Form F-113

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 DEPTH INTERVAL: Bough 9655.0-9685.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		30.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		44.4
FEET OF CORE INCLUDED IN AVERAGES		13.9	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	44.4
AVERAGE PERMEABILITY: MILLIDARCYS	Max 90°	83 61	OIL GRAVITY: °API	(e)	42
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max. 90°	1154 848	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e)	1600
AVERAGE POROSITY: PER CENT		4.5	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.92
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		7.8	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS 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 DEPTH INTERVAL:

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-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 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.

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY	LONE STAR PRODUCING COMPANY			FILE NO	WP-3-1579
WELL	NEW MEXICO FEDERAL "EM" NO. 1	DATE	11-13-60	ENGRS	BOONE
FIELD	UNDESIGNATED	FORMATION	DOUGH	ELEV	4121' DF
COUNTY	ROOSEVELT STATE NEW MEXICO	DRLG FLD	WATER BASE MUD*	CORES	DIAMOND 3 1/2"
LOCATION	SEC. 20-T8S-R36E	REMARKS	SAMPLED AS DIRECTED BY CLIENT *-9% OIL ADDED		

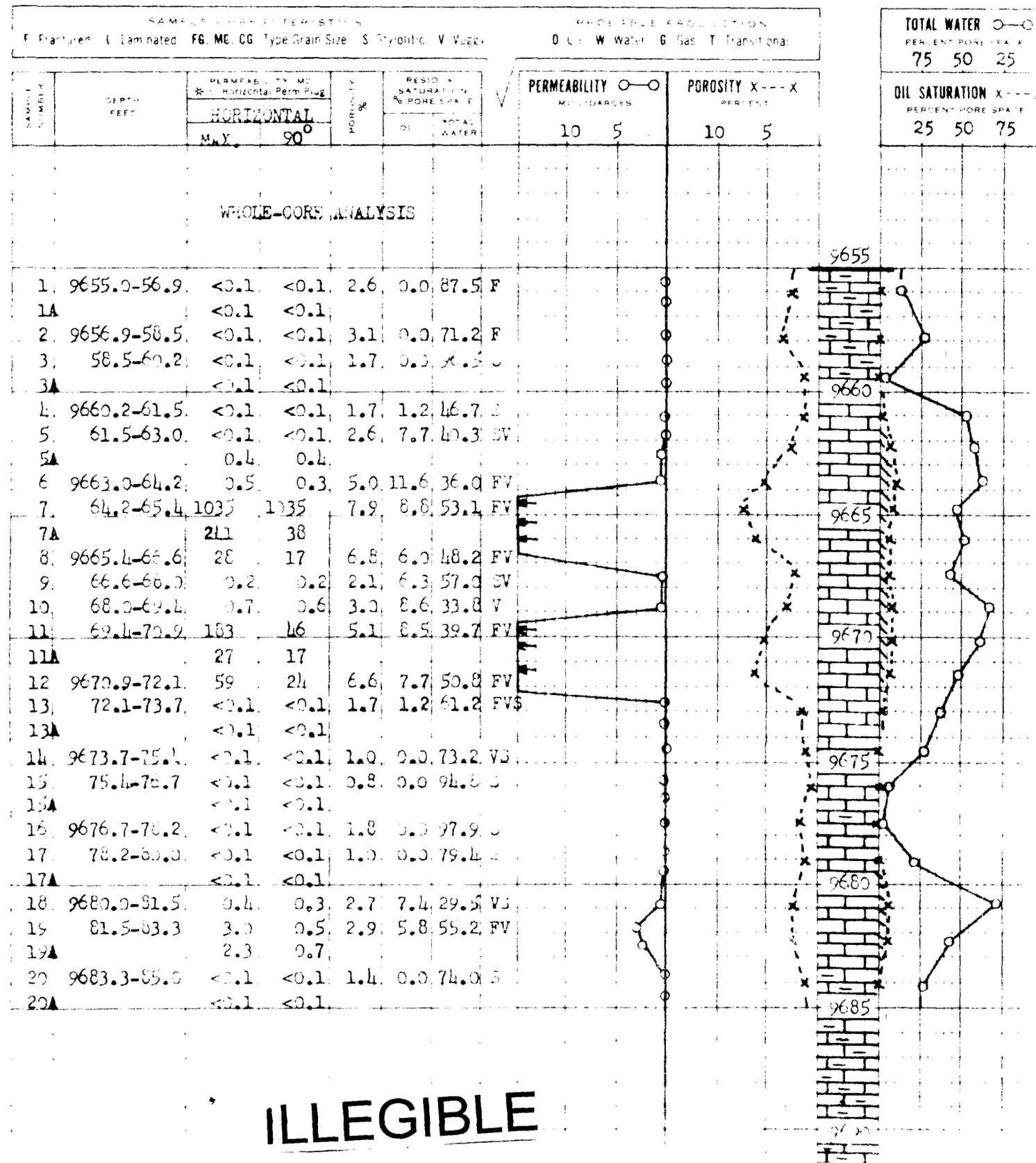
COMPLETION COREGRAPH

SAND · LIMESTONE · CONGLOMERATE · CHERT · ANHYDRITE · SHALE · DOLOMITE · COALTES

SAMPLE DESCRIPTION: F Fractured L Laminated FG, MG, CG Type Grain Size S Styolitic V Vuggy

PRODUCTIVE FRACTION: O Oil W Water G Gas T Transitional

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MD * Horizontal Perm Plug HORIZONTAL MAX.	HORIZONTAL 90°	POROSITY %	RESID. SATURATION % PORE SPACE OIL	RESID. SATURATION % PORE SPACE TOTAL WATER	
		WHOLE-CORE ANALYSIS					
1	9655.0-56.9	<0.1	<0.1	2.6	0.0	87.5	F
1A		<0.1	<0.1				
2	9656.9-58.5	<0.1	<0.1	3.1	0.0	71.2	F
3	58.5-60.2	<0.1	<0.1	1.7	0.0	[illegible]	[illegible]
3A		<0.1	<0.1				
4	9660.2-61.5	<0.1	<0.1	1.7	1.2	46.7	[illegible]
5	61.5-63.0	<0.1	<0.1	2.6	7.7	40.3	FV
5A		0.4	0.4				
6	9663.0-64.2	0.5	0.3	5.0	11.6	36.0	FV
7	64.2-65.4	1035	1035	7.9	8.8	53.1	FV
7A		211	38				
8	9665.4-66.6	28	17	6.8	6.0	48.2	FV
9	66.6-68.0	0.2	0.2	2.1	6.3	57.0	FV
10	68.0-69.4	0.7	0.6	3.0	8.6	33.8	V
11	69.4-70.9	183	46	5.1	8.5	39.7	FV
11A		27	17				
12	9670.9-72.1	59	24	6.6	7.7	50.8	FV
13	72.1-73.7	<0.1	<0.1	1.7	1.2	61.2	FV$
13A		<0.1	<0.1				
14	9673.7-75.4	<0.1	<0.1	1.0	0.0	73.2	VS
15	75.4-76.7	<0.1	<0.1	0.8	0.0	94.6	[illegible]
15A		<0.1	<0.1				
16	9676.7-78.2	<0.1	<0.1	1.8	0.0	97.9	[illegible]
17	78.2-80.0	<0.1	<0.1	1.0	0.0	79.4	[illegible]
17A		<0.1	<0.1				
18	9680.0-81.5	0.4	0.3	2.7	7.4	29.5	VS
19	81.5-83.3	3.0	0.5	2.9	5.8	55.2	FV
19A		2.3	0.7				
20	9683.3-85.0	<0.1	<0.1	1.4	0.0	74.0	[illegible]
20A		<0.1	<0.1				



ILLEGIBLE

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

Case 2139

EXHIBIT No.

	Allison	Bluitt	So. Prairie-Penn.
Rock Properties			
Average Permeability - md.	107.2	508	131
Range of Permeability - md.		.6 to 6,620	.1 to 1035
Average Porosity - %	5.15	5.93	6.9
Average Interstitial Water Saturation - %	25E	15	26
Fluid Properties			
Gravity of Stock tank oil - ^{o}API	48	47	46.7
Saturation pressure - psi	3150	3027	2987
Formation volume factor at sat. press. - Res bbl/STB	1.821	1.762	1.841
Viscosity of reservoir oil at sat. press. - cp	.19		.165
Dissolved gas-oil ratio at sat. press. - CFPB	1517	1517	1490
Reservoir temperature - ^{o}F	156	155	157

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

Case 2139

EXHIBIT No. 10

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'

SUMMARY
Recovery and Economic Calculations
Solution Gas Drive
South Prairie-Pennsylvanian Pool

Case 2139

EXHIBIT No. 11

doubled

	40 Acres	-80 Acres
Gross recovery of original oil in place	29,027 Bbl	58,054 Bbl
Gross gas recovery	131,783 MCF	263,565 MCF
Total gross revenue less severance taxes	$ 84,130	$168,256
Total costs	204,322	206,644
Total profit or loss	($120,192)	($ 38,388)

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

EXHIBIT No.

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

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

$$= 103,668 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$
$$= (0.28)(103668)$$
$$= 29,027 \text{ barrels}$$

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

B_o - 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		
Oil		
29,027 (1-0.125)($3.01) =	$ 76,451	
Less severance taxes at $0.1397/BO	3,548	
Gross oil revenue less severance taxes		$ 72,903
Gas		
(29,027)(1-0.125)(4540)($0.10)	$ 11,531	
Less severance taxes at 0.0264 of value	304	
Gross gas revenue less severance taxes		$ 11,227
Total Gross Revenue Less Severance Taxes		$ 84,130
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
($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 bbls
Average gas-oil ratio throughout life	4,540 CFPB
Oil price	$3.01/Bbl
Casinghead gas price	$0.10/MCF
Operating costs	$0.08/Bbl
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.

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

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

$$= 207,336 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$

$$= 0.28 \times 207,336$$

$$= 58,054 \text{ barrels}$$

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 Acres
In South Prairie-Pennsylvanian Pool

EXHIBIT No.

Revenue		
Oil		
(58,054)(1-.125)($3.01)	$152,399	
Less severance taxes at $.1397/BO	7,096	
Gross oil revenue less severance taxes		$145,803
Gas		
(58,054)(1-.125)(4540)($.10)	$ 23,062	
Less severance taxes at .0264 of value	609	
Gross gas revenue less severance taxes		$ 22,453
Total Gross Revenue Less Severance Taxes		$168,256
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
($.08)(58,054)		4,644
Total Costs		$206,644
Loss per 80-acre well		✓ ($ 38,388)

SUMMARY
Recovery and Economic Calculations
Water-Drive
South Prairie-Pennsylvanian Pool

EXHIBIT No. 12

	40 Acres	80 Acres
Gross recovery of original oil in place	51,840 Bbl	103,680 Bbl
Gross gas recovery	77,760 MCF	155,520 MCF
Total gross revenue less severance Taxes	$136,820	$273,642
Total costs	206,147	210,294
Net loss or profit per well	($ 69,327)	$ 63,348

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

EXHIBIT No.

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

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

$$= 2592 \text{ barrels per acre}$$

40 Acres

$40 \times 2592 = 103{,}680$ barrels

80 Acres

$80 \times 2592 = 207{,}360$ 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 $= .50 \times N_1 \times 40$

$= .50 \times 2592 \times 40$

$= 51{,}840$ barrels

80 Acres

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

$= .50 \times 2592 \times 80$

$= 103{,}680$ barrels

Definition of Symbols:

N_1 - Original oil in place per acre, 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 and 80 acres
B_o - 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

Oil		
(51,840)(1-.125)($3.01)	$136,533	
Less severance taxes at $.1397/BO	6,337	
Gross oil revenue less severance taxes		$130,196
Gas		
(51,840)(1-.125)(1500)($.10)	$ 6,804	
Less severance taxes at .0264 of value	180	
Gross gas revenue less severance taxes		$ 6,624
Total Gross Revenue Less Severance Taxes		$136,820

Costs

Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
($.08)(51,840)		4,147
Total Costs		$206,147
Loss per 40-acre well		($ 69,327)

80 Acres

Revenue		
Oil		
(103,680)(1-.125)($3.01)	$273,067	
Less severance taxes at $.1397/BO	12,674	
Gross oil revenue less severance taxes		$260,393
Gas		
(103,680)(1-.125)(1500)($.10)	$ 13,608	
Less severance taxes at .0264 of value	359	
Gross gas revenue less severance taxes		$ 13,249
Total Gross Revenue Less Severance Taxes		$273,642
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
(.08)(103,680)		8,294
Total Costs		$210,294
Profit per 80-acre well		$ 63,348

Conditions	40 Acres	80 Acres
Recoverable oil in place	51,840 Bbl	103,680 Bbl
Average gas-oil ratio throughout life	1,500 CFPB	1,500 CFPB
Oil price	$3.01/bbl	$3.01/Bbl
Casinghead gas price	$.10/MCF	$.10/MCF
Operating costs	$.08/Bbl	$.08/Bbl
Royalty	1/8	1/8
All wells completed at same time		

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-Pennsylvanian Pool		
Average Cost per well	$202,000	$202,000
Average net revenue per well	$132,673	$265,348
Profit or loss per well	($ 69,327)	$ 63,348

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.

Mr Summers
Testimony Rough.
Then I will send
the Exhibit with
his testimony, use
them when he is ready.

6 — Mon

Case #2139

GORDEN PETROLEUM CORPORATION

Federal "C" No. 1

T.D. 9,900'
Csg. 5-1/2" @ 9,890'
Perf. 9653'-72'

Completion: 9-18-60 - Acidized with 1000 gal MCA, let acid set on perfs 1 hr. - Max. treating press. 5400 psi Min. treating press. 2,000 psi, treated at 2 BPM at 2200 psi. Swabbed 6 times and well kicked off and began flowing.

Potential Test:
9-19-60 - Flowed 282 BO & no water in 6 hrs., 28/64" Ch. T.P. 750# psi, C.P. pkr - GOR 1650 CFPB

Federal "F" No. 1

T.D. 9,760'
Csg. 5-1/2" @ 9,760'
Perf. 9700'-05'

Completion: 11-13-60 Spotted 200 gallons MCA opposite perf. There is some doubt that any acid reached the producing formation because during the completion of the well by swabbing, raw unspent acid was recovered. After swabbing well kicked off and began flowing.

Potential Test:
11-17-60 Flowed 190 BO & no water in 12 hrs, 24/64" Ch. T.P. 750 psi, C.P. pkr, GOR 1190 CFPB

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

EXHIBIT No. 7

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 porosity, 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 Reserveir Fluids**

   a. Gravity of Stock Tank Oil - 46.7° API

   b. Saturation Pressure - 2987 psig

   c. Formation Volume Factor - 1.841 @ Sat. Press.

   d. Viscosity of Reservoir Oil - 0.165 cp @ Sat. Press.

   e. Dissolve Gas-Oil Ratio - 1490 CFPB @ Sat. Press.

5. **Pressures and Temperatures**

   a. Reserveir Pressure (-5540) - 3159 psig (10-1-60)

   b. Reserveir Temperature - 157°F

   c. Productivity Index - 7.22 BOPD/psi draw-down
   (Cosden-Fed "C" No. 1 10-1-60)

Form F-118

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

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

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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.)*

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AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	

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

These recovery estimates represent theoretical maximum value 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.

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY LONE STAR PRODUCING COMPANY — FILE NO WF-3-1579
WELL NEW MEXICO FEDERAL "EE" NO. 1 — DATE 11-13-60 — ENGRS BOOKE
FIELD UNDESIGNATED — FORMATION DOUGH — ELEV 4121' DF
COUNTY ROOSEVELT — STATE NEW MEXICO — DRLG. FLUID WATER BASE MUD* — CORE 3 1/2"
LOCATION SEC. 20-T8S-R36E — REMARKS SAMPLED AS DIRECTED BY CLIENT
*-9% OIL ADDED

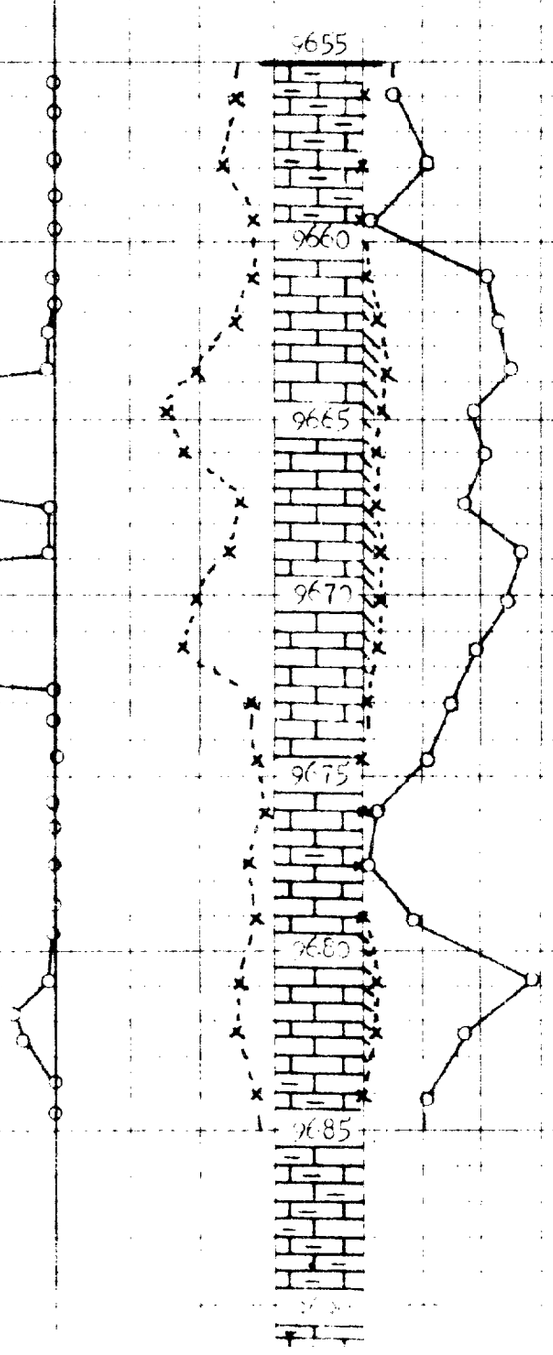
COMPLETION COREGRAPH

SAND · LIMESTONE · CONGLOMERATE · CHERT · ANHYDRITE
SHALE · DOLOMITE · DOLOMITE

F Fractured I Laminated FG MG CG Type Plug Size S Stylolitic V Vuggy
O Oil W Water G Gas F Fluorescent

TOTAL WATER 75 50 25
OIL SATURATION 25 50 75

SAMPLE NO.	DEPTH FEET	PERMEABILITY MAXIMUM HORIZONTAL MAX. 90°		FEET	RESIDUAL SATURATION CORE ANALYSIS OIL %	WATER %	POROSITY %	DESCRIPTION
								WHOLE-CORE ANALYSIS
1	9655.0-56.9	<0.1	<0.1	1.9	2.6	0.0	27.5	F
1A		<0.1	<0.1					
2	9656.9-58.5	<0.1	<0.1	1.6	3.1	0.0	21.2	F
3	58.5-60.2	<0.1	<0.1	1.7	3.0	0.0	24.3	
3A		<0.1	<0.1					
4	9660.2-61.5	<0.1	<0.1	1.3	1.7	1.2	16.7	
5	61.5-63.0	<0.1	<0.1	1.5	2.6	7.7	20.3	V
5A		0.4	0.4					
6	9663.0-64.2	0.3	0.3	1.2	5.0	11.6	36.0	FV
7	64.2-65.4	1035	1035	1.2	7.9	6.8	53.1	FV
7A		211	38					
8	9665.4-66.6	28	17	1.2	6.8	6.0	48.2	FV
9	66.6-68.0	0.2	0.2	1.4	4.1	8.3	37.3	FV
10	68.0-69.4	0.7	0.6	1.4	3.0	8.6	33.8	V
11	69.4-72.2	183	46	2.8	5.1	8.5	39.7	FV
11A		27	17					
12	9670.2-72.1	59	24	1.9	6.6	7.7	50.8	FV
13	72.1-73.7	<0.1	<0.1	1.6	1.7	1.2	41.2	FVS
13A		<0.1	<0.1					
14	9673.7-75.4	<0.1	<0.1	1.7	1.0	0.0	23.2	VS
15	75.4-76.7	<0.1	<0.1	1.3	0.8	0.0	24.6	S
15A		<0.1	<0.1					
16	9676.7-78.2	<0.1	<0.1	1.5	1.9	3.0	27.9	S
17	78.2-80.0	<0.1	<0.1	1.8	1.0	0.0	29.4	
17A		<0.1	<0.1					
18	9680.0-81.5	0.4	0.3	1.5	2.7	7.4	29.5	VS
19	81.5-83.3	3.0	0.5	1.8	2.9	5.8	35.2	FV
19A		2.3	0.7					
20	9683.3-85.1	<0.1	<0.1	1.8	1.4	0.0	24.0	S
20A		<0.1	<0.1					



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

EXHIBIT No.

	Allison	Bluitt	So. Prairie-Penn.
Rock Properties			
Average Permeability - md.	107.2	508	131
Range of Permeability - md.		.6 to 6,620	.1 to 1035
Average Porosity - %	5.15	5.93	6.9
Average Interstitial Water Saturation - %	25%	15	26
Fluid Properties			
Gravity of Stock tank oil - ^{o}API	48	47	46.7
Saturation pressure - psi	3150	3027	2987
Formation volume factor at sat. press. - Res bbl/STB	1.821	1.762	1.841
Viscosity of reservoir oil at sat. press. - cp	.19		.165
Dissolved gas-oil ratio at sat. press. - CFPB	1517	1517	1490
Reservoir temperature - ^{o}F	156	155	157

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

EXHIBIT No. 7

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'

SUMMARY
Recovery and Economic Calculations
Solution Gas Drive
South Prairie-Pennsylvanian Pool **EXHIBIT No.**

	40 Acres	-80 Acres
Gross recovery of original oil in place	29,027 Bbl	58,054 Bbl
Gross gas recovery	131,783 MCF	263,565 MCF
Total gross revenue less severance taxes	$ 84,130	$168,256
Total costs	204,322	206,644
Total profit or loss	($120,192)	($ 38,388)

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

EXHIBIT No. 1

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

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

$$= 103{,}668 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$
$$= (0.28)(103668)$$
$$= 29{,}027 \text{ barrels}$$

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

B_o - 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		
Oil		
29,027 (1-0.125)($3.01) =	$ 76,451	
Less severance taxes at $0.1397/BO	3,548	
Gross oil revenue less severance taxes		$ 72,903
Gas		
(29,027)(1-0.125)(4540)($0.10)	$ 11,531	
Less severance taxes at 0.0264 of value	304	
Gross gas revenue less severance taxes		$ 11,227
Total Gross Revenue Less Severance Taxes		$ 84,130
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
($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 bbls
Average gas-oil ratio throughout life	4,540 CFPB
Oil price	$3.01/Bbl
Casinghead gas price	$0.10/MCF
Operating costs	$0.08/Bbl
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.

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

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

$$= 207,336 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$

$$= 0.28 \times 207,336$$

$$= 58,054 \text{ barrels}$$

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 Acres
In South Prairie-Pennsylvanian Pool EXHIBIT No.

Revenue		
Oil		
(58,054)(1-.125)($3.01)	$152,899	
Less severance taxes at $.1397/BO	7,096	
Gross oil revenue less severance taxes		$145,803
Gas		
(58,054)(1-.125)(4540)($.10)	$ 23,062	
Less severance taxes at .0264 of value	609	
Gross gas revenue less severance taxes		$ 22,453
Total Gross Revenue Less Severance Taxes		$168,256
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
(.08)(58,054)		4,644
Total Costs		$206,644
Loss per 80-acre well		($ 38,388)

SUMMARY
Recovery and Economic Calculations
Water-Drive
South Prairie-Pennsylvanian Pool

EXHIBIT No. 2

	40 Acres	80 Acres
Gross recovery of original oil in place	51,840 Bbl	103,680 Bbl
Gross gas recovery	77,760 MCF	155,520 MCF
Total gross revenue less severance Taxes	$136,820	$273,642
Total costs	206,147	210,294
Net loss or profit per well	($ 69,327)	$ 63,348

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

EXHIBIT No.

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

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

$$= 2592 \text{ barrels per acre}$$

40 Acres

$40 \times 2592 = 103{,}680$ barrels

80 Acres

$80 \times 2592 = 207{,}360$ 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 $= .50 \times N_1 \times 40$

$= .50 \times 2592 \times 40$

$= 51{,}840$ barrels

80 Acres

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

$= .50 \times 2592 \times 80$

$= 103{,}680$ barrels

Definition of Symbols:

N_1 - Original oil in place per acre, 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 and 80 acres
B_o - 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

Oil		
(51,840)(1-.125)($3.01)	$136,533	
Less severance taxes at $.1397/BO	6,337	
Gross oil revenue less severance taxes		$130,196
Gas		
(51,840)(1-.125)(1500)($.10)	$ 6,804	
Less severance taxes at .0264 of value	180	
Gross gas revenue less severance taxes		$ 6,624
Total Gross Revenue Less Severance Taxes		$136,820

Costs

Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
($.08)(51,840)		4,147
Total Costs		$206,147
Loss per 40-acre well		($ 69,327)

80 Acres

Revenue

Oil		
(103,680)(1-.125)($3.01)	$273,067	
Less severance taxes at $.1397/BO	12,674	
Gross oil revenue less severance taxes		$260,393
Gas		
(103,680)(1-.125)(1500)($.10)	$ 13,608	
Less severance taxes at .0264 of value	359	
Gross gas revenue less severance taxes		$ 13,249
Total Gross Revenue Less Severance Taxes		$273,642

Costs

Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
(.08)(103,680)		8,294
Total Costs		$210,294
Profit per 80-acre well		$ 63,348

Conditions	40 Acres	80 Acres
Recoverable oil in place	51,840 Bbl	103,680 Bbl
Average gas-oil ratio throughout life	1,500 CFPB	1,500 CFPB
Oil price	$3.01/bbl	$3.01/Bbl
Casinghead gas price	$.10/MCF	$.10/MCF
Operating costs	$.08/Bbl	$.08/Bbl
Royalty	1/8	1/8
All wells completed at same time		

Economic Comparison
Bluitt and South Prairie-Pennsylvanian Pool

EXHIBIT No. 5

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-Pennsylvanian Pool		
Average Cost per well	$202,000	$202,000
Average net revenue per well	$132,673	$265,348
Profit or loss per well	($ 69,327)	$ 63,348

14

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.

COPY

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 NE¼ of Section 20, T. 8 S., R. 36 E., N.MP.M., Roosevelt County, New Mexico

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

Dear 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 NE¼ 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 proration units to consist of either the E½, W½, N½, or S½ of 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

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

Attorneys for Applicant, Cosden Petroleum Corporation

HCH:db

COPY

HERVEY, DOW & HINKLE, ATTORNEYS
ROSWELL, NEW MEXICO

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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

By _____
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. 9

	Allison	Bluitt	So. Prairie-Penn.
Rock Properties			
Average Permeability - md.	107.2	508	131
Range of Permeability - md.		.6 to 6,620	.1 to 1035
Average Porosity - %	5.15	5.93	6.9
Average Interstitial Water Saturation - %	25%	15	26
Fluid Properties			
Gravity of Stock tank oil - °API	48	47	46.7
Saturation pressure - psi	3150	3027	2987
Formation volume factor at sat. press. - Res bbl/STB	1.821	1.762	1.841
Viscosity of reservoir oil at sat. press. - cp	.19		.165
Dissolved gas-oil ratio at sat. press. - CFPB	1517	1517	1490
Reservoir temperature - °F	156	155	157

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

EXHIBIT No.

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'

SUMMARY
Recovery and Economic Calculations
Solution Gas Drive
South Prairie-Pennsylvanian Pool

EXHIBIT No. 11

	40 Acres	80 Acres
Gross recovery of original oil in place	29,027 Bbl	58,054 Bbl
Gross gas recovery	131,783 MCF	263,565 MCF
Total gross revenue less severance taxes	$ 84,130	$168,256
Total costs	204,322	206,644
Total profit or loss	($120,192)	($ 38,388)

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

EXHIBIT No.

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

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

$$= 103{,}668 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$
$$= (0.28)(103668)$$
$$= 29{,}027 \text{ barrels}$$

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

B_o - 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		
Oil		
29,027 (1-0.125)($3.01) =	$ 76,451	
Less severance taxes at $0.1397/BO	3,548	
Gross oil revenue less severance taxes		$ 72,903
Gas		
(29,027)(1-0.125)(4540)($0.10)	$ 11,531	
Less severance taxes at 0.0264 of value	304	
Gross gas revenue less severance taxes		$ 11,227
Total Gross Revenue Less Severance Taxes		$ 84,130
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
($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 bbls
Average gas-oil ratio throughout life	4,540 CFPB
Oil price	$3.01/Bbl
Casinghead gas price	$0.10/MCF
Operating costs	$0.08/Bbl
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.

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

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

$$= 207,336 \text{ barrels}$$

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

$$\text{Recoverable Oil} = 0.28 \times N_1$$

$$= 0.28 \times 207,336$$

$$= 58,054 \text{ barrels}$$

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 Acres
In South Prairie-Pennsylvanian Pool EXHIBIT No.

Revenue		
Oil		
(58,054)(1-.125)($3.01)	$152,899	
Less severance taxes at $.1397/BO	7,096	
Gross oil revenue less severance taxes		$145,803
Gas		
(58,054)(1-.125)(4540)($.10)	$ 23,062	
Less severance taxes at .0264 of value	609	
Gross gas revenue less severance taxes		$ 22,453
Total Gross Revenue Less Severance Taxes		$168,256
Costs		
Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	
Total development costs		$202,000
Operating		
(.08)(58,054)		4,644
Total Costs		$206,644
Loss per 80-acre well		($ 38,388)

SUMMARY
Recovery and Economic Calculations
Water-Drive
South Prairie-Pennsylvanian Pool

EXHIBIT No.

	40 Acres	80 Acres
Gross recovery of original oil in place	51,840 Bbl	103,680 Bbl
Gross gas recovery	77,760 MCF	155,520 MCF
Total gross revenue less severance Taxes	$136,820	$273,642
Total costs	206,147	210,294
Net loss or profit per well	($ 69,327)	$ 63,348

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

EXHIBIT No.

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

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

$$= 2592 \text{ barrels per acre}$$

40 Acres

$40 \times 2592 = 103{,}680$ barrels

80 Acres

$80 \times 2592 = 207{,}360$ 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 $= .50 \times N_1 \times 40$

$= .50 \times 2592 \times 40$

$= 51{,}840$ barrels

80 Acres

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

$= .50 \times 2592 \times 80$

$= 103{,}680$ barrels

Definition of Symbols:

N_1 - Original oil in place per acre, 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 and 80 acres
B_o - 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

Oil		
(51,840)(1-.125)($3.01)	$136,533	
Less severance taxes at $.1397/BO	6,337	
Gross oil revenue less severance taxes		$130,196
Gas		
(51,840)(1-.125)(1500)($.10)	$ 6,804	
Less severance taxes at .0264 of value	180	
Gross gas revenue less severance taxes		$ 6,624
Total Gross Revenue Less Severance Taxes		$136,820

Costs

Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
($.08)(51,840)		4,147
Total Costs		$206,147
Loss per 40-acre well		($ 69,327)

80 Acres

Revenue

Oil		
(103,680)(1-.125)($3.01)	$273,067	
Less severance taxes at $.1397/BO	12,674	
Gross oil revenue less severance taxes		$260,393
Gas		
(103,680)(1-.125)(1500)($.10)	$ 13,608	
Less severance taxes at .0264 of value	359	
Gross gas revenue less severance taxes		$ 13,249
Total Gross Revenue Less Severance Taxes		$273,642

Costs

Development		
Drilling and completion	$172,000	
Pumping equipment	30,000	$202,000
Operating		
(.08)(103,680)		8,294
Total Costs		$210,294
Profit per 80-acre well		$ 63,348

Conditions	40 Acres	80 Acres
Recoverable oil in place	51,840 Bbl	103,680 Bbl
Average gas-oil ratio throughout life	1,500 CFPB	1,500 CFPB
Oil price	$3.01/bbl	$3.01/Bbl
Casinghead gas price	$.10/MCF	$.10/MCF
Operating costs	$.08/Bbl	$.08/Bbl
Royalty	1/8	1/8
All wells completed at same time		

Economic Comparison
Bluitt and South Prairie-Pennsylvanian Pool

EXHIBIT No. 13

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-Pennsylvanian Pool		
Average Cost per well	$202,000	$202,000
Average net revenue per well	$132,673	$265,348
Profit or loss per well	($ 69,327)	$ 63,348

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.

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: [illegible]

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	[illegible]	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	[illegible]
FEET OF CORE INCLUDED IN AVERAGES	[illegible]	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	[illegible]
AVERAGE PERMEABILITY: MILLIDARCYS	[illegible]	OIL GRAVITY: °API	[illegible]
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	[illegible]	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	[illegible]
AVERAGE POROSITY: PER CENT	[illegible]	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	[illegible]
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	[illegible]	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	[illegible]

Calculated maximum solution gas drive recovery is [illegible] barrels per acre-foot, assuming production could be continued until reservoir pressure declined to [illegible]. Calculated maximum water drive recovery is [illegible] barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to [illegible] water-oil ratio. [illegible]

FORMATION NAME AND DEPTH INTERVAL: [illegible]

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	

Calculated maximum solution gas drive recovery is [illegible] barrels per acre-foot, assuming production could be continued until reservoir pressure declined to [illegible]. Calculated maximum water drive recovery is [illegible] barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to [illegible]

(1) Calculated (2) Estimated (3) [illegible]

These recovery estimates [illegible] *production* [illegible] *original reservoir pressure* [illegible] *drainage* [illegible] *area. The effect of* [illegible] *to reduce* [illegible] *between* [illegible] *water drive recoveries* [illegible] *water drive.* [illegible]

[illegible]

LAB

COMPLETION COREGRAPH

ILLEGIBLE

LARGE FORMAT EXHIBIT HAS BEEN REMOVED AND IS LOCATED IN THE NEXT FILE

R- 36 - E

Maxwell
1—Williamson
E 4145
TD. 4827

7 8 9 10

-5601 -5600 -5625

18 17 16 15

Atlantic Atlantic

-5650 -5625 -5600

C.J. Sparks etal Lone Star U.S. Bill Roden C.J. Sparks etal U.S. State

T 8 S

19 20 21 22

Ohio Lone Star Tidewater R. Nix Cosden

Cosden "C" Cosden 1/2 Socony-Mobil 1/2

A -5528 -5528

H. Hatch Cosden "E" Lone Star Lone Star

U.S. U.S.

30 29 28 27

Cosden 1/2 Socony-Mobil 1/2 "D" -5577 A' Lone Star Cosden 1/2 Socony-Mobil 1/2 Cosden 1/2 Socony-Mobil 1/2

12-80

3
3

Cosden

U.S. U.S.

31 32 33 34

PRODUCTIVE AREA

COSDEN PETROLEUM CORPORATION

SOUTH PRAIRIE PENNSYLVANIAN FIELD

ROOSEVELT CO. NEW MEXICO

CONTOURED ON

BOUGH "C" LIME

CONTOUR INTERVAL = 25' SCALE: 1" = 2000'

DATE 12-10-60

EXHIBIT 2

COSDEN

cosden

COSDEN

Acc 2139

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