

0153 334: North Drig. Co. application for
secondary recovery by water injection A. R.
Taylor Lease Secs. 1-12-13, T.18S, R.21E

Case No.

334

Application, Transcript,
Small Exhibits, Etc.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE NO. 334
ORDER NO. R-133

THE MATTER OF THE APPLICATION
OF THE WORTH DRILLING COMPANY,
INC., FOR APPROVAL OF A SECONDARY-
RECOVERY PROJECT (BY WATER FLOOD-
ING) ON A. C. TAYLOR FEDERAL LEASE
IN SECTIONS 1, 12 AND 13, T. 18 SOUTH,
RANGE 31 EAST, EDDY COUNTY, NEW
MEXICO, BY INJECTION INTO ITS A. C.
TAYLOR NO. 3-A WELL ON SAID LEASE.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause having come on for hearing at 10 o'clock January 22, 1952, at Santa Fe, New Mexico, before the Oil Conservation Commission, hereinafter referred to as the "Commission", and all members being present;

NOW, on this 6th day of March 1952, the Commission, a quorum being present, and having considered the testimony adduced and the exhibits received at said hearing, and being otherwise fully advised in the premises;

FINDS:

(1) That due and proper notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter hereof;

(2) That the petitioner's request to revert to secondary recovery methods by repressuring, using their A. C. Taylor well No. 3-A situated within the North Shugart Field, by a water-injection program, will tend to prevent waste and should be granted upon the condition that said program be pursued in the manner outlined at said hearing.

(3) That a secondary recovery program by water injection is of an experimental nature in this particular pool, and periodic reports should be submitted to the Commission by the petitioner disclosing its acts and doings in the matter.

IT IS THEREFORE ORDERED:

That the petitioner be and hereby is given the right to institute a secondary recovery program of oil on its A. C. Taylor lease by injecting water.

- 2 -

Case No. 334

Order No. R-133

IT IS FURTHER ORDERED: That petitioner submit quarterly reports to the Commission disclosing all of its acts and doings and setting forth therein the progress it has made by the adoption of its secondary recovery program.

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

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO



EDWIN L. MECHEM, CHAIRMAN



GUY SHEPARD, MEMBER



R. R. SPURRER, SECRETARY

S E A L

Re CASE 334

FIELD ADDRESS:
P. O. BOX 887
KERMIT, TEXAS

WORTH DRILLING COMPANY, INC.
FORT WORTH NATIONAL BANK BUILDING
FORT WORTH 2, TEXAS

December 5, 1951

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

Gentlemen:

Worth Drilling Company, Inc. is the operator of a Federal Oil and Gas Lease covering all of Sections 1, 12 & 13, Township 18-South, Range 31-East, Eddy County, New Mexico. There are 12 producing wells on the lease. The producing area of the lease is outlined in red on the plat. All wells are being pumped by individual pumping units.

Production is from the Queen sand encountered at a depth of approximately 3550'. The thickness of the producing zone varies from 15' to 20' and it is a loosely consolidated, fine-grained sand. Geological data indicates that the production is from a stratigraphic trap limited by the decrease of porosity of the Queen sand. Under the conditions of a single sand pay which is fairly consistent throughout the producing area and the evidence of the stratigraphic trap, the lease appears to be ideally suited for secondary recovery by water flooding.

As we are limited in the amount of water which we can make available for water flooding, we intend to inject water in only one well, the A. C. Taylor "A" No. 3. We plan to inject water by gravity, provided the formation takes the water in a satisfactory manner. If necessary, the water will be injected by pressure. The proposed injection well was drilled to a total depth of 3595', the pay zone was from 3566' to 3585', 7" casing was set at 3448', cemented with 100 sacks of cement, and the well was shot with 60 quarts of solidified nitro-glycerin from 3561' to 3585'. This well was completed June 22, 1947. The initial production was 81 barrels of oil per day pumping, and it is now producing from 3 to 4 barrels of oil per day.


We plan to obtain our water from 3 wells as follows: The Malco-Taylor "B" No. 1 was a dry hole, but the 8-5/8" surface casing was not pulled. We intend to perforate opposite water producing sand from 385' to 450' and convert this old dry hole to a water well. Our A. C. Taylor "A" No. 3 had good shows of water from 480' to 520', and we plan to drill a water well which will be a twin to the No. A-3. We already have a water well which is a twin to our A. C. Taylor "A" No. 1. This also is producing water from the sand encountered at approximately 450'. From these 3 water wells we expect to produce from 400 to 600 barrels of water per day, which amount we think to be sufficient for the one injection well. We intend to inject from 400 to 500 barrels of water per day.

Page # 2.

We respectfully request that the Oil Conservation Commission consider all data submitted and set a hearing for our application at the earliest possible date.

If any additional information is needed, we will be glad to supply it.

Yours sincerely,


Joseph D. Kennedy
Secretary-Treasurer

JDK:lc

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Transcript of Hearing

CASE NO. 334

January 22, 1952

Henrickson's Reporting Service
2224 - 47th Street
Los Alamos, New Mexico

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

January 22, 1952

Case 334: In the matter of the application of the Worth Drilling Company, Incorporated for approval of the secondary-recovery program (by water flooding) on A. C. Taylor Federal Lease in Sections 1, 12 and 13, Township 18 South, Range 31 East, Eddy County, New Mexico, by injection into its A. C. Taylor No. 3-A well on said lease. There now being twelve (12) producing wells on the lease, all of which are being pumped by individual pumping units.

JOSEPH D. KENNEDY,

having first been duly sworn, testified as follows:

MR. KENNEDY: Our plan is to establish a program of water flood on our A. C. Taylor Lease in the north sugar field. This will be a pilot project. Production from this lease is from the Queen's Section at about thirty-five hundred (3,500) feet, producing from one sand zone only. We plan to inject approximately one hundred fifty (150) barrels of water per day in the A. C. Taylor A No. 3 in an attempt to increase our recovery of oil. We have had our firm engineer prepare a report to be submitted to this Commission as an exhibit which fully covers all our intentions.

MR. GRAHAM: Do you wish to offer it as an exhibit?

MR. KENNEDY: I do wish to offer it as an exhibit.

MR. SPURRIER: Without objection, it will be accepted as an exhibit.

MR. GRAHAM: What pool is that?

MR. KENNEDY: That's in the North Sugar Pool.

MR. GRAHAM: And that is considered to be an auto-drive - - -

MR. KENNEDY: It is a gas solution pool. We have encountered no water. There is no water being produced in any of the wells.

MR. SPURRIER: Are you familiar with the ^{Caprock} Camp Rock Pool re-pressuring on secondary recovery?

MR. KENNEDY: Yes, I am.

MR. SPURRIER: That is in the same formation, is it not?

MR. KENNEDY: The Camp Rock? Yes, I believe it's in the same formation, yes, sir.

MR. SPURRIER: I just wondered. We understand that they felt that "slugging" - they are using air primarily. "Slugging" with water has not worked out very satisfactorily in that pool. However, I don't know if the conditions aren't different in your pool.

MR. KENNEDY: We had considered using air and have studied the re-pressuring of the south lot and believe that the recovery will be much more efficient using water. We do have sufficient amount of water on the lease to go ahead with our water-injection program.

MR. GRAHAM: Would you care to summarize the contents of that?

MR. KENNEDY: There are twelve (12) producing wells all being

pumped by individual pumping units. Recovery as of January 1st, 1952, was 460,203 barrels. It is estimated that an additional 84,000 barrels will be recovered by primary production. The reservoir data is rather meager in this field. However, the information available indicates that there is an excellent chance for water production to be successful.

MR. SPURRIER: Is this considered to be a pilot?

MR. KENNEDY: A Pilot, yes, sir. If it is successful, we will probably convert more wells to the water-injection method.

MR. SPURRIER: I presume that as in many cases where you get ready to put secondary-recovery methods into effect that you don't have near the information from the old well. That is, there is no reservoir data available because there are no cores available.

MR. KENNEDY: We took one core and one well and took samples from them. The main zone showed very poor recovery.

MR. GRAHAM: Would you like to outline to the Commission the Cantil devices or procedures?

MR. KENNEDY: We intend to obtain water from the existing water well on the lease and in addition we intend to go into an old dry hole on our lease for water-producing sand, and if necessary drill another water well. We believe that with three water wells, we can produce about five or six hundred barrels of water per day which is more than adequate. We intend to inject water by gravity at the

rate of one hundred fifty (150) barrels a day. Not over one hundred fifty (150) barrels a day. This will be increased as the perimeter of the actual flood indicates.

MR. GRAHAM: What will be your criteria? How will you know -

MR. KENNEDY: We probably won't know for some five to six months in view of the fact that we don't know the amount of water that will be injected and also due to the wide spacing in the area. We calculate it will take approximately four months to replace the oil which has been produced in the immediate area by the water injection method. Probably not until that time will we begin to get any noticeable change in our production.

MR. GRAHAM: You have a plat or a map there. Is it your intention to introduce that as evidence?

MR. KENNEDY: I have -- there is a map of our lease. If the Commission wishes, it can be submitted as an exhibit.

MR. SPURRIER: Does anyone have any questions or comment.

MR. KENNEDY: I would like to add that we have the approval of the U. S. Geological Survey and also have gained the approval of the off-set operators.

MR. GRAHAM: Do you care to introduce that letter in the record for the information of the Commission or a photostat of it?

MR. KENNEDY: I have had copies made of the letter from the Off-set Operators. If you wish, I will have photostats made as I

do not have any copies of the U.S.G.S.

MR. SPURRIER: The Commission would like to have photostats of that letter and with no objection, they will be accepted as evidence in this case. Are there any further questions or comment? Mr. Morrell?

MR. MORRELL: No, sir.

MR. SPURRIER: If not, the case will be taken under advisement.

- - - - -

STATE OF NEW MEXICO)
COUNTY OF LOS ALAMOS) ss

I hereby certify that the foregoing and attached transcript of hearing in Case 334 before the Oil Conservation Commission on January 23, 1952, at Santa Fe is a true record of the same to the best of my knowledge, skill and ability.

DATED at Los Alamos, this 23rd day of January, 1952.


Audrey M. Henrickson

My commission expires September 20, 1955.

FIELD ADDRESS:
P. O. BOX 867
KENNY, TEXAS

WORTH DRILLING COMPANY, INC.

FORT WORTH NATIONAL BANK BUILDING
FORT WORTH 2, TEXAS

January 23, 1952

New Mexico Oil Conservation Commission
2005 Booker Building
Artesia, New Mexico

Attention: Mr. Justin P. Newman
Oil and Gas Inspector

Dear Mr. Newman:

Enclosed is a copy of the Engineering Report in regard to our Water Flooding Program on our Taylor Leases in the North Shugart Field, Eddy County, New Mexico. This is the report which was submitted to the New Mexico Oil Conservation Commission as Exhibit "A" at the Hearing on January 22, 1952. We also enclose photostatic copies of letters from the United States Geological Survey and the offset operators giving their approval of our Water Flooding Program.

This material is being sent to you so that you might have the information for your district office.

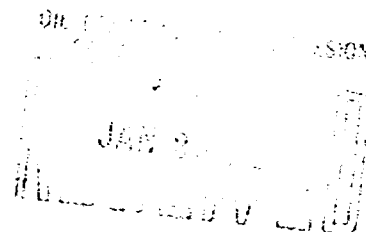
Yours sincerely,

Joseph D. Kennedy
Joseph D. Kennedy
Secretary-Treasurer

JDK/bb

Encls.

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





UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

P. O. Box 997
Roswell, New Mexico

IN REPLY REFER TO:

January 5, 1952

Worth Drilling Company, Inc.
Fort Worth National Bank Building
Fort Worth 2, Texas

Attention: Mr. Joseph D. Kennedy
Secretary - Treasurer

Gentlemen:

Reference is made to your letter of December 5, 1951 to the New Mexico Oil Conservation Commission requesting a hearing on your application for approval by the Commission of a water flooding project for secondary recovery of oil from your Federal Taylor lease Las Cruces 058709(a).

The subject has been reviewed by correspondence and during conferences with representatives of your company and members of our Roswell and Artesia offices. On December 14, 1951, District Engineer John A. Frost approved your notice of intention to convert your well No. 3 "A" Taylor to a water injection well. This well is located 660 feet from the south line and 1980 feet from the west line of sec. 12 T. 18 S., R. 31 E., North Shugart field, Eddy County, New Mexico.

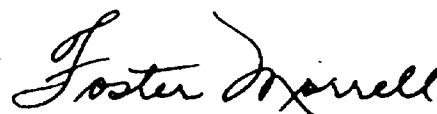
You state that you intend to re-enter the Malco-Taylor "B" well No. 1 which was originally completed as a dry hole and has been plugged to the surface, for the purpose of obtaining additional water. Notice of intention to re-open this well and convert it to a water well must be filed for approval with our Artesia district office before commencing operations.

This is to confirm our concurrence in your proposal for a water flooding project for secondary recovery of oil on lease Las Cruces 058709(a). This office feels that the project is desirable from the standpoint of obtaining greatest ultimate recovery of oil from the Queen sand reservoir. You may use all or any portion of this letter in the presentation of your application before the Oil Conservation Commission.

JAN 25 1952

So that our records may be complete, kindly furnish this office with two (2) copies of any written material, maps, plats or other exhibits that may be presented to the Oil Conservation Commission at its hearing on the subject to be held in Santa Fe on January 22, 1952 under Case No. 334.

Very truly yours,

A handwritten signature in cursive script, reading "Foster Morrell".

FOSTER MORRELL
Regional Oil and Gas Supervisor

Business Office:

~~P. O. Box 577~~
~~TELEPHONE 5443~~
~~ARTESIA, N. M.~~

P. O. Box 577
Artesia, N. M.

Field Office:

1203 CHISUM STREET
TELEPHONE 615W
ARTESIA, NEW MEXICO

BOB JOHNSON

Oil Operator--Drilling Contractor

~~Artesia, New Mexico~~
Artesia, New Mexico
December 15, 1951

Mr. Roy Charlesworth
P. O. Box 667
Worth Drilling Company
Kermit, Texas

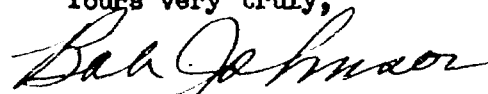
Dear Mr. Charlesworth:

Complying with your request made during our telephone conversation on December 12, 1951 in reference to the plans of your company to create a water drive for the purpose of increasing oil production from your oil wells in the North Shugart Area.

You may consider this as my agreement to your plans to create your water drive. I am the owner of a Federal Oil and Gas Lease referred to as the Swearingen Lease in Section 14, Township 17, Range 31, Eddy County.

It is my understanding that you will comply with all Federal rules and regulations in regard to Federal Oil and Gas Leases and the operations thereunder.

Yours very truly,



Bob Johnson

H. R. PATON
BOX 667
ARTESIA, N. M.

E. A. PATON
BOX 667
ARTESIA, N. M.

PATON BROS.

DRILLING CONTRACTORS

P. O. BOX 667

ARTESIA, N. M.

December 18, 1951

Mr. Roy Charlesworth
c/o Worth Drilling Company
Kermit, Texas

Dear Sir:

With reference to our telephone conversation of recent date, we wish to grant permission to Worth Drilling Company to "water" the lease which offsets the Johnson Lease of Paton Brothers.

Yours truly,

PATON BROTHERS

By


H. R. Paton

HRP:jd

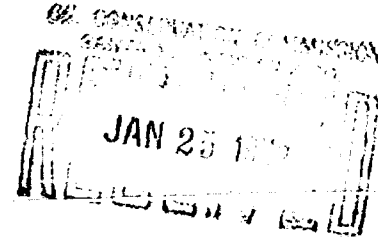
FIELD ADDRESS:

P. O. BOX 667
KERMIT, TEXAS

WORTH DRILLING COMPANY, INC.

FORT WORTH NATIONAL BANK BUILDING

FORT WORTH, TEXAS



January 23, 1952

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

Attention: Mr. R. R. Spurrier
Secretary and Director

Dear Mr. Spurrier:

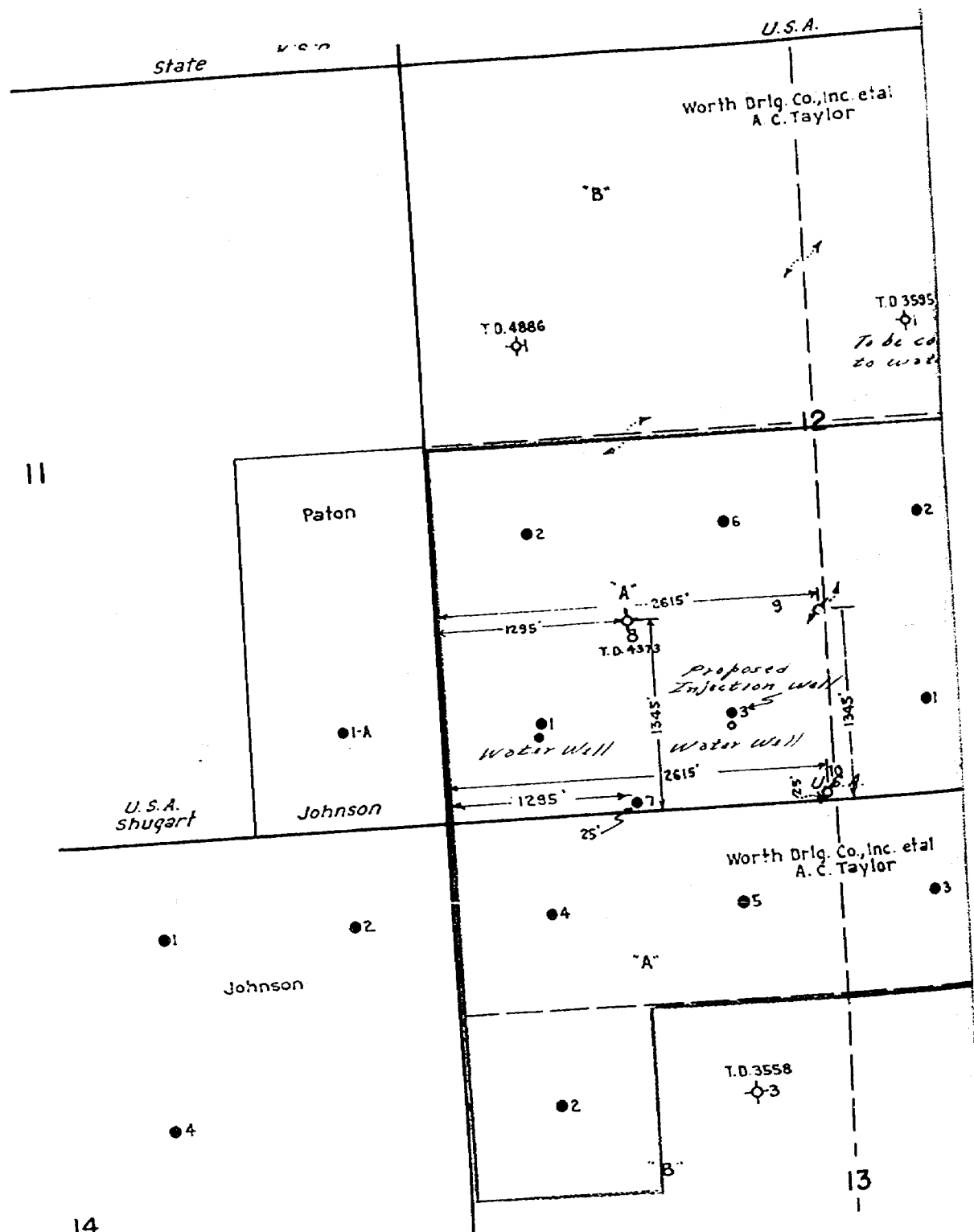
Enclosed are photostatic copies of letters from the United States Geological Survey and the two offset operators giving their approval for our proposed Water Flooding Program on our Taylor Leases in the North Shugart Field, Eddy County, New Mexico.

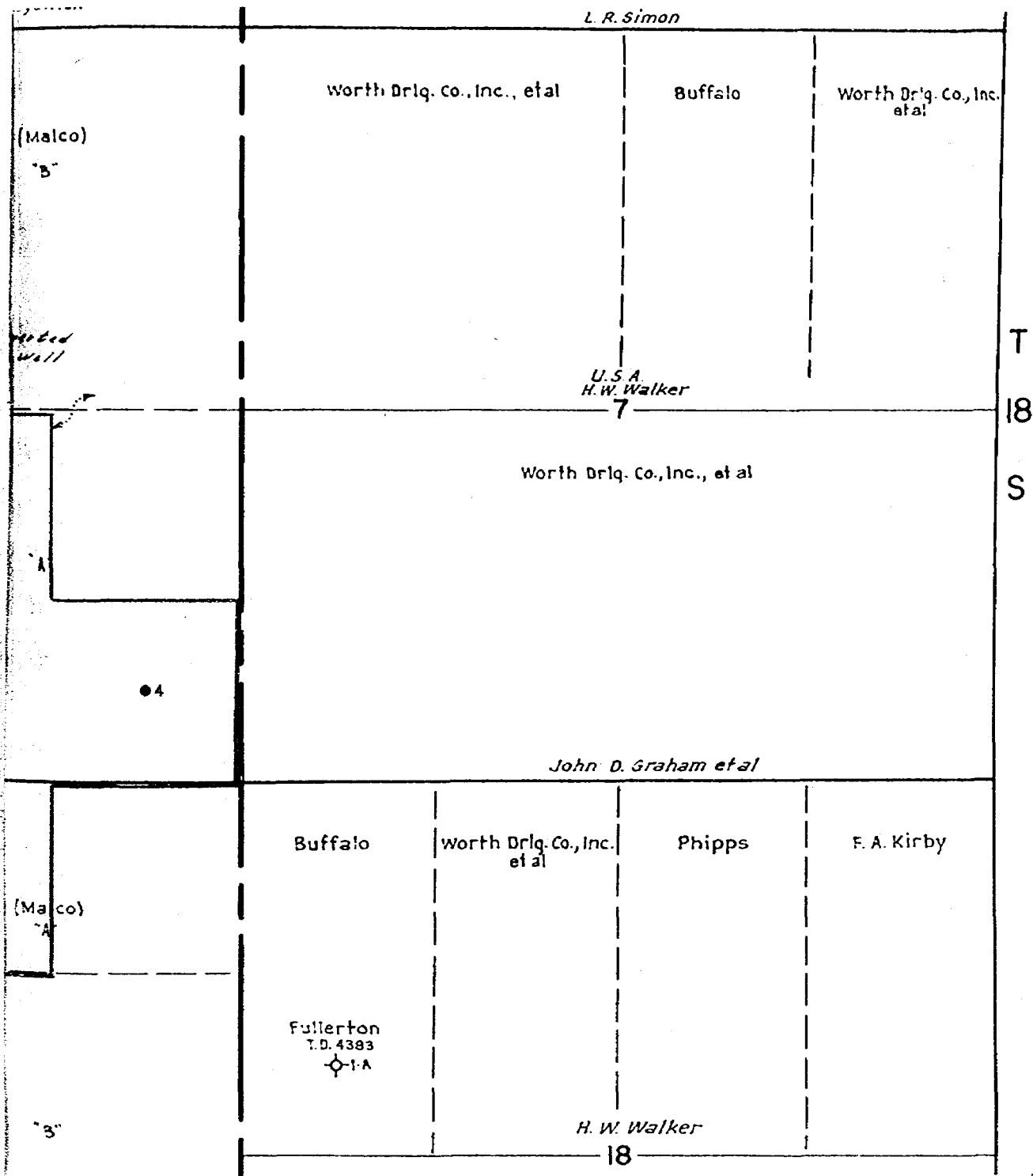
This is the material which I said that I would submit in Case No. 334 and it is requested that these letters be included with my testimony as Exhibit "B", the Engineering Report to be designated as Exhibit "A".

Yours sincerely,

Joseph D. Kennedy
Joseph D. Kennedy
Secretary-Treasurer

JDK/bb
Encls.





Worth Drig Co, Inc. et al
A.C. Taylor

.B.

2

U.S.A.
Sweatingen

R 31 E

U.S.A.

P

WORTH DRILLING

A. C. TAY

A. C. TAYLOR

SECTIONS 1, 1

EDDY COU

SCALE: 1

U.S.A.
T.S. COX

R 32 E

AT OF

COMPANY, INC. ET AL

LOR "A" & "B"

(MALCO) "A" & "B"

8 13 T 18 S R 31 E

TY, NEW MEXICO

1000 FEET

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

November 10, 1965

C
O
P
Y

Maxwell Oil Company
Continental National Bank Building
Fort Worth, Texas 76102

Attention: Mr. Joseph D. Kennedy

Gentlemen:

Reference is made to your letter of November 5, 1965, wherein you advise that you plan to suspend water injection in your A. C. Taylor "A" Well No. 3 located in Unit N of Section 12, Township 18 South, Range 31 East, Shugart Field, Eddy County, New Mexico. You also request authority to convert your A. C. Taylor "A" Well No. 4 located in Unit D of Section 13, Township 18 South, Range 31 East, to water injection as part of a lease line agreement with the Atlantic Refining Company which has been authorized to institute a waterflood project in Section 14 immediately to the west. It is our understanding that approximately 300 barrels per day of fresh water will be injected into the Well No. 4.

Maxwell Oil Company is hereby authorized to substitute A. C. Taylor "A" Well No. 4 for A. C. Taylor "A" Well No. 3 in its Taylor Waterflood Project, Shugart Field, Eddy County, New Mexico.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP:DSN:sg

cc: Oil Conservation Commission (with enclosure) - Artesia
United States Geological Survey - Artesia
✓ Case File No. 334

MAXWELL OIL COMPANY

CONTINENTAL NATIONAL BANK BLDG.
FORT WORTH, TEXAS 76102

November 5, 1965

New Mexico Oil Conservation Commission
Post Office Box 2088
Santa Fe, New Mexico

Attention: Mr. Daniel S. Nutter,
Chief Engineer

In re: Secondary Recovery Project
Order No. R-133 dated
March 6, 1952

Gentlemen:

In accordance with instructions given in your letter of October 8, 1965, in regard to our secondary recovery project on our Taylor Leases, Shugart Field, Eddy County, New Mexico, we hereby file our application for conversion of Well No. 4 to water injection.

In accordance with instructions given in Rule 701-B, we enclose a plat of the project area showing the location of our proposed injection well and Atlantic's proposed injection wells on the offsetting leases.

The only log we have on this well is the old cable tool driller's log and a sample log. These logs show that the Top of the Queen Sand was at 3500 feet and the Base of the Queen Sand at 3560 feet with shows of oil in the samples from 3523 to 3544 feet; total depth, 3567 feet.

Seven-inch casing was set at 3461 feet and was cemented with 100 sacks. Open hole section from 3525 to 3562 feet was shot with 115 quarts of nitro-glycerin and the well was cleaned out to the total depth of 3567 feet.

Approximately 300 barrels per day of fresh water will be injected. The source of the injection water is from 2 shallow water wells on the lease.

We are filing with your District Office Forms C-102 and with the U. S. Geological Survey Forms 9-331a, notices of our intention to suspend water injection in our A. C. Taylor "A" No. 3 and to convert our A. C. Taylor "A" No. 4 to a water injection well.

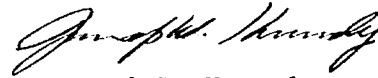
New Mexico OCC

-2-

November 5, 1965

We have been advised by The Atlantic Refining Company that they anticipate they will commence actual water injection some time shortly after the 15th of November. In order that we may commence water injection at approximately the same time, it is requested that this application be given prompt attention and if you have any further questions, please call us collect at EDison 2-8374 (Area Code 817).

Yours sincerely,



Joseph D. Kennedy

JDK:ah
Enclosure

cc: The Atlantic Refining Company
P. O. Box 1978
Roswell, New Mexico
Attn: Mr. R. L. Trimble

Mr. Roy Charlesworth
3002 Windsor Drive
Odessa, Texas

Kewanee Oil Company
P. O. Box 2239
Tulsa, Oklahoma
Attn: Mr. H. S. Erskine

New Mexico Oil Conservation Commission
District 2
P. O. Drawer DD
Artesia, New Mexico

U. S. Geological Survey
P. O. Drawer U-88210
Artesia, New Mexico

PM 2.5

Marathon HBP	Hudson & Hudson HBP	Skelly Mobil HBP	Shell 4500	Maxwell Oil Co. HBP "B"	Maxwell Oil Co. HBP "B"	Carper Drig. HBP	Pan American
Hudson & Hudson HBP	Marathon HBP	Skelly				Carper Drig.	Carper Drig.
Marathon HBP	Hudson & Hudson "A"	Marathon HBP	Hudson & Hudson HBP	Maxwell Oil Co. "B"	Maxwell Oil Co. "B"	W.C. Thompson	Cont'l Maxwell Oil Co. et al
Hudson & Hudson "A"	Marathon "A"	Hudson "A"	Atlantic	A.C. Taylor "A"	Malco-Taylor "A"	Superior (Geckle)	Superior
Marathon HBP	Hudson & Hudson	Atlantic "B"	Atlantic "A"	Maxwell Oil Co.	Maxwell Oil Co.	Cont'l Maxwell Oil Co. et al	O.R. Link

OIL CONSERVATION COMMISSION

P. O. BOX 2086

SANTA FE, NEW MEXICO

October 8, 1965

Maxwell Oil Company
Continental National Bank Building
Fort Worth, Texas 76102

Attention: Mr. Joseph D. Kennedy

Gentlemen:

Reference is made to your letter dated August 25, 1965, regarding the secondary recovery project which your company was authorized to conduct by Order No. R-133 dated March 6, 1952.

It is our understanding that you are entering into a cooperative waterflood agreement with the Atlantic Refining Company which was recently authorized to institute a secondary recovery project in Sections 11 and 14, Township 18 South, Range 31 East, Shugart Field, Eddy County, New Mexico. Further, that to comply with the cooperative waterflood agreement you wish to convert your A. C. Taylor Well No. 4-A located in the NW/4 NW/4 of Section 13 to water injection and to discontinue water injection in your A. C. Taylor Well No. 3-A which is located in the SE/4 SW/4 of Section 12. We feel that the continuous injection of water into the Well No. 3 since 1952 most probably has caused some stimulation to the offsetting producing wells, and that the Well No. 4 would therefore be eligible for administrative approval for conversion to water injection.

Please file your application for conversion of Well No. 4 to water injection in accordance with the provisions of Rule 701-B and we will be most happy to process the application.

Very truly yours,

Daniel S. Mutter
Chief Engineer

DSN:sg

cc: Oil Conservation Commission - Artesia
United States Geological Survey - Artesia

MAXWELL OIL COMPANY

CONTINENTAL NATIONAL BANK BLDG.
FORT WORTH, TEXAS 76102

August 25, 1965

65 AUG 27 1965

Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

Gentlemen:

Maxwell Oil Company is the operator of a federal oil and gas lease covering all of Sections 1, 12 and 13, Township 18 South, Range 31 East, Eddy County, New Mexico. The leases are in the Shugart Field. Worth Drilling Company, at that time operator of the leases, was granted permission by the Oil Conservation Commission to conduct a secondary recovery project on the leases. This order was Case #334, Order #R-133, dated March 6, 1952. Your order granted us permission to inject water in our A. C. Taylor 3-A.

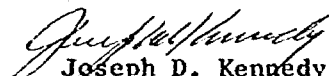
Since the time the order was issued we have continuously injected water in this well, and we have contemplated from time to time expanding to a regular 5 spot pattern by converting other producing wells to injection wells. We have recently been approached by the Atlantic Refining Company to cooperate in a waterflood they propose to put into operation on an adjoining lease. Their lease covers all of Section 14 and the E/2 of the SE/4 of Section 11. We are entering into the cooperative waterflood agreement with Atlantic Refining Company. They are going to convert two offsetting wells; one in the SE/4 of the SE/4 of Section 11, and the other in the SE/4 of the NE/4 of Section 14, and we, in turn, have agreed to convert one of our producing wells located in the NW/4 of the NW/4 of Section 13 to an injection well.

I enclose a plat showing the location of the leases and the wells which will be involved in the cooperative agreement with Atlantic.

Observation of the results obtained by Atlantic from their 5 spot waterflood on the adjoining leases should give us a good indication of the feasibility of expanding our operations to a full scale waterflood, and we propose to discontinue water injection in our A. C. Taylor 3-A and convert our A. C. Taylor 4-A from a producer to an injection well.

Will you please advise us if it will be necessary to have a hearing before the Commission to make this change in our operations and, if so, will you please set a date for a hearing.

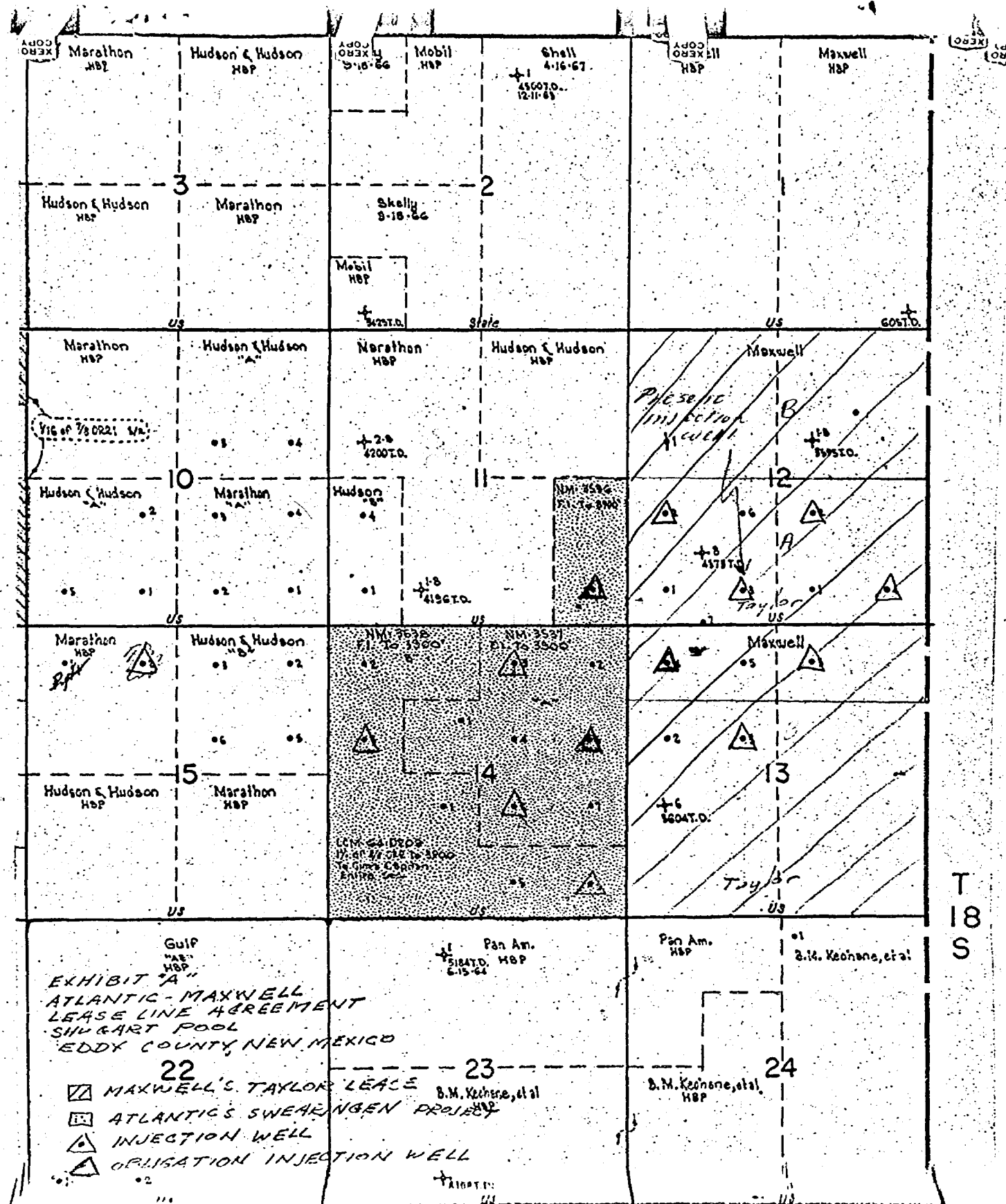
Yours sincerely,

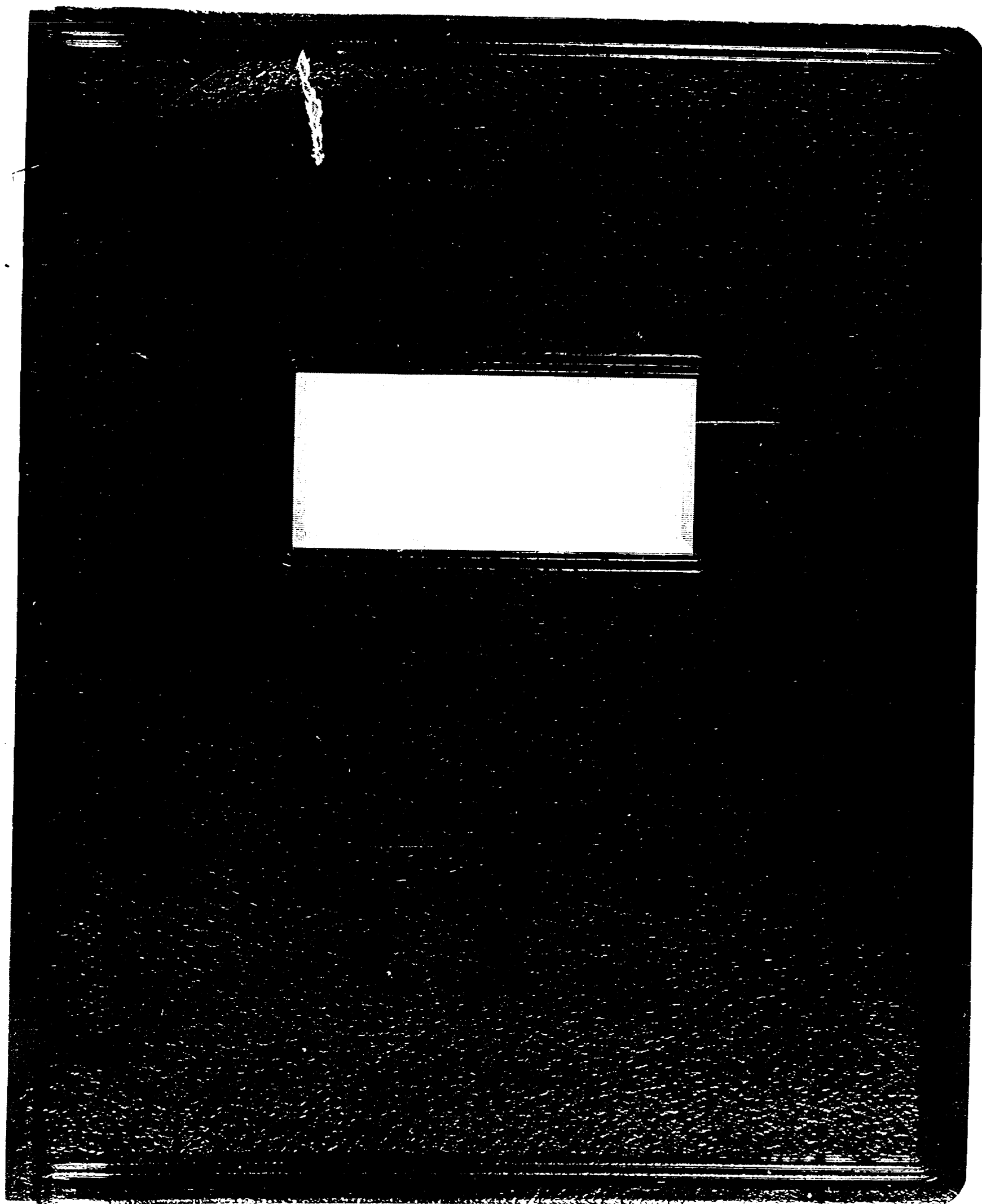

Joseph D. Kennedy

JDK/sr

Enc:

cc: U. S. Department of Interior
Geological Survey
Artesia, New Mexico





WATER FLOOD INVESTIGATION

NORTH SHUGART FIELD

EDDY COUNTY, NEW MEXICO

For

WORTH DRILLING COMPANY, INC.
Fort Worth, Texas

R. W. TESCH

R. W. Tesch
Electric Bldg.
Ft. Worth, Texas

INDEX

	Page
Letter of Transmittal	2
General Discussion and Purpose	3
Geology and Accumulation	4
Recovery and Reservoir Data	5-6
Recovery	5
Reservoir	6
Water Flood	7
Injection Well	7
Water Analysis	7
Future Flood Pattern	7
Additional Reserves	7
Appendix	
Well Data	8
Production Data	10
Water Analysis	9
Composite Decline Curve	11
Structure Map	12

R. W. TESCH
PETROLEUM ENGINEER AND GEOLOGIST
ELECTRIC BUILDING
FORT WORTH, TEXAS

January 18, 1952

Worth Drilling Company, Inc.
Continental Life Building,
Fort Worth, Texas.

Gentlemen:

I have completed an office examination of your properties in the North Shugart Field, Eddy County, New Mexico, to determine the feasibility of injecting water into your Taylor A 3.

The properties involved consist of three leases with a total of twelve pumping wells. The gross recovery of these leases as of January 1, 1952 was 460,203 barrels, and it is estimated that an additional 84,000 barrels (gross) will be recovered by primary production.

Due to absence of reservoir data it is not possible to predict the volume of oil that may be recovered by a water flood. Nevertheless the information available indicates that there is an excellent chance for the flood to be successful, and it is accordingly recommended that the proposed pilot flood be instigated at an early date. It is further recommended that in the event this pilot flood proves successful, the flood be expanded to the entire properties.

Additional discussion, data and exhibits will be found in the following pages.

Respectfully submitted,

R. W. Tesch
R. W. Tesch

General Discussion and Purpose

The properties involved are those of the Worth Drilling Company, Inc. (Fort Worth, Texas) in the North Shugart Field, Eddy County, New Mexico. These leases, all of which are located in Sections 12 and 13, T-18-S, R-31-E, are as follows:

	<u>No. Wells</u>
A. C. Taylor 'A'	7
A. C. Taylor 'B'	1
Malco Taylor 'A'	4
	<hr/>
	12*

The purpose of this investigation is to determine the feasibility of injecting water into Taylor A 3 as a pilot flood in an inverted five spot pattern.

*All wells are pumping and produce no water.

R. W. TESCH

GEOLOGY AND ACCUMULATION

Production in the North Shugart Field originates from the 'Red Sand', which is a part of the Queen formation (Permian). The average depth of this sand is approximately 3,500'. This sand is the equivalent of sands in Winkler and Ward Counties, Texas, which are being successfully water flooded at this time.

The overall thickness, as determined from sample logs, is approximately fifty feet; however, it appears that only 10' - 15' is oil productive. It is evidently of low permeability, as all of the wells have responded to nitroglycerine shots. Furthermore, the permeability appears to be lenticular as was demonstrated when a dry hole (Taylor A 8) was obtained in the middle of productive wells. The absence of core data precludes further discussion of the sand's characteristics.

There appears to be no structural trap, and the accumulation is evidently stratigraphic as a result of permeability pinchouts. It is believed that the limits of the field have been delineated.

A structure map, prepared by Mr. Kennedy, contoured on the top of the 'Red Sand' is included in the appendix.

RECOVERY AND RESERVOIR DATA

Recovery

The past recovery of the leases involved in this report is best illustrated by a decline chart included in the appendix which shows average monthly production (composite) plotted on semilog graph paper. As will be noted, the average decline during the past three years (after drilling ceased), has been 34% per year. This decline is believed to be an accurate representation, as all of the wells are producing at capacity. The following figures are the result of this projection.

	<u>1-1-52</u>	<u>Primary Future</u>	<u>Primary Ultimate</u>
Gross Recovery	460,203	84,000*	544,203
Gross Recovery per well	38,400	7,000	45,350
Gross Recovery per acre (440 acres)	1045	191	1236

With a productive sand thickness of 10' to 15' the estimated ultimate recovery per acre foot will vary between 82 and 123 barrels per acre foot. Lack of data precludes a more definite estimate, but the range indicated appears to be reasonable.

The above estimates are conservative, as it has been observed in similar production that the decline rate has decreased in the later stages of production. During these latter periods the reserves are controlled by economics which are without the scope of this investigation. The reserves as estimated above are realistic and it is believed present a firm basis for future plans.

*This figure is broken down to the following individual lease data:

Taylor 'A'	34,500
Taylor 'B'	7,000
Malco Taylor 'A'	42,500
	<u>84,000</u>

Reservoir

Information is completely lacking as to bottom hole pressure data, reservoir fluid data, core data and gas-oil ratio history.

It is believed, however, on the basis of data available that the reservoir fluid is undersaturated with gas, as the wells today produce very little gas and apparently had very little gas when completed. A few of the wells flowed for a short time after being shot (all wells have been shot), but soon went on the pump, thus indicating a low gas-oil ratio.

The produced oil is sweet and has a gravity of 37°. None of the wells produce water, and it is concluded that there is no water drive. The reservoir is undoubtedly of a depletion type.

WATER FLOOD

Injection Well

The proposed injection well Taylor 'A' 3, now producing approximately three barrels per day, appears to be advantageously located for a pilot flood. It is recommended that a maximum of 150 barrels of water per day be injected into this well and that this rate be much lower at the inception. The rate should be carefully observed and adjustments made as information is developed.

Water Analysis

It is understood that a water well now producing from a depth of 450' is available for this pilot flood. An examination of the analysis (enclosed in the appendix) of this water indicates that no treatment is needed; however, precautions should be taken to isolate this water from air before injection. This can easily be done by keeping a layer of oil on top of the water in the storage tanks.

Future Flood Pattern

In the event the pilot flood indicates that the flood is feasible, the pattern should be changed to a regular five spot pattern by adding the following wells to the pattern:

Taylor 'A' 1, 4 and 5
Malco Taylor 'A' 2, 3 and 4

This program is of course flexible and will depend to a large extent on the results obtained by the pilot flood, the availability of water and the cooperation of offset operators.

Additional Reserves

In the Winkler and Ward Counties floods of the equivalent sand, it is generally estimated that the volume of oil to be recovered by water flooding will equal the volume recovered by primary methods. In those areas, however, the primary recoveries have been higher and the projects therefore had a better chance for success.

In the particular area being discussed it would be extremely hazardous to estimate the additional oil to be recovered as a result of a flood due to the complete lack of reservoir data. Nevertheless, if the area proves adaptable to flooding, it would not be unreasonable to predict a recovery equal to the primary recovery.

WELL DATA

<u>Well</u>	<u>Date of Completion</u>	<u>Initial Production</u>
Taylor A 1	12-3-38	45 pump
2	10-22-40	43 pump
3	6-22-47	81 pump
4	4-10-48	160 flow
5	7-5-48	200 flow
6	9-27-48	105 flow
7	3-18-50	65 flow
 Taylor B 2	 1-4-49	 70 pump
 Malco Taylor A 1	 10-7-47	 100 flow
2	6-28-48	150 flow
3	9-14-48	50 flow
4	7-8-49	25 pump

R. W. TESCH

WATER ANALYSIS

Eddy County, New Mexico

Worth Drilling Company, Inc.

Water Well #1, A. C. Taylor Lease

RADICALS

Parts per million

Sodium and Potassium 53.2

Calcium 40.

Magnesium 43.8

Chloride 20.

Sulfate 98.8

Bicarbonate 323.

TOTAL 578.8

Total Solids at 150° C

Fixed Solids

Silica

Iron none

HYPOTHETICAL COMBINATIONS

Parts per million

Silica

Calcium Chloride

Magnesium Bicarbonate

Magnesium Chloride

Sodium Sulfate

Sodium Chloride

Iron Chloride

Hydrogen Sulfide none

pH 7.9

Density 1.005 @ 72° F.

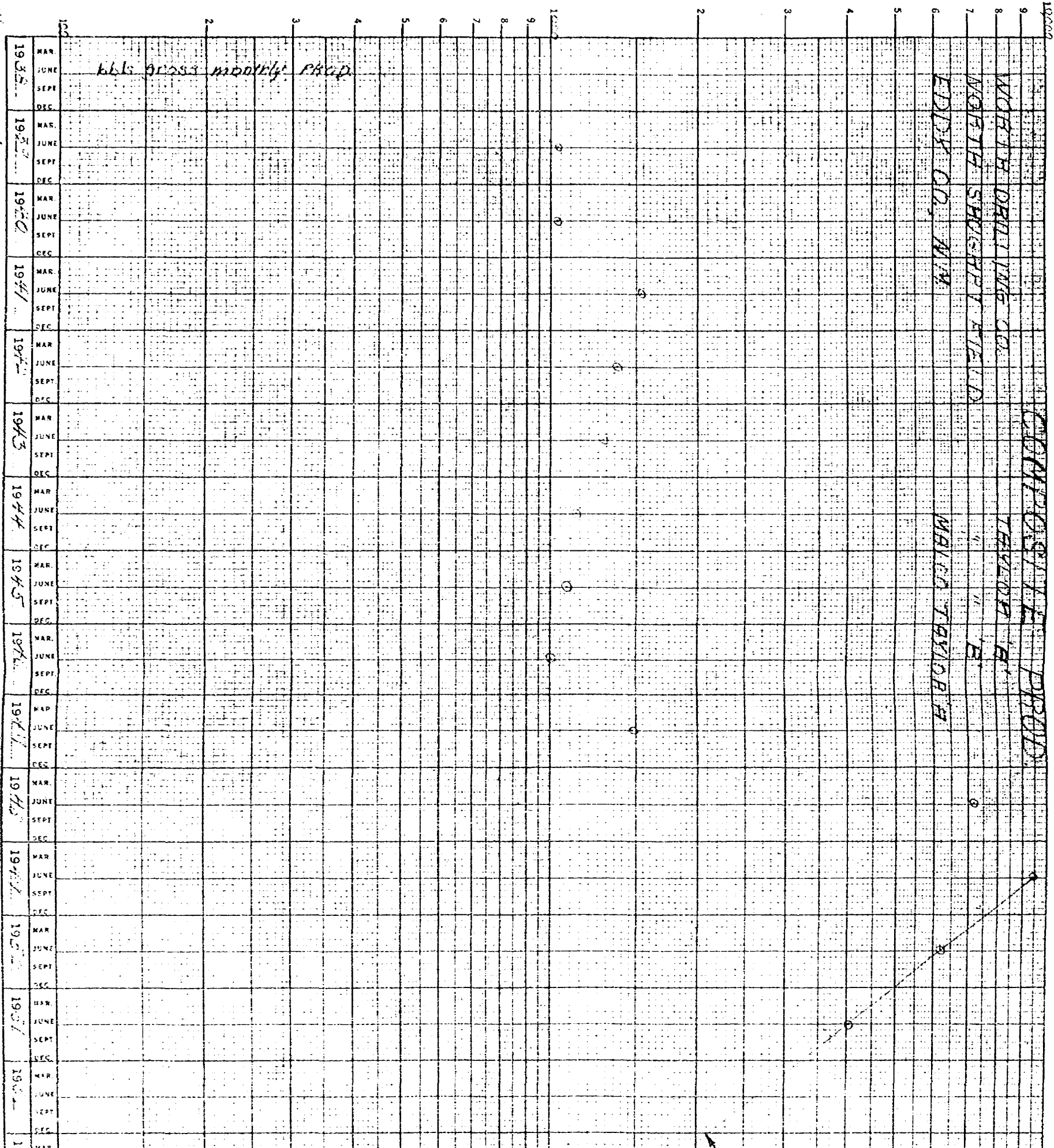
R. W. TESCH

PRODUCTION DATA

<u>Lease</u>	<u>No. Wells</u>	<u>No. Producing acres</u>	<u>Recovery 1-1-52</u>		<u>Decline Rate</u>	<u>Primary Reserves</u>
			<u>Gross</u>	<u>Per Well</u>	<u>Per Acre</u>	<u>1-1-52</u>
Taylor 'A'	7	240	307,480	43,925	1,281	34,500
Taylor 'B'	1	40	21,572	21,572	539	7,000
Kalco Taylor 'A'	4	160	131,151	32,787	819	42,500
Total	12	440	460,203	38,400	1,045	84,000

R. W. TESCH

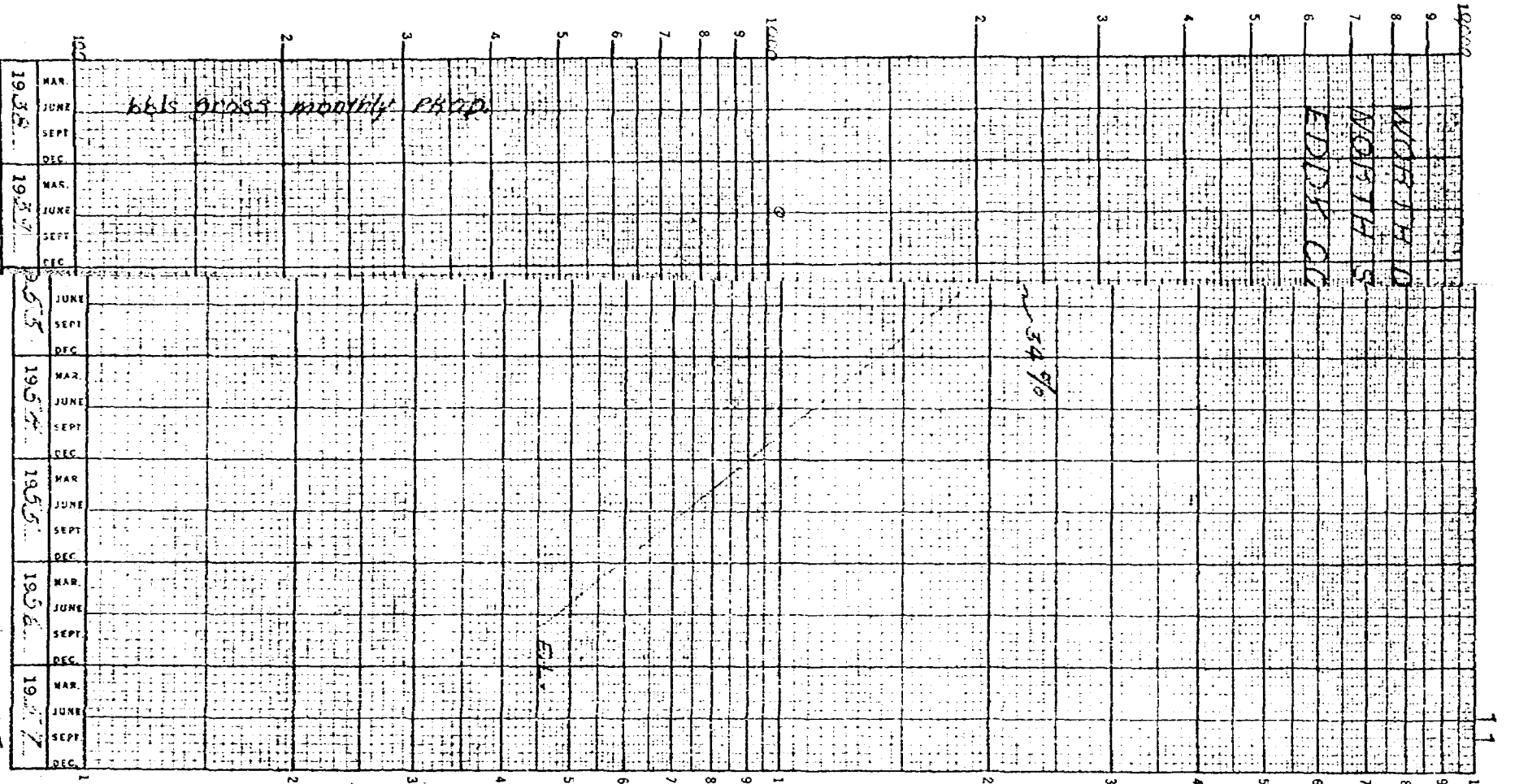
<u>Lease</u>	<u>No. W</u>	<u>Primary</u>		
		<u>Estimated Ultimate Recovery</u>	<u>Gross</u>	<u>Per Well Per Acre</u>
Taylor 'A'	7	341,980	48,854	1,426
Taylor 'B'	1	28,572	28,572	714
Kalco Taylor 'A'	4	173,651	43,412	1,086
Total	12	544,203	46,350	1,238

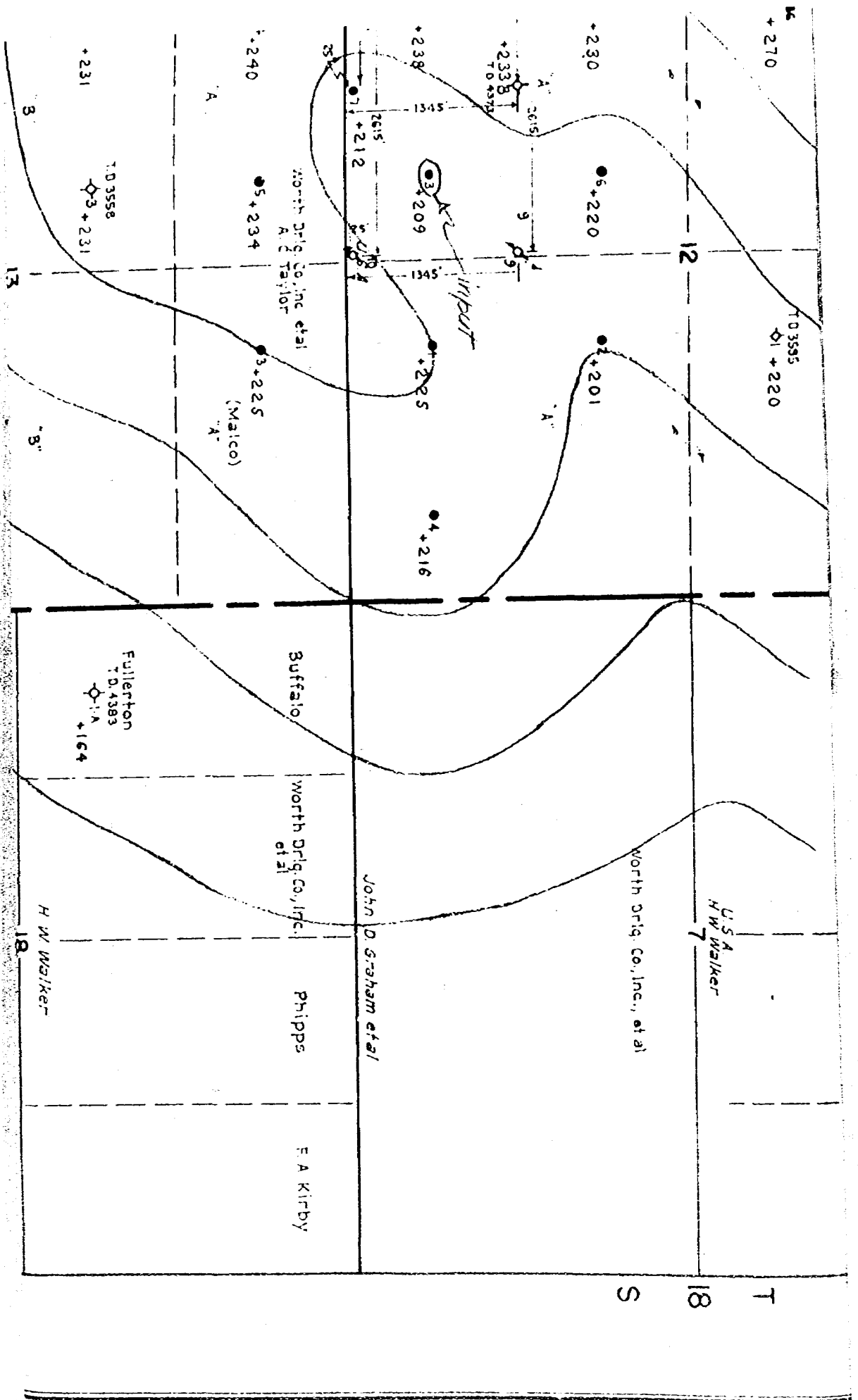


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RWT





31 E

R 32 E

USA
+150

USA
TSCX

PLAT OF

WORTH DRILLING COMPANY, INC. ET AL

A. C. TAYLOR "A" & "B"

A. C. TAYLOR (MALCO) "A" & "B"

SECTIONS 1, 12 & 13 T 18 S R 31 E

EDDY COUNTY, NEW MEXICO

CONTOURS ON TOP OF QUEEN SAND

CONTOUR INTERVAL 25 FT.

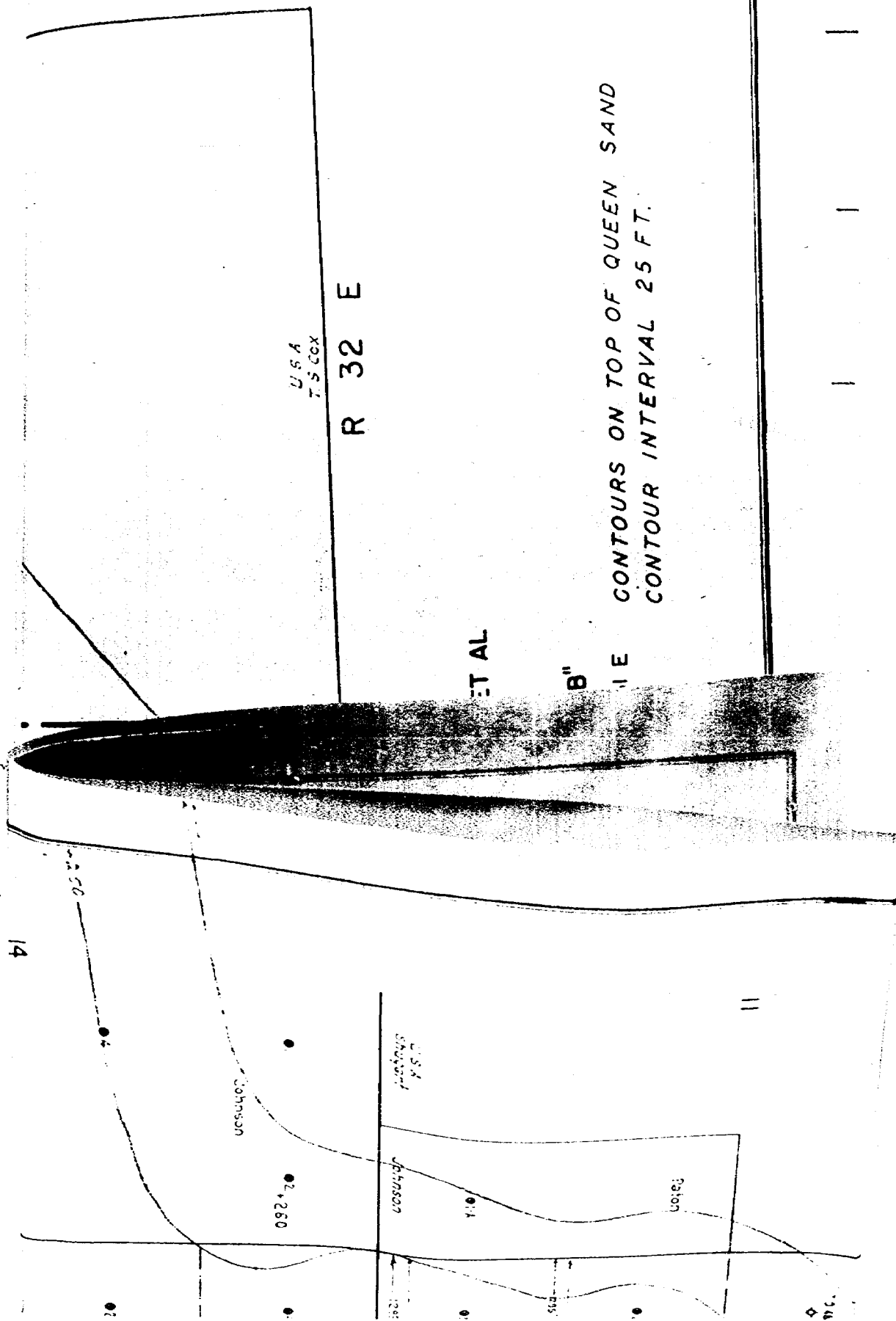
SCALE: 1 INCH = 1000 FEET

57 C.

R 32 E

ET AL

CONTOURS ON TOP OF QUEEN SAND
CONTOUR INTERVAL 25 FT.



R 31 E

USA
+150

R 32 E

USA
7500X

PLAT OF

WORTH DRILLING COMPANY, INC. ET AL

A. C. TAYLOR "A" & "B"

A. C. TAYLOR (MALCO) "A" & "B"

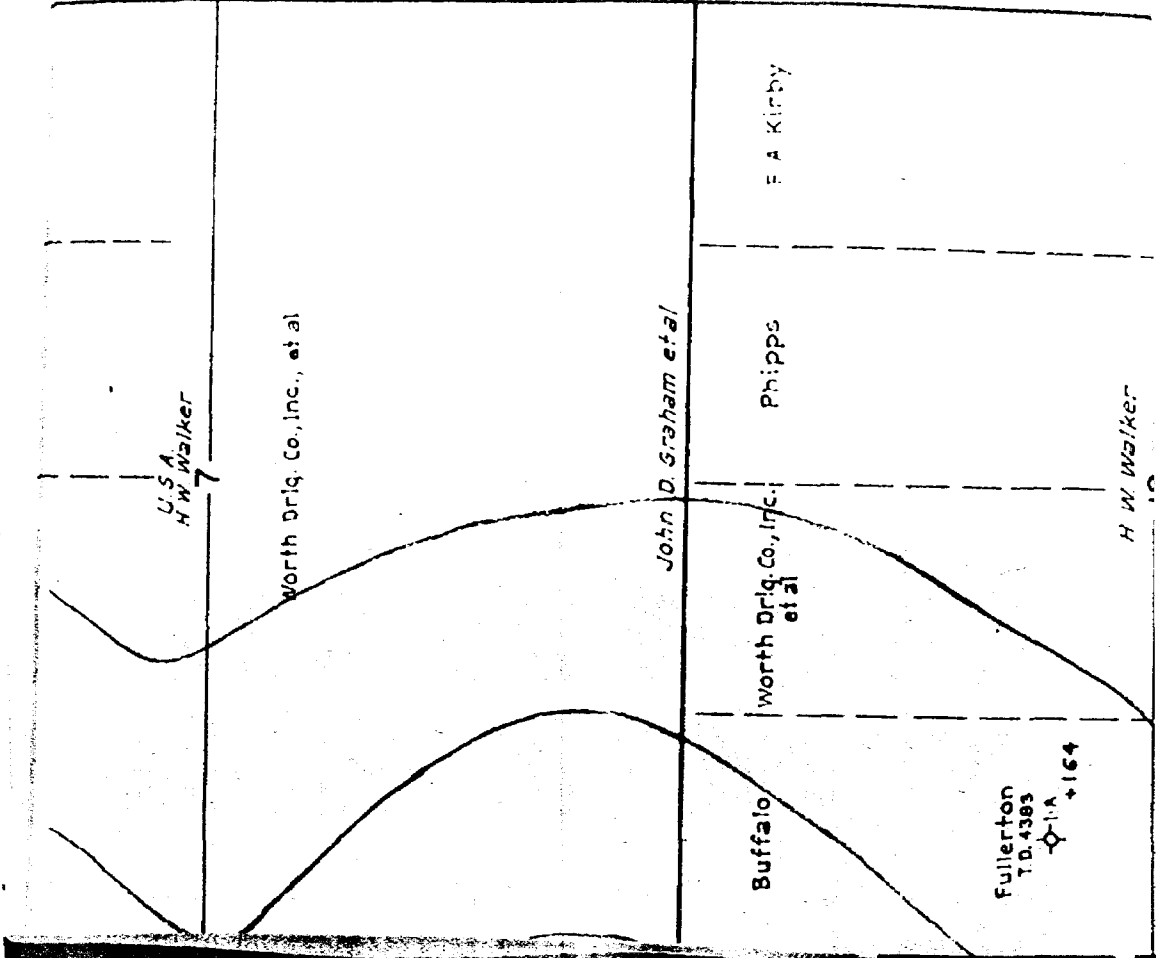
SECTIONS 1, 12 & 13 T 18 S R 31 E

EDDY COUNTY, NEW MEXICO

CONTOURS ON TOP OF QUEEN SAND
CONTOUR INTERVAL 25 FT.

SCALE: 1 INCH = 1000 FEET

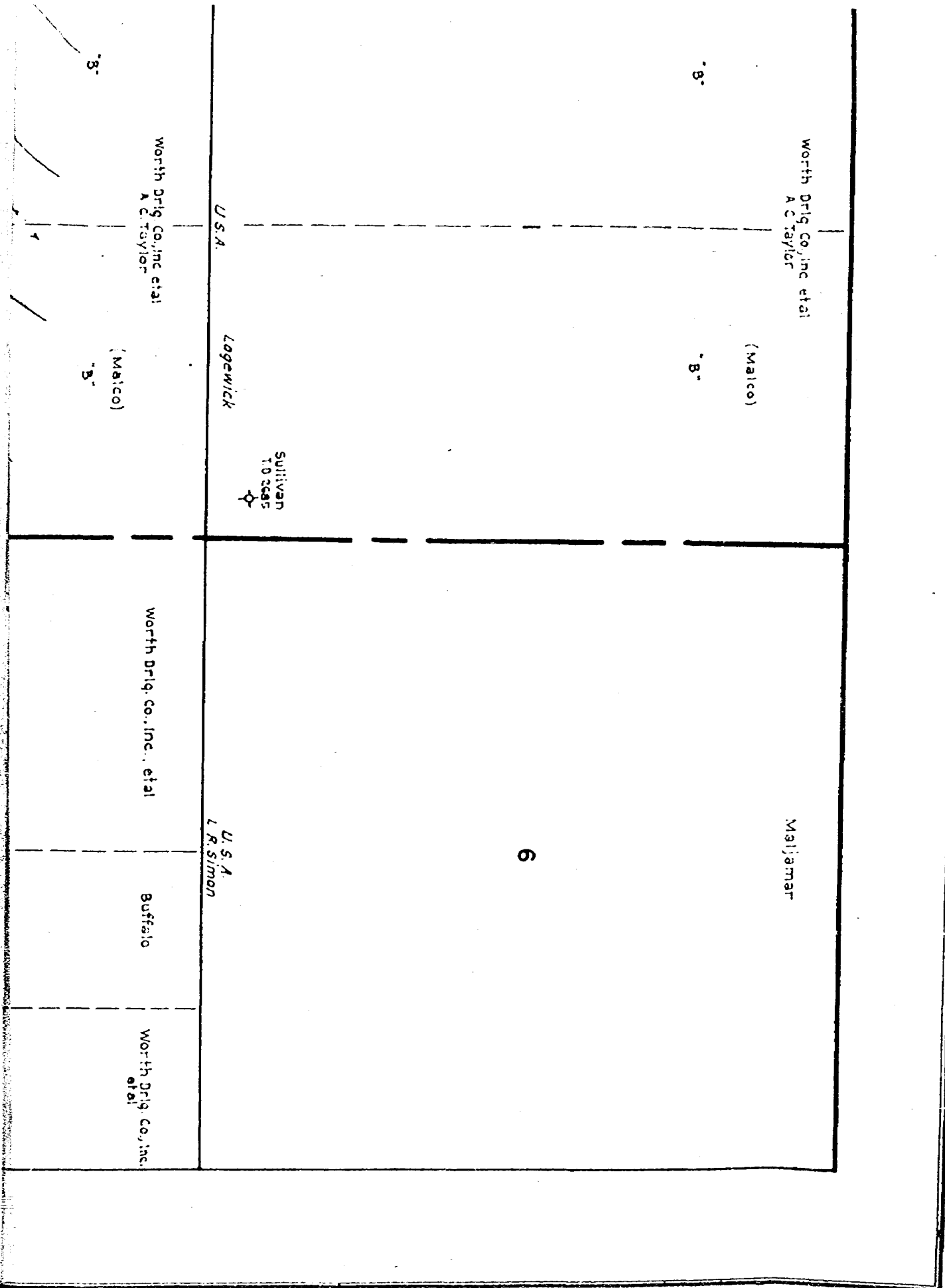
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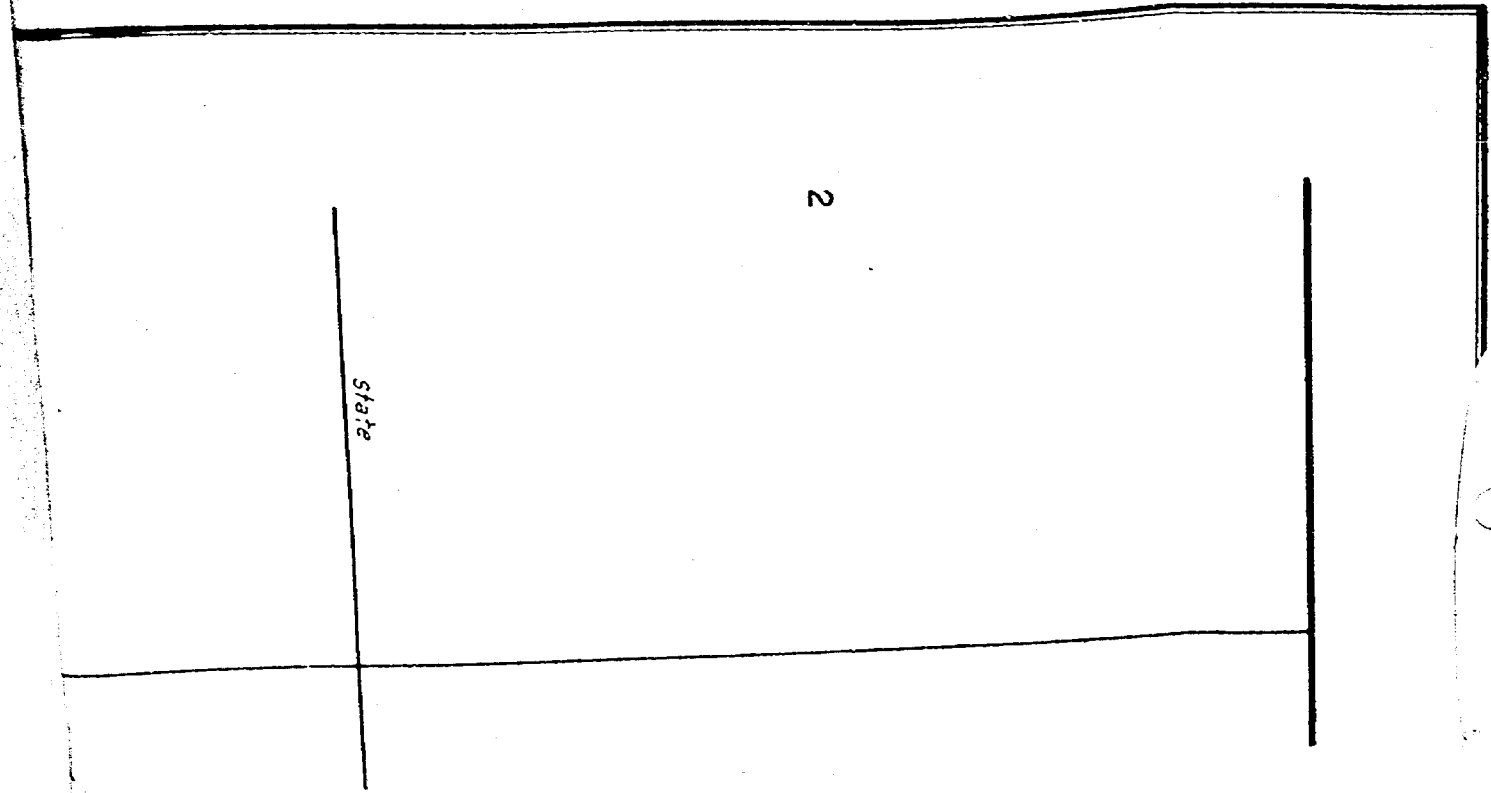
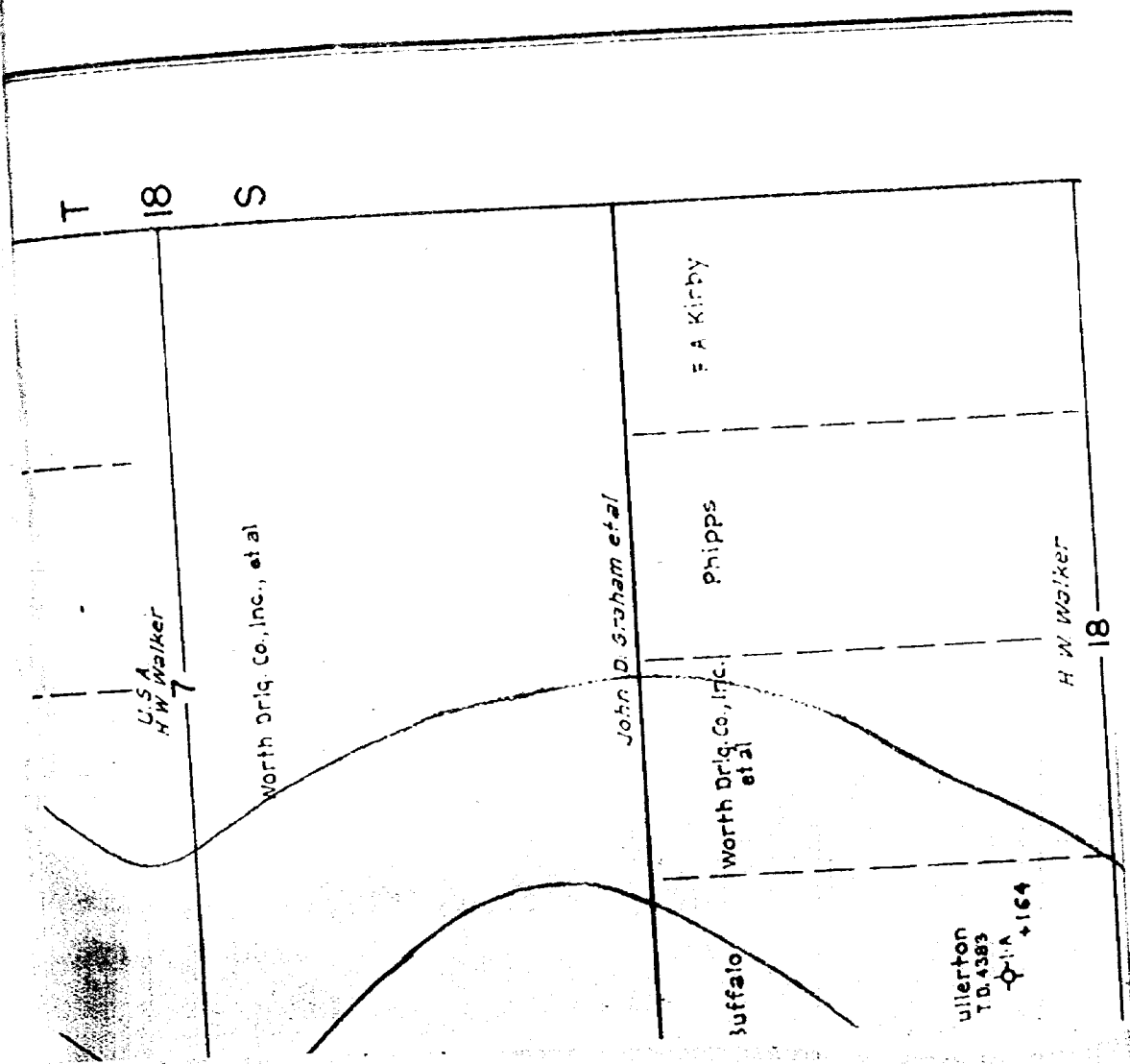


U.S.A. H.W. Walker

4/75

5224





FIELD ADDRESS:

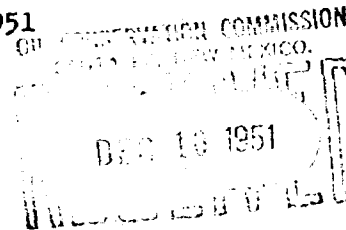
RE CASE 334

P. O. BOX 667
KERMIT, TEXAS

WORTH DRILLING COMPANY, INC.

FORT WORTH NATIONAL BANK BUILDING
FORT WORTH, TEXAS

December 5, 1951



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

Gentlemen:

We have corresponded with you concerning our intentions to enter into a water flooding program on our A. C. Taylor lease in Sections 1, 12 & 13, Twp. 18-S., Rge. 31-E., Eddy County, New Mexico. This was by letter dated October 18, 1951. You replied by letter dated November 1, 1951, that it would be necessary to secure approval of the Oil Conservation Commission after a hearing is held. We submit herewith, in triplicate, our application giving all pertinent information in the matter. We also enclose, in triplicate, a plat of our lease showing the proposed injection well.

We would greatly appreciate it if the matter could be set for the earliest possible hearing.

Yours sincerely,

Joseph D. Kennedy
Joseph D. Kennedy
Secretary-Treasurer

JDK:lc
Encls.

Sam here now?

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

January 2, 1952

C

Worth Drilling Company, Inc.
Ft. Worth National Bank Building
Ft. Worth, Texas

O

Attention: Mr. Joseph D. Kennedy

Gentlemen:

P

Your application of December 5, 1951, has been formalized in Oil Commission records as Case 334 and is scheduled for hearing at our regular hearing on January 22, 1952, at 10 a.m. in Mabry Hall, State Capitol, Santa Fe, New Mexico.

Y

Very truly yours,

R. R. Spurrier
Secretary - Director

RRS:nr

FIELD ADDRESS:

P. O. BOX 667
KERMIT, TEXAS

WORTH DRILLING COMPANY, INC.

FORT WORTH NATIONAL BANK BUILDING
FORT WORTH, TEXAS

December 5, 1951

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

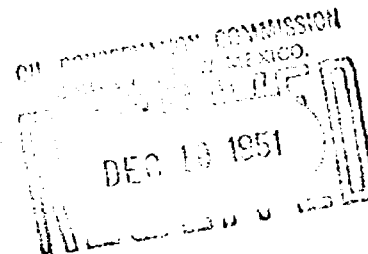
Gentlemen:

Worth Drilling Company, Inc. is the operator of a Federal Oil and Gas Lease covering all of Sections 1, 12 & 13, Township 18-South, Range 31-East, Eddy County, New Mexico. There are 12 producing wells on the lease. The producing area of the lease is outlined in red on the plat. All wells are being pumped by individual pumping units.

Production is from the Queen sand encountered at a depth of approximately 3550'. The thickness of the producing zone varies from 15' to 20' and it is a loosely consolidated, fine-grained sand. Geological data indicates that the production is from a stratigraphic trap limited by the decrease of porosity of the Queen sand. Under the conditions of a single sand pay which is fairly consistent throughout the producing area and the evidence of the stratigraphic trap, the lease appears to be ideally suited for secondary recovery by water flooding.

As we are limited in the amount of water which we can make available for water flooding, we intend to inject water in only one well, the A. C. Taylor "A" No. 3. We plan to inject water by gravity, provided the formation takes the water in a satisfactory manner. If necessary, the water will be injected by pressure. The proposed injection well was drilled to a total depth of 3595', the pay zone was from 3566' to 3585', 7" casing was set at 3448', cemented with 100 sacks of cement, and the well was shot with 60 quarts of solidified nitro-glycerin from 3561' to 3585'. This well was completed June 22, 1947. The initial production was 81 barrels of oil per day pumping, and it is now producing from 3 to 4 barrels of oil per day.

We plan to obtain our water from 3 wells as follows: The Malco-Taylor "B" No. 1 was a dry hole, but the 8-5/8" surface casing was not pulled. We intend to perforate opposite water producing sand from 385' to 450' and convert this old dry hole to a water well. Our A. C. Taylor "A" No. 3 had good shows of water from 480' to 520', and we plan to drill a water well which will be a twin to the No. A-3. We already have a water well which is a twin to our A. C. Taylor "A" No. 1. This also is producing water from the sand encountered at approximately 450'. From these 3 water wells we expect to produce from 400 to 600 barrels of water per day, which amount we think to be sufficient for the one injection well. We intend to inject from 400 to 500 barrels of water per day.

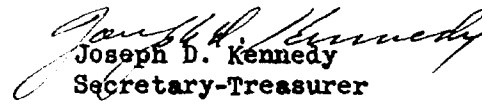


Page # 2.

We respectfully request that the Oil Conservation Commission consider all data submitted and set a hearing for our application at the earliest possible date.

If any additional information is needed, we will be glad to supply it.

Yours sincerely,


Joseph D. Kennedy
Secretary-Treasurer

JDK:lc

DOMESTIC SERVICE	
Check the class of service desired; otherwise this message will be sent as a full rate telegram	
FULL RATE TELEGRAM	SERIAL
DAY LETTER	NIGHT LETTER

WESTERN UNION

1206

INTERNATIONAL SERVICE	
Check the class of service desired; otherwise this message will be sent at the full rate	
FULL RATE	LETTER TELEGRAM
VICTORY LETTER	SHIP RADIOGRAM

W. P. MARSHALL, PRESIDENT

NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED
			Case 334	

Send the following message, subject to the terms on back hereof, which are hereby agreed to

COLLECT TO:

JAN 7 1952

MR WILLIAM D MORRIS, PRESIDENT
WHAEY CO., INC.
2003 CONTINENTAL LIFE BUILDING
FORT WORTH TEXAS

WORTH DRILLING CO. APPLICATION RE WATER-FLOODING PERMIT SET UP AS
COMMISSION CASE 334 SCHEDULED HEARING JANUARY 22 AT 10 A.M. MARRY
HALL STATE CAPITOL SANTA FE. COPY OF DOCKET BEING MAILED YOU TODAY.

R R SPURRIER
N M OIL CONSERVATION COMMISSION

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes or delays, the sender of a message should order it repeated, that is, telegraphed back to the originating office for comparison. For this, one-half the unrepeat message rate is charged in addition. Unless otherwise indicated on its face, this is an unrepeat message and paid for as such, in consideration whereof it is agreed between the sender of the message and this Company as follows:

1. The Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the unrepeat-message rate beyond the sum of five hundred dollars; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the repeat-message rate beyond the sum of five thousand dollars, unless specially valued; nor in any case for delays arising from unavoidable interruption in the working of its lines.
2. In any event the Company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the actual loss, not exceeding in any event the sum of five thousand dollars, at which amount the sender of each message represents that the message is valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeat-message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one percent of the amount by which such valuation shall exceed five thousand dollars.
3. The Company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.
4. Except as otherwise indicated in connection with the listing of individual places in the filed tariffs of the Company, the amount paid for the transmission of a domestic telegram or an incoming cable or radio message covers its delivery within the following limits: in cities or towns of 5,000 or more inhabitants where the Company has an office which, as shown by the filed tariffs of the Company, is not operated through the agency of a railroad company, within two miles of any open main or branch office of the Company; in cities or towns of 5,000 or more inhabitants where, as shown by the filed tariffs of the Company, the telegraph service is performed through the agency of a railroad company, within one mile of the telegraph office; in cities or towns of less than 5,000 inhabitants in which an office of the Company is located, within one-half mile of the telegraph office. Beyond the limits above specified the Company does not undertake to make delivery, but will endeavor to arrange for delivery as the agent of the sender, with the understanding that the sender authorizes the collection of any additional charge from the addressee and agrees to pay such additional charge if it is not collected from the addressee. There will be no additional charge for deliveries made by telephone within the corporate limits of any city or town in which an office of the Company is located.
5. No responsibility attaches to this Company concerning messages until the same are accepted at one of its transmitting offices; and if a message is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.
6. The Company will not be liable for damages or statutory penalties when the claim is not presented in writing to the Company, (a) within sixty days after the message is filed with the Company for transmission in the case of a message between points within the United States (except in the case of an intrastate message in Texas) or between a point in the United States on the one hand and a point in Alaska, Canada, Labrador, Mexico, Newfoundland and St. Pierre & Miquelon Islands on the other hand, or between a point in the United States and a ship at sea or in the air, (b) within 95 days after the cause of action, if any, shall have accrued in the case of an intrastate message in Texas, and (c) within 180 days after the message is filed with the Company for transmission in the case of a message between a point in the United States and a foreign or overseas point other than the points specified above in this paragraph; provided, however, that this condition shall not apply to claims for damages or overcharges within the purview of Section 415 of the Communications Act of 1934.
7. It is agreed that in any action by the Company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.
8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.
9. No employee of the Company is authorized to vary the foregoing.

1-49

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WESTERN UNION

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W. P. MARSHALL, PRESIDENT

(16)

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NEW MEXICO OIL CONSERVATION COMM=
SANTAFE NMEX=

1952 JAN 7 PM 2 37

PLEASE ADVISE BY WIRE COLLECT, DATE, TIME AND PLACE, WATER
FLOODING PERMIT HEARING, NORTH SHUGART FIELD, EDDY COUNTY,
NEW MEXICO STOP ALSO PLEASE MAIL COPY OF NOTICE OF HEARING
AND ANY OTHER DATA AVAILABLE ON SAME TO US AT 2003 CONTINENTAL
LIFE BUILDING, FORT WORTH, TEXAS. THANKS=
WHALEY CO INC BY WILLIAM D MORRIS PRESIDENT=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CASE 337: Shell Oil Co. for dual completion
(gas-oil) of Sarkeys #2, NW SW 22-21S-37E