

CASE 3488: Application of AMERADA
for a waterflood expansion, Lea
County, New Mexico.

CASE No.

3488

Application,

TRANSCRIPTS,

SMALL Exhibits

ETC.

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

March 3, 1967

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Mr. Kellahin:

Reference is made to Commission Order No. R-3144, entered in Case No. 3488, approving the expansion of Amerada's Saunders SB Waterflood Project.

Water injection into the newly authorized well, in addition to the three injection wells previously authorized, will be through plastic-coated tubing set in packers. It is our understanding that all produced water will be recycled and that your injection water will be a mixture of said produced water and fresh water from the Ogallala formation.

As to allowable, our calculations indicate that when all four 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 2067 barrels per day when normal unit allowables are 42 barrels per day or less.

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

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

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March 3, 1967

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

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 unitisation, 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,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/esr

cc: Oil Conservation Commission
P. O. Box 1980
Hobbs, New Mexico

Mr. Frank Irby
State Engineer Office
Capitol Building
Santa Fe, New Mexico

AMERADA PETROLEUM CORPORATION

P. O. BOX 2040

TULSA, OKLAHOMA 74108

November 10, 1966

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

Re: State "SN" Unit and Waterflood
Saunders Permo-Penn Pool
Lea County, New Mexico

Dear Sir:

As you requested, this correspondence is submitted in an attempt to clarify Amerada's plans for secondary recovery in the Permo-Penn reservoir, Saunders Field, Lea County, New Mexico.

A lease waterflood with three (3) injection wells was established on Amerada's State "SB" lease by Order No. R-3078, dated 6/15/66. The timeliness of this hearing was necessary in order to preserve use privileges from the Ogalalla fresh water supply source. Project expansion and approval of the unitization agreement were requested at a hearing held on 11/2/66.

Evidence given at the original hearing indicated that internally coated tubing would be installed in the three (3) injection wells. This procedure was formulated assuming that produced water from the Permo-Penn reservoir would be used in the project. Since that time, two circumstances have altered our approach to the problem of injection well completion: (1) Due to capacity limitations, a separate gathering system to accommodate the Ogalalla supply water has been installed, and (2) compatibility tests run on mixtures of Ogalalla and produced water indicated that treatment would be necessary prior to injection. These tests also showed that the Ogalalla was not corrosive except to the extent that it contained free oxygen.

The purpose of the initial lease waterflood and proposed unitization and expansion is to determine the floodability of the Permo-Penn reservoir at the lowest possible cost. Since supply water must be gathered in a separate system, and in view of the results of compatibility tests, we now propose to inject only Ogalalla water treated with a suitable oxygen scavenger during the entirety of the five-spot pilot program; therefore, we feel that, under these conditions, downhole equipment and completion fluid in existing wells is adequate. Our records indicate that the three approved injection wells on Amerada's State "SB" lease are completed as follows:

*Submitted with Jason Kellahan
regarding proposal not to use
produced water but fresh water
entirely. He contacted with
Jim Lowe who advised
him that the produced water
would be recycled and
mixed w/ fresh water to
obtain sufficient volume*

AKH.

Mr. Dan Nutter

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November 10, 1966

<u>Well</u>	<u>Tubing</u>	<u>Packer</u>	<u>Annular Fluid</u>
State "SB" #2	2-3/8" OD @ 9746'	HOWCO RTTS @ 9736'	Lease Crude
State "SB" #3	2-3/8" OD @ 9752'	GULB. KVL-30 @ 9682'	Lease Crude
State "SB" #4	2-3/8" OD Int. Plastic Coated @ 9692'	Baker Lok-Set Int. & Ext. Plastic Coated @ 8689'	Lease Crude

The fourth injection well, Texaco's "AQ" #2, completes the pilot five-spot flood pattern and is not presently equipped with a packer. A work-over will be required prior to injection at which time internally coated tubing will be installed and inhibited water placed in the annulus.

When, and if, the injection program is expanded and the two water sources are commingled, all injection wells will be equipped with internally coated tubing and packers and completed with inhibited water.

It is hoped that this correspondence has resolved the question of injection well completion. Amerada is vitally interested in every aspect of corrosion in this waterflood system and intends to monitor corrosivity of injected water by means of coupon surveys. Also, annular pressure will be periodically observed in order to detect packer, casing or tubing leakage.

With the above data in mind, it is respectfully requested that Mr. Porter's memorandum of July 6, 1966, (paragraph 2) be amended to include usage of existing injection well equipment and that subsequent orders pertaining to unitization and expansion recognize this change. We understand that these provisions are contingent upon necessary and adequate precautions to prevent and/or detect the presence of corrosion.

Very truly yours,

AMERADA PETROLEUM CORPORATION

David G. Griffin

David G. Griffin

DGG:pw

cc: Mr. Frank Irby
Water Rights Division
Office of the State Engineer
State Capitol Building
Santa Fe, New Mexico

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

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EXAMINER HEARING

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) Cases No. 3487
) and 3488
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BEFORE: ELVIS A. UTZ, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 3487.

MR. HATCH: Case 3487. Application for Amerada Petroleum Corporation for a unit agreement, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, Kellahin and Fox, Santa Fe, appearing on behalf of the Applicant in association with Mr. Thomas W. Lynch, a member of the Oklahoma Bar, who will present the case.

MR. HATCH: Are there other appearances in this case?

MR. LYNCH: Mr. Examiner, we have two cases, Cases Number 3487 and 3488. We would like to consolidate these two cases since they cover essentially the same subject matter. Case Number 3488 is an application to expand a lease waterflood already approved by the Commission. Case 3487 is an application to approve a unit agreement, which will cover the expanded lease waterflood. Last June, when the lease waterflood, which we call the State SB Waterflood, was approved by this Commission, we were in the process of negotiating with Texaco for the expansion of the waterflood and unitization of one of their leases with two of ours. Both are State leases; that unitization has now been accomplished.

We will have one witness, Mr. D. G. Griffin.

MR. UTZ: Case 3487 is just a unit agreement and it actually will contain the original waterflood and its

expansion?

MR. LYNCH: Yes, sir.

MR. UTZ: Cases 3487 and 3488 will be consolidated for the purposes of testimony and separate orders will be written on each case.

MR. LYNCH: Mr. Griffin, will you stand and be sworn?
(Witness sworn)

DAVID G. GRIFFIN, called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. LYNCH:

Q Mr. Griffin, will you state your name and your occupation and by whom you are employed, for the record?

A My name is David G. Griffin and I am employed by Amerada Petroleum Corporation as a petroleum engineer in our Tulsa office.

Q Have you testified previously before this Commission or one of its Examiners?

A Yes, sir.

Q Are you familiar with the area which is the subject of Amerada's two applications in this consolidated Hearing?

A Yes, I am.

MR. LYNCH: Are the witness' qualifications

acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Lynch) Mr. Griffin, would you turn first to what has been marked as Exhibit 1 and briefly tell us what that exhibit shows?

(Whereupon, Exhibit 1 marked for identification.)

A Exhibit Number 1 is a structural contour map on the top of a correlatable interval within the Permo-Pennsylvanian Section. It illustrates a gentle anaclinal nature of the structure and as you can see, the anacline does plunge southward.

Also shown on the exhibit is an outline of the proposed State SN Unit, the three injection wells colored in red that are now -- or were approved in the State SB Lease Waterflood, and the fourth injection well colored in blue.

The discovery well is also indicated in red just to the north of the unit, and it is Gulf-Saunders Number 1 which was completed in January of 1950.

Q (By Mr. Lynch) All right, sir, can you tell us briefly the character of the reservoir rock and the nature of the traffic mechanism?

A This Permo-Penn is a medium limestone, crystalline limestone with regular porosity which averages about eight per cent. It has a gross section of about 200 feet and the

average depth of the Permo-Penn is 9865 and it has an average permeability of 40 millidarcies.

Q There are no field rules, are there, for this field?

A No, the field has been developed on State-wide 40-acre spacing.

Q What type of reservoir drive do you think exists?

A It is producing under the influence of solution gas, fluid expansion.

Q You pointed out on Exhibit 1 the discovery well; when was the pool discovered?

A In January, 1950.

Q How many wells are there presently producing from the Permo-Penn Pool?

A There are now 106 wells producing in the pool that produce either by gas lift or by pump, and average approximately 15 barrels of oil per day per well, and 19 barrels of water per day per well, currently.

(Whereupon, Exhibits 2 and 3 marked for identification.)

Q (By Mr. Lynch) Would you now turn, Mr. Griffin, to what has now been marked as Exhibits 2 and 3, a graph and a table? Would you briefly tell us what those exhibits show?

A Exhibit 2 is a performance graph of the Saunders-Permo-Penn Pool. It shows the monthly oil rate and the total fluid production by month in addition to the number of active

wells in the field, which now total 106.

We have produced approximately 90 per cent of the primary reserves from this reservoir, which leads us to conclude that the pool is in an advanced stage of depletion.

Q You would also call this a stripper stage?

A Or a stripper stage, yes.

(Whereupon, Exhibit 4 marked for identification.)

Q (By Mr. Lynch) Would you now turn to Exhibit 4?

A Pardon me. I skipped Exhibit 3; it is simply supporting data for the curve but it shows the oil-water accumulative oil production by years. The pool has produced to September 1st, 1966, approximately twenty-five million barrels of oil.

Q With respect to the first three exhibits, at least, ~~These~~ were the same exhibits that were introduced in connection with this lease waterflood, except they have been updated?

A That's correct.

Q What does Exhibit 4 show?

A Exhibit 4 is a plat which shows the outline of our proposed State SN Unit. The three injection wells that are colored in red are the wells that were authorized in the State SB Lease Waterflood, which was set up June 15, 1966 by Order R-3078 and the well, the injection well colored blue

is the Texaco AQ Number 2, which is the well which will complete our five-spot flood pattern in the unitized area.

The original lease waterflood excluded the Texaco AQ lease in the center of the unit and also Amerada's SC lease in the extreme northeast corner.

The working interest in this unit is composed of Amerada and Texaco only. The royalty owner is the State of New Mexico with a single beneficiary, the common schools.

Q All right, sir, and have you prepared a data sheet describing the proposed standard projection program?

A Yes, I have. This is Exhibit 5. This exhibit outlines the general data for the Permo-Penn Pool, pressure data, fluid and reservoir rock properties, and supply water data. Injection well data has been updated from the previous Hearing and now will include four injection wells. Our expected rate of injected volume is 2,000 barrels per day per well and our maximum expected injection pressure is 1500 psi at the wellhead.

(Whereupon, Exhibit 5 marked for identification.)

Q (By Mr. Lynch) All right, sir; and initially the injected water will be from the Ogallala for which permits have been granted from the State Engineer's office?

A That's correct.

Q Do you expect in the future to use the Ogallala

only for make-up water and to produce water as well?

A That is our plan, yes. We will supplement produced water from the Permo-Penn with fresh water from the Ogallala.

Q And this, as you testified in the June Hearing, will be a closed system?

A Yes, sir, it will be completely closed and we will install a pressure gauge on the annulus of the injection well in order to protect any leakage that might occur.

(Whereupon, Exhibit 6 marked for identification.)

Q (By Mr. Lynch) All right, sir. Would you turn now to what has been marked as Exhibit 6 and tell us what that is?

A Exhibit 6 is a portion of a gamma-ray neutron log on Texaco's State AQ Number 2 Well, which is our proposed injection well, and shows the perforated interval in the well.

Q A similar log has been previously submitted in connection with the lease waterflood for the three other injection wells, is that correct?

A That's correct, yes.

Q Would you examine Exhibit 7 and tell us what that shows?

(Whereupon, Exhibit 7 marked for identification.)

A Exhibit 7 is a schematic diagram of the Texaco

State AQ Number 2 Well, and shows the various setting depths of the casing strings in the well, cement tops, the approximate packer setting and tubing setting depths, the perforated interval and the TD of the well. This well is not now equipped with a packer and that is the reason for the approximation of the setting depths.

Q (By Mr. Lynch) Mr. Griffin, back in the June Hearing-- Let me digress a minute. In the June Hearing, similar schematics were prepared and submitted in evidence for the other three injection wells already approved, is that correct?

A Yes, sir.

Q And at that time, I believe when questioned, you stated that Amerada intended to use lined tubing?

A Yes, sir, that's correct.

Q Has Amerada made any study since that time to indicate that lined tubing is not necessary?

A Yes, we have. Since the previous Hearing we conducted some compatibility tests on the Ogallala and the produced water, and these indicate that the two waters are not compatible and will therefore necessitate treatment at the surface, commingling treatment, and since we will have to treat the water we propose to inhibit, for not only scale but also corrosion, and we feel that this would eliminate the need for internally lined tubing.

Q What other precautions does Amerada plan to take insofar as possible corrosion is concerned?

A We will monitor corrosion tendencies by both water analyses and corrosion coupons.

Q Mr. Griffin, will the proposed expanded injection program, in your opinion, substantially increase the ultimate recovery of oil and gas from the Saunders-Permo-Penn Pool?

A Yes, it will.

Q Will the proposed completion of not only the Texaco injection well, but the other three injection wells prevent the migrations of fluid in the zones other than the injection zone and will it protect the source of the fresh water and sources of oil and gas?

A Yes, they will.

Q Mr. Griffin, from the standpoint of efficiency of operations, is unitization of leaseholds here necessary for the purposes of this water product?

A Yes, sir, it definitely is.

Q Mr. Griffin, did you prepare Exhibits 1 through 7 or were they prepared under your supervision or direction?

A Yes, they were.

MR. LYNCH: We would like to offer in evidence Exhibits 1 through 7.

MR. UTZ: Without objections, Exhibits 1 through 7

will be entered into the record of this case.

(Whereupon, Exhibits 1 through 7 offered and admitted in evidence.)

MR. LYNCH: We would like to offer in evidence Exhibit 8 which is the unit agreement for the State SN Unit area. The unit agreement is the standard form prescribed by the Land Office. As already testified by Mr. Griffin, it covers three separate leases, two Amerada's and one Texaco lease. Amerada is made the unit operator and tract participation is divided into two phases, which can be explained by Mr. Griffin if you wish it explained. Otherwise, it is a standard agreement.

(Whereupon, Exhibit 8 marked for identification, offered into evidence.)

Q (By Mr. Lynch) Mr. Griffin, what recommendations do you have in this Hearing?

A We recommend approval of the unit agreement and also the expansion of the existing lease waterflood to include the additional area of the Texaco AQ lease, and the Amerada SC lease and the addition of a fourth injection well.

Q Have you calculated the effect that this approval would have on the total allowable from the unit area?

A Yes, I have, according to Rule 701 there are thirteen wells which qualify as either injection wells, direct, or

diagonal off-sets and using a proportional depth factor of 3.77 and a 50 barrel basic allowable, this calculates 2451 barrels per day. Adding to that, the allowable of the Amerada SB Number 11, which is the furthestmost west well, which is the only well that does not qualify, the total unit allowable is estimated to be 2459 barrels per day.

MR. LYNCH: Mr. Examiner, we would like to call attention to a letter which should be in your file from the State Engineer's Office by Frank Irby to Mr. A. L. Porter, which states that the State Engineer has no objection to the granting of the application providing the well is completed in the manner shown in the diagramatic sketch which accompanied the application.

Q (By Mr. Lynch) Mr. Griffin, is the diagramatic sketch which accompanied the application the same diagramatic sketch which was offered here as Exhibit 7?

A Yes, it is.

MR. LYNCH: That's all we have.

MR. UTZ: Yes, we have a copy of the letter from Mr. Irby in the file.

Mr. Griffin, did I understand that the three injection wells which have already been approved have not been tubed yet?

A No, sir, they were old producing wells with tubing

and packers installed and we felt that it would, in all probability, be necessary to perform a workover to remove the packer and install lined tubing, but since that time, we have made our studies which indicate otherwise.

MR. UTZ: Well, what you intend to do with those three wells is to use the production string tubing that is already in the well?

A Yes, sir, that would be our hope.

MR. UTZ: What do you intend to do about the annulus?

A The annulus already contains a non-corrosive inert fluid and we feel that this will suffice.

MR. UTZ: And it is your intention to complete the four injection well in the same manner?

A Yes, sir, it is.

MR. UTZ: Does your application give me the exact location of the fourth injection well?

MR. LYNCH: Yes, sir, I believe it does.

MR. UTZ: It gives the 40-acre tract.

MR. LYNCH: Yes, it is not in terms of lettered units, though.

MR. UTZ: We can figure that one out. Are there any other questions of the witness? He may be excused.

(Witness excused.)

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CONVENTIONS

DAILY COPY

EXPERT TESTIMONY

STATEMENTS

DEPOSITIONS, HEARINGS,

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

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MR. UTZ: The case will be taken under advisement.

I N D E X

WITNESS	PAGE
D. G. GRIFFIN	
Direct Examination by Mr. Lynch	3

E X H I B I T S

EXHIBIT	MARKED FOR IDENTIFICATION	OFFERED	ADMITTED
1	4	11	11
2 & 3	5	11	11
4	6	11	11
5	7	11	11
6	8	11	11
7	8	11	11
8	11	11	11

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STATE OF NEW MEXICO)
) SS
COUNTY OF BERNALILLO)

I, W. DON MCINTYRE, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission Examiner 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 3rd day of December, 1966.

W. Don McIntyre
Notary Public - Court Reporter

My Commission Expires:

July 17, 1970

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Executive hearing of Case No. 3487-88
heard by me on Nov. 2, 1966.

Thos. L. [Signature], Examiner
New Mexico Oil Conservation Commission

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

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

P. O. BOX 2089
SANTA FE

November 9, 1966

Re: Case No. 3488

Order No. R-3144

Applicant:

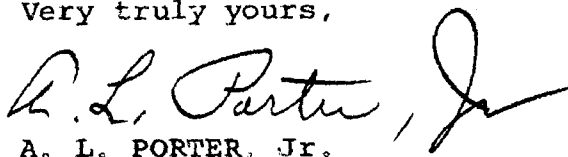
Amerada Petroleum Corporation

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Sir:

Enclosed herewith is a copy of the above-referenced Commission order recently entered in the subject case. Letter pertaining to conditions of approval and maximum allowable to follow.

Very truly yours,



A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC X

Artesia OCC

Aztec OCC

Other Mr. Frank Irby

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. 3488
Order No. R-3144

APPLICATION OF AMERADA PETROLEUM
CORPORATION FOR A WATERFLOOD EXPAN-
SION, LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 2, 1966, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 9th day of November, 1966, 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, Amerada Petroleum Corporation, seeks permission to expand its Saunders SB Waterflood Project in the Saunders Permo-Pennsylvanian Pool by the injection of water into the Permo-Pennsylvanian zone through its Texaco-State "AQ" Well No. 2, located in Unit E of Section 3, Township 15 South, Range 33 East, NMPM, Lea County, New Mexico.

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

(4) That the proposed expansion of the Saunders SB Waterflood Project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

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CASE No. 3488

Order No. R-3144

(5) That the subject application should be approved and the expanded project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

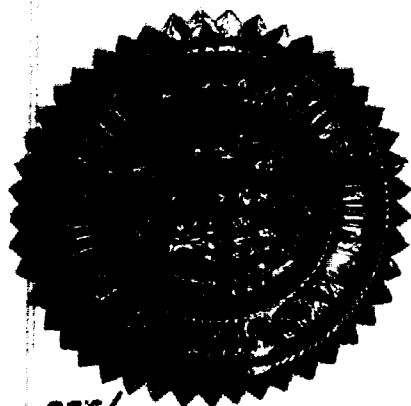
(1) That the applicant, Amerada Petroleum Corporation, is hereby authorized to expand its Saunders SB Waterflood Project in the Saunders-Permo Pennsylvanian Pool by the injection of water into the Permo-Pennsylvanian zone through its Texaco-State "AQ" Well No. 2, located in Unit E of Section 3, Township 15 South, Range 33 East, NMPM, Lea County, New Mexico.

(2) That the expanded waterflood project shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(3) That monthly progress reports of the expanded waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 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.



esx/

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

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

Case 3488

Heard 11-2-66

Dec. 11-4-66

1. Grant Amerada an extension
of their Saunders 'SB' Waterflood
granted by R-3076. Extension consists
of $S\frac{1}{2}$ NW $\frac{1}{4}$ sec. 3, 15S-33E and
one additional injection well, ~~the~~^{the}
Texaco # A3 # 2 E-3-15S-33E.

Thudt. W. S.

2. Water shall be treated before
injection & corrosion checked
by frequent water analysis
and coupons.

EDA

Docket No. 27-66

DOCKET: EXAMINER HEARING - WEDNESDAY - NOVEMBER 2, 1966

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

- - - -

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

- CASE 3479: Application of Gulf Oil Corporation for an exception to Rule 8 of Order No. R-1638 and to Rule 301, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Rule 8 of Order No. R-1638 and to Rule 301 of the Commission rules and regulations to permit discontinuance of individual gas-oil ratio tests in its West Bisti-Lower Gallup Sand Unit, Bisti-Lower Gallup Pool, San Juan County, New Mexico. Applicant proposes to report gas production and ratios on a unit-wide basis rather than individual well GOR data.
- CASE 3480: Application of Tidewater Oil Company for a capacity allowable, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-3097 which permitted its GO State "J" Well No. 1 located in Unit H of Section 7, Township 17 South, Range 33 East, Lea County, New Mexico, which directly offsets the Malmar Unit Waterflood Project, to be produced at capacity for a period not to exceed 90 days from date of said order. Applicant seeks additional time in which to produce said well at capacity and the establishment of an administrative procedure for further extensions.
- CASE 3336 (Reopened)
In the matter of Case No. 3336 being reopened pursuant to the provisions of Order No. R-3005, which order established 80-acre spacing units for the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.
- CASE 3481: Application of Sinclair Oil & Gas Company for a non-standard gas proration unit and an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard gas proration unit comprising the NW/4 of Section 7, Township 22 South, Range 36 East, Jalmat Gas Pool, Lea County, New Mexico, to be dedicated to its State 157 "B" Well No. 1 located at an unorthodox location for said pool 330 feet from the North line and 2310 feet from the West line of said Section 7.

- CASE 3482: Application of Sinclair Oil & Gas Company for a special gas well test, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce and flare up to three million cubic feet of gas per day, for a maximum of 30 days, from its Hackberry Hills Unit Well No. 4 located in Unit F of Section 22, Township 22 South, Range 26 East, Eddy County, New Mexico, as a reservoir limit test to determine the economic feasibility of a pipeline connection to said well.
- CASE 3483: Application of H. S. Moss for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Wolfcamp formation in the interval from 9751 to 9850 feet in its D. P. Peck Well No. 1 located in Unit C of Section 26, Township 12 South, Range 37 East, Gladiola Field, Lea County, New Mexico.
- CASE 3484: Application of Phillips Petroleum Company for a pilot waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pilot waterflood project by the injection of water into the Grayburg-San Andres formation through its Santa Fe Well No. 14 located in Unit P of Section 20, Township 17 South, Range 35 East, Vacuum Field, Lea County, New Mexico.
- CASE 3485: Application of Phillips Petroleum Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through three injection wells located in Sections 8, and 9, Township 17 South, Range 33 East, Vacuum Field, Lea County, New Mexico.
- CASE 3486: Application of Shenandoah Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through four injection wells located in Sections 7, 8 and 16, Township 17 South, Range 33 East, Vacuum Field, Lea County, New Mexico.
- CASE 3487: Application of Amerada Petroleum Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of its State "SN" Unit Area comprising 692 acres, more or less, of State land in Sections 3 and 4, Township 15 South, Range 33 East, Lea County, New Mexico.

-3-

Docket No. 27-66

November 2, 1966 Examiner Hearing

CASE 3488: Application of Amerada Petroleum Corporation for a waterflood expansion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its Saunders SB Waterflood Project by the injection of water into the Permo-Pennsylvanian zone through its Texaco-State "AQ" Well No. 2 located in Unit E of Section 3, Township 15 South, Range 33 East, Saunders Permo-Pennsylvanian Pool, Lea County, New Mexico.

CASE 3489: Application of William A. and Edward R. Hudson for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand their Puckett A Waterflood Project by the injection of water into the Grayburg-San Andres formation through their Puckett A Well No. 30 to be drilled at an unorthodox location 1345 feet from the North line and 25 feet from the West line of Section 24, Township 17 South, Range 31 East, Maljamar Pool, Eddy County, New Mexico.

CASE 3490: Application of Sunray DX Oil Company for pool redelineation, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks the redelineation of the Todd-San Andres Pool, Roosevelt County, New Mexico, into two separate pools: The Todd Upper-San Andres Gas Pool comprising that portion of the San Andres formation above the anhydrite bed found at 4200 feet in the Franklin, Aston and Fair Mark Federal Well No. 1 located in Unit M of Section 26, Township 7 South, Range 35 East, and the Todd Lower-San Andres Pool comprising that portion of the San Andres formation below said anhydrite bed, said Todd Lower-San Andres Pool to be governed by the existing rules for the present Todd-San Andres Pool. Also to be considered at said hearing will be such matters as the effective date of the aforesaid redelineation, the period of time in which to effect dual completion of the affected wells, the distribution of the affected wells' accumulated status in the present pool (overproduction and underproduction) to each of the new pools, and such other pertinent matters as may relate to the aforesaid pool redelineation. Also to be considered will be special pool rules for the proposed Todd Upper-San Andres Gas Pool, including 320-acre spacing for wells located therein.

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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

APPLICATION OF AMERADA PETROLEUM CORPORATION)
FOR AUTHORITY TO EXPAND A WATERFLOOD PROJECT,)
SAUNDERS PERMO-PENNSYLVANIAN POOL, LEA COUNTY,)
NEW MEXICO.)

CASE NO. 10-21-66

APPLICATION

Applicant Amerada Petroleum Corporation states that:

1. By Order No. R-3078, dated June 15, 1966, this Commission authorized Applicant to institute a pilot waterflood project in the Saunders Permo-Pennsylvanian Pool by the injection of water into the Permo-Pennsylvanian zone through three wells in Section 3-15S-33E, Lea County, New Mexico:

Amerada-State S"B"	Well No. 2 (Unit C)
Amerada-State S"B"	Well No. 3 (Unit G)
Amerada-State S"DB"	Well No. 4 (Unit K)

2. Applicant hereby requests authority to expand the approved waterflood project to include, as an additional injection well, the Texaco-State "AQ" Well No. 2, located in the SW/4 NW/4 Section 3-15S-33E, Lea County, New Mexico.

3. Attached hereto as "Exhibit A" is a plat showing the location of the proposed injection well, the location of all other wells within a radius of two miles from the proposed injection well, and the names of all known lessees within the two-mile radius. All of wells within the two-mile radius are completed in the Saunders Permo-Pennsylvanian Pool.

4. Attached hereto as "Exhibit B" is a diagrammatic sketch of the proposed injection well, showing the information required by Statewide Rule 701-B-3.

5. Applicant proposes initially to inject fresh water from the Ogallala Formation into the Permo-Pennsylvanian zone (found at an approximate depth of 9865 feet) at an anticipated rate of 2000 barrels per injection well per day.

6. A copy of this application, complete with all attachments, has been mailed to the State Engineer Office, Capitol Building, Santa Fe, New Mexico.

AMERADA PETROLEUM CORPORATION

By Thomas W. Lynch
Thomas W. Lynch, Attorney
P. O. Box 2040
Tulsa, Oklahoma 74102

Resident Counsel:

Jason W. Kellahin
Kellahin and Fox
P. O. Box 1769
Santa Fe, New Mexico 87501
Robert E. Fox

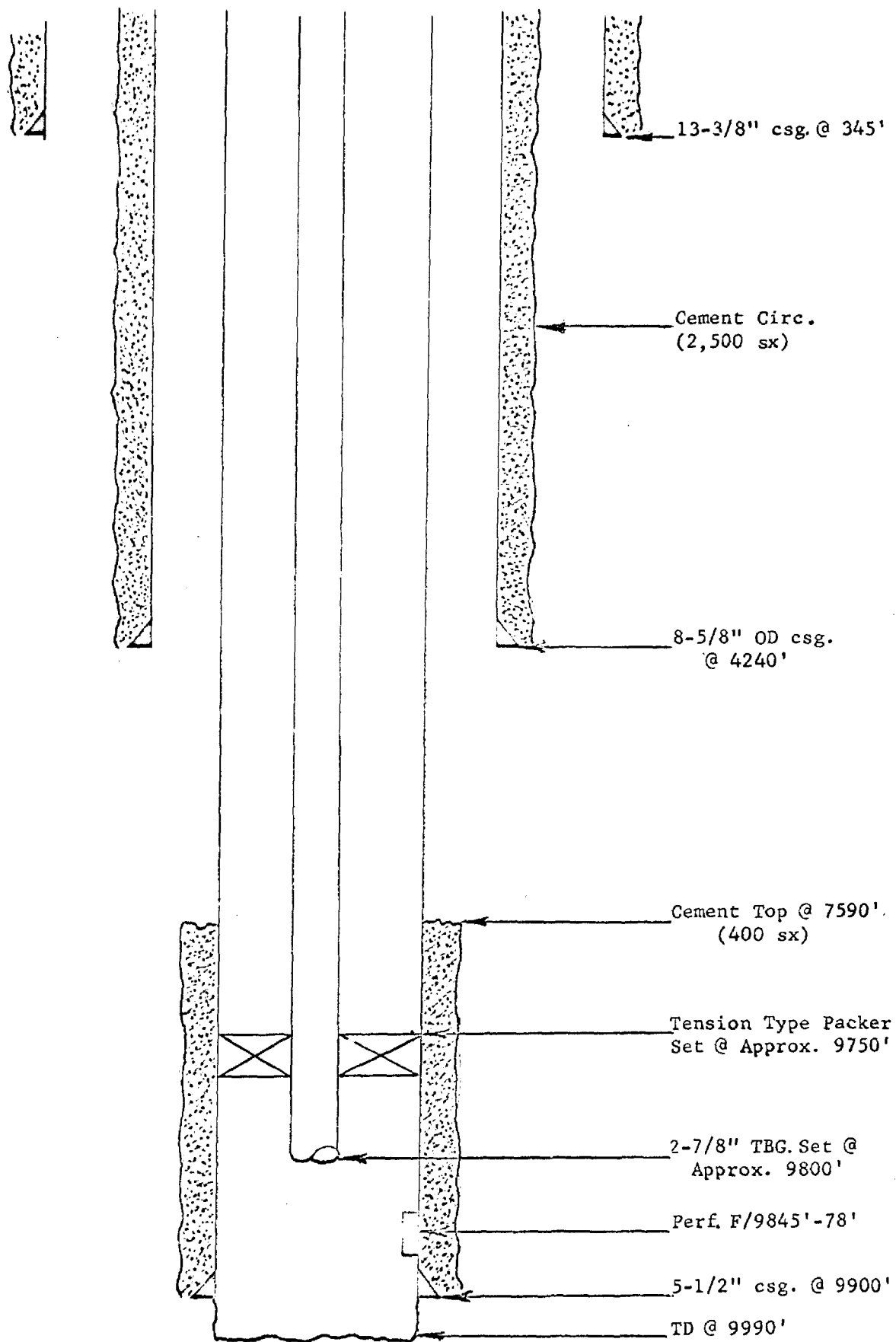
DOCKET MAILED

Date 10-21-66

SCHEMATIC DIAGRAM
TEXACO-STATE "AQ" No. 2 WELL
SAUNDERS FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT B

8-2-34





STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

October 14, 1966

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, NEW MEXICO 87501

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

Dear Mr. Porter:

Reference is made to the application of Amerada Petroleum Corporation submitted October 13, 1966 which seeks authority to expand a waterflood project in the Saunders Permo-Pennsylvanian Pool, Lea County by converting the Texaco-State "AQ" Well #2 to water injection.

This office offers no objection to the granting of this application provided the well is completed in the manner shown on the diagrammatic sketch which accompanied the application.

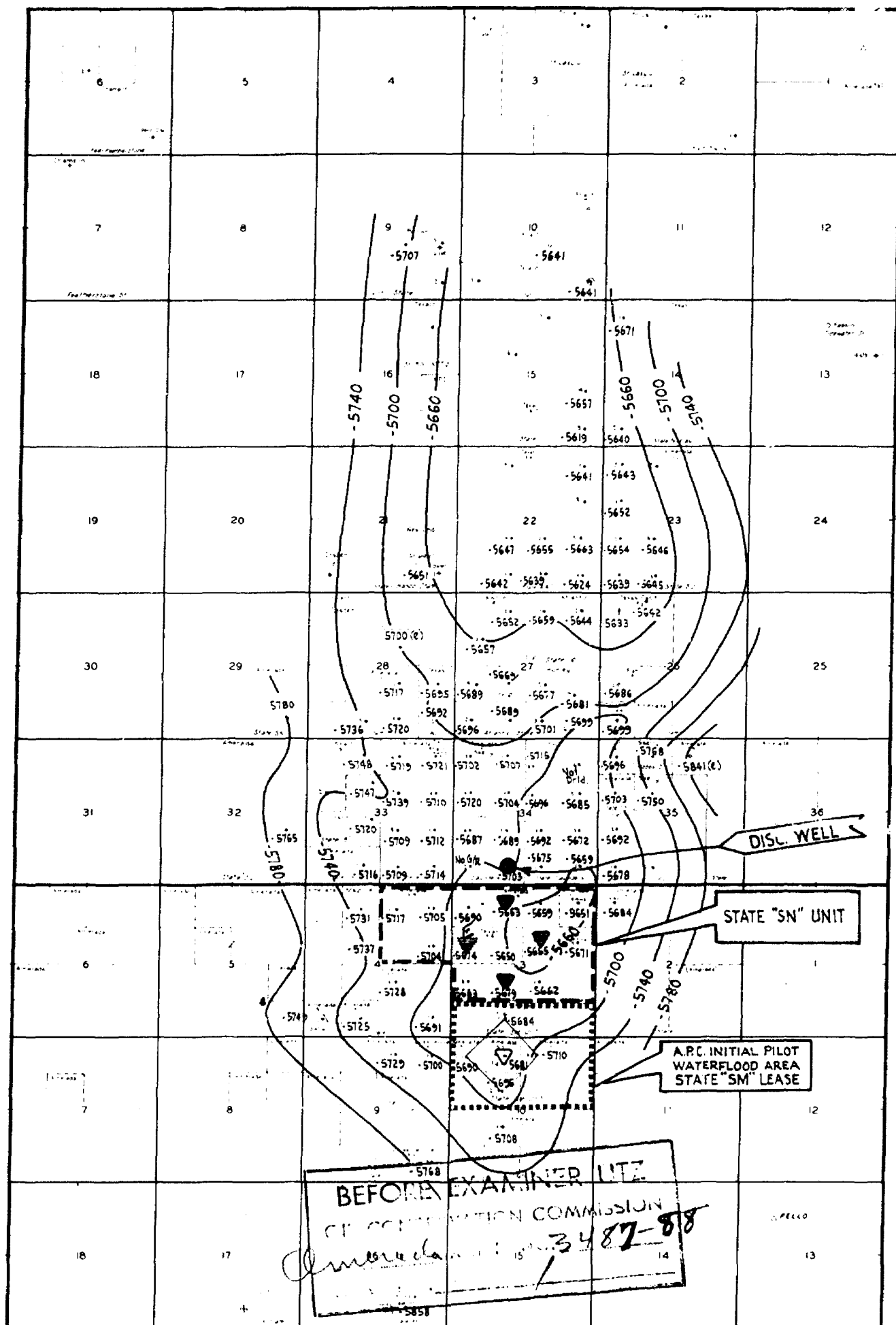
FEI/ma
cc-Amerada Petro. Corp.
F. H. Hennighausen

Yours truly,

S. E. Reynolds
State Engineer

By: *Frank E. Irby*
Frank E. Irby
Chief
Water Rights Div.

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AMERADA PETROLEUM CORP.

EXHIBIT 1

NO. 3487-3488

DATE 11-2-66

SAUNDERS PERMO-PENN POOL
LEA CO. NEW MEXICO

T. 14-15 S. R. 33 E.

STRUCTURAL CONTOUR MAP

C.I. 40'



FIG.

TABULATION OF PRODUCTION
SAUNDERS PERMO-PENN POOL
LEA COUNTY, NEW MEXICO

<u>Year</u>	<u>Oil Production</u>	<u>Cumulative Oil Production</u>	<u>Water Production</u>
1950	79,380	79,380	22,228
1951	704,235	783,615	59,341
1952	1,544,601	2,328,216	375,872
1953	2,140,766	4,468,982	906,722
1954	2,184,083	6,653,065	1,430,428
1955	1,898,300	8,551,365	921,857
1956	1,714,045	10,265,410	848,070
1957	1,549,535	11,814,945	796,037
1958	1,844,799	13,659,744	712,497
1959	2,437,149	16,096,893	1,122,012
1960	2,305,616	18,402,509	1,284,017
1961	1,948,023	20,350,532	1,219,237
1962	1,422,360	21,772,892	1,211,927
1963	1,118,115	22,891,007	1,199,328
1964	1,085,204	23,976,211	1,185,191
1965	823,537	24,799,748	928,864

Cumulative Oil Produced
to 9-1-66

25,228,006

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO. 3487-3488

AMERADA PETROLEUM CORP.
EXHIBIT 3
NO. 3487-3488
DATE 11-2-66

GENERAL DATA
PROPOSED STATE "SN" UNIT
SAUNDERS PERMO-PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO

General

Producing Horizon	Permo-Pennsylvanian
Average Depth	9865'
Average Gross Thickness	200'
Discovery Date	January, 1950
Current Number Producing Wells in Pool	106
Well Spacing	40 Acres

Pressure Data

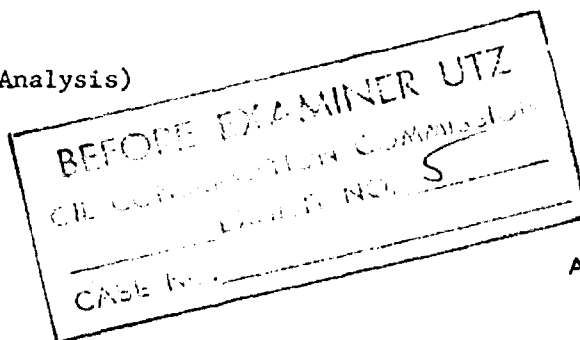
Initial Reservoir Pressure @ -5600'	3660 psi
Current Reservoir Pressure @ -5600'	700 psi
Saturation Pressure @ 130° F	3660 psi

Fluid Properties

Stock Tank Oil Gravity	42.7°
Oil Formation Volume Factor @ 3660 psi and 130° F	1.905
Solution Gas-Oil Ratio	1678 SCF/Bbl
Current Average Producing Gas-Oil Ratio (August 1966)	2965 SCF/Bbl
Oil Viscosity @ 3660 psi and 130° F	0.4 cp
Total Water Saturation (Core Analysis)	30%

Reservoir Rock Properties

Porosity	8%
Permeability (Core Analysis)	40 md



AMERADA PETROLEUM CORP.

EXHIBIT 5

NO. 3487-3488

DATE 11-2-66

General Data

Supply Water Data

Supply Water Source

Type Water

Average Depth to Water Table

Average Thickness of Water Saturated Section

Ogallala

Fresh

115'

140'

Injection Well Data

Number of Proposed Injection Wells

Expected Per Well Injection Volume

Expected Injection Pressure

2000 Bbls/Day ⁴ / well.
1500 psi

LANE RADIOACTIVITY LOG WELLS

COMPANY

FILE NO.

Location of Well

COMPANY: THE TEXAS COMPANY

WELL: STATE A-Q NO. 2

FIELD: SAUNDERS

COUNTY: LRA STATE: N.MEX.

LOCATION: 2271' FM 661' FM

SEC. 3-158-338

COMPANY: THE TEXAS COMPANY
WELL: STATE A-Q NO. 2
FIELD: SAUNDERS
COUNTY: LRA STATE: N.MEX.
LOCATION:

4208' D.P.

LOG MEAS. FROM DRIVE BUSHING ELEV. 4210'

DRLG. MEAS. FROM DRIVE BUSHING ELEV. 4210'

PERM. DATUM 5 1/2" BRADEN HEAD ELEV. 4198'

GAMMA RAY

RADIATION INTENSITY INCREASES

NEUTRON

RADIATION INTENSITY INCREASES

CASING &
COLLAR LOG
DEPTH

9800

9845

9878

R.D. 9900'

T.D. 9902'

THE TEXAS CO.

STATE "AQ" NO. 2

SAUNDERS

BEFORE EX-100

0066

AMERADA PETROLEUM CORP.

EXHIBIT

NO. 3487-3488

DATE 11-2-66

SCHEMATIC DIAGRAM
TEXACO-STATE "AQ" NO. 2 WELL
SAUNDERS FIELD
LEA COUNTY, NEW MEXICO

