U

CASE No.
206

Large Exhibits
OCD

CAPROCK FIELD

R 30 E

R 31 E

T 17 S

12

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8

13

18

17

24

19

20

LS Nash, Windfohr & Brown "A" "J M Jackson"

LS Sinclair "A" "J G Keel"

LS Sinclair "B" "J G Keel"

LS Nash, Windfohr & Brown "A" "J M Jackson"

LS American Republics Corporation No. 029548 "A" "C A Russell" 224.03 Ac. 2200 Ft. 2665 Ft.

LS Aston & Fair "W A Hudson"

LS Superior "V L Foster"

Weiler Drlg. Co. A

Weiler Drlg. Co. A

Murchison & Closuit

LS Danciger "A" "M E Turner"

LS Danciger "B" "M E Turner"

LS Nash, Windfohr & Brown "A" "B" "J M Jackson"

LS Danciger "A" "M E Turner"

LS Danciger "B" "M E Turner"

Exhibit "F"

AMERICAN REPUBLICS CORPORATION
HOUSTON, TEXAS

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

DRAWN BY: O.L.G.
TRACED BY:
APPROVED BY:
SCALE: 1" = 500'
DATE REVISED: 11-14-49
R 1495

R 30 E

R 31 E

12

7

8

US Nash, Windfohr & Brown "A" "J. M Jackson"

US Sinclair "A" "J. G. Keel"

US Sinclair "B" "J. G. Keel"

US Nash, Windfohr & Brown "A" "J. M Jackson"

US American Republics Corporation No. 029548-"A" "C. A. Russell" 224.09 Ac.

US Aston & Fair "W. A. Hudson"

US Superior "V.L. Foster."

Weier Drlg. 1-A

T 17 S

13

18

17

Weier Drlg. 1-A

Murchison & Closuit

US Danciger "A" "M. E. Turner"

US Danciger "B" "M. E. Turner"

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

US Danciger "A" "M. E. Turner"

US Danciger "B" "M. E. Turner"

24

19

20

Exhibit "A"

AMERICAN REPUBLICS CORPORATION
HOUSTON, TEXAS

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

DRAWN BY	D.L.G.	SCALE	1" = 500'
TRACED BY		DATE	11-16-49
APPROVED BY		REVISED	

R
1495

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. 35: NE¼SE¼, SW¼SE¼, S½SW¼
Sec. 35: S½NW¼, E½SE¼
Sec. 36: All

Twp. 12 S., Rge. 32 E., N.M.P.M.
Sec. 29: SW¼SW¼
Sec. 29: SW¼NE¼, S½NW¼, S½SE¼, W½SW¼, 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: S½NW¼, SW¼, W½
Sec. 11: All
Sec. 12: All
Sec. 13: All
Sec. 14: N½NW¼, SE¼NW¼, NE¼SW¼, E½
Sec. 24: NE¼NW¼, NE¼

Twp. 13 S., Rge. 32 E., N.M.P.M.
Sec. 4: NW¼NW¼
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.

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_____

_____

Date_____

_____ Tract No.

_____

Address:_____

_____

Date_____

_____ Tract No.

_____

Address:_____

_____

Date_____

_____ Tract No.

_____

Address:_____

_____

Date_____

_____ Tract No.

_____

Address_____

_____

Date_____

_____ Tract No.

_____

Address_____

Date_____

STATE OF _____)
COUNTY OF _____) SS

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 _____)
COUNTY OF _____) SS

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 _____)
COUNTY OF _____) SS

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 _____)
COUNTY OF _____) SS

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 _____)
COUNTY OF _____) SS

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 sane 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 _____)
COUNTY OF _____) SS

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 _____)
COUNTY OF _____) SS

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

CAPROCK FIELD

OIL CONSERVATION COMM.
SANTA FE, N. M.
RECEIVED
JAN 7 1952

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 - Dalfern Oil Company - Lubbock, Texas
Ralph G. Dekoody - Dalfern 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
N. E. Massey - 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 Morris - British-American - Box 352 - Seymour, Texas
Sam Williams - Sam Williams - Artesia, N. M.
Lonnie Kemper - Vickers Petro. Corp. - Box 744 - 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. Foreman - A. K. Folis Oil Co. - Mollen, Texas
B. Cookburn - Watson Drlg. Co. - Artesia, N.M.
A. K. Folis - A. K. Folis - Box 959 - Hitchburg, Texas
Paul Holloway - Coop. Prod. Assn. - Caprock, N.M.
Eldow Clapham - Calf Oil Corp. - Box 1667, Hobbs, N.M.
D. L. Irion - Mid-Cont. Pet. Corp. - Box 734 - Hobbs, N.M.
Robert D. Fitting - Coop. Prod. Assn. - 202 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 R.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 Dalfern Oil Company and Mr. Paul Holloway 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 11). The group of adjacent leases oil production decline curve has been reprepared on a gross oil production basic 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
GULF 2-A
OCTOBER 25, 1951

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

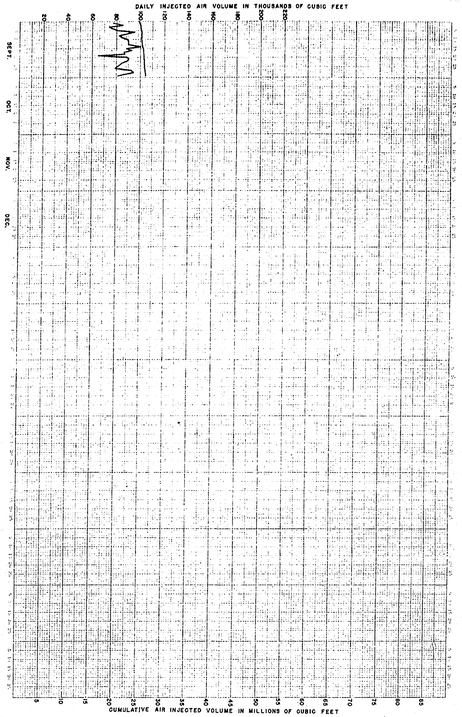
ROBERT D. FITTING, MIDLAND, TEXAS

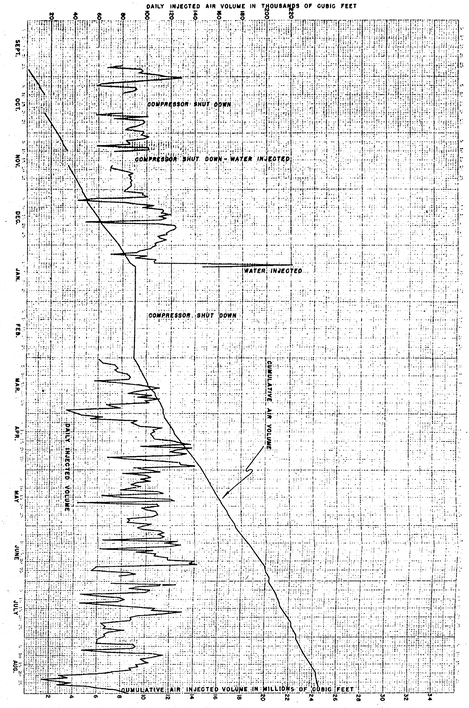
Tabulation 1.

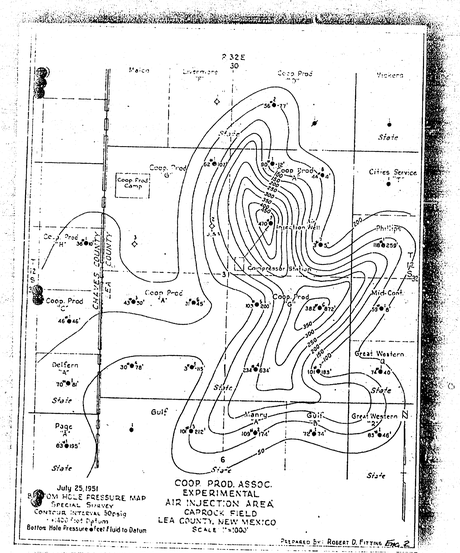
CAPROCK FIELD OPERATORS
PERCENTAGE PARTICIPATION FORMULA ANALYSIS
AS CALCULATED BY THE CAPROCK FIELD ENGINEERING COMMITTEE

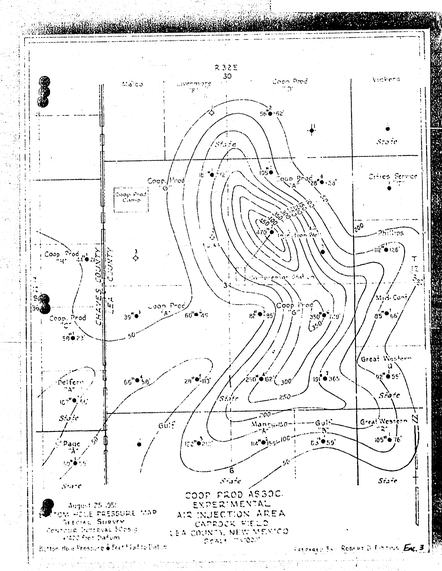
Operator	Operator's Acreage Area	Per Cent	No. Presently Producing Wells Wells	Per Cent	Production from 8-1-50 to 8-1-51 Production	Per Cent	Production from 1-1-50 to 1-1-51 Production	Per Cent	Comparative Est. Ultimate Oil Recovery Barrels	Per Cent	Est. Recovery by plus 1/2 Future Oil Recovery Barrels	Per Cent
British-American	80	1.667	2	1.626	6,727	1.881	7,675	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	101,266	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
Henry & 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
Reeler 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	

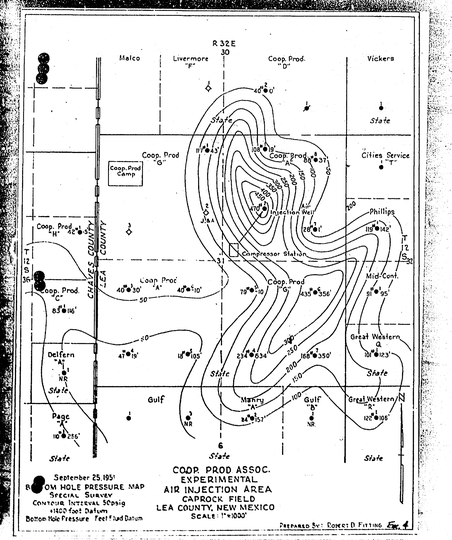
(1)One well temporarily abandoned.
(2)Includes input well.
(3)Two wells Temporarily Abandoned.
(4)One well not producing.

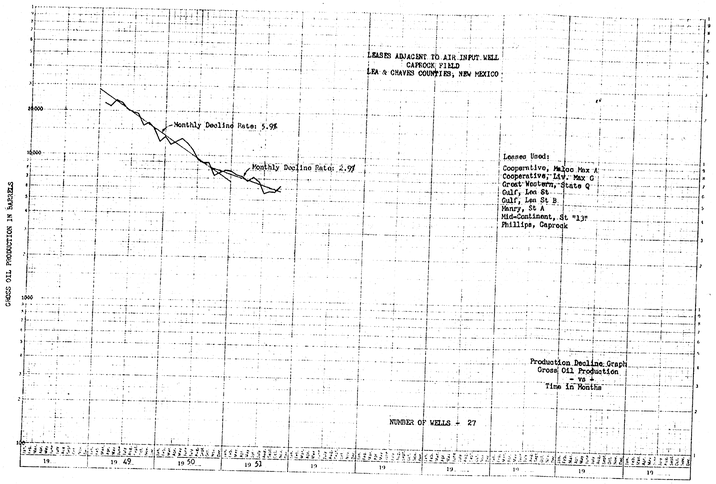












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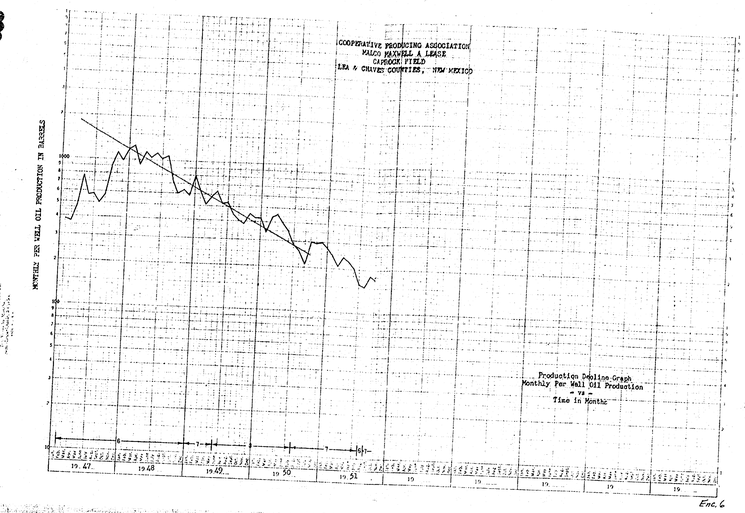

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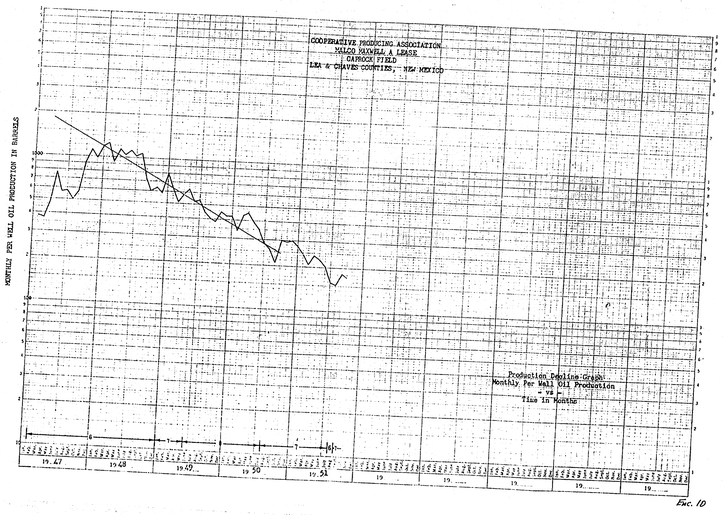

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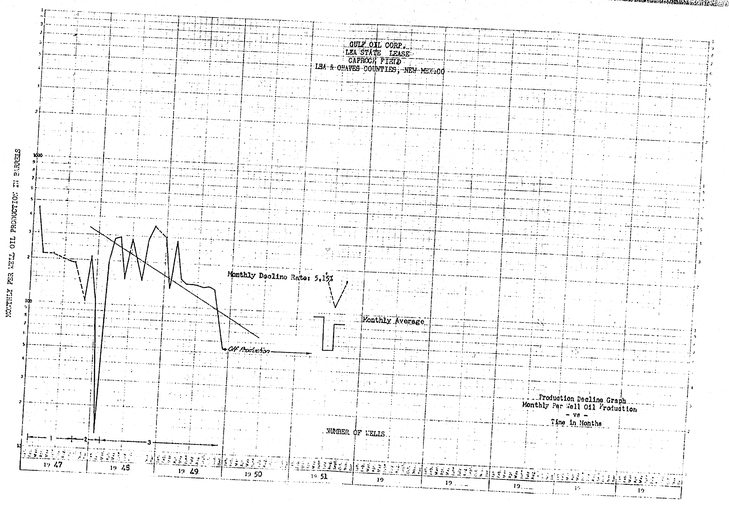

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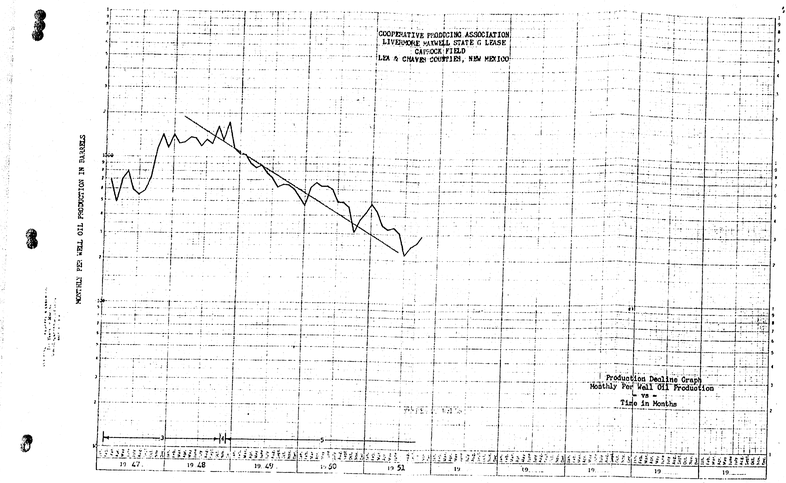

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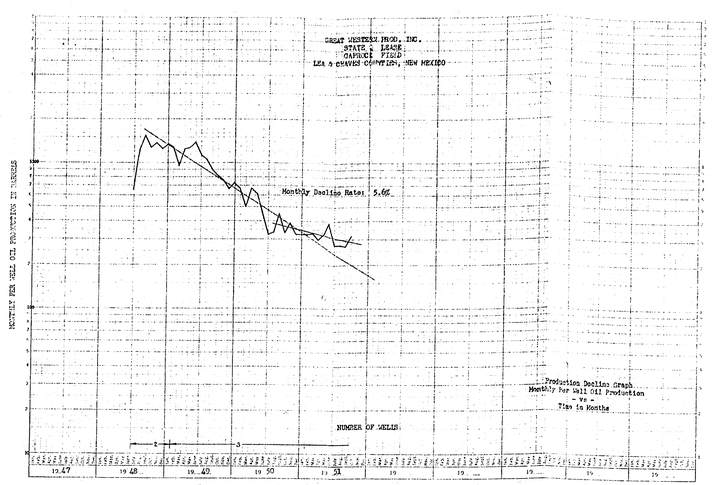

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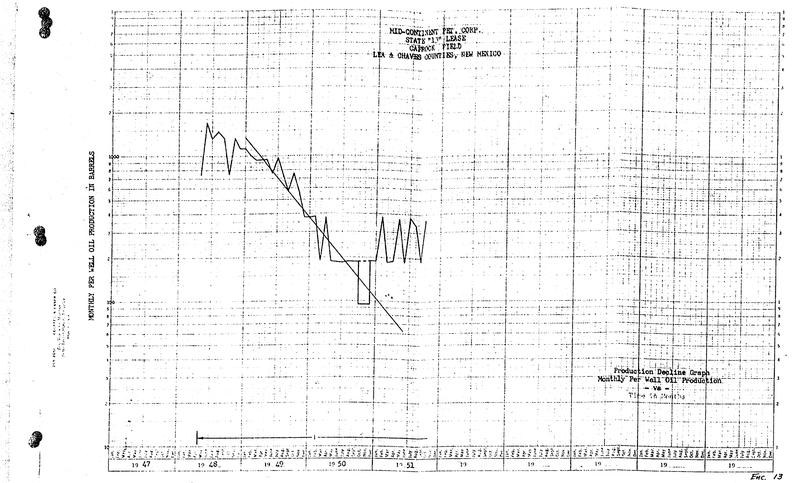

FIG. 13

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, 1950

Prepared By:

Fitting, Fitting and Jones

Registered Engineers
H. U. Fitting, Jr.
Reg. Professional Engineer
and Geologist
No. 4366
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 codingshead gas should

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be used with the introduction of measured quantities of water to create a "bumper or bank" effect. The mixing of air and the produced casinghead gas was not considered feasible in that G.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 G. 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 3052 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 then 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 1949, 124 producing wells produced 932,269 barrels of oil with 2,084 barrels of water. The crude is 30 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

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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 grey-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 section. 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

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have not drilled to the entire pay section. Several records of botton 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 250 to 850 millidarcies on two different samples. The oil is undersaturated with gas, and a solution gas-oil ratio is reported on one analysis to be 290 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.

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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 12,286 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 13,518 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 11,800 barrels, or an ultimate oil recovery per well of 36,052 barrels.

Pressure Decline versus Cumulative Oil Production:

Lease average bottom hole pressure data from several general field-wide 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 47,851 barrels with a future oil recovery of 3850 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 in a year indicate its relative worth.

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COOPERATIVE PRODUCING ASSOCIATION
STATE "A" & "G" LEASES
GAS-OIL RATIO SURVEY
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	33.2	719
7	14	*	-
8	14	*	-
State "G"- 1	42	32.5	773
4	20	66.9	3295
5	42	*	-
6	20	25.2	1260
7	20	*	-

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

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

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Tabulation 1.

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

Lease & Well No.	G.P.M.	Recovery (c.c.)
State "E" No. 1	1.456	29
State "J" No. 3	1.606	42
State "A" No. 4	.960*	13
S. L. Williams No. 3	1.071	49
State "G" No. 6	1.092*	16
State "G" No. 1	1.393	33

*Slightly undersaturated.

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Tabulation 2.

MARCH 16, 1950-GOHWDCM
BOTTOM HOLE PRESSURE SURVEY
DATUM 2,750
COOPERATIVE PRODUCING ASSOCIATION
STATE "A" & "G" LEASES
CAPROCK FIELD
LEA & CHAVES COUNTY, NEW MEXICO

Lease & Well	Elev.	Datum North	Feet To Fluid	Feet of Fluid To Datum	Pressure of Gas Column	Pressure of Oil Column	Measured Casing Pressure Ps.i.g.	Datum Pressure Ps.i.g.
State "A"- 1	4370'	2995'	2604'	391'	21	141	5	167
2	4395'	2995'	2764'	191	24	7	9	31
3	4392'	2991'	2969'	31'	24	11	20	55
4	4388'	2995'	2836'	159'	23	87	25	135
5	4386'	2990'	2356'	634'	19	230	10	299
6	4383'	2983'	2439'	503'	19	203	25	247
7	4383'	2983'	2670'	313'	21	149	10	180
8	4383'	2983'	2935'	-21'	24	35	10	69
State "G"- 1	4397'	2987'	2846'	141'	23	48	25	96
4	4374'	2974'	2909'	65'	23	20	1	44
5	4390'	2990'	2990'	20'	24	6	25	55
6	4384'	2984'	2764'	628'	19	255	15	299
7	4385'	2985'	2697'	328'	21	150	10	181

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 12,286 barrels for an ultimate oil recovery per well of 34,847 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 11,800 barrels, or an ultimate oil recovery per well of 36,052 barrels.

Pressure Decline versus Cumulative Oil Production:

Lease average bottom hole pressure data from several general field-wide 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 47,850 barrels with a future oil recovery of 5850 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 37,600 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 in a year indicate its relative worth.

COOPERATIVE'S PRODUCING ASSOCIATION
STATE "A" & "G" LEASES
GAS-OIL RATIO SURVEY
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	33.2	719
7	14	*	-
8	14	*	-
State "G"- 1	42	32.5	773
4	20	66.9	3295
5	42	*	-
6	20	25.2	1260
7	20	*	-

Note: State "A"-3,4,5 & 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.

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

Lease & Well No.	G.P.M.	Recovery (c.c.)
State "E" No. 1	1.456	29
State "J" No. 3	1.606	42
State "A" No. 4	.962*	13
S. L. Williams No. 3	1.097	19
State "G" No. 6	1.092*	16
State "G" No. 1	1.393	33

*Slightly undersaturaged.

Tabulation 2.

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

Lease & Well	Elev.	Datum Depth	Feet To Fluid	Feet of Fluid To Datum	Pressure of Gas Column	Pressure of Oil Column	Measured Casing Pressure Pst.i.g.	Datum Pressure Pst.i.g.
State "A"- 1	4395'	2995'	2604'	391'	21	141	5	167
2	4395'	2995'	2976'	19'	24	7	0	31
3	4391'	2991'	2960'	31'	24	11	20	55
4	4388'	2995'	2836'	159'	23	57	25	105
5	4386'	2990'	2356'	634'	19	230	10	259
6	4382'	2982'	2419'	563'	19	203	25	247
7	4383'	2933'	2670'	313'	21	149	10	180
8	4383'	2983'	2985'	-2'	24	35	10	69
State "G"- 1	4387'	2987'	2846'	141'	23	48	25	96
4	4374'	2974'	2909'	65'	23	20	1	44
5	4390'	2990'	2990'	20'	24	6	25	55
6	4394'	2984'	2776'	608'	19	253	15	259
7	4385'	2985'	2657'	328'	21	150	10	181

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

1947	State "A"	No. Wells	State "O"	No. Wells	All Leases	No. Wells
Jan.	379	6	693	3	427	26
Feb.	373	6	671	3	408	26
Mar.	469	6	709	3	472	26
Apr.	763	6	786	3	648	26
May	565	6	584	3	530	26
June	572	6	556	3	490	26
July	504	6	595	3	443	26
Aug.	570	6	723	3	636	26
Sept.*	891	6	1106	3	989	29
Oct.	1111	6	1442	3	1100	30
Nov.	993	6	1152	3	867	30
Dec.	1174	6	1437	3	1035	30

1948	State "A"	No. Wells	State "O"	No. Wells	All Leases	No. Wells
Jan.	1240	6	1836	3	1038	31
Feb.	986	6	1278	3	855	31
Mar.	1183	6	1384	3	908	31
Apr.	1039	6	1358	3	843	31
May	1137	6	1197	3	842	31
June	1007	6	1305	3	829	32
July	1096	6	1246	3	802	32
Aug.	785	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

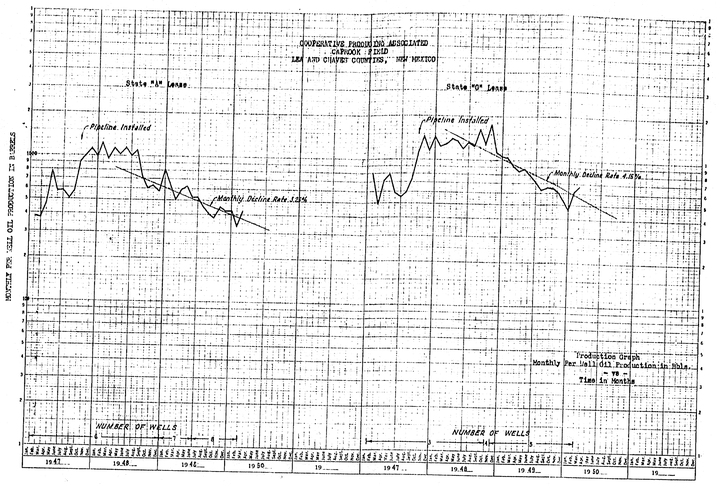
1949	State "A"	No. Wells	State "O"	No. Wells	All Leases	No. Wells
Jan.	640	7	1048	5	549	37
Feb.	506	7	910	5	495	37
Mar.	588	7	844	5	532	37
Apr.	632	7	877	5	512	37
May	521	7	781	5	491	37
June	583	8	715	5	436	38
July	453	8	630	3	396	38
Aug.	408	8	633	3	376	38
Sept.	383	8	647	5	400	38
Oct.	454	8	604	5	418	38
Nov.	426	8	533	5	437	38
Dec.	427	8	461	5	378	38

1950						
Jan.	335	8	620	5	385	38
Feb.	428	8	674	5	384	38

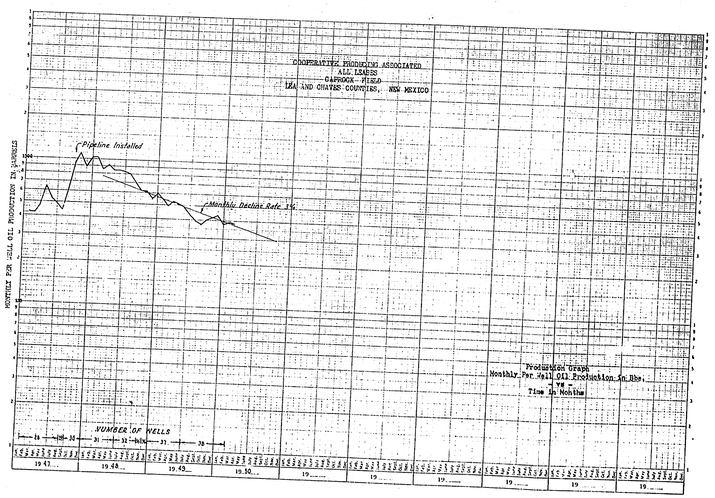
Lease Production to 3-1-50	260,804	180,193	921,577
Avg. Per Well Production to 3-1-50	42,601	36,039	24,852

*Pipe Line Installed.

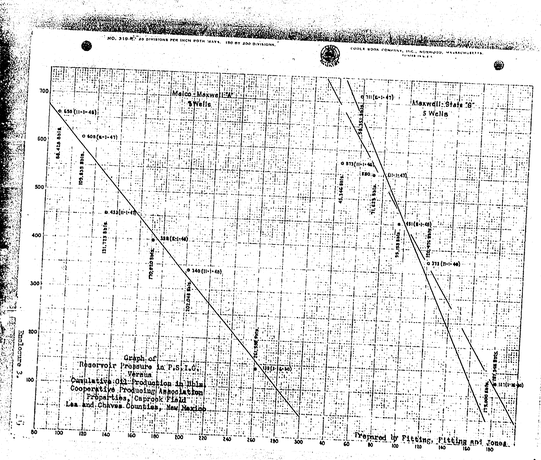
Tabulation 4.



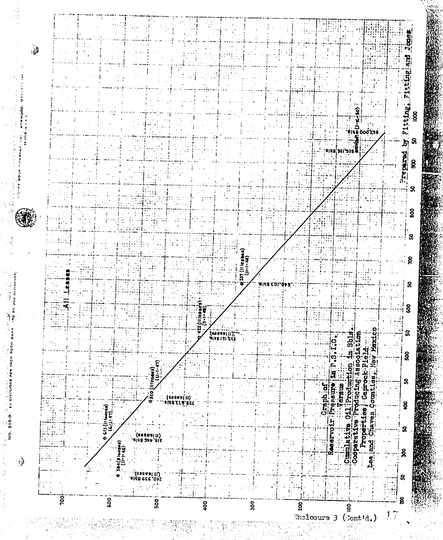
Enclosure 3.



Enclosure 2 (Sent-4)



Enclosure 5


Graph of
Reservoir Pressure in Lbs. p.s.i.
Cumulative Oil Production in Bbls.
Gas-Oil Ratio in Cubic Feet per Barrel
Caprock Field
Lea and Chaves Counties, New Mexico
Prepared by Fitting, Fitting and Jones
All Leases
Cumulative Oil Production
Reservoir Pressure
Gas-Oil Ratio
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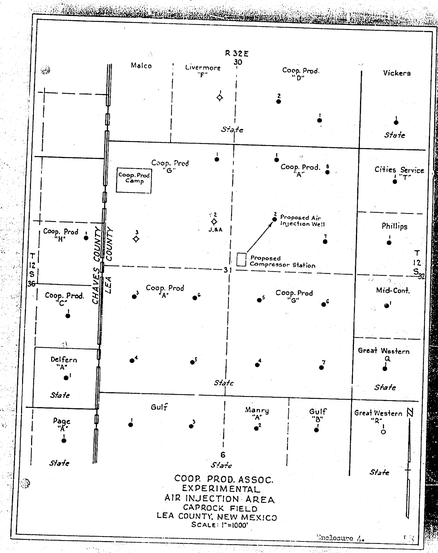
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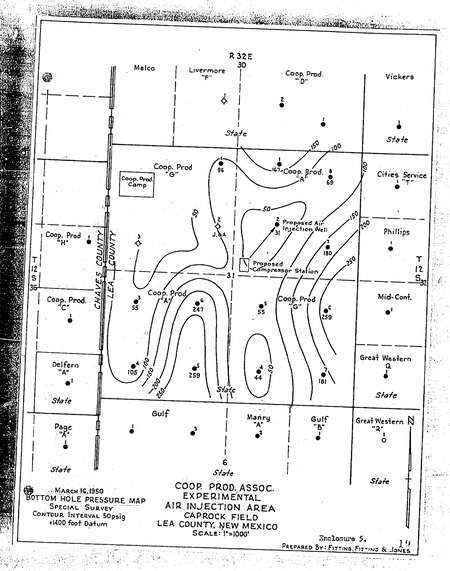
COOP. PROD. ASSOC.
EXPERIMENTAL
AIR INJECTION AREA
CAPROCK FIELD
LEA COUNTY, NEW MEXICO
SCALE: 1"=1000'
Enclosure 4.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Delfern "A"
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Great Western "2"
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March 16, 1950
BOTTOM HOLE PRESSURE MAP
Special Survey
Contour Interval 50 psig
+1400 foot Datum
COOP. PROD. ASSOC.
EXPERIMENTAL
AIR INJECTION AREA
CAPROCK FIELD
LEA COUNTY, NEW MEXICO
SCALE: 1"=1000'
Enclosure 5.
Prepared by: Fitting, Fitting & Jones

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. O. Denton, Jr., Manager
Cooperative Producing Association
Box 978
Lovelland, Texas

June 19, 1951

Prepared by:

Robert D. Fitting

Fitting, Fitting & Jones
Box 1637
Midland, Texas

FITTING, FITTING & JONES

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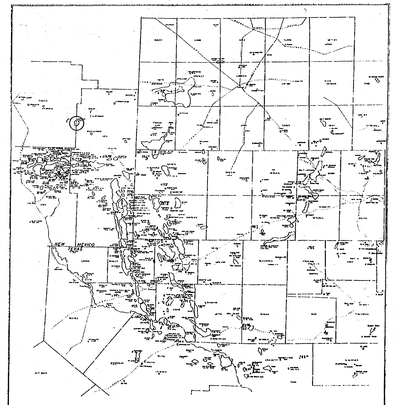

AREA MAP
WEST TEXAS & SOUTHEASTERN NEW MEXICO

PREPARED BY FITTING, FITTING & JONES — REPORT AREA CIRCLED IN RED

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 29, 1950, and the injection of air has continued at an average pressure of 475 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 estimated primary oil recovery is considered probable.

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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 none 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 31). 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 "Q" 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 effected are the Gulf, Lea-State and Lea-State "B", and the Henry & Company, State "A" lease in Section 6; Great Western, State "B" in Section 5; the Cooperative Producing Association "A" and "Q" 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 measureable "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 7; 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 eliminate the future necessity of additional input wells; however, local sand 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 12 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

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 141). 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.

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
Henry & 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
Rouse, 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	478,633	91.91171	88.28125
Williams	15	600	43,067	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.

SUMMARY
ESTIMATE OF SECONDARY 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. Put. Oil Rec. Per Well Barrels	Est. Lease Put. 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 "B"	2	2.9	407	21,421	42,842	51,424	94,266
State "D"	1	13.1	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	2,109	23,430	25,484
Liv. Max "A"	1	6.0	95*	725	725	25,096	25,821
Liv. Max St "B"	3	5.6	275*	5,090	15,450	210,395	225,517
Liv. Max St "C"	1	3.4	559	32,882	32,882	59,662	92,544
Liv. Max St "D"	2	4.3	164	7,814	15,256	156,044	171,300
Liv. Max St "E"	2	9.4	68	1,559	2,318	32,190	34,508
Liv. St "GS"	1	4.0	128*	2,632	2,632	39,806	42,438
Maloo Max "A"	4**	4.65	195*	4,194	33,552	289,919	323,471
Maloo Max "B"	1	7.65	0	0	0	6,820	6,820
Maloo Max "C"	1	2.65	496	18,792	18,792	79,247	98,039
Maloo Max "F" 2	1	6.85	36*	762	762	22,165	22,927
Maloo Max "F" 1	1	2.3	710	16,511	16,511	40,277	56,788
Maloo Max "G"	1	2.45	195	7,960	7,960	42,207	50,167
Max St	1	9.4	104	2,604	2,604	30,983	33,587
McDowell	1	7.5	18*	240	240	17,015	17,255
Ohio St	3	4.5	145	2,778	8,335	46,791	55,126
State "B"	1	3.79	267	7,120	7,120	44,557	51,677
Williams	1	7.2	137	10,684	10,684	64,385	75,069
Total	38			114,693	196,976	1,228,160	1,425,136
Delfern Oil Co. State "A"	1	6.15	58	5,008	5,008	47,007	52,015
State "B"	1	8.3	215	2,950	2,950	50,339	53,289
State "C"	1	7.4	100	1,599	1,599	38,561	40,160
State "D"	1	5.8	434	7,891	7,891	61,103	68,994
State "E"	1	6.8	81	1,717	1,717	45,402	47,119
State "F"	3	7.4	493	6,845	20,541	176,413	196,953
State "G"	2	10.5	379	5,096	10,192	132,453	142,645
State "H"	2	9.2	279	5,033	6,066	108,754	114,820
State "J"	1	7.2	137	4,568	7,136	60,483	67,619
Total	15			38,043	65,749	702,694	768,443

(Continued)

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. Put. Oil Rec. Per Well Barrels	Est. Lease Put. Oil Rec. Barrels	Cumulative Oil Rec. to 4-1-51 Barrels	Est. Ultimate Oil Rec. Barrels
Great Western Prod. Inc. Rex St	1	1.45	830	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	183	1,878	3,756	66,752	70,508
State "N"	4	2.35	283	12,043	48,172	70,480	118,652
State "O"	1	9.7	0	0	0	1,099	1,099
State "P"	1	3.25	3*	1,099	1,099	7,865	8,964
State "Q"	3	5.6	318	5,833	17,500	71,980	89,480
State "R"	3	6.5	868	4,823	12,969	59,363	72,332
State "S"	1	9.5	50*	2,015	2,015	1,310	3,325
Total	18			93,295	159,136	430,369	589,505
Gulf Oil Corp. Cleere St	2	2.9	385	13,276	26,552	82,213	98,765
Lea St	3	5.35	260	2,748	2,748	15,787	18,535
Lea St "B"	2	8.0	000*	1,333	6,666	52,788	71,454
Total	7			17,357	35,862	168,788	144,190
Henry & Co. Henry St "A"	2	7.4	230*	2,838	5,676	87,257	68,933
	2	3.15	144	4,371	9,140	25,054	23,136
Total	4			7,409	14,316	77,871	92,089
Mid-Cont. Pet. Corp. State "13"	1	16.1	90*	891	891	23,153	23,996
Phillips Pet. Co. Cap	1	16.2	54*	599	599	12,367	12,966
Caprock	4	5.3	329	6,627	26,508	91,184	117,692
Levick	1	1.55	257	12,710	12,710	13,186	25,896
Total	6			20,314	37,539	116,931	154,431
Rolla, A. K. State "A"	2	8.7	182	1,452	2,904	61,368	64,272
State "B"	2	6.7	318	4,746	9,472	51,682	61,154
Total	4			6,198	12,376	113,050	125,426

(Continued)

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. Put. Oil Rec. Per Well Barrels	Est. Lease Put. 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*	131	131	16,559	16,700
State "B"	1	5.8	98*	2,000	2,000	16,293	18,293
State "C"	1	7.4	62	838	838	23,082	23,920
State "D"	1	3.6	32*	980	980	4,710	5,690
State "E"	1	8.9	108	3,195	3,195	13,031	16,226
Total	5			6,988	6,988	73,765	80,751
Vickers Pet. Co. Caprock St "A"	5	4.4	72	1,702	8,511	55,668	64,183
Caprock St "A"	2	3.3	295	8,939	17,878	89,084	96,962
Caprock St	11	7.08	206	9,071	99,781	19,141	30,112
Max St	1	7.4	179	2,419	2,419	180,429	127,679
Max St "F" 2	1	9.9	79	1,197	1,197	8,413	9,610
Williams	3	5.0	190	6,400	44,800	98,180	142,980
Total	19			29,533	88,530	315,750	404,280
Watson, J. C., Drlg. Co. State	2	1.65	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, R. L. Drlg. Co. Continental	0	2.25	0	0	0	2,906	2,906
Grand Total	198			408,288	746,283	3,426,987	4,160,738

*Estimated production rate.
**Well SI present air injection well.

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

Operator & Lease	No. Wells on Lease	Sec.,Twp. Range	January Per Lease	January Per Well	February Per Lease	February Per Well	March Per Lease	March Per Well	April Per Lease	April Per Well	May Per Lease	May Per Well	June Per Lease	June Per Well
British American Oil Prod. State	2	13-13-31	668	668	981	981	992	992	15054*	753	973	487	1803	552
Cities Service Oil Co. State B	2	17-13-31												
Cooperative Prod. Assn. Liv. Max	1	36-12-31	775	775	382	382	755	755	749	749	460	460	586	586
Liv. Max A	1	1-13-31	389	389	366	366	379	379	760	760	517	517	573	573
Liv. Max B	3	31-12-32	2079	693	1402	467	2323	774	2334	778	1553	518	1668	556
Liv. Max H	1	30-12-31	376	376	373	373	1893	1893	1753	1753	974	974	1060	1060
Liv. Max I	4	6-13-32	1547	387	4538	569	2206	551	1242	310	1607	402	2296	574
Liv. Max K	1	1-13-32	393	393	387	387	382	382	755	755	469	469	593	593
Liv. St B	1	30-12-32	376	376	377	377	384	384	757	757	468	468	574	574
Mal Max A	6	31-12-30	2074	379	2271	379	2817	456	1977	783	1782	595	3431	572
Mal Max B	1	36-12-31	-	-	331	331	-	-	-	-	1042	142	-	-
Mal Max C	1	36-12-31	385	385	377	377	386	386	744	744	466	466	574	574
Mal Max F-1	1	31-12-31	383	383	382	382	435	435	789	789	469	469	570	570
Mal Max F-2	1	31-12-31	383	383	382	382	435	435	789	789	469	469	565	565
Mal Max H	1	5-13-32	469	469	455	455	469	469	874	874	463	463	565	565
Max St	1	12-13-31	352	352	360	360	756	756	1501	1501	479	479	558	558
McQueen	1	1-13-32	329	329	-	-	-	-	354	354	351	351	393	393
Ohio St	1	1-13-31	353	353	353	353	360	360	361	361	372	372	372	372
State E	1	1-13-31	353	353	352	352	358	358	751	751	344	344	374	374
Williams	3	7-13-32	377	377	373	373	374	374	733	733	472	472	566	566
Delfern Oil Co. State A	1	30-12-31	734	734	313	313	377	377	744	744	481	481	548	548
State B	1	1-13-31	771	771	332	332	333	333	749	749	547	547	519	519
State C	1	1-13-31	351	351	133	133	352	352	734	734	471	471	554	554
State D	1	1-13-31	352	352	353	353	373	373	739	739	561	561	525	525
State E	1	11-13-31	747	374	742	371	1113	371	1493	746	1243	414	1182	394
State F	3	7-13-32	1901	633	1977	659	1822	641	1682	637	1749	584	2559	573
State G	2	1-13-31	729	365	745	350	1177	737	1259	729	1145	573	1229	562
State H	2	17-13-31	771	386	772	386	1530	767	1552	766	1213	606	1147	574
State J	1	17-13-31	-	-	364	364	358	358	721	721	567	567	555	555
Great Western Prod.Inc. Rex St	1	31-13-31	749	749	744	744	392	392	787	787	493	493	493	493
State L	2	12-13-31	762	381	743	372	1162	581	1532	766	1154	577	1151	568
State M	2	13&12-13-31	-	-	370	370	11074	904	1555	778	1229	615	1172	559
State N	3	18-13-31												
State O	1	12-13-31												

*New well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Runs Lease	July Per Well	August Runs Lease	August Per Well	September Runs Lease	September Per Well	October Runs Lease	October Per Well	November Runs Lease	November Per Well	December Runs Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-47
British American Prod. Co. State	2	897	448	1227	614	1899	949	1438	719	1040	520	1409	705	15,743	15,743
Cities Service Oil Co. State B	2			745	745	16028	8014	2649	1324	2797	1399	2972	1486	9,445	9,445
Cooperative Prod. Assn. Liv. Nos	1	371	371	1151	1151	1116	1116	1341	1341	767	767	1521	1521	9,707	89,230
Liv. Nos A	1	375	375	792	792	1113	1113	1532	1532	766	766	923	923	7,191	19,726
Liv. Nos G	1	1301	1301	1281	1281	1281	1281	1281	1281	31566	31566	2315	2315	43,877	43,877
Liv. Nos H	1	1139	1139	1139	1139	1139	1139	1526	1526	767	767	1139	1139	9,769	9,769
Liv. Nos I	1	21345	960	2982	745	2982	1491	4482	1121	4482	1121	4482	1121	51,537	99,139
Liv. Nos K	1	1214	607	1214	607	1214	607	1214	607	1214	607	606	606	9,499	15,485
Liv. Nos L	1	373	373	745	745	731	731	727	727	905	905	1127	1127	7,434	25,968
Mal Nos A	1	2532	2	1265	1	1265	1	1265	1	1265	1	1265	1	164,793	164,793
Mal Nos H	1	-	-	190	190	190	190	190	190	190	190	193	193	1,923	6,384
Mal Nos G	1	746	746	1011	1011	1321	1321	1321	1321	1321	1321	1321	1321	14,030	27,028
Mal Nos F-1	1	214	214	-	-	677	677	1372	1372	903	903	903	903	6,066	13,006
Mal Nos F-2	1	853	853	853	853	1347	1347	1787	1787	709	709	1419	1419	14,329	20,161
Mal Nos H	1	682	682	682	682	1165	1165	1554	1554	776	776	1553	1553	12,904	20,288
Nos 01	1	746	746	746	746	-	-	956	956	1320	1320	1320	1320	11,014	11,014
Nu-Lewis	1	303	303	-	-	304	304	303	303	303	303	304	304	3,437	13,477
Ohio St 1	1	583	583	582	582	568	568	583	583	583	583	581	581	6,984	9,385
Ohio St 2	1	571	571	1321	1321	1319	1319	1333	1333	1321	1321	1321	1321	9,881	12,553
Williams	1	574	574	1570	1570	1574	1574	2133	2133	711	711	1579	1579	17,763	
Walker Oil Co. State A	1	377	377	741	741	737	737	737	737	737	737	375	375	7,096	19,349
State B	1	377	377	377	377	1322	1322	756	756	377	377	1321	1321	8,429	29,991
State C	1	375	375	741	741	1323	1323	741	741	1324	1324	741	741	9,193	22,760
State D	1	373	373	741	741	1323	1323	1323	1323	1323	1323	1323	1323	13,227	21,184
State F	1	373	373	741	741	2327	1118	1716	858	1395	698	1533	766	11,407	25,980
State G	1	1307	1307	1307	1307	2666	1333	2665	1333	2665	1333	2660	1330	21,430	31,580
State F	2	1747	873	1747	873	3077	1606	4303	2304	2652	1326	3705	1894	22,822	37,796
State J	2	1711	853	1706	853	3107	1554	4303	2152	2179	1579	3737	1629	22,782	37,989
State K	2	705	353	1414	707	1322	1322	2313	1320	1321	820	1307	934	12,351	12,351
Great Western Prod. Inc. Wm Ft	1	374	374	741	741	1322	1322	1323	1323	1709	1709	1317	1317	10,977	13,248
State L	2	1380	690	1232	616	2340	1170	2623	1311	1549	1549	1929	1929	17,395	23,232
State M	2	1401	701	1251	626	2390	1195	2623	1311	1882	941	2938	1433	16,282	16,282
State N	1	534	534	958	958	1322	1322	2293	1530	1562	781	1136*	615	7,553	7,553
State O	1	387	387	-	-	381	381	-	-	188	188	191	191	1,117	1,117

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	January Runs Lease	January Per Well	February Runs Lease	February Per Well	March Runs Lease	March Per Well	April Runs Lease	April Per Well	May Runs Lease	May Per Well	June Runs Lease	June Per Well
Gulf Oil Corp. Lea St	2	6-21-32	442	442	219	219	-	-	217	217	-	-	-	-
Chaves St	2	12-13-31												
Hanny & Co. Penny St A	2	6-13-32											1191*	596
Penny St B	2	11-13-31											150	150
Pubco, A.K. State A														
State B														
Barker Oil Co. State A	1	1-13-31	444	444	446	446	358	358	438	438	436	436	443	443
State B	1	12-13-31			360	360	358	358	720	720	580	580	564	564
State C	1	12-13-31	380	380	702	702	382	382	761	761	569	569	567	567
State D	1	13-13-31	383	383	333	333	235	235	235	235	330	330	-	-
State E	1	13-13-31			447	447	436	436	443	443	439	439	561	561
Vickers Petro. Corp. (Formerly Pubco Refg. Inc.) Caprock St	2	6-13-32	212	212	579*	289	642*	321	950*	317	1790	448	1779	445
Nor St	3	12612-13-31	1596*	532	1366	455	1413	471	2166	722	1715	572	1737	579
Nor St F-2	3	11-13-31											737	737
Williams	5	7 & 8-13-32	908	908	990*	495	1663	832	931	931	1589*	530	1565	522
Watson Drlg., (Formerly Cockburn, Barnes) State	2	36-12-31 13-13-31							431	431	331	331	911	911
Williams, Sam Williams	4	7 & 8-13-32	1311*	657	1301	699	1950*	685	3064	771	2096	524	2196	549
FIELD TOTAL			26,932		27,194		31,574		43,958		36,879		36,399	
NUMBER OF WELLS			57		62		65		67		67		73	
AVERAGE PER WELL			458		439		486		656		551		505	

*New Well Completed.

(Continued)

GRAY LEFLET RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Runs Lease	July Per Well	August Runs Lease	August Per Well	September Runs Lease	September Per Well	October Runs Lease	October Per Well	November Runs Lease	November Per Well	December Runs Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-47
Gulf Oil Corp. Lea St	2	196	134	191	191			2324	336	429	215	233	139	2,133	4,011
Chaves St	2			273	273	1965	1965	1437	1437	1019*	152	1778	1645	7,754	7,754
Hanny & Co. Penny St A	2	1044	532	1747	874	2263	1132	1074	535	773	437	1854	927	13,784	13,784
Penny St B	2	215	215	-	-	734	734	667	667	434	434	401	401	2,793	2,793
Pubco, A.K. State A	2														
State B	2			2235	1118	2235	1118	2931	1467	3144	1572	3343	1672	19,549	19,549
								2235*	2235	312	312			2,547	2,547
Barker Oil Co. State A	1	434	434	838	838	773	773	829	829	445	445	722	722	6,154	30,928
State B	1	366	366	722	722	741	741	740	740	382	382	376	376	6,146	6,900
State C	1	586	586	724	724	1129	1129	1393	1393	746	746	1743	1743	9,419	9,419
State D	1	315	315	-	-	376	376	377	377	-	-	376	376	2,197	2,197
State E	1	333	333	349	349	735	735	224	224	231	231	735	735	2,112	2,112
														1,331	6,331
Vickers Petro. Corp. (Formerly Pubco Refg. Inc.) Caprock St	4	951	238	1936	459	1697	424	2253	563	974	244	1776	427	15,299	15,299
Nor St	3	1362	454	2250	733	1929	1200	2753	913	2753	913	4774	1654	3435	1315	77,714	91,564
Nor St F-2	1					1	1	711	711	711	711				661	661	
Williams	5	1688	563	1918*	479	3747	937	3582	921	2643*	57	3599	638	24,018	24,658
Watson Drlg. Co. (Formerly Cockburn, Barnes) State	2	452	452	772	772	539	839	629	629	1779*	591	1776	588	6,916	6,916
Williams, Sam Williams	4	2156	539	2895	724	4249	1063	3264	816	-	-	1883	471	24,174	24,955
FIELD TOTAL		33,506		49,190		61,355		69,721		74,555		93,436		621,131	1,098,411
NUMBER OF WELLS		73		76		71		73		74		74			
AVERAGE PER WELL		459		647		1005		1076		814		1007			

*New Well Completed.

GRAY LEFLET RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Runs Lease	July Per Well	August Runs Lease	August Per Well	September Runs Lease	September Per Well	October Runs Lease	October Per Well	November Runs Lease	November Per Well	December Runs Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-47
Gulf Oil Corp. Lea St	2	196	134	191	191			2324	336	429	215	233	139	2,133	4,011
Chaves St	2			273	273	1965	1965	1437	1437	1019*	152	1778	1645	7,754	7,754
Hanny & Co. Penny St A	2	1044	532	1747	874	2263	1132	1074	535	773	437	1854	927	13,784	13,784
Penny St B	2	215	215	-	-	734	734	667	667	434	434	401	401	2,793	2,793
Pubco, A.K. State A	2														
State B	2			2235	1118	2235	1118	2931	1467	3144	1572	3343	1672	19,549	19,549
								2235*	2235	312	312			2,547	2,547
Barker Oil Co. State A	1	434	434	838	838	773	773	829	829	445	445	722	722	6,154	30,928
State B	1	366	366	722	722	741	741	740	740	382	382	376	376	6,146	6,900
State C	1	586	586	724	724	1129	1129	1393	1393	746	746	1743	1743	9,419	9,419
State D	1	315	315	-	-	376	376	377	377	-	-	376	376	2,197	2,197
State E	1	333	333	349	349	735	735	224	224	231	231	735	735	2,112	2,112
														1,331	6,331
Vickers Petro. Corp. (Formerly Pubco Refg. Inc.) Caprock St	4	951	238	1936	459	1697	424	2253	563	974	244	1776	427	15,299	15,299
Nor St	3	1362	454	2250	733	1929	1200	2753	913	2753	913	4774	1654	3435	1315	77,714	91,564
Nor St F-2	1					1	1	711	711	711	711				661	661	
Williams	5	1688	563	1918*	479	3747	937	3582	921	2643*	57	3599	638	24,018	24,658
Watson Drlg. Co. (Formerly Cockburn, Barnes) State	2	452	452	772	772	539	839	629	629	1779*	591	1776	588	6,916	6,916
Williams, Sam Williams	4	2156	539	2895	724	4249	1063	3264	816	-	-	1883	471	24,174	24,955
FIELD TOTAL		33,506		49,190		61,355		69,721		74,555		93,436		621,131	1,098,411
NUMBER OF WELLS		73		76		71		73		74		74			
AVERAGE PER WELL		459		647		1005		1076		814		1007			

*New Well Completed.

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	January Runs Lease	January Per Well	February Runs Lease	February Per Well	March Runs Lease	March Per Well	April Runs Lease	April Per Well	May Runs Lease	May Per Well	June Runs Lease	June Per Well
British American Oil Prod. State	2	12-13-31	1432	716	916	458	1459	729	1361	681	1443	722	1619	810
Cities Service Oil Co. State A	1	17-13-32	137	69	457	228	1321	661	1319	659	1452	726	1331	665
State T	1	31-12-32	665	665	226	226	656	656	432	432	256	256	226	226
Cooperative Prods. Assn. Liv. Nos	1	31-12-31	387	387	391	391	391	391	391	391	391	391	391	391
Liv. Nos A	1	1-13-31	393	393	376	376	377	377	374	374	377	377	733	733
Liv. Nos C	1	31-12-32	5023	1675	4565	913	4721	944	4345	869	3358	671	3573	714
Liv. Nos G	1	31-12-31	731	731	375	375	376	376	373	373	376	376	376	376
Liv. Nos I	1	6-13-32	1491	498	1125	375	1711	570	2530	843	1775	592	1737	579
Liv. Nos J	2	31-12-31	340	170	309	154	1240	620	1247	623	1244	622	1243	621
Liv. St D	1	31-12-31	548	548	187	187	376	376	373	373	375	375	373	373
Mal Nos A	1	31-12-31	4579	1526	3162	1054	4345	1448	4265	1421	3623	1207	4334	1445
Mal Nos B	1	31-12-31									194	194		
Mal Nos H	1	30-12-31	959	959	959	959	1333	1333	1352	1352	1336	1336	1347	1347
Mal Nos F-1	1	1-13-32					253	253	-	-	787	787	-	-
Mal Nos F-2	1	30-12-31	791	791	1280	1280	660	660	793	793	371	371	357	357
Mal Nos G	1	31-12-31	1261	1261	1321	1321	1322	1322	1365	1365	1334	1334	773	773
Mal Nos H	1	7-13-32	731	731	794	794	760	760	576	576	559	559	571	571
Nor St	1	31-12-31	190	190	-	-	1562	781	-	-	1549	774	-	-
Nu-Lewis	1	1-13-31	1266	422	1339	669	901	901	937	937	1274	1274	784	784
Ohio St	3	31-12-31	-	-	559	559	1218	609	1267	633	1267	633	1264	632
Williams	4	9-13-32	1565	391	1263	316	1615	404	1171	293	1313	328	703	176
Delfern Oil Co. State A	1	36-12-31	1141	1141	994	994	972	972	968	968	1334	1334	1336	1336
State B	1	1-13-31	573	573	935	935	1276	1276	1139	1139	1276	1276	765	765
State C	1	1-13-31	956	956	955	955	752	752	187	187	956	956	371	371
State D	1	1-13-31	765	765	1134	1134	1276	1276	1138	1138	1531	1531	1531	1531
State E	2	13-13-31	566	283	950	475	949	475	380	190	555	278	1894	947
State F	2	7-13-32	2381	793	2535	1268	2283	1142	2280	1140	2280	1140	2564	1282
State G	2	1-13-31	1950	975	2383	1192	2787	1394	2787	1394	2564	1282	2563	1282
State H	2	12-13-31	1929	965	3813	1907	2787	1394	2787	1394	2564	1282	2563	1282
State J	2	13-13-31	919	459	747	374	933	466	397	199	737	368	533	267
Great Western Prod. Inc. Wm Ft	1	10-13-31	780	780	377	377	577	577	1147	1147	1153	1153	1137	1137
State L	2	10-13-31	1921	960	1939	969	2909	1454	2911	1455	2911	1455	2911	1455
State M	2	13-13-31	1532	766	2227	1114	1331	618	1361	1526	2327	1163	2327	1163
State N	1	13-13-32	1510	379	1899	475	2343	586	1923	481	1930	482	1939	485
State O	1	12-13-31	-	-	213	213	-	-	569	569	167	167	-	-
State P	1	1-13-32			1	1	1	1	1	1	1	1	1	1
State T	3	31-12-32	2589	1293	2553	851	3713	1237	3123	1041	4345	1448	3583	1194

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Runs Lease	July Per Well	August Runs Lease	August Per Well	September Runs Lease	September Per Well	October Runs Lease	October Per Well	November Runs Lease	November Per Well	December Runs Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-47
British American Oil Prod. State	2	1416	708	1651	825	953	476	759	479	886	443	977	488	15,299	24,755
Cities Service Oil Co. State B	2	1504	752	752	376	1131	566	1320	660	1303	652	1282	641	12,246	36,851
State T	1	253	253	226	226	226	226	-	-	215	215	-	-	7,317	7,702
Cooperative Prods. Assn. Liv. Nos	1	193	193	194	194	186	186	-	-	192	192	192	192	2,301	20,164
Liv. Nos A	1	191	191	188	188	189	189	-	-	189	189	192	192	2,242	23,881
Liv. Nos G	1	3130	630	3082	616	3035	607	2020	404	2689	537	2356	471	43,279	174,577
Liv. Nos J	1	188	188	187	187	564	564	191	191	953	953	1323	1323	6,221	47,065
Liv. Nos K	2	1258	629	1281	641	1301	651	2563	641	2563	641	2577	644	19,415	138,093
Liv. St D	1	192	192	368	368	189	189	95	95	379	190	189	95	4,313	29,706
Mal Nos A	8	3650	456	3650	456	3041	380	2429	304	2430	304	3413	427	44,459	37,620
Mal Nos B	1														194
Mal Nos H	1	954	954	960	960	963	963	958	958	959	959	959	959	11,233	6,406
Mal Nos F-1	1			208	208	-	-			202	202			872	1,125
Mal Nos F-2	1	370	370	282	282	1135	1135	1529	1529	1529	1529	1525	1525	9,812	29,799
Mal Nos H	1	804	804	879	879	682	682	681	681	666	666	668	668	11,143	36,066
Nor St	1	1562	781	547	547	380	380	334	334	380	380	377	377	5,099	16,742
Nu-Lewis	1	196	196	-	-	331	331	-	-	196	196	-	-	961	14,443
Ohio St	3	949	316	948	316	951	317	771	257	574	191	574	191	10,422	20,399
Ohio St 2	1	733	733	566	566	556	556	578	578	565	565	562	562	7,029	30,682
Williams	4	1154	289	1157	289	1317	329	992	248	1560	390	1587	397	14,886	39,040
Delfern Oil Co. State A	1	742	742	791	791	757	757	733	733	571	571	760	760	10,133	63,922
State B	1	741	741	756	756	757	757	756	756	757	757	761	761	11,031	46,098
State C	1	372	372	374	374	378	378	381	381	380	380	381	381	5,047	35,219
State D	1	1139	1139	1328	1328	1140	1140	1302	1302	1140	1140	1141	1141	15,152	51,243
State E	2	373	187	569	284	395	198	384	192	381	191	379	190	4,331	31,845
State F	2	3851	1286	3654	1218	3613	1130	3397	1299	3397	1299	3156	1201	44,797	120,837
State G	2	2643	1222	2474	1237	2440	1220	2686	1343	2490	1245	2693	1333	37,768	101,969
State H	2	2649	1020	2686	1343	2623	1312	2658	1329	2905	1453	2693	1352	35,855	97,466
State J	2	532	266	187	94	693	335	349	175	561	284	659	329	6,723	39,096
Great Western Prod. Inc. Wm Ft	1	1151	1151	750	750	576	576	773	773	792	792	772	772	9,956	33,977
State L	2	2585	1292	1918	959	1702	851	2675	1338	2251	1126	2298	1149	24,355	53,721
State M	2	2603	1302	1597	934	1979	845	2611	1306	2344	1172	2351	1176	21,915	64,033
State N	1	1536	768	1533	767	1162	581	1413	706	1556	778	1562	781	19,192	52,772
State O	1	-	-	-	-	-	-	-	-	-	-	-	-	750	1,302
State P	1	161	161	-	-	-	-	164	164	-	-	-	-	325	1,375
State Q	3	3179	1060	2910	970	2478	826	2311	770	2315	772	2315	772	35,425	51,751

*New Well Completed.

(Continued)

GROSS PIPELINE RUNS FOR 1947
(Continued)

Operator & Lease	No. Wells on Lease	July Runs Lease	July Per Well	August Runs Lease	August Per Well	September Runs Lease	September Per Well	October Runs Lease	October Per Well	November Runs Lease	November Per Well	December Runs Lease	December Per Well	Year Total 1947	Cum. Total to 1-1-47
British American Oil Prod. State	2	1416	708	1651	825	953	476	759	479	886	443	977	488	15,299	24,755
Cities Service Oil Co. State B	2	1504	752	752	376	1131	566	1320	660	1303	652	1282	641	12,246	36,851
State T	1	253	253	226	226	226	226	-	-	215	215	-	-	7,317	7,702
Cooperative Prods. Assn. Liv. Nos	1	193	193	194	194	186	186	-	-	192	192	192	192	2,301	20,164
Liv. Nos A	1	191	191	188	188	189	189	-	-	189	189	192	192	2,242	23,881
Liv. Nos G	1	3130	630	3082	616	3035	607	2020	404	2689	537	2356	471	43,279	174,577
Liv. Nos J	1	188	188	187	187	564	564	191	191	953	953	1323	1323	6,221	47,065
Liv. Nos K	2	1258	629	1281	641	1301	651	2563	641	2563	641	2577	644	19,415	138,093
Liv. St D	1	192	192	368	368	189	189	95	95	379	190	189	95	4,313	29,706
Mal Nos A	8	3650	456	3650	456	3041	380	2429	304	2430	304	3413	427	44,459	37,620
Mal Nos B	1														194
Mal Nos H	1	954	954	960	960	963	963	958	958	959	959	959	959	11,233	6,406
Mal Nos F-1	1			208	208	-	-			202	202			872	1,125
Mal Nos F-2	1	370	370	282	282	1135	1135	1529	1529	1529	1529	1525	1525	9,812	29,799
Mal Nos H	1	804	804	879	879	682	682	681	681	666	666	668	668	11,143	36,066
Nor St	1	1562	781	547	547	380	380	334	334	380	380	377	377	5,099	16,742
Nu-Lewis	1	196	196	-	-	331	331	-	-	196	196	-	-	961	14,443
Ohio St	3	949	316	948	316	951	317	771	257	574	191	574	191	10,422	20,399
Ohio St 2	1	733	733	566	566	556	556	578	578	565	565	562	562	7,029	30,682
Williams	4	1154	289	1157	289	1317	329	992	248	1560	390	1587	397	14,886	39,040
Delfern Oil Co. State A	1	742	742	791	791	757	757	733	733	571	571	760	760	10,133	63,922
State B	1	741	741	756	756	757	757	756	756	757	757	761	761	11,031	46,098
State C	1	372	372	374	374	378	378	381	381	380	380	381	381	5,047	35,219
State D	1	1139	1139	1328	1328	1140	1140	1302	1302	1140	1140	1141	1141	15,152	51,243
State E	2	373	187	569	284	395	198	384	192	381	191	379	190	4,331	31,845
State F	2	3851	1286	3654	1218	3613	1130	3397	1299	3397	1299	3156	1201	44,797	120,837
State G	2	2643	1222	2474	1237	2440	1220	2686	1343	2490	1245	2693	1333	37,768	101,969
State H	2	2649	1020	2686	1343	2623	1312	2658	1329	2905	1453	2693	1352	35,855	97,466
State J	2	532	266	187	94	693	335	349	175	561	284	659	329	6,723	39,096
Great Western Prod. Inc. Wm Ft	1	1151	1151	750	750	576	576	773	773	792	792	772	772	9,956	33,977
State L	2	2585	1292	1918	959	1702	851	2675	1338	2251	1126	2298	1149	24,355	53,721
State M	2	2603	1302	1597	934	1979	845	2611	1306	2344	1172	2351	1176	21,915	64,033
State N	1	1536	768	1533	767	1162	581	1413	706	1556	778	1562	781	19,192	52,772
State O	1	-	-	-	-	-	-	-	-	-	-	-	-	750	1,302
State P	1	161	161	-	-	-	-	164	164	-	-	-	-	325	1,375
State Q	3	3179

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	Sep., Twp. Range	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	April Per Well Lease	April Per Well Cum	May Per Well Lease	May Per Well Cum	June Per Well Lease	June Per Well Cum
Great Western Prod. Inc. (Cont.)														
State B	1	2-13-32	1013	2696	992	2350	987	2039	693	1660	560	1891	616	2,496
State D	1	2-13-32	279	279	228	228	221			1,500	319			1,500
Gulf Oil Corp.														
Lea 31	3	4-13-32	340	423	141	430	137	-		156	53	-		
Lea 31 B	2	4-13-32	723	1061	531	897	458	1012	336	832	416	1043	522	4,416
Chavez St	2	4-13-32	434	946	402	1279	364	1643	322	1155	290	-		11,456
Hoyer & Co.														
Henry St	2	4-13-32	1071	1565	973	437	1088	561	1096	537	935	478	837	479
Henry St	2	11-13-31	437	278	235	196	214	214	219	219	188	216	324	199
Hoyer & Co.														
Henry St A	2	4-13-32	1071	1565	973	437	1088	561	1096	537	935	478	837	479
Henry St	2	11-13-31	437	278	235	196	214	214	219	219	188	216	324	199
Hilldrum Oil Co.														
State #12	1	32-12-32	330	330	330	330	327	327	327	327	327	327	327	327
Hobbs, Ada														
Cap	2	12-13-31	1020	556	681	460	801	460	809	435	-		431	205
State B	2	1-14-31	1754	879	1550	775	1525	553	950	430	-		893	419
Hobbs Pet. Co.														
Cap	1	30-13-32	193	193	188	188	184	184	183	183	-		-	
Chaparral	1	30-13-32	1695	1695	1693	1693	1679	1679	1679	1679	2005	534	1955	1,955
Lovlace	1	16-13-31	968	968	969	969	966	966	966	966	966	966	966	966
Hodgen Oil Co.														
State	1	1-13-31	-	-	-	-	181	181	179	179	177	177	-	
State B	1	12-13-31	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1,035
State C	1	10-13-31	175	175	179	179	183	183	184	184	189	189	187	187
State D	1	10-13-31	-	-	-	-	186	186	186	186	186	186	183	183
State E	1	13-13-31	202	202	-	-	203	203	209	209	184	184	-	
Hodges, Ed. Prod. Co. (Formerly Hobbs Pet. Co.)														
Cap	1	30-13-32	966	193	683	97	1184	237	685	97	959	190	646	97
Chaparral	1	30-13-32	968	484	968	484	966	483	966	483	966	483	966	483
Chaparral St B	2	30-13-32	-	-	Temporarily Abandoned									
West Ground	1	16-13-31	1367	1367	1368	1368	318	318	211	211	420	420	210	210
Wm St	3	12&13-13-32	1360	666	1681	307	1893	624	1078	387	1687	625	1112	1,112
Wm St F-2	1	13-13-32	-	-	Not St F-2									
Williams	7	8-13-32	1772	253	1652	229	1551	222	1139	163	1390	199	1067	230
Hudson, Ed. Drlg. Co. (Formerly Cockburn, Barney)														
Williams	4	8-13-32	992	248	908	227	814	203	995	244	965	241	968	242
Hudson, Ed. Drlg. Co. (Continental)	1	19-13-32	186	186	-	-	186	186	182	182	-	-	183	183
FIELD TOTAL			59,200		51,904		53,171		47,324		44,589		39,291	
NUMBER OF WELLS			130		130		130		130		130		130	
AVERAGE PER WELL			455		399		409		364		343		302	

(Continued)

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	Sep., Twp. Range	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	April Per Well Lease	April Per Well Cum	May Per Well Lease	May Per Well Cum	June Per Well Lease	June Per Well Cum
Gulf Oil Corp.														
Lea 31	3	4-13-32	-	-	-	-	-	-	-	-	-	-	-	-
Lea 31 B	2	4-13-32	867	434	603	316	380	415	813	437	696	311	812	406
Chavez St	2	12-13-31	329	111	959	229	934	417	736	316	856	427	968	484
Hoyer & Co.														
Henry St	2	4-13-32	1071	535	973	437	1088	561	1096	537	935	478	837	479
Henry St	2	11-13-31	437	278	235	196	214	214	219	219	188	216	324	199
Hoyer & Co.														
Henry St A	2	4-13-32	1071	535	973	437	1088	561	1096	537	935	478	837	479
Henry St	2	11-13-31	437	278	235	196	214	214	219	219	188	216	324	199
Hilldrum Oil Co.														
State #12	1	32-12-32	330	330	330	330	327	327	327	327	327	327	327	327
Hobbs, Ada														
Cap	2	12-13-31	1020	556	681	460	801	460	809	435	-		431	205
State B	2	1-14-31	1754	879	1550	775	1525	553	950	430	-		893	419
Hobbs Pet. Co.														
Cap	1	30-13-32	193	193	188	188	184	184	183	183	-		-	
Chaparral	1	30-13-32	1695	1695	1693	1693	1679	1679	1679	1679	2005	534	1955	1,955
Lovlace	1	16-13-31	968	968	969	969	966	966	966	966	966	966	966	966
Hodgen Oil Co.														
State	1	1-13-31	-	-	-	-	181	181	179	179	177	177	-	
State B	1	12-13-31	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1035	1,035
State C	1	10-13-31	175	175	179	179	183	183	184	184	189	189	187	187
State D	1	10-13-31	-	-	-	-	186	186	186	186	186	186	183	183
State E	1	13-13-31	202	202	-	-	203	203	209	209	184	184	-	
Hodges, Ed. Prod. Co. (Formerly Hobbs Pet. Co.)														
Cap	1	30-13-32	966	193	683	97	1184	237	685	97	959	190	646	97
Chaparral	1	30-13-32	968	484	968	484	966	483	966	483	966	483	966	483
Chaparral St B	2	30-13-32	-	-	Temporarily Abandoned									
West Ground	1	16-13-31	1367	1367	1368	1368	318	318	211	211	420	420	210	210
Wm St	3	12&13-13-32	1360	666	1681	307	1893	624	1078	387	1687	625	1112	1,112
Wm St F-2	1	13-13-32	-	-	Not St F-2									
Williams	7	8-13-32	1772	253	1652	229	1551	222	1139	163	1390	199	1067	230
Hudson, Ed. Drlg. Co. (Formerly Cockburn, Barney)														
Williams	4	8-13-32	992	248	908	227	814	203	995	244	965	241	968	242
Hudson, Ed. Drlg. Co. (Continental)	1	19-13-32	186	186	-	-	186	186	182	182	-	-	183	183
FIELD TOTAL			59,200		51,904		53,171		47,324		44,589		39,291	
NUMBER OF WELLS			130		130		130		130		130		130	
AVERAGE PER WELL			455		399		409		364		343		302	

(Continued)

GROSS PIPELINE RUNS FOR 1950
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	April Per Well Lease	April Per Well Cum	May Per Well Lease	May Per Well Cum	June Per Well Lease	June Per Well Cum
British American Oil Prod.														
State	2	13-13-31	874	437	430	215	965	482	478	239	777	388	1074	537
Gillen Service Oil Co.														
State A	2	17-13-32	1135	567	1139	569	1136	568	1136	568	1136	568	1136	568
State T	1	20-13-32	722	722	-	-	-	-	-	-	-	-	-	-
Cooperative Prod. Assn.														
Liv. Nox	1	36-12-31	1135	567	1139	569	1136	568	1136	568	1136	568	1136	568
Liv. Nox A	1	1-13-32	199	199	-	-	-	-	-	-	-	-	-	-
Liv. Nox B	1	31-12-32	1138	569	1138	569	1138	569	1138	569	1138	569	1138	569
Liv. Nox B II	1	31-12-32	1138	1138	1134	1134	1134	1134	1134	1134	1134	1134	1134	1134
Liv. Nox J	1	36-12-31	-	-	-	-	-	-	-	-	-	-	-	-
Liv. Nox St X	2	6-13-32	2085	521	1939	623	1961	654	1940	647	1623	323	1618	809
Liv. St. D	2	7-13-32	199	99	187	94	183	92	183	92	183	92	183	92
Nelco Nox A	1	30-12-32	-	199	197	197	197	197	197	197	197	197	197	197
Nelco Nox B	1	31-12-32	2682	335	1682	210	1682	210	1682	210	1682	210	1682	210
Nelco Nox C	1	36-12-31	-	-	199	199	-	-	-	-	-	-	-	-
Nelco Nox F-3	1	31-12-32	385	385	199	199	199	199	199	199	199	199	199	199
Nelco Nox F-1	1	1-13-32	-	-	1134	1134	1134	1134	1134	1134	1134	1134	1134	1134
Nelco Nox H	1	36-12-31	1138	1138	964	964	1138	1138	1138	1138	1138	1138	1138	1138
Nox St	2	7-13-32	1134	567	1134	567	1134	567	1134	567	1134	567	1134	567
Mcqueen	1	12-13-31	391	391	389	389	391	391	391	391	391	391	391	391
Ohio St	1	1-13-32	391	391	-	-	-	-	-	-	-	-	-	-
State E	1	1-13-31	255	255	769	256	769	256	769	256	769	256	769	256
Williams	1	1-13-31	397	397	396	396	396	396	396	396	396	396	396	396
Dalfern Oil Co.														
State A	1	36-12-31	797	797	797	797	797	797	797	797	797	797	797	797
State B	1	1-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State C	1	1-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State D	1	2-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State E	1	1-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State F	1	2-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State G	1	1-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State H	1	2-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State I	1	2-13-31	966	966	966	966	966	966	966	966	966	966	966	966
State J	1	12-13-31	966	966	966	966	966	966	966	966	966	966	966	966
Great Western Prod. Inc.														
State A	1	12-13-31	961	961	961	961	961	961	961	961	961	961	961	961
State B	2	12-13-31	2682	1342	2681	1340	2679	1340	2677	1339	2677	1339	2677	1339
State C	2	12-13-31	1359	679	1357	679	1357	679	1357	679	1357	679	1357	679
State G	1	12-13-31	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535
State F	1	12-13-31	-	-	-	-	-	-	-	-	-	-	-	-
State Q	1	2-13-31	-	-	-	-	-	-	-	-	-	-	-	-
State A	3	7-13-32	2087	693	1537	505	2082	694	2082	694	2082	694	2082	694
State B	2	5-13-32	1513	757	1396	698	1413	707	1413	707	1413	707	1413	707
State B	1	5-13-32	785	785	-	-	781	781	-	-	1368	1368	1368	1368

(Continued)

GROSS PIPELINE RUNS FOR 1951
(Continued)

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	Cum. Total to 1-31-51	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	Cum. Total to 4-1-51
British American Oil Prod.										
State	2	13-13-31	54,430	950	475	499	249	478	239	56,347
Gillen Service Oil Co.										
State A	2	17-13-32	68,983	759	379	927	464	755	377	71,424
State T	1	20-13-32	6,971	-	-	-	-	-	-	6,971
Cooperative Prod. Assn.										
Liv. Nox	1	36-12-31	39,197	140	140	-	-	-	-	39,430
Liv. Nox A	1	1-13-32	24,791	-	-	102	102	93	93	25,096
Liv. Nox B II	1	31-12-32	200,160	105	421	102	105	-	-	201,096
Liv. Nox J	1	36-12-31	51,000	568	568	1702	568	1623	323	53,996
Liv. Nox St X	2	6-13-32	154,972	568	568	569	569	569	569	156,623
Liv. St. D	2	7-13-32	31,793	183	183	551	551	551	551	33,662
Nelco Nox A	1	30-12-32	28,202	197	76	197	197	197	197	28,996
Nelco Nox B	1	31-12-32	155,130	1682	189	183	183	182	182	156,044
Nelco Nox C	1	36-12-31	6,600	199	199	1451	203	1689	563	31,190
Nelco Nox F-3	1	31-12-32	27,751	-	-	-	-	-	-	29,839
Nelco Nox F-1	1	1-13-32	28,749	569	569	566	566	563	563	29,319
Nelco Nox H	1	36-12-31	30,252	-	-	-	-	-	-	6,600
Nox St	2	7-13-32	34,018	740	740	739	739	660	660	30,252
Mcqueen	1	12-13-31	41,018	206	206	192	192	391	391	34,761
Ohio St	1	1-13-31	39,572	191	191	183	183	391	391	40,353
State E	2	11-13-31	37,966	-	-	-	-	256	256	39,572
Williams	1	1-13-31	41,756	199	199	198	198	198	198	38,093
Dalfern Oil Co.										
State A	1	36-12-31	46,083	370	370	353	353	361	361	47,009
State B	1	1-13-31	40,874	272	272	185	185	185	185	41,516
State C	1	1-13-31	38,881	113	113	87	87	88	88	39,339
State D	1	2-13-31	39,000	349	349	-	-	98	98	39,561
State E	1	1-13-31	41,393	1750	125	146	73	375	375	42,109
State F	1	2-13-31	833,971	1705	568	1620	474	1352	677	43,652
State G	1	1-13-31	128,780	1498	749	959	479	1150	575	134,187
State H	2	2-13-31	107,980	1498	749	958	479	1150	575	110,110
State I	2	2-13-31	41,519	1498	749	748	374	1150	575	130,242
State J	2	12-13-31	-	334	167	374	187	376	188	108,754
Great Western Prod. Inc.										
State A	1	12-13-31	48,808	930	930	744	744	651	651	51,463
State B	2	12-13-31	96,164	933	476	993	476	1282	641	
State C	2	12-13-31	89,066	1362	96	1351	97	1282	641	51,417
State G	1	12-13-31	40,000	946	237	1350	330	1282	641	99,660
State F	1	12-13-31	1,082	-	-	-	-	1282	1282	42,992
State Q	1	2-13-31	2,716	149	149	-	-	-	-	45,450
State A	3	30-12-32	60,027	998	342	-	-	-	-	2,716
State B	2	5-13-32	2,982	992	334	986	329	998	332	60,023
State B	1	5-13-32	-	-	-	783	261	634	211	2,982
						209	209	-	-	3,026
FIELD TOTAL	138	AVERAGE PER WELL	3,309,397	30,871 241		28,524 213		25,131 220		3,416,929

(Continued)

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

Operator & Lease	No. Wells on Lease	Sec., Twp. Range	Cum. Total to 1-31-51	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	Cum. Total to 4-1-51
British American Oil Prod.										
State	2	13-13-31	54,430	950	475	499	249	478	239	56,347
Gillen Service Oil Co.										
State A	2	17-13-32	68,983	759	379	927	464	755	377	71,424
State T	1	20-13-32	6,971	-	-	-	-	-	-	6,971
Cooperative Prod. Assn.										
Liv. Nox	1	36-12-31	39,197	140	140	-	-	-	-	39,430
Liv. Nox A	1	1-13-32	24,791	-	-	102	102	93	93	25,096
Liv. Nox B II	1	31-12-32	200,160	105	421	102	105	-	-	201,096
Liv. Nox J	1	36-12-31	51,000	568	568	1702	568	1623	323	53,996
Liv. Nox St X	2	6-13-32	154,972	568	568	569	569	569	569	156,623
Liv. St. D	2	7-13-32	31,793	183	183	551	551	551	551	33,662
Nelco Nox A	1	30-12-32	28,202	197	76	197	197	197	197	28,996
Nelco Nox B	1	31-12-32	155,130	1682	189	183	183	182	182	156,044
Nelco Nox C	1	36-12-31	6,600	199	199	1451	203	1689	563	31,190
Nelco Nox F-3	1	31-12-32	27,751	-	-	-	-	-	-	29,839
Nelco Nox F-1	1	1-13-32	28,749	569	569	566	566	563	563	29,319
Nelco Nox H	1	36-12-31	30,252	-	-	-	-	-	-	6,600
Nox St	2	7-13-32	34,018	740	740	739	739	660	660	30,252
Mcqueen	1	12-13-31	41,018	206	206	192	192	391	391	34,761
Ohio St	1	1-13-31	39,572	191	191	183	183	391	391	40,353
State E	2	11-13-31	37,966	-	-	-	-	256	256	39,572
Williams	1	1-13-31	41,756	199	199	198	198	198	198	38,093
Dalfern Oil Co.										
State A	1	36-12-31	46,083	370	370	353	353	361	361	47,009
State B	1	1-13-31	40,874	272	272	185	185	185	185	41,516
State C	1	1-13-31	38,881	113	113	87	87	88	88	39,339
State D	1	2-13-31	39,000	349	349	-	-	98	98	39,561
State E	1	1-13-31	41,393	1750	125	146	73	375	375	42,109
State F	1	2-13-31	833,971	1705	568	1620	474	1352	677	43,652
State G	1	1-13-31	128,780	1498	749	959	479	1150	575	134,187
State H	2	2-13-31	107,980	1498	749	958	479	1150	575	110,110
State I	2	2-13-31	41,519	1498	749	748	374	1150	575	130,242
State J	2	12-13-31	-	334	167	374	187	376	188	108,754
Great Western Prod. Inc.										
State A	1	12-13-31	48,808	930	930	744	744	651	651	51,463
State B	2	12-13-31	96,164	933	476	993	476	1282	641	
State C	2	12-13-31	89,066	1362	96	1351	97	1282	641	51,417
State G	1	12-13-31	40,000	946	237	1350	330	1282	641	99,660
State F	1	12-13-31	1,082	-	-	-	-	1282	1282	42,992
State Q	1	2-13-31	2,716	149	149	-	-	-	-	45,450
State A	3	30-12-32	60,027	998	342	-	-	-	-	2,716
State B	2	5-13-32	2,982	992	334	986	329	998	332	60,023
State B	1	5-13-32	-	-	-	783	261	634	211	2,982
						209	209	-	-	3,026
FIELD TOTAL	138	AVERAGE PER WELL	3,309,397	30,871 241		28,524 213		25,131 220		3,416,929

(Continued)

GROSS PIPELINE RUNS FOR 1951
(Continued)

Operator & Lease	No. Wells on Lease	Sep., Twp. Range	Cum. Total to 1-31-51	January Per Well Lease	January Per Well Cum	February Per Well Lease	February Per Well Cum	March Per Well Lease	March Per Well Cum	Cum. Total to 4-1-51
Gulf Oil Corp.										
Chavez St	2	12-13-31	49,899	854	427	839	419	821	410	52,013
Lea 31	3	4-13-32	15,787	-	-	-	-	-	-	15,787
Lea 31 B	2	4-13-32	38,256	621	310	802	401	1049	524	40,978
Hoyer & Co.										
Henry St A	2	4-13-32	56,702	673	337	647	324	715	357	57,737
Henry St	2	11-13-31	19,152	215	108	232	116	479	217	20,014
Hilldrum Oil Co.										
State #12	1	32-12-32	22,350	181	181	186	186	188	188	23,105
Phillips Pet. Co.										
Cap	1	30-13-32	13,020	-	-	191	191	196	196	13,367
Caprock	4	30-13-32	87,132	1264	321	1490	372	1099	274	91,184
Lovlace	1	16-13-31	31,858	375	375	376	376	371	371	33,780
Pubco, Inc.										
State A	2	12-13-31	62,159	206	104	216	108	225	112	63,306
State B	2	1-13-31	49,777	435	218	435	215	640	320	51,662
Roeder Oil Co.										
State A	1	1-13-31	14,557	-	-	-	-	-	-	14,557
State B	1	12-13-31	16,203	-	-	192	192	-	-	16,395
State C	1	12-13-31	24,890	-	-	-	-	186	186	25,076
State D	1	7-13-31	4,710	-	-	-	-	-	-	4,710
State E	1	13-13-31	12,614	-	-	214	214	189	189	13,017
Shoats Pet. Co. (Formerly Hobbs Pet. Co.)										
Caprock St	5	6-13-32	54,557	439	88	288	58	402	81	55,666
Caprock St A	2	18-13-32	23,245	449	225	666	333	653	326	25,012
West Ground	1	12-13-31	9,350	218	218	186	186	229	229	10,161
Wm St	3	13 & 12-13-31	116,812	674	225	496	165	453	150	120,435
Wm St F-2		1-13-32	1,993	-	-	-	-	-	-	1,993
Williams	7	7 & 8-13-32	94,445	1494	771	1415	202	1212	173	98,485
Hudson, Ed. Drlg. Co. (Formerly Cockburn, Barney)										
Hudson, Ed. Drlg. Co. (Continental)	2	16-13-31 19-13-32	25,043	298	149	297	148	221	221	25,859
Hilldrum, Sam	4	8-13-32	83,045	820	205	694	174	728	182	85,289
Hudson, Ed. Drlg. Co. (Continental)	1	19-13-32	2,721	-	-	186	186	-	-	2,907
FIELD TOTAL			1,309,197	30,871		28,524		25,131		1,416,727
TOTAL WELLS	138	AVERAGE PER WELL		241		213		220		

(Continued)

COOPERATIVE PROJECTS ASSOCIATION
LEA & CHAVES COUNTIES, NEW MEXICO
CAPROCK FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
BY: SOUTHWESTERN PRODUCTION CORP.
State A-1, Secs. 31, T-12-S., R-32-E.

Date	Operating Hours	Daily Inj. Air Injected	Cum. Millions Air Injected	Injection Pressure	Daily Inj. Water Injected	Cum. Inj. Water Injected
9-26-50	23	79,343	79,343	465-75		
9-26-50	23	67,436	146,779			
9-27-50	23	95,181	241,960			
9-28-50	23	77,074	319,034			
9-29-50	23	77,738	396,772			
9-30-50	23	93,850	490,622			
9-31-50	24	140,150	630,772			
10- 1-50	22	106,660	737,432			
10- 2-50	22	115,573	853,005			
10- 3-50	24	129,088	982,093			
10- 4-50	23	135,329	1,117,422			
10- 5-50	18	98,515	1,215,937			
10- 6-50	20	63,320	1,279,257			
10- 7-50	17	59,744	1,339,001			
10- 8-50	22	99,665	1,438,666			
10- 9-50	22	90,955	1,529,621			
10-10-50	22	93,035	1,622,656			
10-11-50	22	89,682	1,712,338			
10-12-50	19	81,330	1,793,668			
10-13-50	Through	-	-			
10-16-50	0	-	-			
10-17-50	21	89,284	1,882,952			
10-18-50	23	85,710	1,968,662			
10-19-50	23	101,822	2,070,484			
10-20-50	23	93,778	2,164,262			
10-21-50	24	97,994	2,262,256			
10-22-50	23	85,874	2,348,130			
10-23-50	24	98,134	2,446,264			
10-24-50	24	99,737	2,546,001			
10-25-50	24	97,735	2,643,736			
10-26-50	22	90,435	2,734,171			
10-27-50	24	89,872	2,824,043			
10-28-50	24	85,216	2,909,259			

COOPERATIVE ASSOCIATION
AIR & WATER INJECTION PROJECT
(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			32	89
11-12-50	0	0			131	220
11-13-50	0	0			84	304
11-14-50	16	Pressure too High for chart				
11-15-50	24	" " " "				
11-16-50	24	" " " "				
11-17-50	17	" " " "				
11-18-50	24	71,338	3,669,751			
11-19-50	24	71,770	3,741,521			
11-20-50	24	76,538	3,818,059			
11-21-50	24	83,408	3,901,465			
11-22-50	24	68,152	3,969,617			
11-23-50	24	80,330	4,049,948			
11-24-50	24	77,120	4,127,068			
11-25-50	24	86,860	4,213,928			
11-26-50	24	87,838	4,301,766			
11-27-50	24	87,193	4,388,959			
11-28-50	24	87,838	4,476,797			
11-29-50	24	87,074	4,563,871			
11-30-50	24	86,136	4,650,007			
12- 1-50	23	81,130	4,731,137			
12- 2-50	24	77,355	4,808,492			
12- 3-50	24	80,741	4,889,233			
12- 4-50	24	103,247	4,992,480			
12- 5-50	16	57,744	5,050,224			
12- 6-50	11	43,949	5,094,173			
12- 7-50	21	81,436	5,175,609			
12- 8-50	24	91,668	5,267,277			
12- 9-50	24	106,896	5,374,173			
12-10-50	22	97,586	5,471,759			
12-11-50	24	113,835	5,585,594			
12-12-50	24	114,312	5,699,906			
12-13-50	24	112,257	5,812,163			
12-14-50	24	120,954	5,933,117			
12-15-50	24	117,163	6,050,280			
12-16-50	24	116,768	6,167,048			
12-17-50	24	111,883	6,278,931			
12-18-50	11	49,645	6,328,576			
12-19-50	23	108,658	6,437,234			
12-20-50	24	122,132	6,559,366			
12-21-50	24	124,934	6,684,300			
12-22-50	24	123,729	6,808,029			
12-23-50	24	119,133	6,927,162			
12-24-50	24	116,857	7,044,019			

(Continued)

COOPERATIVE ASSOCIATION
AIR & WATER INJECTION PROJECT
(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	116,935	7,031,641			
12-26-50	24	99,786	7,131,327			
12-27-50	24	111,436	7,242,763			
12-28-50	24	116,417	7,359,176			
12-29-50	24	111,780	7,471,956			
12-30-50	24	107,155	7,579,111			
12-31-50	24	107,477	7,686,588			
1- 1-51	24	105,124	7,791,712			
1- 2-51	24	103,248	7,894,960			
1- 3-51	24	94,765	7,989,029			
1- 4-51	22	91,260	8,080,289			
1- 5-51	16	70,168	8,150,457			
1- 6-51	23	100,512	8,251,169			
1- 7-51	22	91,765	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	106,238	8,663,473			
1-11-51	18	221,463	8,884,964			
1-12-51	22	146,277	9,031,241			
1-13-51		Injecting Water Pressure			130	484
1-14-51						
1-15-51	through	Too High for Chart			42	526
1-31-51		" " " "				

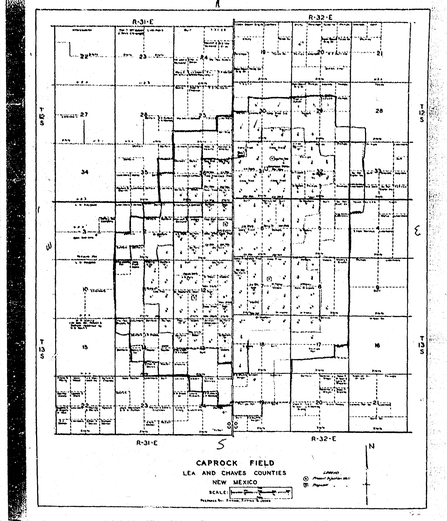
Repressuring Plant down during Month of February, 1951 - Mechanical Difficulties.

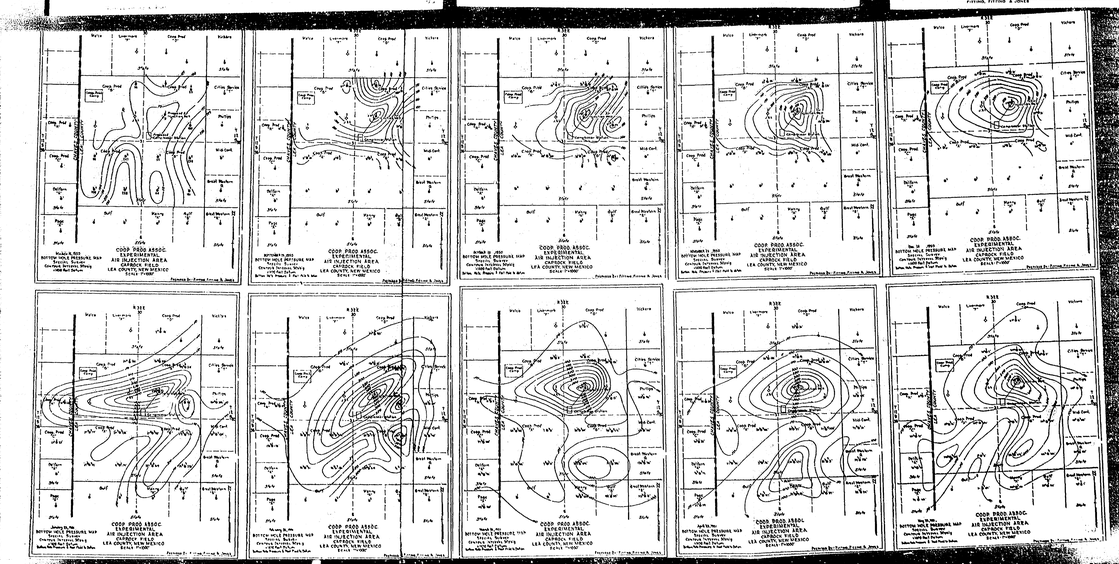
3- 1-51	24	81,631	9,092,872			
3- 2-51	24	96,466	9,189,338			
3- 3-51	24	94,594	9,283,932			
3- 4-51	24	96,950	9,380,882			
3- 5-51	24	74,914	9,369,796			
3- 6-51	24	77,325	9,446,933			
3- 7-51	23	76,187	9,523,120			
3- 8-51	24	77,748	9,598,874			
3- 9-51	24	82,446	9,681,320			
3-10-51	24	86,977	9,773,297			
3-11-51	24	87,331	9,857,633			
3-12-51	24	86,766	9,944,399			
3-13-51	10	37,734	10,001,383			
3-14-51	22	79,445	10,096,828			
3-15-51	24	74,181	10,171,009			
3-16-51	24	101,767	10,272,252			
3-17-51	24	111,917	10,384,175			

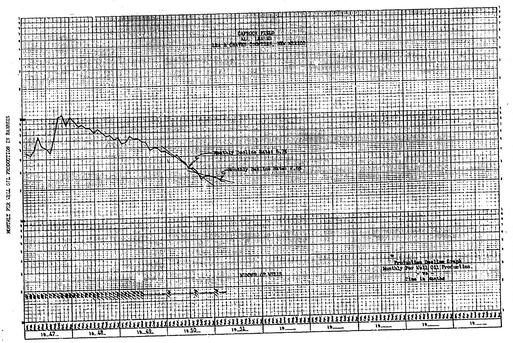
(Continued)

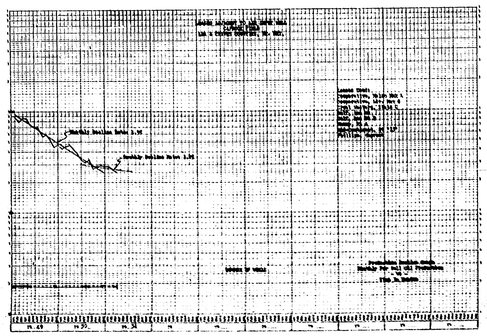
COOPERATIVE ASSOCIATION
AIR & WATER INJECTION PROJECT
(Continued)

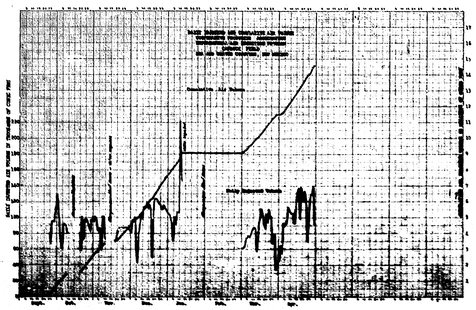
Date	Operating Hours	Daily Vol. Air Injected	Cum. Volume Air Injected	Injection Pressure	Daily Vol. Water Injected	Cum. Vol. Water Injected
3-18-51	24	132,728	10,490,903			
3-19-51	24	92,292	10,579,195			
3-20-51	24	83,886	10,669,081			
3-21-51	24	104,197	10,773,278			
3-22-51	24	91,319	10,865,597			
3-23-51	24	110,780	10,976,377			
3-24-51	24	99,321	11,075,698			
3-25-51	24	121,180	11,196,878			
3-26-51	12	67,782	11,263,994			
3-27-51	14	79,452	11,343,628			
3-28-51	20	79,160	11,395,783			
3-29-51	8	34,391	11,430,174			
3-30-51	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	91,726	11,870,139			
4- 7-51	24	95,447	11,965,586			
4- 8-51	24	113,399	12,077,045			
4- 9-51	24	106,481	12,183,726			
4-10-51	24	106,996	12,290,822			
4-11-51	24	104,131	12,396,793			
4-12-51	23	104,560	12,501,353			
4-13-51	24	92,462	12,593,790			
4-14-51	23	108,593	12,702,389			
4-15-51	24	122,498	12,824,887			
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	138,084	13,325,989			
4-20-51	24	126,237	13,452,226			
4-21-51	24	120,350	13,572,576			
4-22-51	24	134,572	13,707,148			
4-23-51	24	124,580	13,831,728			
4-24-51	14	89,375	13,921,103			
4-25-51	17	86,185	13,987,288			
4-26-51	24	114,280	14,101,568			
4-27-51	24	118,558	14,220,126			
4-28-51	24	127,203	14,347,329			
4-29-51	24	141,573	14,488,902			
4-30-51	23	91,267	14,591,170			

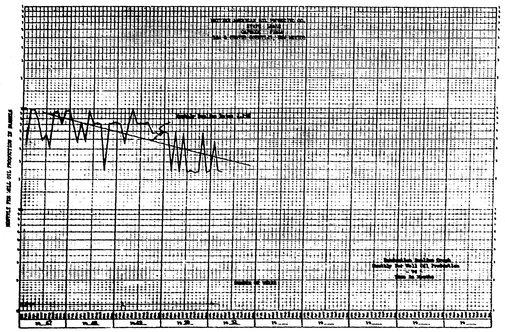


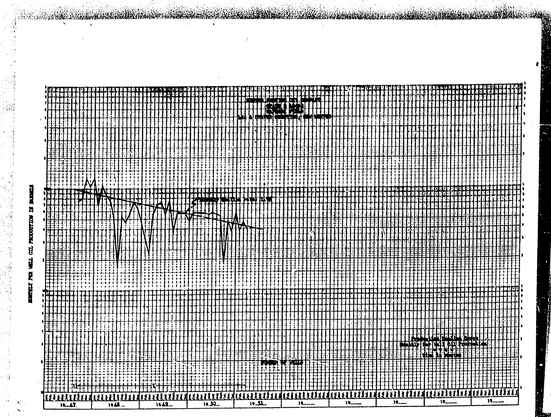


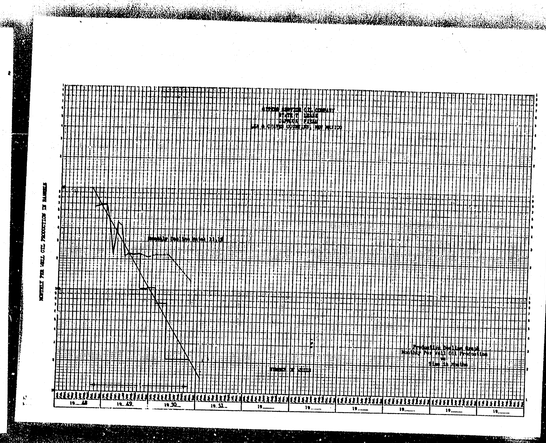


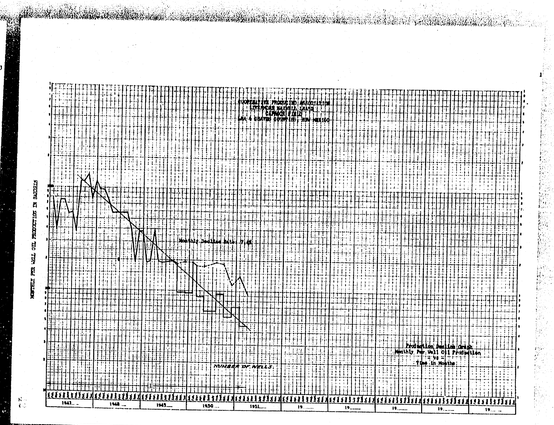


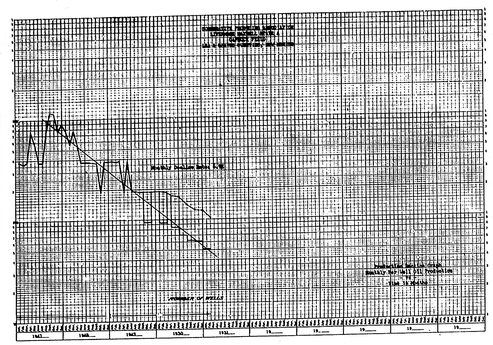


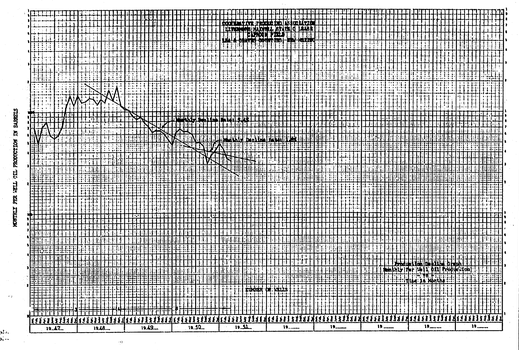


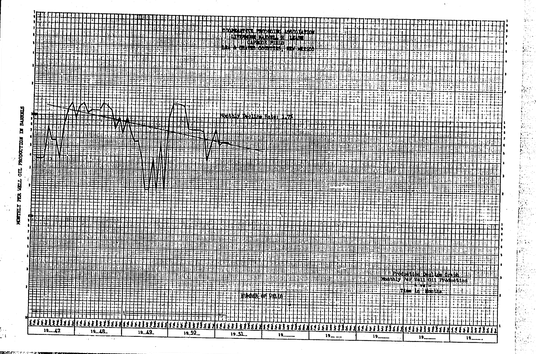

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

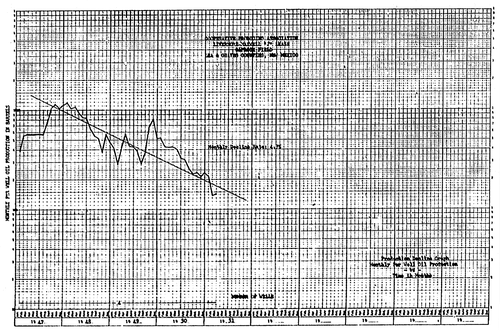

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 11.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

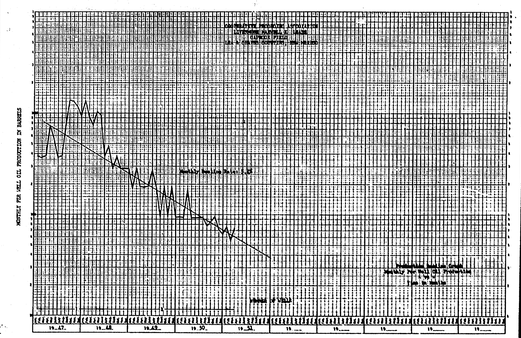

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

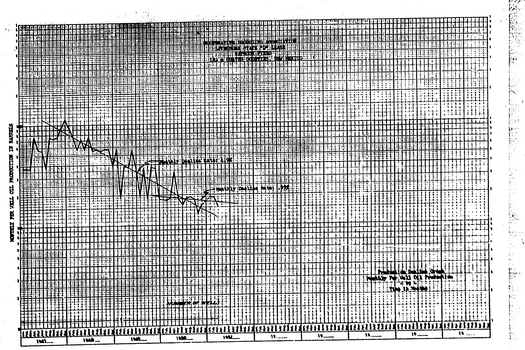

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 5.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

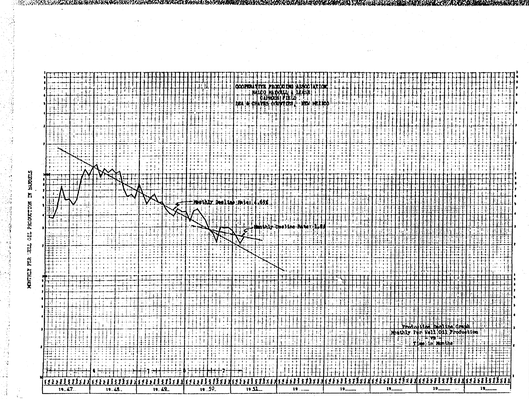

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 6.0%
Monthly Decline Rate: 1.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

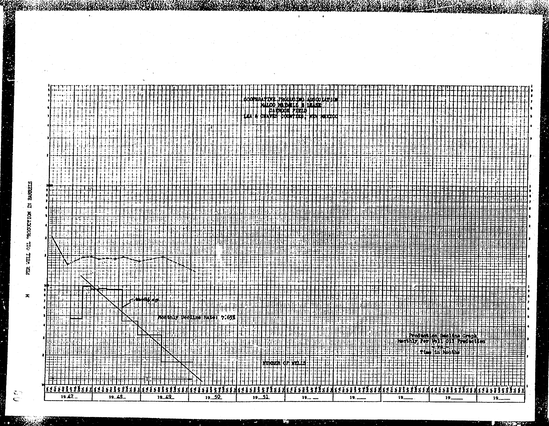

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

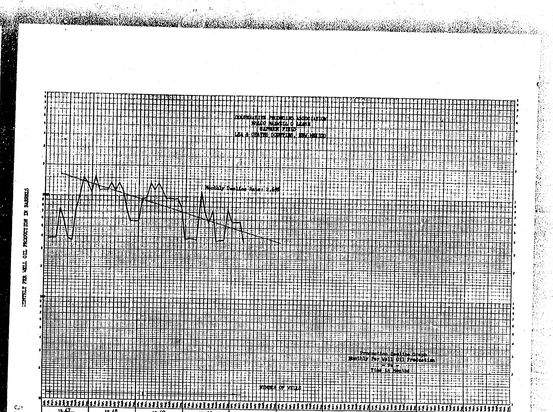

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

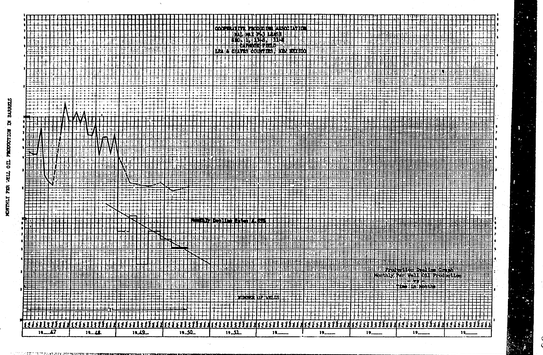

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 1.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

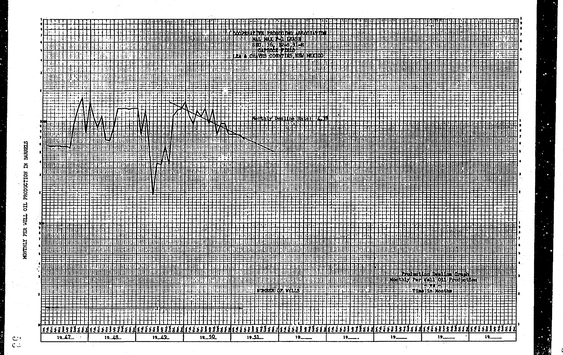

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 1.0%
Monthly Decline Rate: 1.0%
Production Decline Curve
Monthly Per Well Oil Production
vs
Time in Months
NUMBER OF WELLS

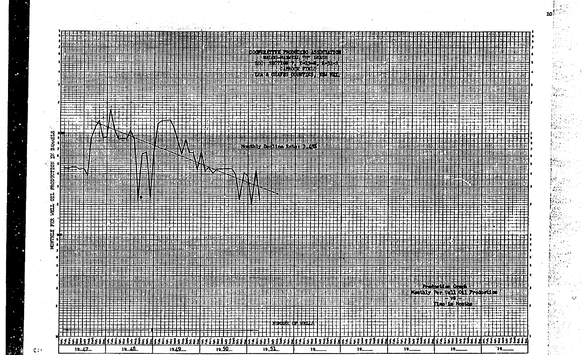

COOPERATIVE PRODUCING ASSOCIATION
MULTI ALBANY 1 SAND
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY DECLINE RATE 1.65%
MONTHLY DECLINE RATE 5.0%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

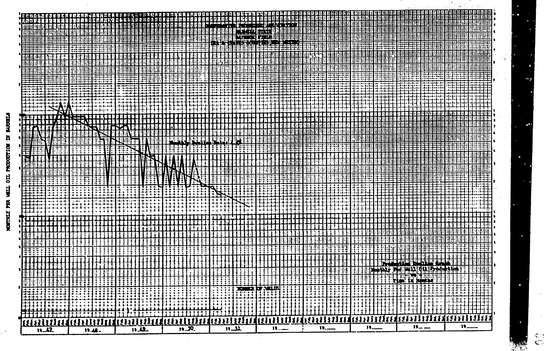

COOPERATIVE PRODUCING ASSOCIATION
MULTI ALBANY 2 SAND
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
MONTHLY DECLINE RATE 9.10%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

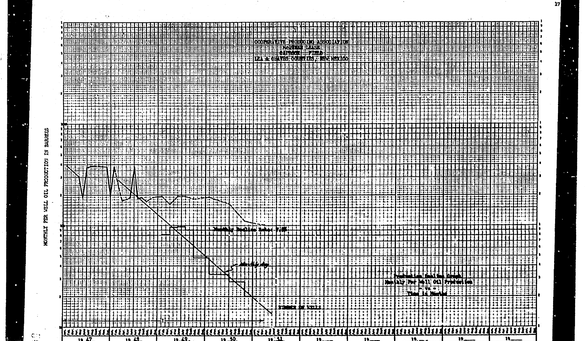

COOPERATIVE PRODUCING ASSOCIATION
MULTI ALBANY 3 SAND
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.68%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

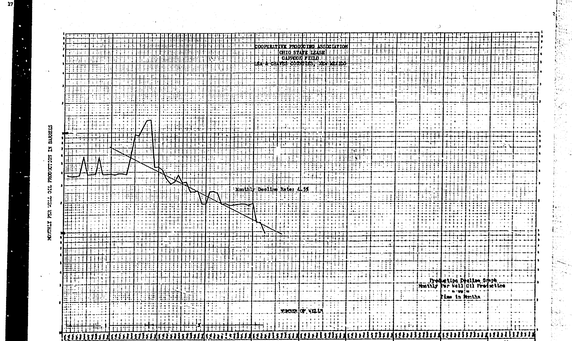

COOPERATIVE PRODUCING ASSOCIATION
ALL MULTI ALBANY SANDS
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.39%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

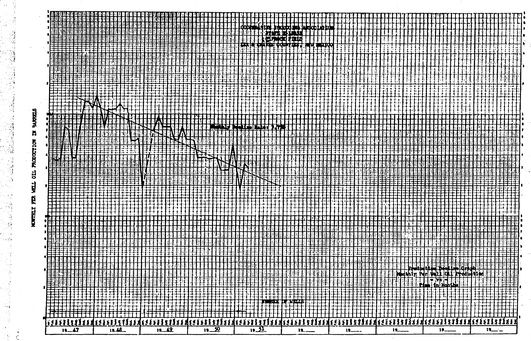

COOPERATIVE PRODUCING ASSOCIATION
ALL MULTI ALBANY SANDS
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 4.0%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

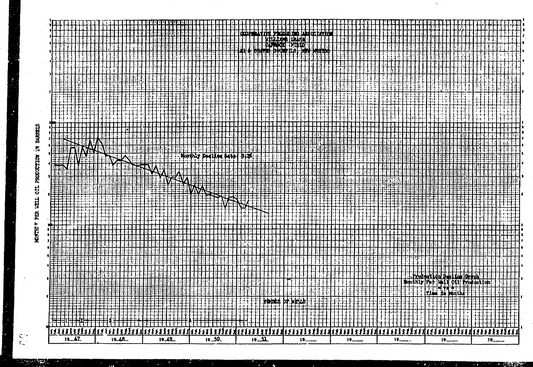

COOPERATIVE PRODUCING ASSOCIATION
MULTI ALBANY SANDS
DRIVE STATE LEASE
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 3.68%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

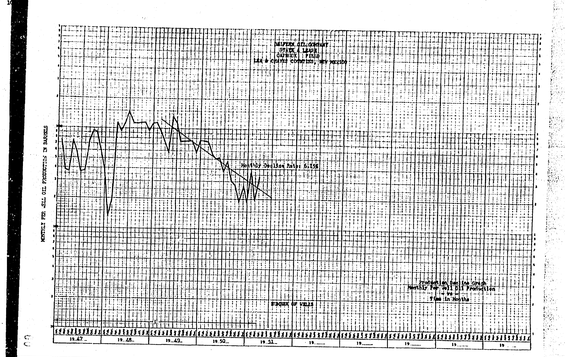

COOPERATIVE PRODUCING ASSOCIATION
ALL MULTI ALBANY SANDS
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 1.8%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

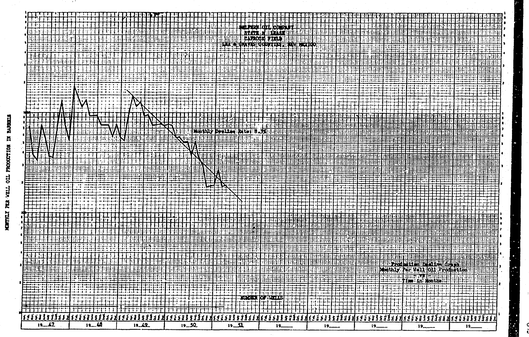

COOPERATIVE PRODUCING ASSOCIATION
ALL MULTI ALBANY SANDS
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 3.0%
Monthly Decline Rate 7.0%
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

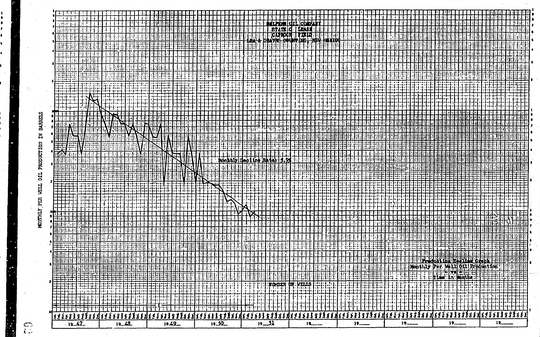

COOPERATIVE PRODUCING ASSOCIATION
MULTI ALBANY SANDS
DRIVE STATE LEASE
CLOVERLY FIELD
LEA & CHAVES COUNTIES, NEW MEXICO
Monthly Decline Rate 4.35
Cooperative Producing Assoc.
Monthly Per Well Oil Production
Vs.
Time in Months
MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

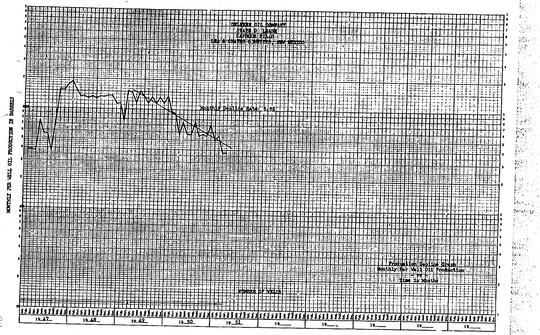

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.0%
NUMBER OF WELLS

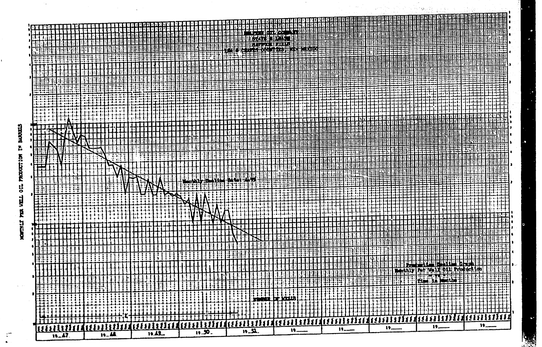

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 3.2%
NUMBER OF WELLS

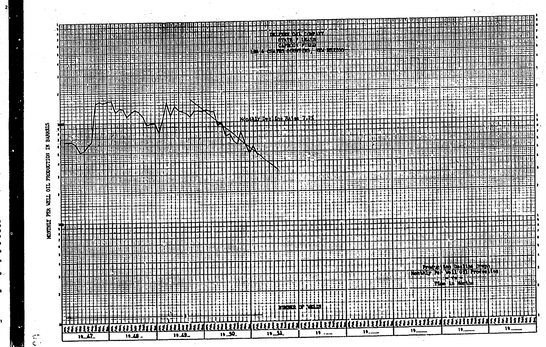

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 6.0%
NUMBER OF WELLS

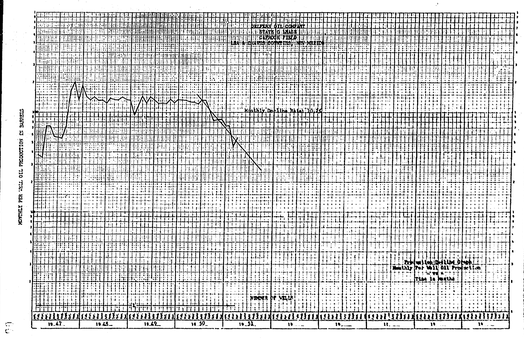

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 9.3%
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 7.3%
NUMBER OF WELLS

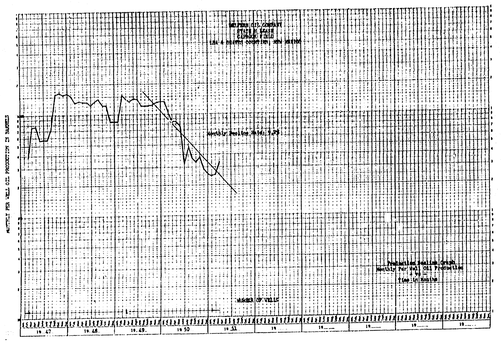

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 5.7%
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 4.9%
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 3.4%
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate: 10.4%
NUMBER OF WELLS

29



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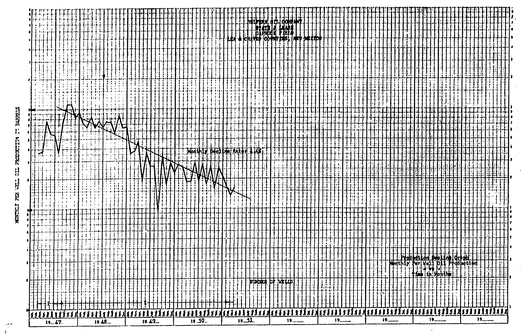

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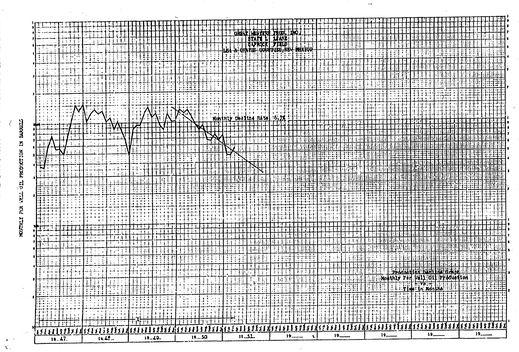

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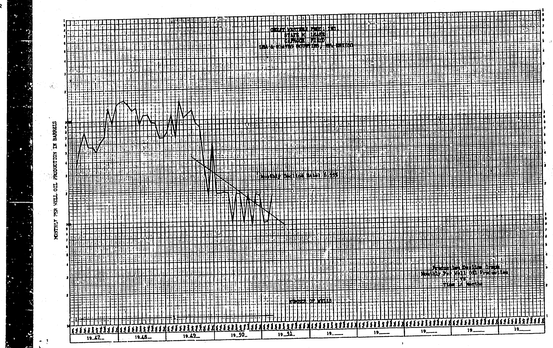

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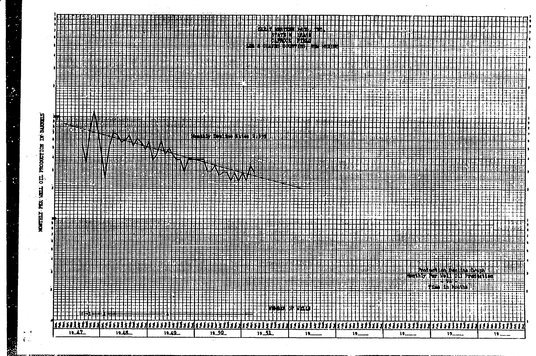

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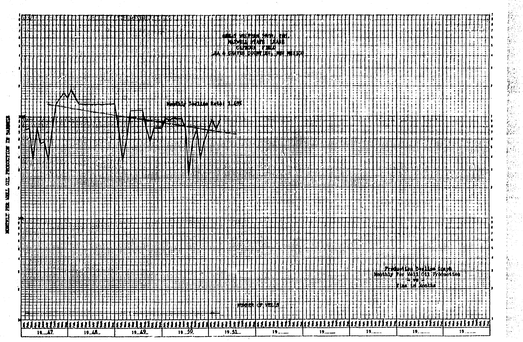

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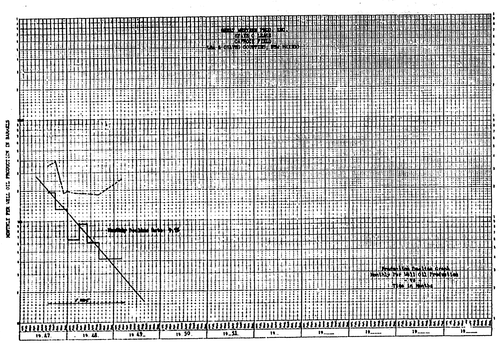

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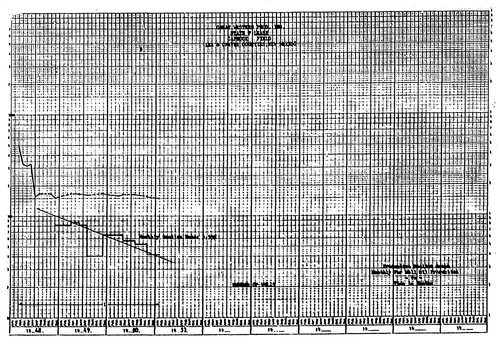
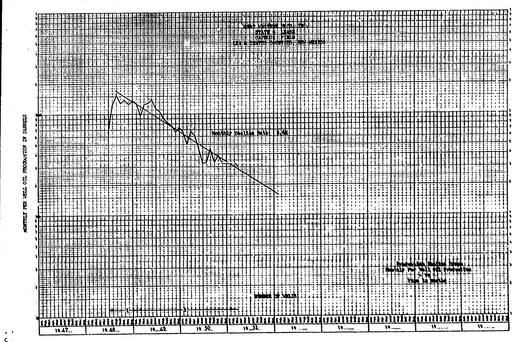
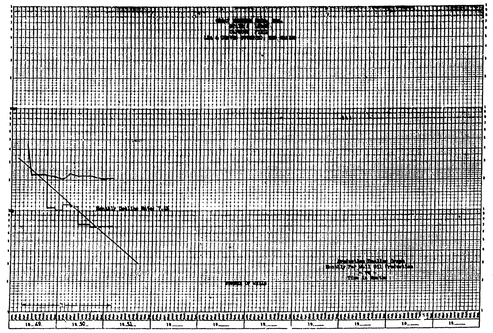
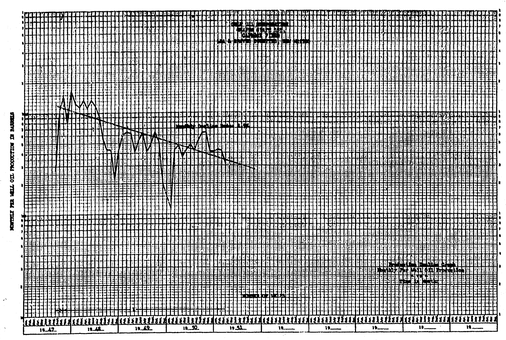
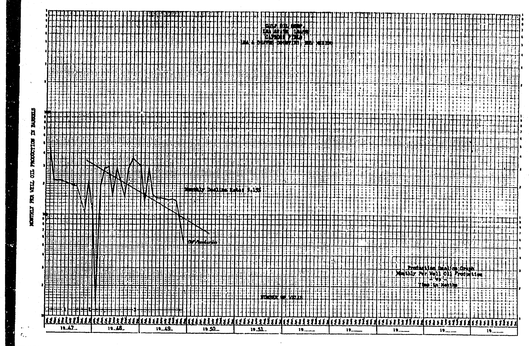
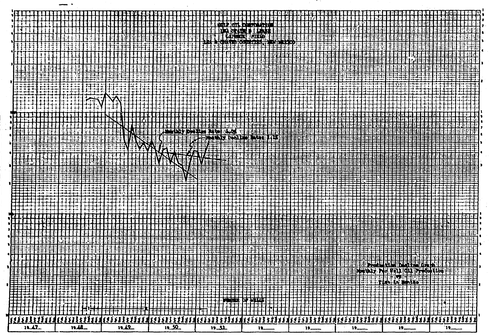


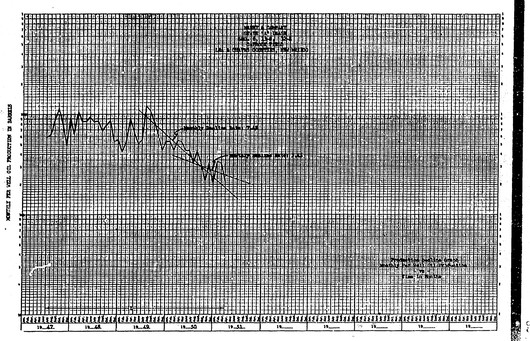


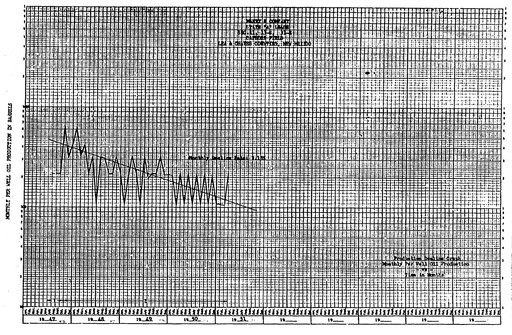

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 7.4%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

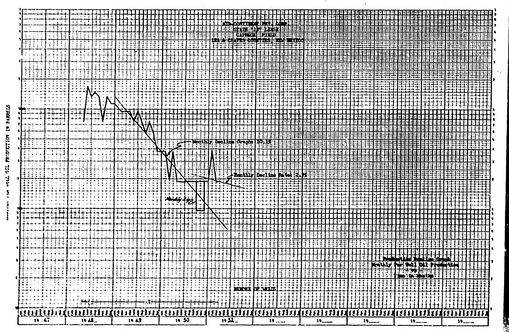

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 5.2%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

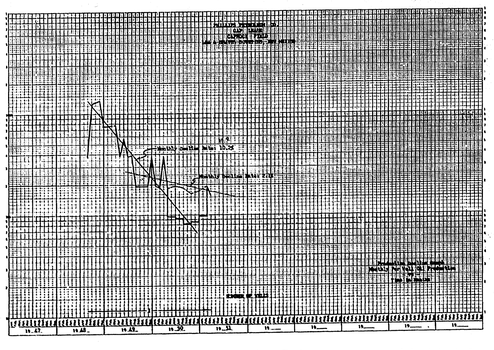

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 3.3%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

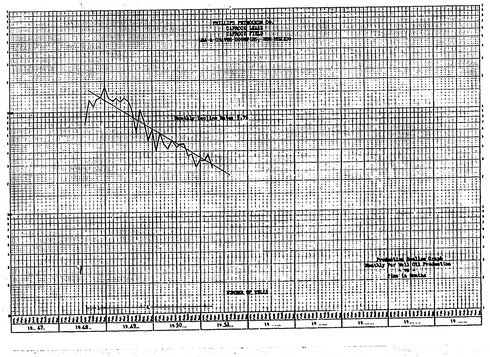

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 5.4%
Monthly Decline Rate 3.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

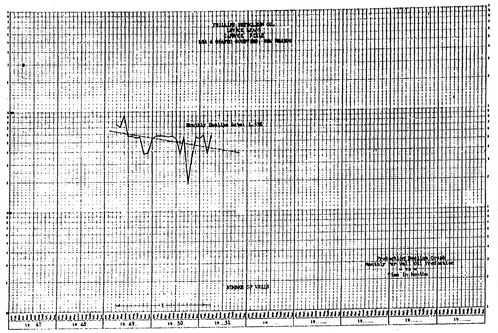

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 7.4%
Monthly Decline Rate 3.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

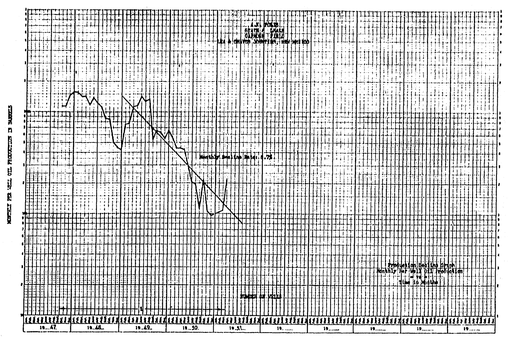

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 3.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

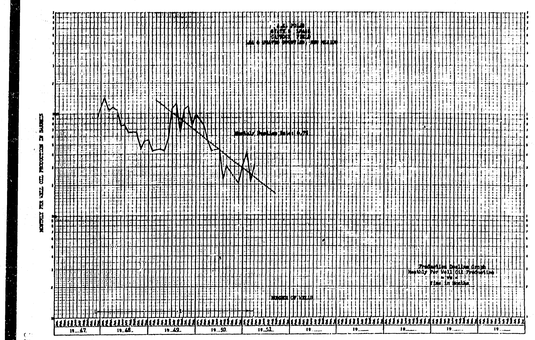

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Range 10.1%
Monthly Decline Rate 10.7%
Monthly Decline Rate 7.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

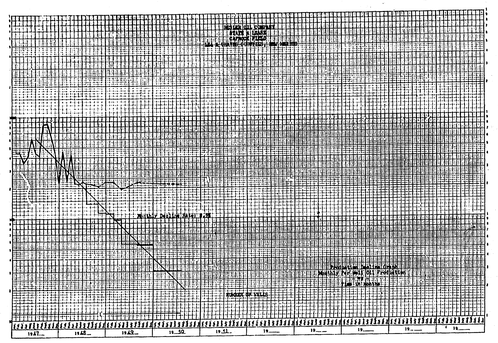

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 10.3%
Monthly Decline Rate 5.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

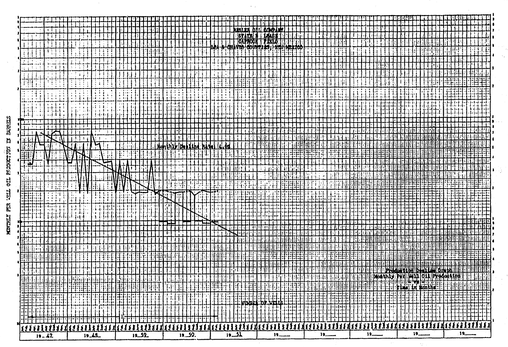

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
Monthly Decline Rate 5.1%
Production Decline Curve
Monthly Per Well Oil Production
Time In Months

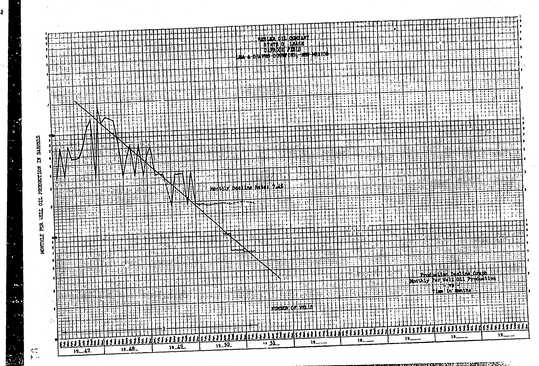

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

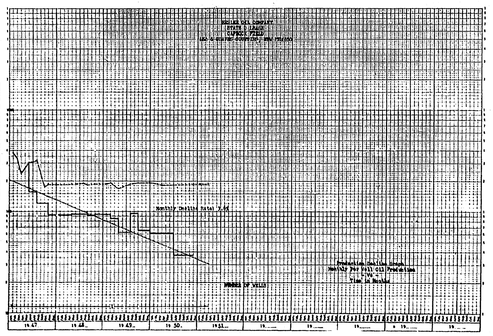

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

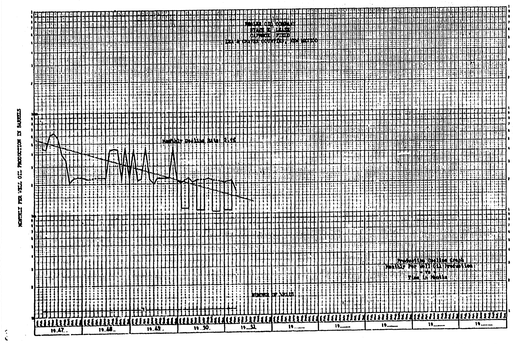

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

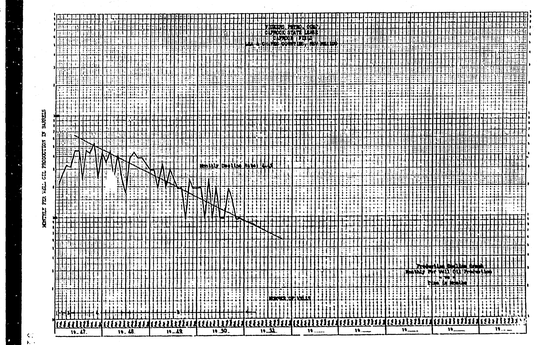

MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS


MONTHLY PER WELL OIL PRODUCTION IN BARRELS
NUMBER OF WELLS

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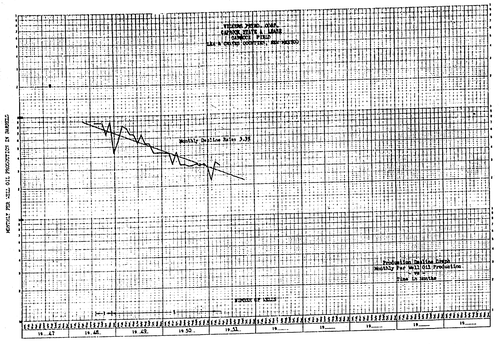

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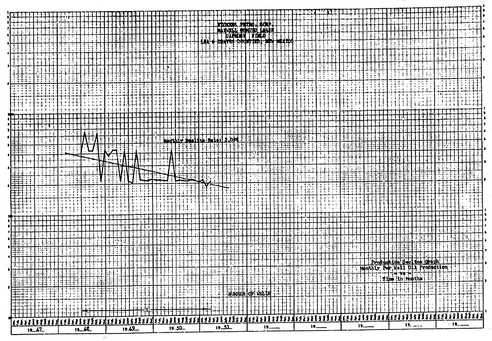

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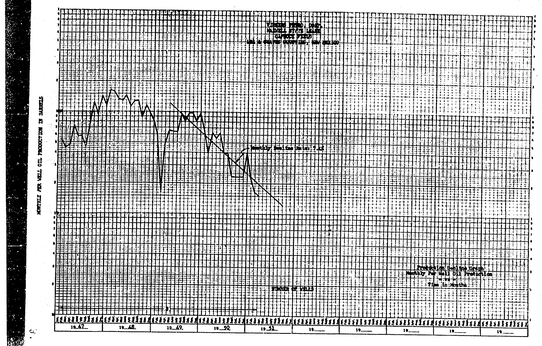

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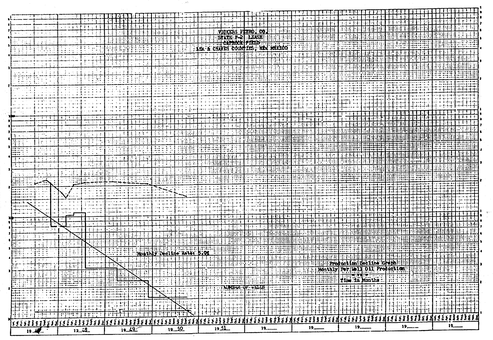

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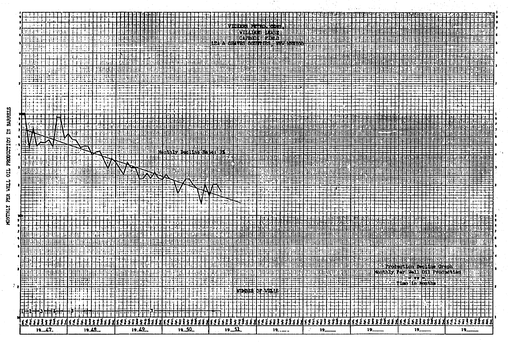

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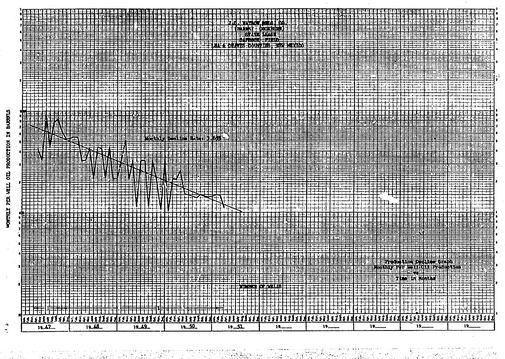

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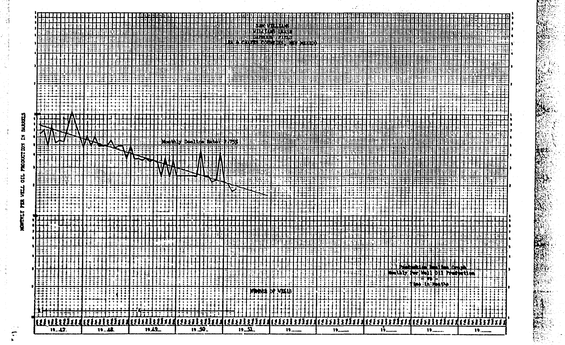


COOPERATIVE PRODUCING ASSOCIATION
LOVINGTON, NEW MEXICO

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 October, 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 23, 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 office 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.

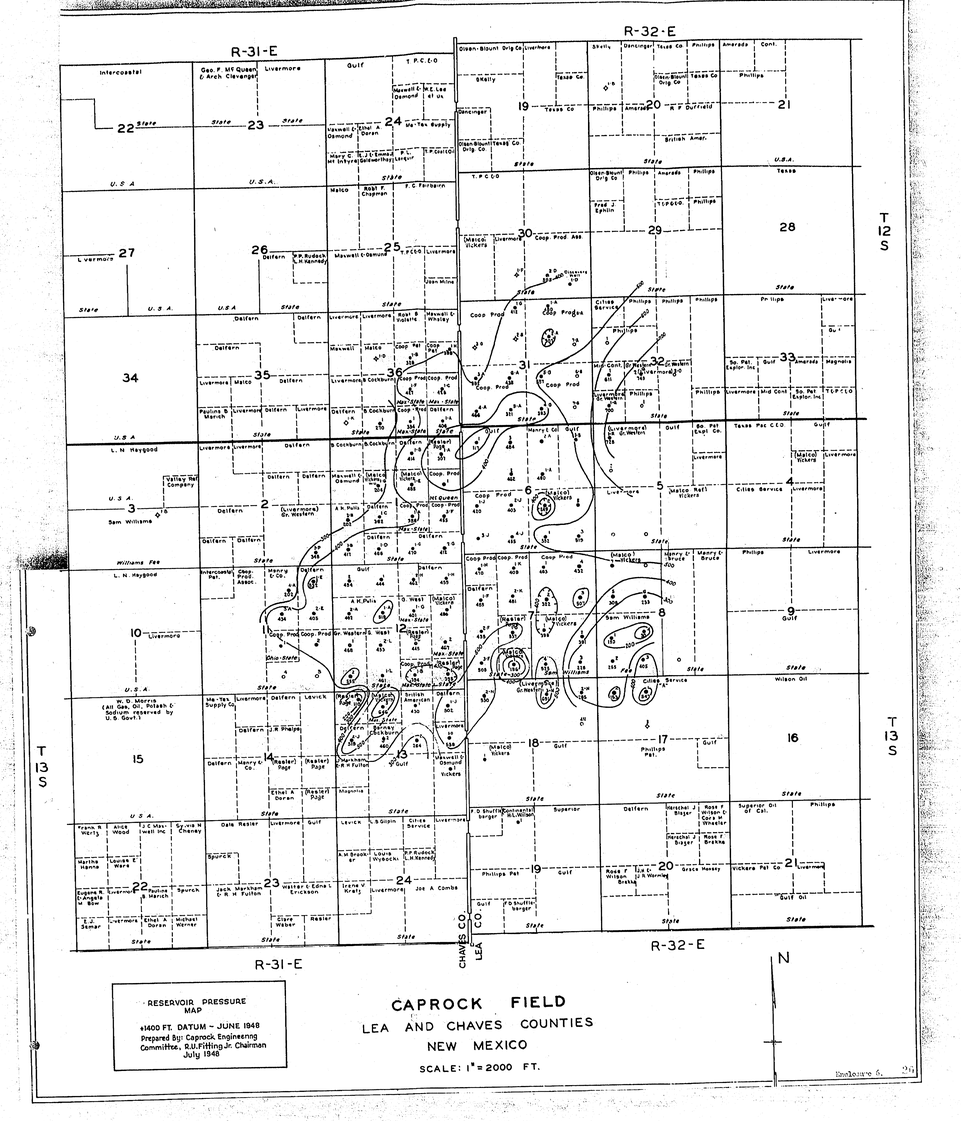
If we may be of any further help or assistance to you in the meantime, please advise us immediately.

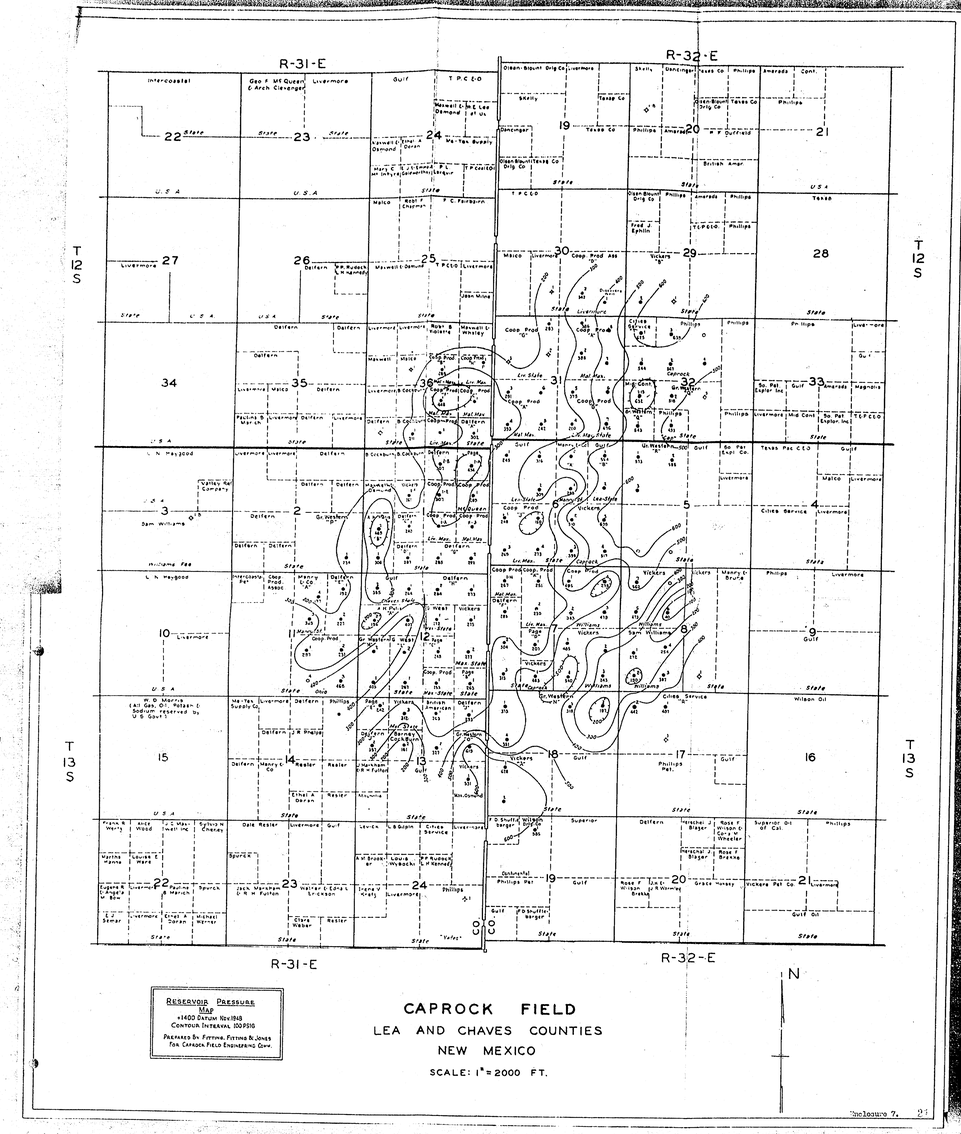
Yours very truly,

COOPERATIVE PRODUCING ASSOCIATION

By /s/ Clenton, Jr.

JCB/dp
Geo. F. Hardwarant
Leonard T. Gordon
Glenn Staley
Robert D. Fitting
Paul Holloway





RESERVOIR PRESSURE MAP
+1400 DATUM NOV 1948
CONTOUR INTERVAL 100 P.S.I.
PREPARED BY FITTING, FITTING & JONES FOR CAPROCK FIELD ENGINEERING COM.

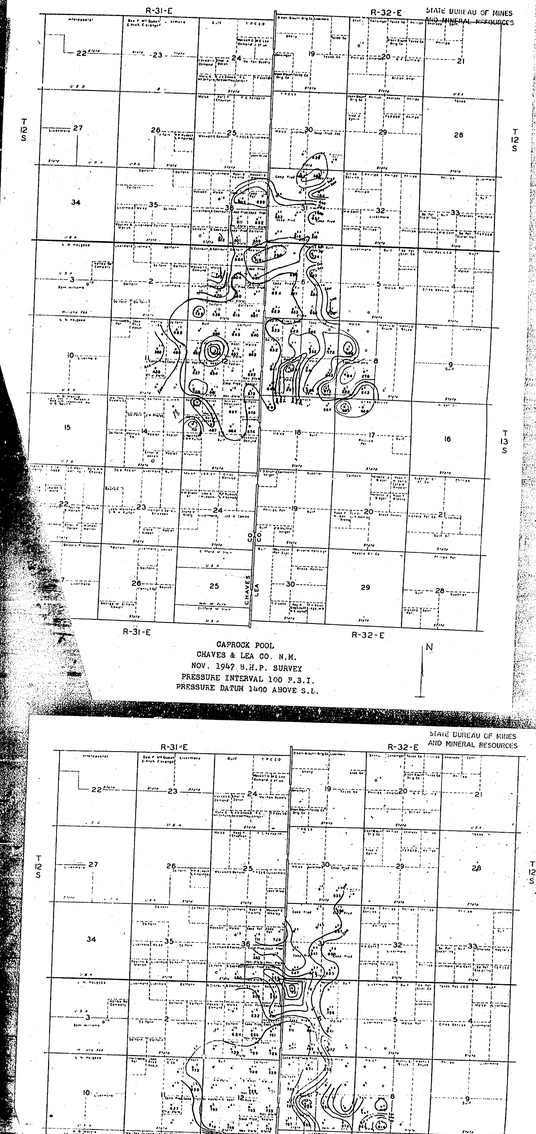
CAPROCK FIELD

LEA AND CHAVES COUNTIES

NEW MEXICO

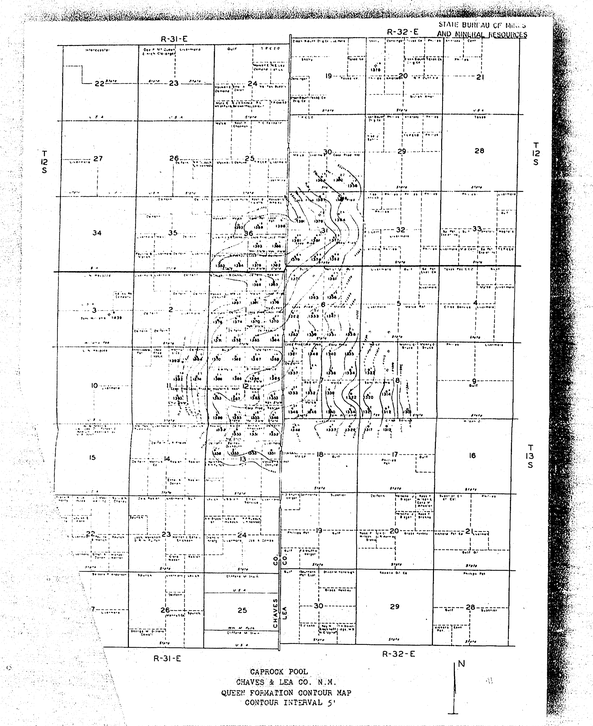
SCALE: 1" = 2000 FT.

Enclosure 7.

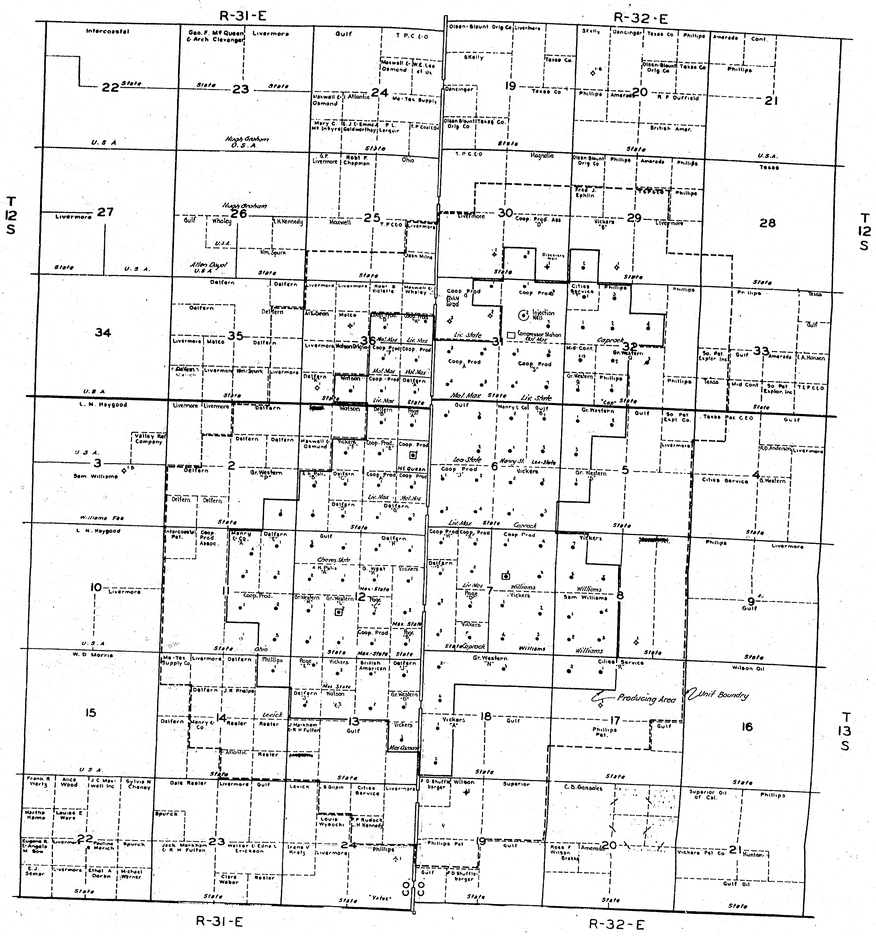


CAPROCK POOL
CHAVES & LEA CO. N.M.
NOV. 1947 B.H.P. SURVEY
PRESSURE INTERVAL 100 P.S.I.
PRESSURE DATUM 1400 ABOVE S.L.

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



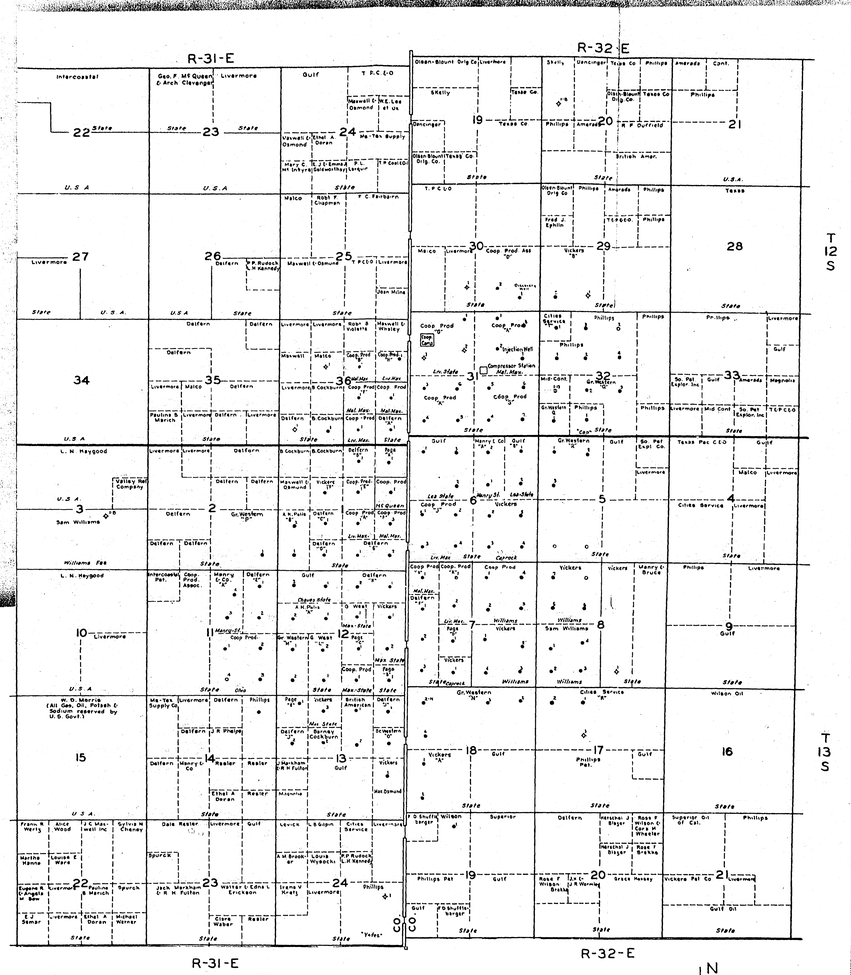
CAPROCK POOL
CHAVES & LEA CO. N.M.
QUEEN FORMATION CONTOUR MAP
CONTOUR INTERVAL 5'



CAPROCK 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

Posted to: 7-1-51



Enclosure 1.

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