

Case No.

1196

Application, Transcript,
Small Exhibits, Etc.

Page 1 of 1

SUPPLEMENTAL DOCKET: EXAMINER HEARING FEBRUARY 4, 1959

Oil Conservation Commission 9 a.m., Mabry Hall, State Capitol, Santa Fe, NM.

The following case will be heard before Elvis A. Utz, Examiner:

CASE 1585: Application of John J. Dempsey Associates for the assignment of a minimum allowable to one gas well in the Fulcher Kutz-Pictured Cliffs Gas Pool, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order assigning a minimum allowable to one gas well in the Fulcher Kutz-Pictured Cliffs Gas Pool in order to prevent premature abandonment thereof, said well being the Hutchison Well No. 1 located 660 feet from the North line and 635 feet from the East line of Section 1, Township 29 North, Range 13 West, San Juan County, New Mexico.

DOCKET: EXAMINER HEARING FEBRUARY 4, 1959

OIL CONSERVATION COMMISSION 9 a.m., Mabry Hall, State Capitol, SANTA FE

The following cases will be heard before ELVIS A. UTZ, Examiner:

- CASE 1587: Application of Cabot Carbon Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its J. L. Reed Well No. 2 located 660 feet from the North and East lines of Section 35, Township 13 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the King-Wolfcamp Pool and King-Devonian Pool through parallel strings of 1½" tubing.
- CASE 1586: Application of Atlantic Refining Company to commingle the production from several separate oil pools. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the Ellenburger, McKee, Fusselman, Montoya, Blinebry, Drinkard, and Queen formations on its State "Y" Lease comprising the N/2 NE/4 and the SE/4 NE/4 of Section 25, Township 25 South, Range 37 East, Lea County, New Mexico. Applicant proposes to separately meter the production from each formation except the Queen prior to being commingled.
- CASE 1589: Application of Humble Oil & Refining Company for an exception to Rule 16 of Order R-586 and for an exception to Rule 303 of the Commission Rules and Regulations. Applicant, in the above-styled cause, seeks an order permitting the classification of a 43-degree gravity oil well as a gas well in the Tubb Gas Pool, said well being its dually completed State "V" Well No. 11 located in the NE/4 SW/4 of Section 10, Township 21 South, Range 37 East, Lea County, New Mexico. Applicant further seeks permission to commingle the liquid hydrocarbons produced from the Tubb zone of said State "V" Well No. 11 with Tubb oil produced from its State "V" Well No. 7 located in the SE/4 SW/4 of said Section 10. Applicant further seeks permission to commingle the Blinebry condensate produced from said State "V" Well No. 11 with the Blinebry oil produced from its State "V" Well No. 1 located in the SW/4 SW/4 of said Section 10.
- CASE 1590: Application of Rex Moore for an order authorizing a gas injection project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection therewith. Applicant, in the above-styled cause, seeks an order authorizing it to inject gas into the Gallup formation of the Bisti-Lower Gallup Oil Pool through its Scott No. 5 Well located 2115 feet from the South line and 2080 feet from the West line of Section 3, Township 24 North, Range 10 West, San Juan County, New Mexico. Applicant further proposes that special rules and regulations be promulgated to govern the above-described project, which rules would provide for the transfer of the allowable from the injection well to producing wells, transfer of allowables from wells which have

been shut-in for observation or to increase the efficiency of the project, operation of the wells on a net gas-oil ratio basis giving allowance for gas injected, and such other rules and regulations as the Commission deems necessary.

CASE 1591:

Application of Angels Peak Oil Company for the assignment of minimum allowables to two gas wells in the Fulcher Kutz-Pictured Cliffs Gas Pool, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order assigning minimum allowables to two gas wells in the Fulcher Kutz-Pictured Cliffs Gas Pool in order to prevent premature abandonment thereof, said wells being applicant's Angels Peak Well No. 3 located 595 feet from the North line and 1240 feet from the East line of Section 11 and Angels Peak Well No. 5 located 285 feet from the North line and 1520 feet from the West line of Section 11, both in Township 28 North, Range 11 West, San Juan County, New Mexico.

CASE 1592:

Application of Amerada Petroleum Corporation for an order extending the horizontal limits of the Bagley-Upper Pennsylvanian Gas Pool and for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order extending the horizontal limits of the Bagley-Upper Pennsylvanian Gas Pool to include the E/2 of Section 33, and the NW/4 of Section 34, all in Township 11 South, Range 33 East, Lea County, New Mexico. Applicant further seeks the establishment of a 320-acre non-standard gas proration unit in said pool consisting of the NE/4 of said Section 33, and the NW/4 of said Section 34, to be dedicated to the applicant's State BT "M" No. 2 Well located in the SE/4 NE/4 of said Section 33.

CASE 1593:

Application of The Texas Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing a 241-acre non-standard gas proration unit in the Eumont Gas Pool consisting of the NE/4 of Section 5, Township 20 South, Range 37 East, and the S/2 SE/4 of Section 32, Township 19 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's J. W. Cooper Well No. 5 located 1668 feet from the North line and 1650 feet from the East line of said Section 5.

CASE 1196:

Application of The Ibez Company for permission to expand its water flood project in the Artesia Pool, Eddy County, New Mexico, and for eight unorthodox well locations. Applicant, in the above-styled cause, seeks an order permitting the expansion of its Artesia Water Flood Project No. 2, authorized by Order No. R-966 in the Artesia Pool, Eddy County, New Mexico, to convert to water injection a well in the NW/4 NW/4 of Section 28 and a well in the SW/4 NE/4 of Section 28, both in Township 18 South, Range 28 East. Applicant further seeks approval of eight unorthodox well locations in Sections 21 and 28 of the aforementioned township.

CASE 1594:

Application of The Ibex Company for permission to install three separate lease automatic custody transfer systems. Applicant, in the above-styled cause, seeks an order authorizing it to install three separate lease automatic custody transfer systems, one on its Welch Duke State Lease, one on its Resler Yates State Lease and the other on its McNutt State Lease, all in the Artesia Field, Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico. Applicant further seeks permission to consolidate multiple tank batteries on said Resler Yates State Lease in exception to Rule 309 of the Commission Rules and Regulations.

CONTINUED CASE

CASE 1573:

Application of Southwestern, Inc. Oil Well Servicing for permission to make a "slim hole" completion. Applicant, in the above-styled cause, seeks an order authorizing it to utilize the "slim hole" method of completion for a well located in the SE/4 NW/4 Section 32, Township 16 South, Range 30 East, Square Lake Pool, Eddy County, New Mexico. Applicant proposes to utilize 2½ inch tubing as a substitute for casing in the above-described well.

STATE OF NEW MEXICO

Case 1196

100 100
100 100

1. That Applicant is the operator of the Artesia Water Flood Project which includes the Welch Duke State Lease, the McNutt State Lease and the Resler Yates State Lease, all in Township 18 South, Range 28 East, N.M.P.M., Eddy County, New Mexico.

3. That approval of this application will result in greater ultimate recovery of oil from the water flood project.

1. That an order be issued authorizing it to redrill on unorthodox locations, or drill new wells on unorthodox locations as follows:

NW/4 NW/4
No. 15 ✓

- A No. 20 New
1-22-59
Docket # 111111
B P

MCNUTT STATE

- 5 No. 1 Redrill old well (282' from south line & 293' from west line of Section 21)
- 6 No. 9 New Well (970' from south line & 1170' from west line of Section 21)

RESLER YATES STATE

- 7 No. 26 Redrill old well (2390' from north line & 1860' from east line of Section 28)
- 8 No. 301 ^{S 1/4 NE 1/4} New Well (1322' from north line & 1322' from east line of Section 28)

2. That the Commission set this matter down for hearing before an Examiner at the earliest possible date and notice of such hearing be published as required by law.

DATED this 19th day of January, 1959.

Respectfully submitted,

THE IBEX COMPANY

By:

Jack M. Campbell
Campbell & Russell
P. O. Box 721
Roswell, New Mexico

Its Attorneys

TABLE SHOWING WELL TESTS
AND
WATER INJECTION DATA
IN
ARTESIA WATER FLOOD PROJECT NO. 2
IN
ARTESIA FIELD, EDDY COUNTY, NEW MEXICO

PRODUCING WELL TESTS

WELLS	DATE	OIL	WATER
McNutt No. 3	12-15-58	25.5	56.2
" 4	1-23-59	4	0
" 7		(T. A. since July 1958)	
MEY 17	1-22-59	80	48
" 19	9- 8-58	6	0
21	1-20-59	80	0
46	1-21-59	7	2
53	1-17-59	54.3	0
23	12- -58	(46 bbls./month)	0
Welch Duke St.			
No. 3	1-13-59	78.5	1.3
6	1-15-59	155	13.5
8	1-14-59	17.8	0
9	1-15-59	55.6	12.6
11	12- -58	(31 bbls./month)	0

WATER INJECTION WELL DATA

(Cumulative Water Injection to 1-1-59)

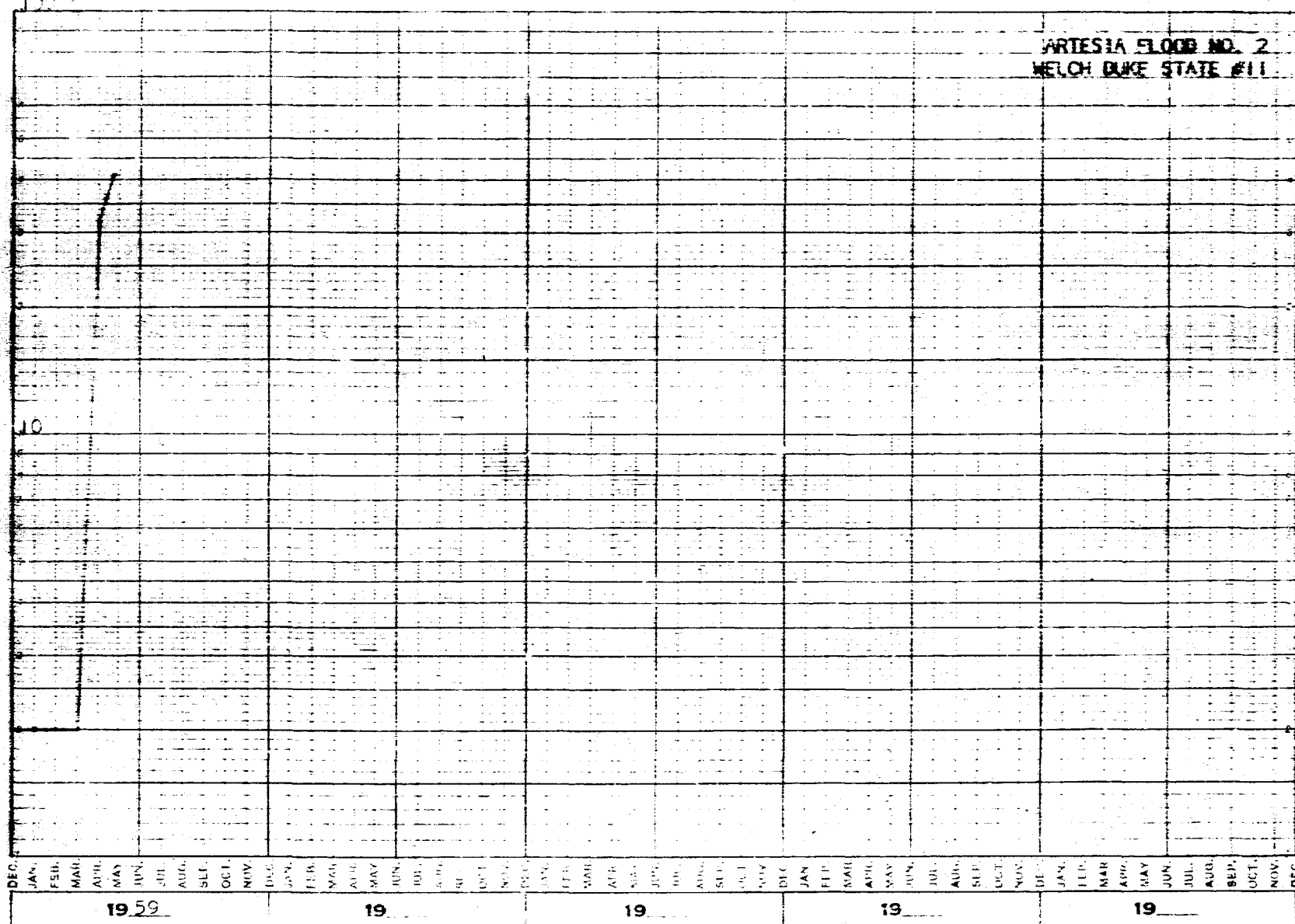
McNutt No. 2	124,450
5	Jan
6	Jan
8	1,434

Welch Duke State	
No. 4	2,469
5	111,533
7	130,984
10	3,065
16	Jan.

Resler Yates State	
No. 13	103,585
18	105,225
22	Jan
39	2,018
51	86,634

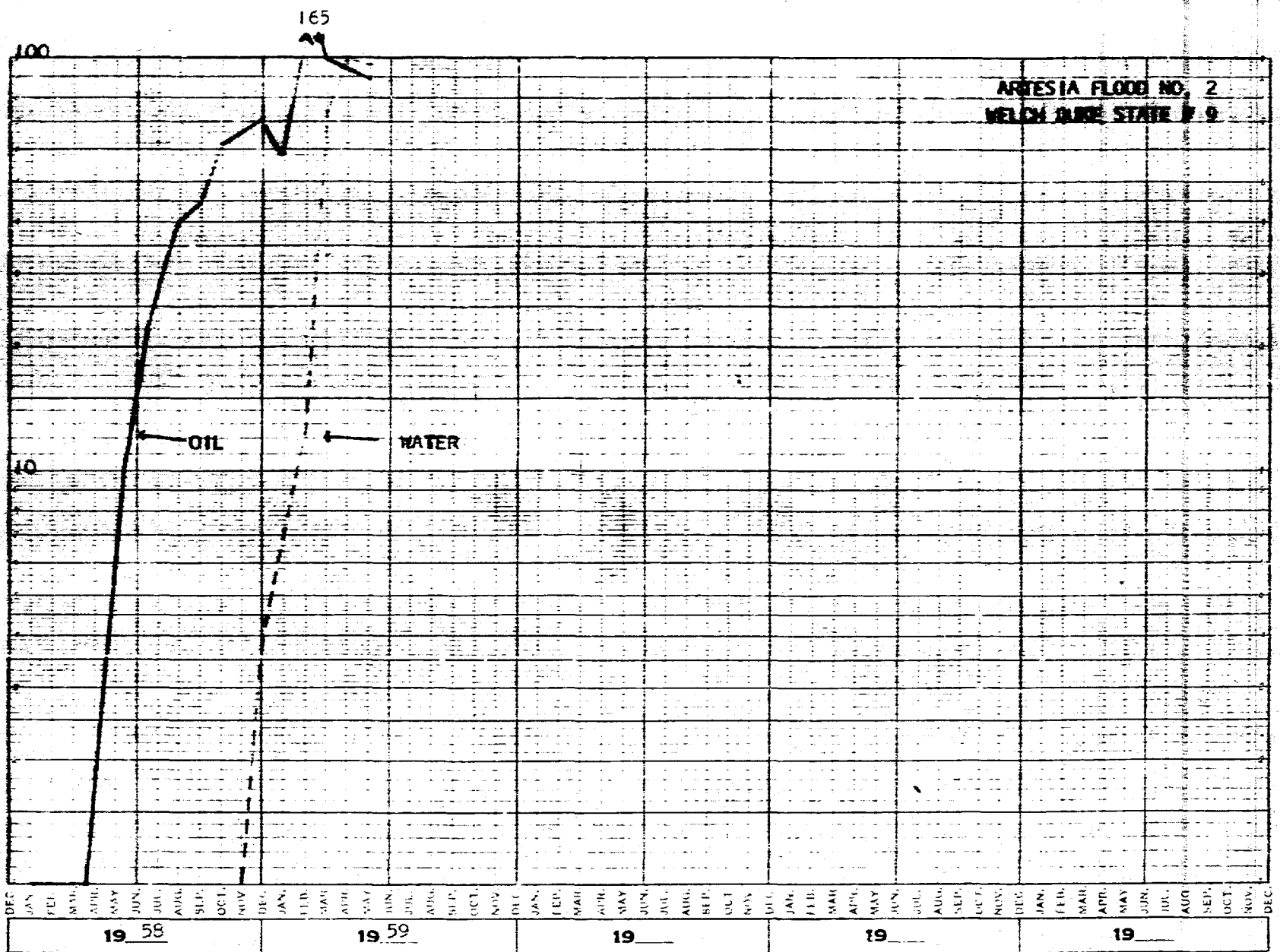
RESLER
YATES

DEPT. OF MINES AND METALS
OIL SECTION - WATER INJECTION
IBEX - EXPLORATION NO. 2
CASE NO. 1196





OIL & WATER PRODUCTION, BBL/DAY BY TEST



BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Case No. 1196

TRANSCRIPT OF HEARING

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

February 4, 1959

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BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Application of the Ibex Company for permission to expand its water flood project in the Artesia Pool, Eddy County, New Mexico, and for eight unorthodox well locations. Applicant, in the above-styled cause, seeks an order permitting the expansion of its Artesia Water Flood Project No. 2, authorized by Order No. R-966 in the Artesia Pool, Eddy County, New Mexico, to convert to water injection a well in the NW/4 NW/4 of Section 28 and a well in the SW/4 NE/4 of Section 28, both in Township 18 South, Range 28 East. Applicant further seeks approval of eight unorthodox well locations in Sections 21 and 28 of the aforementioned township.

CASE NO.

1196

TRANSCRIPT OF HEARING

BEFORE: Elvis A. Utz, Examiner.

MR. UTZ: The hearing will come to order, please.

The next case on the Docket will be 1196.

MR. PAYNE: Case 1196. Application of the Ibex Company for permission to expand its water flood project in the Artesia Pool, Eddy County, New Mexico, and for eight unorthodox well locations.

MR. CAMPBELL: Mr. Examiner, Jack M. Campbell, Campbell and Russell, Roswell, New Mexico, appearing on behalf of the

applicant. We have one witness in this case.

(Witness sworn.)

MR. UTZ: Are there any other appearances to be made in this case? If not, you may proceed.

T O M F O R D, a witness called by and on behalf of the Applicant, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY: MR. CAMPBELL:

Q Will you state your name, please.

A I am Tom Ford.

Q Where do you live, Mr. Ford?

A Beckenridge, Texas.

Q By whom are you employed and in what capacity?

A Ibex Company as manager of production.

Q Are you acquainted with the application of the Ibex Company in Case No. 1196 before the Examiner?

A I am.

Q I hand you, or refer you to what has been indentified there on the board as Ibex's Exhibit No. 1 covering an area within the Artesia field in Eddy, County, New Mexico. Will you please step up to that exhibit now and will you point out on the exhibit the location of the two wells which you propose to use now and seek in this application obtaining approval for, for the injection of water.

A The Resler Yates State No. 301 and the Welch Duke State No. 15.

Q The No. 15 well is situated in the NE/4 of the NE/4 of Section 28, is that correct?

A That is correct.

Q Where is the other well situated?

A It is in the SW of the NE of Section 28.

Q Will you state the reason why you now propose to use those wells as water injection wells, please.

A Mindful of the policy of the Committee to extend the wells as we get substantial increase in production from adjoining wells, I am speaking first of this Welch Duke No. 15, the Welch Duke No. 8 to the east of it is now producing eighteen oil and no water. This was an old well which we had re-drilled at the time, before water flood results. It made approximately one barrel of oil and no water, so it has received water flood benefit to the extent of rising from one to eighteen barrels a day production.

Q Do you consider that in light of that increased production, that it is necessary for you to commence injection of water in your well No. 15 to back-up that increase?

A I do.

Q Do you believe that if the Commission or Examiner grants your application, that by converting this well to water injection, you will ultimately recover more oil than if you did not convert it?

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A YES.

Q Now, will you refer to your well on your Resler Yates State Lease?

A Yes, that is No. --

Q In the NE/4 of Section 28.

A That well is Well No. 301. Before we could stake this location, we had to make an agreement with the Western Ventures and Yates Brothers who own the 40-acre tract here on the NE of the NE. We have now completed a verbal trade on it for the written trade in which we are going to purchase that tract, so we will own all of the NE/4 of this section. In order to utilize the existing wells on that tract, we have come up with the proposed pattern as outlined by dotted lines on the map.

This Resler Yates State No. 53 is now producing 45 oil and no water, so it definitely does need a back-up.

Q In your opinion, if you are permitted to inject water into that well, 301, to back-up the increased production from Well No. 53, will it result in a greater ultimate recovery of oil than if you were not permitted to do so?

A It will.

Q In your application for this case you have also requested authority for six unorthodox locations in addition to the two that you have referred to here. Would you point out to the Examiner on Exhibit 1 where those proposed locations would be?

A Starting up on the McNutt State, the first one will be

the No. 1 well. This is a well which was drilled and completed in this pay and since has been plugged. We propose to re-enter it and eventually make a producing well out of it.

Well No. 9, located, you can see the location on the plat, is diagonally offset to the No. 5 and No. 8 injection wells, and we need to drill that well so we can tell when our water flood has been effective out that far.

MR. UTZ: Will that be a new well?

A Yes, that will be a new well.

Q (By Mr. Campbell) In each instance state whether it is re-entry of an old well or new well, please.

A All right.

Q What was the first one?

A The first one was McNutt State, which will be re-entry of an abandoned well. Going on, now, the No. 15 Welch Duke State well already covered will be re-entry of an abandoned well. The 18 will be a producing well to offset injection wells No. 10 and 16. It will be used to determine when we do have water flood production due from those wells. It will be a new well. No. 19 and No. 20 will eventually be injection wells. It is our plan only to drill them at this time so that they will be available for water injection when the time does come. That will, of course involve a separate application, before we can inject water in them. We do not plan to produce those two wells, 19 and 20. Well No. 301 we've already covered. It will be a new well and a water injec-

tion well. No. 26 Resler Yates State will be a re-entry of an abandoned well. It will be a producer sometime in the future.

Q Do you intend to start work on all of these simultaneously or are you doing this in order to develop a program of drilling in the area?

A To develop a program of drilling. We will probably utilize one drilling rig, of course, always depending on the progress of the flood, but we will probably drill No. 301 first and then 15. We might get two rigs in and move a little faster, just depending on the progress of the flood.

Q You realize, of course, that in the event you intend to, after drilling, to use any of these wells for water injection, you will have to come before the Commission or follow administrative procedure to follow injection of water in these wells?

A Except 301, Resler Yates 301, and Welch Duke State 15.

Q Yes. The other six for which you have not sought here permission to inject water, you will have to come back and obtain permission from the Commission for the injection of water?

A Yes.

Q In your opinion is the drilling or re-entry of these wells at the unorthodox locations that you have pointed out to the Examiner necessary in order to efficiently operate this project and to obtain the greatest possible ultimate recovery of oil?

A Yes.

MR. CAMPBELL: That's all the question I have at this

time, Mr. Examiner. Oh, just a moment, excuse me. I am going to hand you what has been identified as Ibex's Exhibit No. 1, and in order to complete the record in this matter, will you state what that is?

A This is an exhibit prepared to show the latest producing oil tests of the wells involved in this Artesia Water Flood Project No. 2, and also a water injection well data showing cumulative water injection up to January the 1st, 1959. As further explanation of that table on four different wells in that table, there is a notation, "January", or "Jan". That indicates that water washed out into those wells during January.

Q Is that a recapitulation of information that has heretofore been furnished the Commission on regular reporting forms, monthly forms, to your knowledge, or is it just a current statement?

A It is more current than anything the Commission has seen as far as the producing well tests; the cumulative water injection has all be presented to the Commission.

Q I note that your Welch Duke State Well No. 6 on latest test was producing one hundred fifty-five barrels of oil per day, and thirteen and a half barrels of water. In your opinion, has that well probably peaked out and is commencing a decline, or an increase in water production?

A Apparently that is so.

Q Is that the well that has reached the highest point of daily production in the flood to date?

A Yes.

Q And is the same situation true with regard to your MRY Well No. 17, which is now producing 60 barrels of oil and 48 barrels of water, or is that a local condition. What is the situation there, if you know?

A I believe that to be the same condition, yes. I am not too sure of that. I better not say.

MR. CAMPBELL: I would like to offer Ibex's Exhibits 1 and 2 in evidence.

MR. UTZ: Without objection, they will be received.

MR. CAMPBELL: That's all I have at this time.

CROSS EXAMINATION

BY: MR. FISCHER:

Q Mr. Ford, do you have the State Engineers approval for the water that you will need for, or the additional water that you will need for the injection project as it expands at this time?

A I am afraid I can't answer that positively. I think so. I know that we have purchased water rights, or have obtained water rights throughout the area and have worked very closely with him. As to the exact status at this time, I am not positive, but I think that we do have.

Q Mr. Ford, in regard to the Well No. 301, that was a request for a water injection well that you want immediately, right?

A Yes.

Q What was the reason, would you state again what your reason is for wanting that well for injection purposes?

A To start backing up this Well No. 53 which now has a production of fifty-four barrels of oil and no water per day.

Q No. 52 is not producing?

A Yes, it is producing. We are in the process of buying this well from Western Yates. It still belongs to them, but we will own it shortly.

Q Those little circles I note on this map, are they future locations that have nothing to do with this hearing?

A That is correct. The thing down there at the bottom gives the legend on the thing.

Q In regard to the Welch Duke State No. 15, that will be a re-entry, is that correct?

A Yes.

Q You want to make a water injection well out of that?

A Yes.

Q And will you state again your reason for wanting to inject water in that well?

A The Welch Duke No. 8 there to the east, which made only about one barrel a day when it was drilled, is now making eighteen barrels of oil and no water per day. We want to inject water in No. 15 to back up the -- make a five spot, complete five spot around that well.

Q Now, the No. 15 well we were just discussing, is that

to be a producing well?

A Yes, it is a re-entry to make a producing well.

MR. FISCHER: That's all.

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

If not, the witness may be excused.

(Witness excused.)

MR. UTZ: Are there any statements to be made in this case? If there are none, the case will be taken under advisement.

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO)

I, Joseph A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 9th, day of February, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo
JOSEPH A. TRUJILLO
NOTARY PUBLIC

My Commission Expires:
October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1186, heard by me on *Feb 4, 1959*,
Thurston R. [Signature], Examiner
New Mexico Oil Conservation Commission

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

February 13, 1959

Mr. Jack Campbell
Campbell & Russell
P.O. Box 721
Roswell, New Mexico

Dear Mr. Campbell:

On behalf of your client, The Ibex Company, we enclose two copies of Order R-966-C issued February 12, 1959, by the Oil Conservation Commission in Case 1196, which was last heard on February 4th at Santa Fe before an examiner.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 2-5-59

CASE NO. 1186

HEARING DATE 2-4-59

My recommendations for an order in the above numbered case(s) are as follows:

- approve application as requested.
1. The 8 unorthodox locations as requested & listed on applicants application.
 2. Authorize the conversion of 2 of the 8 unorthodox locations to H₂O injection wells as these are:
 - (a) Hex - Welch Duke State #15,
288'/N and 272'/W lines of sec. 28-185-28E
 - (b) Hex - Resler Gates St. #301,
1322'/N + 1322'/E lines of sec. 28-185-28E.
 3. Order probably should be R-966-C

Thurston R.

Staff Member

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

**IN THE MATTER OF THE APPLICATION
OF THE IBEX COMPANY FOR AN
EMERGENCY ORDER GRANTING A CAPACITY
ALLOWABLE FOR ONE WELL IN THE ARTESIA
POOL, EDDY COUNTY, NEW MEXICO.**

EMERGENCY ORDER NO. E-19

NOW, on this 5th day of May, 1959, the Oil Conservation Commission of New Mexico, a quorum being present, having considered the application of The Ibex Company for an Emergency Order and being fully advised in the premises,

FINDS:

(1) That The Ibex Company was authorized by Order No. E-296, and amendments thereto, to institute the Artesia Water Flood Project No. 2 in the Artesia Pool, Eddy County, New Mexico.

(2) That the Ibex Company is the operator of the Welch Duke State Well No. 18, located 1260 feet from the North line and 1380 feet from the East line of Section 28, Township 18 South, Range 28 East, NEPM, Eddy County, New Mexico.

(3) That there is a reasonable probability that said water flood project has caused an increase in the producing capacity of the above-described well to the extent that it is now capable of producing in excess of the top unit allowable for the Artesia Pool.

(4) That there is a possibility that waste will occur if the production from the above-described well is curtailed.

(5) That an emergency exists which requires the promulgation of an order, without notice and hearing, to eliminate the possibility of waste occurring as a result of a curtailment of the production from said well.

(6) That a hearing should be held on May 20, 1959, to determine whether waste will actually result if the production from the said well is curtailed.

(7) That in the event the applicant fails to prove that waste will be caused if the production from the above-described well is curtailed, then any oil produced from said well in excess of the normal unit allowable shall be charged against the future allowable for said well.

IT IS THEREFORE ORDERED:

(1) That the Welch Duke State Well No. 18, located 1260 feet from the North line and 1380 feet from the East line of Section 28,

-2-

Emergency Order No. E-19

Township 18 South, Range 28 East, Artesia Pool, Eddy County, New Mexico, be granted an allowable equal to its capacity to produce, effective May 8, 1939.

(2) That this order shall become effective at 7 o'clock a.m. Mountain Standard Time on May 8, 1939.

(3) That a hearing shall be held at 9 o'clock a.m. Mountain Standard Time on May 20, 1939, to permit the applicant to appear and show cause why the above-described well should be granted a capacity allowable.

(4) That in the event the applicant fails to prove that waste will be caused if the production from the above-described well is curtailed, then any oil produced from said well in excess of the normal unit allowable shall be charged against the future allowable for said well.

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

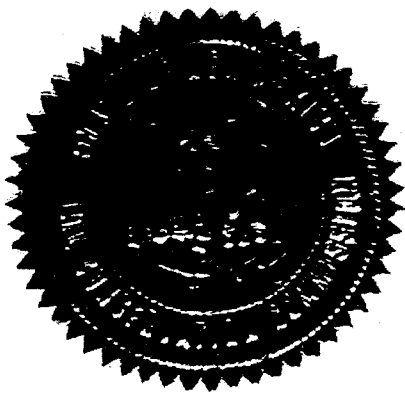
5-5-39
15
520-57

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

John T. Burroughs
JOHN BURROUGHS, Chairman

Murray E. Morgan
MURRAY E. MORGAN, Member

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



ir/

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1196

TRANSCRIPT OF HEARING

June 25, 1959

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

I N D E X

<u>WITNESS</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>
B. G. HARRISON	4	15	

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
June 24, 1959

IN THE MATTER OF:)

)
Application of Graridge Corporation)
for an order amending Order No. R-966.)
Applicant, in the above-styled cause,)
seeks an order amending Order No.)
R-966 to establish administrative)
procedures for development of its)
Artesia Water Flood Projects No. 2)
and 3, Artesia Pool, Eddy County,)
New Mexico, and for approval of)
unorthodox locations for 27 wells in)
Said projects, for authority to)
convert six wells in said projects to)
water injection, for capacity)
allowables for five wells in the)
projects.)

CASE NO.
1196

BEFORE:

ELVIS A. UTZ; Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. UTZ: Case 1196.

MR. PAYNE: Case 1196. Application of Graridge
Corporation for an order amending Order No. R-966.

MR. CAMPBELL: Jack M. Campbell, Roswell, appearing
on behalf of the applicant. We have one witness to be sworn, Mr.
Harrison.

MR. PAYNE: Let the record show it's the same witness
who has testified in the previous case and was sworn at that time.

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B. G. HARRISON

a witness, having been previously sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A B. G. Harrison.

Q Where do you live?

A Breckenridge, Texas.

Q And by whom are you employed and in what capacity?

A By Graridge Corporation as Manager of Secondary Recovery.

Q Have you testified previously before this Commission or its examiners?

A Yes, I have.

Q In your professional capacity?

A Yes, sir.

Q Are the witness' qualifications acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Campbell) Mr. Harrison, are you acquainted with the application of Graridge Corporation in the Case No. 1196?

A Yes, sir, I am.

Q I refer you, Mr. Harrison, to what has been identified as Exhibit No. 1 in this hearing, and ask you to state what that is

and to describe the markings on it briefly.

A This is a plat of a portion of the Artesia field in Eddy County, New Mexico, in which are outlined Graridge Corporation's Artesia Pilots Flood 2 and 3.

Q Now, have you identified the two projects?

A Pilot Flood 2 has been outlined in yellow on the map, and Pilot Flood 3 has been outlined in blue.

Q Have the Pilot projects, Artesia Flood No. 2 and No. 3 previously been approved by the Commission?

A Yes, they have.

Q Does Exhibit No. 1 outline the proposed ultimate development of these two pilot projects?

A Yes, it does. Here we have shown, in the wells with concentric circles and being colored red indicate the present injection wells in both Pilot Flood 2 and Pilot Flood 3. These wells are connected by a solid red line. The other wells -- I note one mistake on this map; possibly it is the same on the other maps. Ventura State No. 305.

Q Where is that?

A In Section 28 in the northeast of the northeast Ventura State No. 305 has been colored red. This well is not oil injection. It has just been drilled.

Q Is it colored red on the original exhibit?

A All of the other wells colored in red on the exhibit

are water injection.

Q No. 305 is not then on the water injection?

A No, it is not.

Q Now, are you asking the Commission at this time to set up administrative procedures such as have been used in other water flood projects for the conversion of wells to water injection wells.

A Yes, we are. We feel like this will expedite getting the wells on injection following an increase of production by an offsetting producing well.

Q Now, I refer you to what has been identified as Applicant's Exhibit No. 2, and ask you to state what that is.

A This is a series of curves depicting the overall Pilot Flood 2 project, indicating the oil production in barrels per month. The accumulative oil production, the accumulative water injection, the daily water injection, and the average injection pressure.

Q Do you have any particular comments in connection with your overall picture on your Artesia Pilot Flood No. 2?

A It might be pointed out that the accumulative production thus far from the pilot flood has been some 230,000 barrels, and that as we are expanding our project it is continuing to increase in production.

Q Anything else?

A We feel like the flood is responding very well.

As you can see our accumulative water injection at this time is about a million two hundred thousand barrels as compared to our two hundred thirty thousand barrels of recovery.

Q Now, referring you to Applicant's Exhibit No. 3 in this case. Will you state what that is, please?

A This is the same information that we have just presented on Artesia Pilot Flood No. 3 depicting mostly oil production, the water injection, injection pressure and the accumulative water injection. This flood responded initially to the water injection program, but since that time has become very ineffective. The area seems to present considerably more problems than we have in Pilot Flood 2. At the present time we plan to go into the area and drill Well No. 348, and core this well and try to obtain some additional information. Well No. MRY No. 7 in Pilot Flood 3, this being an injection well, has been examined by means of a tracer survey and it was determined that 70 or a larger per cent of the water is going into a limestone stringer which immediately underlies the pay section. And our present plans are to attempt to plug this well back and to shut off this thief zone. We feel like that with additional information and some tracer surveys on the other injection wells that we will be able to have better control of this flood and make a success of it.

Q Now, Mr. Harrison, in your application you have requested the present authority to complete or convert existing

wells to water injection wells. Will you state to the Examiner how those are identified on Exhibit No. 1?

A These are not identified except by well number. 3 wells on the Welch Duke State, Wells No. 19, 20 and 21.

Q Are those newly drilled wells?

A Yes, these are all newly completed wells. These are being in the northwest quarter of Section 28.

Q And on your Welch State lease, which wells do you propose to convert to water injection wells at this time?

A Well No. 14.

Q That's the lease immediately east of the Welch Duke State lease, are they not?

A Yes.

Q Do you intend to convert your Welch State 318 and 304 to water injection?

A Yes, that's correct.

Q And on the Ventura State lease, where is that situated?

A The Ventura State lease is a lease we have recently acquired. We took over operations on this lease on May 1. This lease is the northeast quarter of the northeast quarter of Section 28. Well No. 305 has been drilled but has not been completed.

Q Are all of the wells in which you request to inject water except Welch State 14 new wells?

A Yes, they are.

Q Why do you feel it is necessary to inject water in these 6 wells?

A All of these wells directly offset producing wells which have experienced an increase in production from the water flood projects.

Q You feel it's necessary in order to obtain the greatest ultimate recovery of oil to back up the production from these wells which have been stimulated by water injection?

A Yes, we do.

Q Mr. Harrison, you have also requested in your application the approval of some 27 unorthodox well locations in these 2 project areas. Have you identified the locations of these wells?

A Yes. These wells have been identified in both Pilot Flood 2 and Pilot Flood 3, but being underlined in purple.

Q Are some of these wells wells that were already in existence?

A Yes, they are.

Q But they are wells which were drilled on unorthodox locations originally, is that correct?

A Yes, sir, that is true. Some of these represent new wells also. Where a new well is represented by an unorthodox location, the location was made unorthodox in order to be able to place it in a central location within a fire spot pattern. And

the only reason it is necessary to have unorthodox locations here is because of the unorthodox locations which surround the well.

Q Now, have you any amendments to the application with regard to the identity of unorthodox wells, Mr. Harrison?

A Yes. In our original application to the Commission we had included Resler-Yates State No. 28, being 640 feet from the north line and 200 feet from the east line of Section 32. We would like to omit this well and substitute Resler-Yates State No. 12 which is 330 feet from the south line and 200 feet from the east line of Section 29, being over on the very east edge of Pilot Flood 3. And also we would like to substitute for Lackawana State No. 7, which is 1540 from the north line and 1020 from the east line of Section 21, being in the southeast of the northeast of Section 21. And for this well we would like to substitute McNutt State No. 1-A, this well being 252 feet from the south line and 343 feet from the west line of Section 21.

Q Is that 352 feet from the south line or 252 from the south line?

A 252. This is a location which was required due to the impossibility of re-entering McNutt State No. 1. No. 1 had been approved as an unorthodox location having been an old hole.

Q The number of wells for which you seek unorthodox well location authority remains the same as was advertised, 27 wells, does it not?

A Yes, sir, that is correct.

MR. CAMPBELL: I would like to ask leave to amend the application in these two respects, Mr. Examiner, by deleting two of the wells and substituting in lieu thereof the wells that Mr. Harrison has referred to.

MR. UTZ: Are there any objections to the change in application as stated by counsel? If not they will be so amended.

Q (By Mr. Campbell) Now, Mr. Harrison, in this application you have also requested capacity allowable for 5 wells. Where are these wells situated?

A I would like to refer to the plat. We have on the plat some triangles that have been colored in blue. These are .2, the wells which we are asking capacity allowable. These being McNutt State No. 9 and 10 in Section 21 and Lackawana State No. 2-A, Resler-Yates State No. 23. All of these being in Section 21 in the south half. Also Welch Duke State No. 2, being in Section 28 in the southeast quarter of the northwest quarter.

Q Now, Mr. Harrison, I note that each of these wells has a relatively low rate of oil production indicated on Exhibit No. 1. What is the reason for your seeking capacity allowables for these wells at this time?

A These wells have not responded to the flood thus far. In Welch Duke State No. 2 we have 24 barrels of water production there. This, however, we feel is due to a casing leak following

some water analysis which have been made. We feel that we are able to project the approximate time at which these wells will respond to the flood based on similar situations that have occurred in the flood thus far.

Q Mr. Harrison, I refer you to what has been identified as Applicant's Exhibits No. 4 and No. 5. Will you in explaining this to the Examiner refer to these Exhibits?

A Both of these exhibits depict the accumulative water injection which had been calculated to have been injected into the yellow triangles which are shown on the plat. At the time that these wells, Welch State No. 11 and Resler-Yates State No. 35 responded to the flood. Welch Duke State No. 11 can be noted responded -- these water injection figures are in barrels per acre, which is the equivalent of the amount of water that has been injected into the amount of acres shown in the yellow triangles. And it is for Welch Duke State No. 11 as a summation of the water that was injected into Welch Duke State No. 16 and No. 4 as calculated in barrels per acre. Here we show that Welch Duke State No. 11 responded during the month of March, 1959, at which time there had been some 3,800 barrels of water per acre injected into this triangular area. Referring to the curve now on Resler-Yates State No. 53, this well being one of the original wells outside the original pilot flood, we show that this well responded when there was some 5800 barrels per acre having been injected.

We feel that the difference represented here was due to the time required to get Welch Duke State No. 4 and 16 on injection, and that the area around Welch Duke State No. 3 had been pressured up thus gave back up and required less water injection.

Q Have you attempted then to anticipate, based on the volume of water injected in approximately the same area, when the wells included in your application will be likely to respond substantially to the water flood?

A Yes, sir, that is correct.

Q And you believe based upon that that it is necessary to obtain authority for capacity allowables at this time in order to avoid the necessity of emergency orders at a future date?

A Yes, sir, we do. We have based on this type of calculation we have determined that using an average figure between No. 11 and No. 53 in the form of time that McNutt State No. 9 should respond very soon in that it was calculated to. The response date should be about the 6 and 20. McNutt State No. 10 was calculated should have responded along in the first part of the month. Lackawana State A-2 likewise should have responded, but has not. We feel in this case in particular that some remedial work is needed here. We have just recently taken over operation on this lease also, and have not had sufficient time to get into this well and find out what your trouble could be.

Q Do you believe that based on your experience you are

able to calculate with a reasonable degree of certainty when these wells will respond to water flood?

A Yes, sir. Of course, the difference in the type of formations we have, where the formation is homogeneous, we would be able to calculate to a higher degree of accuracy the date at which these wells should respond. But using the best information we have available we have calculated when these responses should come. Here again as in other floods we feel that when these responses come that they will be rather rapid and that we will exceed the unit allowable and require emergency hearings to prevent shut down or over production. And it is with this in mind that we attempt to present this information and calculate the date at which these wells should respond, thinking also from the engineering standpoint that if they do not respond then we have trouble in the area.

Q Were Exhibits 1 through 5 prepared by you or under your supervision?

A Yes, they were, Mr. Campbell.

Q I would like to offer Exhibits 1 through 5 in evidence.

MR. UTZ: Without objection Exhibits 1 through 5 will be admitted into evidence.

A I would like to refer to Exhibit 1 again and point out that with the exception of the unorthodox locations which we

have requested on new wells, all other locations have been set out as standard locations being on regular 10 acre spacing, 330 from the 40 acre unit lines.

MR. CAMPBELL: That is all I have at this time.

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

MR. PAYNE: Yes, sir.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Harrison, your application in this case requested approval of the overall projects as will be presented by the applicant. Now, is that adding anything in addition to the unorthodox locations, the capacity allowables, on the conversion of these 6 wells to water injection and the establishment of administrative procedures?

A The idea in setting out the overall project was to inform the Commission as to the extent of the project, the anticipated development program. Of course, the right of development will be in connection with the control of the Commission as it has been previously set out in allowing us to expand our projects and place new wells or additional wells on injection following offset responses. Here we have set out what we consider to be the maximum development which could occur within this project.

Q Any order that you want entered in this case would

actually set out more specifically the particular points which you request approval for, would it not?

A Yes, sir. It would set out the projected injection well and producing well locations and would allow us to expand the project under the supervision of the Commission by administrative letter rather than by hearing.

Q I see. Thank you.

MR. UTZ: Any other questions of the witness? If not the witness may be excused.

(Witness excused.)

MR. UTZ: Are there any other statements to be made in this case? If there are none the case will be taken under advisement. We will take a ten minute recess.

(Short recess.)

STATE OF NEW MEXICO)
) ss
 COUNTY OF BERNALILLO)

I, Ned A. Greenig, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached transcript of proceedings before the Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript by me and/or under my personal supervision and that the same is a true and correct record to the best of my knowledge, skill and ability.

Witness my hand and seal this the 7 day of July, 1959,
 in the City of Albuquerque, County of Bernalillo, State of New Mexico

Ned A. Greenig
 Notary Public

My Commission Expires:
 May 5, 1963

I do hereby certify that the foregoing is
 a complete record of the proceedings in
 the Examiner hearing of Case No. 1186.
 heard by me on June 24, 1959.
Wm. P. Rife Examiner
 New Mexico Oil Conservation Commission

THE STATE OF TEXAS,
COUNTY OF ARLING
JANUARY NO. 2 & 3 - ARLING

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. 1196
Order No. R-966-E

APPLICATION OF GRARIDGE CORPO-
RATION FOR AN ORDER AMENDING
ORDER NO. R-966 TO APPROVE THE
CONVERSION OF CERTAIN WELLS IN
THE ARTESIA WATER FLOOD PROJECTS
NOS. 2 AND 3 TO WATER INJECTION,
FOR ESTABLISHMENT OF AN ADMINIS-
TRATIVE PROCEDURE WHEREBY ADDI-
TIONAL WELLS MAY BE CONVERTED
TO WATER INJECTION, FOR APPROVAL
OF TWENTY-SEVEN UNORTHODOX WELL
LOCATIONS IN SAID PROJECTS, AND
FOR CAPACITY ALLOWABLES FOR SIX
WELLS IN SAID PROJECTS

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 8:00 o'clock a.m. on June 24, 1959, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 15th day of July, 1959, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That by Order N. R-966, and amendments thereto, The Ibex Company was authorized to institute its Artesia Water Flood Projects Nos. 2 and 3, Artesia Pool, Eddy County, New Mexico.

(3) That Graridge Corporation, operator of said Water Flood Projects, seeks an amendment of Order No. R-966 to establish an administrative procedure whereby additional wells in

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Case No. 1196
Order No. R-966-E

said projects may be converted to water injection without notice and hearing.

(4) That the applicant, Graridge Corporation, further seeks an amendment of said Order No. R-966 to authorize the conversion of the following described wells to water injection:

Welch Duke State Well No. 19, NW/4 NW/4
of Section 28

Welch Duke State Well No. 20, SE/4 NW/4
of Section 28

Welch Duke State Well No. 21, SE/4 NW/4
of Section 28

Resler Yates State Well No. 14, SW/4 NE/4
of Section 28

Resler Yates State Well No. 304, SW/4 NE/4
of Section 28

Venture State Well No. 305, NE/4 NE/4
of Section 28

all in Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico.

(5) That the applicant further seeks approval of twenty-seven (27) unorthodox well locations in said Water Flood Projects.

(6) That the applicant further seeks capacity allowables for the following-described wells in said Water Flood Projects:

Resler Yates State Well No. 23, SW/4 SE/4
of Section 21

Lackawana State "A" Well No. 2, NW/4 SE/4
of Section 21

McNutt State Well No. 9, SW/4 SW/4 of
Section 21

McNutt State Well No. 10, NE/4 SW/4 of
Section 21

Welch Duke State Well No. 2, SE/4 NW/4
of Section 28

all in Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico.

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(7) That the evidence presented indicates that said Water Flood Projects have caused an increase in the producing capacity of the above-described wells to the extent that they are now or soon will be capable of producing in excess of top unit allowable for the Artesia Pool.

(8) That the evidence presented further indicates that waste might occur if production from the wells described in Finding No. 6 is restricted.

(9) That the subject application should be approved.

IT IS THEREFORE ORDERED:

(1) That Order No. R-966 be and the same is hereby amended to establish an administrative procedure whereby additional wells in The Ibox Company's Artesia Water Flood Projects Nos. 2 and 3, Artesia Pool, Eddy County, New Mexico, may be converted to water injection without notice and hearing.

PROVIDED HOWEVER, That no well located in said Water Flood Projects shall be eligible for administrative approval for conversion to water injection unless it is established to the satisfaction of the Secretary-Director of the Commission that the proposed water injection well has experienced a substantial response to the Water Flood Projects or is directly offset by a producing well which has experienced such response; and that it is located on a water injection pattern which will result in a thorough and efficient sweep of oil by said water floods.

PROVIDED FURTHER, That to obtain administrative approval for the conversion of any well to water injection applicant shall submit to the Commission in triplicate a request for such administrative approval, setting forth therein all the facts pertinent to the need for converting additional wells to water injection, and attaching thereto Commission Form C-116, showing production tests of the affected well or wells both before and after stimulation by water flood. Applicant shall also attach plats of the Water Flood Project area and immediate surrounding area, indicating thereon the owner of each lease and the location of all water injection wells and producing wells, and shall submit evidence that a copy of the application to convert additional wells to water injection has been sent to each operator offsetting the proposed injection well.

The Secretary-Director may, if in his opinion there is need for the conversion of additional wells to water injection, authorize said conversion without notice and hearing, provided no offset operator objects to said conversion to water injection within fifteen (15) days. The Secretary-Director may grant

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immediate approval of the conversion upon receipt of waivers of objection from all operators offsetting the proposed water injection well.

(2) That the applicant be and the same is hereby authorized to convert immediately the following-described wells to water injection:

Welch Duke State Well No. 19, NW/4 NW/4
of Section 28

Welch Duke State Well No. 20, SE/4 NW/4
of Section 28

Welch Duke State Well No. 21, SE/4 NW/4
of Section 28

Resler Yates State Well No. 14, SW/4 NE/4
of Section 28

Resler Yates State Well No. 304, SW/4 NE/4
of Section 28

Venture State Well No. 305, NE/4 NE/4 of
Section 28

all in Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That unorthodox well locations be and the same are hereby approved for the following-described wells located in said Water Flood Projects:

Venture State Well No. 306, located 820 feet
from the North line and 1180 feet from the
East line of Section 28

Resler Yates State Well No. 10, located
2360 feet from the South line and 250 feet
from the East line of Section 29

Resler Yates State Well No. 11, located
2390 feet from the South line and 1570 feet
from the East line of Section 29

Resler Yates State Well No. 14, located
2400 feet from the North line and 2380 feet
from the East line of Section 28

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Case No. 1196

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Resler Yates State Well No. 15, located
1570 feet from the North line and 1070 feet
from the East line of Section 29

Resler Yates State Well No. 27, located
2390 feet from the North line and 1300 feet
from the East line of Section 28

Resler Yates State Well No. 30, located
2390 feet from the South line and 1070 feet
from the East line of Section 21

Resler Yates State Well No. 34, located
2390 feet from the North line and 250 feet
from the East line of Section 29

Resler Yates State Well No. 40, located
1320 feet from the South line and 240 feet
from the East line of Section 29

Resler Yates State Well No. 43, located
2400 feet from the North line and 180 feet
from the East line of Section 28

Resler Yates State Well No. 45, located
2390 feet from the South line and 230 feet
from the East line of Section 21

Resler Yates State Well No. 48, located
240 feet from the South line and 670 feet
from the East line of Section 29

Resler Yates State Well No. 49, located
250 feet from the South line and 1570 feet
from the East line of Section 29

Resler Yates State Well No. 307, located
1800 feet from the North line and 1220 feet
from the East line of Section 28

Resler Yates State Well No. 308, located 1780
feet from the North line and 250 feet from
the East line of Section 28

Resler Yates State Well No. 12, located
330 feet from the South line and 200 feet
from the East line of Section 29

Royal Duke State Well No. 2, located 1570
feet from the North line and 1580 feet from
the East line of Section 29

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Lackawana State Well No. 4, located
1560 feet from the North line and 2280 feet
from the East line of Section 21

Lackawana State Well No. 5, located
2390 feet from the North line and 1070 feet
from the East line of Section 21

Lackawana State Well No. 1-A, located
252 feet from the South line and 343 feet
from the West line of Section 21

Lackawana State "A" Well No. 1, located
1540 feet from the South line and 1540 feet
from the East line of Section 21

Welch Duke State Well No. 12, located
950 feet from the North line and 270 feet
from the West line of Section 28

Welch Duke State Well No. 13, located
1570 feet from the North line and 260 feet
from the West line of Section 28

Welch Duke State Well No. 14, located
2310 feet from the North line and 260 feet
from the West line of Section 28

Toomey Allen Well No. 10, located 1650 feet
from the South line and 1330 feet from the
East line of Section 28

Toomey Allen Well No. 13, located 1350 feet
from the South line and 2300 feet from the
East line of Section 28

Toomey Allen Well No. 14, located 1100 feet
from the South line and 1580 feet from the
East line of Section 28

all in Township 18 South, Range 28 East, NNPM, Eddy County, New
Mexico.

(4) That the following-described wells be granted an
allowable equal to their capacity to produce:

Resler Yates State Well No. 23, SW/4 SE/4
of Section 21

Lackawana State "A" Well No. 2, NW/4 SE/4
of Section 21

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McNutt State Well No. 9, SW/4 SW/4 of
Section 21

McNutt State Well No. 10, NE/4 SW/4 of
Section 21

Welch Duke State Well No. 2, SE/4 NW/4
of Section 28

all in Township 18 South, Range 28 East, NMPM, Eddy County, New
Mexico.

(5) That the Commission hereby retains jurisdiction of
this cause to amend all or any part of this order and further to
enter any order or orders deemed necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

John T. Burroughs
JOHN BURROUGHS, Chairman

M. E. Morgan
MURRAY E. MORGAN, Member

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



ven/

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

RP-966-E

Date 7-1-59

CASE NO. 1186

HEARING DATE 6-24-59

My recommendations for an order in the above numbered case(s) are as follows:

1. Approve Grayridge ~~capacity~~ ^{conversion to water injection} for 5 injection wells as listed in application Para. 2.
2. Approve 27 NSL's for wells as listed in para. 4 of application.
3. Approve capacity allowables for 5 wells as listed in para. 5 of application.
4. Approve procedure for administrative approval for ~~new~~ ^{new} injection wells in the future.

Thos. A. Alf.

Staff Member

DOCKET. EXAMINER HEARING JUNE 24, 1959

OIL CONSERVATION COMMISSION - 1120 CERRILLOS ROAD, HIGHWAY DEPARTMENT
AUDITORIUM, 8 a.m., SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or A. L. Porter, Jr., Secretary-Director.

CONTINUED CASE

CASE 1666: Application of Sunray Mid-Continent Oil Company for approval of a unit agreement. Applicant, in the above-styled cause, seeks an order approving its Central Bisti-Lower Gallup Sand Unit embracing approximately 7389 acres of federal, state, and allotted Indian lands in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

NEW CASES

CASE 1692: Application of Continental Oil Company for the establishment of a non-standard gas proration unit in the Tubb Gas Pool. Applicant, in the above-styled cause, seeks the establishment of a 160-acre non-standard gas proration unit in the Tubb Gas Pool consisting of lot 15, the N/2 SE/4 and the SE/4 SE/4 of Section 3, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's Hawk B-3 Well No. 2-T, located 1650 feet from the South and East lines of said Section 3.

CASE 1693: Application of Amerada Petroleum Corporation for three non-standard oil proration units. Applicant, in the above-styled cause, seeks an order establishing three 43.7 acre non-standard oil proration units for Mississippian production in the SE/4 of Section 11, Township 13 South, Range 38 East, Lea County, New Mexico. Applicant further seeks approval of one unorthodox oil well location.

CASE 1694: Application of Texas Crude Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Big Eddy Unit 1-30 Well, located in the SE/4 SE/4 of Section 30, Township 20 South, Range 31 East, Eddy County, New Mexico, in such a manner as to produce oil from an undesignated Tansil pool and to produce oil from an undesignated Delaware pool through parallel strings of tubing.

IE 1695: Application of Texaco, Inc. for a triple completion, for permission to commingle the production from three separate pools, and for the establishment of two non-standard gas proration units. Applicant, in the above-styled cause, seeks an order authorizing it to triple complete its A. H. Blinbry NCT-4 Well No. 1, located in the SE/4 SE/4 of Section 31, Township 22 South, Range 38 East, Lea County, New Mexico, in such a manner as to permit production from the Blinbry formation, production of gas from the Tubb Gas Pool, and production of oil from the Drinkard Pool through tubing, the annulus via cross-over, and tubing respectively. Applicant further seeks the establishment of a 160-acre non-standard gas proration unit in both the Tubb Gas Pool and Blinbry Gas Pool each consisting of the S/2 S/2 of said Section 31. Applicant further seeks permission to commingle the liquid production from the Blinbry, Tubb, and Drinkard formations underlying said acreage.

DOCKET: EXAMINER HEARING JUNE 24, 1959

OIL CONSERVATION COMMISSION - 1120 CERRILLOS ROAD, HIGHWAY DEPARTMENT
AUDITORIUM, 8 a.m. SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or A. L. Porter, Jr., Secretary-Director.

CONTINUED CASE

CASE 1666: Application of Sunray Mid-Continent Oil Company for approval of a unit agreement. Applicant, in the above-styled cause, seeks an order approving its Central Bisti-Lower Gallup Sand Unit embracing approximately 7389 acres of federal, state, and allotted Indian lands in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

NEW CASES

CASE 1692: Application of Continental Oil Company for the establishment of a non-standard gas proration unit in the Tubb Gas Pool. Applicant, in the above-styled cause, seeks the establishment of a 160-acre non-standard gas proration unit in the Tubb Gas Pool consisting of lot 15, the N/2 SE/4 and the SE/4 SE/4 of Section 3, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's Hawk B-3 Well No. 2-T, located 1650 feet from the South and East lines of said Section 3.

CASE 1693: Application of Amerada Petroleum Corporation for three non-standard oil proration units. Applicant, in the above-styled cause, seeks an order establishing three 43.7 acre non-standard oil proration units for Mississippian production in the SE/4 of Section 11, Township 13 South, Range 38 East, Lea County, New Mexico. Applicant further seeks approval of one unorthodox oil well location.

CASE 1694: Application of Texas Crude Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Big Eddy Unit 1-30 Well, located in the SE/4 SE/4 of Section 30, Township 20 South, Range 31 East, Eddy County, New Mexico, in such a manner as to produce oil from an undesignated Tansil pool and to produce oil from an undesignated Delaware pool through parallel strings of tubing.

CASE 1695: Application of Texaco, Inc. for a triple completion, for permission to commingle the production from three separate pools, and for the establishment of two non-standard gas proration units. Applicant, in the above-styled cause, seeks an order authorizing it to triple complete its A. H. Blinebry NCT-4 Well No. 1, located in the SE/4 SE/4 of Section 31, Township 22 South, Range 38 East, Lea County, New Mexico, in such a manner as to permit production from the Blinebry formation, production of gas from the Tubb Gas Pool, and production of oil from the Drinkard Pool through tubing, the annulus via cross-over, and tubing respectively. Applicant further seeks the establishment of a 160-acre non-standard gas proration unit in both the Tubb Gas Pool and Blinebry Gas Pool each consisting of the S/2 S/2 of said Section 31. Applicant further seeks permission to commingle the liquid production from the Blinebry, Tubb, and Drinkard formations underlying said acreage.

- CASE 1696:** Application of Caulkins Oil Company for a triple completion. Applicant, in the above-styled cause, seeks an order authorizing it to triple complete its Breech "F" Well No. PMD-8, located in the NE/4 NE/4 of Section 34, Township 27 North, Range 5 West, Rio Arriba County, New Mexico, in such a manner as to produce gas from the South Blanco-Pictured Cliffs Pool, gas from the Mesaverde formation, and gas from the Dakota formation through parallel strings of tubing.
- CASE 1697:** Application of Universal Oil Corporation for the creation of a new oil pool for Gallup production, and for an exception to Rules 104 and 107 for wells in said pool. Applicant, in the above-styled cause, seeks an order creating a new pool for Gallup production to be designated the Shiprock-Gallup Oil Pool and located in Sections 16 and 17, Township 29 North, Range 18 West, San Juan County, New Mexico. Applicant further seeks the promulgation of pool rules to permit wells in said pool to be located closer than 660 feet to the nearest producing well in exception to Rule 104, and to permit certain exceptions to the casing requirements of Rule 107 of the Commission Rules and Regulations.
- CASE 1698:** Application of Shell Oil Company for an exception to Rule 502 I (a). Applicant, in the above-styled cause, seeks an order which would exempt all wells in the Carson Unit Area and all other Shell wells in Township 25 North, Ranges 11 and 12 West, Bisti-lower Gallup Oil Pool, San Juan County, New Mexico, from the daily tolerance provisions of Rule 502 I (a) of the Commission Rules and Regulations.
- CASE 1195:** Application of Graridge Corporation for capacity allowables for certain wells in a water flood project. Applicant, in the above-styled cause, seeks an order authorizing capacity allowables for three wells in the project area of its water flood in the Caprock-Queen Pool in Lea and Chaves Counties, New Mexico.
- CASE 1196:** Application of Graridge Corporation for an order amending Order No. R-966. Applicant, in the above-styled cause, seeks an order amending Order No. R-966 to establish administrative procedures for development of its Artesia Water Flood Projects No. 2 and 3, Artesia Pool, Eddy County, New Mexico, and for approval of unorthodox locations for 27 wells in said projects, for authority to convert six wells in said projects to water injection, and for capacity allowables for five wells in said projects.
- CASE 1185:** Application of Graridge Corporation for an order amending Order No. R-952. Applicant, in the above-styled cause, seeks an order amending Order No. R-952 to establish administrative procedures for development of its Artesia Water Flood Project No. 1, Artesia Pool, Eddy County, New Mexico, and for approval of unorthodox locations for fifteen wells in said project, and for capacity allowables for five wells in said project.
- CASE 1699:** Application of J. W. Brown for an order authorizing a pilot water flood project. Applicant, in the above-styled cause seeks an order authorizing it to institute a pilot water flood project in the Brown Pool, Chaves County, New Mexico, by the injection of water into the Queen formation through four wells located in the SE/4 NW/4 of Section 26, Township 10 South, Range 26 East, Chaves County, New Mexico.

- CASE 1337:** Application of Gulf Oil Corporation for an order amending Order No. R-1093-A. Applicant, in the above-styled cause, seeks an order amending Order No. R-1093-A to permit the commingling of Paddock production with the commingled Blinbry, Drinkard, and Langlie-Mattix production from its Learcy McBuffington lease consisting of the S/2 of Section 13, Township 25 South, Range 37 East, Justis Field, Lea County, New Mexico.
- CASE 1700:** Application of Gulf Oil Corporation for permission to commingle the production from two separate leases: Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the East Millman Queen-Grayburg Pool from two separate non-contiguous leases in Township 19 South, Range 28 East, Eddy County, New Mexico.
- CASE 1703:** Application of Tidewater Oil Company to commingle the production from several separate oil pools from two separate leases. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the intermediate grade crudes produced from its Coates "D" Lease comprising the SE/4 SW/4 of Section 24, Township 25 South, Range 37 East, Justis Field, Lea County, New Mexico, with the commingled production of all intermediate grade crudes produced from its Coates "C" Lease comprising the E/2, SE/4 NW/4, and the NE/4 SW/4 of said Section 24, and to pass such commingled production through its automatic custody transfer system.
- CASE 1704:** Application of Cities Service Oil Company for capacity allowables for nine wells in a water flood project and for establishment of administrative procedure for expansion of said project. Applicant, in the above-styled cause, seeks an order authorizing capacity allowable for nine wells in the project area of its water flood project in the Caprock-Queen Pool, Chaves County, New Mexico. Said capacity allowables would be in exception to Order R-1128-A. Applicant further seeks establishment of an administrative procedure to expand said water flood project.
- CASE 1705:** Application of Neville G. Penrose, Inc., for a capacity allowable for one well. Applicant, in the above-styled cause, seeks an order authorizing a capacity allowable for its Alston Well No. 2, located in the NW/4 NW/4 of Section 11, Township 14 South, Range 31 East, Caprock Queen Pool, Chaves County, New Mexico, due to a response from the adjoining Cities Service Oil Company water flood project. Said capacity allowable would be in exception to Order R-1128-A.

NEW MEXICO OIL CONSERVATION COMMISSION

Docket No. 23-59-a

In addition to the cases listed on Docket No. 23-59, the following cases will also be heard June 24, 1959, before Elvis A. Utz, Examiner, or A. L. Porter, Jr., Secretary-Director:

CASE 1701:

Application of Gulf Oil Corporation for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Learcy McBuffington Well No. 5, located in the NW/4 SE/4, Section 13, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to produce oil from an undesignated Paddock Pool and oil from the Justis-Ellenburger Pool through parallel strings of tubing.

CASE 1702:

Application of Humble Oil & Refining Company for an oil-gas dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its South Four Lakes Unit Well No. 6, located in the SW/4 SE/4, Section 2, Township 12 South, Range 34 East, Lea County, New Mexico, in such a manner as to produce oil from a Four Lakes-Pennsylvanian Pool extension and gas from a Four Lakes-Devonian Gas Pool extension through parallel strings of tubing.

CASE 1706:

Application of Sunray Mid-Continent Oil Company for an order amending Order No. R-1414. Applicant, in the above-styled cause, seeks an order amending Order No. R-1414 to include the following additional acreage: NW/4 NW/4 of Section 6, Township 25 North, Range 12 West, and the SW/4 SW/4 of Section 31, Township 26 North, Range 12 West, San Juan County, New Mexico.

Place of hearing will be Highway Department Auditorium, 1120 Cerrillos Road, Santa Fe, New Mexico.

Time of hearing will be 8:00 o'clock a.m.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF)
GRARIDGE CORPORATION FOR AN ORDER)
AMENDING ORDER NO. R-966, AND AMEND-)
MENTS THERETO, APPROVING THE CON-)
VERSION OF CERTAIN WELLS TO WATER)
INJECTION WELLS: ESTABLISHING ADMINIS-)
TRATIVE PROCEDURES FOR DEVELOPMENT;)
APPROVING CERTAIN UNORTHODOX WELL)
LOCATIONS; AND AUTHORIZING CAPACITY)
ALLOWABLE FOR 5 WELLS IN ITS ARTESIA)
PILOT FLOOD NO. 2 AND NO. 3, ARTESIA)
POOL, EDDY COUNTY, NEW MEXICO.)

CASE NO. 1196

APPLICATION

Comes now, Applicant, Graridge Corporation, by its Attorneys,
Campbell & Russell and states:

1. It is the operator of Artesia Pilot Flood No. 2 and
No. 3 authorized by the Commission in its Order No.
R-966 and amendments thereto.
2. The Pilot Floods have established that it is in the
interest of conservation through greater ultimate
recovery of oil that the project be continued.

WHEREFORE: Applicant requests the Commission, after hearing
before an examiner to issue its order further amending Order No.
R-966 in the following respects:

1. Approve the over-all projects as will be presented by
the Applicant.
2. Approve the completing or conversion of the following
wells to water injection wells:

<u>Lease</u>	<u>Well No.</u>	<u>Location</u>
Welch Duke State	19 ✓	NW/4, NW/4 Sec. 28 18S 28E
Welch Duke State	20 ✓	SE/4, NW/4 Sec. 28 13S 28E
Welch Duke State	21 ✓	SE/4, NW/4 Sec. 28 18S 28E
Resler Yates State	14 ✓	SW/4, NE/4 Sec. 28 18S 28E
Resler Yates State	304 ✓	SW/4, NE/4 Sec. 28 18S 28E
Venture State	305 ✓	NE/4, NE/4 Sec. 28 18S 28E

3. Establish appropriate administrative procedures for the
conversion of wells to water injection wells in the
future.

Handwritten:
Submitted
Filed
6-12-59
JH

4. Approve the following unorthodox well locations in
Township 18 South, Range 28 East, Eddy County, New
Mexico:

<u>Lease</u>	<u>Well No.</u>	<u>Location</u>
Venture State	306	820' FNL & 1180' FEL of Sec.28
Resler Yates State	10	2360' FSL & 250' FEL of Sec.29
" " "	11	2390' FSL & 1570' FEL of Sec.29
" " "	14	2400' FNL & 2380' FEL of Sec.28
" " "	15	1570' FNL & 1070' FEL of Sec.29
" " "	27	2390' FNL & 1300' FEL of Sec.28
" " "	28	640' FNL & 220' FEL of Sec.32
" " "	30	2390' FSL & 1070' FEL of Sec.21
" " "	34	2390' FNL & 250' FEL of Sec.29
" " "	40	1320' FSL & 240' FEL of Sec.29
" " "	43	2400' FNL & 180' FEL of Sec.28
" " "	45	2390' FSL & 230' FEL of Sec.21
" " "	48	240' FSL & 670' FEL of Sec.29
" " "	49	250' FSL & 1570' FEL of Sec.29
" " "	307	1800' FNL & 1220' FEL of Sec.28
" " "	308	1780' FNL & 250' FEL of Sec.28
" " "	#12	230 FS & 200 FE of Sec.29
Royal Duke State	2	1570' FNL & 1580' FEL of Sec.29
Lackawana State	4	1560' FNL & 2280' FEL of Sec.21
" " "	5	2390' FNL & 1070' FEL of Sec.21
" " "	7	1540' FNL & 1020' FEL of Sec.21
" " "	1-A	252 FS & 343 FW of Sec.21
Lackawana State "A"	1	1540' FSL & 1540' FEL of Sec.21
Welch Duke State	12	950' FNL & 270' FWL of Sec.28
" " "	13	1570' FNL & 260' FWL of Sec.28
" " "	14	2310' FNL & 260' FWL of Sec.28
Toomey Allen	10	1650' FSL & 1330 FEL of Sec.28
" " "	13	1350' FSL & 2300 FEL of Sec.28
" " "	14	1100' FSL & 1580 FEL of Sec.28

5. Approve capacity allowables for the following wells:


<u>Lease</u>	<u>Well No.</u>	<u>Location</u>
Resler Yates State	23	SW/4, SE/4 Sec.21 18S 28E
Lackawana State "A"	2	NW/4, SE/4 Sec.21 18S 28E
McNutt State	9	SW/4, SW/4 Sec.21 18S 28E
" "	10	NE/4, SW/4 Sec.21 18S 28E
Welch Duke State	2	SE/4, NW/4 Sec.28 18S 28E

DATED: May 20, 1959

Respectfully Submitted

Graridge Corporation

By:


For Campbell & Russell
Its Attorney's
Box 721
Roswell, New Mexico

CO. 40
EAST VALLEY
IN ARIZONA POOL RADDY CO

Case No.

1196

Application, Transcript,
Small Exhibits, Etc.

BRECKENRIDGE OFFICE
TELEPHONE 674
P. O. BOX 752

Case 1196

GRAHAM OFFICE
TELEPHONE 1492
P. O. BOX 1110

THE IBEX COMPANY

MANUFACTURERS OF NATURAL GASOLINE AND L. P. G. PRODUCTS
PRODUCERS OF OIL AND GAS

IBEX BUILDING

BRECKENRIDGE, TEXAS

April 28, 1958

Heuring

Mr. A. L. Porter
Oil Conservation Commission
State Capitol
Santa Fe, New Mexico

Re: Malco-Resler-Yates Area
Artesia Pool
Eddy County, New Mexico

Dear Mr. Porter:

Attached hereto you will find application in triplicate of The Ibex Company for an order authorizing capacity production for certain wells within the two separate pilot flood projects in the Grayburg formation underlying Sections 21, 28 and 32, of Township 18 South, Range 28 East, N.M.P.M., Artesia Pool, Eddy County, New Mexico, and further authorizing the unorthodox locations of a number of the applicant's wells in the Artesia Pool.

It is respectfully requested that you set this matter down for hearing at the earliest possible date inasmuch as several of the wells are getting to the point that they may exceed their allowable capacity at most any time.

Thank you very much for giving this matter your usual prompt attention.

Yours very truly,

THE IBEX COMPANY

By *R. L. Elliott*
R. L. Elliott, Attorney

RLE:ea
enc
cc-Graham Office

THE CHEMICAL PROCESS COMPANY

LABORATORY REPORT

SUBJECT: **Water Analysis**
 DEPTH: **335'**
 FORMATION:

BEFORE THE COMMISSION
 OIL CONSERVATION
 SANTA FE, NEW MEXICO
 CASE No. **1196**
 EXHIBIT No. **5**
 Well No. **1**

Company **The Iron Company** Farm **Edley Humble**
 Location _____ County **Edley** State **New Mexico** Date **9-28-33**
 Pool _____ Samples Submitted by _____

SPECIFIC GRAVITY: **1.030**
 pH: **7.7**

PRINCIPAL CONSTITUENTS

RADICAL	PARTS PER MILLION	REACTING VALUE	TOTAL REACTING VALUE
SODIUM	1,000	71.85	26.92
CALCIUM	700	45.00	14.90
MAGNESIUM	200	18.00	6.22

1500 for description
200 Potable

CHLORIDE	3,000	84.00	31.69
SULPHATE	2,210	46.15	17.20
BICARBONATE	100	2.76	1.03

PRIMARY SALINITY:	51.84	PER CENT TOTAL REACTING VALUE
SECONDARY SALINITY:	44.10	PER CENT TOTAL REACTING VALUE
SECONDARY ALKALINITY:	2.03	PER CENT TOTAL REACTING VALUE

General Remarks:

Iron: Less than 1 ppm

NO. **2513 W**
 BY **Hobbs**
 BY **JC**
 JC PREP
jb

Signed

Gerry Cochran

THE CHEMICAL PROCESS COMPANY

LABORATORY REPORT

SUBJECT: **Water Analysis**
 DEPTH: **835'**
 FORMATION:

RECEIVED BY THE DIVISION
 OIL CONSERVATION
 SANTA FE, NEW MEXICO
 CASE 1196
 EXHIBIT No. 5
 Well No. 1

Company **The Ilex Company**Farm **Eddy Humble**

Location

County **Eddy**State **New Mexico**Date **9-25-35**

Pool

Samples Submitted by

SPECIFIC GRAVITY: **1.010**
 pH: **7.7**

PRINCIPAL CONSTITUENTS

RADICAL	PARTS PER MILLION	REACTING VALUE	TOTAL REACTING VALUE
SODIUM	1,455	71.88	25.92
CALCIUM	902	45.01	15.66
MAGNESIUM	302	15.50	5.22

CHLORIDE	3,000	84.60	31.68
SULPHATE	2,218	46.13	17.28
BICARBONATE	168	2.76	1.03

PRIMARY SALINITY:	55.04	PER CENT TOTAL REACTING VALUE
SECONDARY SALINITY:	44.10	PER CENT TOTAL REACTING VALUE
SECONDARY ALKALINITY:	2.06	PER CENT TOTAL REACTING VALUE

General Remarks:

Irons: Less than 1 ppm

LAB. NO. **2513 W**DISTRICT **Hobbs**ANALYZED BY **JC**

1M 94074-36 ABC PRESS

jb

Signed

Jerry Cochran

BRECKENRIDGE OFFICE
TELEPHONE 474
P. O. BOX 752

Case 1178

GRAHAM OFFICE
TELEPHONE 1492
P. O. BOX 1110

THE IBEX COMPANY

MANUFACTURERS OF NATURAL GASOLINE AND L. P. G. PRODUCTS

PRODUCERS OF OIL AND GAS

IBEX BUILDING

BRECKENRIDGE, TEXAS

February 11, 1957

Oil Conservation Commission
State Capitol Building
Santa Fe, New Mexico

Attention: Mr. Warren Mankin

Gentlemen:

Attached is the requested information relative to the proposed
Ibex Company pilot waterfloods #2 and #3, in 18-S, 28-E, Eddy
County, New Mexico.

Please inform us if any additional information is needed.

Yours truly,

Robert H. Vick
ROBERT H. VICK

rhv/jbm
attachments

cc: Graham

6

OIL CONSERVATION DISTRICT
SANTA FE, NEW MEXICO
EXHIBIT NO. 6
CASE 1446

WELL LOCATIONS AFFECTED BY PROPOSED PILOT FLOODS #2 & #3

Artesia - Hargis

These are the "Unorthodox Locations" for which approval to utilize same in the flood projects is sought.

The complete area has been resurveyed by Mr. Mathis, Registered State Land Surveyor, from Artesia, New Mexico. All the following distances are taken from this survey.

FLOOD	LEASE	WELL NO	UNIT & SECTION*	DISTANCES
Pilot #2	Ibex McNutt State	2	N-21	2390' FWL & 250' FSL
		3	N-21	1900' FWL & 250' FSL
		4	N-21	2390' FWL & 1070' FSL
	Ibex Malco-Resler-Yates State	3	C-28	2390' FWL & 1320' FNL
		5	C-28	2390' FWL & 750' FNL
		6	C-28	2390' FWL & 250' FNL
		7	C-28	1890' FWL & 250' FNL
		8	D-28	1300' FWL & 250' FNL
		9	C-28	1890' FWL & 800' FNL
		13	B-28	2900' FWL & 250' FNL
		17	B-28	2900' FWL & 750' FNL
		18	B-28	2900' FWL & 1300' FNL
		19	G-28	2900' FWL & 1850' FNL
		51	B-28	3450' FWL & 500' FNL
		53	B-28	3450' FWL & 1200' FNL
		21	O-21	2900' FWL & 250' FSL
Pilot #3	Ibex Malco-Resler-Yates State	3	D-32	1050' FWL & 600' FNL
		4	C-32	1570' FWL & 550' FNL
		5	D-32	950' FWL & 1050' FNL
		6	D-32	1050' FWL & 100' FNL
		7	D-32	600' FWL & 100' FNL
		9	D-32	450' FWL & 550' FNL

*All the above wells are located in Township 18-S, Range 28-E.

PROPOSED PILOT FLOODS #2 & #3.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, N.M.
CASE 1196

The Ibex Company

12-1-56

See attached list

Artesia Pool

Eddy County

"Upper" or "First" Grayburg Sand

1923

None

Attach plot of field showing lease or leases to be flooded, present producing wells, proposed injection wells, well locations or offset leases, etc. (Attached)

1. Reservoir and fluid characteristics
A. Information on entire reservoir

1. Name of reservoir: Upper or first sand of Grayburg Formation.
2. Estimated productive area of entire reservoir: Approximately 1600 ac.
3. Composition (sand, limestone, dolomite, etc.): Sand
4. Structure: stratigraphic trap
Structural and Isopach Maps Attached.
(Include structural and cross-section maps)
5. Type drive during primary production: solution gas.
6. Original reservoir pressure: unknown
Was gas cap present originally? unknown At present? no

B. Data on proposed project area

(Total of approximately 1100 ac)

1. Number of productive acres in lease or leases to be flooded: Pilot Flood Areas 70ac
2. Average depth to top of pay (feet): 2000'
3. Estimated average effective thickness (feet): 20'
4. Estimated average porosity (%): 17%
5. Average horizontal permeability (mds.): 50
6. Average water content (% of core sample): 40
7. Gravity of oil (API): 35%
8. Viscosity of oil (centipoises): Est. 0.4 to 6 cp.

C. Production history and present status

1. Date first well completed on lease or lease: 1924
2. Date first well completed on lease or lease: 1924
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100. Date first well completed on lease or lease: 1924

stimulation except some sand-fracturing of late.

*Production data on individual wells or leases could not be obtained because production from wells and leases outside the area were included in the operators' production reports.

III. Injection

1. Source of injected water (formations, depths) Red Sand formation @ 350' to 400'
2. Fresh or salt water Brackish (See attached Chemical Analysis.)
3. Open or closed system semi-closed.
4. Treatment of injected water filtering.
5. Pattern and spacing simulated 5-spot - approximately 12 ac each.
6. Initial injection pressure to be used (psi) as needed. Est. @ 800 psi.
7. Estimated initial per well rate of injection (bbls) 300 bbl/well/day
8. Will oil wells be converted into injection wells or will injection wells be drilled? (If to be converted, give well numbers.) All to be converted.

See accompanying plat for numbers and relative locations of the proposed injection wells.

9. Will additional oil wells be drilled? Not at this time. Location New wells will be drilled as the pilot floods are expanded.

IV. Results expected

1. Estimated residual oil saturation at abandonment (% of pore space) 20
2. Estimated ultimate additional oil that will be recovered as a direct result of injection (bbls) 2,420,000 total (2200 bbls/ac) 154,000 bbls from pilot area.
3. Estimated original oil in place (bbls) 16,700,000

V. Recommendations and reasons therefor: Total reservoir is now producing at the approximate economic limit. The above volume of oil will, therefore, not be recovered unless some means of secondary recovery is instigated.

We, therefore, request Commission approval for the two subject pilot floods.

PILOT FLOODS #2 & #3

List of leases in area operated by The Ibox Company:

1. Ibox McButt State: Units K, L, M & N of Section 21.
2. Ibox Welch Duke State: Units C, D, E & F of Section 28.
3. Ibox Royal Duke State: Unit G of Section 29.
4. Ibox Malco Resler Yates State Leases comprised of the following: Units F, H, I, J, K, M, N, O & P of Section 29; Units A, B, C, D, E, F, G, & H of Section 32; Units A & H of Section 31; Unit P of Section 30; Units B, G & H of Section 28; UNITS I & P of Section 20; Units F, I, O & P of Section 21 and Unit N of Section 22.

All of the above leases are in T - 18 - S, R 28 E. Relative positions are shown on the submitted plat.

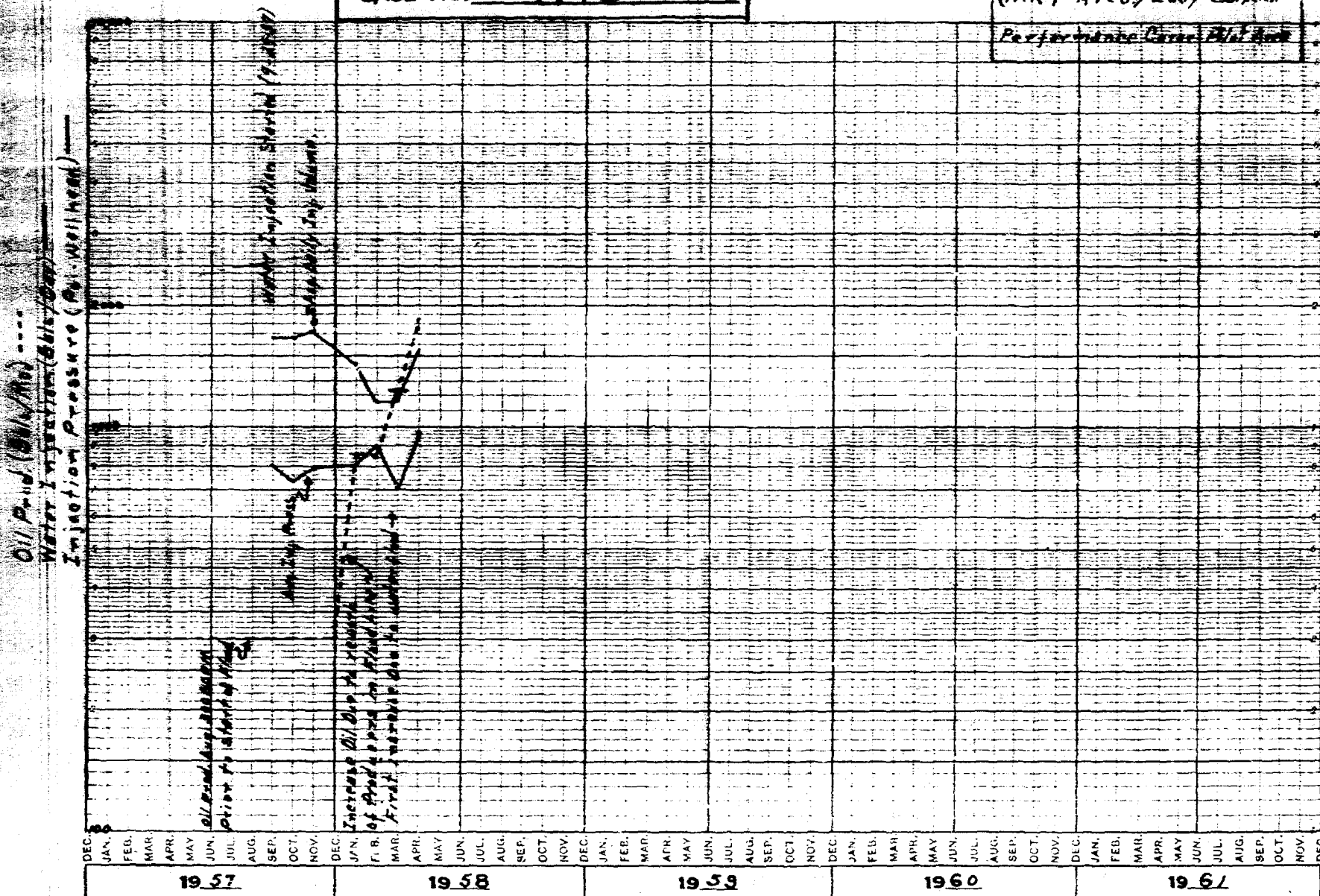


OIL CONSERVATION COMMISSION

EXHIBIT NO. 3
CASE NO. 1196

The Ibox Company
Artesia Pilot Flood #2
(MRY Area) Eddy Co. NM.

Performance Career History

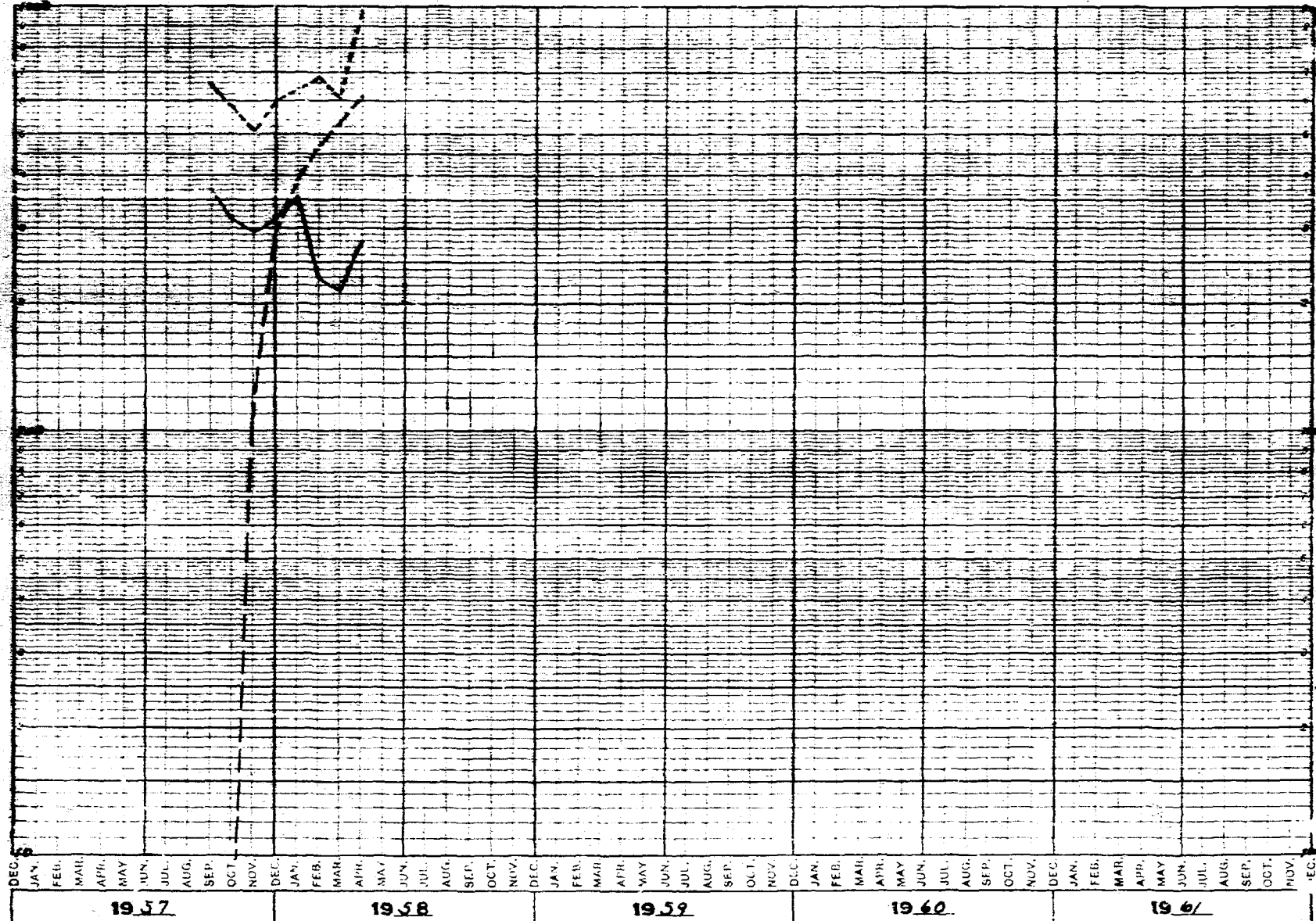




The IbeX Company
Artesia Pilot Flood #2
McNutt St. #2 (Injection Well)

Water Injection (Bbl/Day)
Injection Pressure (psi)

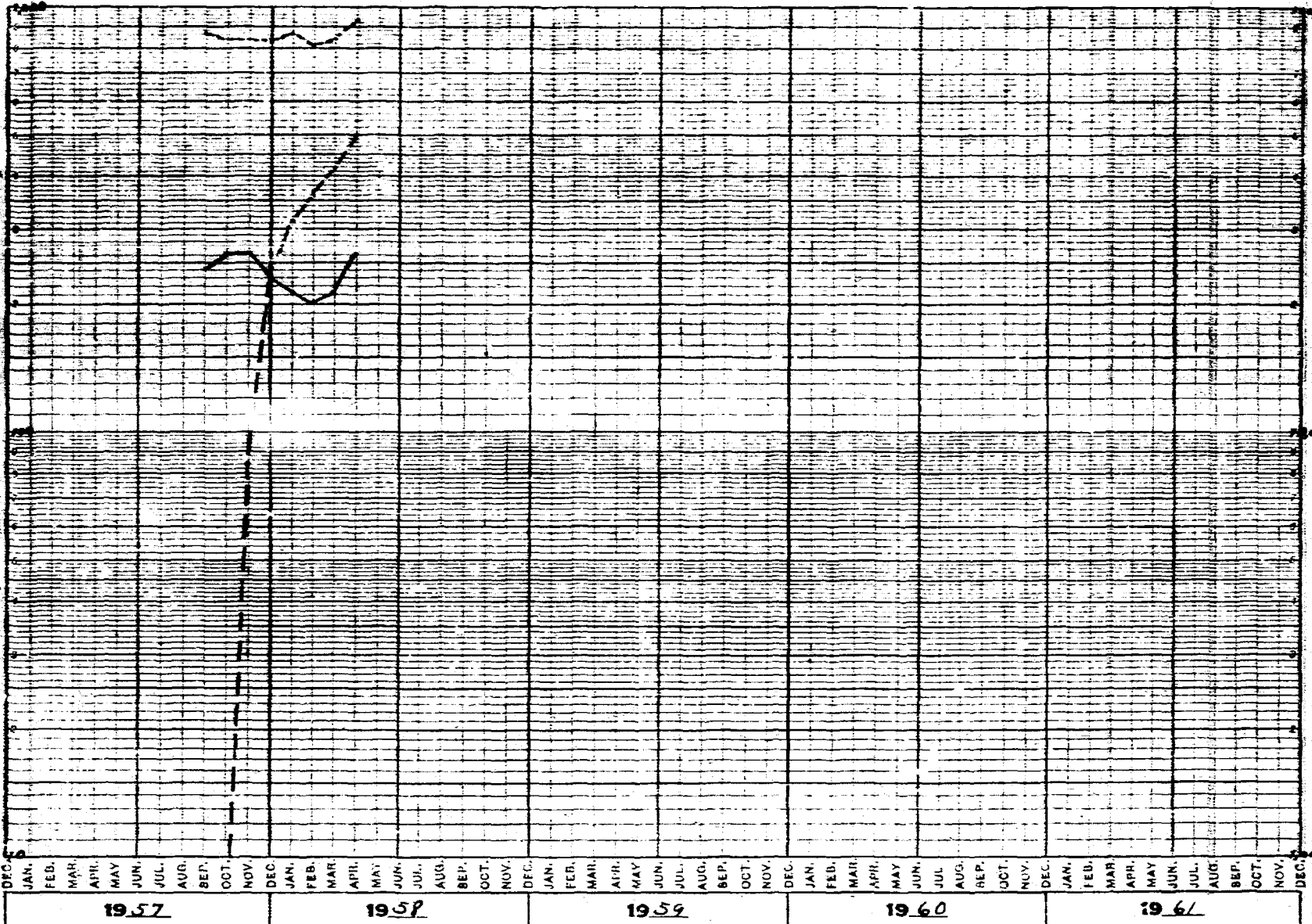
Cumulative Inj. Volume - Bbl.





Welch-Duke St. #5

Water Injection (Bbls/Day Avg.)
Injection Pressure (Psi - Well Head)



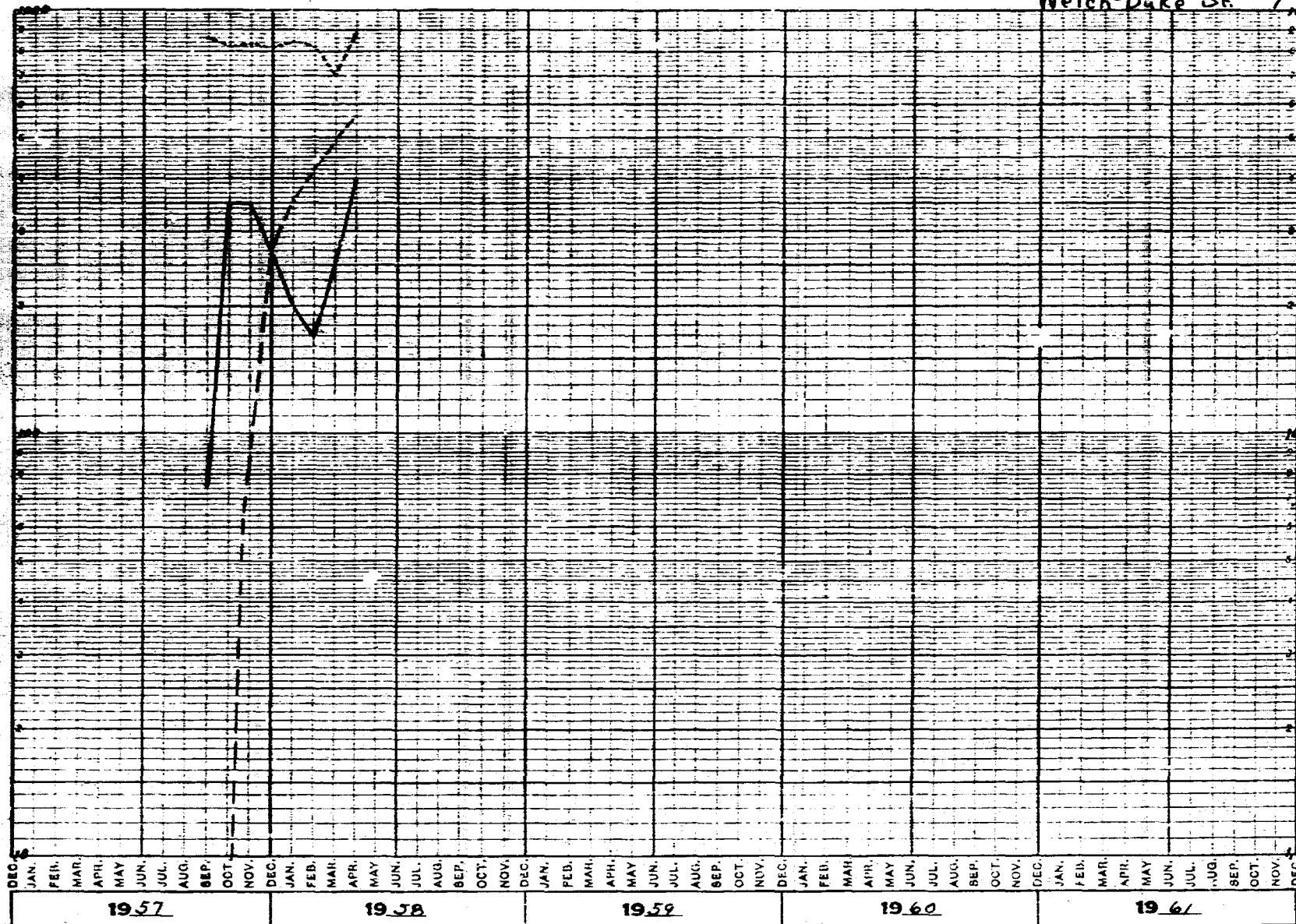
Cumulative Injection Volume (Bbls) - - - -

DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.																							
1957												1958												1959												1960												1961											



Water Injection Volume (Bbls./Day) —
Injection Pressure (psi-wellhead) —

Welch-Duke St. #7



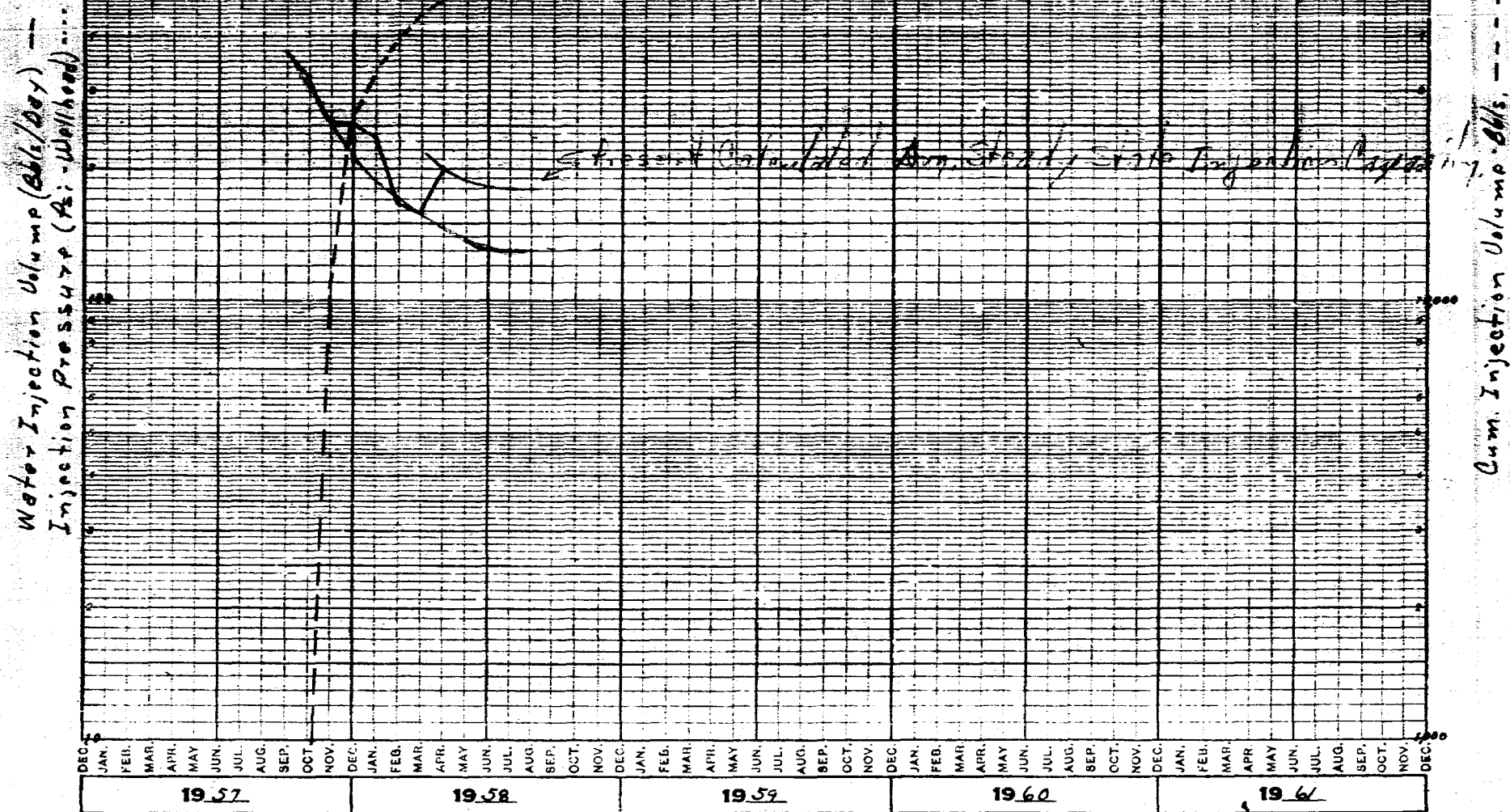
Cumulative Injection Volume - Bbls. —

DEC. 57	JAN. 58	FEB. 58	MAR. 58	APR. 58	MAY 58	JUN. 58	JUL. 58	AUG. 58	SEP. 58	OCT. 58	NOV. 58	DEC. 58	JAN. 59	FEB. 59	MAR. 59	APR. 59	MAY 59	JUN. 59	JUL. 59	AUG. 59	SEP. 59	OCT. 59	NOV. 59	DEC. 59	JAN. 60	FEB. 60	MAR. 60	APR. 60	MAY 60	JUN. 60	JUL. 60	AUG. 60	SEP. 60	OCT. 60	NOV. 60	DEC. 60	JAN. 61	FEB. 61	MAR. 61	APR. 61	MAY 61	JUN. 61	JUL. 61	AUG. 61	SEP. 61	OCT. 61	NOV. 61	DEC. 61											
1957												1958												1959												1960												1961											



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

Malco-Rosier-Yates St. #13



Injection Pressure (P_i - Wellhead) ----

← Present Calculated Ann. Str. 1, 1710 Imperial Paper

Cum. Injection Volume - 66.5, ---

1957

19_58

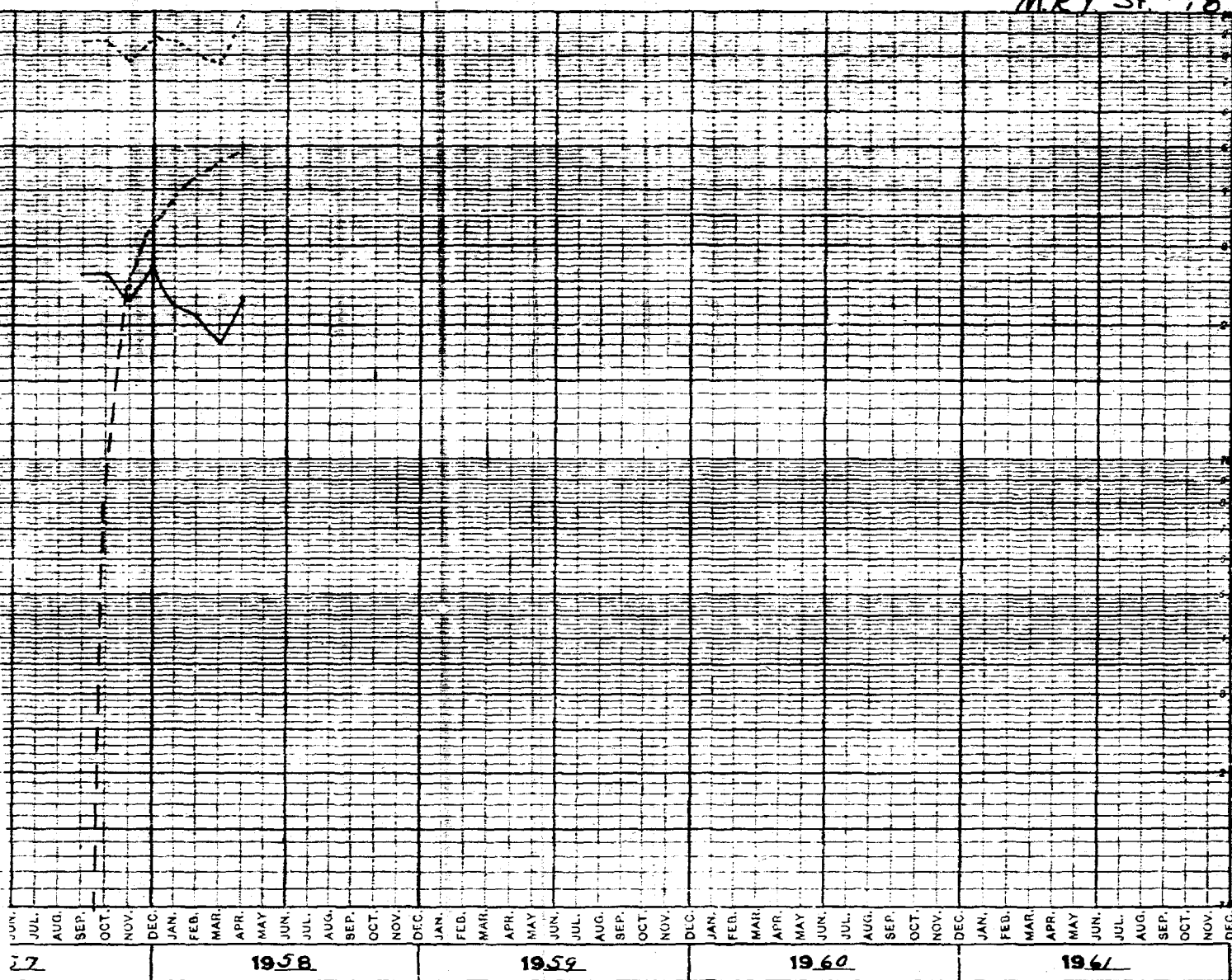
19.59

1960

19_6/



MRY St. #18

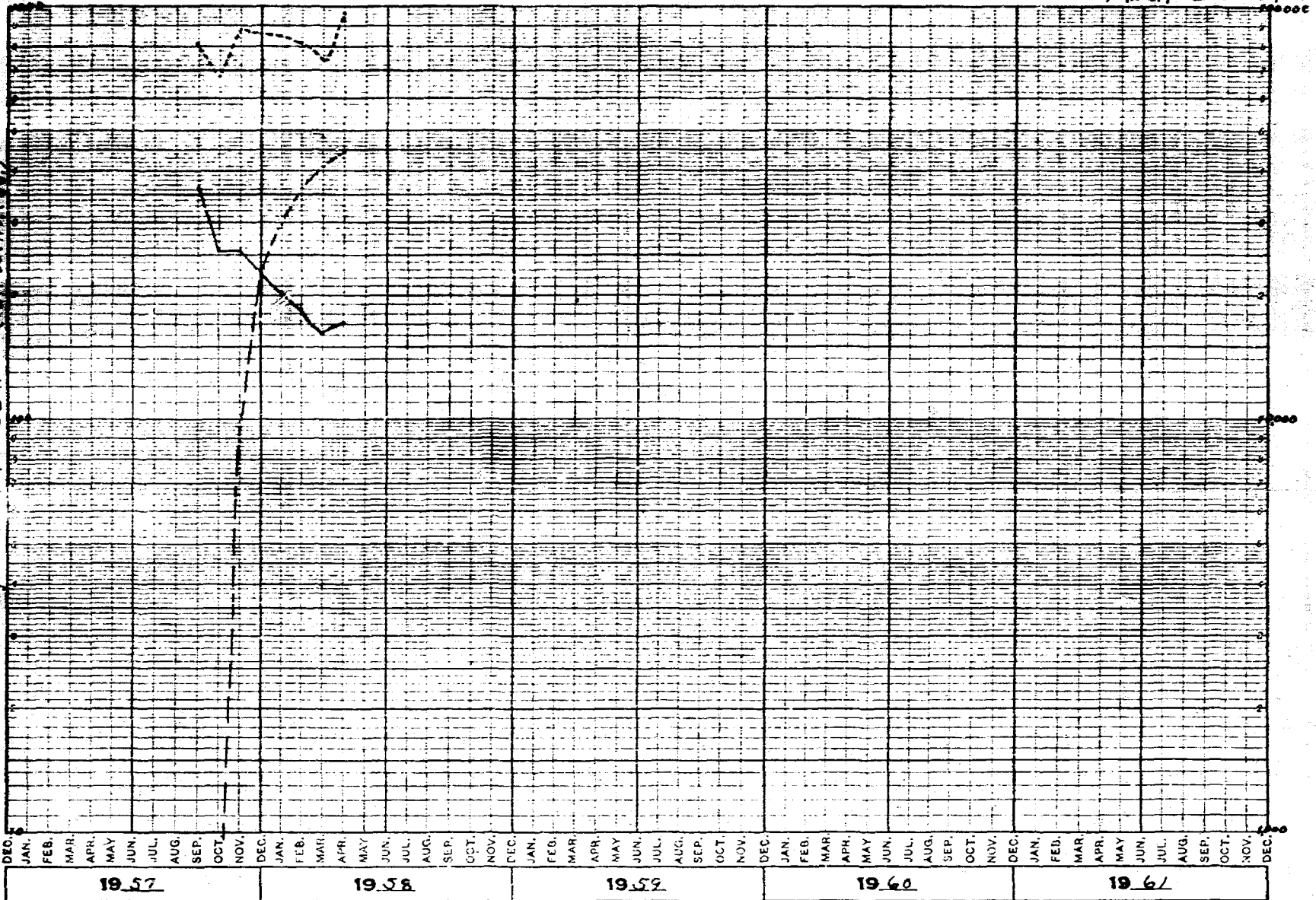




M.R.Y. ST. #51

Water Injection Volume (bbls/day) —
Injection Pressure (psi wellhead) ----

Cum. Injection Volume (bbl) ----



THE IBEX COMPANY
SUGAR CORPORATION

Monthly Water Flood Report

BEFORE EXAMINER NUTTER	
OIL CONSERVATION COMMISSION	
EXHIBIT NO. <u>Appt</u>	Page <u>1</u>
CASE NO. <u>1196</u>	

Project: Artesia Pilot Flood #2 (MAY Area)

Month: April

Water Injection Started: 9-29-57

Field: Artesia

Net Acres Under Flood: Approx. 80 Eff. Ac.

Formation: 1st Grayburg St.

	Last Month	This Month
Gross Oil Production, Bbls.	<u>226</u>	<u>1769</u>
Oil Production Above Normal Decline, Bbls.	<u>682</u>	<u>1269</u>
Water Production, Bbls.	<u>90</u>	<u>90</u>
Water Injection, Bbls.	<u>30,773</u>	<u>46,482</u>
Water/Oil Ratio, %	<u>-</u>	<u>-</u>
Daily Avg. Oil Prod., Bbls.	<u>15 to 19</u>	<u>282 (from Tests)</u>
Daily Avg. Water Prod., Bbls.	<u>3</u>	<u>3</u>
Daily Avg. Injection Bbls.	<u>1183</u>	<u>1548</u>
	Bbls.	B/A-F
Cumulative Oil Prod. Since Start of Inj.	<u>4 -</u>	<u>-</u>
Cumulative Water Prod. Since Start of Inj.	<u>4 - Neg.</u>	<u>-</u>
Cumulative Water Injection	<u>310,192</u>	<u>-</u>
Cumulative Net Water Injection	<u>310,192</u>	<u>-</u>
Cumulative Oil Prod. Above Normal Decline	<u>4 -</u>	<u>-</u>

Well Status	Production			Injection			Water Supply		
	Active	Shut In	Total	Active	Shut In	Total	Active	Shut In	Total
	14	0	14	6	0	6	1	0	1

Avg. Total Daily Output

Average Pressure

Water Injection Plant: 1548 + 762 = 2310 BWPD Total 966

* These figures being calculated for limited time of production from several pay zones and into a common 17th production.

THE INEX COMPANY

GRADIDGE CORPORATION

Page II.

Monthly Water Flood Report

Injection Well Data

Project: Artesia #2

Month: April

Field: Artesia

Location: 1st Grayburg

License & Well No.	Effective Date	Injection Rate (bbl/day)	Injection Pressure (psi)	Total Injection (bbl)	Injection Rate (bbl/day)
M.H.A.S. #1	-	212	1000"	61,046	
W.H.A.S. #5	-	266	930"	50,298	
R.H.A.S. #7	-	398	890"	56,099	
" " #1	-	201	1048"	48,565	
" " #1	-	222	975"	49,558	
" " #1	-	173	980"	44,599	
Total (6)	-	1548	966"	310,192	

Remarks:
* Or Gradidge

THE IREX COMPANY
 GRARIDGE CORPORATION
 Monthly Water Flood Report
 Producing Well Data

Page 111.

Project: Artesia #2 (MRY Area)

Month: April

Field: Artesia

Formation: 1st Grayburg Sh.

Well No.	Date of Test	Oil BPD	Water BPD	Slurries Gals	Change from last test Oil	Water	Gas	Date of Last Test
M ² N ² H St. #3	5-17-58	42	0		-	-	-	
" " #4	"	4	0		-	-	-	
Wolch-Duke St. #3	"	3	0		-	-	-	
" " 6	"	129	0		-	-	-	
" " 8	"	3	0		-	-	-	
" " 9	"	10	0		-	-	-	
" " 11	"	2	3		-	-	-	
" " 16	"	7	0		-	-	-	
Restor-Yabs St. #17	"	60	0		-	-	-	
" " 19	"	1	0		-	-	-	
" " 21	"	12	0		-	-	-	
" " 22	"	1	0		-	-	-	
Remarks: #44	"	2	0		-	-	-	
" #53	"	6	0		-	-	-	

Totals: (14) 282 3

THE INEX COMPANY

CONFIDENTIAL

Page 1.

Monthly Water Flood Report

Project: Artesia Pilot Flood #3 (MR4 Area) Month: April
 Water Injection Started: 12-17-57 Field: Artesia
 Net Acres Under Flood: 14 Ac. Formation: 1st Grayburg Sh.

	<u>Last Month</u>	<u>This Month</u>
Gross Oil Production, Bbls.	<u>4,505</u>	<u>467</u>
Oil Production Above Normal Decline, Bbls.	<u>-</u>	<u>-</u>
Water Production, Bbls.	<u>-</u>	<u>1200</u>
Water Injection, Bbls.	<u>14,115</u>	<u>22,867</u>
Water/Oil Ratio, %	<u>-</u>	<u>-</u>
Daily Avg. Oil Prod., Bbls.	<u>-</u>	<u>14</u>
Daily Avg. Water Prod., Bbls.	<u>4 -</u>	<u>80 (All Permeant)</u>
Daily Avg. Injection Bbls.	<u>697</u>	<u>762</u>
	<u>Bbls.</u>	<u>B/A-F</u>
Cumulative Oil Prod. Since Start of Inj.	<u>4</u>	<u>-</u>
Cumulative Water Prod. Since Start of Inj.	<u>4</u>	<u>-</u>
Cumulative Water Injection	<u>100,882</u>	<u>-</u>
Cumulative Net Water Injection	<u>-</u>	<u>-</u>
Cumulative Oil Prod. Above Normal Decline	<u>4</u>	<u>-</u>

	<u>Production</u>			<u>Injection</u>			<u>Water Supply</u>		
	<u>Active</u>	<u>ShutIn</u>	<u>Total</u>	<u>Active</u>	<u>ShutIn</u>	<u>Total</u>	<u>Active</u>	<u>ShutIn</u>	<u>Total</u>
Well Status	<u>2</u>	<u>0</u>	<u>2</u>	<u>4</u>	<u>0</u>	<u>4</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>Avg. Total Daily Output</u>					<u>Average Pressure</u>				

Water Injection Plant: $762 + 1548 = 2310$ BWPD Tot.

* Cumulative Oil & Water production figures to be a g calculation

THE IBEX COMPANY
GRARIDGE CORPORATION

Page II.

Monthly Water Flood Report
Injection Well Data

Project: Artesia Pilot Flood #3

Month: April

Field: Artesia

Formation: 1st Grayh. - SD

Lense & Well No.	Effective Acres-Foot Injection	Total Water Injected		Water Meter Injection	Injection Pressure	Total Water Injected	Cumulative Injected	
		No.	Ac-Ft.				Water Injected	Net AF
ARY #4	-	7569	252		730		36,734	
#5	-	4800	760		760		23,148	
#6	-	5882	185		815		26,426	
#7	-	4983	165		890		14,574	
Totals (5)		22867	762		799		100,882	

Remarks:
* Or Graridge

Page III.

Month: April
Field: Artesia
Permit: 1st Grayburg St

Remarks: Water Production Now believed to be coming from casing leaks in producing wells. Instead of water breakthrough from injection wells. We are still planning to run Radioactive Tracer logs on the (4) Injection wells.

BEFORE EXAMINER NUTTER

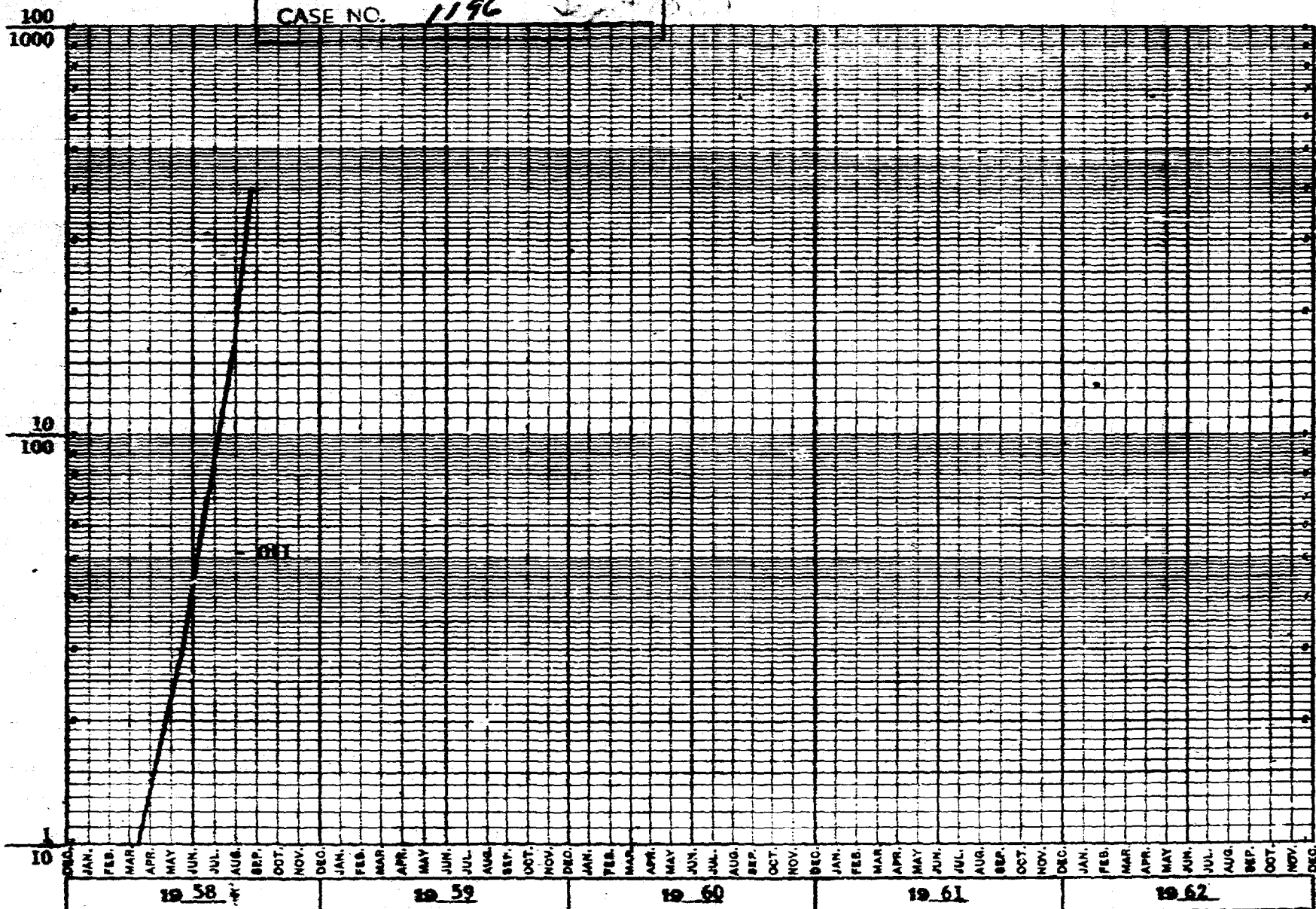
OIL CONSERVATION COMMISSION

Shut EXHIBIT NO. 3

CASE NO. 1196

WELCH DUKE STATE NO. 3

OIL AND WATER PRODUCTION, B/D



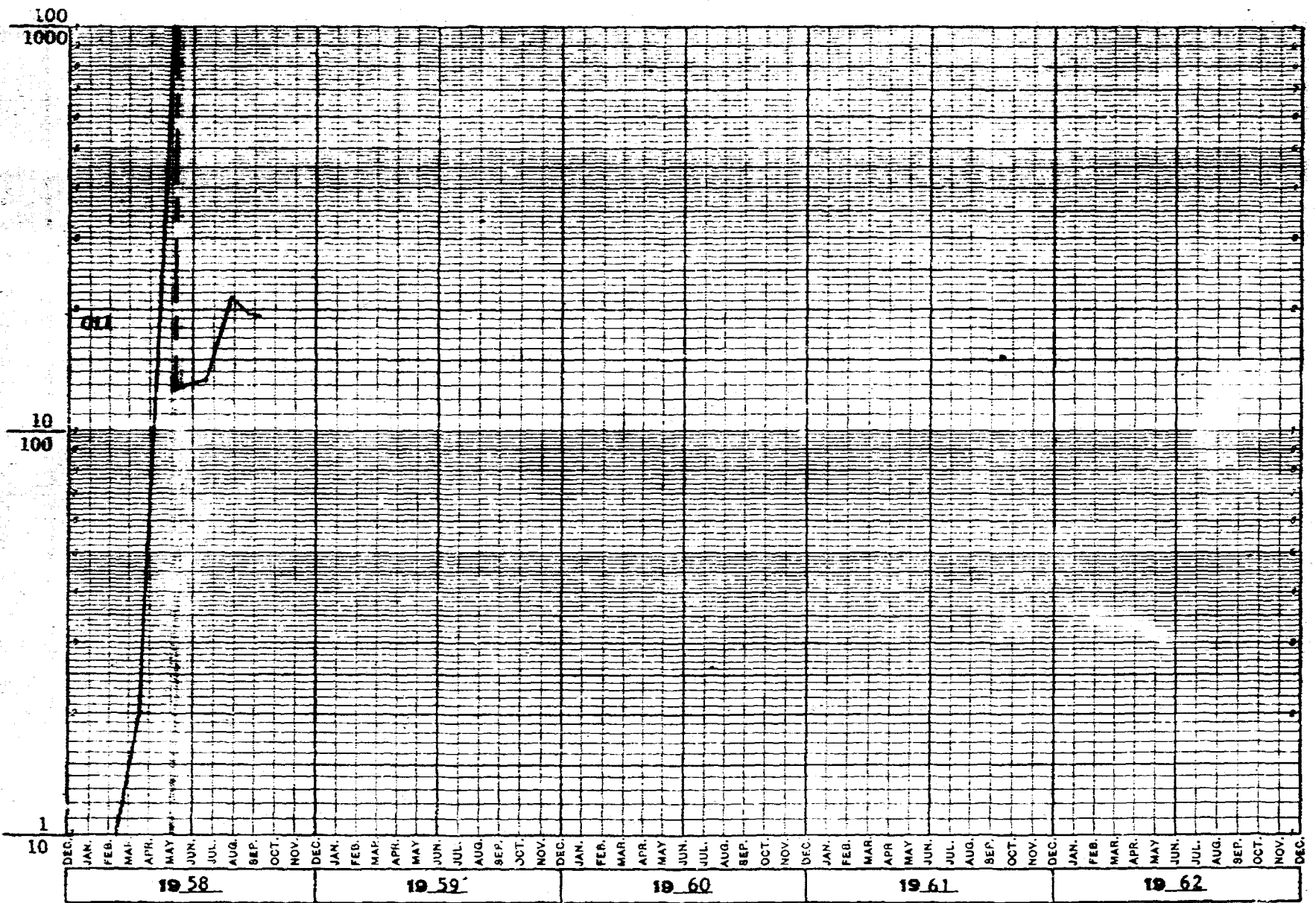
NO. 31121. FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING.



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

WELCH DUKE STATE NO. 6

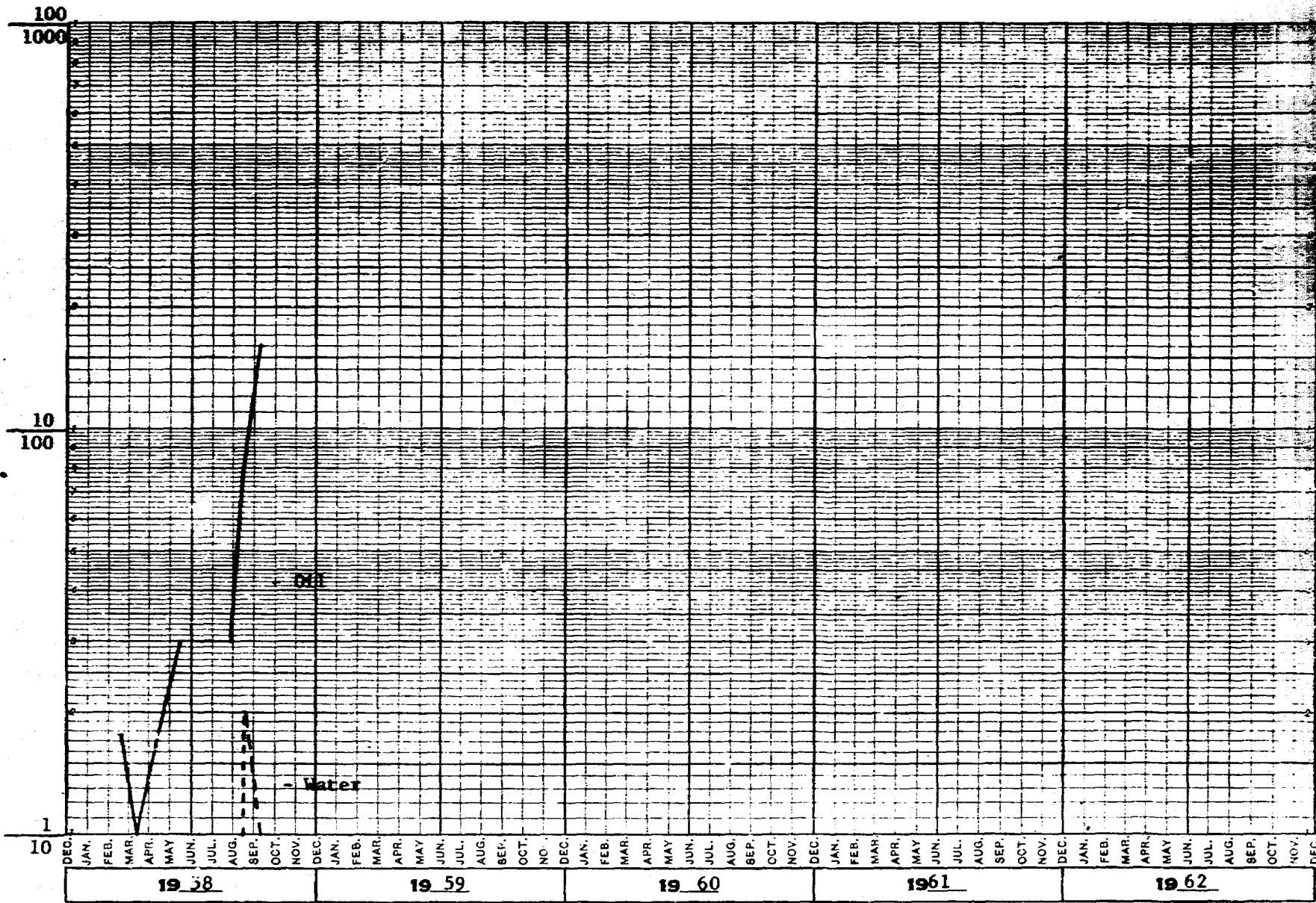
OIL AND WATER PRODUCTION, B/D





WELCH DUKE STATE NO. 8

OIL AND WATER PRODUCTION, B/D

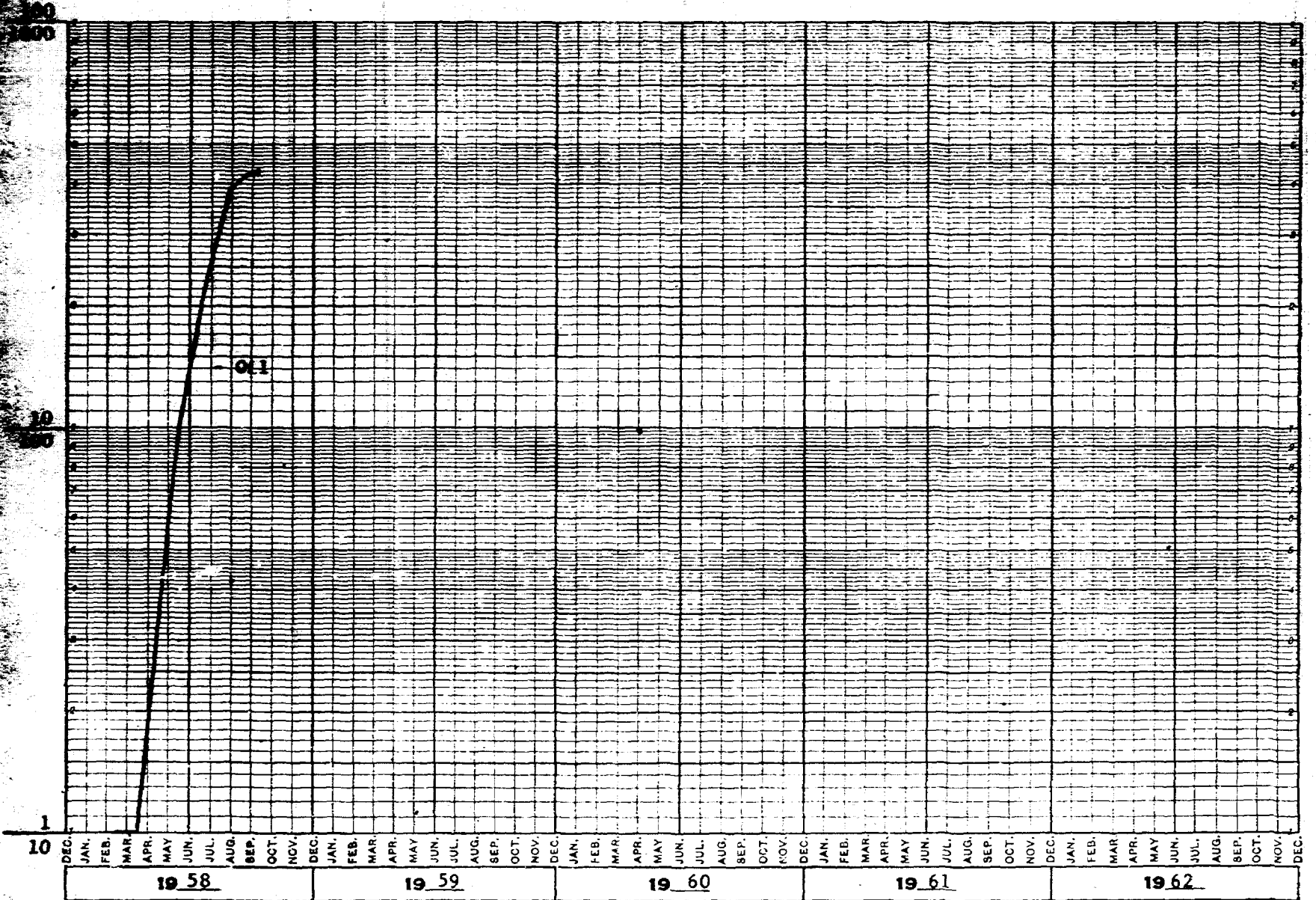


NO. 31123 FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING.



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

WELCH DUKE STATE NO. 9

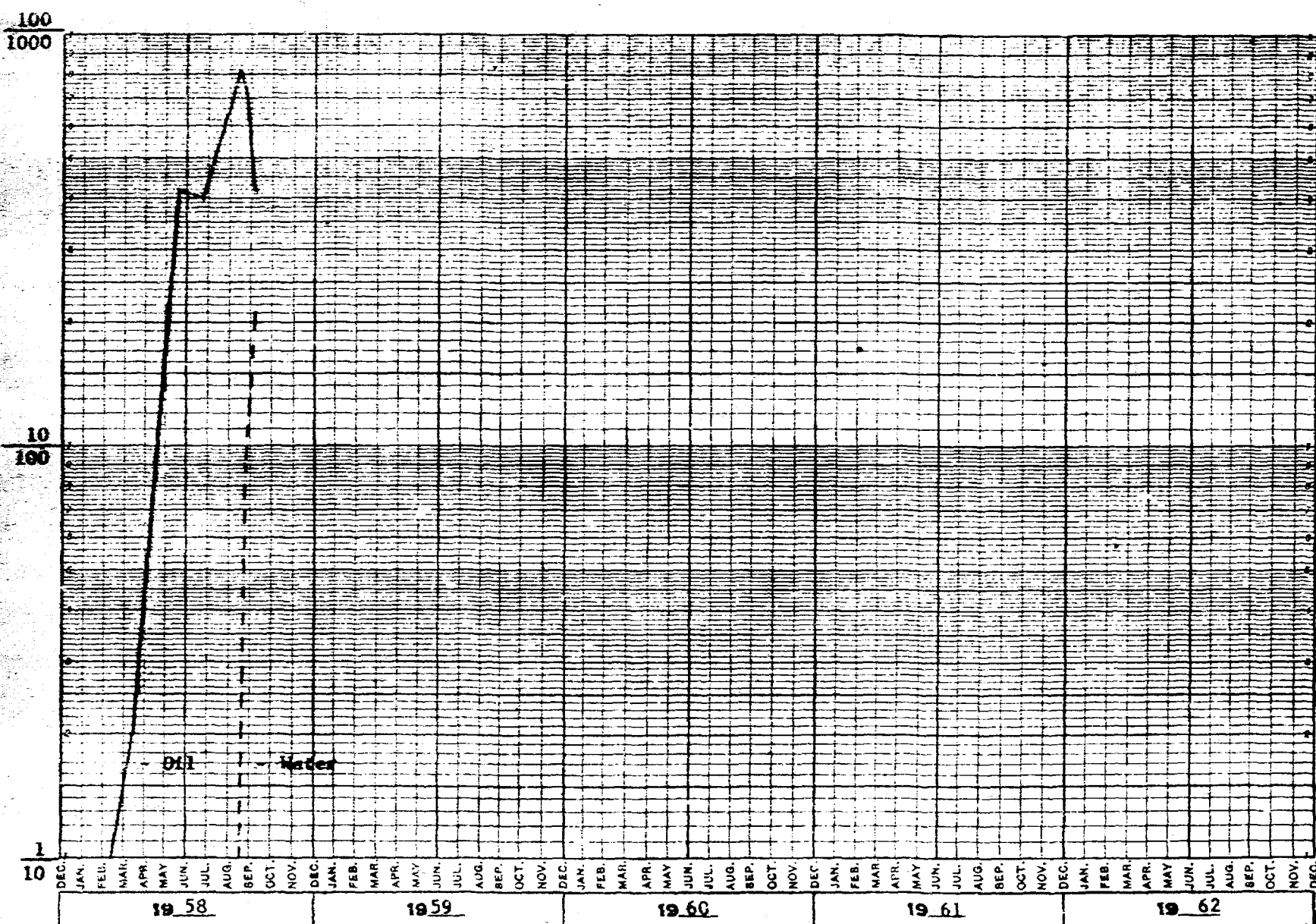


NO. 31121 FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING.



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

MCNUTT STATE NO. 3



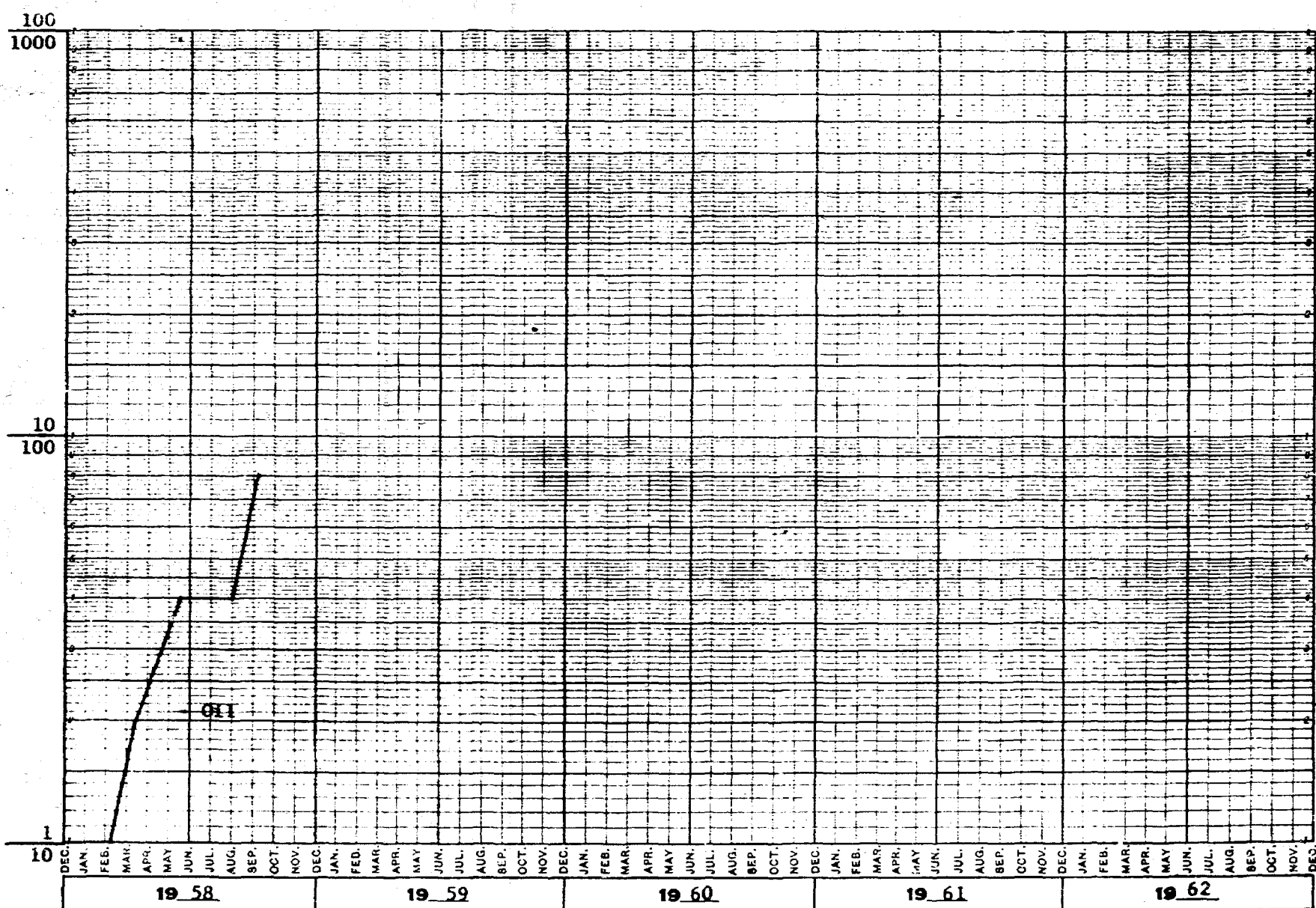
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FULLER BOOK COMPANY, INC. HARTFORD, CONNECTICUT

MCNUTT STATE NO. 4

OIL AND WATER PRODUCTION, B/D



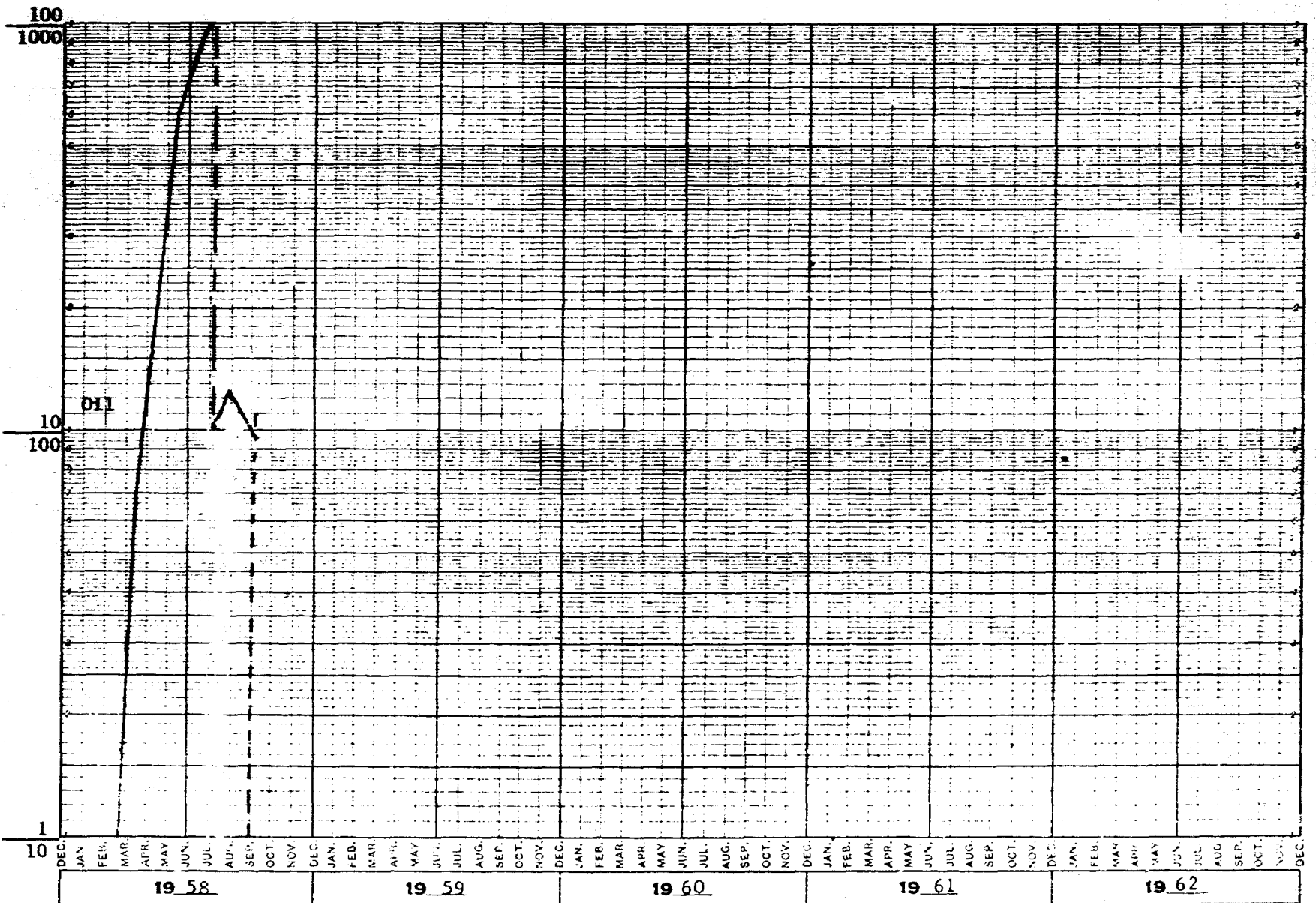
NO. 31121. FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING.



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

RESLER YATES STATE NO. 17

OIL AND WATER PRODUCTION, B/D

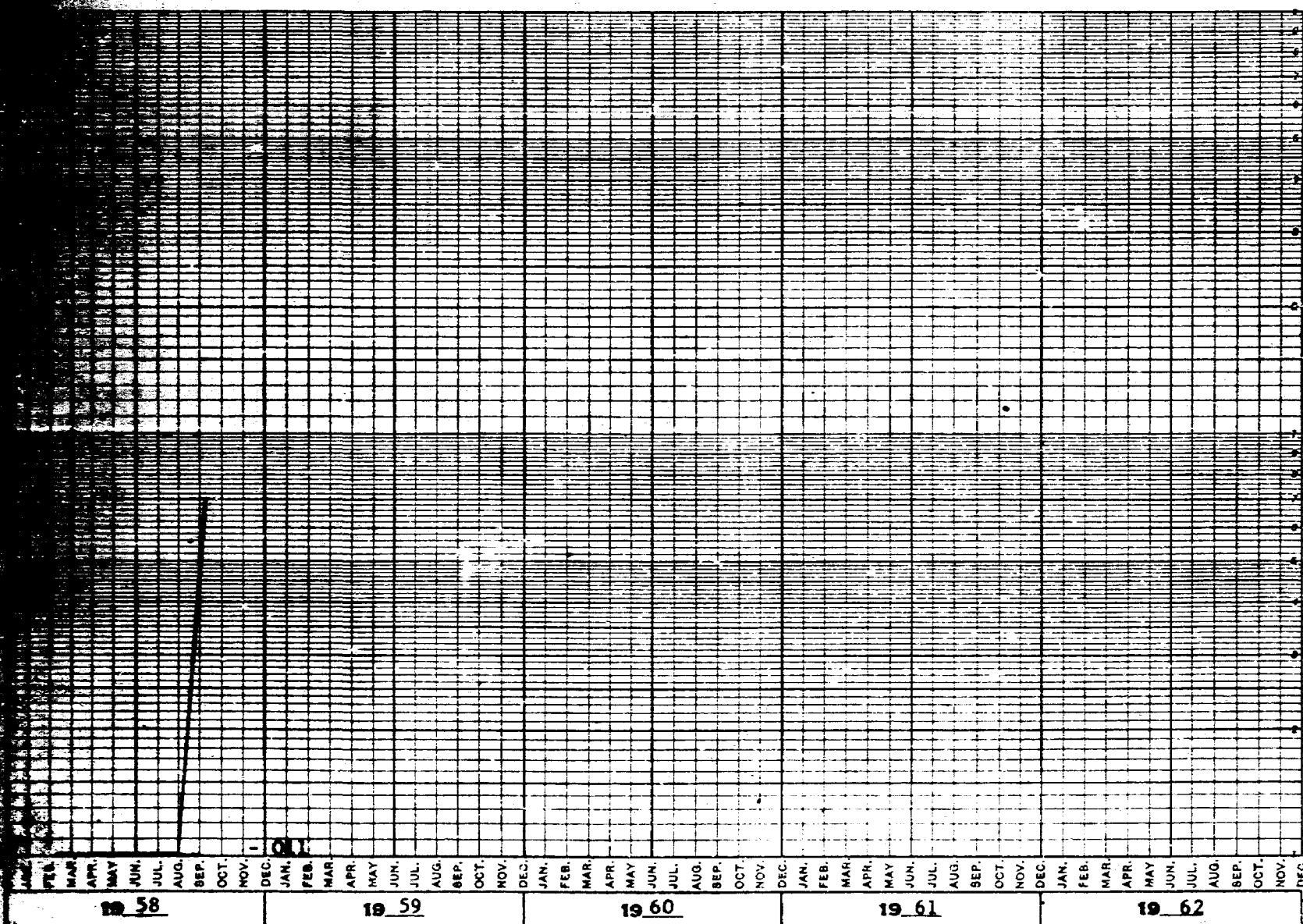


FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING.



CODEx BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

RESLER YATES STATE NO. 19

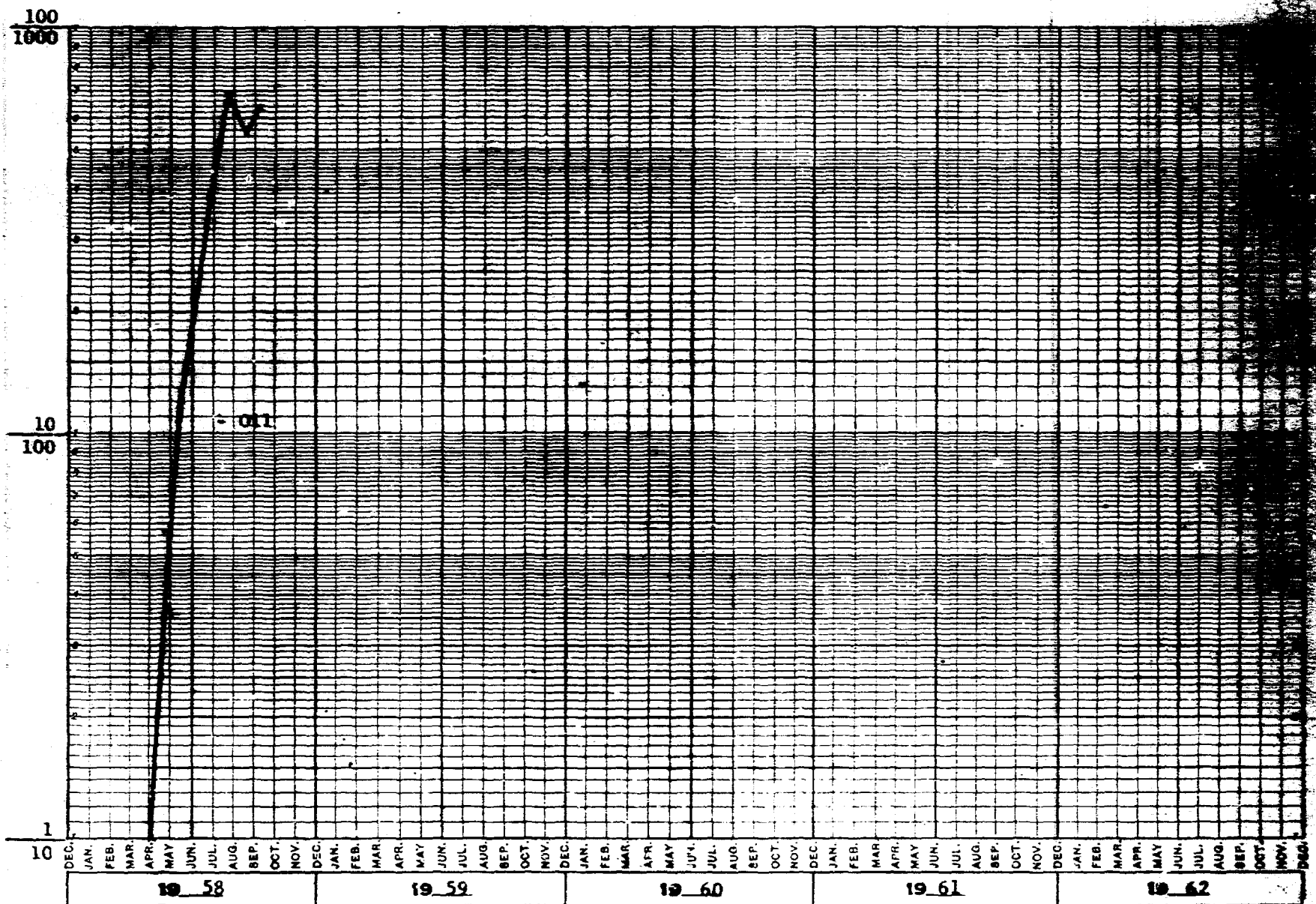


24121. FOR ORDER BY NUMBER 12 3-2000 CIRCLE 1010 RALING.

CODER BOOK COMPANY, INC.

RESLER YATES STATE NO. 21

OIL AND WATER PRODUCTION, B/D



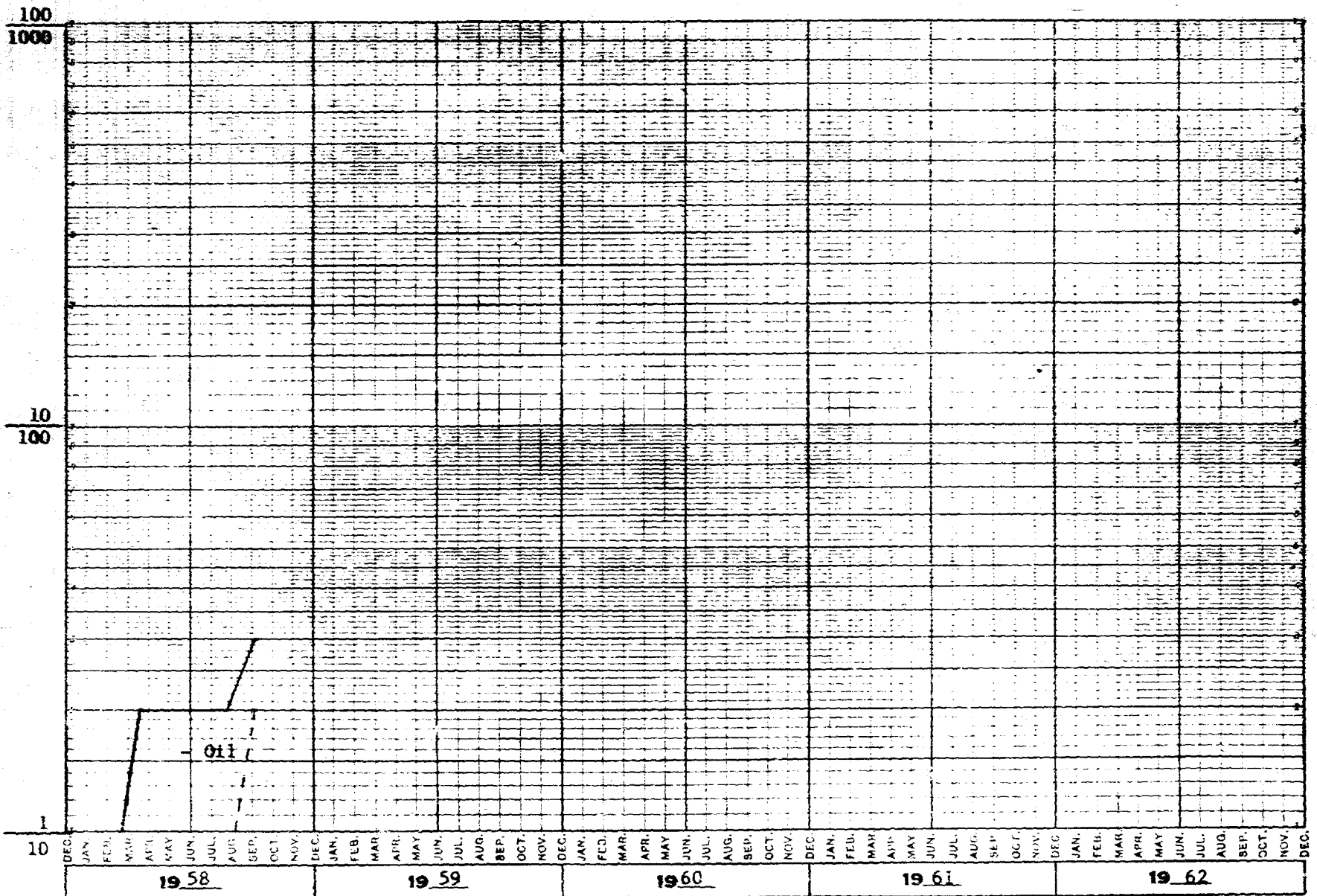
NO. 31121 FIVE YEARS BY MONTHS X 2 3-INCH CYCLES RATIO RULING



COLEX BOOK COMPANY, INC. NORMAN, OKLAHOMA

RESLER YATES STATE NO. 46

OIL AND WATER PRODUCTION, B/D

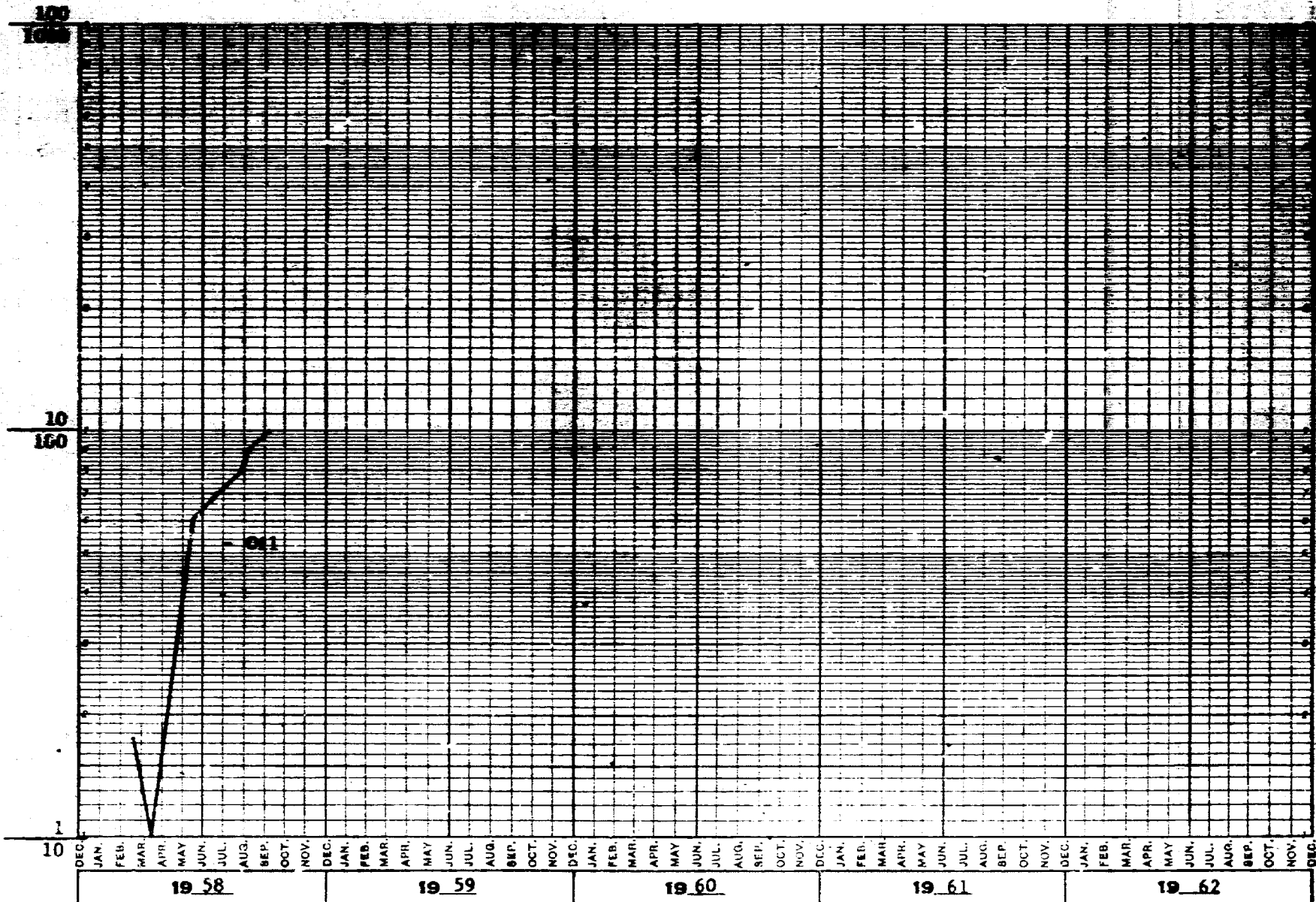


FILE 30000. FOR ORDER BY NUMBER X 2 5-DIGIT CYCLES DATE DURING.

CODING BOOK COMPANY, INC.

RESERVATION STATE NO. 53

OIL AND WATER PRODUCTION, B/D



THE IBEX COMPANY
ARTESIA PILOT FLOOD NO. 2

INJECTION WELL DATA

AUGUST, 1958

Lease	Well No.	Injection B/Mo	Volumes B/D	Avg. Inj. Press. Psi.	Cumulative Injection, Ebls.
McNutt State	2	8163	264	1000	94,467
Welch Duke State	5	8829	285	1060	83,399
Welch Duke State	7	10,192	329	960	95,163
Resler Yates State	13	7808	252	1040	73,033
Resler Yates State	18	7461	241	1020	73,872
Resler Yates State	51	5030	162	1060	62,663
TOTALS:		47,483	1,533	1,023 (Avg.)	482,597

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
ibex EXHIBIT NO. 2
CASE NO. 1196

Sept 10 58

BRECKENRIDGE OFFICE
TELEPHONE 674
P. O. BOX 752

GRAHAM OFFICE
TELEPHONE 1492
P. O. BOX 1110

THE IBEX COMPANY

MANUFACTURERS OF NATURAL GASOLINE AND L. P. G. PRODUCTS
PRODUCERS OF OIL AND GAS

IBEX BUILDING

BRECKENRIDGE, TEXAS

December 19, 1956

1196

AIR SPECIAL

Oil Conservation Commission
Capitol Building
Santa Fe, New Mexico

Attention: Mr. Warren Mankin

Gentlemen:

The Ibex Company would like to amend its application of December 11, 1956, for a Commission hearing concerning two (2) pilot waterfloods in the Artesia Pool, Eddy County, New Mexico.

The amendment would be to secure approval from the Commission to utilize all of the present unorthodox locations in the area, either as future producing oil wells or as future water injection wells. All of the wells in the subject area were drilled prior to present proration laws and are generally only 200 feet to 250 feet from proration unit boundaries. We will have available at the scheduled hearing a certified re-survey plat of all the well locations. Use of the present locations would enable installation of the proposed pilot floods on a 10-acre to 15-acre, 5-spot pattern. This would allow faster and more controlled evaluation of the projects. Any expansion of the pilot floods might be placed on a much larger spacing pattern, depending upon the initial results.

We would like to sincerely thank the Commission and its staff for the assistance it has offered in our present secondary recovery endeavors.

Yours truly,

Robert H. Vick
ROBERT H. VICK

rhv/jbm

BRECKENRIDGE OFFICE
TELEPHONE 674
P. O. BOX 783

GRANHAM OFFICE
TELEPHONE 1492
P. O. BOX 1110

THE IBEX COMPANY

MANUFACTURERS OF NATURAL GASOLINE AND L. P. G. PRODUCTS
PRODUCERS OF OIL AND GAS

IBEX BUILDING

BRECKENRIDGE, TEXAS

December 11, 1956

Oil Conservation Commission
Capitol Building
Santa Fe, New Mexico

Attention: Mr. A. L. Porter

Gentlemen:

The Ibex Company requests a hearing be re-scheduled before the Commission or an examiner to obtain Commission approval to install two (2) pilot waterfloods in the Grayburg Formation in the Artesia Field of Eddy County, New Mexico. The two (2) separate pilot floods are proposed for the following locations:

No. 2 - SE/4 of SW/4 of Section 21 and NE/4 of NW/4
and NW/4 of NE/4 of Section 28, T-18S, R-28E.

No. 3 - NW/4 of Section 32, T-18S, R-28E.

The above two proposed pilot waterfloods were included in a previous application covering three different projects in the Artesia Field. The hearing for this application was scheduled for December 13, 1956. However, due to a mistake in the information submitted for #2 and #3 projects, they were canceled from the above hearing. We are, therefore, submitting new data on these two projects and requesting a new hearing date be scheduled.

Following is the complete information requested according to Rule 701 of the Conservation Commission Rules and Regulations:

I. Field plat, showing all wells in the area and the relative locations of the two (2) separate proposed pilot waterfloods, is attached.

II. Production of the subject area is obtained from the Grayburg formation.

III. Proposed water injection will be through the indicated wells, shown on the attached plat, into the Grayburg formation.

December 11, 1956

IV. All proposed intake wells will be re-entered, cleaned out and $4\frac{1}{2}$ " casing set and cemented on the immediate top of the sand section. All other zones will be cased or plugged off so as to isolate the water injection to the sand being waterflooded.

V. Fresh water is to be used for injection purposes. The water is to be produced from presently completed water wells in the respective areas. All subject water wells are completed in a sand and gravel interval at 340' to 375' depth. Neither of the two (2) respective areas from which fresh water shall be produced is included in any presently established water basin. The Ibex Company has made formal application for water prospecting rights covering all the subject areas.

VII. The operator of the proposed projects will be The Ibex Company, Box 752, Breckenridge, Texas, Attention: Mr. Robert H. Vick.

Anything that you may do to schedule the earliest possible date for the requested hearing will be greatly appreciated.

Sincerely yours,

THE IBEX COMPANY

Robert H. Vick

Robert H. Vick
Waterflood Engineer

rhv/jbm
attachments

cc: Graham Office

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 3-5-57

CASE 1186

Hearing Date Jan. 9, 1957

My recommendations for an order in the above numbered cases are as follows:

I recommend that the applicants request be approved.

Findings:

- (1) That the applicant proposes to institute Two pilot water flood projects to be known as the ^{Antelope} Pilot Flood Project #2 & #3.
- (2) That the applicant proposes to use ~~four~~ ^{five} water injection wells for its #2 pilot flood which wells are located in S $\frac{1}{2}$ SW of Sec. 21, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW, Quarter of Sec. 28 all in T19S - R. 28E.
- (3) That the applicant proposes to use four water injection wells for its #3 pilot flood, which wells are located in the N $\frac{1}{2}$ ~~of~~ NW quarter of Sec. 32, R 19S - T 28E.
- (4) Tends to promote Conservation & prevent waste etc.
- (5) That the applicant should make monthly reports ~~as to~~ the activity of the two proposed projects.

Staff Member

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

(2)

Date _____

CASE _____

Hearing Date _____

My recommendations for an order in the above numbered cases are as follows:

- (6) That the Twenty-Two unorthodox locations in the effected area should be appraised in order to facilitate the operation.
- (7) That the source of water will be from four water wells located in the $5\frac{1}{2}$ of Sec 31-T18S 28E.
- (8) That ~~the~~ these water wells are producing from a sand approx. 3-50 feet deep and that this water is ~~not~~ ^{suitable} for human consumption or irrigation.
9. That a ~~further~~ study is in progress to obtain an additional supply of salt water for injection purposes, which if found would replace the water proposed to be used in the pilot flood.

Staff Member

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

(3)

Date _____

CASE _____ Hearing Date _____

My recommendations for an order in the above numbered cases are as follows:

Order:

(1) That the following wells are hereby approved as water injection wells and unorthodox locations:

Pilot flood # 2.

Shes Mc Hutt State # 2, 2390'/W, 250'/S, sec. 21.
Shes Malco-Ryder State # 5, 2390'/W, 750'/N, sec. 28.
" " " " # 7, 1890'/W, 250'/N, sec. 28
" Malco Ryder Yates " # 13, 2900'/W, 250'/N, sec. 28
" " " " # 18, 2900'/W, 1300'/N, sec. 28
" " " " # 51, 3450'/W, 500'/N, sec. 28

Pilot flood # 3.

Shes Malco-Ryder Yates State # 4, 1570'/W, 550'/N, sec. 32.
" " " " # 5, 950'/W, 1050'/N, sec. 32.
" " " " # 6, 1050'/W, 100'/N, sec. 32
" " " " # 7, 450'/W, 550'/N, sec. 32
~~" " " " # 9, 600'/W, 100'/N, sec. 32~~

All in Twp. 18S, Rge 28E.

Staff Member

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

(4)

Date _____

CASE _____

Hearing Date _____

My recommendations for an order in the above numbered cases are as follows:

(2) That the following wells are hereby approved as unorthodox locations:

~~Pitot flood #2.~~

~~Shirley McHitt State #3~~ ——— 1900/W, 250/S Sec. 21

~~" " " #4~~ ——— 2390/W, 1090/S Sec. 21

~~Shirley McHitt State #3~~ 2390/W, 1320/N, Sec. 28

~~" " " #6~~, 2390/W, 250/N, Sec. 28

~~" " " #8~~, 1300/W, 250/N, Sec. 28

~~" " " #9~~, 1890/W, 500/N, Sec. 28

~~" " " #17~~, 2900/W, 750/N, Sec. 28

~~" " " #19~~, 2900/W, 1850/N, Sec. 28

~~" " " #53~~, 3450/W, 1200/N, Sec. 28

~~" " " #21~~, 2900/W, 250/S, Sec. 21

~~Pitot flood #3.~~

~~Shirley McHitt State #3~~, 1050/W, 600/N, Sec. 32.

~~" " " #9~~, 600/W, 600/N, Sec. 32.

All in Twp. 18S - Rge. 2 & E, N.M. Co., Eddy County, N.M.

FA

Staff Member

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 3/6/57
CASE 1196 Hearing Date 1/9/57 @ 9 AM @ SF
My recommendations for an order in the above numbered cases are as follows: before WWM

OK to approve as EAC recommends.
use P-952 as guide.

Warren W. Munger
Staff Member
Examiner

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

April 1, 1957

Mr. R. L. Elliott
The Itek Company
P.O. Box 752
Breckenridge, Texas

Dear Sir:

We enclose a copy of Order R-966 issued March 29, 1957, by the Oil Conservation Commission in Case 1196, which was heard on January 9th at Santa Fe.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encl.

C
O
P
Y

THE OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF)
THE IBEX COMPANY FOR AN ORDER)
AUTHORIZING CAPACITY PRODUCTION FO)
CERTAIN WELLS WITHIN TWO SEPARATE)
PILOT FLOOD PROJECTS IN THE GRAYBURG)
FORMATION UNDERLYING SECTIONS 21, 28)
and 32 of TOWNSHIP 18 SOUTH, RANGE)
28 EAST, N.M.P.M., ARTESIA POOL,)
EDDY COUNTY, NEW MEXICO, AND FURTHER)
AUTHORIZING THE UNORTHODOX LOCATION)
OF A NUMBER OF THE APPLICANT'S WELLS)
IN THE ARTESIA POOL.)

NO. _____

APPLICATION

Comes now applicant, The Ibex Company, by its attorney, and
states:

1. Applicant is the owner of properties situated within two
separate pilot water flood projects in the Grayburg formation underlying
Sections 21, 28 and 32, of Township 18 South, Range 28 East, N.M.P.M.,
Artesia Pool, Eddy County, New Mexico, known as Ibex-Artesia Pilot Flood
Projects Nos. 2 and 3, which said pilot water flood projects were approved
by Commission Order No. R-966, dated March 29, 1957. A plat showing the
area of each of the pilot projects No. 2 and No. 3 is attached hereto and
marked "Exhibit 1."

2. The said pilot water flood projects have caused an increase
in the producing capacity of certain of the wells in the pilot areas to
the extent that they are likely to produce in excess of the top unit allow-
able for the Grayburg formation in the Artesia Pool, almost any day.

3. That waste will occur if the production from the wells in
the pilot flood areas is restricted.

WHEREFORE, applicant prays for the following relief:

1. That the Commission set this matter down for hearing at the
earliest possible date for the purpose of permitting the applicant to pro-
duce the following described wells in the pilot water flood projects at
capacity:

A. IBEX-ARTESIA PILOT FLOOD PROJECT NO. 2:

The Ibex Company McMutt-State No. 3, 1900 feet from West line and 250 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company McMutt-State No. 4, 2390 feet from West line and 1070 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 3, 2390 feet from West line and 1320 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 6, 2390 feet from West line and 250 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 8, 1300 feet from West line and 250 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 9, 1890 feet from West line and 800 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 11, 1900 feet from West line and 1850 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 16, 1890 feet from West line and 1320 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 17, 2900 feet from West line and 750 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 19, 2900 feet from West line and 1850 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 21, 2900 feet from West line and 250 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 22, 2900 feet from West line and 1050 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 46, 3500 feet from West line and 20 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 53, 3450 feet from West line and 1200 feet from North line of Section 28, 18-S, 28-E.

B. IBEX-ARTESIA PILOT FLOOD PROJECT NO. 3:

The Ibex Company Malco-Resler-Yates-State No. 3, 1050 feet from West line and 600 feet from North line of Section 32, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 9, 600 feet from West line and 100 feet from North line of Section 32, 18-S, 28-E.

2. That an order be issued approving the following Ibex Company wells as Unorthodox locations:

The Ibex Company Malco-Resler-Yates-State No. 22, 2900 feet from West line and 1050 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Malco-Resler-Yates-State No. 46, 3500 feet from West line and 20 feet from South line of Section 21, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 11, 1900 feet from West line and 1850 feet from North line of Section 28, 18-S, 28-E.

The Ibex Company Welch-Duke-State No. 16, 1890 feet from West line and 1320 feet from North line of Section 28, 18-S, 28-E.

3. It is respectfully requested that this Commission set this matter down for regular hearing at the earliest possible date and that notice for such hearing be published as by law required, and that after hearing, the Commission issue its regular order permitting the relief requested in paragraphs 1 and 2 of this prayer.

DONE at Breckenridge, Texas, this the 28th day of April, 1958.

Respectfully submitted,

THE IBEX COMPANY

By



R. L. Elliott

Attorney for Applicant

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER CONCERNING CAPACITY
ALLOWABLES FOR CERTAIN WELLS WITHIN
TWO PILOT WATER FLOOD AREAS IN THE
ARTESIA POOL, IN EDDY COUNTY, NEW
MEXICO.

EMERGENCY ORDER NO. E-10

NOW, on this 6th day of May, 1958, the New Mexico Oil
Conservation Commission, a quorum being present, having considered
the application of The Ibox Company for an emergency order and being
fully advised in the premises,

FINDS:

(1) That The Ibox Company is the owner of certain
~~properties situated within two pilot water flood project areas in~~
the Grayburg formation of the Artesia Pool, Eddy County, New Mexico,
which pilot water flood projects were authorized by Order No. E-886,
dated March 28, 1957.

(2) That said pilot water flood projects have caused an
increase in the producing capacities of sixteen oil wells in the
above-referenced pilot areas to the extent that they are now, or
soon may be, capable of producing in excess of the top unit allow-
able for the Artesia Pool.

(3) That there is a reasonable probability that waste will
occur if production from the above-referenced wells is restricted.

(4) That an emergency exists which requires the promulgation
of an order, without notice and hearing, to eliminate the possibility
of waste occurring.

(5) That a hearing should be held on May 20, 1958, to
determine whether waste will actually occur if production from the
aforementioned wells is restricted.

(6) That in the event the applicant fails to prove that
waste will occur if the production from the aforementioned wells is
restricted, then any oil produced from said wells in excess of the
normal allowables therefor should be charged against future allow-
ables for said wells.

IT IS THEREFORE ORDERED:

(1) That the following described wells be assigned allow-
ables equal to their capacity to produce, to-wit:

IBOX-ARTESIA PILOT FLOOD PROJECT NO. 2:

McNitt-State No. 3	250 feet from the South line and 1800 feet from the West line of Section 21
McNitt-State No. 6	1070 feet from the South line and 2390 feet from the West line of Section 21

Emergency Order No. E-10

Welch-Duke State No. 3	1320 feet from the North line and 2390 feet from the West line of Section 28
Welch-Duke State No. 6	250 feet from the North line and 2390 feet from the West line of Section 28
Welch-Duke State No. 8	250 feet from the North line and 1300 feet from the West line of Section 28
Welch-Duke State No. 9	800 feet from the North line and 1890 feet from the West line of Section 28
Welch-Duke State No. 11	1850 feet from the North line and 1900 feet from the West line of Section 28
Welch-Duke State No. 16	1320 feet from the North line and 1890 feet from the West line of Section 28
Malco-Basler-Yates-State No. 17	750 feet from the North line and 2390 feet from the East line of Section 28
Malco-Basler-Yates-State No. 18	1850 feet from the North line and 2390 feet from the East line of Section 28
Malco-Basler-Yates-State No. 21	250 feet from the South line and 2390 feet from the East line of Section 21
Malco-Basler-Yates-State No. 22	1050 feet from the South line and 2390 feet from the East line of Section 21
Malco-Basler-Yates-State No. 46	20 feet from the South line and 1780 feet from the East line of Section 21
Malco-Basler-Yates-State No. 53	1200 feet from the North line and 1830 feet from the East line of Section 28

INDEX-ARTESIA PILOT FLOOD PROJECT NO. 3:

Malco-Basler-Yates-State No. 3	600 feet from the North line and 1850 feet from the West line of Section 32
Malco-Basler-Yates-State No. 9	100 feet from the North line and 600 feet from the West line of Section 32

all in Township 18 South, Range 23 East, Artesia Pool, Eddy County, New Mexico.

Emergency Order No. 1-10

(2) That this order shall become effective at 7 o'clock a.m. Mountain Standard Time on May 7, 1938.

(3) That a hearing be held at 9 o'clock a.m. on May 30, 1938, at Santa Fe, New Mexico to permit the applicant to appear and show cause why the above-described wells should be granted capacity allowables.

(4) That in the event the applicant fails to prove that waste will occur if the production from the above-described wells is restricted, then any oil produced from said wells in excess of the normal allowables therefor shall be charged against future allowables for said wells.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. RECHER, Chairman

MURRAY E. MORGAN, Member

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

S X A L

ir/

May 6, 1958

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

Dear Sir:

On April 28, 1958, application of The Ibex Company for an order authorizing capacity production for certain wells within two separate pilot flood projects in the Grayburg formation underlying Sections 21, 28 and 32, Township 18 South, Range 28 East, NMPN, Artesia Pool, Eddy County, New Mexico, was made. That in such application the statement was made that certain of the wells were showing an increase and might at any day exceed the top unit allowable for the Artesia Pool.

This condition has now occurred and certain of the wells are exceeding the top unit allowable for the Artesia Pool which creates an emergency for allowable relief or waste will occur.

Therefore, it is respectfully requested that an emergency allowable be granted without hearing to produce the sixteen wells set out in the above referred to application at capacity for a period of 15 days or until a permanent allowable is granted as applied for in the above referred to application, whichever occurs first.

It is further requested that a hearing on the application for permanent allowable above referred to, be set down within 15 days of the granting of an emergency order.

Very truly yours,

THE IBEX COMPANY

By


R. L. ELLIOTT,
Attorney

Received 5-6-58

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

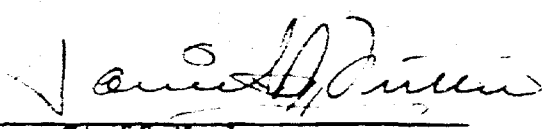
Date May 20, 1958

CASE NO. 1196

HEARING DATE May 6 and May 20th, 1958
9:00 A.M. DSN

My recommendations for an order in the above numbered case(s) are as follows:

Enter an order authorizing the production at capacity of the 16 wells for which capacity allowables were requested; also approve the non-standard location of the 4 wells for which such approval was sought. No objections were received to the approval of either one of these items and it will be in the interests of conservation, the prevention of waste and protection of correlative rights to grant the application.


Staff Member

**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
CONSIDERING:**

CASE NO. 1196
Order No. R-963-A

**APPLICATION OF THE IDEX COMPANY
FOR CAPACITY ALLOCATIONS AND FOR
APPROVAL OF UNSTIMULATED LOCATIONS
FOR CERTAIN WELLS IN PILOT WATER
FLOOD PROJECTS IN THE ARTESIA
POOL, HEDY COUNTY, NEW MEXICO.**

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 20, 1958, at Santa Fe, New Mexico, before Daniel S. Eutter, Examiner duly appointed by the New Mexico Oil Conservation Commission, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 24th day of May, 1958, the Commission, a quorum being present, having considered the application, the evidence adduced and the recommendations of the Examiner, Daniel S. Eutter, and being fully advised in the premises,

FINDS:

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

(2) That the IDEX Company is the owner of certain properties situated within two pilot water flood project areas in the Grapburg formation of the Artesia Pool in Eddy County, New Mexico, which pilot water flood projects were authorized by Order No. R-963, dated March 29, 1957.

(3) That sixteen producing oil wells in the above-referenced pilot areas have been, or soon may be, affected by the said pilot water flood projects, and that said wells are now, or soon may be, capable of producing in excess of the top unit allowable for the Artesia Pool.

(4) That the preponderance of the evidence presented in this case indicates that waste would occur if the production from the above-referenced wells were restricted.

Case No. 1196
Order No. R-966-A

(5) That the applicant is the owner and operator of the following-described oil wells in the above-referenced pilot areas which are on unorthodox locations under the terms of Rule 104 of the Commission Rules and Regulations, to-wit:

Malco-Bowler-Yates State No. 22 Well, located 1000 feet from the South line and 2300 feet from the East line of Section 21;

Malco-Bowler-Yates State No. 46 Well, located 20 feet from the South line and 1780 feet from the East line of Section 21;

Welch-Duke State No. 11 Well, located 1300 feet from the North line and 1900 feet from the West line of Section 28;

Welch-Duke State No. 16 Well, located 1300 feet from the North line and 1800 feet from the West line of Section 28;

all in Township 18 South, Range 28 East, NEPE, Eddy County, New Mexico.

(6) That the unorthodox locations of the above-described locations should be approved in order to facilitate the operation of the aforementioned pilot water flood projects.

IT IS THEREFORE ORDERED:

(1) That the following described wells be assigned allowables effective at 7:00 o'clock a.m. Mountain Standard Time, May 22, 1958, equal to their capacity to produce to-wit:

IBEX-ARTESIA PILOT FLOOD PROJECT NO. 2:

McNutt-State No. 3	250 feet from the South line and 1900 feet from the West line of Section 21
McNutt-State No. 4	1070 feet from the South line and 2300 feet from the West line of Section 21
Welch-Duke State No. 3	1320 feet from the North line and 2300 feet from the West line of Section 28
Welch-Duke State No. 6	250 feet from the North line and 2300 feet from the West line of Section 28
Welch-Duke State No. 8	250 feet from the North line and 1300 feet from the West line of Section 28
Welch-Duke State No. 9	800 feet from the North line and 1890 feet from the West line of Section 28
Welch-Duke State No. 11	1850 feet from the North line and 1900 feet from the West line of Section 28
Welch-Duke State No. 16	1320 feet from the North line and 1890 feet from the West line of Section 28

-3-

Case No. 1196

Order No. R-966-A

Malco-Besler-Yates-
State No. 17

750 feet from the North line and 2380
feet from the East line of Section 28

Malco-Besler-Yates-
State No. 19

1850 feet from the North line and 2380
feet from the East line of Section 28

Malco-Besler-Yates-
State No. 21

250 feet from the South line and 2380
feet from the East line of Section 21

Malco-Besler-Yates-
State No. 22

1050 feet from the South line and 2380
feet from the East line of Section 21

Malco-Besler-Yates-
State No. 46

20 feet from the South line and 1780
feet from the East line of Section 21

Malco-Besler-Yates-
State No. 53

1280 feet from the North line and 1830
feet from the East line of Section 28

INDEX-ARTESIA PILOT FLOOD PROJECT NO. 3:

Malco-Besler-Yates-
State No. 3

600 feet from the North line and 1050
feet from the West line of Section 32

Malco-Besler-Yates-
State No. 9

100 feet from the North line and 600
feet from the West line of Section 32

all in Township 18 South, Range 28 East, NMPM, Artesia Pool, Eddy
County, New Mexico.

(2) That the unorthodox locations of the following
described wells be and the same is hereby approved:

Malco-Besler-Yates State No. 22 Well, located 1050 feet from the
South line and 2380 feet from the East line of Section 21;

Malco-Besler-Yates State No. 46 Well, located 20 feet from the
South line and 1780 feet from the East line of Section 21;

Welch-Duke State No. 11 Well, located 1850 feet from the North
line and 1900 feet from the West line of Section 28;

Welch-Duke State No. 16 Well, located 1320 feet from the North
line and 1830 feet from the West line of Section 28;

all in Township 18 South, Range 28 East, NMPM, Eddy County, New
Mexico.

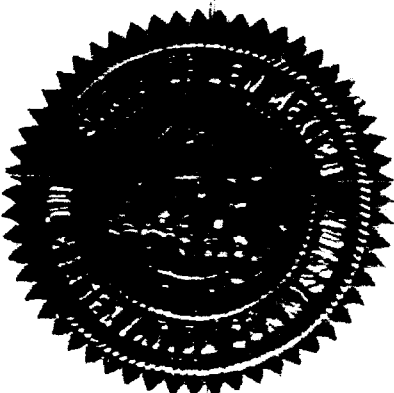
DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

E. L. Mechem
EDWIN L. MECHEM, Chairman

Murray E. Morgan
MURRAY E. MORGAN, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & 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 NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:**

**CASE NO. 1196
Order No. R-966-C**

**APPLICATION OF THE IBEX COMPANY
FOR PERMISSION TO EXPAND A WATER
FLOOD PROJECT IN THE ARTESIA POOL,
EBBY COUNTY, NEW MEXICO, AND FOR
EIGHT UNORTHODOX WELL LOCATIONS.**

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on February 4, 1959, at Santa Fe, New Mexico, before Elvis A. Uitz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 12th day of February, 1959, the Commission, a quorum being present, having considered the application, the evidence adduced and the recommendations of the Examiner, Elvis A. Uitz, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, The IbeX Company, was authorized by Order No. R-966 to institute the Artesia Pilot Water Flood Project No. 2 in the Artesia Pool, Eddy County, New Mexico, and that expansion of said project was authorized by Order No. R-966-B.

(3) That the applicant now seeks permission to expand said Artesia Water Flood Project No. 2 by drilling or redrilling the two following-described wells and converting them to water injection wells:

**Welch Duke State Well No. 15, located 288
feet from the North line and 272 feet from
the West line of Section 28**

-2-

Case No. 1185
Order No. B-986-C

Esler Yates State Well No. 301, located
1322 feet from the North line and 1322
feet from the East line of Section 28,

both in Township 18 South, Range 28 East, NMPM, Eddy County, New
Mexico.

(4) That the applicant further seeks an order authorizing
unorthodox locations for the following-described wells:

Welch Duke State Well No. 15, located 288
feet from the North line and 272 feet from
the West line of Section 28,

Welch Duke State Well No. 18, located 1200
feet from the North line and 1300 feet from
the West line of Section 28,

Welch Duke State Well No. 19, located 1100
feet from the North line and 800 feet from
the West line of Section 28,

Welch Duke State Well No. 20, located 1800
feet from the North line and 1570 feet from
the West line of Section 28,

McNitt State Well No. 1, located 282 feet
from the South line and 293 feet from the
West line of Section 21,

McNitt State Well No. 9, located 970 feet
from the South line and 1170 feet from the
West line of Section 21,

Esler Yates State Well No. 26, located 2300
feet from the North line and 1860 feet from
the East line of Section 28,

Esler Yates State Well No. 301, located
1322 feet from the North line and 1322 feet from
the East line of Section 28,

all in Township 18 South, Range 28 East, NMPM, Eddy County, New
Mexico.

(5) That the subject application should be approved in the
interest of conservation.

IT IS THEREFORE ORDERED:

(1) That the applicant, The Ibex Company, be and the same

-3-

Case No. 1196
Order No. R-966-C

is hereby authorized to drill or redrill the following-described wells and to utilize same as water injection wells:

Welch Duke State Well No. 15, located 288 feet from the North line and 272 feet from the West line of Section 28,

Resler Yates State Well No. 301, located 1322 feet from the North line and 1322 feet from the East line of Section 28,

both in Township 18 South, Range 28 East, NMPN, Eddy County, New Mexico.

(2) That unorthodox locations be and the same are hereby authorized for the following-described wells:

Welch Duke State Well No. 15, located 288 feet from the North line and 272 feet from the West line of Section 28,

Welch Duke State Well No. 18, located 1280 feet from the North line and 1380 feet from the West line of Section 28,

Welch Duke State Well No. 19, located 1180 feet from the North line and 880 feet from the West line of Section 28,

Welch Duke State Well No. 20, located 1800 feet from the North line and 1370 feet from the West line of Section 28.

McNutt State Well No. 1, located 282 feet from the South line and 293 feet from the West line of Section 21,

McNutt State Well No. 9, located 970 feet from the South line and 1170 feet from the West line of Section 21,

Resler Yates State Well No. 26, located 2390 feet from the North line and 1860 feet from the East line of Section 28,

Resler Yates State Well No. 301, located 1322 feet from the North line and 1322 feet from the East line of Section 28,

-4.
Case No. 1198
Order No. B-968-C

all in Township 18 South, Range 28 East, NMPL, Eddy County, New Mexico.

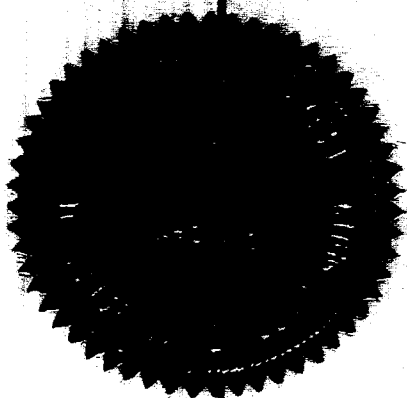
DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

John Burroughs
JOHN BURROUGHS, Chairman

Murray E. Morgan
MURRAY E. MORGAN, Member

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



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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER CONCERNING CAPACITY
ALLOWABLES FOR CERTAIN WELLS WITHIN
TWO PILOT WATER FLOOD AREAS IN THE
ARTESIA POOL, IN EDDY COUNTY, NEW
MEXICO.

EMERGENCY ORDER NO. E-10

NOW, on this 6th day of May, 1958, the New Mexico Oil
Conservation Commission, a quorum being present, having considered
the application of The Ibez Company for an emergency order and being
fully advised in the premises,

FINDS:

(1) That The Ibez Company is the owner of certain
properties situated within two pilot water flood project areas in
the Grapburg formation of the Artesia Pool, Eddy County, New Mexico,
which pilot water flood projects were authorized by Order No. R-966,
dated March 29, 1957.

(2) That said pilot water flood projects have caused an
increase in the producing capacities of sixteen oil wells in the
above-referenced pilot areas to the extent that they are now, or
soon may be, capable of producing in excess of the top unit allow-
able for the Artesia Pool.

(3) That there is a reasonable probability that waste will
occur if production from the above-referenced wells is restricted.

(4) That an emergency exists which requires the promulgation
of an order, without notice and hearing, to eliminate the possibility
of waste occurring.

(5) That a hearing should be held on May 20, 1958, to
determine whether waste will actually occur if production from the
aforementioned wells is restricted.

(6) That in the event the applicant fails to prove that
waste will occur if the production from the aforementioned wells is
restricted, then any oil produced from said wells in excess of the
normal allowables therefor should be charged against future allow-
ables for said wells.

IT IS THEREFORE ORDERED:

(1) That the following described wells be assigned allow-
ables equal to their capacity to produce, to-wit:

IBEX-ARTESIA PILOT FLOOD PROJECT NO. 2:

McNutt-State No. 3	250 feet from the South line and 1900 feet from the West line of Section 21
McNutt-State No. 4	1070 feet from the South line and 2390 feet from the West line of Section 21

Emergency Order No. E-10

Welch-Duke State No. 3	1320 feet from the North line and 2390 feet from the West line of Section 28
Welch-Duke State No. 6	250 feet from the North line and 2390 feet from the West line of Section 28
Welch-Duke State No. 8	250 feet from the North line and 1200 feet from the West line of Section 28
Welch-Duke State No. 9	800 feet from the North line and 1890 feet from the West line of Section 28
Welch-Duke State No. 11	1850 feet from the North line and 1900 feet from the West line of Section 28
Welch-Duke State No. 16	1320 feet from the North line and 1820 feet from the West line of Section 28
Malco-Ressler-Yates-State No. 17	750 feet from the North line and 2390 feet from the East line of Section 28
Malco-Ressler-Yates-State No. 19	1850 feet from the North line and 2390 feet from the East line of Section 28
Malco-Ressler-Yates-State No. 21	250 feet from the South line and 2390 feet from the East line of Section 21
Malco-Ressler-Yates-State No. 22	1050 feet from the South line and 2390 feet from the East line of Section 21
Malco-Ressler-Yates-State No. 45	20 feet from the South line and 1780 feet from the East line of Section 21
Malco-Ressler-Yates-State No. 53	1200 feet from the North line and 1890 feet from the East line of Section 28

INEX-ARTESIA PILOT FLOOD PROJECT NO. 3:

Malco-Ressler-Yates-State No. 3	600 feet from the North line and 1050 feet from the West line of Section 32
Malco-Ressler-Yates-State No. 9	100 feet from the North line and 600 feet from the West line of Section 32

all in Township 18 South, Range 28 East, Artesia Pool, Eddy County, New Mexico.

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Emergency Order No. E-10

(2) That this order shall become effective at 7 o'clock a.m. Mountain Standard Time on May 7, 1938.

(3) That a hearing be held at 9 o'clock a.m. on May 20, 1938, at Santa Fe, New Mexico to permit the applicant to appear and show cause why the above-described wells should be granted capacity allowables.

(4) That in the event the applicant fails to prove that waste will occur if the production from the above-described wells is restricted, then any oil produced from said wells in excess of the normal allowables therefor shall be charged against future allowables for said wells.

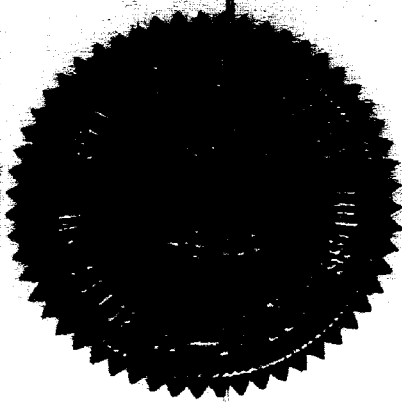
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


EDWIN L. MCCHES, Chairman


MURRAY E. MORGAN, Member


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



1r/

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
CONSIDERING:

CASE NO. 1196
Order No. R-966

APPLICATION OF THE IBEX COMPANY
FOR AN ORDER AUTHORIZING TWO
SEPARATE PILOT WATER FLOOD PROJECTS
IN THE GRAYBURG FORMATION UNDERLYING
SECTIONS 21, 28 AND 32 OF TOWNSHIP
18 SOUTH, RANGE 28 EAST, NMPL, ARTESIA
POOL, EDDY COUNTY, NEW MEXICO, AND
FURTHER AUTHORIZING THE UNORTHODOX
LOCATION OF A NUMBER OF THE APPLICANT'S
WELLS IN THE ARTESIA POOL.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on January 9, 1957, at Santa Fe, New Mexico, before Warren W. Mankin, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 29th day of March, 1957, the Commission, a quorum being present, having considered the application, the evidence adduced and the recommendations of the Examiner, Warren W. Mankin, and being fully advised in the premises,

FINDS:

1. That due notice having been given as required by law, the Commission has jurisdiction of this case and the subject matter thereof.
2. That the applicant, the Ibox Company, proposes to institute two separate pilot water flood projects in the Grayburg formation underlying Sections 21, 28 and 32 of Township 18 South, Range 28 East, NMPL, Artesia Pool, Eddy County, New Mexico, to be known as Ibox Artesia Pilot Flood Projects No. 2 and No. 3.
3. That the applicant proposes to accomplish the said pilot flooding operation in Project No. 2 by means of water injection through six wells located in the SE/4 SW/4 of Section 21 and NW/4 NE/4, NE/4 NW/4 of Section 28, all in Township 18 South, Range 28 East, NMPL, Eddy County, New Mexico.
4. That the applicant proposes to accomplish the said pilot water flooding operation in Project No. 3 by means of water injection through four wells located in the N/2 NW/4 of Section 32, Township 18 South, Range 28 East, NMPL, Eddy County, New Mexico.

5. That the proposed programs for secondary recovery will promote conservation and tend to prevent waste through the production of oil which might not otherwise be recovered.

6. That the progress of each of the above-referenced secondary recovery programs should be reported periodically to the Commission.

7. That the unorthodox locations of the applicant's wells in the area affected by the proposed water flood projects should be approved in order to facilitate the operation of the said projects.

IT IS THEREFORE ORDERED:

1. That the application of the Ihex Company for permission to institute its Ihex Artesia Pilot Flood Project No. 2, in the Grayburg formation of the Artesia Pool underlying all or part of Sections 21 and 28 of Township 18 South, Range 28 East, NNPM, Eddy County, New Mexico, be and the same is hereby approved, and that the following Ihex Company wells be and the same are hereby approved as unorthodox locations and water injection wells for said project:

McNutt State Well No. 2 250 feet from the South line and
2390 feet from the West line of
Section 21.

Welch Duke State Well No. 5 750 feet from the North line and
2390 feet from the West line of
Section 28.

Welch Duke State Well No. 7 250 feet from the North line and
1890 feet from the West line of
Section 28.

Malco-Besler-Yates Well No. 13-250 feet from the North line and
2990 feet from the West line of
Section 28.

Malco-Besler-Yates Well No. 18-1300 feet from the North line and
2990 feet from the West line of
Section 28.

Malco-Besler-Yates Well No. 51-500 feet from the North line and
3450 feet from the West line of
Section 28.

all in Township 18 South, Range 28 East, NNPM, Eddy County, New Mexico.

2. That the application of Ihex Company for permission to institute its Ihex Artesia Pilot Flood Project No. 3 in the Grayburg formation of the Artesia Pool underlying all or part of Section 32, Township 18 South, Range 28 East, NNPM, Eddy County, New Mexico, be and the same is hereby approved, and that the following Ihex Company wells be and the same are hereby approved as unorthodox locations and water injection wells for said project:

Malco-Resler-Yates Well No. 4	550 feet from the North line and 1570 feet from the West line of Section 32.
Malco-Resler-Yates Well No. 5	1050 feet from the North line and 950 feet from the West line of Section 32.
Malco-Resler-Yates Well No. 6	100 feet from the North line and 1050 feet from the West line of Section 32.
Malco-Resler-Yates Well No. 7	550 feet from the North line and 450 feet from the West line of Section 32,

all in Township 18 South, Range 28 East, NMPN, Eddy County, New Mexico.

3. That monthly progress reports on each of the above-referenced water flood projects shall be submitted to the Commission in accordance with Rule 1119 of the Commission Rules and Regulations.

4. That the unorthodox locations of the following Ihen Company wells be and the same are hereby approved in addition to the injection wells listed in paragraph 1 and 2 above:

McNutt State #3	250 feet from the South line and 1900 feet from the West line of Section 21.
McNutt State #4	1070 feet from the South line and 2390 feet from the West line of Section 21.
Welch Duke State #3	1320 feet from the North line and 2390 feet from the West line of Section 28.
Welch Duke State #6	250 feet from the North line and 2390 feet from the West line of Section 28.
Welch Duke State #8	250 feet from the North line and 1300 feet from the West line of Section 28.
Welch Duke State #9	800 feet from the North line and 1890 feet from the West line of Section 28.
Malco-Resler-Yates State #3	600 feet from the North line and 1050 feet from the West line of Section 32.
Malco-Resler-Yates State #9	100 feet from the North line and 600 feet from the West line of Section 32.

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Case No. 1193
Order No. R-966

Malco-Besler-Yates State #17	750 feet from the North line and 2900 feet from the West line of Section 28.
Malco-Besler-Yates State #19	1850 feet from the North line and 2900 feet from the West line of Section 28.
Malco-Besler-Yates State #53	1200 feet from the North line and 3450 feet from the West line of Section 28.
Malco-Besler-Yates State #21	250 feet from the South line and 2900 feet from the West line of Section 21.

all in Township 18 South, Range 28 East, NMPM, Eddy County, New Mexico.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

E. L. Mechem

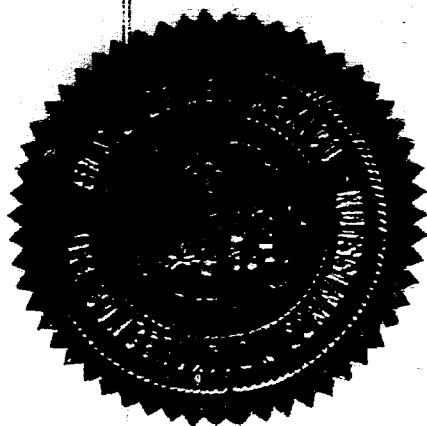
EDWIN L. MECHEM, Chairman

Murray E. Morgan

MURRAY E. MORGAN, Member

A. L. Porter, Jr.

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



This is a fast message unless its deferred character is indicated by the asterisk symbol.

WESTERN UNION

TELEGRAM [28]

TELEGRAM

(28)

DL=Day Letter
NL=Night Letter
LT=International Letter Telegram

THE TIME SHOWN IN THE DESTINATION BOX OF THIS TICKET IS STANDARD TIME AT POINT OF ORIGIN. TIME OF ARRIVAL IS STANDARD TIME AT POINT OF DESTINATION.

LA022 BR069

1958 MAY 29 AM 8 44

IN FVA148 PD=FAX FORT WORTH TEX 20 905AMC=

OIL CONSERVATION COMMISSION=

SANTA FE NMEX=

RE: CASE #1196, IBEX COMPANY, MAY 20, 1958, 9:00AM
AMBASSADOR OIL CORPORATION SUPPORTS AND URGES THE
 COMMISSION, IN THE INTEREST OF CONSERVATION, TO
 APPROVE THIS APPLICATION AS PRESENTED=

KENNETH L SMITH VICE PRESIDENT==

#1196 20 1958 9:00AM=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

11/16

THE IBEX COMPANY
CHANDLER CORPORATION

Page 1.

Monthly Water Flood Report

Project: Arden 2 Pilot Field #2 (MRY Area)

Month: April

Water Injection Started: 9-29-57

Field: Arden 2

Net Acres Under Flood: Apex: 80 Eff. Ac.

Formation: 1st Grayburg

	<u>Last Month</u>	<u>This Month</u>
Gross Oil Production, Bbls.	<u>882</u>	<u>1269</u>
Oil Production Above Normal Decline, Bbls.	<u>682</u>	<u>1269</u>
Water Production, Bbls.	<u>90</u>	<u>90</u>
Water Injection, Bbls.	<u>30,773</u>	<u>46,482</u>
Water/Oil Ratio, %	<u>-</u>	<u>-</u>
Daily Avg. Oil Prod., Bbls.	<u>15 to 19</u>	<u>282 (from -)</u>
Daily Avg. Water Prod., Bbls.	<u>3</u>	<u>3</u>
Daily Avg. Injected Bbls.	<u>1183</u>	<u>1548</u>
	<u>Bbls.</u>	<u>B/A-F</u>
Cumulative Oil Prod. Since Start of Inj.	<u>4 -</u>	<u>-</u>
Cumulative Water Prod. Since Start of Inj.	<u>4 - Neg.</u>	<u>-</u>
Cumulative Water Injection	<u>310,192</u>	<u>-</u>
Cumulative Net Water Injection	<u>310,192</u>	<u>-</u>
Cumulative Oil Prod. Above Normal Decline	<u>4 -</u>	<u>-</u>

	<u>Production</u>			<u>Injection</u>			<u>Water Supply</u>		
	<u>Active</u>	<u>Shutin</u>	<u>Total</u>	<u>Active</u>	<u>Shutin</u>	<u>Total</u>	<u>Active</u>	<u>Shutin</u>	<u>Total</u>
Well Status	<u>14</u>	<u>0</u>	<u>14</u>	<u>6</u>	<u>0</u>	<u>6</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>Avg. Total Daily Output</u>					<u>Average Pressure</u>				

Water Injection Plant: 1548 + 762 = 2310 B.W.P. Total. 965"

* These figures are being calculated & estimated since all prior production from several P77 zones went to a common tank battery.

THE INDEX COMPANY
GRABIDGE CORPORATION

Page II.

Monthly Water Flood Report
Injection Well Data

Project: Artesia #2

Month: April
Field: Artesia
Location: 1st Grayburg

Injection Well No.	Injection Rate GPM	Injection Pressure PSI	Injection Volume Cu Ft	Injection Time Hrs	Injection Rate GPM	Injection Pressure PSI	Total Injection Volume Cu Ft	Injection Rate GPM	Injection Pressure PSI	Total Injection Volume Cu Ft
Artesia #2	-	-	20	-	-	890	6,076	-	-	-
Well #1	-	-	36	-	-	930	58,299	-	-	-
Rocky #1	-	-	398	-	-	890	56,099	-	-	-
" #2	-	-	201	-	-	1048	48,565	-	-	-
" #3	-	-	229	-	-	975	49,551	-	-	-
" #4	-	-	173	-	-	960	44,599	-	-	-
Total (16)	-	-	1,597	-	-	966	310,190	-	-	-

Remarks:
• Or Grabridge

THE INEX COMPANY
GRANIDGE CORPORATION

Page III.

Monthly Water Flood Report
Producing Well Data

Project: Astoria #2 (MRY Area)

Month: April

Field: Astoria

Formation: 1st Grayburg Sh.

Lease & Well No.	Date of Test	Oil BPD	Water BPD	Water Cut	Change from Last Test Oil	Change from Last Test Water	Change from Last Test % Cut	Date of Last Test
Astoria Sh. #3	5-17-78	42	0		-	-	-	
" " #4	"	4	0		-	-	-	
Wichita Sh. #3	"	3	0		-	-	-	
" " #6	"	129	0		-	-	-	
" " #9	"	3	0		-	-	-	
" " #9	"	10	0		-	-	-	
" " #11	"	2	3		-	-	-	
" " #16	"	7	0		-	-	-	
Pasadena Sh. #17	"	60	0		-	-	-	
" " #19	"	1	0		-	-	-	
" " #20	"	12	0		-	-	-	
" " #22	"	1	0		-	-	-	
Remarks: #46	"	2	0		-	-	-	
#53	"	6	0		-	-	-	

Totals: (14) 282 3

7 of 14 have not been reported to date

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

May 27, 1958

Mr. R. L. Elliott
Iber Company
P.O. Box 752
Breckenridge, Texas

Dear Mr. Elliott:

We enclose two copies of Order R-966-A issued May 26, 1958, by the Oil Conservation Commission in Case 1196, which was heard on May 20, 1958, at Santa Fe.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.

C
O
P
Y

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

RECORDED
INDEXED
OCT 10 1958

IN THE MATTER OF:

CASE NO. 1196

TRANSCRIPT OF HEARING

SEPTEMBER 10, 1958

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
Phone CHapel 3-6691

BEFORE THE
OIL CONSERVATION COMMISSION
SEPTEMBER 10, 1958

IN THE MATTER OF:

CASE 1196 Application of The Ibex Company for permis-
sion to expand a pilot water flood project :
in the Artesia Pool, Eddy County, New Mexi- :
co, and for six unorthodox well locations. :
Applicant, in the above-styled cause, seeks :
an order permitting the expansion of its :
Artesia Pilot Water Flood project No. 2, :
authorized by Order No. R-966 in the Ar- :
tesia Pool, Eddy County, New Mexico, to in- :
clude eight additional water injection :
wells in Sections 21 and 28 of Township 18 :
South, Range 28 East, Eddy County, New Mex- :
ico. Applicant further seeks an order :
authorizing six unorthodox well locations :
in said Sections 21 and 28. :

BEFORE:

Mr. Daniel S. Nutter

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: The hearing will come to order, please. First
case on the docket this morning will be Case No. 1196.

MR. PAYNE: Application of The Ibex Company for permission
to install a pilot water flood project in the Artesia Pool, Eddy
County, New Mexico, and for six unorthodox well locations.

MR. NUTTER: Let the record show that this is an applica-
tion to expand the pilot water flood project rather than install
one.

MR. CAMPBELL: Mr. Examiner, I am Jack M. Campbell, Campbell & Russell, Roswell, New Mexico, appearing on behalf of the applicant. I would like to briefly state what the present status and past history of this particular flood is. It's pretty well reflected in the application in this hearing dated -- submitted to the Commission by letter of August 7. The original order approving a pilot water flood project in the area here involved was entered on March 29, 1957 by Order No. R-966. That Order approved what were designated as Artesia Water Flood projects No. 2 and No. 3. This application and the area here involved is only as to Artesia Water Flood project No. 2. On May 26, 1958, the Oil Commission by Order R-966-A authorized capacity production allowable for certain wells in the pilot area, and this application is now filed solely for the purpose of obtaining approval for some unorthodox well locations, wells which were drilled prior to spacing rules by the Commission, and as to injection and producing wells, and for the approval of eight additional injection wells in Artesia Pilot Flood area No. 2. We have one witness, Mr. Harrison, to be sworn.

MR. NUTTER: Mr. Campbell, the Order R-966 and 966-A have been entered in this case?

MR. CAMPBELL: Except there has been an emergency Order E-10, I believe it is, which preceded R-966-A.

MR. NUTTER: Thank you.

(Witness sworn)

B. G. HARRISON.

called as a witness, having been first duly sworn on oath, testified as follows;

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A S. G. Harrison.

Q Where do you live, Mr. Harrison?

A Breckenridge, Texas.

Q By whom are you employed and in what capacity?

A I am employed by The Ibex Company and Grayridge Corporation as manager of secondary recovery.

Q Have you previously testified before the New Mexico Oil Conservation Commission or one of its examiners in your professional capacity?

A Yes sir, I have.

MR. CAMPBELL: Are the witness' qualifications previously made to the Commission acceptable?

MR. NUTTER: Yes, sir, they are.

Q Mr. Harrison, are you acquainted with the pilot water flood project which has been designated as Artesia Pilot Flood project No. 2 in Eddy County, New Mexico?

A Yes, sir.

Q Is The Ibex Company the operator of that project?

A Yes, sir.

Q Under Order R-966, the Company was required to file monthly reports with the New Mexico Oil Conservation Commission, regarding

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the operation of this project. Have those reports, to your knowledge, been filed with the Commission?

A Yes, sir, they have.

Q Mr. Harrison, I hand you what has been identified as Applicant's Exhibit No. 1 in this case, and ask you to state what that is, please?

A This is an area map showing a portion of the Artesia Field in Eddy County, New Mexico. It shows Sections 20, 21, 29 and 28, Range 28 East, Township 18 South. And indicated on the map are the present producing wells, the present injection wells, the proposed injection wells which are requested by this hearing as an expansion to this pilot flood, and also the wells indicated as unorthodox well locations which have not been approved.

Q How have you designated on that the unorthodox locations which you seek -- for which you seek approval in this application?

A They are indicated by dashes of green above, below and on the side of the well location.

Q Did this situation with regard to unorthodox well locations exist at the time the pilot flood was proposed and the order issued except as to other wells?

A Yes, it did, Mr. Campbell. The wells, in some cases, were abandoned wells, but due to the economics involved, it was more economical to reenter the old holes than it was to drill new wells.

Q Now, how have you designated the proposed additional water injection wells on the plat?

A The additional water injection wells have been colored in red.

Q Now, what do the figures adjacent to some of the producing well locations indicate?

A These indicate the present daily production from these wells according to well tests that were taken from the first eight days of September.

Q Now, is there anything else as to that plat that you wish to present to the Examiner at this time, Mr. Harrison?

A I might point out that on The Ibex Company McNutt State Well No. 3, just -- which is an outside location to the pilot flood, we have had some water production there, very recently. We also have some water production in The Ibex Company Resler-Yates No. 17, which also is a very recent development. These wells have each produced a proportional amount of oil per acre. In other words, they have produced about equal amounts of oil per acre prior to water breakthrough.

Q What normally does the water breakthrough indicate with regard to the necessity for additional water injection wells, Mr. Harrison?

A In the case of McNutt State No. 3, we feel that we should have a backup which would involve injection Wells No. 8 and No. 5 to -- in order to produce more oil per barrel of water produced, thus increasing the economic life of the well.

Q Were all of the wells in this area, and that would be

affected by these water injections, additional wells which had reached a marginal stage at the time the project commenced?

A Yes, all of the wells in the area were producing in the neighborhood of one-half to one barrel per well.

Q Referring to Exhibit No. 1, which is the plat, will you indicate the wells that -- the producing wells that, in your judgment make necessary backup and point out to the Examiner the increase in production in those particular wells as a result of the water flood?

A On the Welch Duke State lease, Well No. 3, now producing forty barrels of oil per day; Well No. 9 producing forty-six barrels of oil per day, and Well No. 8 producing sixteen barrels of oil per day. On the McNutt State lease, Well No. 3 is now producing forty-four barrels of oil per day. It has produced as high as eighty-four barrels per day prior to water breakthrough. McNutt State No. 4 also has had a substantial increase in that it was -- has increased from one barrel of oil per day to eight barrels of oil per day. Resler-Yates State No. 21, presently producing sixty-four barrels of oil per day. These wells have all shown increases from approximately one barrel per day to the present figure.

Q In your opinion, in the interest of the greatest ultimate recovery of oil from this area, is it necessary to commence water injection at the locations requested in this application?

A Yes, sir, it is.

Q Now, with regard to the water injection, I hand you what

has been identified as Ibex' Exhibit No. 2 in this case, and ask you to state what that is?

A This is injection well data for the month of August, 1958, which includes the total injection barrels per month for each of the six injection wells in the pilot flood, the average volumes of injected water, barrels per day, and the average injection pressure along with the cumulative injections, volumes which have been injected into each well.

Q Is that report the same as the report you have been submitting monthly with regard to this project, Mr. Harrison?

A This information is included in the Form C 120, which is filed with the Commission.

Q Now, what is the source of your water in this project, Mr. Harrison?

A We have two sources of water, one a brine water, which is being produced in Section 22, from a depth of between three and four thousand feet, and a fresh water injection, or fresh water producing well which is in Section 28.

Q What is the status of the casing situation in this area, if you know, Mr. Harrison, both in the producing and injection wells?

A When we acquired the properties, the wells, on the most part, had six to nine hundred feet of surface pipe with no oil string. We are recompleting our injection wells with a four and a half inch casing as oil string cemented at the top of the producing

pay at approximately two thousand feet.

Q Do you make tests of the surface casing and the other casing that is in the hole when you go in to complete it either as a water injection or producing well?

A Yes. If the well shows any water in the hole, or if it is a producing well and is showing any water, then we test the casing to see if we have a casing leak.

Q And if there is a casing leak, do you make the necessary adjustments to correct it?

A Yes, we do it.

Q Insofar as the operation of this project to date is concerned, is it your opinion that there is any possibility of contamination of upper fresh water sources by the injection of this brine water into the producing formations?

A No, sir. The brine water naturally is corrosive to a certain extent. We are using corrosive inhibitors to protect our casing string, and in the event any detrimental corrosion appears to be resulting, which we will determine by use of various tests, including corrosion coupons and water analyses, we would at that time run strings of two inch plastic lined tubing, and with a packer -- with a packer set at the base of the oil string, in the oil string.

Q You have not considered, to date, that that has been required in any of the wells?

A No, we have had very good reports on our corrosion rates.

Q Now, Mr. Harrison, I hand you what has been identified as Ibex' Exhibit No. 3. Will you please state what that is?

A Exhibit No. 3 is a group of curves which have been drawn on the individual producing wells showing the rates of oil and water production, barrels per day since the beginning of the pilot flood.

Q Do these include the wells you referred to as having shown some water breakthrough?

A Yes, they do.

Q Do you want to make particular reference to those curves for the purpose of explaining the necessity for the additional injection wells?

A I would like to refer to McNutt State No. 3. I might explain the scale which is used. The scale, the upper figure of one ten and 100 apply until the well has reached the producing rate of over 100 barrels per day, and then it reverts back to the scale of ten one hundred, one thousand. This well has had a peak rate of eighty-two barrels of oil per day, and is presently producing twenty-one barrels of water per day, which has decreased the oil production. This is considered to be water breakthrough, not a premature water breakthrough in that this well has produced some 607,000 barrels of oil prior to this water, and also it correlates very well with the data we have on Resler-Yates State No. 17, which is the center producing in the southeast five spot. We might refer to the curve on Resler-Yates No. 17. Here we had a peak rate of over 123 barrels of oil per day, and as we had water breakthrough into

the well our oil production has decreased now to some 56 barrels per day.

Q Do you consider that water breakthrough to be a situation as to that well, or is that what you might have reason to have expected?

A Due to permeability variations, this is something we would expect in most water flood projects; after water breakthrough approximately sixty percent of the water flood oil is produced.

Q Do you have anything further with regard to the production curve shown on Exhibit No. 3 of the various wells?

A I might refer in general to all the curves to indicate that the production in each case was one barrel per day or less, and that it has increased considerably on all the wells. McNutt State No. 4 has shown a very recent increase. It had increased to four barrels per day and had leveled off there for a period of some two and a half months, and now has increased to eight barrels of oil per day, and we assume that it will continue to increase.

Q Now, I hand you what has been identified as Ibex' Exhibit No. 4 in this case, and ask you to state what that is?

A These are performance curves for the entire water flood pilot flood project. As indicated, we have oil production barrels per month which has increased from a figure of 300 barrels per month at the initiation of the flood to its present 15,200 barrels per month. We have injected a volume of some 482,000 barrels of water. I might refer to the two curves of average injection volume,

and average injection pressure. Here it will be noted that during the last month we have had a slight decrease in injection pressure with an increase in the average injection volume. And this is believed to be caused by leaching of gyp from the formation. The presence of this gyp and the fact that it can be leached was indicated in core study, where relative permeabilities were increased by flushing the core with water.

Q Anything further with regard to Exhibit No. 4?

A I believe that's all, Mr. Campbell.

Q Once again, let me ask you this question. Based upon your experience in the operation of this pilot water flood area, is it your opinion that the additional water injection wells sought by this application are necessary in order to assure the greatest ultimate recovery of oil from this area by use of secondary recovery methods?

A Yes, sir.

MR. CAMPBELL: I believe that's all now.

MR. NUTTER: Does anyone have any questions of Mr. Harrison?

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Harrison, the first thing I would like to clear up is, there appears to be a discrepancy between your application and Exhibit No. 1. Is the SE/4 of Section 21 in this unit, or this pilot water floor No. 2?

A Would you repeat that, please?

Q The SE/4 of Section 21 in this pilot water flood project?

A Yes, it is.

Q Well now, as I read your application, it doesn't appear that it is.

MR. CAMPBELL: Which application are you referring to, Mr. Payne?

MR. PAYNE: Your application in this case.

MR. CAMPBELL: Off the record.

(Discussion off the record.)

MR. CAMPBELL: If I may get back on the record. May the applicant request that the Exhibit attached to the application in this matter be corrected to conform to Exhibit No. 1 in the case, in that the NE/4 of Section 21 should be shown as a Lackawana, Lackawana lease rather than Resler-Yates.

MR. NUTTER: Do you have anything further, Mr. Payne?

MR. PAYNE: No.

MR. NUTTER: Does anyone have any questions of the witness?

QUESTIONS BY MR. IRBY:

Q I am Frank Irby, State Engineers' Office. On the source of your water, you stated the brine was in Section 22, and fresh water in 28. What is the Township and Range?

A Those are Range 28 East, Township 18 South.

Q On the cementing in the casing program, I understand you had surface casing in these wells from six to eight hundred feet. Is the cement circulated on that string to the surface?

A No, sir, this is -- I say no, let me amend that and say that in some cases we are not sure because of the records that we have, that is the original pipe that was run in these wells on the original completion back during the period 1924 to 1929.

Q Now, you are running an oil string inside there now, is that correct?

A Yes, that is true.

Q And where did you say you were landing that casing?

A We are landing it approximately two thousand feet, or just above the pay section of the first Grayburg.

Q And how much cement are you putting in that? How far are you bringing it up?

A Well, we are putting in approximately three hundred sacks per well.

Q And will that fill the annulus to the surface, or how far up?

A The approximate volume would, yes, but we haven't run cement tops. We are not certain as to the top of the cement in most instances.

Q What type of formation is the surface string landed in, if you can tell me?

A I am not real certain, but I believe it's in a red bed

on in a shale formation.

Q Now, as to the amounts of water, what percentage and what amount of the water being injected is fresh water?

A At the present time we are injecting approximately 1500 barrels per day of which about 900 barrels is brine water and 600 barrels fresh water.

MR. IRBY: That's all I have. Thank you.

MR. NUTTER: Any further questions? Mr. McCombs?

MR. McCOMBS: I have a few questions.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. McCOMBS:

Q I am J. B. McCombs. What is your maximum production, your estimate of the maximum daily production on this project, Mr. Harrison?

A It will depend on our rate of development, but it should not exceed some twenty and twenty-five thousand barrels per month.

Q When is your peak supposed to be reached in this?

A We don't have a projected curve that I could refer to and give you an estimated time on that.

Q Do you have an estimate life on this twenty or twenty-five thousand barrels? I mean, how long would that appear, would that live?

A Probably a very short period in that you can see we reach a peak year on our producing wells. This pilot flood was initiated in September of 1957, and some of the wells have already reached peak production and are making some water, and after water break-

through, your oil production continues to decline.

MR. McCOMBS: That's all I have.

MR. NUTTER: Any further questions?

A May I make a statement? Did I say twenty-five thousand barrels per day or per month?

MR. McCOMBS: Per month.

A All right.

MR. NUTTER: Any further questions?

QUESTIONS BY MR. NUTTER:

Q Mr. Harrison, I note that your injection wells, McNutt State No. 2 and McNutt State No. 7 are the two wells indicated on Exhibit No. 2, which have had the most cumulative water injected into them, --

A Yes, sir.

Q -- is that correct? Also the McNutt State No. 3 well was the one that you referred to as having experienced a breakthrough of water. Do you attach any significance to the fact that this No. 3 well is offsetting the wells which have had the most water injected into them?

A The injection wells have individual characteristics and at our normal injection pressures, these wells are able to receive more water than other wells in the pilot, and this could be due to a permeability variation in the area and the injection rates overall for all the injection wells are fairly uniform, considering the nature of the sand. In most all water flood projects there will be some variation as to the amounts of water any parti-

cular injection well will take.

Q So, do I interpret your answer correctly to say that there is not necessarily any significance attached to this fact?

A There could be some significance, but it would not be anything that would be out of the ordinary. We have water breakthrough into Well No. 17, a center producer in the lower five spot, and here we have some of the lower and average injection rates so that it probably will be somewhat of a characteristic of the area.

Q Is the peak production for the No. 17 Well this 96 barrels that you indicate on this Exhibit?

A No. It had gone to something over 96 barrels, if you will refer to the individual curve.

Q It produced somewhat in excess of a hundred barrels prior to water breakthrough?

A Yes, that's right.

Q Do you think that the increase in productivity that the McNatt State No. 4 Well has experienced is indicative that it definitely has received the effects of the water flood?

A Yes, sir. Let's refer to the individual curve on that particular well. The well originally was producing one barrel or less per day, and after some cleanout operations, the well increased to two barrels per day, then slowly to four barrels per day, and has recently increased to eight barrels per day, which definitely is a response to the water flood in that other wells in the area are maintaining their one barrel or something of that

nature, barrel per day of oil production.

Q How do you account for the productivity of this well holding to two and a half barrels for four months?

A Well, that probably was just a normal thing that would happen, a well that is being flooded from only one side. It would be difficult to say exactly why that well did that. The fact that the other wells around injection Well No. 2 picked up considerably in production, probably the water has been traveling in the direction of this increased production.

Q How about Well No. 46? Do you believe it's received a response from the water flood? That would be Resler-Yates State No. 46, I believe.

A Yes, it has received some increase. As you'll note, it had no water production prior to water injection, and it also has recently shown a one barrel increase.

Q Do you think that this well will ever show a marked response to the water flood, or is this water breakthrough that has been encountered going to slow down its production?

A It would be difficult to say at this time. It is the first well that we have had to show water production at this early stage, so it would be impossible to say at this time what the performance of that particular well will be. However, in other water floods I have noted that in cases of early water breakthrough that the breakthrough was not necessarily of a serious nature, and that a large amount of oil was produced without producing excessive

amounts of water.

Q Now, on your Exhibit No. 3, Page 1, I notice that the Welch Duke State No. 3 has reached what appears to be a plateau at approximately forty barrels per day, --

A Yes, sir.

Q -- and has held that for almost a month. Do you expect that this well has reached its peak?

A It is possible with the injection that we now have that it would peak at this rate. However, with well tests spaced closer together, actually there is only about twenty days or something of that nature between the test in August and the September test, and it could be that this well would go ahead and increase, but it would be certain to increase and increase more rapidly if it were backed up by other water injection wells.

Q You are taking actual water production tests on these wells once a month?

A Once a month, or more often, yes.

Q Is it expected that a well will reduce its productivity after having reached its peak, but prior to the time of any water breakthrough?

A No. Normally, the well will reach a certain peak dependent upon injection rates and maintain that peak for a short time prior to the water breakthrough.

Q But it won't decrease until the water breakthrough, as a rule?

A Normally, it will not.

Q What is the cause, then, for the Welch Duke State to show this decrease in its production for the last two months? No water has broken through in it, has it?

A What State?

Q Welch Duke State No. 6.

A Well, these variations in test actually is only a volume of some fifteen to twenty barrels involved there.

Q Per day?

A Yes. This could be the effects of pumping equipment or could be the effects of the testing apparatus. I asked the field men about this, and they maintain that the well is producing at its normal rate there. We did have one test that there was some doubt about, which would be the high test, in that we were employing a new testing apparatus, and it is a pre-water knockout type of tester and possibly that test could be a little bit high to actually what the well was producing at that time.

Q Now, Mr. Harrison, you presently have six wells on injection, is that correct?

A Yes, sir.

Q And you are injecting approximately 1500 barrels a day total?

A Yes, sir.

Q Your request here is for an additional eight injection wells?

A Yes, sir.

Q How many barrels additional oil -- additional water do

you expect to be injected when all those eight wells are on injection?

A We would anticipate 150 to 200 barrels per day rate per well. We noted earlier in some of the injection wells that upon initial injection they had a breakdown pressure below our present plant pressure, and that after several months, approximately six months of injection, that new breakdown tests were run on the wells and breakdown pressure had increased to a thousand and fifty pounds due to the cushioning effects of the water that had already been injected and the oil which had been built up, and we feel that probably we would have lower injection rates than the present average rates due to this condition.

Q In response to a question by Mr. Irby, you indicated that about three barrels of brine to two barrels of fresh water are being used. Do you anticipate that this same ratio will hold when you put the additional wells on injection?

A No, we plan to increase the fresh water. We have drilled another fresh water well and have an additional supply of fresh water.

Q Will all of this 1200 to 1600 barrels additional water come from this new fresh water well?

A No, sir. We will still have some capacity in the brine water well. The new water well will supply some 700 barrels per day, and we plan to develop additional fresh water supply.

A Now, in response to Mr. McCombs' question, did you state

that you expect the ultimate recovery of this project to be in the neighborhood of 22,000 barrels per month?

A A peak, not an ultimate. An ultimate peak.

Q An ultimate peak, that's what I meant.

A Yes.

Q That would be after you have the entire area of flood as indicated by the ultimate pattern that you have shown with red marks on this Exhibit?

A Yes, sir.

Q How long do you think it will be before you have this entire area under flood?

A It, of course, will depend on our rate of development, which is going to be controlled by our increases in production, and it looks like it probably would be at least two years before we would have full development.

MR. NUTTER: Does anyone have any questions of Mr. Harrison?

REDIRECT EXAMINATION

BY MR. CAMPBELL:

Q Over a period of two years, I would assume that some of the wells in this initial area, for example, will have reached their peak in decline and be producing a substantial amount of water, isn't that correct?

A Yes, sir. As a matter of fact, the two center wells in the five spot are probably at or near a peak at this time.

Q But you are taking that into consideration in your estimate that the highest ultimate peak, in your opinion, if it is developed over a period of two years, would be the approximate 25,000 barrels per day, is that correct?

A Yes, sir.

MR. NUTTER: Any further questions?

RECROSS EXAMINATION

BY MR. FISCHER:

Q Mr. Harrison, is that Section 28 on this big map here, it is the Welch State, Welch Duke State, those subdivisions there, small subdivisions are forty acres, aren't they?

A Yes, sir.

Q It looks like if you follow your five spot pattern here, you would have to put an injection well in Unit G.

A Of Section 28.

Q Of Section 28. I see. You've got some proposed injection wells other places, but there is not one in there?

A It is possible that we would have to drill an injection well there. We are planning to drill first the corner well between our Resler-Yates State and Western Yates State lease and core this well and determine the economics of development in this area. It is possible that economics will dictate that we should drill another injection well there, but at the present time we propose this pattern. We would have two producing wells surrounded by five injection wells, and the fact that we probably will be using more

fresh water and that the formation is showing a tendency to leach out and actually give us higher injection rates -- well, let's say, the same pressure; we feel that we may be able to go to larger spacing than the original economic evaluation of fifteen acre spacing.

MR. FISCHER: Thank you.

QUESTIONS BY MR. NUTTER:

Q The logical pattern to follow here in Section 28 would be to put Resler-Yates State No. 14 on injection, would it not?

A Yes, sir, that is right. However, we do not own these wells, we own the rights to the first Grayburg but the people who own the wells felt that they could not give up the production which they have there now to plug these wells. They are completed deeper than the first Grayburg. And the D. E. Well Service group has indicated that they would prefer line injection wells to having -- where they would share on a fifty-fifty basis rather than having to convert some of their wells to injection wells and doing some additional inside drilling. They feel like with line injection wells they will be able to evaluate their area and determine the economics of inside drilling.

Q Mr. Harrison, you stated that you felt that the McNutt State No. 4 had experienced a substantial response to the water flood. Do you think that that response has been substantial enough so that Well No. 8 -- Well No. 6 directly north and Well No. 22 directly east must all be put on water injection?

A The justification for Well No. -- McNutt State No. 8 and Resler-Yates State No. 22 would be as backups to McNutt State No. 3 and Resler-Yates State No. 21, and to keep the pattern in balance we felt that Well No. 6 should be included in this hearing since we do have a response in No. 4.

Q What will happen if Well No. 6 is not put on injection?

A If it is not put on injection?

Q Yes.

A We would expect something in the same order to happen as has happened in the McNutt State No. 3. In other words, we would expect some water breakthrough whereby we would have to handle more barrels of water per barrel of oil produced, thus decreasing --

Q Didn't you state the No. 3 and No. 17 had equivalent amounts of oil produced prior to the time of breakthrough?

A Equivalent amounts of oil per acre. In other words, basing No. -- McNutt State No. 3 on approximately ten acres and the No. 17 on the seventeen-acre pattern.

Q Well now, No. 3 has injection from one side by the No. 2 and No. 7 Wells; No. 17 has injection from four sides. How can you attribute the water breakthrough in that case to lack of backup on the No. 3 Well?

A I do not contribute it to lack of backup.

Q You stated that if you did not have No. 6 on injection, you would expect the same thing to happen to No. 4 as happened to No. 3, which would indicate you would not have any backup there?

A Yes, I am saying this, Mr. Nutter, that we would be required to produce more barrels of water per barrel of oil produced. In other words, it increases the lifting cost and cuts down on the economics. It actually involves more expenditure for the same amount of production.

Q Is this what has happened to No. 3, you are going to have to lift more barrels of water for each barrel of oil?

A Yes. In other words, we have 21 barrels of water there now, and it presumably would increase rather than decrease, and we will have to produce the 21 plus barrels of water each day regardless of the amount of oil we are getting there. Let me put it this way, that for instance, in the case of No. 17 we are producing 96 barrels of oil and have produced over a hundred barrels of oil per day, and the ratio there now is 96 barrels of oil to 11 barrels of water, whereas the ratio in No. 3 is 44 barrels of oil to 21 barrels of water. I cannot state that backup would have prevented this water breakthrough, but it seems reasonable due to the performance of the two center producers in the other five spots that we would have produced more oil per barrel of water, or would be producing more barrels of oil per barrel of water at this time.

Q The test on No. 17 that showed 96 barrels of oil and 11 barrels of water, was that the first test that you had that showed water on that well?

A Yes, it was. We knew that we had some water there, but it only developed in the latter part of the -- August, after, we had

a test there in the early part of August, and there was no water production, and the latter part of August the water was noted at the well head and in the tanks, and this was the first test for the actual amount of water that we were producing.

Q For how long a time has it been noticed that water was in this well?

A For approximately two and a half to two years.

Q How about the No. 3 Well, how long has water been produced in it?

A That is very recent also; about the same period of time.

Q About the same period of time?

A Yes. They both occurred at about the same time and reported to us about the same time. These are the first actual tests that we had.

Q The primary difference between the two wells is that you had a greater increase in the amount of water produced on the No. 3, and also a greater decrease on the oil produced than you have experienced in the No. 3?

A Yes, and we feel, too, Mr. Nutter, that we are going to have a gyp or calcium sulphate problem in producing wells since we do have that condition in the formations, and generally following a water breakthrough, if this condition is going to exist, it will develop and we plan to pull the No. 3 Well and check it for gyp deposition. If this occurs, then the production from the well, both oil and water, will decline due to sand phase plugging by the

calcium sulphate and remedial work will be necessary, probably from jobs which also increase the cost of the overall project, so that water breakthrough or early water production could be detrimental in more than one way.

MR. NUTTER: Thank you, Mr. Harrison. Any questions?

QUESTIONS BY MR. UTZ:

Q Mr. Harrison, are you recirculating the water produced in this project at the present time?

A Yes, sir, we plan to. We have had no water, we are not putting the produced water back into the system at the present time, but we have had an analysis made of the water and feel like we will be able to reinject it. But, as I say, this water breakthrough has occurred within the last two and a half weeks, and we are in the process now of evaluating the situation and determining what type of treating system we will have to have there to reinject this water, but we do plan to do that.

Q How much water are you producing now from the whole project?

A Well, the entire project would be an approximate total of the water figures we have there, which would be some 34 barrels per day.

Q Mr. Harrison, I believe you stated that your ultimate -- your peak production would be 25,000 barrels a month from this project. Do you anticipate any difficulty in marketing this amount of oil?

A Not at the present time.

Q Who is your purchaser in this area?

A I believe that Malco is the purchaser.

Q Have you had any discussions with them about the purchasing of this oil when it reaches that amount?

A There has been some discussion with Malco. I do not know to what extent, but our people have been in contact with them.

Q You don't know one way or the other whether or not you will have any difficulty when you reach this volume of production?

A I couldn't state definitely that we would or would not. We presume that we won't.

Q Mr. Harrison, regarding the non-standard locations, are any of those locations producing at the present time?

A Yes. The No. 2 on the Welch Duke State is completed as a producer.

Q None of the others are producing? A No.

Q Are any of your proposed injection wells producing?

A No, sir, they are not. They are prepared for water injection.

Q None of these non-standard locations has ever been approved by the Commission prior to this application?

A None of the ones in this particular application.

MR. CAMPBELL: May I state something there? I doubt whether he knows, and I don't know. I gather from the transcript in the prior case where they obtained approval for unorthodox loca-

tion out of an abundance of caution and due to the age of these wells and so forth, it was assumed that none of them had orders issued. I think that is correct. It is possible that there might be an order on some of the later ones. If there is, I think they felt that it would do no harm to obtain an order here, in any event.

MR. NUTTER: These wells were drilled in accordance with the Rules and Regulations at the time?

MR. CAMPBELL: Absolutely.

MR. NUTTER: 19 what?

MR. CAMPBELL: 24.

Q (By Mr. Utz) These are all old wells?

A Yes, sir. They are all old wells that have been re-entered. We felt like we could re-enter these wells and recomplate them cheaper than we could complete a new well. In any event, we would have to re-enter the old wells and see that they were adequately plugged.

Q Had you reached the --

A We had some work that had been done by a surveyor and plain table that located the wells.

Q Are you reasonably sure that the locations shown here are correct now?

A Yes, sir.

Q How long have you produced the Welch Duke State No. 2?

A I am not real certain about that one. I couldn't state how long or how recent the recompletion has been on it.

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MR. UTZ: That's all I have.

MR. McCOMBS: I would like to make a statement on this.

As far as the market of oil, we do not want to object to the issuance of this expansion, but would like to warn that there is a limit to the amount of crude that we can run in a refinery. At the present time we are going in storage about five hundred barrels a day. We have sold some oil in the past two months, but we don't have any sold for this month or the future. We would like to mention also we are buying from three other water flood projects, and if they were to expand as fast, which some of them are going pretty good, this could get pretty serious on this oil. There are several other projects that have been applied for and some issued that are in our area. This water flood oil has increased by five hundred barrels in the last five months as this project has indicated. We feel that the market and the purchaser should be considered on issuing these projects.

MR. CAMPBELL: May I make an observation on that point since it has been brought up? Of course, I think everyone is aware of, by virtue of prior hearings, that this question of sale of this oil is a pertinent question. I think, however, it would be proper to observe that if the recovery of this additional oil in New Mexico is to await expansion of refinery facilities and purchasing facilities, it will be a long wait before it is obtained. Of course, whether a producer is going to be able to sell his oil is a problem not confined to secondary recovery projects. It is a business risk

which the producer, the people who make these investments and spend the money have to take. And I don't believe that the question of whether this particular purchaser and this particular refinery are going to be able to buy the oil that may or may not be produced, depending on the success of these projects should be the primary factors in determining whether the project should be started or expanded. I have the feeling myself that if these secondary recovery projects work out as they apparently are going to work out in New Mexico, that we will find a market for the oil. If we don't find a market for the oil, the person that made the investment is the one that is going to lose, and the investments have to be made, and if everybody in New Mexico awaited for the drilling of additional or new wells until they were certain that they were going to sell the oil, we wouldn't have as many wells as we have now in New Mexico on primary production.

MR. NUTTER: Does anyone have any questions of Mr. Harrison?

MR. STAMETS: I have just a couple.

QUESTIONS BY MR. STAMETS:

Q Mr. Harrison, do you have any idea of the original capacity of the No. 46 Wells in the southwest, southeast Section of 21?

A Of the original capacity?

Q Producing capacity?

A Producing capacity on primary production?

Q Yes, sir.

A No, sir, I don't. Our records and the records that were kept don't enable us to break that production down to define what one particular well will make or has made.

Q The water that is being produced there now is connate water?

A It could be connate water. We don't have an analysis of it, and it would be doubtful if an analysis would determine whether it is connate water or flood water.

Q It doesn't seem like a particularly high rate of oil for water produced there, does it?

A No. It has had only a slight increase, and the water has increased in proportion to the oil.

Q Would you say that that was an effect of the water flood and the way it is going, or the oil in place?

A It probably -- if this is a water breakthrough, it would be a characteristic of the formation in that particular area.

Q If it were determined that this is water breakthrough, do you think that injection wells should be put into service in the near future? I believe you show one here to the west on the section line between the quarters there?

A Yes, we anticipate drilling that well in the near future and coring it to determine something of the sand quality and characteristics in that particular area, and expansion in that area will be determined somewhat by the data we obtain there. As you'll note to the east, the development has been spares, and as to whether or not it is economical, it is still a question.

MR. SPAMETS: That's all the questions I have.

A Mr. Examiner, may I ask the gentleman from Malco a question? I would like to know if the refiners are thinking in terms of making any type of expansion to take care of additional volumes of oil.

MR. McCOMBS: No, not at this time. It is the marketing of the finished product.

A The marketing of the finished product is what is controlling your thinking right now.

MR. McCOMBS: Yes.

A I see.

MR. NUTTER: Does anyone have any questions of Mr. Harrison?

MR. IRBY: I would like to ask one more question.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. IRBY:

Q What disposition is being made of the water that is being produced?

A At the present time it is being brought into a surface pit. We plan to bring it into a system of tanks or of line pits as soon as we can get our plant worked out so that we will be able to set up a procedure for handling this water in a manner that would make it fit injection water.

MR. IRBY: Thank you.

MR. NUTTER: Are there any further questions of Mr. Harri-

son? If not, he may be excused.

(Witness excused).

MR. CAMPBELL: I would like the record to show I offered Ibex' Exhibits 1 through 4 in evidence.

MR. NUTTER: Is there objection to the introduction of Ibex' Exhibits 1 through 4 in Case 1196? If not, they will be received.

We would like to have Mr. McCombs take the witness stand if anybody has any questions they wish to ask him. If there are no questions of Mr. McCombs, he won't be called then.

Does anyone have anything further they wish to offer in this case? If there is nothing further, we will take Case 1196 under advisement and take up Case 1498.

STATE OF NEW MEXICO)
 : ss
COUNTY OF BERNALILLO)

I, J. A. TRUJILLO, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript by me and/or under my personal supervision; that the same is a true and correct record, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this _____ day of _____, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Notary Public

My Commission Expires:

October 5, 1960.

BEFORE THE
Oil Conservation Commission

SANTA FE, NEW MEXICO

August 16, 1956

IN THE MATTER OF:

CASE NO. 1130

TRANSCRIPT OF PROCEEDINGS

DEARNLEY-MEIER AND ASSOCIATES

COURT REPORTERS

605 SIMMS BUILDING

TELEPHONE 3-6691

ALBUQUERQUE, NEW MEXICO

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Case No. 1130

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
PALMY HALL - STATE CAPITOL
SANTA FE, NEW MEXICO
AUGUST 16, 1956

R E G I S T E R

NAME	REPRESENTING	LOCATION
Leroy Wisc	Velma Petroleum Corp.	Hobbs, N. M.
Ira A. Herbert	Southwest Potash Corp.	Carlsbad, N. M.
Charles W. Hicks	Farm Chemical Resources Development Corp.	Carlsbad, N. M.
W. Aubrey Smith	Southwest Potash Corp.	Carlsbad, N. M.
R. H. Lane	International Minerals & Chemical Corp.	Carlsbad, N. M.
E. C. Jourdan	Potash Co. of America	Carlsbad, N. M.
G. E. Atwood	Duval Sulphur & Potash Co.	Carlsbad, N. M.
G. C. Weaver	Duval Sulphur & Potash Co.	Carlsbad, N. M.
D. L. Libbey	U. S. Potash	Carlsbad, N. M.
R. J. Reeder	National Potash.	Carlsbad, N. M.
R. H. Blackman	Potash Co. of America	Carlsbad, N. M.
R. S. Fulton	U. S. Geological Survey	Carlsbad, N. M.
J. A. Forest	U. S. Geological Survey	Artesia, N. M.
C. M. McConnell	U. S. Geological Survey	Carlsbad, N. M.
John A. Anderson	U. S. Geological Survey	Roswell, N. M.
J. W. Gurley	N. M. O. C. C.	Santa Fe, N. M.

DEARNLEY-MEIER AND ASSOCIATES
STENOGRAPHIC REPORTERS
ALBUQUERQUE, NEW MEXICO
TELEPHONE 3-6691

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IN THE MATTER OF:

CASE 1130: Application of the New Mexico Oil Conservation Commission on its own motion at the request of Velma Petroleum Corporation for approval of four proposed wildcat oil well drilling sites located in the potash area of Eddy County, New Mexico, in compliance with Paragraph VII of Commission Order R-111-A. Applicant, in the above-styled cause, seeks an order approving four proposed wildcat oil well drilling sites to be located in the center of each 40 acre sub-division of the SE/4 of Section 23, Township 19 South, Range 30 East, Eddy County, New Mexico. The Potash Company of America entered an objection to the administrative approval of the subject application whereupon the matter was referred to the Secretary-Director of the Oil Conservation Commission for arbitration. No satisfactory settlement could be reached through arbitration and the matter is hereby set for hearing.

BEFORE:

A. S. (Johnny) Walker.
A. L. Porter, Jr.

TRANSCRIPT OF PROCEEDINGS

MR. WALKER: The hearing will come to order. The first case on the Docket is Case 1130.

MR. GURLEY: Application of the New Mexico Oil Conservation Commission on its own motion at the request of Velma Petroleum Corporation for approval of four proposed wildcat oil well drilling sites located in the potash area of Eddy County, New Mexico, in compliance with Paragraph VII of Commission Order R-111-A.

MR. GIRAND: I would like for the record to show Neal Girand appearing on behalf of the Applicant.

MR. WALKER: How many witnesses do you have?

MR. GIRAND: I have one witness.

MR. BLACKMAN: I would like the record to show R. H. [unclear]
Jr., Carlisbad, New Mexico, appearing on behalf of the [unclear] of
America.

MR. WALKER: How many witnesses do you have?

MR. BLACKMAN: I am planning on four witnesses.

MR. WALKER: I would like to swear them all in at one time.
Of course, it is understood that if either side has any further
witnesses, we can swear them in at that time.

MR. GIRAND: If it please the Commission, at this time I
believe that the Applicant and the Protestant, Potash Company of
America, have agreed on certain stipulations which will shorten
the hearing to some extent.

MR. BLACKMAN: That is right.

MR. GIRAND: And, if we may, we will just dictate the stipu-
lations into the record.

MR. WALKER: That will be fine.

MR. GIRAND: It is stipulated that W. C. Neal is the owner
of record of U. S. Oil and Gas Lease No. NM06770 covering the SE/4
of Section 28, Township 19 South, Range 30 East, NMPM; it is further
stipulated that the property covered by Lease No. NM06770 is located
within the area known as the oil-potash area in Lea and Eddy Counties,
New Mexico; it is further stipulated that Velma Petroleum Corporation
of Hobbs, New Mexico, is the operator designated by the owners of

the working interest on said lease in view of the operations of the lease; it is further stipulated that Potash Company of America is the owner of the potassium lease from the United States. Do you want to give the number?

MR. BLACKMAN: Being Lease No. U.S. Cruces 040/29 A, C and D, and 050063 B, E and F, originally dated the 16th of January, 1933.

MR. GIRAND: It is further stipulated that W. C. Neal, the lessee under U. S. Oil and Gas Lease Serial Number NM06770 signed the stipulation required by the Department of Interior required of all successful bidders for leases within the potash area, the pertinent parts of the stipulation being set forth on this exhibit.

(Whereupon PCA Exhibit No. 3 was marked for identification.)

MR. GIRAND: It is further stipulated that the Velma Petroleum Corporation, the operator under the Oil and Gas Lease NM06770, has complied with all of the procedural steps required under Orders of the Oil Conservation Commission of the State of New Mexico, being Order No. R-111-A, and the approval date of that Order is 13 October 1955; it is further stipulated that either party or any party to this proceeding will have the right to introduce such documentary evidence in support of the stipulated facts.

MR. BLACKMAN: Potash Company of America is agreeable to the stipulation as dictated by Mr. Girand.

MR. WALKER: The record will so show.

DEARNEY-MEIER

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a witness, called on behalf of the Applicant, having been first duly sworn on oath, testified as follows:

EXHIBIT 111-111-111

BY MR. CHAND:

Q State your name, please.

A Leroy Wise.

Q Where do you live?

A Hobbs, New Mexico.

Q Are you associated with the Velma Petroleum Corporation?

A Yes, sir.

Q In what capacity?

A President.

Q Are you the operators designated by the owners of the working interests under U. S. Oil and Gas Lease 11105770?

A Yes, sir.

Q That covers the SE/4 of Section 23, Township 19 South, Range 30 East?

A Right.

Q Mr. Wise, as operator, or designated operator, of that lease, have you filed application or notice of intention to drill with the USGS and with the Oil Conservation Commission?

A We have.

Q In that application did you set forth, or did your office set forth, the drilling program, submitting the program to be employed by the corporation in the drilling of any well?

A Yes, sir.

Q Now, Mr. Wise, you filed four applications, or four notices of intention to drill at one time?

A That's right.

Q For the purpose of the record, will you tell the Commission

Why you filed four notices at one time?

A Well, due to the fact that there was a question, after conference with Potash Company of America, knowing that they would have some objections or might have an objection, we didn't want to file for just one location until we knew that we would have all four locations approved, and instead of hearing on each separate location, we decided that it would be proper to have the hearing on all four locations at one time.

Q Under your letter acquiring your working interest of the U.S. Lease, as has been identified here, did you have any continuous drilling program in the event of discovery? A We did have.

Q Did you feel, or do you feel at this time that it is necessary that you be able to develop the entire property in the event of discovery?

A It would be, for economic reasons.

Q Mr. Wise, I hand you here what appears to be copies of your notices of intention to drill on the four proposed locations. Is that a correct copy of the notices filed by the Velma Petroleum Corporation, as operator? A It is.

Q Will you read into the record the casing program as set out and outlined therein?

A We propose to drill a hole eleven inches in diameter to 370 feet, cement with 150 sacks of cement, allow cement to set under pressure for twelve hours, and an additional 12 hours drying time, test casing by bailing dry; drilling a seven and seven/eighths hole

and setting five and a half casing, cementing with 400 sacks, allowed to set 48 hours, all cement to be circulated as set out in regulations; this well to test Yates Formation.

Q In your opinion, as an oil operator, is that program in full compliance with the requirements of Order H-111-A of the Oil Conservation Commission of New Mexico? A Yes, sir.

MR. GIRAND: Pass the witness.

MR. BLACKMAN: No questions.

MR. WALKER: Is there any further questions of the witness?

BY MR. MANKIN:

Q Mr. Wise, you indicated when you read the program there, you indicated five and a half, and you indicated the program which you intended to follow, but I didn't understand the depth where you intended --

A That is the Yates Formation at about seventeen hundred.

Q In other words, there is only an intermediate string and --

A Surface string.

Q -- surface string and production? A Yes, sir.

MR. WALKER: Any further questions?

BY MR. NUTTER:

Q Mr. Wise, in your indicated cement program you planned to cement the surface pipe with 150 sacks, and the other string with a given amount of cement. Would those cementing programs be subject to change if the calculated volume required of cement were such that more than 150 sacks would be required?

A That is stated in there that we would circulate the cement in accordance with the Commission Regulations.

Q In other words, you weren't bound by the 150 sacks?

A It states that in the application for the permit.

MR. NUTTER: That is all.

MR. GIRAND: For the purpose of the record, that is 175 sacks instead of 150.

A Of course, that is an arbitrary figure, and the other regulations as set out in that application for permit to drill states that we shall circulate the cement to the top in accordance with the Conservation's Rules and Regulations, so, consequently, those figures of sacks are completely arbitrary.

BY MR. GIRAND:

Q Just one further question. Mr. Wise, in filing these applications, and the manner in which they were presented, there was no intent or attempt on the part of Velma Petroleum Corporation to disobey any of the Rules of the Oil Conservation Commission or the U. S. Geological Survey, was there? A No, sir.

MR. MANKIN: I didn't hear a program there as to salt solution.

A It will be drilled with cable tools.

MR. WALKER: Is there any further questions of this witness? If not, the witness may be excused.

(Witness excused.)

MR. WALKER: Is that your only witness?

MR. GIRAND: That is my only witness at this time.

(Whereupon, Applicant's Exhibit No. 1 was marked for identification.)

MR. GIRAND: At this time we would like to offer a reproduced copy of a letter received by John A. Frost, District Engineer of the U.S.G.S., which shows and recites that in addition to complying with the stipulation that has been entered into between the lessee and the U.S.G.S., that the Velma Petroleum Corporation must do this:
(Reading Applicant's Exhibit No. 1).

MR. WALKER: Is there any objections to this Exhibit?

MR. BLACKMAN: No objection.

MR. WALKER: It will be received.

(Whereupon Applicant's Exhibit No. 1 was received in Evidence.)

MR. GIRAND: That is the Applicant's case.

MR. WALKER: Call your first witness, Mr. Blackman.

MR. BLACKMAN: We call Mr. Jourdan. I wonder, Mr. Chairman, if I might have the indulgence of the Commission to conduct my examination sitting down.

MR. WALKER: Certainly.

E V E R E T T C. J O U R D A N

a witness, called on behalf of the Protestant, having been first duly sworn on oath, testified as follows.

D I R E C T E X A M I N A T I O N

BY MR. BLACKMAN:

Q Mr. Jourdan, please state your full name for the record.

A Everett C. Jourdan.

Q By whom are you employed? A Potash Company of America.

Q How long have you been employed by that company?

A Thirteen years.

Q What is your present capacity? A Mining Engineer.

Q What are your duties as Mining Engineer with Potash Company of America?

A In charge of the planning of future mining operations, the statistics and cost work, general engineering nature for the mine.

Q Mr. Jourdan, are you familiar with the general methods of mining potash, general locations of deposits of potash, quite generally in North America?

A Yes, sir.

Q Will you describe for us, just generally, the locations where commercial deposits of potash are presently known to occur on the North American Continent?

A Of course, our biggest at the present time is Carlsbad, that is in production; there is a deposit of unknown quantity in Moab; there is a --

Q Moab where?

A Utah. There is a small production coming from California at the present time, and I think the largest future production will eventually come from Canada.

Q Do you know of the existence of any other deposits of potash in the North American Continent that is known to be of commercial location and quality at the present time? A No, sir, I don't.

Q Will you describe generally, from what source, or how, this potash occurs in the Carlisbad area, and how deep it lies?

A Beg your pardon?

Q How deep is it?

A It varies anywhere from 500 to a little over 1,000 feet deep in our particular mine, and, of course, in that same general depth in the other mines in the area.

Q How are the deposits of potash laid down?

A They are laid in the salado or salt formation in flat deposits varying from four to twelve or fourteen feet in thickness.

Q Is Potash Company of America the lessee under a Federal lease of the SE/4 of Section 28, Township 19 South, Range 30 East of the New Mexico Principal Meridian? A Yes, sir.

Q Have you prepared, Mr. Jourdan, a plat of the SE/4 of Section 28, Township 19 South, Range 30 East, to show the present openings, the present workings of Potash Company of America's mine and also the projected future mining plans as it affects Section 28?

A Yes, sir, it is on the board right here behind me. This is --

Q Just one moment, please.

(Whereupon, PCA Exhibit No. 1 was marked for Identification.)

Q Mr. Jourdan, referring to PCA Exhibit No. 1, would you designate for the Commission with a capital "A" the north boundary of the present workings, the present openings in the PCA mines.

A You mean the -- this is the north. You mean limits?

Q I mean the limits as shown on that sketch.

A That would be --

Q Indicate with a capital "A."

A That is this dash line around here where the present facies are, as of this month, at the present time.

Q Now, still referring to that plat, the heavy lined plan of the plat is indicated in heavy lines to show what?

A This shows the worked-out areas, this is done in light pencil. As we advance the line, we draw an advance in in ink, which, of course, makes the darker print, and this area back in here is already worked out at the present time, in behind this line of facies here.

Q Roughly speaking, then, the heavier marking on the plat is intended to show the present workings of the mine?

A Yes, sir.

Q Now, proceeding to the left side of the map, then, you have scaled in in lighter color similar plans. Will you explain what those represent?

A Yes, sir. That's where we are intending to extend these workings outward to the limits of the ore which are out in this area somewhere here.

Q When you say "out in this area somewhere here," you are referring to an area completely off the map?

A Yes. I would say yes, fourteen percent line.

Q Will you indicate on the map there by the letters "B," "C," "D" and "E" the corners, the four corners of the SE/4 of Section 26

is the same as the one shown on that, and I do not believe they are, "B," "C," "D" and "E".

A Yes, sir.

Q On the basis of the application filed by Veima Petroleum Corporation for the box locations in the four forty acre plots, would you indicate with the letters "B," "C," "D" and "E", the location of those wells as shown on the plat? Indicate it right in the location, if you will, please, Mr. Jourdan.

A Yes, sir.

Q Now, you have shown those locations there surrounded by a circle; will you explain why those locations are surrounded by a circle?

A That is a pillar of 100 foot radius which we would be forced to leave around any well in that area if it was drilled. This one here, of course, would go right down in the middle of the workings, and we couldn't possibly leave a barrier there. I showed it there mainly to emphasize.

Q In respect to the locations which are labeled, the one labeled "I," your testimony is that that location would go right through the present workings of the mine, is that correct?

A Yes, sir.

Q When mining plans proceed, Mr. Jourdan, will this plan of mining be followed?

A Within reasonable limits, yes, sir. We might run into salt, a salt horse, and have to turn, but in general this would be the

Q Now, Mr. Jourdan, will you still draw a line which would go through the entry, and segment of which goes through the top of Section 23. Will you please identify that line with the letters "L", "I", and "M". Is the "L" at the middle, and "I" at the other end. A Yes, sir.

Q Tell us what that represents.

A In planning our mine, we have attempted to lay out our working lines and working schedule. At the end of five years, this is probably the limits where the workings will be at that time.

Q The five-year line that you have drawn on there is the same line as is shown on the official maps presented, or rather filed with the Oil Conservation Commission in compliance with Order R-111-A, is that true, Mr. Jourdan? A Yes, sir.

Q Now, Mr. Jourdan, will you describe generally the method of mining which I believe is called the room-pillar method of mining which is illustrated by that sketch?

A Our haulage ways for either belt conveyer or track would be in this entry, we would proceed down here leaving these pillars on each side. We would go out and take approximately sixty-five per cent of it in the first mining.

Q What is the designation of that entry?

A NW323. We would proceed out in these panel areas, and remove approximately sixty-five percent of the ore, then we would intend to come back and take out a remaining twenty-five percent by removing

three pillars.

Q When you say a "remaining twenty-five percent," do you mean twenty-five percent of what is left, or twenty-five percent of the original hundred percent?

A Twenty-five percent of the original one hundred percent.

Q So the total amount which would be removed under the plan which you have outlined would be sixty-five percent on the first mining and twenty-five percent, or a total of ninety percent of the potash present in that area, is that right?

A Yes, sir. Yes, sir.

Q Have there been any pillar-pulling operations performed at the Potash Company of America?

A No, sir, there haven't been at the present time.

Q I might clarify that question a little bit. Is the operation of the second mining which you have stated that twenty-five percent of the ore would be removed commonly referred to as pillar pulling?

A Yes, sir.

Q How much of the potash is left in a pillar-pulling operation and why is it left?

A Approximately ten percent of the overall total would be left mainly as protective pillars and to protect your haulage way when you moved out.

Q That is a variable figure, is it not, depending on circumstances?

A Yes, sir. That is theoretical. I think some of the other

companies could probably answer that question better than I could. They have had more experience.

Q Mr. Jourdan, have you ever supervised or participated in any plugging operations on wells, oil and gas test wells in this particular area, and, by particular area, I mean within the vicinity of five or ten miles from Potash Company of America's mine site in Bldy County, New Mexico?

A Yes, sir. I supervised the plugging of Mr. Neal Willis' wells in the Barber Pool; we plugged them under our supervision so we were sure they were plugged as close as we could get to what we thought was reasonable for protection.

Q Do you recall the plugging of the State 1-B in the Barber Pool, Mr. Jourdan?

A Yes, sir.

Q Would you describe that for the record, please?

A The well was abandoned by Mr. Willis and he notified us that we could take over the plugging of these wells, and this one particular well, at the time we went out there to examine it, it had a gate valve which was shut on the top of the, I believe, seven inch casing. I opened the valve and it blew gas for about forty-five minutes and never did stop up until that time, so I shut the valve and went back to the laboratory and had a chemist come out and get some samples out of the well, and --

Q What did you do after that?

A Then we put a gauge on the well and left it, and --

Q Did you allow the well to blow for a while before putting the

Gauge on?

A Yes, sir. We let it blow for two days.

Q Then after you shut it in with the gauge, what did you discover?

A Four pounds per square inch reading on the gauge. We opened it and left it for about a week, then.

Q What was the composition of the gas?

A Sixty percent methane, and forty percent nitroge., and with a trace of hydrogensulfide.

Q Now, Mr. Jourdan, in what formation was that well drilled to?

A The Yates formation.

Q Are you familiar with whether or not there is any gas produced in any other wells in this vicinity from the Yates formation?

A I know the best evidence is to drive down through the pool and you can have a very --

Q What pool?

A Barber Pool, or the Getty Pool, any of the pools out in that general area have a very definite odor of hydrogensulfide.

Q But there is some gas being produced?

A I would say yes.

Q That, however, is not in the nature of commercial gas as generally known, is that true?

A No, sir. I do know, in, I believe it's the Hale, I'm not sure of the pool designation, but in that general area, there is two gas wells that have been plugged by Mr. Wills, that I think at

one time were commercial.

MR. DIACKMAN: I believe that is all for now, Mr. Jourdan.

MR. WALLEN: Just a moment, Mr. Jourdan, you haven't been excused, yet. Is there any further questions of this witness?

MR. GIRARD: Yes, sir.

C R O S S E X A M I N A T I O N

BY MR. GIRARD:

Q Mr. Jourdan, can you show, from Exhibit No. 1, the approximate outer boundaries of your mining on or about April the 19th, 1956?

A Same location.

Q Same location?

A Yes, sir.

Q There has been no development within the SE/4 of Section 28 since April 19th?

A No, sir.

Q Now, for the purpose of the record, the small squares shown on the exhibits, what is the dimension of those squares?

A This, the small pillar?

Q Yes, sir.

A They are sixty-five feet, under this plan, from center to center of the rooms, and the rooms are thirty feet wide; that would be thirty feet off sixty-five, or thirty-five feet square.

Q Thirty-five feet square?

A Yes, sir.

Q Now, as you have shown there by your circles marked "F," "G," "H" and "I," what is the diameter of the circle?

A One hundred feet in radius.

Q Now, in relation to the proposed mining area, or the mined

area upon your obtaining the ninety percent production, in relation to that ninety percent of production from each forty-acre subdivision, what is the ratio of the area that would be required to be left as a pillar around a well, as to the total production on your ninety percent basis?

A Will you restate your question, sir?

Q What I am driving at, Mr. Dearnley, what is your potential production from each forty-acre subdivision?

A That would vary with the height of the ore in the area.

Q Well, have you made any estimates?

A In this particular area, I would say the ore is approximately four and a half feet high. I would have to figure it out. I don't have them in my head, I would have --

Q Now, that would be true of the area that you would leave for a pillar, around an oil well bore hole, is that right? In other words, it would be static throughout the entire forty acres?

A You mean we would leave this one hundred foot barrier around every well?

Q Yes, sir.

A Yes, sir.

Q All right. Now, have you calculated the amount of ore remaining that would be recoverable to you as to the amount of ore that you have to leave during the life of an oil and gas well?

A I don't think we would recover any more than sixty-five percent if we had these wells in this area.

Q You feel that sixty-five percent would be your maximum recovery?

A I would be very hesitant to pull pillars where there is an oil well.

Q But you would be able to go along and produce your sixty-five percent of the ore?

A Minus the barriers.

Q I beg your pardon?

A Minus the barriers that we would leave around here, the one hundred foot pillars.

Q Well, percentage wise, have you arrived at any figure?

A It would probably be, I would say, two or three percent. I haven't figured it. It's something like that.

Q In other words, then, during the life of oil and gas production within the area there, you would be able to realize at least sixty-two or three percent of your ore body during the life of the production of oil and gas?

A I would say reasonably, yes, sir.

Q Now, on your exhibit there, do you have any area where you have gone back and made your additional recovery of twenty-five percent of one hundred percent?

A No, sir. We have not pulled pillars anywhere in our mine at the present time.

Q And, at the present time, how long have you been in operation there, Mr. Jourdan?

A Since 1935.

Q And, since that time, you have been operating your mine on

a recovery of approximately sixty-five percent of your ore in place?

A Yes, sir.

Q Mr. Jourdan, is there any particular reason why the outer boundaries to the north and east -- I beg your pardon, west, of your properties have not been extended since April 19th?

A Yes, sir. When we converted over to continuous mining, we took our conventional equipment out of here and plan to come back in with conveyer belts. What we mean by conventional equipment is joy loaders and shuttle cars.

Q Now, you have been in that process since April 19th, is that correct?

A Since before then.

Q Since before then. Has that been over your entire mining operations, or do you have facies on the other side of your mine, for instance, east, north, south sides?

A Yes, sir, and we work only a small area of our mine at one time.

Q On what basis do you arrive at your protracted line, or five-year extended recovery?

A By our production, estimated production figures and tons or number of cubic feet and the tons in each area, and how much we will need to extract and where we will move our equipment, the power, the haulageway tract installation is taken into consideration.

Q Then would you say your protracted line there is correct within a radius of reasonable error?

A It is an estimation.

Q Now, I notice on the map you have an area here undesignated,

that seems to be approximately 150 feet wide and extending over quite an area there. Will you make that, oh, either 1 or 2, anything to identify it?

A I will make it a 2 there.

Q Now, what does that area represent?

A That is a barrier pillar to protect the different panels. This is what we refer to as a panel there; we will have another one here, and we have these barriers in here to keep the weight from coming down too much in one section.

Q I see. Now, would a bore hole of some eleven or twelve inches, we will say, in diameter down to a depth of approximately 375 feet, from there on about seven and a half inches in diameter affect the strength of that barrier?

A It would to a very small extent. I couldn't answer that question exactly.

Q It would be within a tolerance of why you had the barrier, say, 150 feet rather than 150 feet and two inches?

A Yes, sir.

Q Then there would be areas within your proposed mining where a well bore could be located where the operators of both the oil and gas lease and you, in the operation of the potash mines, could both live under and operate under?

A If we wanted to settle on an overall sixty-five extraction, yes.

Q The location of a well bore in your barrier area would deprive

you of going back to your twenty-five percent?

A I would say it would. I would be hesitant to pull pillars with an oil well in the area.

Q Of course, in your mining operations to date, you have had no occasion to go back for that twenty-five percent recovery --

A I think we --

Q -- around any particular well bore or old well bore in your mine -- I mean in your potash area? A No, sir, we haven't.

Q Now, in that area, there are numerous core holes, are there not, drilled to determine the amount of --

A Yes, sir.

Q -- the potash, or if potash exists? Now, those core holes are not of quite the same diameter of an oil well, but then they are what size, if you know?

A Oh, I would say the actual open hole would probably be about four inches in diameter. That's just a rough estimate.

Q Now, in relation to the core holes, what size pillow do you leave around core holes?

A One hundred foot radius.

Q One hundred foot radius. Now, the existence of those core holes in your mine, do they deprive you of your going back into your mine for your second mining operation to recover your additional twenty-five percent?

A No, for the reason that the core holes usually end about six feet below the potash bed, they do not go down into the oil or gas

formations.

Q The penetration of the salt into the formation, would it weaken the hole to any extent?

A I would not say that it would, no, sir.

Q I mean after all is said and done, the only thing that can happen would be from your mined area upward, and not downward on a recovery basis, isn't that right?

A I'm not sure of that, sir. I think there would be a great deal of concentrated weight on the bottom in certain areas.

Q But it would be weight from above, where you had extracted your ore?

A It would be a squeeze, I would assume, down on the bottom.

Q And any hole that extended down below the ore body would be the same, whether it were a core hole or oil well?

A If it went below into the, through the salt, I would say it would be affected in the same way.

Q As I understand your testimony, the majority of the core holes go through the ore?

A That's right. We have a marker bed below the ore. That's the end of the hole.

Q That particular hole does not necessarily weaken your overhang, or your over burden, is that correct, in your opinion?

A I don't believe it does, no, sir.

Q But then one that penetrated deeper would, is that your testimony?

A No, sir, I don't think it would be it weaker; I'm saying it would be stronger because of the fact of any movement in the bottom. There is a possibility of gas or salt water coming from below.

Q You have been in that area for some twenty-five or twenty-six years?

A The mine has been, yes, sir.

Q I didn't mean you, personally, I meant the company. You have been there thirteen?

A Yes, sir.

Q During that time you have had no occasion to go in and effect this secondary recovery of twenty-five percent in any part of your workings, is that correct?

A We have managed to stall it off. We are going to have to in the near future.

Q When would you anticipate that, Mr. Jourdan?

A That would be a pretty difficult question to answer. It depends on our production schedules.

Q Can you proximate it in a tolerance, say, of two or three years?

A I would say within three years, if not sooner.

Q You, yet, have designed there only a portion of the area that you will be able to penetrate within the next five years on your primary recovery?

A We are going to be pulling, probably, pulling pillars in some area of the mine. It takes a lot of experimenting. I think the

International Minerals or U. S. Potash can probably tell you how much trouble they went through in pulling pillars. Of course, we are rather secretive with our information. We are going to have to learn the hard way, to a great extent.

Q Maybe we will learn something about it today, I don't know.

MR. BLACKMAN: I might state that I am going to put on, later, a witness from both United States Potash and International Minerals, both of whom are familiar with their pillar-pulling operations, and may be able to give you the information you wish.

Q I just want to ask one other question. Should practice in the field, or methods be developed, that would satisfy you engineering wise, that the leaving of the pillar as you have designated there, with a one hundred foot radius, being sufficient to protect you and your miners in the extraction of your additional twenty-five percent, assuming that you were able to mine the area out before the production of oil and gas had been depleted, would only be approximately two or three percent, which would be within the tolerance of your base figure of ten percent you intended to leave anyhow, isn't that correct, sir?

A That would be possible, but I don't think the oil industry could devise a casing that would withstand any of the stresses of moving ground.

Q This is only a hypothetical --

A Yes. I think if they could prove to us, and guarantee it -- I would almost want a written guarantee, because our whole mine is

all mine, it is not just one area, because it is over just one area there, it would be pretty serious.

MR. SHAND: I believe that is all.

RE-EXAMINATION

BY MR. BLACKMAN:

Q Mr. Jourdan, I would like to ask another question or two. PCA Exhibit No. 1 represents a rather large scale of the SE/4 of Section 26; would you tell the Commission the approximate length of the PCA mine from north to south?

A It would be approximately six and a half miles from north to south.

Q And the approximate width from east to west?

A About three miles east and west.

Q And are all of these areas, mining areas, interconnected with the rooms the way this plat shows on the right hand side?

A Yes, sir. Every area in the mine, 475 miles of tunnels, approximately, are connected.

Q In your opinion, is there any feasible or practicable way in which any particular area of the mine could be isolated?

A Practically, no. It could be done, but from an economic standpoint it would be disastrous to us, I think.

Q I forgot in my first examination, Mr. Jourdan, to question you on one other exhibit.

(Whereupon, PCA Exhibit No. 2 was marked for identification.)

Q Mr. Jourdan, will you please indicate on exhibit No. 2 placed on the chart board in front of you what this is?

A This is a highly theoretical diagram. Actually it is backed up by information we have gotten from the other companies, but this is the area in the mine, these are pillars where they are being removed, and this was made to show the slumping action of the salt and disturbance of the floor when the pillars are removed.

Q May I interrupt you just a moment and ask you if that is a theoretical cross section shown diagrammatically of a subsidence area, an area from which the underlying support has been removed?

A Yes, sir.

Q And will you point out on the diagram and show the pillars that remain in place as they are shown on that diagram?

A These are the pillars.

Q Will you designate those pillars, one of them, please, with an "A," and the area slightly to the right of center, where the pillars are not shown heavily, are where the pillars have been removed?

A Yes, sir. This indicates the fall from the back, and fall of the pillars that fall to the side when the ground begins to take weight.

Q Was that diagram prepared under your supervision, Mr. Jourdan?

A Yes, sir.

MR. BLACKMAN: I believe that is all. I will have my other witnesses testify as to what that chart shows, in detail, and how

it relates to the other exhibits that we have, Mr. Commissioner.

MR. GIRARD: If the Commission please, there is a couple of matters I left out in my cross examination which I would like to bring out, if I may, as well as cross examine a little bit on this exhibit.

MR. WALKER: Proceed.

R E C R O S S E X A M I N A T I O N

BY MR. GIRARD:

Q Mr. Jourdan, you referred to a term 'salt horse,' or 'salt horses.' For my enlightenment, and that of the Commission and everybody else, what is a 'salt horse'?

A That is an area of salt that is encountered in mining, a small area, and there is no way of telling it in core holes, or anything, it is something you run into and you have to move to one side and go around it, or if it is in a haulage entry, you have to go through and mine the salt anyway.

Q Are they found at frequent intervals, or are they more the exception, just an occasional encounter?

A Well, it is a known fact that they increase near the edge of your ore body to approximately, oh, I would say as much in the extreme limits to ten percent of the area near the fringe, what we call the fringe of the ore is in salt horses.

Q Is there any of the fringe area within the SE/4 of Section 23?

A It is rather difficult to say. It depends on the nature of

the ore, the characteristics of the ore, and the workings from mine to mine, as far as the ore is concerned. And in the mine, if you can see those detour places, they are very small in area, but we usually get through them -- sometimes they are so small that we go ahead and mine them anyway, and stack the salt, or haul it out, but there is no large salt horses indicated in this area.

Q You have a map of your entire mine, or property, up there above your Exhibit No. 1, do you not?

A No, sir. That belongs to Mr. Libbey.

MR. BLACKMAN: That is an area of United States Potash.

MR. GERARD: I beg your pardon.

Q You do own potash leases covering Section 32 in 19 - 30, do you not?

A Right off-hand, I would -- I believe we do. I would hesitate to say.

Q For your information, that is the area in which W. H. Black has two wells, one the State Lowe No. 1 and State Lowe No. 2.

A Yes, sir.

Q Now, the State Lowe No. 2 is outside of the potash area, and the State Lowe No. 1 is within the potash area?

A Yes, sir. Right on the bare fringe, I would say, sir.

Q Then there is the W. H. Black Federal Yates No. 1, located in the SW SW of Section 26, which is within the potash area.

A That would put it out here?

Q No, right down off the corner of your map on the bottom.

A Yes, sir.

Q I believe that FCA concerned in the mining of the A. I. Black Federal Yates No. 1, as well as the A. I. Black State No. 1, is that correct?

A To the best of my knowledge it is. I do not approve the applications.

Q You do know the existence of the wells?

A Yes, sir.

Q Now, Mr. Jourdan, you never attempt a secondary recovery until you have completed your primary recovery of sixty-five percent of the ore volume, is that right?

A That is the practice at the present time in a mine, sir. There are other ways of mining it, but we do not intend, at the present time, to take it all at once.

Q I understand that under your present planning, as far as you know, that would be the planning and has been for the past several years, that you will take out sixty-five percent?

A Yes, sir, that has been the practice in the past.

Q So the two operations will not be conducted simultaneously in any given area?

A I wouldn't say that right off, Mr. Girard. We have a plan on the drawing board now of taking quite a bit and leaving very small pillars, taking eighty-five to ninety percent on the first time. It is only theoretical at the time.

Q That particular process is not being employed, nor is it

considered in your plan. But the development of the ore body under the SE 1/4 of Section 20.

A At the present time it is not, sir.

Q I see. Now, this subsidance that you have diagramed, and in which you portray the subsidance or what would happen upon removal of the pillars, what effect if any did you calculate would happen here on the pillar immediately next to the one that was removed?

A I would prefer to leave those questions to Mr. Lane or Mr. Libbey, who can actually back them up with facts. All I can give is theory.

Q Did they assist you in the preparation of this?

A No, sir. That is theoretical.

Q You have, though, calculations as to the effect it would have on the pillar immediately adjacent to the removal?

A The only thing we got from them is in the actual bottom in there and this line here of forty-five degrees. We verified that from their information.

Q That the line would be a forty-five degree angle, is that correct?

A Yes, sir. They have proof of that, sir.

Q I see. Now, that forty-five degree line, was that established on any particular depth or thickness of ore body? Was that from a four-foot ore body, or a twelve-foot ore body?

A I can't answer that question at the present time. I would rather leave that to the people who know. I don't want to stick my

out.

MR. GIRARD: Thank you very much, sir.

MR. WALKER: Any further questions of this witness?

BY MR. GURLEY:

Q Mr. Jourdan, you testified, I believe, that you figure that it will take, oh, a hundred foot barrier, that is, a radius of a hundred feet, on each side of the bore hole, is that correct?

A Yes, sir.

Q What do you base that on?

A Past -- I believe there is a Government Regulation with regard to pillars and oil wells. I think Order R-111-A has the same information in it.

Q But have you had any experience with that sort of thing in your own mine?

A You mean leaving pillars? Yes, sir, we leave them all over the mine wherever we have a drill hole.

Q You do leave a hundred feet, is that correct?

A Yes, sir. Here's one right here, for example. That is our PCA Drill Hole No. 54. The barrier has been left around that.

Q Now, according to your chart up there, the proposed well, marked, I think, "I", would be right over what is presently your operational area, is that correct?

A Yes, sir. It is right in the center of this room here, and it is almost dead center.

Q It would be a physical impossibility to leave a hundred foot

barrier if that wall is drilled there?

A Yes. I would say yes, you might force concrete in there, or some physical method.

MR. WALKER: Any further questions of the witness?

BY MR. NOTTER:

Q Mr. Jourdan, I didn't understand you when you stated what the extent of your five-year plan was as indicated on the map.

A You mean how we obtain this line?

Q No, sir. I didn't know where the line was. Is it that diagonal line?

A It's this line here. It is rather difficult to see. It comes right down this way and then it drops down here. Again I would like to point out that is only theoretical, it depends on our sales and equipment and production for the next three or four years.

Q Over what range of time would the mining operations, as indicated by the little rooms throughout the entire 160 acres in the SE/4 of that section, be completely mined out?

A Probably six or seven years.

Q In other words, the five-year plan is the dotted line, and the balance outside of that would be another year or two?

A I would like to point out that this area out here is not definite yet, these edges are more or less feathered out. There is no limit there. That is not the limit of the ore, either, it is just lying out of our mining plans through that area.

Q Where do you estimate the limit to the ore is to the west?

A It depends on the limit of what ore, what percent and what height. That is kind of a hard thing to say, because I think one of the other mines is mining stuff that we would throw away.

Q What is the approximate thickness of the ore bed in this area that you have mined as indicated by the heavy lines?

A In here?

Q Yes.

A About four and three-quarters feet, I would estimate; it is about four and a half out here.

Q And is the thickness of the deposit thinning?

A Yes, theoretically, we assume it does. Sometimes we hit on the edge of the salt, it will be six feet on one round, and five the other, and you will be in solid salt.

Q In the area such as this, where the average thickness is probably four and a half feet, unless we are giving away a secret here, what rate of advance would you make as you mine that out?

A I would have to calculate that. We would have to know what kind of equipment we have in here, continuous miners, or joy equipment. If you had joy equipment in there, you would probably run around sixteen feet per heading per day.

Q What does that mean?

A In each of these, say you were coming in this tunnel here, you would probably get sixteen feet in a day here, this way. It depends on the number of tunnels and how much you are working in the panel at a time. It is a hard question to answer. It would

actually depend on the equipment available, number of men you had.

Q Rate of production?

A Yes, for that panel.

Q If and when you decide you are going to pull some pillars -- Now, I understand you take sixty-five percent out in your first or primary operation?

A That's right.

Q When you go in and pull your pillars, you recover another twenty-five percent?

A Yes.

Q What happens with the remaining ten percent.

A Stuff we can't possibly get, fall off the side of the pillars, clean up, and a certain number of small pillars that you have to leave. As I say, on that pillar pulling, I would rather leave that to the experts.

Q When you do pull pillars, though, you do leave some pillars?

A Yes, sir.

Q When you go in and recover your secondary ore, and pull pillars, do you pull those barriers like that big barrier you marked as No. 2, I believe, on your Exhibit?

A At the present time I cannot answer that question, because I think we would pull a portion of it. We have no experience in that, we would have to sit down and figure what we are going to do, we might have to take a chance on losing some equipment in learning.

Q How long has it been since your operations were in this area indicated by the heavy lines?

A Approximately two and a half years down in here.

Q I see. One other question, Mr. Jordan -- or two more, rather. You said as you drive down through these oil fields in that area, you can smell hydrogensulfide gas, is that correct?

A Yes, sir.

Q Do you know the percentage of hydrogensulfide in the gas produced in that area?

A No. We had only a trace in the test. Of course, you can smell it a long way. I think the actual wells are some five hundred or a thousand feet from the road, and you can get a very definite odor of gas.

Q By 'a trace,' how many parts per million were in that?

A You will have to ask a chemist.

Q Do you know what the United States Department of Labor specifies as the amount of hydrogensulfide in the area to be dangerous?

A I know it is a very, very small percentage.

Q Would it be a trace or less or more?

A Probably a little more than a trace, I would say. I think they would get excited if we said we had a trace in the mine area.

Q You are not sure if that gas you had analyzed was dangerous or not?

A No. The laboratory reported it to me as 'a trace.'

Q Has PCA ever engaged in drilling any wells for oil and gas?

A I think we have, yes, sir, but not in our own mining area.

Q Not in this particular area? A That's right.

Q Where have they engaged in that business?

A I believe we had some up at Abbe, and I think we had some in Kansas, if I'm not mistaken. That's the Exploration Department. Mr. Blackman probably could answer that question.

MR. NUTTER: That's all I have.

MR. WALKER: Mr. Mankin.

BY MR. MANKIN:

Q Awhile ago Mr. Girard was leading you on a question in regards to the possible drilling of wells in these barriers, which I believe you have indicated as "1" or "2" on your Exhibit?

A Yes, sir.

Q He was apparently indicating by suggestion that maybe wells could be drilled in that area without leaving any great amount of potash under the ground. Is it not true that a big portion of that barrier would be mined in that other twenty-five percent operation?

A I would assume that it would be.

Q And, as a result, the danger would be just as great then as it would be out in open mine workings?

A I would say yes, that any movement in there at all, if you sheared your casing, and believe me, there is some great pressures involved, and the gas did migrate up into the mine, that would be all as far as we are concerned. I know of no way we could handle it.

Q Referring, again, to the exhibit where you showed the forty-five degrees, that is actually a component, is it not, which was

both vertical subsidence and horizontal which gives you a forty-five degree component.

A Yes, sir. You would have probably something like this. This dashed line here would indicate it is not perfect, it might break through this section, through this section it might be absolutely vertical and then go over, but the evidence here indicates that it is forty-five from the point of pillar pulling.

Q Again some questions were brought up regarding core test holes where you leave a hundred foot radius, the same as you would suggest for the oil wells. The great danger is from oil or gas below, with the casing sheared, that is your great problem, is it not?

A I would say that is our main problem. We are not overly worried about anything from the top, it is the things down below in an oil well causing our concern.

Q There is, or has been, some seepage in mines in Eddy County, has there not been?

A We had some oil in our mine that migrated from somewhere. We don't know where it came from.

Q As a result of that, were not those workings disbanded and you went around?

A Yes, sir. We backed up some five hundred feet and took off in a forty-five degree angle, hit it again, took a chance and went through it, and it seeped for about three months. Apparently it has stopped now, there is no more evidence of oil. We have never found out where it came from.

Q But it is a very great danger?

A I would say it is, yes, sir.

Q That seepage which you were mentioning there is now more of an asphaltic nature in the salt section there, is it not?

A Yes, sir.

Q In other words, it is a very heavy, viscous oil?

A It is a heavy oil, and it doesn't have too much of a petroleum odor.

BY MR. NUTTER:

Q Mr. Jourdan, is there any evidence that that came from any oil and gas drilling operations in the area?

A Fourteen hundred feet from the location of the oil there is an abandoned well plugged as a dry hole, I believe the Chase No. 1.

Q Did it recover any oil or gas?

A No, it wasn't recorded. It was recorded as a dry hole. I think their plugging procedures were probably poor.

Q Did they report any oil or gas before plugging?

A Not to my knowledge.

Q So there is no evidence that this oil came from any oil or gas well?

A I don't think we can prove it, but we believe that's where it came from.

MR. WALKER: Any further questions of this witness?

MR. GERAND: Has it been established whether that was refined or crude oil, the seepage?

A There are no pipelines around there that I know of at that depth.

MR. WALKER: I see. All right. (Laughter.)

REDIRECT EXAMINATION

BY MR. BLACKMAN:

Q A couple of more questions. The area that is designated on PCA Exhibit No. 1 indicates two main haulage entries; I believe it is in W223, is that right?

A 325. Up here it is 223.

Q Now, I would like an estimate, Mr. Jourdan, of the number or other working places in the PCA Mine, not those that are working, but the number of other working places that are in the mine, similar to this, if you can make an estimate of that number just to give us an idea of the size of the overall operations.

A We probably have -- you mean that have been worked out, or where we are going?

Q That's right.

A Oh, probably three or four hundred.

Q How many do you usually work at one time?

A About four or five.

MR. BLACKMAN: That is all.

MR. WALKER: Are there any further questions of this witness? If not, the witness may be excused.

(Witness excused.)

MR. BLACKMAN: I would like to call Mr. Libbey.

MR. WALKER: Before we start with your next witness, let's take a five-minute recess.

(Short recess.)

MR. WALKER: The hearing will come to order.

D O N A L D L. L I B B E Y

a witness, called on behalf of the Protestant, having been first duly sworn on oath, testified as follows:

D I R E C T E X A M I N A T I O N

BY MR. BLACKMAN:

Q Mr. Libbey, will you state your full name for the record, please?

A Donald L. Libbey.

Q Your profession, Mr. Libbey?

A Geologist.

Q By whom are you employed?

A United States Potash Company Division of United States Borax and Chemical Corporation.

Q What is your position with the United States Potash Company?

A Assistant to the Resident Manager.

Q How long have you been with the United States Potash Company?

A Approximately seven years.

Q Are you familiar, generally, with the geology in and around the potash producing section in Carlsbad? A Yes, sir.

Q Would you compare the geology of the area with which you are particularly familiar, the United States Potash Mine, with the other areas, particularly the Potash Company of America section?

A The location of the United States Potash Company Mine is

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approximately eight miles southeast of the mining area of Potash Company of America. As far as the geology is concerned, the Salado Formation is present in approximately the same degree of conformity that you gentlemen have over at Potash Company of America, very similar in every respect.

Q You heard Mr. Jourdan testify this morning concerning the method of producing potash which is employed at Potash Company of America; what method is employed at United States Potash Company?

A Very similar to what Mr. Jourdan presented, very similar.

Q Do you proceed with mining plans in somewhat the same way at United States Potash as Mr. Jourdan testified as to Potash Company of America?

A Yes, sir.

Q Is the potash producing zone from which potash is now being produced at the United States Potash Mine the same zone from which potash is now being produced from the Potash Company of America Mine?

A Yes, sir.

Q Do the same structural beds exist from the potash producing zones upwards as they do at the Potash Company of America Mine?

A Yes, sir.

Q Would you generally outline those beds, beginning at the potash producing bed, with particular reference, if you would, Mr. Libbey, to PCA Exhibit No. 2, which is posted on the chart board, marking on that Exhibit a letter indicating where the potash is and the generalized zones above that by other letters?

A Yes, sir.

Q Beginning with the letter "D," if you please.

A As you know -- can you gentlemen see me?

MR. WALKER: Yes.

A As you know, this is the producing bed, this area here.

Q You are referring, now, to the bed which has been designated by Mr. Jourdan with the letter "A"?

A That's correct. That is the producing potash bed. It is in the upper one-third of the Salado Formation, and you have a salt series starting, just for the purpose of the question, from this point here on up to your top salt.

Q Will you place the letter "B" to indicate where the top of the salt is? A large one, if you please.

A Yes, sir.

Q Now, carry it on upward to your next general zone.

A On top of your top salt, going on up in the next section, you have, oh, six feet to eighty-five feet of unconsolidated material, sandy clay, silt, and heterogenous mixtures of gypsums. Above that, you have approximately 220 to 240 feet of anhydrite gypsum in which you have two dolomite beds, known locally as the magentadolomite and calabradolomite, with the latter being the lower member. Above your anhydrite gypsum, you have approximately 200 to 300 feet of red silt zone triassic red beds, and in certain scattered areas you have caliche outcrops. Sometimes you don't have caliche, although your caliche is --

Q All right, Mr. Libbey, would you take your seat, again, if

you please. Have you performed any pillar-pulling operations at the United States Potash Mine?

A Yes, sir.

Q And approximately when did you commence the pillar-pulling operations in secondary mining at the United States Potash Mine, if you know the answer to that?

A December the 15th, 1953.

Q And approximately when did you cease the operation, the pillar-pulling operations, in that same area?

A April the 17th, 1956.

Q Have all of those pillar-pulling operations of United States Potash been in one area, one general area?

A Yes, sir.

(Whereupon, PCA Exhibit No. 4 was marked for identification.)

Q Mr. Libbey, are you familiar with the geological and engineering work that was performed at United States Potash Company in connection with the pillar-pulling operation?

A Yes, sir.

Q Will you describe, generally, the geological work and engineering work that was done by your company in connection with that operation, what control points did you set up, what observation techniques you utilized?

A In preparation to final mining, or second mining procedure, we very carefully studied every technical consideration we could think of regarding this situation. First, we established a survey

over a large area of our property, indicating the exact survey points in respect to the exact elevations, and also as to location, which would take into consideration subsidence and displacement.

Q Mr. Libbey, would you kindly refer to PCA Exhibit No. 4, and locate thereon, in the first instance, what area is delineated in dark pink, the area that is delineated in dark pink represents what?

A The area delineated in dark pink is our present final mined area.

Q That is as of the present time? A That's correct, sir.

Q You have mined out the maximum amount of potash that it is possible to get out of that area, is that true?

A Possibly not. There is approximately ten percent of the ore still in there that was necessary to remain in there. Due to economic need, at some later date, we may go in after that ten percent.

Q I wonder if you would state what has happened underground when you removed this ninety percent of the potash in this area? What happens to the roof?

A Generally within two or three days after final mining has been conducted, we notice the roof to start coming down, it begins to heave and heave from the floor, or fault; the corners of the pillars, or fenders, start taking weight and falling off. Those are the first symptoms.

Q Will you, now, please indicate what you intend to show by the

area that is delineated on the PCA Exhibit No. 4 in light pink.

A In light pink, we have shown here the area where vertical subsidence has taken place. I would like to point out, again, this is the area where actual final mining operations have been conducted, and this is the area where overall vertical subsidence has taken place.

Q Now, the latter item which you referred to is the area delineated in light pink?

A Yes, sir.

Q And where is that, in the mine, or on the surface?

A On the surface, from a surface survey.

Q The light pink is surface and the dark is underground?

A That's correct.

Q How deep is the light pink with respect to the surface?

A Approximately a hundred feet below.

Q If you can give us an overall picture, approximately what was the thickness of the potash that was removed from this underground area?

A From nine to eleven feet, approximately.

Q Now, Mr. Libbey, in the area which you have delineated in light pink, at a large number of locations you have small figures; in the dark pink area, they are enclosed in a white circle. What do those represent?

A All the figures on this map show the degree of vertical subsidence.

Q When you say 'the degree,' do you mean in terms of what?

A Feet and tenths of feet.

Q Feet and tenths of feet?

A That's correct.

Q Does that apply, Mr. Libbey, both to the figures which appear in the dark pink area and those which appear in the light pink area?

A Yes, sir, they are both of a surface consideration.

Q Now, will you tell us what the exterior boundaries of the light pink area represents in terms of date of latest survey?

A The latest survey, as of July 26, 1956, your extent of vertical subsidence.

Q Will you also explain how you have shown on that plat the boundary at an earlier survey, the survey boundary of subsidence area?

A The extent of an edge, or the boundary, of vertical subsidence on 4-23-56, was at this point here, as indicated on this map, and also at this point here; as you can see, the movement is progressive, even though final mining activity has not been conducted since the 17th of April, 1956.

Q Will you tell the Commission just when the last pillar-mining operation was conducted in this area?

A Seventeenth of April, 1956.

Q And where, with respect to your coordinate shown on the side of the map, is the approximate area from which that material was removed?

A Right in this area here.

Q Will you state, for the record, the coordinates of that area?

A Yes, sir. It would be on North, 30 East on our coordinnance.

Q Then, to explain that further, the coordinnance to which you refer are the coordinnances which appear on the edges of the cross hatched section of Exhibit No. 4? A Yes, sir.

Q Will you, then, explain the area that you have designated on that plat with a dashed line consisting of large and small dashes, a combination of dot-dash line, which is a square area?

A Well, this dot-dash line is divided up into forty-acre plots. It may be a little difficult for you to see from afar, but those of you who have maps can see, in the bottom right hand corner, forty acre blocks, and so forth, right across this area.

Q The overall dimension, then, of the area which you have included in the outside boundaries of the combination dot-dash delineation on your sketch is 640 acres, is that correct, a section?

A That's correct.

Q Now, Mr. Libbey, will you point out where the boundary on the top side of that plat showed the area of subsidence to have extended at the time the last pillar-removing operations were conducted?

A This point right here on this, and this point right here, 1250 feet.

Q I am not sure you understood my question correctly. The plat shows, does it not, the edge, boundary, of your surface movement on April the 23rd, 1956? A Yes.

Q Now, it also shows the boundary on July 25, 1956?

A Yes, sir.

Q Now, both of those boundaries were established under your supervision, were they not?

A Yes, sir.

Q And will you state, for the record, the character of the survey by which those boundaries were established?

A Our survey is one/hundredths of a foot on the vertical survey, and one/thousandths of a foot on a horizontal survey, the point and figuration established by giving each one of these locations a number and the outside figuration was located by interpolation.

Q Now, Mr. Libbey, you have also established the vertical and horizontal movements of a number of these checkpoints that you have shown on this plat, have you not?

A Yes, sir.

Q Have you prepared, Mr. Libbey, exhibits showing the vertical and horizontal movement of two of those checkpoints?

A Yes, sir, I have.

(Whereupon PCA Exhibits Nos. 5 and 6 were marked for identification.)

Q Mr. Libbey, I hand you a document which has been marked for identification as PCA Exhibit No. 5, and ask you if you can identify this exhibit, please.

A Yes, sir, I am familiar with it.

Q What is it?

A This is a graph, or plat, showing horizontal displacement and vertical subsidence at Station 35 North, 95 East.

Q Will you state what the upper half of that exhibit represents,

Mr. Libbey?

A Surface horizontal displacement.

Q And now was that established?

A By survey on nine different dates, when the vertical subsidence was also surveyed.

Q So you established, by your survey, the exact location of one of these checkpoints on several different dates as shown on the exhibit itself, and then platted, on the exhibit, the movement that that checkpoint went through, is that correct?

A That's correct.

Q What is the first date shown on that, Mr. Libbey?

A September 15th, 1955.

Q What is the last date? A June 26, 1956.

Q What is the coordination between PCA Exhibit 5 and PCA Exhibit No. 4?

A This station we have here, 65 North, 95 East, was located right at this point.

Q It is located at North Coordinate 65 and East Coordinate 95 on PCA Exhibit No. 4, correct? A Yes, sir.

Q And what is the extent of the horizontal movement of that checkpoint during the time between the first survey and the last survey? A Slightly over four feet.

Q What is the vertical distance in subsidence between the first and last survey?

A In this case, approximately four point five feet.

Q Now, that is in vertical subsidence?

A Yes, sir.

Q Now, Mr. Libbey, I would like for you to state whether, between the first and second survey dates, that checkpoint moved up or down.

A Between a first and second survey date, in respect to vertical subsidence, our point moved up.

Q And between the sixth survey date and the seventh survey date, with respect to -- strike that. Now, Mr. Libbey, I hand you a document marked PCA Exhibit No. 6, and ask you if you will identify this document?

A Yes, sir. I am familiar with it.

Q Will you identify it, please?

A Yes, sir. I am familiar with it.

Q What is it?

A This will show a graph, or plat, of Station 50 North, 95 East, showing surface horizontal displacement and vertical subsidence.

Q Will you locate that particular checkpoint on Exhibit No. 4?

A 50 North, 95 East, right at this point.

Q Now, Mr. Libbey, you also stated, before, that you surveyed a number of other check points; will you state, for the record, what the largest amount of horizontal displacement you found to occur between your first and last survey dates in any of your checkpoints?

A Three point eight feet horizontal displacement.

Q What checkpoint was that?

A Right at this point right here.

Q Will you identify that, please, by coordinates?

A 65 North, 125 East.

Q That is in terms of horizontal displacement?

A Surface horizontal displacement.

Q Would you also state what, in terms of vertical subsidence, the greatest vertical subsidence you found and encountered between your first and last survey dates?

A Eight point twenty-six feet.

Q Please locate the checkpoint with respect to the coordinates on PCA Exhibit No. 4.

A That would be 50 North, 90 East.

Q Now, Mr. Libbey, would you kindly describe PCA Exhibit No. 2, and explain just how PCA Exhibit No. 2 would coordinate with PCA Exhibit No. 4?

A Yes, sir. Area "A," bed, is comparable to the mined-out area of this plat here. In detail, it would be, this zone right here, comparing to the mined out area.

Q Will you please place a letter on PCA Exhibit No. 2 at the boundaries which would represent the boundaries of the dark pink area of PCA Exhibit No. 4? Please use the letters "C" and "D" to represent those exterior boundaries.

A Yes, sir.

Q Now, will you also place on PCA Exhibit No. 2 the letter "E" to indicate the exterior boundary of the light pink area on PCA

Exhibit No. 4?

A Yes, sir.

Q Now, Mr. Libbey, would you kindly detail, for us, just what occurred in your mine, explaining, if you can, and in as much detail as possible, just what movements were noted, and show us, if you can, on Exhibit No. 2, just what happened from a purely physical standpoint of the things that you observed?

A Yes, sir. In the beginning of the second mining operations, we have noted that your back, or roof, conditions become incompetent very shortly after the final mining, or second mining, has begun, there is an arching effect from your ninety percent extraction and extending six, ten, twelve, sometimes greater, feet into your roof or back. We find the arch, or salt, which makes up your arch, to fall. Now, this becomes progressive as you go up through the sections, your area is taking the weight, and it is reflected on up to the surface with vertical subsidence. At the bed depths, at the sides of your final mining operations, we note differential punching from the extreme loads, the fantastic loads, that are being put on certain materials in this area and also the remnant pillars left in the bed area. Generally speaking, your subsidence is dominant in this general area through your bed depth. Due to your differential punching from these -- your sides of your mined-out area and also inside your mined-out area, we have what we call floor heaves with the salt section punching back up. That is true inside your final mined area and also on the flanks.

Q What you have stated, to make the record clear, is if you

have removed the pillar support from the area between point C and D, on Exhibit 2, that -- and correct me if I don't state it correctly -- the weight is then transferred, must be carried some place, the increase, it increases the weight on the areas outside points C and D, increasing the pressure there, is that correct?

A That's correct. In our fault section, we visualize a flowing effect, and also a slumping effect as a result of our vertical subsidance; in the overburdened section above the salt, we visualize possibly, a flowage effect, a slumping effect, and also a bending effect.

Q Mr. Libbey, would you comment, please, upon the approximate forty-five degree angle that is shown there on Exhibit No. 2, with respect to your experience, your actual experience in the angle that developed at the mine at United States Potash Company?

A The angle, the forty-five degrees of vertical subsidance angle is a good average figure from the results that we have obtained at our mine.

Q What is the greatest angle that you have sofar calculated from the vertical at the United States Potash operations?

A It would be fifty-two degrees and twenty minutes with a 1250 degree.

Q Is that along the north side of the property shown on Exhibit No. 4?

A Yes, sir.

Q Will you comment, Mr. Libbey, upon the variations in the degree of plasticity in the several formations from the salt up to

the surface?

A As we all know, due to the salt domes, European potash activities or Carlsbad potash activities, salt is quite plastic, and will flow to some degree; the area above the salt, your silting sand, your clays, your unconsolidated gypsums, well, it is not well cemented at all, and there we would somewhat feel you would have a slumping effect, and possibly some flowing; in your Rustler Formation, your anhydrited gypsum formations where you have your two dolomite members, we visualize certain bending and flexing. As far as your silt stone, or your redbed formations above, on to the surface, we visualize some slumping, bending.

Q Is it fair to state, then, Mr. Libbey, that in the event, or when vertical supports are removed from an area such as have been removed here, the various formations will react differently?

A Yes, sir, with differentials.

Q Now, Mr. Libbey, will you point out on the chart, Exhibit No. 2, and indicate with a letter, or a line, if you prefer, the area in which you feel the greatest vertical pressures would be exerted?

A The centerpoint of your final mining activity.

Q Might we identify that by saying between points C and D?

A Yes, sir.

Q Where, Mr. Libbey, do you think the points of greatest sheer pressure would be exerted?

A Along our forty-five degree subsidence angle.

Q Would you say, Mr. Libbey, that the material within the angles, within the funnel-shaped pocket, you might say, is material that might be said to be in motion of some type, depending upon its characteristic, and material outside of that point would not be in motion to the degree that the material inside is?

A Yes, sir.

Q The line C and D -- no, correction. The lines C and E, what do they represent?

A That represents a theoretical line, or subsidence from your underground bed going up to your surface. In that line you have several formational sections.

Q Now, Mr. Libbey, where do you feel the greatest point of sheer pressure would be exerted?

A Along your line, subsidence line, your forty-five degree line.

Q At what points on that line, with respect to the several zones involved, do you feel that the greatest sheer pressure would be exerted?

A Due to the fact that we have different formational plasticity and composition at our top soil, you would have one differential, the salt would behave one way, your sand and clay and heterogenous material above the salt would behave another way, your Rustler Formation, your anhydrite gypsums, your redbed and silt zones would be another way, and, coupled with the evidence we have submitted, it would appear that you have repetition of direction with vertical

subsidence and horizontal displacement.

Q In other words, two formations having different degrees of plasticity, you feel that would be the greatest point of horizontal pressure?

A Yes, sir.

Q Now, Mr. Libbey, will you assume that an oil or gas well were drilled in a particular area, and, at some later date, the vertical support represented by a potash member, were removed so that a subsidence occurred, and the oil or gas well were in the area of subsidence movement, so that the theoretical line you have drawn of forty-five degrees would, at some point below the surface, intersect the casing of the oil or gas well, what do you think would be the effect upon that oil or gas well casing?

A No casing I know of would be competent enough to withstand the pressures involved.

Q Suppose there were some low-pressure gas in that well, do you think it could be contained?

A No.

Q What do you think would be the effect on a potash mine if any gas leaked into it?

A It would be most detrimental.

Q There has been some testimony here, Mr. Libbey, about the fact that one gas well in that area was analyzed at forty percent methane; are you familiar with the characteristics of methane?

A Yes, sir.

Q Do you feel that would be a dangerous gas to have in the mine?

A Definitely.

Q Is it a very explosive gas? A Yes, sir.

Q Is it, in addition to being explosive, characterized as being a poisonous gas? A Yes, sir.

MR. BLACKMAN: I believe that is all.

MR. WALKER: Before we start the cross examination of this witness, I think it would be wise for us to recess for lunch until 1:00 o'clock, so that we will get service much faster.

We will recess until 1:00 p.m.

(Whereupon, the hearing in the above matter was recessed until 1:00 p.m. the same day.)

August 16, 1956, 1:00 P. M.:

MR. WALKER: The hearing will come to order. Have you finished with the witness, Mr. Blackman?

MR. BLACKMAN: I have a few more questions.

Continuing direct-examination of the witness, DONALD L. LIBBEY, by MR. BLACKMAN:

Q Mr. Libbey, you have testified concerning the number of various check points on Potash Company of American's Exhibit No. 4, and I wonder if you would point out along Exhibit 4, along the top margin of the dark pink area, the extent of the vertical subsidence that has occurred, as reflected by the several check points that you have discussed.

A Along the top--

Q (Interrupting) What is the vertical coordinate on that-- I can't read it from here?

A We have a coordinate of 70 north.

Q That is what I want, along that line, will you comment on the extent of the verticle subsidence?

A We have 0.66 feet, and we have 0.39 feet (indicating); and 0.96 feet and 1.51 feet.

Q Now, Mr. Libbey, would you please point out in similar fashion the extent of verticle subsidence which occurs along the south side, approximately where the veins now rest?

A Along the coordinate line 40 north, we have two points indicated on this map, of 2.17 and 7.82 feet, and--excuse me, there is one further point here, 2.78 feet.

Q Now it appears from observing the map here, Mr. Libbey,

that the extent of the of the horizontal movement as shown on the surface is not as far from the mined out area underground on the south portion, along the south boundary, as along the north?

A That is correct.

Q In other words, where it appears you had a large amount of verticle subsidance, the horizontal movement did not extent out so far away?

A That is correct. The changes are very rapid in that respect and presently we have no way to predict them.

Q Would you comment somewhat on the time within which movement commences after removal of the sub-surface support?

A We have definitely noticed movement within one month after the operation originally started; in fact, it come on much faster than we thought it would.

Q What is the situation now with respect to the extent of movement?

A Well, we feel that the movement would extend out in respect to the vertical subsidance undoubtedly in all directions that we have indicated in light pink. We have attested that it has moved from April to July that much, and what is very much a possibility, after letting it rest longer, the vertical subsidance will extend in all directions to a greater degree.

Q Would you please comment on the forces and pressures involved in a movement of this sort, if you can?

A The forces that are in effect in a movement of this type are fantastic. They are particularly accentuated where you have formational change, or a difference in composition, or a foreign object that might be present there, and you get geometric increases

in your various earth pressures. The very intricate earth pressures pointing your downward effect, vertical subsidence, horizontal effect, are extremely intricate and I might say fantastic in just a month.

Q You have commented on Exhibits 5 and 6 and have shown the variation in movements of two check points. Are those representative check points?

A Yes, sir.

Q Do other check points which you have observed move around in such irratic fasion?

A Some of them move move; some of them move less. Those were more or less generalized points to complete the dimensional consideration.

MR. BLACKMAN: I believe that's all.

C R O S S E X A M I N A T I O N

By MR. GIRAND:

Q Mr. Libbey, as I understood your testimony, you stated that the U. S. mined area, which is exhibited in Exhibit No. 4, was comparable to the mined area now being operated by Potash Company of American, is that not correct?

A Generally correct.

Q The testimony here has been that the ore body was approximately four feet in thickness under the quarter section that is involved in the SE/4 of Section 28, 19, 30. As I recall your testimony, your ore body had a thickness of some 9.11 feet?

A That is correct, sir.

Q Would the difference there of some five to seven feet in

thickness of ore body affect your figures on the amount of subsidence or amount of movement, both vertically and horizontally?

A The situation is this: That once your earth pressures are triggered and start moving, your subsidence angle will remain the same as I have reported. As to the total vertical subsidence, naturally the figures will vary, but the subsidence angle will remain generally the same.

Q I see. But the extent of the subsidence will vary based on the amount of displaced dirt under the surface?

A On the vertical consideration you are correct. As far as the angle is concerned, from a theoretical point of view,--and that is all you can go on on that, it would appear absolutely that the 45° subsidence angle would be the same.

Q That 45° angle varies on your Exhibit 4, does it not?

A Yes, sir.

Q What is the minimum, or degree of variance there? In other words, I believe you stated to the north it ran as much as fifty degrees, twenty minutes.

A The minimum angle that we have reported is some twenty-seven degrees and I might add that ground is still working.

Q Then from your study of this movement, why the angle varies from twenty-seven degrees to fifty-two degrees, twenty minutes?

A Yes, sir.

Q That is at the present time?

A At the present time; the ground is still working.

Q All right. Now, if you know, when did the United States

start mining out the area, making their secondary recovery, so to speak, of the area covered by Exhibit 4?

A As I stated this morning, December 15, 1953.

Q December 15, 1953. That is when--

A (Interrupting) --they started second mining in this area.

Q In relation to the other mining property, the sections you have shown there in Exhibit 4 are on what side of your mining property, generally speaking?

A Generally, on the south side.

Q Is that to the extent of your lease-owned property--I mean does it go to the south extremity of your leased property?

A Would you clarify the question sir?

Q The area shown there--

A (Interrupting) May I ask a question?

Q Yes, sir.

A You may not own the lease-line of the ore limit--

Q (Interrupting) The ore limit or the development limit?

A To our ore limit.

Q In the area shown there, where there any existing well bores or old oil and gas wells?

A No, sir.

Q Were there any old core holes in the area?

A Yes, sir.

Q Was any check made in regard to the old core holes?

A They were watched very very carefully, yes, sir.

Q Was any of the information furnished here in your exhibits 4, 5 and 6 obtained from information obtained from watching those core holes?

A Yes, in general--there is one core hole, I might add.

Q One--can you identify it on Exhibit 4?

A It is approximately in this area right here (indicating).

Q That would be on your north coordinate?

A Approximately part of the 40 and 45 north coordinate, and approximately 95 east.

Q Now, Mr. Libbey, in the process of your secondary mining, did the company explore any other methods of recovering additional ore and still leaving sufficient pillar strength to alleviate any subsidance?

A Oh, yes.

Q What measures did the company take in that regard?

A We carried on long studies on a European subsidance problem where holes were drilled in pillars to try to establish equilibriums so that when the back came down and the floor would come up in the final mining position, that equilibriums would be established bringing the back or roof and the floor together with the greatest amount of ease and undisturbment.

Q Did you employ those methods in this operation?

A No, sir.

Q Now, have you made any study as to the extent, percentage-wise, of ore body that would be required to be left in the mined property in order to eliminate subsidance?

A Well, subsidance goes along with the mining industry.

Q We have established that you can take out 65% and not bother it--I think that is established.

A Yes, sir.

Q And we know when you take it down to 10%, she moves?

A That's right.

Q Somewhere in there, there is a point of recovery that would still leave your property free of any subsidence?

A That is a question which is not quite as clear-cut/^{or simple} as you have to say. Once you start your earth pressures moving, you have a triggering effect, and possibly the best solution is to leave your remnant pillars in place, which would allow ten per cent of your ore to be there to act as a cushion to bring it down in equilibrium. Actually, when you start going much higher than sixty-five or seventy per cent, you develop differentials or points of maximum pressures that disturb your equilibriums and make it much harder than bringing down your pillars on a ten per cent remaining basis.

Q What effect--getting back to the core hole you examined, what effect would it have on the core hole--what did your study reveal?

A Very little or none--very little or none. It subsided at the surface, I can't exactly quote the vertical subsidence figure consistent with the area I mentioned, but for the purposes of the question I will say around six feet. The casing friction which was at the very surface, the upper one hundred feet or so, behaved very well and went down uniformly.

Q Then, from your study of that core hole, would you say a well drilled in the potash area, and properly plugged, or could it be properly plugged so as to alleviate any seepage of gas or oil in the event of subsidence as you testified to under Exhibit 4?

A No, sir; your development casing is the big question there. I say no to the oil test, potash test is different in that respect.

Q It is your testimony that an oil well or oil well bore hole presents a different problem than a core bore hole?

A Yes, sir.

Q How far below the floor of your mine property do you estimate there would be any movement?

A That is a question that we would like to know, sir. We have thought about employing sonar and radar and geophysics all the way through, aside from drilling. We feel, aside from theory, though, that it would probably go down forty or fifty feet.

Q Then any well that was plugged from the bottom up to we will say within the---through the salt section, would in all probability not be affected from fifty feet below the depth of the floor on down to the bottom of the hole?

A I am saying that purely on our own experience. I understand there are some operators that probably have other considerations along that line. The subsidance and displacement possibly might not have to occur, although bear in mind that the activity we have done here is done on the basis that we were operating under the best technical premise possible. We have learned a lot from our second mining operations and continue to do so.

Q There is one question which I think I have asked you and I am not sure of the answer or that I got an answer, so I will ask it again: Should an area be penetrated with oil and gas well bore holes, and should--you had left your pillars, in connection with R-111-A, one hundred feet radius around the bore hole,

how far out from that pillar do you feel you would be unable to move your other square and/or other bodies of ore, that 25%--how much additional space do you think you would need?

A Mr. Girand, I believe you would find it the policy of United States Potash Company Division of United States Borax and Chemical Corporation, from a purely technical and operators' point of view, that we could not afford to conduct even first mining in and around mining operations due to the fact that we could not gamble on the life of our mine.

Q Well, that is a good answer, but it doesn't answer my question--you don't feel there is any safe position then?

A Somewhere between a mile or two miles from commercial ore.

Q You feel safe in that?

A Let's say two miles from commercial ore.

Q Do you have any old oil wells, that is wells which are plugged and abandoned, in your mining property at the present time?

A No, sir.

Q Mr. Libbey, in the event a section of your mine, or should your mine become gassed through a gas leak, it is not your statement that the gas cannot be removed or the leak repaired and the gas removed and the mine made safe?

A Well, one-tenth of one per cent of methane or CH_4 is out of the question as far as a mining operation is concerned. That is your limit. It would be most detrimental to your mining operation and could very possibly cause the loss of the entire mine under certain conditions due to the fact that your section in respect to where the gas probably would be coming in would be

around the bed where you have been conducting final mining operations and would be migrating from the gas-producing zone to where you are indicating the casing was breached or something. You would find the whole salt section in that immediate area and other areas would be completely honey-combed with foliage patterns, weakness planes, and separation units, and suddenly in other areas of operation--you are familiar with it, I am sure--you have a gas well blow out, and we would be picking up gas on all sides of us, in front and in back and there is great doubt whether our ventilation techniques could take care of that, and I think in all operations in the industry the protection of our personnel is the prime consideration.

MR. GIRARD: That's all.

MR. WALKER: Any further questions?

CROSS EXAMINATION

BY MR. NUTTER:

Q First of all, I would like to establish where this area is where you have done the secondary mining indicated on your Exhibit No. 4?

A The south portion of our ore body, the extreme southern portion.

Q What section would that be in the map?

A It would be a portion of Section 13, Township 21 South, Range 29 East, N. M. P. M.

Q Is the area south of Shaft No. 2?

A Yes, sir.

Q Mr. Libbey, for one thing, when you mine this--carry out

71.
your primary mining operation, you remove some 75% of the ore in place and leave pillars of 25%, is that correct?

A Well, you must bear in mind that various operators vary in detail as to extraction figure. Our figure presently is closer to sixty, maybe sixty-two, varying in some areas, although in some areas sixty-five is correct.

Q Your mining operation is much the same as P. C. A.'s, leaving a pillar and driving a long ^{room} broom through, is that right?

A Very similar.

Q Has any attempt ever been made to determine whether any subsidence takes place on the surface, before the pillars are closed, as a result of primary mining?

A In a few limited cases there were, but I think you will agree that the time that should have been done was in 1929 or so, before the mining operation came in to being, due to the fact that our operation was a pioneer development in respect to the North American continent. We are sorry that we did not have this type of grid over our operation and we don't have the proper information as to subsidence on primary mining.

Q Is your company or any other company engaged in first mining in the Carlsbad potash area at the present time?

A Yes, sir.

Q Are they taking any measurements that you know of to determine whether there is surface subsidence?

A I can't speak for others, but we have established a different grid over a large portion of our operations.

Q But you don't know whether they are measuring or not?

A I presume International has. They have done final mining and I can't say anymore--I don't know.

Q I wonder if you would turn to P.C.A. Exhibit No. 2 there which is a cross-section of the subsidance and draw a vertical line commencing at a point midway between C and D?

(Witness complied)

A Is that satisfactory?

Q Yes, sir, right down through there. Now, if you would mark on that vertical line the areas of either unconsolidated, conglomerance or salts, or any material that would either build or flow--could you do that? I believe you said at the top it was either unconsolidated or conglomerate?

A Your weave would be involved from, say, zero to twenty feet unconsolidated rotten caliche. From twenty feet to shall we say 200 feet, we would have red beds. From 200 feet--I'm not able to draw this to scale--

Q That's fine, I just want approximate figures.

A --from 200 to, say, 430 feet, you would have a Rustler formation with two beds known as the magentadolomite and the calabradolomite, and from 430 feet down to, say, just as a general figure, five hundred feet, you would have a rather unconsolidated sort of clay, silt and loosely consolidated gypsum, I would say 500 feet, going down through the soft section, say, to a depth of 1,000 feet, which is here, you have the upper one-third of Salado salt section of which there are numerous grade beds, to say nothing of the fact that there are some approximate twelve ore zones in that interval that are recognized in the area. Do you want me to go into the flowage?

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Q I would like to know which would flow or slump.

A They all have indicated that we have subsidance; I think you will agree to that. Due to the fact that we have a change in composition as far as the formations are concerned themselves, I think you would also agree that there is a good possibility that we would have a change in subsidance aspects. After rather detailed studies, both in this country and abroad, it has been determined that your salt will flow under sufficient pressure. In some cases in the European mines at a little different depth than we have, your potash actually flows like beeswax between two bricks, so I think you can assume as far as the upper formation of the Salado formation, that the Salado will flow and bend or slump to a degree with the main thing being its flowing effect, due to the fact that the bed material has been removed. As to the unconsolidated zone right above the salt, we visualize due to the fact it is not too well knit together, that we will get a certain amount of slumping. There are clay seams and things of that nature. You can correct the flow if you want to--it is just to the coordinate. As far as the zone above it, we feel it will bend and slump as has been attested, due to the fact that we have the vertical subsidance indicated. As far as the upper section is concerned, I look at it as more of a slumping situation. There are few red bed situations in that section. Back to the salt beds I mentioned, the dolomite and anhydrate beds, we are all familiar with them, those beds act as reinforcing steel does in cement, and help control the subsidance.

Q That bed of dolomite across there--in order to achieve this subsidance as indicated on the chart, it would probably have to shear in two and drop, wouldn't it?

A The dolomite bed in the present detail on the Calabra, is a dolomitic line from shaft-sinking operations. It appears to have a pretty heavy block effect and the theoretical consideration--I would tend to feel that it would possibly bend, although it could shear. I can't answer that question--very definitely it could shear, but we would feel possibly it would bend also, and it has a possibility of shearing also. We just don't know.

Q There is no bed across the theoretical funnel with enough rigidity to withstand the weight of the overburden in case of subsidence?

A No, sir.

Q I would like to find out just how you obtained--or after you had control already, just what steps you took to observe the vertical and horizontal movements?

A Each month--I had better say that we have established well control point designations and locations--and each month our surveying department checks most of the survey points mentioned in this area, or over a far greater area than mentioned. It is done on a regular basis each month.

Q And after they have laid out the grid, what do they do?

A After that they had all the various specifications checked for a permanent type marker, using steel stacks with cement footings along proper specifications approved by various organizations and the Government, and established the grid so that those points would remain stable. Some animals dug up some, and one was on a train right-of-way, and we lost one or two that way.

Q Those are permanently fixed however, and the only way

they would move would be if the ground moved?

A Yes, sir.

Q And they checked those movements on a transit, or what?

A Yes, we have a very competent survey monthly, each month.

Q Referring to your Exhibit No. 4, point 65 north, 95 east or west, whatever that is--what has been the general movement of that point in a horizontal direction?

A 65--95, we note that from Point 1 to Point 2 we went, shall we say, northeast. From point 2 to 3, we went southwest. From three to four we went northwest; from four to five, we went southeast; from five to six, we went southwest; from six to seven, we went northeast; from seven to eight, southwest, and to Point 9, well--we did go due north.

Q What has been the general movement from Point 1 to Point 9?

A What do you mean, I don't understand?

Q What is the over-all net movement?

A Well, it would be--

Q (Interrupting) In a southerly direction?

A Yes--yes. And with the very definite provision that the point has reversed its position back and forth many times.

Q Referring to control point 50, north 95, what has been the general trend of its movement?

A It has generally moved to the north from--as you can see, the location of Point 1 to Point 9, there has been much duplication of intersection or movement here as was in the other case briefly mentioned--generally north.

Q Referring to Exhibit 2, Point E on the top of the ground there, and Point F on the far right side--would the tendency of those two points be to move together also?

A Yes, sir. It is our very definite opinion that in the center of your final mined out areas, you have more vertical subsidence.

Q There would be a point where you wouldn't have any horizontal movement but you would have vertical subsidence?

A Well, yes, but on the flanks of your 45-degree subsidence angle you would have a greater horizontal movement than in the center. What I am trying to say is that this point here, you would have greater horizontal displacement here than here, and also greater horizontal displacement here on the surface than here.

Q Where would the greatest vertical displacement be?

A In the center, although as far as the displacement aspects are concerned, they change. When you think it is all figured out, something very definitely in reverse happens sometimes, but what I have said is generally true.

Q Mr. Libbey, how are mines ventilated?

A Well, under the State of New Mexico Mining Law, we have to have two shafts to operate, I believe, more than ten men, and most of the operators have a down-draft and an up-draft shaft. Extending over the areas of underground operation we use various fans and openings to push the air to the working face, and as it reaches the working face, it goes on to the up-draft shaft where we have a large fan that pumps the air out of the shaft with fresh air coming in.

Q These shafts, those are operator shafts that you have?

A Yes, sir, production shafts.

Q In other words, you don't have to bore them--there are some drilled in the mine?

A In some cases, I believe--but it is not true in respect to the operation I am most familiar with,--I believe in some cases in possibly service and supply, the main reason for sinking shafts would be due to the high cost. Naturally we try to keep the shafts at a minimum and no bore hole shafts for ventilation have been yet completed in the Carlsbad area.

Q In the event that pillar pulling becomes necessary to extract the final amount of ore, how close do you pull pillars near the shaft?

A That is an extremely difficult question to answer. We are evaluating that very carefully from the information we have developed, and along that line of thought, the theoretical figure we are considering is around 2,000 feet, possibly a little less, possibly a little bit more, but it very definitely is a theoretical figure and is under advisement.

MR. NUTTER: I believe that is all, thank you.

MR. PORTER: Any further questions of the witness? If not, the witness may be excused.

R. S. FULTON,

a witness, called on behalf of the Protestant, having been first duly sworn on oath, testified as follows:

D I R E C T E X A M I N A T I O N

By MR. BLACKMAN:

Q Kindly state your name.

A R. S. Fulton.

Q And your profession, Mr. Fulton?

A Mining engineer.

Q What is your present position?

A Regional Mining Supervisor, Geological Survey, Carlsbad, New Mexico.

Q And as such, are you in the immediate charge of the operations of the United States Geological Survey as it applies to potash operations in the Carlsbad area?

A As it applies to the Carlsbad operation, potash operation on Federal potash leases.

Q Mr. Fulton, in your capacity as Regional Supervisor, do you have access to all core drilling data and mining data from time to time submitted to you by all the potash companies?

A Yes.

Q And are you familiar with the methods generally in use in the potash mining industry for the estimating of the amount and character of ore in place?

A Yes, sir.

Q I will ask you, Mr. Fulton if at my request you addressed a letter to Potash Company of America, dated August 13, 1956, in which you set forth your calculations on the basis of information in the hands of the Geological Survey on the value of potash under the SE $\frac{1}{4}$ of Section 28, Township 9 South, Range 30 East?

A Yes, sir.

(Whereupon PCA Exhibit No. 7
was marked for identification.)

Q I will hand you a document marked Potash Company of America's Exhibit No. 7 and ask you if that is a photostatic copy of that latter?

A Yes, it is.

Q Would you kindly read that letter into the record, Mr. Fulton, and explain to the Commission just how it is you have arrived at these evaluations, if you will, please, and make any explanation you think is necessary?

A The letter is addressed to Potash Company of America, Post Office Box 31, Carlsbad, New Mexico: "Gentlemen: This is in response to your recent verbal request that this office compile data relative to the potash orebody contained in the SE $\frac{1}{4}$ of Section 28, T. 19 S., R. 30 E., N. M. P. M., New Mexico, which is embraced in your potash lease Las Cruces 046729-D, issued January 18, 1933. Potash values have been determined on the basis of total recoverable value and recoverable value per acre for the several extraction stages involved in the mining operation. The average grade and thickness of the orebody were obtained by taking the weighted average of the four potash core tests located at the four corners of the SE $\frac{1}{4}$ Sec. 28. The recoverable values are obtained by using the following formula:

Recoverable value per acre = $2,722.5 \times \text{thickness of ore in feet} \times \text{grade of ore in } \% \text{ K}_2\text{O} \times \% \text{ mining extraction} \times \% \text{ mill efficiency} \times \text{units of K}_2\text{O per ton} \times \text{price per unit of K}_2\text{O}$.

The constant, 2,722.5, represents the tons of ore contained in one acre-foot, using 16 cubic feet = 1 ton of ore. The price per unit of K₂O in muriate is 36 cents. Following are the values

determined:

	<u>Recoverable Value per 160 Acres</u>	<u>Per Acre</u>
1. First mining (extraction 65%, mill efficiency 90%)	\$9,804,430	\$61,278
2. Second mining (extraction 25%, mill efficiency 90%)	3,770,935	23,568
3. Total mining (extraction 90%, mill efficiency 90%)	13,575,365	84,846

The following values relate to a protective pillar with a minimum radius of 100 feet which would be required to protect a producing oil well drilled through the orebody, no part of which could be recovered:

Value of pillar (65% extraction, 90% mill efficiency)
= \$44,390

Value of pillar (90% extraction, 90% mill efficiency)
= \$61,464

The average depth of the orebody in the SE $\frac{1}{4}$ Sec. 28 is approximately 750 feet. In the event that four producing oil wells existed in the tract at the time second mining was contemplated, the Survey would require observance of a subsidence angle of 45 degrees - pillars could not be removed closer than 750 feet to a producing well. As the proposed oil wells are to be located in the center of each 40-acre subdivision of the SE $\frac{1}{4}$ Sec. 28, this means that all mine pillars within the 160-acre tract would be less than 750 feet from a producing oil well, hence no pillars could be removed."

Q Now, Mr. Fulton, in order to calculate the value of the potash which would be left in place in the event oil wells were drilled as stated in your letter, it would be necessary to add

together your 25% figure on page 1 of your letter, which is point 2 in your table of values, to the value of the pillar which you have shown on page 3, not part of which could be recovered--is that true?

A That is true.

Q Do you care to make any further comments upon what you have stated in this letter?

A No, I believe not.

Q Mr. Fulton, I hand you a document marked Potash Company's Exhibit No. 8 and ask you if you will kindly identify that for the record?

(Said Exhibit No. 8 of PCA had heretofore been marked for identification.)

A That is the copy of the Department of the Interior regulations which apply to the issuance of oil leases covering formerly withdrawn potash lands.

Q That is a copy of the Department of the Interior notice containing the regulations published prior to the issuance of the lease which is the subject matter of this hearing today, is it not?

A Yes.

MR. BLACKMAN: Thank you, that is all.

MR. PORTER: Any questions?

CROSS EXAMINATION

BY MR. GIRAND:

Q Mr. Fulton, I think there is a slight error there. I don't know how great it is, but it wouldn't be the sum of your value figure No. 2 on the 25% plus the value of the pillar because the pillar you would have in there, whether you would--other than

your well bore radius, because of the 100 foot radius--you wouldn't have quite the exact figure there, would you?

A Well, what is meant, Mr. Girand, is that in the event the 100 foot radius pillar had to be left around the producing well, the operation would lose is normal expected 65% from the area. In addition, I don't believe he would be able to remove anything in secondary mining--hence, the 25% plus that pillar area there.

Q Has it been determined that no pillars would be allowed to be removed from around a producing well from within 750 feet of the well bore?

A Such a case has never come up, Mr. Girand. However, my office is the power that is, you might say, in that respect. The only way our instructions could be overruled would be from the higher officials in the Department.

Q I was only inquiring whether that determination had been made. That being true, it would still allow the potash operator to recover at the present time and during the life of the production of the oil and gas well, at least 65% of his ore?

A That is correct.

Q A denial of the right to drill for oil and gas, in the event oil and gas exist in place, would deprive the lessee of the oil and gas of 100% of his oil?

MR. BLACKMAN: If the commission please, I think that is a bit of argument.

MR. GIRAND: All right, I will withdraw it. I will make my speech later.

Q Mr. Fulton, in the field the potash is now in, have there

been occasions where potash has been mined around producing oil and gas wells?

A I am not certain, Mr. Girand. I think the Potash Company of America either have been close or are getting close to some wells in their operation.

Q As a matter of fact, Mr. Fulton, there are two wells in-- at the present time--producing within the limits of the Potash Company of America leases right at this time, aren't there? That is, the W. H. Black Federal Yates located in the Southwest, Southwest of Section 28 and the Black State Lowe No. 1 in the Northeast of the Northeast of 33, I believe, or 32?

A The thirty--two?

Q Both of those wells are located in what has been delineated as the potash area. Do your records disclose the estimated value of the potash on the SW $\frac{1}{4}$ of Section 28?

A No, sir. We could compute it, if there is a need for it. However, my office was asked to compile the data for this particular case.

Q I wonder if you would make that information available to the Commission to show a comparable value between the SW $\frac{1}{4}$ and the SE $\frac{1}{4}$ of Section 28?

A The Southwest and the Southeast? It will take sometime, Mr. Girand, to prepare that. I have no facts or anything available to do it now.

Q There are no core holes, or there isn't the same information in regard to the SW $\frac{1}{4}$ of Section 28 that exists as to the Southeast quarter?

A Oh, yes, but I don't have it here.

Q Well, I meant at a later time.

A Yes.

Q Just for the Commission's enlightenment.

MR. BLACKMAN: You have made a statement, Mr. Girand, in the course of your questions, that part of this area is within the PCA area, and I haven't challenged the statement because I don't know the facts. I don't have our lease line around there.

MR. PORTER: The map will show it, it is on file in our office.

MR. BLACKMAN: Will the Commission take judicial notice of the map on file to the extent of the PCA leases?

MR. WALKER: The Commission will take judicial notice and it will be in the record.

MR. BLACKMAN: Fine.

C R O S S E X A M I N A T I O N

By MR. NUTTER:

Q In making your calculations on the value of the potash reserve, what were the thicknesses of the beds in the four corners of the quarter section?

A Well, sir, those thicknesses and the actual information information is really not mine to divulge unless PCA would agree to it.

Q Well, I think it is just a matter of figuring it out backwards--would you say it was an average of $4\frac{1}{2}$ feet?

A Does PCA have any objection?

MR. BLACKMAN: We have no objection.

A The average thickness was 4.52 feet.

Q Is that usually a pretty reliable method of determining the thickness--taking the core thickness? At the section line?

A Yes, it is a weighted average.

Q Has experience in the past revealed it to be pretty reliable?

A Yes,

Q One other question--the value of the K_2O is thirty-six cents in the unit. Is that the value of the ore in the mine or on the surface or at the mill, or where?

A That is the value of the product as sold.

Q In other words, from these figures we would have to deduct the cost of mining and processing the ore, is that correct?

A You would if you were calculating profits, but we are speaking of values here.

Q The stuff doesn't have any value until it is brought to the surface and processed though, does it?

A True, true.

Q Has your office constantly observed this 45 degree angle of subsidence?

A Yes, sir.

MR. NUTTER: That's all.

MR. WALKER: Any further questions?

C R O S S E X A M I N A T I O N

By MR. GURLEY:

Q One question: I don't understand what you mean when you

say on the second page of your letter that "pillars could not be removed closer than 750 feet to a producing well." I am not quite clear on that. You mean there would have to be a solid piece of ground there, I mean ore, of 750 feet, surrounding the well, or in that area the pillars that were there, mined around them and left them, they could not be removed--which would be the case?

A What I mean is, Mr. Gurley, observing the 45-degree subsidence angle with the average depth being 750 feet vertically, your 45-degree angle would indicate a 750-foot distance horizontally, so if the well was 750 feet out, we wouldn't dare take any pillars closer than that because it would affect the well itself.

Q Then, actually, in effect, it would be--you mine 65% within the area of the well, and leave the pillars for 750 feet, is that correct?

A Yes, they would get 65% extraction over the entire tract except for the pillar around the well, but when it came time to take the 25% normally expected in the pillars, if there were four producing oil wells in the center of each 40-acre tract, all the mine pillars in that 160-acre tract would be less than 750 feet from a producing well, and you could not take them.

(Mr. Gurley indicated he had finished his cross-examination.)

MR. BLACKMAN: May I clarify that last statement: I thought you intended to say if there were one producing oil well in the center of each 40-acre tract within the 160-acre tract, in that case all of the potash ore-producing zone would be within 750 feet of an oil-well, is that correct?

A That is correct, all the pillars within the area.

RE - CROSS EXAMINATION

By MR. NUTTER:

Q Referring to Exhibit No. 8, Mr. Fulton, this copy of the rules and regulations put out by the Department of the Interior, in here do they say how close a well can be drilled to the potash reserves, or anything about 750 feet?

A No, sir, they don't.

Q They don't mention any angle of subsidence or anything on that, do they? That's all.

MR. WALKER: Any further questions of this witness. You may be excused, Mr. Fulton.

ROBERT H. LANE,

a witness, called on behalf of the Protestant, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

By MR. BLACKMAN:

Q Mr. Lane, will you state your name, please?

A Robert H. Lane.

Q And your address?

A Carlsbad, New Mexico.

Q By whom are you employed?

A International Minerals and Chemical Corporation.

Q What is your capacity at International?

A I am a mine engineer?

Q Mine engineer?

A Yes, sir.

Q Are you in charge of the mining engineering department at International?

A Yes, sir.

Q And how long have you been with International Minerals and Chemical Corporation?

A Six and a half years.

Q Mr. Lane, you just heard Mr. Fulton testify on the methods of estimating amounts of potash or ore. Would you give your comment upon the general use of methods familiar to those in the industry?

A Our company estimates reserves the same way as Mr. Fulton.

Q Have you generally found those methods to be accurate?

A Yes, in most cases.

Q Mr. Lane, do you consider the general averages we have been talking about with several witnesses, of 65% on first mining and 25% on second mining, to be fair averages of the type of mining that would be performed in an area such as is under consideration here in the Southeast quarter of Section 28?

A Yes.

Q Have you had any experience in removing the pillars and observing the resultant subsidence in International Minerals and Chemicals?

A We have robbed them three different times; first, in 1948, second time in 1952 and 1953, and we have just finished a small area this spring. On the surface we have very little in the way of check points compared to U. S. Potash. Underground we have observed it very closely.

Q Before passing that, have you had an occasion to measure

the movement of the potash members, or the general ground, after first mining?

A No. We have one case, not on the surface. This is underground and the back and the bottom will come together at a uniform rate immediately upon first mining.

Q Can you tell us what that rate is?

A An average rate of 1/100 of a foot per month.

Q Will you explain to us, Mr. Lane, the pillar-pulling operations which you engaged in and what you observed to have taken place at that time, and when it was, if you please?

A I will try to go over the area we just finished. It is a small area compared to what we call a sub-panel; an area approximately 800 feet wide and 1,000 feet long. After you mine to the edge of the sub-panel, you start to retrend, by pillar mining. Movement started within forty-eight feet. The first movement is that the floor heaves, this is caused by a mud seam underneath the potash bed and happens after the first pillar is split by additional weight being placed on it, and that weight, theoretically, is 375% on first mining and 1200% on second mining--the additional weight on a pillar. Movement occurs when there is a four-inch mud seam four feet underneath the mining bottom. This mud seam is compressed and tends to flow away from the fender causing the floor to heave or buckle in the center.

Q What is the fender?

A The fender is the remaining portion of the original pillar. After the floor heave takes place, it has been noticed in many instances where the pillar itself will move up to six inches

and then slide down to the tip of the bed. After that movement, usually the back will cave out.

Q Approximately what was the extent of your over-all recovery in the area from which you pulled those pillars?

A 93%.

Q Mr. Lane, would you comment on the lapse of time that should be expected between first mining and second mining operations? Is there any rule you can go by that you know of?

A I can't say there is a rule, but it varies from week to week, even in our own property.

Q In other words, if too much time is allowed to elapse before commencing second mining operations, your area might get in the condition that you can't perform second mining operations?

A Yes, sir, we have a small area of that nature.

Q Explain any direct experience you have had in that area?

A In 1952 we opened a new section in the mine, practicing the same standards as in the older section.

Q By that what do you mean?

A The same standards for width in first mine extraction-- identical standards, with no rough salts or protection of that sort. In the new area, it wasn't very long before we found out our mistake. Then new standards had to be adopted and the original area was lost.

Q What do you mean when you say the original area was lost?

A The new orebody we went to.

Q When you say it was lost, what do you mean?

A It was lost to second mining. Safety-wise we can't rob

pillars.

Q How long a time was it between the time you finished mining in there and the area became what you considered to be unsafe for second mining?

A Seven to nine months.

Q Mr. Lane, would you care to comment on the pressures involved in a subsidence situation such as this, such as we have been talking about here? Can you illustrate it, if possible, by referrals to Exhibit 2 and state just what you observed with reference to Exhibit 2?

A Theoretically, on the pillars, you have an increase of 375% more pressure on the pillar on first mining than on the area before first mining. In the center area between C and B, the fenders remaining have an increased pressure of around 1200%.

Q You stated in your testimony, I believe, that you had had some floor heaves?

A Yes.

Q Will you state where they have occurred in there with reference to points C and D?

A It would be in the dark portion, taking Pillar A, the remaining portion, you take and drive pocket cuts through the center and this would be the remaining fender on each side. There is a normal pillar on this side with a fender in here and a mud seam four feet underneath. The increased pressure on the fender also would get it down through the mud seam; the mud seam being the weakest component, it will tend to flow out in both directions under the pillars, and the original mining bottom will boil off by push-

ing the additional mud.

MR. BLACKMAN: May the record show that the witness sketched on the bottom of Potash Company of America's Exhibit No. 2 a little sketch showing the method of removing pillars, which constitutes removing the center of the pillar and leaving two small portions of the pillar which he has denominated fenders.

(Whereupon PCA Exhibits No's. 9, 10 and 11 were marked for Identification.)

Q Mr. Lane, I hand you a document marked Potash Company's Exhibit No. 9 and ask you if you will identify that picture, please?

A Exhibit 9 was taken in the International Mine in a robbed-out area. It shows a typical floor heave.

Q Can you state approximately how far that heave occurred from the area where the pillars were actually removed?

A This is right in the area, this Exhibit 9.

Q Right in the area where the forms were removed?

A Yes, as in the diagram marked Exhibit 2.

Q I hand you another picture and ask you to identify that, please?---and this has been marked Potash Company's Exhibit No. 10.

A Exhibit 10 is a picture taken in International's mine. It is located about 300^{feet} from a mined-out area, and shows a floor heave in one of our main-line tracts. The large pillar you see on the righthand side was the barrier pillar and the floor heaving action came through that long pillar.

Q Mr. Lane, I hand you a document marked Potash Company's Exhibit 11, and ask you if you will identify that, please?

A Exhibit 11 is a picture which was taken in International's

mine on the 850-foot level, fifty feet above the level which has been in question all day.

Q I think you might explain, if you will, the number of levels on which mining is conducted at International Mine and Chemical?

A At the present time, we are on two levels--at one time, we were on three, but one has been abandoned for the time being.

Q It is not conducted on only one level as other mines are, is that true?

A To my knowledge.

Q Will you explain just what occurred on Exhibit 11?

A The pictures shows a corner of a pillar on an upper level. Subsidence occurred between this pillar and the one below, and the pillar is separating from the actual mining back which is a mud slip on this leve.

Q What had occurred on the lower level prior to the time that subsidence occurred?

A In Exhibit 11?

Q Yes.

A Pillar mining was completed with a normal floor heave and normal spreading of the pillars, and fenders.

Q Mr. Lane, are you generally familiar with deposits of potash in New Mexico?

A Yes.

Q I would like to have you comment on the extent of those deposits--and be as specific as you can. If you have to, you may look at any information you have about them.

A The deposits are generally the same in International's

9.

mine as with the other mines, the difference being that we have two of the upper levels out of the reconized twelve mineralized zones. But in general all features are the same, mud slips, and the different compositions and beds.

Q Does International--I don't wish to ask you for confidential information so please feel free not to answer--I would like to know if International's over-all percentage of ore, of potash contained in the ore, is less now than it was previously.

A Would you re-word that?

Q Does International--I would like to know if International is mining a lower grade of ore than a few years ago?

A Yes, by 25%.

Q From your knowledge of the situation, is that the general situation in Carlsbad?

A It will be.

Q What is your reason for stating that, would you explain that?

A I think we can bear it out--all the shaft logs were placed in a higher grade of ore, and they are working to the fringe area now.

Q Would it be fair to state that New Mexico deposits do not constitute an inexhaustible source, but are definitely limited.

A They are.

Q Mr. Lane, would it be fair to compare the action and the pressures which are involved in a subsidence funnel of the type shown here with the method of underground mining which is in use in a good many mines throughout the world, known as block-caving?

A To a limited extent, yes.

Q Is the first action occurring in this subsidence funnel similar to the first action occurring in a block-caving situation?

A Yes.

Q In block-caving, then, you simply remove the material on the bottom between Position C and D on Exhibit 2, and keep on doing it and the material keeps on falling in?

A As long as an open area remains, it will keep crushing.

Q And if that is continued and there is a sufficient overburden for the weight upon your ore body, it is possible to crush the entire orebody and bring it out through the bottom as they have done in Butte, Montana?

A I don't think we can control the grade in our type of mining.

Q Not in potash, but if you were to do it, it could be done?

A Yes.

Q Mr. Lane, in the event oil or gas wells were drilled in an area and at some later time the Potash Mine came in and removed the sub-surface support by removing the pillars on second mining, would you care to comment on the effect it would have on a well?

A I don't think our mine would extract the pillars if there would be existing oil.

Q Assume for the moment that you did extract the pillars-- what would be the effect on the oil and gas well?

A Through evidence of movement underground, it should be sheared, more likely the loss of the well or leakage into the mine.

MR. BLACKMAN: I believe that is all.

(Whereupon there was a recess,
following which the hearing
continued.)

MR. BLACKMAN: I have just one more question.

Q Mr. Lane, would you kindly explain to the Commission just why it is that International^{al} Minerals and Chemical, in line with some of the other potash mine operators in Carlsbad and throughout the area, are now beginning to pull pillars?

A As stated before, the shaft sites are generally put down in higher grade sections and when the high grade is really gone, or tending to be, you approach the fringe area and the grade of ore is less. It becomes necessary then that the pillars be pulled before any of your power cables or haulage ways are taken out. It is just economy. The grade of ore is so low, the decrease in the grade makes it necessary to pull pillars sooner after first mining on an economic basis, and also in certain areas a long period of time might destroy the chance of robbing the pillars due to first mining subsidence.

Q You think there may be a difference in the element of time that might be safely spent between first and second mining in some areas you might consider to be rich in the grade of potash and high in volume, as compared to what we call the fringe area on the edges of the orebody?

A I think the time element is mostly in the nature of the beds. Where there is a heavy mud seam underneath, the time element might make a difference in the extraction of pillars.

Q And also it might be, if you had a rich body of ore that

was quite thick that you might hold your pillars in reserve for sometime and still be able to go in at a later date and recover them, whereas on a fringe area you would probably have to recover the pillars very soon after first mining, as a part of the same operation, is that not true?

A Yes, sir.

Q Do you care to make any further comments on the general situation here, is there anything you care to add?

A No.

C R O S S - E X A M I N A T I O N

By MR. GIRAND:

Q Mr. Lane, you have been in the hearing room all day, have you not?

A Yes.

Q You were here when Mr. Fulton gave his testimony in regard to valuations on the SE $\frac{1}{4}$ of Section 28, Twnship 19 south, Range 30 East?

A Yes, sir.

Q That is the quarter section being involved and being the Potash Company's Exhibit 7. In looking at that report, would you say that Exhibit 7, that that area involved is what you would call a fringe area?

A I couldn't answer that question.

Q If the record showed the potash at approximately an average of four-foot orebody, averaging out four feet in thickness, of commercial ore, would you consider that a fringe area?

A Not necessarily.

Q Now, a mining operation that had been engaged in one mining area for a period of some twenty-one years, and during that twenty-one years had not seen fit to go in and conduct any secondary mining program--would you consider there was any subsidence of any significance in that area?

A I couldn't say in that mine.

Q When you remove or pull a pillar and leave fenders as you testified, what are the dimensions of those fenders?

A That would depend on the original size of the pillar.

Q Assuming it has been testified, I believe it has been, that the pillars left by PCA are 35 x 35 feet--is that right?

MR. BLACKMAN: I believe so.

Q What would be the dimensions of a fender left from that size pillar in a secondary mining operation?

A That will be controlled by--just the structural member of the bed--it could be any size.

Q I believe you testified your mine operation is similar to PCA's?

A I also testified it varies from section to section due to the type of ground.

Q Yes--but on the part of the mine similar to PCA's, bearing that in mind as a preface, would you mind testifying what size fenders you would leave on pillars of 35 feet by 35 feet?

A I think if I would be laying it out on the board, I would leave a fender of about 8 x 26 -- it would be 8 by 24.

Q Eight by twenty-four?

A Yes.

Q Now, in the area that you removed the pillars in 1948, did you make any test or checks on the subsidence that existed there?

A Yes, sir--very limited checks.

Q What was the result of those checks?

A We have surface subsidence to $4\frac{1}{2}$ '.

Q Vertical or horizontal?

A Vertical.

Q Now, in your pillar removal program you had in 1952 and 1953, did you make any check on subsidence there?

A No, sir.

Q In your 1956 operation, have you noted any there?

A No, sir, not on the surface.

Q I will ask you, referring back to your Exhibits 9, 10 and 11, the photographs here, these pictures were taken from the area from which the pillars were removed in 1948?

A Exhibit 9 was taken in the area of the 1952-1953 mining.

Q All right. And what about Exhibit 10?

A Exhibit 10, the picture was taken approximately 700 feet from Exhibit 9.

Q And was that in the area that the pillars were removed in 1952 and 1953?

A Outside the area that was robbed in 1952 and 1953.

Q Now, Exhibit 11?

A Exhibit 11 lies in the bed fifty feet above Exhibit 9.

Q Fifty feet above Exhibit 9?

A Yes, sir.

Q You testified that in your opinion, and of course we all

that the orebody, is limited from the standpoint of productivity--in other words, there is just so much potash in place. In years, do you have any estimate as to the number of years of potash production available in the past?

A No, sir.

Q Do you have any estimate from the standpoint of tons?

A No, sir.

Q Do you anticipate an immediate exhaustion of the potash fields within the next five or ten years?

A No, sir.

Q Do you anticipate an exhaustion of the potash fields around Carlsbad area in the next fifteen to twenty years?

A It is possible from my information.

RE-DIRECT EXAMINATION

By MR. BLACKMAN:

Q Mr. Lane, when you used the word "fringe" in response to a question I asked, were you thinking of fringe in terms of margins or being near the edge of an orebody?

A Both--as you approach the edge of the orebody, it would be a fringe, it would be marginal.

MR. WALKER: Does anyone else have any further questions?

CROSS EXAMINATION

By MR. GURLEY:

Q Mr. Lane, in your opinion, is an extensive practice of secondary recovery in the industry or in the mining area down there near at hand?

A I think it is.

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TELEPHONE 3-6691

Q How long, in your opinion, would it take to produce all the potash possible by secondary recovery methods in the area?

A That depends on production schedules.

Q Well, assuming that you ceased new operations and that you went into the secondary recovery angle, for ^{your} production, can you give me some idea in years how long it would take--for instance, in your own mine at International--to recover all the potash available there?

A No, sir; we don't know what the schedules would be next year or the year following.

Q Would you say it would take a matter of ten years?

A No, sir; it would be less than ten years if production schedules remain at today's levels.

Q Would you say it would be nearer five years?

A It would be nearer five, yes.

Q Then, in your opinion, it would be somewhere between five and ten years, is that correct?

A Well I wouldn't say which side.

Q You're a hard man to get an answer out of. Thank you, that's all.

MR. WALKER: Any further questions?

C R O S S E X A M I N A T I O N

By MR. NUTTER:

Q Mr. Lane, the area of the floor buckling in Exhibit 9, is that between a couple of fenders?

A Yes.

Q The area in Exhibit 10 shows the railroad track buckling.

You say that is a distance of some seven hundred feet from the place where you robbed the pillars--I am learning the language.

A No, it's approximately two- or three hundred feet, and seven hundred from where the other picture was taken.

Q But it is about two-, two-fifty or three hundred feet from the area in which the pillars were pulled?

A Yes.

Q In which direction from the buckling were the pillars pulled?

A To the right.

Q On the other side of this pillar?

A On the right side of the buckling.

Q How long is the pillar there?

A The pillar in the picture is 400 feet wide and 150 feet long.

Q Exhibit 11, that was taken in the room immediately above the room where the pillars were pulled, is that correct?

A Yes.

Q Has the floor in this room subsided yet?

A As indicated in the picture, it has.

Q Has the ceiling subsided?

A We don't know.

Q If the ceiling has subsided, the floor has subsided faster, is that correct?

A Yes.

Q And yet the ceiling is the one with the weight of the overburden on it?

A Yes.

Q I think you made some mention, didn't you, that there is a time limit within which it is feasible to go in and pull pillars after primary mining?

A There is for a given area.

Q Is there a time in which those operations could be performed in any area in Eddy County?

A What do you mean?

Q I mean, would every area have a time limit?

A In a sense, yes.

Q What would be the maximum time limit?

A I wouldn't say.

Q In your own operation I think you mentioned eight to ten months?

A In eight or nine months we lost the pillars in one small area.

Q What is the determining factor on whether the time limit is short or length before you can pull pillars safely?

A The underlying and overlying beds--the mud seams are the main thing.

Q Are mud seams pretty prevalent in the Carlsbad area?

A Yes, to a lesser or greater extent, either pure mud or contaminated with salt.

Q Would you estimate the time limit of pulling pillars would exceed five years or be less than five years?

A In some cases over five years.

Q How much more than five years?

A The longest we have left any was eight years.

Q And were you able to pull those pillars?

A Yes.

MR. NUTTER: That is all.

MR. WALKER: Any further questions? If not, the witness will be excused.

MR. BLACKMAN: We offer in evidence exhibits numbered Potash Company's Exhibits one to eleven (1 - 11), inclusive.

MR. WALKER: Any objection to the admittance of these exhibits? (No objection) They will be received.

MR. BLACKMAN: We would like to request that the Commission take judicial notice of the oil records in its files, of the several oil pools in the general vicinity of the SE $\frac{1}{4}$ of Section 28, Township 19 South, Range 30 East.

MR. WALKER: The record will so show.

MR. BLACKMAN: I would also like to ask the Commission to note what its files may show of the work done by Mr. Stanley who was at that time--Mr. S. J. Stanley--an engineer for the Oil Conservation Commission, on April 20, 1955, and who did some engineering work for the Commission at that time on the proposition of subsidence and oil and gas well casings in the event of subsidence. I am not sure of what the record will show on that, but there was some testimony in regard to that in Case No. 862.

MR. WALKER: The Commission will take judicial notice of that.

MR. BLACKMAN: The Potash Company of America has no further evidence to offer at this time.

MR. GIRAND: I am not sure that the applicant offered their one exhibit.

MR. WALKER: You did, and it was received. There are no further witnesses? Are there any further comments in this case, or statements?

MR. BLACKMAN: I would like to make a statement. What is the method of procedure?

MR. WALKER: Who wants to go first?

MR. GIRAND: Being the applicant, I should have the right of opening and closing.

MR. WALKER: We wouldn't cut you off anyway.

MR. GIRAND: The only remarks I have to make in regard to this matter are that we have applied here to the Commission for authority, or rather consent or approval of our notice of intention to drill, as to this location. This is required under Rule R-111-A as well as under the restrictions placed on us in filing our notice of intention with the U. S. G. S. How far the jurisdiction of this Commission goes in a matter of this kind, as to passing on whether we have the right to drill or not drill, I am really not prepared to argue at this time. There is serious doubt in my mind that it is a matter within the jurisdiction of this Commission because it is Federal land and the lease was acquired under a Federal Stipulation which required consent of the Director before the drilling would be allowed. There has been no opposition or protest made as to the location of the well as not being within the rules prescribed by the Commission. Each of the well locations is a regular 660 location--a 660 location free of the potash

area. All it would require would be the filing with the Commission because it had complied with the rules. Now, the evidence here clearly shows that a 660-660 location on the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ --however, putting my eagle eye on it, it would seem to me a 330-330 out of the NE corner of the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ would be or could be permissible under the rules. We just think that the Commission is confronted here with you might say co-tenants. We own one floor and they own the other floor, and they can get 65% of their orebody out while we get ours out under the testimony, without interference, but in order for them to get the remaining 25%, in the event of 90% recovery, they can't tolerate us as a tenant. The facts are a little hazy and have a lot of elasticity to them as to how much potash we have and how long it will last and when they will get to it. I don't know the rights and wrongs on the matter, but I know the Federal code gives a lease on potash and also oil and gas. I don't know who is going to be the hen or the egg. I don't know that we should be put in that position, but surely if they are entitled to recover at least 65% of their orebody at this time, and can do that and live with us in the production of our product, if there is any there, it seems equitable and just that we might be entitled to enjoy some of the fruits of our estate, but to say that we are entitled to it as a matter of law I think there are other matters to be considered. There has been quite a bit of testimony as to the hazard involved and we do not want to be a party to anything that is ultimately, directly or indirectly, dangerous to human lives and values. I am in this position on the matter: If we can get to our estate and test it and see whether

or not we have oil and gas, and do it safely, and they can in turn enjoy production at the present time, and during our production, of 65% of their orebody, without assurance that they will need to get the other 25% during the life of our production, I think we would be entitled to go ahead with our operation.

MR. BLACKMAN: Mr. Chairman, and gentlemen, I would like to say in the first instance here, that the Potash Company of America approaches this problem a little more in the light and line of a problem in conservation, rather than a problem of the relative rights of the two parties. I think the engineering evidence is quite clear here that a producing oil and gas well will most certainly deny to somebody the production of the potash on second mining. Let's look at it a minute and see to whom it is denied. It is quite true that that denial is a denial to PCA of the amount of profit it can make from operations its mine in this particular section. But let's take a look at the letter Mr. Fulton has put in evidence, as to the value of the potash to the people. The value of the potash to the State of New Mexico, how much will be lost if this oil well or these four oil wells are drilled. The testimony is uncontroverted, both the engineers' testimony and the statement of Mr. Fulton, that it will not be possible to mine this potash on second mining if oil and gas are discovered and produced here. The testimony of Mr. Lane is very very strong on the proposition that second mining--that we cannot wait for a large number of years before going in on second mining. Let's look at the economic situation in which all of the potash companies now find themselves. All of the old companies who have been participating

here--U. S. Potash, International Minerals and Chemical, and Potash Company of America--who have operated in this area for a good many years, and are approaching the limits of their orebodies, and beginning with the retrending operation of pillar pulling, and getting out final mining, they are in competition not only with the new companies coming in, but there is the strong possibility that the New Mexico operation is going to be in competition with the potash deposit now being developed by Delhi Taylor in Moab, Utah, and extensive operations in Canada, in which all potash companies are interested to the extent of taking out prospecting permits in Canada. The effect of these things is in all probability, permission to drill the wells at this time will mean a practical denial of second mining recovery of the SE $\frac{1}{4}$ of Section 28 to the State. And what is the value of that? It is in the general area of Four Million Dollars. That is the value of the property which will be brought to the surface, loaded as a salable product. That isn't the value of it to PCA--their profit is a great deal less than that. But it is the value of the estate because it is made up of the wages and other expenses, but all the wages and other expenses going into that are funneled into the economy of the State. It all goes to the ultimate benefit of the State. I don't know the actual figures, or how many times you can turn over a dollar, but this certainly goes into the economy of the State of New Mexico. Now, what is the value of these wells? That, of course, is the sixty-four dollar question. They are a drug on the market if there is nothing there. But I ask you gentlemen to take notice of the records in your files on the values in terms of total production

in oil in other of the small pools around there and I think you will find a figure of something in the general neighborhood of Four Thousand Dollars, from Two Thousand to Four Thousand Dollars per acre is very very generous. The particular wells that have been drilled which are close by the Black Yates well, look pretty bad to me but I will not presume to tell you how good they are because I don't know anything about anything in the oil business, except the dry holes. I would like to state here and ask you to look carefully at this situation: We do not have here the situation Mr. Girard mentioned, of co-tenants; where two people, one owns the property on one level and one the other, and both have equal rights. That is not the situation at all. I refer specifically to Exhibit 3. Potash Company's Exhibit No. 3 is the oil and gas stipulation. This oil and gas lease of which Velma is assignee was issued under specific regulations by the Department of the Interior--our printed Exhibit No. 8--and I want to read to you one paragraph taken from the regulations which appears in the Velma lease:

"No wells will be drilled for oil or gas in formations above the base of the Delaware sand, or above a depth of 5,000 feet, whichever is the lesser, except upon approval of the Director of the Geological Survey, it being understood that drilling for production to these formations will be permitted only in the event that it is satisfactorily established that such drilling will not interfere with the mining and recovery of potash deposits or the interest of the United States would best be subserved thereby."

This oil and gas lessee is not in the position of a co-tenant,

DEARNLEY MEIER AND ASSOCIATES
ATTORNEYS AT LAW
ALBUQUERQUE, NEW MEXICO
TELEPHONE 3-6611

but is the owner of a serving estate. It is up to them to prove that the mining and recovery of potash will not be interfered with. That is their obligation. And who is the beneficiary? The beneficiary is the State. And the loss, one set against the other, it seems to be a ridiculous comparison to me. A value of approximately four million dollars on second mining as against the valuation of the type of wells we may think we would get in this particular area. The question of jurisdiction has been raised by Mr. Girand. It is our feeling with respect to that problem, that the Oil Conservation Commission of the State of New Mexico does have jurisdiction, over-all conservation jurisdiction, which under the circumstances of this case they are entitled to exercise at this point. The question of jurisdiction between the State and Federal Governments is one of complexity. The law is very meager on the subject. And I think you are safe in saying that orders of this Commission conserving the natural resources of the State will be observed by the Federal Government, if they are reasonable. The so-called right which Velma has here is not a right which Potash Company of America is seeking to destroy. PCA had an original lease in this area, long before it was ever released by the United States Government for oil and gas leasing. Our mine was constructed and operations were conducted. The oil and gas lessee is charged with complete notice of everything that has gone forth, complete notice of the Department of Interior regulations affecting this. The State of New Mexico, in addition to direct benefits through economy, still is interested directly. As you all know, the royalties which are paid on both potash and oil to the Federal Govern-

ment come back to the State of New Mexico; 37½% of those royalties, under the Mineral Leasing Act, are returned directly to the State of New Mexico in the form of a direct cash grant for use in education or in public roads; 52½% of those royalties for both oil and gas are paid to the Bureau of Reclamation and the Bureau has already expended them in the State in which granted so the Federal Government only gets 10% back of the royalties. It doesn't take too much to calculate the relative values as far as direct cash benefits to the State of New Mexico on each of these propositions, whether we use the oil or whether we refer to the potash.

I believe, Gentlemen, that we are here looking at, I am afraid, the beginnings of probably several propositions similar to this, and with mention only of the proposition here, we would like you to check your land carefully through your records, and the testimony here, with respect to the amount of gas you find in the Yates formation. It is quite true there is only a small amount of commercial gas in this area, but there is still a good deal of gas available down there, and we are concerned with the contamination of our entire mine. You may say, "What are you thinking of here when you say you can't figure on second mining? Maybe you can figure a way to get in there." The plain fact of the matter is that this section is only a small portion of our mine, but it extends over a very large area all of which is connected together, and we simply couldn't take a chance on injuring our entire mine. The risk is very much too great, even if it were possible to conduct our operations by removing the pillars, which if you will refer to Mr. Fulton's letter, you will see it is not. Thank you.

MR. WALKER: Does anyone have anything further? If not, we will take the case under advise. The hearing is adjourned.

C E R T I F I C A T E

STATE OF NEW MEXICO)
 : ss
COUNTY OF BERNALILLO)

I, THURMAN J. MOODY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings, Pages 1 through 60, inclusive, were reported by me in Stenotype at the time and place hereinbefore set forth; that same was later reduced to type-written transcript by me and/or under my personal supervision, and that same is a true and correct transcript to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this, the 27th day of August, 1956, in the City of Albuquerque, County of Bernalillo, State of New Mexico.


Notary Public

My Commission Expires:
April 3, 1960.

STATE OF NEW MEXICO)
 : ss
COUNTY OF SANTA FE)

I, DOROTHY B. MYERS, Notary Public in and for the County of Santa Fe, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings, Pages 61 through ///, inclusive, were reported by me in shorthand at the time and place hereinbefore set forth; that same was later reduced to type-written transcript by me and/or under my personal supervision, and that same is a true and correct transcript to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this, the 8th day of September, 1956, in the City of Santa Fe, County of Santa Fe, State of New Mexico.


Notary Public

My Commission Expires:
8-3-60

BRECKENRIDGE OFFICE
TELEPHONE 674
P. O. BOX 782

Case 1196

GRAHAM OFFICE
TELEPHONE 1492
P. O. BOX 1110

THE IBEX COMPANY

MANUFACTURERS OF NATURAL GASOLINE AND L. P. G. PRODUCTS
PRODUCERS OF OIL AND GAS

IBEX BUILDING

BRECKENRIDGE, TEXAS
August 7, 1958

Ex. Hearing
8-10

Oil Conservation Commission
State of New Mexico
State Capitol
Santa Fe, New Mexico

Re: Artesia Pilot Flood No. 2
Eddy County, New Mexico

Gentlemen:

Attached please find an original and two copies of an application for authority to expand the waterflood in Artesia Pilot Flood No. 2 in Eddy County, New Mexico.

It would be appreciated very much if you would set this matter up for hearing before an Examiner at the earliest possible date.

I would also appreciate your notification of the date which has been set for the hearing of this application.

Yours very truly,

THE IBEX COMPANY

O. H. Reaugh

BY: O. H. Reaugh

OHR:bjg

Docket Mailed
8-28-58
BP

OIL CONSERVATION COMMISSION

P. O. BOX 571

SANTA FE, NEW MEXICO

April 26, 1962

Granridge Corporation
P. O. Box 752
Brookridge, Texas

Gentlemen:

Reference is made to your application dated April 19, 1962, requesting permission to deviate from the flood pattern of your Artesia Water Flood Project No. 2, as presented in Case 1196, by completing Resler Yates State Well No. 310 as a producing well rather than as an injection well and to omit the drilling of Resler Yates State Well No. 309.

Inasmuch as your study of reservoir conditions in the area surrounding the two wells indicate the need for only one producing well in lieu of one producing well and an injection well and will not effect the ultimate recovery of the project, permission is hereby granted to allow the change as requested. The change permits the drilling of your Resler Yates State Well No. 310 located 310 feet from the East line and 1450 feet from the South line of Section 21, Township 18 South, Range 28 East, Eddy County, New Mexico, as a producing well and to abandon the proposed location of Resler Yates State Well No. 309 at 320 feet from the East line and 990 feet from the South line of Section 21, Township 18 South, Range 28 East, NEPM, Eddy County, New Mexico.

Very truly yours,

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

ALP/JEK/og

GRARIDGE CORPORATION

IBEX BUILDING

POST OFFICE BOX 752

BRECKENRIDGE, TEXAS

April 19, 1962

1962 APR 23 12

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

Re: Order No. R-966-E
Graridge Corporation Waterflood
Project No. 2

Gentlemen:

On July 15, 1959, Order No. R-966-E was issued relative to Case No. 1196 setting up administrative procedure for the expansion of Graridge Corporation operated Artesia Water Flood Projects No. 2 and No. 3. At the hearing for Case No. 1196, a waterflood pattern was presented which was projected to cover the area considered to have possible waterflood pay in the First Grayburg.

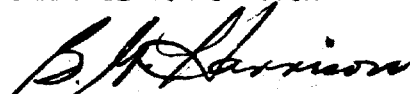
In this projection, Resler Yates State No. 310, located 330' FEL and 1650' FSL of Section 21, T-18S, R-28E, would be an injection well and No. 309, located 330' FEL and 990' FSL of Section 21, T-18S, R-28E, would be a producing well. Subsequent development of this flood project has indicated that the sand is much thinner and tighter in the vicinity of these two locations than was originally anticipated. Using projected recovery figures for producing wells which have responded in this immediate area, we would expect to recover approximately 32,000 gross barrels of oil from the floodable area around these two location which does not justify the expense involved in drilling two wells.

We believe that by maintaining injection into Resler Yates State Nos. 30, 24, and 303 and Lackawanna State No. 1, following the eventual watering out of Resler Yates State No. 25, that the area in the vicinity of locations 309 and 310 can be adequately swept. This should recover ultimately as much oil from the area with No. 310 as a producer as would be expected from the drilling of both 309 and 310 since we will be flooding toward a pinchout.

We respectfully request that the Commission grant administrative approval for the drilling and completing of Resler Yates State No. 310 as a producing well.

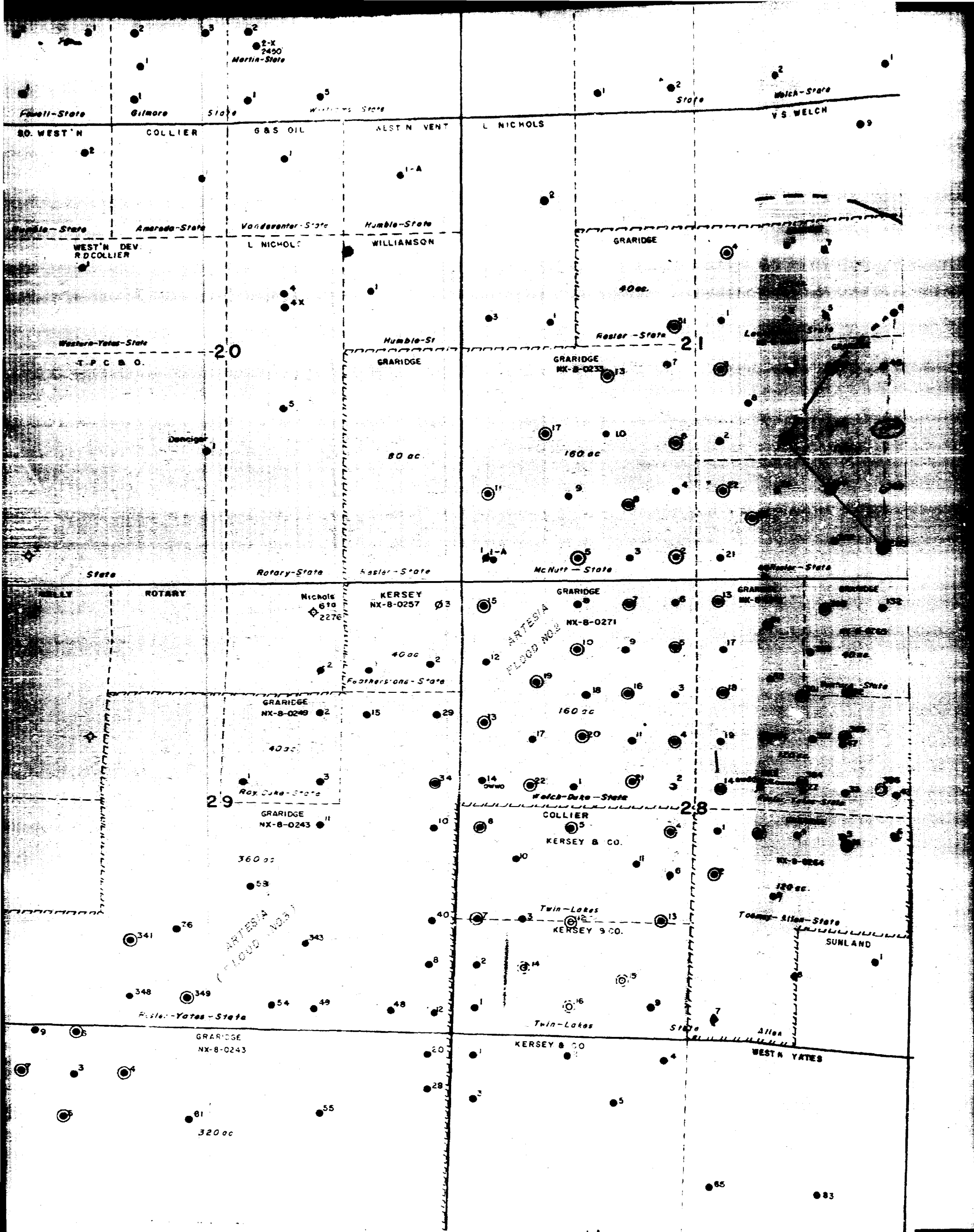
Yours very truly,

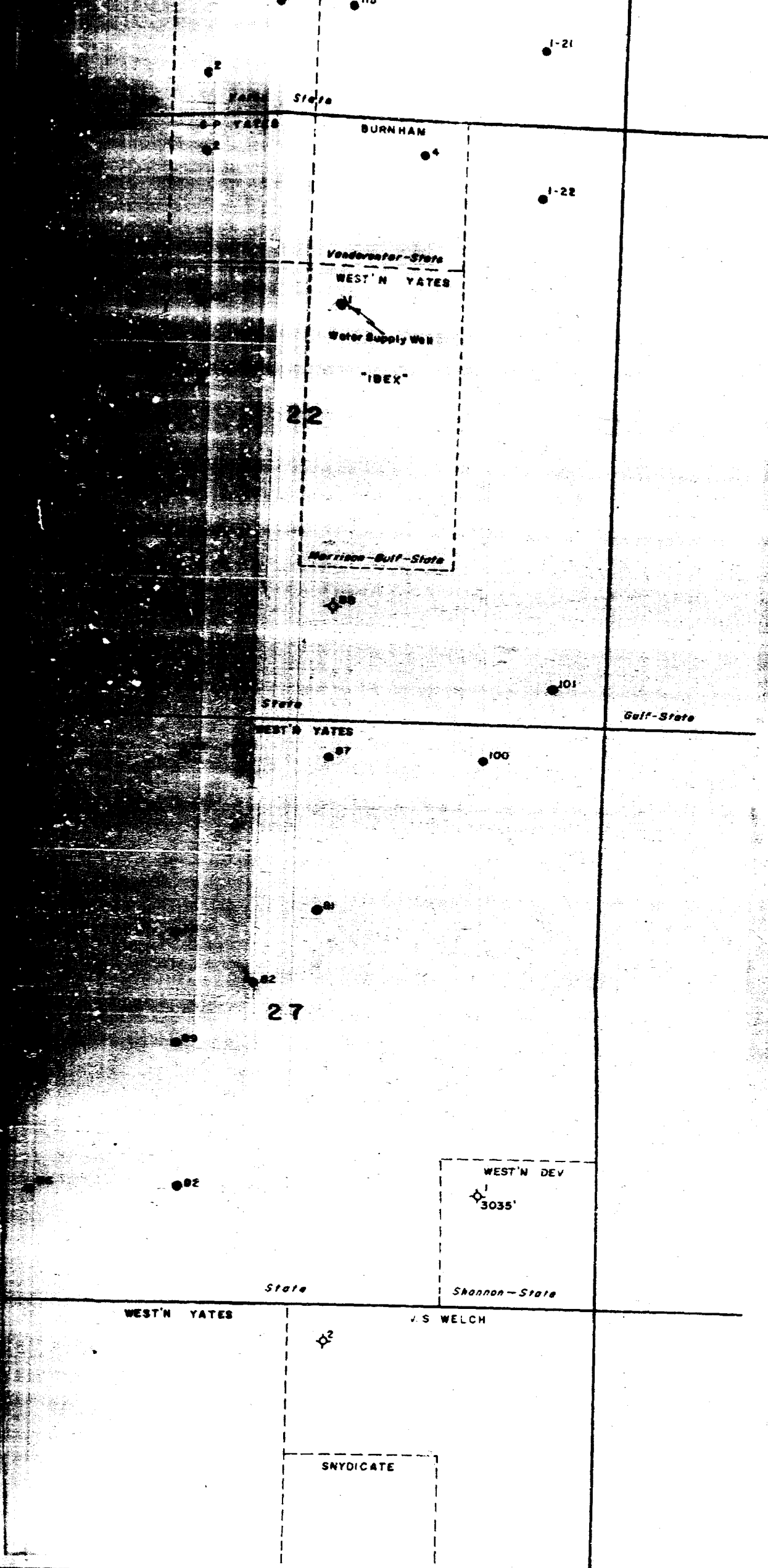
GRARIDGE CORPORATION



B. G. Harrison
Manager of Secondary Recovery

BGH:vw





Case 1196

MAIN OFFICE 000

APPLICATION FOR AUTHORITY TO EXPAND THE
IBEX COMPANY ARTESIA PILOT FLOOD PROJECT NO. 2 IN THE
ARTESIA POOL, EDDY COUNTY, NEW MEXICO

OIL CONSERVATION COMMISSION OF STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

WHEREAS, on March 29, 1957, the Oil Conservation Commission of New Mexico, by its Order Number R-966, authorized The Ibex Company to institute Artesia Pilot Flood Project Number 2 in the Grayburg formation underlying certain of their leases in part of Sections 21 and 28-18S-28E Artesia Pool, Eddy County, New Mexico. That in such order six (6) water injection wells were authorized, which are more particularly set out on the plat attached hereto and marked Exhibit "A" as well numbers 5 and 7 on the Welch Duke State Lease, numbers 8, 13, and 51 on the M R Y Lease and number 2 on the McNutt State Lease, all being marked in red.

WHEREAS, the operation of said pilot flood over a period of months resulted in a successful increase in production and on May 26, 1958, the Oil Conservation Commission of the State of New Mexico, by its Order R-966-A, authorized capacity production allowable for certain wells in the pilot waterflood project above referred to for the purpose of handling the increased production.

WHEREAS, after due consideration of data obtained from the above referred to pilot waterflood project that in order to prevent waste and obtain full ultimate recovery of oil from the waterflood area, such pilot flood must be expanded by converting additional wells into water injection wells.

It is therefore respectfully requested by the undersigned, waterflood operator, The Ibex Company, that the Oil Conservation Commission of the State of New Mexico immediately approve the following wells situated in Pilot Flood No. 2 in the Artesia Pool, Eddy County, New Mexico, which are indicated in green on Exhibit "A" attached hereto, as unorthodox well locations:

- (1) McNutt State No. 5, 272' from the South Line and 1291' from the West Line of Section 21, 18S-28E.
- (2) McNutt State No. 6, 1618' from the South Line and 2335' from the West Line of Section 21, 18S-28E.
- (3) Malco-Resler-Yates State No. 22, 1070 from the South Line and 2370' from the East Line of Section 21, 18S-28E.
- (4) Welch Duke State No. 2, 2331' from the North Line and 2419' from the West Line of Section 28, 18S-28E.
- (5) Welch Duke State No. 4, 1803' from the North Line and 2407' from the West Line of Section 28, 18S-28E.
- (6) Welch Duke State No. 10, 750' from the North Line and 1337' from the West Line of Section 28, 18S-28E.

It is further requested that the following wells which include the above mentioned unorthodox wells situated in Pilot Flood No. 2 in the Artesia Pool and encircled in yellow in Exhibit "A" attached hereto be approved as injection wells and that The Ibex Company be authorized to convert these wells to water injection wells:

- (1) McNutt State No. 5, Situated in SW/4 SW/4 of Section 21-18S-28E, N.M.P.M.
- (2) McNutt State No. 6, Situated in NE/4 SW/4 of Section 21-18S-28E, N.M.P.M.
- (3) McNutt State No. 8, Situated in SE/4, SW/4 of Section 21-18S-28E, N.M.P.M.
- (4) Malco-Resler-Yates State No. 22, Situated in SW/4 SE/4 of Section 21-18S-28E, N.M.P.M.
- (5) Malco-Resler-Yates State No. 39, Situated in SW/4 SE/4 of Section 21-18S-28E, N.M.P.M.
- (6) Welch Duke State No. 4, Situated in NE/4 NW/4 of Section 28-18S-28E, N.M.P.M.
- (7) Welch Duke State No. 10, Situated in NE/4 NW/4 of Section 28-18S-28E, N.M.P.M.
- (8) Welch Duke State No. 16, Situated in the NE/4 NW/4 of Section 28-18S-28E, N.M.P.M.

It is therefore, respectfully requested that this Commission set a date for a hearing on this application so that the undersigned may establish the facts necessary to authorize this expansion in the interest of conservation and prevention of waste as above set out.

Respectfully submitted,

THE IBEX COMPANY



O. H. Reaugh

OHR:bjg

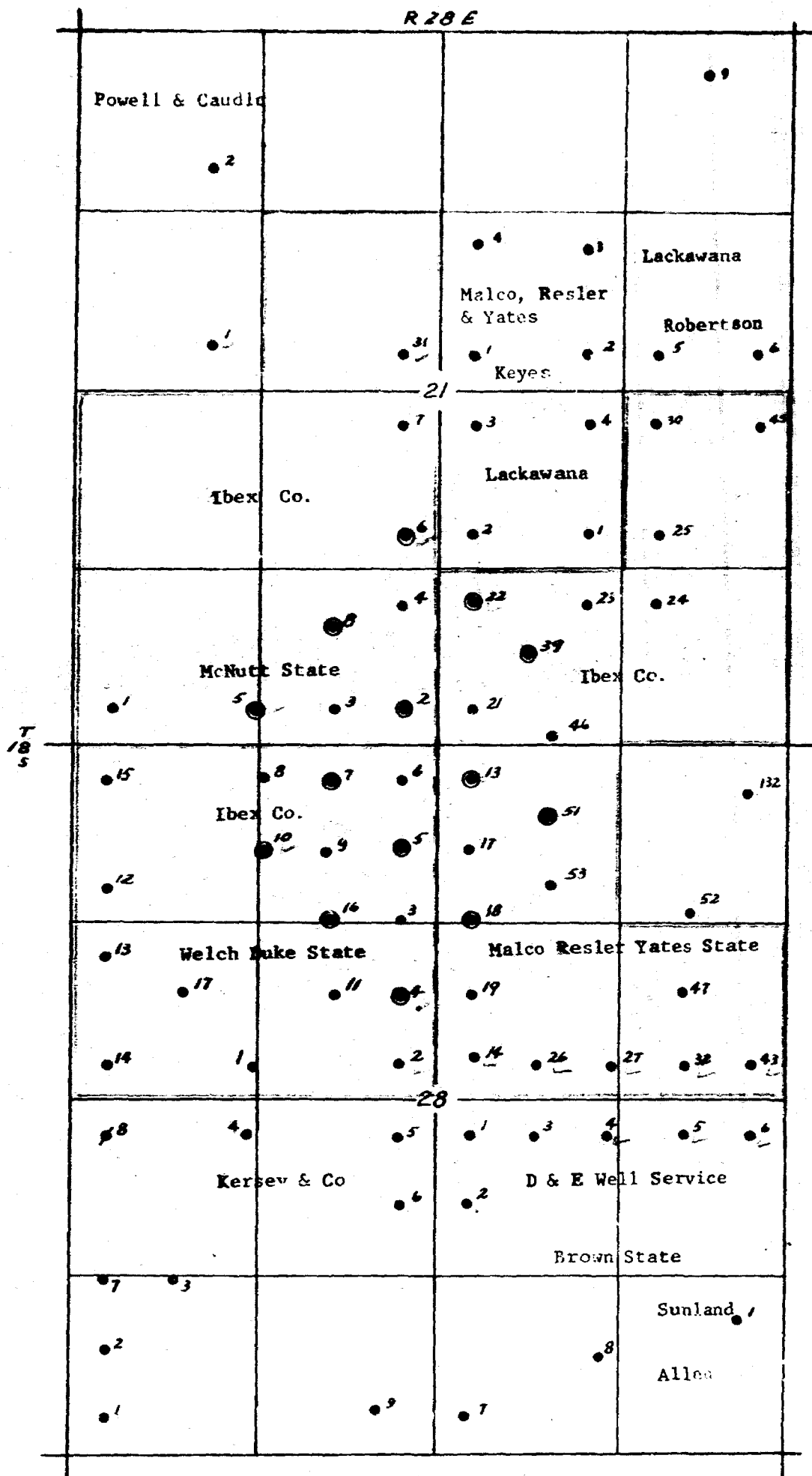


TABLE SHOWING WELL TESTS
AND
WATER INJECTION DATA
IN
ARTESIA WATER FLOOD PROJECT NO. 2
IN
ARTESIA FIELD, EDDY COUNTY, NEW MEXICO

PRODUCING WELL TESTS

WELL	DATE	OIL	WATER
McNitt No. 3	12-15-58	25.5	56.2
" 4	1-23-59	4	0
" 7		(T. A. since July 1958)	
MEY 17	1-22-59	80	48
" 19	9- 8-58	6	0
21	1-20-59	89	0
46	1-21-59	7	2
53	1-17-59	54.3	0
23	12- -58	(46 bbls./month)	0
Walch Duke St. No. 3	1-13-59	78.5	1.3
6	1-15-59	155	13.5
8	1-14-59	17.8	0
9	1-15-59	55.6	12.6
11	12- -58	(31 bbls./month)	0

WATER INJECTION WELL DATA

(Cumulative Water Injection to 1-1-59)

McNitt No. 2	124,458
5	Jan
6	Jan
8	1,434

Walch Duke State No. 4	2,469
5	111,533
7	130,984
10	3,065
16	Jan.

Basler Yates State No. 13	103,585
18	105,225
22	Jan
39	2,018
51	86,634

DOCKET: EXAMINER HEARING SEPTEMBER 10, 1958

Oil Conservation Commission 9 a.m., Mabry Hall, State Capitol, Santa Fe, New Mexico

The following cases will be heard before Daniel S. Nutter, Examiner:

CASE 1196:

Application of The Ibex Company for permission to expand a pilot water flood project in the Artesia Pool, Eddy County, New Mexico, and for six unorthodox well locations. Applicant, in the above-styled cause, seeks an order permitting the expansion of its Artesia Pilot Water Flood project No. 2, authorized by Order No. R-966 in the Artesia Pool, Eddy County, New Mexico, to include eight additional water injection wells in Sections 21 and 28 of Township 18 South, Range 28 East, Eddy County, New Mexico. Applicant further seeks an order authorizing six unorthodox well locations in said Sections 21 and 28.

CASE 1498:

Application of El Paso Natural Gas Company for permission to conduct maximum pressure build-up tests and for the non-cancellation and/or transfer of allowables for test wells. Applicant, in the above-styled cause, seeks an order authorizing it to conduct maximum pressure build-up tests on seventeen gas wells in the Aztec-Pictured Cliffs, Ballard-Pictured Cliffs, Fulcher Kutz-Pictured Cliffs, South Blanco-Pictured Cliffs, and Blanco Mesaverde Gas Pools in San Juan and Rio Arriba Counties, New Mexico. Applicant further requests the non-cancellation of allowable accruing to test wells during the test period and for authority to transfer said allowables to other wells on the same basic lease, and for such other relief as is necessary to properly conduct said tests.

CASE 1499:

Application of Sinclair Oil and Gas Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing a 240-acre non-standard gas proration unit in the Tubb Gas Pool consisting of the SW/4 and the S/2 SE/4 of Section 26, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's J. R. Cone "A" Well No. 1, located 660 feet from the South and West lines of said Section 26.

CASE 1500:

Application of Sinclair Oil and Gas Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing a 200-acre non-standard gas proration unit in the Blinebry Gas Pool consisting of the SW/4 and the SW/4 SE/4 of Section 26, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to the applicant's J. R. Cone "A" Well No. 2, located 1980 feet from the South line and 660 feet from the West line of said Section 26.

- CASE 1501: Application of Continental Oil Company for a dual completion and for permission to commingle the liquids produced from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing a gas-gas dual completion for its Britt B-15 Well No. 9, located 1980 feet from the South and East lines of Section 15, Township 20 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of gas from an undesignated Tubb Gas pool and the production of gas from an undesignated Blinebry gas pool. Applicant further seeks permission to commingle the liquids produced from said well from the two above-named pools.
- CASE 1502: Application of The Pure Oil Company for an order authorizing a salt water disposal well. Applicant, in the above-styled cause, seeks an order authorizing the disposal of salt water through its State Lea "E" No. 1 Well, located 1980 feet from the North and East lines of Section 21, Township 16 South, Range 34 East, Lea County, New Mexico. Said well is a producing oil well in the Kernitz-Cisco Pool and the applicant proposes to inject salt water through the annulus between the 8 5/8" and 5 1/2" casing. The proposed injection zone is from 4,527 feet to 9,450 feet.
- CASE 1503: Application of The Pure Oil Company for permission to commingle the production from two separate oil pools. Applicant, in the above-styled cause, seeks an order authorizing the commingling of oil produced from the Kernitz-Cisco Pool and the Kernitz-Wolfcamp Pool on its State-Lea "E" Lease located in Section 21, Township 16 South, Range 34 East, Lea County, New Mexico. The applicant proposes to separately meter the production from each pool prior to commingling.
- CASE 1504: Application of Gulf Oil Corporation for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Learcy McBuffington Well No. 8, located 330 feet from the South line and 1980 feet from the West line of Section 13, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Fusselman formation adjacent to the Justis-Fusselman Pool and oil from an undesignated Montoya pool through parallel strings of tubing.
- CASE 1505: Application of Gulf Oil Corporation for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Learcy McBuffington Well No. 9, located 1650 feet from the South line and 1980 feet from the West line of Section 13, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Fusselman formation adjacent to the Justis-Fusselman Pool and oil from an undesignated Montoya pool through parallel strings of tubing.

CASE 1506:

Application of Gulf Oil Corporation for the creation of two non-standard gas proration units in the Tubb Gas Pool and two non-standard gas proration units in the Blinebry Gas Pool. Applicant, in the above-styled cause, seeks an order authorizing the creation of a 160-acre non-standard gas proration unit in both the Blinebry Gas Pool and in the Tubb Gas Pool, each to comprise the NE/4 SW/4, and W/2 SE/4 of Section 28 and the NW/4 NE/4 of Section 33, and to be dedicated to applicant's J. N. Carson "A" Well No. 4, located 554 feet from the South line and 2086 feet from the East line of said Section 28 and J. N. Carson "A" Well No. 6, located 2086 feet from the South and East lines of said Section 28 respectively. Applicant further seeks an order authorizing the creation of a 120-acre non-standard gas proration unit in both the Blinebry Gas Pool and in the Tubb Gas Pool, each to comprise the E/2 SE/4 of Section 28 and the NE/4 NE/4 of Section 33, and to be dedicated to applicant's J. N. Carson "C" Well No. 6, located 330 feet from the South line and 965 feet from the East line of said Section 28 and J. N. Carson "C" Well No. 3, located 640 feet from the South line and 660 feet from the East line of said Section 28 respectively, all of the above being in Township 21 South, Range 37 East, Lea County, New Mexico.

CASE 1507:

Application of Lea County Drip Company, Inc., for authority to construct and operate two waste oil treating plants. Applicant, in the above-styled cause, seeks an order authorizing it to construct and operate two treating plants in Lea County, New Mexico, to treat waste oil and tank bottoms collected from leases in Lea, Eddy, Chaves and Roosevelt Counties, New Mexico, said plants to be located at the following points:

- (1) Adjacent to the Shell Pipeline Company's Pipeline approximately three miles South of Hobbs, New Mexico.
- (2) Adjacent to the Shell Pipeline Company's Eunice Station approximately five miles West of Eunice, New Mexico.

August 25, 1958

ga

966-B
R-~~966-B~~

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date September 11, 1958

CASE NO. 1196

HEARING DATE 9-10-58-9 a.m. DSN - Santa Fe

My recommendations for an order in the above numbered case(s) are as follows:

Enter an order in the subject case authorizing the expansion of the pilot water flood to include eight additional water injection wells. The injection wells will be:

- (1) McNutt State No. 5, SW/4 SW/4 of Section 21-18S-28E, NMPM.
- (2) McNutt State No. 6, NE/4 SW/4 of Section 21-18S-28E, NMPM.
- (3) McNutt State No. 8, SE/4, SW/4 of Section 21-18S-28E, NMPM.
- (4) Malco-Besler-Yates State No. 22, SW/4 SE/4 of Section 21-18S-28E, NMPM.
- (5) Malco-Besler-Yates State No. 39, SW/4 SE/4 of Section 21-18S-28E, NMPM.
- (6) Welch Duke State No. 4, NE/4 NW/4 of Section 28-18S-28E, NMPM.
- (7) Welch Duke State No. 10, NE/4 NW/4 of Section 28-18S-28E, NMPM.
- (8) Welch Duke State No. 16, NE/4 NW/4 of Section 28-18S-28E, NMPM.

Also, authorize six unorthodox locations in Sections 21 and 28 as requested by the applicant. The unorthodox locations are for the following wells; all of which were drilled years ago:

- (1) McNutt State No. 5, 272' from the South line and 1291' from the West line of Section 21, 18S-28E.
- (2) McNutt State No. 6, 1618' from the South line and 2335' from the West line of Section 21, 18S-28E.


Staff Member
DANIEL S. NUTTER

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date September 11, 1958

Page No. 2

CASE NO. 1196

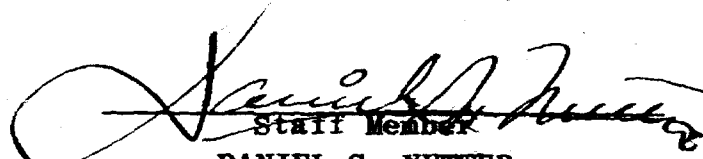
HEARING DATE 9-10-58 9 a.m. DSN-Santa Fe

~~My recommendations for an order in the above numbered case(s) are as follows:~~

- (3) Malco-Besler-Yates State No. 22, 1070' from the South line and 2370' from the East line of Section 21, 18S-28E.
- (4) Welch Duke State No. 2, 2331' from the North line and 2419' from the West line of Section 28, 18S-28E.
- (5) Welch Duke State No. 4, 1803' from the North line and 2407' from the West line of Section 28, 18S-28E.
- (6) Welch Duke State No. 10, 750' from the North line and 1337' from the West line of Section 28, 18S-28E.

This water flood has progressed to the point where it is necessary to add additional injection wells.

There is no question as to the necessity of any of the proposed injection wells with the exception of one, that well being the Ibex Company's McNatt State No. 6. There is a doubt in my mind as to the necessity for conversion of this particular well. However, there will be a definite need for conversion of same in the near future and approval might as well be given now.


Staff Member
DANIEL S. NUTTER

ir/

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

September 29, 1958

C
O
P
Y

Mr. Jack Campbell
Campbell & Russell
P.O. Box 721
Roswell, New Mexico

Dear Mr. Campbell:

On behalf of your client, The Ibez Company, we enclose two copies of Order R-966-B issued September 29, 1958, by the Oil Conservation Commission in Case 1196, which was last heard on September 10th at Santa Fe before an examiner.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Original

IN THE MATTER OF:

Case No. 1196

TRANSCRIPT OF PROCEEDINGS

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE - SANTA FE
3-6691 2-2211

January 9, 1957

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 9, 1957

IN THE MATTER OF:

Application of The Ibex Company for an order authorizing two pilot water flood projects in the Artesia Pool, Eddy County, New Mexico, in exception to Rule 701 of the New Mexico Oil Conservation Commission Statewide Rules and Regulations and further approval of the unorthodox location of a number of its old wells in said pool. Applicant, in the above-styled cause, seeks an order authorizing two separate pilot water flood projects in the Grubbburg formation of the Artesia Pool; said projects to be effected by means of water injection through approximately 10 existing wells in Sections 21, 28, and 32, Township 18 South, Range 28 East, Eddy County, New Mexico. Applicant also seeks Commission approval of the unorthodox location of certain of its old wells in the Artesia Pool.

No. 1196

BEFORE:

Mr. Warren W. Mankin, Examiner

TRANSCRIPT OF PROCEEDINGS

MR. MANKIN: And we will continue to the last case on the docket, which is Case No. 1196.

MR. GURLEY: Case No. 1196. Application of The Ibex Company for an order authorizing two pilot water flood projects in the Artesia Pool, Eddy County, New Mexico, in exception to Rule 701 of the New Mexico Oil Conservation Commission Statewide Rules and Regulations and further approval of the unorthodox location of a

number of its old wells in said pool.

(Witness sworn.)

MR. ELLIOTT: I am R. L. Elliott of Breckenridge, Texas.
We have one witness, Mr. Vich, who has been sworn.

ROBERT H. VICH

called as a witness, having first been duly sworn, testified as follows:

DIRECT EXAMINATION

BY: MR. ELLIOTT:

Q Mr. Vich, you are Water Flood Engineer for The Ibox Company in Breckenridge, Texas?

A I am.

Q And you have been qualified as an expert before this Commission?

A Yes, sir.

MR. ELLIOTT: Will you please, Mr. Examiner, if further qualification be had or --

MR. MANKIN: The qualifications are acceptable. Proceed.

Q At this time, we should like to enter as Exhibit No. 1 the field plat of the area that we once entered in the other case before.

(Ibox's Exhibit No. 1 marked for identification.)

Q Mr. Vich, would you discuss this area plat as to well location, proposed water floods, and so forth?

A The plat marked Exhibit No. 1 indicates the proposed pilot positions and the injection wells are indicated, the producing wells, the temporarily abandoned wells and also two of the currently completed or presently completed water wells, and also we would like to point out in Section 22, the location of an abandoned Gulf producing well, which we are in the process of obtaining permits to re-enter. This subject well had an indication of salt water in considerable volume indicated when it was drilled back at an earlier date and we are investigating this as a possible source of future water for the flooding operation in this area.

Q The two proposed floods shown on this area will be referred to as what pool?

A As Pilot Number 2 and Pilot Number 3 of the Artesia Pool. We have previously applied for an application to install pilot flood No. 1, which is in Section 4 of Township 17, Range 28 in the same pool.

Q Do you have any further discussion relative to this field plat at this time?

A No, that is all we have to offer on Exhibit No. 1.

MR. GURLEY: Do you have a list of these wells that you propose to --

A Yes, sir, and I have an exhibit for those.

MR. GURLEY: Fine.

MR. ELLIOTT: At this time, if it please the Examiner, I would like to enter as Exhibit No. 2 a data sheet, which, Mr.

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Vich, I will have you look at before we enter it.

(Ibex's Exhibit No. 2 marked
for identification)

Q Did you prepare this Data Sheet or have it prepared at
your direction?

A I did. And the material shown on the subject Data
Sheet covers the reservoir conditions and proposed flooding opera-
tion and method, water supply, and anticipated results from the
proposed pilot water flood. Also as an attachment to proposed
Exhibit No. 2 we have listed the leases currently operated by The
Ibex Company in the subject area.

MR. ELLIOTT: I would like to enter this as an exhibit.

Q Mr. Vich, at this time do you have any further dis-
cussion as to the production history of this area?

A We were unable to attach production curves or indi-
vidual production figures for the individual wells in the subject
area due to the condition that the previous operators in there
report of production on this area, had included production from
other leases surrounding the subject wells, and we were unable to
ascertain the exact cumulative production or to derive production
curves on the area. We have estimated, however, the production,
cumulative production from the first Grayberg sand formation, which
is the sub-pay interval, to be approximately in excess of four and
a half million barrels cumulative.

Q Mr. Vich, is this isopach map one which you drew or had
drawn under your direction?

A It was prepared under my supervision.

MR. ELLIOTT: I would like to enter this isopach map as Exhibit No. 3.

(Ibex's Exhibit No. 3 marked for identification)

A. We would like to correct that. That exhibit is a Contour Map on top of the first pay section of the Grayberg formation.

Q Mr. Vich, this is an isopach map. Did you prepare or have prepared under your direction this isopach map of the area?

A This isopach map of the net sand thickness of the first Grayberg pay was prepared under my supervision, yes, sir.

MR. ELLIOTT: I would like to introduce this as Exhibit No. 4.

(Ibex's Exhibit No. 4 marked for identification)

Q Mr. Vich, what is the sand in which you propose to introduce pilot flood known as, and discuss its depth?

A It is the first pay interval or first, known locally as the first sand of the Grayberg formation.

Q Will you discuss your oil completion program for this project at this time?

A The majority of the wells that have been completed in the area do not have an oil producing string. The surface casing on the majority of them is set at approximately eight hundred to nine hundred feet, and the remainder of the hole is open hole.

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We propose to go in and run an injection string or an oil string and cement in the top of the producing sand on all of the wells that we will recomplete on the over-all program, the water injection will definitely be isolated to the first sand section of the Grayberg formation.

Q Mr. Vich, what has been done with reference to available water supply for this water flood -- pilot water project?

A We have currently investigated the two possible sources there, the first one being -- or three possible sources -- the first one being fresh water, which is available from shallow sand some sixty feet deep and also from slightly deeper sand at two hundred sixty-five feet. Both of these water supplies are of limited volume and are definitely fresh water. But we have another supply, possible supply at approximately three hundred and fifty feet of depth, which contains approximately nineteen thousand parts per million of salt. And we therefore consider it unfit for domestic consumption, and that is the source of water that we propose or have applied to use -- applied for use in the flooding operation. The other possible source is the Gulf well -- from the old Gulf well in Section 22 which we have previously indicated on Exhibit No. 1 which we are currently investigating and drawing up arrangements for permit to re-enter and test the salt water at approximately forty-four hundred feet.

Q Mr. Vich, is this water supply in one of the recognized water basins of the state?

A No, it is not.

Q You did state, however, there was a water source which you have investigated at approximately three hundred and thirty-five, three hundred and fifty feet, which would be suitable for water injection but not suitable for human consumption or irrigation?

A That is our understanding, yes, sir.

Q I will show you here a laboratory water analysis. Did you have that prepared?

A Yes, sir. This was a sample of the water obtained from the local water wells producing from the three hundred and thirty-five foot depth. This was analyzed by the Chemical Process Company of Breckinridge in their laboratory and is, to our knowledge, correct.

MR. ELLIOTT: At this time I would like to introduce this analysis as Exhibit No. 5.

(Ibex's Exhibit No. 5 marked
for identification)

Q Mr. Vich, according to the plats which have been introduced, indicates that most of the wells involved in this pilot flood are in unorthodox locations. Will you discuss with the Examiner when these wells were drilled and any other information you might have that would indicate why the locations are unorthodox?

A The majority of the wells in the area were completed at an early date prior to the pre-spacing and proration unit rules, and with very few exceptions, all of the wells are not over two hundred and fifty feet from the respective production or allowable

unit boundaries, and we would propose that we be permitted to utilize these present locations in an effort to install the pilot programs on twenty acres, ten to twenty acre spacing patterns and in order to obtain faster results and have better control over the flooding operations, and also to keep down the economic cost more or less in line with the risk involved. And so we therefore propose that we be allowed to utilize the present locations which we have^a indicated on/detailed sheet, the wells to be affected by the respective two pilot floods with --

Q Mr. Vich, has anything been done to determine the exact locations of these unorthodox wells to be used in connection with this water flood?

A The areas, sub-areas, have been re-surveyed by Mr. Mathis, who is the state registered land surveyor from Artesia and we have in our records these re-surveyed plats and have taken the respective distances of the sub-well locations from those re-surveyed plants and prepared them on an itemized sheet.

Q I will ask you, Mr. Vich, if this represents the itemized sheet which you prepared or had prepared at your direction showing the exact locations of each well involved in this project?

A That is correct, yes, sir.

MR. ELLIOTT: At this time, Mr. Examiner, I wish to enter this as Exhibit No. 6 and ask that you will use this in connection with your plat to determine the exact locations of these unorthodox wells.

(Ibex's Exhibit No. 6 marked
for identification)

DEARNLEY-MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE - SANTA FE
3-6591 2-1869

Q Mr. Vich, from your study of this area relative to the water flood project, is it your opinion that the wells in this area have reached their economic limits and what you propose to do would be an interest to conservation and prevention of waste?

A That is correct. The average production was indicated on Exhibit No. 2 as approximately one and a half barrels per day, present production of oil, and from this rate the wells are definitely approaching the economic limit and will have to be abandoned with a subsequent loss of the otherwise recoverable reserves which we have indicated on Exhibit No. 2.

Q Mr. Vich, I believe I asked you, on most of these exhibits -- we have entered six exhibits here -- I would like to ask you at this time whether or not each was prepared by you or under your direction?

A They were all prepared either by me or underneath my supervision.

MR. ELLIOTT: At this time I should like to make a motion that these exhibits be entered and be made a matter of record in this case.

MR. MANKIN: Is there any objection to entering Exhibits Nos. 1 through 6 in this case? If not, they will be so entered.

MR. ELLIOTT: I believe that's all.

MR. MANKIN: On your Exhibit No. 2 you indicated you anticipated initial injection of three hundred barrels per day per well, of which there is approximately ten injection wells in these

two pilot floods. Would that not be about three thousand barrels per day injection.

A That is correct. Now that was taken as purely an estimated figure. We do not have exact core data on the sub-area but it will be obtained in the process of re-completing these sub-wells and we intend to apply for a new producing well offsetting one of the proposed pilots which we will core and analyze and evaluate, further evaluate the producing sand, which might lower somewhat our anticipated water requirements for the proposed floods.

MR. MANKIN: This proposed new well which you might core, is it not in the vicinity of your pilot flood Number 1, rather than No. 2 and No. 3, or is it in this area?

A It will be in the vicinity of pilot flood Number 2.

MR. MANKIN: Returning again to the water source, do you anticipate at first utilizing the four water source wells in the beginning, or do you anticipate using the old Gulf from the San Andres?

A We will definitely pursue the source of water in the Gulf well as soon as we get the permit to re-enter the well. However, we have applied for prospecting rights through the Commissioner of Public Lands, for prospecting rights for this sub-area. The water shows that we have indications at three hundred and thirty-five feet. Now the volume of water from the presently completed water supply wells that we have indicated on Exhibit No. 1 is not sufficient to carry on the operations. We would drill additional wells to this

three hundred thirty-five foot water-sand interval for it when we obtain the permits from the, through the Commissioner of Public Land.

MR. MANKIN: You indicated that all of these old wells were completed, some at -- with casing at some six hundred feet, and the anticipated setting of new production strings down into the zone that was to be flooded.. That was in the injection well, is that correct?

A That will be both injection and producing wells.

MR. MANKIN: In both types of wells?

A Yes.

MR. MANKIN: So that you can isolate the zones?

A Yes, sir.

MR. MANKIN: Are there other questions of the witness?

MR. IRBY: The number of gallons in your barrels, how many gallons per barrel in this three thousand barrel minimum per day?

A That would be regular 42-gallon barrel.

MR. IRBY: Thanks. That's all.

MR. ELLIOTT: I would like to ask one more question of the witness to clarify this proposed possible source of Gulf Oil. I don't know if it has been brought out clearly or not.

MR. ELLIOTT: Mr. Vich, I would like for you to explain to Mr. Irby and Mr. Mankin just what we know about this thing as to possibility that there may be water and there may not be?

A Well, when the well was drilled, it was never completed

as a producing well back at some early date, but they did have on the log of the well, indicated a hole full of salt water and how much that would be finally, we don't know. It would just have to be determined by re-entering the well and testing or acidizing and testing, which we intend to do. We have obtained the verbal approval from Gulf and the agreements are being drawn up, the legal agreements to gain access to the well.

MR. ELLIOTT: And, actually, the only information we have as to this possible source is that the old log showed the hole full of salt water?

A That is correct, yes, sir.

MR. ELLIOTT: That's all.

MR. MANKIN: Mr. Vich, returning to Exhibit No. 6, which was your well locations, unorthodox locations, are all of the proposed unorthodox locations which you requested on Exhibit No. 6, are these either presently producing wells or wells that will be converted to injection or -- first answer that question. Can you answer that?

A Yes, sir. I believe on Exhibit No. 1, on our designation at the bottom we have stipulated the temporarily abandoned locations, the presently producing locations and the wells proposed for conversion to injection wells.

MR. MANKIN: So none of these wells are abandoned, they are temporarily abandoned producers?

A That's correct.

MR. MANKIN: There is none that would have to be renewed completely? They are not abandoned?

A That's correct. We might possibly find junk or some other material in the hole and which would require the drilling of a new well or the abandonment of a proposed injection well, but that would just have to be as the program progressed.

MR. GURLEY: You don't stipulate on your -- specify on your Exhibit No. 6 which wells are to be used. That is the unorthodox wells -- location of wells that are to be used as water injection wells and the ones that are to produce. In other words, you got to use your Exhibit No. 1 in connection with --

MR. ELLIOTT: When I introduced it, I asked that it be used in connection with Exhibit No. 1 so that you could get it all in your mind in a picture. In other words, that will give you everything except the map, which would have the full footage on each location and if you would like to have that, we could prepare that for you at a later date.

MR. GURLEY: Just a minute.

MR. MANKIN: That's satisfactory. Any other questions of the witness?

MR. UTZ: Mr. Vich, I believe you stated that the water you proposed to use from the three hundred and thirty-five foot level was unfit for human consumption or irrigation purposes?

Q Yes, sir, to our knowledge.

MR. UTZ: I wonder if you would refer to your Exhibit

No. 5, the water analysis report, and indicate for the record what makes this water unfit?

A Well, the sodium parts is indicated at 1653 parts per million and the chloride at 3000 parts per million which chloride content, I believe of anywhere in excess of 200 parts per million is unfit for domestic consumption?

MR. UTZ: And also irrigation?

A Well, not sure about irrigation but in treating books for various water supplies they list a limit of some 200 parts per million of salt as being the maximum allowable.

MR. UTZ: Can you state whether or not the State Engineer's office agrees that this water is unfit for irrigation purposes?

A We have furnished them with copies of water analyses from the previous application for the pilot flood Number 1 that we proposed in Section 4 of this same township and range and we will also, as we complete new water supply wells, definitely furnish them chemical analysis and samples of the water for their records and then for their interpretation and ruling.

MR. UTZ: That's all I have.

MR. MANKIN: Is there any further questions of the witness? If there is no further questions of the witness, the witness may be excused.

(Witness excused)

MR. MANKIN: Is there any statements to be made in this case? If not, we will take the case under advisement and the hearing is adjourned.

* * * * *
DEARNLEY MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE - SANTA FE
3-6691 2-1865

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal, this, the 30 day of January, 1957.

J. A. Trujillo
NOTARY PUBLIC - COURT REPORTER

My Commission Expires:

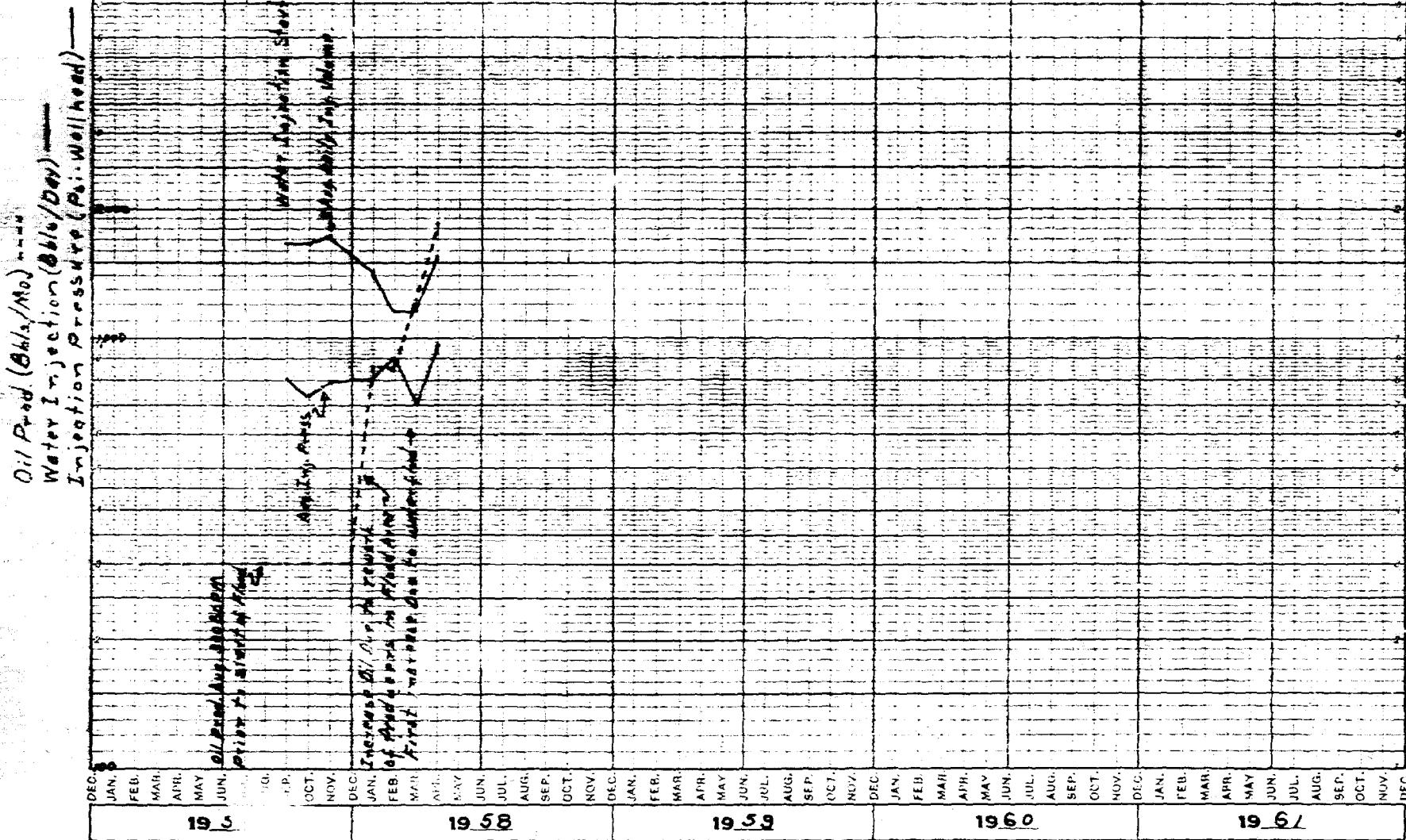
October 5, 1960

DEARNLEY-MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE SANTA FE
3 6691 2-1869



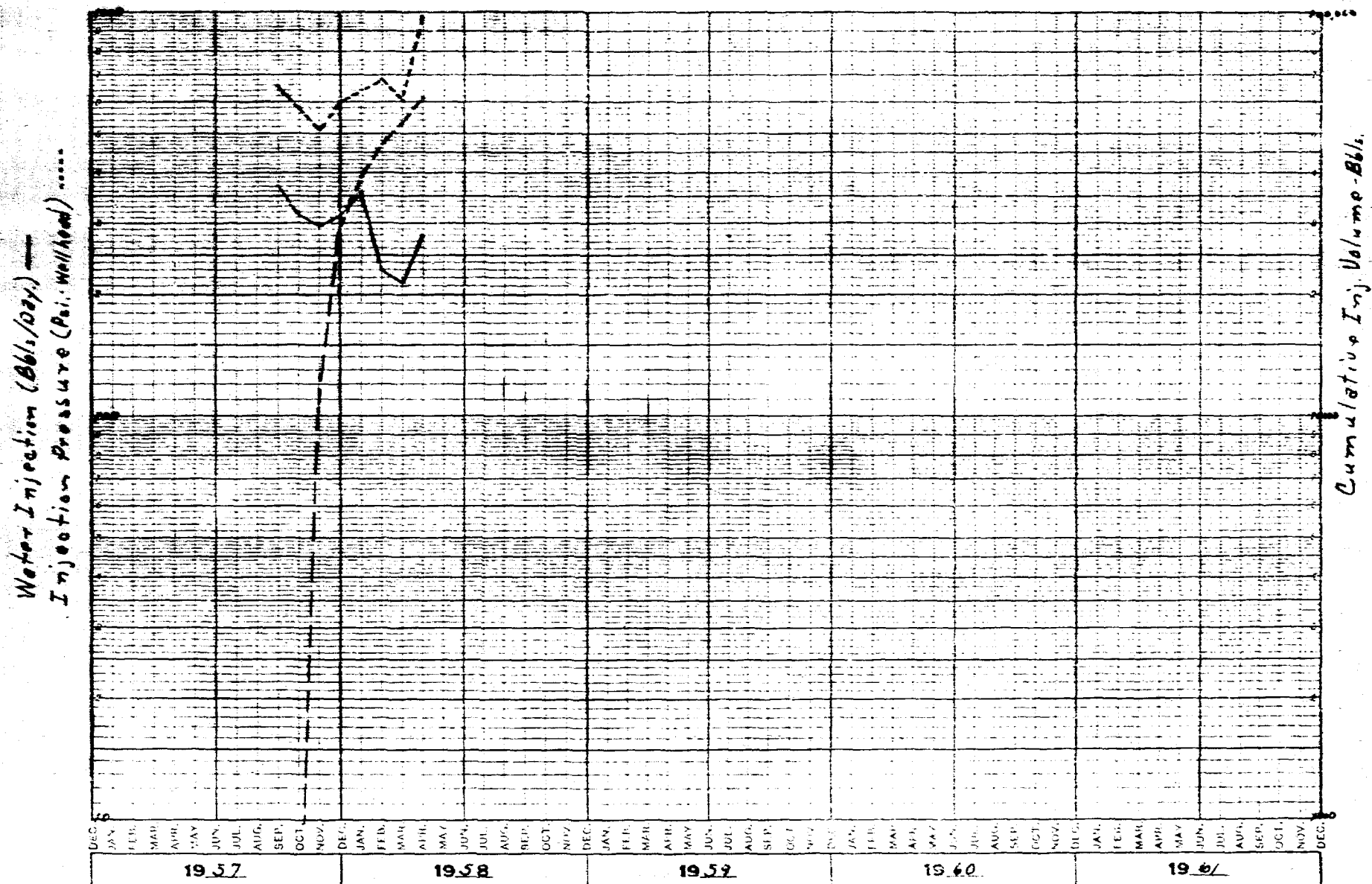
The Ixex Company
Artesia Pilot Flood #2
(M-R-Y Area) Eddy Co., N.M.

Performance Curve Plot Area





The Ibx Company
Artesia Plot Flood #2
McNutt St. #2 (Injection Well)

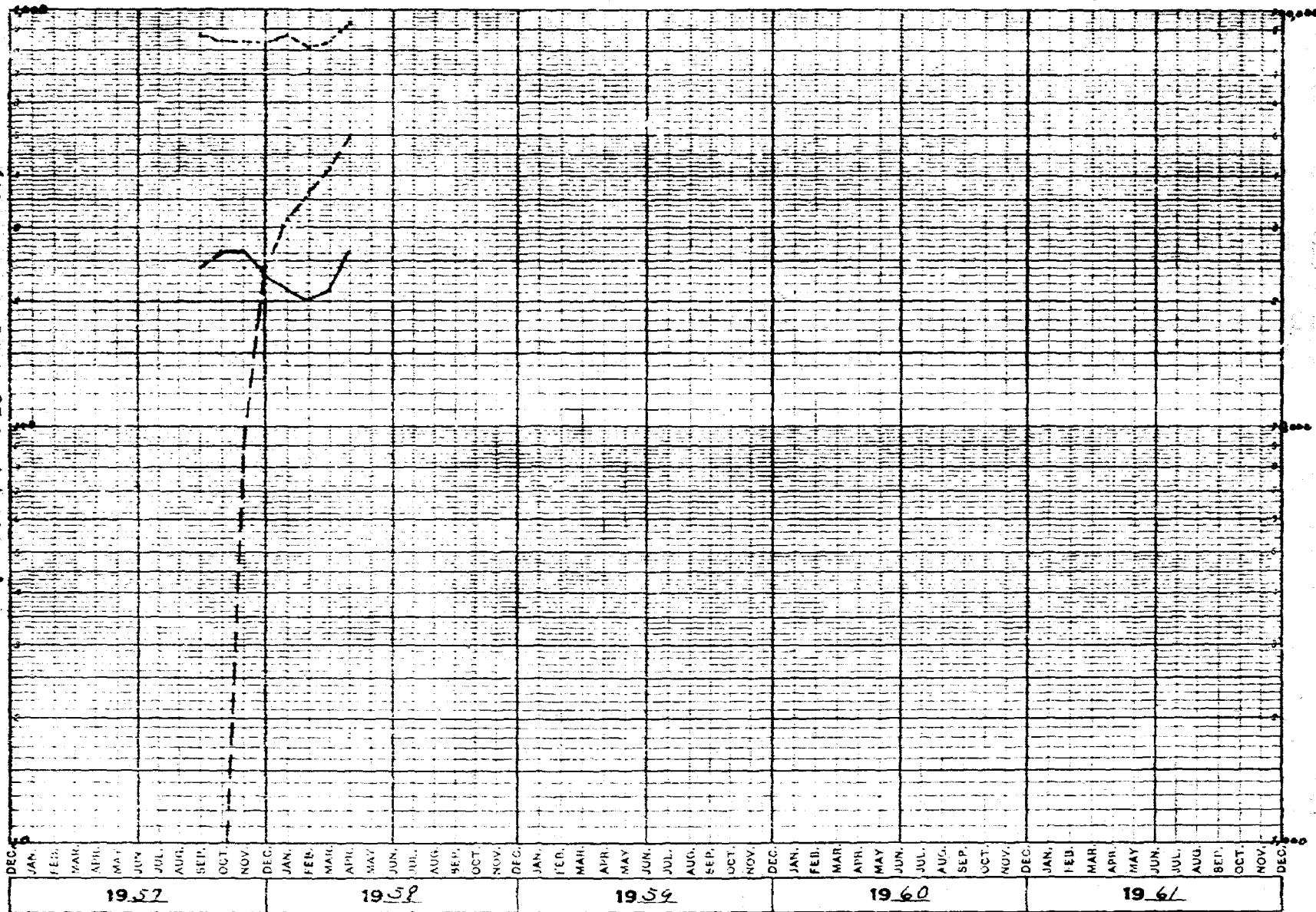




Welch-Duke St. #5

Water Injection (Bbls/Day) ---
Injection Pressure (Psi-Wallhead) ----

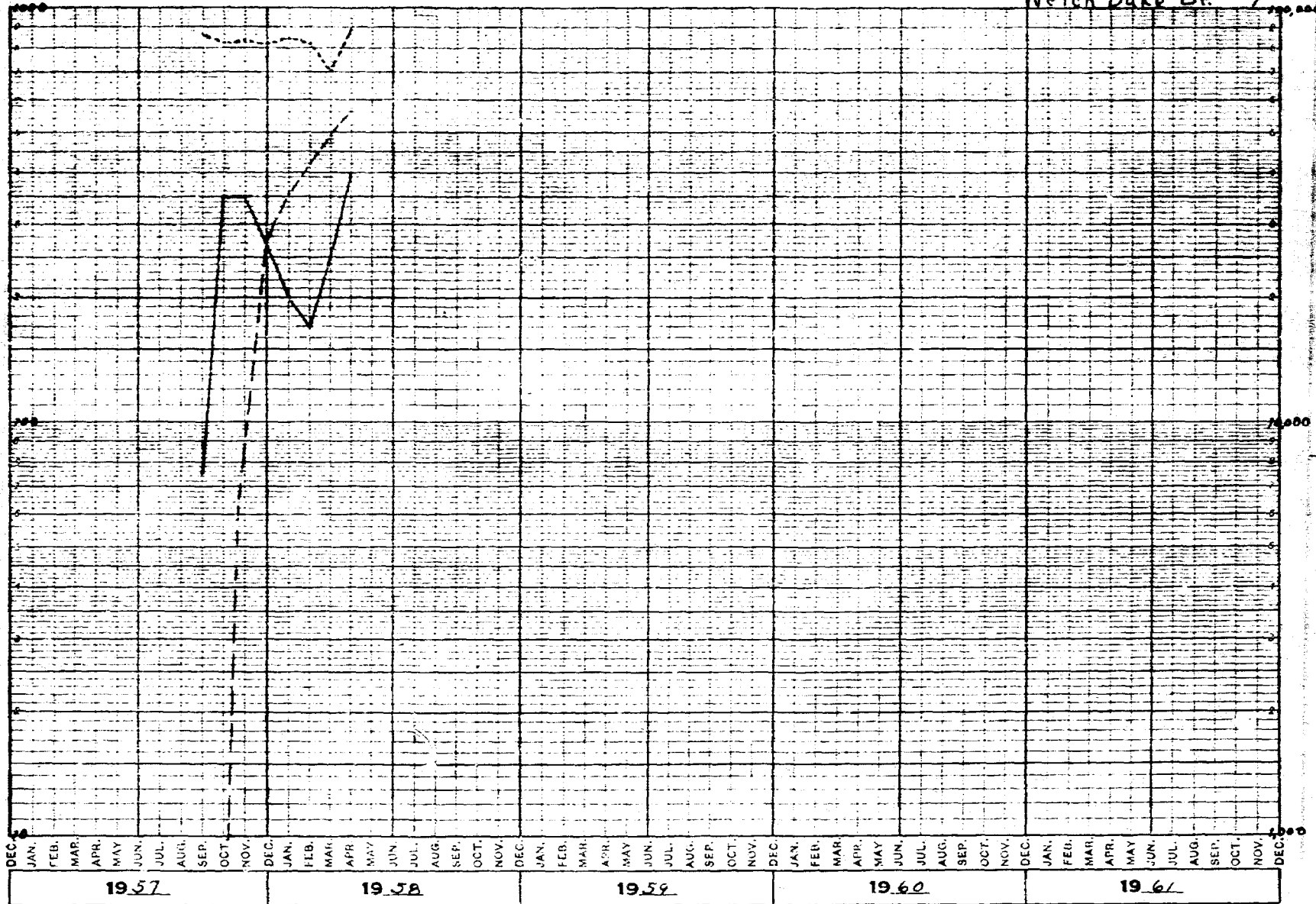
Cumulative Injection Volume (Bbls) ----





Water Injection Volume (Bbls./Day Avg.) —
Injection Pressure (Psi - Well head) ----

Welch-Duke St. # 7

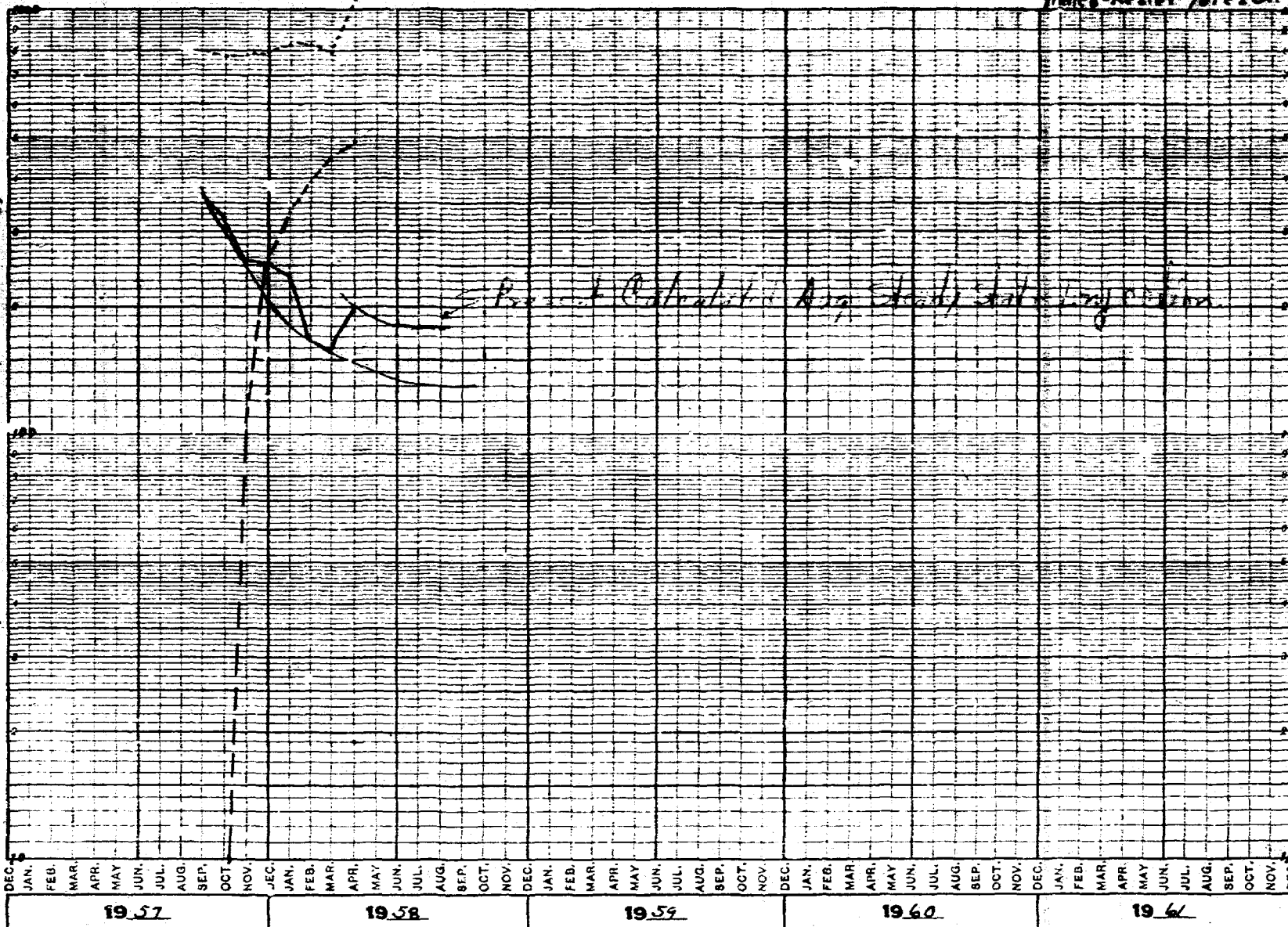


Cumulative Injection Volume - Bbls. ----



Malco-Roster Yates St. #13

Water Injection Volume (Bbls/Day) —
Injection Pressure (Psi - Wellhead) ----

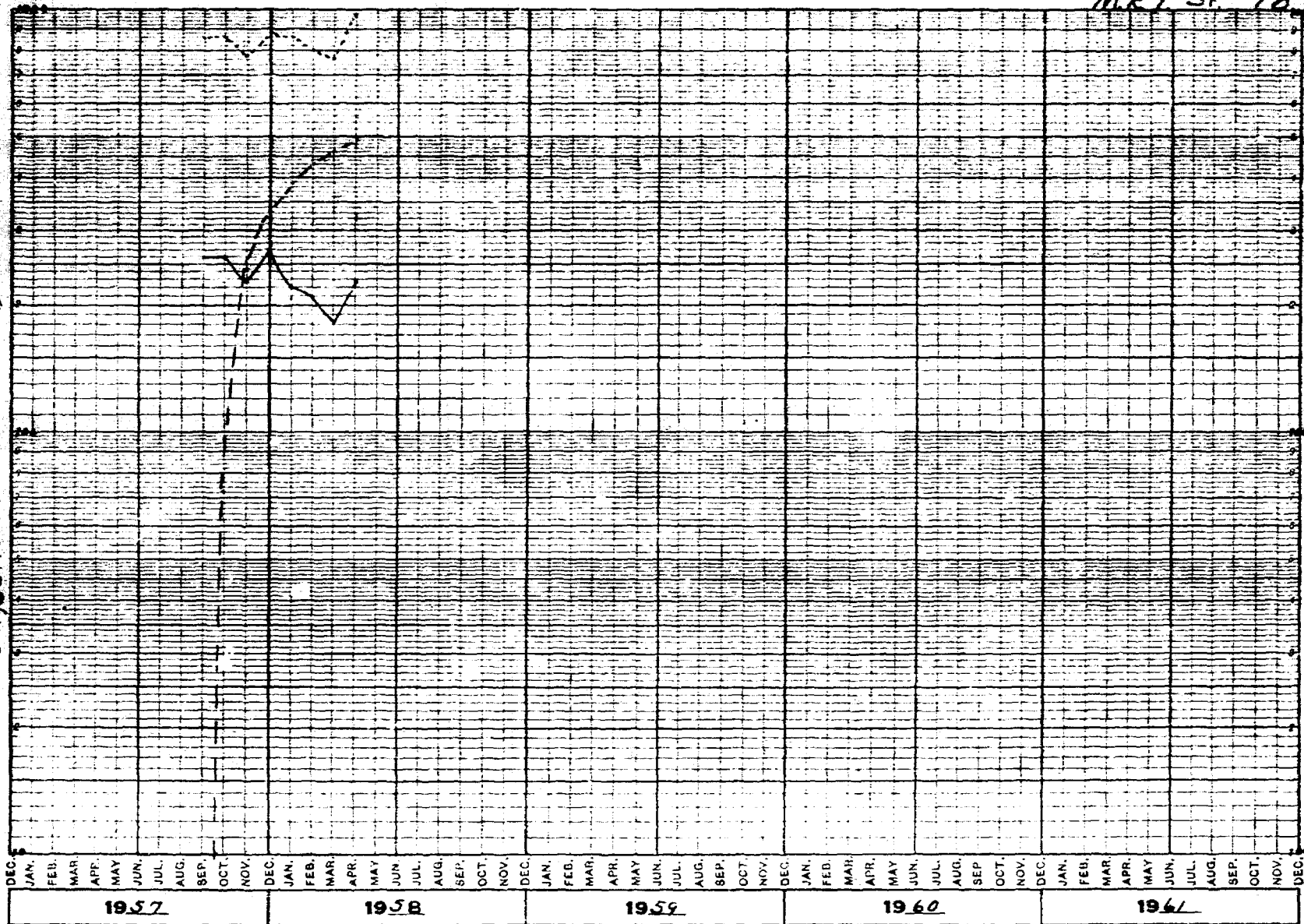


Cum. Injection Volume (Bbls) ----



Water Injection Volume (Bbl./Day) —
Injection Pressure (Psi) - - - - -

M.P.Y. ST. #18



Cum. Inj. Volume - Bbl. - - - - -



M.R.Y. St. #51

Water Injection Volume (Bbls/DAY)
Injection Pressure (Psi. Wellhead) -----

Cum. Injection Volume - Bbls. -----

