per well Average met revenue per well	\$202,000 <u>\$132,673</u>	\$202,000 <u>\$265,348</u>
Profit or loss per well	(\$ 69,327)	\$ 63,34 8

SPECIAL RULES AND REGULATIONS FOR THE SOUTH PRAIRIE-PENNSYLVANIAN POOL

RULE 1. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool or in the Pennsylvanian formation within one mile of the South Prairie-Pennsylvanian Pool, and not nearer to nor within the limits of another designated Pennsylvanian pool, shall be spaced, drilled, operated, and prorated in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool shall be located in a unit containing 80 acres, more or less, which consists of the S/2, N/2, E/2, or W/2 of a single governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quarter-quarter sections in the unit.

RULE 3. The initial well on any 80-acre unit in said pool shall be located within 150 feet of the center of either the SW/4 or the NE/4 of the quarter section on which the well is located. Any well which was drilling to or completed in the South Prairie-Pennsylvanian Pool prior to September 1, 1959, is granted an exception to the well location requirements of this Rule.

RULE 4. For good cause shown, the Secretary-Director may grant exception to the requirements of Rule 2 without notice and hearing when the application is for a non-standard unit comprising a single quarter-quarter section or lot or when the application is for the purpose of joining fractional lots not exceeding 20.49 acres each with a standard unit. All operators offsetting the proposed non-standard unit shall be notified of the application by registered mail and the application shall state that such notice has been furnished. The Secretary-Director may approve the application if, after a period of 30 days, no offset operator has entered an objection to the formation of such non-standard unit.

The allowable assigned to any such non-standard unit shall bear the same ratio to a standard allowable in the South Prairie-Pennsylvanian Pool as the acreage in such non-standard unit bears to 80 acres.

RULE 5. An 80-acre proration unit (79 through 81 acres) in the South Prairie-Pennsylvanian Pool shall be assigned an 80-acre proportional factor of 4.77 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any proportion. $\mathbb{C} \mathbb{O} \mathbb{P} \mathbb{Y}$

HERVEY, DOW & HINKLE, ATTORNEYS ROSWELL, NEW MEXICO

Case 2139

November 22, 1960

Re: Application of Cosden Petroleum Corporation for the Promulgation of Special Rules and Regulations Governing the South Prairie-Pennsylvanian Pool embracing the NEt of Section 20, T. 8 S., R. 36 E., N.MP.M., Roosevelt County, New Mexico

Mr. A. L. Porter, Jr. Secretary-Mirector New Mexico 011 Conservation Commission P. O. Box 871 Santa Fe, New Mexico

Gear Mr. Porter:

Cosden Petroleum Corporation hereby requests that a hearing be scheduled by the New Mexico Oil Conservation Commission at the earliest possible date.

It is requested that the hearing be called for the purpose of promulgating special rules and regulations to govern the South Prairie-Pennsylvanian Pool comprising the NEL of Section 20, T. 8 S., R. 36 E., N.M.P.M. It is requested that the special rules and regulations issued provide for 80-acre spacing and promation units to consist of either the Ed. No. No. Solar Solar each governmental quarter-quarter section.

It is further requested that an 80-acre proration unit be assigned an 80-acre proportional depth factor for allowable purposes in accordance with the statewide rule.

It is requested that the above matter be set down for hearing at the earliest available date, either before an Examiner or before the full Commission at your discretion.

Very truly yours,

COSDEN PETROLEUM CORPORATION

N Hervey, Dow & Hinkle

P. O. Box 547 Roswell, New Mexico

Attorneys for Applicant, Cosden Petroleum Corporation

HCD: 3b

 $\mathbb{C} \mathbb{O} \mathbb{P} \mathbb{Y}$

HERVEY, DOW & HINKLE, ATTORNEYS ROSWELL, NEW MEXICO

Pack 2139

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It is further requested that an 80-acre proration unit be assigned an 80-acre proportional depth factor for allowable purposes in accordance with the statewide rule.

It is requested that the above matter be set down for hearing at the earliest available date, either before an Examiner or before the full Commission at your discretion.

Very truly yours,

COSDEN PETROLEUM CORPORATION

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Hervey, Dow & Hinkle P. O. Box 547 Roswell, New Mexico

Attorneys for Applicant, Cosden Petroleum Corporation

HCB: db

Comparison of Rock and Fluid Properties of the Allison, Bluitt, and South Prairie-Pennsylvanian Pool EXHIBIT No.?

Rock Properties	Allison	<u>Bluitt</u>	o. Prairie- Penn.
Average Permembility - md. Range of Permembility - md.	107.2	508 .6 to 6,620	131
Average Perosity - Z Average Interstitial Water Saturation - 7	5 .15 258	5.93 15	6.9 26
<u>Pluid</u> Properties			
Gravity of Stock tank oil - ^O API	48	47	46.7
Saturation pressure - psi Formation volume factor at sat, press	3150	3027	2987
Res bb1/STB	1.821	1.762	1.841
Viscosity of reservoir oil at sat. press ep			.165
Dissolved gas-eil ratio at sat. press CFFB Reservoir temperature - °F	1517 156	1517 155	1490 157

Net Pay By Wells South Prairie-Pennslyvanian Pool Roosevelt County, New Mexico

Operator, Lease and Well	Net Pay, Feet		
Cosden Petroleum Corporation			
Federal C #1	11		
Federal D #1	18		
Lone Star Producing Company			
New Mexico Federal "NM" #1	7		

Arithmetic Average Thickness - 12"

SURGARY Recovery and Economic Calculations Solution Gas Drive South Prairie-Pennsylvanian Pool EXHIBIT No. (
	40 Acres	-80 Acres		
Gross recovery of original oil in place Gross gas recovery		58,054 Bb1 263,565 MCF		
Total gross revenue less severance taxes Total costs	\$ 84,130 204,322	\$168,256 206,644		
Total profit or loss	(<u>\$120,192</u>)	(<u>\$_38,388</u>)		

. -

VOLUMETRIC CALCULATIONS For Oil In Place - 40 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_{\frac{1}{2}} = \frac{7758 \times \# \times (1-Sw) \times h \times A}{B_0}$$

$= \frac{7758 \times 0.069 \times (1-0.26) \times 12 \times 40}{1.834}$

* 103,668 barrels

A recovery factor of 28% is believed to be reasonable for the South Prairie-Pennsylvanian Pool which would result in a recovery of:

```
Recoverable 011 - 0.28 x N<sub>1</sub>
- (0.28)(103668)
= 29,027 barrels
```

Definition of Symbols:

```
N<sub>1</sub> - Original oil in place per 40 acre tract, stock tank barrels
```

Porosity as a fraction, 0.069

- Sw Interstitual water saturation, fraction of pore space 0.26
- h Net pay thickness, feet 12
- A Area for which oil in place is being calculated 40 acres
- B₀ Original oil formation volume factor, barrels of reservoir space per barrel of stock tank oil - 1.834
- 7758 Number of barrels per acre-foot

Economics of Drilling One Well Per 40 Acres In South Prairie-Pennsylvanian Pool

Revenue

011 29,027 (1-0.125)(\$3.01) = Less severance taxes at \$0.1397/BO Gross oil revenue less severance taxes	\$ 76,451 <u>3,548</u> \$ 72,903
Gas (29,027)(1-0.125)(4540)(\$0.10) Less severance taxes at 0.0264 of value Gross gas revenue less severance taxes	\$ 11,531 <u>304</u> <u>\$ 11,227</u>
Total Gross Revenue Less Severance Taxes	<u>\$ 84,130</u>
Costs	
Development Drilling and completion Pumping equipment Total development costs	\$172,000 <u>30,000</u> \$202,000
<u>Operating</u> (\$0.08)(29,027)	2,322
Total Costs	<u>\$204,322</u>
Loss per 40-Acre well	(\$120,192)
Conditions	
Recoverable oil in place per 40 acres Average gas-oil ratio throughout life Oil price Casinghead gas price Operating costs Royalty All wells completed at same time	29,027 bbls 4,540 CFPB \$3.01/Bb1 \$0.10/MCF \$0.08/Bb1 1/8

VOLUMETRIC CALCULATIONS For Oil In Place - 80 Acre Tract South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \times 4 \times (1-8w) \times h \times A}{B_0}$$

$$= \frac{7758 \times 0.069 \times (1-.26) \times 12 \times 80}{1.834}$$

= 207,336 barrels

Using the recovery factor of 28%, the recovery would be:

Recoverable 011 * 0.28 x N1 = 0.28 x 207,336 = 58,054 barrels

The symbols used are the same as those used in determining the recovery for a 40-acre tract.

Economics of Drilling One Well Per 80 Ac In South Prairie-Pennsylvanian Pool		EXHIBIT No.
Revenue		
011 (58,054)(1125)(\$3.01) Less severance taxes at \$.1397/BO Gross oil revenue less severance taxes	\$152,899 7,096	
Gas (58,054)(1125)(4540)(8.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes Total Gross Revenue Less Severance Taxes	\$ 23,062 609	
Costs Development		
Drilling and completion Pumping equipment Total development costs	\$172,000 30,000	
<u>Operating</u> (#.08)(58,054)		4, 64 4
Total Costs		\$ 206,64 4
Loss per 80-acre well		(\$ 38,38 8)

SUMMARY Recovery and Economic Calc Water-Drive South Prairie-Pennsylvani		EXHIBIT No.	
	40 Acres	80 Acres	
Gross recovery of original oil in place Gross gas recovery	51,840 Bb1 77,760 MCF	103,680 Eb1 155,520 MCF	
Total gross revenue less severance Taxes Total costs	\$1 36, 820 206,147	\$273,642 210,294	
Net loss or profit per well	(\$ 69,327)	\$ 63,34 8	

VOLUMETRIC CALCULATIONS For Oil in Place South Prairie-Pennsylvanian Pool Roosevelt County, New Mexico

EXHIBIT No.

$$N_1 = \frac{7758 \ \phi \ (1-Sw) \ h}{B_0}$$

• 7758 x .069 x (1-.26) x 12 1.834

= 2592 barrels per acre

40 Acres

40 x 2592 = 103,680 barrels

80 Acres

80 x 2592 = 207,360 barrels

For a water-drive, a recovery factor of 50% is believed to be reasonable for the South Prairie-Pennsylvanian Pool. This would result in a recovery for:

40 Acres

Recoverable 0i1 = .50 x N₁ x 40
= .50 x 2592 x 40
= 51,840 barrels

80 Acres

Recoverable Oil = .50 x N_1 x 80

• .50 x 2592 x 80

- 103,680 barrels

Definition of Symbols:

N1 - Original oil in place per acre, stock task barrels

- Porosity as a fraction, 0.069
- Sw Interstitual water saturation, fraction of pore space 0.26
- h Net pay thickness, fest 12
- A Area for which oil in place is being calculated 40 acres and 80 acres
- B_0 Original oil formation volume factor, barrels of reservoir
- space per barrel of stock tank oil 1.834
- 7758 Number of barrels per acre-foot

Economics of Development	
South Prairie-Pennsylvanian Pool	
Roosevelt County, New Mexico	EXHIBIT No.

40 Acres

Revenue

<u>Oil</u> (51,840)(1125)(\$3.01) Less severance taxes at \$.1397/BO Gross oil revenue less severance taxes	\$136,533 6,337	\$ 13 0,196
<u>Gas</u> (51,840)(1125)(1500)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes Total Gross Revenue Less Severance Taxes	\$ 6,804 <u>180</u>	\$ 6,62 4 <u>\$136,820</u>
<u>Development</u> Drilling and completion Pumping equipment	\$172,000 <u>30,000</u>	\$202 ,00 0
Operating (\$.08)(51,840) Total Costs		<u>4,147</u> <u>\$206,147</u>
Loss per 40-acre well		(\$ 69,327)

80 Acres

Revenue

<u>011</u> (103,680)(1125)(\$3.01) Less severance taxes at \$.1397/BO Gross oil revenue less severance taxes	\$273,067 <u>12,674</u>	\$2 60,3 93
Gas (103,680)(1125)(1500)(\$.10) Less severance taxes at .0264 of value Gross gas revenue less severance taxes	\$ 13,60 8 <u>359</u>	<u>§ 13,249</u>
Total Gross Revenue Less Severance Taxes		<u>\$273,642</u>
Costs		
Development Drilling and completion Fumping equipment	\$172,000 <u>30,000</u>	\$ 202,00 0
<u>Operating</u> (.08)(103,680)		8,294
Total Costs		<u>\$210,294</u>
Profit per 80-acre well		\$ 63,3 48
Conditions	40 Acres	80 Acres
Recoverable oil in place Average gas-oil ratio throughout life Oil price Casinghead gas price Operating costs Royalty All wells completed at same time	51,840 Bb1 1,500 CFFB \$3.01/bb1 \$.10/MCF \$.08/Bb1 1/8	103,680 Bb1 1,500 CFPB \$3.01/Bb1 \$.10/MCF \$.08/Bb1 1/8

Economic Comparison				
Bluitt and South Prairie-Pennsylvanian Pool EXHIBIT No.				
Bluitt Pool	40 acres	80 Acres		
Average cost per well	\$190,000	\$190,000		
Average net revenue per well	140,482	280,963		
Profit or loss per well	(\$ 49,518)	\$ 90, 963		
South Prairie-Peansylvanian Pool				
Average Cost per well	\$202,000	\$202,000		
Average net revenue per well	\$132,673	\$265,348		
Profit or loss per well	(\$ 6 9,327)	\$ 63,3 48		

v

SPECIAL RULES AND REGULATIONS FOR THE SOUTH PRAIRIE-FENNEYLVANIAN POOL

RULE 1. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool or in the Pennsylvanian formation within one mile of the South Prairie-Pennsylvanian Pool, and not measure to nor within the limits of another desigmated Pennsylvanian pool, shall be spaced, drilled, operated, and prorated in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the South Prairie-Pennsylvanian Pool shall be located in a unit containing 80 acres, more or less, which consists of the S/2, N/2, E/2, or W/2 of a single governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quartér-quarter sections in the unit.

RULE 3. The initial well on any 80-scre unit in said pool shall be located within 150 feet of the center of either the SW/4 or the NE/4 of the quarter section on which the well is located. Any well which was drilling to or completed in the South Prairie-Pennsylvanian Pool prior to September 1, 1959, is granted an exception to the well location requirements of this Rule.

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RULE 4. For good cause shown, the Secretary-Director may grant exception to the requirements of Rule 2 without notice and hearing when the application is for a non-standard unit comprising a single quarter-quarter section or lot or when the application is for the purpose of joining fractional lots not exceeding 20.49 acres each with a standard unit. All operators offsetting the proposed non-standard unit shall be notified of the application by registered mail and the application shall state that such notice has been furnished. The Secretary-Director may approve the application if, after a period of 30 days, no offset operator has entered an objection to the formation of such non-standard unit.

The allowable assigned to any such non-standard unit shall bear the same ratio to a standard allowable in the South Prakie-Pennsylvanian Pool as the acreage in such non-standard unit bears to 80 acres.

RULE 5. An 80-acre proration unit (79 through 81 acres) in the South Prairie-Pennsylvanian Pool shall be assigned an 80-acre proportional factor of 4.77 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any proportion.

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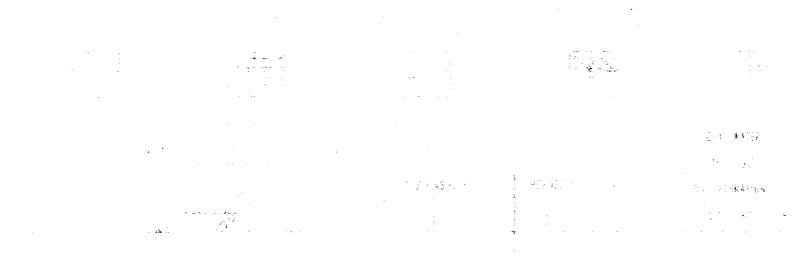
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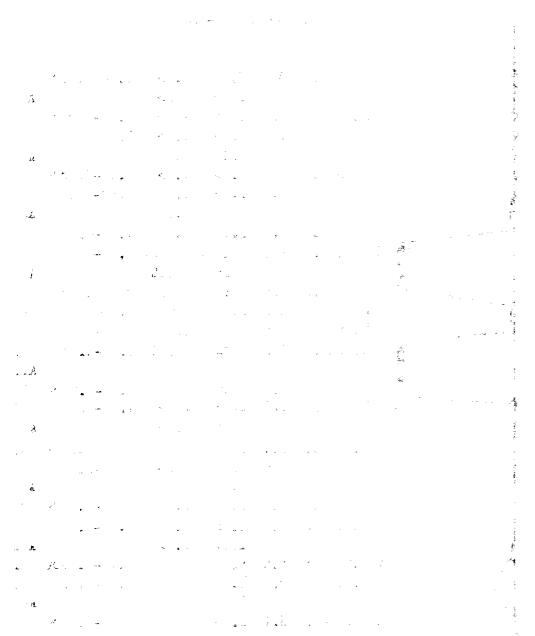
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COMPLETION COREGRAPH





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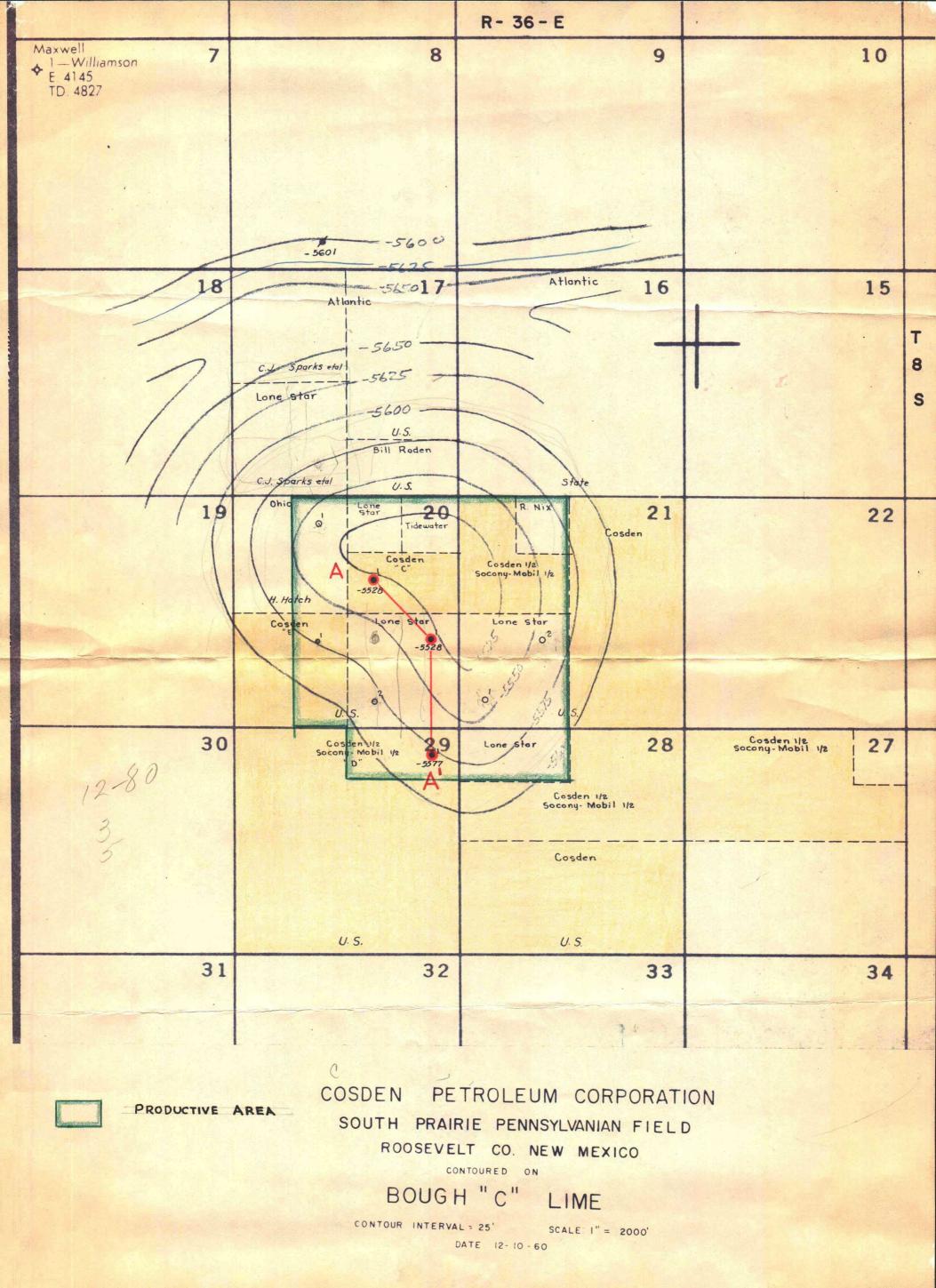


EXHIBIT 2

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