

CASE 3020: Application of PAN AM.
for permission to drill in the
POTASH-OIL AREA, EDDY COUNTY, N.M.

CASE NO.
3029

3rd
fine

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

POLISH COMPANY OF AMERICA EXHIBIT 1

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

May 25, 1964

C
O
P
Y

Mr. Charles F. Malone
Atwood & Malone
Attorneys at Law
Post Office Drawer 700
Roswell, New Mexico

Dear Mr. Malone:

Since talking with you last week in regard to Case No. 3029, I have contacted Governor Campbell and Commissioner Walker and it is agreeable with the Commission for the date for submitting findings to be extended to Monday, August 3, 1964.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

cc: Mr. Roy Blackman
Mr. J. K. Smith
Mr. W. W. Heard

Memo

From

A. L. Porter, Jr.
Secretary-Director

To Governor Campbell

In view of the circumstances described in the attached letter, I think we should grant the extension of time as requested.

Is this OK?

OK

ATWOOD & MALONE

LAWYERS

1964 MAY 22 PM 1:05

P. O. DRAWER 700
TELEPHONE 503 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

JEFF D. ATWOOD (1883-1960)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON

May 21, 1964

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

Re: Case No. 3029

Dear Mr. Porter:

Thank you for your letter of May 14, 1964, stating the decision of the Commission in this matter, and directing that Requested Findings be submitted by June 5, 1964.

The writer has discussed the date for Requested Findings with Mr. Roy Blackman of Potash Company of America, and it has been agreed between Mr. Blackman, for his client, and the writer, for Pan American Petroleum Corporation, that the parties will respectfully request the Commission to extend the date for submitting findings to Monday, August 3, 1964.

This request by the parties is made necessary by the fact that Ross Malone of this firm is required, by having presented the matter to the Commission, to draft Requested Findings, and is outside the country on an extended trip. Mr. Blackman will be married in the near future, and contemplates a wedding trip of some duration.

The parties to this case therefore respectfully request that the time for submitting Requested Findings be extended to August 3, 1964.

Page 2
Mr. Porter
May 21, 1964

1004 MAY 21 PM 1 05

Thank you for your kind attention and with regards, we are,

Very truly yours,

ATWOOD & MALONE

CFM/mm

BY: *Charles Malone*

CC: Roy Blackman, Esquire
J.K. Smith, Esquire
W.W. Heard, Esquire

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NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Form C-101
Revised (12/1/55)

NOTICE OF INTENTION TO DRILL

Notice must be given to the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in **QUINTUPLICATIONS**. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission. If State Land submit 6 Copies Attach Form C-128 in triplicate to first 3 copies of form C-101

Hobbs, New Mexico

March 6, 1964

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

(Alternate Location)

Gentlemen:

You are hereby notified that it is our intention to commence the Drilling of a well to be known as

Pan American Petroleum Corporation

State of New Mexico "GCS"

(Company, or Operator)

Well No. **1**, in **J** The well is

located **1739** feet from the **South** line and **2310** feet from the

East line of Section **17**, T. **20-S**, R. **30-E**, NMPM.

(GIVE LOCATION FROM SECTION LINE) **Wildcat** Pool, **Eddy** County

If State Land the Oil and Gas Lease is No. **B-2386**

If patented land the owner is

Address

We propose to drill well with drilling equipment as follows: **0-12,600' with rotary tools**

The status of plugging bond is **Blanket bond on file with Commission**

Drilling Contractor **To be furnished at a later date**

We intend to complete this well in the **Mississippian** formation at an approximate depth of **12,600'** feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Sacks Cement
24"	20"	53.6#	New	400	Circulate
17-1/4"	13-3/8"	48#	"	1400	"
12-1/4"	9-5/8"	32.3-36#	"	4000	"
8-3/4"	5-1/2"	17-20#	"	12,600	Sufficient to cover all indicated pays

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

Comments to comply with provisions of NMOCC Order R-111A

* See attached comments on location.

Approved _____, 19____
Except as follows:

OIL CONSERVATION COMMISSION

By _____

Sincerely yours,

Pan American Petroleum Corporation

(Company or Operator)

By _____

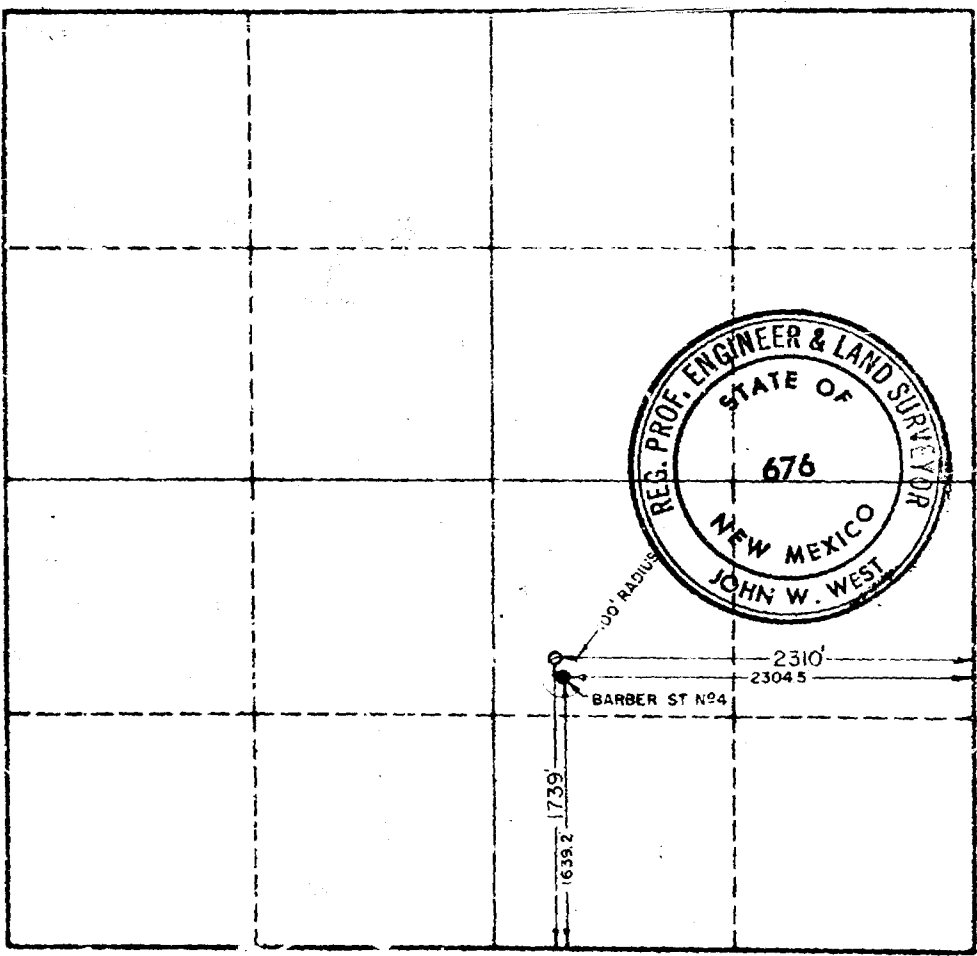
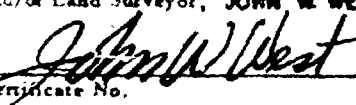
Position **Area Superintendent**

Send Communications regarding well to

Name **V. E. Staley**

Address **Box 68 - Hobbs, New Mexico - 88240**

File 3029

NEW MEXICO OIL CONSERVATION COMMISSION						FORM C-128 Revised 3/1/57
WELL LOCATION AND AGREEMENT OFFICE DEDICATION PLAT						
SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE						
SECTION 12 N 8 E 49						
Operator PAN AMERICAN PET. CORP.			STATE CS		Well No. 1 ALTERNATE	
Unit Letter J	Section 17	Township 20 SOUTH	Range 30 EAST	County EDDY		
Actual Footage Location of Well 1739 feet from the SOUTH line and 2310 feet from the EAST line						
Ground Level Elev. 1739	Producing Formation Mississippian		Pool Wildcat	Dedicated Acreage 40 Acres		
<p>1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> ("Owner" means the person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another. (63-3-29 (a) N.M.S.A. 1935 (comp.))</p> <p>2. If the answer to question one is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES <input type="checkbox"/> NO <input type="checkbox"/> If answer is "yes," Type of Consolidation _____</p> <p>3. If the answer to question two is "no," list all the owners and their respective interests below _____</p>						
Owner			Land Description			
<div><div>SECTION B</div><div>0 330 660 990 1320 1650 1980 2310 2640 2000 1500 1000 500 0</div></div>						
<div><div>CERTIFICATION</div><p>I hereby certify that the information in SECTION A above is true and complete to the best of my knowledge and belief.</p><p>_____ Position Area Superintendent Company Pan American Petroleum Corp. Date March 6, 1964</p><p>I hereby certify that the well location shown on the plat in SECTION B was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.</p><p>Date Surveyed 3/3/64 Registered Professional Engineer and/or Land Surveyor, JOHN W. WEST  Certificate No. N.M. - P.E. & L.S. NO. 676</p></div>						

Case 3029

MAIN OFFICE OCC

ATTACHMENT TO FORM G-101 DATED FEBRUARY 25, 1964,
PAN AMERICAN STATE OIL & GAS CO. NO. 149
SECTION 17, T-20-S, R-30-E

Re Arbitration Meeting held at USGS Office in Roswell, New Mexico, on February 6, 1964. Above location is the best considering customary rig equipment arrangement within 100' of the Barber "4-A" Well; however, as discussed in the Arbitration Meeting, Pan American is agreeable to a location anywhere within a 100' radius circle, the center of the circle being the Barber "4-A" well located 1639.2' FSL and 2304.5' FEL, Section 17, T-20-S, R-30-E. This is an alternate location with agreement made at the Arbitration Meeting for both Pan American and Potash Company of America to waive requirement for an additional arbitration meeting.

A plat showing the location of the proposed well is attached hereto.

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

Case 3029

March 13, 1964

C
O
P
Y

Mr. Ross Malone
Atwood & Malone
Attorneys at Law
P. O. Drawer 700
Roswell, New Mexico 88201

DOCKET MAILED

Date 4/3/64

Dear Mr. Malone:

With further reference to Pan American's application to drill in the SE/4 of Section 17, Township 20 South, Range 30 East, this is to confirm that a case will be docketed for the consideration of this matter on April 15, 1964, which is the regular monthly hearing date.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

cc: Mr. R. H. Blackman
Resident Counsel
Potash Company of America
Carlsbad, New Mexico

Mr. M. L. Armstrong, Supervisor
Oil Conservation Commission
Artesia, New Mexico

DOCKET MAILED

Date 4-3-64



POTASH COMPANY OF AMERICA

MINE AND REFINERY: P. O. BOX 31 • CARLSBAD, NEW MEXICO • TEL 5-2111

1964 MAR 13 AM 8:13

March 12, 1964

R. H. BLACKMAN
RESIDENT COUNSEL

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

Re: Pan American Petroleum Corporation Notice of Intention
to Drill Pan American's State "CS" Well No. 1-SE/4 of
Section 17, Township 20 South, Range 30 East, N.M.P.M.,
Eddy County, New Mexico

Dear Mr. Porter:

We acknowledge receipt of a copy of Mr. Malone's March 10
letter to you regarding the matter referenced.

Potash Company of America hereby objects to the drilling
of a well at any location within the SE/4 of Section 17,
T.20S., R.30E., N.M.P.M., waives an arbitration meeting
as provided for by Order R111-A, Case No. 278 and con-
sents to a joint hearing on the original Notice of Inten-
tion to Drill and the alternate Notice.

Very truly yours,

RHB:mw
cc: Ross L. Malone, Esq.
P.O. Drawer 700
Roswell, New Mexico



MEMBER: AMERICAN POTASH INSTITUTE

DOCKET: REGULAR HEARING - WEDNESDAY - APRIL 15, 1964

OIL CONSERVATION COMMISSION - 9 A.M. - MORGAN HALL, STATE LAND OFFICE BUILDING,
SANTA FE, NEW MEXICO

- ALLOWABLE:
- (1) Consideration of the oil allowable for May, 1964;
 - (2) Consideration of the allowable production of gas for May, 1964, from ten prorated pools in Lea and Eddy Counties, New Mexico, also consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico for May, 1964.

CASE 3029: Application of Pan American Petroleum Corporation for permission to drill in the Potash-Oil Area, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill a well to the Mississippian formation at an approximate depth of 12,600 feet, said well to be located 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, Eddy County, New Mexico, or to drill said well at an alternate location anywhere within a circle of 100 feet radius around the Barber Well No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17. The above location and the alternate location are in the Potash-Oil Area as defined by the Commission in Order No. R-111-A as amended.

CASE 2942: (De Novo - Continued from the March Regular Hearing)
Application of Sunray DX Oil Company for the creation of a new pool and for temporary pool rules, Lea County, New Mexico. Upon application of Sunray DX Oil Company, this case will be heard De Novo under the provisions of Rule 1220. The case may be continued to the next regular hearing.

CASE 3030: Southeastern New Mexico nomenclature case calling for an order for the creations, extensions, abolishment, and contraction of certain pools in Lea, Eddy, and Roosevelt Counties, New Mexico:

- a) CREATE A new oil pool for San Andres production, designated as the Allison-San Andres Pool, and described as:

TOWNSHIP 8 SOUTH, RANGE 37 EAST, NMPM
SECTION 31: NE/4

- b) CREATE A new oil pool for San Andres production, designated as the North Allison-San Andres Pool, and described as:

TOWNSHIP 8 SOUTH, RANGE 37 EAST, NMPM
SECTION 19: NW/4

- c) CREATE A new gas pool for Pennsylvanian (Morrow) production, designated as the Antelope Ridge-Morrow Pennsylvanian Gas Pool, and described as:

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM
SECTION 4: NE/4

- d) CREATE A new oil pool for San Andres production, designated as the Flying "M"-San Andres Pool, and described as:

TOWNSHIP 9 SOUTH, RANGE 33 EAST, NMPM
SECTION 21: NW/4

- 2 - April 15, Nomenclature

- e) CREATE A new gas pool for Paddock production , designated as the North Paddock Gas Pool, and described as:

TOWNSHIP 21 SOUTH, RANGE 37 EAST, NMPM
SECTION 2: Lots 3, 4, 5, and 6

- f) CREATE A new oil pool for San Andres production, designated as the Tamano-San Andres Pool, and described as:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM
SECTION 35: SE/4 SE/4

- g) ABOLISH the North Justis-Blinebry Pool described as:

TOWNSHIP 24 SOUTH, RANGE 37 EAST, NMPM
SECTION 34: E/2 SE/4
SECTION 35: S/2 and NE/4
SECTION 36: W/2

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 1: W/2
SECTION 2: ALL
SECTION 11: N/2

- h) EXTEND the Justis Blinebry Pool to include:

TOWNSHIP 24 SOUTH, RANGE 37 EAST, NMPM
SECTION 34: E/2 SE/4
SECTION 35: S/2 and NE/4
SECTION 36: W/2

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 1: W/2
SECTION 2: ALL
SECTION 11: N/2, SW/4, and N/2 SE/4
SECTION 35: SE/4

- i) EXTEND the Atoka-San Andres Pool to include:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
SECTION 13: SE/4 SW/4

- j) EXTEND the South Brunson-Ellenburger Pool to include:

TOWNSHIP 22 SOUTH, RANGE 38 EAST, NMPM
SECTION 31: SE/4

- k) EXTEND the Drinkard Pool to include:

TOWNSHIP 22 SOUTH, RANGE 38 EAST, NMPM
SECTION 17: NW/4

- l) EXTEND the Flying "M"-Abo Pool to include:

TOWNSHIP 9 SOUTH, RANGE 33 EAST, NMPM
SECTION 23: W/2

- 3 - April 15, Nomenclature

- m) EXTEND the Gladiola-Wolfcamp Pool to include:

TOWNSHIP 12 SOUTH, RANGE 38 EAST, NMPM
SECTION 5: SE/4

- n) EXTEND the North Hackberry-Yates Pool to include:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
SECTION 29: SE/4 NE/4

- o) EXTEND the Inbe-Pennsylvanian Pool to include:

TOWNSHIP 11 SOUTH, RANGE 33 EAST, NMPM
SECTION 12: SE/4

TOWNSHIP 11 SOUTH, RANGE 34 EAST, MPM
SECTION 7: E/2 NW/4

- p) EXTEND the North Justis Tubb-Drinkard Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 11: N/2 SE/4

- q) EXTEND the Kemnitz-Wolfcamp Pool to include:

TOWNSHIP 16 SOUTH, RANGE 34 EAST, NMPM
SECTION 27: NW/4

- r) EXTEND the Lusk-Strawn Pool to include:

TOWNSHIP 19 SOUTH, RANGE 32 EAST, NMPM
SECTION 8: SW/4
SECTION 17: NW/4
SECTION 19: SW/4
SECTION 29: SW/4

- s) EXTEND the Mescalero-San Andres Pool to include:

TOWNSHIP 10 SOUTH, RANGE 32 EAST, NMPM
SECTION 11: SW/4

- t) EXTEND the Milnesand-San Andres Pool to include:

TOWNSHIP 8 SOUTH, RANGE 34 EAST, NMPM
SECTION 25: S/2 NE/4

TOWNSHIP 8 SOUTH, RANGE 35 EAST, NMPM
SECTION 30: NW/4

- u) EXTEND the Monument-Tubb Pool to include:

TOWNSHIP 20 SOUTH, RANGE 37 EAST, NMPM
SECTION 3: W/2
SECTION 9: SE/4
SECTION 10: NW/4

- 4 - April 15, Nomenclature

- u) EXTEND the Oil Center-Blinebry Pool to include:

TOWNSHIP 20 SOUTH, RANGE 37 EAST, NMPM
SECTION 32: SW/4

TOWNSHIP 21 SOUTH, RANGE 36 EAST, NMPM
SECTION 10: SE/4

- w) EXTEND the Paddock Pool to include:

TOWNSHIP 21 SOUTH, RANGE 37 EAST, NMPM
SECTION 22: S/2 SW/4

- x) EXTEND the Scharb-Bone Springs Pool to include:

TOWNSHIP 19 SOUTH, RANGE 35 EAST, NMPM
SECTION 8: NW/4

- y) EXTEND the Shugart Pool to include:

TOWNSHIP 18 SOUTH, RANGE 30 EAST, NMPM
SECTION 25: E/2 NE/4

- z) EXTEND the Vacuum-Abo Reef Pool to include:

TOWNSHIP 17 SOUTH, RANGE 35 EAST, NMPM
SECTION 24: SE/4
SECTION 25: NE/4

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
SECTION 3: S/2 SE/4
SECTION 10: NE/4

- sa) EXTEND the East Weir-Blinebry Pool to include:

TOWNSHIP 20 SOUTH, RANGE 37 EAST, NMPM
SECTION 13: NE/4

- bb) EXTEND the Artesia Pool to include:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM
SECTION 7: W/2

- cc) CONTRACT the Loco Hills Pool by the deletion of the following area:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM
SECTION 7: W/2

Case 3029
ATWOOD & MALONE

LAWYERS
1964 MAR 12 AM 8:38

JEFF D. ATWOOD (1883-1950)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON

P. O. DRAWER 700
TELEPHONE 575 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

March 10, 1964

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

Re: Pan American Petroleum Corporation Notice of Intention
to Drill Pan American's State "CS" Well No. 1 - SE/4 of
Section 17, Township 20 South, Range 30 East, N.M.P.M.,
Eddy County, New Mexico

Dear Mr. Porter:

In accordance with the understanding reached at the arbitration meeting between Pan American Petroleum Corporation and Potash Company of America at Roswell on February 6, 1964, I am enclosing herewith alternate Notice of Intention to Drill the referenced well by Pan American Petroleum Corporation. By this alternate notice Pan American expresses its willingness to drill at a location anywhere within a 100 foot circle around the Barber "4-A" well located 1,650 feet FSL and 2,310 feet FEL, Section 17, Township 20 South, Range 30 East, N.M.P.M.

It is Pan American's understanding of the arrangement agreed to on February 6th that it will waive the filing of an additional protest by Potash Company of America and will treat the protest originally filed as applicable to this alternate location also. It is also our understanding that both Pan American and Potash Company of America will waive the holding of an additional arbitration meeting on this alternate notice and that the original notice and alternate notice will be heard by the Commission at the time of the April meeting of the Commission or at such other time as the Commission finds to be convenient. This letter will evidence Pan American's:

1. Waiver of the filing of an additional protest by Potash Company of America, and,

Page 2

Mr. A. L. Porter, Jr.

MAIN OFFICE OCC

1964 MAR 12 AM 8:38

2. Waiver of an arbitration meeting as provided by Order No. R-111-A, Case No. 278,
3. Consent to a joint hearing on the original Notice of Intention to Drill and the enclosed alternate Notice of Intention to Drill the referenced well.

I assume that Potash Company of America will immediately confirm to you its waiver of the formalities in accordance with the agreement reached at the meeting in Roswell. A copy of this letter, together with a copy of the enclosed notice is being forwarded to Potash Company of America by registered mail. If anything further is required of Pan American in this connection, please advise me.

Very truly yours,

R. L. Malone
for ATWOOD & MALONE

R
L
M

*

v
Encls.

DOCKET MAILED

Cc: Mr. Neil S. Whitmore
District Superintendent
Pan American Petroleum Corporation
Post Office Box 268
Lubbock, Texas

Date 4-3-64

Roy S. Blackman, Esquire
Potash Company of America
Carlsbad, New Mexico

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NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Form C-101
Revised (12/1/55)

NOTICE OF INTENTION TO DRILL

Notice must be given to the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in **QUINTUPLICATE**. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission. If State Land submit 6 Copies Attach Form C-128 in triplicate to first 3 copies of form C-101

Hobbs, New Mexico
(Place)

March 6, 1964
(Date)

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

(Alternate Location)

Gentlemen:

You are hereby notified that it is our intention to commence the Drilling of a well to be known as

Pan American Petroleum Corporation

(Company or Operator)

State of New Mexico "CS" (Lease), Well No. **1**, in **J** (Unit). The well is located **1739** feet from the **South** line and **2210** feet from the **East** line of Section **17**, T. **20-S**, R. **30-E**, NMPM. (GIVE LOCATION FROM SECTION LINE) **Wildest** **Edg** County

If State Land the Oil and Gas Lease is No. **B-2386**

If patented land the owner is

Address

We propose to drill well with drilling equipment as follows: **0-12,600' with tools**

The status of plugging bond is **Blanket bond on file with Commission**

Drilling Contractor **To be furnished at a later date**

We intend to complete this well in the **Mississippian** formation at an approximate depth of **12,600'** feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Sacks Cement
24"	20"	53.6#	New	400	Cemented
17-1/4"	13-3/8"	48#	"	1400	"
12-1/4"	9-5/8"	32.3-36#	"	4000	"
8-3/4"	5-1/2"	17-20#	"	12,600	Sufficient to

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

Comments to comply with provisions of NMOCC Order R-111A

* See attached comments on location.

Approved....., 19.....
Except as follows:

OIL CONSERVATION COMMISSION

By.....

Sincerely yours,

Pan American Petroleum Corporation

(Original Signed By) (Company or Operator)

By **V. E. STALEY**

Position **Area Superintendent**

Send Communications regarding well to

Name **V. E. Staley**

Address **Box 63 - Hobbs, New Mexico - 88240**

Case 3029

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

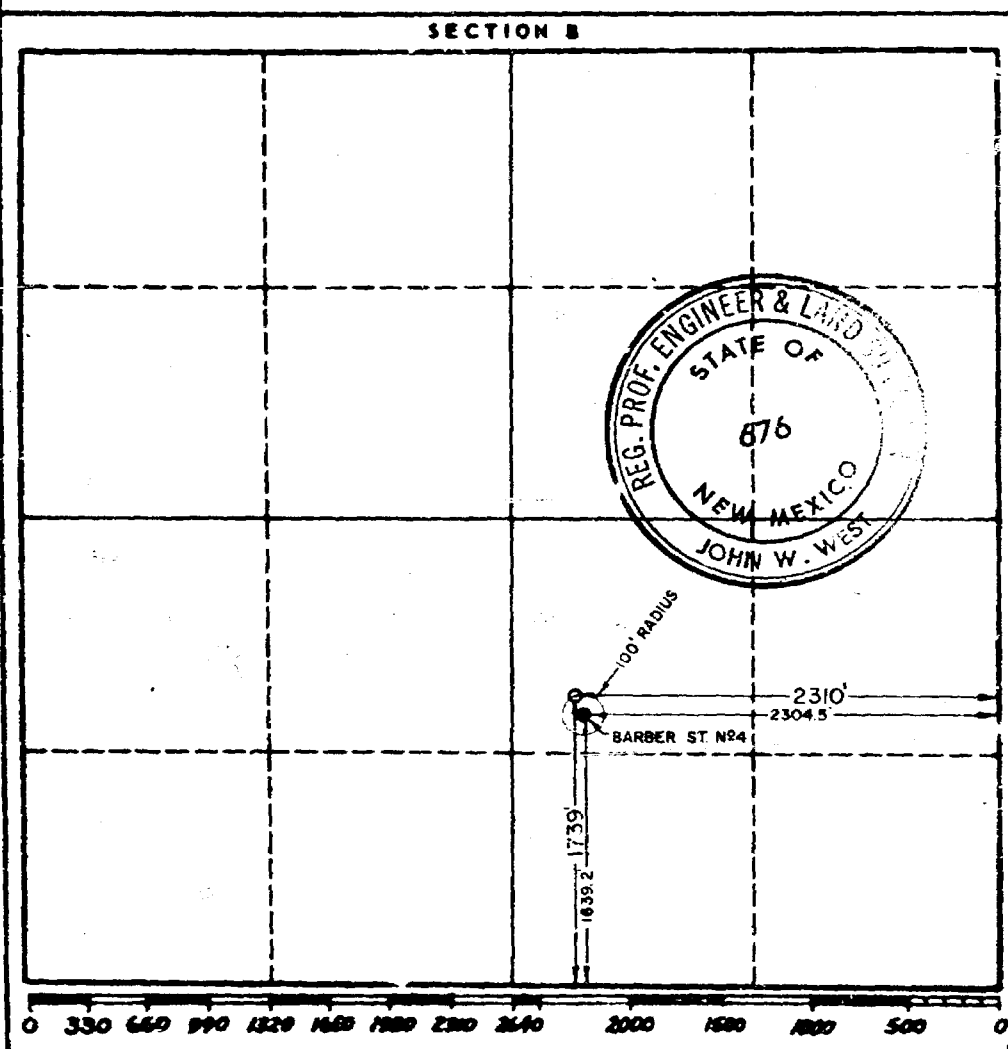
FORM C-128
 Revised 5/1/57

SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE

SECTION A				
Operator PAN AMERICAN PET. CORP.		Lease STATE CS		Well No. 1 ALTERNATE
Unit Letter J	Section 17	Township 20 SOUTH	Range 30 EAST	County EDDY
Actual Postage Location of Well: 1739 feet from the SOUTH line and 2310 feet from the EAST line				
Ground Level Elev.	Producing Formation Mississippian		Pool Wildcat	Dedicated Acreage: 40 Acres

1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES ☒ NO ☐ ("Owner" means the person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another. (65-3-29 (e) NMSA 1935 Comp.)
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES ☐ NO ☐ If answer is "yes," Type of Consolidation _____
3. If the answer to question two is "no," list all the owners and their respective interests below:

Owner	Land Description



CERTIFICATION

I hereby certify that the information in SECTION A above is true and complete to the best of my knowledge and belief.

Name Original Signed by:
V. E. STALEY
 Position
Area Superintendent
 Company
Pan American Petroleum Corp.
 Date
March 6, 1964

I hereby certify that the well location shown on the plat in SECTION B was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed
5/3/64
 Registered Professional Engineer and/or Land Surveyor, **JOHN W. WEST**

 Certificate No.
N. M. - P. E. & L. S. NO. 876

Case 3029

MAIN OFFICE OCC

ATTACHMENT TO FORM C-101 DATED FEBRUARY 25, 1964,

PAN AMERICAN STATE "CS" 1964 MAR 12 AM 8:49

SECTION 17, T-20-S, R-30-E

Re Arbitration Meeting held at USGS Office in Roswell, New Mexico, on February 6, 1964. Above location is the best considering customary rig equipment arrangement within 100' of the Barber "4-A" Well; however, as discussed in the Arbitration Meeting, Pan American is agreeable to a location anywhere within a 100' radius circle, the center of the circle being the Barber "4-A" well located 1639.2' FSL and 2304.5' FEL, Section 17, T-20-S, R-30-E. This is an alternate location with agreement made at the Arbitration Meeting for both Pan American and Potash Company of America to waive requirement for an additional arbitration meeting.

A plat showing the location of the proposed well is attached hereto.

SUBPOENA

THE STATE OF NEW MEXICO,

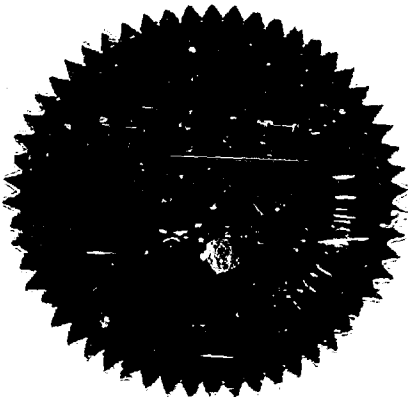
Case No. 3029

To J. B. Livingston, Greeting:

You are hereby commanded to appear before the New Mexico Oil Conservation Commission at Morgan Hall, Santa Fe, New Mexico, on April 15, 1964, at the hour of 9:00 A.M., and there to testify in a cause therein pending wherein Pan American Petroleum Corporation is Applicant, on the part of Pan American Petroleum Corporation.

And this do you under penalty of the law.

Witness the Oil Conservation Commission of the State of New Mexico and the Seal of said Commission, this 14th day of April, A.D., 1964.


A. L. Porter, Jr.
Director
Oil Conservation Commission
of the State of New Mexico

RETURN OF SERVICE

I, the undersigned, a citizen of the United States of America, over 21 years of age, and not having an interest in the foregoing matter, certify that I made service of the foregoing subpoena by delivering a copy thereof to J. B. Livingston in Santa Fe, New Mexico, on the 14 day of April, 1964.

G. Russell Wilson

SUBSCRIBED AND SWORN TO BEFORE ME, THE UNDERSIGNED NOTARY PUBLIC, ON THIS 15th DAY OF APRIL, 1964.

James M. Durbin
Notary Public

MY COMMISSION EXPIRES: December 3, 1965

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

May 14, 1964

Mr. Ross Malone
Atwood & Malone
Attorneys at Law
Post Office Box 700
Roswell, New Mexico

Mr. Roy Blackman
Potash Company of America
Post Office Box 31
Carlsbad, New Mexico

Re: CASE 3029

Gentlemen:

On May 13, 1964, the Commission reached a decision in the above case. The application of Pan American Petroleum Corporation for permission to drill in the Potash-Oil Area, Eddy County, New Mexico, will be denied. Please submit requested findings by June 5, 1964.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ix

C
O
P
Y

CASF. 3029 - MISCELLANEOUS
CORRESPONDENCE

RECEIVED	
DISTRIBUTION	
FILE	
LAND OFFICE	
TRANSPORT	
OPERATION OFFICE	
OPERATOR	

NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Form O-101
Revised (12/1/55)

NOTICE OF INTENTION TO DRILL

Notice must be given to the District Office of the Oil Conservation Commission and approval obtained before drilling or recompletion begins. If changes in the proposed plan are considered advisable, a copy of this notice showing such changes will be returned to the sender. Submit this notice in **QUINTUPPLICATE**. One copy will be returned following approval. See additional instructions in Rules and Regulations of the Commission. **If State Land submit 6 Copies Attach Form O-128 in triplicate to first 3 copies of form O-101**

Santa Fe, New Mexico
(Place)

November 20, 1963
(Date)

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Gentlemen:

You are hereby notified that it is our intention to commence the Drilling of a well to be known as

Pen American Petroleum Corporation

State of New Mexico
(Lease)

Well No. **1**, in **1** The well is located **600** feet from the **South** line and **600** feet from the **East** line of Section **17**, T. **20-S**, R. **20-S**, NMPM. (GIVE LOCATION FROM SECTION LINE) **Wildcat** Pool, **Blanco** County

D	C	B	A
E	F	G	H
L	K	J	I
M	N	O	8

If State Land the Oil and Gas Lease is No. **2-4386**

If patented land the owner is

Address

We propose to drill well with drilling equipment as follows: **0-12,400' with rotary tools.**

The status of plugging bond is **Blanket bond on file with Commission**

Drilling Contractor

To be furnished at a later date

We intend to complete this well in the **Blanco** formation at an approximate depth of **12,400'** feet.

CASING PROGRAM

We propose to use the following strings of Casing and to cement them as indicated:

Size of Hole	Size of Casing	Weight per Foot	New or Second Hand	Depth	Sacks Cement
2 1/2"	2 1/2"	22.6	New	400	Circulate
17-1/2"	12-1/2"	20	New	1400	Circulate
12-1/2"	9-1/2"	22.2-24	New	4000	Circulate
2-3/4"	2-1/2"	27-00	New	12400	Sufficient to cover all indicated pays.

If changes in the above plans become advisable we will notify you immediately.

ADDITIONAL INFORMATION (If recompletion give full details of proposed plan of work.)

Comes to comply with provisions of NMOS Order 2-1114

Approved....., 19.....
Except as follows:

OIL CONSERVATION COMMISSION

By

Superintendent Co. of American-P.O.Box 11, Santa Fe, N.M.

Sincerely yours,

Pen American Petroleum Corporation

By **V. E. STALEY** (Company or Operator)

By

Position **Area Superintendent**

Send Communications regarding well to

V. E. Staley

Name

Address **Box 60 - Hobbs, New Mexico**

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

FORM C-128
 Revised 5/1/57

SEE INSTRUCTIONS FOR COMPLETING THIS FORM ON THE REVERSE SIDE

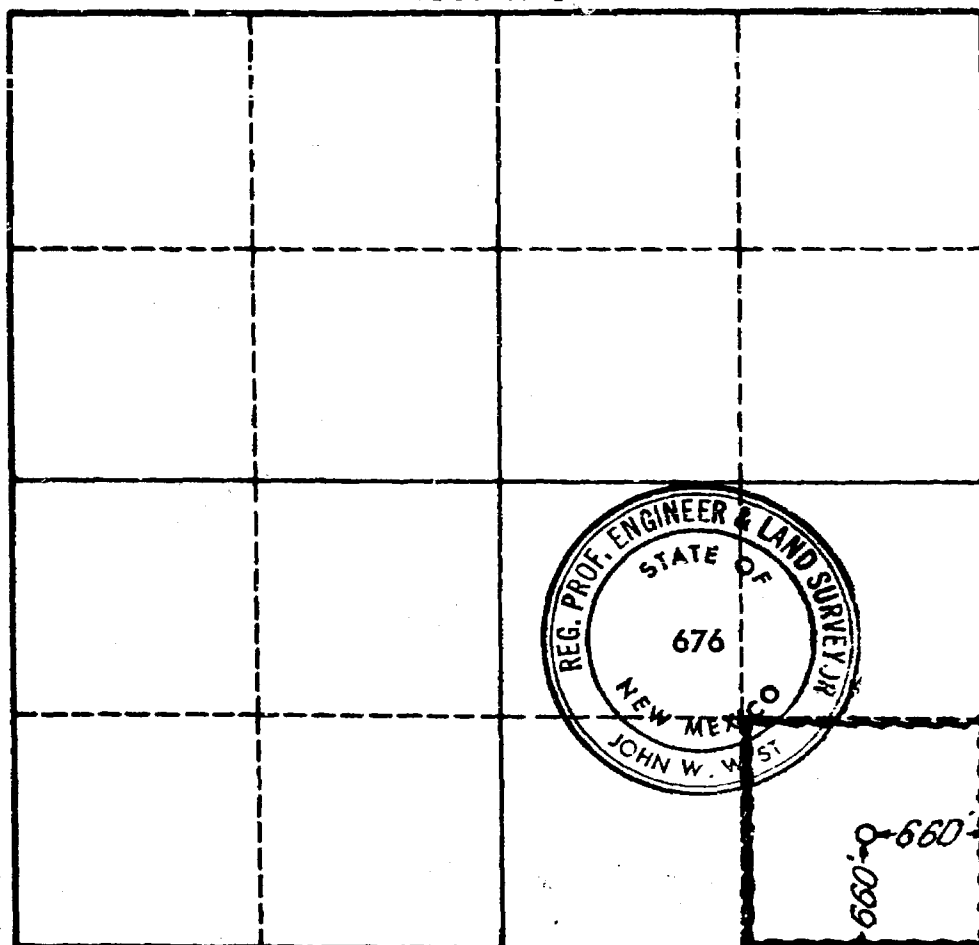
SECTION A

Operator Pan American		Lessee State C S		Val No. 1
Well Letter P	Section 17	Township 20	Range 30	County Eddy
Actual Footage Location of Well: 660 feet from the South line and 660 feet from the East line				
Ground Level Elev.	Producing Formation Mississippian	Pool Wildcat	Dedicated Acreage: 40 Acres	

1. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES ☒ NO ☐ ("Owner" means the person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another. (65-3-29 (e) NMSA 1935 Comp.)
2. If the answer to question one is "no," have the interests of all the owners been consolidated by communication agreement or otherwise? YES ☐ NO ☐ If answer is "yes," Type of Consolidation _____
3. If the answer to question two is "no," list all the owners and their respective interests below:

Owner	Land Description

SECTION B



CERTIFICATION

I hereby certify that the information in SECTION A above is true and complete to the best of my knowledge and belief.

Name Original Signed By
V. E. STALEY
 Position
~~Area Superintendent~~
~~Pan American Petroleum Corp.~~
 Date
November 22, 1963

I hereby certify that the well location shown on the plat in SECTION B was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed
11-16-63
 Registered Professional Engineer and/or Land Surveyor, **JOHN W. WEST**

 Certificate No.
N. M. - P. E. & L. S. NO. 676

0 320 640 960 1280 1600 1920 2240 2560 2880 3200 3520 3840 4160 4480 4800 5120 5440 5760 6080 6400



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P. O. BOX 1716
CARLSBAD, NEW MEXICO

IN REPLY REFER TO:

April 10, 1964

BEFORE THE
OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

Exhibit No. L

Case No. 3039

Potash Company of America
P. O. Box 31
Carlsbad, New Mexico

Gentlemen:

You recently requested that this office compile data relative to the potash orebody contained in the SE $\frac{1}{4}$, Sec. 17, T. 20 S., R. 30 E., N.M.P.M., New Mexico, which is embraced in your State of New Mexico potash lease, with special reference to unrecoverable tonnages and values involved in the event a high pressure gas or oil well should be drilled in the SE $\frac{1}{4}$, Sec. 17, which would require protection when mining operations progressed to the vicinity of the well.

Data sheets are attached hereto which set forth the information desired. The four potash core tests located at the four corners of the SE $\frac{1}{4}$, Sec. 17, indicate the potash orebody will average 4 feet in thickness with a grade of 24.8% K₂O. Tonnages are computed on the basis of 16 cubic feet = 1 ton. The average value per unit of K₂O during the current fertilizer year is 37.5 cents for standard muriate. Mining extraction is computed on the basis of 65% for first mining and 25% for second mining. Mill efficiency should approximate 90%. The orebody lies at an average depth of about 700 feet and observance of a 45 degree subsidence angle would be required to protect a producing oil or gas well. In the event of a high pressure gas well the normal 100-foot radius mine protection ore pillar adjacent to the well should be increased to at least a 200-foot radius pillar.

In summary, the potash orebody in the SE $\frac{1}{4}$, Sec. 17, computes to a recoverable value of \$81,870 per acre with a recoverable value per ton of ore of \$8.35. Total losses involved in protecting a producing oil or gas well compute to 116,632 tons with a recoverable value of \$973,877, consisting of a second mining loss of 88,358 tons and a well pillar loss of 28,274 tons.

While I am not aware of the future production potential of the Barber pool, the pool has been producing since discovery in 1937. In the normal course of events it would appear that, to some degree, production should be declining and the pool should be approaching economic exhaustion. If

this be true, it would not be unreasonable to assume that within the next sixteen years, which your company estimates as the remaining productive life of the mine, the pool wells normally would be plugged and abandoned, thus rendering available for mining the considerable tonnage of ore presently required to be left intact to protect the pool wells.

Very truly yours,

R. S. Fulton

R. S. Fulton
Regional Mining Supervisor

RSF:nb
Attachment:

POTASH ORE DATA - SE $\frac{1}{4}$, SEC. 17, T. 20 S., R. 30 E., N.M.P.M.

Average thickness and grade of ore under 160-acre tract:

<u>Well No.</u>	<u>% K₂O</u>	<u>Thickness in Feet</u>	<u>Assay Ft.</u>
P-32	24.0	4.0	96.00
P-4A	22.5	4.0	90.00
P-64	21.6	4.0	86.40
P-63	30.5	4.0	123.60
		<u>4/16.0</u>	<u>16/196.00</u>

Average thickness = 4.0 ft; Average Grade = 24.75% K₂O

Average value per unit of K₂O = 37.5 cents

Recoverable Value/Acre = $2,722.5 \times 4.0' \times .2475 \times .81 \times 100 \times .375 = \$81,870$

Recoverable Value/Ton = $.2475 \times .90 \text{ (Mill Efficiency)} \times 100 \times .375 = \$ 8.35$

Recoverable Ore Tons and Values Involved in 700 ft. Radius

Subsidence Area Containing 200 ft. Radius Solid Ore Pillar Left To
Protect High Pressure Gas or Oil Well

Conditions: 16 cu. ft. = 1 ton; first mining extraction = 65%;
second mining extraction = 25%; mill efficiency = 90%;
average depth of orebody = 700 feet.

Total subsidence area = $77 r^2 = 3.1416 \times (700')^2 = 1,539,384 \text{ sq. ft.}$

Total tons contained ore = $\frac{1,539,384 \times 4 \text{ ft.}}{16} = 384,846$

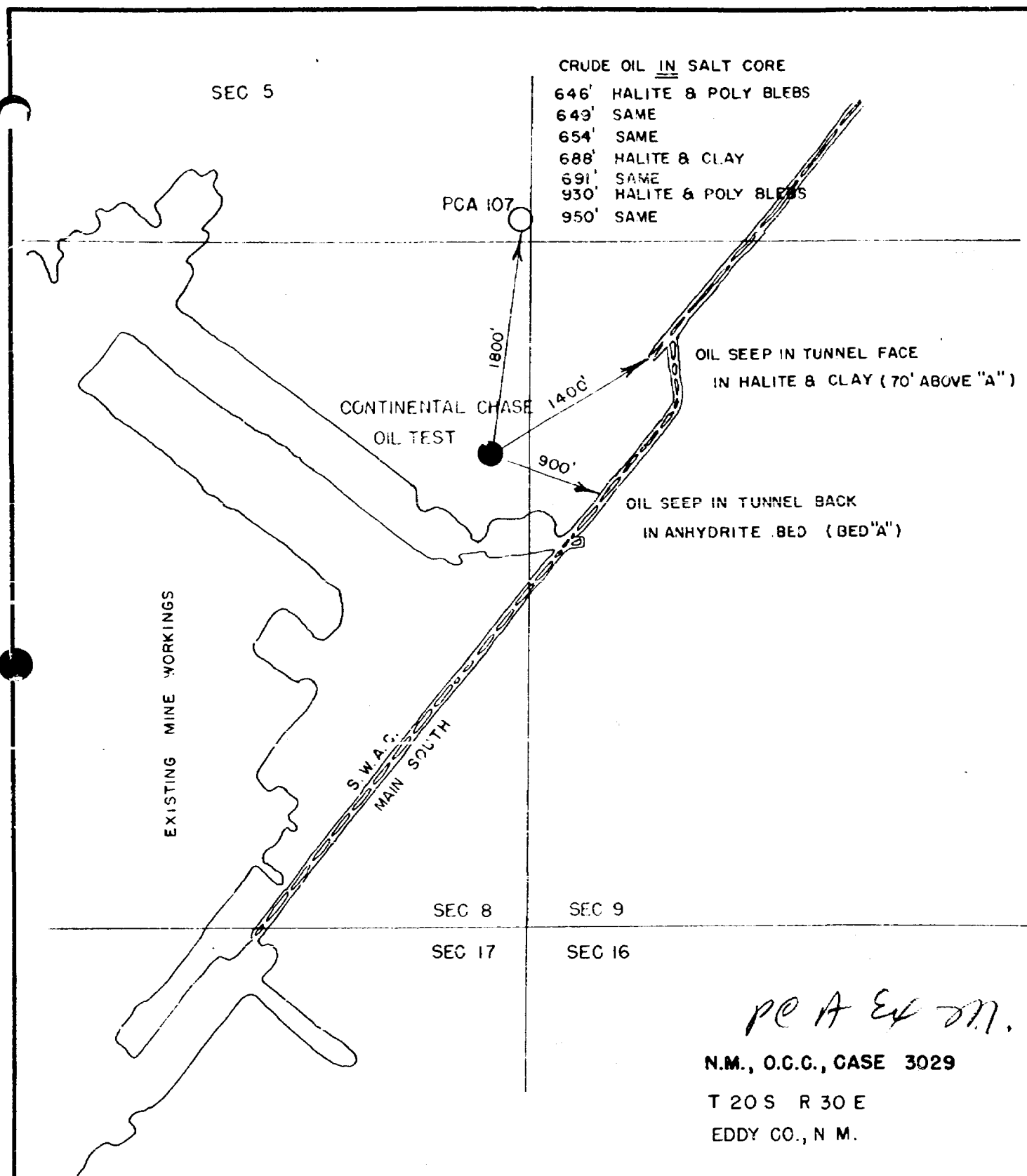
Solid Ore Pillar Area = $77 r^2 = 3.1416 \times (200')^2 = 125,664 \text{ sq. ft.}$

Total Tons contained ore = $\frac{125,664 \times 4 \text{ ft.}}{16 \text{ cu. ft.}} = 31,416$

	<u>Recoverable Tons</u>	<u>Value/Ton</u>	<u>Recoverable Value</u>
1st Mining (65% ext.)	250,150	\$ 8.35	\$ 2,088,753
2nd Mining (25% ext.)	<u>96,212</u>	<u>"</u>	<u>803,370</u>
<u>Total Mining</u>	<u>346,362</u>	<u>\$ 8.35</u>	<u>\$ 2,892,123</u>
Pillar Stumps (10%)	<u>(38,484)</u>	Not Recoverable	<u>(\$ 321,341)</u>
Total Ore	384,846	\$ 8.35	\$ 3,213,464

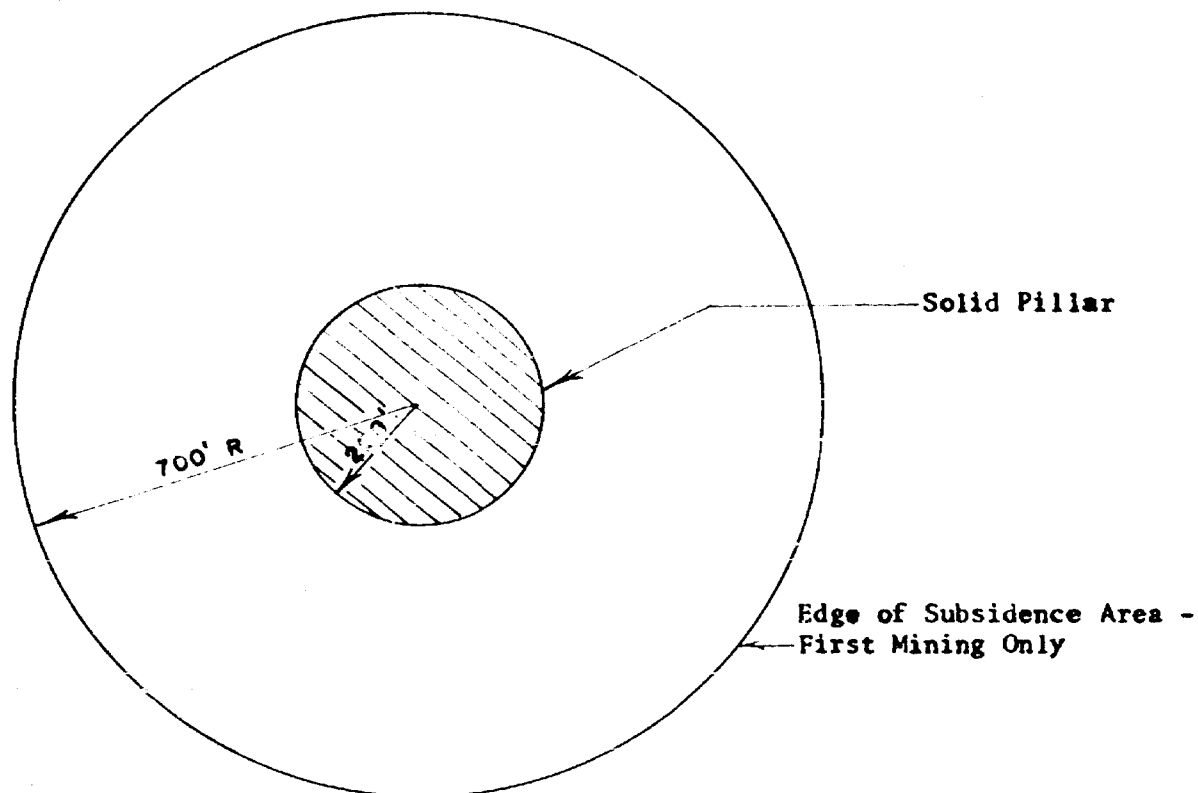
Recoverable Ore Tons and Value Lost in 700-ft. Radius Subsidence
Area Containing 200-ft. Radius Solid Ore Pillar to Protect Well:

	<u>Tons</u>	<u>Value/ton</u>	<u>Total Value</u>
Total Subsidence Area	384,846	\$ 8.35	\$ 3,213,464
Less Ore Pillar Area	- 31,416	"	- 262,324
Available Ore	353,430		\$ 2,951,140
Lost 2nd Mining (25% ext.)	- 88,358	"	- 737,789
Lost Recoverable Ore in Pillar (90% ext. of 31,416 tons)	- 28,274	"	- 236,088
Total Recoverable Ore Lost	<u>116,632</u>	\$ 8.35	<u>\$ 973,877</u>



APPROVED BY	SHOWING CONTINENTAL CHASE OIL TEST AND		POTASH COMPANY OF AMERICA	
	THE AREAS WHERE CRUDE OIL HAS BEEN		CARLSBAD, NEW MEXICO	
	ENCOUNTERED IN SALT.		DRAWN BY	DRAWING NO.
	SCALE- 1" = 1000'		DATE- MARCH 64	CHECKED BY
			DIRECTED BY	JBC

LOSS OF POTASH - OIL OR GAS WELL - PAN AMERICAN AREA



Factors:

(a) Thickness = 4.13'; (b) Ore Grade = 24.4% K₂O; (c) Extraction - 1st. Mining = 65%
2nd Mining = 25% - Total = 90%; (d) Tonnage Factor = 15.3 Cu. ft./ton; (e) Value =
37.5¢/Sh. Ton Unit K₂O; 90% Mill recovery; (f) Average depth to ore zone = 700';
Draw or subsidence angle = 45 degrees.

Ore Lost Area "A"

$$\frac{3.1416 \times (200')^2 \times 4.13' \times 0.90}{15.3} = 30,530 \text{ Tons}$$

$$30,530 \text{ T.} \times 24.4\% \text{ K}_2\text{O} \times 37.5\text{¢/Unit} \times .90 = \$251,700 \text{ Value}$$

Ore Lost Area "B"

$$\frac{[3.1416 \times (700')^2 - 3.1416 \times (200')^2] \times 4.13' \times 0.25}{15.3} = 95,400 \text{ Tons}$$

$$95,400 \text{ T.} \times 24.4\% \text{ K}_2\text{O} \times 37.5\text{¢/Unit} \times .90 = \$785,630 \text{ Value}$$

Total Ore Lost, Areas "A" and "B"

	<u>Tons</u>	<u>Value</u>
"A"	30,530	\$ 251,400
"B"	95,400	785,630
Totals	<u>125,930</u>	<u>\$1,037,030</u>

Area 3029
P.C.A. E.T.

JBC
Mar., 1964

T. 15 N., R. 20 W.,
 Secs. 1, 3, 5, 7, 9, 11, 13, 15, 17, and 21;
 Sec. 23, SW $\frac{1}{4}$;
 Secs. 25, 27, and 29;
 Sec. 31, less R/W AT&SF Ry., Manuelito Pipeline;
 Sec. 33;
 Sec. 35, NE $\frac{1}{4}$ and SW $\frac{1}{4}$.
 T. 11 N., R. 21 W.,
 Sec. 1;
 Sec. 3, lots 1 through 6, Incl. S $\frac{1}{2}$ NE $\frac{1}{4}$ and SE $\frac{1}{4}$;
 Secs. 11 and 13;
 Sec. 15, lots 1, 2, 3, and 4, E $\frac{1}{2}$.
 T. 12 N., R. 21 W.,
 Sec. 1;
 Sec. 3, lots 1 through 6, Incl. S $\frac{1}{2}$ NE $\frac{1}{4}$ and SE $\frac{1}{4}$;
 Sec. 11;
 Sec. 13, NE $\frac{1}{4}$ and S $\frac{1}{2}$;
 Sec. 15, lots 1, 2, 3, 4, E $\frac{1}{2}$;
 Secs. 23 and 25;
 Sec. 27, lots 1, 2, 3, 4, E $\frac{1}{2}$;
 Sec. 35.
 T. 13 N., R. 21 W.,
 Sec. 1, less R/W AT&SF Ry., FAP 76-B;
 Sec. 3, lots 1, 2, 3, and 4;
 Sec. 13, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, and S $\frac{1}{2}$;
 Sec. 15, lots 2, 3, 4, less R/W FAP 76-B;
 Secs. 23 and 25;
 Sec. 27, lots 1, 2, 3, and 4;
 Sec. 35.
 T. 14 N., R. 21 W.,
 Sec. 1, N $\frac{1}{2}$ and SW $\frac{1}{4}$;
 Sec. 3, lots 1, 2, 3, and 4;
 Secs. 11 and 13;
 Sec. 15, lots 1, 2, 3, and 4;
 Sec. 23;
 Sec. 25, S $\frac{1}{2}$ N $\frac{1}{2}$ and S $\frac{1}{2}$;
 Sec. 27, lots 1, 2, 3, and 4;
 Sec. 35, NE $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$, and S $\frac{1}{2}$.
 T. 15 N., R. 21 W.,
 Sec. 1;
 Sec. 3, lots 1, 2, 3, and 4;
 Secs. 11 and 13;
 Sec. 15, lots 1, 2, 3, and 4;
 Secs. 23 and 25;
 Sec. 27, lots 1, 2, 3, and 4;
 Sec. 35, W $\frac{1}{2}$.

The areas described aggregate 241,807.89 acres.

5. Some of the lands described in paragraph 2 of this order were declared by the Act of August 13, 1949 (63 Stat. 604; 25 U.S.C. 622), to be held by the United States in trust for the respective tribes, bands, or groups of Indians occupying and using them. The remainder were by the said Act declared to be public domain. As authorized by the said Act, an order of the Secretary of the Interior appearing at pages 1851-1858 of the FEDERAL REGISTER of March 31, 1950,

identified the lands in the respective categories. The public domain lands were opened by a Bureau of Land Management order of November 13, 1953 (18 F.R. 7496-7497).

6. The lands in the withdrawal of July 8, 1931, described in paragraph 3 of this order have been included in other orders of revocation or have been otherwise disposed of, with the exception of the following-described lands:

T. 2 N., R. 6 W.,
 Sec. 6, lot 3 and SE $\frac{1}{4}$ NW $\frac{1}{4}$.

7. The lands withdrawn by paragraph 4 of this order are all within the revocation made by paragraph 1. The objective of paragraph 4 of this order is to establish for ready reference the lands still remaining in the withdrawal created by the order of September 1, 1939, and to establish with certainty, without reference to other sources, the identity of those lands, at the same time releasing from the withdrawal made by the order of September 1, 1939, all lands no longer withdrawn for its purposes, because disposed of by exchange or otherwise.

8. Beginning at 10:00 a.m. on October 1, 1960, the lands in section 6, T. 2 N., R. 6 W., described in paragraph 6 of this order, shall be open to application, petition, location and selection, under applicable nonmineral public land laws, subject to valid existing rights, the requirements of applicable law, and the six-months preference right filing period granted to the State of New Mexico, by subsection (c) of section 2 of the act of August 27, 1958 (72 Stat. 928; 43 U.S.C. 851-2).

9. The lands described in paragraph 6 shall be open to location under the United States mining laws and to applications and offers under the mineral leasing laws at 10:00 a.m. on February 25, 1961. Mining locations made prior thereto shall be invalid.

10. Inquiries concerning the lands shall be addressed to the Manager, Land Office, Bureau of Land Management, Santa Fe, New Mexico.

ROGER ERNST,
 Assistant Secretary of the Interior.

AUGUST 26, 1960.

[F.R. Doc. 60-8238; Filed, Sept. 2, 1960; 8:47 a.m.]

[Public Land Order 2199]

[54464]

UTAH

Withdrawing Public Lands From Oil and Gas Leasing for Preservation and Development of Potash Deposits Belonging to the United States

By virtue of the authority vested in the President and pursuant to Executive Order No. 10353 of May 26, 1952, it is ordered as follows:

1. The following described lands are hereby withdrawn from appropriation under the oil and gas leasing provisions of the Mineral Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. 181, et seq.), as amended and supplemented for the purpose of preservation and development of potash deposits belonging to the United States:

SALT LAKE PRINCIPAL MERIDIAN

T. 26 S., R. 20 E.,
 Secs. 22 to 27, incl.;
 Sec. 34, E $\frac{1}{2}$;
 Secs. 35 and 36.
 T. 27 S., R. 20 E.,
 Sec. 1;
 Sec. 2, lots 1, 2, 7, 8, and S $\frac{1}{2}$ NE $\frac{1}{4}$.
 T. 26 S., R. 21 E.,
 Secs. 30 to 32, incl.
 T. 27 S., R. 21 E.,
 Secs. 4 to 6, incl.;
 Sec. 7, lots 1 to 4, incl., and NE $\frac{1}{4}$;
 Sec. 8, N $\frac{1}{2}$;
 Sec. 9, N $\frac{1}{2}$.

The areas described aggregate approximately 11,128 acres, of which approximately 9,445 acres are public lands.

2. The withdrawal effected by this order shall terminate ten years from and after the date of the publication of this order in the FEDERAL REGISTER unless it is extended by an appropriate order of extension. Upon the termination of the withdrawal, the lands shall again be subject to leasing for oil and gas development purposes upon such terms and conditions as the Secretary of the Interior may specify in an order of opening, consistent with the then existing law and regulations.

ELMER F. BENNETT,
 Under Secretary of the Interior.

AUGUST 29, 1960.

[F.R. Doc. 60-8239; Filed, Sept. 2, 1960; 8:47 a.m.]

This is a copy of the Public Land Order from the Federal Register 9/3/60.

Exh. O

Saskatchewan foremost in potash

GREAT NATURAL MARKET

Local potash ore has market advantages

The following remarks by IMC's Vice President A. E. Cassino, to the special preview guests last week, indicate the thriving market for Esterhazy potash:

Because of its location and the high grade of its ore, this mine has certain advantages that put it in a unique position.

We have a productive capacity of 1,000,000 tons a year — which is a lot of potash in anybody's book. Yet — because of economics peculiar to the potash industry — we actually find ourselves with a market potential of six million tons a year.

Basically, this is because of the fact that 114 nations in the world consume potash — and less than a dozen have potash deposits within their own borders.

Consequently, each producing point has its own natural market — a natural market being that portion of the world to which any given producer can ship more economically and efficiently than any other producer.

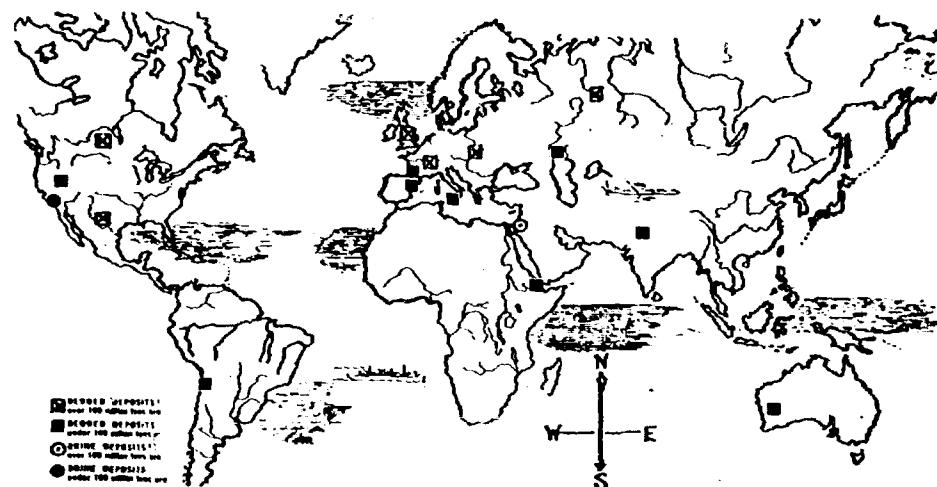
Six factors govern any producer's ability to compete in a foreign market. These are: grade of ore, mining costs, shipping costs from mine to port of embarkation, vessel loading costs, shipping cost from port of embarkation to port of debarkation, and finally, processing costs within the customer's plant.

Extensive computations reveal that Saskatchewan potash is so strategically located, and the ore is so rich, that any other producer could have to reduce its prices at the mine merely to match the customers landed costs for our potash.

And the area in which this holds true, our natural market area — is all of the Western hemisphere above the middle of the United States, with the exception of eastern Greenland; Australia and most of the islands of the South Pacific, and all of Free Asia as far west as half of India. Most importantly, Japan is part of this natural market.

While these facts alone do not assure the sale of more than a million tons a year, they do constitute a tremendous economic advantage. And when this advantage is added to the many others we possess, it is easy to see why we are confident of Esterhazy's future.

We have a full line of services, sizeable captive consumption, many attractive reciprocity agreements, the largest technical staff in the industry, a host of agrono-



This map shows the distribution of potash deposits throughout the world. On the North American continent there are only two bedded deposits of over 100 million tons, in Saskatchewan and New Mexico. Brine deposits are found in California, and in the great salt lake in Utah. The bedded deposits are layers of potassium salts deposited in the evaporation of ancient seas, and in these bedded deposits lie most of the world's potash. The brine deposits refer to a still incompletely evaporated lake, or seas, such as the Dead Sea. Potash can be recovered from brine by a further evaporation process.

Map from IMC World.

mists, a well trained and established overseas sales force based in strategic locations, and — very significantly — long-standing and intimate relationships with large customers in foreign markets.

It is interesting that this natural market for Canadian potash does not impinge on the natural markets for U.S. potash, including our own potash mine and refinery at Carleton Place. The natural market for U.S. producers is all of North America and South America, below the middle half of the United States. Naturally, the arrival of Canadian potash on the market will cause some displacement, but those most affected will be the older European producers. Even so, prices should remain firm. It simply will not be economical to try to compete with Canadian potash within its natural market. Moreover, demand for potash is growing at an annual rate of half a million tons. There is plenty of market for all.



The mighty deposits of potash laid down under Saskatchewan by the ancient seas extend in a varying belt from Manitoba to Alberta, running in a north-west direction. The potash deposits extend only a short distance into Manitoba, and little is reported in Alberta.

Three shafts have been sunk in the province to seek the potash. The one at Unity was started some years ago, and work has started and stopped at various times. The Potash Company of America sank a shaft at Patience Lake, near Saskatoon, four years ago, and they were the first people to produce potash in Saskatchewan.

After a few months operation, the mighty forces of the underground water endangered the shaft, and production had to cease because of the water entering the shaft. The task of grouting off this water has been going on ceaselessly at Saskatoon since that time, but production is still some time away.

The IMC shaft at Esterhazy was started in 1957, and production began this fall. The use of "lubbing" in the Blairmore, and very extensive grouting in other water bearing areas, has given a sound shaft here, with no water problems that will hinder the steady production of potash for many, many years.

CONGRATULATIONS

to

International Minerals and Chemical Corporation (Canada) Ltd.

on the occasion of K-Day, September 20th, 1962,
marking the start of full production at their
potash mine and refinery at Yarbo.

—from—

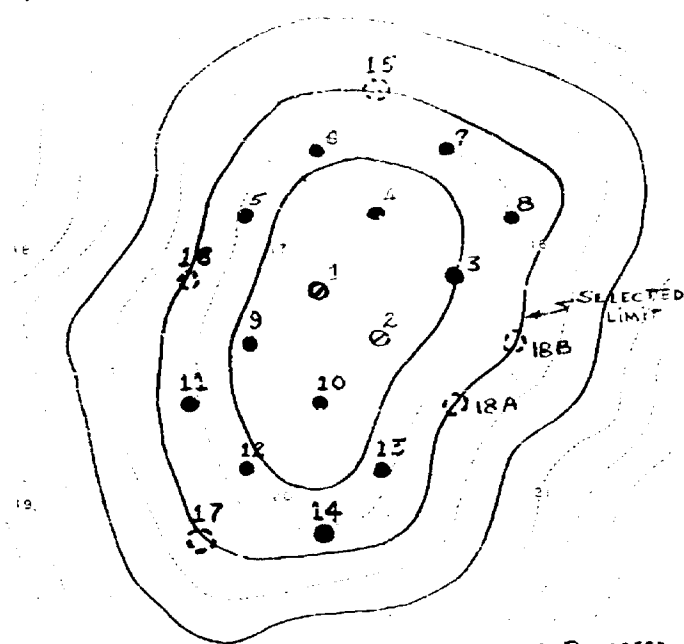
The Miner Rubber Company
LIMITED

Makers of Black Diamond Industrial Clothing and Safety Rubber Footwear

435 Cumberland Ave.,

Winnipeg 2, Man.

Exhibit



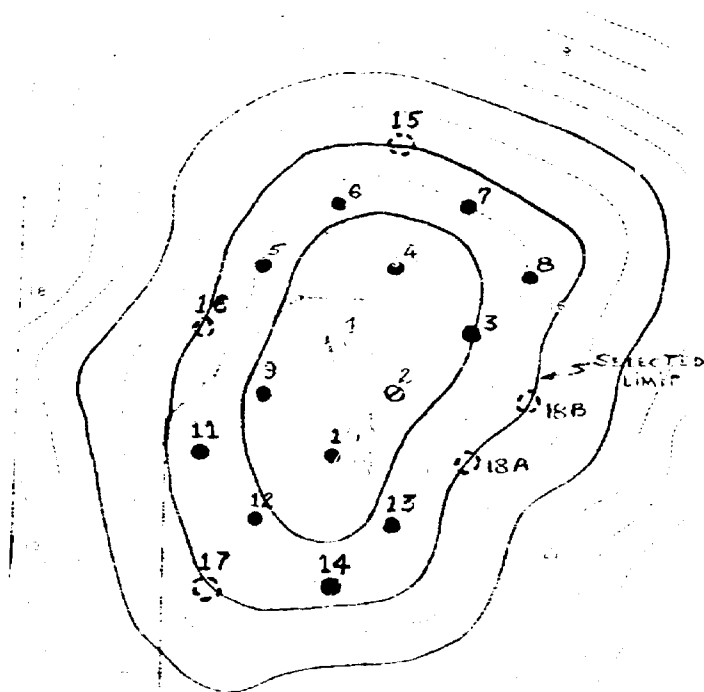
MAP 1

- Proposed
- DEFINITE
- ⊙ Probable

BEFORE THE
 U.S. CONSERVATION COMMISSION
 Santa Fe, New Mexico

Exhibit No. 3-1

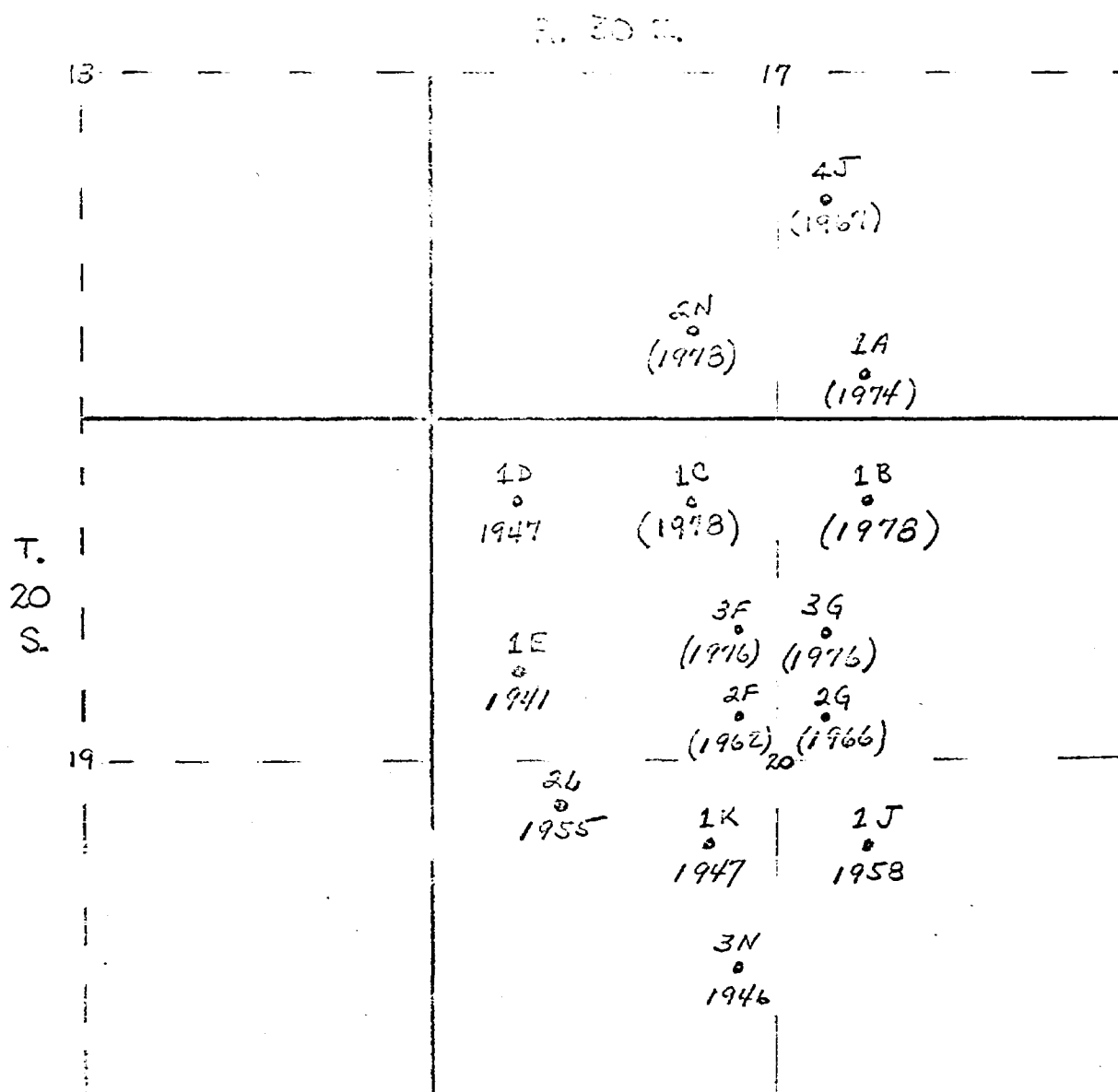
Case No. 3029



~~Call of TAP 2~~
~~Add line across~~
~~contours except for 17~~
~~which would have to~~
~~be an outlier~~

● Proposed
 ● Existing
 ⊗ Possible

BEFORE THE
 CONSERVATION COMMISSION
 Santa Fe, New Mexico
 Exhibit No. Q-2
 Case No. 3029



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Exhibit No. Q-3
Case No. 3029

BARBER FIELD
EDDY COUNTY, NEW MEXICO
ABANDONMENT SCHEDULE
(1970) -- Projected year
1950 -- Actual year

TABLE I. OIL FIELDS HAVING PRODUCED 10 MILLION BARRELS OR MORE
FROM FORMATIONS OF PENNSYLVANIAN AGE OR OLDER

Field	Formation	Thick- ness	Approx. Date Spac- ing	of Disc.	Crude Gravity	Cummulative Production to 1/1/62 MM Barrels.
LEA COUNTY						
Bagley Sil-Dev.	Siluro-Devonian	175	40	7-49	44	15
Brunson	Ellenbergor	70	40	9-45	42	27
Caprock East Dev.	Devonian	30	40	8-51	43	14
Crossroads Dev.	Devonian	100	80	5-48	42	13
Denton	Devonian	200	40	10-49	45	61
Gladiola	Devonian	50	40	11-50	47	35
Hare	Simpson	50	40	7-47	40	14

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Exhibit No. Q-4

Case No. 3029

TABLE III. RANGE OF CONDITIONS FOR POTENTIAL OIL
RESERVOIR IN PENNSYLVANIAN OR OLDER FORMATION

	<u>Worst</u>	<u>Best</u>	<u>Average</u>
PROPERTIES AND IN-PLACE VALUES			
Porosity, o/o	4	14	6
Water Saturation, o/o	50	20	35
Oil in Place Bbls/AF	110	620	216
Thickness, Ft.	10	200	75
Oil in Place Bbls/Acre	1,100	124,000	16,200

RECOVERY

	Solution Gas	Water	Solution Gas	Water	Solution Gas	Water
Recovery Bbls/Acre	180	450	25,000	50,000	2,916	6,480
Recovery Bbls/80 Acres	14,400	36,000	2,000,000	4,000,000	233,000	518,000
Recovery Dollars/80 Acres	\$43,200	\$108,000	\$6,000,000	\$12,000,000	\$700,000	\$1,554,000

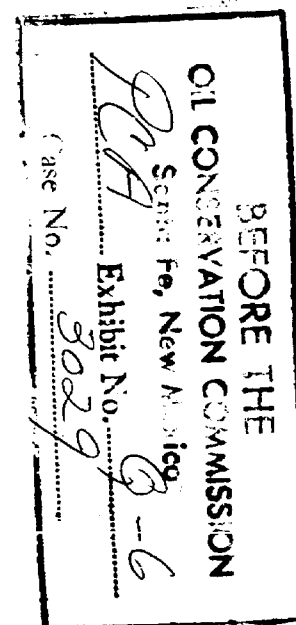


TABLE II. GAS FIELDS HAVING PRODUCED FIVE TRILLION CUBIC FEET OR MORE
EDDY COUNTY

Anderson Penn	Bend	40	320	10-54	6.8
Atoka Penn	Penn	31	160	10-57	5.1
Empire Penn	Penn	30	320	9-53	9.1
Shugart Sil-Dev.	Siluro-Devonian	70	480	2-57	8.1

LEA COUNTY

Bagley L Penn	Penn	10	160	10-51	8.3
Bagley U Penn	Penn		320	11-55	13.1
Crosby Dev.	Devonian	95	160	1-55	41.7
Monument McKee	Simpson	40	160	11-48	5.6

BEFORE THE
OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

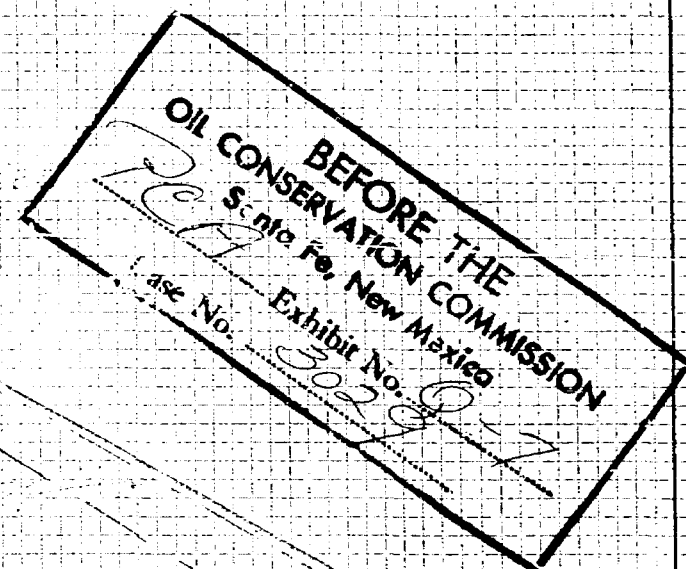
Exhibit No.

Case No.

9-5
3029

FIGURE 1

Gas Pressure Prediction
 with
 Underground Reservoirs



10.0
 10.0

1.0
 1.0

Compressive Gas Production, mscf

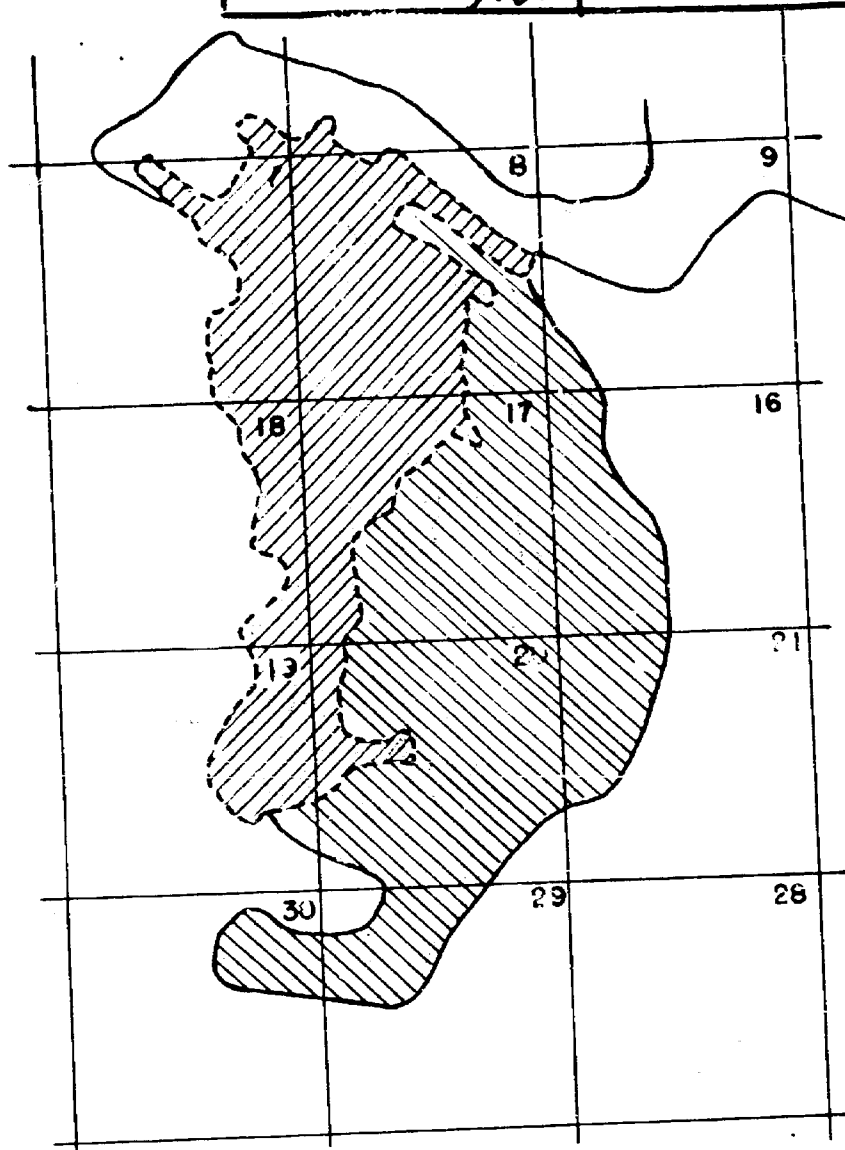
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

BEFORE THE
OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

PCA Exhibit No. H

Case No. 3029



T 20S , R 30E

EDDY CO., N.M.

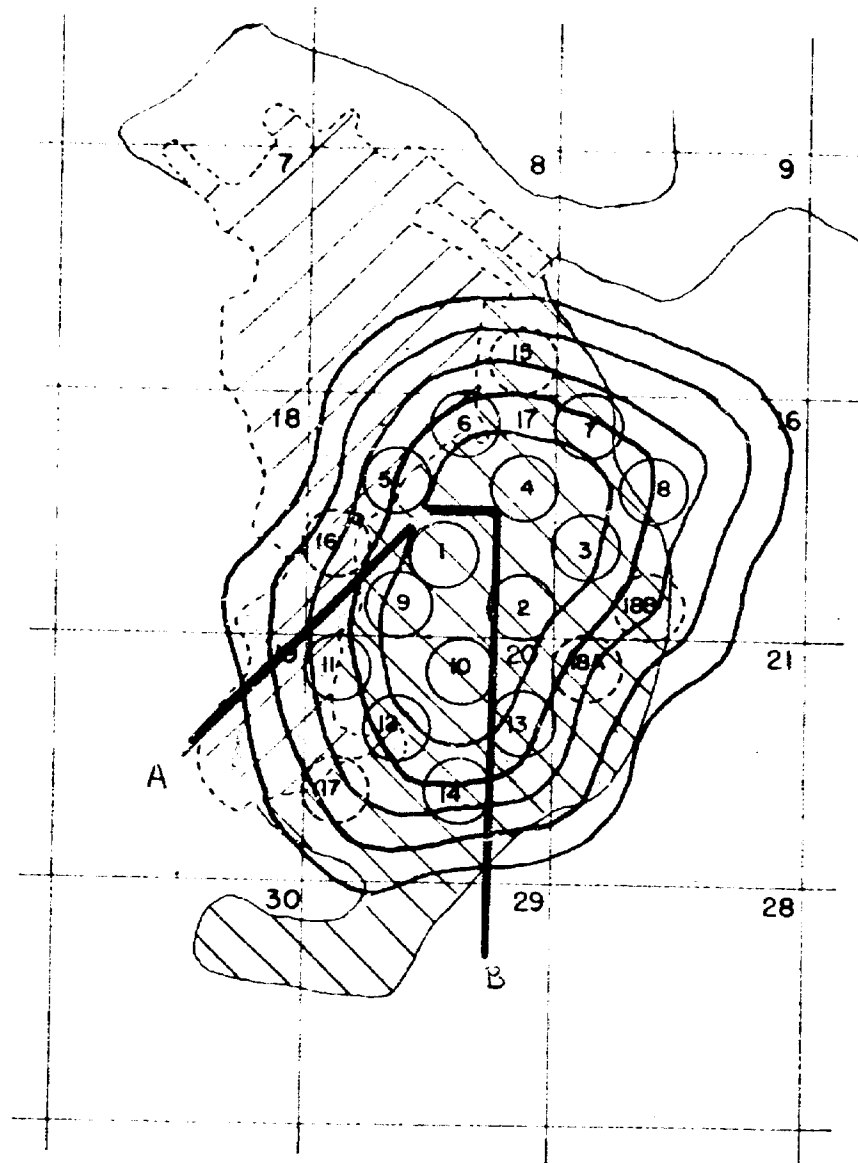
N.M., O.C.C., CASE 3029

APPROVED BY		POTASH COMPANY OF AMERICA CARLSBAD, NEW MEXICO	
		DRAWN BY LPC	DRAWING NO.
		CHECKED BY	
		DIRECTED BY JBC	
SCALE- 1" = 4000'		DATE- MARCH '64	

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Exhibit No. 5

Case No. _____



T 20 S , R 30 E

EDDY CO., N.M.

N.M., O.C.C., CASE 3029

APPROVED BY		POTASH COMPANY OF AMERICA CARLSBAD, NEW MEXICO	
		DRAWN BY LPC	DRAWING NO.
		CHECKED BY	
		DIRECTED BY JBC	
SCALE: 1" = 4000'		DATE: MARCH '64	

OFFICE OF THE
BEFORE THE OIL CONSERVATION COMMISSION

1964 AUG 3 AM 7 52
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF CON-
SIDERING:

Case No. 3029

Order No. _____

APPLICATION OF PAN AMERICAN
PETROLEUM CORPORATION FOR PERMISSION TO
DRILL WITHIN THE POTASH-OIL AREA AS
DEFINED BY COMMISSION ORDER NO. R-111-A,
AS AMENDED

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 A.M. on April 15,
1964, at Santa Fe, New Mexico, before a quorum of the Oil Conser-
vation Commission of the State of New Mexico, hereinafter referred
to as the "Commission."

NOW, on this _____ day of August, 1964, the Commission,
a quorum being present, having considered the application and the
alternative application, the testimony presented and the exhibits
received at said hearing, and being fully advised in the premises,

FINDS:

FINDING I.

That, due public notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

FINDING II.

That the applicant proposes to drill a deep test well 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, N.M.P.M. Eddy County, New Mexico or at an alternative location anywhere within a radius of 100 feet from an existing oil well, Barber No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17, each of which proposed locations is within the Potash-Oil Area as defined by the Commission Order R-111-A, as amended, and that applicant proposes to test thereby some or all of the Devonian, Morrow and Strawn horizons.

FINDING III.

(a) That Potash Company of America operates a mine in Eddy County, New Mexico which consists of between 12,000 and 13,000 acres of potash reserves and open mine workings; and that said open mine workings consist of interconnected rooms and tunnels totaling approximately 825 miles in length, averaging 5 feet in height and 32 feet in width.

(b) That potash mining operations are conducted by Potash Company of America by the room and pillar method, extracting about

65% of the potash deposit on primary mining and leaving about 35% in pillars supporting the overburden; that about 25% of the original potash deposit can be removed on secondary mining and that subsidence of the overburden and subsurface disturbance can be expected to result from secondary mining.

(c) That, as a reasonable safety measure, potash mining operations will not be conducted by Potash Company of America within a radius of 200 feet of a high pressure gas well, as to primary mining, or within a radius equal to the depth of the potash deposit below the surface of the ground, as to secondary mining.

(d) That the proposed well in either proposed location would pass through unmined potash reserves at a depth of approximately 700 feet from the surface which average 4.13 feet in thickness, have an average grade of 24.4% K_2O and an average density of approximately 15.3 pounds per cubic foot of ore in place.

(e) That the alternate location of the applicant's proposed well within 100 feet radius of Barber No. 4-A well is approximately 2400 feet from the present open workings of said mine, the easterly boundary of which open workings passes through the SW/4, the NW/4 and the NE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M.

FINDING IV.

That the drilling of the proposed well at either of the two proposed locations would create a hazard to human life in that

drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

FINDING V.

(a) That an anticlinal structure exists in the Devonian, Morrow, and Strawn horizons including within its high contour substantially all of the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico, which structure probably contains a pool or pools of crude petroleum oil or natural gas, or both, in an area of approximately 1825 acres which includes said SE/4 and surrounding contiguous land, and part of which lies under the present open workings of the Potash Company of America mine.

(b) That proper development of any such pool to prevent reduction of the total quantity of crude petroleum oil ultimately to be recovered therefrom and to prevent the inefficient, excessive or improper use or dissipation of the reservoir energy would require several wells, some of which would be located within or near the present open workings of the Potash Company of America mine.

(c) That drilling of wells at this time in or near such open mine workings would constitute a hazard to human life in that drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or

oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

(d) That if such wells in or near such open mine workings are not drilled and produced contemporaneously with the development of the remainder of any such pool, waste will result in that substantial amounts of crude petroleum oil which could be recovered from the pool by such contemporaneous drilling and production will never ultimately be so recovered, and reservoir energy will be used or dissipated in an inefficient, excessive and improper manner.

(e) That if drilling is postponed until both primary and secondary potash mining operations shall have been completed and subsidence shall be substantially complete, all wells necessary to produce the total quantity of recoverable oil or gas, or both, in any such pool can be drilled without hazard to human life and that such postponement of drilling is practicable and will prevent waste of crude petroleum oil and natural gas.

FINDING VI.

(a) That an anticlinal structure exists in the Devonian, Morrow, and Strawn horizons including within its high contour

substantially all of the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico, which structure probably contains a pool or pools of crude petroleum oil or natural gas, or both, in an area of approximately 1825 acres which includes said SE/4 and surrounding contiguous land, and part of which lies under the present open workings of the Potash Company of America mine.

(b) That correlative rights of the owner of each property in such pool or pools can be protected only if waste is prevented.

(c) That the prevention of waste in said pool or pools would require proper development of any oil or oil and gas pool by drilling several wells, some of which would be located within or near the present open workings of the Potash Company of America mine.

(d) That drilling of wells at this time in or near such open mine workings would constitute a hazard to human life in that drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

(e) That if such wells in or near such open mine workings are not drilled and produced contemporaneously with the development of the remainder of the pool or pools, waste will occur and correlative rights will not be protected.

(f) That if drilling is postponed until both primary and secondary potash mining operations shall have been completed and

subsidence shall be substantially complete, all wells necessary to produce the total quantity of recoverable oil or gas, or both, in any such pool can be drilled without hazard to human life and that such postponement of drilling is practicable and will fully protect correlative rights.

FINING VII.

(a) That if a drilling program to properly develop the oil and gas pool or pools described in Finding V(a) is conducted at this time, several wells will be drilled through the proven potash reserves of Potash Company of America.

(b) That if secondary mining operations are conducted within a radius of approximately 700 feet from a well in the pool area, the well will be subject to subsurface disturbance and possible crushing and shearing action and no adequate assurance can be provided that the casing of any oil or gas well could withstand such crushing and shearing action or that hydrocarbon fluids and natural gas could be confined within such casing and prevented from entering the open workings of the Potash Company of America mine.

(c) That, as a reasonable safety measure because of the hazard to human life if hydrocarbon fluids or natural gas should escape into open mine workings, primary mining will not be conducted within a radius of 100 feet of a low pressure shallow producing oil well, or within a radius of 200 feet of a high pressure gas or oil and gas well and secondary mining will not be

conducted within a radius of 700 feet from any oil or gas well and therefore the potash property will be injured in that substantial amounts of potash will of necessity be left unmined to protect such wells, which potash will be lost to production and wasted.

(d) That as a result of these reasonable safety measures, the drilling of the proposed well in either of the proposed locations and the drilling of the additional wells necessary to develop properly any pool or pools of crude petroleum oil or natural gas or both discovered thereby would result in undue waste of potash deposits and would constitute a hazard to and interfere unduly with potash deposits.

(e) That, if the development of the pool or pools is postponed until after the potash is removed, such pool or pools may be properly developed without waste of potash deposits or crude petroleum oil or natural gas and without hazard to or interference with potash deposits.

FINDING VIII.

(a) That if secondary mining operations are conducted within a radius of approximately 700 feet from the proposed well in either proposed location, such well will be subject to sub-surface disturbance and possible crushing and shearing action and no adequate assurance can be provided that the casing of such well could withstand such crushing and shearing action or that hydrocarbon fluids and natural gas could be confined within such

casing and prevented from entering the open workings of the Potash Company of America mine.

(b) That, as a reasonable safety measure because of the hazard to human life if hydrocarbon fluids or natural gas should escape into open mine workings, primary mining will not be conducted within a radius of 100 feet of a low pressure shallow producing oil well, or within a radius of 200 feet of a high pressure gas or oil and gas well and secondary mining will not be conducted within a radius of 700 feet from any oil or gas well and therefore the potash property will be injured in that substantial amounts of potash will of necessity be left unmined to protect each such well, which potash will be lost to production and wasted.

(c) That as a result of these reasonable safety measures, the drilling of the proposed well in either of the proposed locations would result in undue waste of potash deposits and would constitute a hazard to and interfere unduly with potash deposits.

(d) That if the drilling of the proposed wells is postponed until after the potash is removed, there will be no waste of potash deposits and no hazard to or interference with potash deposits.

FINDING IX.

That each of the findings numbered IV through VIII inclusive stated above is in itself sufficient to support the order stated below.

IT IS THEREFORE ORDERED

That the application of Pan American Petroleum Corporation for an order granting the approval of the drilling of the proposed well at either of the proposed locations in the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico be, and it hereby is, denied.

DONE AT SANTA FE, NEW MEXICO on the _____ day of August, 1964.

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

Jack M. Campbell, Chairman

E. S. Walker, Member

A. L. Porter, Jr., Member and Secretary

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF CON-
SIDERING:

CASE No. 3029
Order No. R-2772

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR PERMISSION TO DRILL
WITHIN THE POTASH-OIL AREA AS DEFINED
BY COMMISSION ORDER NO. R-111-A, AS
AMENDED, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 A.M. on April 15, 1964, at Santa Fe, New Mexico, before a quorum of the Oil Conservation Commission of the State of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 25th day of September, 1964, the Commission, a quorum being present, having considered the application and the alternative application, the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant proposes to drill an oil well 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, NNPM, Eddy County, New Mexico, or at an alternative location anywhere within a circle of 100 feet radius around an existing oil well, Barber No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17.

(3) That each of the proposed locations is within the Barber-Yates Oil Pool in Eddy County, New Mexico, and within the Potash-Oil Area as defined by Commission Order No. R-111-A, as amended.

(4) That there are nine wells currently producing in the Barber-Yates Oil Pool; that these wells are producing from an approximate depth of 1500 to 1600 feet.

(5) That the applicant proposes to drill the subject well to an approximate depth of 12,600 feet, or deeper, to test the Strawn, Morrow, and Devonian formations.

(6) That Potash Company of America operates a mine in Eddy County, New Mexico, which consists of between 12,000 and 13,000 acres of potash reserves and open mine workings; that said open mine workings consist of interconnected rooms and tunnels totaling about 825 miles in length, averaging 5 feet in height and 32 feet in width.

(7) That the proposed well in either proposed location would pass through unmined potash reserves at a depth of 700 feet from the surface which average 4.13 feet in thickness and have an average grade of 24.4% K_2O .

(8) That the alternate location of the applicant's proposed well is within a 100 foot radius of the Barber Well No. 4-A which is located approximately 1500 feet from the present open mine area of said mine, the easterly boundary of which open mine workings passes through the SW/4, the NW/4 and the NE/4 of Section 17, Township 20 South, Range 30 East, NMPH, Eddy County, New Mexico.

(9) That potash mining operations are conducted by Potash Company of America by the room and pillar method, extracting about 65% of the potash deposit on primary mining and leaving about 35% in pillars supporting the overburden; that about 25% of the original potash deposit can be removed on secondary mining and that subsidence of the overburden and subsurface disturbance can be expected to result from secondary mining.

(10) That as a reasonable safety measure, Potash Company of America will not conduct potash mining operations within a radius of 100 feet of a shallow oil well or within a radius of 200 feet of a high pressure gas or oil and gas well, as to primary mining,

CASE No. 3029
Order No. R-2772

or within a radius equal to the depth of the potash deposit, as to secondary mining.

(11) That the applicant has not established that the proposed well could be cased and cemented in a manner that would withstand the subsidence experienced in normal potash mining operations; that damaged casing will ultimately result in waste of oil or gas; and that no waste of oil or gas will occur from subsidence if drilling is postponed until the potash has been removed and subsidence is substantially complete.

(12) That the drilling of a well at either of the proposed locations at this time would create a hazard to human life as the applicant has not established that such well could be cased and cemented in a manner that would withstand the subsidence experienced in normal potash mining operations and prevent natural gas from escaping into the open mine workings; that if drilling is postponed until the potash has been removed and subsidence is substantially complete, the proposed well can be drilled without hazard to human life.

(13) That the drilling of an oil well at either of the proposed locations at this time would result in undue waste of potash deposits and unduly interfere with the orderly development of potash deposits in the area contrary to the provisions of Commission Order No. R-111-A; that if drilling is postponed until the potash has been removed, there will be no waste of potash.

(14) That postponing the drilling of exploratory wells in the Potash-Oil Area, as defined by Commission Order No. R-111-A, until the potash in said area has been removed and subsidence is substantially complete will, so far as it is practicable to do so, afford to the owner of each property in any pool underlying said area the opportunity to produce without waste his just and equitable share of the oil and gas in such pool.

(15) That the subject application should be denied.

IT IS THEREFORE ORDERED:

(1) That the application of Pan American Petroleum Corporation for authority to drill a well at either of the proposed locations in the SE/4 of Section 17, Township 20 South, Range 30 East, NMPM, Eddy County, New Mexico, is hereby denied.

-4-

CASE No. 3029

Order No. R-2772

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

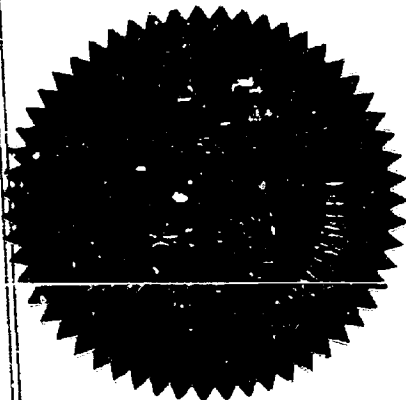
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

E. S. Walker
E. S. WALKER, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary



ear/

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Application of Pan American Petroleum
Corporation for permission to drill in
the Potash-Oil Area, Eddy County, New
Mexico. Applicant, in the above-styled
cause, seeks authority to drill a well to
the Mississippian formation at an ap-
proximate depth of 12,600 feet, said well
to be located 660 feet from the South line
and 660 feet from the East line of Section
17, Township 20 South, Range 30 East,
Eddy County, New Mexico, or to drill said
well at an alternate location anywhere with-
in a circle of 100 feet radius around the
Barber Well No. 4-A, located 1639.2 feet
from the South line and 2304.5 feet from
the East line of said Section 17. The above
location and the alternate location are in the
Potash-Oil Area as defined by the Commis-
sion in Order No. R-111-A as amended.

CASE 3029

REQUESTED FINDINGS OF FACT AND
CONCLUSIONS OF LAW OF APPLICANT
PAN AMERICAN PETROLEUM CORPORATION

COMES now Applicant Pan American Petroleum Corporation
and respectfully requests the Oil Conservation Commission to adopt
the following

FINDINGS OF FACT

1. Applicant Pan American Petroleum Corporation, herein
referred to as "Pan American", is the owner and operator of oil
and gas properties in the State of New Mexico and is the owner of
the oil and gas leasehold estate created by the State of New Mexico
Oil and Gas Lease B-2386, dated January 10, 1934, as to all rights

below a depth of 2500 feet beneath the surface of the ground in the SE $\frac{1}{4}$ Section 17, Township 20 South, Range 30 East, N. M. P. M., Eddy County, New Mexico. Pan American also is the owner of similar deep rights in additional tracts located in the immediate vicinity of the SE $\frac{1}{4}$ of said Section 17 as more fully shown on Pan American's Exhibit 1, in evidence herein. These tracts include all of Section 9, all of Section 15, all of Section 16, all of Section 17 except the N $\frac{1}{2}$ NE $\frac{1}{4}$, all of Section 18 except the SW $\frac{1}{4}$ NW $\frac{1}{4}$ and NW $\frac{1}{4}$ SW $\frac{1}{4}$, all of Section 19, the W $\frac{1}{2}$ of Section 20, the NE $\frac{1}{4}$ of Section 21, the NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 28, the W $\frac{1}{2}$ NW $\frac{1}{4}$ of Section 29, the N $\frac{1}{2}$ of Section 30, all in Township 20 South, Range 30 East, and all of Section 11, the W $\frac{1}{2}$ and the SE $\frac{1}{4}$ of Section 12, the W $\frac{1}{2}$ SE $\frac{1}{4}$ and SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 13, Township 20 South, Range 29 East, N. M. P. M., Eddy County, New Mexico.

2. Protestant Potash Company of America, herein referred to as "PCA", is the owner of State of New Mexico Potash Mining Lease No. M-873 issued by the Commissioner of Public Lands on April 24, 1939, and of the rights created thereby to explore for, develop and produce potassium, sodium, phosphorus and other minerals of similar occurrence and their salts and compounds from the SE $\frac{1}{4}$ of Section 17, Township 20 South, Range 30 East, and other lands in the vicinity thereof.

3. The title of PCA to the potash mining lease embracing the SE $\frac{1}{4}$ of Section 17, Township 20 South, Range 30 East, was acquired by assignment of the rights of Homer H. Harris, the original lessee

of Potash Mining Lease M-873. The said Homer H. Harris, by assignment from M. A. Lewis and Dorothy F. Lewis, his wife, dated March 14, 1939, acquired title to Potash Mining Lease M-274, dated June 30, 1931, which embraced the SE $\frac{1}{4}$ of Section 17, Township 20 South, Range 30 East, and other lands in the vicinity thereof. Under date of April 20, 1939, the said Homer H. Harris and wife relinquished and released unto the State of New Mexico all of their rights, title and interest in and to said Potash Mining Lease No. M-274, as to all lands embraced therein, reciting in said release that it was made for the sole purpose of consolidating said lease with three other leases held by Homer H. Harris, to-wit: Potash Mining Leases M-306, M-275 and M-348. At the time of the relinquishment of Lease M-274 there remained unexpired, of the primary term thereof, only the period from March 14, 1939 to June 30, 1941, on which date said lease would expire by its terms in the absence of production in paying quantities from lands included in said lease.

4. The relinquishment of Lease M-274 so made was filed in the office of the Commissioner of Public Lands on April 24, 1939, and approved by the Commissioner of Public Lands on said date. On the same date, to-wit, April 24, 1939, the Commissioner of Public Lands issued to the said Homer H. Harris Potash Mining Lease M-873, dated April 24, 1939, which embraced all lands included in Lease M-274, and other lands, and provided for a primary term of ten (10) years from its date and as long thereafter as said minerals

should be produced in paying quantities from the leased lands.

5. At the time of the relinquishment of Potash Minine Lease M-274, and the issuance of Potash Mining Lease M-873, the statutes of New Mexico, N.M.S.A., 1929 Comp., provided, in part, as follows:

"§111-501. The Commissioner Public Lands is hereby authorized to issue leases for the development, exploration and production of potassium, sodium, phosphorus and other minerals of similar occurrence, and their salts and compounds including chloride, sulphates, carbonates, borates, silicates, nitrates and any and all other salts and compounds of the said minerals, on any lands of the State of New Mexico upon such terms and conditions as he may deem to be for the best interest of the State and conformable to this Act. * * *

" §111-502. Leases under this Act may be made for a term of ten (10) years or less and as long after as said minerals, or any of them, in paying quantities shall be produced from the leased lands."

6. As a result of seismic and geophysical operations recently completed, Pan American has delineated a Devonian structure disclosed by its Exhibit 1 herein, the closure of which centers in the SE $\frac{1}{4}$ of Section 17, Township 20 South, Range 30 East. In the opinion of qualified experts of Pan American the structure so disclosed indicates that approximately 1825 acres centering in the SE $\frac{1}{4}$ of Section 17, will be productive of oil from the Devonian Formation, that approximately 640 acres would be productive from the Morrow Formation and approximately 1825 acres will be productive from the Strawn Formation. On the basis of reserves developed in comparable reservoirs in the area, it is the opinion of qualified experts of Pan American that the working interest income which might be expected to accrue from production of oil or gas or both from the Devonian

Formation would be in the approximate amount of \$5,590,000.00, from the Strawn Formation in the amount of \$5,100,000.00, and from the Morrow Formation, \$1,430,000.00. It is further the opinion of such experts that royalty income to the State of New Mexico from such production would be as follows: Devonian, \$675,000.00; Strawn, \$630,000.00; Morrow, \$169,000.00; and to the United States of America, Devonian, \$225,000.00; Strawn, \$210,000.00; Morrow, \$56,000.00.

7. The proposed location of Pan American is within the outer limits of the Barber-Yates Oil Pool in which nine wells are currently producing. These wells were completed in the early 1940's and are producing from an approximate depth of 1600 feet. The Barber 4-A Well which was completed in July of 1942, is located in the SE $\frac{1}{4}$ of Section 17, Township 20 South, Range 30 East, N.M.P.M.

8. Pan American regularly filed with the Commission its application to drill a single well for oil or gas to the Mississippian Formation at an approximate depth of 12,600 feet at a location 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, Eddy County, New Mexico, or in the alternative, to drill at a location anywhere within a circle of 100 feet radius around the Barber Well No. 4A above referred to. In the event of the granting of either of said applications, Pan American proposes to drill to the Mississippian Formation and, using it as a marker to determine whether or not additional drilling

to the Devonian Formation is justified, in which event, additional authority of the Commission would be requested. In so filing its application contemplating an ultimate completion in the Devonian, Pan American was following a practice which has been used in other cases before the Commission. Both of the above locations are in the so-called Potash-Oil Area as defined in Order R-111-A of the Oil Conservation Commission as amended.

9. The proposed locations of Pan American Petroleum Corporation in the $SE\frac{1}{4}$ of Section 17 lie within the area embraced in potash reserves of PCA which aggregate twelve to thirteen thousand acres. At this time the nearest underground workings of PCA are located approximately 1200 feet West of the Barber 4-A Well which Pan American proposes to twin. No work in the mine has occurred at this point since the year 1957.

10. The ore body proposed to be mined by PCA in the $SE\frac{1}{4}$ of Section 17 is approximately 4 feet in thickness and is found at a depth of 700 feet. All existing wells in the Barber-Yates Pool produce at a depth of approximately 1600 feet so that the well bore and casing of all existing wells in that pool, including the Barber 4-A Well, pass through the potash formation which PCA proposes to mine.

11. Under existing practices of PCA it will be necessary for PCA to leave a pillar 100 feet in diameter around the casing in the Barber 4-A Well at such time as mining operations are conducted at the location of this well.

12. The Barber 4-A Well is an average well in the pool.

Extrapolation of the pressure production curve of the wells in the pool indicates that they will continue to produce until approximately 1984 so that, in no event, will it be possible for PCA to mine the ore left in the pillar around the Barber 4-A Well for approximately twenty years.

13. Market value cannot be determined for the potash in place, mining of which would be prevented by existing or future oil and gas wells. The economic impact upon PCA of inability to remove specified quantities of ore therefore is measured by profit which it would have realized from the removal, refining and sale of said ore and not by the gross value of the ore in place.

14. The proposed cementing and casing program of Pan American in the well applied for meet all requirements of the Oil Conservation Commission for wells drilled in the Potash area.

15. Through the use of casing of greater strength than required, and casing-coat on the exterior thereof, the proposed well would have casing strength and cementing program sufficient to avoid the escape of oil or natural gas from said well.

16. It is in the interest of the people of the State of New Mexico that all of its natural resources be developed so that the maximum benefit from each will be realized by the State of New Mexico. While the contemporaneous development of potash deposits and oil deposits underlying them results in certain additional expense, postponement of profits and loss of revenue to those producing each natural resource, it is in the interest of the State of New Mexico that such development go forward simultaneously

wherever possible

17. The drilling of the proposed well of Pan American at the alternate location proposed, which is within a radius of 100 feet of the Barber 4 A Well will minimize the amount of potash which will be required to be left in place during the life of said wells and will not unduly prejudice PCA in its mining operations through loss of profit or otherwise. By reason thereof, the alternate location proposed by Pan American is preferable.

18. The drilling by Pan American of a well at the alternate location will not result in undue waste of potash deposits or constitute a hazard to, or interfere unduly with, potash deposits. To prohibit the drilling of the well of Pan American at the location proposed would unreasonably interfere with the orderly development and production of oil and gas from the deposits indicated by the geological and geophysical exploration conducted by Pan American.

CONCLUSIONS OF LAW

1. State of New Mexico Oil and Gas Lease B-2386 having been issued on January 10, 1934, and been in full force and effect at all times since that date, rights and interests created thereby are paramount and superior to rights created by Potash Mining Lease M-873 which was issued by the Commissioner of Public Lands on April 24, 1939. While the State of New Mexico under the police power can impose reasonable regulations and restrictions upon the exercise of the rights granted by Lease B-2386, subordination of the exercise

of the rights under said lease to the exercise of rights and interests created by the junior Potash Mining Lease M-873 in order to prevent waste of potash or interference with the mining of potash deposits, does not constitute a reasonable exercise of the police power and is beyond the power of the Oil Conservation Commission.

2. The effect of denying the application of Pan American on the basis of the protest of PCA would be to subordinate the rights under its lease to the rights of PCA under a junior lease and would constitute the taking of the property of Pan American without due process of law.

3. The State of New Mexico has not authorized the Oil Conservation Commission to prohibit or postpone the exercise of rights created by oil and gas leases issued by the Commissioner of Public Lands of the State of New Mexico on the basis of possible interference with potash mining operations conducted under a junior lease and the Commission has no authority to deny the application of Pan American Petroleum Corporation under the circumstances of this case.

4. The Oil Conservation Commission of the State of New Mexico has been given jurisdiction and authority over all matters relating to the conservation of oil and gas in New Mexico and is charged with the responsibility of preventing waste of oil and gas and of protecting the correlative rights of the owners thereof. The legislature has granted the Oil Conservation Commission no authority to conserve potash, to prevent the waste thereof, or to prevent interference with potash mining operations. To the extent that Order R-111-A of the

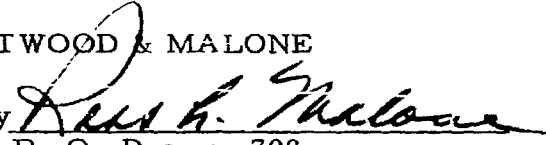
Oil Conservation Commission of New Mexico purports to prohibit the drilling of oil or gas wells, or the production of oil and gas because it would result in interference with potash mining operations or result in the waste of potash, said Order is beyond the authority of the Oil Conservation Commission of New Mexico and provides no basis for denying the application of Pan American in this case.

5. The application of Pan American as elaborated by the testimony in this case meets all valid requirements of the statutes of New Mexico and the Orders of the Oil Conservation Commission for the drilling of a well at the alternate location proposed by Pan American and said application should be granted.

Respectfully submitted,

ATWOOD & MALONE

By


P. O. Drawer 700

Roswell, New Mexico

Attorneys for Applicant

Pan American Petroleum Corporation

REPORT

OF

PROFESSOR DANIEL M. BASS, JR.

Registered Professional Petroleum Engineer

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EXPERIENCE RESUME

DANIEL M. BASS, JR.

EXPERIENCE RESUME

Educational

Received B.S. in Petroleum Engineering from Louisiana State University
Received M.S. in Petroleum Engineering from Texas A and M College
Receiving Ph.D. in Petroleum Engineering from Texas A and M College

Industrial

Field Engineer District Reservoir Eng.	Magnolia Petroleum Co. Approx. 3 years
Research Engineer	Texas Pet. Research Committee Approx. 2-1/2 years
Professor in Pet. Eng.	Texas A and M College Approx. 9 years
Taught: (1) Fluid Transmission (2) Surface Handling of Petroleum (3) Basic and Advanced Reservoir Eng.	
Professor and Head of Pet. Eng. Department	Colorado School of Mines Approx. 2 years
Teach: (1) Drilling and Well Completion (2) Basic and Advanced Res. Eng.	

Consulting

Reservoir Evaluation

- (1) Regulatory hearing.
- (2) Oil and Gas studies
- (3) Application of Digital Computers to oil and gas reservoirs and surface production systems.
- (4) Economic analysis
- (5) Special Industry schools in Petroleum Reservoir Engineering

Research Work

- (1) Application of Digital Computers in the Petroleum Industry
- (2) Effect of Fluid and Rock Properties on Water Displacement
- (3) Volatile crude oil systems
- (4) Flooding patterns
- (5) Fracture Propping Agents

DANIEL M. BASS, JR.

EXPERIENCE RESUME

Publications and Presentations

- (1) "The Petroleum Engineer; Conservation, The Public and the Profession", Presented to Denver SPE Section, 1962.
- (2) "Estimating Secondary Reserves", Presented and Published by Regional SPE - Billings, Montana, 1962.
- (3) "Evaluation of Volatile Oil Reservoirs", Presented and Published - 13th Oil Recovery Conference - 1961.
- (4) Contributed to "Petroleum Production Handbook", Vol. II, edited by Tom Frick, published by McGraw-Hill, 1962.
- (5) "Petroleum Reservoir Engineering-Physical Properties", co-author - book published by McGraw-Hill, 1960.
- (6) "Experimental Waterflooding Recoveries Above and Below the Bubble Point", AIME Trans. 1956.
- (7) "Predicting Reservoir Performance", Petroleum Eng., June, 1955.

DEVELOPMENT PROGRAM

DEVELOPMENT PROGRAM

I. Mr. Blackman requested that I speak to the following question:

"Please refer to the exhibit attached to the bulletin board which has been marked for identification as PCA Exhibit No. . It is a plat which shows Section 17, Township 20 South, Range 30 East, New Mexico Principal Meridian, on which the contour lines on the approximate top of the Devonian as depicted by Exhibit No. presented by Pan American Petroleum Corporation in this hearing have been extended.

"Will you kindly make these assumptions with respect to that exhibit:

"A. There exists at the location shown on that exhibit a closed Pennsylvanian or Devonian structure below 9,000 feet, having the configuration shown on said exhibit which is inhabited with oil, or with oil and gas to the third contour line.

"B. There are no surface terrain problems, surface relief being nominal.

"C. The reservoir consists of oil having a solution gas drive.

"D. The reservoir characteristics and conditions are the approximate average of what might be expected to be found in this location in Southeastern New Mexico.

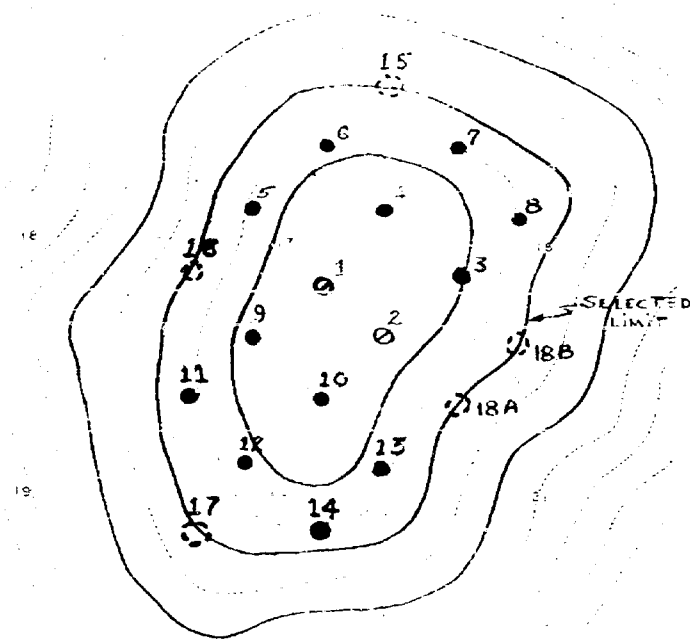
"Assume that 80-acre spacing would be approved if an oil or oil and gas reservoir were to be discovered at this location and depth.

"On the basis of the assumptions which I have enumerated, will you kindly indicate on PCA Exhibit No. an ideal development program, to recover the maximum amount of petroleum products from the reservoir. Please begin with the proposed location near Barber Well 4J and number each well location without regard to order in which the wells might be drilled. In this connection, please consider the New Mexico statute governing waste, which reads as follows: 'As used in this act the term "waste," in addition to its ordinary meaning, shall include: (a) "Underground waste" as those words are generally understood in the oil and gas business, and in any event

to embrace the inefficient, excessive, or improper, use or dissipation of the reservoir energy, including gas energy and water drive, of any pool, and the locating, spacing, drilling, equipping, operating, or producing, of any well or wells in a manner to reduce or tend to reduce the total quantity of crude petroleum oil or natural gas ultimately recovered from any pool ...'

"When you have indicated the ideal drilling and development program on PCA Exhibit No. , please comment on the pattern for the solution gas drive and also comment upon such variations as you might recommend in the event the reservoir has a water drive or a gas cap drive."

Ans You have asked me to indicate an ideal drilling and development program on 80-acre spacing for a Pennsylvanian or Devonian oil or oil and gas reservoir which occupies a producing structure which might be expected under average conditions in Southeastern New Mexico. The structure is assumed to be in the location and to have the configuration as shown on PCA Exhibit No. 8 , to be inhabited with oil or oil and gas in the area inside of the closure



MAP 1

- ⊙ Proposed
- DEFINITE
- ⊗ Probable

9-1

depicted by the third closed contour line and to have a gas solution drive. Attached to the facing page hereof is a photocopy of a map which is designated Map No. 1 - T 20S, R 30E, N.M.P.M., which shows the same area and drilling and development program.

The wells on this map marked 1 and 2 are the wells represented by the present drilling application of Pan American Petroleum Corporation. The wells with the dark spots would be definite wells within the structure and the wells with the broken circles represent possible additional wells. Of course, knowing the structure as it is seen here, it is noted that I have not included any uncommercial wells, of which, one or two would probably be drilled in order to define the structure. The wells marked with the broken circles would all be potential wells and, in all probability, would be drilled during the development program. Thus it is seen that there are fourteen definite wells and four potential wells. Thus, the possibility of one or two non-commercial wells would indicate a potential between seventeen and twenty wells

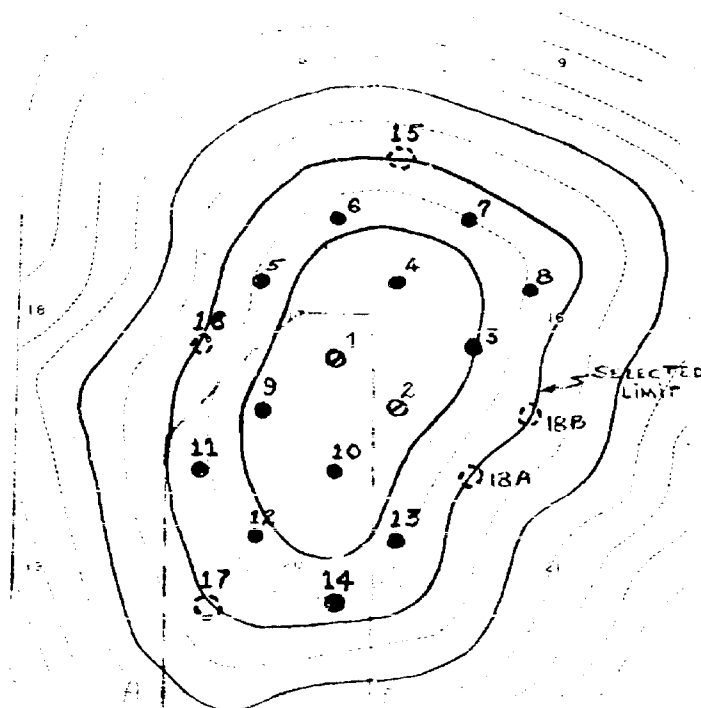
in order to completely define the oil accumulation within the structure.

The sequence of drilling these wells is at the present time difficult to define. The exact sequence of course would depend on what was found during the drilling of the initial well. If this well were on top of the structure, as indicated, then it would be necessary to drill down-dip, flank wells in order to determine the limits of the hydrocarbon accumulation. If, as in most cases, the initial well were not exactly on top of the structure, and dip meter surveys and other information obtained during the drilling of the well indicated that the structure top were away from the present well, then the next well drilled would be an effort to define the structural top. It is nearly impossible to define an exact drilling program until after the first well is drilled into the accumulation.

This 80 acre development program would adequately produce the reservoir if it were of a solution gas drive type energy.

If the reservoir were of gas-cap type energy in which it was necessary to permit the advance of the gas cap in order to obtain maximum conservation then it would be necessary to drill essentially all of the wells which are denoted by a broken circle. This type drive would increase the number of wells which would be required for adequate depletion from fourteen to nineteen. In this case, considering that two non-commercial wells would be drilled, a gas-cap energy source would result in the drilling of the maximum number of wells on the structure, twenty-one wells.

Should a water drive energy source be prevalent then it would be unnecessary to drill the wells which are indicated by the broken circles and well No. 14. Probably two of the wells indicated by a broken circle would be drilled during the development program and probably one non-commercial well would be drilled in defining the structure. Thus, a water drive energy source would require the drilling of the minimum number of wells on the structure, approximately sixteen wells.



Q 2

The 80 acre spacing as indicated on Map 1 would probably be required for any oil accumulation which is found.

II. You have requested that I comment on the following question "What would be the effect on such an oil or oil and gas accumulation if the structure were divided as I will now indicate by a red line designated "A" at one end and "B" at the other end on PCA Exhibit No. 9 and only those wells which are situated below or southerly of the red line A-B were drilled and produced for an initial period of fifteen years, there being no wells drilled or produced above or northerly of the red line A-B for such initial 15-year period."

Map No. 2, facing this page, indicates a dashed line A-B which is equivalent to the red line, also marked A-B, on PCA Exhibit No. 9. The effect on conservation of the natural resources within such an accumulation would be dependent upon the mode of operation of the developer and on the energy source within the oil accumulation itself. In order to properly

answer this question it will be necessary to stipulate a behavior for at least three distinct types of energy sources. If the reservoir were a solution gas, gas cap drive or a water drive reservoir, one would expect a different performance; hence, each of these type drives will be discussed separately.

Solution Gas Drive

If the reservoir is a solution gas drive type then the recovery mechanism would be that of displacing the oil by the evolution of gas from within the oil. This is probably one of the least efficient drive mechanisms available if it is not aided in some fashion by gravity segregation and conversion to a secondary gas cap drive. It is entirely possible that a restriction of development to one segment of the reservoir would create conditions such that a secondary gas cap would be formed at the top of the structure. In any case, this restrictive development would be detrimental to the conservation of the petroleum within the structure. Such a development would force the oil and its associated gas in the undeveloped area to

migrate around or over the structure in order that it might be produced. The force of gravity would work against migration over the top of the structure and would, in effect, leave oil in the lower portions of the structure and gas would migrate to the upper section. During the depletion of the developed portions the operator would be unable to produce his wells in a fashion which would prevent the pressure depletion and the migration of the gas from the area in which no drilling had occurred. During this depletion stage the operator would be producing from wells, according to your red line, in approximately 38 percent of the volume of the reservoir, leaving approximately 62 percent undeveloped. Within this 62 percent of the total structure the operator would probably recover some 25 to 50 percent of the oil that he would recover were he able to fully develop that region. Thus the operator and the state would lose between 30 and 45 percent of the oil within the structure that would normally be recovered by a solution gas drive mechanism under full development.

The granting of permission to drill and develop this region fifteen years after the development of the southernly end of the structure would in all probability not be economic from the standpoint of primary recovery. During the pressure depletion in the southernly part of the structure, the energy for movement of the oil in the northern part of the structure probably would have been dissipated. Thus, even drilling within the structure where no previous production had occurred would not yield oil in the same quantities that were obtained during the initial development on the southernly end of the structure. To adequately remove the oil from this previously undeveloped area of the structure would require that the operator install a supplementary energy source, gas injection or water injection, to supply energy for movement of the oil from within the formation to the loci of the wells. Supplementation of the natural energy would be costly and its initiation would depend on whether the producer could recover the required investment from the recoverable oil that remained in the formation.

In the outside case, in which a secondary gas cap is formed at the top of the structure, the operator could conserve some of the energy by not producing the secondary gas cap. In so doing, he would still not recover by primary means any additional oil and in all probability would recover less from the undeveloped side of this structure. This would mean that a restrictive development program would cause the producer to leave approximately 45 percent of the recoverable oil within the ground. The only advantage of the secondary gas cap is that after the end of the fifteen year period there is the probability that some of the oil in the undeveloped region could be recovered by means of expansion of this gas cap. Thus, the operator would be conserving part of the natural energy within the reservoir by letting gas accumulate at the top of the structure and later permitting this gas to expand and displace oil to the wells. The additional recovery which might be obtained during this second development program would be dependent upon the magnitude and size of the secondary gas cap. If the gas cap is small then little additional oil would be realized because the

energy source would be insufficient to adequately deplete the undeveloped portion. If this gas cap is large and if it has been possible to maintain the pressure somewhere in the neighborhood of one-half of the original pressure, it would be possible to reduce the loss of this stage development program from 45 percent to some 15 or 20 percent.

It is fairly apparent that regardless of the mechanism which might be involved in the solution gas drive depletion of such a partially developed structure, some loss of petroleum would occur. The magnitude of this loss would be in the neighborhood of 15 percent for very favorable conditions and 45 percent for normal conditions.

Gas Cap Drive

If the structure had a hydrocarbon accumulation of the size shown in Map 2 and part of this accumulation were gas, to say the first contour, then the southernly area in which development is to be permitted would encompass part of the oil zone and part of the gas zone. This gas

zone represents a concentrated source of energy which, if permitted to expand through the oil zone, acts as a more efficient recovery mechanism than solution gas alone. In a partial development, such as you have indicated, the presence of the gas cap can be a disadvantage during the depletion stage of the developed area. The gas is very mobile, it moves much more readily within the pore structure than does oil. Gas also transmits pressure changes much more readily than does a similar section of the reservoir containing oil. Hence, at any given time, the pressure within the gas zone would essentially be constant value over a large part of the original reservoir filled with gas. Thus the pressure in the undepleted area would have ample opportunity to decline along with the decline in gas pressure. Also, partial development would tend to concentrate the expenditure of this gas cap energy in only a fraction of the oil saturated zone. The irregular decline in pressure would result in a tilting of the gas zone as depletion occurred. This tilting would cause the developed portion of the reservoir to be swept by gas

with very little enlargement of the gas cap in the undeveloped region. To adequately deplete the section that is developed it would be necessary to produce a good portion of the original gas cap gas from the wells within the oil zone. The presence of the gas cap would retard the migration of oil from the undeveloped portion into the developed portion because of the greater ability of the gas to advance into the producing region. Thus, the initial loss due to partial development would be in the neighborhood of 35 to 40 percent of the normal recoverable oil. Development of this region after a delay of 15 years would recover some of the remaining oil. Advancing gas from the gas cap would not be as efficient a displacing agent after the delay because of the effect declining pressure has on the properties of the oil and the reduced ability of the operator to obtain maximum sweep with the advancing gas. If the pressure had been depleted to a very low level, the economics of developing this region would not be as good as if it had been developed along with the other section because of the energy content of the remaining

fluids. Thus, even under the most ideal conditions, the delayed development results in a total loss within the structure on the order of 15 percent of that which would be recovered had the structure been developed uniformly.

In all probability it would be necessary to supplement the energy within the reservoir with either gas or water injection which alters the economics and increases the cost. Regardless of the operators practice of production, a delay of 15 years in full development would result in a loss of between 15 and 40 percent of that oil which would be recoverable under a standard, uniform development program.

Water Drive

If the oil accumulation within the indicated structure has a strong water drive around the periphery and if development were restricted to the southernly part enclosed by dashed-line A-B on Map 2 it would be necessary for the operator to concentrate his production in the upper segment of the structure in order to partially deplete the lower part of the undeveloped portion of the reservoir.

Under these conditions, the production from the wells adjacent to the dashed line could be controlled so that it would be possible to partially pressure deplete and cause water invasion into the area in which no development had been permitted. Concentrating the production at the top of the structure would cause water to advance within the undeveloped region but would also cause extreme pressure losses around these wells and might endanger the completion of the well and reduce the recovery efficiency of the water drive mechanism. The advance of water in the undrilled region would not occur as rapid as the water advanced within the developed region because of the concentration of production in the developed area. Thus, the pressure distribution within the structure would have a tendency to cause water to migrate in a tongue like fashion into the developed area and a short advance in the undeveloped region. This manner of water advance would create a region near the top of the structure which would contain significant quantities of oil at the time the existing wells were invaded by water and forced into a non-commercial category.

The loss in such a situation cannot be ascertained with a finite degree of accuracy because of the dependency of water invading the undeveloped region on the exact well locations, their relative production rates and the volumetric efficiency of water as a displacing agent. A fair estimate of the loss of recoverable oil would be in the neighborhood of 20 to 25 percent. If this region were developed after a period of fifteen years it would be a rather costly development program because the position to which water had advanced in the undeveloped region would be unknown. Thus, wells would be drilled which were un-economical to operate and for depletion purposes un-necessary. The recovery from this region would depend on the magnitude of the pressure reduction required to deplete or produce the undeveloped region. Additional oil could be obtained by development after a delay of fifteen years but a net loss of approximately 15 to 20 percent of the recoverable oil in the structure would still be left in the ground.

Summary

It is seen that regardless of the type of drive the idea of partial development of a structure, with full development being delayed for some fifteen years, results in a loss of recoverable petroleum and an increase in the cost of operation to the developer of this mineral resource. Unfortunately one cannot determine which type drive would be prevalent in a formation on this structure with present knowledge. The reservoirs which have been found in the potential oil bearing formations on this structure have indicated all three types of drive energies. Therefore, it would be inadvisable for an operator, both from a standpoint of mineral resource conservation and from a standpoint of economics, to delay development for a period of fifteen years on a part of a hydrocarbon accumulation.

THE BARBER FIELD

THE BARBER FIELD

I.. Mr. Blackman has posed the following question:
"The alternate location proposed by Pan American Petroleum Corporation is within a 100 ft. radius from existing Barber Field well #4-A, which is properly designated 4-J. Please state your opinion as to the probable future economic life of that well."

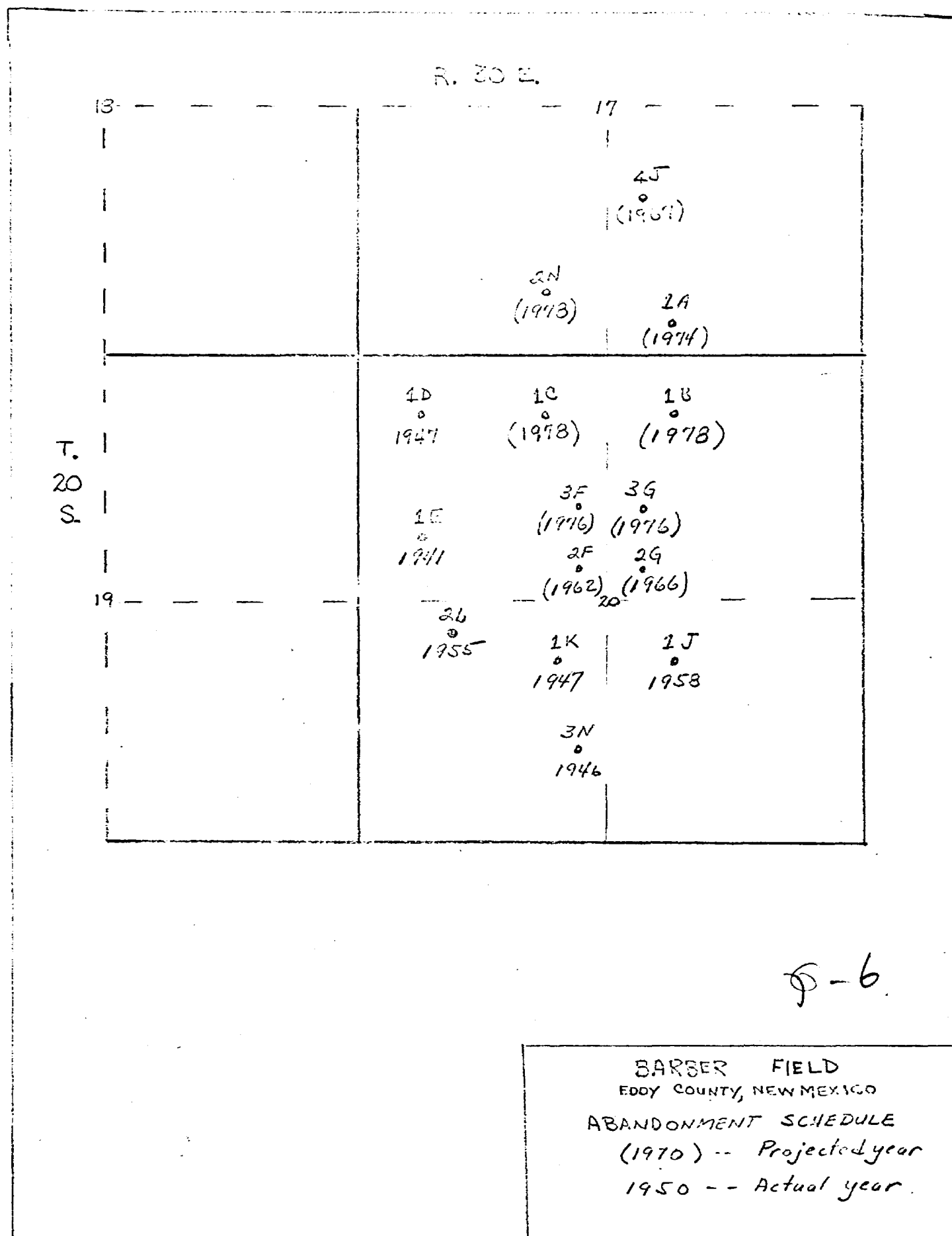
In answer to said question:

I have examined the production records of Barber Field well 4-J located in the NW1/4SE1/4 of Sec. 17, T. 20 S., R. 30 E., N.M.P.M. covering the period beginning June, 1942 and ending with calendar 1963. Based on that information, it is my opinion that well 4-J has a remaining economic life of from four to five years from the end of calendar 1963.

II. You have asked me to express my opinion on the future productive life of the remaining wells in the Barber Field. I have examined the production records of the

Barber Field, covering the period from 1941 through calendar 1963. As only the past production records were available, with no operating cost data, it was necessary that some limiting economic rate be assumed. All the answers which follow are based on a limiting economic rate of 45 barrels per month per well. Also, after studying well 4-J, it was assumed that only seven wells would be produced during the remainder of the field's economic productive life. Under these conditions, it is my opinion, that the Barber Field can be economically operated through calendar year 1974.

Because of the uncertainty of the limiting economic conditions for the field as a unit, I examined the production records of each well individually. Using the same limiting economic rate of production, an estimate was made of the year each well in Barber Field would become uneconomical to operate. The results of this evaluation are shown on Figure 1 entitled "Barber Field - Abandonment Schedule". It is noted from Figure 1 that three of the wells in the Barber Field could be economically productive into the calendar year 1978.



GENERAL

GENERAL

You have asked that I "comment on the average values of hydrocarbons which have been produced in Southeast New Mexico from the Pennsylvanian and Devonian formations and make such comment as you deem appropriate concerning the value of the hydrocarbons which might be expected to be recovered under ideal conditions from a Pennsylvanian or Devonian reservoir confined within a structure such as that pictured on PCA Exhibit No. and your Map. No. 1."

In answering this request I will discuss first the producing formations in the area and then the probable content of these formations.

Producing Formations:

The major oil and/or gas producing formations of Pennsylvanian age or older are:

- (1) Bend
- (2) Pennsylvanian ✓

- (3) Devonian /
- (4) Siluro-Devonian
- (5) Simpson
- (6) Ellenberger

All oil fields in the eastern half of the state which had produced ten million barrels of oil by January 1, 1962 from formations of Pennsylvanian Age or older are shown in Table I. All gas fields in the eastern half of the state which had produced five billion cubic feet of gas by January 1, 1962 from formations of Pennsylvanian Age or older are shown in Table II. From a study of these two tables it becomes apparent that the Pennsylvanian and Devonian formations are the primary oil and gas producers of the group.

Since 1958 other fields have been developed which will soon join the ranks of those fields listed in the tables. The major fields which have been discovered since 1958 add very few new major producing formations to the list indicated prior to that time.

Discoveries as late as 1961 indicate that the Morrow formation may have possibilities of developing

into a major gas producing formation and the Fusselman formation may have similar possibilities with respect to oil.

Also from studying the tables it is seen that forty acres per well is the predominant spacing in the oil fields and one-hundred and sixty acres per well is the predominant spacing in gas fields.

QUANTITY AND QUALITY OF POTENTIAL OIL PRODUCTION

A review of the Pennsylvanian, Devonian or related producing formations indicate that the potential oil is of highest quality (40° API or higher) and hence will command top market price.

The Pennsylvanian, Devonian and related age formations are generally limestones or dolomites. These formations range in productive thickness from 10 to 200 feet with porosity values from four to fourteen percent and initial water saturations from twenty to fifty percent. Using the lowest value of porosity and the highest value of water saturation results in an oil in place value of approximately 110 stock tank barrels per acre foot. The recoverable oil from this formation would

be approximately 18 barrels per acre foot by solution gas drive and 45 barrels per acre foot by gas drive.

Using a porosity of fourteen percent and a water saturation value of twenty percent results in an oil in place value of approximately 620 stock tank barrels per acre foot. The recoverable oil from this formation would be approximately 125 barrels per acre foot by solution gas drive and 250 barrels per acre foot by water drive.

Combining the range of possible oil in place values with the wide range in thickness results in a very diverse potential economic value per acre. The minimum approximate value per acre would be for a ten foot thickness with four percent porosity, fifty percent water saturation and a solution gas recovery factor. This adverse combination of factors would result in a recovery of approximately 180 barrels of oil per acre with a value of approximately \$540.00. The best conditions would be a formation 200 feet thick with a porosity of fourteen percent, water saturation of twenty percent and a water drive recovery

factor. A reservoir under these very favorable conditions would recover approximately 50,000 barrels of oil per acre with a value of approximately \$150,000.00.

From the values presented above it is seen that any well drilled to formations in the Pennsylvanian or older formation on eighty acre spacing has the potential of finding oil valued at between \$43,200 and \$12,000,000. In this particular area the formation which had a potential income of only \$43,200 would not be considered a commercial well although it would probably be produced to recover as much of the drilling cost as possible.

An average oil field in the Pennsylvanian or older formations would probably have a porosity value of 6 percent, a thickness of 75 feet and a water saturation value of 35 percent such that the oil in place would be 216 barrels per acre foot. The potential recovery from a well developed in an eighty acre spacing pattern would be between 233,000 barrels (solution gas drive) and 518,000 barrels (water drive). The monetary value of

such a well would be between \$700,000 and \$1,554,000.00.

The worst, average and best possible reservoirs obtainable in the area are summarized in Table III.

TABLE I. OIL FIELDS HAVING PRODUCED 10 MILLION BARRELS OR MORE
FROM FORMATIONS OF PENNSYLVANIAN AGE OR OLDER

Field	Formation	Thick- ness	Approx. Date Spac- ing	of Disc.	Crude Gravity	Cummulative Production to 1/1/62 MM Barrels.
LEA COUNTY						
Bagley Sil-Dev.	Siluro-Devonian	175	40	7-49	44	15
Brunson	Ellenberger	70	40	9-45	42	27
Caprock East Dev.	Devonian	30	40	8-51	43	14
Crossroads Dev.	Devonian	100	80	5-48	42	13
Denton	Devonian	200	40	10-49	45	61
Gladiola	Devonian	50	40	11-50	47	35
Hare	Simpson	50	40	7-47	40	14

TABLE II. GAS FIELDS HAVING PRODUCED FIVE TRILLION CUBIC FEET OR MORE

EDDY COUNTY

Anderson Penn	Bend	40	320	10-54	6.8
Atoka Penn	Penn	31	160	10-57	5.1
Empire Penn	Penn	30	320	9-53	9.1
Shugart Sil-Dev.	Siluro-Devonian	70	480	2-57	8.1

LEA COUNTY

Bagley L Penn	Penn	10	160	10-51	8.3
Bagley U Penn	Penn		320	11-55	13.1
Crosby Dev.	Devonian	95	160	1-55	41.7
Monument McKee	Simpson	40	160	11-48	5.6

TABLE III. RANGE OF CONDITIONS FOR POTENTIAL OIL
RESERVOIR IN PENNSYLVANIAN OR OLDER FORMATION

	<u>Worst</u>	<u>Best</u>	<u>Average</u>
PROPERTIES AND IN-PLACE VALUES			
Porosity, o/o	4	14	6
Water Saturation, o/o	50	20	35
Oil in Place Bbls/AF	110	620	216
Thickness, Ft.	10	200	75
Oil in Place Bbls/Acre	1,100	124,000	16,200

RECOVERY

	<u>Solution Gas</u>	<u>Water</u>	<u>Solution Gas</u>	<u>Water</u>	<u>Solution Gas</u>	<u>Water</u>
Recovery Bbls/Acre	180	450	25,000	50,000	2,916	6,480
Recovery Bbls/80 Acres	14,400	36,000	2,000,000	4,000,000	233,000	518,000
Recovery Dollars/80 Acres	\$43,200	\$108,000	\$6,000,000	\$12,000,000	\$700,000	\$1,554,000

CEMENTING

CEMENTING

Question: Are you generally familiar with the techniques and problems of cementing a deep oil or gas well?

Answer: Yes

Question: Would you enumerate some of the problems of cementing a well penetrating a thick salt section with several known loss circulation zones above and below the salt section?

Answer: In any region with loss circulation zones the major problem is to get adequate cement volumes in the desired locations. Two techniques may be used to cement casing in loss circulation zones. Both methods depend on putting the cement in the hole in stages.

Method I is to calculate the volume of cement required to fill the annulus from the bottom of the hole to the loss circulation zone and the volume of the cement that can be placed above the loss circulation zone without imposing too high a pressure on the loss circulation zone. This volume of cement is circulated into the annulus and permitted to obtain some set. A temperature survey is run to locate the top of the cement or a bond log is run to locate the top of the bond between cement and pipe. The casing is perforated at the top of cement or top of bond and with appropriate hole equipment in place, cement is circulated through the perforation to another preselected height in the annulus. This procedure may be repeated until cement fills the annulus to the desired height above the bottom of the hole.

Method II requires careful planning prior to the placement of the casing string in the hole.

In this method special gating devices are placed in the casing string which can be opened by plugs larger than a given diameter. The cement is again placed in the annulus in batches or stages with the first stage being displaced out the bottom of the casing, the second stage enters the annulus through the lowest stage tool and the third, fourth and other cement stages, if required, being pumped through sequentially higher stage tools. This method is desirable only when the location of the loss circulation zones can be accurately defined and it is known that each volume of cement staged into the hole will at least reach the height of the next stage tool.

Certain problems of cement placement are common to both of the methods previously mentioned. The major problems, other than loss circulation, are obtaining a uniform distribution of cement in the annulus and obtaining good pipe-cement and cement-formation bonds.

In order to obtain the most uniform distribution of cement in the annulus, centralizers are placed on the casing to try and provide an equal spacing between the hole and the pipe. Also to prevent channeling or "by-passing" of the cement, the velocity of the cement is controlled so as to obtain turbulent flow during the period of placement.

In order to improve the chances of obtaining a cement bond between the cement and the casing and wall of the hole the operator will usually prepare the pipe surface, use scratchers on the casing, use water ahead of the cement, control the velocity of the water and cement in the annulus, and use excess cement volume so that mud contaminated cement at the top and bottom of the column can be placed in regions not desired to be cemented. The major difficulty in obtaining a cement bond is reaching the surface at which a cement bond is desired. In washed out sections of the hole the velocity may decrease so that plug flow occurs and the mud is

not displaced from the washed out volume. The engineer designing the cement job will use a caliper log and set the velocity so as to have turbulent flow in the largest indicated hole size. If the caliper log accurately defined the hole size, then the cement placement will probably displace the mud from the hole.

Question: Are special cements used in operations such as this?

Answer: Yes special chemicals can be mixed with the cement to provide desired properties, such as reduced weight, low water content, loss circulation material, setting retarders, etc. I am not familiar with the exact chemicals which might be used here, but such information could be obtained from Haliburton, Dowell or any other cementing firm by the engineer designing the cementing job. I am sure the properties of the cement would be considered in the design of any casing cement job.

Question: Does taking all the precautions you have enumerated guarantee a good cement job?

Answer: No guarantees are included. All of these steps are followed in a cementing job to create the most favorable conditions for obtaining a good cement job.

Question: If a cementing technique cannot be designed to guarantee a perfect job then how do you tell if you have any cement job at all?

Answer: There are four major ways of obtaining a qualitative check on the quality of the cement job obtained.

Two of the methods are primarily designed to locate the top of the cement column if it is not circulated to the surface. A radioactive material may be added to the lead volume of cement slurry and a gamma ray log run to detect the location of the radioactive cement after placement. The other method is to run a temperature measuring device in

the hole during the time the cement is "setting". A change in the normal temperature gradient is observed at the top of the cement column. By knowing the volume of cement placed in the hole and a good estimate of the volume of the annulus it is possible to estimate if channeling of cement or loss of cement has occurred. Neither of these methods will indicate

- (1) the strength of the set cement;
- (2) the bonding of the cement to the casing and the wall of the hole;
- (3) whether cement encircles the pipe or is just located on a portion of the pipe surface;

but does indicate

- (1) the height to which cement has been placed;
- (2) whether a measurable degree of channeling and loss circulation has occurred.

Another tool available for checking on the quality of a cement job is the Bond Log. This is a tool which generates sonic impulses and measures the magnitude of the energy of these impulses that is transmitted to a receiving device. If casing is surrounded only by fluid it will transmit a greater amount of energy than if it is resting against something solid. This transmission of energy is much the same as a bell whose sound can be muted by placing anything of a semi-solid nature against its surface. Thus the Bond Log indicates whether or not a section of the pipe is resting against something solid. The Bond Log will indicate the following:

- (1) when the pipe is completely surrounded by fluid;
- (2) when the pipe is resting against something solid, cement, cavings or side of the hole.

The Bond Log will not indicate the following:

- (1) the strength of the bond against the pipe,
- (2) whether the bond encircles the pipe,
- (3) whether cement is bonded to the wall of the hole.

The fourth procedure of testing a casing cement job is to apply pressure and check for cement failure. The pressure is applied inside the casing and to the bottom of the cement column. This procedure only checks the casing for leaks and the very bottom of the cement column. This test does not necessarily locate weaknesses in the upper part of the cement column unless they are so severe that casing leaks result. Of course the maximum bottom hole test pressure that can be used is determined by the depth to the bottom of the casing. A pressure cannot be used which would cause fracturing of the formations.

lease of pressure;

(3) additional drilling after the casing has been set creates impact loads because

Question: Is it possible that a casing cementing job could satisfy all of the tests and still fail at some future date?

Answer: Yes

Question: What might cause such a failure?

Answer: Essentially three factors might cause the cement job to fail at some later date. These three causes may be summarized as follows:

- (1) the original cement job just barely met the test requirements but did not have sufficient strength or bonding to either the pipe or the wall of the hole;
- (2) pressure testing of the cement job caused expansion of the pipe which could cause a loss of cement-pipe bond on release of pressure;

(3) additional drilling after the casing has been set creates impact loads because of the drill pipe and temperature increases because of the returning drilling fluid. Both of these factors could result in a failure of the casing cement.

Question: Is it possible that a casing cement job could be subjected a greater pressure than that used in testing the cement?

Answer: Yes, at shallow depths. Such a condition would normally only occur as a result of a "blow-out" during drilling when the "blow-out" preventors work. A formation with gas at 4500 psi at 10,000 feet could exert a pressure at 3800 feet in excess of 3800 psi and cause the formations to fracture. If casing were set in this example at any depth less than 3800 feet the formations between 3800 feet and the bottom of the casing would be subject to fracturing.

Question: Could this fracturing cause a complete failure of the cement job?

Answer: It would unless the formations above the fracturing were competent enough to withstand the abnormal pressures and resulting deformation.

Question: Does perforation of the cemented casing endanger the cement-casing bond?

Answer: Perforating with jet charges does very little damage to the cement pipe bond, whereas, perforating with bullet guns would cause some fracturing of the cement sheath at the point of bullet entry. The effect of this fracturing normally does not extend any significant distance from the point of impact of the bullet. Hence, it probably would be concluded that perforation of the cemented casing does not hurt a good cement job. If the cement job is not a good one then any additional surface exposure could result in a complete failure of the cement-casing bond.

Question: Is there any known non-destructive method of determining the in-place strength of cement job in an oil or gas well?

Answer: No

Question: If a high pressure gas well, such as Federal Dooley #1 which has a bottom hole pressure of 5000 psi, were leaking through the cement at the production perforations into the salt section at a rate of approximately 50,000 cubic feet per day, would it be possible to detect such a loss?

Answer: I must answer your question with a conditional yes.

Question: How would you detect such a leak?

Answer: As you have stipulated the leak to be located at the producing perforations, the leak could not be detected using temperature and pressure measuring devices within the well during test periods. The only means of detecting such a small loss would be the use of a volumetric gas balance applied over an extended period

of production. By observing the shut in pressure after fixed intervals of production, it would be possible to determine that fluid was leaving the reservoir which was not accounted for by the production measured at the surface. The length of time required to detect this loss of fluid would depend on the rate of gas production and the size of the leak. Figure 1 shows the ideal performance and the performance that would be observed if the loss were uniformly one percent and ten percent of the total reservoir production. It is noted from Figure 1 that the smaller the leak the greater the value of cumulative production at which the leak can be detected.

If the gas reservoir was producing under the influence of a partial water drive, it would be difficult if not impossible to detect an underground loss of gas equivalent to one percent of the total gas removed from the reservoir.

Because of the possibility of water influx and the probability that a loss of 50,000 cubic feet per day would represent less than one percent of the

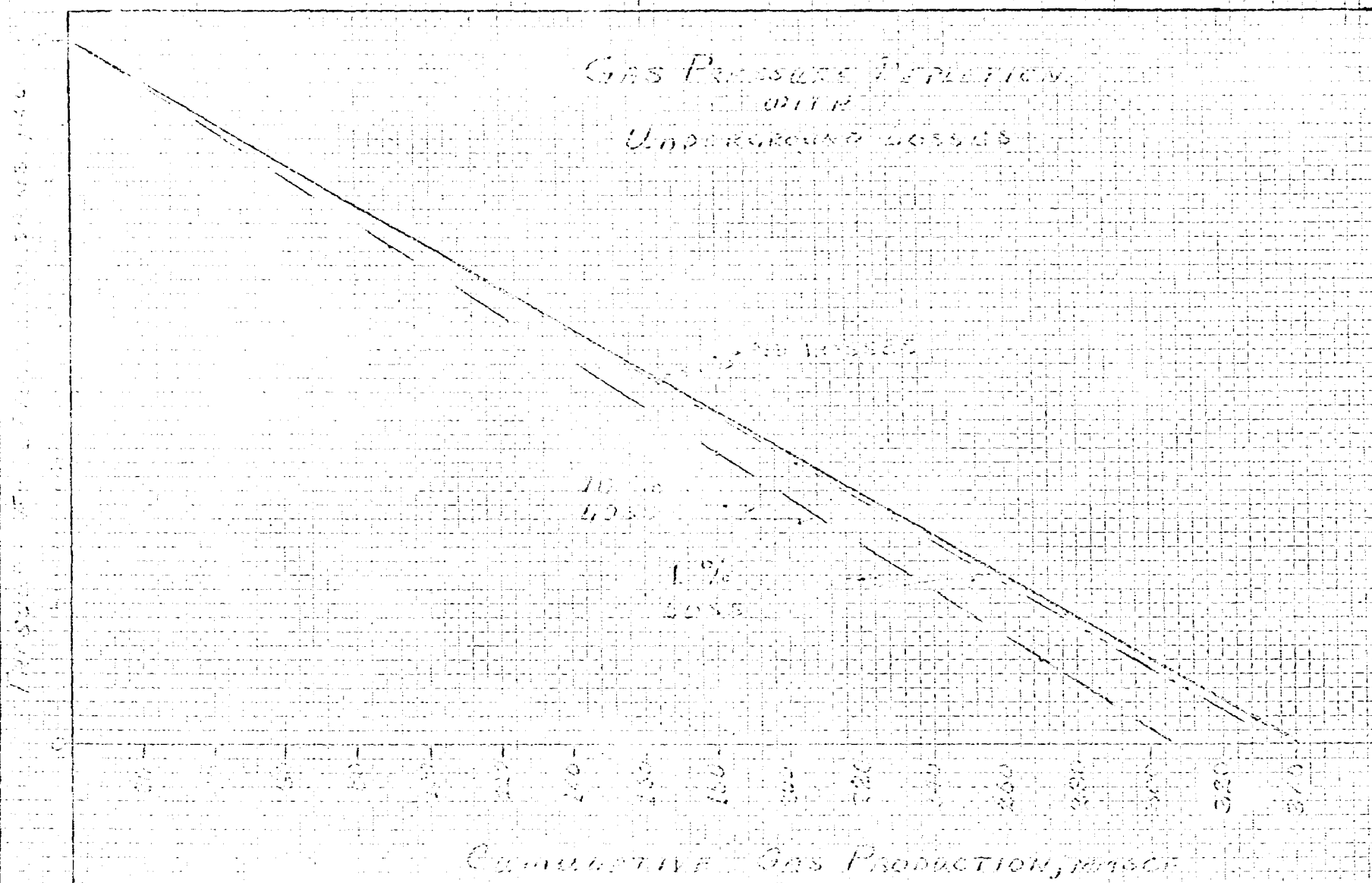
production, one cannot answer your question with an unconditional yes.

Question: If a non-commercial gas or oil well is plugged and abandoned, is there any way in which a leak may be detected around the cement outside the productive casing string?

Answer: No

FIGURE 1

Gas Pressure Depletion
 with
 Underground Losses



DRAFT

JMD/esr
10-16-64

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE No. 3029
Order No. R-2772-A

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR PERMISSION TO DRILL
WITHIN THE POTASH-OIL AREA AS DEFINED
BY COMMISSION ORDER NO. R-111-A, AS
AMENDED, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause having come on for reconsideration upon Application for Rehearing filed by Pan American Petroleum Corporation,

NOW, on this _____ day of October, 1964, the Oil Conservation Commission, a quorum being present, having considered the Application for Rehearing,

FINDS:

(1) That the Application for Rehearing does not allege that the applicant for rehearing has new or additional evidence to present in this case.

(2) That the Commission has carefully considered the evidence presented in this case and is fully advised in the premises.

~~(3) That Order No. R-2772 is proper in all respects.~~

(3) That the Application for Rehearing should be denied.

IT IS THEREFORE ORDERED:

That the Application of Pan American Petroleum Corporation for Rehearing in Case No. 3029, Order No. R-2772, is hereby denied.

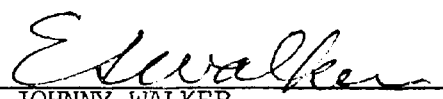
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

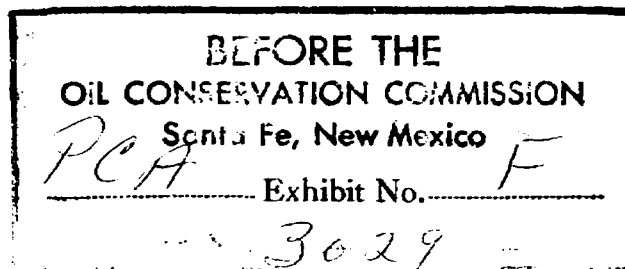
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CERTIFICATION

I, E. S. Johnny Walker, duly elected, qualified and acting Commissioner of Public Lands in and for the State of New Mexico, do hereby certify that the attached and foregoing photostatic copy of Assignment of State Potash Lease M-873 from Homer H. Harris to Potash of America dated August 7, 1952, is a full, true and complete copy of the original thereof as it appears on file in the State Land Office.

IN WITNESS WHEREOF, I have hereunto set my hand and the Seal of Office on this the 14th day of April, 1964.


E.S. JOHNNY WALKER,
Commissioner of Public Lands



MINING
ASSIGNMENT OF STATE POTASH / LEASE

KNOW ALL MEN BY THESE PRESENTS:

Homer H. Harris and

THAT Georgine Harris, his wife for and in consideration of the sum

of One Dollar(\$1.00) in hand paid, the receipt of which is hereby

acknowledged and for other good and valuable considerations, do _____

hereby sell, assign, transfer and set over unto Potash Company of America,

hereinafter called the Assignee, that certain Potash Mining

Lease made and executed by the State of New Mexico, through its

Commissioner of Public Lands as Lessor, unto Homer H. Harris

as Lessee, bearing the date of April 24, 1939 ~~xxxx~~
together with amendments dated Feb. 6, 1940 & May 27, 1949, being
designated as Potash mining lease No. M-873 ~~xxxxxxx~~
and embracing the lands more particularly
described as follows:

<u>Subdivision</u>	<u>Sec.</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres</u>
✓✓ All of	23	19S	29E	640 -
✓✓ All of	24	19S	29E	640 -
✓✓ All of	25	19S	29E	640 -
✓✓ All of	26	19S	29E	640 -
✓✓ N 1/2	36	19S	29E	320 -
✓ NW 1/4 NW 1/4	25	19S	30E	40 -
✓✓ All of	32	19S	30E	640 -
✓✓ S 1/2	36	19S	29E	320 -
✓✓ All of	2	20S	29E	643.76 -
✓✓ All of	16	20S	30E	640 -
✓✓ All of	17	20S	30E	640 -
✓✓ All of	18	20S	30E	636.88 -
✓✓ All of	19	20S	30E	637.84 -
✓ NW 1/4 NW 1/4	20	20S	30E	40 -
✓ NE 1/4 SW 1/4	20	20S	30E	40 -
✓ S 1/2 SW 1/4	20	20S	30E	80 -
✓✓ All of	36	20	28E	640 -
✓✓ All of	(32)	19S	31E	640 -
✓✓ All of	(36)	19S	30E	640 -
✓ N 1/2, W 1/2 SW				
✓ 1/4, E 1/2 SE				
✓✓ 1/4	2	20S	30E	480.72 -

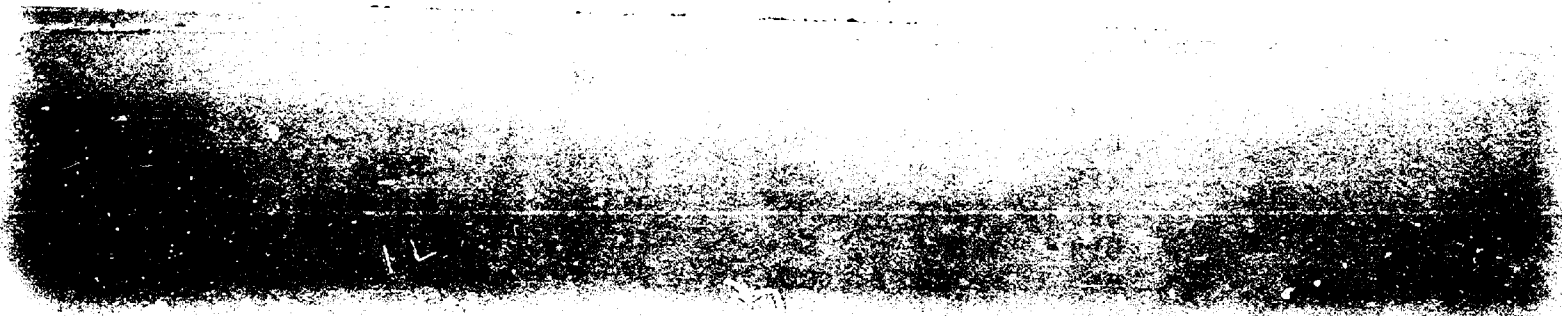
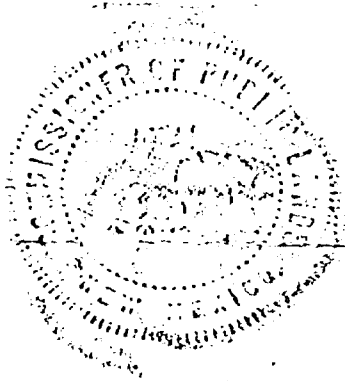
contains 4-16-53

containing 9,639.20 acres, more or less.

Subdivision Sec. Twp. Rge. Acres

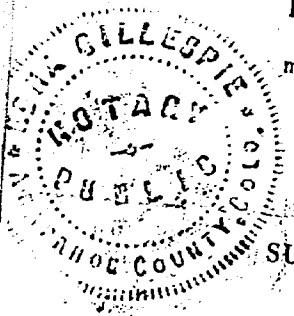
✓✓ All	16	22S	29E	640.00	
✓✓ All	2	22S	28E	641.02	4-16-53
✓✓ All	16	22S	28E	640.00	
✓✓ All	36	22S	28E	640.00	
✓✓ N 1/2, SE 1/4					
✓✓ NE 1/4 SW 1/4	2	23S	28E	518.14	

containing 3,079.16 acres, more or less.



The Assignee agrees to assume all obligations of the Assignor to the State of New Mexico insofar as said described lands are concerned and to pay such rentals and royalties and to perform such acts as are required by said lease, to the same extent and in the same manner as if the terms and provisions of said lease were fully set out herein. It is further agreed that the Assignee shall succeed to all rights, benefits and privileges granted the Lessee by the terms of said lease. This assignment is subject to any and all obligations of Lessee with respect to said lease which Assignee agrees to recognize and assume.

IN WITNESS WHEREOF, the Assignor has hereunto executed this assignment this 7th day of August, 1952



Terrence H. Harris
Assignor.

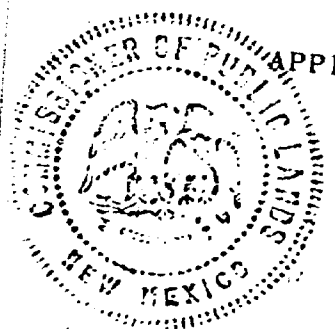
SUBSCRIBED AND SWORN TO BEFORE ME THIS 8 DAY OF Aug, 1952

Edna Gillespie
Notary Public.

My commission expires Nov. 14, 1955

APPROVED THIS 11th DAY OF August, 1952.

Guy Shepard
Commissioner of Public Lands.



APPLICATION

For Lease on State Lands for Potassium, Sodium, Phosphorus, Etc.

(Under Act of March 11, 1929)

To the Commissioner of Public Lands,
Santa Fe, New Mexico.

Whereas Potash Mining Company, Inc., No. 1, N-275, N-306 and N-318,
 Sir: held by the said lands, have been relinquished solely for the pur-
 pose of consolidation into one lease, and desiring to secure such con-
 solidation, I, Homer H. Harris, of the City and County of Denver, Colorado
 hereby make application for a lease for the development, exploration and production of potassium, sodium, phos-
 phorus, and their salts and compounds, as authorized by the Act of the New Mexico Legislature above cited,
 upon the following described lands situate in the County of 2037, State of New Mexico,
 to-wit:

SUBDIVISION	SEC.	TWP.	RGE.	ACRES
All of	25	19S	29E	640
All of	25	19S	29E	640
All of	25	19S	29E	640
All of	25	19S	29E	640
N 1/2	36	19S	29E	320
NW 1/4 NW 1/4	25	19S	30E	40
All of	32	19S	30E	640
S 1/2	36	19S	29E	320
All of	2	20S	29E	643.76
All of	16	20S	30E	640
All of	17	20S	30E	640
All of	18	20S	30E	636.82
All of	19	20S	30E	637.84
NW 1/4 NW 1/4	20	20S	30E	40
NE 1/4 SW 1/4	20	20S	30E	40
S 1/2 SW 1/4	20	20S	30E	80
All of	36	20S	28E	640
All of	32	19S	31E	640
All of	36	19S	30E	640
N 1/2, W 1/2 SW 1/4, E 1/2 SE 1/4	2	20S	30E	480.72

through a shaft located in Section 4, Township 20 South, Range 30 East.

See descriptions of such wells heretofore filed by said Potash
 Company of America in the office of the Commissioner of Public
 Lands for New Mexico.

3. What is the value of a lease upon said lands for the above mentioned minerals?
 (State the actual value, or if speculative, insert the words "purely speculative")

Purely speculative.

I, Homer H. Harris,

(Specify applicant, agent, attorney in fact or officer of corporation)

the above named applicant, do solemnly swear that each and every statement made in this application is true and
 correct to the best of my knowledge and belief.

STATE OF Colorado
 City and
 COUNTY OF Denver

Subscribed and sworn to before me by Homer H. Harristhe above named applicant, this 20th day of April, 1932.

My commission expires.....

Notary Public.

A BRY TO A TION

containing a total of 9,639.20 acres, more or less, and is tendered herewith as a bonus and first year's rental thereon the sum of \$ together with application fee of \$5.00.

Applicant states and shows that the facts and conditions relating to the character and value of the said lands for production of said minerals and the development and exploration of the same thereon and in the vicinity thereof as stated in answer to the following questions:

1. Have any test well or wells been drilled on said lands or within five miles thereof for determining whether or not deposits of said minerals, or any of them, are present?

Test wells have been drilled on said lands, or within the vicinity thereof by Potash Company of America, which said company is now engaged in developing a substantial acreage of Federal and state lands through a shaft located in Section 4, Township 20 South, Range 30 East.

See descriptions of such wells heretofore filed by said Potash Company of America in the office of the Commissioner of Public Lands for New Mexico.

3. What is the value of a lease upon said lands for the above mentioned minerals?
(State the actual value, or if speculative, insert the words "purely speculative")

Purely speculative.

I, Homer H. Harris,
(Specify applicant, agent, attorney in fact or officer of corporation)

the above named applicant, do solemnly swear that each and every statement made in this application is true and correct to the best of my knowledge and belief.

STATE OF Colorado
City and
COUNTY OF Denver

Subscribed and sworn to before me by Homer H. Harris
the above named applicant, this 20th day of April, 1939.

My commission expires

Notary Public.

STATE OF NEW MEXICO)
COUNTY OF SANTA FE)

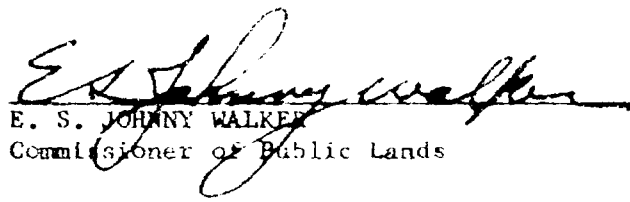
ss.

Exh E

C E R T I F I C A T E

I, E. S. Johnny Walker, duly elected, qualified and acting Commissioner of Public Lands in and for the State of New Mexico, do hereby certify that the attached and foregoing photostatic copy of M-873, dated April 24, 1939, is a full, true and complete copy of the original thereof as it appears on file in the State Land Office.

IN WITNESS WHEREOF, I have hereunto set my hand and Seal of Office on this 19th day of March, 1964.


E. S. JOHNNY WALKER
Commissioner of Public Lands

To: Files

Date: April 8, 1957

From: D. E. Protz

Subject: STATE LEASE M-873

Aug 3 '62
ACREAGE AS OF 4-25-57

	<u>Acres</u>
Twp. 19-S., Rge 29 E.:	
Sec. 23 - All ✓	640.00
Sec. 24 - All ✓	640.00
Sec. 25 - All ✓	640.00
Sec. 26 - All ✓	640.00
Sec. 36 - All ✓	640.00
 Twp. 19-S., Rge 30 E.:	
Sec. 32 - All ✓	640.00
Sec. 36 - All ✓	640.00
 Twp. 20-S., Rge 29 E.:	
Sec. 2 - All ✓	643.76
 Twp. 20-S., Rge 30 E.:	
Sec. 2 - N1/2, W1/2 SW1/4, E1/2 SE1/4 ✓	480.72
Sec. 16 - All ✓	640.00
Sec. 17 - All ✓	640.00
Sec. 18 - All ✓	836.88
Sec. 19 - All ✓	837.84
Sec. 20 - NW1/4 NW1/4, NE1/4 SW1/4, S1/2 SW1/4 ✓	160.00
 Twp. 22-S., Rge 29 E.:	
Sec. 18 - All ✓	640.00
 EDDY COUNTY TOTAL	<u>8,319.20</u>

Answering Date & Vested Date April 24.

April 8, 1957

ACREAGE AS OF 4-25-57

1957 AUG
STATE LAND OFFICE
SANTA FE, N.M.
RECORDED

	<u>Acres</u>
Twp. 19-S., Rge 33 E.:	
Rel. March 29 1960 Sec. 32 - S1/2 NW1/4	360.00
Sec. 36 - N1/2, NE1/4 SE1/4	360.00
 Twp. 19-S., Rge 34 E.:	
Rel. March 29 1960 Sec. 22 - All	640.00
 Twp. 20-S., Rge 34 E.:	
Rel. March 29 1960 Sec. 2 - All	640.00
Sec. 16 - All	640.00
Sec. 32 - N1/2, SE1/4, NE1/4 SW1/4	520.00
 Twp. 21-S., Rge 35 E.:	
Sec. 1 - All except S1/2	640.12
Sec. 2 - All except S1/2	640.56
Sec. 3 - All except S1/2	638.52
Sec. 4 - All except S1/2	638.58
Sec. 5 - Lots 3, 4, 5, 6, 11, 12, 13 & 14	318.08
Sec. 6 - Lots 9, 10, 11, 12, 13, 14, 15 & 16	305.92
Sec. 7 - All	622.84
Sec. 8 - W1/2	320.00
Sec. 9 - All	640.00
Sec. 10 - All	640.00
Sec. 11 - All	640.00
Sec. 12 - All	640.00
Sec. 13 - All	640.00
Sec. 14 - All	640.00
Sec. 15 - All	640.00
Sec. 16 - All	320.00
Sec. 17 - W1/2	311.87
Sec. 18 - S1/2	624.24
Sec. 19 - All	640.00
Sec. 20 - All	640.00
Sec. 21 - All	640.00
Sec. 22 - All	640.00
Sec. 23 - All	640.00
Sec. 24 - All	640.00
Sec. 25 - NE1/4, E1/2 NW1/4, SW1/4 NW1/4, SW1/4, W1/2 SE1/4, and SE1/4 SE1/4	560.00
Sec. 26 - All	640.00
Sec. 27 - All	640.00

April 8, 1957

ACREAGE AS OF 4-25-57.

Acres

Twp. 21-S., Rge 33 E.:

Sec. 28 -	S1/2, NE1/4, W1/2 NW1/4, SE1/4 NW1/4	800.00
Sec. 29 -	All /	640.00
Sec. 30 -	All /	624.56
Sec. 31 -	All /	625.08
Sec. 32 -	All /	640.00
Sec. 35 -	All /	640.00
Sec. 36 -	All /	640.00

Twp. 21-S., Rge 34 E.:

Sec. 5 -	All /	956.78
Sec. 6 -	All /	847.10
Sec. 7 -	All /	633.36
Sec. 8 -	All except NE1/4 SE1/4	600.00
Sec. 17 -	All /	640.00
Sec. 18 -	All /	633.88
Sec. 19 -	All /	634.44
Sec. 20 -	All /	640.00
Sec. 29 -	All /	640.00
Sec. 30 -	All /	635.16
Sec. 31 -	All /	636.00
Sec. 32 -	All /	640.00

Twp. 22-S., Rge 33 E.:

Sec. 5 -	N1/2 /	320.20
Sec. 6 -	N1/2 /	312.83

LEA COUNTY TOTAL	30,338.08	31,781.38
EDDY COUNTY TOTAL	8,319.20	3,952.20

TOTAL 38,657.28 ~~40,860.48~~

Lease No. M-873

Application No. M-873

POTASH MINING LEASE

(Under Act Approved March 12, 1929)

THIS INDENTURE OF LEASE entered into in duplicate this 24th day of April, 1939, by and between the State of New Mexico acting in this behalf by FRANK WORDEN, its Commissioner of Public Lands, party of the first part and hereinafter called the Lessor, and HOMER H. HARRIS of the City and County of Denver, State of Colorado, party of the second part and hereinafter called the Lessee, under, pursuant and subject to the terms and provisions of Chapter 140 of the Session Laws of the New Mexico Legislature of 1929, and hereinafter referred to as the Act, all of the provisions of said statute being hereby made a part hereof.

W I T N E S S E T H:

SECTION 1. THAT WHEREAS, the said Lessee has filed in the State Land Office an application for a lease for the exploration, development and production of potassium, sodium, phosphorus and other minerals of similar occurrence and their salts and compounds upon the lands hereinafter described and has tendered the sum of Nine Hundred Sixty-four & No/100 (\$264.00)-----Dollars as the first annual rental thereon, together with the sum of \$5.00 application fee, evidenced by official receipt No. _____.

NOW, THEREFORE, in consideration of the said above tender, receipt whereof is hereby confessed and

acknowledged, and of the rents and royalties to be paid and the covenants to be observed as herein set forth, the Lessor does hereby grant, demise, lease and let to the Lessee exclusively for the sole and only purpose of exploration, development and production of potassium, sodium, phosphorus and other minerals of similar occurrence and their salts and compounds in, upon and under the following described land situated in the County of Eddy, State of New Mexico, and more particularly described as follows, to-wit:

<u>Subdivision.</u>	<u>Sec.</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres.</u>
✓ All of	✓ 23	19S	29E	640
✓ All of	✓ 24	19S	29E	640
✓ All of	✓ 25	19S	29E	640
✓ All of	✓ 26	19S	29E	640
✓ N 1/2	✓ 36	19S	29E	320
✓ NW 1/4 NW 1/4	✓ 25	19S	30E	40
✓ All of	✓ 32	19S	30E	640
✓ S 1/2	✓ 36	19S	29E	320
✓ All of	✓ 2	20S	29E	643.76
✓ All of	✓ 16	20S	30E	640
✓ All of	✓ 17	20S	30E	640
✓ All of	✓ 18	20S	30E	636.88
✓ All of	✓ 19	20S	30E	637.84
✓ NW 1/4 NW 1/4	✓ 20	20S	30E	40
✓ NE 1/4 SW 1/4	✓ 20	20S	30E	40
✓ S 1/2 SW 1/4	✓ 20	20S	30E	80
✓ All of	✓ 36	20S	28E	640
✓ All of	✓ 32	19S	31E	640
✓ All of	✓ 36	19S	30E	640
✓ N 1/2, W 1/2 SW				
✓ 1/4, E 1/2 SE				
✓ 1/4	2	20S	30E	480.72

containing 9,639.20 acres, more or less, together with the right to construct and maintain thereon all works, buildings, plants, waterways or reservoirs necessary to the full enjoyment thereof, including the right to drill,

maintain and operate water wells on said lands and to produce and use the water therefrom; provided, that this lease shall extend only to and include any right or interest in the lands or the minerals therein reserved to the State of New Mexico under contract of purchase or deed heretofore or hereafter issued with a reservation of the minerals therein to said State.

TO HAVE AND TO HOLD the said lands and all rights and privileges granted hereunder for a term of ten years and as long thereafter as the said minerals or any of them in paying quantities shall be produced from the leased lands.

SECTION 2. In consideration of the premises, the Lessee hereby agrees as follows, to-wit:

(a) Within twelve (12) months from date hereof, unless extension be granted, to begin actual drilling upon some portion of the leased lands with machinery and equipment suitable for taking and preserving a core of salt formation, and to continue such drilling with reasonable diligence until a depth of 1800 feet shall be reached or the formations containing the minerals hereinabove mentioned shall have been completely penetrated and satisfactory evidence thereof furnished the Lessor by the Lessee. Provided, however, that where deposits of said minerals are so situated that prospecting work may be effectually carried on by shafts, tunnels, open cuts or in any manner otherwise than by drilling test wells, such prospecting work may be accepted by the Lessor in lieu of the drilling of a well or wells as herein provided.

(b) Upon the completion of the first well, as hereinabove provided for, to drill at least one such test well to completion on the said premises during each and every year thereafter during the ten year primary term of this lease or until the number of wells completed shall equal the number of sections of land of 640 acres each contained in this

lease, a minor fraction of such a section to be disregarded and a major fraction to be treated and regarded as a full section for the purpose of this paragraph. Provided, however, that where conditions existent on the lands may justify, exploratory work other than by the drilling of wells may be accepted in lieu of such drilling upon proper showing thereof made by the Lessee.

(c) To pay to the Lessor annually in advance on the successive anniversary dates of this lease the sum of ten cents (10¢) per acre for each and every acre of land as to which the lease may be in force when such payment shall become due, such rental payments to continue so long as this lease shall remain in force. Provided, however, that the annual rental on this lease shall not in any case be less than one hundred (\$100.00) dollars to be paid in cash.

(d) To pay to the Lessor a royalty of five per cent of the value of the minerals produced hereunder, such royalty to be computed upon the value of said minerals delivered at the nearest or most accessible railroad shipping point; all such royalty provided for herein expressly reserved to the Lessor as provided by statute.

(e) Rentals and royalties due the State shall constitute a first lien on any and all improvements on the land leased, prior and superior to any other lien or encumbrance whatsoever whether created with or without notice of the lien for rental or royalties due or to become due.

(f) To furnish monthly certified statements in detail in such form as may be prescribed by the Lessor, of the amount and value of output from the leasehold delivered at the nearest or most accessible railroad shipping point, as a basis for determining the amount of royalties, and to permit at all reasonable times the inspection by the Lessor or his duly authorized agent of all books and accounts of the Lessee relating thereto, it being a condition of this grant that falsification of any such statements, records, books or accounts by the Lessee shall be deemed and taken as sufficient ground for cancellation of this lease.

(g) To furnish the Lessor annually a map showing all prospecting and development work

on the leased lands and other related information, together with a report showing all buildings, structures and workings placed thereon, and a complete statement of the amount of potassium and other minerals produced and saved by Lessee's operations hereunder.

(h) If said minerals or any of them in commercially paying quantities shall be discovered on the lands embraced herein, to develop and produce in commercial quantities with reasonable diligence the potassium and other mineral deposits susceptible of such production; to carry on all mining, reducing, refining and other operations in a good and workmanlike manner in accordance with approved methods and practice, having due regard to the health and safety of employees, the prevention of waste and the preservation and conservation of the property for further productive operations, and to observe all state laws relative to the health and safety of such employees, all mining and related productive operations to be subject to inspection by the Lessor or his duly authorized agent and by other duly constituted state authority.

(i) To deliver to the Lessor upon the termination of this lease as a result of forfeiture or otherwise, the lands covered hereby including all fixtures and improvements other than structures, buildings, derricks, machinery, equipment, tools and personal property located and used above ground and other than pumps, engines, air compressors, dynamos, motors, cars and other similar appliances used underground situated on any of said lands, in good order and condition so as to permit of immediate continued operation to the full extent and capacity of the leased premises. Provided, that upon such termination of the lease the Lessee shall have ninety days from such termination to remove such machinery, tools, equipment and personal property from the leased premises if free from a state lien; and all such property shall become the property of the Lessor if not so removed within said period of ninety days or within such extension of time as may be granted by the Lessor.

(j) To pay when due all taxes lawfully assessed and levied under the laws of the State of New Mexico upon the improvements, output of mines and other rights, property and assets of the Lessee.

(k) To comply with all statutory requirements where the surface of the lands embraced herein has been or may be leased, sold or otherwise disposed of under State laws reserving to the State of New Mexico the mineral deposits therein contained.

(l) Not to assign or sublet the premises covered hereby without the written consent and approval of the Lessor.

(m) To take and preserve a core of all formations penetrated by any test well containing any of the minerals mentioned in Section 1 hereof, one-quarter of such core to be the property of the Lessor and the Lessee further agrees to furnish the Lessor promptly copies of any and all analysis made by or for the Lessee of cores taken from test wells drilled on the leased premises, and copies of analysis of samples of minerals mined therefrom upon demand of the Lessor.

(n) Before commencing operations hereunder to furnish the Commissioner of Public Lands a good and sufficient bond in the penal sum of not to exceed ten thousand (\$10,000.00) dollars conditioned upon the faithful performance by the Lessee of all and singular, the terms and conditions of this lease, and keep such bond in force and effect so long as Lessee's operations shall continue under the terms hereof.

SECTION 3. The Lessor hereby expressly reserves:

(a) The right to permit for joint or several such easements and rights of way upon, through or in the lands hereby issued as may be necessary or appropriate to the use or disposal of the lands for purposes other than the purpose of this lease, and the right to dispose of the surface of the said lands under the laws of the State of New Mexico now existing or hereafter enacted, insofar as said surface is not necessary or required for use of the Lessee in extracting and removing the potash and other mineral deposits therein contained. And the Lessor further expressly reserves the right to lease the said lands for minerals other than those described in Section 1 hereof, but the working of said lands under such lease, for such other minerals shall not be permitted where such operations will prevent or materially interfere with the operations of the Lessee hereunder.

SECTION 4. The Lessee may at any time, by paying to the Lessor all amounts then due the Lessor as provided herein and the further sum of ten and no/100 (\$10.00) dollars surrender and cancel this lease insofar as the same covers all or any portion of the land herein leased, and be relieved from further obligations or liabilities hereunder as to the lands surrendered. Provided, that all wages or monies due and payable to the workmen employed by the Lessee shall have been paid and that a satisfactory showing is made to the Lessor that all creditors or others having an interest in or lien or claim against the Lessee are fairly and equitably protected, but in no case shall such termination be effective until the Lessee shall have made adequate provision for the preservation of any mines, productive works and permanent improvements on the lands covered hereby; and provided further that this surrender clause and the option herein reserved to the Lessee shall cease and become absolutely inoperative immediately and concurrently with the institution of any suit in any court of law or equity by the Lessor, Lessee or any assignee to enforce this lease or any of its terms, expressed or implied.

SECTION 5. If the Lessee shall fail to comply with the provisions of this lease or make default in the performance or observance of any of the terms, covenants and stipulations herein, and such default shall continue for thirty days after service of written notice thereof by the Lessor, then the Lessor may and he is hereby ex-

pressly authorized to declare a forfeiture and cancellation of this lease. A waiver of any particular cause of forfeiture shall not prevent the cancellation and forfeiture of this lease for any other cause of forfeiture or for the same cause occurring at any time in the future.

SECTION 6. It is expressly understood and agreed that all of the obligations, covenants, agreements, rights and privileges of this lease shall extend to and be binding upon and inure to the benefit of the lawful assigns or successors in interest of the parties hereto.

IN WITNESS WHEREOF, The party of the first part has hereunto signed and caused its name to be signed by its Commissioner of Public Lands, thereunto duly authorized, with the seal of his office affixed, and the Lessee has signed this instrument the day and year first above written.



STATE OF NEW MEXICO

By

Frank Worden
Commissioner of Public Lands.

Laura H. Ham

STATE OF NEW MEXICO

COUNTY OF _____

)

:

SS.

)

Upon this _____ day of _____, 1939,
personally appeared before me FRANK WORDEN, to me known to
be the person described therein and who executed the above

and foregoing instrument, and acknowledged that he executed the same as Commissioner of Public Lands of the State of New Mexico as his 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 first above written.

My commission expires _____.

Notary Public.

STATE OF COLORADO)
CITY AND)
COUNTY OF DENVER)

Upon this 15th day of March, 1939,
personally appeared before me HOMER H. HARRIS, to me known
to be the person described therein and who executed the
above and foregoing instrument and acknowledged that he
executed the same as his 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 first above written.

My commission expires January 15, 1942.

Louise Hatfield
Notary Public.



RELEASE

Exh. 1

KNOW ALL MEN BY THESE PRESENTS:

That Homer H. Harris, a married man,
(State whether married or single)and Georgine R. Harris, his wife,
(wife, if any)of the City and County of Denver and State of Coloradodo hereby relinquish and release unto the State of New Mexico all their right, title and interestin and to that certain potash mining lease No. M-274 issued by the State of NewMexico, and now held under assignment No. One insofar as the same affects the

following described lands:

<u>Subdivision</u>	<u>Sec.</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres</u>
All of	16	20S	30E	640
All of	17	20S	30E	640
All of	18	20S	30E	640
All of	19	20S	30E	640
NW $\frac{1}{4}$ NW $\frac{1}{4}$	20	20S	30E	40
NE $\frac{1}{4}$ SW $\frac{1}{4}$	20	20S	30E	40
S $\frac{1}{2}$ SW $\frac{1}{4}$	20	20S	30E	40

The relinquishment of the potash mining lease herein is made for the sole purpose of consolidating said lease with three others held by Homer H. Harris, to-wit: Potash Mining Lease No. M-306, Potash Mining Lease No. M-275, and Potash Mining Lease No. M-348.

WITNESS our hands and seals this 20th day of April, 1939

Homer H. Harris (Seal)
Georgine R. Harris (Seal)
 _____ (Seal)

STATE OF Colorado
 City and _____ } ss.
 COUNTY OF Denver

On this _____ day of April, 1939, before me appeared Homer H. Harris, a married man, and Georgine R. Harris, his wife,
 to me personally 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.

E. H. B

ASSIGNMENT NO. ONE.

ASSIGNMENT OF POTASH MINING LEASE.

WHEREAS, H. A. LEWIS is the Lessee named in and the present holder of Potash Mining Lease No. M-274, granted to him June 30, 1931, by the Commissioner of Public Lands of the State of New Mexico, and for a valuable consideration, receipt whereof is confessed and acknowledged, has agreed to assign all his right, title and interest in said Lease to the Assignee hereinafter named,

NOW, THEREFORE, This Indenture WITNESSETH:

That the said H. A. Lewis and Dorothy F. Lewis, his wife, both of the City and County of Denver, State of Colorado, for and in consideration of good, valuable and sufficient considerations, receipt whereof is confessed and acknowledged, do hereby transfer, assign and set over unto Homer H. Harris of the City and County of Denver, State of Colorado, all of their right, title and interest in and to the aforesaid Potash Mining Lease and in and to the following described lands situate in Eddy County, New Mexico, covered by said Lease, to-wit:

<u>Subdivision</u>	<u>Sec.</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres</u>
All of	16	20S	30E	640
All of	17	20S	30E	640
All of	18	20S	30E	640
All of	19	20S	30E	640
NW 1/4 NW 1/4	20	20S	30E	40
NE 1/4 SW 1/4	20	20S	30E	40
S 1/2 SW 1/4	20	20S	30E	40

From 1931

Dated at Denver, Colorado, this 14th day of
March, 1939.

M. A. Lewis (SEAL)
Dorothy F. Lewis (SEAL)

STATE OF COLORADO)
CITY AND : SS.
COUNTY OF DENVER)

Upon this 15th day of March, 1939, personally appeared before me M. A. Lewis and Dorothy F. Lewis, his wife, to me known to be the persons described in and who executed the above and foregoing instrument, and acknowledged to me that they and each of them 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 first above written.

My commission expires January 15, 1942.

Louise Natfield
Notary Public.

Office of Commissioner of Public Lands,
Santa Fe, New Mexico.

I hereby certify that the within assignment was filed in my office on the 24th day of April, 1939, and approved by me on April 24, 1939.

Frank W. Gordon
Commissioner of Public Lands.

LEASE NO. 1-1004APPLICATION NO. 1-1004NORMAL MINING LEASE
(UNDER ACT APPROVED MARCH 12, 1929)

THIS MINING LEASE entered into in duplicate this 30th day of June, 1931, by and between the State of New Mexico acting in this behalf by J. F. Hinkle, its Commissioner of Public Lands, thereunto duly authorized, party of the first part and hereinafter called the lessor and M. A. Lewis, whose post office address is First National Bank Building, Denver, Colorado, party of the second part and hereinafter called the lessee, under, pursuant and subject to the terms and provisions of Chapter 140 of the Session Laws of the New Mexico Legislature of 1929, and Chapter 99 of the Session Laws of the New Mexico Legislature of 1923, and hereinafter referred to as the Acts, all of the provisions of said statutes being hereby made a part hereof.

WITNESSETH:

SECTION 1. THAT WHEREAS, the said lessee has filed in the office of the Commissioner of Public Lands an application for a lease for the exploration, development and production of potassium, sodium, phosphorus and other minerals of similar occurrence and their salts and compounds upon the lands hereinafter described and has tendered the sum of Two hundred seventy two and no/100 dollars (\$ 272.00) as the first annual rental thereon, together with the sum of \$5.00 application fee, evidenced by official receipt No. 73935.

NOW, THEREFORE, in consideration of the said above tender, receipt whereof is hereby confessed and acknowledged, and of the rents and royalties to be paid and the covenants to be observed as herein set forth, the lessor does hereby grant, demise, lease and lot to the lessee exclusively for the sole and only purpose of exploration, development and production of potassium, sodium, phosphorus and other minerals of similar occurrence and their salts and compounds in, upon and under the following described land situated in the County of Eddy, State of New Mexico, and more particularly described as follows; to-wit:

<u>Subdivision</u>	<u>Sec.</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres</u>
All of	16	20S	30E	640
All of	17	20S	30E	640
All of	18	20S	30E	640
All of	19	20S	30E	640

Description continued:

Subdivision	Sec.	Twp.	Rge.	Acres
NW 1/4	20	20S	30E	40
NE 1/4	20	20S	30E	40
SE 1/4	20	20S	30E	40

containing 2720.00 acres, more or less, together with the right to construct and maintain thereon all works, buildings, plants, waterways or reservoirs necessary to the full enjoyment hereof, including the right to drill, maintain and operate water wells on said lands and to produce and use the water therefrom.

TO HAVE AND TO HOLD the said lands and all rights and privileges granted hereunder for a term of ten years and as long thereafter as the said minerals or any of them in paying quantities shall be produced from the leased lands.

SECTION 2. In consideration of the premises, the lessee hereby agrees as follows, to-wit:

(a) Within twelve (12) months from date hereof, unless extension be granted, to begin actual drilling upon some portion of the leased lands with machinery and equipment suitable for taking and preserving a core of salt formation, and to continue such drilling with reasonable diligence until a depth of 1800 feet shall be reached or the formations containing the minerals hereinabove mentioned shall have been completely penetrated and satisfactory evidence thereof furnished the Commissioner of Public Lands by the lessee. Provided, however, that where deposits of said minerals are so situated that prospecting work may be effectually carried on by shafts, tunnels, open cuts or in any manner otherwise than by drilling test wells, such prospecting work may be accepted by the Commissioner of Public Lands in lieu of the drilling of a well or wells as herein provided.

(b) Upon the completion of the first well, as hereinabove provided for, to drill at least one such test well to completion on the said premises during each and every year thereafter during the ten year primary term of this lease or until the number of wells completed shall equal the number of sections of land of 640 acres each contained in this lease, a minor fraction of such a

section to be disregarded and a major fraction to be treated and regarded as a full section for the purpose of this paragraph. Provided, however, that where conditions existent on the lands may justify, exploratory work other than by the drilling of wells may be accepted in lieu of such drilling upon proper showing thereof made by the lessee.

(c) To pay to the Commissioner of Public Lands annually in advance on the successive anniversary dates of this lease the sum of ten cents (10¢) per acre for each and every acre of land as to which the lease may be in force when such payments shall become due, such rental payments to continue so long as this lease shall remain in force. Provided, however, that the annual rental on this lease shall not in any case be less than one hundred (\$100.00) dollars to be paid in cash.

(d) To pay to the Commissioner of Public Lands of the State of New Mexico a royalty of five percent of the value of the minerals produced hereunder, except sodium chloride or common salt, such royalty to be computed upon the value of said minerals delivered at the nearest or most accessible railroad shipping point; and to pay to the Commissioner of Public Lands of the State of New Mexico a royalty of ten percent of the actual sale price on all sodium chloride or common salt produced hereunder at the place of extraction; all such royalty provided for herein is expressly reserved to the lessor as provided by statute.

(e) To pay when due all taxes lawfully assessed and levied under the laws of the State of New Mexico upon the improvements, output of mines and other rights, property and assets of the lessee.

(f) To furnish monthly certified statements in detail in such form as may be prescribed by the lessor, of the amount and value of output from the leasehold delivered at the nearest or most accessible railroad shipping point, as a basis for determining the amount of royalties, and to permit at all reasonable times the inspection by the Commissioner of Public Lands or his duly authorized agent of all books and accounts of the lessee relating thereto, it being a condition of this grant that falsification of any such statements, records, books or accounts by the lessee shall be deemed and taken as sufficient ground for the cancellation of this lease.

(g) To furnish the Commissioner of Public Lands annually a map showing all prospecting and development work on the leased lands and other related information, together with a report showing all buildings, structures and workings placed thereon, and a complete statement of the amount of potassium and other minerals produced and saved by lessee's operations hereunder.

(h) If said minerals or any of them in commercially paying quantities shall be discovered on the lands embraced herein, to develop and produce in commercial quantities with reasonable diligence the potassium and other mineral deposits susceptible of such production; to carry on all mining, reducing, refining and other operations in a good and workmanlike manner in accordance with approved methods and practice, having due regard to the health and safety of employees, the prevention of waste and the preservation and conservation of the property for further productive operations, and to observe all state laws relative to the health and safety of such employees, all mining and related productive operations to be subject to inspection by the Commissioner of Public Lands or his duly authorized agent and by other duly constituted state authority.

(i) To deliver up to the lessor upon the termination of this lease as a result of forfeiture or otherwise, the lands covered hereby including all fixtures and improvements other than structures, buildings, derricks, machinery, equipment, tools and personal property located and used above ground and other than pumps, engines, air compressors, dynamos, motors, cars and other similar appliances used underground situated on any of said lands, in good order and condition so as to permit of immediate continued operation to the full extent and capacity of the leased premises. Provided, that upon such termination of the lease the lessee shall have ninety days from such termination to remove such machinery, tools, equipment and personal property from the leased premises and all such property shall become the property of the lessor if not so removed within said period of ninety days or within such extension of time as may be granted by the Commissioner of Public Lands.

(k) To comply with all statutory requirements where the surface of the lands embraced herein has been or may be leased, sold or otherwise disposed of under State laws reserving to the State of New Mexico the mineral deposits therein contained.

(l) Not to assign or sublet the premises covered hereby without the written consent and approval of the Commissioner of Public Lands.

(m) To take and preserve a core of all formations penetrated by any test well containing any of the minerals mentioned in Section 1 hereof, one-quarter of such core to be the property of the lessor and to be stored and preserved or disposed of as the Commissioner of Public Lands may from time to time direct, and the lessee further agrees to furnish the Commissioner of Public Lands promptly copies of any and all analysis made by or for the lessee of cores taken from test wells drilled on the leased premises, and copies of analysis of samples of minerals mined therefrom upon demand of the Commissioner of Public Lands.

(n) Before commencing operations hereunder to furnish the Commissioner of Public Lands a good and sufficient bond in the penal sum of not to exceed ten thousand (\$10,000.00) dollars conditioned upon the faithful performance by the lessee of all and singular, the terms and conditions of this lease, and keep such bond in force and effect so long as lessee's operations shall continue under the terms hereof.

SECTION 3. The lessor hereby expressly reserves:

(a) The right to permit for joint or several such easements and rights of way upon, through or in the lands hereby issued as may be necessary or appropriate to the use or disposal of the lands for purposes other than the purposes of this lease, and the right to dispose of the surface of the said lands under the laws of the State of New Mexico now existing or hereafter enacted, insofar as said surface is not necessary or required for use of the lessee in extracting and removing the potash and other mineral deposits therein contained. And the lessor further expressly reserves the right to lease the said lands for minerals other than those described in Section 1 hereof, but the workings of said lands under such lease, for such other minerals shall not be permitted where such operations will prevent or materially interfere with the operations of the lessee hereunder.

SECTION 4. The lessee may at any time, by paying to the State of New Mexico through its Commissioner of Public Lands all amounts then due the lessor as provided herein and the further sum of ten and no/100 (\$10.00) dollars

surrender and cancel this lease insofar as the same covers all or any portion of the land herein leased, and be relieved from further obligations or liabilities hereunder as to the lands surrendered. Provided, that all wages or monies due and payable to the workmen employed by the lessee shall have been paid and that a satisfactory showing is made to the Commissioner of Public Lands that all creditors or others having an interest in or lien or claim against the lessee are fairly and equitably protected, but in no case shall such termination be effective until the lessee shall have made adequate provision for the preservation of any mines, productive works and permanent improvements on the lands covered hereby; and provided further that this surrender clause and the option herein reserved to the lessee shall cease and become absolutely inoperative immediately and concurrently with the institution of any suit in any court of law or equity by the lessor, lessee or any assignee to enforce this lease or any of its terms, express or implied.

SECTION 5. If the lessee shall fail to comply with the provisions of this lease or make default in the performance or observance of any of the terms, covenants and stipulations here, and such default shall continue for thirty days after service of written notice thereof by the Commissioner of Public Lands, then the Commissioner of Public Lands may and he is hereby expressly authorized to declare a forfeiture and cancellation of this lease. A waiver of any particular cause of forfeiture shall not prevent the cancellation and forfeiture of this lease for any other cause of forfeiture or for the same cause occurring at any other time.

SECTION 6. It is expressly understood and agreed that all of the obligations, covenants, agreements, rights and privileges of this lease shall extend to and be binding upon and inure to the benefit of the lawful assigns or successors in interest of the parties hereto.

IN WITNESS WHEREOF: The party of the first part has hereunto signed and caused its name to be signed by its Commissioner of Public Lands, thereunto duly authorized, with the seal of his office affixed, and the lessee has signed this instrument the day and year first above written.

Attest: STATE OF NEW MEXICO
J. F. Adair
Commissioner of Public Lands
Chief Clerk

STATE OF NEW MEXICO

COUNTY OF SANTA FE

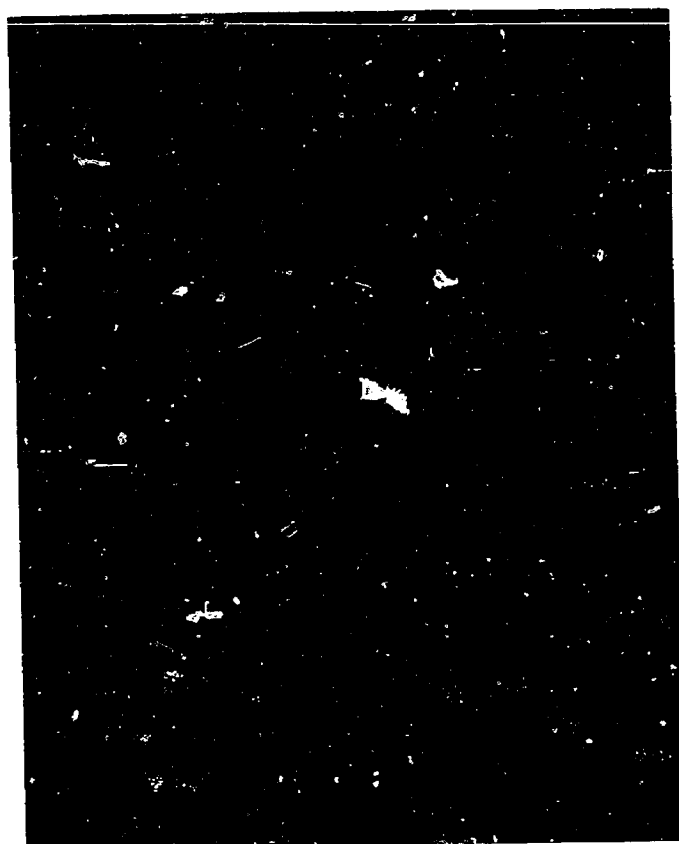
On this the 30th day of June 1937, personally appeared before me M. A. Lewis, to me known to be the person who executed the foregoing instrument as Lessee, and acknowledged that he executed the same as his free act and deed.

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

Frank Coleman Buzzein
Notary Public

My commission expires:

May 15-1938



Memo

From

IDA RODRIGUEZ

To

Send copy to
Bryant H. Croft

DRAFT
JMD/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF CON-
SIDERING:

CASE No. 3029

Order No. R-2172

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR PERMISSION TO DRILL
WITHIN THE POTASH-OIL AREA AS DEFINED
BY COMMISSION ORDER NO. R-111-A, AS
AMENDED, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 A.M. on April 15, 1964, at Santa Fe, New Mexico, before a quorum of the Oil Conservation Commission of the State of New Mexico, hereinafter referred to as the "Commission."

NOW, on this _____ day of _____, 1964, the Commission, a quorum being present, having considered the application and the alternative application, the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant proposes to drill an oil well 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, NMPM, Eddy County, New Mexico, or at an alternative location anywhere within a circle of

100 feet radius around an existing oil well, Barber No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17.

Barber-Optima Oil Pool in Eddy County, New Mexico and within the
(3) That each of the proposed locations is within the Potash-Oil Area as defined by Commission Order No. R-111-A, as amended.

(4) That there are nine wells currently producing in the Barber-Optima Oil Pool; that these wells are producing from an approximate depth of 1500 to 1600 feet.

✓ (5) That the applicant proposes to drill the subject well to an approximate depth of 12,500 feet ^{or deeper, as shown, Morrow and} to test the ^{and Morrow} Devonian ^{and Morrow} formations.

(5) That Potash Company of America operates a mine in Eddy County, New Mexico, which consists of between 12,000 and 13,000 acres of potash reserves and open mine workings; that said open mine workings consist of interconnected rooms and tunnels totaling about 825 miles in length, averaging 5 feet in height and 32 feet in width.

(6) That the proposed well in either proposed location would pass through unmined potash reserves at a depth of 700 feet from the surface which average 4.13 feet in thickness and have an average grade of ^{24.49%} ~~24.75%~~ K₂O.

(7) That the alternate location of the applicant's proposed well within 100 feet radius of the ~~Barber Well No. 4-A~~ ^{which is located} approximately ¹⁵⁰⁰ ~~2400~~ feet from the present open mine area of said mine, the easterly boundary of which open mine workings passes through the SW/4, the NW/4 and the NE/4 of Section 17, Township 20 South, Range 30 East, NMPM, Eddy County, New Mexico.

(8) That all proposed mine workings are conducted by Potash

100 feet radius around an existing oil well, Barber No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17.

Barber-Opta Oil Pool in Eddy County, New Mexico and within the
(3) That each of the proposed locations is within the Potash-Oil Area as defined by Commission Order No. R-111-A, as amended.

(4) That there are nine wells currently producing in the Barber-Opta Oil Pool; that these wells are producing from an approximate depth of 1500 to 1600 feet.

✓ (4) That the applicant proposes to drill the subject well to an approximate depth of 12,600 feet ^{*81 days, 1/2 hour, Morrow and*} to test the ^{*Devonian formations*} ~~Morrow, and Strawn formations.~~

(5) That Potash Company of America operates a mine in Eddy County, New Mexico, which consists of between 12,000 and 13,000 acres of potash reserves and open mine workings; that said open mine workings consist of interconnected rooms and tunnels totaling about 825 miles in length, averaging 5 feet in height and 32 feet in width.

(6) That the proposed well in either proposed location would pass through unmined potash reserves at a depth of 700 feet from the surface which average 4.13 feet in thickness and have an average grade of ^{*24.49%*} ~~24.75%~~ K₂O.

(7) That the alternate location of the applicant's proposed well within 100 feet radius of the ~~Barber Well No. 4-A~~ ^{*which is located*} approximately ^{*1500*} ~~2400~~ feet from the present open mine area of said mine, the easterly boundary of which open mine workings passes through the SW/4, the NW/4 and the NE/4 of Section 17, Township 20 South, Range 30 East, NMPM, Eddy County, New Mexico.

(8) That potash mining operations are conducted by Potash Company of America by the room and pillar method, extracting about 65% of the potash deposit on primary mining and leaving about 35% in pillars supporting the overburden; that about 25% of the original potash deposit can be removed on secondary mining and

that subsidence of the overburden and subsurface disturbance can be expected to result from secondary mining.

(9) That as a reasonable safety measure, Potash Company of America will not conduct potash mining operations within a radius of 100 feet of a shallow oil well or within a radius of 200 feet of a high pressure gas or oil and gas well, as to primary mining, or within a radius equal to the depth of the potash deposit, as to secondary mining.

(10) That the applicant has not established that the proposed well could be cased and cemented in a manner that would withstand the subsidence experienced in normal potash mining operations; that ^{damaged} ~~defective~~ casing will ultimately result in waste of oil or gas; and that no waste of oil or gas will occur from subsidence if drilling is postponed until the potash has been removed and subsidence is substantially complete.

(11) That the drilling of a well at either of the proposed locations at this time would create a hazard to human life as the applicant has not established that such well could be cased ^{and cemented} in a manner that would withstand the subsidence experienced in normal potash mining operations and prevent natural gas from escaping into the open mine workings; that if drilling is postponed until the potash has been removed and subsidence is substantially complete, the proposed well can be drilled without hazard to human life.

¹³
(12) That the drilling of an oil well at either of the proposed locations at this time would result in undue waste of potash deposits and unduly interfere with the orderly development of potash deposits in the area contrary to the provisions of Commission Order No. R-111-A; that if drilling is postponed until the potash has been removed, there will be no waste of potash.

(13) That postponing the drilling of exploratory wells in the Potash-Oil Area, as defined by Commission Order No. R-111-A, until the potash in said area has been removed and subsidence is substantially complete will, so far as it is practicable to do so, afford to the owner of each property in any pool underlying said area the opportunity to produce without waste his just and equitable share of the oil and gas in such pool.

(14) That the subject application should be denied.

IT IS THEREFORE ORDERED:

(1) That the application of Pan American Petroleum Corporation for authority to drill a well at either of the proposed locations in the SE/4 of Section 17, Township 20 South, Range 30 East, NMPM, Eddy County, New Mexico, is hereby denied.

(2) 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.

ATWOOD & MALONE
LAWYERS

JEFF D. ATWOOD (1883-1960)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON

P. O. DRAWER 700
TELEPHONE 505 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

May 26, 1964

*Case
File*

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

Re: Case No. 3029

Dear Mr. Porter:

I thank you for your letter of May 25, stating that findings in this matter would be received by the Commission on August 3, 1964.

Your consideration in this matter is appreciated.

Very truly yours,

ATWOOD & MALONE

By: *Charles F. Malone*

CFM:d

cc: J. K. Smith, Esquire
W. W. Heard, Esquire

DAVIS, GRAHAM & STUBBS
(LEWIS, GRANT & DAVIS)
ATTORNEYS AND COUNSELLORS AT LAW
AMERICAN NATIONAL BANK BUILDING
DENVER, COLORADO 80202

RICHARD M. DAVIS
DONALD S. GRAHAM
DONALD S. STUBBS
HOWARD W. REA
ROBERT H. HARRY
CLYDE O. MARTZ
GEORGE M. HOFFENBECK, JR.
ROBERT L. SHANSTROM

HUGH J. MCCLEARN
THOMAS S. NICHOLS
WILLIAM S. HUFF

LESTER R. WOODWARD
DONALD J. O'CONNOR
GEORGE E. LOHR
WALTER B. ASH
W. DAVID SLAWSON
ROBERT M. JEFFERS
WILLIAM E. MEYERS

L. RICHARD FREESE, JR.
DALE R. HARRIS
JON N. HALVERSON

255-5475
AREA CODE 303

ROBERT L. STEARNS
COUNSEL

June 1, 1964

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

Attention: Mr. Daniel S. Nutter, Chief Engineer

Gentlemen:

Thank you for furnishing us photostatic copies
of Applicant's Exhibits 12 and 13 in Case 3029, which
were transmitted by Mr. Nutter's letter of May 28, 1964.

Enclosed is our check in the amount of \$1.00
in payment for these documents.

Very truly yours,

George E. Lohr
for

DAVIS, GRAHAM & STUBBS

GEL:ag
Enc.



POTASH COMPANY OF AMERICA

MINE AND REFINERY: P. O. BOX 31 • CARLSBAD, NEW MEXICO • TU 5-2111

1964 AUG 3 AM 7 52

July 31, 1964

R. H. BLACKMAN
RESIDENT COUNSEL

Oil Conservation Commission
Santa Fe, New Mexico

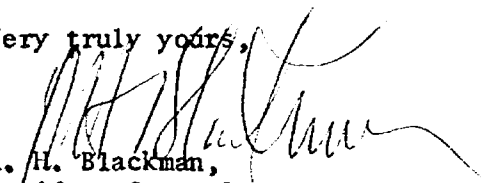
Attention: Mr. A. L. Porter,
Secretary-Director

Re: Case No. 3029

Gentlemen:

As authorized by the Commission, I enclose original
and 2 copies of a suggested form of order incorporat-
ing our requested findings of fact in the above num-
bered case.

Very truly yours,


R. H. Blackman,
Resident Counsel

RHB/b

Enc.

cc: Ross L. Malone, Esq.
Roswell, New Mexico



MEMBER: AMERICAN POTASH INSTITUTE

ATWOOD & MALONE
LAWYERS

MAIL OFFICE 000

1964 AUG 15 AM 7:42

P. O. DRAWER 700
TELEPHONE 505 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

JEFF D. ATWOOD (863-1960)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. HANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON

4 August 1964

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

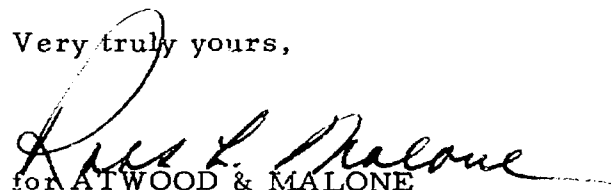
Attention: James M. Durette, Jr.

Re: Application of Pan American Petroleum Corporation
for Permission to Drill within the Potash-Oil Area
Case No. 3029

Gentlemen:

We enclose herewith original and one copy of Requested Findings of Fact and Conclusions of Law, submitted on behalf of Applicant Pan American Petroleum Corporation in accordance with the invitation of the Commission.

Very truly yours,


for ATWOOD & MALONE

RLM:v
encls.

cc: J. K. Smith, Esquire - w/encls.
Roy Blackman, Esquire - w/encls.



POTASH COMPANY OF AMERICA

MINE AND REFINERY: P. O. BOX 31 • CARLSBAD, NEW MEXICO • TU 5-2111

MAILED
OCT 1 1964

PH 3
OCT 1 1964

Caa 3029

October 1, 1964

R. H. BLACKMAN
RESIDENT COUNSEL

Mrs. Ida Rodriguez
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Ida:

Thank you very much for sending me the copy
of the Commission's Order in the Pan American Case.

With best personal wishes, I am

Sincerely,

RHB/b



MEMBER: AMERICAN POTASH INSTITUTE

ATWOOD & MALONE
LAWYERS

P. O. DRAWER 700
TELEPHONE 505 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

October 14, 1964

JEFF D. ATWOOD (883-1960)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON
JOHN W. BASSETT, JR.

James M. Durette, Jr., Esquire
Attorney for Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Re: Case No. 3029

Dear Jim:

I enclose herewith for filing with the Commission, the Application for Rehearing of Applicant Pan American Petroleum Corporation in Case No. 3029.

I will appreciate it very much if, upon receipt of this letter, and after the Application for Rehearing has been properly filed with the Commission, you will telephone John Bassett, in my office at Roswell, collect, and advise him that the Application has been filed in order that we may know that there will be no problem as regards filing within the period specified by the statute.

If John has not heard from you by mid-morning on the 25th, he will be telephoning you as we want to take no chances as regards the timely filing of the Application.

Thank you very much for your assistance in this connection.

With best wishes, I am

Very truly yours,

Ross L. Malone
By John W. Bassett, Jr.
for ATWOOD & MALONE

RLM:d

cc: Roy H. Blackman, Esquire

Called Bassett & acknowledged receipt on Oct 15
[Signature]

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. B. JOHNNY WALKER
MEMBER

P. O. BOX 2088
SANTA FE

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

October 23, 1964

Mr. Ross Malone
Atwood & Malone
Attorneys at Law
Box 700
Roswell, New Mexico

Re: CASE NO. 3029
ORDER NO. R-2772-A
APPLICANT PAN AMERICAN

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 x

Aztec OCC

OTHER Mr. Roy Blackman
Mr. John Anderson

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE No. 3029
Order No. R-2772-A

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR PERMISSION TO DRILL
WITHIN THE POTASH-OIL AREA AS DEFINED
BY COMMISSION ORDER NO. R-111-A, AS
AMENDED, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause having come on for reconsideration upon Application for Rehearing filed by Pan American Petroleum Corporation,

NOW, on this 21st day of October, 1964, the Oil Conservation Commission, a quorum being present, having considered the Application for Rehearing,

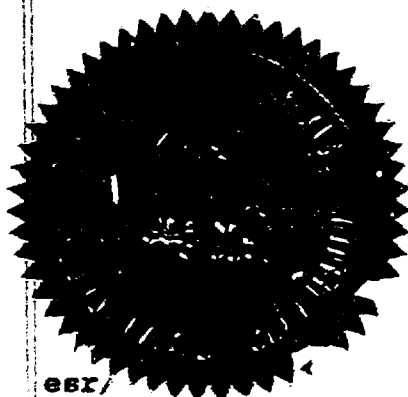
FINDS:

- (1) That the Application for Rehearing does not allege that the applicant for rehearing has new or additional evidence to present in this case.
- (2) That the Commission has carefully considered the evidence presented in this case and is fully advised in the premises.
- (3) That the Application for Rehearing should be denied.

IT IS THEREFORE ORDERED:

That the Application of Pan American Petroleum Corporation for Rehearing in Case No. 3029, Order No. R-2772, is hereby denied.

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



STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

E. S. Walker
E. S. WALKER, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary

esr/

MAILED
OCT 15 1964

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Application of Pan American Petroleum Corporation for permission to drill in the Potash-Oil Area, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill a well to the Mississippian formation at an approximate depth of 12,600 feet, said well to be located 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, Eddy County, New Mexico, or to drill said well at an alternate location anywhere within a circle of 100 feet radius around the Barber Well No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17. The above location and the alternate location are in the Potash-Oil Area as defined by the Commission in Order No. R-111-A as amended.

No. 3029

APPLICATION FOR REHEARING

COMES NOW Applicant Pan American Petroleum Corporation, sometimes herein referred to as "Pan American," and files this, its Application for Rehearing by the New Mexico Oil Conservation Commission of the above styled and numbered cause and, as grounds for granting such Application, states:

1. This cause came on for hearing before the Commission at 9 o'clock A.M., on April 15, 1964, at Santa Fe, New Mexico, on the Application of Pan American duly filed herein, and thereafter the Commission, on the 25th day of September, 1964, having considered the Application and Alternate Application of Pan American, issued its Order

No. R-2772 which was entered in the records of the Commission less than 20 days prior to the filing of this Application for Rehearing.

2. That Finding No. 10 of the Commission is erroneous in that it determines that the practice of Potash Company of America is to leave a pillar of a radius of 100 feet around the shallow oil well, and of 200 feet around a high pressure gas, or oil and gas, well as to primary mining or within a radius equal to the depth of the potash deposit as to secondary mining, and such Finding is contrary to the weight of the evidence and is not supported by substantial evidence.

3. That Finding No. 11 of the Commission is erroneous and contrary to the weight of the evidence and is not supported by substantial evidence to the extent that it finds that Applicant has not established that the proposed well could be cased and cemented in a manner that would withstand the subsidence experienced in normal potash mining operations, and in holding that damaged casing would ultimately result in waste of oil or gas in the event that the Application of Pan American were granted.

4. That Finding No. 12 of the Commission stating that the drilling of a well at either of the proposed locations, at this time, would create a hazard to human life is erroneous, is contrary to the evidence, and is not supported by substantial evidence; that said Finding is further not supported by substantial evidence to the extent that it finds that Applicant has not established that the proposed well could be cased and cemented in a manner that would withstand the subsidence experienced in normal potash mining operations and prevent the escape of natural gas into open mine workings.

5. That Finding No. 13 of the Commission is contrary to the evidence and is not supported by substantial evidence in holding that the drilling of an oil well at either of the proposed locations, at this time, would result in undue waste of potash deposits and unduly interfere with the orderly development of such deposits contrary to the provisions of Commission Order No. R-111-A.

6. That Finding No. 14 of the Commission is contrary to the evidence, is not supported by substantial evidence, deals with matters beyond the issues of this case, and beyond the authority of the Commission on the record and issues in this case.

7. That Finding No. 15 of the Commission is erroneous, unreasonable, and unlawful.

8. The Commission erred in failing to adopt Requested Findings of Fact Nos. 1 to 5 inclusive, of Applicant Pan American Petroleum Corporation in that the evidence, with reference to the facts therein recited, is undisputed and said facts are material to a determination of the issues before the Commission in this proceeding.

9. The Commission erred in failing to adopt Requested Findings of Fact Nos. 6 to 12 inclusive, for the reason that the evidence in support of the Facts therein recited, is undisputed and said Facts are material to the disposition of this case by the Commission.

10. The Commission erred in failing to adopt Applicant's Requested Finding No. 13 in that the facts therein recited were established by a preponderance of the evidence before the Commission and there is no substantial evidence to the contrary.

11. The Commission erred in refusing to adopt proposed Findings

of Fact Nos. 14 and 15 of Applicant in that they are supported by the undisputed evidence in this case and there is no substantial evidence to the contrary.

12. The Commission erred in refusing to adopt Requested Findings of Fact Nos. 16, 17 and 18 of Applicant Pan American Petroleum Corporation in that they are supported by the preponderance of the evidence heard by the Commission and there is not substantial evidence to the contrary.

13. The refusal of the Commission to grant the Application of Pan American to drill at the alternate location proposed constitutes an invalid exercise of the police power of the State of New Mexico and is beyond the power of the Oil Conservation Commission of New Mexico, for the reasons stated in Requested Conclusions of Law Nos. 1 and 2 which were submitted to the Commission.

14. The Order of the Commission is erroneous and unlawful in that the Legislature of New Mexico has not granted to the Oil Conservation Commission of New Mexico power or authority to prohibit or postpone the exercise of rights created by oil and gas leases issued by the Commissioner of Public Lands, be reason of possible interference with potash mining operations conducted under a lease which is junior in right to the oil and gas lease.

✓ 15. The Order of the Commission is erroneous and unlawful in that the Legislature has granted the Oil Conservation Commission of New Mexico jurisdiction and authority over matters relating to the conservation of oil and gas but has granted to the Commission no authority to conserve potash or to prevent the waste thereof, or to prevent interference with potash mining operations when to do so prevents exploration and development of oil

and gas deposits, the right of which was created by a lease paramount and superior to the existing potash lease embracing the premises.

16. The Order of the Commission is erroneous and unlawful in that the Application of Pan American, as elaborated by the testimony in this case, meets all valid requirements of the statutes of New Mexico and the Orders of the Oil Conservation Commission for the drilling of a well at the alternate location proposed by Pan American, and, by reason thereof, said Application should have been granted.

17. The Order of the Commission is unlawful in that it results in the taking of the property of Applicant without due process of law, and the postponement of the rights of Applicant under its lease to the complete exercise of the rights of the potash Lessee under a lease junior in time and right to the oil and gas lease of Applicant.

WHEREFORE, Applicant Pan American Petroleum Corporation respectfully prays the Commission for a rehearing in this case as to all matters determined by the Commission in its Order above referred to, to the extent that the same are alleged herein to be in any respect, illegal, unreasonable or unlawful, and that upon such rehearing the Application of Pan American Petroleum Corporation, above referred to, be granted.

Respectfully submitted,

ATWOOD & MALONE

By Rosa A. Malone
by John H. Bassett, Jr.
P. O. Drawer 700
Roswell, New Mexico
Attorneys for Applicant
Pan American Petroleum Corporation

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. B. JOHNNY WALKER
MEMBER

P. O. BOX 2088
SANTA FE

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

September 29, 1964

Mr. Ross Malone
Atwood & Malone
Post Office Box 700
Roswell, New Mexico

Re: CASE NO. 3029
ORDER NO. R-2772
APPLICANT Pan American

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 x

Aztec OCC

OTHER Mr. Roy Blackman
Mr. Bryant H. Croft (604 El Paso Bldg. - Salt Lake City, Utah)
Mr. John Anderson

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

AMENDED 7 52

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF CON-
SIDERING:

Case No. 5029

Order No. _____

APPLICATION OF PAN AMERICAN
PETROLEUM CORPORATION FOR PERMISSION TO
DRILL WITHIN THE POTASH-OIL AREA AS
DEFINED BY COMMISSION ORDER NO. R-111-A,
AS AMENDED

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 A.M. on April 15, 1964, at Santa Fe, New Mexico, before a quorum of the Oil Conservation Commission of the State of New Mexico, hereinafter referred to as the "Commission."

NOW, on this _____ day of August, 1964, the Commission, a quorum being present, having considered the application and the alternative application, the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

FINDING I.

That, due public notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

FINDING II.

That the applicant proposes to drill a deep test well 660 feet from the South line and 660 feet from the East line of Section 17, Township 20 South, Range 30 East, N.M.P.M. Eddy County, New Mexico or at an alternative location anywhere within a radius of 100 feet from an existing oil well, Harbor No. 4-A, located 1639.2 feet from the South line and 2304.5 feet from the East line of said Section 17, each of which proposed locations is within the Potash-Oil Area as defined by the Commission Order R-111-A, as amended, and that applicant proposes to test thereby some or all of the Devonian, Morrow and Strawn horizons.

FINDING III.

(a) That Potash Company of America operates a mine in Eddy County, New Mexico which consists of between 12,000 and 13,000 acres of potash reserves and open mine workings; and that said open mine workings consist of interconnected rooms and tunnels totaling approximately 825 miles in length, averaging 5 feet in height and 32 feet in width.

(b) That potash mining operations are conducted by Potash Company of America by the room and pillar method, extracting about

65% of the potash deposit on primary mining and leaving about 35% in pillars supporting the overburden; that about 25% of the original potash deposit can be removed on secondary mining and that subsidence of the overburden and subsurface disturbance can be expected to result from secondary mining.

(c) That, as a reasonable safety measure, potash mining operations will not be conducted by Potash Company of America within a radius of 200 feet of a high pressure gas well, as to primary mining, or within a radius equal to the depth of the potash deposit below the surface of the ground, as to secondary mining.

(d) That the proposed well in either proposed location would pass through unmined potash reserves at a depth of approximately 700 feet from the surface which average 4.13 feet in thickness, have an average grade of 24.4% K_2O and an average density of approximately 15.3 pounds per cubic foot of ore in place.

(e) That the alternate location of the applicant's proposed well within 100 feet radius of Barber No. 4-A well is approximately 2400 feet from the present open workings of said mine, the easterly boundary of which open workings passes through the SW/4, the NW/4 and the NE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M.

FINDING IV.

That the drilling of the proposed well at either of the two proposed locations would create a hazard to human life in that

drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

FINDING V.

(a) That an anticlinal structure exists in the Devonian, Morrow, and Strawn horizons including within its high contour substantially all of the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico, which structure probably contains a pool or pools of crude petroleum oil or natural gas, or both, in an area of approximately 1825 acres which includes said SE/4 and surrounding contiguous land, and part of which lies under the present open workings of the Potash Company of America mine.

(b) That proper development of any such pool to prevent reduction of the total quantity of crude petroleum oil ultimately to be recovered therefrom and to prevent the inefficient, excessive or improper use or dissipation of the reservoir energy would require several wells, some of which would be located within or near the present open workings of the Potash Company of America mine.

(c) That drilling of wells at this time in or near such open mine workings would constitute a hazard to human life in that drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or

oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

(d) That if such wells in or near such open mine workings are not drilled and produced contemporaneously with the development of the remainder of any such pool, waste will result in that substantial amounts of crude petroleum oil which could be recovered from the pool by such contemporaneous drilling and production will never ultimately be so recovered, and reservoir energy will be used or dissipated in an inefficient, excessive and improper manner.

(e) That if drilling is postponed until both primary and secondary potash mining operations shall have been completed and subsidence shall be substantially complete, all wells necessary to produce the total quantity of recoverable oil or gas, or both, in any such pool can be drilled without hazard to human life and that such postponement of drilling is practicable and will prevent waste of crude petroleum oil and natural gas.

FINDING VI.

(a) That an anticlinal structure exists in the Devonian, Morrow, and Strawn horizons including within its high contour

substantially all of the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico, which structure probably contains a pool or pools of crude petroleum oil or natural gas, or both, in an area of approximately 1825 acres which includes said SE/4 and surrounding contiguous land, and part of which lies under the present open workings of the Potash Company of America mine.

(b) That correlative rights of the owner of each property in such pool or pools can be protected only if waste is prevented.

(c) That the prevention of waste in said pool or pools would require proper development of any oil or oil and gas pool by drilling several wells, some of which would be located within or near the present open workings of the Potash Company of America mine.

(d) That drilling of wells at this time in or near such open mine workings would constitute a hazard to human life in that drilling, completing and cementing operations cannot be conducted in such manner as to give adequate assurance that natural gas or oil under pressure would not escape into any lower pressure media or into open workings of the Potash Company of America mine.

(e) That if such wells in or near such open mine workings are not drilled and produced contemporaneously with the development of the remainder of the pool or pools, waste will occur and correlative rights will not be protected.

(f) That if drilling is postponed until both primary and secondary potash mining operations shall have been completed and

subsidence shall be substantially complete, all wells necessary to produce the total quantity of recoverable oil or gas, or both, in any such pool can be drilled without hazard to human life and that such postponement of drilling is practicable and will fully protect correlative rights.

FINDING VII.

(a) That if a drilling program to properly develop the oil and gas pool or pools described in Finding V(a) is conducted at this time, several wells will be drilled through the proven potash reserves of Potash Company of America.

(b) That if secondary mining operations are conducted within a radius of approximately 700 feet from a well in the pool area, the well will be subject to subsurface disturbance and possible crushing and shearing action and no adequate assurance can be provided that the casing of any oil or gas well could withstand such crushing and shearing action or that hydrocarbon fluids and natural gas could be confined within such casing and prevented from entering the open workings of the Potash Company of America mine.

(c) That, as a reasonable safety measure because of the hazard to human life if hydrocarbon fluids or natural gas should escape into open mine workings, primary mining will not be conducted within a radius of 100 feet of a low pressure shallow producing oil well, or within a radius of 200 feet of a high pressure gas or oil and gas well and secondary mining will not be

conducted within a radius of 700 feet from any oil or gas well and therefore the potash property will be injured in that substantial amounts of potash will of necessity be left unmined to protect such wells, which potash will be lost to production and wasted.

(d) That as a result of these reasonable safety measures, the drilling of the proposed well in either of the proposed locations and the drilling of the additional wells necessary to develop properly any pool or pools of crude petroleum oil or natural gas or both discovered thereby would result in undue waste of potash deposits and would constitute a hazard to and interfere unduly with potash deposits.

(e) That, if the development of the pool or pools is postponed until after the potash is removed, such pool or pools may be properly developed without waste of potash deposits or crude petroleum oil or natural gas and without hazard to or interference with potash deposits.

FINDING VIII.

(a) That if secondary mining operations are conducted within a radius of approximately 700 feet from the proposed well in either proposed location, such well will be subject to subsurface disturbance and possible crushing and shearing action and no adequate assurance can be provided that the casing of such well could withstand such crushing and shearing action or that hydrocarbon fluids and natural gas could be confined within such

casing and prevented from entering the open workings of the Potash Company of America mine.

(b) That, as a reasonable safety measure because of the hazard to human life if hydrocarbon fluids or natural gas should escape into open mine workings, primary mining will not be conducted within a radius of 100 feet of a low pressure shallow producing oil well, or within a radius of 200 feet of a high pressure gas or oil and gas well and secondary mining will not be conducted within a radius of 700 feet from any oil or gas well and therefore the potash property will be injured in that substantial amounts of potash will of necessity be left unmined to protect each such well, which potash will be lost to production and wasted.

(c) That as a result of these reasonable safety measures, the drilling of the proposed well in either of the proposed locations would result in undue waste of potash deposits and would constitute a hazard to and interfere unduly with potash deposits.

(d) That if the drilling of the proposed wells is postponed until after the potash is removed, there will be no waste of potash deposits and no hazard to or interference with potash deposits.

FINDING IX.

That each of the findings numbered IV through VIII inclusive stated above is in itself sufficient to support the order stated below.

IT IS THEREFORE ORDERED

That the application of Pan American Petroleum Corporation for an order granting the approval of the drilling of the proposed well at either of the proposed locations in the SE/4 of Section 17, Township 20 South, Range 30 East, N.M.P.M., Eddy County, New Mexico be, and it hereby is, denied.

DONE AT SANTA FE, NEW MEXICO on the _____ day of
August, 1964.

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

Jack M. Campbell, Chairman

E. S. Walker, Member

A. L. Porter, Jr., Member and Secretary