



MR. UTZ: The hearing will come to order. The next case on the Docket will be Case 3397, Application of Texaco Inc., for a unit agreement, Lea County, New Mexico; and 3398, Application of Texaco Inc., for a waterflood project, Lea County, New Mexico. We'll consolidate both cases and save a little record.

MR. KELLY: Booker Kelly appearing on behalf of the applicant, Texaco Inc., we have one witness and he was previously sworn.

MR. PORTER: Let the record show that he was sworn in the previous case.

(Whereupon, Applicant's Exhibits  
1-9 marked for identification.)

J. T. J O H N A P E L U S, a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLY:

Q Would you state your name, position and employer?

A J. T. Johnapelus, employed by Texaco, Incorporated as a Proration Conservation Engineer, located in Midland, Texas.

Q You have testified before this Commission before?

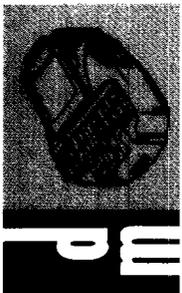
A Yes, I have.

Q Would you state what Texaco seeks?

dearnley-meier

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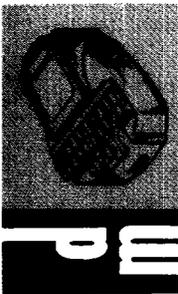
A Mr. Examiner, Texaco, Inc., requests the permission to unitize an area in the Skaggs-Grayburg Pool to be known as the Skaggs-Grayburg Unit, which is to consist of the Southeast Quarter, East half of the Southwest Quarter and Southwest Quarter of the Southwest Quarter of Section 12, the East half of the Northeast Quarter, Northwest Quarter of the Northeast Quarter, Northwest Quarter and Northeast Quarter of the Southwest Quarter of Section 13, West half of the Southwest Quarter and Southeast Quarter of the Southwest Quarter of Section 18 and the West half of the Northwest Quarter, Northeast Quarter of the Northwest Quarter and Northwest Quarter of the Northeast Quarter of Section 19 all in Township 20 South, Range 37 East, Lea County, New Mexico, units in the unitized area; and third, a permit to use 11 existing wells and the injection wells and a basic five spot pattern flood with variations.

Q The unit is shown on what we have marked Exhibit 6 and is outlined in dark -- it's the last exhibit in the little booklet; is that correct?

A Yes, sir, the last exhibit on the right-hand side would be Exhibit 6.

Q Would you give the Examiner a description of the reservoir characteristics and the production history?

A The Skaggs-Grayburg Field was discovered in March



14, 1937 by Continental Oil Company. This field produces from the Grayburg formation of Permian Age, Upper Guadalupe or Capitan series at an average depth of 3700 feet to 3950 feet.

The Physical Properties of the Reservoir Rock, the Average Porosity (Net Pay) is 6 percent. This was derived from a core analysis on the Continental Oil Company well.

The Average Permeability of net pay is 8.3 millidarcies.

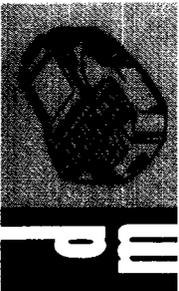
The average connate water saturation is approximately 30 percent.

There is no known oil-water contact, nor a gas-oil contact.

The structure is a trap, primarily, structurally, with some stratigraphic control, and dips to the Northeast at approximately 50 feet per mile. Permeability is also a controlling factor.

Directing your attention to Exhibit 1 which appears on the right-hand side of the brochure, this is a structure map contoured on the top of the Penrose (Lower Queen), and the contour interval is at 50 foot.

The average net effective oil pay thickness is 35 feet. The oil gravity is 36 degrees API. The average gas gravity is .855 as compared to air being 1.0. Salinity of water is approximately 14,000 ppm Cl. The oil is over



saturated as indicated by high producing gas-oil ratios. No PVT analysis is available.

The original reservoir pressure is 1550 psi. The cumulative oil production is approximately 929,000 barrels as of January 1, 1966. The average per well production is 3.4 barrels of oil per day.

The current producing gas-oil ratio is 11,000 cubic feet.

The average water production is approximately 28 percent of the total fluid.

The well status as of February 1, 1965 for the wells encompassed by the unit is: 22 producing wells; 19 pumping wells; 3 flowing wells.

The proven oil productive acreage developed on Texaco's properties is 880 acres.

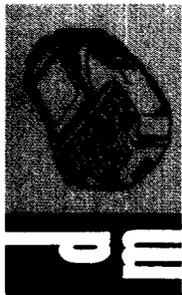
The well density in acres per well is 40 acres.

The state of depletion of the reservoir is a stripper.

The current gas is being purchased by the Warren Petroleum Corporation.

No oil or gas is injected into the upper reservoir at this time.

Q Exhibit 2 is a diagram of your production, is that right?



A Yes, sir, this is a graphic family of curves and production performance of the area in which Texaco proposed to unitize, and it is self-explanatory.

Q Go on to the individual well problems there.

A Most wells have been completed below casing in an open hole interval. Acid treatments, Nitroglycerin, were used to stimulate production prior to potential test. Fracture treatments have been conducted on several wells during the latter years.

The L. R. Kershaw Well No. 8 is a triple tubingless completion through perforations in the Skaggs (Grayburg), Weir (Blinbry) East and the Eumont formations.

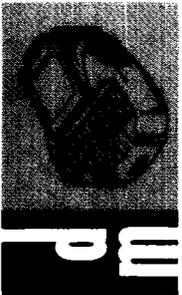
General Reservoir Mechanics is a gas cap expansion and solution gas drive have been the major drive mechanisms in this field.

No effective water drive as indicated by the field performance as of this date.

Q You testified that you're proposing 11 injection wells. Would you describe those for the Examiner, referring to Exhibit 6?

A All right, sir. Referring back to Exhibit 6, in the upper portion of the plat is shown a hatched area which is the unit boundary proposed by Texaco for unitization.

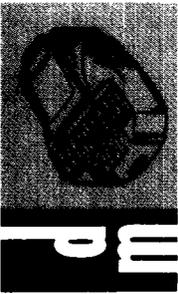
We have also shown the injection wells that we



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propose, except in one instance, and I direct your attention to Section 13 in the Southwest Quarter of the Northwest Quarter, being the Kershaw Well Number 6. We're asking for that to be an injection well along with the other 10.

At this time we do not know whether we will use that well as an injection well, depending on the negotiations with Continental at this time for conversion with one of their wells in the section just West of Number 13.

These wells I'll identify: This is the L. R. Kershaw Well Number 1 in the Northeast Quarter, Northeast Quarter of Section 13; the L. R. Kershaw Well Number 4 in the Northeast Quarter, Northwest Quarter of Section 13; L. R. Kershaw Well Number 5 in the Northeast Quarter, Southwest Quarter of Section 13; L. R. Kershaw Well Number 6 in the Southwest Quarter, Northwest Quarter of Section 13; C. H. Weir 'A' Well Number 1 in the Northeast Quarter, Southwest Quarter of Section 12; C. H. Weir 'A' Well Number 3 in the Northeast Quarter, Southeast Quarter of Section 12; M. B. Weir 'B' Well Number 3 in the Southwest Quarter, Southeast Quarter of Section 12; M. B. Weir 'B' Well Number 6 in the Southwest Quarter, Southwest Quarter of Section 12; M. B. Weir 'B' Well Number 2 in the Southwest Quarter, Southwest

Quarter of Section 7; M. B. Weir 'A' Well Number 2 in the Southwest Quarter, Northwest Quarter of Section 18; B. L. Sweet's Trickey Well Number 2 in the Northwest Quarter, Northeast Quarter of Section 18.

Q Would you describe your injection procedure?

MR. UTZ: Excuse me just a moment. All these wells are described in detail on the left-hand side of your brochure?

THE WITNESS: Yes, sir.

MR. UTZ: Those are correct descriptions?

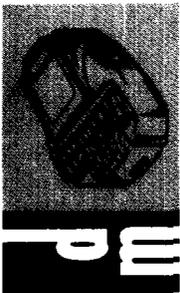
THE WITNESS: Yes, sir, those are correct descriptions.

A The producing wells in the project area to be waterflooded have reached an advanced state of depletion and are properly to be classified as 'stripper' wells.

Water is to be injected in an open hole interval through plastic coated tubing below a packer. Anticipated injection rate is 500 barrels of water per day per injection well at a maximum pressure of approximately 2000 psi.

Provision for expansion by administrative approval is requested if the undeveloped acreage underlying the above leases appear prospective for economic development after flood response is observed.

It is requested that the proposed waterflood



project should be authorized and should be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including those provisions regarding allocation of allowables and their transfer and credits.

Immediately to the South of the subject area, Oil Conservation Commission of New Mexico Order No. R-1710 authorizes Continental Oil Company to waterflood the Grayburg formation on its Southeast Monument Unit, Skaggs Pool, Lea County, New Mexico, effective June 10, 1960. The subject waterflood project will be in cooperative agreement with Continental.

As a result of Texaco's waterflood project, it is anticipated that from 950,000 to 1,050,000 barrels of oil will be recovered over primary production. Eighty percent fillup is expected within two years after commencement of injection.

Q You've been producing water out of these wells, now, is that right?

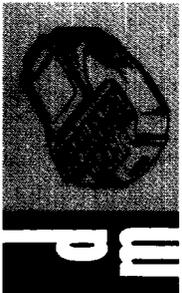
A Yes, sir, we have.

Q And what kind of water is it, is it fresh water?

A No, sir, it's salt water.

Q And what have you been doing with the water up to now?

A Texaco has been disposing of this water into its



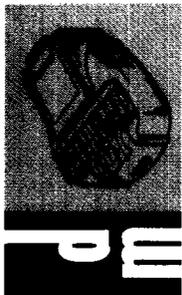
M. B. Weir Number 2 located in the Southwest Quarter, Southwest Quarter of Section 7, Township 20 South, Range 38 East. The water in being injected into the lower San Andres formation at an interval of 4105 to 4128.

Q Texaco doesn't plan to use this water as an injection source?

A No, sir.

Q What is the water source?

A Water source is; fresh water is to be used for the injection fluid which is available from a fresh water supply well located 745' from the North Line and 330' from the East Line of Section 13, Township 20 South, Range 37 East. This well was drilled under Texaco's water permit L-4412 approved by the State Engineer in the Lea County Shallow Underground Basin in April, 1964 and is designated as water source Well Number L-4412. The fresh water is from the Ogallala formation Pliocene epoch, Tertiary period, and consists of pinkish-gray calcareous sand usually with a thick basal gravel. It is anticipated that one more water source well will be needed upon commencement of injection and possibly another well will be required later during the life of the flood. The wells are to be positioned on a line running North-South through the existing well. The location of Water Supply Well Number



L-4412-S has been filed with and approved by the State Engineer. It is to be located in the Southeast Quarter of the Northeast Quarter of Section 13, Township 20 South, Range 37 East. Upon completion, Water Source Well Number L-4412 tested for 200 gallons per minute or 6857 barrels per day.

Water requirements will be approximately 4500 barrels of water per day which is below the capacity of the existing water well, but to prevent excessive drawdown, the other well will be drilled and equipped to pump.

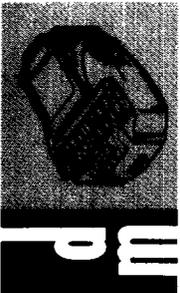
Q Now, have you prepared a diagrammatic sketch of the proposed installation for the injection wells?

A Yes.

Q Would you describe your system?

A Exhibit 3 is a diagrammatic sketch of the L. R. Kershaw Well Number 5 showing the surface casing of 8-5/8" and set at 1440' and cemented with 800 sacks of cement to the surface, and set a production string of 5-1/2" 15.5# J-55 casing set in 7-7/8" hole at 3788', and calculated the top at 1300'.

We will produce from an open hole formation from 3788' to 3930' and injection will be through 2-3/8" OD internally plastic coated tubing, and the packer will be set at 3750' which is below the top of the cement behind the



production string.

Q Do you feel that you could anticipate any type of corrosion problems?

A No, sir, and I would like to add that there will be inhibited water between the annulus and the string in the tubing. This takes care of all possibilities of corrosion.

Q Do you feel it would protect against communication in other zones?

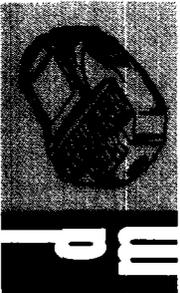
A Yes, sir, we do.

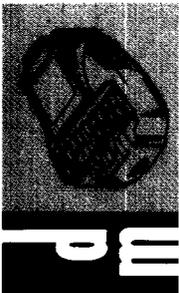
Q What has been marked Exhibit 5 is a list of all the injection wells and their casing programs and injection intervals, is that correct?

A Yes. This is a tabulation of all the casing, cement casing size and production intervals.

Q Is there anything you would like to add to Exhibit 6 at this time?

A Only one comment I would like to make on Exhibit 6, which is the last exhibit on the right-hand side; that the shaded area to the South is a pilot area approved by the Commission on Continental's flood operations there. The area between that and Texaco's has been approved by the Commission in their expansion, and this is to show the tie-in that Texaco has with Continental.





Q Would you describe Exhibit 7 for the Examiner?

A Exhibit 7 is an electric log on the L. R. Kershaw Well Number 1 and is offered as an exhibit to show the producing interval up the hole. It is self-explanatory.

Q Turning to Exhibit 8 in the phase of the case on unitization --

MR. UTZ: Just a moment. I have a log Exhibit 8.

MR. KELLY: We'll change them.

MR. UTZ: I'll change it.

Q (By Mr. Kelly) Referring to your two mile plat, this injection program is following what is generally known as a 5 spot pattern?

A Yes, sir.

Q From the 5 spot, which is if my directions are correct, North and East, what do you feel that will change your Sweet or lessen the effectiveness of your Sweet by veering some of that 5 spot to the North?

A Up to the North?

Q That's Sweet Number 3 and Byers Number 1.

A I call your attention to our Exhibit Number 8. This is a field map of the area showing the various fields and the completions. The one that Texaco is interested in is the red colored circles. If you will notice from the unitized area going to the Northeast, there is no

Grayburg production until you get over to the Depco in Section 7, and North of that in Section 6 in the Wolfson Wells. There is apparently a permeability barrier to the Northeast of our unit, therefore there is no concern by having no injection well to the Northwest of the well to protect the B. L. Sweet Number 3. We will protect them. The same holds true for the M. B. Weir to the North. There is none beyond the unitized area. All that is Eumont and Weir (Blinebry) production.

Q This Exhibit 8 shows in dark outline the proposed injection unit, right?

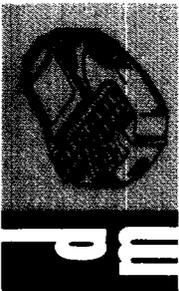
A Yes, sir.

Q And the proposed unitized area?

A Yes, sir.

Q Have you notified all working interest owners, and have you notified royalty?

A Yes, sir, and I have on the left-hand side of our brochure a Status Sign-Up of the unitized area broken down in working and royalty interests by tract. There are 10 tracts involved. Tract 2 is a small tract in the Southwest Quarter of the Northwest Quarter, being the Hissom Drilling Company's tract in Section 1. He has a partner and Mr. Hissom has signed the unit agreement and he holds 87.5 percent of the working interest in that



tract. We do not anticipate any problem with his partner.

The royalty interests have, in several instances, have fairly well signed up. We're making a continued effort. We have had no one turn us down completely. These people are getting around and talking to their attorneys and they have given us no reason to think they won't sign.

The total unit area shown on the bottom of the exhibit, 99.6 percent of the people have executed a unit agreement, and 75.0 percent have signed as of that date.

Q Has Texaco been in contact with the royalty owner for tract 3, where you indicate there is no --

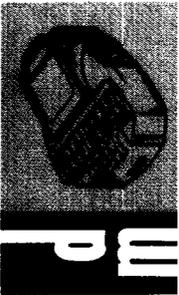
A Yes, this is a 1 interest party of Mrs. Lacy and she has not given us a "no", and she has taken us under advisement with her attorney as we do not see any problems in getting her to sign the unit agreement.

Q Is the unit agreement that Texaco has prepared and offered to the working and royalty interest owners, a standard type unit that has been approved by this Commission?

A Yes, it is.

MR. KELLY: We have a copy of the proposed unit agreement if the Examiner would like to have it. I just wasn't sure of your practice on that.

MR. UTZ: Usually we accept it as an exhibit in



the unit case.

MR. KELLY: Mark this as Exhibit Number 10.

(Whereupon, Applicant's Exhibit 10 marked for identification.)

MR. UTZ: The map on this has the tract -- yes, it has.

THE WITNESS: Right.

Q (By Mr. Kelly) In your opinion would the granting of these two applications promote the efficient production of oil underneath this tract?

A Yes, I believe it will.

Q And prevent waste by preventing having oil left in place?

A That's correct.

Q Were Exhibits 1 through -- all of them except the log and unit agreement prepared by you or under your direction?

A Yes.

Q And the unit agreement was prepared by Texaco's attorneys?

A Yes, and our Legal Department.

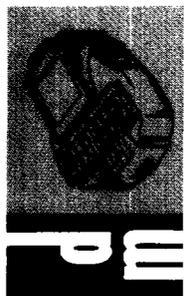
MR. KELLY: We move the introduction of Exhibits 1 through 10.

(Whereupon, Applicant's Exhibits 1 through 10 offered into evidence.)

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MR. UTZ: Without objection the exhibits will be admitted.

(Whereupon, Applicant's Exhibits 1 through 10 admitted into evidence.)

MR. KELLY: I have nothing further at this time.

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

MR. IRBY: Yes, sir.

CROSS-EXAMINATION

BY MR. IRBY:

Q This Kershaw Number 8 --

A Yes, sir.

Q -- is it the well to the Northwest Northwest of 13, it's a triple completion?

A Yes, sir, that's correct.

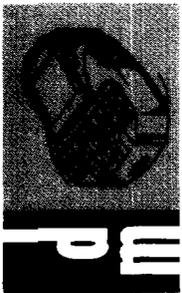
Q And it's to be continued as a producer and not converted to injection?

A That is correct.

Q You stated in your testimony that the produced water would not be recycled through the injection wells. Did you state what would be done with this water?

A We will continue use of Order Number 23 to dispose of that water into the M. B. Weir 'B' Number 5.

MR. IRBY: Thank you, that's all the questions I have.



## CROSS-EXAMINATION

BY MR. UTZ:

Q Where is that well located, again?

A Southwest Quarter, Southwest Quarter, Section 7.

Q Southwest, Southwest of 7?

A Yes, sir. If you will notice there, it has Texaco's 'B' 2. That's an M. B. Weir 2, and offsetting that is a symbol for a dry hole, being Number 5. Do you note that in the Southwest, Southwest of Section 7? If you will excuse me, I'll come over and point it out to you. This is a better place to find it right here. See where the dry hole symbol is there on 5, that well has been conditioned and permitted to be a disposal well.

MR. IRBY: But there is a Number 2 there, also. That will be used as an injection well?

THE WITNESS: Let me look at my Exhibit 7.

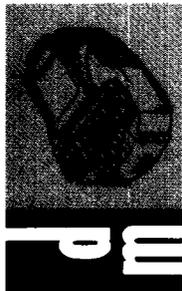
MR. IRBY: According to Exhibit 6 --

THE WITNESS: Yes, sir, it will be an injection well.

MR. IRBY: But the disposal well doesn't show on Exhibit 6?

A No, sir, because we're disposing in the lower San Andres and not the Grayburg.

MR. IRBY: Thank you.



Q (By Mr. Utz) How far below the production string cement are you setting the packer; what is the range?

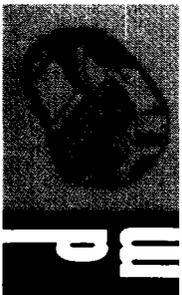
A The packers are being set approximately -- well, in the Kershaw Number 5 will be 38 feet above the shoe of the production string which is 2400 feet or more below the top of the cement.

Q Will they all run approximately that depth?

A I will have to make reference back to our Exhibit Number 6. Yes, sir, that would be approximate. There are 2 wells, that is the top of the cement is at, being the Weir 'A' Number 1, is 2,020 feet, and for the Weir 'B' Number 2, is 2160 feet, in those particular casings, then it would be some 1500 feet below the tops of the cement in the production string.

Q Do you plan to pressure test this casing at all in view of the fact you're injecting through tubing?

A Mr. Examiner, I don't know what our production people had planned to do there and I can't answer your question. I will be more than happy to find out. We will be putting inhibitive fluid behind the tubing; we will be running some pressure tests. Whether they would satisfy the Commission or not I can't answer. If you want to make that a part of the order, then Texaco will be happy to do it.



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Q At any rate, you have inhibitive fluid behind the tubing?

A Yes, sir.

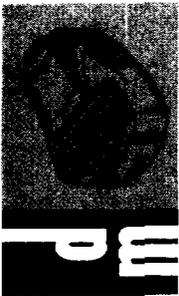
Q With a pressure gauge at the surface?

A Yes, sir.

Q That ought to be satisfactory.

A Fine.

MR. UTZ: Any other questions? The witness may be excused. Are there any statements in this case? The case will be taken under advisement.



I N D E X

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| Cross-Examination by Mr. Irby   | 17          |
| Cross-Examination by Mr. Utz    | 18          |

E X H I B I T S

| <u>NUMBER</u> | <u>MARKED FOR IDENTIFICATION</u> | <u>OFFERED</u> | <u>ADMITTED</u> |
|---------------|----------------------------------|----------------|-----------------|
| Applt's. 1    | 2                                | 16             | 17              |
| Applt's. 2    | 2                                | 16             | 17              |
| Applt's. 3    | 2                                | 16             | 17              |
| Applt's. 4    | 2                                | 16             | 17              |
| Applt's. 5    | 2                                | 16             | 17              |
| Applt's. 6    | 2                                | 16             | 17              |
| Applt's. 7    | 2                                | 16             | 17              |
| Applt's. 8    | 2                                | 16             | 17              |
| Applt's. 9    | 2                                | 16             | 17              |
| Applt's. 10   | 16                               | 16             | 17              |

