Case No.

Caprock Field 206

Large Exhibits

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
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MEMBERS OF THE CAPROCK FIELD OPERATORS COMMITTEE:

The following is a brief outline of the progress that has been made to date toward a unitized or cooperative agreement for the Caprock Field in order to facilitate the commencement of a secondary oil recovery program:

On September 19th at the New Mexico Oil & Gas Engineering Committee office in Hobbs a meeting of the Caprock Field Engineering Committee was held with the following representatives and companies present:

J. D. Duncan - Delfern Oil Company - Lubbock, Texas
Ralph C. Dekoody - Delfern Oil Company - Lubbock, Texas
John R. Brack - Ohio Oil Company - Midland, Texas
Merrill B. Wilson - Great Western Prod. Inc. - Lubbock, Tex.
O. H. Crews - Great Western Prod. Inc. - Lubbock, Texas
H. E. Vesey - Cities Service Oil Co. - Hobbs, New Mexico
A. D. Pickett - Phillips Petro. Co. - Box 1605 - Hobbs, N.M.
Wesley W. Moore - British-American - Box 2649 - Tulsa, Okla.
Joseph D. Kennedy - J. C. Maxwell, Inc. and Crandall & Osmund - 2006 Cont. Life Bldg. - Fort Worth, Texas
Fred Norris - British-American - Box 352 - Seymour, Texas
Sam Williams - Sam Williams - Artesia, N. M.
Lonnie Kemper - Vickers Petro. Corp. - Box 714 - Roswell, N.M.
R. B. Moore - Lea Co. Elect. Coop., Inc. - Lovington, N.M.
Lyle L. Donovan - Lea Co. Elect. Coop., Inc. - Lovington, N.M.
George Hirschfeld - N. Mex. Oil & Gas Engr. Comm. - Hobbs, N.M.
M. C. Forsman - A. K. Polis Oil Co. - McAllen, Texas
B. Cockburn - Watson Drlg. Co. - Artesia, N.M.
A. K. Polis - A. K. Polis - Box 959 - Hisburg, Texas
Paul Hollaway - Coop. Prod. Assn. - Caprock, N.M.
Eldon Clapham - Gulf Oil Corp. - Box 1567, Hobbs, N.M.
D. L. Irion - Mid-Cont. Pet. Corp. - Box 734 - Hobbs, N.M.
Robert D. Fitting - Coop. Prod. Assn. - 205 West Bldg. Midland, Texas (Temporary Chairman)

The meeting was for the primary purpose of discussing from an engineering viewpoint the next steps to be taken in order to effect a fieldwide secondary oil recovery program and prepare recommendations

for a participation formula.

Mr. Morse of the S.E.A., cooperative electric company, gave a few brief remarks about possibility of obtaining three-phase electrical current for the Caprock Field. His company would be interested in connecting the field with their system in Artesia; however, in order to assure installation pay out, they require a five-year contract and approximately one year to complete the system. The offered rate scale was graduated in accordance with load and reasonable, considering the high installation cost of 30 miles of transmission lines. In view of the uncertain need, it appeared to be the general consensus of opinion that additional work must be done before definite plans for this electrical power could be made.

An Operating Methods Subcommittee was formed, consisting of Mr. Barney Cockburn of the Watson Drilling Company, Mr. M. B. Wilson of the Great Western Production Company, Mr. John Duncan of Delfern Oil Company and Mr. Paul Hollaway of the Cooperative Producing Association. The aim of this Operating Methods Subcommittee was to establish some general recommendations as to the method or cooperative agreement of operation to be followed under unitization. The Committee was to meet at their convenience and formulate plans for the general field operations.

Considerable discussion was made concerning the effectiveness of the present experimental air injection program. The evidence available at the time of the meeting was deemed insufficient by some of the operators to clearly establish its worth. Some of the operators favored the injection of water at higher pressures; consequently, an attempt was made on October 25, 1951, to inject water at higher

pressures into the present air injection well (Tabulation 1). A pump capable of pumping at higher pressures was prepared and sufficient fresh water was made available. The use of fresh water was considered necessary due to extremely high salt content of the pay sand. It is apparent from this test that water is not a reasonable and practical medium to use for injection purposes in the present input well. Other wells in the field may have pay sections with less Bentonitic silts and allow the satisfactory introduction of water; however, this test does demonstrate the inability of the use of water as a general fieldwide injection medium.

The next item of interest was the development of participation percentages by which the individual companies would participate in a fieldwide pressure maintenance program. Several percentages were calculated by the Engineering Committee in order to satisfy all concerned. In general agreement was a percentage calculation, based on the operator's interest in the presently producing wells and acreage in the outlined producing area. A tabulation showing these various percentages has been prepared and is attached hereto (Tabulation 2).

The third calculation, at the suggestion of the Great Western Production Company, concerned the development of company percentage of total production from August 1, 1950, to August 1, 1951. The Cooperative Producing Association in their study of the Caprock Field have shown that a definite effect is being evidenced by the current air injection program and felt that the production from January 1, 1950, to January 1, 1951, prior to the experimental air injection, would be more representative (Column 4, Tabulation 2).

The fifth percentage is based on a comparative ultimate oil recovery as derived from production decline method of analysis, as set forth in Robert D. Fitting's report of June, 1951.

The sixth method, as suggested by British-American Oil Company, was the one-half of the comparative ultimate oil recovery, as shown in the report, weighted against the estimated primary recovery.

It is suggested that the individual companies examine these participation formulas and be prepared at the next meeting to recommend the use of one or a combination of these methods as a fair and equitable basis for fieldwide participation.

At the request of several of the operators, herewith is a brief supplement to the report of June, 1951.

The injection of air has continued at the same daily average volume, 100,000 cubic feet and injection pressure of 470 psig, in the experimental injection well, with only minor shutdowns for repairs (Enclosure 1). The monthly bottom hole pressure surveys have continued to show a pressure and fluid build-up to the south and east of the input-well (Enclosures 2, 3, 4). Little increase in gas-oil ratio has been noted; consequently, no indication of by-pass is detected. The offset leases to the injection well continue to show increases oil productive ability over their respective extrapolated production declines (Enclosures 6 through 13). The group of adjacent leases oil production decline curve has been reprepared on a gross oil production basis as it has been difficult to obtain accurate information concerning the net number of producing wells (Enclosure 5). It is evident that the rate of oil production decline has been substantially reduced after the experimental air injection program was commenced.

It is, in the writer's opinion, noteworthy that this one experimental air injection well, with an injected volume of less than the current oil depletion rate of the reservoir, has been able to materially change the producing characteristics of these surrounding wells. It has not only increased the effective bottom hole pressure but retarded the rate of oil production decline. From all indications, the present air injection system is operating satisfactorily, and it has been definitely demonstrated that air is the only practical injection medium for secondary oil recovery in the Caprock Field.

Respectfully submitted,

Robert D. Fitting

RDF:mag

WATER INJECTION TEST
COOPERATIVE PRODUCING ASSOCIATION
STATE A-4
OCTOBER 25, 1951

Tank Gauge	Inches	Barrels	Time	Pressure, Pounds
23' 9"	-	-		
23' 8-3/4"	.25	4.33	10:00 A.M.	0
23' 6-1/2"	2.25	38.99	10:15 A.M.	0
23' 4-3/4"	1.75	30.33	10:30 A.M.	100
23' 3-3/4"	1.00	17.33	10:45 A.M.	175
23' 3-1/2"	.25	4.33	11:00 A.M.	270
23' 3-1/4"	.25	4.33	11:15 A.M.	600
23' 3-1/4"	-	4.33	11:30 A.M.	750
23' 3"	.25	-	12:00 Noon	750
23' 2-3/4"	.25	4.33	1:00 P.M.	750
23' 2-3/4"	-	4.33	2:00 P.M.	750
23' 2-1/2"	.25	-	3:00 P.M.	750
23' 2-1/4"	-	4.33	4:00 P.M.	750
23' 2-1/8"	-	-	5:00 P.M.	750
23' 2"	.12	2.08	6:00 P.M.	750
23' 1-3/4"	.13	2.25	7:00 P.M.	750
23' 1-3/4"	.25	4.33	8:00 P.M.	770
23' 1-5/8"	-	-	9:00 P.M.	770
23' 1-1/2"	.12	2.08	10:00 P.M.	770
23' 1-1/8"	.13	2.25	11:00 P.M.	800
23' 1-1/4"	.12	2.08	12:00 M.N.	750
	.13	2.25	1:00 A.M.	700
	TOTAL -	129.95	15 Hours	

AVERAGE BARRELS OF WATER INJECTED PER HOUR - 8.66

AVERAGE BARRELS OF WATER INJECTED PER HOUR LAST EIGHT HOURS - 2.17

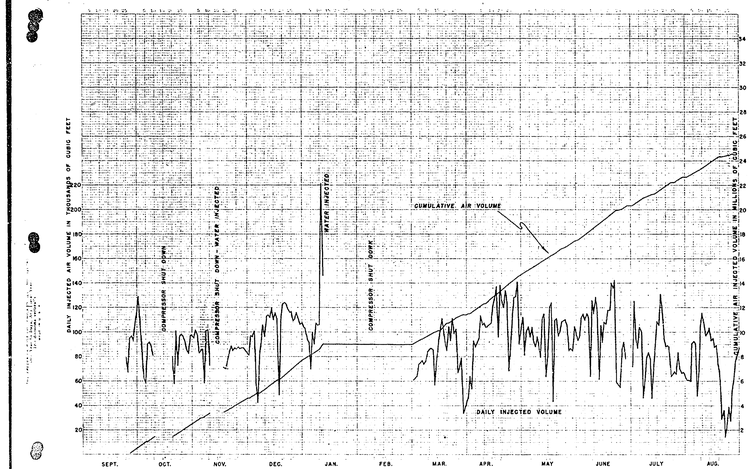
ROBERT D. FITTING, MIDLAND, TEXAS

Tabulation 1.

CAPROCK FIELD OPERATORS
PERCENTAGE PARTICIPATION FORMULA ANALYSIS
AS CALCULATED BY THE CAPROCK FIELD ENGINEERING COMMITTEE

Operator	Operator's Acreage Acres	Per Cent	No. Presently Producing Wells Wells	Per Cent	Production from 8-1-50 to 8-1-51 Production	Per Cent	Production from 1-1-50 to 1-1-51 Production	Per Cent	Comparative Est. Ultimate Oil Recovery Barrels	Per Cent	Est. Recovery by plus 1/2 Future Oil Recovery Barrels	Per Cent
British-American	80	1.667	2	1.626	6,727	1.881	7,671	1.554	84,791	2.038	70,840	2.506
Cities Service Oil Co.	120	2.500	2(1)	1.626	10,384	2.904	12,699	2.571	100,537	2.416	93,110	3.293
Cooperative Prod. Assn.	1320	27.500	38(2)	30.894	97,524	27.272	141,057	28.563	1,425,136	34.251	909,544	32.171
Delfern Oil Company	600	12.500	15	12.195	62,373	17.442	101,246	20.502	768,443	18.469	449,970	15.916
Great Western Prod.	720	15.000	17	13.822	62,230	17.402	80,473	16.295	589,505	14.168	453,889	16.055
Gulf Oil Corp.	320	6.667	5(3)	4.065	18,560	5.190	18,647	3.776	144,190	3.466	107,557	3.804
Neary & Company	160	3.333	3(4)	2.439	9,960	2.785	13,494	2.732	92,089	2.213	60,863	2.153
Mid-Continent	40	0.833	1	0.813	2,808	0.785	2,451	0.497	23,996	0.577	12,889	0.456
Phillips Petro. Co.	240	5.000	6	4.878	22,157	6.196	28,337	5.738	127,746	3.070	121,412	4.295
Polis, A.K.	160	3.333	4	3.252	8,910	2.492	15,363	3.111	174,470	4.193	99,991	3.537
Reeder Oil Co.(Page)	200	4.167	5	4.065	4,657	1.302	5,884	1.191	82,751	1.989	50,363	1.781
Vickers Petro. Corp.	600	12.500	19	15.447	38,619	10.799	51,294	10.387	404,280	9.716	290,670	10.281
Watson Drlg. Co.	80	1.667	2	1.626	3,332	0.933	3,926	0.796	33,341	0.801	24,122	0.853
Williams, Sam	160	3.333	4	3.252	9,360	2.617	11,294	2.287	109,529	2.633	81,965	2.899
TOTAL	4800		123		357,601		493,840		4,160,804		2,827,185	

(1)One well temporarily abandoned.
(2)Includes input well.
(3)Two wells Temporarily Abandoned.
(4)One well not producing.



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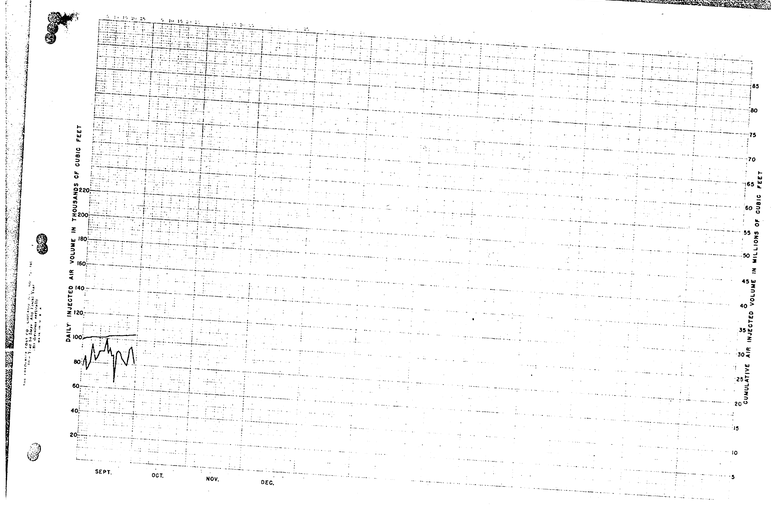

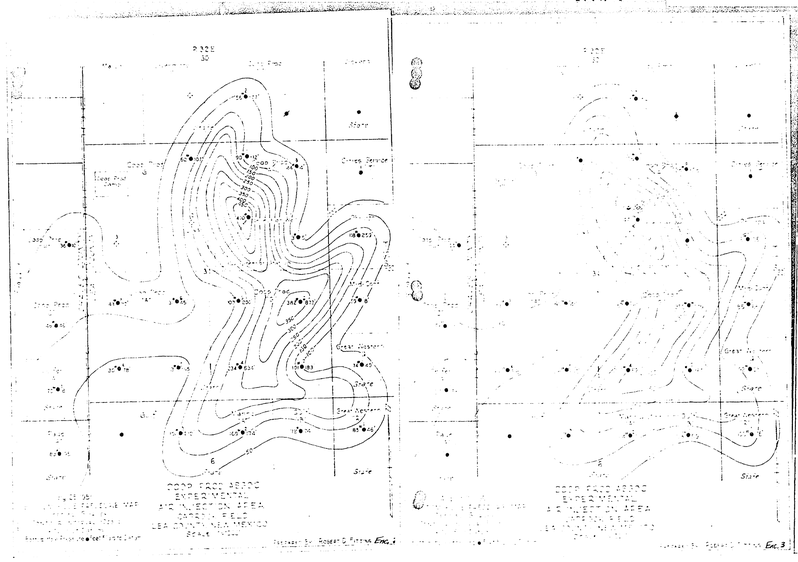

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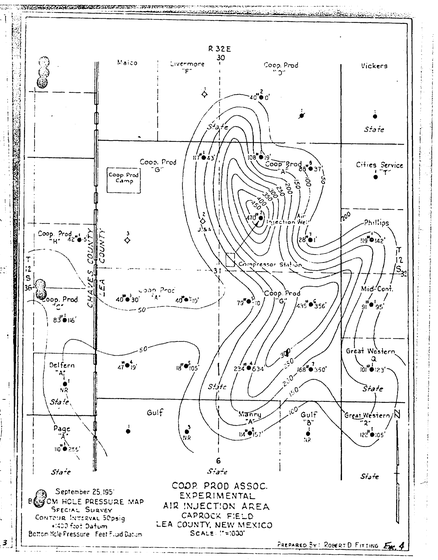

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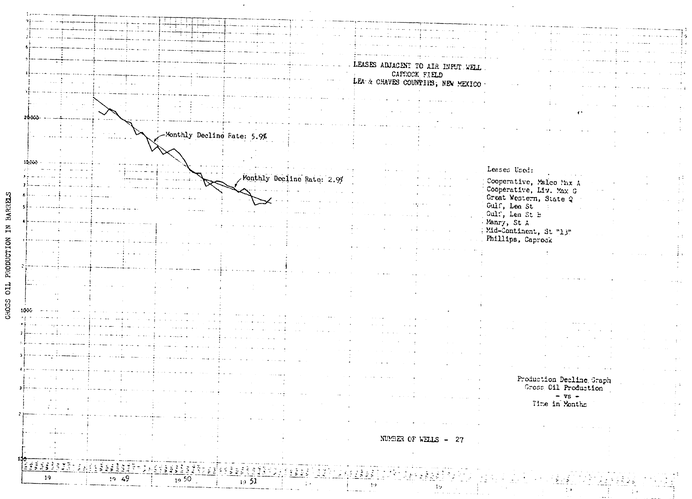

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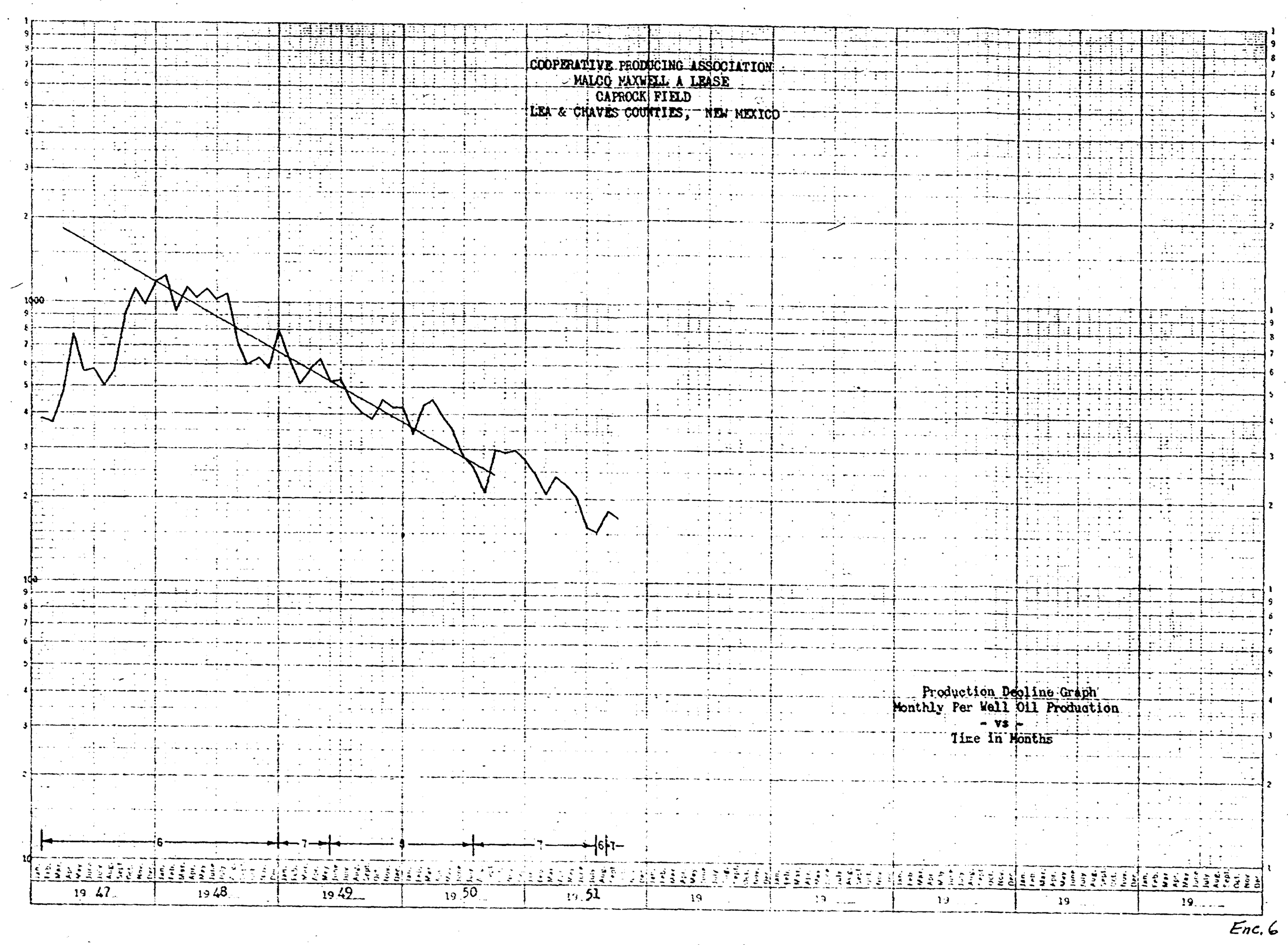

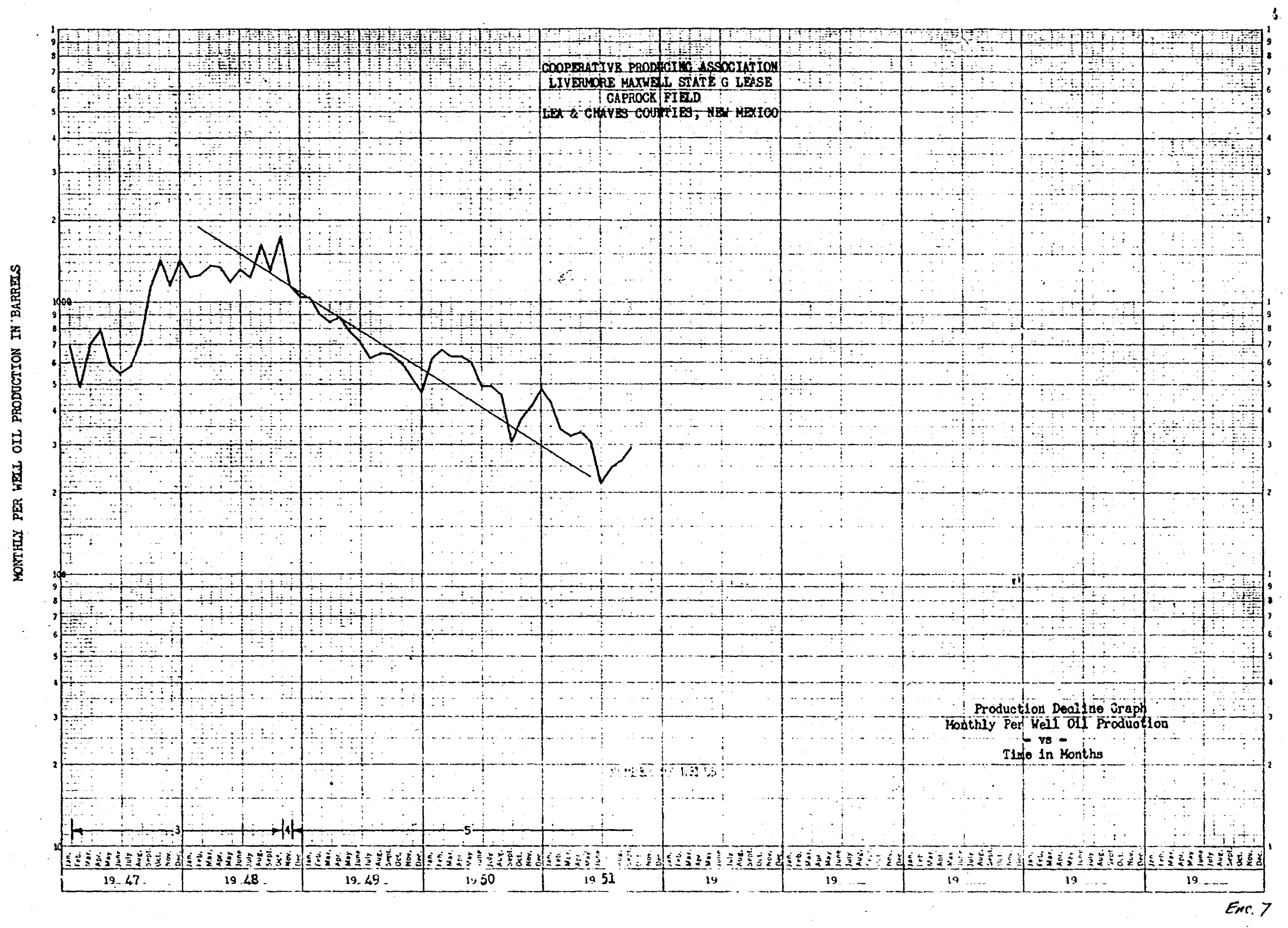

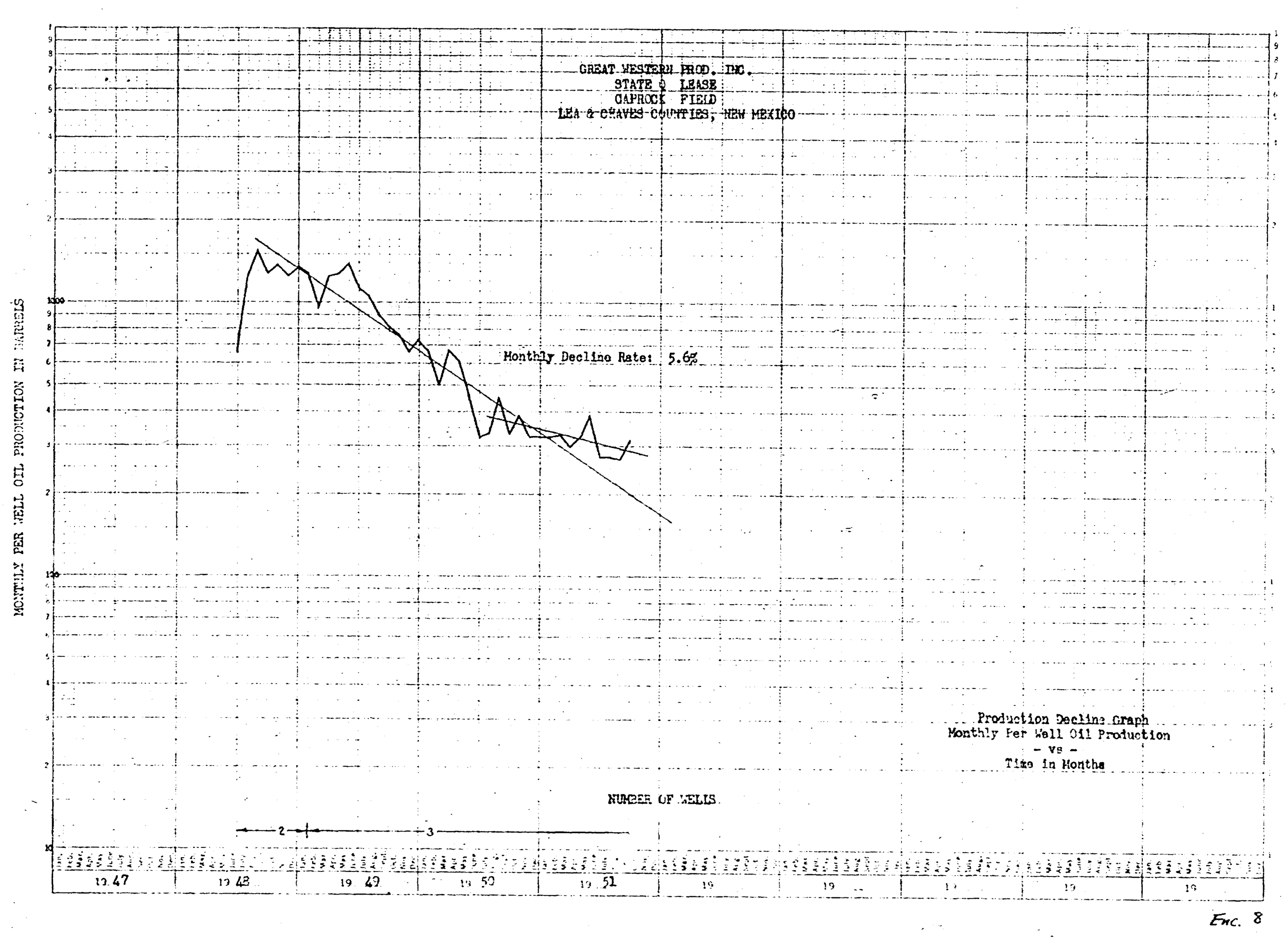

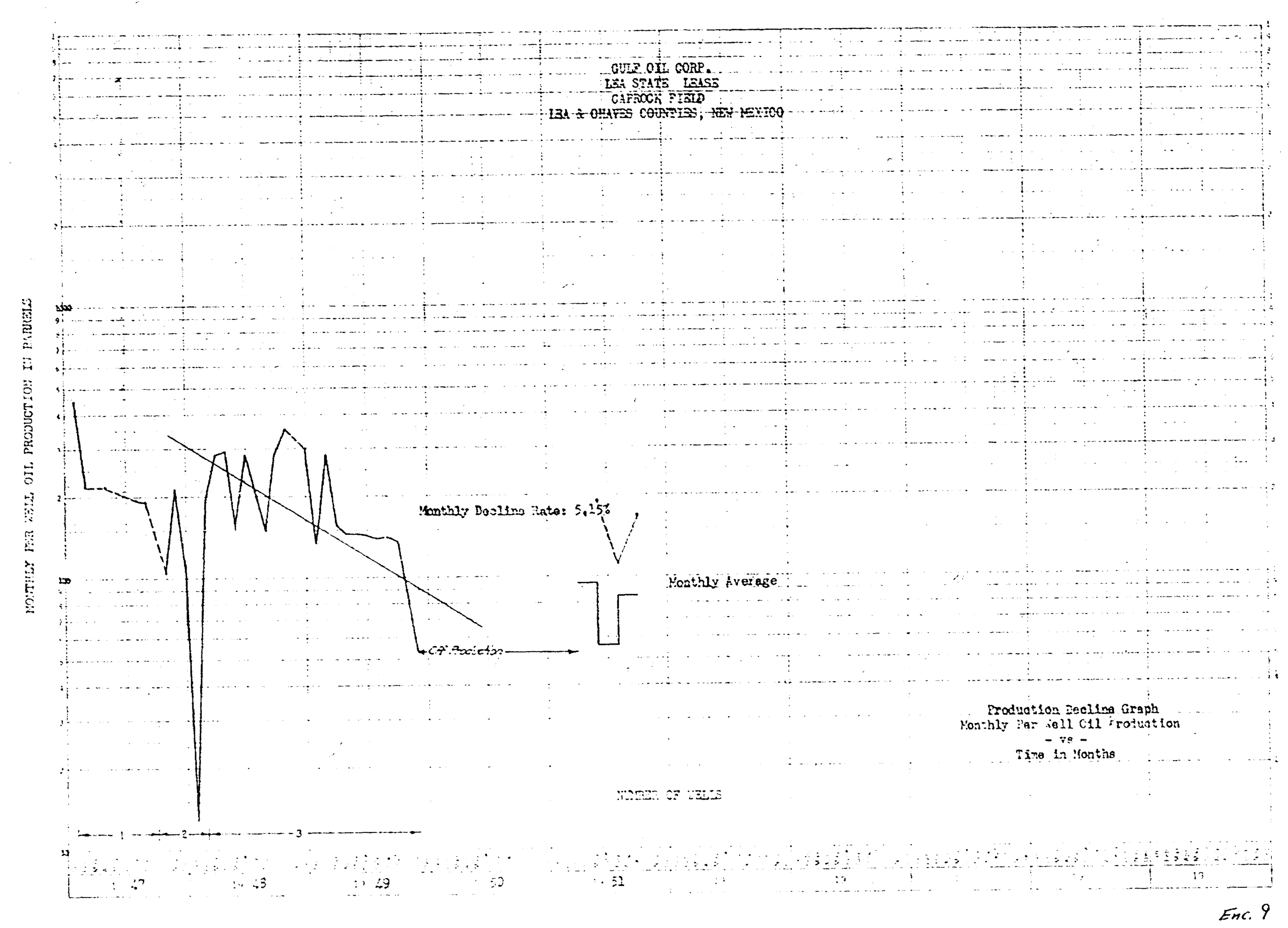

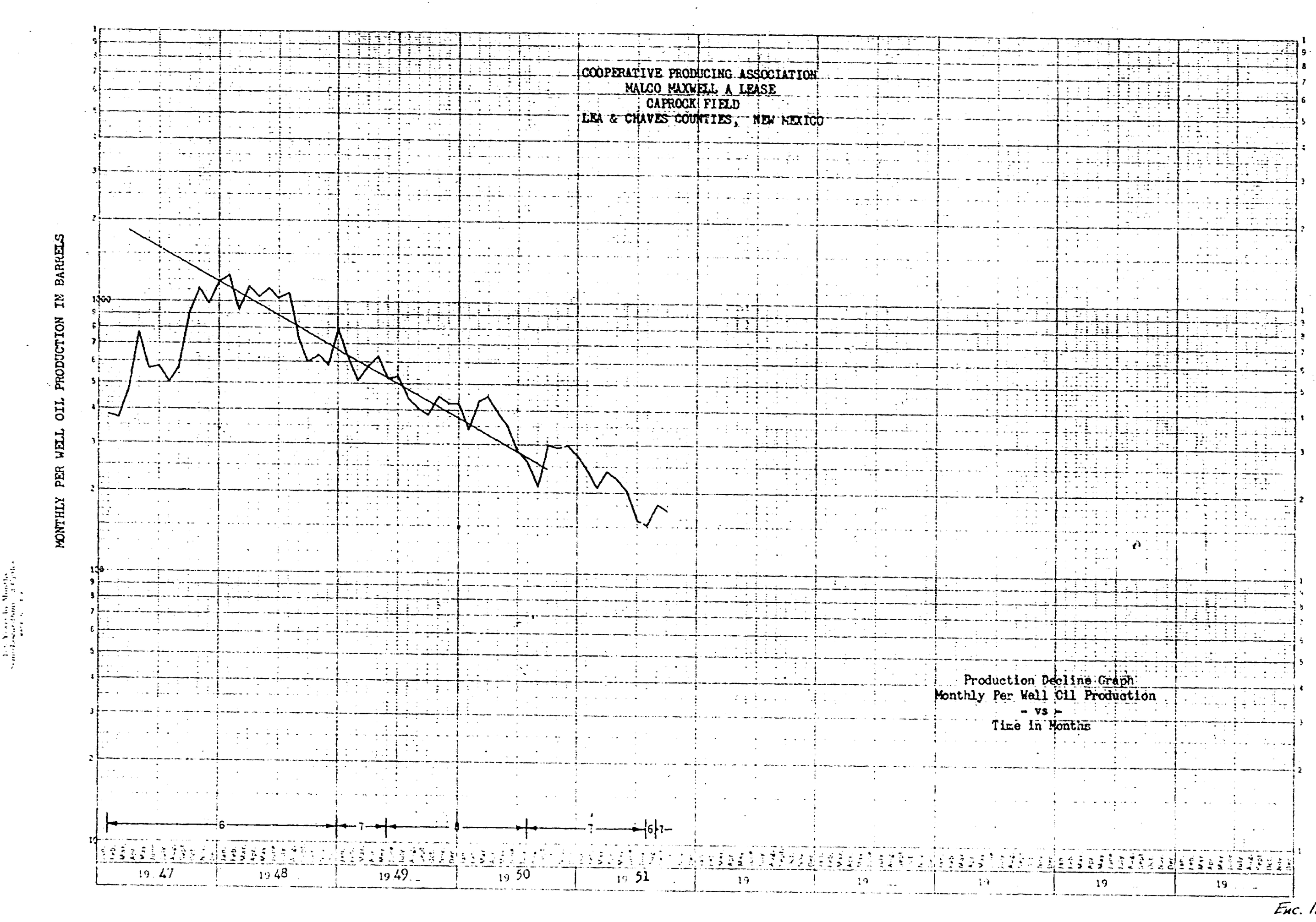

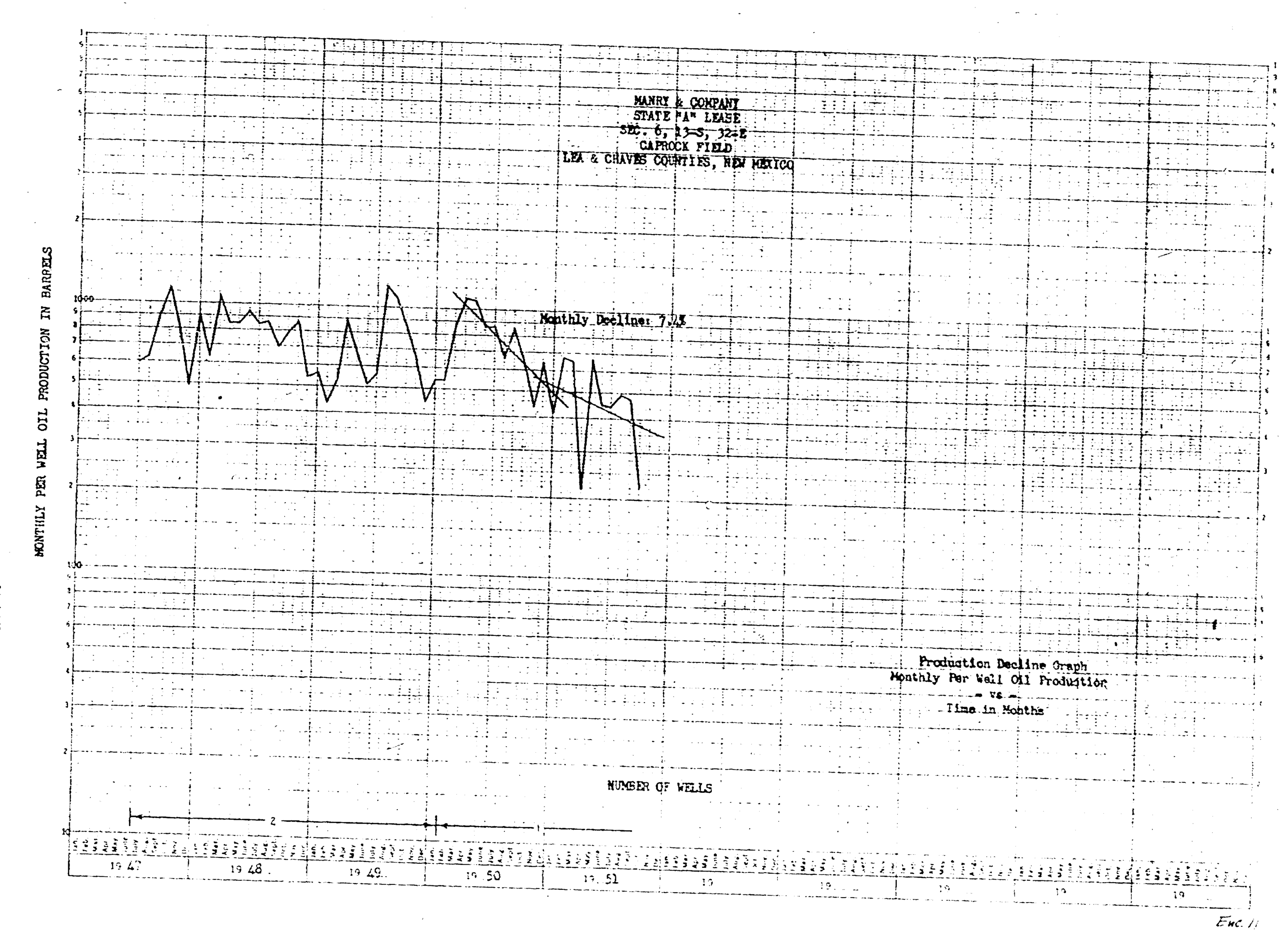

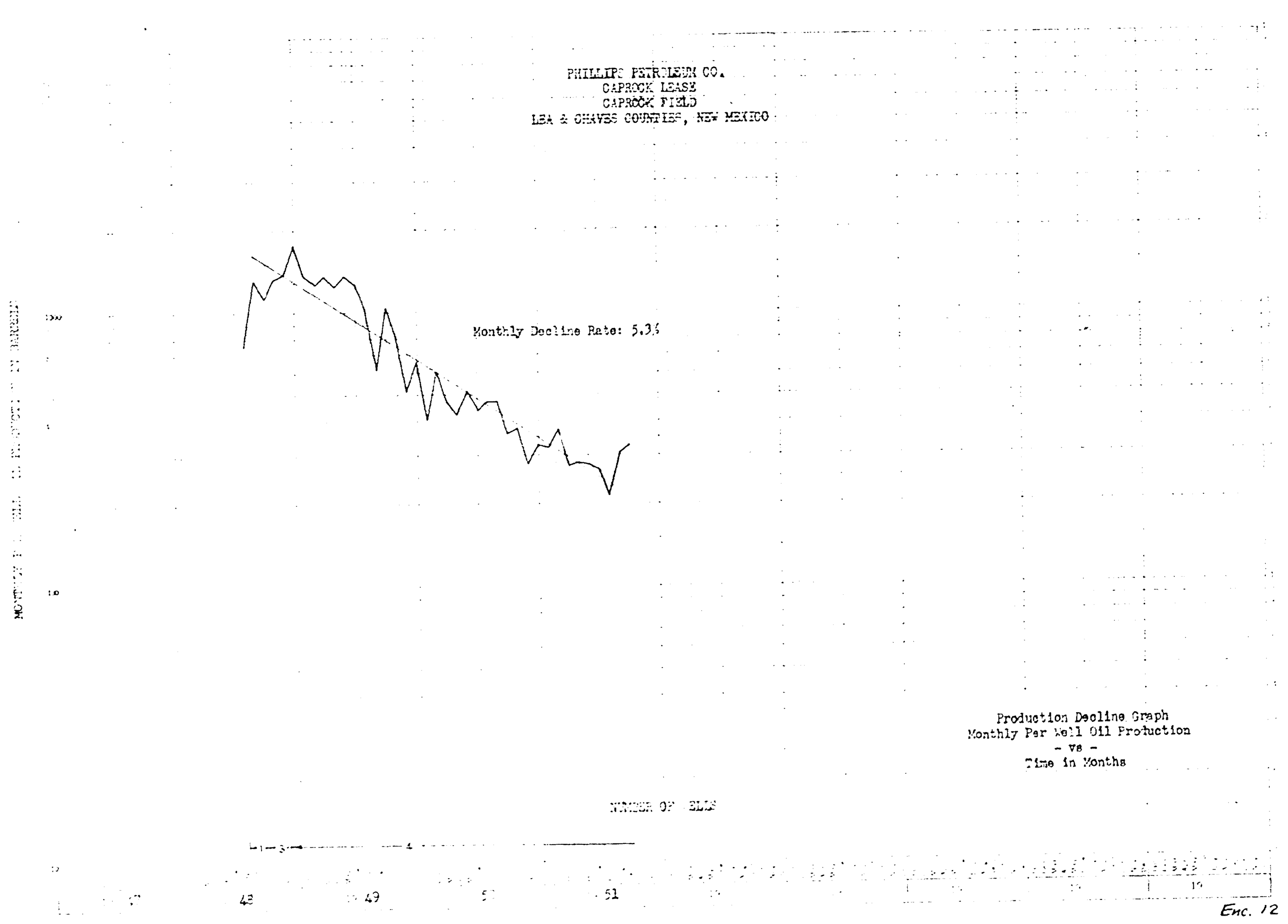

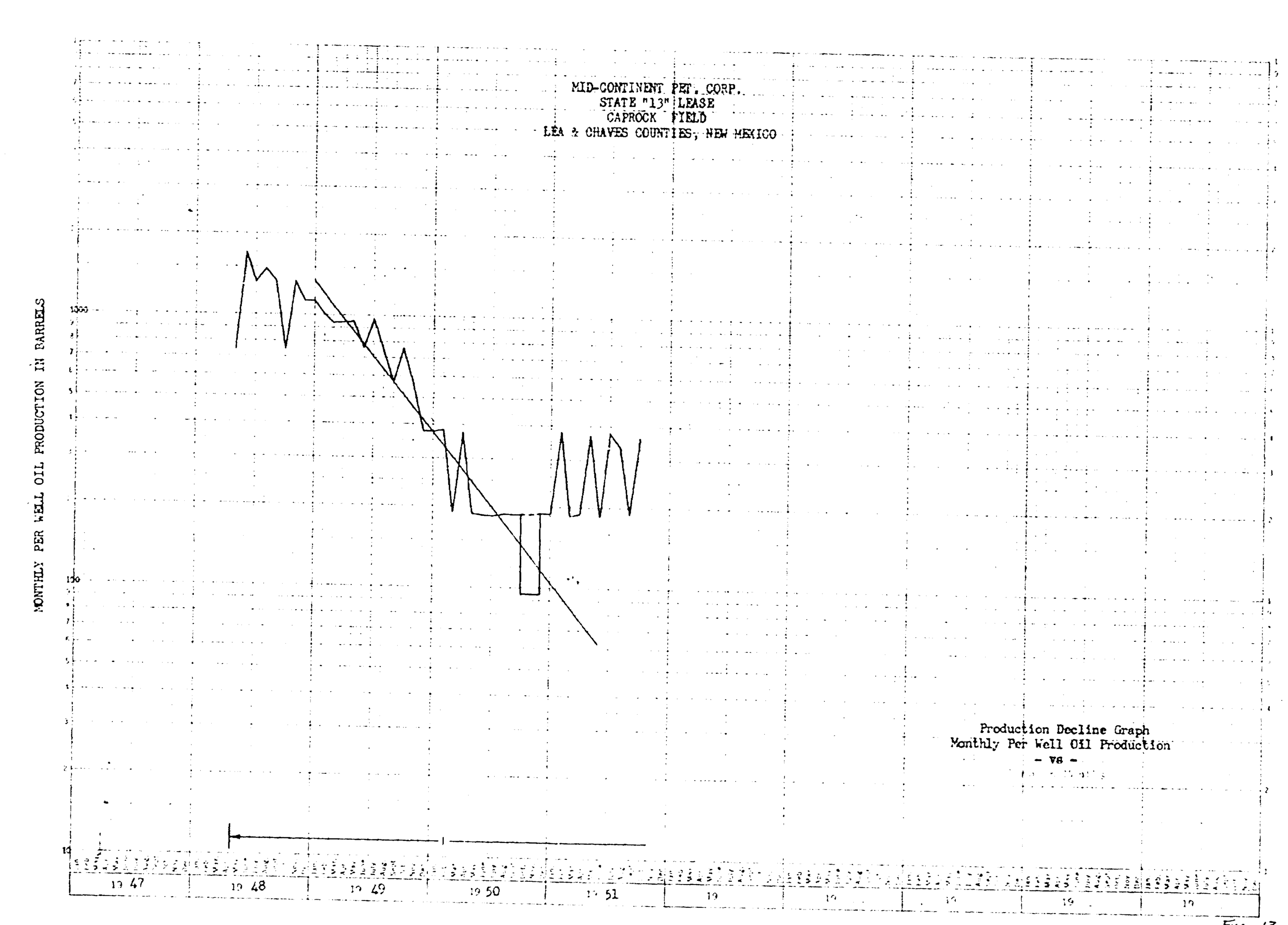

REPORT ON THE FEASIBILITY OF
SECONDARY RECOVERY IN THE
CAPROCK FIELD, LEA AND CHAVES
COUNTIES, NEW MEXICO

Prepared For:

Cooperative Producing Association
Amarillo
Texas

Requested By:

Mr. J. O. Denton, Jr.

March 18, 195[illegible]

Prepared By:

Fitting, Fitting and Jones

R. J. Fitting, Jr.
Reg. Professional Engineer
and Geologist
No. 43[illegible]
State of Texas

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REPORT ON THE FEASIBILITY OF SECONDARY RECOVERY IN THE CAPROCK FIELD, LEA AND CHAVES COUNTIES, NEW MEXICO

Considerable time has been spent in a study of the Caprock Field Reservoir in order to determine the probable results from a secondary oil recovery program. An engineering committee was formed of the Caprock Field Operators and a concerted effort was made, primarily by the Cooperative Producing Association, to organize a fieldwide application of a secondary recovery program. Concrete evidence was presented by all companies that some type of secondary recovery method was feasible and would probably increase the amount of recoverable oil. The data presented, however, did not conclusively show the definite type of injection medium that would be applicable for the field. To inject water into the Caprock pay was not considered economical due to the scarcity of any known surface or subsurface water in the area. The use of gas was not advisable in that there was insufficient volume available with which to attempt a secondary recovery or repressuring program (see Tabulation 1). The only logical solution to the problem was injection of air, but due to experimental nature of this method of injection, agreement among the various operators could not be reached.

Working on the supposition that a secondary recovery method was absolutely essential for the future life of the field and with full realization that now is the time to commence such a program before all the available reservoir energy is depleted, the Cooperative Producing Association decided to formulate plans for an experimental air injection program. The conclusions reached after a complete investigation was that the injection should be experimentally commenced on the State "A" lease located in the north end of the field, and that air without additive casinghead gas should

be used with the introduction of measured quantities of water to create a "Sweep or bank" effect. The mixing of air and the produced casinghead gas was not considered feasible in that O.P.M. test of the gas produced by offset wells showed a gasoline content that would probably be dangerous to process in that explosive mixtures might occur (see Tabulation 2). The following is a brief summary of the information derived by this investigation of the properties with estimates as to the amount of additional Oil recovery that may be expected by the application of a secondary recovery program:

CAPROCK FIELD DISCUSSION

The Caprock Field of Lea and Chaves Counties, New Mexico is generally located in Townships 12 and 13 South and Ranges 31 and 32 East. The field was discovered by O. P. Livermore, State-Dean No. 1, located in Section 30, T-12-S, R-32-E, when an oil productive queen sand member was encountered between an interval of 3085 to 3092 feet. This well was subsequently deepened to 4385 feet in order to test the San Andres limestone; however, the zone was watered. The well was thus plugged back to the upper oil show and completed for 40 barrels of oil per day in October of 1940.

To January 1, 1949, there had been 136 wells drilled in the Caprock area of which 10 were completed as dry holes, 91 were pumping and 33 were flowing. As of the present date the majority of the wells in the field are being pumped, and there are two wells shut in as a result of edge water encroachment. The Caprock Field has a cumulative oil recovery to January 1, 1949 of 2,012,680 barrels. During the year of 1948, 124 producing wells produced 938,869 barrels of oil with 2,084 barrels of water. The crude is 36 degrees gravity with a sulphur content of 1.07 per cent. Until September 1, 1947 the oil produced from this field was curtailed as a result of inadequate crude shipping facilities; however, at this time the Stanolind Pipe Line Company installed a gathering system, and capacity production has subsequently occurred.

The oil accumulation in the Caprock Field is considered to be a permeability lens or stratigraphic trap within the Artesia Red Sand, a member of the Queen Sandstone of Permian Age, occurring between a depth of 3000 to 3200 feet. The sand is fine to coarsely grained and is, in the oil productive parts, oxidized to a gray-white color. The permeability is not uniform, varying both in vertical and horizontal distribution. The pay section is approximately 25 feet in gross thickness with an average of eight to ten feet of net effective pay.

Wells in the area are generally drilled by rotary to the point of setting the oil string on top of the oil productive sand and are completed with cable tools. It was general practice in the completion of many Caprock wells to barely penetrate the more permeable member of the pay section. Rework completions of some of these older wells have shown that the higher rate of production decline exhibited by many of these wells can be decreased by drilling of the complete pay section and shooting with from 30 to 120 quarts of nitroglycerine.

SUMMARY OF AVAILABLE DATA

Available reservoir information on the Caprock Field is not sufficient for a complete analysis of this accumulation. There is a complete lack of gas-oil ratio history on a fieldwide basis, and electric logs have been run on but two wells. Core analysis is available on several wells; however, these analyses appear to be confined to the less permeable parts of the pay section. This is as a result of extremely difficult experience with either rotary or cable tool core barrels in recovering the more permeable, non-cemented, pay sections. A single bottom hole oil sample in the field has been taken. Physical well record data are available, and pay thickness is generally of record on some of the wells, but is lacking on the better wells that have not drilled to the entire pay section. Several records of bottom hole pressure surveys are enclosed, but productivity indices have not been taken. The oil production record is complete as reported to the State Conservation Commission; however, it is only reliable by tank batteries.

CAPROCK RESERVOIR CONDITION

The net effective pay of the Caprock Field is estimated to comprise from eight to ten feet of fine- to coarse-grained, well oil-saturated sandstones. The permeability of one part of the pay section is of high order. This zone has been analyzed from 850 to 860 millidarcies on two different samples. The oil is undersaturated with gas, and a solution gas-oil ratio is reported on one analysis to be 260 cubic feet per barrel. The porosity is high, averaging 19 per cent on the uncemented parts, and the connate water content is variable from a lowest point of 6.5 to 31.8 for an overall average of approximately 18 per cent.

Little evidence exists to substantiate a water drive in the field. The water currently produced by edge wells is considered to be as a result of release of formation connate water with the lowering reservoir pressures. The rate of water influx does not appear to be proportional to the rate of fluid withdrawal from the reservoir. There are many indications of permeability barriers within the field, and it is reasonable to assume that reservoir edge barriers may exist, and thereby prevent effective pressure maintenance from water influx. A concrete effort was made to determine whether or not the operators in the field would be interested in artificial water flood, air or gas injection program. Much effort and time was put into this undertaking; however, the various operators in the field were evidently reticent to cooperate with one another.

OIL RESERVE ESTIMATION

The oil reserves estimated to be recoverable by primary means from the Cooperative Producing Associated properties have been attempted by three separate methods.

Oil Production Decline:

The use of oil production decline was considered applicable as the properties have produced to capacity since the installation of a pipeline to the field in September of 1947. All leases have been examined separately, and enclosed are oil production decline graphs on the State "A" and "G" leases located in the area of the proposed experimental air injection and for comparison, a graph on all of the leases (Enclosure 2). The present indicated decline for the State "A" lease is 3.25 per cent per month. The calculated future expected oil recovery to an economic limit of 30 barrels per well per month is 12,846 barrels for an ultimate oil recovery per well of 54,847 barrels. The State "G" lease, with a present decline rate of 4.15 per cent per month, is calculated to have a future oil recovery of 15,518 barrels for an ultimate oil recovery per well of 51,552 barrels. An average of all Cooperative Producing Association wells has shown a decline of three per cent per month for future estimated oil recovery per well, to the economic limit of 30 barrels per well per month of 11,000 barrels, or an ultimate oil recovery per well of 36,652 barrels.

Pressure Decline versus Cumulative Oil Production:

Lease average bottom hole pressure data from several general fieldwide surveys have been plotted against the cumulative oil production of these leases (Enclosure 3). Bottom hole pressure maps of the last available surveys are also enclosed (Enclosures 5, 6 and 7). It is calculated on pressure decline that the State "A" will have an ultimate oil recovery per well to a depletion pressure of 50 p.s.i.g., approximately 47,831 barrels with a future oil recovery of 5856 barrels of oil. On the same set of conditions it is estimated that the five-well State "G" lease will have ultimate oil recovery per well of 39,600 barrels for a future recovery of 3566 barrels. The bottom hole pressure survey of March 16, 1950 did not include all of the subject wells, but using an average of 200 pound pressure decline, confirmation of the curve established by previous surveys is obtained.

Volumetric Analysis:

Complete information is lacking to provide an adequate oil reserve estimation by the volumetric analysis method. The information presently available from Core Laboratories, Incorporated, however, indicates that the following factors are probably applicable:

Barrels per acre foot	7758
Average Porosity	19%
Connate Water Factor	.83
Shrinkage Factor	.87
Recovery factor by primary means	20%
Indicated Recoverable Oil per acre foot	213 Bbls.
Indicated recoverable oil per acre @ 8 feet net pay	1704 Bbls.
Assumed drainage per well	40 acres
Calculated ultimate oil recovery for average well	68,160 Bbls.

The discrepancies existent between the estimated oil apparently recoverable, based on pay volume, pressure decline and production decline is considerable. The rate of pressure decline is exceedingly great and should be seriously considered. The rate of oil production decline is probably directly dependent upon the rate of pressure depletion. The end effect of gravity drainage is now known, but it is estimated that mechanics of

gravity drainage will not be efficient in this field. It is, however, apparent that some method of experimental secondary recovery program is needed and should be commenced before all available reservoir energy has been depleted. The increased oil recovery by secondary methods cannot be accurately calculated from the available field data, but it is entirely possible that an additional 20 to 30 per cent of the oil in place could be obtained.

SECONDARY RECOVERY PROGRAM

It was fairly evident that the normal secondary recovery method of water or gas injection is not applicable to these properties as water in quantity is not available and sufficient gas in the area is non-existent. A search was made into the available literature on the use of air injection for secondary recovery. There are several evident disadvantages to the use of air as an injection medium, such as corrosion of equipment, increasing the viscosity and decreasing the gravity of the produced crude, formation of gums and recycling of explosive mixtures. In order to help prevent the most serious of these conditions, gum formation and explosive mixtures, it was decided to inject air after the injection of a measured quantity of water plus additive chemicals to decrease gum formation and form a "bank or sweep effect. It was in addition agreed to introduce water at set intervals in order to maintain the bank and decrease recycling "bypass". The recycling of possible explosive mixtures and bypass is to be additionally controlled by the use of low injection pressures and volumes. An investigation into pay versus volume relationship in other such air injection programs showed that if a volume equivalent to 1000 times the gross pay,or in this case 30,000 cubic feet a day is injected, the most efficiency is obtained.

The present intention of the Cooperative Producing Association is to experimentally inject air and water in well State No. 2 "A". The volume to be injected is from 20 to 40,000 cubic feet of gas per day at a pressure not to exceed 200 p.s.i.g. Adequate two-stage air compressors will be installed as shown on Enclosure 1, and complete checking of volumes both at the input well and in all output wells will be installed. All possible safeguards will be maintained to prevent "bypass". The location of the input well is such as to result in the effect from injection being noticed on the subject wells before the offset producers. The volume to be injected is not considered to be sufficient to allow quick "bypass" or increases in the oil production of offset wells and will undoubtedly require 10 to 15 months before the results are noticed. The above outlined method of air and water injection for secondary oil recovery in the Caprock Field is considered to be the best method possible at the present time and an experimental program will probably to a year indicate its relative worth.

COOPERATIVE PRODUCING ASSOCIATION
STATE "A" & "G" LEASES
GAS-OIL RATIO REPORT
MARCH, 1950
CAPROCK FIELD
LEA & CHAVES COUNTY, NEW MEXICO

Lease & Well	Oil Production Per Day	Gas Volume (Casing) MCF/Day	Casing Gas-Oil Ratio
State "A"- 1	14	*	-
2	14	*	-
3	14	15.7	1121
4	24	50.2	2091
5	14	*	-
6	42	30.2	719
7	14	*	-
8	14	*	-
State "G"- 1	42	32.5	773
4	20	65.9	3295
5	42	*	-
6	20	25.2	1260
7	20	*	-

Notes: State "A"-3,6,5 & 6 & State "G"-1,4,5,6,7 tested during 12-hour flow at separator with 2" tester & 1/8-inch plate - insufficient to measure.

*Barely enough volume to run engine off casing - insufficient to measure from tubing.

Tabulation 1.

CRABCOAL GASOLINE TESTS
ON BOMB OF THE
COOPERATIVE PRODUCING ASSOCIATION WELLS
CAPROCK FIELD
LEA AND CHAVES COUNTIES, NEW MEXICO

Lease & Well No.	G.P.M.	Recovery (c.c.)
State "A" No. 1	1.496	29
State "J" No. 3	1.606	42
State "A" No. 4	.962*	13
S. L. Williams No. 3	1.077	49
State "G" No. 6	1.092*	16
State "G" No. 1	1.393	33

*Slightly undersaturaged.

Tabulation 2.

MARCH 16, 1950-SHUT-IN
BOTTOM HOLE PRESSURE REPORT
DATUM 4,100
COOPERATIVE PRODUCING ASSOCIATION
STATE "A" & "G" LEASES
CAPROCK FIELD
LEA & CHAVES COUNTY, NEW MEXICO

Lease & Well	Elev.	Datum Depth	Fast To Fluid	Feet of Fluid To Datum	Pressure of Gas Column	Pressure of Oil Column	Measured Casing Pressure Reading	Datum Pressure Pounds
State "A"- 1	4395'	2795'	2604'	391'	21	141	5	187
2	4395'	2795'	2776'	19'	24	7	0	31
3	4393'	2793'	2969'	31'	24	11	20	55
4	4388'	2795'	2836'	159'	23	57	25	105
5	4386'	2793'	2356'	634'	19	230	10	259
6	4382'	2792'	2419'	569'	19	203	25	247
7	4383'	2793'	2670'	313'	21	149	10	180
8	4383'	2793'	2955'	-29	24	35	10	69
State "G"- 1	4389'	2797'	2546'	141'	23	48	25	96
4	4391'	2791'	2939'	65'	23	20	1	44
5	4390'	2790'	2970'	20'	24	6	25	55
6	4384'	2784'	2776'	698'	19	235	15	259
7	4385'	2785'	2657'	328'	21	150	19	191

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AVERAGE PER WELL PRODUCTION
COOPERATIVE PRODUCING ASSOCIATED LEASES
CAPROCK FIELD, LEA AND CHAVES COUNTIES, NEW MEXICO

1947	State "A" Wells	No. Wells	State "G" Wells	No. Wells	All Leases	No. Wells
Jan.	379	6	693	3	427	28
Feb.	373	6	691	3	408	28
Mar.	469	6	709	3	472	28
Apr.	703	6	786	3	648	28
May	585	6	584	3	530	28
June	572	6	596	3	490	28
July	504	6	595	3	443	28
Aug.	570	6	723	3	636	28
Sept.*	891	6	1108	3	909	29
Oct.	1111	6	1442	3	1100	30
Nov.	993	6	1152	3	987	30
Dec.	1174	6	1437	3	1035	30
1948						
Jan.	33[illegible]	6	62[illegible]	3	38[illegible]	30
Feb.	426	6	774	3	564	36

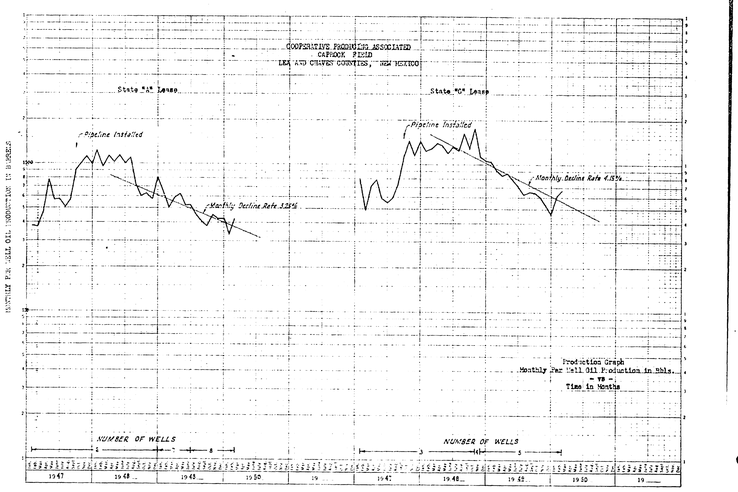
1948	State "A" Wells	No. Wells	State "G" Wells	No. Wells	All Leases	No. Wells
Jan.	1240	6	1236	3	1036	31
Feb.	946	6	1278	3	855	31
Mar.	1123	6	1384	3	908	31
Apr.	1039	6	1358	3	843	31
May	1237	6	1197	3	842	31
June	1007	6	1305	3	829	32
July	1096	6	1246	3	802	32
Aug.	725	6	1636	3	698	32
Sept.	600	6	1294	3	621	32
Oct.	636	6	1761	3	613	32
Nov.	577	6	1117	4	556	35
Dec.	802	6	1059	5	597	36

1949	State "A" Wells	No. Wells	State "G" Wells	No. Wells	All Leases	No. Wells
Jan.	640	7	1042	5	549	37
Feb.	506	7	910	5	495	37
Mar.	588	7	844	5	532	37
Apr.	632	7	877	5	512	37
May	521	7	781	5	491	37
June	525	8	715	5	436	38
July	453	8	630	3	396	38
Aug.	468	8	653	3	376	38
Sept.	383	8	647	5	404	38
Oct.	454	8	604	5	418	38
Nov.	426	8	533	5	437	38
Dec.	427	8	461	5	378	38

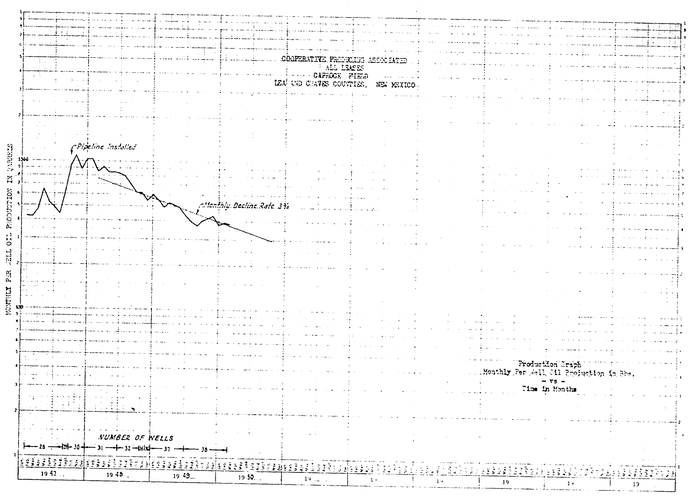
Lease Production to 3-1 50	266,804	180,193	921,577
Avg. Per Well Production to 3-1 50	42,601	35,039	24,252

*Pipe Line Installed.

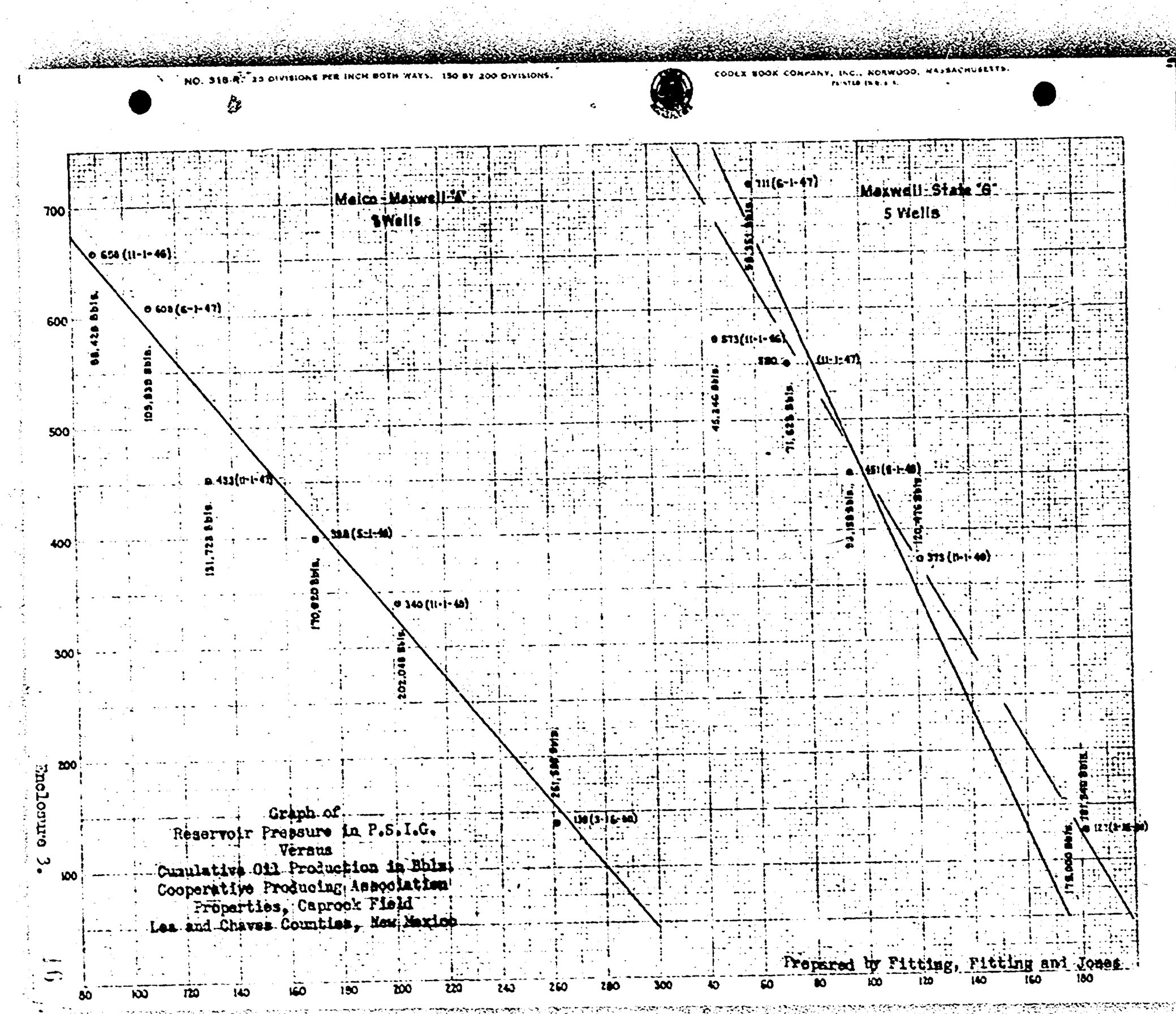
Tabulation 4.

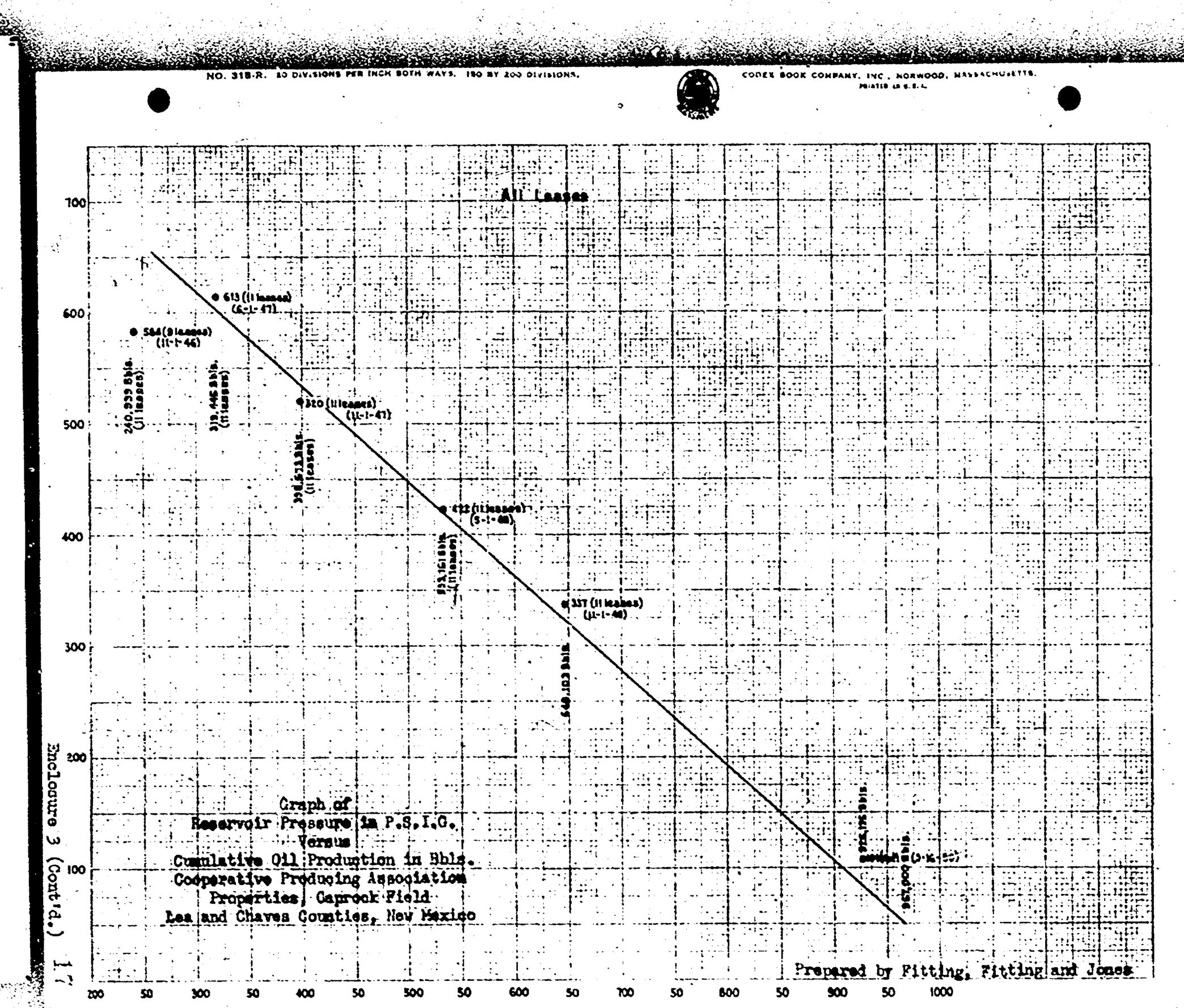


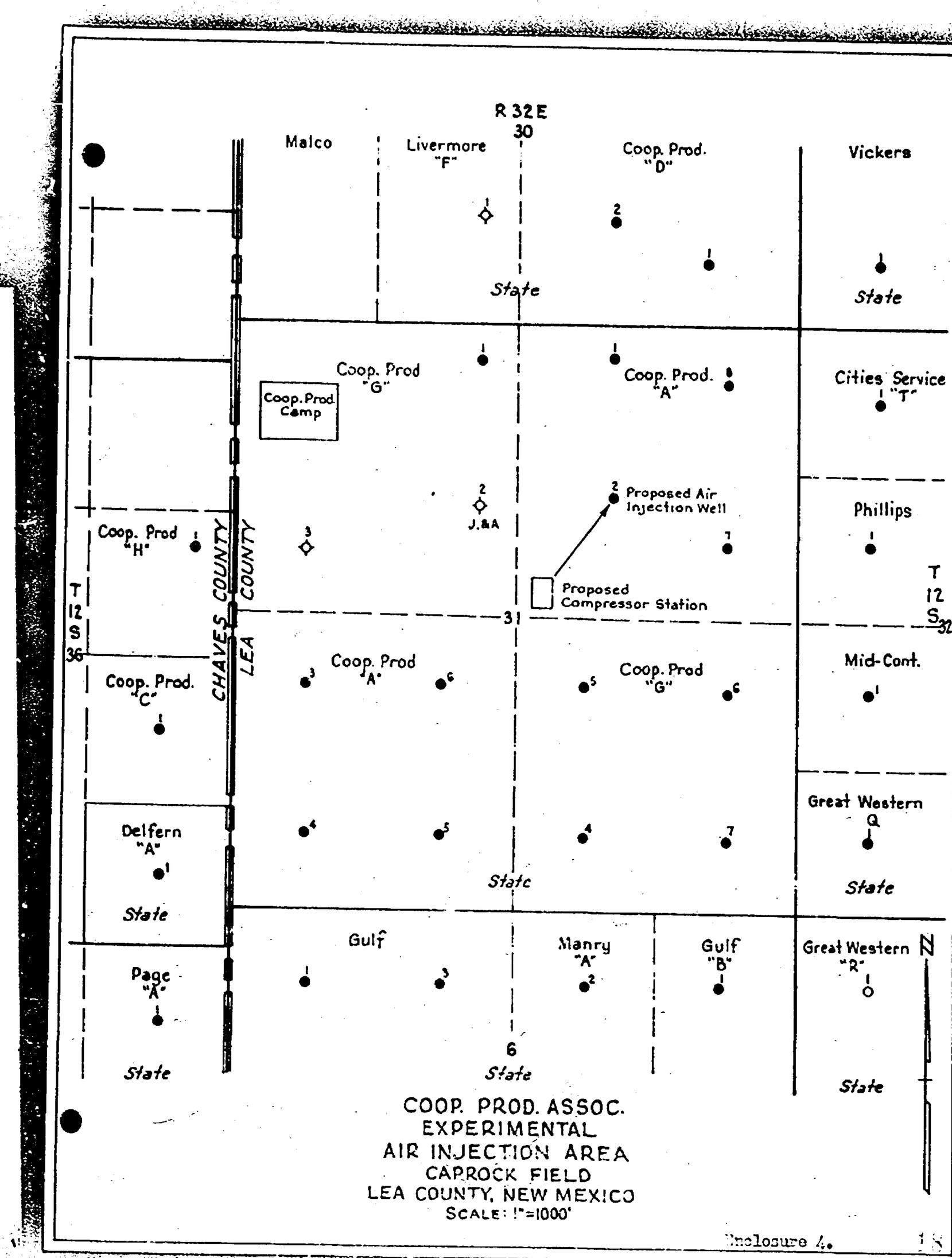
Tabulation 5.

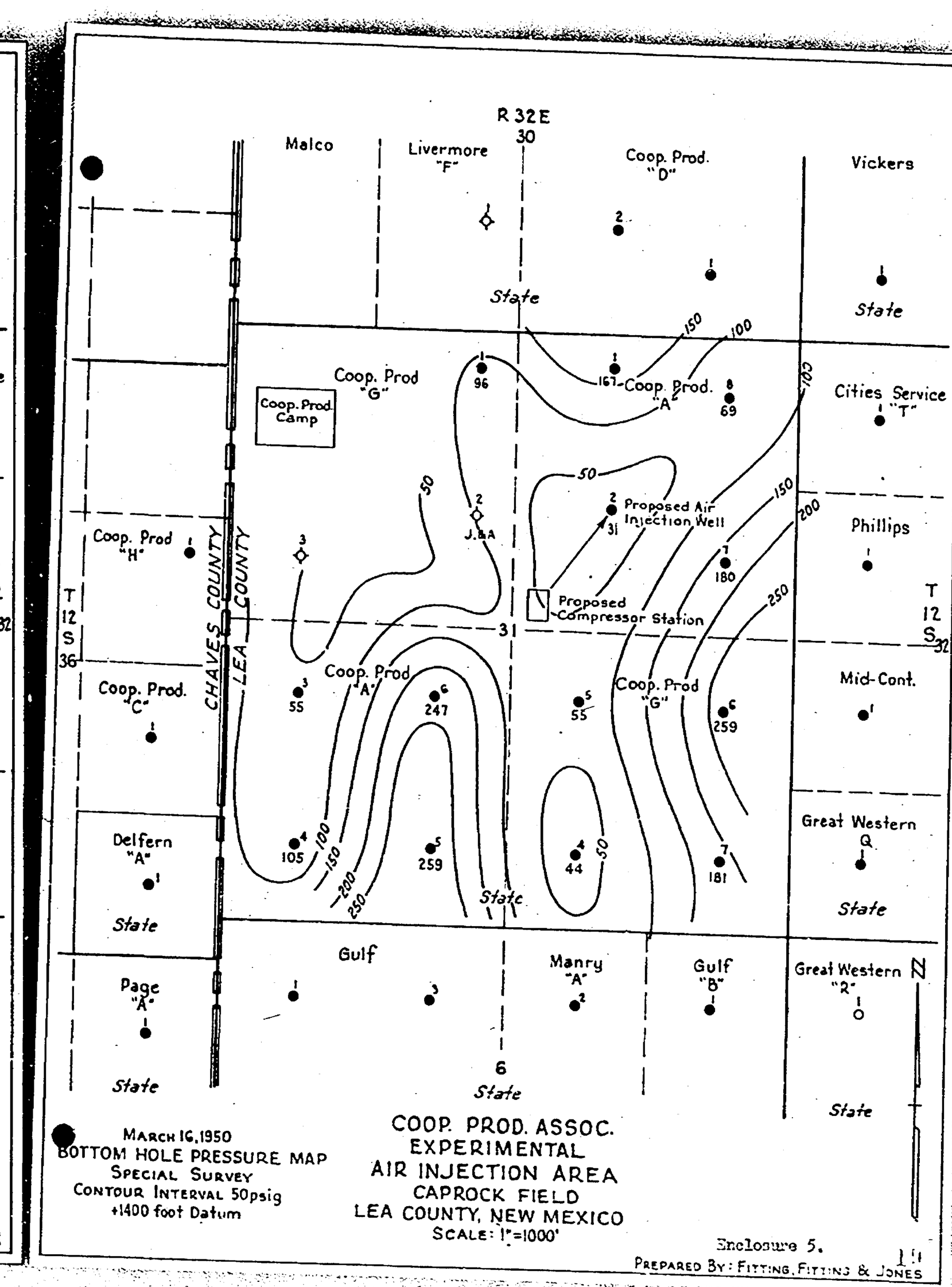


Tabulation 5 (Cont'd)









EXPERIMENTAL AIR AND WATER INJECTION SECONDARY OIL RECOVERY PROGRAM

OF THE

COOPERATIVE PRODUCING ASSOCIATION

CAPROCK FIELD

LEA AND CHAVES COUNTIES, NEW MEXICO

REPORT ON THE
EXPERIMENTAL AIR AND WATER INJECTION
SECONDARY OIL RECOVERY PROGRAM
OF THE COOPERATIVE PRODUCING ASSOCIATION
CAPROCK FIELD, LEA AND CHAVES COUNTIES, NEW MEXICO

Requested By:

J. C. Denton, Jr., Manager
Cooperative Producing Association
Box 978
Levelland, Texas

June 19, 1951

Prepared By:

Robert D. Fitting
Robert D. Fitting

Fitting, Fitting & Jones
Box 1637
Midland, Texas

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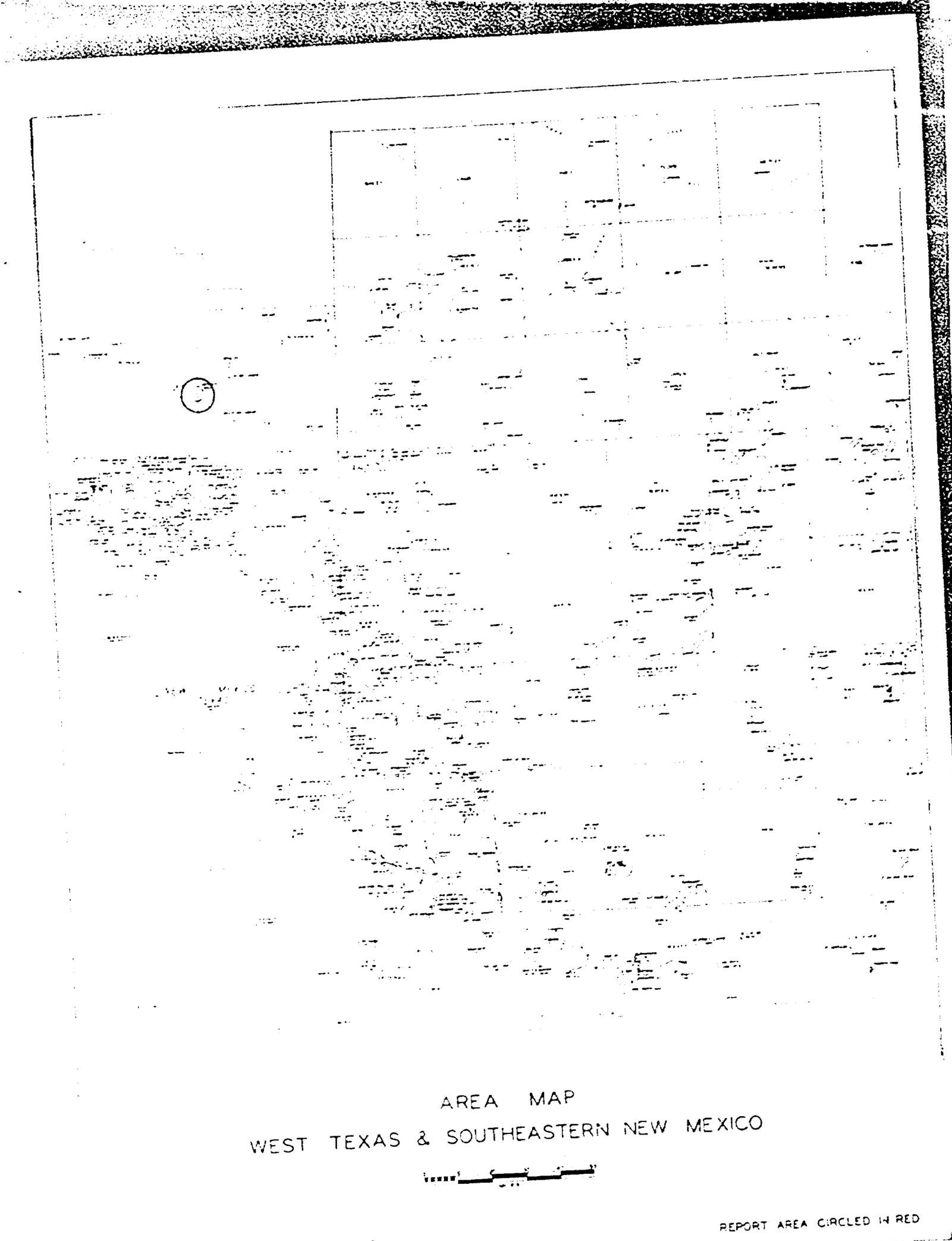

REPORT ON THE
EXPERIMENTAL AIR AND WATER INJECTION
SECONDARY RECOVERY PROGRAM
OF THE COOPERATIVE PRODUCING ASSOCIATION
CAPROCK FIELD, LEA AND CHAVES COUNTIES, NEW MEXICO

This is a report on the status and results of an experimental air and water injection secondary oil recovery program as installed and operated by the Cooperative Producing Association in the Caprock Field, Lea and Chaves Counties, New Mexico. This experimental air and water injection was commenced on September 25, 1950, and the injection of air has continued at an average pressure of 470 psig with a daily average injected volume of 100,000 cubic feet. Several attempts have been made to introduce water with the air, but to date this has not proved successful. Monthly bottom hole pressure, fluid level, and gas-oil ratio surveys have been conducted on the wells immediately surrounding the input well, and the gross oil pipeline runs of the offset leases have been collected and examined. The following are the general facts derived from the data obtained: Some of the leases offset to the input well have shown marked increases in oil productive ability. A definite pressure injection pattern is developing laterally from the input well. Little "by-pass" of air as would be shown by measurable increases in gas-oil ratio is apparent. It is therefore concluded that the present experimental air injection has been successful and as a medium for secondary oil recovery or pressure maintenance, air has proven more than satisfactory. It is recommended that the installation of a minimum of three additional air input wells be immediately commenced and that these wells be spaced to effectively encompass the remainder of the field. The amount of increased oil recovery to result from this air injection system cannot be accurately estimated; however, an additional recovery equal to the total estirated primary oil recovery is considered probable.

Before a fieldwide pressure maintenance, or secondary oil recovery program can be successfully commenced, a formula for operator participation in the expenses and the increased oil recovery must be determined. Accordingly, a percentage participation formula premised on the ultimate oil recovery estimated to be obtainable by primary means on the individual leases as compared to the total field ultimate oil recovery has been calculated. The estimated primary oil recovery has been determined by extrapolation of the present rate of oil production decline on the individual leases to complete abandonment. The following is a brief discussion of the methods and basic facts employed in this report.

HISTORY

The Cooperative Producing Association prior to the commencement of the current experimental air injection program fostered an effort to obtain unified operator interest in a secondary oil recovery or pressure maintenance program for the Caprock Field. An operators' engineering committee was formed with the primary purpose of examining the Caprock Field Queen sand reservoir in order to determine its characteristics and acceptability to a secondary oil recovery or pressure maintenance program. This study resulted in a sizeable amount of collected data, and a concerted effort was made for its direct utilization on a fieldwide secondary oil recovery program. It was soon evident that little detailed information was available on the effective pay sand thickness, its porosity and permeability, and an insufficient number of wells had been cored and analyzed to enable a complete volumetric reservoir analysis. Several of the then current drilling wells were cable tool cored within the pay zone and these cores were analyzed as to their acceptability to various types of fluids. The use of water as an injection medium was considered reasonable, although a high degree of silt and wax was shown to be present in some of the analyzed cores. A study was instigated to develop a water supply that would be sufficient for use in a water flooding operation. The evidence showed that a good source of surface or subsurface water could only be obtained after much expense, and considerable speculation existed as to the amount of water that would be available. Gas as a medium for injection was not considered practical because of a lack of usable supply in the area. An analysis was conducted on several typical produced gas samples from the Caprock Field and several of these samples showed to be primarily inert nitrogen and helium and would not burn. The only practical and immediately available injecting medium was therefore air. The Cooperative Producing Association, after a complete study of its probable suitability to the reservoir, attempted to promote a fieldwide experimental air injection program. Many of the operators, although agreeing in principle, lack management approval; consequently Cooperative Producing Association, after obtaining authority from the State of New Mexico, installed and equipped at their own expense an experimental air injection well.

AIR AND WATER INJECTION

In August of 1950 a compressor station was erected, a water well drilled, and the Cooperative Producing Association, Malco-Maxwell State A-2, in Section 31, Township 12 South, Range 32 East, was suitably equipped for air and water injection. This experimental air injection program was successfully commenced on September 25, 1950, and has subsequently injected an average daily volume of 100,000 cubic feet at an average pressure of 470 pounds (Page 38). A basic assumption was made prior to the installation of the air injection program that a periodic introduction of water with the air would probably create a more efficient secondary recovery "sweep", however, the injection of water has been attempted on several occasions without success (Page 30). The lack of ability of this well to accept the injection of water is undoubtedly the result of a fine silt condition of the sand pay of the present input well, and does not in itself preclude the successful periodic introduction of air and water in other input wells.

During the entire month of February, 1950, mechanical compressor difficulties were experienced and it was found necessary to shut down the compressor station. An immediate effect of the shutdown was apparent in the Cooperative Producing Association, Malco-Maxwell State "A" and "G" leases, but little effect was noticed in wells located one-quarter to one-half mile from the input well. This fact was one of the first indications that the experimental air injection system was operating effectively.

Monthly bottom hole pressure surveys by use of a Sonolog acoustic well measurement meter have been conducted on all the wells surrounding the input well. It is evident from the enclosed pressure maps that a definite lateral pressure pattern is developing and an increase in pressure is noted on wells showing increased oil productive capacity (Page 35). A direct correlation between bottom hole pressure and fluid level is not yet apparent, although it is anticipated that in the future increases in static fluid level with pressure will be experienced. A careful study was made of the pipeline runs of the surrounding leases, and it is evident that the oil productive ability of many of the offset leases have been materially increased (Page 37). The leases actively affected are the Gulf, Lea-State and Lea-State "B", and the Manry & Company, State "A" lease in Section 6; Great Western, State "R" in Section 5; the Cooperative Producing Association "A" and "G" leases in Section 31; the Phillips, Cap-State lease and Great Western "Q" lease; and especially the Mid-Continent No. 1 "13" in Section 32.

Prior to the injection of air it was anticipated that explosive mixtures might be formed and "by-pass" of the air, when used without water, would occur at a greater than normal expected rate. A close check has been maintained on the surrounding wells, and it is apparent that although increases in tubing and casing pressure have been noted, measurable increases in gas- or air-oil ratios have not occurred.

The increased oil production shown by the offset leases and the definite pressure pattern forming surrounding the input well plus the lack of measurable "by-pass" is considered conclusive evidence that the present experimental air injection has proven successful and practical. It is therefore recommended that a minimum of three additional injection wells be equipped to service the remainder of the field. The proposed wells are as shown on the enclosed map (Page 34), one in Section ; one in Section 12, T-13-S, R-31-E, and an additional well in Section 7, T-13-S, R-32-E. The actual location of these future input wells has not been rigidly determined and is primarily based on the effective radial area of the present injection well. The proper placement of these injection wells may [illegible] the future necessity of additional input wells, however, [illegible] conditions will dictate the future requirements. The present compressor facilities can undoubtedly be enlarged to service one of the additional injection wells and thereby the proposed three-well system would require only one additional compressor station.

A fieldwide secondary oil recovery or pressure maintenance program requires the determination of an equitable participation formula. The usual methods of calculating the effective reservoir volume of the individual well for a basis of participation is in this instance not practical. The data available on the oil pay zone thickness, its effectiveness or character are not considered adequate. A careful and complete study was made of the Caprock Field current and past oil production history (Pages [illegible] to 24). All of the leases in the field have shown for the past year an inability to produce their prorated allowable and are producing at capacity production rates. Oil

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production decline graphs have been prepared on all of the leases in the field, and individual monthly oil production decline percentages for each lease has been determined (Pages 39 to 101). The average per well oil production for the first three months of 1950 have been used on each lease to derive an ultimate oil recovery by primary means through the extrapolation of this oil production rate at the current indicated decline to complete well abandonment (Pages 9 to 11). In instances where the present injection program has affected the current lease oil production decline rates, a decline rate has been determined prior to the injection and a present average oil production has been estimated from this curve. The resultant ultimate oil recoveries as calculated for the individual leases have been compiled into operators' interests and fieldwide totals. The total estimated ultimate oil recovery by primary means assignable to the leases of the individual operators has been employed in calculating the percentage interest it bears to the total field ultimate oil recovery (Page 8). This method of participation analysis is considered to result in the most equitable formula that can be determined for the Caprock Field reservoir and should be the basic participation of any cooperative or unit agreement promulgated for the field.

FITTING, FITTING & JONES

SUMMARY OF FIELD INTEREST
CAPROCK FIELD
LEA AND CHAVES COUNTIES, NEW MEXICO

Operator	No. Wells	Number Productive Acres	Est. Ult. Oil Rec. by Primary Means	Percentage Interest in Total Field Ult.	Percentage of Total Wells
WORKING INTEREST					
British-American	2	80	84,791	2.03785	1.56250
Cities Service Oil Co.	3	120	100,537	2.41629	2.34375
Cooperative Prod. Assn.	39[1]	1560	1,425,136	34.25145	30.46875
Delfern Oil Co.	15	600	768,443	18.46862	11.71875
Great Western Prod. Inc.	17[2]	720	589,505	14.16806	13.28125
Gulf Oil Corporation	7	280	144,190	3.46544	5.46875
Manry & Company	4	160	92,089	2.21325	3.12500
Mid-Continent Pet. Corp.	1	40	23,996	0.57672	0.78125
Phillips Pet. Co.	6	240	127,746	3.07022	4.68750
Polis, A. K.	4	160	174,470	4.19318	3.12500
Resler Oil Co.	5	200	82,751	1.98882	3.90625
Vickers Pet. Corp.	19	780	404,280	9.71639	14.84375
Watson Drlg. Co.	2	80	33,341	0.80131	1.56250
Williams	4	160	109,529	2.63240	3.12500
TOTAL	128	5120	4,160,804[3]	100.00000	100.00000
ROYALTY INTEREST					
State	113	4520	478,033	91.91171	88.28125
Williams	15	600	42,067	8.08829	11.71875
TOTAL	128	5120	520,100[4]	100.00000	100.00000

[1]One well currently cleaning out to complete
[2]One well recently abandoned.
[3]Excludes cumulative oil recovery of non-producing abandoned leases.
[4]Gross royalty recovery of estimated ultimate oil recovery by primary means.

FITTING, FITTING & JONES

SUMMARY
ULTIMATE OIL RECOVERY ANALYSIS
CAPROCK FIELD LEASES
LEA AND CHAVES COUNTIES, NEW MEXICO

Operator and Lease	No. Wells	Monthly Per Well Decline Per Cent	Avg. Per Well Prod. Rate Last Three Months Barrels	Est. Fut. Oil Rec. Per Well Barrels	Est. Lease Fut. Oil Rec. Barrels	Cumulative Oil Rec. to 4-1-51 Barrels	Est. Ultimate Oil Rec. Barrels
British American Oil Prod.							
State	2	2.25	320	14,222	28,444	56,347	84,791
Cities Service Oil Co.							
State "R"	2	1.9	407	21,421	42,842	51,424	94,266
State "T"	1	11.1	0	0	0	6,271	6,271
Total	3			21,421	42,842	57,695	100,537
Cooperative Prod. Assn.							
Liv. Max	1	7.4	78	1,054	1,054	29,430	30,484
Liv. Max "A"	1	6.9	50*	725	725	25,096	25,821
Liv. Max St "G"	5	5.4	275*	5,092	25,460	210,595	236,055
Liv. Max St "H"	1	1.7	559	32,882	32,882	59,682	92,564
Liv. Max "J"	4	4.3	164	3,814	15,256	156,044	171,300
Liv. Max St "K"	2	5.4	68	1,259	2,518	32,190	34,708
Liv. St "D"	1	4.9	128*	2,612	2,612	39,826	42,438
Malco Max "A"	8**	4.65	195*	4,194	33,552	289,919	323,471
Malco Max "B"	1	7.65	0	0	0	6,620	6,620
Malco Max "C"	1	2.65	498	18,792	18,792	59,245	78,037
Malco Max "F" 3	1	4.85	36*	742	742	22,749	23,491
Malco Max "F" 1	1	4.3	710	16,511	16,511	60,335	76,846
Malco Max "H"	1	3.45	286	8,290	8,290	41,877	50,167
Max St	1	4.4	170	3,864	3,864	30,083	33,947
McQueen	1	7.5	18*	240	240	17,015	17,255
Ohio St	3	4.5	146	2,578	7,734	38,792	46,526
State "E"	1	3.75	267	7,120	7,120	44,557	51,677
Williams	4	3.2	157	4,906	19,624	64,105	83,729
Total	38			114,675	196,976	1,228,160	1,425,136
Delfern Oil Co.							
State "A"	1	6.15	308	5,008	5,008	47,007	52,015
State "B"	1	8.3	215	2,590	2,590	50,519	53,109
State "C"	1	5.9	100	1,695	1,695	38,561	40,256
State "D"	1	5.5	434	7,891	7,891	61,103	68,994
State "E"	2	4.9	85	1,735	3,470	45,622	49,092
State "F"	3	7.2	493	6,847	20,541	176,412	196,953
State "G"	2	10.2	579	5,676	11,352	132,253	143,605
State "H"	2	9.2	279	3,033	6,066	108,754	114,820
State "J"	2	4.4	357	3,568	7,136	42,463	49,599
Total	15			38,043	65,749	702,694	768,443

(Continued)

FITTING, FITTING & JONES

ULTIMATE OIL RECOVERY ANALYSIS
(Continued)

Operator and Lease	No. Wells	Monthly Per Well Decline Per Cent	Avg. Per Well Prod. Rate Last Three Months Barrels	Est. Fut. Oil Rec. Per Well Barrels	Est. Lease Fut. Oil Rec. Barrels	Cumulative Oil Rec. to 4-1-51 Barrels	Est. Ultimate Oil Rec. Barrels
Great Western Prod. Inc.							
Max St	1	1.45	870	60,000	60,000	51,417	111,417
State "L"	2	6.3	504	8,000	16,000	99,440	115,440
State "M"	2	6.55	123	1,878	3,756	68,702	72,458
State "N"	4	2.35	283	12,043	48,172	70,480	118,652
State "O"	1	9.7	0	0	0	1,922	1,922
State "P"	1	3.55	39*	1,099	1,099	3,865	4,964
State "Q"	3	5.6	318	5,679	17,037	71,889	88,926
State "R"	3	6.5	268	4,123	12,369	59,563	71,932
State "S"	1	7.4	52*	763	763	3,031	3,794
Total	18			93,525	159,136	430,369	589,505
Gulf Oil Corp.							
Chaves St	2	2.9	385	13,276	26,552	52,213	78,765
Lea St	3	5.35	40*	748	2,244	15,787	18,031
Lea St "B"	2	6.0	200*	3,333	6,666	40,728	47,394
Total	7			17,357	35,462	108,728	144,190
Manry & Co.							
Manry St "A"	2	7.4	210*	2,838	5,676	57,257	62,933
	2	3.15	144	4,571	9,142	20,014	29,156
Total	4			7,409	14,918	77,271	92,089
Mid-Cont. Pet. Corp.							
State "13"	1	10.1	90*	891	891	23,105	23,996
Phillips Pet. Co.							
Cap	1	10.2	54*	529	529	12,367	12,896
Caprock	4	5.3	322	6,075	24,300	91,184	115,484
Levick	1	1.55	507	32,710	32,710	13,380	46,090
Total	6			39,314	57,539	116,931	174,470
Polis, A. K.							
State "A"	2	8.7	142	1,632	3,264	63,308	66,572
State "B"	2	6.7	318	4,746	9,492	51,682	61,174
Total	4			6,378	12,756	114,990	127,746

(Continued)

FITTING, FITTING & JONES

ULTIMATE OIL RECOVERY ANALYSIS
(Continued)

Operator and Lease	No. Wells	Monthly Per Well Decline Per Cent	Avg. Per Well Prod. Rate Last Three Months Barrels	Est. Fut. Oil Rec. Per Well Barrels	Est. Lease Fut. Oil Rec. Barrels	Cumulative Oil Rec. to 4-1-51 Barrels	Est. Ultimate Oil Rec. Barrels
Resler Oil Co.							
State "A"	1	8.5	12*	141	141	14,559	14,700
State "B"	1	4.6	92*	2,000	2,000	16,395	18,395
State "C"	1	7.4	62	838	838	25,082	25,920
State "D"	1	3.6	32*	889	889	4,710	5,599
State "E"	1	2.5	128	5,120	5,120	13,017	18,137
Total	5			8,988	8,988	73,763	82,751
Vickers Pet. Co.							
Caprock St	5	4.4	75	1,705	8,525	55,668	64,193
Caprock St "A"	2	3.3	295	8,939	17,878	29,024	46,902
Max Osmund	1	2.05	204	9,951	9,951	10,161	20,112
Max St	3	7.4	179	2,419	7,257	120,422	127,679
Max St "F" 2	1	5.9	7*	119	119	1,995	2,114
Williams	7	3.0	192	6,400	44,800	98,480	143,280
Total	19			29,533	88,530	315,750	404,280
Watson, J. C., Drlg. Co.							
State	2	3.65	136	3,726	7,452	25,889	33,341
Williams, Sam							
Williams	4	2.75	187	6,800	27,200	82,329	109,529
Wilson, H. L. Drlg. Co.							
Continental	0	2.25	0	0	0	2,906	2,906
Grand Total	128			402,282	746,783	3,416,927	4,163,710

*Estimated production rate.
**Well #2 present air injection well.

FITTING, FITTING & JONES

GROSS PIPELINE RUNS FOR 1947
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	April Lease	April Per Well	May Lease	May Per Well	June Lease	June Per Well
British American Oil Prod.														
State	2	13-13-31	443	443	981	981	971	971	1505*	753	973	487	1103	552
Cities Service Oil Co.														
State R	2	17-13-31												
Cooperative Prod. Assn.														
Liv. Max.	1	36-12-31	775	775	384	384	755	755	749	749	560	560	566	566
Liv. Max A	1	1-13-31	350	350	366	366	379	379	760	760	567	567	373	373
Liv. Max G	3	31-12-32	2079	693	1472	491	2127	709	2359	786	1751	584	1668	556
Liv. Max H	1	36-12-31	376	376	373	373	380	380	761	761	575	575	558	558
Liv. Max J	4	6-13-32	1347	337	2232	559	2236	574	2268	567	2256	564	2296	574
Liv. Max K	1	7-13-32	379	379	367	367	332	332	753	753	565	565	369	369
Liv. St D	1	30-12-32	376	376	371	375	364	364	757	757	561	561	554	554
Mal Max A	6	31-12-32	2274	379	2274	379	2517	469	4577	763	3392	565	3431	572
Mal Max B	1	36-12-31	-		310	310	-		-		162	162	-	
Mal Max C	1	36-12-31	335	335	387	387	336	336	744	744	556	555	334	334
Mal Max F-3	1	1-13-31	450	450	425	425	435	435	769	769	269	269	230	230
Mal Max F-1	1	36-13-31	583	583	568	568	576	576	579	579	570	570	565	565
Mal Max H	1	7-13-32	459	459	455	455	463	463	464	464	443	443	452	452
Max St	1	12-13-31	352	352	369	369	755	756	769	769	573	573	558	558
McQueen	1	1-13-32	359	359	-				354	354	189	189	370	370
Ohio St	1	11-13-31	370	370	363	363	358	358	371	371	572	572	330	330
State E	1	1-13-31	353	353	352	352	358	358	759	759	714	714	375	375
Williams	3	7-13-32	357	357	383	383	384	384	353	353	570	570	566	566
Delfern Oil Co.														
State A	1	36-12-31	756	756	380	380	373	373	744	744	566	566	368	368
State B	1	1-13-31	735	735	382	382	335	335	749	749	547	547	368	368
State C	1	1-13-31	331	331	413	413	372	372	743	743	571	571	565	565
State D	1	1-13-31	382	382	335	335	373	373	759	759	560	560	546	546
State E	2	11-13-31	747	374	743	374	750	375	1533	767	1423	712	1112	556
State F	3	7-13-32	1922	641	1977	659	1922	641	1852	617	1543	514	1569	523
State G	2	1-13-31	756	378	715	358	1477	739	1459	730	1145	573	1123	562
State H	2	17-13-31	771	386	772	386	1500	750	1532	766	1123	562	1147	574
State J	2	13-13-31	-		364	364	373	373	741	741	567	567	555	555
Great Western Prod, Inc.														
Max St	1	12-13-31	749	749	764	764	384	384	767	767	553	553	561	561
State L	2	12-13-31	762	381	743	372	1142	571	1532	766	1126	563	1135	568
State M	2	13&12-13-31	-		370	370	1127*	564	1515	758	1123	562	1117	559
State N	3	13-13-31												
State O	1	12-13-31												

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-48
British American Prod. Co.															
State	2	837	413	1837	934	1889	945	1438	734	1890	945	1929	965	15,741	15,741
Cities Service Oil Co.															
State R	2			745	745	1620*	810	2549	1275	2059	1029	2572	1286	9,545	9,545
Cooperative Prod. Assn.															
Liv. Max	1	371	371	1151	1151	1156	1156	1351	1351	767	767	1142	1142	9,727	19,200
Liv. Max A	1	375	375	756	756	1151	1151	1134	1134	766	766	889	889	7,701	15,955
Liv. Max G	3	1784	595	2170	723	3325	1108	4323	1442	3456	1152	4313	1438	33,327	69,251
Liv. Max H	1	377	377	757	757	1160	1160	1346	1346	947	947	1139	1139	9,769	29,240
Liv. Max J	4	2238	560	2993	748	4202	1051	4592	1148	4141	1035	4481	1120	35,533	79,593
Liv. Max K	1	380	380	758	758	1335	1335	1302	1302	1143	1143	926	926	8,669	15,582
Liv. St D	1	373	373	743	743	731	731	747	747	925	925	1127	1127	7,633	25,869
Mal Max A	6	3022	504	3417	569	5347	891	6666	1111	5961	994	7046	1174	49,191	144,739
Mal Max B	1	-		-		190	190	192	192	193	193	-		1,047	5,364
Mal Max C	1	366	366	734	734	1011	1011	1520	1520	1332	1332	1093	1093	8,933	27,408
Mal Max F-3	1	215	215	-		677	677	1374	1374	922	922	920	920	6,686	13,006
Mal Max F-1	1	557	557	953	953	1347	1347	1737	1737	775	775	1539	1539	13,349	20,634
Mal Max H	1	462	462	881	881	1145	1145	1336	1336	906	906	913	913	8,379	15,167
Max St	1	369	369	752	752	926	926	1319	1319	956	956	1305	1305	9,034	11,914
McQueen	1	383	383	-		385	385	381	381	379	379	192	192	3,022	13,477
Ohio St	1	383	383	382	382	563	563	380	380	381	381	381	381	4,794	9,285
State E	1	375	375	763	763	1329	1329	1333	1333	1143	1143	1516	1516	9,381	21,553
Williams	3	385	385	570	570	1950*	475	1985*	662	1513	504	2133	711	10,179	17,763
Delfern Oil Co.															
State A	1	377	377	741	741	938	938	939	939	572	572	375	375	7,096	19,249
State B	1	357	357	727	727	1322	1322	756	756	537	537	1321	1321	8,629	23,991
State C	1	375	375	734	734	1532	1532	1294	1294	1304	1304	934	934	9,193	22,760
State D	1	373	373	743	743	1340	1340	1343	1343	1720	1720	1373	1373	10,327	21,116
State E	2	763	382	1528	764	2277	1138	1716	858	1295	648	1530	765	15,437	25,980
State F	3	1767	589	1927	642	4666	1555	4357	1619	4739	1580	4362	1421	33,602	51,580
State G	2	1101	550	1466	733	3207	1604	4028	2014	2652	1326	3786	1894	22,922	37,396
State H	2	1143	572	1510	755	3140	1570	3249	1625	3179	1590	3238	1619	22,324	32,030
State J	2	365	365	1425*	724	2212	1121	2213	1106	1641	820	1367	934	12,331	12,331
Great Western Prod, Inc.															
Max St	1	374	374	752	752	1322	1322	1525	1525	1709	1709	1517	1517	10,977	13,248
State L	2	1000	500	1230	615	1990	995	3056	1528	2629	1315	3040	1520	19,385	23,212
State M	2	1001	501	1216	608	1396	698	2663	1332	1882	941	2825	1413	16,252	16,252
State N	3	539	539	358	358	1524*	752	2275	1138	1542	771	1136*	445	7,553	7,553
State O	1	357	357	-		331	331	-		133	133	191	191	1,117	1,117

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-48
Gulf Oil Corp.															
Lea St	2	176	176	191	191	-		212*	106	423	212	213	106	2,113	4,031
Chaves St	2			270	270	1065	1065	1437	1437	1623*	812	3289	1645	7,734	7,734
Manry & Co.															
Manry St A	2	1264	632	1747	874	2263	1132	1676	838	979	490	1834	917	10,954	10,954
	2	215	215	-		214	214	647	647	636*	318	861	430	2,763	2,763
Polis, A.K.															
State A	2					2235	1118	2235	1118	2933	1467	3144	1572	10,549	10,549
State B	2									913	913	2335*	1193	3,293	3,293
Resler Oil Co.															
State A	1	416	416	333	333	373	373	629	629	446	446	224	224	6,154	10,808
State B	1	366	366	722	722	761	761	760	760	551	551	376	376	6,146	6,905
State C	1	586	586	746	746	1120	1120	1390	1390	364	364	1343	1343	9,413	9,413
State D	1	315	315	-		176	176	137	137	-		136	136	2,112	2,112
State E	1	390	390	349	349	295	295	224	223	231	231	230	230	4,331	4,331
Vickers Petro. Corp. (Formerly Malco Refg., Inc.)															
Caprock St		951	238	1336	459	1697	424	2153	538	984	246	1706	427	15,229	15,229
Max St	3	1362	454	2200	733	3829	1276	2821	940	4374	1458	3436	1145	23,014	33,546
Max St F-2	1	-		-		231	231	213	213	-		-		661	661
Williams	5	1683	563	1913*	479	3747	937	3682	921	2333*	577	3190	638	24,613	24,613
Watson Drlg. Co. (Formerly Cockburn, Barney)															
State	2	452	452	772	772	339	339	629	629	1075*	533	1076	538	6,516	6,516
Williams, Sam															
Williams	4	2156	539	2895	724	4240	1060	3264	816	-		1880	470	26,474	23,935
FIELD TOTAL		33,596		49,192		81,365		89,231		74,555		90,636		621,131	1,092,411
NUMBER OF WELLS		73		76		81		83		83		90			
AVERAGE PER WELL		459		647		1005		1076		847		1007			

*New Well Completed.

GROSS PIPELINE RUNS FOR 1948
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	April Lease	April Per Well	May Lease	May Per Well	June Lease	June Per Well
British American Oil Prod.														
State	2	13-13-31	1424	712	923	462	1479	739	942	471	1515	757	1412	706
Cities Service Oil Co.														
State R	2	17-13-32	1332	596	2170	1085	1789	895	1516	758	1019	510	338	169
State T	1	32-12-32												
Cooperative Prodn. Assn.														
Liv. Max	1	36-12-31	965	965	959	959	769	769	575	575	569	569	565	565
Liv. Max A	1	1-13-31	760	760	561	561	763	763	564	564	374	374	376	376
Liv. Max G	5	31-12-32	3708	1236	3334	1273	4159	1383	4075	1358	3591	1197	3924	1305
Liv. Max H	1	36-12-31	1321	1321	1035	1035	1140	1140	1142	1142	1129	1129	1322	1322
Liv. Max J	4	6-13-32	4722	1181	4125	1031	4245	1061	3723	931	3371	843	3346	837
Liv. Max K	2	7-13-32	1310	1310	936	936	758	758	1129	1129	755	755	754*	377
Liv. St D	1	30-12-32	926	926	744	744	563	563	711	711	560	560	746	746
Mal Max A	6	31-12-32	7443	1241	5674	946	6735	1123	6236	1039	6825	1137	6041	1007
Mal Max B	1	36-12-31	134	134	-		132	132	-		136	136	-	
Mal Max C	1	36-12-31	1560	1560	1135	1135	1152	1152	1137	1137	1325	1325	1132	1132
Mal Max F-3	1	1-13-31	1110	1110	373	373	1123	1123	660	660	653	653	351	351
Mal Max F-1	1	36-12-31	1144	1144	1520	1520	1146	1146	1323	1323	1335	1335	1313	1313
Mal Max H	1	7-13-32	1587	1587	1382	1382	372	372	395	395	373	373	1378	1378
Max St	1	17-13-31	955	955	954	954	959	959	949	949	763	763	759	759
McQueen	1	1-13-31	379	379	-		175	175	-		187	187	377	377
Ohio St	3	11-13-31	379	379	384	384	384	384	381	381	566	566	946	946
State E	1	1-13-31	1119	1119	741	741	1119	1119	1132	1132	1113	1113	1337	1337
Williams	4	7-13-32	2506	627	1893	475	1900	475	1531	383	1719	430	1707	427
Delfern Oil Co.														
State A	1	36-12-31	131	131	139	139	1123	1123	930	930	1124	1124	1472	1472
State B	1	1-13-31	1472	1472	1128	1128	1374	1374	920	920	334	334	334	334
State C	1	1-13-31	754	754	554	554	937	937	925	925	753	753	754	754
State D	1	1-13-31	1520	1520	1319	1319	1321	1321	1299	1299	1322	1322	1279	1279
State E	2	11-13-31	1479	739	1126	563	1115	558	1121	560	1127	564	933	467
State F	3	7-13-32	[illegible]	1532	3876	1292	4139	1379	[illegible]	1381	3380	1127	3857	1286
State G	2	1-13-31	2834	1417	2644	1322	2826	1413	2604	1302	2626	1313	2468	1234
State H	2	12-13-31	3070	1535	2644	1322	2725	1363	2636	1318	2629	1315	2476	1238
State J	2	13-13-31	1454	727	1310	655	1650	825	1311	656	1505	753	1316	658
Great Western Prod., Inc.														
Max St	1	12-13-31	1586	1586	1542	1542	1340	1340	1337	1337	1341	1341	1338	1338
State L	2	12-13-31	2698	1349	2455	1227	2765	1383	2482	1241	2651	1326	2073	1037
State M	2	12&13-13-31	3033	1526	3163	1582	2821	1410	2484	1242	2639	1319	1877	939
State N	4	13-13-32	755	252	1523	508	2135	[illegible]	2684	671	2291	573	2354	589

*New Well Completed.

(Continued)

247

GROSS PIPELINE RUNS FOR 1948
(Continued)

Operator & Lease	No. Wells on Lease	July	August	September	October	November	December	Year Total 1948	Cum. Total to 1-1-49
British American Oil Prod.									
State	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cities Service Oil Co.									
State R	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State T	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cooperative Prodn. Assn.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delfern Oil Co.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Great Western Prod., Inc.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1948
(Continued)

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	April Lease	April Per Well	May Lease	May Per Well	June Lease	June Per Well
Great Western Prod, Inc.														
State P	1	2-13-31	-		433	433	344	324	316	316	325	325	158	158
State O	1	12-13-31	-		-		133	133	-		135	135	-	
State Q	2	32-12-32											1300*	650
State R	2	5-21-32 / 5-13-32											270	270
Gulf Oil Corp.														
Lea St	3	6-13-32												
Lea St B	2	5-13-32	27	13	382	191	355*	235	232	234	453	151	350	233
Chaves St	2	12-13-31	2436	1218	2260	1130	2633	1316	2204	1102	2657	1329	2379	1189
Manry & Co.														
Manry St A	2	[illegible]-13-32	1271	636	2126	1063	1693	847	1689	845	1854	927	1679	839
Manry St A	2	11-13-31	1276	638	648	324	850	425	426	213	640	320	217	108
Mid-Continent Pet. Corp.														
State "13"	1	32-12-32							757	757	1692	1692	1309	1309
Phillips Petro. Co.														
Cap	1	32-12-32												
Caprock	4	32-12-32												
Polis, A.K.														
State A	2	12-13-31	3125	1563	2870	1435	2852	1426	2335	1168	2767	1384	2417	1208
State B	2	1-13-31	2830	1415	2165	1083	2333	1167	2159	1079	1516	758	1548	774
Resler Oil Co. (Formerly Page, Henry)														
State A	1	1-13-31	461	461	233	233	433	433	226	226	219	219	229	229
State B	1	12-13-31	373	373	573	573	192	192	570	570	133	133	758	758
State C	1	12-13-31	1237	1237	1423	1423	1390	1390	1313	1313	752	752	367	367
State D	1	7-13-32	-		184	184	-		134	134	-		-	
State E	1	13-13-31	226	226	221	221	-		229	229	-		227	227
Vickers Pet. Corp. (Formerly Malco Refg., Inc.)														
Caprock St	5	6 & 7-13-32	1381	345	1775	444	956	239	1603	401	954	239	698	175
Caprock St A	2	7 &18-13-32												
Max Osmund	1	13-13-32											408	408
Max St	3	12&13-13-31	4336	1632	4670	1557	3913	1304	3887	1296	4342	1447	3356	1119
Max St F-2	1	1-13-31	171	171	155	155	-		207	207	-		-	
Williams	7	7 & 8-13-32	2327	565	2738	548	2379	476	2413	483	2401	480	2790*	399
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)														
State	2	36-12-31 / 13-13-31	1114	557	1099	549	657	329	660	330	857	429	438	219
Williams, Sam														
Williams	4	7 & 8-13-32	2444	611	1748	437	2412	603	1952	488	1932	483	1956	489
FIELD TOTAL			[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
NUMBER OF WELLS			94		95		97		98		98		105	
AVERAGE PER WELL			921		832		843		791		787		712	

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1948
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1948	Cum. Total to 1-1-49
Great Western Prod., Inc.															
State P	1	162	162	-		166	166	167	167	152	152	-		2,253	2,253
State O	1	-		132	132	-		-		-		-		555	1,672
State Q	2	2416	1208	3136	1568	2595	1298	2788	1394	2493	1249	2693	1346	17,426	17,426
State R	2	1555	1555	1309	1309	1323	1323	-		2508	1254	2937	1474	9,957	9,957
Gulf Oil Corp.															
Lea St	3	634	211	451	150	357	286	1052	351	-		897	299	7,340	11,371
Lea St B	2	1331	1331	1390	1390	1360	1360	1350	1350	2232*	1116	3120	1560	10,783	10,783
Chaves St	2	1377	949	1103	552	876	433	872	436	452	226	876	433	20,645	23,379
Manry & Co.															
State A	2	1699	849	1347	674	1534	767	1697	849	1047	524	1103	554	13,749	29,703
State A	2	641	320	619	309	427	214	427	214	631	315	441	221	7,243	10,006
Mid-Continent Pet. Co.															
State "13"	1	1489	1489	1315	1315	756	756	1321	1321	1147	1147	1144	1144	10,937	10,937
Phillips Petro. Co.															
Cap	1	-		379	379	1253	1253	1295	1295	1346	1346	753	753	5,036	5,036
Caprock	4	753	753	1300	1300	1113	1113	3931*	1310	4163	1389	5257*	1752	16,522	16,522
Polis, A.K.															
State A	2	2224	1112	1731	866	1516	758	1015	508	897	449	848	424	24,597	35,146
State B	2	1315	658	1314	657	1315	658	887	444	1076	538	1092	546	17,549	22,947
Resler Oil Co. (Formerly Page, Henry)															
State A	1	221	221	-		215	215	209	209	-		228	228	2,674	13,432
State B	1	561	561	569	569	372	372	377	377	380	380	190	190	5,111	12,016
State C	1	556	556	737	737	372	372	749	749	377	377	566	566	9,894	19,312
State D	1	190	190	186	186	-		186	186	-		-		930	3,042
State E	1	428	428	439	439	430	430	217	217	448	448	224	224	3,089	7,420
Vickers Pet. Corp. (Formerly Malco Refg. Inc.)															
Caprock St	5	1934*	387	2139	428	1923	385	1925	385	1681	336	1457	291	18,431	33,660
Max Osmund	1	649	649	423	423	424	424	634	634	213	213	429	429	3,180	3,180
Max St	3	3363	1288	3365	1288	2617	872	3425	1142	2936	979	2450	817	44,520	73,066
Max St F-2	1	-		219	219	-		-		-		-		752	1,413
Caprock St A	2	357	357	853	853	353	353	645	645	361	361	868*	434	4,942	4,942
Williams	7	2966	424	3012	430	2519	360	2051	293	2563	366	2322	332	33,276	55,594
Watson, J.C. Drlg. Co.															
State	2	879	440	853	427	441	220	882	441	434	217	438	219	8,742	15,268
Williams, Sam															
Williams	4	2224	556	1864	466	1944	486	1948	487	1456	364	1944	486	24,044	53,029
FIELD TOTAL		83,519		73,213		71,359		74,577		70,598		75,330		930,269	2,012,680
NUMBER OF WELLS		109		110		110		112		117		120			
AVERAGE PER WELL		766		711		649		666		603		628			

(Continued)

[illegible]

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January	February	March	April	May	June
British American Oil Prod.								
State	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cities Service Oil Co.								
State R	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
State T	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cooperative Prodn. Assn.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delfern Oil Co.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Great Western Prod., Inc.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*New Well Completed.

(Continued)

[illegible]

Operator & Lease	No. Wells on Lease	July	August	September	October	November	December	Year Total	Cum. Total
British American Oil Prod.									
State	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15,759	46,755
Cities Service Oil Co.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cooperative Prodn. Assn.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delfern Oil Co.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Great Western Prod., Inc.		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(Continued)

GROSS PIPELINE RUNS FOR 1949
(Continued)

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January	February	March	April	May	June
Great Western Prod., Inc. (Contd.)			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Gulf Oil Corp.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Manry & Co.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mid-Continent Pet. Corp.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phillips Pet. Co.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polis, A. K.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Resler Oil Co.			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vickers Pet. Co. (Caprock St B: Temporarily Abandoned)			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)	2	36-12-31 / 13-13-31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Williams, Sam	4	7-13-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wilson, H.L. Drlg. Co.	1	19-13-32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FIELD TOTAL			64,179	71,762	81,639	77,443	77,919	73,257
NUMBER OF WELLS			124	125	127	127	128	128
AVERAGE PER WELL			559	581	643	605	609	569

(Continued)

GROSS PIPELINE RUNS FOR 1949
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1949	Cum. Total to 1-1-50
Great Western Prod., Inc.															
State R	3	3033	1011	2676	892	2360	787	2019	673	1680	560	1831	610	34,406	44,363
State S	1	225	225	223	223	221	221	-		219	219	-		1,789	1,789
Gulf Oil Corp.															
Lea St	3	419	140	423	141	410	137	-		158	53	-		4,416	15,737
Lea St B	2	1486	743	1061	531	857	428	1012	506	832	416	1043	522	18,378	29,661
Chaves St	2	835	418	864	432	1287	644	1043	522	400	200	-		11,468	30,247
Manry & Co.															
Manry St A	2	2398	1199	2163	1082	1703	852	1278	639	857	429	1071	536	16,570	46,273
Manry St A	2	385	193	439	219	430	215	648	324	419	210	422	211	5,318	15,324
Mid-Continent Pet. Corp.															
State "13"	1	756	756	579	579	756	756	579	579	380	380	379	379	8,352	19,300
Phillips Pet. Co.															
Cap	1	393	393	132	132	133	133	131	131	132	132	321	321	5,165	10,191
Caprock	4	4063	1016	2452	613	4119	1030	3170	795	2080	520	2628	657	57,133	66,715
Levick	1	571	571	554	554	557	557	383	383	355	355	543	543	5,348	5,348
Polis, A. K.															
State A	2	2640	1320	1076	538	1305	653	1270	635	1086	543	1308	654	21,722	56,869
State B	2	2461	1231	1322	661	2234	1117	2374	1187	1547	774	1957	979	19,609	41,537
Resler Oil Co.															
State A	1	-		226	226	-		-		-		220	220	861	14,347
State B	1	138	138	190	190	332	332	131	131	193	193	-		2,665	14,681
State C	1	368	368	372	372	374	374	139	139	384	384	191	191	3,912	23,214
State D	1	135	135	-		191	191	-		-		192	192	1,114	4,156
State E	1	225	225	225	225	225	225	227	227	452	452	212	212	3,300	10,720
Vickers Pet. Co.															
Caprock St	5	961	192	974	195	482	96	1176	235	976	195	959	192	12,771	46,431
Caprock St A	2	1300	650	1073	537	1062	531	866	433	871	436	869	435	13,981	18,923
Caprock St B	1													0	0
Max Osmund	1	206	206	424	424	218	213	215	215	215	215	220	220	3,594	6,774
Max St	3	2367	956	2410	803	2911	970	2892	964	2439	813	2399	966	25,593	133,659
Max St F-2	1	-		-		-		-		207	207	-		427	1,840
Williams	7	1620	231	1826	261	1614	231	1852	265	1623	232	1591	227	22,081	77,675
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)															
State	2	653	327	229	115	659	329	430	215	216	108	675	338	5,879	21,147
Williams, Sam															
Williams	4	1344	336	980	245	1464	366	976	244	1404	351	992	248	15,762	68,791
Wilson, H.L. Drlg. Co.															
Continental	1	183	183	181	181	-		134	134	187	187	-		1,451	1,451
FIELD TOTAL		71,971		61,193		63,272		62,123		57,902		57,690		823,355	2,836,035
NUMBER OF WELLS		129		129		129		129		129		129			
AVERAGE PER WELL		558		474		490		482		449		447			

GROSS PIPELINE RUNS FOR 19[illegible]
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	April Lease	April Per Well	May Lease	May Per Well	June Lease	June Per Well
British American Oil Prod.														
State	2	13-13-31	[illegible]	437	[illegible]	246	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cities Service Oil Co.														
State R	2	17-13-32	1136	[illegible]	1133	[illegible]	1133	[illegible]	1130	[illegible]	1126	[illegible]	[illegible]	[illegible]
State T	1	32-13-32	222	222	-		-		221	221	-		-	
Cooperative Prod. Assn.														
Liv. Max	1	36-12-31	[illegible]	130	170	170	-		175	175	-		-	
Liv. Max A	1	1-13-31	190	190	-		132	132	175	175	-		[illegible]	[illegible]
Liv. Max G	5	31-12-32	3112	[illegible]	3371	[illegible]	3137	639	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Liv. Max H	1	36-12-31	1338	1338	1334	1334	1290	1290	762	762	[illegible]	[illegible]	[illegible]	[illegible]
Liv. Max J	4	6-13-32	2086	521	1693	423	1691	[illegible]	1700	425	1599	400	1317	329
Liv. Max K	2	7-13-32	189	95	187	[illegible]	343	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Liv. St D	1	30-12-32	-		177	177	[illegible]	[illegible]	336	336	[illegible]	[illegible]	[illegible]	[illegible]
Mal Max A	8	31-12-32	2682	335	3126	[illegible]	[illegible]	[illegible]	3188	[illegible]	2834	354	2266	[illegible]
Mal Max B	1	36-12-31	-		130	130								
Mal Max C	1	36-12-31	385	385	384	384	370	370	1136	1136	730	730	567	567
Mal Max F-3	1	1-13-31	-		186	186	-		-		-		203	203
Mal Max F-1	1	36-12-31	1138	1138	944	944	1292	1292	1108	1108	1314	1314	351	351
Mal Max H	1	7-13-32	436	436	462	462	411	411	444	444	445	445	448	448
Max St	1	12-13-31	381	381	189	189	332	332	193	193	382	382	188	188
McQueen	1	1-13-31	191	191	-		-		-		-		164	164
Ohio St	3	11-13-31	762	254	767	256	745	248	569	190	572	191	553	184
State E	1	1-13-31	557	557	373	373	376	376	373	373	362	362	379	379
Williams	4	7-13-32	963	241	770	193	957	239	770	193	776	194	747	187
Delfern Oil Co.														
State A	1	36-12-31	757	757	740	740	566	566	556	556	519	519	374	374
State B	1	1-13-31	744	744	565	565	564	564	553	553	510	510	376	376
State C	1	1-13-31	379	379	190	190	190	190	190	190	182	182	184	184
State D	1	1-13-31	956	956	913	913	556	556	752	752	571	571	567	567
State E	2	11-13-31	357	179	298	149	333	167	190	95	365	182	192	96
State F	3	7-13-32	3921	1307	3881	1294	3839	1279	2799	933	2981	994	2206	735
State G	2	1-13-31	2674	1337	2656	1328	2588	1294	2465	1233	2441	1220	2644	1322
State H	2	12-13-31	2642	1321	2065	1033	1691	845	1699	849	1439	719	643	322
State J	2	13-13-31	556	278	522	261	375	187	376	188	569	284	370	185
Great Western Prod. Inc.														
Max St	1	12-13-31	961	961	932	932	962	962	955	955	958	958	767	767
State L	2	12-13-31	2684	1342	2458	1229	2690	1345	2297	1148	1914	957	1690	845
State M	2	12-13-31	379	189	379	189	386	193	376	188	193	97	376	188
State N	4	13-13-32	1536	384	1535	384	1162	291	1159	290	1356	339	1075	269
State O	1	12-13-31	-		-		-		-		-		-	
State P	1	2-13-31	-		-		159	159	164	164	-		-	
State Q	3	32-13-32	2019	673	1517	506	2012	671	1852	617	1344	448	966	322
State R	3	5-13-32	1510	503	1714	571	1413	471	1342	447	1182	394	1007	336
State S	1	5-13-32	215	215	-		231	231	-		220	220	-	

(Continued)

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1950	Cum. Total to 1-1-51
British American Oil Prod.															
State	2	435	243	469	235	478	239	957	478	474	237	483	244	7,675	54,430
Cities Service Oil Co.															
State R	2	1109	555	1067	534	369	185	934	467	750	375	1113	557	12,132	43,983
State T	1	-		-		-		124	124	-		-		567	6,271
Cooperative Prod. Assn.															
Liv. Max	1	190	190	-		183	183	-		116	116	-		1,033	29,197
Liv. Max A	1	-		141	141	-		126	126	-		122	122	1,110	24,991
Liv. Max G	5	2454	491	2275	455	1523	305	1862	372	2027	405	2202	440	30,588	205,165
Liv. Max H	1	757	757	711	711	378	378	570	570	760	760	570	570	9,980	53,005
Liv. Max J	4	1274	319	1036	259	917	229	932	233	844	211	944	236	16,023	154,076
Liv. Max K	2	186	93	156	78	-		187	94	140	70	127	64	2,075	31,783
Liv. St D	1	131	131	139	139	131	131	130	130	153	153	-		1,332	39,302
Mal Max A	7	2091	261	1827*	261	2092	299	2063	295	2077	297	1885	269	30,302	235,110
Mal Max B	1	-		-		-		-		-		-		139	6,620
Mal Max C	1	714	714	363	363	379	379	378	378	743	743	567	567	6,725	57,751
Mal Max F-3	1	-		-		-		-		-		-		389	22,749
Mal Max F-1	1	1302	1302	740	740	945	945	947	947	740	740	745	745	12,166	58,205
Mal Max H	1	452	452	445	445	395	395	223	223	411	411	382	382	4,954	41,018
Max St	1	192	192	353	353	-		191	191	192	192	183	183	2,331	29,573
McQueen	1	-		-		-		110	110	-		-		465	16,914
Ohio St	3	559	186	552	187	569	190	570	190	553	184	575	192	7,356	37,746
State E	1	372	372	183	183	132	132	135	135	599	599	291	291	4,132	43,756
Williams	4	734	184	758	189	562	142	732	183	738	185	694	174	9,237	62,226
Delfern Oil Co.															
State A	1	476	476	301	301	277	277	137	137	270	270	134	134	5,161	46,083
State B	1	514	514	357	357	292	292	132	132	135	135	139	139	4,982	49,874
State C	1	165	165	173	173	130	130	119	119	93	93	99	99	2,044	38,261
State D	1	756	756	551	551	569	569	543	543	704	704	512	512	7,955	59,800
State E	2	369	185	277	139	189	94	288	144	188	94	252	126	3,296	45,111
State F	3	2253	751	1890	630	1507	502	2333	778	1807	602	1451	484	31,151	171,973
State G	2	2623	1312	2075	1037	1663	832	1705	853	1687	844	1479	739	26,321	123,780
State H	2	743	372	736	368	675	337	749	375	565	283	513	257	14,415	107,080
State J	2	547	273	344	172	523	262	316	158	502	251	421	210	5,421	41,519
Great Western Prod. Inc.															
Max St	1	264	264	573	573	750	750	330	330	575	575	734	734	3,331	43,808
State L	2	1899	949	1348	674	1321	660	1522	761	1333	667	1516	758	22,593	96,414
State M	2	370	185	191	96	373	187	186	93	371	185	355	178	3,934	67,967
State N	4	1154	288	1154	288	958	239	1142	287	941	235	1136	284	14,315	67,085
State O	1	-		-		-		-		-		-		0	1,922
State P	1	162	162	-		-		156	156	-		-		641	3,716
State Q	3	1008	336	1347	449	998	333	1145	383	979	326	969	323	16,176	69,027
State R	3	1004	335	1005	335	671	224	672	224	664	221	816	272	12,790	57,153
State S	1	-		220	220	-		-		227	227	-		1,093	2,832

(Continued)

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	April Lease	April Per Well	May Lease	May Per Well	June Lease	June Per Well
Gulf Oil Corp.														
Lea St	3	6-13-32	-		-		-		-		-		812	406
Lea St B	2	6-13-32	867	434	633	316	830	415	843	422	636	318	968	484
Chaves St	2	12-13-31	227	114	859	429	954	477	736	368	854	427		
Manry & Co.														
Manry St	2	6-13-32	1071	536	873	437	1088	544	1076	538	855	428	857	429
Manry St	2	11-13-31	417	209	212	106	428	214	219	110	430	215	214	107
Mid-Continent Pet. Corp.														
State "13"	1	32-12-32	380	380	190	190	377	377	189	189	187	187	187	187
Polis, A.K.														
State A	2	12-13-31	1108	554	881	440	881	440	869	435	-		411	206
State B	2	1-13-31	1758	879	1550	775	1105	553	860	430	-		881	440
Phillips Pet. Co.														
Cap	1	32-12-32	193	193	188	188	374	374	183	183	-		191	191
Caprock	4	32-12-32	1655	414	2435	609	1879	470	1686	421	2055	514	1760	440
Levick	1	14-13-31	568	568	559	559	566	566	560	560	563	563	536	536
Resler Oil Co.														
State A	1	1-13-31	-		-		-		-		-		-	
State B	1	12-13-31	193	193	-		188	188	190	190	190	190	-	
State C	1	12-13-31	185	185	189	189	183	183	184	184	188	188	137	137
State D	1	7-13-32	-		-		186	186	-		-		183	183
State E	1	13-13-31	202	202	-		223	223	209	209	214	214		
Vickers Pet. Corp. (Formerly Malco Refg. Inc.)														
Caprock St	5	6 & 7-13-32	964	193	483	97	1184	237	485	97	959	192	486	97
Caprock St A	2	13-13-31	867	434	848	424	654	327	854	427	650	325	648	324
Caprock St B	2	29-12-32	Temporarily Abandoned											
Max Osmund	1	13-13-32	213	213	213	213	213	213	214	214	422	422	212	212
Max St	3	12 & 13-13-32	1967	656	1161	387	1873	624	1671	557	1866	622	1173	391
Max St F-2	1	1-13-31	-											
Williams	7	8-13-32	1770	253	1602	229	1551	222	1139	163	1390	199	1607	230
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)														
State	2	36-12-31 13-13-31	208	104	433	216	427	214	517	258	304	152	299	150
Williams, Sam														
Williams	4	8-13-32	992	248	992	248	992	248	976	244	964	241	968	242
Wilson, H.L. Drlg. Co.														
Continental	1	19-13-32	136	136	-		134	134	132	132	-		133	133
FIELD TOTAL			55,208		51,304		53,171		47,694		44,580		39,271	
NUMBER OF WELLS			130		130		130		130		130		130	
AVERAGE PER WELL			425		392		409		367		343		301	

(Continued)

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	July Lease	July Per Well	August Lease	August Per Well	September Lease	September Per Well	October Lease	October Per Well	November Lease	November Per Well	December Lease	December Per Well	Year Total 1950	Cum. Total to 1-1-51
Gulf Oil Corp.															
Lea St	3	-		-		-		-		-		-		0	15,737
Lea St B	2	641	320	605	303	419	210	642	321	835	417	832	416	8,595	38,256
Chaves St	2	840	420	1058	529	627	314	1280	640	828	414	821	410	10,052	49,399
Manry & Co.															
Manry St	2	648	324	844	422	646	323	434	217	641	320	416	208	9,449	55,722
Manry St	2	429	215	214	107	425	213	217	108	405	203	216	108	3,323	19,152
Mid-Continent Pet. Corp.															
State "13"	1	188	188	188	188	137	137	-		139	139	139	139	2,451	22,350
Polis, A.K.															
State A	2	386	193	222	111	425	213	216	108	192	96	-		5,591	62,459
State B	2	446	223	598	299	-		-		412	206	630	315	3,240	49,777
Phillips Pet. Co.															
Cap	1	184	184	183	183	-		164	164	-		169	169	1,320	12,020
Caprock	4	1875	469	1876	469	1456	364	1491	373	1122	281	1308	327	20,598	87,313
Levick	1	379	379	544	544	189	189	345	345	553	553	538	538	5,910	11,858
Resler Oil Co.															
State A	1	212	212	-		-		-		-		-		212	14,559
State B	1	196	196	179	179	-		196	196	-		190	190	1,522	16,203
State C	1	190	190	-		186	186	-		-		190	190	1,582	24,396
State D	1	-		-		-		-		185	185	-		554	4,710
State E	1	217	217	221	221	215	215	-		210	210	203	203	1,914	12,634
Vickers Pet. Corp. (Formerly Malco Refg., Inc.)															
Caprock St	5	487	97	951	190	700	140	475	95	480	96	454	91	8,108	54,559
Caprock St A	2	631	316	639	319	656	328	630	315	651	326	605	303	8,333	27,256
Caprock St B		Temporarily Abandoned													
Max Osmund	1	216	216	214	214	210	210	219	219	214	214	206	206	2,776	9,550
Max St	3	1178	393	704	235	694	231	691	230	690	230	1185	395	15,153	113,312
Max St F-2	1	-		-		155	155	-		-		-		155	1,995
Williams	7	1605	229	1383	198	1239	184	912	130	1419	203	1103	158	16,770	94,445
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)															
State	2	291	146	280	140	300	150	294	147	283	142	290	145	3,926	25,073
Williams, Sam															
Williams	4	976	244	976	244	860	215	896	224	840	410	860	215	11,274	80,085
Wilson, H.L. Drlg. Co.															
Continental	1	-		175	175	-		133	133	-		177	177	1,270	2,721
FIELD TOTAL		39,774		35,358		29,994		32,217		32,460		32,130		493,361	3,329,397
NUMBER OF WELLS		130		129		129		129		129		129			
AVERAGE PER WELL		306		278		233		250		252		249			

GROSS PIPELINE RUNS FOR 1951
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	Cum. Total to 1-1-51	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	Cum. Total to 4-1-51
British American Oil Prod.										
State	2	13-13-31	54,430	950	475	489	245	473	239	56,347
Cities Service Oil Co.										
State R	2	17-13-32	43,983	759	379	927	464	755	377	51,424
State T	1	32-13-32	6,271	-		-		-		6,271
Cooperative Prod. Assn.										
Liv. Max	1	36-12-31	29,197	140	140	-		93	93	29,430
Liv. Max A	1	1-13-31	24,991	-		105	105	-		25,096
Liv. Max St G	5	31-12-32	205,165	2105	421	1702	340	1623	325	210,595
Liv. Max St H	1	36-12-31	58,005	568	568	567	567	542	542	59,682
Liv. Max J	4	6-13-32	154,076	851	213	551	138	566	142	156,044
Liv. Max St K	2	7-13-32	31,783	152	76	110	55	145	73	32,190
Liv. St. D	1	30-12-32	39,302	139	139	183	183	152	152	39,826
Malco Max A	7	31-12-32	235,110	1699	243	1421	203	1689	241	239,919
Malco Max B	1	36-12-31	6,620	-		-		-		6,620
Malco Max C	1	36-12-31	57,751	565	565	566	566	363	363	59,245
Malco Max F-3	1	1-13-31	22,749	-		-		-		22,749
Malco Max F-1	1	36-12-31	58,205	740	740	723	723	662	662	60,335
Malco Max H	1	7-13-32	41,018	206	206	432	432	221	221	41,377
Max St	1	12-13-31	29,573	191	191	163	163	156	156	30,083
McQuean	1	1-13-31	16,914	-		-		101	101	17,015
Ohio St	3	11-13-31	37,746	379	126	375	125	292	97	38,792
State E	1	1-13-31	43,756	182	182	323	323	296	296	44,557
Williams	4	7-13-32	62,226	577	144	575	144	727	182	64,105
Delfern Oil Co.										
State A	1	36-12-31	46,083	370	370	193	193	361	361	47,007
State B	1	1-13-31	49,874	272	272	185	185	183	183	50,519
State C	1	1-13-31	38,261	115	115	87	87	98	98	38,561
State D	1	1-13-31	59,800	549	549	379	379	375	375	61,103
State E	2	11-13-31	45,111	250	125	146	73	115	57	45,622
State F	3	7-13-32	171,973	1705	568	1422	474	1312	437	176,412
State G	2	1-13-31	123,780	1459	729	912	456	1102	551	132,253
State H	2	12-13-31	107,080	496	243	511	256	667	333	108,754
State J	2	13-13-31	41,519	334	167	274	137	336	168	42,463
Great Western Prod. Inc.										
Max St	1	12-13-31	48,808	930	930	744	744	935	935	51,417
State L	2	12-13-31	96,414	953	476	951	476	1122	561	99,440
State M	2	12-13-31	67,967	192	96	193	97	350	175	68,702
State N	4	18-13-32	67,085	946	237	1320	330	1129	282	70,430
State O	1	12-13-31	1,922	-		-		-		1,922
State P	1	2-13-31	3,716	149	149	-		-		3,865
State Q	3	32-12-32	69,027	978	326	986	329	898	299	71,889
State R	3	5-13-32	57,153	972	324	783	261	655	218	59,563
State S	1	5-13-32	2,832	-		209	209	-		3,091

(Continued)

GROSS PIPELINE RUNS FOR 1951
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	Cum. Total to 1-1-51	January Lease	January Per Well	February Lease	February Per Well	March Lease	March Per Well	Cum. Total to 4-1-51
Gulf Oil Corp.										
Chaves St	2	12-13-31	49,899	854	427	839	419	621	310	52,213
Lea St	3	6-13-32	15,737	-		-		-		15,737
Lea St B	2	6-13-32	38,256	621	310	802	401	1049	524	40,728
Manry & Co.										
Manry St A	2	6-13-32	55,722	673	337	647	324	215	107	57,257
	2	11-13-31	19,152	215	108	212	106	435	217	20,014
Mid-Cont. Pet. Corp.										
State "13"	1	32-12-32	22,350	331	331	136	136	188	188	23,105
Phillips Pet. Co.										
Cap	1	32-12-32	12,020	-		191	191	156	156	12,367
Caprock	4	32-12-32	87,313	1284	321	1490	372	1097	274	91,134
Levick	1	14-13-31	11,858	575	575	376	376	571	571	13,380
Polis, A.K.										
State A	2	12-13-31	62,459	208	104	216	108	425	212	63,308
State B	2	1-13-31	49,777	835	418	430	215	640	320	51,682
Resler Oil Co. (Formerly Page, Henry)										
State A	1	1-13-31	14,559	-		-		-		14,559
State B	1	12-13-31	16,203	-		192	192	-		16,395
State C	1	12-13-31	24,896	-		-		186	186	25,082
State D	1	7-13-31	4,710	-		-		-		4,710
State E	1	13-13-31	12,634	-		214	214	169	169	13,017
Vickers Pet. Co. (Formerly Malco Refg., Inc.)										
Caprock St	5	6-13-32 7-13-32	54,559	439	88	288	58	402	81	55,668
Caprock St A	2	18-13-32	27,256	449	225	666	333	653	326	29,024
Max Osmund	1	13-13-31	9,550	218	218	184	184	209	209	10,161
Max St	3	13 & 12-13-31	113,312	674	225	486	162	450	150	120,422
Max St F-2		1-13-31	1,995	-		-		-		1,995
Williams	7	7 & 8-13-32	94,445	1408	201	1415	202	1212	173	98,480
Watson, J.C. Drlg. Co. (Formerly Cockburn, Barney)										
State	2	36-12-31 13-13-31	25,073	298	149	297	148	221	221	25,889
Williams, Sam										
Williams	4	8-13-32	80,085	820	205	690	174	723	182	82,329
Wilson, H.L. Drlg. Co.										
Continental	1	19-13-32	2,721			185	185	-		2,906
FIELD TOTAL			3,329,397	30,375		23,524		28,131		3,416,927
TOTAL WELLS	123	AVERAGE PER WELL		241		223		220		

COOPERATIVE PRODUCING ASSOCIATION
AIR & WATER INJECTION RECORD
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
ON EXPERIMENTAL INJECTION WELL
STATE 2-A, Sec. 31, T-12-S, R-32-E

Date	Operating Hours	Daily Vol. Air Injected	Cum. Volume Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
9-25-50	23	79,040	79,040	465-70		
9-26-50	23	67,536	146,576			
9-27-50	23	95,081	241,657			
9-28-50	23	97,274	338,931			
9-29-50	23	93,840	432,771			
9-30-50	24	106,440	539,211			
10- 1-50	24	115,588	654,799			
10- 2-50	24	129,638	784,437			
10- 3-50	24	105,319	889,756			
10- 4-50	13	80,845	970,601			
10- 5-50	16	63,040	1,033,641			
10- 6-50	17	59,425	1,093,066			
10- 7-50	24	90,055	1,183,121			
10- 8-50	24	92,085	1,275,206			
10- 9-50	22	89,692	1,364,898			
10-10-50	19	81,330	1,446,228			
10-11-50	through					
10-19-50	0	-				
10-20-50	14	80,294	1,526,522			
10-21-50	23	58,219	1,584,741			
10-22-50	23	101,822	1,686,563			
10-23-50	22	73,975	1,760,538			
10-24-50	24	97,254	1,857,792			
10-25-50	24	98,635	1,956,427			
10-26-50	24	97,357	2,053,784			
10-27-50	22	92,305	2,146,089			
10-28-50	24	86,878	2,232,967			
10-29-50	24	82,916	2,315,883	465-70		
10-30-50	23	96,728	2,412,611			
10-31-50	24	97,309	2,509,920			
11- 1-50	23	95,607	2,605,527			
11- 2-50	24	101,924	2,707,451			
11- 3-50	23	98,042	2,805,493			
11- 4-50	24	83,099	2,888,592			
11- 5-50	21	85,565	2,974,157			
11- 6-50	24	86,167	3,060,324			
11- 7-50	16	59,485	3,119,809			
11- 8-50	24	101,164	3,220,973			
11- 9-50	24	102,340	3,323,313			
11-10-50	18	73,280	3,396,593			

(Continued)

COOPERATIVE PRODUCING ASSOCIATION
AIR & WATER INJECTION RECORD
(Continued)

Date	Operating Hours	Daily Vol. Air Injected	Cum. Volume Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
11-11-50	0	0			82	82
11-12-50	0	0			198	280
11-13-50	0	0			84	364
11-14-50	14	Pressure too high for chart				
11-15-50	24	"	"	"	"	
11-16-50	24	"	"	"	"	
11-17-50	18					
11-18-50	24	71,633	3,468,281			
11-19-50	24	71,040	3,539,321			
11-20-50	24	76,728	3,616,049			
11-21-50	24	83,496	3,699,545			
11-22-50	24	88,152	3,787,697			
11-23-50	24	85,302	3,872,999			
11-24-50	24	87,120	3,960,119			
11-25-50	24	86,840	4,046,959			
11-26-50	24	87,817	4,134,776			
11-27-50	24	87,593	4,222,369			
11-28-50	24	87,288	4,309,657			
11-29-50	24	87,074	4,396,731			
11-30-50	24	85,536	4,482,267			
12- 1-50	23	81,153	4,563,420			
12- 2-50	24	97,355	4,660,775			
12- 3-50	24	96,349	4,757,124			
12- 4-50	24	101,227	4,858,851			
12- 5-50	16	59,744	4,918,595			
12- 6-50	11	43,942	4,962,537			
12- 7-50	21	81,506	5,044,043			
12- 8-50	24	91,648	5,135,691			
12- 9-50	24	106,896	5,242,587			
12-10-50	22	97,006	5,339,593			
12-11-50	24	113,835	5,453,428			
12-12-50	24	114,312	5,567,740			
12-13-50	24	112,250	5,679,990			
12-14-50	24	120,954	5,800,944			
12-15-50	24	110,186	5,911,130			
12-16-50	24	116,748	6,027,878			
12-17-50	24	111,880	6,139,758			
12-18-50	11	49,645	6,189,403			
12-19-50	23	108,458	6,297,861			
12-20-50	24	122,102	6,419,963			
12-21-50	24	124,984	6,544,947			
12-22-50	24	123,329	6,668,276			
12-23-50	24	119,513	6,787,789			
12-24-50	24	116,857	6,904,646			

(Continued)

COOPERATIVE PRODUCING ASSOCIATION
AIR & WATER INJECTION RECORD
(Continued)

Date	Operating Hours	Daily Vol. Air Injected	Cum. Vol. Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
12-25-50	24	116,995	7,021,641			
12-26-50	24	109,686	7,131,327			
12-27-50	24	111,432	7,242,759			
12-28-50	24	116,417	7,359,176			
12-29-50	24	111,880	7,471,056			
12-30-50	24	107,155	7,578,211			
12-31-50	24	107,577	7,685,788			
1- 1-51	24	105,124	7,790,912			
1- 2-51	24	103,352	7,894,264			
1- 3-51	24	94,765	7,989,029			
1- 4-51	22	91,260	8,080,289			
1- 5-51	16	70,368	8,150,657			
1- 6-51	23	100,512	8,251,169			
1- 7-51	22	91,965	8,343,134			
1- 8-51	24	107,783	8,450,917			
1- 9-51	24	106,350	8,557,267			
1-10-51	24	106,208	8,663,475			
1-11-51	18	121,469	8,784,944			
1-12-51	22	146,207	9,031,151			
1-13-51		Injecting Water Pressure			120	434
1-14-51						
1-15-51	through	Too High for Chart			42	526
1-31-51		" " " "				

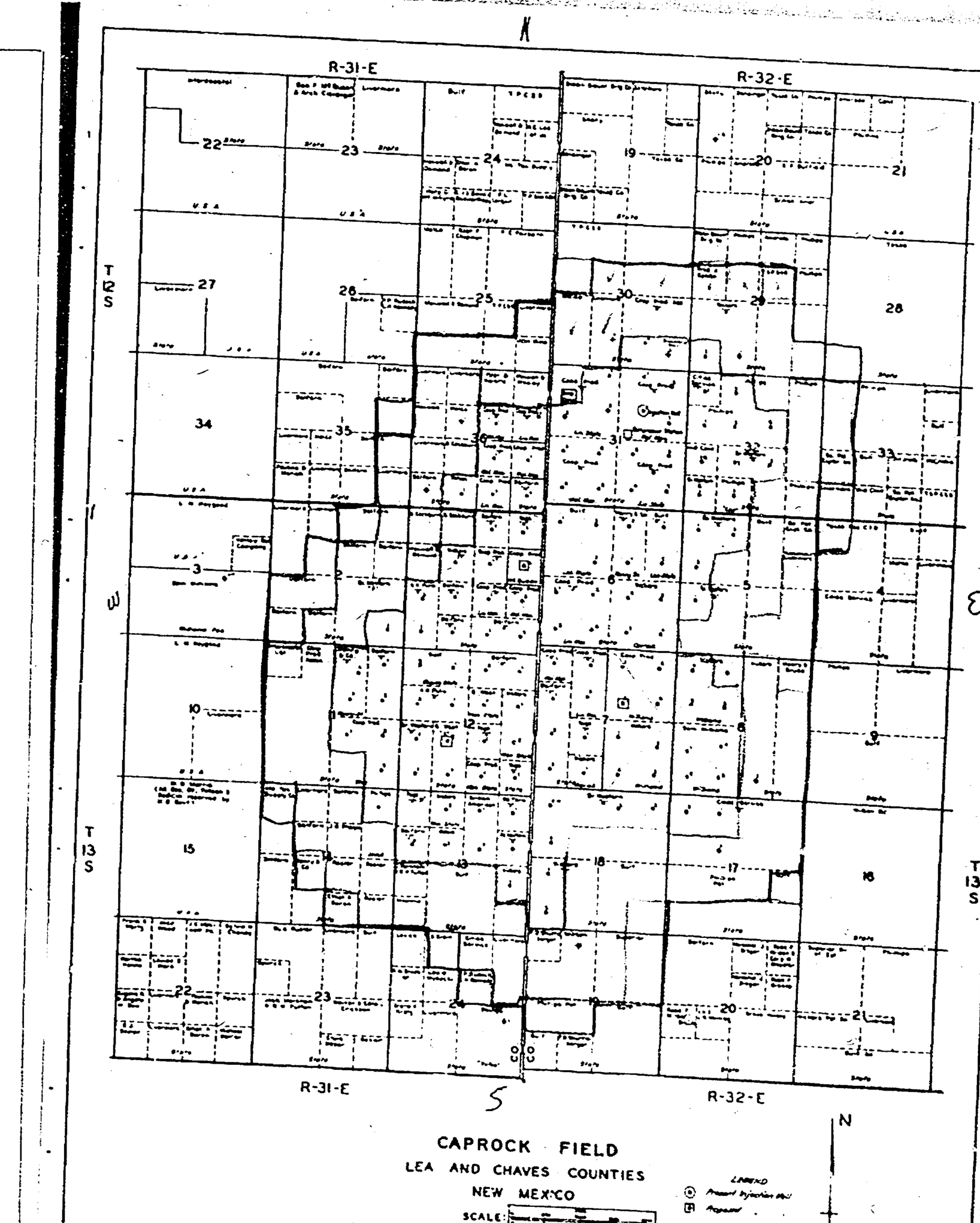
Repressuring Plant down during Month of February, 1951 – Mechanical Difficulties.

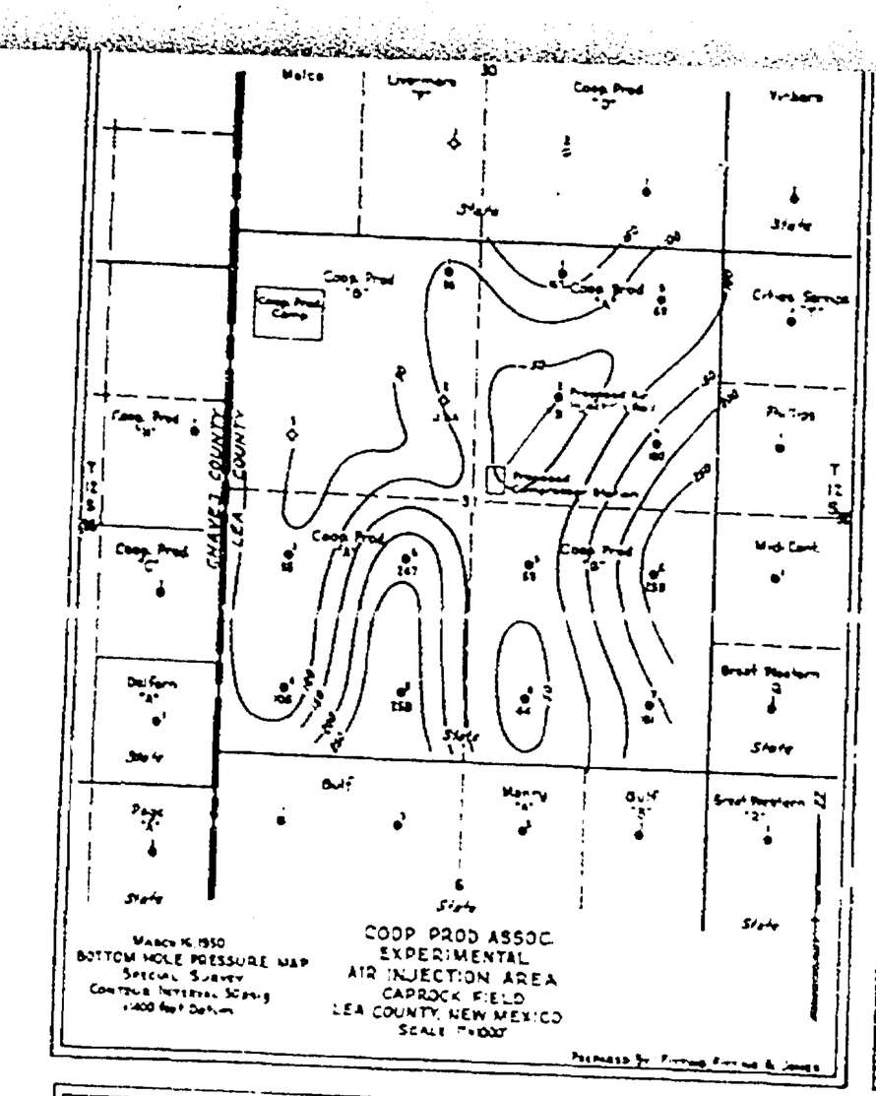
Date	Operating Hours	Daily Vol. Air Injected	Cum. Vol. Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
3- 1-51	24	61,431	9,092,582			
3- 2-51	24	62,696	9,155,278			
3- 3-51	24	62,604	9,217,882			
3- 4-51	24	76,262	9,294,144			
3- 5-51	24	74,914	9,369,058			
3- 6-51	24	77,225	9,446,833			
3- 7-51	23	74,243	9,521,126			
3- 8-51	24	77,748	9,598,874			
3- 9-51	24	84,446	9,683,320			
3-10-51	24	86,977	9,770,297			
3-11-51	24	87,338	9,857,635			
3-12-51	24	86,724	9,944,359			
3-13-51	16	57,024	10,001,383			
3-14-51	22	75,445	10,076,828			
3-15-51	24	94,181	10,171,009			
3-16-51	24	101,249	10,272,258			
3-17-51	24	111,917	10,384,175			

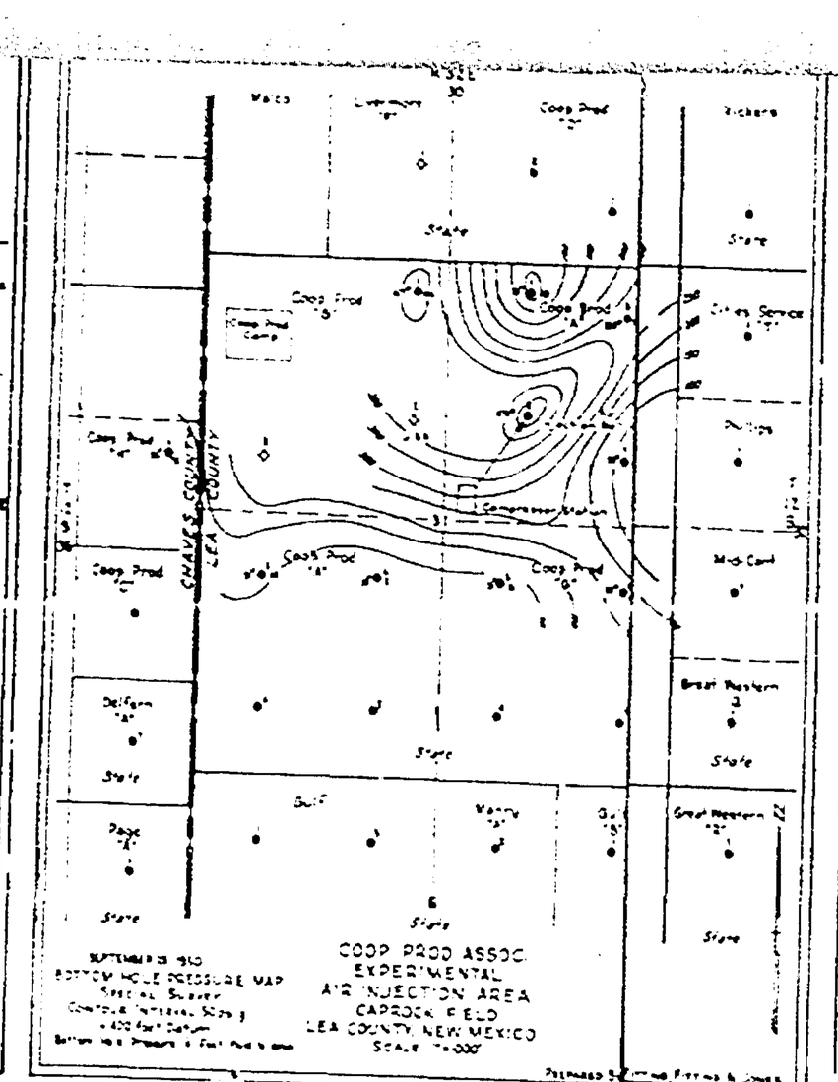
(Continued)

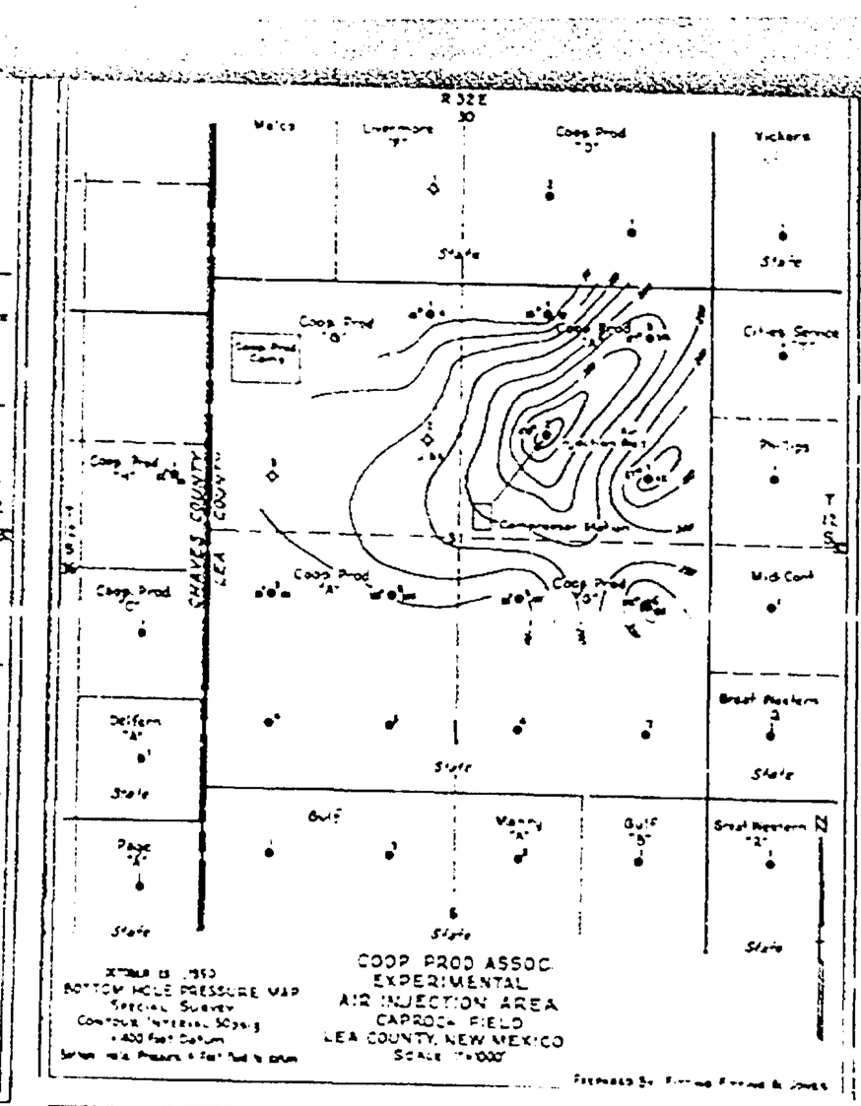
COOPERATIVE PRODUCING ASSOCIATION
AIR & WATER INJECTION RECORD
(Continued)

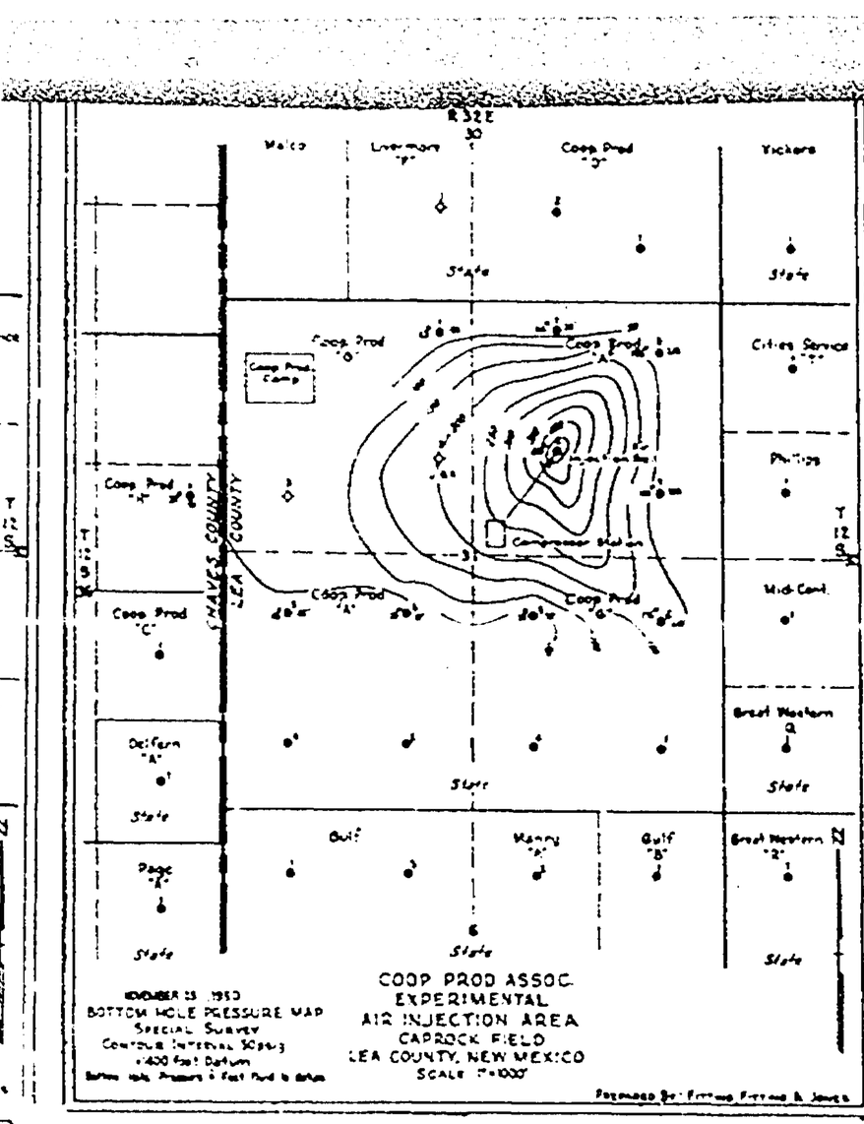
Date	Operating Hours	Daily Vol. Air Injected	Cum. Volume Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
3-18-51	24	102,728	10,486,903			
3-19-51	24	92,292	10,579,195			
3-20-51	24	85,886	10,665,081			
3-21-51	24	104,597	10,769,678			
3-22-51	24	93,889	10,863,567			
3-23-51	24	110,970	10,974,537			
3-24-51	24	99,321	11,073,858			
3-25-51	24	102,320	11,176,178			
3-26-51	12	67,798	11,243,976			
3-27-51	14	72,452	11,316,428			
3-28-51	20	79,360	11,395,788			
3-29-51	3	34,386	11,430,174			
4- 1-51	14	47,340	11,477,514			
4- 2-51	19	64,738	11,542,252			
4- 3-51	24	54,266	11,596,518			
4- 4-51	24	93,516	11,690,034			
4- 5-51	24	88,379	11,778,413			
4- 6-51	24	91,786	11,870,199			
4- 7-51	24	95,447	11,965,646			
4- 8-51	24	113,399	12,079,045			
4- 9-51	24	106,681	12,185,726			
4-10-51	22	106,896	12,292,622			
4-11-51	24	104,131	12,396,753			
4-12-51	23	104,569	12,501,322			
4-13-51	24	92,468	12,593,790			
4-14-51	23	108,599	12,702,389			
4-15-51	22	122,492	12,824,881			
4-16-51	24	129,300	12,954,181			
4-17-51	24	137,484	13,091,665			
4-18-51	17	96,240	13,187,905			
4-19-51	24	138,964	13,326,869			
4-20-51	24	126,037	13,452,906			
4-21-51	24	120,350	13,573,256			
4-22-51	24	134,272	13,707,528			
4-23-51	24	124,520	13,832,048			
4-24-51	14	69,375	13,901,423			
4-25-51	17	36,105	13,937,528			
4-26-51	24	114,080	14,051,608			
4-27-51	24	128,508	14,180,116			
4-28-51	24	128,820	14,308,936			
4-29-51	24	141,573	14,450,509			
4-30-51	20	91,367	14,541,876			

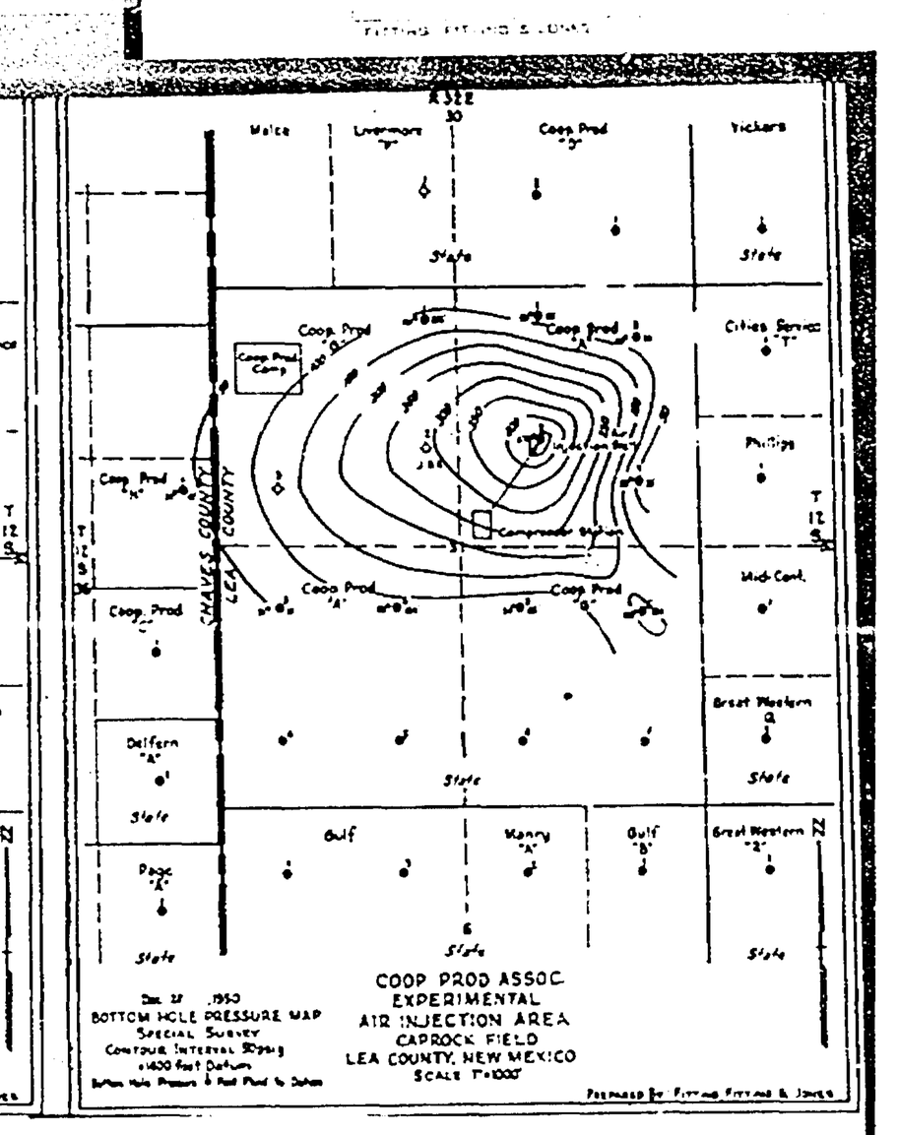


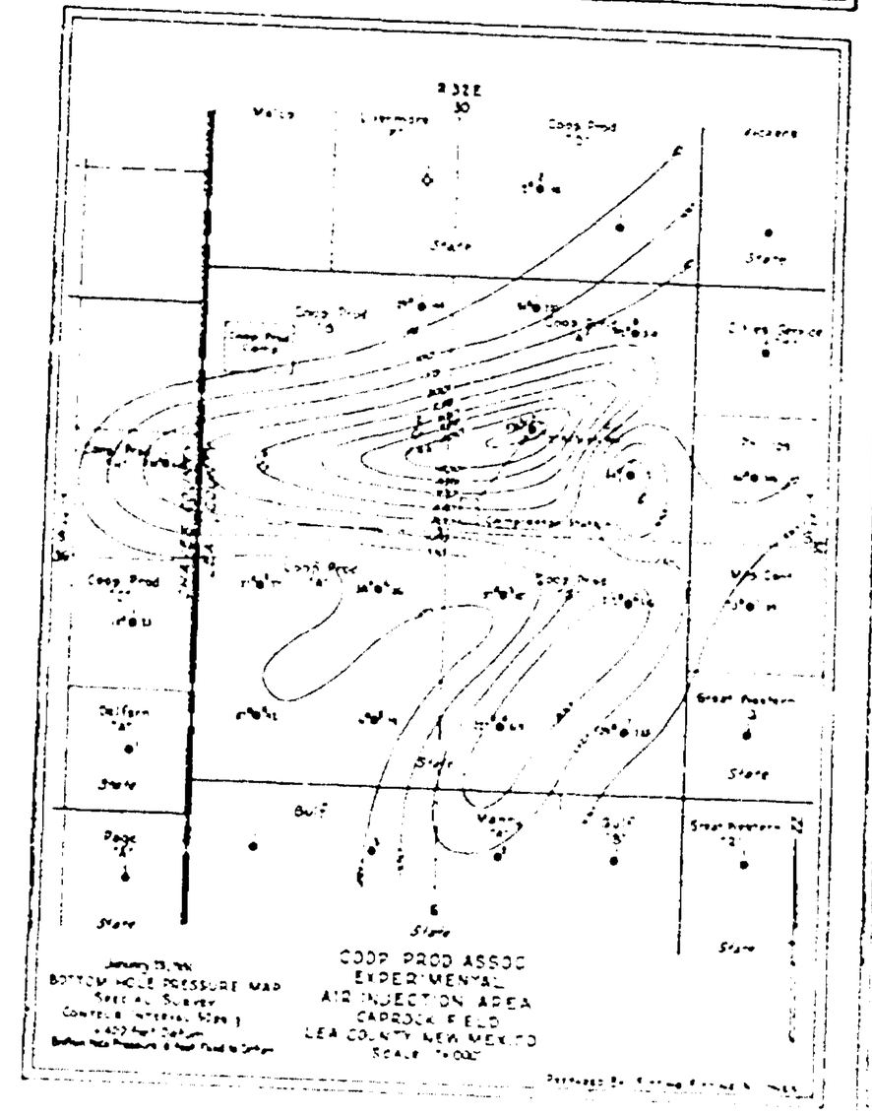


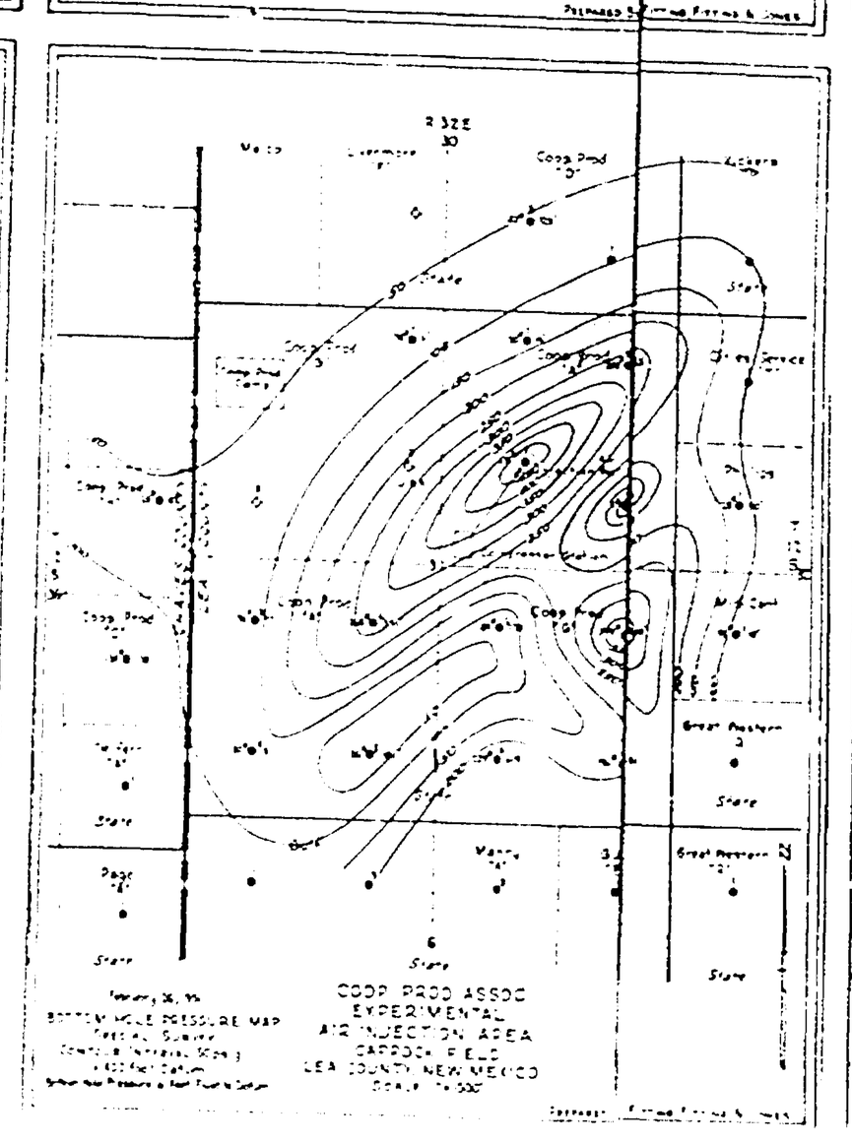


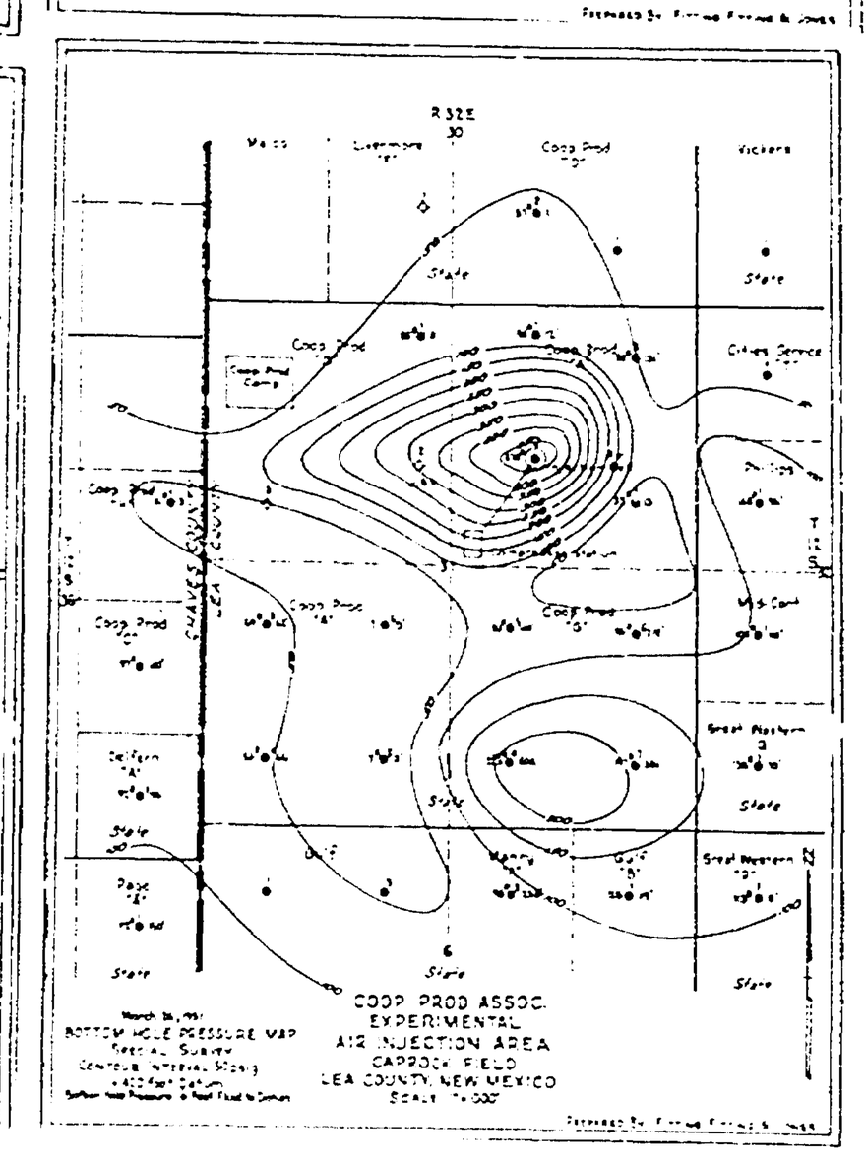


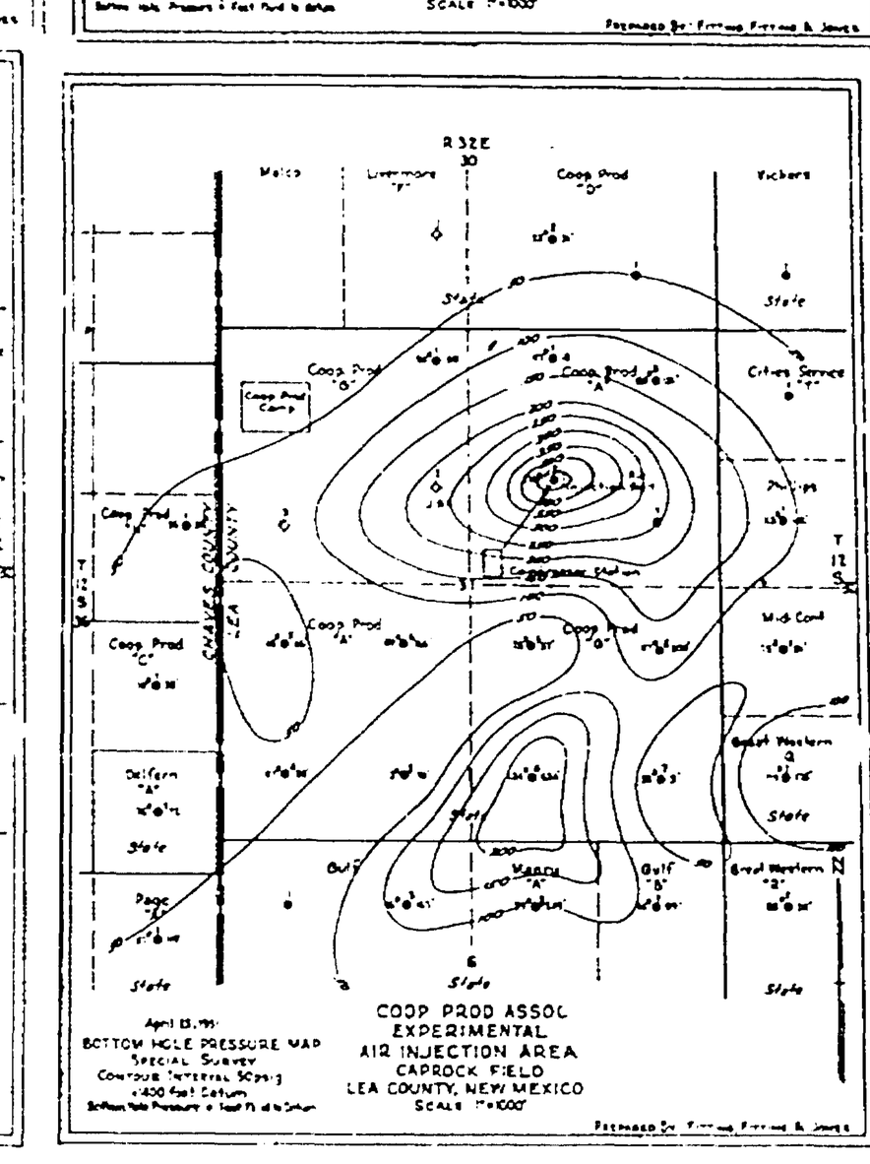


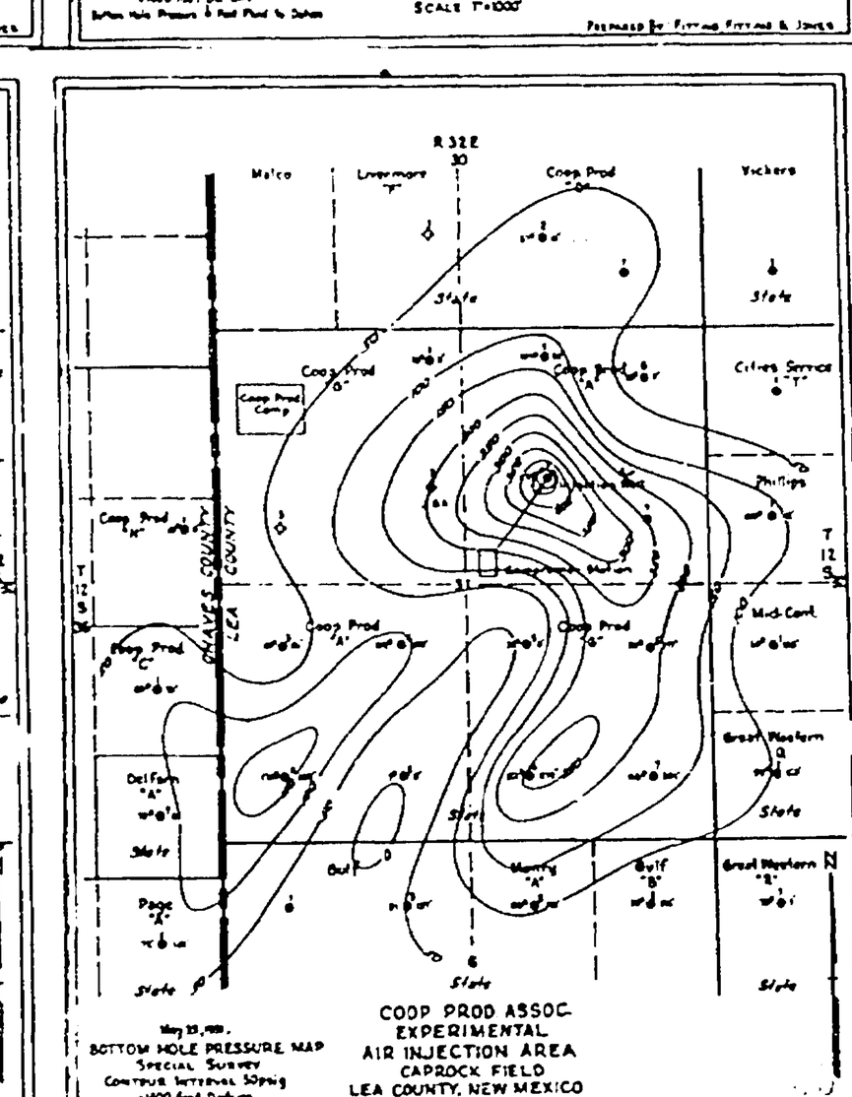


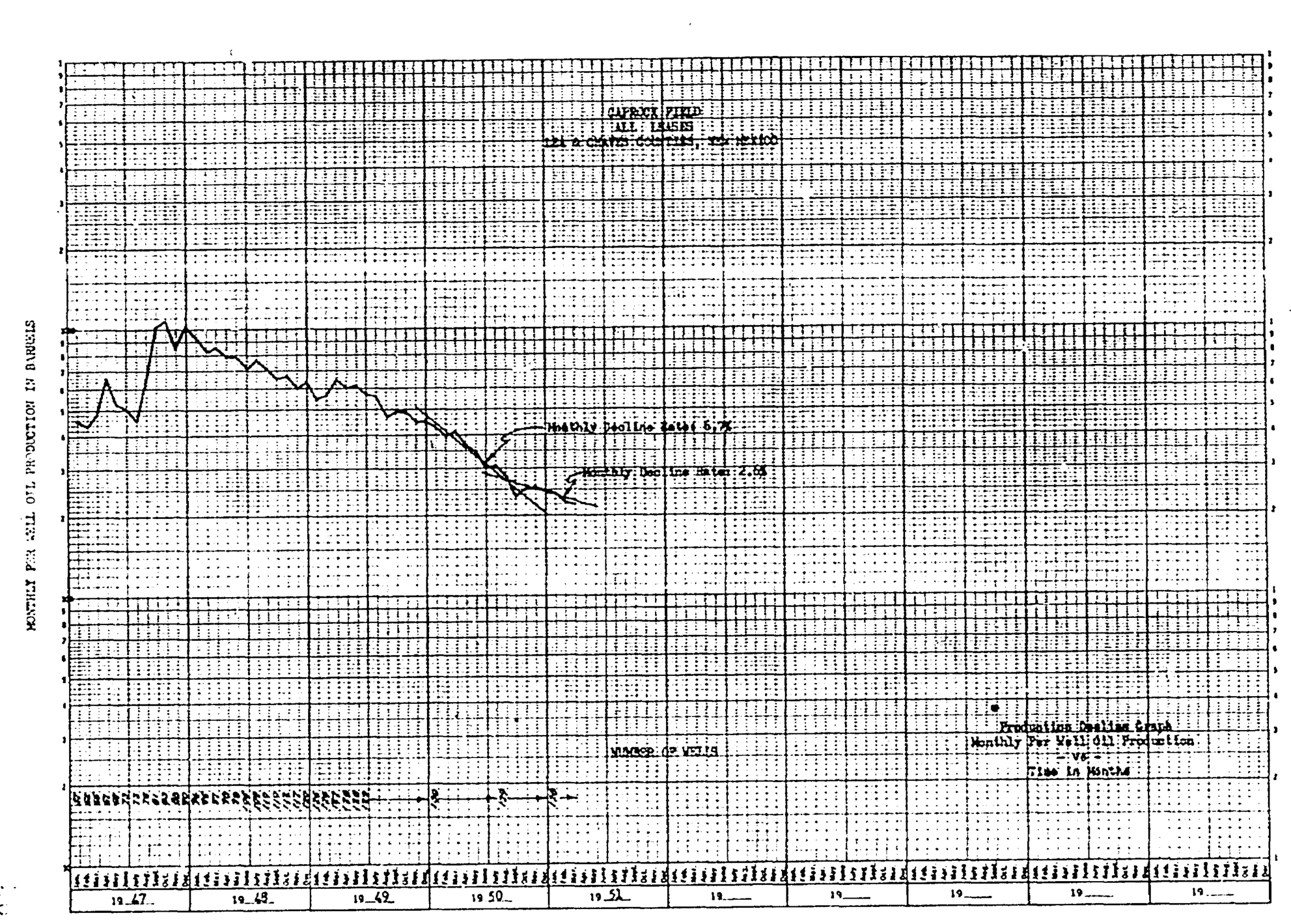


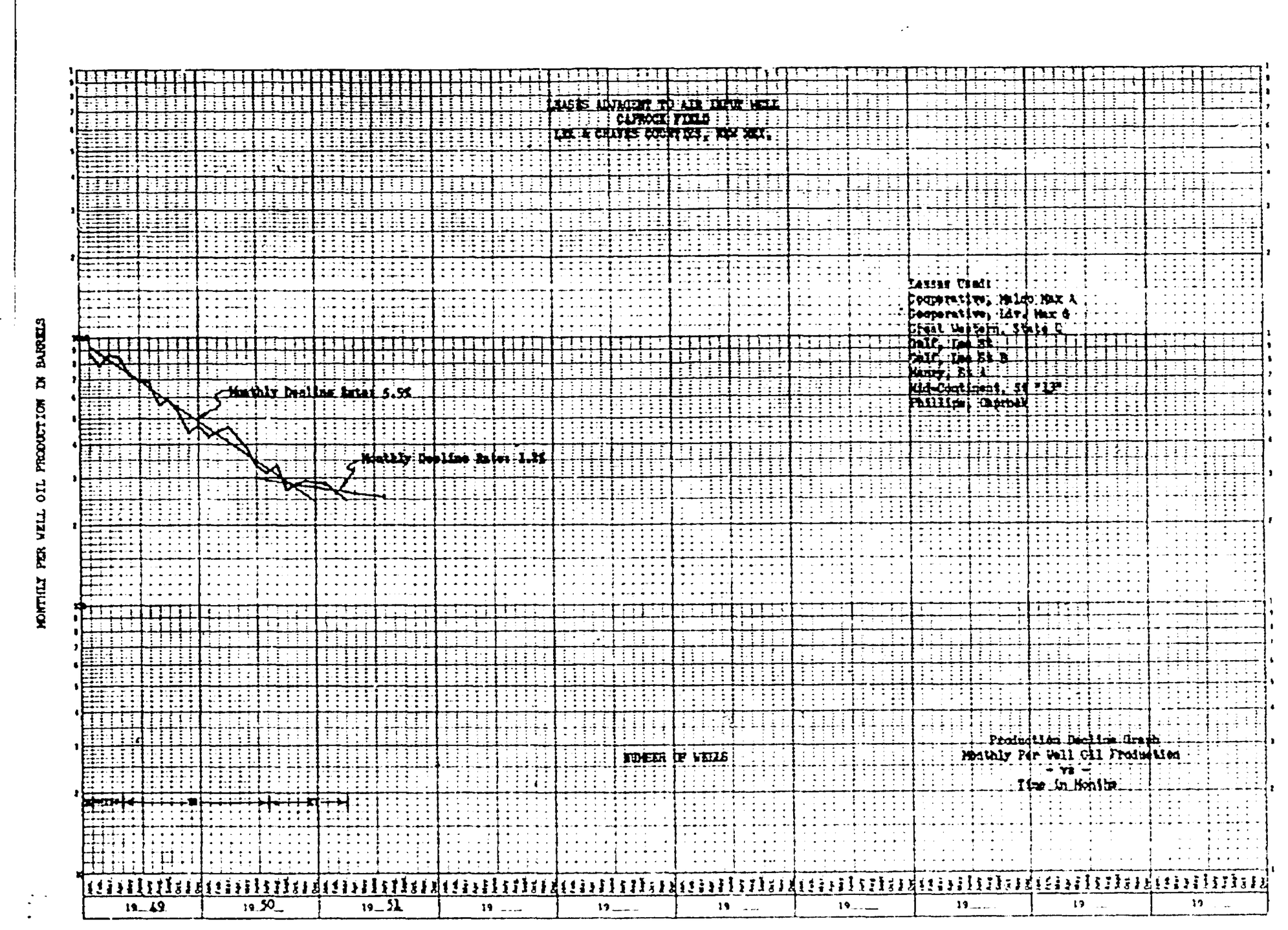












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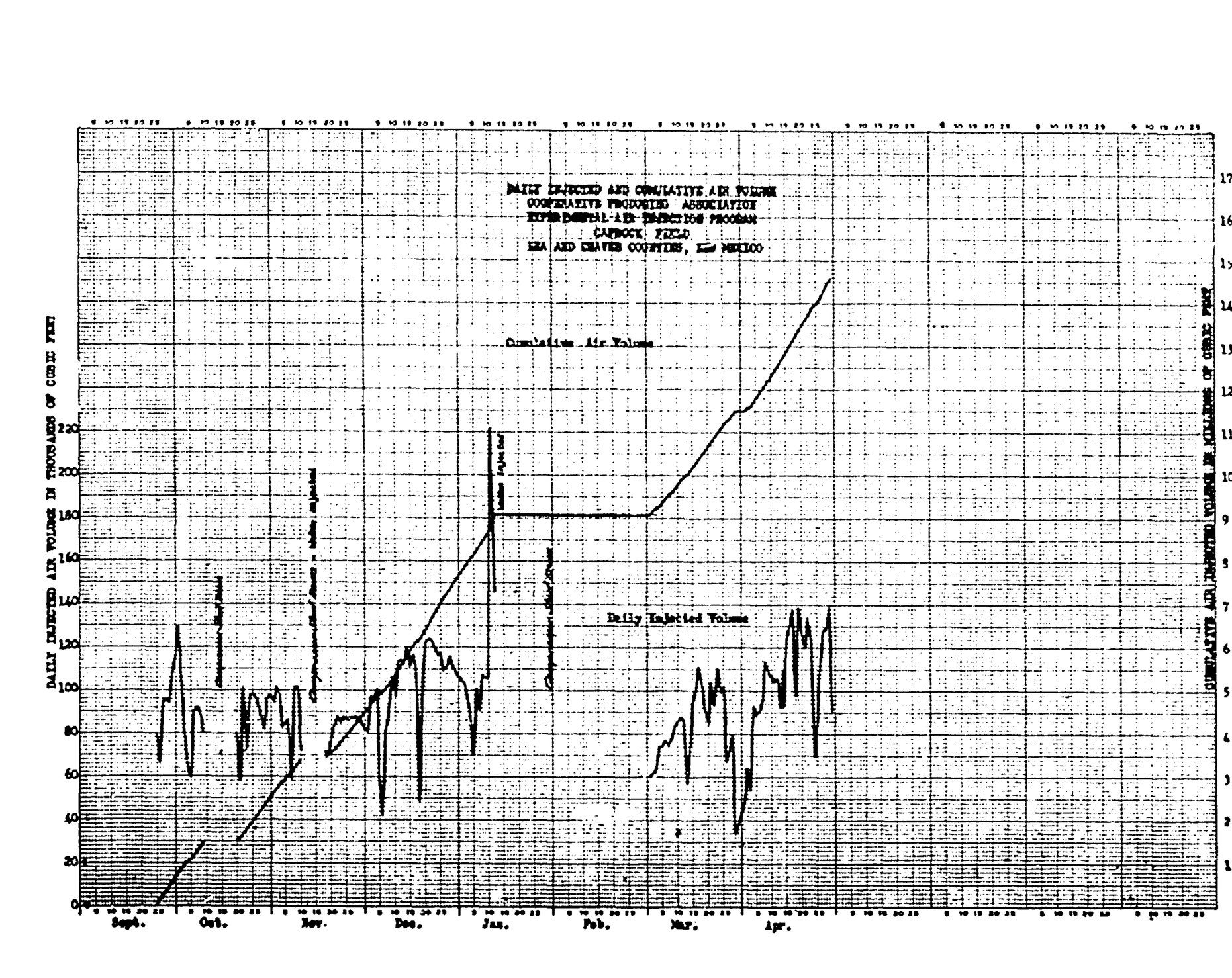
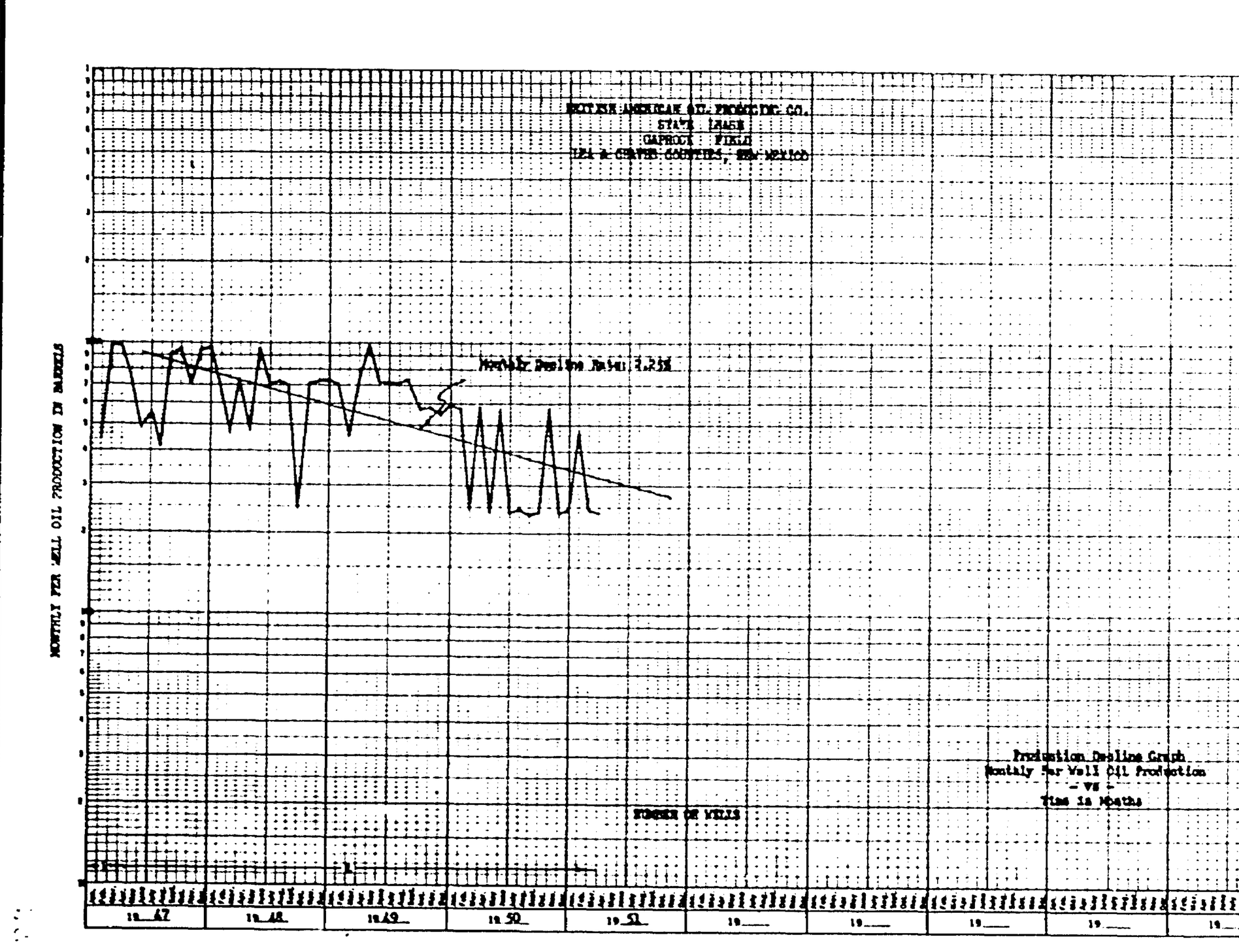
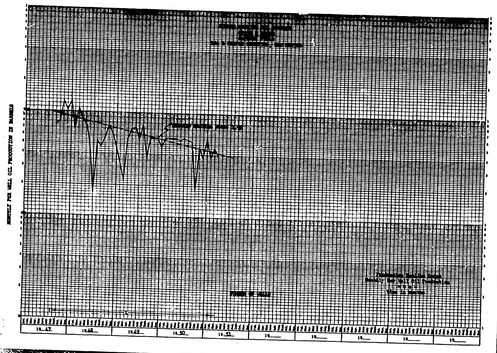
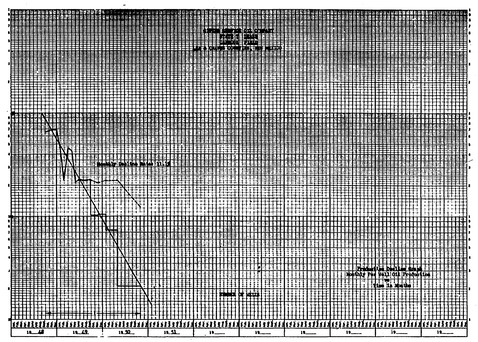
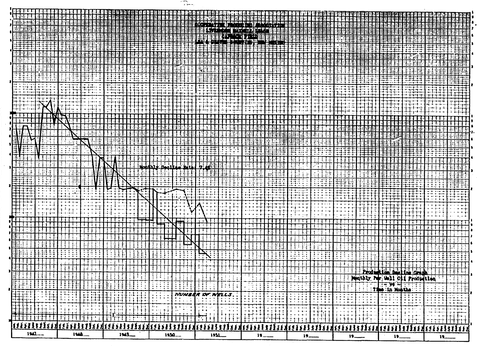
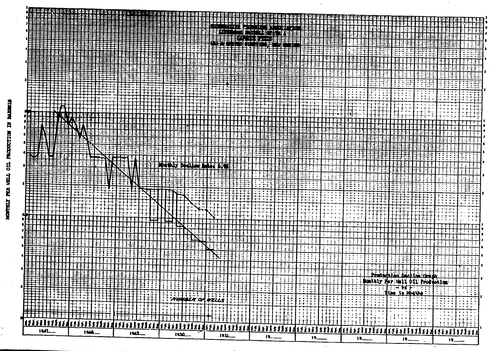


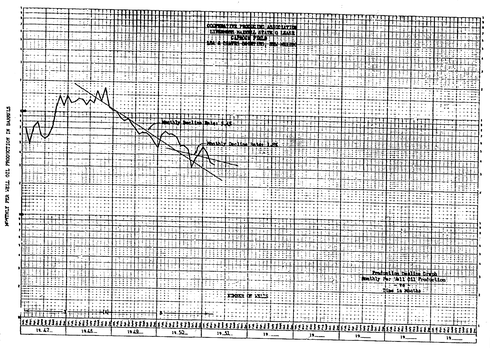


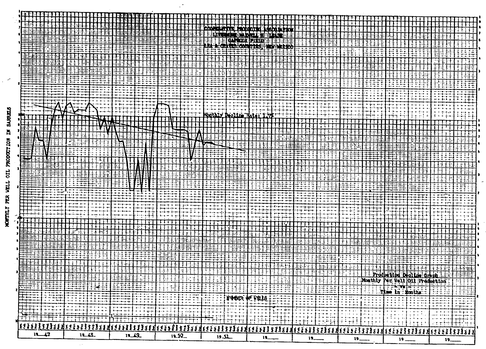

Monthly Decline Rate 4.5%
Monthly Decline Rate .39%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

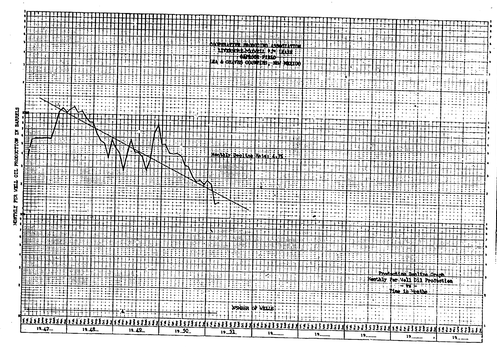

Monthly Decline Rate 11.5%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

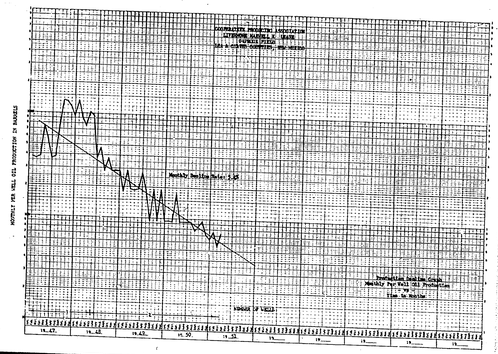

Monthly Decline Rate 7.4%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

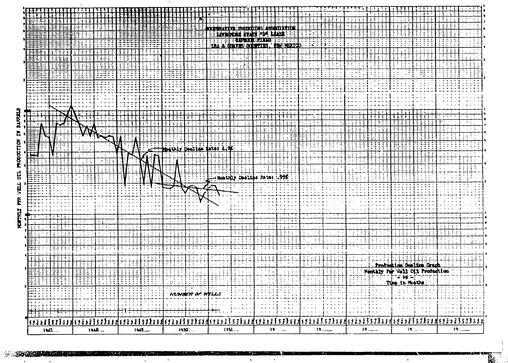

Monthly Decline Rate 5.9%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

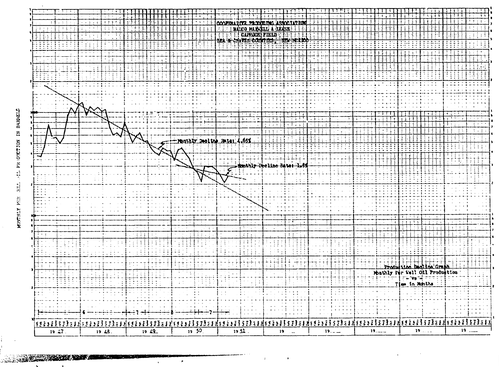

Monthly Decline Rate 4.5%
Monthly Decline Rate 1.8%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

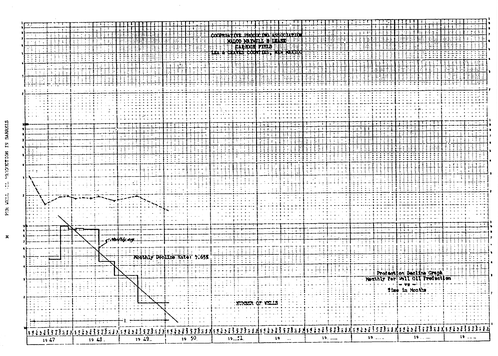

Monthly Decline Rate 4.1%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

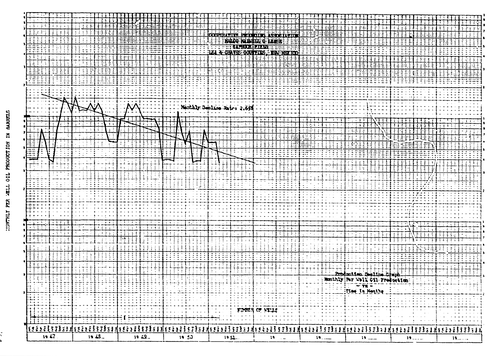

Monthly Decline Rate 4.7%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

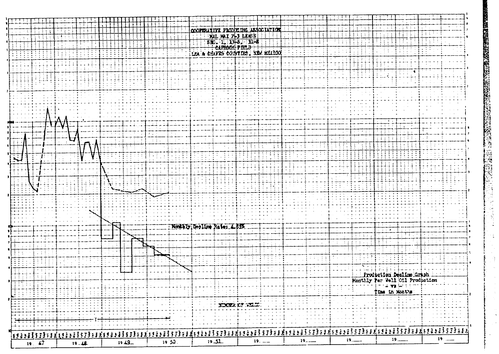

Monthly Decline Rate 2.4%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

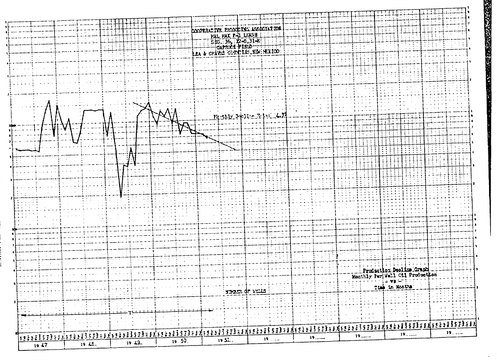

Monthly Decline Rate 4.2%
Monthly Decline Rate .39%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

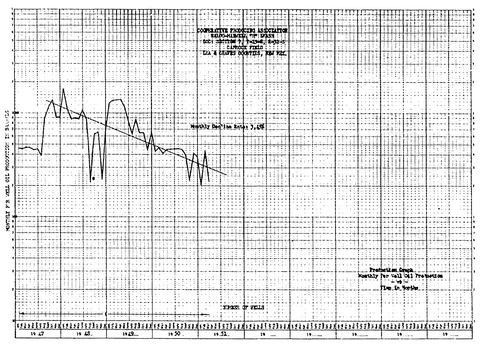

Monthly Decline Rate 4.6%
Monthly Decline Rate 1.4%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

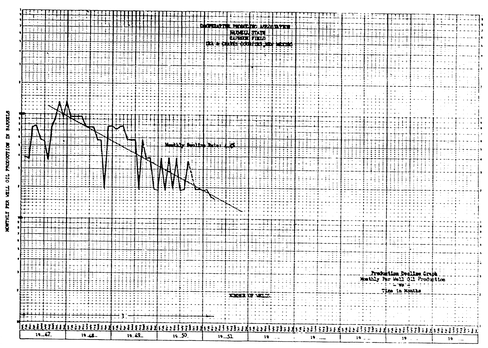

Monthly Decline Rate 5.6%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months


Monthly Decline Rate 3.6%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months


Monthly Decline Rate 4.1%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months


Monthly Decline Rate 4.7%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months


Monthly Decline Rate 3.6%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months


Monthly Decline Rate 1.8%
NUMBER OF WELLS
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

249

COOPERATIVE PRODUCING ASSOCIATION
GRID STATE LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.5%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

COOPERATIVE PRODUCING ASSOCIATION
GRID STATE LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.5%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

COOPERATIVE PRODUCING ASSOCIATION
STATE M LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 7.2%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

COOPERATIVE PRODUCING ASSOCIATION
STATE M LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 5.0%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE A LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.5%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE A LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.5%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE A LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 5.5%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE B LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 5.4%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE B LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.0%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE B LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 7.2%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE B LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 6.4%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

DELPARK OIL COMPANY
STATE B LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 7.2%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

GREAT WESTERN PROD. INC.
MARSHALL STATE LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 5.45%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

GREAT WESTERN PROD. INC.
STATE D LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

Monthly Decline Rate: 5.1%

MONTHLY PER WELL OIL PRODUCTION IN BARRELS

Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

NUMBER OF WELLS

GREAT WESTERN PROD. INC.
STATE M LEASE
CAPROCK FIELD
SEC 6 CHAVES COUNTY, NEW MEXICO

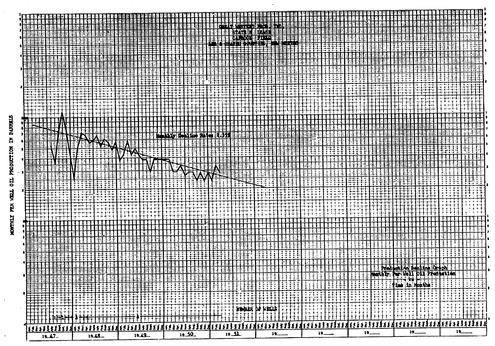
Monthly Decline Rate: 6.5%

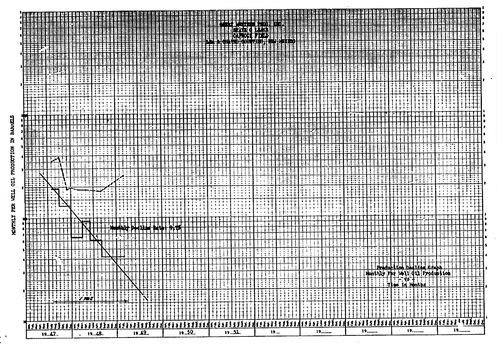
MONTHLY PER WELL OIL PRODUCTION IN BARRELS

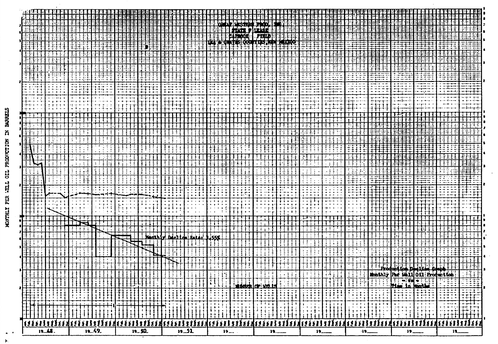
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months

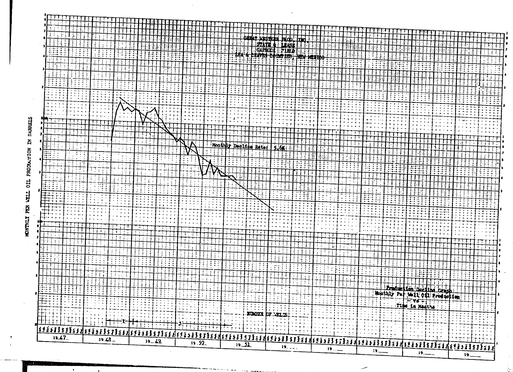
NUMBER OF WELLS

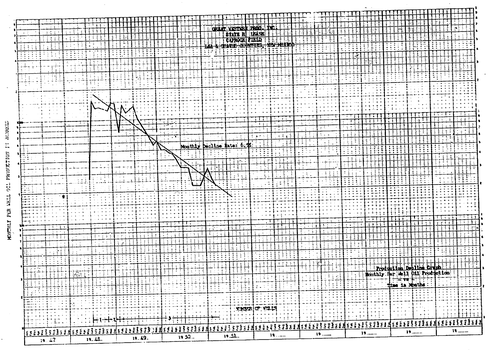
250

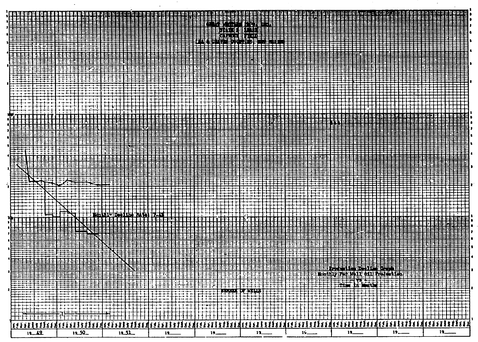

GULF OIL CORPORATION
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

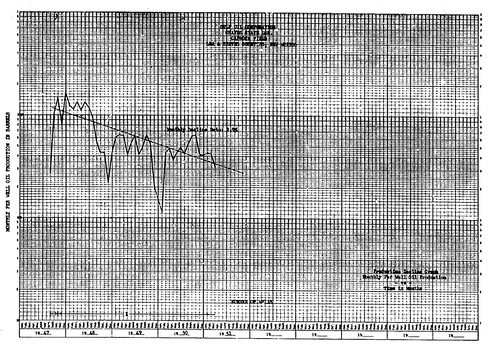

GULF OIL CORP.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 7.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

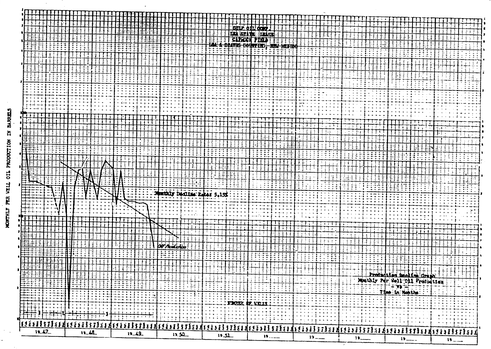

GULF OIL CORP.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.0%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

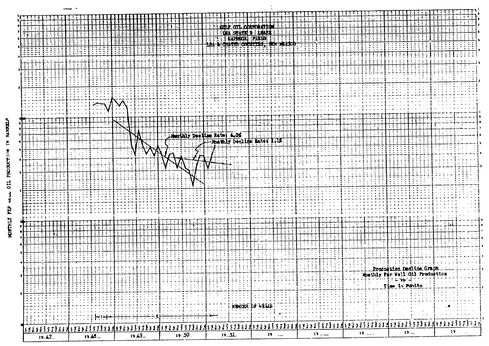

GULF OIL CORP.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 3.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

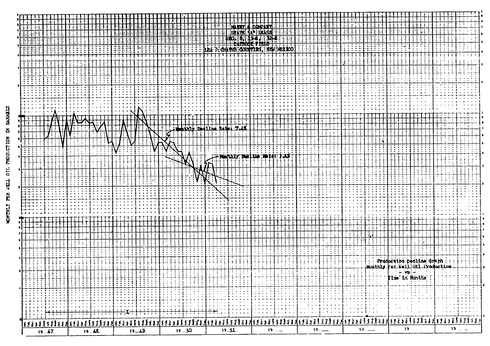

GULF OIL CORP.
SEC 19 BLOCK 5
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 5.4%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

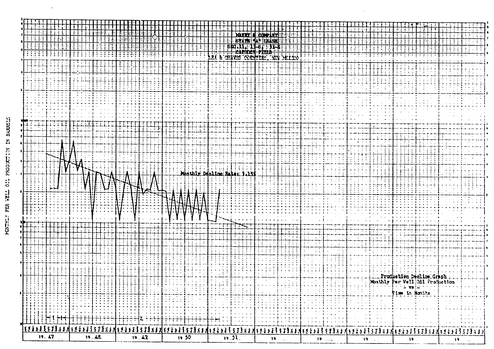

GULF OIL CO.
SEC 19 BLOCK 5
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 7.0%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

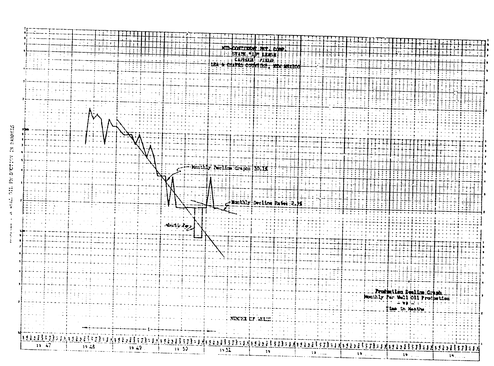

GULF OIL CORP.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

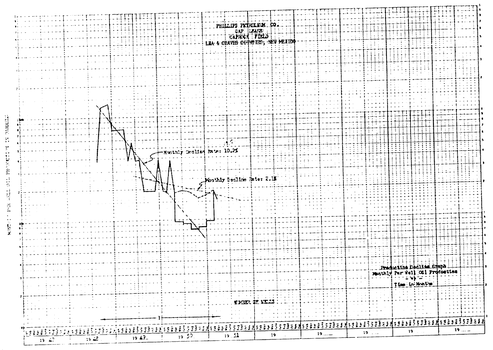

GULF OIL CORP.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 3.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

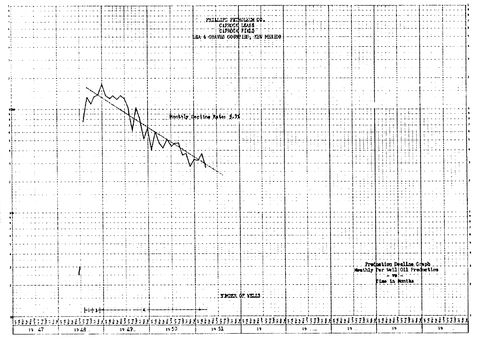

GULF OIL CORPORATION
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 4.0%
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

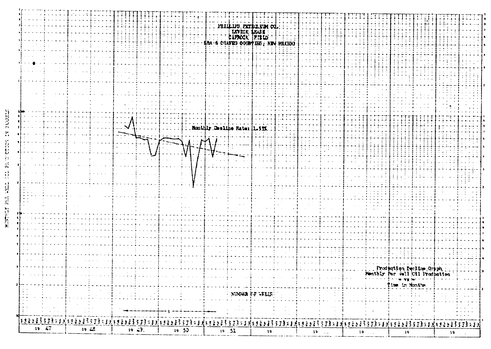

MARK A CONDIE
GRAYBURG UNIT
SEC. 19, T-17-S, R-32-E
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 7.1%
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS

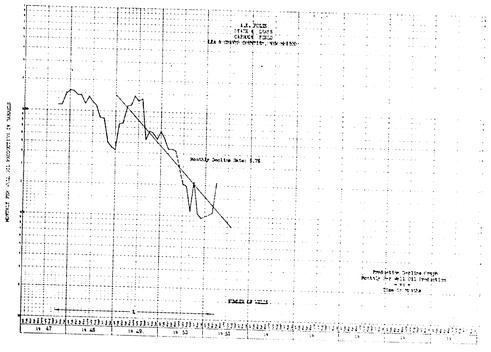

MARK A CONDIE
STATE "A" LEASE
SEC. 32-T-16-S, R-32-E
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 3.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS


MID-CONTINENT NAT. GAS CORP.
STATE "AP" LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Graph 10.1%
Monthly Decline Rate 3.1%
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

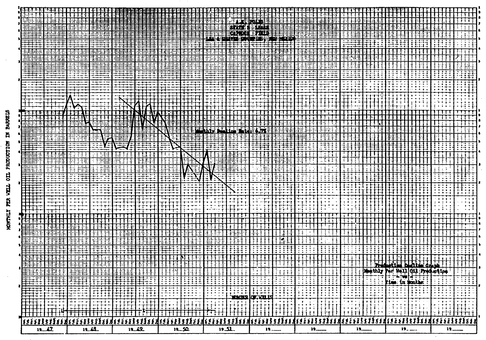

PHILLIPS PETROLEUM CO.
SEC 19 BLOCK 5 LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 10.0%
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

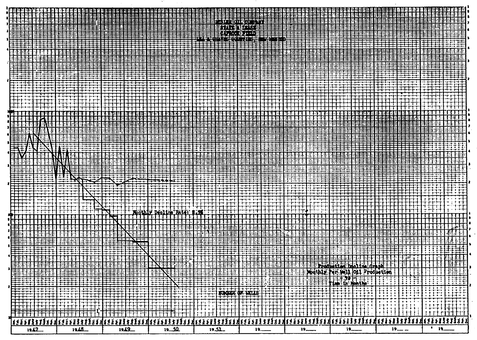

PHILLIPS PETROLEUM CO.
CARMEN LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 5.7%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

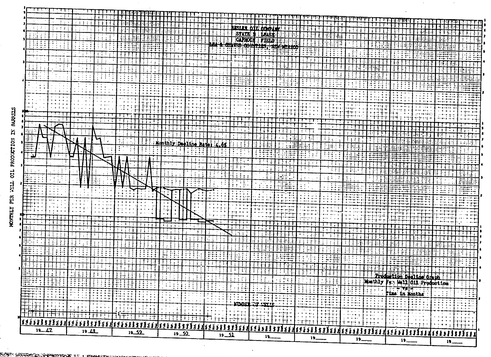

PHILLIPS PETROLEUM CO.
CARMEN LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.1%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

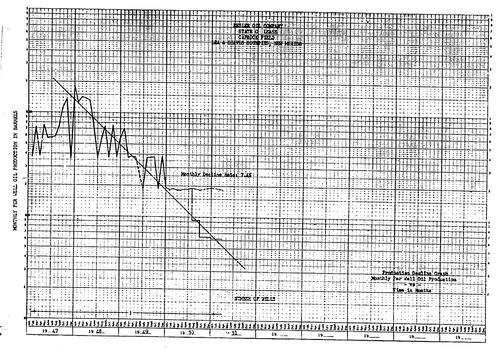

J.F. YOUD
STATE A LEASE
CARMEN FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.7%
Production Decline Graph
Monthly Per Well Oil Production
vs
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
PERIOD OF WELLS

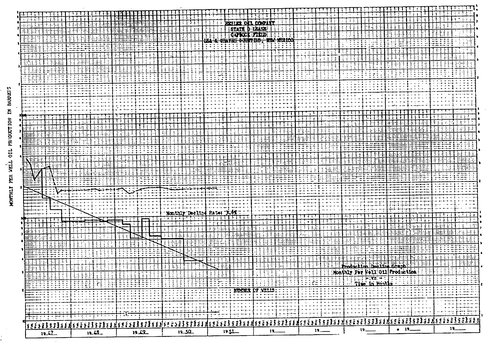
251

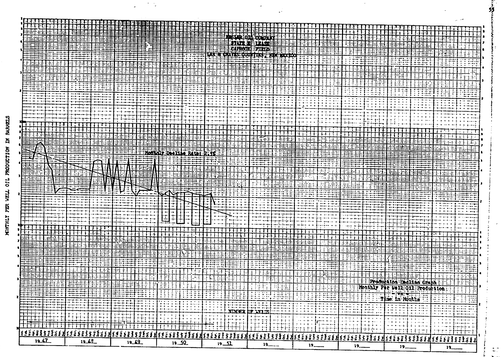

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.7%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

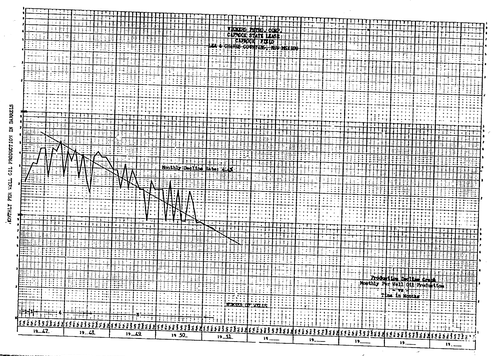

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.4%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

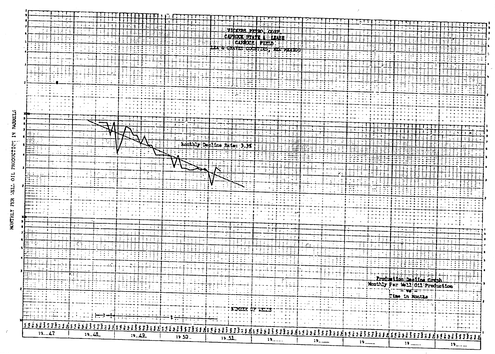

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.6%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

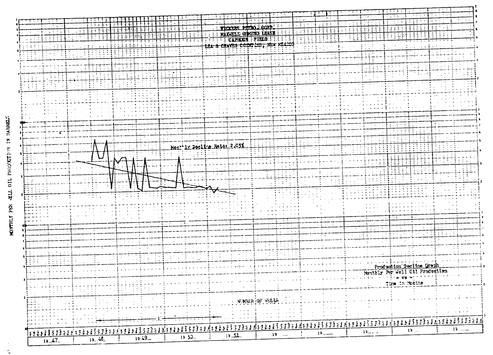

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.4%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

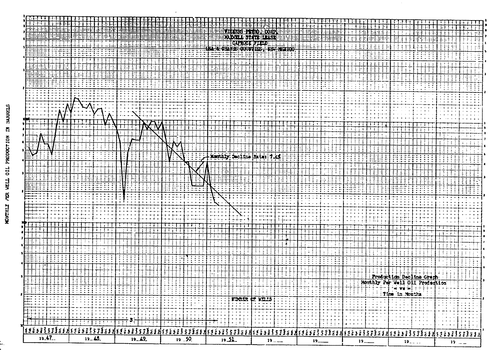

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.4%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

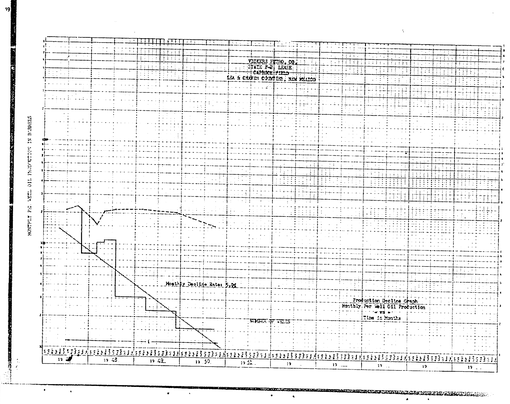

SHELL OIL COMPANY
STATE D 16638
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.4%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

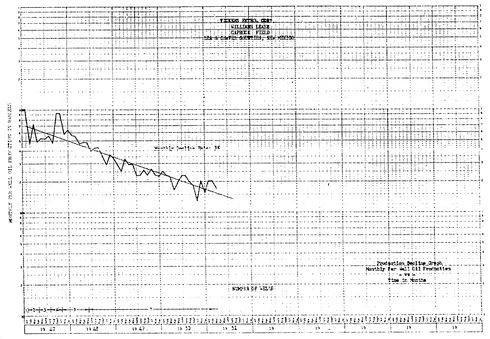

TEXACO INCORPORATED
CAPROCK PARTY LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.4%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS


TEXACO INCORPORATED
CAPROCK STATE L LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 3.3%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

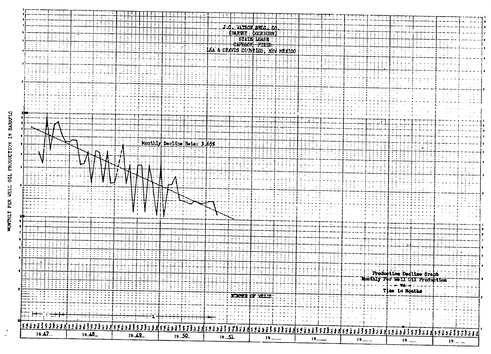

TEXACO INCORPORATED
CAPROCK STATE L LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 2.0%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

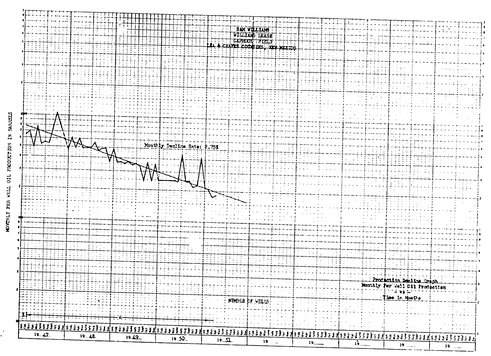

TEXACO INCORPORATED
CAPROCK STATE L LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.6%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS


TEXACO INCORPORATED
CAPROCK STATE L LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 5.0%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS


TEXACO INCORPORATED
CAPROCK STATE L LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 3%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

252


J.C. HINCH ANAL. CO.
(AGENT OPERATOR)
FEDERAL LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 3.6%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS


TAM PETROLEUM
WILLIAMS LEASE
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.7%
Production Decline Graph
Monthly Per Well Oil Production
Time In Months
NUMBER OF WELLS

COOPERATIVE PRODUCING ASSOCIATION
LEVELLAND, TEXAS

November 24, 1951

Mailed to all Operators:

Enclosed you will find a report supplementing the report of Fitting, Fitting and Jones and bringing the same down to October1, 1951. Pursuant to advice to Mr. Robert D. Fitting, all curves have been brought down to date along with contour maps of the injection area and a discussion of the water injection had at Caprock Field, Cooperative Producing Association's Secondary Recovery Plant on October 25, 1951.

We are hopeful that this information will be of value to you in that we can come to some definite agreement either on a unitization or cooperative operating agreement in the very near future.

We, therefore, are asking for a meeting of all operators at 10:00 A.M., Thursday, December 6, 1951, Hobbs, New Mexico, in the offices of the New Mexico Oil and Gas Engineering Committee. We would further request that your representative be vested with sufficient authority to come to some agreement subject to the approval of your company. We feel that sufficient time has elapsed for all necessary study of this proposed program and that an agreement on the division of interest or percentage of participation, the type and method of operation, and the formation of the management are the only questions not agreed upon.

If we may be of any further help or assistance to you in the meantime, please advise us immediately.

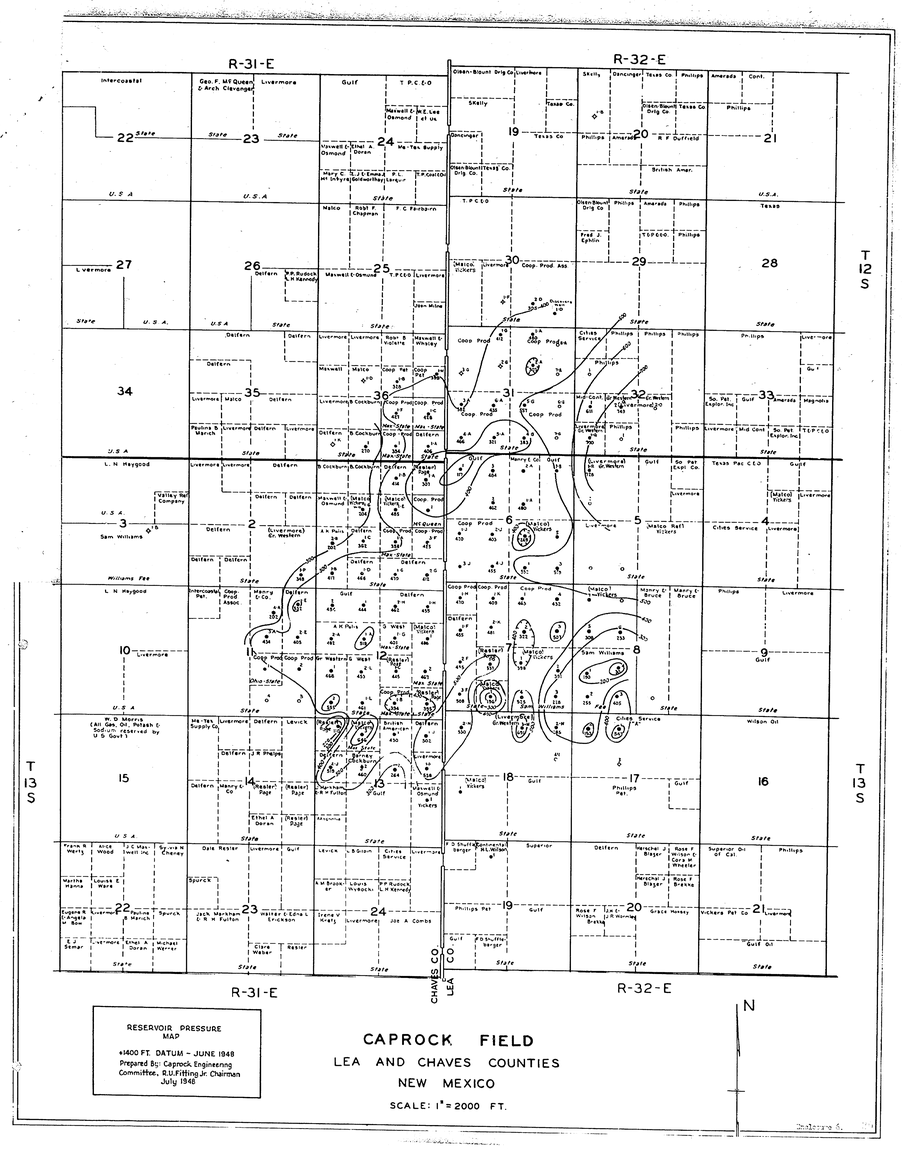
Yours very truly,

COOPERATIVE PRODUCING ASSOCIATION

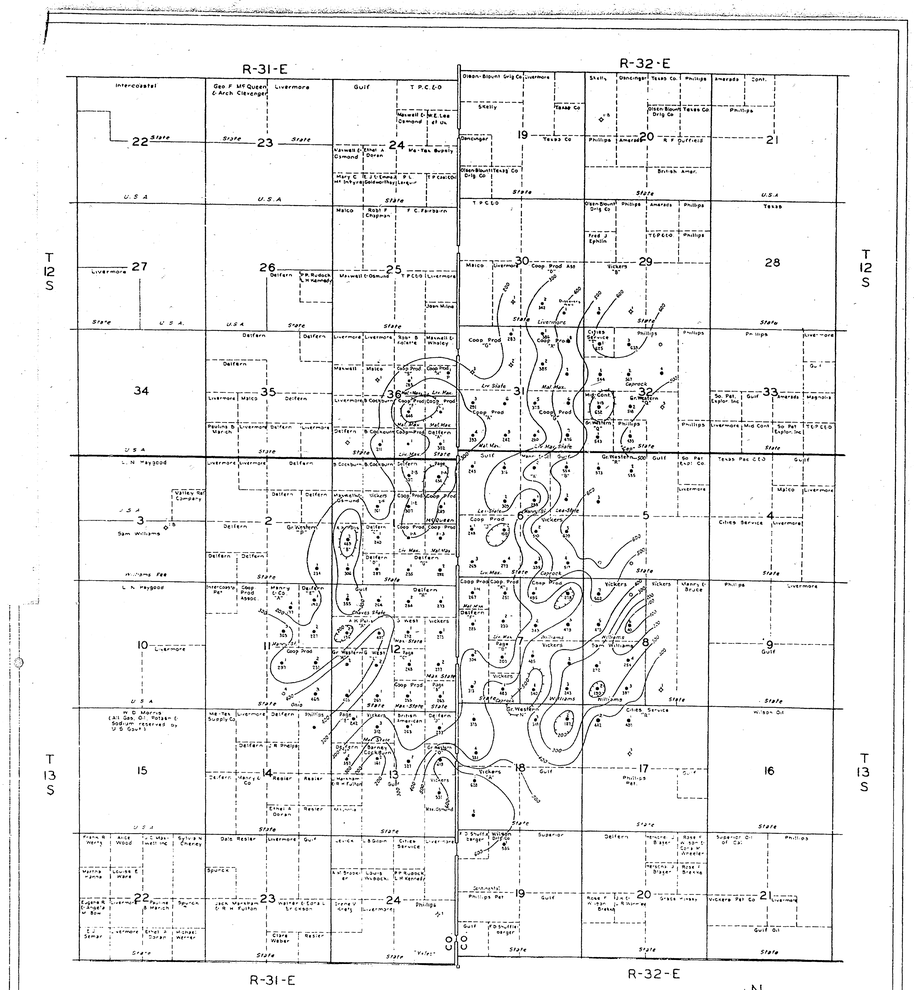
By J. Hunton, Jr.

JCH/dp
Enc.
W. T. Montgomery
Leonard E. Gordon
Glenn Staley
Robert D. Fitting
Paul Holloway

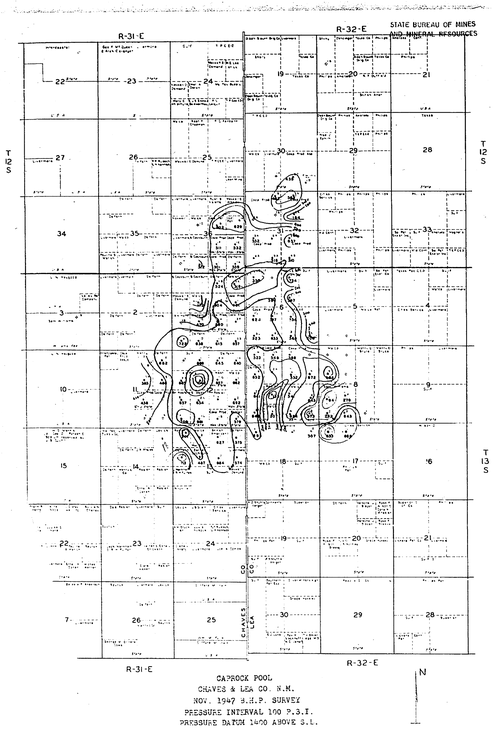
253


R-31-E
R-32-E
T 12 S
T 13 S
T 13 S
R-31-E
R-32-E
CHAVES CO.
LEA CO.
N
RESERVOIR PRESSURE MAP
+1400 FT. DATUM - JUNE 1948
Prepared By: Caprock Engineering Committee, R.U.Fitting Jr. Chairman July 1948
CAPROCK FIELD
LEA AND CHAVES COUNTIES
NEW MEXICO
SCALE: 1" = 2000 FT.

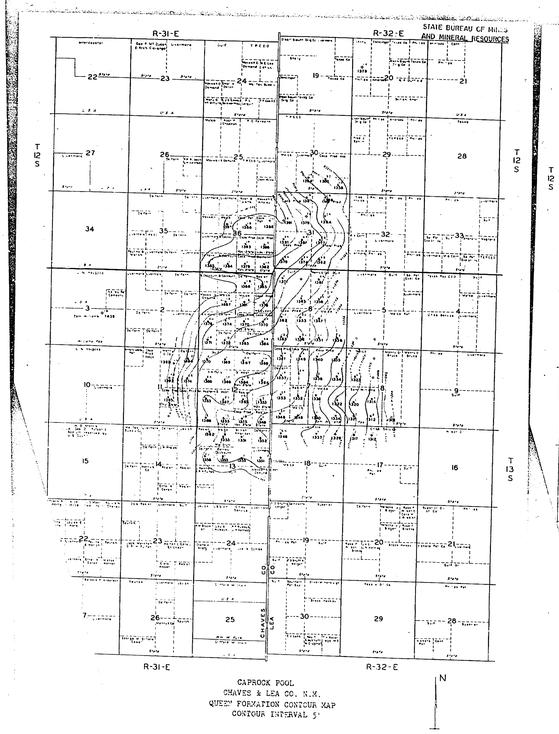
254


R-31-E
R-32-E
T 12 S
T 13 S
R-31-E
R-32-E
RESERVOIR PRESSURE MAP
1400 DATUM 10K 1948
CONTOUR INTERVAL 100 PSIG
PREPARED BY FITZPATRICK, FEATHERLY & JONES FOR CAPROCK FIELD ENGINEERING COMM.
CAPROCK FIELD
LEA AND CHAVES COUNTIES
NEW MEXICO
SCALE: 1" = 2000 FT.
N

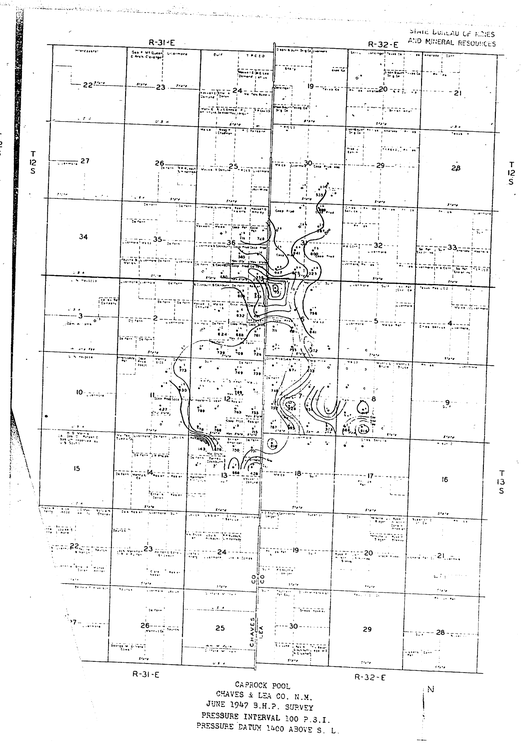
255



CAPROCK POOL
CHAVES & LEA CO. N.M.
NOV. 1947 B.H.P. SURVEY
PRESSURE INTERVAL 100 P.S.I.
PRESSURE DATUM 1400 ABOVE S.L.



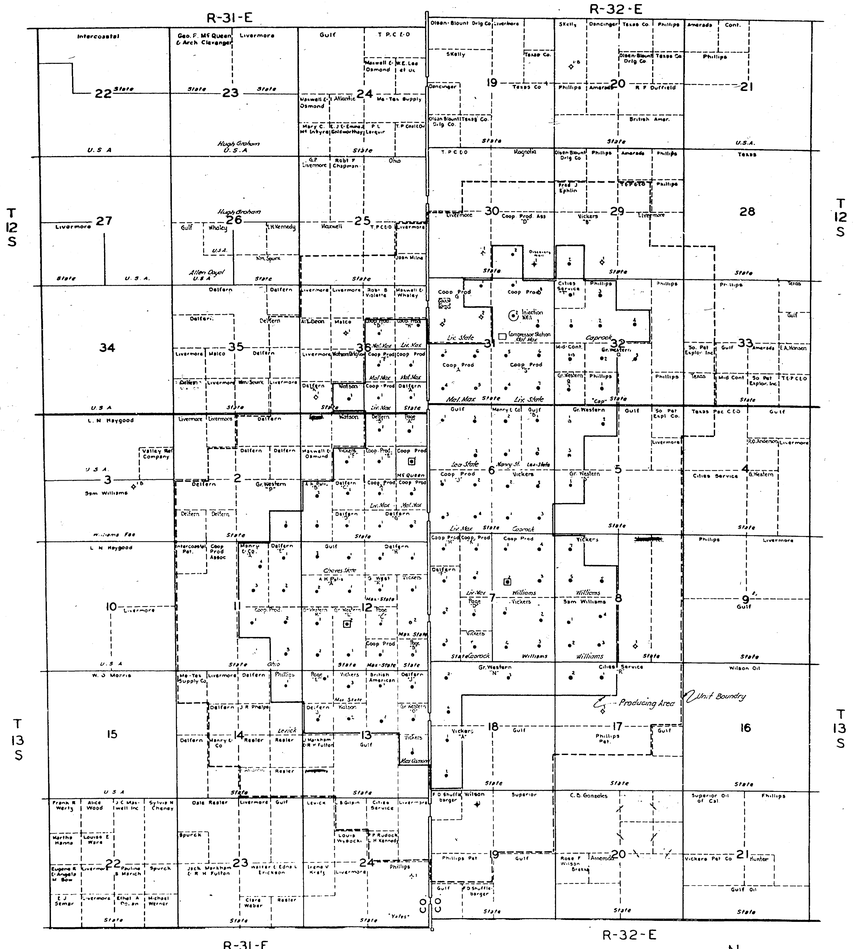
CAPROCK POOL
CHAVES & LEA CO. N.M.
QUEEN FORMATION CONTOUR MAP
CONTOUR INTERVAL 5'



CAPROCK POOL
CHAVES & LEA CO. N.M.
JUNE 1947 B.H.P. SURVEY
PRESSURE INTERVAL 100 P.S.I.
PRESSURE DATUM 1400 ABOVE S. L.

256

257



CAPROCK FIELD

LEA AND CHAVES COUNTIES

NEW MEXICO

SCALE: 1" = 2000 FT.

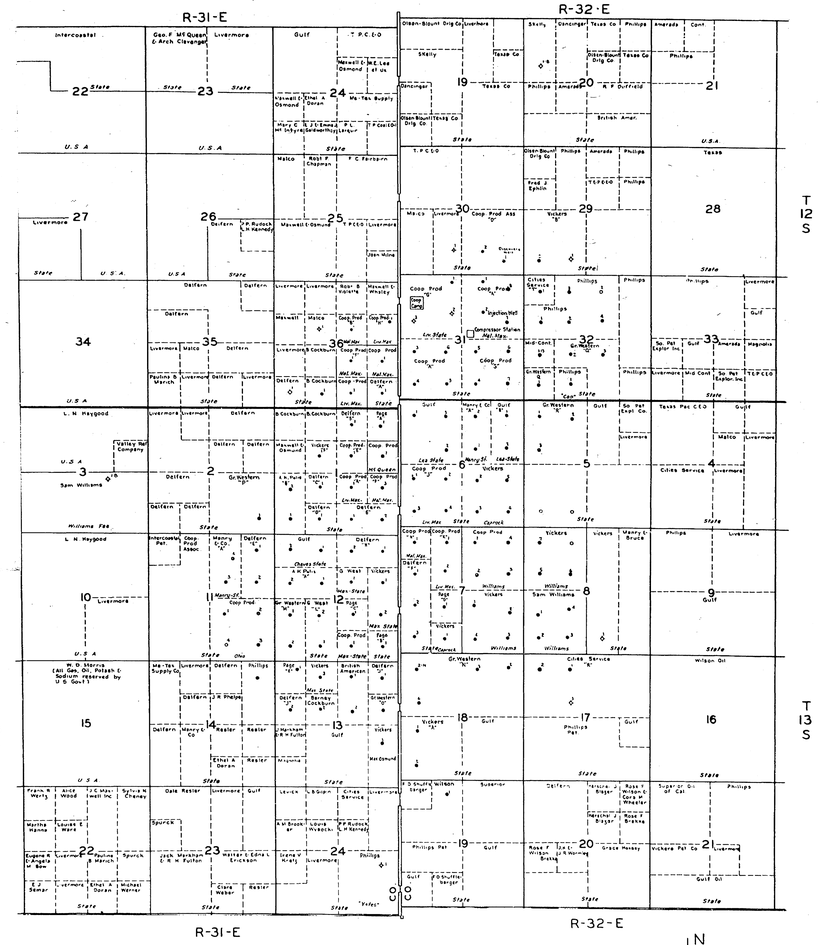
Prepared By: Fitting, Fitting & Jones

LEGEND

- Present Injection Well
- Proposed Injection Well
- Producing Area
- Unit Boundry

N

Posted to: 7-1-51



258

CAPROCK FIELD

LEA AND CHAVES COUNTIES

NEW MEXICO

SCALE: 1" = 2000 FT.

PREPARED BY: FITTING, FITTING & JONES

N

Posted to:

COOPERATIVE AGREEMENT FOR THE SECONDARY RECOVERY
OF THE CAPROCK FIELD,
LEA AND CHAVES COUNTIES, NEW MEXICO

THIS AGREEMENT, made and entered into as of the ____day of_____, 1951, by and between the parties subscribing, ratifying or consenting hereto and herein referred to as the "parties hereto";

W I T N E S S E T H:

WHEREAS, the parties hereto are the owners of working, royalty and other oil or gas interests in the cooperative area subject to this agreement; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico, hereinafter referred to as the "Commissioner", is authorized by law (Chapter 88, Session laws of 1943 and Acts amendatory thereto) to consent to and approve the development or operation of State lands under agreements made by lessees of State land jointly or severally with other lessees where such agreements provide for the cooperative or unit operation or development of part or all of any oil or gas pool, field or area; and

WHEREAS, the New Mexico Oil Conservation Commission, hereinafter referred to as the "Commission", is authorized by law (Chapter 72, Laws of 1935, and Acts amendatory thereto) to approve this agreement and the conservation provisions thereof; and

WHEREAS, it is the purpose of the parties hereto to effect and put into operation a plan for the secondary recovery of the Caprock Field or pool embracing lands situated in Lea and Chaves Counties, New Mexico, hereinafter more particularly described, and thereby effect a secondary recovery program which will promote the conservation of oil and gas and the prevention of waste, and secure other benefits obtainable through the development and operation of the area subject to this

agreement (which may be referred to as the "Caprock Cooperative Repressuring Association") under the terms, conditions and limitations herein set forth;

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this agreement their respective interests in the below defined cooperative area, and agree severally among themselves as follows:

1. COOPERATIVE AREA. The following described land is hereby designated and recognized as constituting the cooperative area:

Twp. 12 S., Rge. 31 E., N.M.P.M.
Sec. 25: NE¼SE¼, SW¼SE¼, S½SW¼
Sec. 35: S½NE¼, E½SE¼
Sec. 36: All

Twp. 12 S., Rge. 32 E., N.M.P.M.
Sec. 29: SW¼SW¼
Sec. 29: SW¼NE¼, S½NW¼, S½SE¼, W½S½, SW¼
Sec. 30: SE¼NW¼, S½NE¼, S½
Sec. 31: All
Sec. 32: All
Sec. 33: W½W½

Twp. 13 S., Rge. 31 E., N.M.P.M.
Sec. 1: All
Sec. 2: S½SW¼, SW¼, E½
Sec. 11: All
Sec. 12: All
Sec. 13: All
Sec. 14: W½W½, S½SW¼, N½SW¼, E½
Sec. 24: N½NW¼, NE¼

Twp. 13 S., Rge. 32 E., N.M.P.M.
Sec. 4: NW¼W¼
Sec. 5: All
Sec. 6: All
Sec. 7: All
Sec. 8: All
Sec. 17: N½, N½SW¼, NW¼SE¼
Sec. 18: All
Sec. 19: N½, N½SW¼

Containing 11,120 acres, more or less.

Exhibit "A" attached hereto and made a part hereof is a map showing the cooperative area and the boundaries and identity of the respective leases in said area and the present ownership thereof. Exhibit "B" attached hereto and made a part hereof is a schedule showing the percentage and kind of ownership of oil and gas interests in all lands in

the cooperative area, including those which are productive and those which are non-productive. However, nothing herein contained or in said schedule or map shall be construed as a representation by and parties hereto as to the ownership of any interest other than such interest or interests as are shown on said map or schedule as owned by such party.

2. SUBSTANCES AND FORMATIONS COVERED BY AGREEMENT. All oil and gas and other hydrocarbon substances in the "Queen" or "Red" Sand found at a depth of from approximately 3000 to 3200 feet are covered by this agreement and shall be subject to all of the terms and conditions hereof.

3. OPERATORS' COMMITTEE. All operations conducted pursuant to this agreement shall be under the supervision of an Operators' Committee. The Operators' Committee shall consist of one representative of each operator who is a party to this agreement. The members of the Operators' Committee shall be designated from time to time by the respective operators or working interest owners of the producing leases as shown by the schedule attached hereto as Exhibit "B" or their successors in interest. Said representatives shall be selected within 10 days after the effective date of this agreement and shall meet and organize within 30 days thereafter, and shall select from among their membership a Chairman, Vice-Chairman, Secretary and Treasurer. The offices of Secretary and Treasurer may be combined in one person. Each member of the Operators' Committee on all questions coming before the Committee shall be entitled to a vote equal to the number of producing wells that the operator whom he represents has in the cooperative area, provided, however, to constitute a quorum for the purpose of holding any meeting there must be present in person or by proxy members of the Operators' Committee having a vote equal to at least 65% of the total number of votes represented by all of the members of the Operators' Committee. The vote of a majority of all operators present in person or by proxy

at any regular called or held meeting of the Operators' Committee shall prevail.

The Operators' Committee shall adopt by-laws or rules and regulations for the conduct of their meetings and as a basis for all operations to be conducted pursuant to this agreement, and defining the duties, powers and authority of all officials and employees, and when so adopted the same shall not be changed unless by a majority vote of all of the members of the Operators' Committee. The Operators' Committee shall also have the right to delegate any and all powers and authority herein given to the Operators' Committee to the Executive Committee hereinafter provided for, and any reference hereinafter made to the Operators' Committee shall apply to the Executive Committee where the Operators' Committee has delegated to the Executive Committee the right to carry out or perform any of the specific provisions hereof wherein the Operators' Committee is designated to carry out such provisions.

4. EXECUTIVE COMMITTEE. The Operators' Committee may select an Executive Committee consisting of not less than three members of the Operators' Committee and may delegate such power and authority to the Executive Committee as they may deem desirable.

5. SUPERINTENDENT AND ENGINEER. The Operators' Committee shall employ a competent superintendent and engineer for the purpose of supervising and conducting properly all operations which are to be carried on pursuant to this agreement. If prescribed by the by-laws or regulations of the Operators' Committee, the superintendent and engineer may be employed by the Executive Committee. The superintendent and engineer shall be employed for such time and paid such salaries or compensations as may be determined by the Operators' Committee, and their salaries or compensations shall be considered as a part of the operating expenses in carrying on operations hereunder. The duties and powers of the superintendent and engineer shall be prescribed by the Operators' Committee, and they shall be immediately and directly responsible to the Executive Committee.

The superintendent shall have the right to hire such employees as may be necessary to carry on the operations contemplated by this agreement within such limitations as may be prescribed by the Operators' Committee.

6. PARTICIPATION AND ALLOCATION OF PRODUCTION. Each of the parties hereto owning an interest in and to the oil, gas and other hydrocarbon substances which may be produced from the cooperative area shall participate in the total production from the cooperative area upon the basis of the percentages shown on the schedule attached hereto, made a part hereof, and for purposes of identification marked Exhibit "C", and for the purpose of determining any benefits accruing under this agreement, and the distribution of the royalties payable to the State of New Mexico and others, each separate lease shall have allocated to it such percentage of said production as shown on said Exhibit "C", and the oil and gas and other hydrocarbon substances so allocated shall be deemed to have been produced from the respective leasehold interests participating therein.

Notwithstanding any provisions contained herein to the contrary, each working interest owner shall have the right to take such owner's proportionate share of the oil, gas and other hydrocarbon substances which may be produced from said cooperative area in kind, or to personally sell or dispose of the same, and nothing herein contained shall be construed as giving or granting to either the Operator's Committee or the Executive Committee the right to sell or otherwise dispose of the proportionate share of any working interest owner or other owner entitled to take such owner's proportionate share in kind.

Any working interest or other owner who takes such owner's share of the oil, gas or other hydrocarbon substances allocated to such leasehold interest in kind shall pay or secure the payment of all royalties and other obligations payable on account of such interest, and shall also

bear any additional expense which may be necessary or occasioned by the taking of said substances in kind.

7. ROYALTY AND RENTAL PAYMENTS. All royalties due the State of New Mexico and others under the terms of the respective leases committed to this agreement shall be computed and paid on the basis of all oil, gas and other hydrocarbon substances which may be allocated to the respective leases committed hereto on the basis of the percentages shown on the schedule attached hereto as Exhibit "C", provided, however, the State and other royalty owners, where provided by the terms of their leases, shall be entitled to take in kind their share of such substances so allocated. All rentals due the State of New Mexico and to others shall be paid by the respective lease owners in accordance with the terms of their leases.

8. PLANT AND EQUIPMENT FOR SECONDARY RECOVERY PROGRAM. The Cooperative Producing Association, one of the parties hereto, has heretofore equipped a well located in the NE¼ Sec. 31, Twp. 12 S., Rge. 32 E., N.M.P.M., as an injection well for air and water and has also installed in connection therewith compressors and other equipment for the purpose of injecting air and water into the "Queen" or "Red" Sand formation. The Operators' Committee, as soon as possible after the effective date of this agreement, shall formulate and put into effect a secondary recovery plan for the purpose of obtaining the greatest possible recovery of oil, gas and other hydrocarbon substances from the "Queen" or "Red" Sand formation underlying the cooperative area, and in connection therewith shall have the power and authority to select from among the wells which have heretofore been drilled such input or injection wells as may be deemed necessary or required to carry on effectively such operation, and shall also have the right to purchase, acquire, install and maintain such plants or equipment as may be necessary or required in connection therewith, and to do and perform every act and

thing which may be necessary or required to maintain properly and to make effective said secondary recovery program.

The value of the plant and equipment heretofore installed by the Cooperative Producing Association shall be determined on the basis of the initial cost thereof, plus any capital repairs or improvements, less depreciation on a reasonable basis, to the time such plant and equipment is taken over by the Operators' Committee as herein provided. In addition, the Operators' Committee shall make an estimate of the cost of all additional equipment which may be necessary or required to carry on said secondary recovery program, including the drilling and equipping of any injection wells, if such wells shall be deemed necessary. The total estimated cost, including the appraised value of the plant and equipment of the Cooperative Producing Association, shall be prorated or allocated to the respective leasehold interests on the basis of the percentages shown by the schedule attached hereto as Exhibit "C", and each operator or the working interest owners of each lease shall thereupon pay to the Operators' Committee their proportionate parts of the total cost of the plant and equipment and all facilities necessary or required to carry on such secondary recovery program. The Cooperative Producing Association shall be given credit on its proportionate part of the total cost for an amount equal to the appraised value of its plant and equipment hereinabove referred to, or if the appraised value thereof should be more than the cost allocated to the Cooperative Producing Association, the difference shall be paid to the latter. The Operators' Committee shall designate the time and manner of payment.

9. OPERATING EXPENSES AND CONTINGENCY FUND. Accurate books of account shall be kept reflecting all costs and expenses of operation in connection with the secondary recovery program as formulated and put into operation by the Operators' Committee, including the cost of the entire plant, equipment and other facilities purchased, acquired

and maintained in connection therewith. All expenses of operation shall be allocated to the respective leases on the basis of the percentages shown on the schedule attached hereto as Exhibit "C" and shall be paid by the Operator or working interest owners of the respective leases monthly within 20 days after being billed therefor.

The Operators' Committee may provide for a contingency fund over and above the initial cost of the plant, equipment and other facilities necessary to carry on said secondary recovery program, which shall be paid by the respective operators or working interest owners on the basis of the percentages shown on Exhibit "C", and which said fund shall be used to take care of any emergency or any necessary capital replacements or repairs of any of the equipment used in connection with the secondary recovery program, and including the drilling and equipping of any injection wells which may be deemed necessary.

In the event any working interest owner or other owner charged with the payment of any obligation provided for by this agreement should fail to pay such owner's proportionate part of any cost allocated as herein provided and remain in default thereof for more than 30 days, the Operators' Committee shall have a first and prior lien upon the leasehold interest of such party or parties and all of the production therefrom until such time as the obligation is fully paid and satisfied, together with interest thereon at the rate of 6% per annum. The Operators' Committee shall have the right to foreclose any such lien in the manner provided by law for the foreclosure of mortgage deeds, and any purchaser of the oil, gas and other hydrocarbon substances allocated to the lease on account of which the deficiency exists shall upon notice from the Operators' Committee or its duly authorized representative impound all payments due such delinquent owner or owners until the delinquent account has been paid or any controversy with respect thereto finally settled.

10. MAINTENANCE OF WELLS. The owners or operators of each

lease committed hereto from which oil or gas or other hydrocarbon substances are being produced shall maintain all wells on their respective leases at their own cost, risk and expense. All wells shall be maintained in a first class condition and in accordance with good oil field practice. All wells shall be subject to inspection by the superintendent, engineer and any authorized representatives or employees of the Operators' Committee or Executive Committee, and they shall have the right to test the same from time to time for the purpose of determining their condition. Whenever any well is found not to be in a condition favorable for obtaining the most efficient production, the operator or owners thereof shall upon notice in the form prescribed by the Operators' Committee commence operations within 24 hours thereafter to remedy such condition, failing in which the Operators' Committee or anyone having the authority delegated by the Operators' Committee shall have the right to undertake such operations, looking to placing such well in proper condition, and the cost thereof shall be charged to the owner or owners of such well as their respective interests appear.

11. NEW DEVELOPMENT The owner or owners of any oil and gas lease within the cooperative area having therein a 40-acre legal subdivision upon which a well has not been drilled shall have the right to drill a well thereon according to the regular well spacing pattern to the "Queen" or "Red" Sand formation, subject to the approval of the Commission. In the event any such well is completed as a well capable of producing from said formation an amount of oil equal to or in excess of the average daily production of all of the producing wells within the cooperative area as of July 1, 1951, such owner or owners shall be entitled to have allocated to said well out of the total production from the cooperative area an amount equal to said average as of July 1, 1951, plus one-half of all production from such well actually in excess of said average. The owner or owners of such well shall pay to the

Operators' Committee an amount equal to such owner's proportionate part on an acreage basis of the depreciated value as of the date of the completion of such well, of the entire plant and facilities acquired, erected, installed and maintained pursuant to the terms of this agreement.

In the event any of the parties hereto, their heirs, personal representatives, successors, or assigns should undertake the drilling of any well or wells within the cooperative area for the purpose of testing, developing or producing oil, gas or other hydrocarbon substances from any formations which may be found below the "Queen" or "Red" Sand, such party or parties shall at their own expense take the necessary steps to protect the "Queen" or "Red" Sand formation so that the drilling of such well or wells will not be a detriment to or adversely affect the secondary recovery program to be carried on pursuant to the terms of this agreement, and the Operators' Committee, subject to the approval of the Commission, shall have the right to prescribe reasonable regulations for the protection of the "Queen" or "Red" Sand formation under such circumstances.

12. CONSERVATION. All operations hereunder shall be conducted so as to provide for the most economical and efficient recovery of oil and gas from the cooperative area without waste as defined by or pursuant to State laws and regulations.

13. LEASES AND CONTRACTS CONFORMED AND EXTENDED. The terms, provisions and conditions of all leases, subleases, operating agreements and other contracts relating to the exploration, drilling, development or operations for oil or gas on the lands committed to this agreement shall as of the effective date hereof be, and the same are, hereby expressly modified to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect. Each lease committed to this agreement shall continue in full force and effect beyond the term provided therein so long as this agreement remains in effect, and the termination of this agreement shall not affect any lease

which pursuant to the terms thereof or any applicable law shall continue in full force and effect thereafter. All lands of the State of New Mexico which are not subject to any valid and subsisting oil and gas lease shall, if and when leased, be subject to all of the terms and provisions hereof.

14. EFFECTIVE DATE AND TERM. This agreement shall become effective upon approval by the Commission and Commissioner and shall continue in full force and effect so long as oil is being produced in paying quantities from the "Queen" or "Red" Sand formation of the lands within the cooperative area. This agreement may be terminated at any time by the Operators' Committee with the approval of the Commissioner, provided members of the Operators' Committee representing 80% of all wells within the cooperative area vote for such termination.

15. APPEARANCES. The Operators' Committee or their duly authorized representative shall after notice to other parties affected have the right to appear for and on behalf of any and all interests affected hereby before the Commissioner or Commission and to appeal from orders issued under the regulations of the Commissioner or Commission or to apply for relief from any of said regulations or in any proceedings relative to operations pending before the Commissioner or Commission, provided, however, that any other interested parties shall also have the right at his own expense to appear and to participate in any such proceeding.

16. NOTICES. All notices, demands or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if given in writing or personally delivered to the party or sent by postpaid registered mail or prepaid telegram addressed to such party or parties at their respective addresses set forth in connection with their signatures hereto or to the ratification or consent hereof or to such other address as any such party may have furnished in writing to the party sending the notice, demand or statement.

17. CONTROVERSIES INVOLVING TITLE. In the event the title

to any tract within the cooperative area committed to this agreement is involved in any dispute, the purchaser of the oil may withhold payment or delivery of the allocated portion involved on account thereof without liability for interest, until the dispute is finally settled, provided that no payment of funds due the State of New Mexico shall be withheld.

18. SUBSEQUENT JOINDER. Any leasehold interests within the cooperative area not committed hereto prior to the submission of this agreement for final approval by the Commission and Commissioner may be committed hereto by the owner or owners of such rights subscribing or consenting to this agreement or a counterpart thereof, or by executing a ratification agreement upon a form acceptable to the Operators' Committee.

19. COUNTERPARTS. This agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the cooperative area.

20. COVENANTS RUN WITH LAND. The covenants hereof shall be construed as covenants running with the land or leasehold interests committed to this agreement and shall be binding upon the parties hereto and their successors in interest.

IN WITNESS WHEREOF, the undersigned parties hereto have caused this agreement to be executed as of the respective date set opposite their signatures.

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SIGNATURES AND ADDRESSES

DESCRIPTION OF INTERESTS COMMITTED TO CAPROCK REPRESSURING AGREEMENT BY REFERENCE TO TRACT NUMBERS IN EXHIBIT "B" ATTACHED HERETO

________________ Tracts:

By________________ President

ATTEST:

________________ Secretary

Address________________

____

Date________________

________________ Tracts:

By________________ President

ATTEST:

________________ Secretary

Address________________

____

Date________________

________________ Tracts:

By________________ President

ATTEST:

________________ Secretary

Address________________

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Date________________

________________ Tract No.

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Address:________________

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Date________________

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Date________________

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Date________________

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Address:________________

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Date________________

________________ Tract No.

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Address________________

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Date________________

________________ Tract No.

____

Address________________

Date________________

260

STATE OF________________)
)SS
COUNTY OF ________________)

On this ____day of ______________, 195__, before me personally appeared ________________to me personally known who being by me duly sworn, did say that he is the ______President of________________ ________________and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said ________________acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on this the day and year last above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________, 195__, before me personally appeared ________________to me personally known who being by me duly sworn did say that he is the ______President of ________________ ________________and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said ________________acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on this the day and year last above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________,195__, before me personally appeared ________________to me personally known who being by me duly sworn did say that he is the______President of ________________ ________________ and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors,and ________________acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on this the day and year last above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________,195__, before me personally appeared ________________ to me personally known to be the person__described in and who executed the foregoing instrument, and acknowledged that __he__executed the same as ______free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year in this certificate above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________,195__, before me personally appeared ________________ to me personally known to be the person__ described in and who executed the foregoing instrument, and acknowledged that __he__ executed the same as ________ free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year in this certificate first above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________, 195__, before me personally appeared ________________ to me personally known to be the person__ described in and who executed the foregoing instrument and acknowledged that __he__ executed the same as ________ free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year in this certificate last above written.

My Commission Expires: ________________ Notary Public

STATE OF ________________)
)SS
COUNTY OF ________________)

On this ____day of ______________, 195__, before me personally appeared ________________ to me personally known to be the person__described in and who executed the foregoing instrument and acknowledged that __he__ executed the same as ________ free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year in this certificate last above written.

My Commission Expires: ________________ Notary Public

261

R 30 E

R 31 E

12

7

8

18

17

19

20

24

T 17 S

U.S. Nash, Windfohr & Brown "A" "J. M. Jackson"

U.S. Sinclair "A" "J. G. Keel"

U.S. Sinclair "B" "J. G. Keel"

U.S. Nash, Windfohr & Brown "A" "J. M. Jackson"

U.S. American Republics Corporation No. 029348 "A" "C. A. Russell" 224.03 Ac.

2200 ft.

2655 ft.

U.S. Aston & Fair "W. A. Hudson"

U.S. Superior "V. L. Foster."

Weier Drlg. 2-A

Weier Drlg. 2-A

Murchison & Clossuit

U.S. Danciger "A" "M. E. Turner"

U.S. Danciger "B" "M. E. Turner"

U.S. Nash, Windfohr & Brown "A" "B" "J. M. Jackson"

U.S. Danciger "A" "M. E. Turner"

U.S. Danciger "B" "M. E. Turner"

Exhibit "A"

AMERICAN REPUBLICS CORPORATION
HOUSTON, TEXAS

UNITED STATES U.S. No. 029548 A
C. A. RUSSELL - ASSIGNEE
EDDY COUNTY, NEW MEXICO

DRAWN BY D. L. G.	SCALE 1" = 500'	R
TRACED BY	DATE 11-4-49	
APPROVED BY	REVISED	1495

R 30 E

R 31 E

12

7

8

13

18

17

24

19

20

T 17 S

262

U.S. Nash, Windfohr & Brown "A" "J. M. Jackson"

U.S. Sinclair "A" "J. G. Keel"

U.S. Sinclair "B" "J. G. Keel"

U.S. Nash, Windfohr & Brown "A" "J. M. Jackson"

U.S. American Republics Corporation No. 029548 "A" "C. A. Russell" 2200 Ft. 224.03 Ac.

2200 Ft.

U.S. Aston & Fair "W. A. Hudson"

U.S. Superior "V. L. Foster"

Weier Drlg. 2-A

Weier Drlg. 2-A

Murchison & Closuit

U.S. Danciger "A" "M. E. Turner"

U.S. Danciger "B" "M. E. Turner"

U.S. Nash, Windfohr & Brown "A"

"B"

"J. M. Jackson"

U.S. Danciger "A" "M. E. Turner"

U.S. Danciger "B" "M. E. Turner"

Exhibit "A"

AMERICAN REPUBLICS CORPORATION
HOUSTON, TEXAS

UNITED STATES U.S. No. 029548 A
C.A. RUSSELL - ASSIGNEE
EDDY COUNTY, NEW MEXICO

DRAWN BY D.L.G.
TRACED BY
APPROVED BY

SCALE 1" = 500'
DATE 11-14-49
REVISED

R
1495