

CASE 2497: Application of AMERADA for  
a waterflood project in the Langlie-  
Mattix Pool, Lea County.

1052 / 10.

2497

Application, Transcript,  
and Exhibits, Etc.

**BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO**

**IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
COMMISSION OF NEW MEXICO FOR  
THE PURPOSE OF CONSIDERING:**

**CASE No. 2497  
Order No. R-2197**

**APPLICATION OF AMERADA PETROLEUM  
CORPORATION FOR A WATERFLOOD PRO-  
JECT, LANGLEIE-MATTIX POOL, LEA  
COUNTY, NEW MEXICO.**

**ORDER OF THE COMMISSION**

**BY THE COMMISSION:**

This cause came on for hearing at 9 o'clock a.m. on February 27, 1962, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 14th day of March, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

**FINDS:**

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the applicant, Amerada Petroleum Corporation, seeks permission to institute the Langlie Mattix Woolworth Waterflood Project in the Langlie-Mattix Pool in Sections 27, 28, 33 and 34, Township 24 South, Range 37 East, NMPM, Lea County, New Mexico, with the injection of water initially to be through six wells located in said sections.
- (3) That the producing wells in the project area have reached an advanced stage of depletion and should be classified as "stripper" wells.
- (4) That the proposed waterflood project should be authorized and should be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including those provisions regarding allocation of allowables.
- (5) That inasmuch as the bottom of the casing in some of the injection wells is set above the Langlie-Mattix Pool, the

-2-

CASE No. 2497  
Order No. R-2197

operator should conduct flow tests to determine into which formation the water is being injected through said wells and should adequately case off the well bores in the event the water is being injected into any formation above the Langlie-Mattix Pool.

IT IS THEREFORE ORDERED:

(1) That the applicant, Amerada Petroleum Corporation, is hereby authorized to institute the Langlie Mattix Woolworth Waterflood Project in the Langlie-Mattix Pool in Sections 27, 28, 33 and 34, Township 24 South, Range 37 East, NMPM, Lea County, New Mexico, with the injection of water initially to be through the following-described wells:

Amerada-R. J. Johnston Well No. 1 located in  
the NW/4 SW/4 of Section 27;

Amerada-R. J. Johnston Well No. 4 located in  
the SE/4 SW/4 of Section 27;

Humble-John Williams Well No. 4 located in  
the NW/4 NW/4 of Section 34;

Schermerhorn-Woolworth Well No. 2 located in  
the SE/4 NE/4 of Section 28;

Schermerhorn-Woolworth Well No. 7 located in  
the SE/4 SE/4 of Section 28 and

a proposed well to be drilled in the NW/4 SE/4  
of Section 28;

all in said Township and Range.

PROVIDED HOWEVER, That the operator shall conduct flow tests to determine into which formations the water is being injected through the injection wells in which the bottom of the casing is set above the Langlie-Mattix Pool.

PROVIDED FURTHER, That the operator shall adequately case off the well bores in the event the water is being injected into any formation above the Langlie-Mattix Pool.

(2) That the operator of the waterflood herein authorized shall be governed by Rule 701 of the Commission Rules and Regulations, including those provisions regarding allocation of allowables.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in

-3-

CASE No. 2497  
Order No. R-2197

accordance with Rule 704 and Rule 1119 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION



*E. L. Mechem*

EDWIN L. MECHEM, Chairman

*E. S. Walker*

E. S. WALKER, Member

*A. L. Porter, Jr.*

A. L. PORTER, JR., Member & Secretary

esr/

OIL CONSERVATION COMMISSION

P. O. BOX 871  
SANTA FE, NEW MEXICO

April 4, 1962

Mr. Jason Kellahin  
Kellahin & Fox  
Attorneys at Law  
Box 1713  
Santa Fe, New Mexico

Dear Mr. Kellahin:

Enclosed herewith is Commission Order No. R-2206, entered in Case No. 2509, approving Amerada Petroleum Corporation's Langlie Mattix Woolworth Unit Agreement. We are also enclosing a photostatic copy of Order No. R-2197, entered in Case No. 2497, approving the Langlie Mattix Woolworth Waterflood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 1176 barrels per day.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing

**OIL CONSERVATION COMMISSION**

P. O. BOX 871

SANTA FE, NEW MEXICO

-2-

wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

ALP/lr

cc: Mr. J. D. Ramey  
Oil Conservation Commission  
Hobbs, New Mexico

Mr. J. E. Kapteina  
Oil Conservation Commission  
Santa Fe, New Mexico

C  
O  
P  
Y

GOVERNOR  
EDWIN L. MECHEM  
CHAIRMAN

*State of New Mexico*  
**Oil Conservation Commission**

LAND COMMISSIONER  
E. S. JOHNNY WALKER  
MEMBER



STATE GEOLOGIST  
A. L. PORTER, JR.  
SECRETARY - DIRECTOR

P. O. BOX 871  
SANTA FE

<sup>14</sup>  
March 13, 1962

Mr. Jason Kellahin  
Kellahin & Fox  
P. O. Box 1713  
Santa Fe, New Mexico

Re: CASE NO. 2497  
ORDER NO. R-2197  
APPLICANT:  
Amerada Petroleum Corporation

Dear Sir:

Enclosed herewith are two copies of the above-referenced  
Commission order recently entered in the subject case.

Very truly yours,

*A. L. Porter, Jr.*  
A. L. PORTER, Jr.  
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x  
Artesia OCC         
Aztec OCC       

OTHER



Case ~~2004~~ 2497

Heard 2-27-62

Rec. 2-28-62

1. Grant Amerada's request for a Pilot water flood to be known as the Langlie Mattie Woolworth water flood and consisting of:

245-376.

Secs. 27, 28, B3 & 34. A11.

2. The injection in the order shall be those described in para. 3 of applicant's application. (6 wells).

3. Since some wells in the <sup>flood</sup> area share the casing set above the Langlie Mattie pay the operator shall make flow tests to determine where the water is being injected in these wells. Should the injected water be going into the formation above the L. M. pay, operator shall cease off this section of the well.

4. Give Administrative procedure for expansion.

5. Shall operate under provisions of Rule 701.

Ernest A. W. [Signature]

JASON W. KELLAHIN  
ROBERT E. FOX

MAIN OFFICE OCC  
1962 FEB 2 PM 1:12

KELLAHIN AND FOX  
ATTORNEYS AT LAW  
54 1/2 EAST SAN FRANCISCO STREET  
POST OFFICE BOX 1713  
SANTA FE, NEW MEXICO

YUCCA 3-9396  
YUCCA 2-2991

February 2, 1962

New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Gentlemen:

Enclosed is application of Amerada Petroleum Corporation in three copies, seeking approval of a pilot ~~88~~-acre water flood project in the Langlie-Mattix Pool, and for rules including procedure for expansion of the project by administrative procedure.

It is requested that this application be set for hearing at the February 27, 1961, examiner hearing if at all possible, since the operating agreement calls for securing an order from the Commission prior to April 1.

Very truly yours,

*Jason W. Kellahin*

JASON W. KELLAHIN

jwk:mas  
enclosures

*Rec'd  
Kellahin  
2/12/62*

BEFORE THE OIL CONSERVATION COMMISSION FEB 2 PM 2 13  
OF THE STATE OF NEW MEXICO

APPLICATION OF AMERADA PETROLEUM CORPORATION TO ESTABLISH 80-ACRE WATER FLOOD PILOT PROJECT FOR THE LANGLEIE MATTIX POOL AND OTHER RULES INCLUDING PROCEDURE FOR ADMINISTRATIVE APPROVAL TO EXTEND SUCH WATER FLOOD PROJECT TO INCLUDE ALL OF SECTIONS 27, 28, 33, and 34, Twp. 24 So., Rge 37 E., LEA COUNTY, NEW MEXICO

CASE NO. 3497

APPLICATION

Applicant Amerada Petroleum Corporation alleges and states:

1. By agreement among owners and other persons owning interests in the area here described, Amerada Petroleum Corporation has been designated operator of a proposed water flood project for the Langlie Maddix Pool insofar as it covers Sections 27, 28, 33 and 34, Township 24 South, Range 37 East, Lea County, New Mexico, to be known as the Langlie Maddix Woolworth Unit.

2. The vertical limits of the Langlie Maddix oil pool is defined as extending from a point 100 feet above the base of the Seven Rivers Formation to the base of the Queen Formation; and during the first quarter of 1961, the average production of oil from 44 wells completed in the Langlie Maddix, and located within the area described in the preceding paragraph, was 6.4 barrels of oil per day, indicating that the wells in this area have reached a state of depletion and are regarded as what is commonly referred to as "stripper" wells.

3. A 80-acre pilot project comprised of an area indicated on the attached plat marked as Exhibit No. 1 is proposed in which there will be 6 water injection wells located and designated as follows:

- (1) Amerada Petroleum Corporation-R. J. Johnston No. 1 located in the NW/4 SW/4 of Section 27;
- (2) Amerada Petroleum Corporation-R. J. Johnston No. 4 located in the SE/4 SW/4 of Section 27;
- (3) Humble-John Williams No. 4 located in the NW/4 NW/4 of Section 34;
- (4) Schermerhorn-Woolworth No. 2 located in the SE/4 NE/4 of Section 28;
- (5) Schermerhorn-Woolworth No. 7 located in the SE/4 SE/4 of Section 28;
- (6) A proposed well to be drilled in the NW/4 SE/4 of Section 28.

As a part of the 80-acre pilot project there will be two producing wells:

- (1) The Amerada Petroleum Corporation-R. J. Johnston No. 2 located in the SW/4 SW/4 of Section 27;
- (2) The Schermerhorn-Woolworth No. 4 located in the NE/4 SE/4 of Section 28.

4. A radio-activity log of the Amerada-R. J. Johnston No. 3 well, located in the NE/4 SW/4 Section 27, showing the location of the vertical limits of the Langlie-Maddix Oil Pool is attached and marked as Exhibit No. 2. Electric logs for two of the proposed injection wells, the Humble-John Williams No. 4 well and the Schermerhorn-Woolworth No. 2 well, located as described

above, will be furnished under separate cover prior to hearing, if then available, or will be offered at the hearing.

5. A description of the casing program of each proposed injection well will be offered at the hearing.

6. The fluid to be injected is salt water from the San Andres formation encountered at approximately 4,000 feet produced by a water well to be drilled, and during the operation of the pilot project it is anticipated that there will be injected a maximum of 500 barrels per well per day.

7. The 80-acre pilot project here proposed is to prevent waste and to increase the ultimate recovery of oil in place.

8. Applicant proposes that the Commission issue a rule authorizing the Commission without notice and hearing to issue an order approving the expansion of the water flood project to include the area herein described as soon as there is evidence that the pilot project can increase recovery of oil in place.

WHEREFORE, Applicant requests that this matter be set for hearing before an examiner, that notice thereof be given as required by law, and upon hearing that this Commission enter an order permitting the 80-acre water flood pilot project here proposed and provide for such other rules which the Commission deems necessary including a rule authorizing administrative approval for expansion of such project.

AMERADA PETROLEUM CORPORATION

By

  
H. D. Bushnell

KELLAHIN AND FOX

By

  
Jason W. Kellahin

Attorneys for Applicant

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

APPLICATION OF AMERADA PETROLEUM  
CORPORATION TO ESTABLISH 160-ACRE  
WATER FLOOD PILOT PROJECT FOR THE  
LANGLIE MATTIX POOL AND OTHER RULES  
INCLUDING PROCEDURE FOR ADMINISTRATIVE  
APPROVAL TO EXTEND SUCH WATER FLOOD  
PROJECT TO INCLUDE ALL OF SECTIONS 27,  
28, 33, AND 34, TWP. 24 SO., RGE. 37 E.,  
LEA COUNTY, NEW MEXICO

CASE NO. 2-177

AMENDED APPLICATION

Applicant Amerada Petroleum Corporation, in filing this amended application to amend the application originally filed on or about February 1, 1962, for the purpose of showing that the pilot project therein proposed is to comprise of 160 acres instead of 80 acres as stated in the original application, alleges and states:

1. By agreement among owners and other persons owning interests in the area here described, Amerada Petroleum Corporation has been designated operator of a proposed water flood project for the Langlie Mattix Pool insofar as it covers Sections 27, 28, 33 and 34, Township 24 South, Range 37 East, Lea County, New Mexico, to be known as the Langlie Mattix Woolworth Unit.

2. The vertical limits of the Langlie Mattix oil pool is defined as extending from a point 100 feet above the base of the Seven Rivers Formation to the base of the Queen Formation; and during the first quarter of 1961, the average production of oil from 44 wells completed in the Langlie Mattix, and located within the area described in the preceding paragraph, was 6.4 barrels of oil per day, indicating that the wells in this area have reached a state of depletion and are regarded as what is commonly referred to as "stripper" wells.

3. A 160-acre pilot project comprised of an area indicated on the attached plat marked as Exhibit No. 1 is proposed in which there will be 6 water injection wells located and designated as follows:

- (1) Amerada Petroleum Corporation-R. J. Johnston No. 1 located in the NW/4 SW/4 of Section 27;
- (2) Amerada Petroleum Corporation-R. J. Johnston No. 4 located in the SE/4 SW/4 of Section 27;
- (3) Humble-John Williams No. 4 located in the NW/4 NW/4 of Section 34;
- (4) Schermerhorn-Woolworth No. 2 located in the SE/4 NE/4 of Section 28;
- (5) Schermerhorn-Woolworth No. 7 located in the SE/4 SE/4 of Section 28;
- (6) A proposed well to be drilled in the NW/4 SE/4 of Section 28.

As a part of the 160-acre pilot project there will be two producing wells:

- (1) The Amerada Petroleum Corporation-R. J. Johnston No. 2 located in the SW/4 SW/4 of Section 27;
- (2) The Schermerhorn-Woolworth No. 4 located in the NE/4 SE/4 of Section 28.

4. A radio-activity log of the Amerada-R. J. Johnston No. 3 Well, located in the NE/4 SW/4 Section 27, showing the location of the vertical limits

of the Langlie Mattix Oil Pool is attached and marked as Exhibit No. 2. Electric logs for two of the proposed injection wells, the Humble-John Williams No. 4 Well and the Schermerhorn-Woolworth No. 2 well, located as described above, will be furnished under separate cover prior to hearing, if then available, or will be offered at the hearing.

5. A description of the casing program of each proposed injection well will be offered at the hearing.

6. The fluid to be injected is salt water from the San Andres formation encountered at approximately 4,000 feet produced by a water well to be drilled and during the operation of the pilot project it is anticipated that there will be injected a maximum of 500 barrels per well per day.

7. The 160-acre pilot project here proposed is to prevent waste and to increase the ultimate recovery of oil in place.

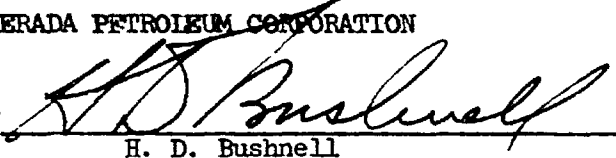
8. Applicant proposes that the Commission issue a rule authorizing the Commission without notice and hearing to issue an order approving the expansion of the water flood project to include the area herein described as soon as there is evidence that the pilot project can increase recovery of oil in place.

9. A copy of the original Application and this Amended Application has been furnished to the office of the State Engineer for the State of New Mexico.

WHEREFORE, Applicant requests that this matter be set for hearing before an examiner, that notice thereof be given as required by law, and upon hearing that this Commission enter an order permitting the 160-acre water flood pilot project here proposed and provide for such other rules which the Commission deems necessary including a rule authorizing administrative approval for expansion of such project.


AMERADA PETROLEUM CORPORATION

By

  
H. D. Bushnell

KELIAHIN AND FOX

By

  
Jason W. Kellahin

Attorneys for Applicant

JASON W. KELLAHIN  
ROBERT E. FOX

KELLAHIN AND FOX

ATTORNEYS AT LAW

54 1/2 EAST SAN FRANCISCO  
POST OFFICE BOX 113

SANTA FE, NEW MEXICO

2497  
MAIN OFFICE OCC

YUCCA 3-2300  
YUCCA 2-2001

1962 FEB 7 AM 8:11

February 5, 1962

New Mexico State Engineer  
State of New Mexico  
Santa Fe, New Mexico

Re: Application of Amerada Petroleum Corporation  
for approval of a water-flood project, Lea  
County, New Mexico

Dear Sir:

C  
O  
P  
Y  
Enclosed for your information is a copy of an application  
filed with the Oil Conservation Commission on behalf of  
Amerada Petroleum Corporation, for approval of a pilot  
water flood project in the Langlie-Maddix Pool, Lea County,  
New Mexico.

It is anticipated that this application will be heard at  
the last examiner hearing of the Commission in February,  
or the first examiner hearing in March.

Very truly yours,

JASON W. KELLAHIN:

jwk:mas

enclosure

cc: Oil Conservation Commission  
Mr. H. D. Bushnell

# **STANDARD OIL COMPANY OF TEXAS**

A DIVISION OF CALIFORNIA OIL COMPANY

P. O. BOX 1249 • HOUSTON 1, TEXAS

February 21, 1962

Oil Conservation Commission  
State Land Office Building  
College Avenue  
Santa Fe, New Mexico

Gentlemen:

The application of Amerada Petroleum Corporation for a waterflood project in the Langlie-Mattix Pool, Lea County, New Mexico, Case 2497, has been scheduled for the February 27, 1962, Examiner Hearing.

The Applicant seeks permission to institute a waterflood project in the Langlie-Mattix Pool in Sections 27, 28, 33, and 34, Township 24 South, Range 37 East, Lea County, New Mexico.

Standard Oil Company of Texas, a Division of California Oil Company, a working interest owner in the area of the proposed project, concurs in the application and recommendations of Amerada Petroleum Corporation in the aforementioned case.

Yours very truly,

*C. H. Segnar*  
C. H. Segnar  
Chief Engineer

RLMc:ja

cc: Mr. Jason W. Kellahin  
Kellahin and Fox ✓  
P. O. Box 1713  
Santa Fe, New Mexico





PHILLIPS PETROLEUM COMPANY  
BARTLESVILLE, OKLAHOMA

PRODUCTION DEPARTMENT

February 21, 1962

New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr., Secretary and Director

Application of Amerada Petroleum Corporation for Approval of the Langlie Mattix Woolworth Unit, Lea County, New Mexico - New Mexico Oil Conservation Commission - Case No. 2497

Gentlemen:

A hearing is scheduled for February 27, 1962, before the New Mexico Oil Conservation Commission (Case No. 2497) on Amerada Petroleum Corporation's application for approval of the Langlie Mattix Woolworth Unit water flood project.

This proposed operation is located in Sections 27, 28, 33, and 34, Township 24 South, Range 37 East, Lea County, New Mexico, and said project is to be governed by the provisions of Rule 701.

We wish to advise that Phillips Petroleum Company, a working interest owner in this water flood project, concurs in the testimony to be presented by the applicant at this hearing and we strongly urge the Commission's approval of this application.

Yours very truly,

L. E. Fitzjarrald  
Vice President

LEF:JRB:hd

cc: Amerada Petroleum Corporation  
P. O. Box 2040  
Tulsa 2, Oklahoma



MAIN OFFICE OGC  
FEB 26 AM 8:22  
SINCLAIR OIL & GAS COMPANY

P.O. BOX 1470

DAVID, TEXAS

MUTUAL 3-2761

February 21, 1962

R. L. ELSTON  
VICE PRES. & DIVISION MANAGER

Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

Please refer to Amerada Petroleum Corporation's application to waterflood the Langlie-Mattix Woolworth Unit, in the Langlie-Mattix Pool, Lea County, New Mexico, Case No. 2497, scheduled for hearing on February 27, 1962.

Sinclair Oil & Gas Company, as a working interest owner in this Unit, concurs with Amerada's application and respectfully requests favorable consideration by the Commission.

Yours very truly,

Joe Mefford

JM:RMA:lw

cc: Amerada Petroleum Corporation  
P. O. Box 2040  
Tulsa 2, Oklahoma

MAIN OFFICE OCC



1962 FEB 25 AM 3:26

# THE PURE OIL COMPANY

SOUTHERN PRODUCING DIVISION • Midland Area Operations

P. O. BOX 871 • MIDLAND, TEXAS • Mutual 2-3728

February 23, 1962

New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Subject: Langlie-Mattix  
Woolworth Unit Application,  
Case #2497, February 27, 1962

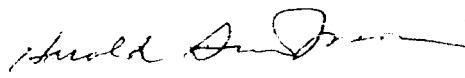
Attention: Executive Secretary

Gentlemen:

The Pure Oil Company as a working interest owner in the Langlie-Mattix Field, Lea County, New Mexico, is in agreement with and wishes to support the application of Amerada Petroleum Corporation as operator for conducting pilot waterflood operations in the proposed Langlie-Mattix Woolworth Unit. The Pure Oil Company will be a participant in the Unit.

Yours very truly,

THE PURE OIL COMPANY

  
Harold Simpson  
Area Superintendent

HS:jcv

File

MAIN OFFICE OCC



962 FEB 25 AM 3:26

## THE PURE OIL COMPANY

SOUTHERN PRODUCING DIVISION • Midland Area Operations

P. O. BOX 871 • MIDLAND, TEXAS • MUTUAL 2-3725

February 23, 1962

New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Subject: Langlie-Mattix  
Woolworth Unit Application,  
Case #2497, February 27, 1962

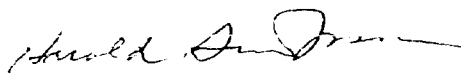
Attention: Executive Secretary

Gentlemen:

The Pure Oil Company as a working interest owner in the Langlie-Mattix Field, Lea County, New Mexico, is in agreement with and wishes to support the application of Amerada Petroleum Corporation as operator for conducting pilot waterflood operations in the proposed Langlie-Mattix Woolworth Unit. The Pure Oil Company will be a participant in the Unit.

Yours very truly,

THE PURE OIL COMPANY

  
Harold Simpson  
Area Superintendent

HS:jcv

File

# Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. A. Shellshear  
DISTRICT MANAGER  
F. O. Mortlock  
DISTRICT EXPLORATION  
MANAGER  
M. I. Taylor  
DISTRICT PRODUCTION  
MANAGER  
H. C. Vivian  
DISTRICT SERVICES MANAGER

1962 FEB 25 AM 9:25

February 22, 1962

P. O. Drawer 1938  
Roswell, New Mexico

Oil Conservation Commission  
State of New Mexico  
Post Office Box 871  
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Re: Case No. 2497 Scheduled  
for Examiner Hearing on  
February 27, 1962

Gentlemen:

Reference is made to the application of Amerada Petroleum Corporation in the above Case, for approval of the Langlie Mattix Woolworth Unit and for conducting pilot waterflood operations within the Unit.

Gulf Oil Corporation has a working interest in this proposed Unit, and concurs with Amerada in their application.

Yours very truly,



W. A. Shellshear

JHH:dd

cc: Amerada Petroleum Corporation  
Post Office Box 2040  
Tulsa 2, Oklahoma  
  
Attention: Mr. J. C. Blackwood



MAIN OFFICE



1962 FEB 25 AM 8:24  
**CONTINENTAL OIL COMPANY**

P. O. BOX 1377

ROSWELL, NEW MEXICO

February 22, 1962

WM. A. MEAD  
DIVISION SUPERINTENDENT  
OF PRODUCTION  
NEW MEXICO DIVISION

823 PETROLEUM BUILDING  
TELEPHONE: MAIN 2-4202

New Mexico Oil Conservation Commission  
P. O. Box 871  
Santa Fe, New Mexico

Gentlemen:

Re: APPLICATION OF AMERADA PETROLEUM  
CORPORATION CASE NUMBER 2497

We understand that Amerada Petroleum Corporation, as Unit Operator for the Langlie-Mattix Woolworth Unit, will, on February 27, 1962, appear before the Commission to request approval of the Unit Agreement and of a pilot waterflood within the Unit Area.

Continental Oil Company, individually, and as a working interest owner and participant in the Unit, believes that the Unit Agreement is, in principal, a proper conservation measure and will tend to promote the conservation of oil and gas. Waterflood operations within the Unit area will recover oil and gas that would not otherwise be recovered.

Continental Oil Company, therefore, concurs with Amerada Petroleum Corporation, and respectfully requests that the Commission approve the Unit Agreement and pilot waterflood operations.

Very truly yours,

*W. A. Mead*

CRA-sm

Carbon copy to: Amerada Petroleum Corporation - Tulsa, Okla.



**STANDARD OIL COMPANY OF TEXAS**  
MAIN OFFICE 600 A DIVISION OF CALIFORNIA OIL COMPANY  
P. O. BOX 1249 HOUSTON 1, TEXAS

1962 FEB 22 PM 1:23

February 21, 1962

Case 2497

Oil Conservation Commission  
State Land Office Building  
College Avenue  
Santa Fe, New Mexico

Gentlemen:

The application of Amerada Petroleum Corporation for a waterflood project in the Langlie-Mattix Pool, Lea County, New Mexico, Case 2497, has been scheduled for the February 27, 1962, Examiner Hearing.

The Applicant seeks permission to institute a waterflood project in the Langlie-Mattix Pool in Sections 27, 28, 33, and 34, Township 24 South, Range 37 East, Lea County, New Mexico.

Standard Oil Company of Texas, a Division of California Oil Company, a working interest owner in the area of the proposed project, concurs in the application and recommendations of Amerada Petroleum Corporation in the aforementioned case.

Yours very truly,

*C. N. Segner*  
C. N. Segner  
Chief Engineer

RLMc:ja

cc: Mr. Jason W. Kellahin  
Kellahin and Fox  
P. O. Box 1713  
Santa Fe, New Mexico

**HUMBLE OIL & REFINING COMPANY**

MIDLAND, TEXAS

MIDLAND AREA

February 20, 1962

1962 FEB 24 11:44 AM  
MAIL ROOM

PRODUCTION DEPARTMENT

R. R. MCCARTY  
MANAGER

H. L. HENSLEY  
J. M. SHEPHERD  
OPERATIONS SUPERINTENDENTS

H. E. MEADOWS  
ENGINEERING COORDINATOR

10-2

Langlie-Mattix Pool  
Waterflood Project  
Lea County, New Mexico

New Mexico Oil Conservation Commission  
State Land Office Building  
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

In regard to Case 2497 scheduled for hearing on February 27, 1962, Humble wishes to express its support of Amerada Petroleum Corporation's application for a Langlie-Mattix Pool waterflood project in Lea County, New Mexico. The Commission is urged to approve the project and the Unit Agreement which will also be presented at the hearing.

Very truly yours,

HUMBLE OIL & REFINING COMPANY

R. R. MCCARTY

BY:  H. E. Meadows

HPB/jn



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# WESTERN UNION TELEGRAM

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NEW MEXICO OIL CONSERVATION COMMISSION,

STATE LAND OFFICE BLDG= COLLEGE AVE

SANTA FE NMEX=

REFERENCE TO CASE NO. 2497 TO BE HEARD FEBRUARY

2 PLEASE BE ADVISED THAT DELHI TAYLOR OIL CORPORATION AS A WORKING INTEREST PARTICIPANT SUPPORTS THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR APPROVAL OF THE LANGLIE MATTIX WOOLWORTH UNIT AND FOR CONDUCTING PILOT WATERFLOOD OPERATIONS WITHIN SUBJECT UNIT=

J H DOUGHMAN MANAGER PRODUCTION DEPT.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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A L PORTER JR=

SECRETARY DIRECTOR NEWMEXICO OIL CONSERVATION

COMMITTEE CONFERENCE ROOM LAND OFFICE BLDG SANTAFE NMEX=  
SCHERMERHORN OIL CORP AND KENWOOD OIL CO STRONGLY SUPPORT AMERADA PETROLEUM APPLICATION FOR LANGLIE MATTIX WOOLWORTH UNIT CASE NUMBER 2497=

F M HAMNER SCHERMEHORN OIL CORP.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
February 27, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Amerada Petroleum Corporation for a water-flood project, Langlie-Mattix Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a water-flood project in the Langlie-Mattix Pool in Sections 27, 28, 33 and 34, Township 24 South, Range 37 East, Lea County, New Mexico; the injection of water initially to be through six wells located in said sections, said project to be governed by the provisions of Rule 701.

BEFORE:

ELVIS UTZ, Examiner

(Whereupon Amerada's Exhibits 1 through 6 marked for identification)

TRANSCRIPT OF HEARING

MR. UTZ: Case 2497

MR. MORRIS: Application of Amerada Petroleum Corporation for a water-flood project, Langlie-Mattix Pool, Lea County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox, representing the Applicant. We have two witnesses to be sworn.

MR. UTZ: Are there any other appearances?

MR. BUELL: For Pan-American, Guy Buell.

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MR. UTZ: Are there any others? You may proceed, Mr. Kellahin.

R. W. BOYLE,  
called as a witness herein, having been first duly sworn on oath,  
was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please.

A R. W. Boyle.

Q By whom are you employed and in what position, Mr. Boyle?

A By Amerada Petroleum Corporation as a Unitization Supervisor for the Land Department.

MR. UTZ: Would you spell your name?

A B-O-Y-L-E.

Q (By Mr. Kellahin) Have you ever testified before the Oil Conservation Commission of New Mexico?

A No, sir.

Q How long have you been employed in the Land Department with Amerada?

A Thirteen years.

Q And how long in your present position?

A A little over nine years.

Q During all of this time have you worked with matters such as unit agreement leases and matters pertaining to land

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acquisitions?

A Yes, sir.

Q Have you had any educational qualifications in that field?

A Well, I have a Bachelor of Science in Commerce from the University of Notre Dame and have had extra courses on the oil and gas law.

Q In connection with your duties in the Land Department of Amerada Petroleum, have you had anything to do with the Langlie-Mattix Woolworth Unit?

A Yes, sir, I was responsible for the effort to secure the situation of the working interest owners involved in this matter as well as the royalty owners.

MR. KELLAHIN: Are the witness' qualifications accepted?

MR. UTZ: Yes sir.

Q Do you have a copy of the Unit Agreement designated as Langlie-Mattix Woolworth Unit?

A Yes, sir.

Q First, do you have a plat of the area involved here, Mr. Boyle?

A Yes, sir, Exhibit No. 1.

Q Now, referring to what has been marked as Amerada's Exhibit No. 1, would you discuss the information that is shown on that Exhibit?

A This Exhibit shows in a hatched outline the four areas



involved in this unit effort, being Sections 27 and 28 then 33 and 34 of 24 South, 37 East, Lea County, New Mexico. The total acreage involved is 2,559.48 acres of which 2,239.40 are fee land and 320.98 acres being a federal lease which on this Exhibit is the east half of Section 27.

MR. UTZ: Are those figures shown on one of the Exhibits?

A Yes, sir, on Exhibit B of the Unit Agreement.

Q (By Mr. Kellahin) What is the area outlined in the center of the plat, Mr. Boyle?

A The area in the center is the pilot area in which the initial effort for rejection will be commenced.

Q And that will be discussed--

A By another witness.

Q Now, referring to what has been marked as Exhibit No. 2, would you identify that Exhibit?

A This is a copy of the Unit Agreement for the Langlie-Mattix Woolworth Pool, Lea County, New Mexico.

Q Now, have all the working interest executed that Unit Agreement?

A Yes, one hundred percent of the working interest have joined.

Q What about royalty interest?

A On the total of 103 individual royalty interest owned, we have at the present time 83 consenting royalty owners



representing 80.60 percent of the total royalty burden and are continuing our efforts to secure the joinder of the presently unsigned owners, and as of this date have had no one refuse to join the Agreement. We have many estates involved and other interest owned in producory capacity. It is just taking time. We are continuing our effort to secure more.

Q Do you anticipate you will get all the royalty interest signed up?

A At the moment we hope so.

Q Now, referring to what appears in Exhibit 2, as Exhibit A, would you discuss the information shown by that portion of Exhibit 2?

A Exhibit A, within Exhibit 2, is a map showing the unit area and within the unit area are the tracts so designated under which there was common royalty ownership and each tract has been given a percentage of participation in the Agreement as shown on Exhibit B.

Q As I understood your testimony awhile ago, this acreage consists of federal and fee land?

A Yes, there are twenty tracts involved. There is one federal tract and nineteen fee tracts.

Q No state land?

A No.

Q Has the Unit Agreement been approved by the U.S.G.S.?

A It has not been approved as yet. It has been submitted.



We are presently awaiting the approval and expecting it. We might receive 80.60 percent of the total royalty burden. The U.S.G.S. royalty interest is 9.23 percent which will materially increase our total consent of royalty interest.

Q Now, upon what event does the Unit Agreement become effective?

A The Unit Agreement requires that you have eighty-five percent of the working interest joining in the Unit. We have one hundred percent. It requires seventy-five percent of the royalty interest. We have in excess of that. That is one condition. The second is the approval of the directors authorized representative and the Commission and lastly filing a copy, an executed copy of this Agreement together with the ratification of the record in Lea County, New Mexico. When these three things are accomplished, the Agreement will become effective on the first day of the month next following.

Q The Unit Agreement requires approval of this Commission?

A Yes, sir.

Q Is the Unit Agreement substantially in the same form as the agreement involving federal lands heretofore been approved by this Commission?

A Yes, sir, it has been patterned after that.

Q And upon completion of the agreement, will you furnish this Commission with a conformed copy?

A Yes, sir.



MR. MORRIS: Could I interject a question?

MR. KELLAHIN: Yes, sir.

MR. MORRIS: I don't believe that this case has been properly advertised for the approval of the Unit Agreement.

MR. KELLAHIN: I am aware of that. It was advertised for the approval of the order project which has been created by the Unit Agreement. If the Commission readvertises the approval of the Unit requiring the approval of the Commission, we would be happy to continue for that purpose and advertise just that portion if the Commission so desires. I personally don't see the necessity of it.

MR. MORRIS: As you know, the Commission in the past in approving Unit Agreement, has specifically called a case for that purpose and has considered water-flood projects quite separately.

MR. KELLAHIN: I am aware of that. I know it has been the practice and if the Commission feels it is without jurisdiction at this time to consider the Unit Agreement I would like to ask that it be advertised for that purpose and that at the time of that hearing we would be permitted to introduce records from this case if there is no opposition.

MR. BUSHNELL: May I make a statement? H. B. Bushnell, attorney for Amerada. I personally prepared the original application and amendment. At the time of doing so I was aware that the Commission adopted the policy of approving, not only the





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Unit's plan of operation, but the Unit Agreement. I was not aware until I arrived yesterday that the Commission had not adopted a policy of requiring this matter to be in the notice. We are concerned about this matter in two respects: First, the company is anxious of course to get an order approving this Unit plan prior to April 1st, but secondly, at the time I prepared the applications, I of course reviewed 701 and yesterday and last night reviewed all of the rules and the statutes and I don't find any basis for requiring this to be the subject of a separate notice. If the Commission has adopted that as a policy for which I don't argue the pros or cons here, I feel that Rule 701 ought to be amended to require notice and hearing for that purpose. I don't see why this requirement should be made in this particular hearing.

MR. MORRIS: If the Examiner please, Rule 701 is intended as a rule governing secondary recovery projects which may or may not be conducted upon unitized lands and I don't believe that one could expect to find any requirement in that particular Rule with respect to hearings upon units. I would agree with Mr. Bushnell, however, that the matter is largely one of policy with the Commission in requiring separate hearings upon unit agreements. I would recommend to the Examiner that we go ahead and hear this case subject to a later determination by the Commission of whether they feel it necessary to consider again the approval of the Unit in a separate hearing.



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MR. UTZ: The Examiner will hear the testimony pertaining to the Unit Agreement and he will make a later determination as to whether or not that will be accepted, after we have read-  
vertised it.

MR. KELLAHIN: We appreciate that. We would request, Mr. Utz, if it is determined that a separate hearing is to be held, that it be advertised immediately and as soon as possible so the effective date can be made.

MR. UTZ: Yes.

Q (By Mr. Kellahin) Mr. Boyle, was Exhibit No. 2 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibit No. 2. That completes our examination.

MR. UTZ: How about No. 1?

MR. KELLAHIN: That will be identified by the other witness.

MR. UTZ: Exhibit No. 2 will be accepted into the record.

(Whereupon Amerada's Exhibit  
No. 2 admitted in evidence)

MR. KELLAHIN: No. 1 will be offered later.

MR. UTZ: Are there any questions of the witness? The witness may be excused.

(Witness excused)



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A. E. SNYDER,

called as a witness herein, having been first duly sworn on oath,  
was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name please?

A A. E. Snyder.

Q By whom are you employed and in what position?

A Amerada Petroleum Corporation as District Engineer in  
the State of New Mexico.

Q Have you previously testified before the Oil Conserva-  
tion Commission and made your qualifications a matter of record?

A Yes, sir.

MR. KELLAHIN: Are the witness' qualifications accepted?

MR. UTZ: The witness is qualified.

Q (By Mr. Kellahin) Mr. Snyder, referring to what has  
been marked as Exhibit No. 1 in this case, would you discuss  
further the information shown on that Exhibit?

A This Exhibit primarily shows a portion of the area  
covered by the Langlie-Mattix Pool as our previous witness testi-  
fied. In Sections 27, 28, 33 and 34 in Township 24 South, Range  
37 East, in the portion of the Langlie-Mattix Pool that we are  
attempting to unitize at this time in water flood. On this  
Exhibit we have outlined two eighty acre pilot water flood areas.  
The injection wells for these pilot flood areas will be Amerada-



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Johnson No. 1 located in Unit L and Johnson No. 4 located in Unit N, both in Section 27. The Schermerhorn-Woolworth No. 2 located in Unit H there, Woolworth No. 7 located in Unit P and a well to be drilled in Unit J, all in Section 28 and R. J. Johnson located in Section 27, and the Humble-John Williams located in Unit D of Section 34.

Q Then, all of the injection wells are drilled with the exception of one?

A Yes, sir.

Q Now, referring to what has been marked as Amerada's Exhibit No. 3, would you identify that Exhibit and discuss the information shown on it?

A Exhibit No. 3 is a log of Amerada's R. J. Johnson No. 3 located in Unit K, Section 27. On this log, near the base, we have marked the top of the Queen Formation at 3342 and the top of the Langlie-Mattix producing interval 100 feet above that 3242 as the Commission ordered.

Q Is there any other information you want to mention?

A No, sir.

Q Now, referring to what has been marked as Amerada's Exhibit No. 4, would you first identify that Exhibit?

A Exhibit No. 4 is an engineering summary of the work that has been done by the engineering committee.

Q Does this contain information as to the geology of the area?



A Yes.

Q Would you discuss that?

A Within this engineering summary, what is referred to as Figure 2, is a structure map of the proposed unit area showing that this part of the unit is located on the general northwest, southeast anticline of the Langlie-Mattix. It is on the western slope, we have a dip to the west. The producing interval here as pointed out in our Exhibit 3, the log of the well, is a Langlie-Mattix interval as set up by what the Commission ordered to be that part of Seven Rivers of the lower 100 feet of Seven Rivers and all of the Queen Formation. These intervals are all of permian age.

Q Now, do you have something on the history and the development of this area.

A Yes, sir, the Langlie-Mattix Pool in this particular area was primarily developed a number of years ago, most of it between the years of 1934 and 1940. The bay interval consists of 200 feet of gross sections. It has a gas oil contact about minus 150 feet, water oil contact minus 350 feet. Most wells were completed in open hole and then had initial potentials ranging 200 to 500 barrels per day.

Q Now, is the reservoir at a state of near depletion on primary?

A Yes, sir. Referring to Figure 5 of Exhibit 4, Figure 5 is a plat of production versus time from the wells drilled



within this interval. You will notice that during the years 1936 to 1940 as development continued the production increased and in 1940 when development was essentially completed production started declining rapidly. That rapid decline continued until 1955 when many wells were sand tracked and we had a slight increase in production. The producing rate is now declining again. During the year 1961 the area is produced a total of 69,566 barrels of oil which is an average of 191 barrels a day for an average of 3.4 barrels of oil per day. The gas oil ratio slightly below 3,000 cumulative recovery has been 5.4 million barrels for an average of 84,000 barrels per well. Water production has never been substantial, it is currently about 60 barrels a day from the unit area.

Q Now, there has been a drop then in the production, a considerable drop?

A Yes, sir.

Q Was it accompanied by a decline in pressures?

A Yes, this reservoir is without a water drive, the bottom hole pressure declined quite rapidly parallel with the amount of production taken from the reservoir. The initial pressure was 1450 pounds, about two-thirds dissipated by the end of 1941 when we took the last pressure. It was down about 600 pounds since then. All the wells are producing by artificial lifts of some kind. We assume pressure is somewhere below 200 pounds into the area.



Q Do you have any core data on any wells in the project area?

A There is one, Phillips-Woolworth No. 8 located in Unit B, Section 33 where the Langlie-Mattix interval was cored from 3416 feet to 3565 feet, recovered from 132 of the 149 feet, seventeen feet not recovered. The analysis of the recovered portion showed that there is about fifteen feet of net pay porosity, 12.1 percentage and permeability 8.7 millidarcies.

Q Do you believe this information is representative of the formation in the area?

A It is rather hard to tell if it would or would not be representative. It is probably doubtful that it is representative of the entire area. It is one well out of four total sections and all of the core was not recovered.

Q Well, actually it would not account for the recoveries that have already been made?

A No, sir.

Q In other words, reservoirs would be somewhat better?

A Yes, sir.

Q Now, in your opinion, Mr. Snyder, does this area lend itself to secondary recovery by water flooding?

A I believe that it does. I think that it has possibility.

Q Now, what type of flood do you propose to institute here?



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A In Figure 6 of this Exhibit 4 again it is a plat of the four-section area of the proposed unit showing the pilot flood in the center of the unit and a possible expanded pilot pattern beyond that point. We do not know that this will be the expansion of the pilot flood but it would be the logical expansion if everything works right.

Q The actual expansion to be made will depend upon the success of the pilot area?

A Yes, sir.

Q And you will keep a close watch on the pilot area to determine what further steps are to be taken?

A Yes, sir.

Q Would you keep the Commission advised on your program in that connection?

A Yes, sir, they will be advised.

Q Now, referring to what has been marked Exhibit No. 5, identify that Exhibit.

A Exhibit No. 5 is the log of the Humble-John Williams No. 4, one of injection wells that we previously mentioned on this log. Again we have marked the top of the Langlie-Mattix interval at 3308 feet.

Q Referring to what has been marked as Exhibit No. 5, would you identify that?

A Exhibit No. 5A is the log of the Schermerhorn Woolworth No. 2, also one of the injection wells in the pilot area previously





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mentioned. It also has the top of the Langlie-Mattix interval marked on it.

Q Do you have the log for any of the injection wells?

A No, sir.

Q Do you plan to log the wells you are going to drill for injection purposes?

A Yes, sir.

Q Will you furnish the Commission with that?

A Yes, they will be furnished.

Q Referring to what has been marked as Exhibit No. 6, will you discuss the information shown?

A Exhibit No. 6 is merely a tabulation of the five injection wells that currently are existing. The names of the wells, the present operator, the location of the wells, the casing, size and setting depth and the amount of cement used on each string of pipe is indicated.

Q How do you propose to use those wells for injection purposes, will you inject through casing?

A No, sir, tubing will be set on these wells on packers.

Q In your opinion, will that adequately protect any water or oil or other formation encountered?

A Yes, sir. I might point out one thing before we leave this. It was apparent on the logs and this tabulation also, that as I mentioned before, these wells were completed in open hole.

The casing sometimes is set above the top of the Langlie-Mattix,



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producing interval. We are not sure what effect this will have on injection programs. We do plan to run tests as we start to see for sure where the water is going, we would take the necessary steps to see it does go into the Langlie-Mattix producing interval.

Q What is your water source going to be?

A We plan on drilling a well to the San Andres as our primary target, to get water for this flood. It will be salty, brackish water. We do plan on running tests on other zones as we drill this water well.

Q On the basis of your experience in this area, do you anticipate that a sufficient supply of water can be obtained from the San Andres?

A Yes.

Q What volume?

A Four pilots 3,000 barrels per day, we hope to have 500 barrels per day into each injection.

Q Do you anticipate it to be water on vacuum?

A We anticipate pressure out as time goes by. We designate we can operate on the order of 2,000 pounds, if necessary.

Q Now, what would you anticipate in the way of recovery in the secondary recovery program?

A It is real hard to tell with the information we have on this reservoir as to how thick the bay, actually how much oil is left there. Floods of this type in similar formation in the area have been known to recover somewhere from fifty to 100 percent of



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what was initially recovered on a primary basis and we would expect to recover a minimum of fifty percent of primary.

Q Would you expect the secondary recovery program to be economical?

A Yes, sir.

Q Under the application we asked for approval of the secondary recovery program by order of an injection in administrative procedure for the expansion of the water flood--

A Yes, sir.

Q --program, is that correct?

A Yes.

Q And that is what you are asking the Commission for?

A That's right.

Q Can the project be operated under the provision of Rule 701?

A Yes, sir.

Q Without any modification?

A Yes, sir.

Q Were Exhibits 1 and 3 through 6 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: I would like to offer in evidence Exhibits 1 and 3 through 6.

MR. UTZ: Exhibit 1 and 3 through 6 will be entered into the record in this case.



(Whereupon Amerada's Exhibits  
1, 3, 4, 5, and 6 admitted in  
evidence)

MR. KELLAHIN: This is all the questions I have, Mr.

Utz.

CROSS-EXAMINATION

BY MR. UTZ:

Q What size tubing do you intend to inject through?

A It will probably be two inch.

Q And that will carry the volume of water that you want  
to inject?

A Yes.

Q What will be your injection breaker?

A We don't know what they will be. We are designing our  
system where it operates at 2,000 pounds.

Q You feel that casing injection is capable of holding  
that amount of pressure?

A The way that we planned on running and setting the  
packers of casing, it will not be exposed to that pressure.

Q You will have a packer on the new tubing?

A Yes, sir.

Q Now, this was brackish water?

A Yes, it is brackish water.

Q Do you intend to treat the water?

A We are not sure what type of control we will need on the  
water until we have our source developed but we will take the



necessary steps to clean or plastic coat our equipment as economics dictate.

Q I notice on your Figure 3 of Exhibit 4, that you have quite--I don't know where it is--a string or what is it, anyway your Langlie-Mattix has quite a contour, do you expect that this will hamper your efficiency in your program any?

A Yes, it undoubtedly will. It will create some problems. We will have to fact that as the time goes by.

Q Do you expect that the water then will follow parallel to the contours and go up into the gas section?

A Probably, it would be expected to do that to some extent in the type of flood that we are planning. The pattern flood where you are using injection wells not too far apart we can hold to a minimum, then it would go over short distances. It would be able to hold migration to a minimum.

Q In other words you expect to pick up most of the oil before it can get into the gas section?

A Yes.

Q I believe you said these pressures were down in the neighborhood of 200 pounds?

A Somewhere below 200 pounds.

Q And all of these injection wells are open?

A No, sir, on Exhibit 6, the Humble-John Williams No. 4 is not in open hole, I believe the other four are in open hole.

MR. UTZ: Are there any other questions of the witness?

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MR. MORRIS: Yes.

MR. UTZ: Mr. Morris.

CROSS-EXAMINATION

BY MR. MORRIS:

Q Mr. Snyder, referring to Figure 5 of your Exhibit No. 4, the production graph, how many wells did you consider in preparing this graph?

A I believe there were 56 wells.

Q Those are the wells shown on one of the tables in the--

A Yes, sir.

Q --Table 1 in the rear of Exhibit No. 4?

A Yes, sir, in times passed there were a total of 63 wells, I believe some of those wells have been either plugged or abandoned or plugged back into the Jalmet. This Exhibit 1 which you mentioned shows the current usable wells.

Q In preparing this graph, Figure 5, do these figures represent the average of 56 wells or does it represent some other figure?

A It represents the total amount of oil produced from this four-section area regardless of the number of wells at any particular time.

Q From the year 1955 to the year 1960, the graph would indicate a slight rise in yearly production, is that attributable to new wells or workover?

A It is attributed to the frac treatment. Nearly all

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wells in the area were stimulated during this period of time.

Q Do you feel that by additional frac treatments the production could be stimulated in the wells in this area to maintain them above the stripper level?

A No, sir.

Q Now, there were 56 wells that were considered in constructing this graph, some of the wells actually range as high as 25 barrels per day in production, do they not?

A The test data that is listed in this Table 2, in the back of this Exhibit, shows the tests that were taken sometime last year and according to those tests some of the wells do have a 24 and 25 barrel per day capacity. The wells currently are not producing that much. I didn't tabulate the current production figures but I checked the December figures and our engineering committee reports that none of the wells apparently are producing that much oil at the present time.

Q Taking the area as a whole, though, you would say the wells were stripper wells?

A Yes, sir, the average in the area as a whole was about 3.4 barrels per day per well.

Q Mr. Snyder, you have testified that the water-flood project can be governed by the provision of the Commission's Rule 701 with respect to allowable and the expansion of the project area, is that correct?

A Yes, sir.



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Q Is there any provision in the Unit Agreement that would be contrary in any way to these provisions of Rule 701, first I should ask, are you familiar with the provisions of the Unit Agreement?

A I am not real familiar.

Q So you could not say definitely whether the provisions of the Agreement might differ from the provisions of Rule 701?

A No, sir, I couldn't testify as to that.

Q As operator of this water-flood project and as operator of the unit, Mr. Snyder, does Amerada submit all production reports for all the operators or will each operator submit its own?

A No, Amerada will submit a project report. We will take over physical operating property and submit all reports that are to be submitted.

Q You will submit all the reports from just the water-flood project area or will you immediately upon approval of the unit, submit reports from all wells and properties within the unit?

A No, when the unit is agreed upon it has been approved, Amerada will immediately resume operation of all properties within the four-section areas, not just the pilot area.

MR. MORRIS: I believe that is all the questions I have.

MR. KELLAHIN: Mr. Utz, in connection with the question asked by Mr. Morris, in regard to provisions of the Unit Agreement, Section 23 of the Agreement makes a provision that all production in the disposal thereof shall be in conformity with allocation and





quarters made or fixed by duly regulatory bodies under any federal or state statutes. That will clearly put under reasons of 701. I know of nothing in the Unit Agreement which is contrary to 701.

MR. MORRIS: Would that include the provisions with respect to expanding the pilot area?

MR. KELLAHIN: It would conform.

MR. UTZ: Are there any other questions?

CROSS-EXAMINATION

BY MR. PORTER:

Q Mr. Snyder, did you testify as to percentages of the original oil and gas that would be recovered in the primary recovery? You gave a total figure of about something in excess of 2 million?

A No, sir, 5.4 million barrels.

Q And you think you might reasonably expect to recover that much here if this is successful?

A From 2.7 million to 5.4 million, yes, sir.

MR. PORTER: That is all.

MR. IRBY: I am Frank Irby, State Engineers Office.

CROSS-EXAMINATION

BY MR. IRBY:

Q I believe you testified that you anticipated taking your water from the San Andres?

A Yes, sir.



Q Where does the San Andres lie with respect to the producing formation?

A It is below the producing formation about 1,000 feet.

Q Do you have at this time an analysis of this water?

A No, sir.

Q Do you anticipate analyzing it before you put it to use?

A Yes, we would develop and analyze it for our own benefit. It would be necessary to know what treating program to make on the water.

Q Would you forward a copy of that to the State Engineer's Office in Santa Fe?

A Yes, sir.

MR. IRBY: That is all the questions I have.

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Snyder, in regard to the wells which have the casing set above a Langlie-Mattix bay, what type of test do you propose to make in order to determine that the water is going into the Langlie-Mattix Pool?

A There are several different types of injectivity tests that we can run to determine where the water is going and if the water, a portion of it, is going into this open interval above the Langlie-Mattix. Then, we would take the necessary measures to run the casing or whatever we would need to determine that the water is going into the Langlie-Mattix Pool.



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Q How would you determine that it is going into the interval above the bay?

A By the method of running the surveys we can determine this. Say we are injecting 500 barrels and run an instrument in the hole and survey from the bottom up and see what percent of the water is going passed this instrument as at any particular depth so we can know when we get to the top of the Langlie-Mattix interval. If we still do not have 100 percent of the water going passed the instrument we will know that some of it is going above the Langlie-Mattix Pool. The same thing can be accomplished by radio activity traces and surveys.

Q If you determine water going above the Langlie-Mattix bay, then you set lines?

A Yes, sir.

MR. UTZ: Are there any other questions? The witness may be excused.

(Witness excused)

MR. UTZ: Are there any statements in this case?

MR. BUELL: May it please the Examiner, Pan-American Petroleum Corporation is a working interest owner in this, and as such an interest owner we would like to concur in the recommendation made by Amerada in urging the Commission's approval of these requests.

MR. MORRIS: If the Examiner please, the Commission has received correspondence from Schermerhorn Oil Corporation, Kenwood



Oil Company, Delhi-Taylor Oil Corporation, Humble Oil and Refining Company, Standard Oil Company of Texas, Continental Oil Company, Gulf Oil Corporation, the Pure Oil Company and Sinclair Oil and Gas Company, all concurring in the application of Amerada Petroleum Corporation.

MR. UTZ: Are there any other statements? The case will be taken under advisement.

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CERTIFICATE PAGE

STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) ss

I, KATHERINE PETERSON, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill, and ability.

*Katherine Peterson*  
COURT REPORTER

I do hereby certify that the foregoing is a correct record of the proceedings in the New Mexico Oil Conservation Commission Case No. 2487, heard by me on July 27, 1962.

*James H. [Signature]*  
Examiner  
New Mexico Oil Conservation Commission

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UNIT AGREEMENT  
FOR THE DEVELOPEMENT AND OPERATION OF THE  
LANGLIE MATTIX WOOLWORTH UNIT  
LEA COUNTY, NEW MEXICO

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UNIT AGREEMENT  
FOR THE DEVELOPMENT AND OPERATION OF THE  
LANGLIE MATTIX WOOLWORTH UNIT  
LEA COUNTY, NEW MEXICO

NO. \_\_\_\_\_

THIS AGREEMENT, entered into as of the 24th day of March, 1961,  
made between the parties subscribing, ratifying or consenting hereto, and  
herein referred to as "parties hereto,"

WITNESSETH: THAT,

WHEREAS, the parties hereto are the owners of working, royalty or  
other oil or gas interest in the Unit subject to this Agreement; and

WHEREAS, the Oil Conservation Commission of the State of New  
Mexico is authorized by law (Chap. 72, Laws of 1935, as amended by Chap. 193,  
Laws of 1937, Chap. 166, Laws of 1941, and Chap. 168, Laws of 1949), to  
approve this Agreement, and the conservation provisions hereof; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, (41 Stat.  
437, as amended, 30 U. S. C. Sections 181 et seq.) authorizes Federal lessees  
and their representatives to unite with each other or jointly or separately  
with others in collectively adopting and operating a co-operative or unit  
plan of development or operation of any oil or gas pool, field, or like area  
or any part thereof for the purpose of more properly conserving the natural  
resources thereof whenever determined and certified by the Secretary of the  
Interior to be necessary or advisable in the public interest; and

WHEREAS, the parties hereto hold sufficient interest in the  
Langlie Mattix Woolworth Unit covering the land hereinafter described to  
give reasonably effective control of operation therein; and



WHEREAS, it is the purpose of the parties hereto to enable institution and consummation of secondary recovery operations, conserve natural resources, prevent waste and secure the other benefits obtainable through development and operation of the area subject to this Agreement 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 entire respective interests in the below defined Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS: The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid, pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder and valid, pertinent and reasonable regulations hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this Agreement; and as to non-Federal lands, the oil and gas operating regulations in effect as of the effective date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the State in which the non-Federal land is located, are hereby accepted and made a part of this Agreement.

SECTION 2. UNIT AREA AND DEFINITIONS: For the purposes of this Agreement, the following terms and expressions as used herein shall mean:

(a) "Unit Area" is defined as those lands shown on Exhibit "A" hereof, and such land is hereby designated and recognized as constituting the Unit Area; the lands initially shown in said Exhibit "A" and described in Exhibit "B" as:

NEW MEXICO PRINCIPAL MERIDIAN, NEW MEXICO

LEA COUNTY, NEW MEXICO

Township 24 South, Range 37 East,

Section 27: All

Section 28: All

Section 33: All

Section 34: All

and containing 2,559.48 acres, more or less.

(b) "Commission" is defined as the Oil Conservation Commission of the State of New Mexico.

(c) "Director" is defined as the Director of the United States Geological Survey.

(d) "Secretary" is defined as the Secretary of the Interior of the United States of America.

(e) "Department" is defined as the Department of the Interior of the United States of America.

(f) "Supervisor" is defined as the Oil and Gas Supervisor of the United States Geological Survey.

(g) "Langlie Mattix zone" is defined as and shall mean that underground reservoir regardless of the depth or thickness established by the Commission as the Langlie Mattix Oil Pool and defined as the lower 100 feet throughout the entire Unit Area of the Seven Rivers formation and all of the Queen formation. The Langlie Mattix zone is found between the subsurface depths of 3,170 feet and 3,510 feet in the Continental Oil Company, Jack B-27 No. 7 located in the SE/4 of the SE/4 of Section 27, Township 24 South, Range 37 East, N.M.P.M.

(h) "Unitized Formation" is defined as the Langlie Mattix zone underlying the lands effectively committed to this Agreement.

(i) "Unitized Substances" is defined as and shall mean all of the oil and gas contained in or produced from the Unitized Formation on and after the effective date hereof.

(j) "Usable Well" is defined as and shall mean a cased well which, on the effective date of this Agreement, is classified by the Commission as a completion in the Langlie Mattix Oil Pool.

(k) "Current Production" is defined as the oil produced from the Langlie Mattix zone in the Unit Area during the period from June 1, 1959 through November 30, 1959, as such production was reported to the Commission.

(l) "Cumulative Production" is defined as the oil produced from the Langlie Mattix zone in the Unit Area through November 30, 1959, as such production was reported to the Commission.

(m) "Working Interest" is defined as the right to search for, produce and acquire Unitized Substances whether held as an incident of ownership of mineral fee simple title, under an oil and gas lease, or otherwise held.

(n) "Working Interest Owner" is defined as and shall mean any party hereto owning a Working Interest, including a carried working interest owner, holding an interest in the Unitized Substances by virtue of a lease, operating agreement, fee title or otherwise, which interest is chargeable with and obligated to pay or bear, either in cash or out of production, or otherwise, all or a portion of the cost of drilling, developing and producing the Unitized Substances from the Unitized Formation and operation thereof hereunder.

(o) "Royalty Interest" or "Royalty" is defined as an interest other than a Working Interest in or right to receive a portion of the Unitized Substances or the proceeds thereof and includes the royalty interest reserved by the lessor by an oil and gas lease and any overriding royalty interest, oil payment, interest, net profit contracts, or any other payment or burden which does not carry with it the right to search for and produce Unitized Substances.

(p) "Royalty Owner" is defined as and shall mean the owner of a Royalty Interest.

(q) "Unit Operating Agreement" is defined as and shall mean an agreement entered into by and between the Working Interest Owners as provided in Section 9, infra, and styled "Unit Operating Agreement, Langlie Mattix Woolworth Unit, Lea County, New Mexico," or any amendments thereof.

(r) "Paying Quantities" is defined as production of Unitized Substances in quantities sufficient to pay for the cost of producing same from wells on the unitized land.

(s) "Unit Manager" is defined as the person or corporation appointed by the Working Interest Owners to perform the duties of the Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 8 hereof.

SECTION 3. EXHIBITS: Exhibit "A" attached hereto is a map showing, to the extent known to the Unit Operator, the Unit Area and the boundaries and identity of tracts and leases in said Unit Area. Exhibit "B" attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each tract, percentage ownership of each Working Interest Owner in each tract, and the percentage of participation each tract has in the Unit Area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown in said map or schedule as owned by such party. Exhibits "A" and "B" shall be revised by the Unit Operator whenever changes herein provided for render such revision necessary, and not less than six copies thereof shall be filed with the Supervisor.

SECTION 4. EXPANSION: The above described Unit Area may when practicable be expanded to include therein any additional tract or tracts regarded as reasonably necessary or advisable for the purposes of this Agreement. Such expansion shall be effected in the following manner:

(a) The Working Interest Owner or owners of a tract or tracts desiring to bring such tract or tracts into this Unit, shall file an application therefor with Unit Operator requesting such admission.

(b) Unit Operator shall circulate a notice to each Working Interest Owner of the proposed expansion, setting out the basis for admission, the unit participation to be assigned to such tract or tracts, and other pertinent data. After negotiation (at Working Interest Owners' meeting or otherwise) if eighty-five (85%) per cent of the Working Interest Owners (on the basis of final unit participation) have agreed to such tract or tracts being brought into the Unit, then Unit Operator shall:

(1) Prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit

Area, the reason therefor, the basis for admission of the additional tract or tracts, the unit participation to be assigned thereto and the proposed effective date thereof, preferably the first day of a month subsequent to the date of notice; and

(2) Deliver copies of said notice to the Supervisor, each Working Interest Owner (mailing copy of such notice to the last known address of each such Working Interest Owner) and to the lessee and lessor whose interests are proposed to be committed, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objection to such proposed expansion; and

(3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above and provided that objections of owners owning not more than fifteen (15%) per cent of the Working Interest on the basis of final phase participation have been filed thereto, with the Director and the Commission following: (a) comprehensive statements to mailing said notice of expansion; (b) an application for such expansion; and (c) an instrument containing the appropriate joinders as to the additional tract or tracts to be committed in compliance with the participation requirements of Section 13, *infra*.

The expansion shall, after due consideration of all pertinent information and upon approval by the Supervisor, become effective as of the date prescribed in the notice thereof or on such other date as set by the Director and the Commission in the order or instrument approving such expansion.

SECTION 5. UNITIZED LAND AND UNITIZED SUBSTANCES: All Unitized Substances, as hereinabove defined, in all or the hereinabove described and subsequently admitted land effectively committed to this Agreement, insofar only as the same may be found in the Langlie Mattix zone, together with the surface rights of ingress and egress, are unitized under the terms of this Agreement and said land shall constitute land referred to herein as "Unitized Land" or "Land Subject to this Agreement."

Nothing herein shall be construed to unitize, pool, or in any way affect the oil, gas and other minerals contained in or that may be produced from any formation other than the Langlie Mattix zone.

SECTION 6. UNIT OPERATOR: Amerada Petroleum Corporation, a Delaware corporation, is hereby designated as Unit Operator, and by signing this instrument as Unit Operator it agrees and consents to accept the duties and obligations of Unit Operator for the operation, development and production of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as an owner of interests in Unitized Substances, and the term "Working Interest Owner" when used herein shall include or refer to Unit Operator as the owner of a Working Interest when such an interest is owned by it.

SECTION 7. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights as such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners and Director, unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

The Unit Operator may be subject to removal by seventy-five (75%) per cent of the committed Working Interest Owners (on the basis of current Unit participation) exclusive of the Working Interest Owner who is the Unit Operator. Such removal shall be effective upon notice thereof to the Director.

In all such instances of effective resignation or removal, until

a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal becomes effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this Agreement shall not terminate its right, title or interest as the owner of a Working Interest or other interest in the Unitized Substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all equipment, books and records, materials, appurtenances and any other assets, used in conducting the Unit operations and owned by the Working Interest Owners (including any and all data and information which it might have gained or assembled by reason of its operation of the Unit Area) to the new duly approved successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected, to be used for the purpose of conducting Unit operations hereunder. Nothing herein shall be construed as authorizing removal of any material, equipment and appurtenances needed for the preservation of any wells. Nothing herein contained shall be construed to relieve or discharge any Unit Operator who resigns or is removed hereunder for any liability or duties accruing or performable by it prior to the effective date of such resignation or removal.

SECTION 8. SUCCESSOR UNIT OPERATOR: Whenever the Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners shall select a successor Unit Operator by a majority vote of the Working Interest Owners (on the basis of current Unit participation), provided no Working Interest Owner who has been

Unit Operator and who has been removed may vote for self succession. Such selection shall not become effective until (a) a Unit Operator so selected shall accept in writing the duties and responsibilities of Unit Operator, and (b) the selection shall have been approved by the Director. If no successor Unit Operator or Unit Manager is selected and approved as herein provided, the Director, at his election, may declare this Agreement terminated.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT:

Costs and expenses incurred by Unit Operator in conducting Unit operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Unit Agreement or to relieve the Unit Operator of any right or obligation established under this Agreement, and in case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall prevail. Three true copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with the Supervisor, prior to approval of this Agreement.

SECTION 10. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR. Except as otherwise specifically provided herein, the exclusive right, privilege and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting for, producing, storing, allocating and distributing the Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Acceptable evidence of title to said rights shall be deposited with said Unit Operator, and together with this Agreement shall constitute and define the rights, privileges and obligations of Unit Operator. Nothing herein, however, shall be construed to



transfer title to any land or to any lease or operating agreement, it being understood that under this Agreement the Unit Operator, in its capacity as Unit Operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified.

SECTION 11. PLAN OF OPERATIONS: It is recognized and agreed by the parties hereto that all of the land subject to this Agreement is reasonably proved to be productive of Unitized Substances in paying quantities and that the object and purpose of this Agreement is to formulate and to put into effect a secondary recovery project in order to effect the greatest recovery of Unitized Substances, prevent waste and conserve natural resources. The parties hereto agree that the Unit Operator may, subject to the consent and approval of a plan of operation by the Working Interest Owners and the Supervisor, inject into the Unitized Formation, through any well or wells completed therein, brine, water, air, gas, oil or any one or more other substances whether produced from the Unit Area or not, and that the location of input wells and the rates of injection therein and the rate of production shall be governed by standards of good geologic and petroleum engineering practices and conservation methods. After commencement of secondary operations, Unit Operator shall furnish the Supervisor periodical injection and production reports for each well in the Unit. The Working Interest Owners and the Supervisor, shall be furnished periodical reports on the progress of the plan of operation and any revisions or changes thereto; provided, however, such other methods of operation as may from time to time be determined by Working Interest Owners to be feasible, necessary or desirable to efficiently and economically increase the ultimate recovery of Unitized Substances may be conducted by Working Interest Owners. Nothing herein

contained shall prevent the Working Interest Owners from discontinuing or changing in whole or in part any particular method of operation if, in their opinion, such method of operation is no longer economically feasible or in accord with good engineering or production practices.

The initial plan of operation shall be filed with the Supervisor concurrently with the filing of this Unit Agreement for final approval. Said initial plan of operation shall be as complete and adequate as the Supervisor may determine to be necessary for timely operation consistent herewith. Reasonable diligence shall be exercised in complying with the obligation of the approved plan of operation.

Notwithstanding anything to the contrary herein contained, the Unit Operator shall commence secondary recovery operations on the Unit Area within six (6) months after the effective date of this Agreement and approval of the initial plan of operation by the Supervisor, or any extension thereof approved by the Director, or this Agreement shall terminate automatically, in which latter event Unit Operator shall notify all interested parties. After such operations are commenced, Unit Operator shall carry on such operations as would a reasonably prudent operator under the same or similar circumstances.

SECTION 12. PARTICIPATION: In Exhibit "B", attached hereto, there are listed and numbered the various tracts within the Unit Area and set forth opposite each tract is a figure which represents the percentage of participation allocated to each tract in the Unit Area calculated on a one hundred (100%) per cent commitment. The participation percentage of each tract was determined as follows:

(a) Initial period participation:

Percentage  
 Participation =  $50 \frac{(\text{Tract Current Production})}{(\text{Unit Area Current Production})}$  plus  
 of Each Tract  
 $25 \frac{(\text{Tract Acreage})}{(\text{Unit Area Acreage})}$  plus  $25 \frac{(\text{Tract Usable Wells})}{(\text{Unit Area Usable Wells})}$

The period of initial participation shall begin at 7:00 A.M. on the effective date of this Agreement and terminate as of 7:00 A.M. on the first day of the calendar month following the month in which 250,000 barrels of oil has been produced and saved from the Unitized Formation after January 1, 1961.

(b) Final period of participation:

Percentage  
 Participation =  $33\frac{1}{3} \frac{(\text{Tract Acreage})}{(\text{Unit Area Acreage})}$  plus  $33\frac{1}{3} \frac{(\text{Tract Usable Wells})}{(\text{Unit Area Usable Wells})}$   
 of Each Tract

Plus  $33\frac{1}{3} \frac{(\text{Tract Cumulative Production})}{(\text{Unit Area Cumulative Production})}$

The period of final phase participation shall commence upon termination of the initial phase participation, and continue until termination of this Agreement.

Notwithstanding the inclusion of the participation formula, the participation factors of the tracts as shown in Exhibit "B" shall be adopted as true, correct, and accurate, and not subject to change except only to the extent as may be required in the event some uncommitted tract is eliminated from the Unit.

SECTION 13. TRACTS QUALIFIED FOR UNIT PARTICIPATION: On and after the effective date hereof the tracts within the Unit Area which shall be entitled to participation in the production of Unitized Substances therefrom shall be those tracts within the Unit Area and more particularly described in said Exhibit "B" which corner, adjoin, or are contiguous to each other that are qualified as follows:

(a) Each tract as to which Working Interest Owners owning one hundred (100%) per cent of the working interest have signed or ratified this Agreement and Royalty Owners owning seventy-five (75%) per cent or more of the royalty interest have signed or ratified this Agreement; and

(b) Each tract as to which Working Interest Owners owning one hundred (100%) per cent of the working interest have signed or ratified this Agreement and Royalty Owners owning less than seventy-five (75%) per cent of the royalty interest have signed or ratified this Agreement, and as to which (i) all Working Interest Owners in such tract join in a request for the inclusion of such tract in the Unit Area, and further as to which (ii) Working Interest Owners owning eighty-five (85%) per cent in all tracts which meet the requirements of the preceding subparagraph (a) vote in favor of the inclusion of such tract. For the purpose of this subparagraph (b) the voting interest of each Working Interest Owner shall be equal to the ratio (expressed in percentage) which the total of such Working Interest Owner's final unit participation attributable to the tracts which qualify under subparagraph (a) bears to the total of the final unit participation of all Working Interest Owners attributable to all tracts which qualify under said subparagraph (a); and

(c) Each tract as to which Working Interest Owners owning less than one hundred (100%) per cent of the working interest have signed or ratified this Agreement, regardless of the percentage of royalty interest therein that is committed hereto, and as to which (i) the Working Interest Owner who operates the tract and all of the other subscribing Working Interest Owners in such tract have joined in a request for inclusion of such tract in the Unit Area and have executed and delivered an indemnity agreement acceptable to the other Working Interest Owners in the Unit Area indemnifying and agreeing to hold such parties harmless from and against all claims and demands that may be made by the nonsubscribing working interest owners in such tract on account of the inclusion of the same in the Unit Area, and further as to which (ii) Working Interest Owners owning eighty-five (85%) per cent of the final participation in all tracts which meet the requirements of subparagraphs (a) and (b) above, vote in favor of the inclusion of such tract. For the purposes of this subparagraph (c) the voting interest of each Working Interest Owner shall be equal to the ratio (expressed in percentage) which the total of such Working Interest Owner's final unit participation attributable to tracts which qualify under subparagraphs (a) and (b) bears to the total final unit participation of all Working Interest Owners attributable to all tracts which qualify under said subparagraphs (a) and (b).

(d) In no event, however, shall the Unit Area include less than all of those tracts initially described and referred to in Exhibits "A" and "B" hereof unless such action be approved by the vote of the Working Interest Owners owning eighty-five (85%) per cent of the final participation in such tracts which shall have qualified pursuant to subparagraphs (a), (b), and (c), above.

If, on the effective date of this Agreement, there is any tract or tracts which have not been effectively committed to or made subject to this Agreement by qualifying as above provided, then such tract or tracts shall not be entitled to participate hereunder. Unit Operator shall, when submitting this Agreement for final approval by the Supervisor, file therewith a schedule of those tracts which have been committed and made subject to this Agreement and are entitled to participate in the production from the Unit Area hereunder. Said schedule shall set forth opposite each such committed tract the lease number or assignment number, the owner of record of the lease, and the percentage participation of such tract which shall be computed according to the participation formula set out in Section 12 (Participation) above. This schedule of participation shall be a part of Exhibit "B" and upon approval thereof by the Supervisor shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until a new schedule is filed and approved by the Supervisor.

SECTION 14. ALLOCATION OF UNITIZED SUBSTANCES: All Unitized Substances produced and saved (less, save and except any part of such Unitized Substances used in conformity with good operating practices on unitized land with respect to the Unitized Formation for drilling, operating, camp, and other production or development purposes and for pressure maintenance or unavoidably lost) shall be apportioned among and allocated to the qualified committed tracts within the Unit Area in accordance with the respective

tract participation effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the schedule of participation in Exhibit "B". The amount of Unitized Substances so allocated to each tract, and only that amount, (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such tract), shall, for all intents, uses and purposes, be deemed to have been produced from such tract.

The Unitized Substances allocated to each tract shall be distributed among, or accounted for to the parties executing, consenting to or ratifying this Agreement entitled to share in the production from such tract in the same manner, in the same proportions, and upon the same conditions, as they would have participated and shared in the production from such tracts, or in the proceeds thereof, had this Agreement not been entered into; and with the same legal force and effect.

No tract committed to this Agreement and qualified for participation, as above provided, shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances, and nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the joinder of any tract.

If the Working Interest and the Royalty Interest in any tract are divided with respect to separate parcels or portions of such tract and owned severally by different persons, the percentage participation assigned to such tract shall, in the absence of a recordable instrument executed by all owners and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

The Unitized Substances allocated to each tract shall be

delivered in kind to the respective Working Interest Owners and parties entitled thereto by virtue of the ownership of oil and gas rights therein or by purchase from such owners. Each Working Interest Owner and the parties entitled thereto shall have the continuing right to receive such production in kind at a common point within the Unit Area and to sell or dispose of the same as it sees fit. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose on unitized land, provided the same are so constructed, maintained and operated as not to interfere with operations carried on pursuant hereto. Subject to Section 15 hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party receiving the same in kind. In the event any party hereto shall fail to take or otherwise adequately dispose of its proportionate share of the production from the Unit Area currently as and when produced, then so long as such conditions continue, Unit Operator, for the account and at the expense of such party and in order to avoid curtailing the operation of the Unit Area, may sell or otherwise dispose of such production to itself or others on a day-to-day basis at not less than the prevailing market price in the area for like production, and the account of such party shall be charged therewith as having received such production. The net proceeds, if any, of the Unitized Substances so disposed of by Unit Operator shall be paid to the party entitled thereto.

Any party receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any tract, or receiving the proceeds therefrom if the same is sold or purchased by Unit Operator,

shall be responsible for the payment of all Royalty on the lease or leases and tracts contributed by it and received into the Unit, and each such party shall hold each other party hereto harmless against all claims, demands and causes of action for such Royalty on the lease or leases and tracts contributed by it and received into the Unitized land.

If, after the effective date of this Agreement, there is any tract or tracts that are subsequently committed hereto, as provided in Section 4 (Expansion) hereof, or any tract or tracts within the Unit Area not committed hereto as of the effective date hereof but which are subsequently committed hereto or if any tract is excluded from the Unit Area as provided for in Section 29 (Loss of Title), the schedule of participation as shown in Exhibit "B", subject to Section 12 (Participation), shall be revised by the Unit Operator and distributed to the Working Interest Owners and the Supervisor to show the new percentage participation of all the then effectively committed tracts; and the revised schedule, upon approval by the Supervisor, shall govern all the allocation of production from and after the effective date thereof until a new schedule is filed and approved by the Supervisor.

SECTION 15. ROYALTY SETTLEMENT: The United States of America and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the substances produced from any tract unitized hereunder, shall continue to be entitled to such right to take in kind their share of the Unitized Substances allocated to such tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable contracts, laws and regulations. Settlement for Royalty Interest not taken in kind shall be made by Working



Interest Owners responsible therefor under existing contracts, laws and regulations, on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under their leases, except that such Royalty shall be computed in accordance with the terms of this Unit Agreement.

If gas, liquid petroleum gas, frac oil, or other such outside substances, obtained from lands not subject to this Agreement is introduced into the Unitized Formation, for use in repressuring, stimulation of production or increasing ultimate recovery in conformity with a plan approved pursuant to Section 11 (Plan of Operations), a like amount of gas, liquid petroleum gas, frac oil or other such outside substances, less appropriate deductions for loss from any cause, may be withdrawn from the Unitized Formation, Royalty free as to dry gas but not as to the liquid hydrocarbons extracted therefrom, provided such withdrawal shall be pursuant to such conditions and formulae as may be prescribed or approved by the Supervisor; and provided further that such right of withdrawal shall terminate as of the effective date of termination of the Unit Agreement.

All Royalty due the United States of America and the other Royalty Owners hereunder shall be computed and paid on the basis of all Unitized Substances allocated to the respective tract or tracts committed hereto, in lieu of actual production from such tract or tracts.

Each Royalty Owner (other than the United States of America) that executes this Agreement represents and warrants that it is the owner of a

Royalty Interest in a tract or tracts within the Unit Area. If any Royalty Interest in a tract or tracts should be lost by title failure or otherwise in whole or in part, during the term of this Agreement, then the Royalty Interest of the party representing himself to be the owner thereof shall be reduced proportionately and the interest of all parties shall be adjusted accordingly.

SECTION 16. RENTAL SETTLEMENT: Rentals or minimum royalties due on leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations, provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum royalty in lieu thereof, due under their leases. Rental or minimum royalty for lands of the United States of America subject to this Agreement shall be paid at the rate specified in the respective leases from the United States of America, unless rental or minimum royalty is waived, suspended, or reduced by law or by approval of the Secretary or his duly authorized representative.

SECTION 17. CONSERVATION: Operations hereunder and production of Unitized Substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by or pursuant to Federal and State laws and regulations.

SECTION 18. DRAINAGE: The Unit Operator shall take appropriate and adequate measures to prevent drainage of Unitized Substances from unitized land by wells on land not subject to this Agreement.

SECTION 19. LEASES AND CONTRACTS CONFORMED AND EXTENDED: The terms, conditions and provisions of all leases, subleases, and other contracts

relating to exploration, drilling, development or operation for oil or gas on lands committed to this Agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect, and the parties hereto hereby consent that the Secretary shall, and by his approval hereof or by the approval of his duly authorized representative, hereby establish, alter, change, or revoke the drilling, producing, rental, minimum royalty and royalty requirements of Federal leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this Agreement.

Without limiting the generality of the foregoing, all leases, subleases, and contracts are particularly modified in accordance with the following:

(a) The development and operation of lands subject to this Agreement under the terms hereof shall be deemed full performance of all obligations for development and operation with respect to each and every part or separately owned tract subject to this Agreement, regardless of whether there is any development of any particular part or tract of the Unit Area, notwithstanding anything to the contrary in any lease, operating agreement or other contracts by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling, producing or secondary recovery operations performed hereunder upon any of unitized lands shall be accepted and deemed to be performed upon and for the benefit of each and every tract of unitized land, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on land therein embraced.

(c) Suspension of drilling or producing operations on all unitized lands pursuant to direction or consent of the Supervisor or a duly authorized representative, shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every tract of unitized lands.

(d) Each lease, sublease, or contract relating to the exploration, drilling, development or operation for oil and

gas which by its terms might expire prior to the termination of this Agreement, is hereby extended beyond any such term so provided therein, so that it shall be continued in full force and effect for and during the term of this Agreement.

(e) The segregation of any Federal lease committed to this Agreement is governed by the following provision in the fourth paragraph of Sec. 17(b) of said Act of February 25, 1920, as amended by the Act of July 29, 1954, (68 Stat. 583, 585): "Any (Federal) lease hereafter committed to any such plan (unit) embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date of unitization; Provided, however, that any such lease as to the non-unitized portion shall continue in force and effect for the term thereof but for not less than two years from the date of such segregation and so long thereafter as oil or gas is produced in paying quantities."

SECTION 20. MATHEMATICAL ERRORS: It is hereby agreed by all parties to this Agreement that Unit Operator is empowered to correct any mathematical errors which might exist in the pertinent exhibits to this Agreement upon approval of the Supervisor.

SECTION 21. COVENANTS RUN WITH THE LAND: The covenants herein shall be construed to be covenants running with the land with respect to the interest of the parties hereto and their successors in interest until this Agreement terminates, and any grant, transfer or conveyance of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee or other successor in interest. No assignment or transfer of any Working Interest subject hereto shall be binding upon Unit Operator until 7:00 o'clock A.M. of the first day of the calendar month after Unit Operator is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer; and no assignment or

transfer of Royalty Interest subject hereto shall be binding upon the Working Interest Owner responsible therefor until 7:00 o'clock A.M. of the first day of the calendar month after said Working Interest Owner is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer.

SECTION 22. EFFECTIVE DATE AND TERM: This Agreement shall become binding upon each party who executes or ratifies it as of the date of execution or ratification by such party and shall become effective as of 7:00 o'clock A.M. of the first day of the month next following:

(a) The execution or ratification of this Agreement and the Unit Operating Agreement by Working Interest Owners owning a combined final unit participation of at least eighty-five (85%) per cent and the execution or ratification of this Agreement by Royalty Owners owning a combined interest of at least seventy-five (75%) per cent of the Royalty Interest based on final phase participation in said Unit Area; and

(b) The approval of this Agreement by the Secretary or his duly authorized representative, and the Commission; and

(c) The filing of at least one counterpart of this Agreement for record in the office of the respective county clerks of Lea County, New Mexico, by the Unit Operator; and provided, further, that if (a), (b), and (c) above are not accomplished on or before April 1, 1962, this Agreement shall ipso facto terminate on said date (hereinafter called "termination date") and thereafter be of no further force or effect, unless prior thereto this Agreement has been executed or ratified by Working Interest Owners owning a combined unit participation of at least eighty (80%) per cent, and the Working Interest Owners owning a combined final unit participation of at least eighty (80%) per cent committed to this Agreement have decided to extend said termination date for a period not to exceed six (6) months (hereinafter called "extended termination date"). If said termination date is so extended and (a), (b), and (c) are not accomplished on or before said extended termination date, this Agreement shall ipso facto terminate on said extended termination date and thereafter be of no further force or effect. For the purpose of this Section, ownership shall be computed on

the basis of final unit participation as determined from Exhibit "C" attached to the Unit Operating Agreement.

(c) Unit Operator shall, within thirty (30) days after the effective date of this Agreement, file for record in the offices where a counterpart of this Agreement is recorded, a certificate to the effect that this Agreement has become effective according to its terms and stating further the effective date.

The term of this Agreement shall be for and during the time that Unitized Substances are produced in paying quantities from the Unit Area or that drilling, reworking or other operations (including secondary recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days, unless sooner terminated by Working Interest Owners in the manner hereinafter provided.

This Agreement may be terminated with the approval of the Director by Working Interest Owners owning eighty-five (85%) per cent final unit participation whenever such Working Interest Owners determine that Unit operations are no longer profitable, feasible or in the interest of conservation. Notice of any such termination shall be given by Unit Operator to all parties hereto.

Upon termination of this Agreement, the further development and operation of the Unit Area as a Unit shall be abandoned, Unit operations shall cease, and thereafter the parties hereto shall be governed by the terms and provisions of the leases and contracts affecting the separate tracts.

If not otherwise covered by the leases unitized under this Agreement, Royalty Owners hereby grant Working Interest Owners a period of six (6) months after termination of this Agreement in which to salvage, sell, distribute or otherwise dispose of the personal property and facilities used in connection with Unit operations.

SECTION 23. RATES OF PROSPECTING, DEVELOPMENT AND PRODUCTION:

All production and the disposal thereof shall be in conformity with allocations and quotas made or fixed by any duly authorized person or regulatory body under any Federal or State statute. The Director is hereby vested with authority to alter or modify from time to time, in his discretion, the rate of prospecting and development and within the limits made or fixed by the Commission to alter or modify the quantity and rate of production under this Agreement, such authority being hereby limited to alteration or modification in the public interest, the purpose thereof and the public interest to be served thereby to be stated in the order of alteration or modification; provided further, that no such alteration or modification shall be effective as to any privately-owned lands subject to this Agreement as to the quantity and rate of production in the absence of specific written approval thereof by the Commission.

Powers in this Section vested in the Director shall only be exercised after notice to Unit Operator and opportunity for hearing to be held not less than fifteen (15) days from notice.

SECTION 24. FAIR EMPLOYMENT: In connection with the performance of work on Federally owned lands under this Agreement, the Unit Operator agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Unit Operator agrees to post hereafter in conspicuous places, available for employees and applicants for

employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

The Unit Operator agrees to insert the foregoing provision in all sub-contracts hereunder, except sub-contracts for standard commercial supplies or raw materials.

SECTION 25. APPEARANCES: Unit Operator shall have the right to appear for or on behalf of any and all interests affected hereby before the Department, and the Commission, and to appeal from any order issued under the rules and regulations of the Department, or the Commission, or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Department, or the Commission, or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his or its own expense to be heard in any such proceeding.

SECTION 26. NOTICES: All notices, demands, objections or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if made in writing and personally delivered to the party or parties or sent postpaid certified mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party or parties may have furnished in writing to the party sending the notice, demand or statement.

SECTION 27. NO WAIVER OF CERTAIN RIGHTS: Nothing in this Agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as to the validity or invalidity of any law of the State wherein said unitized lands



are located or the United States, or rules or regulations issued there-  
under in any way affecting such party, or as a waiver by any such party  
of any right beyond his or its authority to waive.

SECTION 28. UNAVOIDABLE DELAY: All obligations under this Agree-  
ment requiring the Unit Operator to commence or continue secondary recovery  
operations or to operate on or produce Unitized Substances from any of the  
lands covered by this Agreement shall be suspended while, but only so long  
as the Unit Operator, despite the exercise of due care and diligence, is  
prevented from complying with such obligations, in whole or in part, by  
strikes, acts of God, Federal, State or municipal law or agency, unavoidable  
accident, uncontrollable delays in transportation, inability to obtain  
necessary materials in open market, or other matters beyond the reasonable  
control of the Unit Operator whether similar to matters herein enumerated  
or not.

SECTION 29. LOSS OF TITLE: In the event title to any tract of  
unitized land shall fail so as to render the tract inoperable under this  
Agreement and the true owner cannot be induced to join this Unit Agreement,  
such tract shall be automatically regarded as not committed hereto and there  
shall be such readjustment of future costs and benefits as may be required  
on account of the loss of such title. In the event of a dispute as to title  
as to any Royalty, Working Interest, or other interest subject thereto,  
payment or delivery on account thereof may be withheld without liability or  
interest until the dispute is finally settled; provided, that as to Federal  
land or leases, no payments of funds due the United States of America shall  
be withheld, but such funds shall be deposited as directed by the Supervisor,

to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

Unit Operator as such is relieved from any responsibility for any defect or failure of any title hereunder.

SECTION 30. NONJOINDER AND SUBSEQUENT JOINDER: Joinder by any Royalty Owner, at any time, must be accompanied by appropriate joinder by the corresponding Working Interest Owner in order for the interest of such Royalty Owners to be regarded as effectively committed. Joinder to the Unit Agreement by a Working Interest Owner, at any time, must be accompanied by appropriate joinder to the Unit Operating Agreement in order for such interest to be regarded as effectively committed to this Unit Agreement.

Any oil or gas interest in the Langlie Mattix zone not committed hereto prior to submission of this Agreement to the Director for final approval may thereafter be committed hereto upon compliance with the applicable provisions of this Section and of Section 13 (Tracts Qualified for Unit Participation) hereof, at any time up to the effective date hereof on the same basis of participation as provided in said Section 13, by the owner or owners thereof, subscribing, ratifying, or consenting in writing to this Agreement and, if the interest is a Working Interest, by the owner of such interest subscribing also to the Unit Operating Agreement.

It is understood and agreed however that from and after the effective date hereof the right of subsequent joinder as provided in this Section shall be subject to such requirements or approvals and on such basis as may be agreed upon by owners owning Eighty-five (85%) per cent of the Working Interest based upon final phase participation. Such joinder by

a proposed Working Interest Owner must be evidenced by his execution or ratification of this Agreement and the Unit Operating Agreement. Such joinder by a proposed Royalty Owner must be evidenced by his execution, ratification or consent of this Agreement and must be consented to in writing by the Working Interest Owner responsible for the payment of any benefits that may accrue hereunder in behalf of such proposed Royalty Owner. Except as may be otherwise herein provided, subsequent joinder to this Agreement shall be effective at 7:00 A.M. as of the first day of the month following the filing with the Supervisor of duly executed counterparts of any and all documents necessary to establish effective commitment of any tract or interest to this Agreement, unless objection to such joinder by the Director is duly made within sixty (60) days after such filing.

SECTION 31. COUNTERPARTS: This Agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties and 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 all 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 above described Unit Area.

SECTION 32. TAXES: Each party hereto shall, for its own account, render and pay its share of any taxes levied against or measured by the amount or value of the Unitized Substances produced from the unitized land; provided, however, that if it is required or if it be determined that the Unit Operator or the several Working Interest Owners must pay or advance said taxes for the account of the parties hereto, it is hereby expressly agreed that the

parties so paying or advancing said taxes shall be reimbursed therefor by the parties hereto, including Royalty Owners, who may be responsible for the taxes on their respective allocated share of said Unitized Substances. No such taxes shall be charged to the United States, nor to any lessor who has a contract with a lessee which requires his lessee to pay such taxes.

SECTION 33. CONFLICT OF SUPERVISION: Neither the Unit Operator nor the Working Interest Owners, nor any of them, shall be subject to any forfeiture, termination or expiration of any rights hereunder or under any leases or contracts subject hereto, or to any penalty or liability on account of delay or failure in whole or in part to comply with any applicable provisions thereof to the extent that the said Unit Operator or the Working Interest Owners, or any of them, are hindered, delayed or prevented from complying therewith by reason of failure of the Unit Operator to obtain, in the exercise of due diligence, the concurrence of proper representatives of the United States and proper representatives of the State of New Mexico in and about any matters or things concerning which it is required herein that such concurrence be obtained. The parties hereto agree that all powers and authority vested in the Commission in and by any provisions of this Agreement are vested in the Commission and shall be exercised by it pursuant to the provisions of the laws of the State of New Mexico and subject in any case to appeal or judicial review as may now or hereafter be provided by the laws of the State of New Mexico.

SECTION 34: LIMITATION OF APPROVALS. Notwithstanding anything herein contained to the contrary, if no Federal lands are committed to this Agreement, then no consents or approvals provided herein shall be required of the Department, the Secretary, the Director, or the Supervisor, and it

shall not be necessary to file any instrument hereunder with said officers or agencies unless and until Federal lands are so committed to this Agreement.

SECTION 35. RELATIONSHIP OF PARTIES: The duties, obligations and liabilities of the parties hereto are intended to be several and not joint or collective, and nothing herein contained shall ever be construed to create an association, trust or impose a partnership duty, obligation or liability with regard to any one or more of the parties hereto. Each party hereto shall be individually responsible for its own obligations as herein provided.

Nothing in this agreement shall be construed as providing, directly or indirectly, for any cooperative refining or joint sale or cooperative marketing of Unitized Substances.

It is understood and agreed that this Agreement shall never be construed as imposing upon any Royalty Owner any obligation to pay for any development or operating expense unless such Royalty Owner is obligated to pay for same by the terms of agreements existing before the execution of this Agreement.

Each Royalty Owner shall be entitled to all information in possession of Unit Operator to which such Royalty Owner is entitled by his existing agreement with any Working Interest Owner with the express stipulation that if, by reason of this Agreement, such information is not available, the nearest approximation or equivalent of such information shall be made available.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement

to be executed and have set opposite their respective names the date of execution.

ATTEST:

\_\_\_\_\_  
Assistant Secretary

Date \_\_\_\_\_

AMERADA PETROLEUM CORPORATION

By \_\_\_\_\_  
President

UNIT OPERATOR AND WORKING INTEREST OWNER.

ATTEST:

\_\_\_\_\_  
Date \_\_\_\_\_

THE ATLANTIC REFINING COMPANY

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_  
Date \_\_\_\_\_

CONTINENTAL OIL COMPANY

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_  
Date \_\_\_\_\_

GULF OIL CORPORATION

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_  
Date \_\_\_\_\_

HUMBLE OIL AND REFINING COMPANY

By \_\_\_\_\_

ATTEST:

HUSKY OIL COMPANY

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

ATTEST:

KENWOOD OIL COMPANY

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

ATTEST:

PAN AMERICAN PETROLEUM CORPORATION

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

ATTEST:

PHILLIPS PETROLEUM COMPANY

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

ATTEST:

PRODUCING PROPERTIES, INC.

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

ATTEST:

\_\_\_\_\_

Date \_\_\_\_\_

THE PURE OIL COMPANY

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_

Date \_\_\_\_\_

SCHERMERHORN OIL CORPORATION

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_

Date \_\_\_\_\_

SINCLAIR OIL AND GAS COMPANY

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_

Date \_\_\_\_\_

STANDARD OIL COMPANY OF TEXAS

By \_\_\_\_\_

ATTEST:

\_\_\_\_\_

Date \_\_\_\_\_

THREE STATES NATURAL GAS COMPANY

By \_\_\_\_\_



ATTEST:

WEIER DRILLING COMPANY

\_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_  
Margaret B. Allen, Individually

Date \_\_\_\_\_

\_\_\_\_\_  
Joe Platt

Date \_\_\_\_\_

\_\_\_\_\_  
Julian E. Simon

ATTEST:

THE RUFUS CLAY TRUSTS NO. 1, 2 AND 3

\_\_\_\_\_

By \_\_\_\_\_  
Republic National Bank of Dallas,  
Texas; and

Date \_\_\_\_\_

By \_\_\_\_\_  
Margaret B. Allen  
CO-TRUSTEES.

STATE OF OKLAHOMA )  
 ) SS:  
COUNTY OF TULSA )

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn, did say that he is the \_\_\_\_\_ President of AMERADA  
PETROLEUM CORPORATION, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires:

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
 ) SS:  
COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of THE ATLANTIC  
REFINING COMPANY, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires:

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of CONTINENTAL OIL  
COMPANY, and that the seal affixed to said instrument is the corporate seal  
of said corporation, and that said instrument was signed and sealed in be-  
half 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of GULF OIL CORPORATION,  
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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being by  
me duly sworn did say that he is the \_\_\_\_\_ President of HUMBLE OIL AND REFIN-  
ING COMPANY, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires:

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being by  
me duly sworn did say that he is the \_\_\_\_\_ President of HUCKY OIL COMPANY,  
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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires:

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being by  
me duly sworn did say that he is the \_\_\_\_\_ President of KENWOOD OIL COMPANY,  
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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of PAN AMERICAN  
PETROLEUM CORPORATION, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being by  
me duly sworn did say that he is the \_\_\_\_\_ President of PHILLIPS PETROLEUM  
COMPANY, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being by  
me duly sworn did say that he is the \_\_\_\_\_ President of PRODUCING PROPERTIES,  
INC., 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of THE PURE OIL  
COMPANY, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of SCHERMERHORN OIL  
CORPORATION, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of SINCLAIR OIL AND  
GAS COMPANY 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of STANDARD OIL  
COMPANY OF TEXAS, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public



STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of THREE STATES  
NATURAL GAS COMPANY, 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me  
appeared \_\_\_\_\_, to me personally known, who, being  
by me duly sworn did say that he is the \_\_\_\_\_ President of WEIER DRILLING  
COMPANY, and that the seal affixed to said instrument is the corporate seal  
of said corporation, and that said instrument was signed and sealed in be-  
half 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.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before  
me personally appeared MARGARET B. ALLEN, INDIVIDUALLY, to me known to be  
the person described in and who executed the foregoing instrument, and ack-  
nowledged that she executed the same as her free act and deed.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before  
me personally appeared JOE PIATT, to me known to be the person described in  
and who executed the foregoing instrument, and acknowledged that he executed  
the same as his free act and deed.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before  
me personally appeared JULIAN E. SIMON, to me known to be the person described  
in and who executed the foregoing instrument, and acknowledged that he executed  
the same as his free act and deed.

WITNESS my hand and official seal the day and year first above  
written.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me appeared \_\_\_\_\_, to me personally known, who, being by me duly sworn, did say that he is the \_\_\_\_\_ President of REPUBLIC NATIONAL BANK OF DALLAS, TEXAS, CO-TRUSTEE OF THE RUFUS CLAY TRUSTS NO. 1, 2 AND 3, and that the seal affixed to said instrument is the corporation 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 act and deed of said corporation.

WITNESS my hand and official seal the day and year first above written.

My commission expires:

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

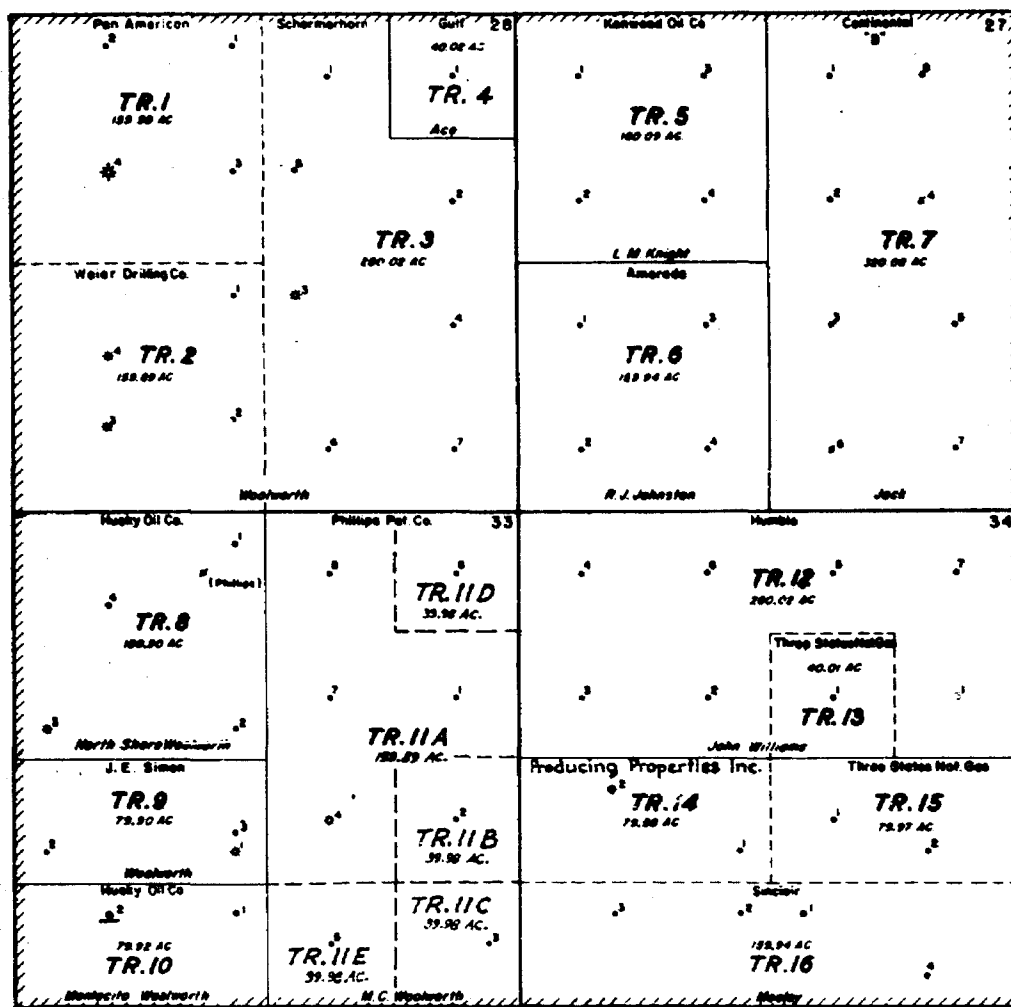
On this \_\_\_\_\_ day of \_\_\_\_\_, 1961, before me personally appeared MARGARET B. ALLEN, CO TRUSTEE OF THE RUFUS CLAY TRUSTS NO. 1, 2, AND 3, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that she executed the same as her free act and deed.

WITNESS my hand and official seal the day and year first above written.

My commission expires:

\_\_\_\_\_  
Notary Public

R-37-E



## EXHIBIT "A"

# LANGLIE MATTIX WOOLWORTH UNIT

LEA COUNTY, NEW MEXICO

### LEGEND -

- ★ JALMAT GAS WELL
- OIL WELL IN LANGLIE MATTIX POOL
- DUAL COMPLETION
- UNIT AREA BOUNDARY

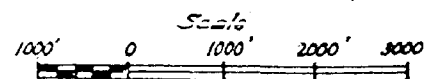


EXHIBIT "B"

LANGFIE MATTHEW WOOLWORTH UNIT

WELL INFORMATION

<u>TRACT NO.</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>LEASE NO.</u>	<u>BASIC ROYALTY</u>	<u>LESSEE OF RECORD</u>	<u>OVERRIDING ROYALTY OWNER AND AMOUNT</u>	<u>WORKING INTEREST OWNER AND AMOUNT</u>	<u>PERCENT INITIAL PARTICIPATION</u>	<u>PERCENT FINAL PARTICIPATION</u>
7	E <sup>1</sup> Sec. 27, T-24-S, R-37-E	320.08	Federal LC-032326-B	12.5%	E. E. Jack	Guy Jack, Jr. Annie May Kavanaugh Florence Jack Mayo W. M. Beachamp, Guardian Abner M. Jack Mack Easley John Quinn J. H. Daws Charles S. Mitchell	1/2 of 1% 1/2 of 1% 1/2 of 1% 1/2 of 1% 1/4 of 1% 1/16 of 1% 1/16 of 1% 1/16 of 1% 1/16 of 1%	Continental - 25% Standard Oil Co. of Texas - 25% Atlantic - 25% Pan American - 25%	7.86840 11.40905

1 Federal Tract

320.08 Acres

6 Wells

<u>TRACT NO.</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>LESSOR</u>	<u>BASIC ROYALTY</u>	<u>LESSEE OF RECORD</u>	<u>WORKING INTEREST OWNER AND AMOUNT</u>	<u>PERCENT INITIAL PARTICIPATION</u>	<u>PERCENT FINAL PARTICIPATION</u>
1	NW <sup>1</sup> Sec. 28, T-24-S, R-37-E	159.99	Fee Little Woolworth	12.5%	E. S. Stahl	Pan American - 100%	5.19708	5.49019
2	SW <sup>1</sup> Sec. 28, T-24-S, R-37-E	159.89	Little Woolworth	12.5%	Weier Drilling Co.	Joe Piatt - 20% Three States Natural Gas Co. - 40% Weier Drilling Co. - 40%	3.23364	4.58378
3	NW <sup>1</sup> NE <sup>1</sup> , SE <sup>1</sup> NE <sup>1</sup> , Sec. 28, T-24-S, R-37-E	280.02	Elizabeth Woolworth	12.5%	Schermerhorn Oil Corp.	Schermerhorn Oil Corp. - 100%	8.69458	11.60675
4	NE <sup>1</sup> NE <sup>1</sup> Sec. 28, T-24-S, R-37-E	40.02	R. A. Christmas and wife, Annie L. Christmas	12.5%	Gypsy Oil Co.	Gulf - 100%	0.91540	1.51030
5	NW <sup>1</sup> Sec. 27, T-24-S, R-37-E	160.09	Lillie M. Knight	12.5%	Addison Oil Co.	Kenwood Oil Co. - 100%	5.22322	6.62735
6	SW <sup>1</sup> Sec. 27, T-24-S, R-37-E	159.94	R. J. Johnston and wife, Sallie Johnston	12.5%	Ralph W. Leftwich	Anerada - 100%	7.87713	7.08333
8	NW <sup>1</sup> Sec. 33, T-24-S, R-37-E	159.90	May Woolworth	12.5%	North Shore Corp.	Husky Oil Co. - 100%	5.43472	5.01326
9	NW <sup>1</sup> NW <sup>1</sup> , NW <sup>1</sup> SW <sup>1</sup> Sec. 33, T-24-S, R-37-E	19.90	May Woolworth	12.5%	Ted Weiner	Margaret B. Allen - 25% Republic National Bank and Margaret B. Allen, Co-Trustees of the Rufus Clay Trusts Nos. 1, 2 & 3 - 25% Julian E. Simon - 50%	2.55873*	2.71122

Exhibit "B"  
Langlie Mattix Woolworth Unit  
Well Information  
Page #2

TRACT NO.	DESCRIPTION	NUMBER OF ACRES	LESSOR	BASIC ROYALTY	LESSEE OF RECORD	WORKING INTEREST OWNER AND AMOUNT	PERCENT INITIAL PARTICIPATION	PERCENT FINAL PARTICIPATION
10	S $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	79.92	May Woolworth	12.5%	Montecito Corp.	Husky Oil Co. - 100%	7.09672	3.05277
11-A	W $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	159.89	C. D. Woolworth	12.5%	The Pure Oil Co.	Phillips - 50% Pure - 50%	6.40670	6.29584
11-B	NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	39.98	C. D. Woolworth	12.5%	The Pure Oil Co.	Phillips - 50% Pure - 50%	3.16633	1.78190
11-C	SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	39.98	C. D. Woolworth	12.5%	The Pure Oil Co.	Phillips - 50% Pure - 50%	2.12904	1.59120
11-D	NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	39.98	C. D. Woolworth	12.5%	The Pure Oil Co.	Phillips - 50% Pure - 50%	2.36413	1.76530
11-E	SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 33, T-24-S, R-37-E	39.98	C. D. Woolworth	12.5%	The Pure Oil Co.	Phillips - 50% Pure - 50%	2.24058	1.40894
12	NE $\frac{1}{4}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 34, T-24-S, R-37-E	200.02	John Williams	12.5%	Charles T. Bates	Humble - 100%	16.85760	12.04587
13	SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 34, T-24-S, R-37-E	40.01	John Williams	12.5%	Charles T. Bates	Producing Properties, Inc. - 50% Three States Natural Gas Co. - 50%	1.09376	1.77330
14	N $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 34, T-24-S, R-37-E	79.98	Risbie L. Mosley	12.5%	Fred S. Cook	Producing Properties, Inc. - 100%	2.08933	3.82028
15	N $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 34, T-24-S, R-37-E	79.97	Risbie L. Mosley	12.5%	Fred S. Cook	Three States Natural Gas Co. - 100%	2.07464	3.33784
16	S $\frac{1}{2}$ S $\frac{1}{2}$ Sec. 34, T-24-S, R-37-E	159.94	Risbie L. Mosley	12.5%	Fred S. Cook	Sinclair - 100%	7.47822	7.09153
TOTAL							100.00000	100.00000
19 Fee Tracts						2,239.40 Acres	50 Wells	

\*By agreement the Julian E. Simon Woolworth No. 3 well and Tract 9 is assigned a current production of 1,032 barrels. The well was completed after November 30, 1959, and the amount of current production was calculated from the results of actual test of the well's producing ability.

Exhibit "B"  
Langlie Mattix Woolworth Unit  
Well Information  
Page #3

TOTALS

1 Federal Tract	320.08 Acres	12.50566% of Unit Area
19 Fee Tracts	<u>2,239.40 Acres</u>	<u>87.49434% of Unit Area</u>
	2,559.48 Acres	100.00000% of Unit Area

LANGLIE MATFIX WOOLWORTH UNIT -- LEA COUNTY, NEW MEXICO

ENGINEERING SUMMARY  
AND  
INITIAL PLAN OF OPERATION  
LANGLIE MATTHEX WOOLWORTH UNIT  
LEA COUNTY, NEW MEXICO

October 1, 1961



### INTRODUCTION

The proposed Langlie Mattix Woolworth Unit consists of Sections 27, 28, 33 and 34 of Township 24 South, Range 37 East, Lea County, New Mexico. Efforts to form the Unit were instigated after it became apparent that a cooperative flood was impractical and, since very little reservoir data was available, a pilot flood was needed to insure the success of the project. A base map of the Unit is attached as Figure I and the participation by tracts is shown in Table I.

The Unit lies on the west flank of a northwest-trending anticlinal feature with production being obtained from the Seven Rivers and Queen formations. The productive sands wedge out up dip forming stratigraphic traps. Production is also controlled by porosity and permeability development, as well as gas-oil and water-oil contacts.

Wells in the Unit are approaching the economic limit with the average well now having a productivity of about six barrels per day. Cumulative production is about 83,000 barrels per well, and the gas-oil ratio has declined to about 2,800 to 1. Water production has always been quite small.

Initial plans call for the pilot flood to consist of two 80-acre five spots and for the program to be conducted immediately after unitization. As soon as the pilot indicates that waterflooding will be a success, the flood will be expanded to full scale development.

## DISCUSSION

### Geology

The Woolworth Unit lies on the west flank of a northwest-trending anticlinal feature. Along the feature, at least three zones, the Yates, Seven Rivers and Queen, are productive in the Langlie Mattix field. Within the Unit area, only the Lower Seven Rivers and Queen are oil productive. The Yates zone lies above the gas-oil contact and is included in the Jalmat Gas Pool. Only the Langlie Mattix interval, which is defined by the New Mexico Conservation Commission as the lower 100 feet of the Seven Rivers formation and all of the Queen formation, is to be unitized. The Queen formation contains two productive sands which have been termed the Upper Queen and the Penrose.

None of the reservoir sandstones are continuous across the structure but wedge out up-dip forming stratigraphic traps. Production is also controlled by porosity and permeability development, as well as a gas-oil contact estimated at -150 feet and a water-oil contact estimated at -350 feet.

The dip of the Langlie Mattix formations within the Unit area is shown by the structure map attached as Figure II. The effects of the dip are shown by Figures III and IV. Figure III is an idealized west-east cross section across the Unit revealing that all three sand sections are not productive throughout the Unit area but are limited by the gas-oil and water-oil contacts. The productive limits of the three zones is shown on Figure IV. It may be noted that only about

one-fourth of the Unit area is productive from all three zones and that cumulative production from this area indicates it to be of better quality.

Only one well was cored through the Langlie Mattix formations. This well, Phillips Petroleum Company's M. C. Woolworth No. 8, was completed July 7, 1939 and was cored from 3,416 feet to 3,565 feet. Only 132 feet of the 149 feet cored were recovered. Almost all of the core lost is believed to be sand which could be productive. Analysis of the core obtained revealed 14.8 feet of net pay with a porosity of 12.1 per cent and a permeability of 8.7 md.

#### Well Completion and Performance

Most of the wells in the Woolworth Unit were drilled between 1934 and 1940. The Unit was fully developed on 40-acre spacing, however several wells have been plugged and abandoned and others have been plugged back to the Jalmat Gas Zone. On completion, the wells were bottomed near the water-oil contact estimated at -350 feet and completed in open hole. The wells were shot with nitroglycerin and received very little other treatment until 1955 when a concentrated frac program was initiated. Success of the frac treatments is shown on the production curve attached as Figure V.

Cumulative production from the Unit area to January 1, 1961 amounts to 5,329,731 barrels, or about 83,000 barrels per well. During the first quarter of 1961, well test of forty-four wells in the Unit (Table II) indicated a producing capacity of 282 barrels per day or

about 6.4 barrels per well. Actual production during December, 1960, however, was only 207 barrels per day. Very little water has been produced from wells within the Unit, and no well produced a significant amount of water before being fraced. Currently, there are twelve wells producing a total of about 62 barrels of water per day. Gas production, though in the past was quite large, has declined until only two wells have gas-oil ratios in excess of the 10,000 to 1 penalty. The weighted average gas-oil ratio is now about 2,875 to 1.

#### Future Recovery

As is typical with most old fields, very little data is available on the Langlie Mattix field from which to make an estimate of oil recovery by waterflooding. The success of projects in fields of similar history, however, has led to the belief that the Langlie Mattix formations may be successfully flooded. Experience has indicated that waterflood projects similar to the Woolworth Unit may recover additional oil equal to 50 to 100 per cent of the primary recovery. A minimum of 2,750,000 barrels of secondary oil could thus be expected from the Unit.

#### Initial Plan of Operation

Since sufficient reservoir data is not available to adequately evaluate waterflood susceptibility in the Woolworth area, it is planned to conduct a pilot flood. The pilot will consist of two 80-acre five spots as shown in Figure VI and will be located where all

three pay sands may be evaluated. The injection wells for the pilot will be Amerada's Johnson 1 and <sup>4</sup>/<sub>7</sub>, Humble's Williams 4, Schermerhorn's Woolworth 2 and 7 and a new well to be drilled near Schermerhorn's Woolworth 3. Cores through the Langlie Mattix interval will be obtained from the injection well to be drilled in order to evaluate reservoir data such as porosity, permeability, saturations and susceptibility to flooding. The core data will also aid in determining the quantities of water to be injected.

The pilot program will be expanded to full scale flooding as soon as the pilot indicates the project will be a success. As shown on Figure VI, four injection wells and four producing wells will be drilled. Eighteen closed five-spots will be developed on the Unit, and it is anticipated that line agreements with offset operators will complete additional five-spots.

#### Water Supply

Three sources of water supply, Permian reef water from west of the Unit, San Andres water from approximately 4,000 feet and Santa Rosa water from approximately 500 feet were considered for injection. The cost of transporting reef water to the Unit area plus the uncertainty of future supply makes that course undesirable. The cost of developing San Andres and Santa Rosa water are about the same. The comparative freshness of Santa Rosa water, however, makes it less desirable than San Andres water. The need for core data through the Langlie Mattix horizon also makes the San Andres supply more desirable. Tentative plans call for the drilling of a San Andres water supply well near the pilot and located so that all three of the Langlie Mattix sands may be cored.

[illegible]

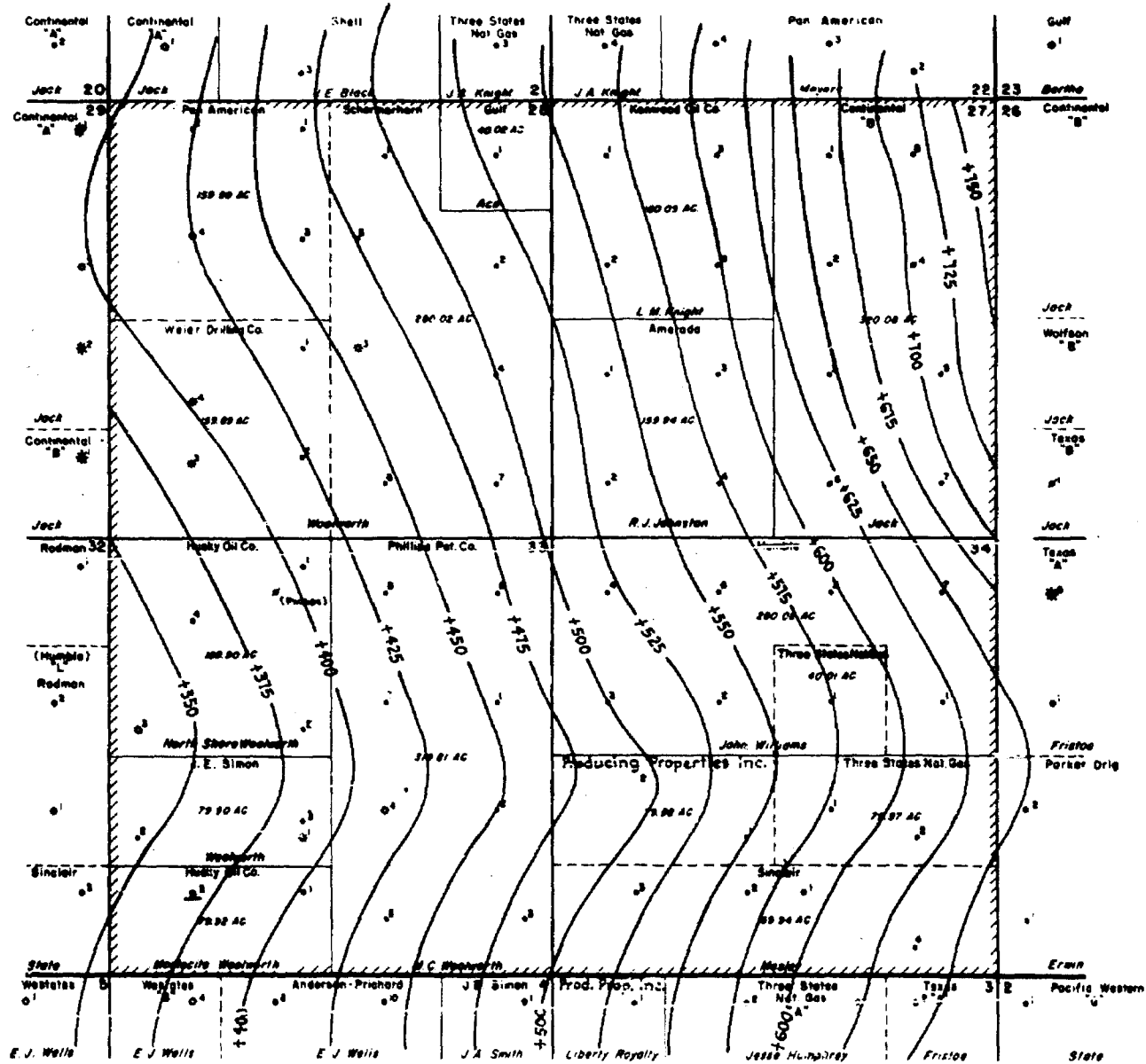
\* JALMAT GAS WELL  
 \* GAS WELL IN LANGLEY MATTIX POOL  
 • OIL WELL  
 1 DUAL COMPLETION  
----- UNIT BOUNDARY

LANGLIE MATTIX WATER  
FLOOD UNIT  
FIGURE I

R-37-E

T  
24  
S

T  
24  
S



CONTOURS ON TOP OF YATES

LANGLIE MATTIX FIELD

1000' 0 1000' 2000' 3000'  
SCALE

LEGEND

- JALMAT GAS WELL
- GAS WELL IN LANGLE MATTIX POOL
- OIL WELL
- DUAL COMPLETION
- UNIT BOUNDARY

LANGLIE MATTIX WATER  
FLOOD UNIT  
FIGURE II

# IDEALIZED WEST-EAST CROSS SECTION

## PROPOSED LANGLEIE MATTIX UNIT

### LEA COUNTY, NEW MEXICO

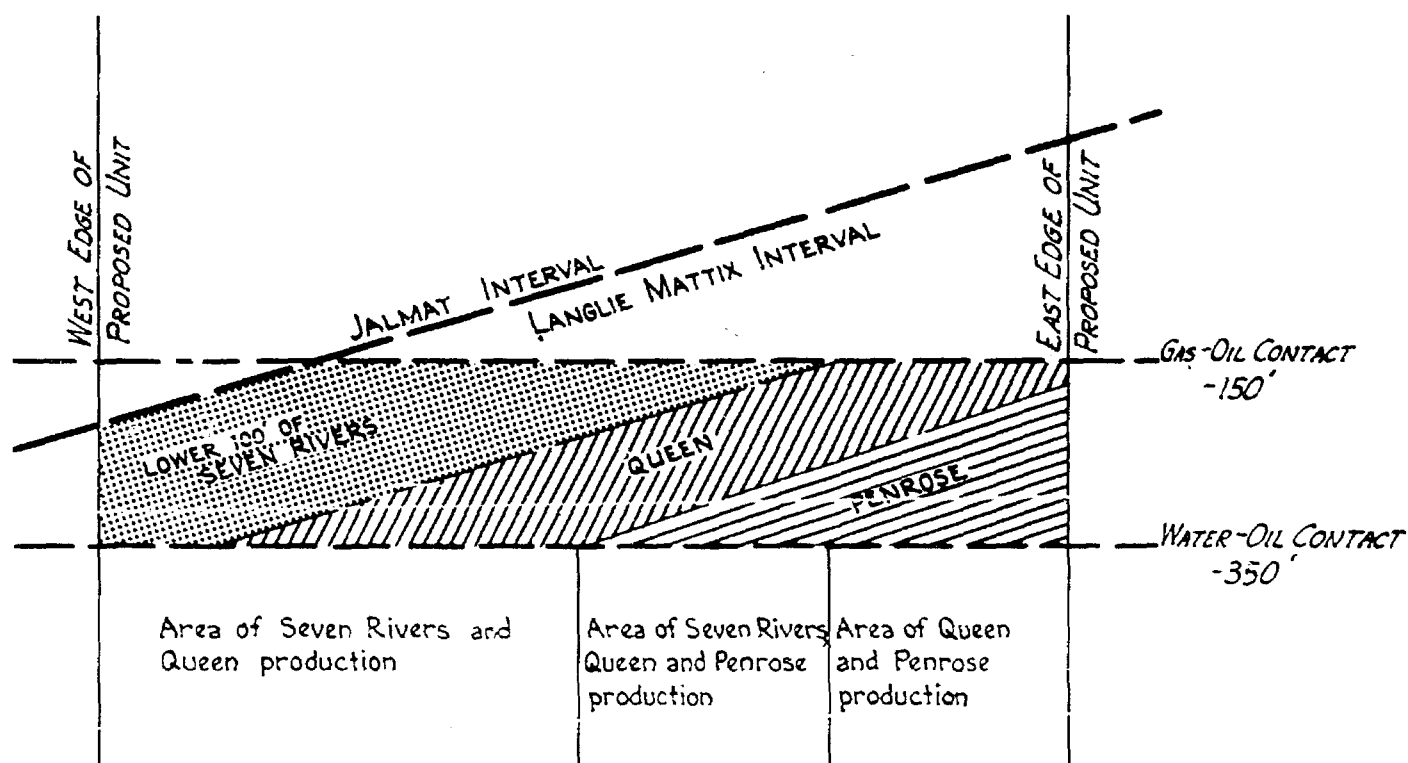
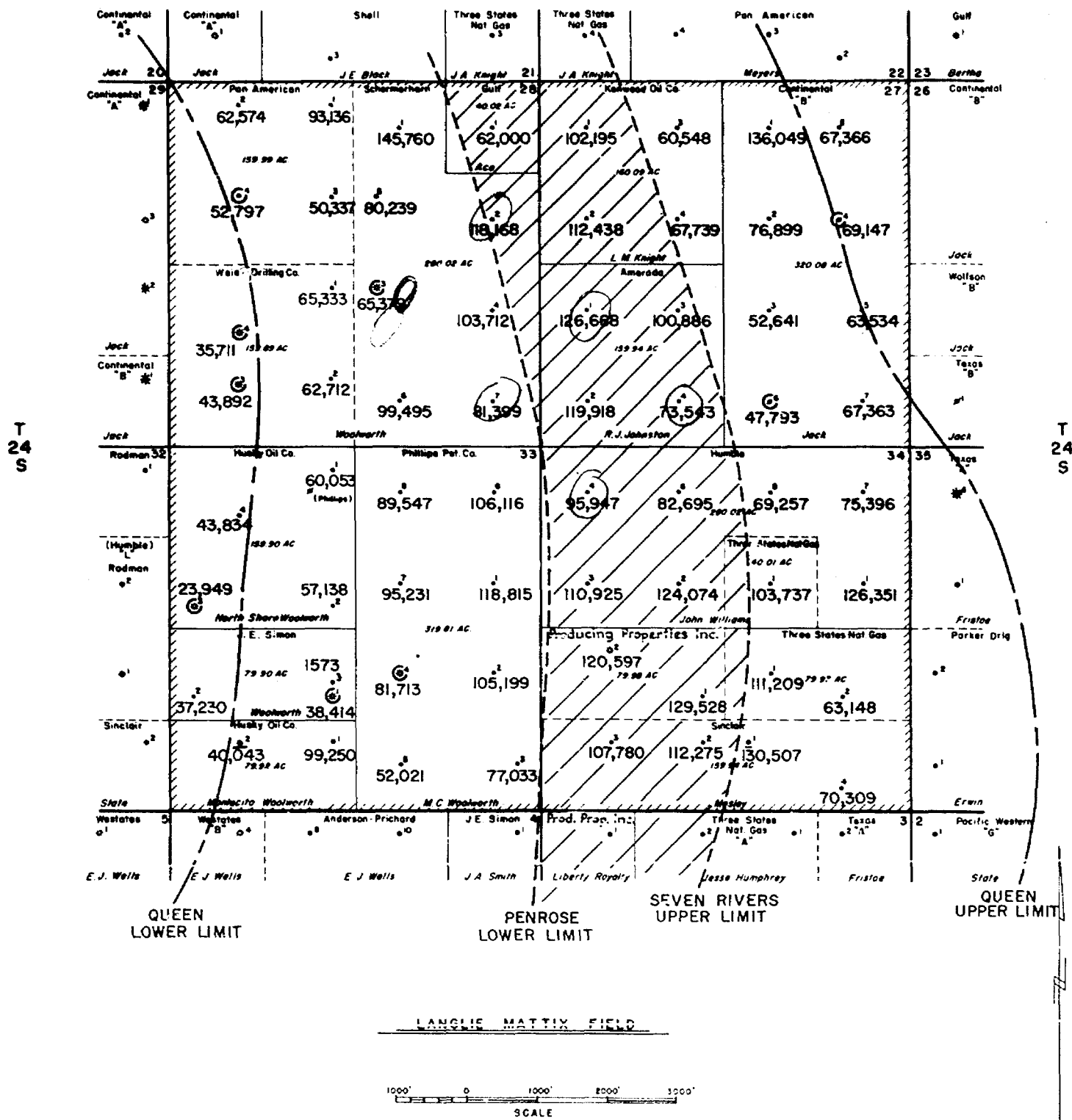


FIGURE III



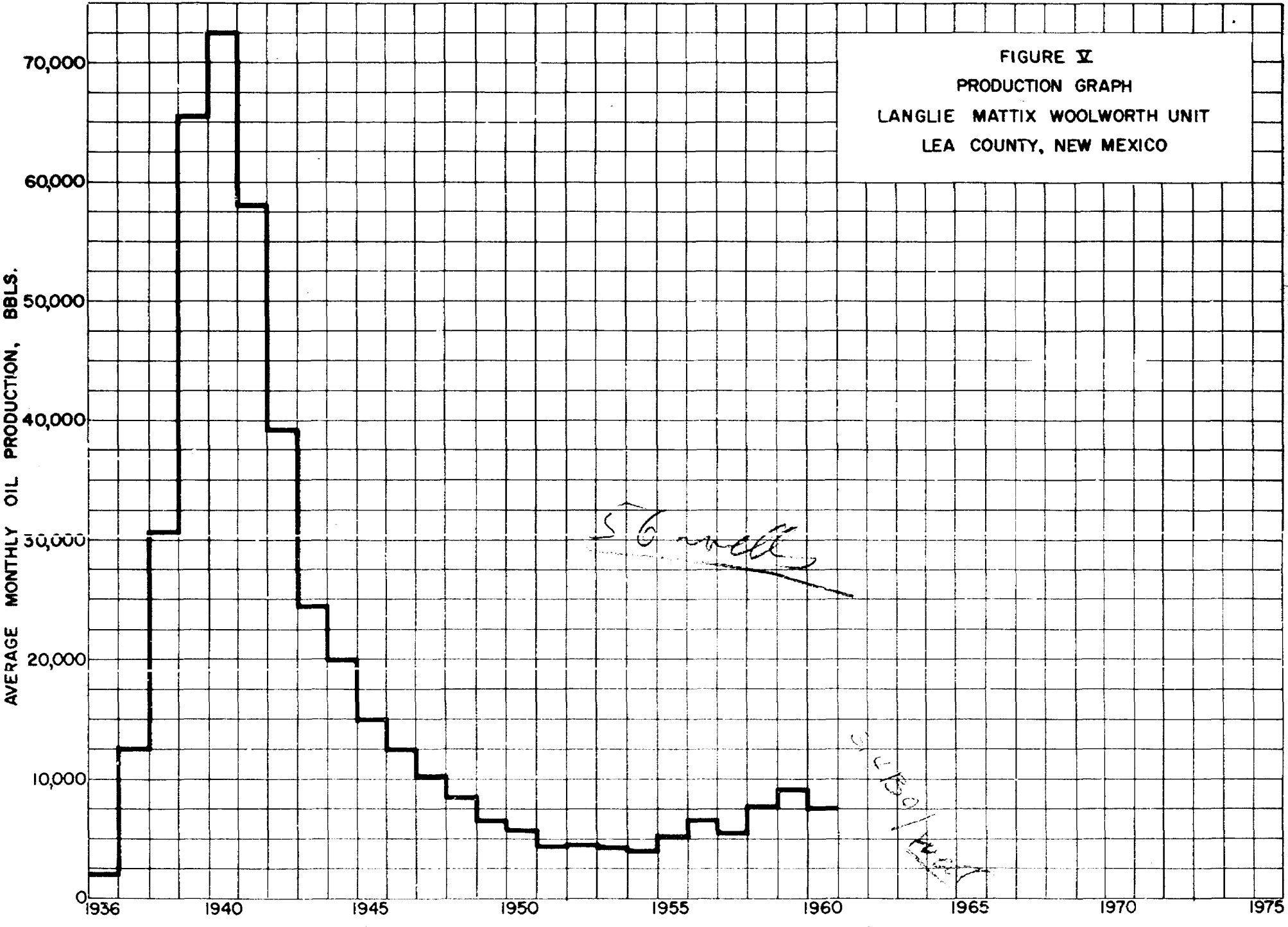
R-37-E



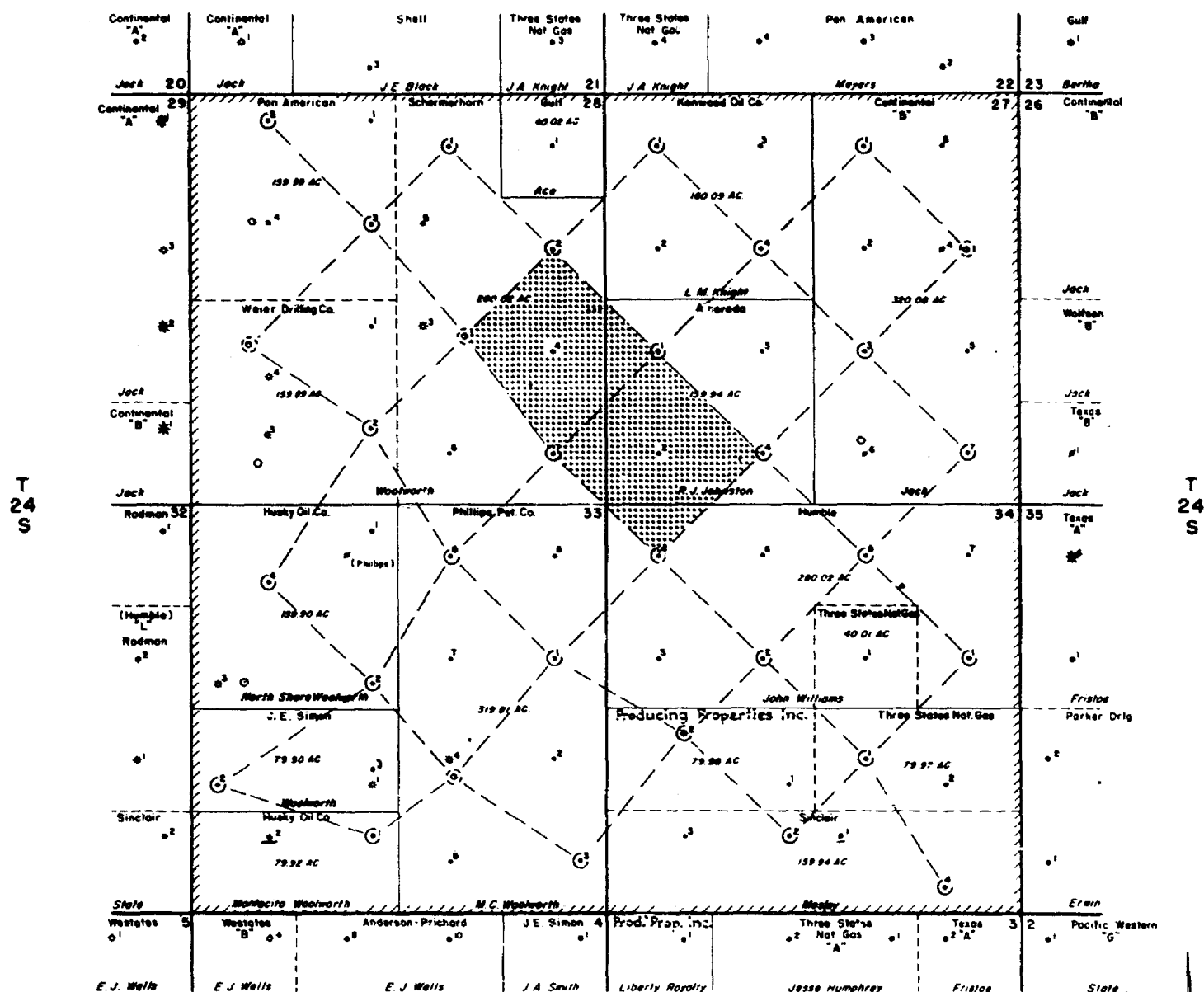
- LEGEND**
- JALMAT GAS WELL
  - GAS WELL IN LANGLEIE MATTIX POOL
  - OIL WELL
  - DUAL COMPLETION
  - UNIT BOUNDARY
  - ⊙ WELL NOT USABLE IN FLOODING
  - 68,266 CUMULATIVE PRODUCTION TO 1-1-61
  - /// AREA OF SEVEN RIVERS, QUEEN, AND PENROSE PRODUCTION

LANGLEIE MATTIX WATER  
FLOOD UNIT  
FIGURE IV

FIGURE V  
PRODUCTION GRAPH  
LANGLIE MATTIX WOOLWORTH UNIT  
LEA COUNTY, NEW MEXICO



R-37-E



80 ACRE PILOT & DEVELOPMENT

LANGLIE MATTIX FIELD



- LEGEND**
- ☆ JALMAT GAS WELL
  - ⊙ GAS WELL IN LANGLIE MATTIX POOL
  - OIL WELL
  - ⊙ DUAL COMPLETION
  - UNIT BOUNDARY
  - ⊙ INJECTION WELL
  - ⊙ INJECTION WELL TO BE DRILLED
  - PRODUCING WELL TO BE DRILLED
  - ▨ PILOT FLOOD

18 Closed 5-Spots  
To Be Drilled :  
4 Injection Wells  
4 Producing Wells

LANGLIE MATTIX WATER  
FLOOD UNIT  
FIGURE VI

TABLE I  
LANGFIE MATTHEX WOOLWORTH UNIT  
PARTICIPATION BY TRACTS

Tract No.	Operator	Lease	Acres	Percent Acreage	Usable Wells	Percent Usable Wells	Cumulative Production 11-30-59	Percent Cum. Production To 11-30-59	Production 6-1-59 to 11-30-59	Percent Prod. 6-1-59 to 11-30-59	Initial Participation	Final Participation
6	Amerada	Johnson	159.94	6.24893	4	7.14286	411,068	7.85821	5,279	9.05846	7.87718	7.08333
7	Continental	Jack B-27	320.08	12.50566	6	10.71428	575,796	11.00724	2,405	4.12684	7.86840	11.40905
4	Gulf	Ace	40.02	1.56360	1	1.78571	61,809	1.18158	91	0.15615	0.91540	1.51030
12	Humble	Williams	280.02	10.94050	7	12.50000	664,194	12.69711	12,818	21.99495	6.85760	12.04587
10	Husky	M.Woolworth	79.92	3.12251	2	3.57143	128,913	2.46437	6,321	10.84647	7.09672	3.05277
8	Husky	N.S. Woolworth	159.90	6.24736	3	5.35714	179,701	3.43527	2,953	5.06718	5.43472	5.01326
5	Kenwood	Knight	160.09	6.25479	4	7.14286	339,203	6.48439	2,184	3.74762	5.22322	6.62735
1	Pan American	Woolworth	159.99	6.25088	3	5.35714	254,364	4.86256	2,675	4.59015	5.19708	5.49019
11	Phillips	Woolworth	319.81	12.49512	7	12.50000	707,994	13.53441	11,723	20.11600	16.30678	12.84318
14	Producing Prop.	Moseley	79.98	3.12485	2	3.57143	249,239	4.76459	484	0.83052	2.08933	3.82028
3	Schermerhorn	Woolworth	280.02	10.94050	6	10.71429	688,694	13.16546	3,824	6.56177	8.69458	11.60675
9	Simon	Woolworth	79.90	3.12173	2	3.57143	75,353	1.44049	1,032	1.77085	2.55873	2.71122
16	Sinclair	Moseley	159.94	6.24893	4	7.14286	412,354	7.88279	4,814	8.26055	7.47822	7.09153
15	Three States	Moseley	79.97	3.12446	2	3.57143	173,548	3.31764	467	0.80134	2.07464	3.33784
13	Three States	Williams	40.01	1.56321	1	1.78571	103,102	1.97096	299	0.51307	1.09376	1.77330
2	Weier	Woolworth	159.89	6.24697	2	3.57143	205,734	3.93293	908	1.55808	3.23364	4.58378
			<u>2559.48</u>	<u>100.00000</u>	<u>56</u>	<u>100.00000</u>	<u>5,231,066</u>	<u>100.00000</u>	<u>58,277</u>	<u>100.00000</u>	<u>100.00000</u>	<u>100.00000</u>

TABLE II  
WELL TEST DATA  
LANGLIE MATTIX WOOLWORTH UNIT

<u>OPERATOR</u> <u>LEASE AND WELL</u>	<u>OIL</u> <u>BARRELS</u>	<u>WATER</u> <u>BARRELS</u>	<u>GAS</u> <u>MCF</u>	<u>GOR</u>
<u>AMERADA</u>				
R. J. Johnson 1	6	Tr.	20	3,630
2	10	Tr.	30	3,150
3	8	Tr.	24	3,229
4	5	Tr.	24	5,048
<u>CONTINENTAL</u>				
Jack "B-27" 1	7	3	9.66	1,380
5	9	2	5.59	621
7	2.3	0	6.59	2,865
8	1	0	1.52	1,520
<u>HUMBLE</u>				
John Williams 1	6	0	92	15,333
2	1	0	11	9,310
3	5	0	20	4,000
4	24	0	84	3,500
5	7	0	33	4,714
6	4	0	17	4,250
7	2	0	5	2,275
<u>HUSKY</u>				
M. Woolworth 1	25	3	38	1,525
2	8	10	14	1,780
N.S. Woolworth 4	15	4	36	2,368
<u>KENWOOD</u>				
L. M. Knight 1	3	0	2.5	840
2	3	0	2.7	920
3	5	0	4	800
4	5	0	4.9	980
<u>PAN AMERICAN</u>				
Woolworth 1	11	4.13	2	182
4	5	0	7	1,400

LANGLIE MATTIX  
WOOLWORTH UNIT

WELL TEST DATA

PAGE 2

OPERATOR LEASE AND WELL		OIL BARRELS	WATER BARRELS	GAS MCF	GOR
<u>PHILLIPS</u>					
Woolworth	1	5	15	TSTM	
	2	13	8	22.3	1,715
	3	6	7	16.64	2,773
	5	6	2	3.5	583
	6	5	2	4.14	828
	7	6	0	10.13	1,688
	8	7	0	8.79	1,256
<u>SCHERMERBORN</u>					
Woolworth	1	4	0	4.2	1,060
	2	4	0	3.6	900
	4	4	0	5.6	1,410
	5	3	0	2.5	860
	6	4	0	5	1,280
	7	4	0	3.6	920
<u>SIMON</u>					
Woolworth	3	4	0	4.7	1,175
<u>SINCLAIR</u>					
Moseley	1	8	0	71	8,875
	2	7	0	50	7,143
	3	8	0	45	5,625
<u>PRODUCING PROPERTIES</u>					
Moseley	1	3	2	17	5,667
<u>THREE STATES</u>					
Moseley	1	1.35	0	16.22	1,217
Williams	1	2.07	0	22.9	11,101

CASING PROGRAM  
PROPOSED INJECTION WELLS  
LANGLIE MATTIX WOOLWORTH UNIT

<u>Operator</u>	<u>Well</u>	<u>Location</u>	<u>Casing</u> <u>Size</u>	<u>Depth</u>	<u>Comment</u>
Amarada	R. J. Johnston No. 1	NW/4 SW/4 Sec. 27-24S-37E	10 3/4"	439'	300 ex.
			7"	3285'	250 ex.
Amarada	R. J. Johnston No. 4	SE/4 SW/4 Sec. 27-24S-37E	8 5/8"	447'	140 ex.
			5 1/2"	3266	200 ex.
Humble	John Williams No. 4	NW/4 NW/4 Sec. 34-24S-37E	9 5/8"	421'	250 ex.
			7"	3301'	345 ex.
			5"	3254 to 3530'	* P
Schermmerhorn	Woolworth No. 2	SE/4 NE/4 Sec. 28-24S-37E	13"	141'	100 ex.
			8 5/8"	1411'	200 ex.
			7"	3238'	150 ex.
Schermmerhorn	Woolworth No. 7	SE/4 SE/4 Sec. 28-24S-37E	13"	124'	100 ex.
			8 5/8"	1428'	175 ex.
			5 1/2"	3273'	100 ex.

Case No. 2497

Ex. No. 6