

CASE 2987: Application of SHELL
OIL CO. for a waterflood project, __
Chaves County, New Mexico.

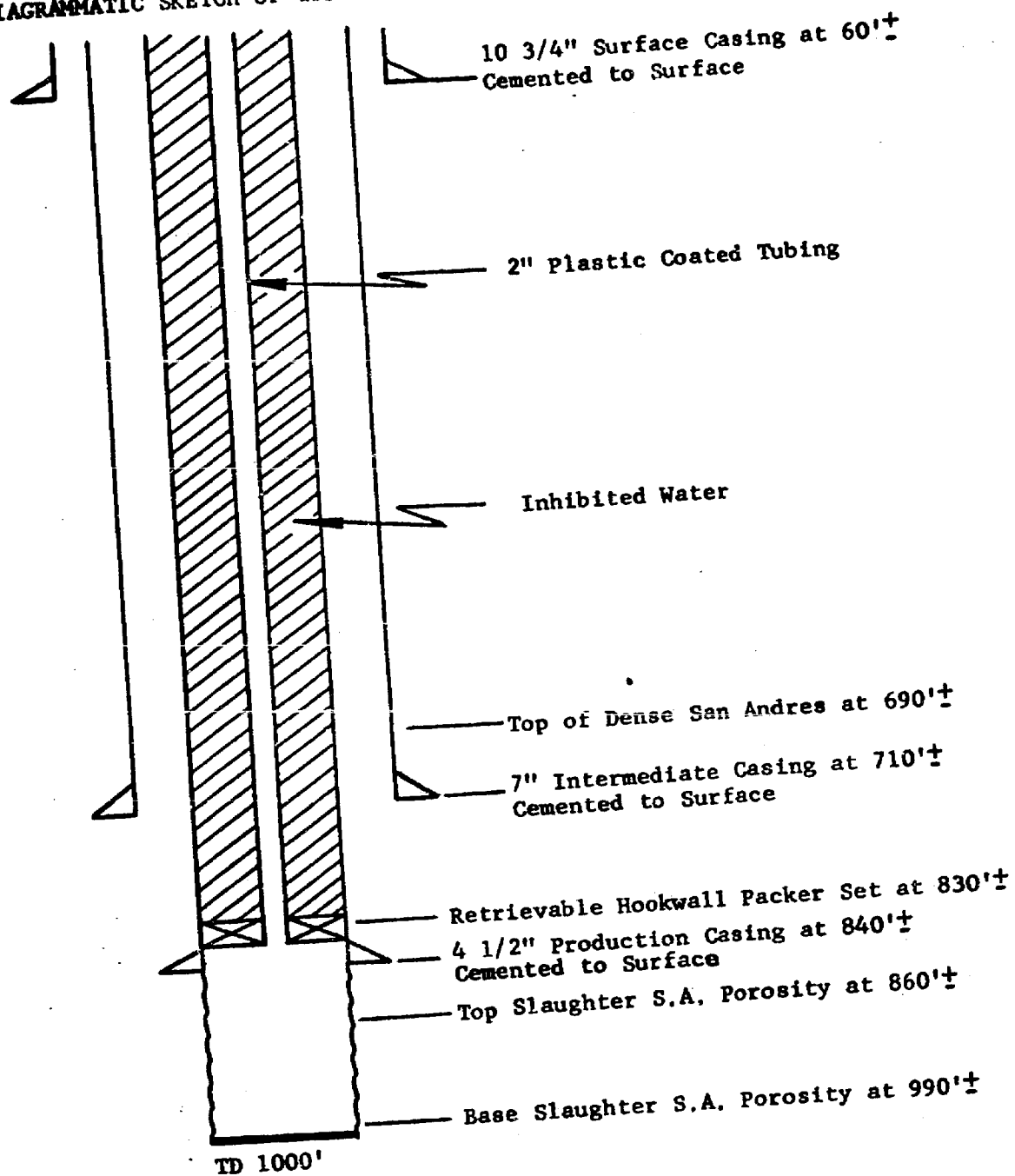
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CASE No.
2987

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

SOUTH BITTER LAKE SAN ANDRES
CHAVES COUNTY, NEW MEXICO
PILOT WATERFLOOD PROJECT
SHELL-CANNON LEASE
DIAGRAMMATIC SKETCH OF TYPICAL INJECTION WELL

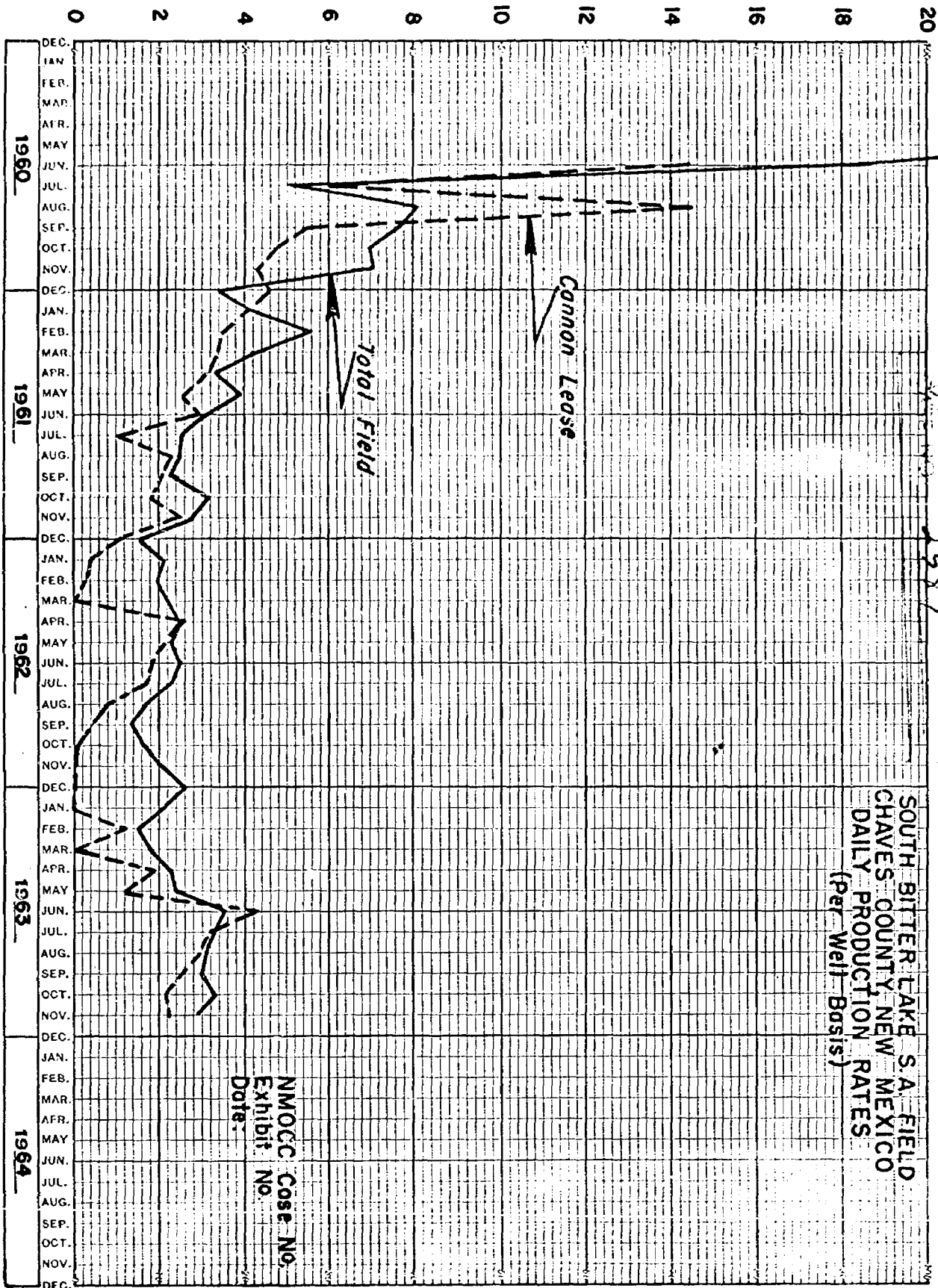
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BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 2587

N.M.O.C.C. Case No.
Exhibit No.
Date:

OIL PRODUCTION, BBLS./DAY/WELL



BEFORE EXAMINER NOTED
 OIL CONSERVATION COMMISSION
 EXHIBIT NO. 4-B
 2587

SOUTH BITTER LAKE S.A. FIELD
 CHAVES COUNTY, NEW MEXICO
 DAILY PRODUCTION RATES
 (Per Well Basis)

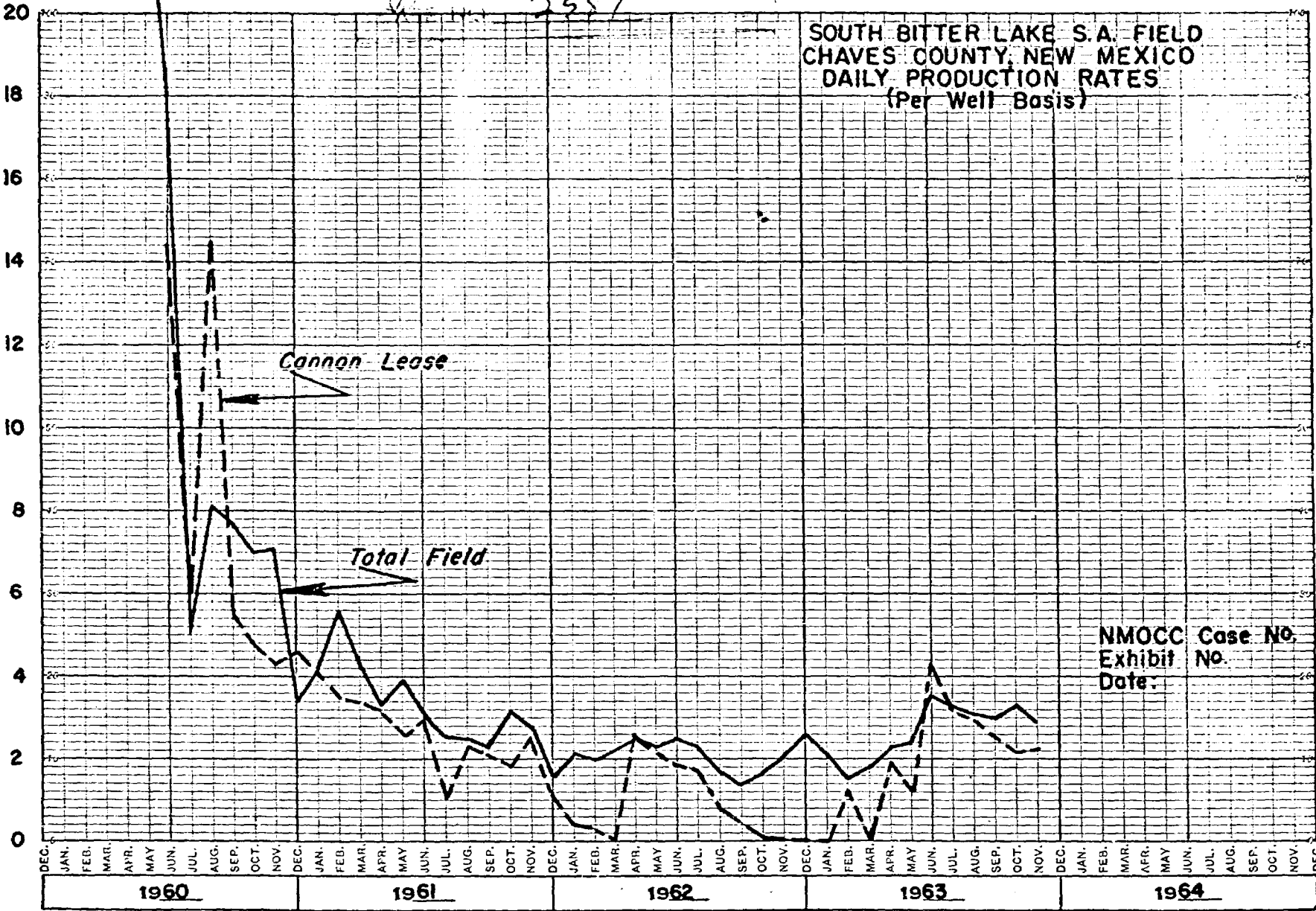
NMOCC Case No.
 Exhibit No.
 Date:

REPORT EXAMINED AND
OIL CONSERVATION COMMISSION

Case No. 2557
4-B

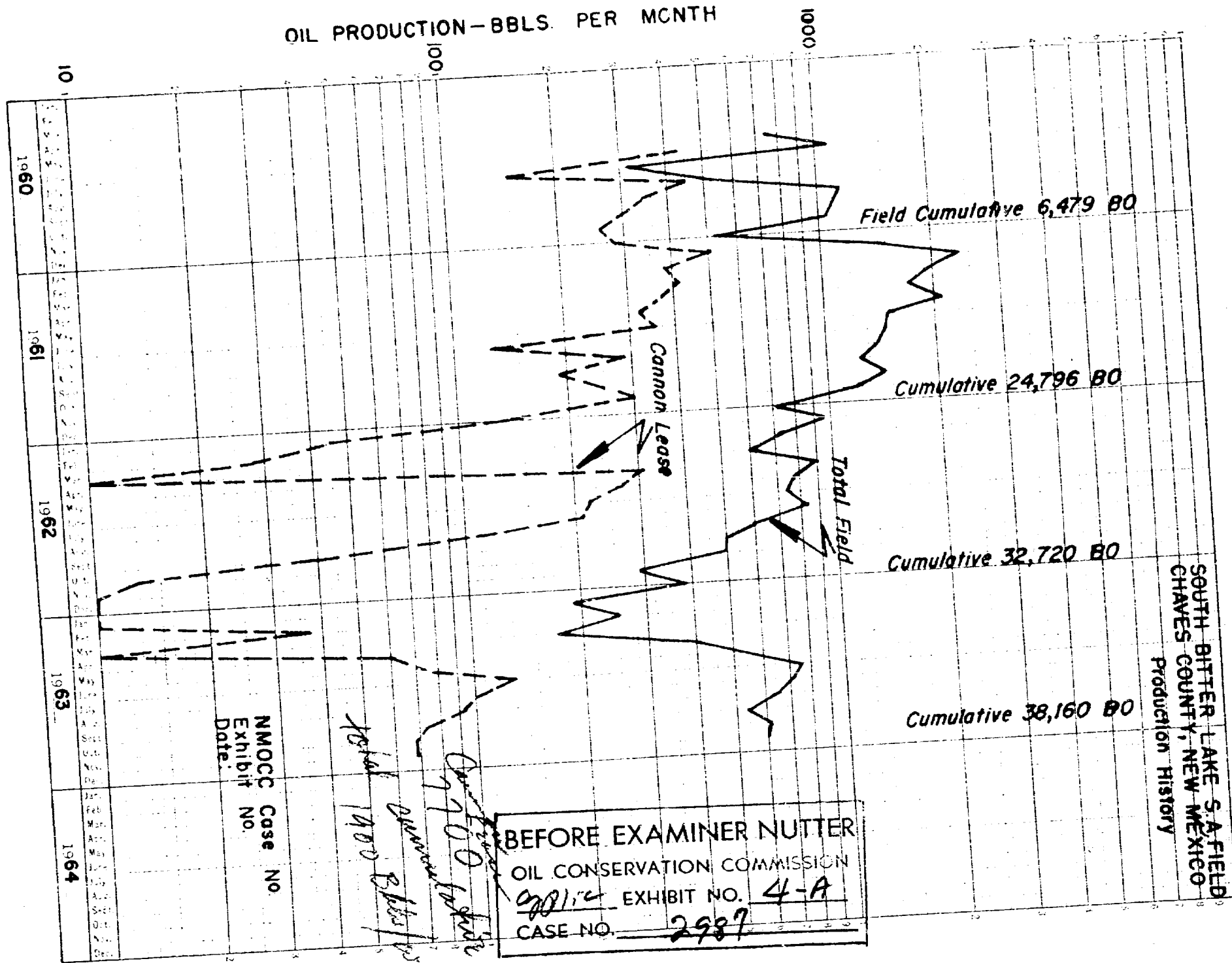
SOUTH BITTER LAKE S.A. FIELD
CHAVES COUNTY, NEW MEXICO
DAILY PRODUCTION RATES
(Per Well Basis)

OIL PRODUCTION, BBLs./DAY/Well



NMOCC Case No.
Exhibit No.
Date:

OIL PRODUCTION-BBLS. PER MONTH



WELL NO.	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL	1944 TOTAL	ACCUM. TO 1-1-45
BENSON QUEEN GRAYSBURG NORTH CYO															
3F291830	226	11	11	3	3	2	2	1	1	1	1	1	30		3081
TEXACO INC BUC															
1N271830	1	1	1	1	1	1	1	1	1	1	1	1	1		1924
2M271830	1	1	1	1	1	1	1	1	1	1	1	1	1		22734
3M281830	1	1	1	1	1	1	1	1	1	1	1	1	1		19837
40281830	1	1	1	1	1	1	1	1	1	1	1	1	1		18863
5J281830	1	1	1	1	1	1	1	1	1	1	1	1	1		16293
61281830	1	1	1	1	1	1	1	1	1	1	1	1	1		14231
7K281830	1	1	1	1	1	1	1	1	1	1	1	1	1		14089
8L271830	1	1	1	1	1	1	1	1	1	1	1	1	1		13232
9L281830	1	1	1	1	1	1	1	1	1	1	1	1	1		11967
10N281830	1	1	1	1	1	1	1	1	1	1	1	1	1		12410
110281830	1	1	1	1	1	1	1	1	1	1	1	1	1		12070
12H281830	1	1	1	1	1	1	1	1	1	1	1	1	1		11366
13M281830	1	1	1	1	1	1	1	1	1	1	1	1	1		10575
14P281830	1	1	1	1	1	1	1	1	1	1	1	1	1		10941
15C281830	1	1	1	1	1	1	1	1	1	1	1	1	1		2309
16E271830	1	1	1	1	1	1	1	1	1	1	1	1	1		8839
17K271830	1	1	1	1	1	1	1	1	1	1	1	1	1		9422
18P271830	1	1	1	1	1	1	1	1	1	1	1	1	1		4962
19D271830	1	1	1	1	1	1	1	1	1	1	1	1	1		1484
TRICO JOHN H															
10351830	1	1	1	1	1	1	1	1	1	1	1	1	1		4766
WELFORD OIL CO															
20291830	1	1	1	1	1	1	1	1	1	1	1	1	1		6064
30291830	1	1	1	1	1	1	1	1	1	1	1	1	1		3803
USA MOLT															
1N291830	1	1	1	1	1	1	1	1	1	1	1	1	1		3555
USA LIGHT															
1K291830	1209	1131	1209	1054	1143	79	70	70	70	70	70	70	70		17435
21291830	502	334	884	796	800	79	62	70	70	70	70	70	70		10540
BENSON YATES FACTOR 0 TO 5M															
YATES HARVEY E															
SNOOKS HARVEY E															
STATE OF TEXAS															
WHEELAZI STATE															
BENSON YATES EAST FACTOR 0 TO 5M															
CULBERTSON IRWIN SOUTHERN CAL. PETROLEUM															
10351830	145	183	180	117	180	180	180	180	180	180	180	180	180		12533
20351830	40	33	46	30	30	30	30	30	30	30	30	30	30		1293
30351830	40	33	46	30	30	30	30	30	30	30	30	30	30		3318
40351830	40	33	46	30	30	30	30	30	30	30	30	30	30		3318
SOUTHWESTERN INCO															
1N141930	213	107	204	196	182	189	189	189	189	189	189	189	189		17249
BISHOP CANYON QUEEN FACTOR 0 TO 5M															
HOBBS MUNICIPAL SCHOOL DIST 16															
1N111830	393	393	393	393	393	393	393	393	393	393	393	393	393		78579
BISHOP CANYON S A FACTOR 0 TO 5M															
MORRISON R G															
1A111830	44	44	44	44	44	44	44	44	44	44	44	44	44		24444
C W GRIFIN															
1A101830	44	44	44	44	44	44	44	44	44	44	44	44	44		24880
HUSTON															
1A 91838	44	44	44	44	44	44	44	44	44	44	44	44	44		37855
PENNZOIL CO															
1M 91838	44	44	44	44	44	44	44	44	44	44	44	44	44		18823
TRAINER C W															
1L101838	44	44	44	44	44	44	44	44	44	44	44	44	44		10253
BITTER LAKE															
OKALIS AGRICULTURAL ASSOCIATION INC															
1N131025	1	1	1	1	1	1	1	1	1	1	1	1	1		90
BITTER LAKE S A SOUTH FACTOR 0 TO 5M															
INTEX OIL CO															
1N31 25	85	83	74	7	73	64	63	62	56	56	50	678	7830		2409
SHELL OIL CO															
1K271025	18	18	14	6	7	6	6	6	6	6	6	6	6		4243
2J271025	18	18	14	6	7	6	6	6	6	6	6	6	6		3339

DATE	STATE	COUNTY	TOWNSHIP	SECTION	ACRES	OWNER	REMARKS
1951	ILLINOIS	COOK	CHICAGO	1	100	JOHN J. COUGHLIN	...
1952	ILLINOIS	COOK	CHICAGO	2	100	JOHN J. COUGHLIN	...
1953	ILLINOIS	COOK	CHICAGO	3	100	JOHN J. COUGHLIN	...
1954	ILLINOIS	COOK	CHICAGO	4	100	JOHN J. COUGHLIN	...
1955	ILLINOIS	COOK	CHICAGO	5	100	JOHN J. COUGHLIN	...
1956	ILLINOIS	COOK	CHICAGO	6	100	JOHN J. COUGHLIN	...
1957	ILLINOIS	COOK	CHICAGO	7	100	JOHN J. COUGHLIN	...
1958	ILLINOIS	COOK	CHICAGO	8	100	JOHN J. COUGHLIN	...
1959	ILLINOIS	COOK	CHICAGO	9	100	JOHN J. COUGHLIN	...
1960	ILLINOIS	COOK	CHICAGO	10	100	JOHN J. COUGHLIN	...
1961	ILLINOIS	COOK	CHICAGO	11	100	JOHN J. COUGHLIN	...
1962	ILLINOIS	COOK	CHICAGO	12	100	JOHN J. COUGHLIN	...
1963	ILLINOIS	COOK	CHICAGO	13	100	JOHN J. COUGHLIN	...
1964	ILLINOIS	COOK	CHICAGO	14	100	JOHN J. COUGHLIN	...
1965	ILLINOIS	COOK	CHICAGO	15	100	JOHN J. COUGHLIN	...
1966	ILLINOIS	COOK	CHICAGO	16	100	JOHN J. COUGHLIN	...
1967	ILLINOIS	COOK	CHICAGO	17	100	JOHN J. COUGHLIN	...
1968	ILLINOIS	COOK	CHICAGO	18	100	JOHN J. COUGHLIN	...
1969	ILLINOIS	COOK	CHICAGO	19	100	JOHN J. COUGHLIN	...
1970	ILLINOIS	COOK	CHICAGO	20	100	JOHN J. COUGHLIN	...

OCTOBER

[illegible]

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

March 5, 1964

C
O
P
Y
Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Dear Sir:

Enclosed herewith is Commission Order No. R-2658, entered in Case No. 2987, approving the South Bitter Lake-Cannon Waterflood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, and all of the proposed producing wells have been completed, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 378 barrels.

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

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

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

-2-

Mr. Richard S. Morris
Seth, Montgomery, Federici, and Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

March 5, 1964

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/ir
Enclosure

cc: Mr. Frank Irby, State Engineer Office, Santa Fe, N.M.
Mr. M. L. Armstrong, Oil Conservation Commission,
Artesia, New Mexico

C
O
P
Y

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

File

April 6, 1964

C Shell Oil Company
P.O. Box 1858
Roswell, New Mexico
Attention: Mr. T. H. Dyer

O Gentlemen:

Reference is made to your letter of April 2, 1964, wherein you request authority to drill your Cannon Well No. 8A at an unorthodox location 1315 feet from the South line and 1375 feet from the West line of Section 27, Township 10 South, Range 25 East, South Bitter Lake-San Andres Pool, Chaves County, New Mexico.

P The well is to be a replacement injection well for your Cannon Well No. 8, an injection well authorized by Commission Order No. R-2658 fifty feet to the east which was junked and abandoned.

Y The above unorthodox injection well location for Well No. 8A is hereby approved. All appropriate forms relating to the drilling and completing of the subject well should be filed with the Artesia office of the Commission in the usual manner.

Very truly yours,

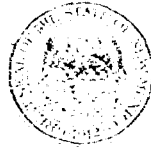
A. L. Porter, Jr.
Secretary-Director

ALP:DSN:sg

cc: M. L. Armstrong - NM Oil Conservation Commission - Artesia
NM Oil & Gas Engineering Committee - Hobbs
Case File 2987

GOV.
EDWIN L. ALCHEN
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

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

P. O. BOX 871
SANTA FE

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
P. O. Box 2307
Santa Fe, New Mexico

_____, 19____

Gentlemen:

Enclosed herewith is Commission Order No. R- 2658, entered in Case No. 2987, approving the Santa Fe City Lake Causeway Water Flood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 378 barrels per day.

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

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

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

Very truly yours,

cc: Mr. Frank Irby

A. L. PORTER, Jr.
Secretary-Director

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

March 5, 1964

C
O
P
Y

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Dear Sir:

Enclosed herewith is Commission Order No. R-2658, entered in Case No. 2987, approving the South Bitter Lake-Cannon Waterflood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, and all of the proposed producing wells have been completed, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 378 barrels.

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

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

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

-2-

Mr. Richard S. Morris
Seth, Montgomery, Federici, and Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

March 5, 1964

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSK/ix
Enclosure

cc: Mr. Frank Irby, State Engineer Office, Santa Fe, N.M.
Mr. M. L. Armstrong, Oil Conservation Commission,
Artesia, New Mexico

C
O
P
Y

File

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

April 6, 1964

C
Shell Oil Company
P.O. Box 1858
Roswell, New Mexico

Attention: Mr. T. H. Dwyer

O
Gentlemen:

Reference is made to your letter of April 2, 1964, wherein you request authority to drill your Cannon Well No. 8A at an unorthodox location 1315 feet from the South line and 1375 feet from the West line of Section 27, Township 10 South, Range 25 East, South Bitter Lake-San Andres Pool, Chaves County, New Mexico.

P
The well is to be a replacement injection well for your Cannon Well No. 8, an injection well authorized by Commission Order No. R-2658 fifty feet to the east which was junked and abandoned.

Y
The above unorthodox injection well location for Well No. 8A is hereby approved. All appropriate forms relating to the drilling and completing of the subject well should be filed with the Artesia office of the Commission in the usual manner.

Very truly yours,

A. L. Porter, Jr.
Secretary-Director

ALP:DSN:sg

cc: M. L. Armstrong - NM Oil Conservation Commission - Artesia
NM Oil & Gas Engineering Committee - Hobbs
Case File 2987



SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

MAIN OFFICE OCC

1964 APR 3 PM 1:26

April 2, 1964

Subject: Shell Cannon No. 8A
South Bitter Lake S.A. Field
Chaves County, New Mexico

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention Mr. Dan Nutter

Gentlemen:

Reference is made to the April 1, 1964, phone conversation between our Mr. George G. Carnahan and Mr. Dan Nutter of your office in which Mr. Nutter gave verbal approval of our request to drill the Shell Cannon No. 8A, a replacement injection well for the junked and abandoned Cannon No. 8, at a location 1315 feet from the south line and 1375 feet from the west line of Section 27, T-10-S, R-25-E, South Bitter Lake San Andres Field, Chaves County, New Mexico.

The Shell Cannon No. 8 was drilled to a depth of 736 feet and due to adverse drilling conditions was junked and abandoned April 1, 1964. The No. 8 well, a planned pilot water injection well, was drilled at an unorthodox location approved in Commission Order No. R-2658. Well No. 8A will be drilled at a location 50 feet east of the No. 8 well, as described above, and will be used as an injection well in the pilot waterflood project also approved in Order No. R-2658.

The appropriate well forms will be filed with the N.M.O.C.C. office in Artesia as regards the abandonment of Well No. 8 and the drilling of Well No. 8A.

We wish to express our appreciation of your help in this matter.

Very truly yours,

T. H. Dwyer
T. H. Dwyer
Division Production Manager

DRAFT

DSN/esr
February 27, 1964

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. 2987

Order No. R- 2658

APPLICATION OF SHELL OIL COMPANY
FOR A WATERFLOOD PROJECT, CHAVES
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on February 5, 1964, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter, ~~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 day of March, 19 64, the Commission, a quorum being present, having considered the ~~application and~~ testimony, the record, ~~and the recommendations of the Examiner,~~ and the recommendations of the Examiner, , 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, Shell Oil Company, seeks authority to institute a waterflood project in the South Bitter Lake-San Andres Pool by the injection of water into the San Andres formation at several locations on its Cannon Lake through three wells in Sections 27 and 34, Township 10 South, Range 25 East, NMPM, Chaves County, New Mexico.

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the subject application should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Shell Oil Company, is hereby authorized to institute a waterflood project in the South Bitter Lake-San Andres Pool by the injection of water into the San Andres formation through three wells to be drilled at the following-described unorthodox locations ^{on its Cannon Rease} in Township 10 South, Range 25 East, NMPM, Chaves County, New Mexico:

SECTION 27

1315 feet from the South line and 2635 feet
from the East line

1315 feet from the South line and 1325 feet
from the West line

SECTION 34

5 feet from the North line and 2635 feet
from the East line

(2) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

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

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

CASE 2986: Application of Shell Oil Company to establish a GOR limit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of a special gas-oil ratio limitation of 5,000 cubic feet of gas for each barrel of oil produced in the Mesa-Queen Pool, Lea County, New Mexico.

CASE 2987: Application of Shell Oil Company for a waterflood project, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pilot waterflood project in the South Bitter Lake-San Andres Pool, by the injection of water into the San Andres formation through three wells at unorthodox locations in Sections 27 and 34, Township 10 South, Range 25 East, Chaves County, New Mexico.

CASE 2480 (Reopened):

In the matter of Case No. 2480 being reopened pursuant to the provisions of Order No. R-2182-A which continued for a period of one year the temporary 80-acre proration units established by Order No. R-2182, Henshaw-Wolfcamp Pool, Eddy County, New Mexico. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2988: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit George E. Willett and all other interested parties to appear and show cause why the SDD Hare Well No. 7, located 600 feet from the South line and 1360 feet from the East line of Section 14, Township 29 North, Range 11 West, San Juan County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 5, 1964

9:00 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Elvis A. Utz, Alternate Examiner:

- CASE 2976: Application of Midland Production Corporation for directional drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to directionally drill its Hill & Meeker Phillips Cryer Well No. 34-2 located 2310 feet from the South and West lines of Section 34, Township 10 South, Range 36 East, to bottom in the Devonian formation 1980 feet from the North and West lines of said Section 34, Lea County, New Mexico.
- CASE 2977: Application of Cities Service Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Brunson C Well No. 4, located in Unit J of Section 3, Township 22 South, Range 37 East, Lea County, New Mexico, to produce oil from the Blinbry and Drinkard Oil Pools through parallel strings of 1 1/2 inch and 2 1/16 inch tubing, respectively.
- CASE 2978: Application of Union Oil Company of California for a waterflood expansion, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its South Caprock Queen Unit Waterflood Project, Caprock Queen Pool, Chaves County, New Mexico, by the conversion of nine additional wells located in Sections 28, 29, and 33, Township 14 South, Range 31 East, and Sections 3 and 4, Township 15 South, Range 31 East, to water injection.
- CASE 2979: Application of Pan American Petroleum Corporation for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Abo formation through its U. S. A. Malco Refineries 'G' Well No. 13, located 2302 feet from the South line and 1650 feet from the West line of Section 10, Township 18 South, Range 27 East, Empire Abo Pool, Eddy County, New Mexico.
- CASE 2980: Application of Pioneer Production Corporation for force-pooling and an unorthodox location, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order force-pooling all mineral interests in the Basin-Dakota Pool underlying the W/2 of Section 15, Township 29

-2- Case 2980 continued from page 1

North, Range 13 West, and authorizing the drilling of a well for said unit at an unorthodox location 1625 feet from the South line and 1250 feet from the West line of said Section 15, Town of Farmington, San Juan County, New Mexico.

- CASE 2981: Application of Gulf Oil Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Northwest Eumont Unit Area comprising 2,760 acres, more or less, of State and fee lands in Township 19 South, Range 36 East, Lea County, New Mexico.
- CASE 2982: Application of Gulf Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Eumont Gas Pool by the injection of water into the Queen Formation through 15 wells in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 36 East, Lea County, New Mexico.
- CASE 2983: Application of The Pure Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Brinninstool Unit Area comprising 17,237 acres, more or less, of Federal and State lands in Townships 23 and 24 South, Ranges 32 and 33 East, Lea County, New Mexico.
- CASE 2984: Application of The Pure Oil Company and Continental Carbon Company to utilize natural gas in a carbon black plant, Lea County, New Mexico. Applicants, in the above-styled cause, seek authority to utilize approximately 7 MCF of Devonian gas per day in the Continental Carbon Company carbon black plant near Eunice, New Mexico, said gas to be produced from The Pure Oil Company Wilson Deep Unit Well No. 1, located in the SE/4 NW/4 of Section 13, Township 21 South, Range 34 East, Lea County, New Mexico.
- CASE 2985: Application of Shell Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Bootleg Ridge Unit Area comprising 10,818 acres, more or less, of State and Federal lands in Townships 22 and 23 South, Ranges 32 and 33 East, Lea County, New Mexico.

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BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF SHELL OIL COMPANY
FOR APPROVAL OF A WATER FLOOD
PROJECT, CHAVEZ COUNTY, NEW MEXICO }

No. 2987

A P P L I C A T I O N

COMES NOW, Shell Oil Company and applies to the New Mexico Oil Conservation Commission for approval of a pilot water flood project, to be instituted in the South Bitter Lake, San Andres Pool, Chavez County, New Mexico, and in support of its application, states:

1. That the Applicant, Shell Oil Company, is the owner and operator of the Shell-Cannon Lease comprising 320 acres more or less, being the Southwest Quarter ($SW\frac{1}{4}$) and the West Half ($W\frac{1}{2}$) of the Southeast Quarter ($SE\frac{1}{4}$) of Section 27, and the Northwest Quarter, Northeast Quarter ($NW\frac{1}{4}$ $NE\frac{1}{4}$) and the Northeast Quarter, Northwest Quarter ($NE\frac{1}{4}$ $NW\frac{1}{4}$) of Section 34, all in Township 10 South, Range 25 East, Chavez County, New Mexico.

2. That said lease is presently developed by four producing wells in the South Bitter Lake, San Andres Pool, located in Units, J. K. L. and M. of Section 27. Shell Oil Company proposes to drill four additional producing wells in connection with the water flood project, which wells will be located at standard locations in Units N. and O. of said Section 27, and in Units B. and C. of said Section 34. In

DOCKET MAILED

Date 1-24-64

addition, Shell Oil Company proposes to drill three injection wells at unorthodox locations, for which approval also is sought in this application, as follows:

(a) 1315 feet from the south line and 2635 feet from the east line of said Section 27;

(b) 1315 feet from the south line and 1325 feet from the west line of said Section 27;

(c) 5 feet from the north line and 2635 feet from the east line of said Section 34;

the location of the existing wells and of the proposed wells is shown on the plat attached to this application and incorporated herein by reference.

3. That Shell Oil Company proposes to inject water through the three above described injection wells into the San Andres formation of the South Bitter Lake, San Andres Pool, and to produce oil from said pool through the eight producing wells on the Cannon Lease, four of which are presently in existence and four of which are to be drilled, as described above.

4. That all wells in the South Bitter Lake, San Andres Pool, and the four producing wells on the Cannon Lease, which are proposed as producing wells in the subject water flood project, are in an advanced state of depletion and are properly to be considered as "stripper" wells.

5. That approval of the subject application will prevent waste and protect correlative rights.

WHEREFORE, the Applicant, Shell Oil Company, requests that this application be set for hearing before the Commission or one

of its examiners and that the Commission enter its Order approving the proposed water flood project.

SETH, MONTGOMERY, FEDERICI & ANDREWS
P. O. Box 828
Santa Fe, New Mexico

By Richard S. Morris

Attorneys for Shell Oil Company

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

December 20, 1965

Mr. Charles C. Langdon
Attorney at Law
3000 Sandage
Fort Worth, Texas 76109

Dear Charlie:

My reply to your letter of December 10, 1965, was delayed as I was out of town most of last week.

I am enclosing copies of the following exhibits from our file in Case 2987:

1. Exhibit No. 1 (Plat)
2. Exhibit No. 2 (Structural Map)
3. Exhibit No. 3A (Cross Section A-A')
4. Exhibit No. 3B (Cross Section B-B')
5. Exhibit No. 4A (Production History)
6. Exhibit No. 4B (Daily Production Rates)
7. Exhibit No. 5 (Diagrammatic Sketch)
8. Transcript of Hearing

I also am enclosing a copy of Order No. R-2658, a copy of a letter assigning the project allowable, a copy of a letter approving an unorthodox location for the Cannon Well No. 8A, a copy of the October Monthly Statistical Report, and a copy of the 1964 Annual Statistical Report.

The Statistical Report for 1965 will not be available until April or May. If production figures from January

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OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

-2-

December 20, 1965

Mr. Charles C. Langdon
Attorney at Law

through September, 1965, will be helpful to you, I can
have these figures tabulated.

Please return the exhibits and transcript at your
earliest convenience to the attention of Ida Rodriguez.

I hope this information will be helpful to you, and
please let me know if I can be of further assistance.

Best personal regards.

Very truly yours,

J. M. DURRETT, Jr.
Attorney

JMD/esr
Enclosures

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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. 2987
Order No. R-2658

APPLICATION OF SHELL OIL COMPANY
FOR A WATERFLOOD PROJECT, CHAVES
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
February 5, 1964, at Santa Fe, New Mexico, before Examiner
Daniel S. Nutter.

NOW, on this 4th day of March, 1964, the Commission,
a quorum being present, having considered the testimony, the
record, and the recommendations of the Examiner, 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, Shell Oil Company, seeks authority
to institute a waterflood project in the South Bitter Lake-San
Andres Pool by the injection of water into the San Andres forma-
tion through three wells at unorthodox locations on its Cannon
Lease in Sections 27 and 34, Township 10 South, Range 25 East,
NMPM, Chaves County, New Mexico.

(3) That the wells in the project area are in an advanced
state of depletion and should properly be classified as "stripper"
wells.

(4) That the proposed waterflood project is in the interest
of conservation and should result in recovery of otherwise unrecoy-
erable oil, thereby preventing waste.

(5) That the subject application should be approved and
the project should be governed by the provisions of Rule 701 of
the Commission Rules and Regulations.

-2-

CASE No. 2987

Order No. R-2658

IT IS THEREFORE ORDERED:

(1) That the applicant, Shell Oil Company, is hereby authorized to institute a waterflood project in the South Bitter Lake-San Andres Pool by the injection of water into the San Andres formation through three wells to be drilled at the following-described unorthodox locations on its Cannon Lease in Township 10 South, Range 25 East, NMPM, Chaves County, New Mexico:

SECTION 27

1315 feet from the South line and 2635 feet
from the East line

1315 feet from the South line and 1325 feet
from the West line

SECTION 34

5 feet from the North line and 2635 feet
from the East line

(2) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

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

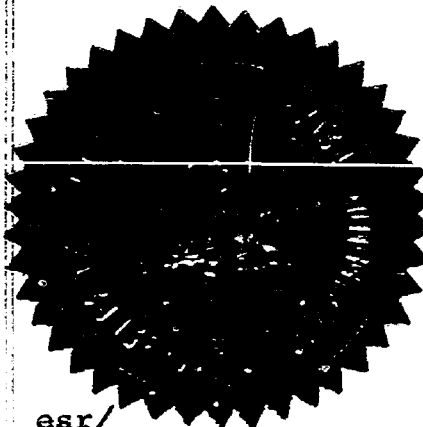
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

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

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



esr/

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

SANTA FE, N. M.
PHONE 983-3971

ALBUQUERQUE, N. M.
PHONE 243-6691

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 5, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Shell Oil Company for a
waterflood project, Chaves County, New
Mexico.

Case No. 2987

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING



DEARNLEY, MEIER, WILKINS and CROWNOVER

General Court Reporting Service

Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 5, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Shell Oil Company for
a waterflood project, Chaves County,
New Mexico.

CASE NO. 2987

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

MR. NUTTER: Call Case 2987.

MR. DURRETT: Application of Shell Oil Company for a
waterflood project, Chaves County, New Mexico.

MR. MORRIS: If the Examiner please, I am Richard Morris,
of Seth, Montgomery, Federici and Andrews, of Santa Fe, appearing
on behalf of the Shell Oil Company.

(Witness sworn)

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



DIRECT EXAMINATION

BY MR. MORRIS:

Q Please state your name, by whom you are employed, and in what capacity and where your office is located?

A I am George G. Carnahan, Senior Reservoir Engineer with Shell Oil Company in Roswell, New Mexico.

Q Mr. Carnahan, you have testified before the Commission or one of its examiners, have you not?

A I have.

Q Are you familiar with Shell's application in this case?

A I am.

Q Have you done most of the work in putting together this pilot waterflood project?

A Yes.

Q What is it that Shell seeks by the application?

A We seek approval of a pilot waterflood project to be conducted in the South Bitter Lake-San Andres Field on a 320 acre Shell-Cannon lease and also the unorthodox location of the three injection wells involved.

Q Referring to what has been marked as Exhibit Number One in this case, which is a plat of the South Bitter Lake-San Andres Pool, would you point out the pertinent features of that exhibit?

A On Exhibit Number One, outlined in red is the 320 acre Shell-Cannon lease, which comprises the pilot waterflood project



area.

Q All right.

A Within the project area there are three injection wells to be drilled which are shown in red, along with four existing San Andres producers shown in black, numbered One through Four, and four producing wells to be drilled. The pilot waterflood pattern is a 40 acre inverted five spot with injection wells so located as not to offset any wells outside the project area. The three proposed injection wells are to be drilled at unorthodox locations to establish a 20 acre well spacing within the waterflood pattern. The locations of the three injection wells are as follows: The first well to be located 1315 feet from the South line, and 2635 feet from the East line of Section 27, 10 South, 25 East. The second injection well will be located 1315 feet from the South line and 1325 feet from the East line of Section 27, Township 10 South, Range 25 East. The third and last injection well is to be located five feet from the North line and 2635 feet from the East line of Section 34, Township 10 South, Range 25 East.

MR. DURRETT: Excuse me. On your second well, you said, I believe, 1325 from the East line?

A Right.

MR. DURRETT: Is that what you mean?

A 1325 feet from the East line, right.

MR. DURRETT: Of Section 27? The reason I am asking or questioning you on this, and I want to do it at this time, I note



that the application says 1325 feet from the West line on that well.

A I am reading the wrong run. 1325 feet from the West line, right.

MR. DURRETT: All right, sir. Thank you.

A Also shown on Exhibit One are all wells and leases within the two mile radius of the proposed injection wells. It should be noted before we pass from this exhibit that there is an error on the exhibit. The Gorman Federal Number Two, located in Unit "O" of Section 26, 10 South, 25 East, is erroneously shown as a former San Andres producer. This well was temporarily abandoned after a completion attempt. It was never actually completed in the San Andres as a producing well.

Q (By Mr. Morris) Do you have a structure map showing the geological data in the area of your proposed pilot waterflood project?

A Yes. If you will refer to Exhibit Number Two contoured on the top of the Slaughter-San Andres zone, this map was constructed utilizing available well logs and shows a gentle eastwardly dipping San Andres feature. The top of the Slaughter zone is encountered at approximately 850 feet in the South Bitter Lake Field area.

Exhibits 3-A and B are north-south, east-west cross sections, traversing the South Bitter Lake Field, and indexed to this cross section presented on each exhibit. The Slaughter zone, the top of which is correlated on these cross sections, is a



continuous porous interval present in all wells that have penetrated the zone in the field area. Lithologically, the Slaughter zone is a light brown, very fine crystalline Dolomite, placed for core analysis data, average porosity indicated to be 10½ percent with a permeability of 2.2 millidarcies. The produced crude is about 22 degrees API gravity, and the solution gas-oil ratio is estimated to be less than 200 cubic feet per barrel, and the oil is currently being trucked, and the negligible casinghead gas production is being flared at this time.

Q Do you have a series of exhibits, Mr. Carnahan, showing the development and the production history in this pool?

A I do. Initially, production in the field was established May, 1960 with the completion of the DeCalb Federal Number One located in Unit F of Section 27. Referring to Exhibit One, it would probably be easier to locate this, by October, 1961, 21 wells had been completed in the field. No additional wells has been completed in the field since this time. Currently, there are seven producing wells, eight shut in wells, and six plugged and abandoned, former producing wells. Four San Andres wells on the Cannon lease were completed during the period, June, 1960 to January, 1961. Currently, wells Number One, Three and Four are shut in. Well Number Two is the only producer. Exhibit Four-A presents the complete production history of the South Bitter Lake-San Andres Field through November, 1963. Also shown is the production history of the Cannon lease; through November, 1961, the



South Bitter Lake Field had accumulated approximately 38,000 barrels of oil or an average of about 1800 barrels per well. The Cannon lease has accumulated approximately 7,700 barrels of oil or an average of approximately 1900 barrels per well. Exhibit Four-B presents the per well average daily production rate of the South Bitter Lake Field, and also the Cannon lease. Only the wells that actually produced during the month concerned were used in calculating these average rates. Currently, the field is producing on an average per well daily rate of three barrels, while the Cannon lease is producing at a rate of approximately two barrels per day per well. The wells in the field and on the Cannon lease are definitely stripper wells and are very near the end of their primary life.

Q Mr. Carnahan, just what are your plans for development in this pilot project?

A Initially, our plans call for drilling the first and second injection wells at the previously stated unorthodox locations, in Section 27, along with the two producing wells in Section 27, to be located in the approximate center of Units "N" and "O". The third injection well and the two remaining producing wells to be drilled in Section 34 will be drilled later, depending on the initial pilot results and subsequent evaluation requirements.

Exhibit Number Five is a diagrammatic sketch of a typical injection well, and depicted on this sketch is that we plan to set, in drilling these wells, seven inch casing at approximately



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PAGE 8

710 feet, this being an average of the three injection wells, and cement this to surface. The four and a half inch production casing will be cemented at approximately 840 feet, and also cemented to surface. The wells will be completed open hole. The packer, a retrievable hook wall packer, set slightly above the casing shoe, and internally plastic coated tubing used for injection purposes, and the casing to be - - or tubing annulus to be filled with inhibited water.

A copy of this sketch has been given to the State Engineer's office prior to this hearing. Initial injection rates are estimated to be approximately 150 barrels per day per injection well, or a total for the two initial injection wells of 300 barrels per day.

Q Assuming approval of this pilot project, Mr. Carnahan, what would be the top allowable under Rule 701?

A Based on the basic 42 barrel per day waterflood allowable, initial area of 242 acres in Section 27, the top allowable would be 280 barrels per day. Now, **this** would be taking credit for the fact that additional wells would be located in Units "N" and "O", the basic allowable for Units "N" and "O" would be 56 barrels, giving an additional one-third allowable for the additional well in the proration unit.

Q Looking at the project as a full 320 acres, what would be the allowable under 701?

A Based on the wells that we have indicated to drill, the



top allowable would be 378 barrels per day.

Q Now, you mentioned before that you would plan to inject approximately 150 barrels per day into each injection well. What is the anticipated source of that water?

A Present plans call for the purchase of sufficient water to supply our pilot requirement from the City of Roswell. This water will be supplied from their office, of Saline Water Well No. Three, located in the Northwest Quarter of the Southeast Quarter of the Southeast Quarter of Section 33, Township 10 South, Range 25 East. The subject well is flowing, shut in currently, but it has the capabilities of a flowing artesian well, completed in the artesian zone, and produces water too high in chloride content to be useable for domestic or irrigation purposes. This well is currently not hooked up to the Roswell water system, is not being used for any purpose at this time. It is my understanding that the City of Roswell is in the process of advertising to convert or dedicate a certain number of acre feet of water to this well in order that they may sell it to us under a contract.

Q Mr. Carnahan, we have been talking here in terms of just a pilot waterflood project. Can you look ahead at this point to see just what benefit you expect to receive under this project?

A Yes. Naturally, a pilot waterflood project is instituted to determine if you can economically recover additional oil. Therefore, we feel that should this project prove to recover additional oil by secondary means, injection of water, and this be in



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economic quantities, that we would as a result appreciably increase the total recovery from this particular reservoir, and waste, as a result, will be prevented should this prove to be feasible by the recovery of additional oil that would not be recoverable under primary completion mechanism.

Q As well as preventing waste, will you also understand your proposed plan protects the correlative rights of all persons involved?

A Yes. As previously mentioned, the interior location of the injection wells with respect to the producing or shut in wells outside of the project area, should restrict the injection to within the project area, thereby, protecting the correlative rights.

Q Do you have anything further you would like to add?

A No.

Q Were Exhibits One through Five prepared by you or under your direction?

A They were.

Q We offer those exhibits at this time.

MR. NUTTER: Shell's Exhibits One through Five will be admitted in evidence. Are there questions of Mr. Carnahan?

CROSS EXAMINATION

BY MR. IRBY:

Q What is your anticipated injection pressure?



A Actually, we are anticipating pressure somewhere in the range of between and nine hundred pounds. This is something we are - - we really don't know. We are anticipating something in that range.

Q All right. Thank you.

MR. IRBY: That is all I have, Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Carnahan, have any estimates been made of the original oil in place here in this area?

A Based on our original look at this core analysis data, that was available, we felt like that this was something left to be desired in this information. As a result, we are going to core all these wells, but we estimate that there was originally approximately about eight million barrels of oil originally in place per section. Now, this is very rough, a very rough estimate

Q Recoveries haven't been a very large percentage?

A Relatively they have been just about nill, being around 1800 barrels per well on 40 acre spacing.

Q You probably attribute this to being such shallow depth, lack of reservoir pressure, lack of solution gas.

A Permeability.

Q Heavy qualities of oil viscosity?

A Probably all three of those factors.



Q Do you have any estimate to what the secondary recovery will be then?

A What?

Q In relation to primary?

A Actually, we have no estimate, strictly just would be a guess would be all it would be. This type of reservoir is something that normally we shall- - we say we don't have too much information on this type of reservoir, to say we might anticipate so much recovery on waterflood, that is why we are going at a pilot aspect to start with.

Q You are not anticipating the use of any special additives to the water to change the surface tension quality figures or anything like that?

A I might add that there is a possibility, not initially, but should down the road it appear that we need to do so, we might I don't anticipate it would be like- - like I say, our initial plans are for just use of straight water, but this wouldn't preclude the use of some special additive.

Q What is your estimate of cost for drilling these water injection wells?

A Approximately \$17,000.00 to drill and complete these wells.

Q Does that apply to the producing wells also?

A Approximately, there is a pump involved on producing the wells. I would say probably sixteen for injection, a thousand for



the wells, and 18 thousand for producing wells, an average of seventeen thousand for two types of wells.

Q Are there any further questions?

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. Carnahan, referring to your exhibit, Exhibit One, the wells in the Southwest Quarter of Section 27, your three wells there, I believe you stated were former producers, but shut in at this time, Number One, Three and Four, why are those wells shut in?

A I am trying to recall whether- -

MR. MORRIS: You can pretty well tell that from your Exhibit Four-A, can't you, Mr. Carnahan?

A Well, if you are particularly interested in each well as to when the last time the well produced, or as to when the wells were actually on production, Exhibit Number 4-A doesn't really show it too well. The production is so low that- -

Q (By Mr. Durrett) Well, just give me an approximate date, if you can?

A I would say that actually the wells on the lease were produced, well, all four of them were produced up through August, 1962, and after August, 1962, why, periodically during this time. Some months the wells were not produced at all, some months one or two of the wells were produced, but up through that time, the wells

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were produced more or less on a regular basis.

Q They were produced just off and on after that?

A Right, like I say, we did not operate the wells during this period. All I can speak from is the commission record as to what months wells produced or they didn't produce.

Q Were they all three shut in, finally shut in about the same time?

A Yes. I would say that Well Number Four was or has not produced since August, 1962. Well Number Three has not produced since November of 1962, or shall I say October, 1962, and Well Number Two has or is actually the only well that is currently being produced. Well Number One last produced in February, 1963.

Q February, 1963?

A Yes, sir.

Q What is the approximate accumulation or accumulative production to date on your Number Two, which is the Southeast Quarter?

A Well Number Two had accumulated 1814 barrels through 1-1-63. And this is strictly an estimated figure. I am just looking at the figure. I would say it has produced an additional five hundred barrels since then, making it accumulate roughly 2300 barrels to date.

Q How many barrels a day does that Number Two well make, approximately?

A This is indicated directly on Number 4-B, because this is



the only well that produces on the lease, so it is currently producing at exactly 2.2 barrels during the month of November, barrels per day.

Q Your dotted line on 4-B actually is your Well Number Two?

A Essentially this last part of the year, it is.

MR. DURRETT: That is all.

* * * *

MR. NUTTER: Any further questions? The witness may be excused. Do you have anything further, Mr. Morris?

MR. MORRIS: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2987? We will take the case under advisement.

* * * *

STATE OF NEW MEXICO {

COUNTY OF BERNALILLO {

I, ROY D. WILKINS, 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, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill, and ability.

WITNESS my Hand and Seal of Office, this 20th day of February, 1964

I do hereby certify that the foregoing is
My Commission Expires September 6, 1968
the Examiner hearing of Case No. 2987 PUBLIC

Heard by me on Feb 5, 1964
[Signature], Examiner
New Mexico Oil Conservation Commission



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