

Case No.

322

Application, Transcript,
Small 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. 322
ORDER NO. R-109

THE APPLICATION OF L. G. WELSH
FOR AN ORDER APPROVING A PROPOSED
UNIT AGREEMENT FOR THE DEVELOPMENT
AND OPERATION OF THE ANTELOPE LAKE UNIT
AREA, EMBRACING LANDS IN LINCOLN AND CHAVES
COUNTIES, NEW MEXICO, COMPRISING 44,635.59
ACRES, MORE OR LESS.

ORDER OF THE COMMISSION

By the Commission:

This cause came on for hearing at 10 a.m. on November 1, 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," upon the application of L. G. Welsh for approval of the Antelope Lake Unit Agreement embracing lands situated in Lincoln and Chaves Counties, New Mexico.

Now, on this 5th day of November, 1951, the Commission, a quorum being present, having considered the testimony adduced and exhibits received at said hearing, 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 case, of all interested parties, and the subject matter thereof.

(2) That the proposed unit plan will in principle tend to promote the conservation of oil and gas and the prevention of waste.

It is therefore ordered:

SECTION 1. That this order shall be known as the
Antelope Lake Unit Agreement Order

SECTION 2. (a) That the project herein referred to shall be known as the Antelope Lake Unit Agreement, and shall be referred to herein as the "Project."

(b) That the plan by which the Project shall be operated shall be embraced in the form of a unit agreement for the development and operation of the Antelope Lake Unit Area referred to in the petitioner's petition and filed with said petition, and shall be known as the Antelope Lake Unit Agreement Plan.

SECTION 3. That the Antelope Lake Unit Agreement Plan shall be, and hereby is approved in principle as a proper conservation measure; provided, however, that notwithstanding any of the provisions contained in said unit agreement, this approval shall not be considered as waiving or relinquishing in any manner any rights, duties or obligations which are now, or may hereafter, be vested in the New Mexico Oil Conservation Commission by law relative to

the supervision and control of operations for exploration and development of any lands committed to said Antelope Lake Unit Agreement, or relative to the production of oil or gas therefrom.

SECTION 4. (a) That the Unit Area shall be:

New Mexico Principal Meridian, New Mexico

Township 9 South, Range 19 East

All of Sections 1 and 12;
N/2 of Section 13

Township 7 South, Range 20 East

Section 34, S/2 NW/4, SW/4, S/2 SE/4

Township 8 South, Range 20 East

All of Sections 3 and 4, 9 and 10;
Section 11, S/2;
Section 12, S/2;
All of Sections 13 to 16, incl.;
All of Sections 21 to 28, incl.;
Section 29, E/2;
All of Sections 31 to 36, incl.

Township 9 South, Range 20 East

All of Sections 1 to 18, incl.;
All of Sections 22 to 27, incl.;
Section 34, N/2;
Section 35, N/2;

Township 8 South, Range 21 East

Section 7, Lots 9-16, incl.
Section 18, Lots 1-16, incl.
Section 19, Lots 1-16, incl.
Section 30, Lots 1-16, incl;
Section 31, Lots 1-16, incl.

Township 9 South, Range 21 East

Section 6, Lots 1-22, incl., S/2 NE/4, SE/4, all;
Section 7, Lots 1-20, incl., E/2, all;
Section 17, SW/4;
Section 18, Lots 1-20, incl., E/2, all;
Section 19, Lots 1-20, incl., E/2, all;
Section 20, all;
Section 21, SW/4;
Section 28, S/2 NE/4, W/2, SE/4;
Section 29, all;
Section 30, Lots 1-20, incl., E/2, all;
Section 31, Lots 2, 3, 4, 5, 12, 13, 17, 18, 19, 20, E/2

containing 44,635.59 acres of land, more or less, of which 35,887.52 acres are Federal lands, 4,973.72 acres are State lands, and 3,774.35 acres are fee or privately owned lands.

(b) The Unit Area may be enlarged or contracted, as provided in said plan.

SECTION 5. That the unit operator shall file with the Commission an executed original or executed counterpart of the Antelope Lake Unit Agreement within 30 days after the effective date thereof.

SECTION 6. That any party owning rights in the unitized substances who does not commit such rights to said unit agreement before the effective date thereof may thereafter become a party thereto by subscribing to such agreement or counterpart thereof. The unit operator shall file with the Commission within 30 days an original of any such counterpart.

SECTION 7. This order shall become effective upon approval of said unit agreement by the Commissioner of Public Lands of the State of New Mexico and the director of the United States Geological Survey, and shall terminate ipso facto upon the termination of said unit agreement. The last unit operator shall immediately notify the Commission in writing of such termination.

Done at Santa Fe, New Mexico, on the day and year hereinabove written.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Edwin L. Mechem

Edwin L. Mechem, Chairman

Guy Shepard

Guy Shepard, Member

R. R. Spurrier

R. R. Spurrier, Secretary

S E A L

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

- - - -

TRANSCRIPT OF RECORD

ANTELOPE LAKE UNIT AREA HEARING

Held at Santa Fe, New Mexico

Thursday, November 1, 1951

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Public Hearing held November 1, 1951 at 10:00
o'clock A. M. in the City of Santa Fe, New
Mexico, in Mabry Hall (new Capitol Office
Building).

BEFORE: Hon. Edwin L. Mechem, Governor, State of New Mexico,
Chairman

Hon. R. R. Spurrier, Secretary and Director

Hon. Jason Kellahin, Attorney

REGISTER: L. G. Welsh, Applicant

Hart Brown, Brown Geophysical Company,
Houston, Texas

- - - - -

The meeting was called to order by the Chairman, who
presided.

Attorney Kellahin read the Notice of Publication which
had been published as provided by law and the rules and regula-
tions of the Commission, as follows:

****(Prescribed Preamble)****

CASE 322

In the matter of the application of L. G.
Welsh for an order approving a proposed unit agreement
for the development and operation of the Antelope Lake
Unit Area, Lincoln and Chaves Counties, New Mexico, em-
bracing lands as follows:

New Mexico Principal Meridian, New Mexico

T. 9 S., R. 19 E.,
Sec. 1, all
Sec. 12, all
Sec. 13, N $\frac{1}{2}$

T. 7 S., R. 20 E.,
Sec. 34, $3\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$

T. 8 S., R. 20 E.,
Secs. 3 and 4, all
Secs. 9 and 10, all
Sec. 11, S $\frac{1}{2}$
Sec. 12, S $\frac{1}{2}$
Secs. 13-16, inclusive, all
Secs. 21-28, inclusive, all
Sec. 29, E $\frac{1}{2}$
Secs. 31-36, inclusive, all

T. 9 S., R. 20 E.,
Secs. 1-18, inclusive, all
Secs. 22-27, inclusive, all
Sec. 34, N $\frac{1}{2}$
Sec. 35, N $\frac{1}{2}$

T. 8 S., R. 21 E.,
Sec. 7, Lots 9-16, inclusive
Sec. 18, Lots 1-16, inclusive
Sec. 19, Lots 1-16, inclusive
Sec. 30, Lots 1-16, inclusive
Sec. 31, Lots 1-16, inclusive

T. 9 S., R. 21 E.,
Sec. 6, Lots 1-22, inclusive, S $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$, all
Sec. 7, Lots 1-20, inclusive, E $\frac{1}{2}$, all
Sec. 17, SW $\frac{1}{4}$
Sec. 18, Lots 1-20, inclusive, E $\frac{1}{2}$, all
Sec. 19, Lots 1-20, inclusive, E $\frac{1}{2}$, all
Sec. 20, all
Sec. 21, SW $\frac{1}{4}$
Sec. 28, S $\frac{1}{2}$ NE $\frac{1}{4}$, W $\frac{1}{2}$, SE $\frac{1}{4}$
Sec. 29, all
Sec. 30, Lots 1-20, inclusive, E $\frac{1}{2}$, all
Sec. 31, Lots 2, 3, 4, 5, 12, 13, 17, 18, 19,
20, E $\frac{1}{2}$

Comprising 44,635.59 acres, more or less.

MR. HART BROWN took the stand and was sworn.

MR. BROWN: If it please the Commission I will make the following statements in support of the application of Mr. L. G. Welsh for approval of the Antelope Lake Unit Area, centering

about thirty miles northwest of Roswell.

My name is Hart Brown; I reside in Houston, Texas. I hold a B. S. degree in electrical engineering from Rice Institute and an M. S. degree in physics from Washington University in St. Louis.

I have been engaged in exploration for oil and gas by geophysical means for more than twenty years. During the period of exploration I have directed the surveying by gravity methods of almost all of the Mid-Continent states south of Montana and almost all of the coastal states from Maryland to Florida and to Texas. Most of this work was done by me as a consultant for various major oil companies. I was responsible for the writing of reports setting forth the most probable geologic meaning of these surveys.

Beginning five years ago I mapped at my own expense an area including half of New Mexico and nearly all of Texas. I sell these data to prepare reports on specific areas.

I have here such a report which I prepared on behalf of Mr. L. G. Welsh and which was submitted to the Commission in support of his application for approval of the Antelope Lake Unit Area agreement.

MR. KELLAHIN: Is the Commission satisfied with Mr. Brown's qualifications.

CHAIRMAN: Yes.

MR. BROWN: I would like to introduce this report as "EXHIBIT B." Also, I would like to introduce as "EXHIBIT A" a map on which the unit area is outlined in red and the State acreage is outlined in green.

The proposed Antelope Lake Unit Area is an outgrowth of the studies made by me to which I have referred. This Unit Area totals 44,635 acres, more or less; of this, 35,887 acres are federal lands; 4,974 are state; and 3,774

are privately owned.

In my opinion this unit includes essentially all of the area overlying the most promising geophysical prospects in this vicinity, and the well which Mr. Welsh proposes to drill is the next logical step which should be taken to evaluate petroleum possibilities in this wildcat area. In the report marked "EXHIBIT B" I have stated:

"The writer believes that if the proposed well is drilled, that basement will be encountered at 6500 feet or a less depth; that there is excellent chance for petroleum accumulation to be encountered in structural traps typically found in connection with faulting, in any rocks encountered between the base of the Pennsylvanian and the top of the basement; that there is possibility of production from reef type formations or from pinch-out developments in the lower Permian or in the Pennsylvanian."

I have read the Unit Agreement and it is my opinion that development under such an agreement will tend to promote the conservation of oil and gas and the prevention of waste, should Mr. Welsh's well result in a discovery.

(Mr. Brown and the members of the Commission here inspected and map ("EXHIBIT A") which was explained and discussed in some detail by Mr. Brown.)

MR. SPURRIER: (Q. to Mr. Welsh) When do you figure on drilling this well?

MR. WELSH: We expect to commence operations in the next 30 to 60 days, if possible.

MR. KELLAHIN: As I understand from your testimony, Mr. Brown, there is no one separate geological structure, but several possibilities in this area?

MR. BROWN: There is no way of surveying that area at present to determine that until an exploratory well is drilled but we believe it contains a single structure or a series of related structures.

Q. But, in your opinion, in event of discovery of oil or gas, this unit area will afford control of the entire structure or structures?

A. Yes.

Q. (To Mr. Welsh): You are familiar with the proposed unit agreement for Antelope Lake Area as drawn, are you not?

A. Yes.

Q. And after the issuance of an order by the Commissioner you will properly execute that agreement with the Commission, will you not?

A. Yes, sir.

There being no further testimony or questions, the hearing was adjourned.

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice pursuant to law and the rules and regulations of said Commission promulgated thereunder of the following public hearing to be held November 1, 1951, beginning at 10 o'clock a. m. on that day in the City of Santa Fe, New Mexico, in Mabry Hall (new Capitol office building).

STATE OF NEW MEXICO TO:

All named parties and persons having any right, title, interest or claim in the following case, and notice to the public.

CASE 322

In the matter of the application of L. G. Welsh for an order approving a proposed unit agreement for the development and operation of the Antelope Lake Unit Area, Lincoln and Chaves Counties, New Mexico, embracing lands as follows:

New Mexico Principal Meridian, New Mexico

T. 9 S., R. 19 E.,
Sec. 1, all
Sec. 12, all
Sec. 13, N 1/2

T. 7 S., R. 20 E.,
Sec. 34, S 1/2 NW 1/4, SW 1/4, S 1/2 SE 1/4

T. 8 S., R. 20 E.,
Secs. 3 and 4, all
Secs. 9 and 10, all
Sec. 11, S 1/2
Sec. 12, S 1/2
Secs. 13-16, inclusive, all
Secs. 21-28, inclusive, all
Sec. 29, E 1/2
Secs. 31-36, inclusive, all

T. 9 S., R. 20 E.,
Secs. 1-18, inclusive, all
Secs. 22-27, inclusive, all
Sec. 34, N 1/2
Sec. 35, N 1/2

T. 8 S., R. 21 E.,
Sec. 7, Lots 9-16, inclusive
Sec. 18, Lots 1-16, inclusive
Sec. 19, Lots 1-16, inclusive
Sec. 30, Lots 1-16, inclusive
Sec. 31, Lots 1-16, inclusive

T. 9 S., R. 21 E.,
Sec. 6, Lots 1-22, inclusive, S 1/2 NE 1/4, SE 1/4, all
Sec. 7, Lots 1-20, inclusive, E 1/2, all
Sec. 17, SW 1/4
Sec. 18, Lots 1-20, inclusive, E 1/2, all

Case 322 - Notice of Publication

Sec. 19, Lots 1-20, inclusive, E 1/2, all
Sec. 20, all
Sec. 21, SW 1/4
Sec. 28, S 1/2 NE 1/4, W 1/2, SE 1/4
Sec. 29, all
Sec. 30, Lots 1-20, inclusive, E 1/2, all
Sec. 31, Lots 2, 3, 4, 5, 12, 13, 17, 18, 19, 20, E 1/2

Comprising 44,635.59 acres, more or less

GIVEN under the seal of the Oil Conservation Commission at Santa Fe,
New Mexico, this 11th day of October, 1951.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. SPURRIER, Secretary

SEAL

LE ROY G. WELSH
PETROLEUM GEOLOGIST AND ENGINEER
NATIONAL STANDARD BUILDING
HOUSTON, TEXAS

October 5, 1951

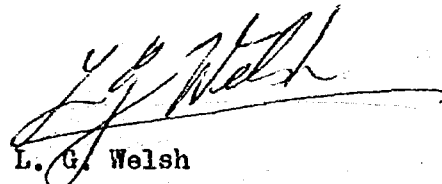
Mr. R. R. Spurrier
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Sir:

We hand you, herewith, one copy of a proposed Unit Agreement for the operation and development of the Antelope Lake Unit Area, in Lincoln and Chaves Counties, New Mexico. Also enclosed is an application for approval of the Agreement, with a geological report attached.

This area has heretofore been approved by the U.S.G.S. as suitable and proper for unitization. We would like to have a hearing on the application as quickly as possible, and would appreciate your arranging for the necessary notice at your earliest convenience. Please advise us of the date set for the hearing.

Yours very truly,


L. G. Welsh

Encls.

May 10, 1934

Mr. L. O. Welch
O. and I. Life Building
Houston 2, Texas

Re: Antelope Lake Unit Agreement
Lincoln and Chaves Counties,
New Mexico

Dear Sir:

We are in receipt of your application requesting
termination of the above captioned unit agreement to-
gether with a letter from the United States Geological
Survey approving said proposal.

We are approving termination of this Unit Agreement as
of this date provided like approval is obtained from the
Oil Conservation Commission.

Very truly yours,

E. S. Walker
E. S. WALKER
Commissioner of Public Lands

cc: United States Geological Survey (3)
Roswell, New Mexico

Oil Conservation Commission (1) ✓
Santa Fe, New Mexico

C
O
P
Y

STATE OF NEW MEXICO
OFFICE OF STATE GEOLOGIST
SANTA FE, NEW MEXICO

August 12, 1952

Case 522

C

O

P

Y

Mr. Le Roy G. Welsh
C & L Life Building
Houston, Texas

RE: Antelope Lake Unit Agreement, Lincoln
and Chaves Counties

Dear Mr. Welsh:

This is to advise that the New Mexico Oil
Conservation Commission is agreeable to a six-months
deferment on the commencement date of your test well
on the Antelope Lake Unit Agreement.

This Commission is advising the U. S. Geological
Survey and Commissioner of Public Lands of its attitude.

Very truly yours,

W

Secretary and Director

cc: USGS, Roswell
State Land Office

Case 322

LE ROY G. WELSH
PETROLEUM GEOLOGIST AND ENGINEER
C. & L. LIFE BUILDING
HOUSTON 2, TEXAS

August 7, 1952



Mr. R. R. Spurrier, Secretary
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Spurrier:

Attached hereto is a copy of the Unit Agreement covering the Antelope Lake Area which I thought had been sent to you some time ago.

After numerous delays in obtaining support to help in the drilling of the test well on this Unit and securing a contractor for the work, I am now confronted with the casing shortage and the fact that the six months from the effective date of the Unit Agreement, which was February 13, 1952, is about to expire. Therefore will you kindly arrange to grant me a six months extension of time in which to start a test well on the Unit? I feel confident that both casing and drilling contractors will be available and permit me to start the drilling within this time.

Yours very truly,


L. G. Welsh

LGW/ss

Feb 13.
- M
- A
- M
- J
- Aug 13
- Sept
- Oct
- Nov
- Dec
- Jan
- Feb

OK (w/room)

MRK
8/12/52

322
OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

May 20, 1954

C
O
P
Y

Mr. L. G. Welsh
C & I Life Building
Houston 2, Texas

Dear Mr. Welsh:

The U. S. Geological Survey has informed the New Mexico Oil Conservation Commission of your desire to terminate the Antelope Lake Unit Agreement, and has supplied us with a copy of your formal application for termination.

As you know, such termination cannot be effected without approval of the Oil Conservation Commission. To date we have received no communication from you regarding such termination. We desire to close our records on this unit as soon as possible.

The termination of the Antelope Lake Unit Agreement is therefore approved by the New Mexico Oil Conservation Commission effective as of May 1, 1954.

It should be noted that the Oil Commission approval of this termination action is subject to like approval by the Commissioner of Public Lands of the State of New Mexico.

Very truly yours,

R. R. Spurrier
Secretary and Director

RRS:vc



UNITED STATES
MAIN OFFICE DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

1954 MAY 10 AM 8:30 O. Box 6721
Roswell, New Mexico

IN REPLY REFER TO:

May 6, 1954

New Mexico Oil Conservation Commission
Box 871
Santa Fe, New Mexico

Commissioner of Public Lands
State of New Mexico
Santa Fe, New Mexico

Gentlemen:

Enclosed for your information and files is a copy of a letter dated April 30, 1954, from the Geological Survey to Mr. L. C. Welsh advising that the Acting Director approved the termination of the Antelope Lake unit agreement, New Mexico, effective as of May 1, 1954. The approval is subject to like approval by your respective offices. Also enclosed is a copy of the application requesting termination of the unit agreement.

It would be appreciated if you would inform this office of any action you may take in the matter.

Very truly yours,

R. E. Canfield
R. E. CANFIELD
Acting Regional Oil & Gas Supervisor

Enclosures



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

April 30, 1954

C
O
P
Y

Mr. L. G. Welsh
C. and I. Life Building
Houston 2, Texas

My dear Mr. Welsh:

On April 29, 1954, effective as of May 1, 1954, Acting Director of the Geological Survey, Thomas B. Nolan, approved the termination of the Antelope Lake unit agreement, Chaves and Lincoln Counties, New Mexico, I-Sec. No. 913, approved February 13, 1952, pursuant to the last paragraph of section 20 thereof.

One copy of the approved application is enclosed for your record. It is requested that you send notice of this approval to each interested working interest owner, lessee, and lessor at their last known address.

It should be noted that the Survey's approval of this termination action is subject to like approval by the Commissioner of Public Lands of the State of New Mexico, and you must obtain such State approval before the unit agreement can be considered effectively terminated. In order that our files may be complete, it is requested that you inform the Survey when the State of New Mexico approves the termination of the unit agreement.

Sincerely yours,

H. J. Duncan
For the Director

WJH:att:dp 4/29/54

Enclosure

Copy to: Roswell 2 (w/2 copies appd. appln.)

BLM 2:

Santa Fe (w/1 copy appd. appln.)

Washington (ltr only)

C
O
P
Y

APPLICATION FOR TERMINATION OF UNIT AGREEMENT

Houston, Texas
June 27, 1953

Mr. John A. Anderson
Regional Oil and Gas Supervisor
United States Department of the Interior
Geological Survey
P. O. Box 997
Roswell, New Mexico

Re: New Mexico I-See. No. 913

Dear Sir:

Due to the fact that we were unable to comply with the starting of a well by April 1, 1953 on the Antelope Lake Unit in Chaves and Lincoln Counties, New Mexico, we, the following undersigned lease owners in the Unit, hereby apply for termination of the Unit Agreement.

Yours very truly,

RECEIVED
APR 9 1954
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

UNIT OPERATOR:

Date

6-27-53

L. G. Welsh

OWNERS OF WORKING INTEREST:

Date

6-27-53

Leaw M. Welsh
and wife, Jean M. Welsh

L. G. Welsh
1608 C. & I. Life Bldg.
Houston 2, Texas
Tracts Nos. 1, 3, 4, 5, 6, 7, 8, 9, 10,
11, 12, 13, 14, 15, 16, 17,
18, 23, 25, 27

Date

7-9-53

Thelma Ethredge
and wife, Thelma Ethredge

M. D. Ethredge
1313 Vassar Street
Houston, Texas
Tract No. 2

Date

7-2-53

Dorothy J. Grange
and wife, Dorothy J. Grange

Donald C. Grange
Nims Building
Arlene, Texas
Tracts Nos. 1, 3, 4, 5, 6, 13, 14, 15, 16, 17,
subject to option in favor of L. G. Welsh

ATTEST:

Date

DIXON OIL CORPORATION

Mrs. H. K. Dixon
Assistant Secretary
1973 West Gray Street
Office 19,
Houston 19, Texas

7/22/53

T. K. Dixon, Jr.
President

UNIT AGREEMENT

FOR THE DEVELOPMENT AND OPERATION OF THE
ANTELOPE LAKE UNIT AREA
COUNTIES OF LINCOLN AND CHAVES, STATE OF NEW MEXICO

RECEIVED

NOV 16 1951

U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

JAN 25 1952

GEOLOGICAL SURVEY

I-SEC. NO. 913

This agreement, entered into as of the 1st day of November 1951, by and between the parties subscribing, ratifying, or consenting hereto, and herein referred to as the "parties hereto".

WITNESSETH: Whereas the parties hereto are the owners of working, royalty, or other oil and gas interests in the unit area subject to this agreement; and

Whereas the Act of February 25, 1920, 41 Stat. 437, as amended by the Act of August 8, 1946, 60 Stat. 950, 30 U.S.C. Secs. 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 cooperative 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 Commissioner of Public Lands of New Mexico is authorized by an Act of the Legislature (Chap. 88, Laws 1943, as amended) to consent to or approve this agreement on behalf of the State of New Mexico, insofar as it covers and includes lands and mineral interests of the State of New Mexico; and

Whereas, the Oil Conservation Commission of the State of New Mexico is authorized by an act of the Legislature (Chap. 72, Laws 1935) to approve this agreement and the conservation provisions hereof; and

Whereas the parties hereto hold sufficient interests in the Antelope Lake Unit Area covering the land hereinafter described to give reasonably effective control of operations therein; and

Whereas it is the purpose of the parties hereto to conserve natural resources, prevent waste, and secure 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 respective interests in the below-defined unit area, and agree severally among themselves as follows:

1. ENABLING ACT AND REGULATIONS. The act of February 25, 1920, as amended, supra, and all valid pertinent regulations, including operating and unit plan

regulations, heretofore issued thereunder or 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.

2. UNIT AREA. The following-described land is hereby designated and recognized as constituting the unit area:

New Mexico Principal Meridian, New Mexico

- T. 9 S., R. 19 E.,
 sec. 1, all
 sec. 12, all
 sec. 13, $N\frac{1}{2}$
- T. 7 S., R. 20 E.,
 sec. 34, $S\frac{1}{2}NW\frac{1}{4}$, SW $\frac{1}{4}$, $S\frac{1}{2}SE\frac{1}{4}$
- T. 8 S., R. 20 E.,
 secs. 3 and 4, all
 secs. 9 and 10, all
 sec. 11, $S\frac{1}{2}$
 sec. 12, $S\frac{1}{2}$
 secs. 13-16, inclusive, all
 secs. 21-28, inclusive, all
 sec. 29, $E\frac{1}{2}$
 secs. 31-36, inclusive, all
- T. 9 S., R. 20 E.,
 secs. 1-18, inclusive, all
 secs. 22-27, inclusive, all
 sec. 34, $N\frac{1}{2}$
 sec. 35, $N\frac{1}{2}$
- T. 8 S., R. 21 E.,
 sec. 7, Lots 9-16, inclusive
 sec. 18, Lots 1-16, inclusive
 sec. 19, Lots 1-16, inclusive
 sec. 30, Lots 1-16, inclusive
 sec. 31, Lots 1-16, inclusive
- T. 9 S., R. 21 E.,
 sec. 6, Lots 1-22, inclusive, $S\frac{1}{2}NE\frac{1}{4}$, $SE\frac{1}{4}$, all
 sec. 7, Lots 1-20, inclusive, $E\frac{1}{2}$, all
 sec. 17, SW $\frac{1}{4}$
 sec. 18, Lots 1-20, inclusive, $E\frac{1}{2}$, all
 sec. 19, Lots 1-20, inclusive, $E\frac{1}{2}$, all
 sec. 20, all
 sec. 21, SW $\frac{1}{4}$
 sec. 28, $S\frac{1}{2}NE\frac{1}{4}$, W $\frac{1}{2}$, $SE\frac{1}{4}$
 sec. 29, all
 sec. 30, Lots 1-20, inclusive, $E\frac{1}{2}$, all
 sec. 31, Lots 2, 3, 4, 5, 12, 13, 17, 18, 19, 20, $E\frac{1}{2}$

Containing 444.44.59 acres, more or less.

Exhibit A attached hereto is a map showing the unit area and the boundaries and identity of tracts and leases in said area to the extent known to the Unit Operator. Exhibit B attached hereto is a schedule showing to the extent known to

the Unit Operator the acreage, percentage, and kind of ownership of oil and gas interests in all land 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 in the unit area render such revision necessary, or when requested by the Oil and Gas Supervisor, hereinafter referred to as "Supervisor," and not less than five copies of the revised exhibits shall be filed with the Supervisor and one copy with the Commissioner of Public Lands of the State of New Mexico, hereinafter referred to as "Commissioner" and one copy with the New Mexico Oil Conservation Commission, hereinafter referred to as "Commission."

The above-described unit area shall when practicable be expanded to include therein any additional tract or tracts regarded as reasonably necessary or advisable for the purposes of this agreement, or shall be contracted to exclude lands not within any participating area whenever such expansion or contraction is necessary or advisable to conform with the purposes of this agreement. Such expansion or contraction shall be effected in the following manner:

(a) Unit Operator, on its own motion or on demand of the Director of the Geological Survey, hereinafter referred to as "Director," or on demand of the Commissioner, shall prepare a notice of proposed expansion or contraction describing the contemplated changes in the boundaries of the unit area, the reasons therefor, and the proposed effective date thereof.

(b) Said notice shall be delivered to the Supervisor and the Commissioner, and copies thereof mailed to the last known address of each working interest owner, lessee, and lessor whose interests are affected, advising that 30 days will be allowed for submission to the Unit Operator of any objections.

(c) Upon expiration of the 30-day period provided in the preceding item (b) hereof, Unit Operator shall file with the Supervisor and the Commissioner evidence of mailing of the notice of expansion or contraction and a copy of any objections thereto which have been filed with the Unit Operator.

(d) After due consideration of all pertinent information, the expansion or contraction shall, upon approval by the Director and Commissioner, become effective as of the date prescribed in the notice thereof.

(e) Automatic Contraction. Notwithstanding any other provision of this agreement, each quarter quarter section or numbered lot of land subject hereto, which, five years from the effective date hereof or two years after the date of

first sale of unitized substances discovered hereunder, whichever period is longer, is situated one mile or more from the boundary of any participating area then established hereunder, shall be automatically eliminated from and no longer subject to this agreement, unless on the expiration date of such period drilling operations by unit operators are in progress at a location one mile or more from the boundary of any such participating area, in which event such non-participating land shall remain subject hereto for so long as drilling operations at locations situated one mile or more from the boundary of any such participating area are continued diligently without a lapse of time of more than one year between the completion of one such well and the beginning of the next such well. Inasmuch as any contraction under this section is automatic, the unit operator shall, within a reasonable time after any such contraction hereunder, define the area so eliminated, with the approval of the Director of the Geological Survey, the Commissioner of Public Lands and the Commission, and thereafter promptly notify all parties affected thereby.

All land committed to this agreement shall constitute land referred to herein as "unitized land" or "land subject to this agreement."

3. UNITIZED SUBSTANCES. All oil and gas in any and all formations of the unitized land are unitized under the terms of this agreement and herein are called "unitized substances."

4. UNIT OPERATOR. Mr. L. G. Welsh is hereby designated as Unit Operator and by signature hereto as Unit Operator agrees and consents to accept the duties and obligations of Unit Operator for the discovery, 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 interest 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.

5. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time prior to the establishment of a participating area or areas hereunder, 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 6 months after notice of intention to resign has been served by Unit Operator on all working interest owners and the Director and Commissioner, and until all wells then drilled hereunder are placed in a satisfactory condition for suspension or abandonment whichever is required

by the Supervisor as to Federal Lands, and the Commissioner as to State and Privately-Owned Lands, unless a new Unit Operator shall have been selected and approved and shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

Unit Operator shall have the right to resign in like manner and subject to like limitations as above provided at any time a participating area established hereunder is in existence, but until a successor unit operator is selected and approved as hereinafter provided, the working interest owners shall be jointly responsible for performance of the duties of unit operator, and shall not later than 30 days before such resignation becomes effective appoint a common agent to represent them in any action to be taken hereunder.

The resignation of Unit Operator shall not release Unit Operator from any liability for any default by it hereunder occurring prior to the effective date of its resignation.

The Unit Operator may, upon default or failure in the performance of its duties or obligations hereunder, be subject to removal by the same percentage vote of the owners of working interests determined in like manner as herein provided for the selection of a new Unit Operator. Such removal shall be effective upon notice thereof to the Director and Commissioner.

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 unitized substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all equipment, materials, and appurtenances used in conducting the unit operations and owned by the working interest owners to the new duly qualified successor Unit Operator or to the owners thereof 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.

6. SUCCESSOR UNIT OPERATOR. Whenever the Unit Operator shall tender his or its resignation as Unit Operator or shall be removed as herein-above provided, the owners of the working interests in the participating area or areas according to their respective acreage interests in such participating area or areas, or, until a participating area shall have been established, the owners of the working interests according to their respective acreage interests in all unitized land, shall by majority vote select a successor Unit Operator: PROVIDED, That, if a

majority but less than 75 per cent of the working interests qualified to vote are owned by a one party to this agreement, a concurring vote of one or more additional working interest owners shall be required to select a new operator. 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 and Commissioner. If no successor Unit Operator is selected and qualified as herein provided, the Director and Commissioner at their election may declare this unit agreement terminated.

7. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT. If the Unit Operator is not the sole owner of working interests, costs and expenses incurred by Unit Operator in conducting unit operations hereunder shall be paid and apportioned among and borne by the owners of working interests, all in accordance with the agreement or agreements entered into by and between the Unit Operator and the owners of working interests, whether one or more, separately or collectively. Any agreement or agreements, entered into between the working interest owners and the Unit Operator as provided in this section, whether one or more, are herein referred to as the "unit operating agreement." Such unit operating agreement shall also provide the manner in which the working interest owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases, or other independent contracts, and such other rights and obligations as between Unit Operator and the working interest owners as may be agreed upon by Unit Operator and the working interest owners; 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 unit agreement, and in case of any inconsistency or conflict between the unit agreement and the unit operating agreement, this unit agreement shall prevail. Three copies of any unit operating agreement executed pursuant to this section shall be filed with the Supervisor.

8. 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.

9. DRILLING TO DISCOVERY. Within 6 months after the effective date hereof, the Unit Operator shall begin to drill an adequate test well at a location approved by the Supervisor, as to wells on Federal Lands, or the Commissioner as to wells on State or Privately-Owned Lands, unless on such effective date a well is being drilled conformably with the terms hereof, and thereafter continue such drilling diligently until the entire Pennsylvanian formation has been tested or until at a lesser depth unitized substances shall be discovered which can be produced in paying quantities (to wit: quantities sufficient to repay the costs of drilling, and producing operations, with a reasonable profit) or the Unit Operator shall at any time establish to the satisfaction of the Supervisor as to wells on Federal Lands, and the Commissioner as to wells on State or Privately-Owned Lands, that further drilling of said well would be unwarranted or impracticable, provided, however, that Unit Operator shall not in any event be required to drill said well to a depth in excess of 6500 feet. Until the discovery of a deposit of unitized substances capable of being produced in paying quantities, the Unit Operator shall continue drilling diligently one well at a time, allowing not more than 6 months between the completion of one well and the beginning of the next well, until a well capable of producing unitized substances in paying quantities is completed to the satisfaction of said Supervisor, if on Federal Land, or of the Commissioner if on State or Privately-Owned Land, or until it is reasonably proved that the unitized land is incapable of producing unitized substances in paying quantities in the formations drilled hereunder. Nothing in this section shall be deemed to limit the right of the Unit Operator to resign as provided in Section 5 hereof, or as requiring Unit Operator to commence or continue any drilling during the period pending such resignation becoming effective in order to comply with the requirements of this section. The Director and Commissioner may modify the drilling requirements of this section by granting reasonable extensions of time when, in their opinion, such action is warranted.

Upon failure to comply with the drilling provisions of this section, the Director and Commissioner may, after reasonable notice to the Unit Operator, and each working interest owner, lessee, and lessor at their last known addresses, declare this unit agreement terminated.

10. PLAN OF FURTHER DEVELOPMENT AND OPERATION. Within 6 months after completion of a well capable of producing unitized substances in paying quantities, the Unit Operator shall submit for the approval of the Supervisor, the Commissioner and the Commission an acceptable plan of development and operation for the unitized land which, when approved by the Supervisor, the Commissioner and the Commission, shall constitute the further drilling and operating obligations of the Unit Operator under this agreement for the period specified therein. Thereafter, from time to time before the expiration of any existing plan, the Unit Operator shall submit for the approval of the Supervisor, the Commissioner and the Commission a plan for an additional specified period for the development and operation of the unitized land. Any plan submitted pursuant to this section shall provide for the exploration of the unitized area and for the determination of the area or areas thereof capable of producing unitized substances in paying quantities in each and every productive formation and shall be as complete and adequate as the Supervisor, the Commissioner and the Commission may determine to be necessary for timely development and proper conservation of the oil and gas resources of the unitized area and shall (a) specify the number and locations of any wells to be drilled and the proposed order and time for such drilling; and (b) to the extent practicable specify the operating practices regarded as necessary and advisable for proper conservation of natural resources. Separate plans may be submitted for separate productive zones, subject to the approval of the Supervisor, the Commissioner and the Commission. Said plan or plans shall be modified or supplemented when necessary to meet changed conditions or to protect the interests of all parties to this agreement. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of development. The Supervisor and Commissioner are authorized to grant a reasonable extension of the 6-month period herein prescribed for submission of an initial plan of development where such action is justified because of unusual conditions or circumstances. After completion hereunder of a well capable of producing any unitized substance in paying quantities, no further wells, except such as may be necessary to afford protection against operations not under this agreement or such as may be specifically approved by the Supervisor, shall be drilled except in accordance with a plan of development approved as herein provided.

11. PARTICIPATION AFTER DISCOVERY. Upon completion of a well capable of producing unitized substances in paying quantities or as soon thereafter as required by the Supervisor or the Commissioner, the Unit Operator shall submit for

approval by the Director, the Commissioner and the Commission a schedule, based on subdivisions of the public-land survey or aliquot parts thereof, of all unitized land then regarded as reasonably proved to be productive of unitized substances in paying quantities; all lands in said schedule on approval of the Director to constitute a participating area, effective as of the date of first production. Said schedule also shall set forth the percentage of unitized substances to be allocated as herein provided to each unitized tract in the participating area so established, and shall govern the allocation of production from and after the date the participating area becomes effective. A separate participating area shall be established in like manner for each separate pool or deposit of unitized substances or for any group thereof produced as a single pool or zone, and any two or more participating areas so established may be combined into one with the consent of the owners of all working interests in the lands within the participating areas so to be combined, on approval of the Director, the Commissioner and the Commission. The participating area or areas so established shall be revised from time to time, subject to like approval, whenever such action appears proper as a result of further drilling operations or otherwise, to include additional land then regarded as reasonably proved to be productive in paying quantities or to exclude land then regarded as reasonably proved not to be productive and the percentage of allocation shall also be revised accordingly. The effective date of any revision shall be the first of the month in which is obtained the knowledge or information on which such revision is predicated, unless a more appropriate effective date is specified in the schedule. No land shall be excluded from a participating area on account of depletion of the unitized substances.

It is the intent of this section that a participating area shall represent the area known or reasonably estimated to be productive in paying quantities; but, regardless of any revision of the participating area, nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the revision of the participating area.

In the absence of agreement at any time between the Unit Operator and the Director, the Commissioner and the Commission as to the proper definition or redefinition of a participating area, or until a participating area has, or areas have, been established as provided herein, the portion of all payments affected thereby may be impounded in a manner mutually acceptable to the owners of working interests, except royalties due the United States and the State of New Mexico,

which shall be determined by the Supervisor and the Commissioner, respectively, and the amount thereof deposited, as directed by the Supervisor and the Commissioner, respectively, to be held as unearned money until a participating area is finally approved and then applied as earned or returned in accordance with a determination of the sum due as Federal and State royalty on the basis of such approved participating area.

Whenever it is determined, subject to the approval of the Supervisor, as to wells on Federal Land, the Commissioner as to wells on State Land, and the Commission as to wells on Privately-Owned Land, that a well drilled under this agreement is not capable of production in paying quantities and inclusion of the land on which it is situated in a participating area is unwarranted, production from such well shall, for the purposes of settlement among all parties other than working interest owners, be allocated to the land on which the well is located so long as such land is not within a participating area established for the pool or deposit from which such production is obtained. Settlement for working interest benefits from such a well shall be made as provided in the unit operating agreement.

12. ALLOCATION OF PRODUCTION. All unitized substances produced from each participating area established under this agreement, except any part thereof used in conformity with good operating practices within the unitized area for drilling, operating, camp and other production or development purposes, for repressuring or recycling in accordance with a plan of development approved by the Supervisor, the Commissioner and the Commission, or unavoidably lost, shall be deemed to be produced equally on an acreage basis from the several tracts of unitized land of the participating area established for such production and, for the purpose of determining any benefits accruing under this agreement, each such tract of unitized land shall have allocated to it such percentage of said production as the number of acres of such tract included in said participating area bears to the total acres of unitized land in said participating area. It is hereby agreed that production of unitized substances from a participating area shall be allocated as provided herein regardless of whether any wells are drilled on any particular part or tract of said participating area. If any gas produced from one participating area is used for repressuring or recycling purposes in another participating area, the first gas withdrawn from such last-mentioned participating area for sale during the life of this agreement shall be considered to be the gas so transferred until an amount equal to that transferred shall be so

produced for sale and such gas shall be allocated to the participating area from which initially produced as constituted at the time of such final production.

13. DEVELOPMENT OR OPERATION OF NON-PARTICIPATING LAND OR FORMATIONS.

Any party hereto owning or controlling the working interest in any unitized land having thereon a regular well location may with the approval of the Supervisor as to Federal Land, the Commissioner as to State Land and the Commission as to Privately-Owned Land, at such party's sole risk, cost, and expense drill a well to test any formation for which a participating area has not been established or to test any formation for which a participating area has been established if such location is not within said participating area, unless within 90 days of receipt of notice from said party of his intention to drill the well the Unit Operator elects and commences to drill such well in like manner as other wells are drilled by the Unit Operator under this agreement.

If any well drilled as aforesaid by a working interest owner results in production such that the land upon which it is situated may properly be included in a participating area, such participating area shall be established or enlarged as provided in this agreement and the well shall thereafter be operated by Unit Operator in accordance with the terms of this agreement and the unit operating agreement.

If any well drilled as aforesaid by a working interest owner obtains production in quantities insufficient to justify the inclusion in a participating area of the land upon which such well is situated, such well may be operated and produced by the party drilling the same subject to the conservation requirements of this agreement. The royalties in amount or value of production from any such well shall be paid as specified in the underlying lease and agreements affected.

14. ROYALTY SETTLEMENT. The United States and the State of New Mexico and all royalty owners who, under existing contract, are entitled to take in kind a share of the substances now unitized hereunder produced from any tract, shall hereafter be entitled to the right to take in kind their share of the unitized substances allocated to such tract, and Unit Operator, or in case of the operation of a well by a working interest owner as herein in special cases provided for, such working interest owner, 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 royalties due under their leases.

If gas obtained from lands not subject to this agreement is introduced into any participating area hereunder, for use in repressuring, stimulation of production, or increasing ultimate recovery, which shall be in conformity with a plan first approved by the Supervisor, the Commissioner and the Commission, a like amount of gas, after settlement as herein provided for any gas transferred from any other participating area and with due allowance for loss or depletion from any cause, may be withdrawn from the formation into which the gas was introduced, royalty free as to dry gas, but not as to the products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the plan of operations or as may otherwise be consented to by the Supervisor, the Commissioner and the Commission, as conforming to good petroleum engineering practice; and provided further, that such right of withdrawal shall terminate on the termination of this unit agreement.

Royalty due the United States shall be computed as provided in the operating regulations and paid in value or delivered in kind as to all unitized substances on the basis of the amount thereof allocated to unitized Federal land as provided herein at the rates specified in the respective Federal leases, or at such lower rate or rates as may be authorized by law or regulation; provided, that for leases on which the royalty rate depends on the daily average production per well, said average production shall be determined in accordance with the operating regulations as though each participating area were a single consolidated lease. Royalty due on account of state or privately-owned lands shall be computed and paid on the basis of all unitized substances allocated to such lands.

15. RENTAL SETTLEMENT. Rental 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 subject to this agreement shall be paid at the rate specified in the respective leases from the United States unless such rental or minimum royalty is waived, suspended, or reduced by law or by approval of the Secretary or his duly authorized representative.

With respect to any lease on non-Federal land containing provisions which would terminate such lease unless drilling operations were within the time therein specified commenced upon the land covered thereby or rentals paid for the privilege of deferring such drilling operations, the rentals required thereby shall, notwithstanding any other provision of this agreement, be deemed to accrue and become payable during the term thereof as extended by this agreement and until the required drilling operations are commenced upon the land covered thereby or some portion of such land is included within a participating area.

16. 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 State or Federal law or regulation.

17. 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 or pursuant to applicable regulations pay a fair and reasonable compensatory royalty as determined by the Supervisor for Federal land, or as approved by the Commissioner as to State land, or as determined by agreement between the Unit Operator and the royalty owner as to fee land.

18. 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 of 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 and the Commissioner shall and by their approval hereof, or by the approval hereof by their duly authorized representatives, do hereby establish, alter, change, or revoke the drilling, producing, rental, minimum royalty, and royalty requirements of Federal and State leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this agreement, and, 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 contract by and between the parties hereto, or their respective predecessors in interest, or any of them,

(b) Drilling and producing operations performed hereunder upon any tract of unitized lands will 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 the land therein embraced.

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

(d) Each lease, sublease or contract relating to the exploration, drilling, development or operation for oil or gas of lands other than those of the United States, and the State of New Mexico, committed to this agreement, 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) Any Federal lease for a fixed term of twenty (20) years or any renewal thereof or any part of such lease which is made subject to this agreement shall continue in force beyond the term provided therein until the termination hereof. Any other Federal lease committed hereto shall continue in force beyond the term so provided therein or by law as to the committed land so long as such land remains committed hereto, provided unitized substances are discovered in paying quantities within the unit area prior to the expiration date of the primary term of such lease.

(f) Each sublease or contract relating to the operation and development of unitized substances from lands of the United States committed to this agreement, which by its terms would expire prior to the time at which the underlying lease, as extended by the immediately preceding paragraph, will expire, 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 the underlying lease as such term is herein extended.

(g) Any lease having only a portion of its lands committed hereto shall be segregated as to the portion committed and the portion not committed, and the terms of such lease shall apply separately to such segregated portions commencing as of the effective date hereof. In the event any such lease provides for

a lump-sum rental payment, such payment shall be prorated between the portions so segregated in proportion to the acreage of the respective tracts.

19. COVENANTS RUN WITH 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 assignments or transfer of any working interest, royalty, or other interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, photostatic, or certified copy of the instrument of transfer.

20. EFFECTIVE DATE AND TERM. This agreement shall become effective upon approval by the Secretary or his duly authorized representative and shall terminate on August 31, 1956, unless (a) such date of expiration is extended by the Director and the Commissioner, or (b) it is reasonably determined prior to the expiration of the fixed term or any extension thereof that the unitized land is capable of production of unitized substances in paying quantities in the formations tested hereunder and after notice of intention to terminate the agreement on such ground is given by the Unit Operator to all parties in interest at their last known addresses, the agreement is terminated with the approval of the Director and the Commissioner, or (c) a valuable discovery of unitized substances has been made on unitized land during said initial term of any extension thereof, in which event the agreement shall remain in effect for such term and so long as unitized substances can be produced in paying quantities, i.e., in this particular instance in quantities sufficient to pay for the cost of producing same from wells on unitized land within any participating area established hereunder and, should production cease, so long thereafter as diligent operations are in progress for the restoration of production or discovery of new production and so long thereafter as the unitized substances so discovered can be produced as aforesaid, or (d) it is terminated as heretofore provided in this agreement.

This agreement may be terminated at any time by not less than 75 per centum, on an acreage basis, of the owners of working interests signatory hereto, with the approval of the Director and the Commissioner; notice of any such approval to be given by the Unit Operator to all parties hereto.

21. RATE OF PROSPECTING, DEVELOPMENT, AND PRODUCTION. The Director is hereby vested with authority to alter or modify from time to time in his

discretion the quantity and rate of production ^{upon federal lands} under this agreement when such quantity and rate is not fixed pursuant to Federal or State law or does not conform to any state-wide voluntary conservation or allocation program, which is established, recognized, and generally adhered to by the majority of operators in such State, 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. Without regard to the foregoing, the Director is also hereby vested with authority to alter or modify from time to time in his discretion the rate of prospecting and development and the quantity and rate of production under this agreement when such alteration or modification is in the interest of attaining the conservation objectives stated in this agreement and is not in violation of any applicable Federal or State law.

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 15 days from notice.

22. DETERMINATIONS BY UNIT OPERATOR AND REVIEW THEREOF. Whenever a determination is required to be made in order to carry out the express terms of this agreement and the agreement does not specify by whom such determination shall be made, the Unit Operator is hereby authorized to make the necessary determination subject to approval of the Director and the Commissioner in the manner hereinafter provided. Notice of any such determination by the Unit Operator, accompanied by data in support thereof, shall be furnished to the Director through the Supervisor and directly to the Commissioner. If, after reviewing all the available evidence, the Director and the Commissioner find that the determination reviewed is incorrect they shall advise the Unit Operator accordingly, stating the reasons therefor, and thereupon such determination shall be of no force and effect.

The Unit Operator shall then make a new determination in conformity with the finding of the Director and the Commissioner or appeal to the Secretary as provided in the Operating Regulations and to the Commission as provided in the rules of the Commission. All determinations made by the Unit Operator pursuant to this section shall be effective unless and until altered, modified, or rescinded as herein provided.

Any party hereto shall have the right to request the Director and the Commissioner (such request to be accompanied by appropriate supporting evidence)

to review any determination made by the Unit Operator pursuant to this section not previously reviewed on appeal to the Secretary or to the Commission. Such request will be granted or denied in the discretion of the Director and Commissioner within 60 days after being received. If denied, the requesting party shall have the right to appeal to the Secretary. If the request for review is granted and thereafter the Director and the Commissioner find that the determination should be altered, modified, or rescinded, the Unit Operator shall be advised accordingly and shall either comply with the finding of the Director and the Commissioner or appeal to the Secretary and to the Commission.

23. APPEARANCES. Unit Operator shall, after notice to other parties affected, have the right to appear for or on behalf of any and all interests affected hereby before the Department of the Interior, the Commissioner of Public Lands and the New Mexico Oil Conservation Commission and to appeal from orders issued under the regulations of said Department, the Commissioner or the Commission, or to apply for relief from any of said regulations or in any proceedings relative to operations before the Department of the Interior, the Commissioner, the Commission, or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his own expense to be heard in any such proceeding.

24. NOTICES. All notices, demands or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if given in writing and personally delivered to the party or sent by postpaid registered 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 hereto or to such other address as any such party may have furnished in writing to party sending the notice, demand or statement.

25. 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 of the United States, or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waive.

26. UNAVOIDABLE DELAY. All obligations under this agreement requiring the Unit Operator to commence or continue drilling 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 agencies, unavoidable accidents, 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.

27. FAIR EMPLOYMENT. The Unit Operator shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and an identical provision shall be incorporated in all subcontracts.

28. LOSS OF TITLE. In the event title to any tract of unitized land shall fail and the true owner cannot be induced to join in 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 interests subject thereto, payment or delivery on account thereof may be withheld without liability for interest until the dispute is finally settled; provided, that, as to Federal or State land, no payments of funds due the United States or the State of New Mexico should be withheld, but such funds shall be deposited as directed by the Supervisor and the Commissioner, respectively, 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.

29. NON-JOINDER AND SUBSEQUENT JOINDER. If the owner of any substantial interest in a tract within the unit area fails or refuses to subscribe or consent to this agreement, the owner of the working interest in that tract may withdraw said tract from this agreement by written notice to the Director and the Commissioner and the Unit Operator prior to the approval of this agreement by the Director and the Commissioner. Any oil or gas interests in lands within the unit area not committed hereto prior to submission of this agreement for final approval may thereafter be committed hereto by the owner or owners thereof subscribing or consenting to this agreement, and, if the interest is a working interest, by the owner of such interest also subscribing to the unit operating agreement. After operations are commenced hereunder, the right of subsequent joinder, as provided in this section, by a working interest owner is subject to such requirements or approvals, if any, pertaining to such joinder, as may be provided for in the unit

operating agreement. After final approval hereof joinder by a non-working interest owner must be consented to in writing by the working interest owner committed hereto and responsible for the payment of any benefits that may accrue hereunder in behalf of such non-working interest. Prior to final approval hereof, joinder by any owner of a non-working interest must be accompanied by appropriate joinder by the owner of the corresponding working interest in order for the interest to be regarded as effectively committed hereto. Except as may otherwise herein be provided subsequent joinders to this agreement shall be effective as of the first day of the month following the filing with the Supervisor of duly executed counterparts of all or any papers necessary to establish effective commitment of any tract to this agreement unless objection to such joinder is duly made within 60 days by the Director.

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

31. SURRENDER. Nothing in this agreement shall prohibit the exercise by any working interest owner of the right to surrender vested in such party in any lease, sub-lease, or operating agreement as to all or any part of the lands covered thereby, provided that each party who will or might acquire such working interest by such surrender or by forfeiture as hereafter set forth, is bound by the terms of this agreement.

If as a result of any such surrender, the working interest rights as to such lands become vested in any party other than the fee owner of the unitized substances, said party shall forfeit such rights and no further benefits from operations hereunder as to said land shall accrue to such party, unless within ninety (90) days thereafter said party shall execute this agreement and the unit operating agreement as to the working interest acquired through such surrender, effective as though such land had remained continuously subject to this agreement and the unit operating agreement. And in the event such agreements are not so executed, the party next in the chain of title shall be and become the owner of such working interest at the end of such ninety (90) day period, with the same force and effect as though such working interest had been surrendered to such party.

If as the result of any such surrender or forfeiture the working interest rights as to such lands become vested in the fee owner of the unitized substances, such owner may:

(1) Execute this agreement and the unit operating agreement as a working interest owner, effective as though such land had remained continuously subject to this agreement and the unit operating agreement.

(2) Again lease such lands but only under the condition that the holder of such lease shall within thirty (30) days after such lands are so leased execute this agreement and the unit operating agreement as to each participating area theretofore established hereunder, effective as though such land had remained continuously subject to this agreement and the unit operating agreement.

(3) Operate or provide for the operation of such land independently of this agreement as to any part thereof or any oil or gas deposits therein not then included within a participating area.

If the fee owner of the unitized substances does not execute this agreement and the unit operating agreement as a working interest owner or again lease such lands as above provided with respect to each existing participating area, within six (6) months after any such surrender or forfeiture, such fee owner shall be deemed to have waived the right to execute the unit operating agreement or lease such lands as to each such participating area, and to have agreed, in consideration for the compensation hereinafter provided, that operations hereunder as to any such participating area or areas shall not be affected by such surrender.

For any period the working interest in any lands are not expressly committed to the unit operating agreement as the result of any such surrender or forfeiture, the benefits and obligations of operations accruing to such lands under this agreement and the unit operating agreement shall be shared by the remaining owners of unitized working interests in accordance with their respective participating working interest ownerships in any such participating area or areas, and such owners of working interests shall compensate the fee owner of unitized substances in such lands by paying sums equal to the rentals, minimum royalties, and royalties applicable to such lands under the lease in effect when the lands were unitized, as to such participating area or areas.

Upon commitment of a working interest to this agreement and the unit operating agreement as provided in this section, an appropriate accounting and settlement shall be made, to reflect the retroactive effect of the commitment,

for all benefits accruing to or payments and expenditures made or incurred on behalf of such surrendered working interest during the period between the date of surrender and the date of recommitment, and payment of any moneys found to be owing by such an accounting shall be made as between the parties then signatory to the unit operating agreement and this agreement within thirty (30) days after the recommitment. The right to become a party to this agreement and the unit operating agreement as a working interest owner by reason of a surrender or forfeiture as provided in this section shall not be defeated by the non-existence of a unit operating agreement and in the event no unit operating agreement is in existence and a mutually acceptable agreement between the proper parties thereto cannot be consummated, the Supervisor may prescribe such reasonable and equitable agreement as he deems warranted under the circumstances.

Nothing in this section shall be deemed to limit the right of joinder or subsequent joinder to this agreement as provided elsewhere in this agreement. The exercise of any right vested in a working interest owner to reassign such working interest to the party from whom obtained shall be subject to the same conditions as set forth in this section in regard to the exercise of a right to surrender.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed and have set opposite their respective names the date of execution.

UNIT OPERATOR:

Date

10-17-51

I. G. Welsh
I. G. Welsh

OWNERS OF WORKING INTEREST:

Date

10-17-51

I. G. Welsh
I. G. Welsh
209 National Standard Building
Houston 2, Texas
Tracts Nos. 1,3,4,5,6,7,8,9,10,
11,12,13,14,15,16,17, ~~23~~ 18,
23,25,27

Jean M. Welsh
and wife, Jean M. Welsh

Date

10-26-51

M. D. Ethredge
M. D. Ethredge
1313 Vassar Street
Houston, Texas
Tract No. 2

Thelma Ethredge
and wife, Thelma Ethredge

OWNERS OF WORKING INTEREST (Cont.):

	Date	
<u>Ernest A. Hanson</u> Ernest A. Hanson	<u>11-14-51</u>	<u>Beulah Irene Hanson</u> and wife, Beulah Irene Hanson
Roswell, New Mexico Tract No. 28		

	Date	
<u>Elizabeth A. Elliott</u> Box 1081 Santa Fe, New Mexico Tract No. 18		and husband, Elliott

	Date	
<u>Donald C. Grange</u> Donald C. Grange Rm 28 Mc Clintic Bldg. Midland, Texas Tract Nos. 1, 3, 4, 5, 6, 13, 14, 15, 16, 17, subject to option in favor of L. G. Welsh.	<u>10-29-51</u>	<u>Dorothy J. Grange</u> and wife, Dorothy J. Grange

ATTEST:

DIXON OIL CORPORATION

<u>James C. Dean</u> Secretary 1913 West Gray Street, Office 19 Houston, 19, Texas.	<u>Nov. 9th. 1951</u> Date	<u>T. K. Dixon Jr.</u> T. K. Dixon Jr., President.
---	-------------------------------	---

OWNERS OF BASIC ROYALTY:

	Date	
<u>Oliver L. Porter</u> Roswell, New Mexico Tract Nos. 38, 39, 40		and wife, Porter

OWNERS OF BOTH WORKING INTEREST AND BASIC ROYALTY:

	Date	
Walter B. Jones		and wife, Jones
Roswell, New Mexico		
Tract No. 35 (undivided interest)		

	Date	
Harford E. Bonham		and wife, Bonham
Tract No. 35 (undivided interest)		

	Date	
Robert C. Marley		and wife Marley
Roswell, New Mexico		
Tracts Nos. 36, 37		

	Date	
Grace M. Jones		Oliver Seth
Carrizozo, New Mexico		Carrizozo, New Mexico
Executors and Trustees Estate of Andrew H. Hudspeth		
Tract No. 41		

	Date	
S. Clyde Marley		and wife, Marley
1304 Highland Road,		
Roswell, New Mexico		
Tract No. 42		

	Date	
George Shanks		and wife, Shanks
704 South Kentucky		
Roswell, New Mexico		
Tract No. 43		

	Date	
W. E. Doolin		and wife, Doolin
1614 West Third Street		
Roswell, New Mexico		
Tract No. 44 (undivided interest)		

	Date	
Bernard P. Keohane		
Tract No. 44 (undivided interest)		

	Date	
Marianne Keohane		
Tract No. 44 (undivided interest)		

OWNERS OF BOTH WORKING INTEREST AND BASIC ROYALTY (Cont.):

ATTEST:

Date

MORTGAGE LOANS, INC.

Secretary

By:

President

%First National Bank
Roswell, New Mexico
Tract No. 45

Date

Joe A. Mimms

and wife,

Mimms

Roswell, New Mexico
Tract No. 46 (undivided interest)

Date

Walter B. Chesser
304 N. Michigan
Roswell, New Mexico
Tract No. 46 (undivided interest)

and wife

Chesser

Date

For the Estate of Louis Mennecke
300 North Washington
Roswell, New Mexico
Tract Nos. 47, 48 Tract No. 49 (undivided interest)

Date

Tyler F. Seale

and wife

Seale

Tract No. 49 (undivided interest)

STATE OF TEXAS

COUNTY OF HARRIS

On this 9th day of November, 1951, before me appeared
T.K. DIXON JR. to me personally known, who,
being duly sworn, did say that he is President of

DIXON 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 _____

T.K. DIXON JR. acknowledged said instrument to be
the free act and deed of said corporation.

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

My Commission expires June 1st 1953

Robin A. Elverson

Notary Public

ROBIN A. ELVERSON.

STATE OF Texas

COUNTY OF Harris

On this 27th day of October, 1951, before me appeared

L. G. Welsh to me personally known, who,

being duly sworn, did say that he is _____

_____ and
that the seal affixed to said instrument is the corporate seal of said
corporation and that said instrument was signed and sealed in behalf of
said corporation by authority of its Board of Directors and said _____

_____ acknowledged said instrument to be
the free act and deed of said corporation.

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

My Commission expires _____
Notary Public

STATE OF Texas

COUNTY OF Harris

On this 27th day of October, 1951, before me personally

appeared L. G. Welsh and Jean M. Welsh
his wife, to me known to be the persons described in and who executed the
foregoing instrument, and acknowledged that they executed the same as
their free act and deed.

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

My Commission expires 6/1/53
Dudley C. Jarvis
Notary Public
DUDLEY C. JARVIS
Notary Public in and for Harris County, Texas.

STATE OF _____

COUNTY OF _____

On this _____ day of _____, 1951, before me appeared _____ to me personally known, who, being duly sworn, did say that he is _____

_____ and ~~that~~ the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors and said _____

_____ acknowledged said instrument to be the free act and deed of said corporation.

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

My Commission expires _____ Notary Public

STATE OF TEXAS:

COUNTY OF Taylor

On this 29th day of October, 1951, before me personally appeared Donald C. Grange and Dorothy J. Grange his wife, to me known to be the persons described in and who executed the foregoing instrument, and acknowledged that they executed the same as their free act and deed.

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

My Commission expires 1953 Olga Barrett Notary Public

STATE OF TEXAS
COUNTY OF HARRIS

On this 27th day of October, 1951, before me personally
appeared L. G. Welsh and _____
his wife, to me known to be the persons described in and who executed the
foregoing instrument, and acknowledged that they executed the same as
their free act and deed.

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

My Commission expires 6-1-53 W. H. Killingsworth
Notary Public

STATE OF TEXAS
COUNTY OF HARRIS

On this 27 day of October, 1951 before me personally
appeared M. D. Ethridge and Thelma Ethridge
his wife, to me known to be the persons described in and who executed
the foregoing instrument, and acknowledged that they executed the same
as their free act and deed.

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

My Commission expires June 1953 L. J. Morris
Notary Public

STATE OF New Mexico
COUNTY OF Chaves

On this 14th day of November, 1951 before me personally
appeared Ernest A. Hanson and Beulah Irene Hanson
his wife, to me known to be the persons described in and who executed
the foregoing instrument, and acknowledged that they executed the same
as their free act and deed.

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

My Commission expires January 28, 1954 Emerson B. Bodhunter
Notary Public

STATE OF _____
COUNTY OF _____

On this _____ day of _____, 1951, before me personally
appeared _____ and _____
his wife, to me known to be the persons described in and who executed
the foregoing instrument, and acknowledged that they executed the same
as their free act and deed.

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

My Commission expires _____
Notary Public

"EXHIBIT B"

BROWN GEOPHYSICAL COMPANY

5300 BROWNWAY ROAD
HOUSTON 19, TEXAS

October 2, 1951

REPORT ON

ANTELOPE LAKE UNIT AREA

Lincoln County, New Mexico

Prepared for

Mr. L. G. Welsh

INTRODUCTION

This report is a condensation of a report filed for the confidential use of the U.S.G.S., at the time application was first made for the designation of the Antelope Lake Unit Area. That original report contained confidential data regarding an extensive area surrounding the proposed Unit Area. The writer will be glad to show and to discuss all these confidential data with the New Mexico Oil Conservation Commission and with the Land Commissioner, if requested.

Selection of this proposed Unit Area is the result of study of the gravity survey covering the entire southeastern quarter of New Mexico; and a correlation of that data with all available surface and subsurface geological information. These studies have been conducted by the writer during the last five years, and involve other prospects additional to this proposed Antelope Lake Unit Area, hence the writer's hesitancy to include such information in this file which is to be available to public inspection.

SOURCE OF GEOPHYSICAL DATA

Map 3 shows an index of Regional Gravity maps which the writer has compiled and owns. The intensive study of these data, in correlation with the known geologic structures within that area, furnish the experience and background drawn upon in predicting what geologic conditions will probably be found when the proposed Antelope Lake Unit Area is drilled; and in preparing the conclusions and recommendations contained in this report. Map 1, of this report, is a very small section taken out of this extensive regional gravity map. It shows the Bouguer Anomaly values, on U.S. Coast and Geodetic datum, at points where observations were made, and also shows contours of equal gravity values.

INTERPRETATIONS

From the regional gravity map, the writer has defined an area in excess of 1000 square miles as the "Arabella Basin". Part

of this basin is outlined in yellow on enclosed Map 1. It is the writer's conclusion that chances are 9 out of 10 that this basin will show considerable thicknesses of Devonian-Silurian and/or Ordovician, whereas the areas immediately surrounding the basin will have very thin sections or be devoid of these formations. Exact interpretation of Gravity Maps can rarely be made; and there is one chance in ten that this gravity indication results from densities in the basement rocks entirely, in which event there will be no basin found by drilling. Published studies of the Permian surface by Philip King definitely support the theory that such a basin exists. No deep wells have been drilled in locations which will prove or disprove the presence of such a supposed basin, hence there is no positive means of evaluating the subsurface conditions. Because of the thick limestone at the surface, seismic studies are extremely difficult or impossible. Exploratory drilling is the best present approach to evaluate the prospect.

Along the eastern edge of the basin a very strong gravity indication can best be interpreted as a fault zone in the basement surface, and probably also in the rocks immediately on top of the basement. The writer's interpretation of these indications are portrayed on Map 1.

Gravity generally permits determination of relative depths only. The cross-sections shown on Chart 2. were prepared in order to estimate reasonable depths and formation thicknesses, which probably will be found by drilling. Profile A-E is taken from a point about 15 miles north of Alamogorda, thence eastward across the mountains, through the wells shown, and terminates at the Cass Pool. Although these profiles are several years old, no new wells have been drilled in the areas west of Roswell. These profiles make use of the subsurface points established by drilled holes and by surface exposures, for positive information; and make use of suggestions contributed by the gravity as to the contours of the deep subsurface between known points. Profile F-G was developed in the same manner, crosses the proposed Unit Area, and provides the best available basis on which to predict depths at which the various formations will be encountered in the proposed test well.

CONCLUSIONS

The writer believes that if the proposed well is drilled, that basement will be encountered at 6500 feet or a less depth; that

there is excellent chance for petroleum accumulation to be encountered in structural traps typically found in connection with faulting, in any rocks encountered between the base of the Pennsylvanian and the top of the basement; that there is possibility of production from reef type formations or from pinch-out developments in the lower Permian or in the Pennsylvanian.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Hart Brown".

Hart Brown

